Portsmouth International Airport at Pease

Part 150 Update

2014 and 2019 NOISE EXPOSURE MAPS

HMMH Report No. 305310.000

July 2014

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CERTIFICATION

This is to certify the following:

(1) The revised Noise Exposure Maps, and associated documentation for Portsmouth International Airport at Pease submitted in this volume to the Federal Aviation Administration under Federal Aviation Regulations Part 150, Subpart B, Section 150.21, are true and complete.

(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 "2014 Existing Condition Noise Exposure Map" (Figure 4-1on page 39) accurately represents conditions for calendar year 2014.

(4) The "2019 Five-Year Forecast Condition Noise Exposure Map" (Figure 4-2 on page 41) accurately represents forecast conditions for calendar year 2019.

By: ______________________

Title: Executive Director

Date: 7/10/14

Airport Name: *Portsmouth International Airport at Pease*

Airport Owner/Operator: Pease Development Authority

Address: 55 International Drive Portsmouth, NH 03801

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LIST OF ACRONYMS USED IN THIS REPORT

Acronym	Full Definition	First Reference or Definition in Document
AC	[Federal Aviation Administration] Advisory Circular	Section 1.3
ATCT	Air Traffic Control Tower	Section 4.4.1
CAC	Citizens Advisory Committee	Section 2.4
CFR	Code of Federal Regulations	Footnote 2, Section 1
dB	Decibel	Section 2.1.1
dBA	A-Weighted Decibel	Section 2.1.2
DNL	Day Night Average Sound Level	Section 2.1.6
EPA	Environmental Protection Agency	Section 2.1.2
EPNdB	Effective Perceived Noise decibels	Section C.1
ESRI	Environmental Systems Research Institute	Section D.2
FAA	Federal Aviation Administration	Section 1
FAR	Federal Aviation Regulations	Section 1
FAR Part 36	Federal Aviation Regulation Part 36, "Noise Standards: Aircraft Type and Airworthiness Certification"	Appendix Section C.1
FAR Part 150	Federal Aviation Regulation Part 150, "Airport Noise Compatibility Planning"	Section 1.1
FAR Part 161	Federal Aviation Regulation Part 161, ""Notice and Approval of Noise and Access Restrictions"	Section 1
FICAN	Federal Interagency Committee on Aircraft Noise	Section 2.2.2
FICON	Federal Interagency Committee on Noise	Section 2.1.6
GIS	Geographic Information System	Appendix D
GNIS	Geographic Names Information System	Appendix Section D.2
GRE	Ground Run-up Enclosure	Section 3.1.7
HMMH	Harris Miller Miller & Hanson Inc.	Section 1
HTA	Hoyle, Tanner & Associates, Inc.	Section 4.4.5
ILS	Instrument Landing System	Section 3.1.5
INM	Integrated Noise Model	Section 2.3.2
Leq	Equivalent Sound Level	Section 2.1.5
Ldn or LDN	Day Night Average Sound Level (also DNL, as noted above)	Section 2.1.6
Lmax	Maximum A-Weighted Sound Level	Section 2.1.3
MSL	Mean Sea Level	Section 4.4.4
NEM	Noise Exposure Map	Section 1
NEPA	National Environmental Policy Act	Section 1.1.2
NCP	Noise Compatibility Program	Section 1
NHANG	New Hampshire Air National Guard	Section 3.1.10
NLR	Noise Level Reduction	Section 2.4
PDA	Pease Development Authority	Section 1.2.1
PSM	Portsmouth International Airport at Pease	Section 1
NCC	Noise Compatibility Committee	Section 3.3.4
NAD83	North American Datum 1983	Appendix D
SEL	Sound Exposure Level	Section 2.1.4
SID	Standard Instrument Departure	Section 3.1.3
ROA	Record of Approval	Section 3
SPL	Sound Pressure Level	Section 2.1
TAF	Terminal Area Forecast	Section 4.4.1
TFMSC	Traffic Flow Management System Counts	Section 4.4.1
VFR	Visual Flight Rules	Section 3.1.4

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1 INTRODUCTION

Part 150[1] of the Federal Aviation Regulations (FAR) "Airport Noise Compatibility Planning"[2] sets 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) the Noise Exposure Map (NEM) and (2) the Noise Compatibility Program (NCP).

The Pease Development Authority (PDA) has conducted one previous Part 150 study for Portsmouth International Airport at Pease (PSM), submitted in 1995.[3] The 1995 submission presented both the NEM and NCP elements. Appendix A presents the FAA acceptance of the NEMs from the federal register. Appendix B presents the FAA Record of Approval for the NCP.

In 2012, the PDA retained Harris Miller Miller & Hanson Inc. (HMMH), in association with Hoyle, Tanner & Associates (HTA), to prepare an update to NEMs from the original Part 150 Study. This document presents updated NEMs and related documentation for 2014 existing conditions and 2019 forecast conditions.

1.1 FAR 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 Noise Compatibility Program development with local land use officials and other interested parties
- Documenting the analytical process and development of the compatibility program
- Submitting documentation to the FAA
- FAA and public review processes
- FAA approval or disapproval of the submission

1.1.1 Noise Exposure Maps

The Noise Exposure Map documentation describes the airport layout and operation, aircraft-related noise exposure, land uses in the airport environs and the resulting noise/land use compatibility situation. The Noise Exposure Map documentation must address two time frames: (1) data

[1] All abbreviations and acronyms used in this document are listed in the "Table of Acronyms" on page xii.

[2] Codified as Title 14 Code of Federal Regulations (CFR) Part 150.

[3] Flight Transportation Associates, Inc., "Pease International Tradeport FAR Part 150 Airport Noise Compatibility Study," June 1995.

representing the year of submission (the "existing conditions") and (2) a forecast year that is at least five years following the year of submission (the "forecast conditions"). Part 150 requires more than simple "maps" to provide all the necessary information in a Noise Exposure Map. 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 Noise Exposure Map documentation includes graphic depiction of existing and future noise exposure resulting from aircraft operations and of land uses in the airport environs. The Noise Exposure Map documentation must describe the data collection and analysis undertaken in its development.

The anticipated year of submission for this update is 2014, with an existing conditions "map" for that year, and a five-year forecast case map for 2019. Chapter 4 presents the updated existing and forecast case Noise Exposure Maps, with the existing Noise Compatibility Program.

1.1.2 Noise Compatibility Program

The Noise Compatibility Program is essentially a list of the actions the airport proprietor proposes to undertake to minimize existing and future noise/land use incompatibilities. The Noise Compatibility Program 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 Noise Compatibility Program 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.

Note that this Part 150 NEM Update includes a review of the status of the approved elements of the existing NCP at PSM in section 3.

1.2 Project Roles and Responsibilities

Several groups were involved in the Part 150 update; primary groups included the PDA, the FAA, the New Hampshire Department of Transportation, and the consulting team.

1.2.1 Pease Development Authority (PDA)

As the airport operator, the PDA has overall responsibility for all Part 150 related actions at PSM. The PDA retained a team of consultants to conduct the technical work required to fulfill Part 150 analysis and documentation requirements, and to assist in public outreach and consultation.

1.2.2 Federal Aviation Administration

The FAA has the authority to review and accept the Noise Exposure Map submitted under Part 150. Their review encompasses all details of technical documentation. FAA involvement includes participation by staff from several agency offices.

On a regional level, the FAA's New England Regional Office will review Noise Exposure Map for compliance with Part 150, notify the PDA of their determinations, publish related notices in the Federal Register, and provide opportunity for public comment.

The Regional Office may solicit review and input on more complex technical, regulatory, legal, or other matters from FAA's Washington headquarters.

1.2.3 New Hampshire Department of Transportation

The New Hampshire Department of Transportation Bureau of Aeronautics works with aviation agencies at the Federal, State and local levels to preserve and promote a system of airports necessary to guarantee the future of air transportation in New Hampshire. The Bureau of Aeronautics was kept apprised of the progress of the NEM update and participated in the project initiation and the review of the draft NEM documentation.

1.2.4 Consulting Team

The consulting firm of Harris Miller Miller & Hanson Inc. (HMMH) was responsible for assembling the data necessary to compute noise contours for the NEMs, preparing the NEMs, completing the NEM documentation, and coordinating the public participation program. This work was completed with assistance and oversight by the prime contractor, Hoyle, Tanner & Associates (HTA).

1.3 FAA Noise Exposure Map Checklist

The FAA provides advice to airports and other interested parties to consider in preparing a Part 150 study, in Advisory Circular (AC) 150/5020, "Airport Noise and Land Use Compatibility Planning." The Advisory Circular includes checklists for FAA's internal use in reviewing Noise Exposure Map and Noise Compatibility Program submissions. The FAA prefers that Part 150 documentation include completed copies of the checklists. Table 1-1 presents a copy of the Noise Exposure Map checklist.

Table 1-1 Part 150 Noise Exposure Map Checklist

FAR PART 150 NOISE EXPOSURE MAP CHECKLIST-PART I			
Airport Name: Portsmouth International Airport at Pease	Reviewer:		
	Yes/No/ NA	Page/Other Reference	Notes/ Comments
I. IDENTIFICATION AND SUBMISSION OF MAP DOCUMENT			
A. Is this submittal appropriately identified as one of the following, submitted under Part 150:			
1. a Noise Exposure Map only	Yes	Section 1	As discussed, this document updates 1993-1994 and forecast scenario maps submitted in 1995.
2. a Noise Exposure Map and Noise Compatibility Program	No		
3. a revision to Noise Exposure Maps that have previously been determined by FAA to be in compliance with Part 150?	Yes		
B. Is the airport name and the qualified airport operator identified?	Yes	Certification, page iii	
C. Is there a dated cover letter from the airport operator which indicates the documents are submitted under Part 150 for appropriate FAA determinations?	Yes	Cover letter	
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?	Yes	Section 5	
B. Identification:			
1. Are the consulted parties identified?	Yes	Section 5	
2. Do they include all those required by 150.21(b) and 150.105(a)?	Yes	Section 5, Appendix E, and Appendix F	
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)?	Yes	Section 5 and Certification, page iii	
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 region?	Yes	Section 5 and Appendix G	
III. GENERAL REQUIREMENTS: (150.21)			
A. Are there two maps, each clearly labeled on the face with year (existing condition year and 5-year)?	Yes	Figure 4-1 and Figure 4-2	
B. Map currency:			
1. Does the existing condition map year match the year on the airport operator's submittal letter?	Yes	Figure 4-1	2014
2. Is the 5-year map based on reasonable forecasts and other planning assumptions and is it for the fifth calendar year after the year of submission?	Yes	Figure 4-2	2019
3. If the answer to 1 and 2 above is no, has the airport operator verified in writing that data in the documentation are representative of existing conditions and 5-year forecast conditions as of the date of submission?	NA	NA	
C. If the Noise Exposure Map and Noise Compatibility Program are submitted together:	NA	NA	

FAR PART 150 NOISE EXPOSURE MAP CHECKLIST-PART I			
Airport Name: Portsmouth International Airport at Pease	Reviewer:		
	Yes/No/ NA	Page/Other Reference	Notes/ Comments
1. Has the airport operator indicated whether the 5-year map is based on 5-year contours without the program vs. contours if the program is implemented?	NA	NA	Maps reflect implementation of the previously approved program, as discussed in Section 3.
2. If the five year map is based on program implementation:			
a. are the specific program measures which are reflected on the map identified?	NA	NA	
b. does the documentation specifically describe how these measures affect land use compatibilities depicted on the map?	NA	NA	
3. If the 5-year Noise Exposure Map does not incorporate program implementation, has the airport operator included an additional Noise Exposure Map for FAA determination after the program is approved which shows program implementation conditions and which is intended to replace the 5-year Noise Exposure Map as the new official 5-year map?	NA	NA	
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 be not be less than 1" to 2,000'), and is the scale indicated on the maps?	Yes	1" to 2,000'	
B. Is the quality of the graphics such that required information is clear and readable?	Yes	All official graphics.	
C. Depiction of the airport and its environs.			
1. Is the following graphically depicted to scale on both the existing condition and 5-year maps:	Yes	All official graphics.	
a. airport boundaries	Yes	All official graphics.	
b. runway configurations with runway and numbers	Yes	All official graphics.	
2. Does the depiction of the off-airport data include:			
a. a land use base map depicting streets and other identifiable geographic features	Yes	All official graphics.	
b. area within 65 DNL (or beyond, at local discretion.)	Yes	All official graphics.	60 DNL
c. clear delineation of geographic boundaries and the names of all jurisdictions with planning and land use control authority within the 65 DNL (or beyond, at local discretion).	Yes	All official graphics.	60 DNL
D. 1. Continuous contours for at least DNL 65, 70, and 75?	Yes	All official graphics.	Plus 60 DNL
2. Based on current airport and operational data for the existing condition year Noise Exposure Map, and forecast data for the 5-year Noise Exposure Map?	Yes	2014 - Figure 4-1, 2019 - Figure 4-2	
E. Flight tracks for the existing condition and 5-year forecast time frames (these may be on supplemental graphics which must use the same land use base map as the existing condition and 5-year Noise Exposure Map), which are numbered to correspond to accompanying narrative?	Yes	Figure 4-5 through Figure 4-10	A large scale graphic will be provided with the final submission to FAA.

FAR PART 150 NOISE EXPOSURE MAP CHECKLIST-PART I			
Airport Name: Portsmouth International Airport at Pease	Reviewer:		
	Yes/No/ NA	Page/Other Reference	Notes/ Comments
F. Locations of any noise monitoring sites (these may be on supplemental graphics which must use the same land use base map as the official Noise Exposure Maps)	NA		
G. Noncompatible land use identification:			
1. Are noncompatible land uses within at least the 65 DNL depicted on the maps?	Yes	2014 - Figure 4-1, 2019 - Figure 4-2	60 DNL
2. Are noise sensitive public buildings identified?			
3. Are the noncompatible uses and noise sensitive public buildings readily identifiable and explained on the map legend?			
4. Are compatible land uses, which would normally be considered noncompatible, explained in the accompanying narrative?	Yes	Section 4.1	Sound Insulation applied
V. NARRATIVE SUPPORT OF MAP DATA: [150.21(A), A150.1, A150.101, A150.103]			
A. 1. Are the technical data, including data sources, on which the Noise Exposure Maps are based, adequately described in the narrative?	Yes	Section 4.4	
2. Are the underlying technical data and planning assumptions reasonable?	Yes	Section 4.4	
B. Calculation of Noise Contours:			
1. Is the methodology indicated?	Yes	Section 4.4	INM 7.0d
a. is it FAA approved?	Yes	Section 4.4	
b. was the same model used for both maps?	Yes	Section 4.4	
c. has AEE approval been obtained for use of a model other than those with previous blanket FAA approval?	NA	NA	
2. Correct use of noise models:			
a. does the documentation indicate the airport operator has adjusted or calibrated FAA-approved noise models or substituted one aircraft type for another?	Yes	No calibration. Substitutions and user-defined profiles as discussed in Section 4.4.3 and further documented in Appendix A.	
b. if so, does this have written approval from AEE?	Yes		
3. If noise monitoring was used, does the narrative indicate that Part 150 guidelines were followed?	NA	NA.	
4. For noise contours below 65 DNL, does the supporting documentation include explanation of local reasons? (Narrative explanation is desirable but not required.)	Yes	Section 2.4	60 DNL depicted
C. Noncompatible Land Use Information:			
1. Does the narrative 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 5-year maps?	Yes		
2. Does the documentation indicate whether Table 1 of Part 150 was used by the airport operator?	Yes	Section 2.4	
a. If a local variation to Table 1 was used:			
(1) does the narrative clearly indicated which adjustments were made and the local reasons for doing so?	NA	NA	
(2) does the narrative include the airport operator's complete substitution for Table 1?	NA	NA	

FAR PART 150 NOISE EXPOSURE MAP CHECKLIST-PART I			
Airport Name: Portsmouth International Airport at Pease	Reviewer:		
	Yes/No/ NA	Page/Other Reference	Notes/ Comments
3. Does the narrative include information on self-generated or ambient noise where compatible/noncompatible land use identifications consider non-airport/aircraft sources?	NA	NA	
4. Where normally noncompatible land uses are not depicted as such on the Noise Exposure Maps, does the narrative satisfactorily explain why, with reference to the specific geographic areas?	Yes	Section 4.1	Sound Insulation applied
5. Does the narrative describe how forecasts will affect land use compatibility?	Yes	Section 4.3 and Table 4-1	
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?	Yes	Certification page iii	
B. Has the operator certified in writing that each map and description of consultation and opportunity for public comment are true and complete?	Yes	Certification page iii	

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2 INTRODUCTION TO NOISE TERMINOLOGY AND EVALUATION

Noise is a complex physical quantity. The properties, measurement, and presentation of noise involve specialized terminology that can be difficult to understand. Throughout the Part 150 update, we will use graphics and everyday comparisons to communicate noise-related quantities and effects in reasonably simple terms.

To provide a basic reference on these technical issues, this chapter introduces fundamentals of noise terminology (Section 2.1), the effects of noise on human activity (Section 2.2), weather and distance effects (Section 2.3), and Part 150 noise-land use compatibility guidelines (Section 2.4).

2.1 Introduction to Noise Terminology

Part 150 relies largely on a measure of cumulative noise exposure over an entire calendar year, in terms of a metric called the Day-Night Average Sound Level (DNL). However, DNL does not provide an adequate description of noise for many purposes. A variety of other measures is available to address essentially any issue of concern, including:

- Sound Pressure Level, SPL, and the Decibel, dB
- A-Weighted Decibel, dBA
- Maximum A-Weighted Sound Level, L_{max}
- Sound Exposure Level, SEL
- Equivalent A-Weighted Sound Level, L_{eq}
- Day-Night Average Sound Level, DNL

2.1.1 Sound Pressure Level, SPL, and the Decibel, dB

All sounds come from a sound source – a musical instrument, a voice speaking, an airplane passing overhead. It takes energy to produce sound. The sound energy produced by any sound source travels through the air in sound waves – tiny, quick oscillations of pressure just above and just below atmospheric pressure. The ear senses these pressure variations and – with much processing in our brain – translates them into "sound."

Our ears are sensitive to a wide range of sound pressures. The loudest sounds that we can hear without pain contain about one million times more energy than the quietest sounds we can detect. To allow us to perceive sound over this very wide range, our ear/brain "auditory system" compresses our response in a complex manner, represented by a term called sound pressure level (SPL), which we express in units called decibels (dB).

Mathematically, SPL is a logarithmic quantity based on the ratio of two sound pressures, the numerator being the pressure of the sound source of interest (P_{source}), and the denominator being a reference pressure ($P_{reference}$)[4]

$$\text{Sound Pressure Level (SPL)} = 20 * Log\left(\frac{P_{source}}{P_{reference}}\right) dB$$

[4] The reference pressure is approximately the quietest sound that a healthy young adult can hear.

The logarithmic conversion of sound pressure to SPL means that the quietest sound that we can hear (the reference pressure) has a sound pressure level of about 0 dB, while the loudest sounds that we hear without pain have sound pressure levels of about 120 dB. Most sounds in our day-to-day environment have sound pressure levels from about 40 to 100 dB.[5]

Because decibels are logarithmic quantities, we cannot use common arithmetic to combine them. For example, if two sound sources each produce 100 dB operating individually, when they operate simultaneously they produce 103 dB -- not the 200 dB we might expect. Increasing to four equal sources operating simultaneously will add another three decibels of noise, resulting in a total SPL of 106 dB. *For every doubling of the number of equal sources, the SPL goes up another three decibels.*

If one noise source is much louder than another is, the louder source "masks" the quieter one and the two sources together produce virtually the same SPL as the louder source alone. For example, a 100 dB and 80 dB sources produce approximately 100 dB of noise when operating together.

Two useful "rules of thumb" related to SPL are worth noting: (1) humans generally perceive a six to 10 dB increase in SPL to be about a doubling of loudness,[6] and (2) changes in SPL of less than about three decibels are not readily detectable outside of a laboratory environment.

2.1.2 A-Weighted Decibel

An important characteristic of sound is its frequency, or "pitch." This is the per-second oscillation rate of the sound pressure variation at our ear, expressed in units known as Hertz (Hz).

When analyzing the total noise of any source, acousticians often break the noise into frequency components (or bands) to consider the "low," "medium," and "high" frequency components. This breakdown is important for two reasons:

- Our ear is better equipped to hear mid and high frequencies and is least sensitive to lower frequencies. Thus, we find mid- and high-frequency noise more annoying.
- Engineering solutions to noise problems differ with frequency content. Low-frequency noise is generally harder to control.

The normal frequency range of hearing for most people extends from a low of about 20 Hz to a high of about 10,000 to 15,000 Hz. Most people respond to sound most readily when the predominant frequency is in the range of normal conversation – typically around 1,000 to 2,000 Hz. The acoustical community has defined several "filters," which approximate this sensitivity of our ear and thus, help us to judge the relative loudness of various sounds made up of many different frequencies.

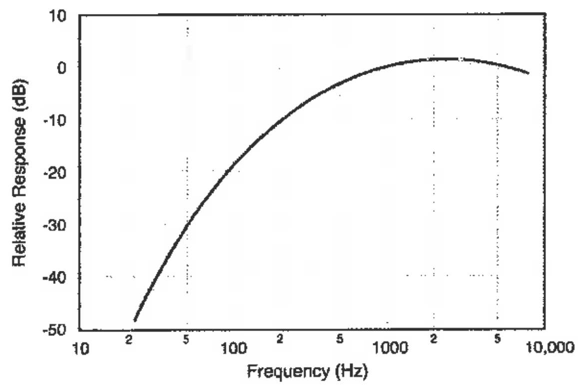
The so-called "A" filter ("A weighting") generally does the best job of matching human response to most environmental noise sources, including natural sounds and sound from common transportation sources. "A-weighted decibels" are abbreviated "dBA." Because of the correlation with our hearing, the U. S. Environmental Protection Agency (EPA) and nearly every other federal and state agency have adopted A-weighted decibels as the metric for use in describing environmental and

[5] The logarithmic ratio used in its calculation means that SPL changes relatively quickly at low sound pressures and more slowly at high pressures. This relationship matches human detection of changes in pressure. We are much more sensitive to changes in level when the SPL is low (for example, hearing a baby crying in a distant bedroom), than we are to changes in level when the SPL is high (for example, when listening to highly amplified music).

[6] A "10 dB per doubling" rule of thumb is the most often used approximation.

transportation noise. Figure 2-1 depicts A-weighting adjustments to sound from approximately 20 Hz to 10,000 Hz.

Figure 2-1 A-Weighting Frequency Response
Source: Extract from Harris, Cyril M., Editor, "Handbook of Acoustical Measurements and Control," McGraw-Hill, Inc., 1991, pg. 5.13; HMMH

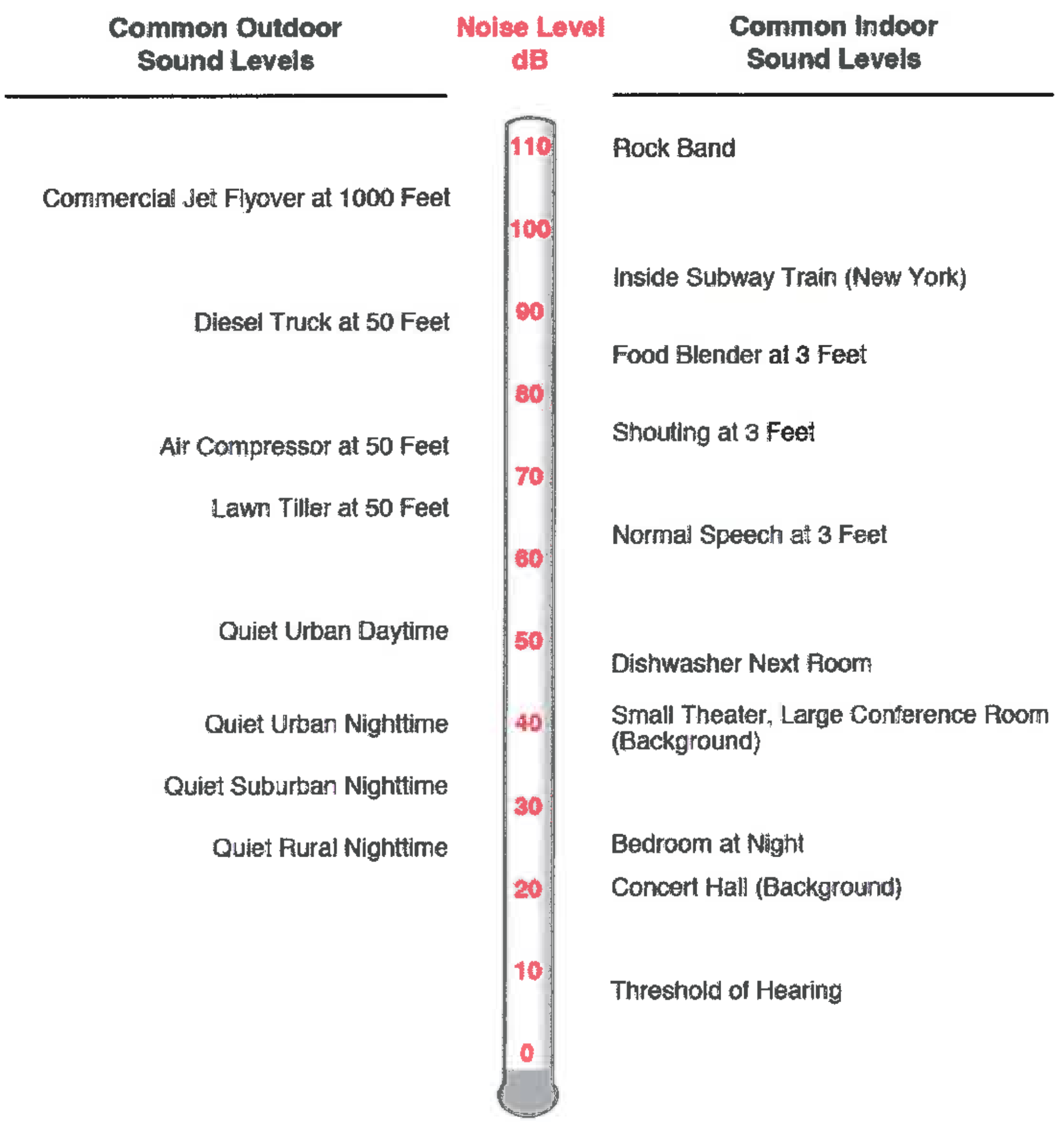


As the figure shows, A-weighting significantly de-emphasizes noise content at lower and higher frequencies where we do not hear as well, and has little effect, or is nearly "flat," in for mid-range frequencies between 1,000 and 5,000 Hz.

All sound pressure levels presented in this document are A-weighted unless otherwise specified.

Figure 2-2 depicts representative A-weighted sound levels for a variety of common sounds.

Figure 2-2 A-Weighted Sound Levels for Common Sounds

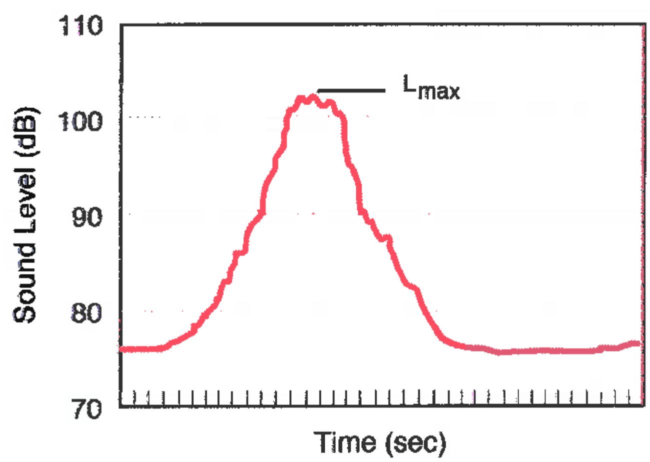


2.1.3 Maximum A-Weighted Sound Level, L_{max}

An additional dimension to environmental noise is that A-weighted levels vary with time. For example, the sound level increases as a car or aircraft approaches, then falls and blends into the background as the aircraft recedes into the distance. The background or "ambient" level continues to vary in the absence of a distinctive source, for example due to birds chirping, insects buzzing, leaves rustling, etc. It is often convenient to describe a particular noise "event" (such as a vehicle passing by, a dog barking, etc.) by its maximum sound level, abbreviated as L_{max}.

Figure 2-3 depicts this general concept, for a hypothetical noise event with an L_{max} of approximately 102 dB.

Figure 2-3 Variation in A-Weighted Sound Level over Time and Maximum Noise Level
Source: HMMH



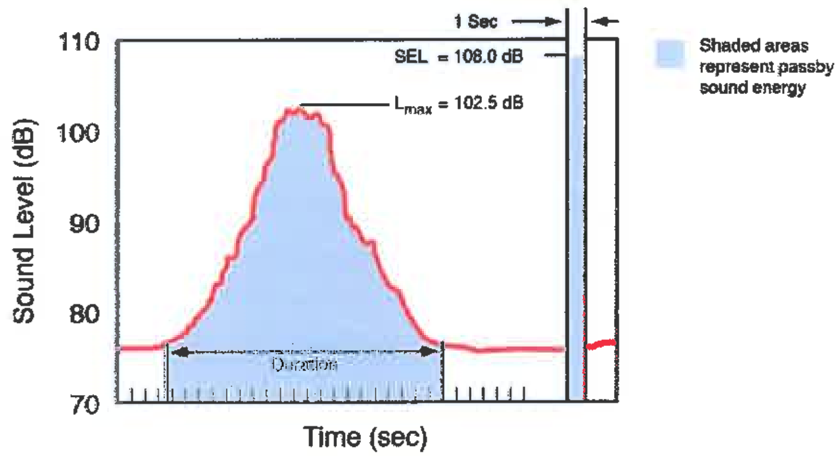
While the maximum level is easy to understand, it suffers from a serious drawback when used to describe the relative "noisiness" of an event such as an aircraft flyover; i.e., it describes only one dimension of the event and provides no information on the event's overall, or cumulative, noise exposure. In fact, two events with identical maximum levels may produce very different total exposures. One may be of very short duration, while the other may continue for an extended period and be judged much more annoying. The next section introduces a measure that accounts for this concept of a noise "dose," or the cumulative exposure associated with an individual "noise event" such as an aircraft flyover.

2.1.4 Sound Exposure Level, SEL

The most commonly used measure of cumulative noise exposure for an individual noise event, such as an aircraft flyover, is the Sound Exposure Level, or SEL. SEL is a summation of the A-weighted sound energy over the entire duration of a noise event. SEL expresses the accumulated energy in terms of the one-second-long steady-state sound level that would contain the same amount of energy as the actual time-varying level.

SEL provides a basis for comparing noise events that generally match our impression of their overall "noisiness," including the effects of both duration and level. The higher the SEL, the more annoying a noise event is likely to be. In simple terms, SEL "compresses" the energy for the noise event into a single second. Figure 2-4 depicts this compression, for the same hypothetical event shown in Figure 2-3. Note that the SEL is higher than the L_{max}.

Figure 2-4 Graphical Depiction of Sound Exposure Level
Source: HMMH



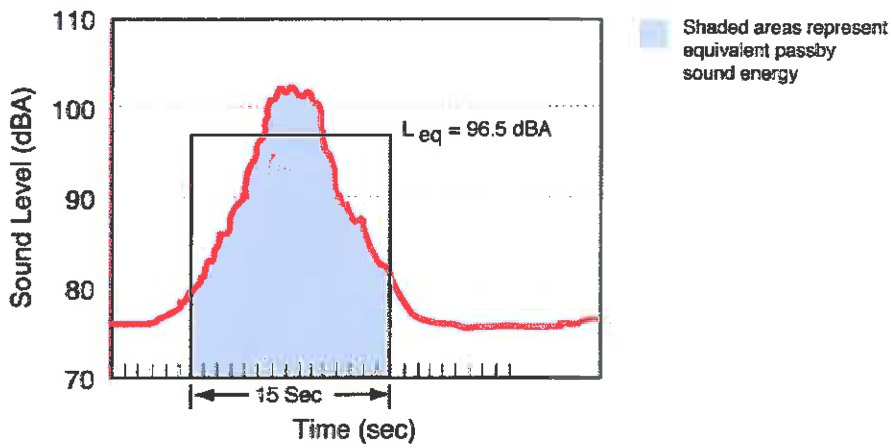
The "compression " of energy into one second means that a given noise event's SEL will almost always will be a higher value than its L_{max}. For most aircraft flyovers, SEL is roughly five to 12 dB higher than L_{max}. Adjustment for duration means that relatively slow and quiet propeller aircraft can have the same or higher SEL than faster, louder jets, which produce shorter duration events.

2.1.5 Equivalent A-Weighted Sound Level, L_{eq}

The Equivalent Sound Level, abbreviated L_{eq}, is a measure of the exposure resulting from the accumulation of sound levels over a particular period of interest; e.g., one hour, an eight-hour school day, nighttime, or a full 24-hour day. L_{eq} plots for consecutive hours can help illustrate how the noise dose rises and falls over a day or how a few loud aircraft significantly affect some hours.

L_{eq} may be thought of as the constant sound level over the period of interest that would contain as much sound energy as the actual varying level. It is a way of assigning a single number to a time-varying sound level. Figure 2-5 illustrates this concept for the same hypothetical event shown in Figure 2-3 and Figure 2-4. Note that the L_{eq} is lower than either the L_{max} or SEL.

Figure 2-5 Example of a 15-Second Equivalent Sound Level
Source: HMMH



2.1.6 Day-Night Average Sound Level, DNL or Ldn

Part 150 requires that airports use a measure of noise exposure that is slightly more complicated than L_{eq} to describe cumulative noise exposure – the Day-Night Average Sound Level, DNL.

The U.S. Environmental Protection Agency identified DNL as the most appropriate means of evaluating airport noise based on the following considerations.[7]

- The measure should be applicable to the evaluation of pervasive long-term noise in various defined areas and under various conditions over long periods.
- The measure should correlate well with known effects of the noise environment and on individuals and the public.
- The measure should be simple, practical, and accurate. In principal, it should be useful for planning as well as for enforcement or monitoring purposes.
- The required measurement equipment, with standard characteristics, should be commercially available.
- The measure should be closely related to existing methods currently in use.
- The single measure of noise at a given location should be predictable, within an acceptable tolerance, from knowledge of the physical events producing the noise.
- The measure should lend itself to small, simple monitors, which can be left unattended in public areas for long periods.

Most federal agencies dealing with noise have formally adopted DNL. The Federal Interagency Committee on Noise (FICON) reaffirmed the appropriateness of DNL in 1992. The FICON summary report stated; "There are no new descriptors or metrics of sufficient scientific standing to substitute for the present DNL cumulative noise exposure metric."

In simple terms, DNL is the 24-hour L_{eq} with one adjustment; all noises occurring at night (defined as 10 p.m. through 7 a.m.) are increased by 10 dB, to reflect the added intrusiveness of nighttime

[7] "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," U. S. EPA Report No. 550/9-74-004, March 1974.

noise events when background noise levels decrease. In calculating aircraft exposure, this 10 dB "penalty" is mathematically identical to counting each nighttime aircraft noise event ten times.

DNL can be measured or estimated. Measurements are practical only for obtaining DNL values for limited numbers of points, and, in the absence of a permanently installed monitoring system, only for relatively short periods. Most airport noise studies use computer-generated DNL estimates depicted as equal-exposure noise contours (much as topographic maps have contours of equal elevation). Part 150 *requires* that airports use computer-generated contours, as discussed in Section 4.3.

More specifically, Part 150 requires that Noise Exposure Maps depict the 65, 70, and 75 dB DNL contours for total annual operations for the existing and forecast conditions cases (2014 and 2019 in this study). The annual DNL is mathematically identical to the DNL for the average annual day; i.e., a day on which the number of operations is equal to the annual total divided by 365 (366 in a leap year).

Figure 2-6 graphically depicts the manner in which the nighttime adjustment applies in calculating DNL. Figure 2-7 presents representative outdoor DNL values measured at various U.S. locations.

Figure 2-6 Example of a Day-Night Average Sound Level Calculation
Source: HMMH

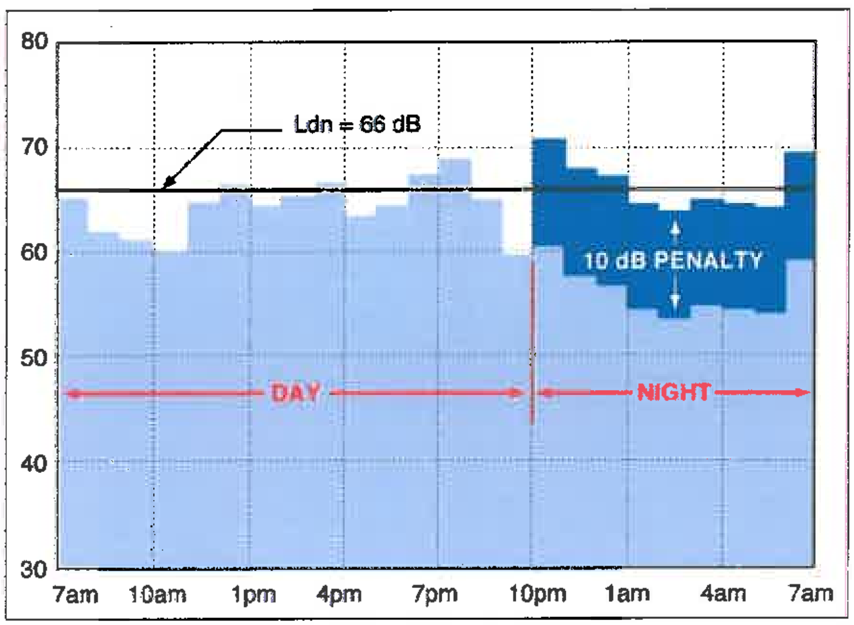
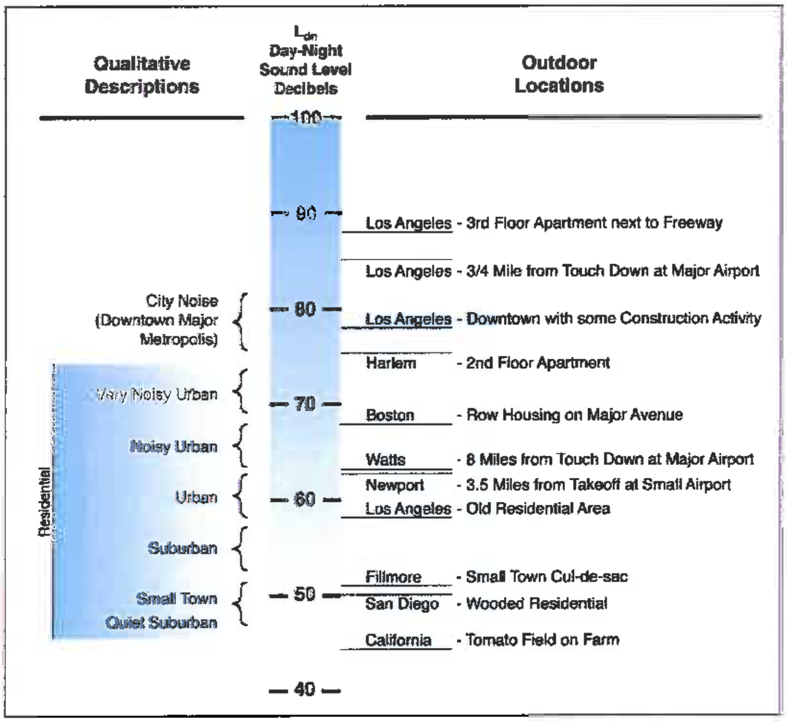


Figure 2-7 Examples of Measured Day-Night Average Sound Levels, DNL
Source: U.S. Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," March 1974, p.14.



2.2 Aircraft Noise Effects on Human Activity

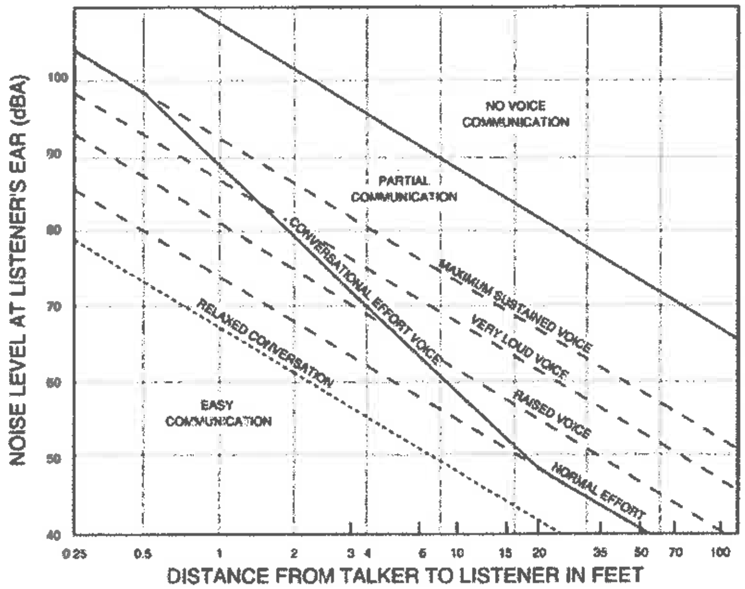
Aircraft noise can be an annoyance and a nuisance. It can interfere with conversation and listening to television, disrupt classroom activities in schools, and disrupt sleep. Relating these effects to specific noise metrics helps in the understanding of how and why people react to their environment.

2.2.1 Speech Interference

One potential effect of aircraft noise is its tendency to "mask" speech, making it difficult to carry on a normal conversation. The sound level of speech decreases as the distance between a talker and listener increases. As the background sound level increases, it becomes harder to hear speech.

Figure 2-8 presents typical distances between talker and listener for satisfactory outdoor conversations, in the presence of different steady A-weighted background noise levels for raised, normal, and relaxed voice effort. As the background level increases, the talker must raise his/her voice, or the individuals must get closer together to continue talking.

Figure 2-8 Outdoor Speech Intelligibility
Source: U.S. Environmental Protection Agency, "Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," March 1974, p.D-5.



Satisfactory conversation does not always require hearing every word; 95% intelligibility is acceptable for many conversations. In relaxed conversation, however, we have higher expectations of hearing speech and generally require closer to 100% intelligibility. Any combination of talker-listener distances and background noise that falls below the bottom line in the figure (which roughly represents the upper boundary of 100% intelligibility) represents an ideal environment for outdoor speech communication. Indoor communication is generally acceptable in this region as well.

One implication of the relationships in Figure 2-8 is that for typical communication distances of three or four feet, acceptable outdoor conversations can be carried on in a normal voice as long as the background noise outdoors is less than about 65 dB. If the noise exceeds this level, as might occur when an aircraft passes overhead, intelligibility would be lost unless vocal effort were increased or communication distance were decreased.

Indoors, typical distances, voice levels, and intelligibility expectations generally require a background level less than 45 dB. With windows partly open, housing generally provides about 10 to 15 dB of interior-to-exterior noise level reduction. Thus, if the outdoor sound level is 60 dB or less, there a reasonable chance that the resulting indoor sound level will afford acceptable interior conversation. With windows closed, 24 dB of attenuation is typical.

2.2.2 Sleep Interference

Research on sleep disruption from noise has led to widely varying observations. In part, this is because (1) sleep can be disturbed without awakening, (2) the deeper the sleep the more noise it takes to cause arousal, (3) the tendency to awaken increases with age, and other factors. Figure 2-9 shows a recent summary of findings on the topic.

Figure 2-9 Sleep Interference
Source: Federal Interagency Committee on Aircraft Noise (FICAN), "Effects of Aviation Noise on Awakenings from Sleep," June 1997, pg. 6

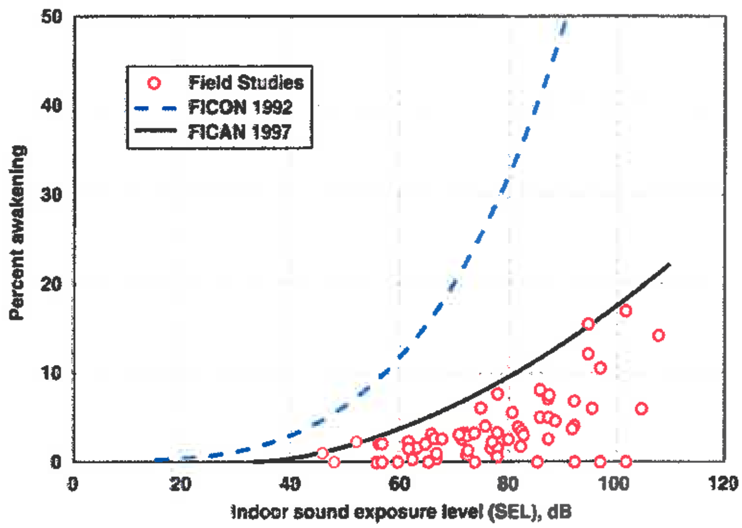


Figure 2-9 uses indoor SEL as the measure of noise exposure; current research supports the use of this metric in assessing sleep disruption. An indoor SEL of 80 dBA results in a maximum of 10% awakening.[8]

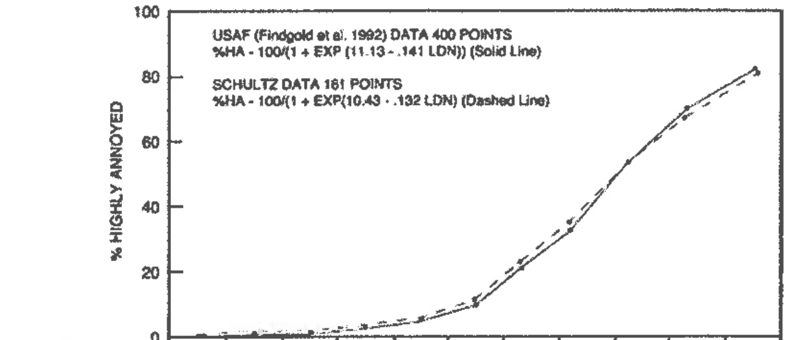
2.2.3 Community Annoyance

Numerous psychoacoustic surveys provide substantial evidence that individual reactions to noise vary widely with noise exposure level. Since the early 1970s, researchers have determined (and subsequently confirmed) that aggregate community response is generally predictable and relates reasonably well to cumulative noise exposure such as DNL. Figure 2-10 depicts the widely recognized relationship between environmental noise and the percentage of people "highly annoyed," with annoyance being the key indicator of community response usually cited in this body of research.

[8] The awakening data presented in Figure 2-9 apply only to individual noise events. The American National Standards Institute (ANSI) has published a standard that provides a method for estimating the number of people awakened at least once from a full night of noise events: ANSI/ASA S12.9-2008 / Part 6, "Quantities and Procedures for Description and Measurement of Environmental Sound – Part 6: Methods for Estimation of Awakenings Associated with Outdoor Noise Events Heard in Homes." This method can use the information on single events computed by a program such as the FAA's Integrated Noise Model, to compute awakenings.

Figure 2-10 Percentage of People Highly Annoyed

Source: FICON, "Federal Agency Review of Selected Airport Noise Analysis Issues," September 1992

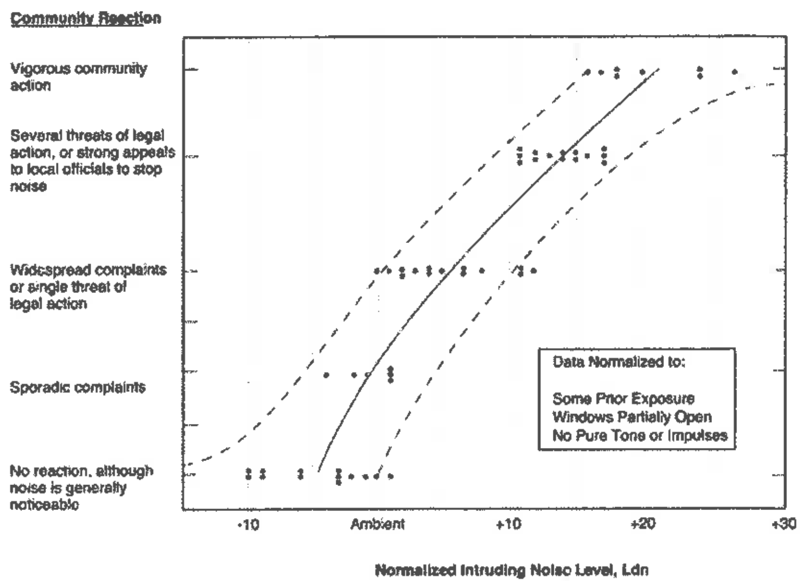


	Day - Night Average Sound Level in dB	40	45	50	55	60	65	70	75	80	85	100
Calculated %HA Points	USAF	0.41	0.831	1.66	3.31	6.48	12.29	22.1	36.47	53.74	70.16	82.64
	SCHULTZ	0.576	1.11	2.12	4.03	7.52	13.59	23.32	37.05	53.25	68.78	81

Separate work by the EPA has shown that overall community reaction to a noise environment is also dependent on DNL. Figure 2-11 depicts this relationship.

Figure 2-11 Community Reaction as a Function of Outdoor DNL

Source: Wyle Laboratories, Community Noise, prepared for the U.S. Environmental Protection Agency, Office of Noise Abatement and Control, Washington, D.C., December 1971, pg. 63



Data summarized in the figure suggest that little reaction would be expected for intrusive noise levels five decibels below the ambient, while widespread complaints can be expected as intruding noise exceeds background levels by about five decibels. Vigorous action is likely when levels exceed the background by 20 dB.

2.3 Effects of Weather and Distance

Participants in airport noise studies often express interest in two sound-propagation issues: (1) weather and (2) source-to-listener distance.

2.3.1 Weather-Related Effects

Weather (or atmospheric) conditions that can influence the propagation of sound include humidity, precipitation, temperature, wind, and turbulence (or gustiness). The effect of wind – turbulence in particular – is generally more important than the effects of other factors. Under calm-wind conditions, the importance of temperature (in particular vertical "gradients") can increase, sometimes to very significant levels. Humidity generally has little significance relative to the other effects.

Influence of Humidity and Precipitation

Humidity and precipitation rarely effect sound propagation in a significant manner. Humidity can reduce propagation of high-frequency noise under calm-wind conditions. In very cold conditions, listeners often observe that aircraft sound "tinny," because the dry air increases the propagation of high-frequency sound. Rain, snow, and fog also have little, if any noticeable effect on sound propagation. A substantial body of empirical data supports these conclusions.[9]

Influence of Temperature

The velocity of sound in the atmosphere is dependent on the air temperature.[10] As a result, if the temperature varies at different heights above the ground, sound will travel in curved paths rather than straight lines. During the day, temperature normally decreases with increasing height. Under such "temperature lapse" conditions, the atmosphere refracts ("bends") sound waves upwards and an acoustical shadow zone may exist at some distance from the noise source.

Under some weather conditions, an upper level of warmer air may trap a lower layer of cool air. Such a "temperature inversion" is most common in the evening, at night, and early in the morning when heat absorbed by the ground during the day radiates into the atmosphere.[11] The effect of an inversion is just the opposite of lapse conditions. It causes sound propagating through the atmosphere to refract downward.

The downward refraction caused by temperature inversions often allows sound rays with originally upward-sloping paths to bypass obstructions and ground effects, increasing noise levels at greater distances. This type of effect is most prevalent at night, when temperature inversions are most common and when wind levels often are very low, limiting any confounding factors.[12] Under extreme conditions, one study found that noise from ground-borne aircraft might be amplified 15 to 20 dB by a temperature inversion. In a similar study, noise caused by an aircraft on the ground

[9]Ingard, Uno. "A Review of the Influence of Meteorological Conditions on Sound Propagation," *Journal of the Acoustical Society of America*, Vol. 25, No. 3, May 1953, p. 407.

[10]In dry air, the approximate velocity of sound can be obtained from the relationship:

$c = 331 + 0.6T_c$ (c in meters per second, T_c in degrees Celsius). Pierce, Allan D., *Acoustics: An Introduction to its Physical Principles and Applications.* McGraw-Hill. 1981. p. 29.

[11]Embleton, T.F.W., G.J. Thiessen, and J.E. Piercy, "Propagation in an inversion and reflections at the ground," *Journal of the Acoustical Society of America*, Vol. 59, No. 2, February 1976, p. 278.

[12]Ingard, p. 407.

registered a higher level at an observer location 1.8 miles away than at a second observer location only 0.2 miles from the aircraft[13].

Influence of Wind

Wind has a strong directional component that can lead to significant variation in propagation. In general, receivers that are downwind of a source will experience higher sound levels, and those that are upwind will experience lower sound levels. Wind perpendicular to the source-to-receiver path has no significant effect.

The refraction caused by wind direction and temperature gradients is additive.[14] One study suggests that for frequencies greater than 500 Hz, the combined effects of these two factors tends towards two extreme values: approximately 0 dB in conditions of downward refraction (temperature inversion or downwind propagation) and -20 dB in upward refraction conditions (temperature lapse or upwind propagation). At lower frequencies, the effects of refraction due to wind and temperature gradients are less pronounced[15].

Wind turbulence (or "gustiness") can also affect sound propagation. Sound levels heard at remote receiver locations will fluctuate with gustiness. In addition, gustiness can cause considerable attenuation of sound due to effects of eddies traveling with the wind. Attenuation due to eddies is essentially the same in all directions, with or against the flow of the wind, and can mask the refractive effects discussed above.[16]

2.3.2 Distance-Related Effects

People often ask how distance from an aircraft to a listener affects sound levels. Changes in distance may be associated with varying terrain, offsets to the side of a flight path, or aircraft altitude. The answer is a bit complex, because distance affects the propagation of sound in several ways.

The principal effect results from the fact that any emitted sound expands in a spherical fashion – like a balloon – as the distance from the source increases, resulting in the sound energy being spread out over a larger volume. With each doubling of distance, spherical spreading reduces instantaneous or maximum level by approximately six decibels, and SEL by approximately three decibels.

"Atmospheric absorption" is a secondary effect. As an overall example, increasing the aircraft-to-listener distance from 2,000' to 3,000' could produce reductions of about four to five decibels for instantaneous or maximum levels, and of about two to four decibels for SEL, under average annual weather conditions. This absorption effect drops off relatively rapidly with distance. The Integrated Noise Model (INM) takes these reductions into account.

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[13]Dickinson, P.J., "Temperature Inversion Effects on Aircraft Noise Propagation," (Letters to the Editor) *Journal of Sound and Vibration.* Vol. 47, No. 3, 1976, p. 442.

[14]Piercy and Embleton, p. 1412. Note, in addition, that as a result of the scalar nature of temperature and the vector nature of wind, the following is true: under lapse conditions, the refractive effects of wind and temperature add in the upwind direction and cancel each other in the downwind direction. Under inversion conditions, the opposite is true.

[15]Piercy and Embleton, p. 1413.

[16]Ingard, pp. 409-410.

2.4 Noise / Land Use Compatibility Guidelines

DNL estimates have two principal uses in a Part 150 study:

1. Provide a basis for comparing existing noise conditions to the effects of noise abatement procedures and/or forecast changes in airport activity.
2. Provide a quantitative basis for identifying potential noise impacts.

Both of these functions require the application of objective criteria for evaluating noise impacts. FAR Part 150 Appendix A provides land use compatibility guidelines as a function of DNL values. Table 2-1 reproduces those guidelines.

For the 1995 Part 150 study, the PDA appointed a 43-member Citizen's Advisory Committee (CAC) to represent the interests of the local communities, airport users, the PDA, and other concerned parties. The CAC reviewed the FAA's land use compatibility guidelines and were asked to consider specific land uses in their communities and how they were addressed by the guidelines. Based on the review of the FAA's guidelines, discussions about local conditions, and examination of other Part 150 studies in New Hampshire, the CAC identified noise sensitive uses to include residences, schools, places of worship, hospitals, and nursing homes. The CAC recommended 60 dB DNL as the threshold for compatibility for noise sensitive uses around PSM. Additionally, the 55 dB DNL contour was displayed on all noise contour figures for informational purposes. The 60 dB DNL compatibility threshold is lower than the 65 dB DNL guideline provided in FAR Part 150 and has not been formally adopted in local land use planning regulations. For disclosure purposes and consistent with the CAC recommendations for the 1995 NEM for PSM, figures and tables in this document will display tabulate land uses and noise sensitive locations within the 60 dB DNL contours.

Table 2-1 FAR Part 150 Noise / Land Use Compatibility Guidelines

Source: FAR Part 150, Appendix A, Table 1

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

Key to Table 2-1

SLCUM:	Standard Land Use Coding Manual.
Y(Yes):	Land use and related structures compatible without restrictions.
N(No):	Land use and related structures are not compatible and should be prohibited.
NLR:	Noise Level Reduction (outdoor to indoor) to be achieved through incorporation of noise attenuation into the design and construction of the structure.
25, 30, or 35:	Land use and related structures generally compatible; measures to achieve NLR of 25, 30, or 35 dBA must be incorporated into design and construction of structure.

Notes for Table 2-1

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

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

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

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

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

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

(6) Residential buildings require an NLR of 25.

(7) Residential buildings require an NLR of 30

(8) Residential buildings not permitted.

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3 EXISTING NOISE COMPATIBILITY PROGRAM

This Part 150 Update builds on the previous noise compatibility planning at Portsmouth International Airport at Pease. The airport's existing Noise Compatibility Program includes 23 FAA-approved measures, based on PDA's Part 150 Update submission in 1995. Appendix A presents a copy of the FAA's February 9, 1996 Record of Approval (ROA) for this submission.

The existing NCP includes a mix of noise abatement, land use management, and noise program management elements. The following sections describe each element in the order that they are presented in the FAA's 1996 ROA.

3.1 Noise Abatement

3.1.1 Preferential Runway System

Recommendation: Runway 34 will be designated as the preferential runway so long as the tailwind component does not exceed 5 knots.

FAA Approval: Approved as Voluntary.

Status: Completed. This measure is implemented through a letter of agreement between the PDA and the Air National Guard contracted control tower. It is also published in the Airport Remarks section for PSM in the FAA's Airport/Facility Directory. Runway 34 is the dominant runway for daytime arrivals and departures with 65% of all daytime operations.

3.1.2 Nighttime Runway Use System

Recommendation: During the nighttime hours (10:00 pm to 6:59 am), Runway 16 will be designated as the preferential runway for takeoffs and runway 34 will be designated as the preferential runway for landings, so long as the tailwind component does not exceed 5 knots on either runway and the ceiling and visibility are not below the minima for visual approaches.

FAA Approval: Approved as Voluntary.

Status: Completed. This measure is implemented through a letter of agreement between the PDA and the Air National Guard contracted control tower. It is also published in the Airport Remarks section for PSM in the FAA's Airport/Facility Directory. As in the daytime, Runway 34 is the dominant runway for arrivals at night with 65% of all operations. Runway 16 is utilized for departures at nighttime at a higher rate than during the daytime with 50% of nighttime departures.

3.1.3 Noise Abatement Flight Tracks

Recommendation: Standard departure procedures would be established for both visual and instrument meteorological conditions as follows: (1) departures from Runway 16 to the south, west, and northwest via Lawrence (LWM), Concord (CON) or Montpelier (MPV) would maintain runway heading until passing 1.5 DME from the Pease VOR/DME, then turn right to overfly Interstate Highway 95 on a magnetic heading of 220 degrees until reaching an altitude of 3000 feet MSL or until passing 5.0 DME from the Pease VOR/DME; (2) departures from Runway 16 to the northeast via Kennebunk (ENE) would climb on runway heading until reaching an altitude of 3000 feet MSL;

(3) west and southbound departures from Runway 34 would climb on runway heading until reaching an altitude of 2000 feet MSL.

FAA Approval: Approved as Voluntary.

Status: Completed. Aircraft departing Runway 16 using the PEASE TWO Standard Instrument Departure (SID) comply with the instructions in item (1) above. Aircraft departing on either Runway 16 or Runway 34 using the TANKER ONE SID climb to 3000 feet MSL before initiating turns, thus complying with items (2) and (3) above.

3.1.4 Descent Profile

Recommendation: Visual Flight Rules (VFR) aircraft arriving from the north or east to Runway 34 would be directed to enter a 2-mile final approach at or above 700 feet MSL, traffic permitting.

FAA Approval: Approved.

Status: Completed. This measure is published for both runway ends in the Airport Remarks section for PSM in the FAA's Airport/Facility Directory

3.1.5 NAVAID Improvements

Recommendation: The PDA would support existing FAA plans to install an Instrument Landing System (ILS) on Runway 16.

FAA Approval: Approved.

Status: Completed. A glide slope and an Instrument Landing System (ILS) localizer for Runway 16 were commissioned on September 30, 1998.

3.1.6 Run-up Areas

PDA will work with tenants to establish the location of preferred maintenance run-up areas.

FAA Approval: Approved.

Status: Completed. Tenants are to call Operations prior to a run-up to determine the location and direction an aircraft should be facing. Operators of non-military aircraft with wingspans of 118 ft. or less are directed to use PSM's Ground Run-Up Enclosure (discussed in section 3.1.7) unless the aircraft type or situation is specifically excluded in the ground run-up procedures handbook.

3.1.7 Noise Barrier

Recommendation: An optimum noise barrier for ground engine run-ups would be placed on the apron in the vicinity of the large maintenance hangar. Design of the barrier would be reviewed by a Noise Compatibility Committee prior to approval.

FAA Approval: Approved.

Status: Completed. A Ground Run-Up Enclosure (GRE) was constructed in 1995 and is still in use.

3.1.8 Design and Placement of Structures

PDA would ensure that future building projects occurring near the airport apron consider the potential use of the buildings as noise barriers for aircraft taxiing and run-up operations. This would be implemented through site plan review and airport master planning.

FAA Approval: Approved.

Status: Continuing. Prior to any airfield construction, the PDA Engineering Department reviews ways of mitigating ground noise in the design phase of the project.

3.1.9 Limitations on Types of Aircraft

Recommendation: The PDA would negotiate voluntary nighttime restrictions on aircraft having a departure Lmax which exceeds 85 dBA as specified in FAA Advisory Circular AC-36-3F (or subsequent revisions).

FAA Approval: Approved in concept.

Status: This recommendation targeted the loudest aircraft in the fleet at the time of the 1995 Part 150 Study. In the interim between that report and this time, three changes have occurred which have resulted or will result in the elimination of many of the loudest aircraft in the fleet. The Airport Noise and Capacity Act of 1990 required the phase out of civil operations by Stage 2 jet aircraft weighting 75,000 pounds or more at the end of 1999. A similar phase out for jets weighing less than 75,000 pounds will occur at the end of 2015. Additionally, all new aircraft designs approved by the FAA starting in 2006 must meet Stage 4 standards. Appendix C provides additional details on aircraft noise stage classifications and the phase outs described above.

3.1.10 Restrictions on Aircraft Run-ups

Recommendation: This PDA should complete the development of regulations governing ground run-up operations of aircraft.

FAA Approval: Approved in part: disapproved in part pending submission of sufficient information to make an informed analysis. Approved with respect to establishing in airport rules the location of runups.

Status: Completed. The PDA's Voluntary Noise Mitigation Procedures state that maintenance ground run-ups of aircraft engines are permitted only in locations approved by the Airport Management. The New Hampshire Air National Guard (NHANG) calls Operations with location of run-up, the number of engines being tested, time test will take and what power the engines will be tested. Tenants call Operations to use the GRE and it is recorded in a log. If the GRE is closed, Operations checks weather conditions and determines a place for the aircraft to run-up which will have the least impact on the surrounding community.

3.1.11 Study Mandatory Access Restrictions

Recommendation: The PDA shall study and consider mandatory use restrictions.

FAA Approval: Approved for study.

Status: Completed. The PDA analyzed the possibility of mandatory use restrictions through a Part 161 study. The PDA submitted the completed study documentation to the FAA. The Part 161 was terminated after the FAA determined that the proposed restriction would be discriminatory.

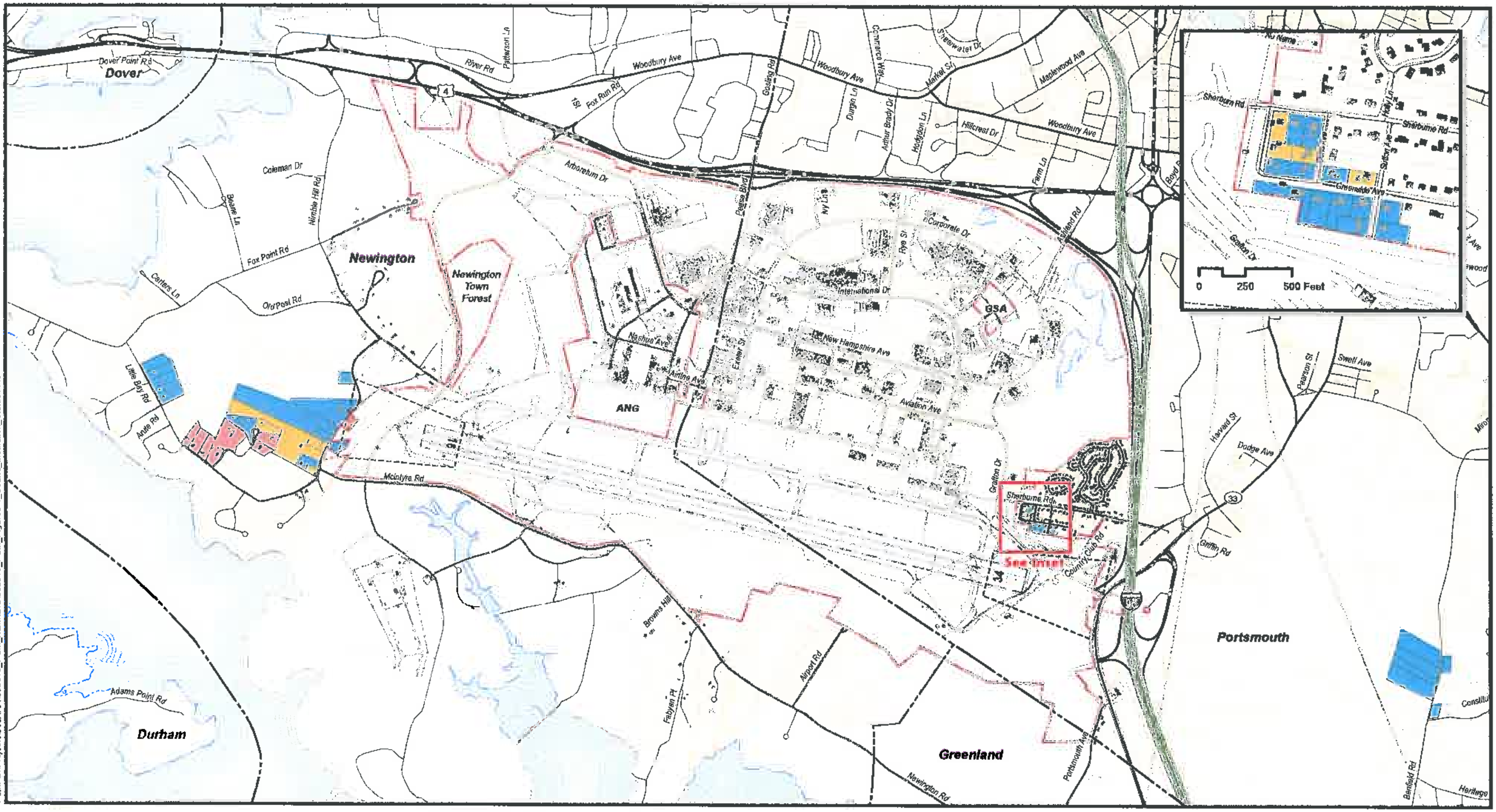
3.2 Land Use Management

3.2.1 Remedial Sound Insulation

Recommendation: The PDA would offer a sound insulation option to existing dwellings (and one church) in Newington and Portsmouth, where such structures are exposed to 65 DNL or greater under the abated 1993-1994 Base Case.

FAA Approval: Approved.

Status: Completed. The PDA began a four-phase program starting in 2003 and ending in 2010. In total, 31 residences and one church were sound insulated during the program. Eight additional residences were eligible, but inclusion in the sound insulation program was declined by the homeowner. Figure 3-1 displays a map of the sound insulated properties.



Airport Boundary (Approximate)
Municipal Boundary
Sound Insulation Status
Completed (32 Structures)
Eligible, Declined (8 Structures)
Not Eligible (8 Structures)
Parcel Boundary
Highway
Major Roads
Local Roads
Railroad
Water

0 2,000 4,000 Feet

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Portsmouth, New Hampshire

Status of Residential Sound Insulation Program

Figure 3-1

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3.2.2 Fee-Simple Purchase for Compatible Use

Recommendation: The PDA would offer to purchase, on a voluntary basis, existing dwellings in Newington and Portsmouth which are exposed to 65 DNL or greater under the abated 1993-94 Base Case, as well as undeveloped, residentially-zoned land in Newington which would be exposed to 65 DNL or greater as depicted in the 1995 NCP Scenario A with noise abatement, including aircraft access restrictions.

FAA Approval: Approved.

Status: The PDA focused noise mitigation resources on the sound insulation program as discussed in section 3.2.1

3.2.3 Sales Assurance

Recommendation: For owners of existing, remaining dwellings exposed to 60-65 DNL the PDA would offer to guarantee the sale of a home at fair market value, as funding permits.

FAA Approval: Approved.

Status: The PDA focused noise mitigation resources on the sound insulation program as discussed in section 3.2.1

3.2.4 Construction Standards

Recommendation: The PDA would request that the Town of Newington enact mandatory sound-insulation performance standards for construction of future noise-sensitive structures within the 60 DNL noise exposure contour. The PDA would adopt similar standards for development within the PDA's jurisdiction.

FAA Approval: Approved.

Status: Representatives selected by the Town of Newington were active members of the Part 150 Study Committee and subsequently the approved program was submitted to the Town of Newington. The Town of Newington and the PDA have not enacted mandatory standards for future construction.

3.2.5 Construction Guidance

Recommendation: The PDA would request Greenland, Newington, Portsmouth, and Rye provide advisory sound-insulation performance guidelines for construction of future noise-sensitive structures exposed to noise levels of 55-60 DNL (55 DNL and above in Portsmouth). Newington and Portsmouth would be requested to provide such guidance for construction of future public-oriented, commercial, and industrial structures to be exposed to 60 DNL and greater. The PDA would adopt similar guidelines for future development within the PDA's jurisdiction.

FAA Approval: Approved.

Status: The PDA has recommended guideline procedures to neighboring communities, but to-date none have zoned as recommended.

3.2.6 Subdivision and Site Review Regulations

Recommendation: The PDA would request that Newington and Portsmouth amend their development review regulations to address compatibility of future land uses with Pease operations. The PDA would adopt similar provisions in its own land use and development regulations.

FAA Approval: Approved.

Status: The PDA has recommended the Towns of Newington and Portsmouth amend their development review regulations. Newington, Portsmouth, and the PDA all have airport districts identified on their zoning maps with land use controls which consider compatibility with the airport in delineating land use zones.

3.2.7 Master Planning/Capital Improvements Programming

Recommendation: The PDA would request that Greenland, Newington, Portsmouth, and Rye review community master plans and capital improvement programs in order to advance policies encouraging compatibility between their land uses and Pease operations. The PDA would, as necessary, adopt similar policies in its own master plan and capital improvement programs.

FAA Approval: Approved.

Status: The PDA has requested the review by the neighboring communities.

3.3 Noise Program Management

3.3.1 Noise Monitoring Equipment

Recommendation: The PDA should establish a noise monitoring program utilizing two portable sound monitoring units.

FAA Approval: Approved.

Status: Completed. The PDA purchased two portable Larson Davis noise monitoring devices in 1995 and four with an FAA Grant in 2006. The PDA conducts noise monitoring when determined to be effective. The PDA maintains records of prior measurements that allow the recognition of any reoccurring issues.

3.3.2 User Education

Recommendation: The PDA would undertake an on-going user education program to establish and maintain an awareness of the noise abatement programs at the airport.

FAA Approval: Approved.

Status: Continuing. The PDA has bi-annual Airport Users Group meetings which maintain awareness of the noise abatement program at the airport.

3.3.3 Citizen Complaint Mechanism

Recommendation: The PDA shall continue to operate the noise complaint system for recording, researching, and reporting on citizen complaints about aircraft noise.

FAA Approval: Approved.

Status: Continuing. The PDA continues to accept and respond to noise complaints. Currently, complaints can be made at Flyportsmouthairport.com or by calling the PDA's dedicated noise line at (603)436-6333.

3.3.4 Community Participation Program

Recommendation: The PDA shall establish a permanent Noise Compatibility Committee (NCC) to monitor implementation of the Part 150 study and ensure ongoing community participation in the implementation process.

FAA Approval: Approved.

Status: Completed. The PDA established an NCC in 1995. The NCC currently meets every four months.

3.3.5 Public Outreach Program

Recommendation: The PDA should periodically issue a newsletter on the Pease Noise Compatibility Plan. A PDA staff person should be designated as a resource and point of contact for municipalities, realtors, and the general public on noise-compatibility matters.

FAA Approval: Approved.

Status: Ongoing. The PDA's Community Liaison serves as a point of contact for the surrounding communities on noise-compatibility matters. The PDA does not issue periodic newsletters due to very little activity.

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4 UPDATED EXISTING AND FORECAST CONDITIONS NOISE EXPOSURE MAPS WITH EXISTING NOISE COMPATIBILITY PROGRAM

The fundamental noise elements of an Noise Exposure Map are DNL contours for existing and forecast conditions (2014 and 2019 in this update), 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.

Section 4.1 presents the official 2014 and 2019 Noise Exposure Map contour graphics. For historical perspective, Section 4.2 compares the 2014 Existing Conditions contours to the 1993-94 Base Case contours from the previous FAA-accepted Noise Exposure Map (June 1995).

Section 4.3 presents land use compatibility statistics for the official 2014 and 2019 Noise Exposure Maps.

4.1 2014 and 2019 Noise Exposure Maps

Figure 4-1 presents the existing conditions Noise Exposure Map for 2014 operations. Figure 4-2 presents the five-year forecast conditions Noise Exposure Map for 2019 operations. These are the official Noise Exposure Maps that the PDA is submitting under Part 150 for appropriate FAA review and determination of compliance, pursuant to §150.21(c).

The figures present noise contours for 2014 and 2019 annual-average-day operations on a map depicting land uses, in generalized Part 150 land use categories. The land uses are colored on a parcel-by-parcel basis within the contours, based on detailed field verification.[17] Consistent with Part 150 requirements, the figures also depict airport, municipal, and county boundaries, and discrete sensitive receptors (e.g., schools and houses of worship).

The noise sensitive locations as defined by the CAC (see Section 2.4) are residences, schools, hospitals, nursing homes, and places of worship. Figure 4-1 shows that there are areas of both compatible and non-compatible residential land use within the 60 dB DNL contour. The compatible areas are due to the PDA's sound insulation program discussed in Section 3.2.1. Apart from residential land use there is a single noise sensitive location within the 60 dB DNL contour, the Apostolic Church of Jesus Christ in Portsmouth. This church has been sound insulated. Therefore, the only non-compatible land uses within the 60 dB DNL contour are non-sound insulated residences.

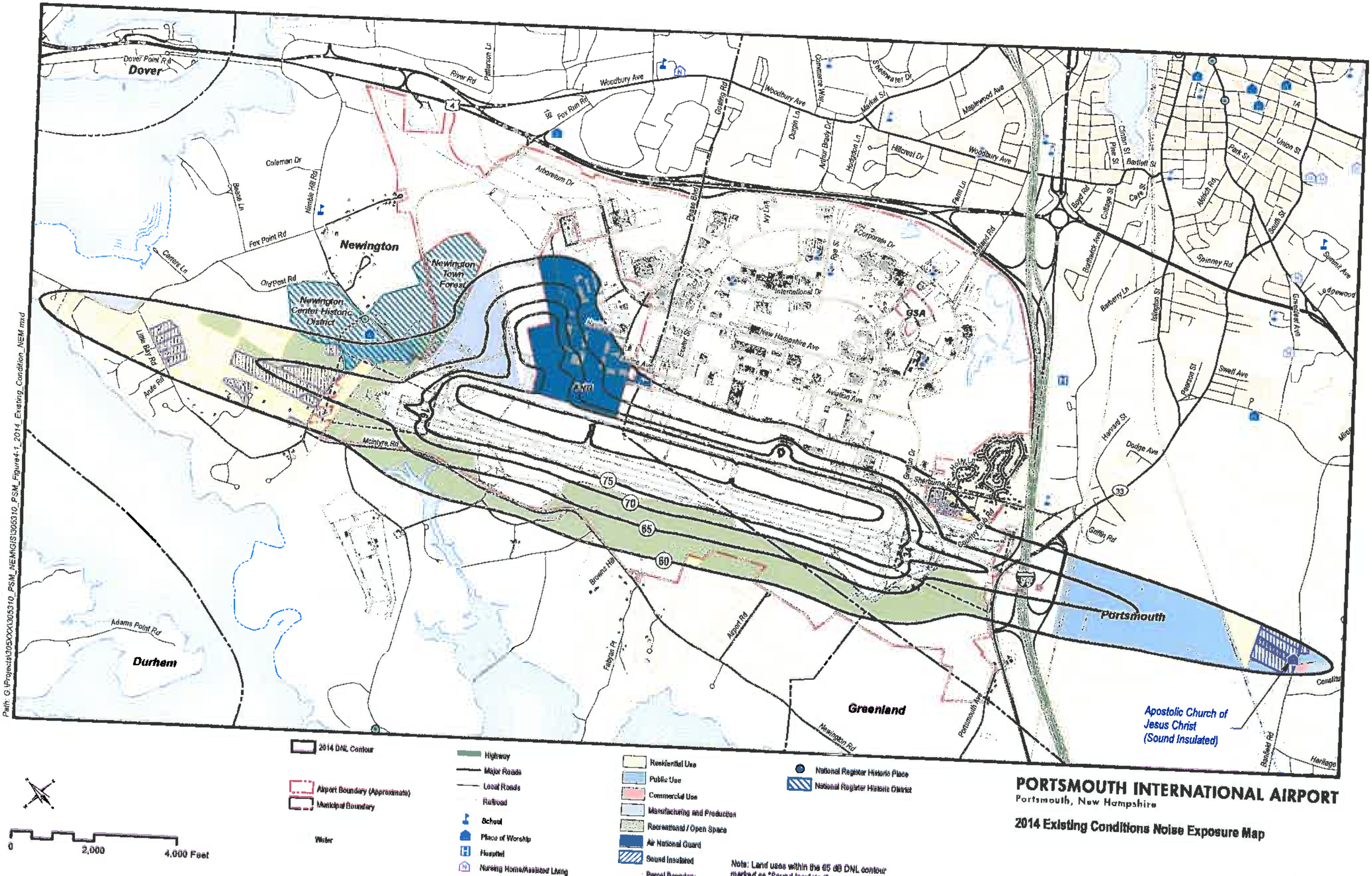
Figure 4-2 shows that the contours for 2019 are very similar in shape, though somewhat smaller than the 2014 Existing conditions. This slight decrease is due primarily to the phase out of Stage 2 jets less than 75,000 pounds at the end of 2015 (see Section C.7). Currently, there are approximately 258 annual operations by civil Stage 2 jets. As with the 2014 NEM, the 2019 NEM shows both compatible and non-compatible residential land use and a single sound insulated church (compatible) within the 60 dB DNL contour.

[17] Appendix D summarizes the steps undertaken in preparing the land use base map, including sources and field verification steps.

Both Noise Exposure Maps reflect continuation of the noise abatement elements of the existing Noise Compatibility Program as currently implemented (as summarized in Section 3) and the existing airport layout (as shown in Figure 4-4). Consistent with Part 150 requirements, the PDA will submit revised Noise Exposure Maps should either of these assumptions change. In addition, the PDA will comply with the following requirement set forth in §150.21(d) to prepare and submit revised Nosie Exposure Maps:

(1) If, after submission of a noise exposure map under paragraph (a) of this section, any change in the operation of the airport would create any "substantial, new noncompatible use" in any area depicted on the map beyond that which is forecast for a period of at least five years after the date of submission, the airport operator shall, in accordance with this section, promptly prepare and submit a revised noise exposure map. A change in the operation of an airport creates a substantial new noncompatible use if that change results in an increase in the yearly day-night average sound level of 1.5 dB or greater in either a land area which was formerly compatible but is thereby made noncompatible under Appendix A (Table 1), or in a land area which was previously determined to be noncompatible under that Table and whose noncompatibility is now significantly increased.

(2) If, after submission of a noise exposure map under paragraph (a) of this section, any change in the operation of the airport would significantly reduce noise over existing noncompatible uses that is not reflected in either the existing conditions or forecast noise exposure map on file with the FAA, the airport operator shall, in accordance with this section, promptly prepare and submit a revised noise exposure map. A change in the operation of the airport creates a significant reduction in noise over existing noncompatible uses if that change results in a decrease in the yearly day-night average sound level of 1.5 dB or greater in a land area which was formerly noncompatible but is thereby made compatible under Appendix A (Table 1).



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Note: Land uses within the 65 dB DNL contour marked as "Sound Insulated" are compatible.

PORTSMOUTH INTERNATIONAL AIRPORT
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2014 Existing Conditions Noise Exposure Map

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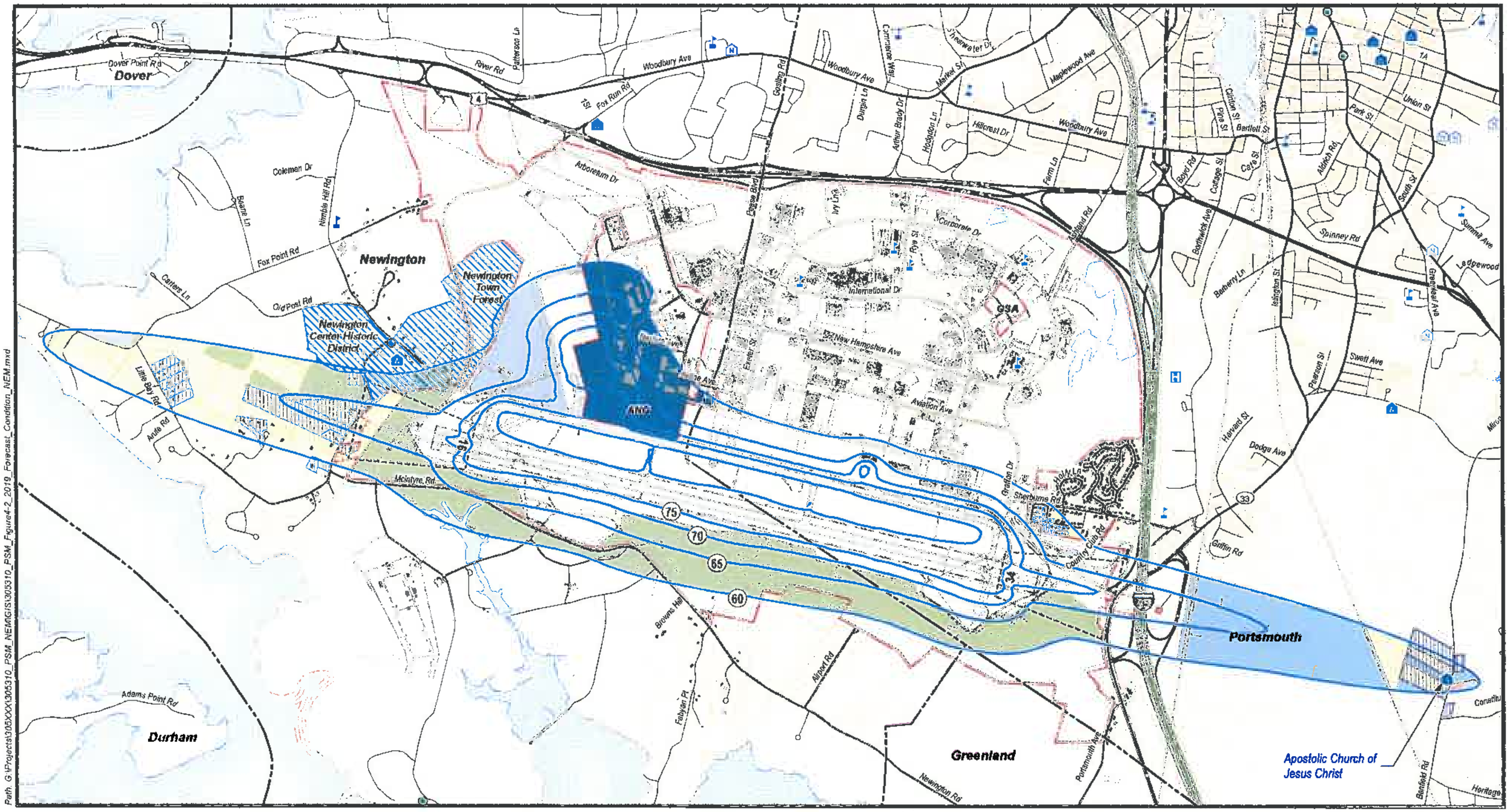
Figure 4-1



2019 DNL Contour
Airport Boundary (Approximate)
Municipal Boundary
Water
Highway
Major Roads
Local Roads
Railroad
School
Place of Worship
Hospital
Nursing Home/Assisted Living
Residential Use
Public Use
Commercial Use
Manufacturing and Production
Recreational / Open Space
Air National Guard
Sound Insulated
Parcel Boundary
National Register Historic Place
National Register Historic District

Note: Land uses within the 65 dB DNL contour marked as "Sound Insulated" are compatible.

0 2,000 4,000 Feet

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PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire

2019 Five-Year Forecast Conditions Noise Exposure Map

Figure 4-2

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4.2 Comparison of 2014 Existing Conditions Noise Contours to 1993-94 Base Case Noise Contours from 1995 Noise Exposure Map

Figure 4-3 compares the 2014 existing conditions contour to the 1993-94 Base Case contour from the most recent, FAA-approved Noise Exposure Map submission (June 1995). Outside of airport property, the contours are roughly similar in shape though smaller. This reduction is due to differences between the 1993-94 and 2014 fleet mixes, in particular a 15 % overall reduction in operations and a 26% reduction in military operations which includes the elimination of operations by extremely loud aircraft such as the F-4C. The FAA also has made substantial improvements to the Integrated Noise Model since 1995. The 2014 contours were developed using the most recent release (version 7.0d). The 1993-94 contours were developed using the most current version available in 1995 (Version 3.10). Version 7.0d includes data for many more aircraft models, up-to-date aircraft noise and performance profiles, and improved performance and acoustic algorithms, permitting more precise modeling. There also are also likely subtle changes in the shape of the contours resulting from the more detailed flight track development undertaken for this update (as discussed in Section 4.4.6), as well as more obvious changes due to the inclusion of taxiway noise, run-ups, and helicopter operations.

This figure is at the same scale as the 2014 and 2019 Noise Exposure Map figures, and includes the same land use information.

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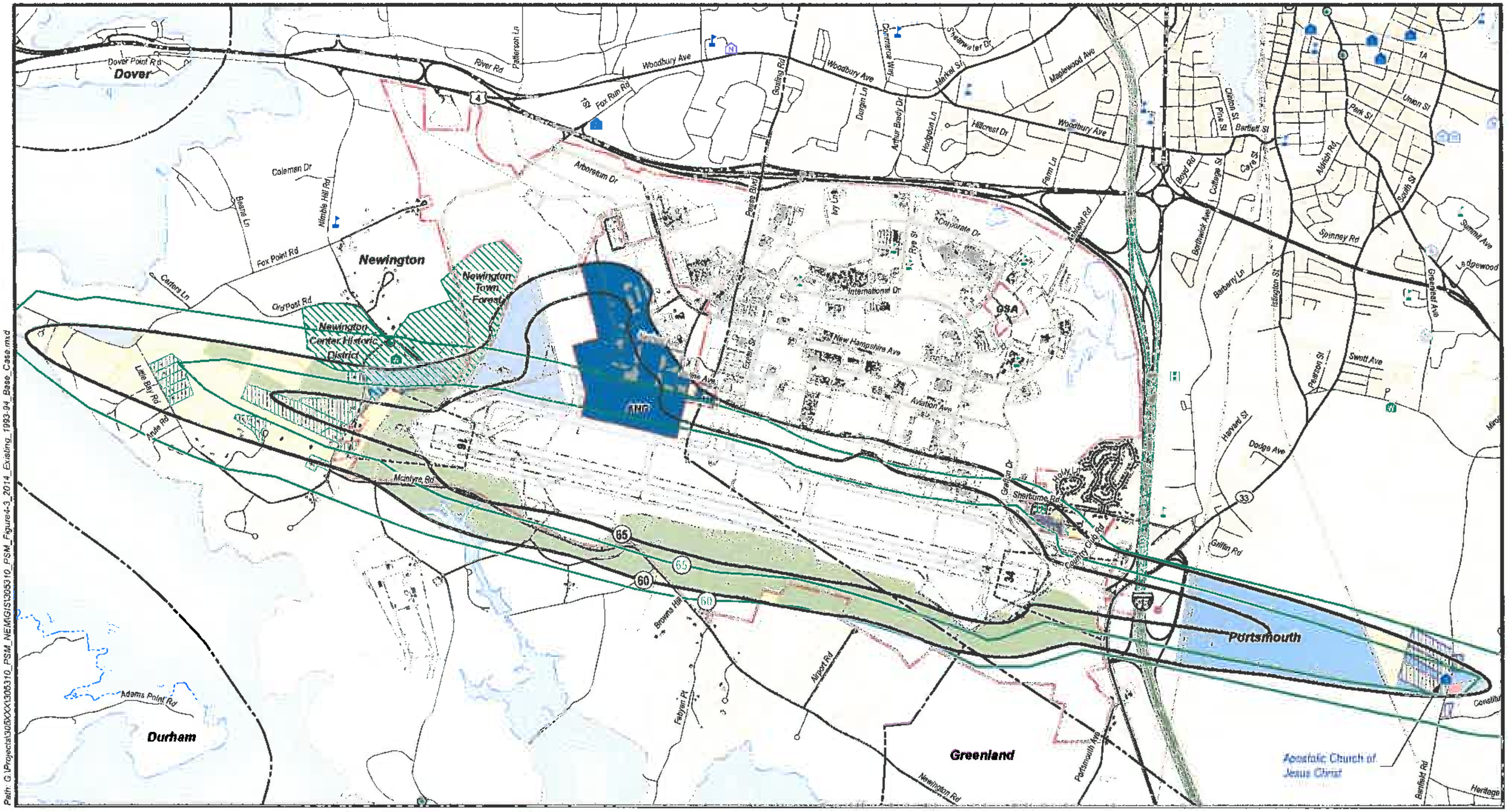

2014 DNL Contour	Highway	Residential Use	National Register Historic Place
1993-94 Base Case DNL Contour	Major Roads	Public Use	National Register Historic District
Airport Boundary (Approximate)	Local Roads	Commercial Use	
Municipal Boundary	Railroad	Manufacturing and Production	
	School	Recreational / Open Space	
	Place of Worship	Air National Guard	
Water	Hospital	Sound Insulated	
	Nursing Home/Assisted Living	Parcel Boundary	

Note: Land uses within the 65 dB DNL contour marked as "Sound Insulated" are compatible.

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PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire

Comparison of DNL Contours for 2014 Existing Conditions and 1993-94 Base Case from 1995 Part 150 Study

Figure 4-3

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4.3 Potential Noncompatible Land Uses within the Noise Contours

The figures presented in Sections 4.1 and 4.2 depict land uses within the noise contours. As shown in the figures the only potentially non-compatible land use encompassed within the contours is a single residence within the 65 dB DNL contours, based on the land use compatibility criteria presented in Table 2-1. As discussed in Section 3.2.1, the PDA has completed a sound insulation program which included both residences and a church. The parcels of land for these sound insulated buildings are shown in the figures with cross-hatching. The single uninsulated residence within the 65 dB DNL contours was constructed after October 1, 1998 and thus is not eligible for sound insulation using FAA grant funding under 14 CFR Part 150.

Table 4-1 presents the estimated dwelling units and residential population within the 60 to 65 dB and 65 to 70 dB DNL contour intervals for each of the contour cases, using the data and procedures discussed in Appendix D.3.[18] There is no residential population within the higher contour intervals; i.e., the 70 to 75, or 75+ intervals. Note that the estimated counts for residences which have been sound insulated are included in the columns marked "Compatible" even if the parcel lies within the 65 dB DNL contour.

With the exception of the single sound insulated house of worship, there are no other noise sensitive public buildings (such as schools, hospitals, and health care facilities) within the 60 dB and higher DNL contours. The Newington Center Historic District is listed in the National Register of Historic Places. The contour figures show that portions of this district lie within the 60 dB DNL contours and a very small portion lies within the 65 dB DNL contours.

[18] The table also lists numbers of residential parcels falling wholly or partially within the 60 dB DNL contours that are the basis for estimating the numbers of encompassed dwelling units and residents.

Table 4-1 Estimated Residential Population within the DNL Contours

Source: HMMH, 2014

Case	DNL Contour Interval	Encompassed Residential Uses (Note 1)					
		Dwelling Units			Population		
		Compatible (Note 2)	Non-Compatible	Total	Compatible (Note 2)	Non-Compatible	Total
2014 Existing Conditions Noise Exposure Map	60-65	69	0	**69**	166	0	**166**
	65-70	2	1	**3**	5	3	**8**
	70-75	0	0	**0**	0	0	**0**
	>75	0	0	**0**	0	0	**0**
	Total	**71**	**1**	**72**	**171**	**3**	**174**
2019 Five-Year Forecast Conditions Noise Exposure Map	60-65	57	0	**57**	141	0	**141**
	65-70	2	1	**3**	4	3	**7**
	70-75	0	0	**0**	0	0	**0**
	>75	0	0	**0**	0	0	**0**
	Total	**59**	**1**	**60**	**145**	**3**	**148**

Table Notes:

1. Estimated using data and procedures discussed in Appendix D.
2. Estimated dwelling units and population for parcels within the 65dB DNL contour that have been sound insulated are listed as compatible.

4.4 Development of Noise Contours

The DNL contours for this study were prepared using the most recent release of the FAA's Integrated Noise Model (INM) that was available at the time the contours were prepared, "Version 7.0d." Consistent with FAA requirements, the model was used without any unauthorized "calibration" or "adjustment".

The INM requires inputs in the following categories:

- Number and mix of aircraft operations
- Aircraft noise and performance characteristics
- Physical description of the airport layout
- Runway utilization rates
- Prototypical flight track descriptions and accompanying utilization rates.

Sections 4.4.1 through 4.4.6 present this information in order, for the noise contours presented in the preceding figures.

4.4.1 Aircraft Operations

Operations data for the 2014 and 2019 NEMs were developed from a number of sources including tower counts, flight plan records, and interviews with operators and tower staff. The NHANG Air Traffic Control Tower (ATCT) provided tower counts to the PDA for the most recent full calendar year, 2012. These tower count totals were used as the baseline for the existing conditions operations development. The counts were categorized as follows:

- Air Carrier – Operations by aircraft capable of holding 60 seats or more and are flying using a three letter company designator.
- Air Taxi - Operations by aircraft less than 60 seats and are flying using a three letter company designator or the prefix "Tango".
- Military –all classes of military operations.
- General Aviation – Civil (non-military) aircraft operations not otherwise classified under air carrier or air taxi.

Additionally in 2013, three carriers initiated new service at PSM. Seacoast Helicopters initiated operations at PSM during the first week of September. Evergreen International Airlines began cargo operations on September 30th. Allegiant Air announced new passenger service to PSM starting in October of 2013. Based on published schedule information and communication with the operators, the number of annualized operations for each new carrier was estimated and added to the existing conditions totals. The final operations totals by aircraft category for the 2014 NEM are presented in Table 4-2.

Consistent with the historical trend at PSM, the most recent version of the FAA's Terminal Area Forecast (TAF) for PSM, published in January of 2013, shows a 0% growth rate for total operations over the next five years. With this in mind, the operations for the 2019 NEM remain the same as the 2014 NEM operations with the exception of a small number of additional helicopter operations. This reflects the Seacoast Helicopters' estimate of their maximum number of operations given their current facilities and fleet. Table 4-2 also presents the final operations total by aircraft category for the 2019 NEM. These operations were reviewed and approved for use in this NEM document by the FAA.

Table 4-2 2014 and 2019 NEM Operations by Aircraft Category

Category	2014 NEM Operations		2019 NEM Operations	
	Annual	Average Annual Day	Annual	Average Annual Day
Air Carrier	919	2.5	919	2.5
Air Taxi	6,406	17.5	7,006	19.2
General Aviation	22,340	61.2	22,340	61.2
Military	7,814	21.4	7,814	21.4
Total	**37,479**	**102.7**	**38,079**	**104.3**

Noise modeling in the INM requires a detailed specification of the types of aircraft, number of operations, and the time of day at which the aircraft depart and land. The FAA's Traffic Flow Management System Counts (TFMSC) interface was used to supply much of this information. A full year of data for 2012 was downloaded and analyzed. This data was scaled to the approved forecast for each aircraft category for 2014 and 2019. Note that the operations for the KC-135R were not scaled. The NHANG reviewed the operations from the 2012 TFMSC data and stated that the data represented current operations at PSM. Other military operations found in the TFMSC data were however scaled so that the total modeled military operations matched the tower count.

Due to the upcoming phase-out of Stage 2 aircraft weighing less than 75,000 pounds (see Appendix Section C.7), the 2019 fleet was modified to remove all civil operations by Stage 2 jets. Approximately 258 annual operations were replaced by operations of similarly sized Stage 3 jets.

The INM allows the modeling of arrivals, departures, and pattern operations. For training purposes, aircraft may "touch and go" by landing and then reapplying power to take off immediately without coming to a stop. These aircraft remain within the local traffic pattern and may execute several touch-and-go cycles, one after another. The NHANG ATCT provided the estimates of the percentage of operations which were itinerant (arrivals and departures) vs. those that remain in the pattern (touch and goes) for general aviation and military aircraft. The NHANG also estimated that on average a KC-135R would conduct three to four touch-and-go cycles at a time. For each local KC-135R record in the TFMSC data, 3.5 touch-and-go cycles were modeled.

The following tables present the detailed aircraft modeling fleet mixes for the 2014 Existing Conditions NEM (Table 4-3) and the 2019 Forecast NEM (Table 4-4). The tables present fleet mix detail broken down by type of operation (departures, arrivals, and touch-and-go cycles), the DNL "day" and "night" time periods (as discussed in Section 2.1.6), and INM database aircraft types.

Table 4-3 2014 Existing Conditions Average Annual Day Operations

Source: HMMH, 2014

Aircraft Category	INM Aircraft Type	Departures		Arrivals		Touch & Go Cycles (1)		Total
		Day	Night	Day	Night	Day	Night	
Air Carrier	707120	0.023	0.000	0.023	0.000	0.000	0.000	0.046
	727EM2	0.000	0.007	0.003	0.003	0.000	0.000	0.013
	737700	0.029	0.000	0.023	0.007	0.000	0.000	0.059
	737800	0.137	0.082	0.183	0.036	0.000	0.000	0.438
	74720B	0.069	0.020	0.069	0.020	0.000	0.000	0.176
	747400	0.365	0.049	0.371	0.042	0.000	0.000	0.828
	757PW	0.013	0.000	0.010	0.003	0.000	0.000	0.026
	767300	0.075	0.056	0.065	0.065	0.000	0.000	0.261
	A300-622R	0.007	0.003	0.010	0.000	0.000	0.000	0.020
	A320-232	0.010	0.000	0.010	0.000	0.000	0.000	0.020
	DC93LW	0.013	0.003	0.013	0.003	0.000	0.000	0.033
	MD83	0.299	0.000	0.296	0.003	0.000	0.000	0.599
Air Carrier Subtotal		1.040	0.219	1.076	0.183	0.000	0.000	2.518
Air Taxi	A109	0.006	0.000	0.006	0.000	0.000	0.000	0.012
	BEC58P	0.062	0.260	0.068	0.254	0.000	0.000	0.645
	CIT3	0.006	0.000	0.006	0.000	0.000	0.000	0.012
	CL600	0.112	0.019	0.115	0.015	0.000	0.000	0.260
	CL601	0.294	0.105	0.288	0.112	0.000	0.000	0.800
	CNA172	0.006	0.000	0.006	0.000	0.000	0.000	0.012
	CNA182	0.003	0.000	0.003	0.000	0.000	0.000	0.006
	CNA206	0.006	0.496	0.087	0.415	0.000	0.000	1.004
	CNA208	3.251	0.803	3.670	0.384	0.000	0.000	8.108
	CNA441	0.102	0.003	0.105	0.000	0.000	0.000	0.211
	CNA510	0.012	0.000	0.012	0.000	0.000	0.000	0.025
	CNA525C	0.077	0.006	0.081	0.003	0.000	0.000	0.167
	CNA55B	0.056	0.006	0.062	0.000	0.000	0.000	0.124
	CNA560E	0.015	0.000	0.015	0.000	0.000	0.000	0.031
	CNA560U	0.062	0.009	0.071	0.000	0.000	0.000	0.143
	CNA560XL	0.192	0.000	0.189	0.003	0.000	0.000	0.384
	CNA680	0.164	0.009	0.170	0.003	0.000	0.000	0.347
	CNA750	0.096	0.009	0.096	0.009	0.000	0.000	0.211
	CVR580	0.000	0.006	0.000	0.006	0.000	0.000	0.012
	DHC6	0.000	0.003	0.000	0.003	0.000	0.000	0.006
	DO228	0.053	0.000	0.053	0.000	0.000	0.000	0.105
	ECLIPSE500	0.006	0.003	0.006	0.003	0.000	0.000	0.019
	EMB145	0.015	0.000	0.015	0.000	0.000	0.000	0.031
	F10062	0.059	0.000	0.059	0.000	0.000	0.000	0.118
	FAL20	0.015	0.003	0.015	0.003	0.000	0.000	0.037
	GASEPV	0.056	0.000	0.056	0.000	0.000	0.000	0.112
	GIIB	0.009	0.000	0.009	0.000	0.000	0.000	0.019
	GIV	0.068	0.022	0.068	0.022	0.000	0.000	0.180
	GV	0.040	0.009	0.050	0.000	0.000	0.000	0.099
	HS748A	0.003	0.000	0.003	0.000	0.000	0.000	0.006
	IA1125	0.015	0.000	0.015	0.000	0.000	0.000	0.031
	LEAR35	0.167	0.025	0.183	0.009	0.000	0.000	0.384
	MU3001	0.065	0.000	0.062	0.003	0.000	0.000	0.130
	PA28	0.003	0.000	0.003	0.000	0.000	0.000	0.006
	PA31	0.006	0.000	0.003	0.003	0.000	0.000	0.012
	R22	0.822	0.000	0.822	0.000	0.000	0.000	1.644
	R44	0.822	0.000	0.822	0.000	0.000	0.000	1.644

Aircraft Category	INM Aircraft Type	Departures		Arrivals		Touch & Go Cycles (1)		Total
		Day	Night	Day	Night	Day	Night	
	SD330	0.217	0.009	0.217	0.009	0.000	0.000	0.452
Air Taxi Subtotal		6.968	1.807	7.514	1.261	0.000	0.000	17.551
General Aviation	737700	0.004	0.000	0.004	0.000	0.000	0.000	0.008
	737800	0.000	0.004	0.000	0.004	0.000	0.000	0.008
	757PW	0.012	0.000	0.000	0.012	0.000	0.000	0.023
	767CF6	0.027	0.000	0.019	0.008	0.000	0.000	0.054
	777200	0.012	0.000	0.008	0.004	0.000	0.000	0.023
	A109	0.027	0.004	0.019	0.012	0.221	0.000	0.504
	BEC58P	0.657	0.035	0.649	0.043	2.208	0.000	5.800
	CIT3	0.027	0.008	0.031	0.004	0.000	0.000	0.070
	CL600	0.167	0.016	0.171	0.012	0.000	0.000	0.365
	CL601	0.653	0.051	0.680	0.023	0.000	0.000	1.406
	CNA172	0.229	0.004	0.225	0.008	0.442	0.000	1.350
	CNA182	0.291	0.008	0.295	0.004	0.442	0.000	1.482
	CNA206	0.381	0.019	0.396	0.004	0.000	0.000	0.800
	CNA208	1.224	0.132	1.236	0.120	3.975	0.000	10.662
	CNA441	0.637	0.004	0.602	0.039	0.663	0.000	2.607
	CNA500	0.008	0.000	0.004	0.004	0.221	0.000	0.457
	CNA510	0.078	0.000	0.070	0.008	0.000	0.000	0.155
	CNA525C	0.128	0.004	0.132	0.000	0.000	0.000	0.264
	CNA55B	0.144	0.000	0.136	0.008	0.000	0.000	0.288
	CNA560E	0.008	0.000	0.008	0.000	0.000	0.000	0.016
	CNA560U	0.225	0.031	0.233	0.023	0.221	0.000	0.955
	CNA560XL	0.105	0.000	0.097	0.008	0.000	0.000	0.210
	CNA680	0.019	0.000	0.019	0.000	0.000	0.000	0.039
	CNA750	0.043	0.000	0.043	0.000	0.000	0.000	0.085
	DC93LW	0.004	0.000	0.000	0.004	0.000	0.000	0.008
	DO228	0.101	0.004	0.097	0.008	0.000	0.000	0.210
	ECLIPSE500	0.004	0.000	0.004	0.000	0.000	0.000	0.008
	EMB145	0.008	0.004	0.008	0.004	0.000	0.000	0.023
	F10062	0.423	0.058	0.455	0.027	0.000	0.000	0.964
	GASEPF	0.066	0.004	0.066	0.004	0.221	0.000	0.582
	GASEPV	0.793	0.027	0.800	0.019	1.104	0.000	3.848
	GII	0.000	0.012	0.004	0.008	0.000	0.221	0.465
	GIIB	0.031	0.000	0.031	0.000	0.000	0.000	0.062
	GIV	0.583	0.085	0.626	0.043	0.000	0.000	1.337
	GV	0.140	0.070	0.198	0.012	0.221	0.000	0.861
	IA1125	0.058	0.000	0.058	0.000	0.000	0.000	0.117
	LEAR25	0.058	0.004	0.062	0.000	0.000	0.000	0.124
	LEAR35	0.548	0.023	0.528	0.043	0.221	0.000	1.584
	MD83	0.004	0.000	0.004	0.000	0.000	0.000	0.008
	MU3001	0.101	0.000	0.093	0.008	0.221	0.000	0.644
	PA28	0.198	0.004	0.202	0.000	1.325	0.000	3.054
	PA30	0.012	0.000	0.012	0.000	0.000	0.000	0.023
	PA31	0.311	0.004	0.311	0.004	9.496	0.000	19.622
	S76	0.004	0.000	0.004	0.000	0.000	0.000	0.008
	SD330	0.008	0.000	0.008	0.000	0.000	0.000	0.016
	SF340	0.004	0.000	0.004	0.000	0.000	0.000	0.008
General Aviation Subtotal		8.563	0.618	8.652	0.528	21.201	0.221	61.205
Military	737700	0.084	0.010	0.084	0.010	0.000	0.000	0.189
	74720B	0.052	0.000	0.052	0.000	0.000	0.000	0.105
	757PW	0.189	0.000	0.189	0.000	0.000	0.000	0.378
	A109	0.031	0.000	0.021	0.010	0.000	0.000	0.063
	BEC58P	0.010	0.000	0.010	0.000	0.000	0.000	0.021

Aircraft Category	INM Aircraft Type	Departures		Arrivals		Touch & Go Cycles (1)		Total
		Day	Night	Day	Night	Day	Night	
	C130	0.525	0.010	0.504	0.031	0.009	0.000	1.089
	C17	0.126	0.031	0.136	0.021	0.000	0.000	0.315
	C5A	0.262	0.000	0.262	0.000	0.000	0.000	0.525
	CL600	0.535	0.000	0.535	0.000	0.000	0.000	1.071
	CL601	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	CNA172	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	CNA182	0.042	0.000	0.042	0.000	0.000	0.000	0.084
	CNA206	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	CNA208	0.031	0.000	0.031	0.000	0.000	0.000	0.063
	CNA441	0.556	0.000	0.556	0.000	0.220	0.023	1.600
	CNA560U	0.126	0.010	0.136	0.000	0.000	0.000	0.273
	DC1030	0.189	0.063	0.252	0.000	0.000	0.000	0.504
	DC870	0.042	0.000	0.031	0.010	0.009	0.000	0.103
	DHC6	0.052	0.000	0.052	0.000	0.000	0.000	0.105
	DO328	0.073	0.000	0.073	0.000	0.000	0.000	0.147
	E3A	0.021	0.000	0.021	0.000	0.019	0.000	0.079
	EA6B	0.042	0.000	0.042	0.000	0.000	0.000	0.084
	F16A	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	F-18	0.126	0.010	0.136	0.000	0.047	0.000	0.367
	GASEPV	0.063	0.000	0.063	0.000	0.019	0.000	0.163
	GII	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	GIIB	0.084	0.000	0.084	0.000	0.000	0.000	0.168
	GIV	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	GV	0.231	0.000	0.231	0.000	0.000	0.000	0.462
	HS748A	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	IA1125	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	KC135R	0.477	0.047	0.496	0.027	4.459	0.547	11.058
	LEAR25	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	LEAR35	0.661	0.000	0.661	0.000	0.000	0.000	1.323
	MU3001	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	S70	0.262	0.010	0.273	0.000	0.000	0.000	0.546
	SF340	0.073	0.000	0.073	0.000	0.000	0.000	0.147
	T-38A	0.031	0.000	0.031	0.000	0.000	0.000	0.063
Military Subtotal		5.159	0.194	5.241	0.111	4.782	0.570	21.408
Total		21.730	2.837	22.483	2.084	25.983	0.791	102.682

Notes: Totals and subtotals may not match due to rounding. (1) Touch-and-go cycles are two operations.

Table 4-4 Forecast 2019 Average Annual Day Operations

Source: HMMH, 2014

Aircraft Category	INM Aircraft Type	Departures		Arrivals		Touch & Go Cycles (1)		Total
		Day	Night	Day	Night	Day	Night	
Air Carrier	707120	0.023	0.000	0.023	0.000	0.000	0.000	0.046
	727EM2	0.000	0.007	0.003	0.003	0.000	0.000	0.013
	737700	0.029	0.000	0.023	0.007	0.000	0.000	0.059
	737800	0.137	0.082	0.183	0.036	0.000	0.000	0.438
	74720B	0.069	0.020	0.069	0.020	0.000	0.000	0.176
	747400	0.365	0.049	0.371	0.042	0.000	0.000	0.828
	757PW	0.013	0.000	0.010	0.003	0.000	0.000	0.026
	767300	0.075	0.056	0.065	0.065	0.000	0.000	0.261
	A300-622R	0.007	0.003	0.010	0.000	0.000	0.000	0.020
	A320-232	0.010	0.000	0.010	0.000	0.000	0.000	0.020
	DC93LW	0.013	0.003	0.013	0.003	0.000	0.000	0.033
	MD83	0.299	0.000	0.296	0.003	0.000	0.000	0.599
Air Carrier Subtotal		1.040	0.219	1.076	0.183	0.000	0.000	2.518
Air Taxi	A109	0.006	0.000	0.006	0.000	0.000	0.000	0.012
	BEC58P	0.062	0.260	0.068	0.254	0.000	0.000	0.645
	CIT3	0.006	0.000	0.006	0.000	0.000	0.000	0.012
	CL600	0.112	0.019	0.115	0.015	0.000	0.000	0.260
	CL601	0.294	0.105	0.288	0.112	0.000	0.000	0.800
	CNA172	0.006	0.000	0.006	0.000	0.000	0.000	0.012
	CNA182	0.003	0.000	0.003	0.000	0.000	0.000	0.006
	CNA206	0.006	0.496	0.087	0.415	0.000	0.000	1.004
	CNA208	3.251	0.803	3.670	0.384	0.000	0.000	8.108
	CNA441	0.102	0.003	0.105	0.000	0.000	0.000	0.211
	CNA510	0.012	0.000	0.012	0.000	0.000	0.000	0.025
	CNA525C	0.077	0.006	0.081	0.003	0.000	0.000	0.167
	CNA55B	0.056	0.006	0.062	0.000	0.000	0.000	0.124
	CNA560E	0.015	0.000	0.015	0.000	0.000	0.000	0.031
	CNA560U	0.062	0.009	0.071	0.000	0.000	0.000	0.143
	CNA560XL	0.192	0.000	0.189	0.003	0.000	0.000	0.384
	CNA680	0.164	0.009	0.170	0.003	0.000	0.000	0.347
	CNA750	0.096	0.009	0.096	0.009	0.000	0.000	0.211
	CVR580	0.000	0.006	0.000	0.006	0.000	0.000	0.012
	DHC6	0.000	0.003	0.000	0.003	0.000	0.000	0.006
	DO228	0.053	0.000	0.053	0.000	0.000	0.000	0.105
	ECLIPSE500	0.006	0.003	0.006	0.003	0.000	0.000	0.019
	EMB145	0.015	0.000	0.015	0.000	0.000	0.000	0.031
	F10062	0.059	0.000	0.059	0.000	0.000	0.000	0.118
	FAL20	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	GASEPV	0.056	0.000	0.056	0.000	0.000	0.000	0.112
	GIIB	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	GIV	0.077	0.022	0.077	0.022	0.000	0.000	0.198
	GV	0.040	0.009	0.050	0.000	0.000	0.000	0.099
	HS748A	0.003	0.000	0.003	0.000	0.000	0.000	0.006
	IA1125	0.015	0.000	0.015	0.000	0.000	0.000	0.031
	LEAR35	0.183	0.028	0.198	0.012	0.000	0.000	0.422
	MU3001	0.065	0.000	0.062	0.003	0.000	0.000	0.130
	PA28	0.003	0.000	0.003	0.000	0.000	0.000	0.006
	PA31	0.006	0.000	0.003	0.003	0.000	0.000	0.012
	R22	1.233	0.000	1.233	0.000	0.000	0.000	2.466
	R44	1.233	0.000	1.233	0.000	0.000	0.000	2.466

Aircraft Category	INM Aircraft Type	Departures		Arrivals		Touch & Go Cycles (1)		Total
		Day	Night	Day	Night	Day	Night	
	SD330	0.217	0.009	0.217	0.009	0.000	0.000	0.452
Air Taxi Subtotal		7.790	1.807	8.336	1.261	0.000	0.000	19.195
General Aviation	737700	0.004	0.000	0.004	0.000	0.000	0.000	0.008
	737800	0.000	0.004	0.000	0.004	0.000	0.000	0.008
	757PW	0.012	0.000	0.000	0.012	0.000	0.000	0.023
	767CF6	0.027	0.000	0.019	0.008	0.000	0.000	0.054
	777200	0.012	0.000	0.008	0.004	0.000	0.000	0.023
	A109	0.027	0.004	0.019	0.012	0.221	0.000	0.504
	BEC58P	0.657	0.035	0.649	0.043	2.208	0.000	5.800
	CIT3	0.027	0.008	0.031	0.004	0.000	0.000	0.070
	CL600	0.167	0.016	0.171	0.012	0.000	0.000	0.365
	CL601	0.653	0.051	0.680	0.023	0.000	0.000	1.406
	CNA172	0.229	0.004	0.225	0.008	0.442	0.000	1.350
	CNA182	0.291	0.008	0.295	0.004	0.442	0.000	1.482
	CNA206	0.381	0.019	0.396	0.004	0.000	0.000	0.800
	CNA208	1.224	0.132	1.236	0.120	3.975	0.000	10.662
	CNA441	0.637	0.004	0.602	0.039	0.663	0.000	2.607
	CNA500	0.008	0.000	0.004	0.004	0.221	0.000	0.457
	CNA510	0.078	0.000	0.070	0.008	0.000	0.000	0.155
	CNA525C	0.128	0.004	0.132	0.000	0.000	0.000	0.264
	CNA55B	0.144	0.000	0.136	0.008	0.000	0.000	0.288
	CNA560E	0.008	0.000	0.008	0.000	0.000	0.000	0.016
	CNA560U	0.225	0.031	0.233	0.023	0.221	0.000	0.955
	CNA560XL	0.105	0.000	0.097	0.008	0.000	0.000	0.210
	CNA680	0.019	0.000	0.019	0.000	0.000	0.000	0.039
	CNA750	0.043	0.000	0.043	0.000	0.000	0.000	0.085
	DC93LW	0.004	0.000	0.000	0.004	0.000	0.000	0.008
	DO228	0.101	0.004	0.097	0.008	0.000	0.000	0.210
	ECLIPSE500	0.004	0.000	0.004	0.000	0.000	0.000	0.008
	EMB145	0.008	0.004	0.008	0.004	0.000	0.000	0.023
	F10062	0.423	0.058	0.455	0.027	0.000	0.000	0.964
	GASEPF	0.066	0.004	0.066	0.004	0.221	0.000	0.582
	GASEPV	0.793	0.027	0.800	0.019	1.104	0.000	3.848
	GII	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	GIIB	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	GIV	0.614	0.097	0.660	0.051	0.000	0.221	1.864
	GV	0.140	0.070	0.198	0.012	0.221	0.000	0.861
	IA1125	0.058	0.000	0.058	0.000	0.000	0.000	0.117
	LEAR25	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	LEAR35	0.606	0.027	0.591	0.043	0.221	0.000	1.708
	MD83	0.004	0.000	0.004	0.000	0.000	0.000	0.008
	MU3001	0.101	0.000	0.093	0.008	0.221	0.000	0.644
	PA28	0.198	0.004	0.202	0.000	1.325	0.000	3.054
	PA30	0.012	0.000	0.012	0.000	0.000	0.000	0.023
	PA31	0.311	0.004	0.311	0.004	9.496	0.000	19.622
	S76	0.004	0.000	0.004	0.000	0.000	0.000	0.008
	SD330	0.008	0.000	0.008	0.000	0.000	0.000	0.016
	SF340	0.004	0.000	0.004	0.000	0.000	0.000	0.008
General Aviation Subtotal		8.563	0.618	8.652	0.528	21.201	0.221	61.205
Military	737700	0.084	0.010	0.084	0.010	0.000	0.000	0.189
	74720B	0.052	0.000	0.052	0.000	0.000	0.000	0.105
	757PW	0.189	0.000	0.189	0.000	0.000	0.000	0.378
	A109	0.031	0.000	0.021	0.010	0.000	0.000	0.063
	BEC58P	0.010	0.000	0.010	0.000	0.000	0.000	0.021

Aircraft Category	INM Aircraft Type	Departures		Arrivals		Touch & Go Cycles (1)		Total
		Day	Night	Day	Night	Day	Night	
	C130	0.525	0.010	0.504	0.031	0.009	0.000	1.089
	C17	0.126	0.031	0.136	0.021	0.000	0.000	0.315
	C5A	0.262	0.000	0.262	0.000	0.000	0.000	0.525
	CL600	0.535	0.000	0.535	0.000	0.000	0.000	1.071
	CL601	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	CNA172	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	CNA182	0.042	0.000	0.042	0.000	0.000	0.000	0.084
	CNA206	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	CNA208	0.031	0.000	0.031	0.000	0.000	0.000	0.063
	CNA441	0.556	0.000	0.556	0.000	0.220	0.023	1.600
	CNA560U	0.126	0.010	0.136	0.000	0.000	0.000	0.273
	DC1030	0.189	0.063	0.252	0.000	0.000	0.000	0.504
	DC870	0.042	0.000	0.031	0.010	0.009	0.000	0.103
	DHC6	0.052	0.000	0.052	0.000	0.000	0.000	0.105
	DO328	0.073	0.000	0.073	0.000	0.000	0.000	0.147
	E3A	0.021	0.000	0.021	0.000	0.019	0.000	0.079
	EA6B	0.042	0.000	0.042	0.000	0.000	0.000	0.084
	F16A	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	F-18	0.126	0.010	0.136	0.000	0.047	0.000	0.367
	GASEPV	0.063	0.000	0.063	0.000	0.019	0.000	0.163
	GII	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	GIIB	0.084	0.000	0.084	0.000	0.000	0.000	0.168
	GIV	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	GV	0.231	0.000	0.231	0.000	0.000	0.000	0.462
	HS748A	0.010	0.000	0.010	0.000	0.000	0.000	0.021
	IA1125	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	KC135R	0.477	0.047	0.496	0.027	4.459	0.547	11.058
	LEAR25	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	LEAR35	0.661	0.000	0.661	0.000	0.000	0.000	1.323
	MU3001	0.021	0.000	0.021	0.000	0.000	0.000	0.042
	S70	0.262	0.010	0.273	0.000	0.000	0.000	0.546
	SF340	0.073	0.000	0.073	0.000	0.000	0.000	0.147
	T-38A	0.031	0.000	0.031	0.000	0.000	0.000	0.063
Military Subtotal		5.159	0.194	5.241	0.111	4.782	0.570	21.408
Total		22.552	2.837	23.305	2.084	25.983	0.791	104.326

Notes: Totals and subtotals may not match due to rounding. (1) Touch-and-go cycles are two operations.

4.4.2 Aircraft Run-Ups

The National Guard provided data on run-ups by their fleet of KC-135R aircraft at PSM. The INM requires the following information to model a run-up:

- Aircraft type
- Location
- Orientation
- Thrust
- Duration

In order to model the average daily exposure, the INM also requires the number of average daytime and nighttime run-ups. Table 4-5 presents the estimated existing daily KC-135R run-up operations. This estimate was utilized in both the 2014 NEM and 2019 NEM noise contours. The run-ups occur on the ANG Apron, the southeast corner of the North Apron, and at the runway-ends; see Figure 4-4. Run-ups are generally conducted with the aircraft facing into the wind, thus ratio of run-ups facing north-northwest to those facing south-southeast matches the runway use ratio.

Table 4-5 Estimated Existing and Future KC-135R Run-Up Operations

Location	Heading (deg)	Thrust (lbs per engine)	Duration (s)	Average Daily Run-Ups	
				Day	Night
Runway 16	149	8800	5	0.251	0.041
Runway 16	149	15400	20	0.056	0.009
Runway 34	329	8800	5	0.362	0.032
Runway 34	329	15400	20	0.103	0.009
North Apron	302	18920	600	0.036	0.027
North Apron	302	16500	3600	0.062	0.045
North Apron	302	4180	1800	0.062	0.045
ANG Apron	329	4180	1800	0.178	0.214
North Apron	122	18920	600	0.019	0.014
North Apron	122	16500	3600	0.034	0.024
North Apron	122	4180	1800	0.034	0.024
ANG Apron	149	4180	1800	0.096	0.115

4.4.3 Aircraft Noise and Performance Characteristics

The INM database contains noise and performance data for over 270 different aircraft types. The program automatically accesses the applicable noise and performance data for operations by those aircraft. Noise data is in the form of SEL (see Section 2.1.4) at a range of distances (from 200 feet to 25,000 feet) from a particular aircraft with engines at a specific thrust level. Performance data include thrust, speed, and altitude profiles for takeoff and landing operations.

The aircraft operations listed in the tables in Section 4.4.1 are categorized according to INM aircraft types. Many of these types represent multiple aircraft models with comparable noise and performance characteristics. For some aircraft models for which the database does not include type-specific data, the FAA has identified "standard" substitutes; i.e., pre-approved surrogates to use from among models in the database. For models not included in the database and for which there is not a standard substitute, the FAA works with the INM user to identify appropriate "non-standard substitutes." Appendix A includes correspondence between HMMH and the FAA for this purpose, including the FAA letter identifying the approved substitutes.

In addition, Appendix A presents documentation on two types of user-defined aircraft performance profiles. The first relates to the KC-135R. The NHANG reviewed the INM's standard performance profiles for the KC-135R and determined that they did not adequately represent the actual performance of these aircraft at PSM. In consultation with the NHANG, HMMH modified the INM standard profiles to more accurately reflect the weight, altitude, thrust, and speed of the aircraft for arrivals, departures, and pattern operations.

The second type of user-defined profile is for modeling taxiing aircraft. The edge of Taxiway A near its southeast end is as close as 750 feet from the nearest residence. In order to include the noise contribution of taxiing aircraft special profiles are required. For arrivals, the profiles model a simple constant speed taxi under idle thrust along Taxiway A. For departures, the aircraft taxi at a constant speed under idle thrust along Taxiway A, slow to a stop at a hold line, hold at idle thrust for one or two minutes[19], apply breakaway thrust, and taxi onto the runway for departure. Intersection departures, as discussed in Section 4.4.5, conduct parts of their taxi, hold, and breakaway along either Taxiway B or Taxiway C. Appendix A presents the details of the taxi profile development. Figure 4-4 shows the taxiway layout at PSM.

4.4.4 Airport Physical Parameters

Portsmouth International Airport at Pease (PSM) has one operational paved runway: Runway 16/34. The INM requires detailed inputs on the runway layout, including runway end points, runway end elevations, start-of-takeoff roll points, landing thresholds, threshold crossing heights, and approach angles. These inputs define the starting and ending points of modeled operations in three dimensions. These data were obtained from the most current, official published sources, and verified with PDA staff. The airport layout data sources used in this process include:

- FAA "airport diagram" for PSM[20]
- FAA Form 5010-1 "Airport Master Record" for PSM[21]
- Pease Development Authority staff

For noise modeling purposes the helipad was located on a ramp central to most civil operations. Table 4-6 summarizes the runway data required by the INM.

Table 4-6 Runway Dimensions

Source: HMMH, 2014

Runway	Latitude (degrees)	Longitude (degrees)	Length x Width (feet)	End Elevation (feet MSL)	Displaced Landing Threshold (ft.)	Approach Slope (degrees)	Threshold Crossing Height (feet)
16	43.091278	-70.834167	11321 x 150	94	803	3.0	55
34	43.064632	-70.812390	11321 x 150	84	0	3.0	64
Helipad	43.074276	-70.813718	N/A	64	N/A	N/A	N/A
Airport elevation: 100 feet above mean sea level (MSL).							

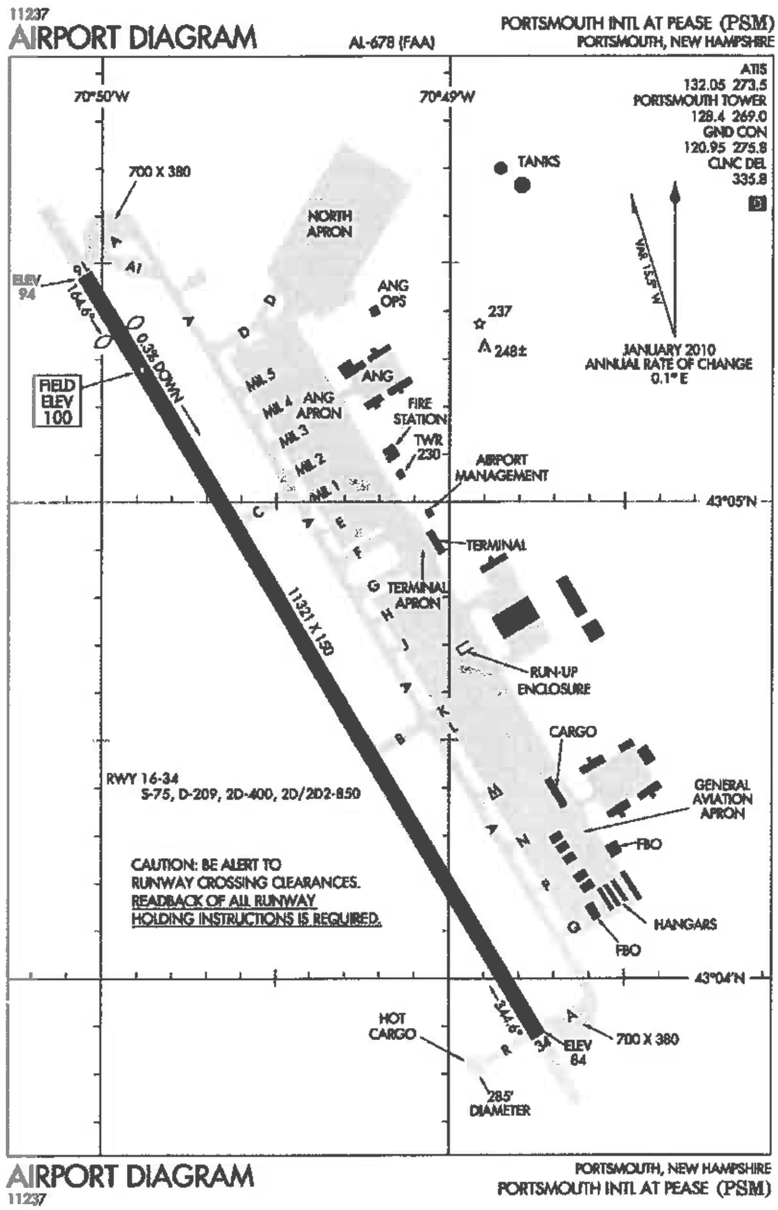
[19] The NHANG ATCT estimated that piston propeller aircraft hold on average for two minutes. All other aircraft hold for one minute prior to departure. The additional minute for piston propeller aircraft was due to their tendency to conduct pre-flight checks while holding near the runway end rather than on the ramp area.

[20] The FAA publishes (electronically and in hard copy) "U.S. Terminal Procedure Publications" that provide charts of "instrument approach procedures," "departure procedures," "standard terminal arrival procedures," "charted visual flight procedures" and "airport diagrams." The airport diagrams are an official source of airport physical dimensions. See: http://www.naco.faa.gov/index.asp?xml=naco/online/d_tpp.

[21] The FAA Form 5010-1, "Airport Master Record," presents comprehensive data on airports. It is maintained for all public use airports by the FAA's National Flight Data Center. See: http://www.faa.gov/airports_airtraffic/airports/airport_safety/airportdata_5010/.

Figure 4-4 presents the FAA Airport Diagram for Portsmouth International Airport at Pease. It depicts the runway layout data in a graphic format. The displaced landing threshold on Runway 16 (landing from the northwest) is shown with ellipses across the runway. This threshold is the first point at which aircraft can touch down, except in emergency conditions. There is no displacement on the runway 34 end (landing from the southeast); the landing threshold is the physical end of that runway. Table 4-6 lists the applicable approach angles and threshold crossing heights. Takeoffs start at the physical ends of the runways or, in some cases, at the intersection of a taxiway with the runway, as discussed in Section 4.4.5.

Figure 4-4 FAA Airport Diagram for Portsmouth International Airport at Pease



4.4.5 Runway Utilization

Table 4-7 summarizes the runway use data utilized in the INM modeling for both the 2014 and 2019 contours. These percentages were developed through interviews with personnel in the New Hampshire Air National Guard's Aircraft Control Tower (ATCT).

Table 4-7 Runway Use

Source: NHANG ATCT

Runway	Arrivals		Departures	
	Day	Night	Day	Night
16	35%	35%	35%	50%
34	65%	65%	65%	50%
Total	100%	100%	100%	100%

Runway 16/34 is over 11,000 feet long. Some aircraft departing at PSM do not require the entire length of the runway for a safe take-off. Therefore, in order to limit taxi time, pilots may request permission from the ATCT to depart at one of two intersecting points labeled "B" and "C" in Figure 4-4. Table 4-8 provides the percent of each aircraft group to use these intersection departures. These percentages were applied to all civil aircraft operations and all military operations by aircraft which are also used by civil operators such as general aviation jets and small propeller aircraft. All other military operations (i.e. by "military only" aircraft such as fighter jets) were modeled using departures from the ends of the runways.

Table 4-8 Utilization of Intersection Departures by Aircraft Group

Aircraft Group	Runway End	Intersection Point			Total
		A*	B	C	
Large Jet	16	100%	0%	0%	100%
Medium Jet	16	75%	0%	25%	100%
Turboprop	16	15%	60%	25%	100%
Twin Piston	16	10%	55%	35%	100%
Single Engine Piston	16	5%	70%	25%	100%
Large Jet	34	100%	0%	0%	100%
Medium Jet	34	95%	5%	0%	100%
Turboprop	34	70%	30%	0%	100%
Twin Piston	34	90%	10%	0%	100%
Single Engine Piston	34	90%	10%	0%	100%

*Intersection A is located at the physical runway end. See Figure 4-4.

4.4.6 Flight Track Geometry and Utilization

To maximize the accuracy of the flight track modeling inputs, actual flight operations ("radar") data were obtained for 43 days between February 4 and November 21, 2012. These days were spread throughout the time period in seven or eight day periods and avoided all major holidays (but do include the Wednesday before Thanksgiving.) These data were obtained from FAA. These flight operations data included information on aircraft tracks over the ground and aircraft altitudes. The data also included flight identification information (such as aircraft type, flight origin or destination, tail number, etc.) for aircraft operating under a flight plan filed with the FAA.

Flight operation tracks were grouped by runway, operation type, engine type (jets, turboprops, props), with the KC135s given their own group, and geometry. These groups were then loaded into INM for model track creation.

The INM uses "backbone" tracks, with associated "dispersion" tracks on either side of the backbone. The arrival and departure utilization rates presented in the tables are for the operations assigned to each backbone track and its associated dispersion tracks. The INM distributes operations among the dispersion tracks using a "normal" distribution (e.g., a "bell-shaped" curve). For example, operations assigned to a model track with a backbone and four dispersion tracks would be distributed as follows:

- Outer-left dispersion track: 6.3%
- Inner-left dispersion track: 24.4%
- Backbone track: 38.6%
- Inner-right dispersion track: 24.4%
- Outer-right dispersion track: 6.3%

The flight track data thus obtained were used to develop both flight track geometry and percent utilization of each track. The utilization rates were calculated on a runway-end basis for each track group; i.e., for each type of operation, runway-end and engine-type group, the track utilization rates add up to 100%.

The following six figures present the model and radar flight tracks:

- Figure 4-5 Comparison of Jet Arrival Model Tracks to Radar Sample
- Figure 4-6 Comparison of Jet Departure Model Tracks to Radar Sample
- Figure 4-7 Comparison of Propeller Arrival Model Tracks to Radar Sample
- Figure 4-8 Comparison of Propeller Arrival Model Tracks to Radar Sample
- Figure 4-9 Comparison of Pattern Model Tracks to Radar Sample
- Figure 4-10 Taxi Model Tracks

The flight track utilization rates can be found in Table 4-9 through Table 4-13.

As required by Part 150, these figures depict the modeled flight tracks out to at least 30,000 feet from brake release. However, to fit on an 11" by 17" page, all track figures, with the exception of Figure 4-10, are at the scale of 1" to 5,000'. Part 150 requires that the modeled flight tracks be presented at the same scale as the Noise Exposure Map contours, which are at 1" to 2,000' in this document. FAA guidelines permit airports to present the flight tracks on a separate, unbound figure at this scale accompanying the Noise Exposure Map document. Such a figure is included in a sleeve immediately before the rear cover of this volume.

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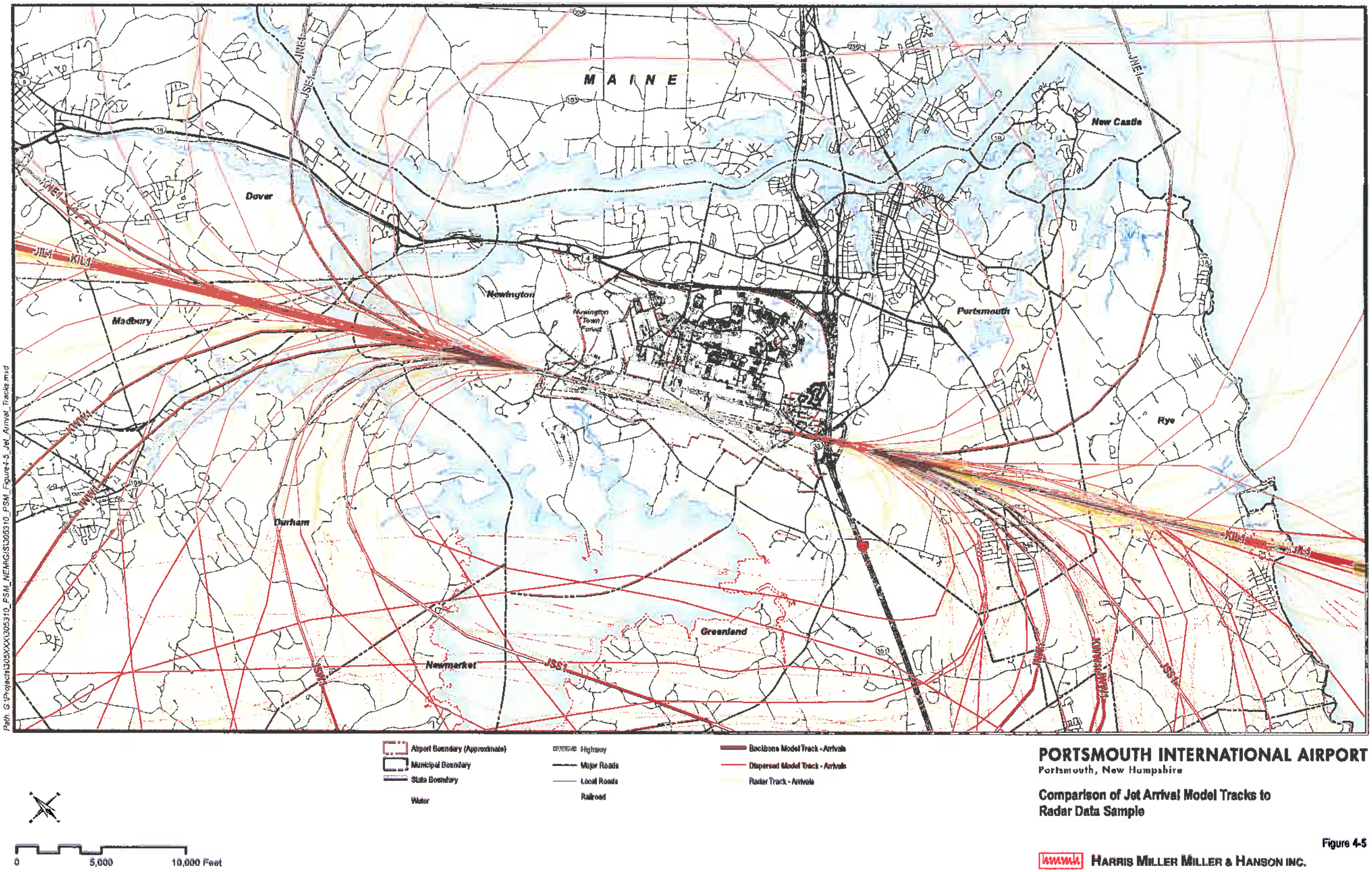
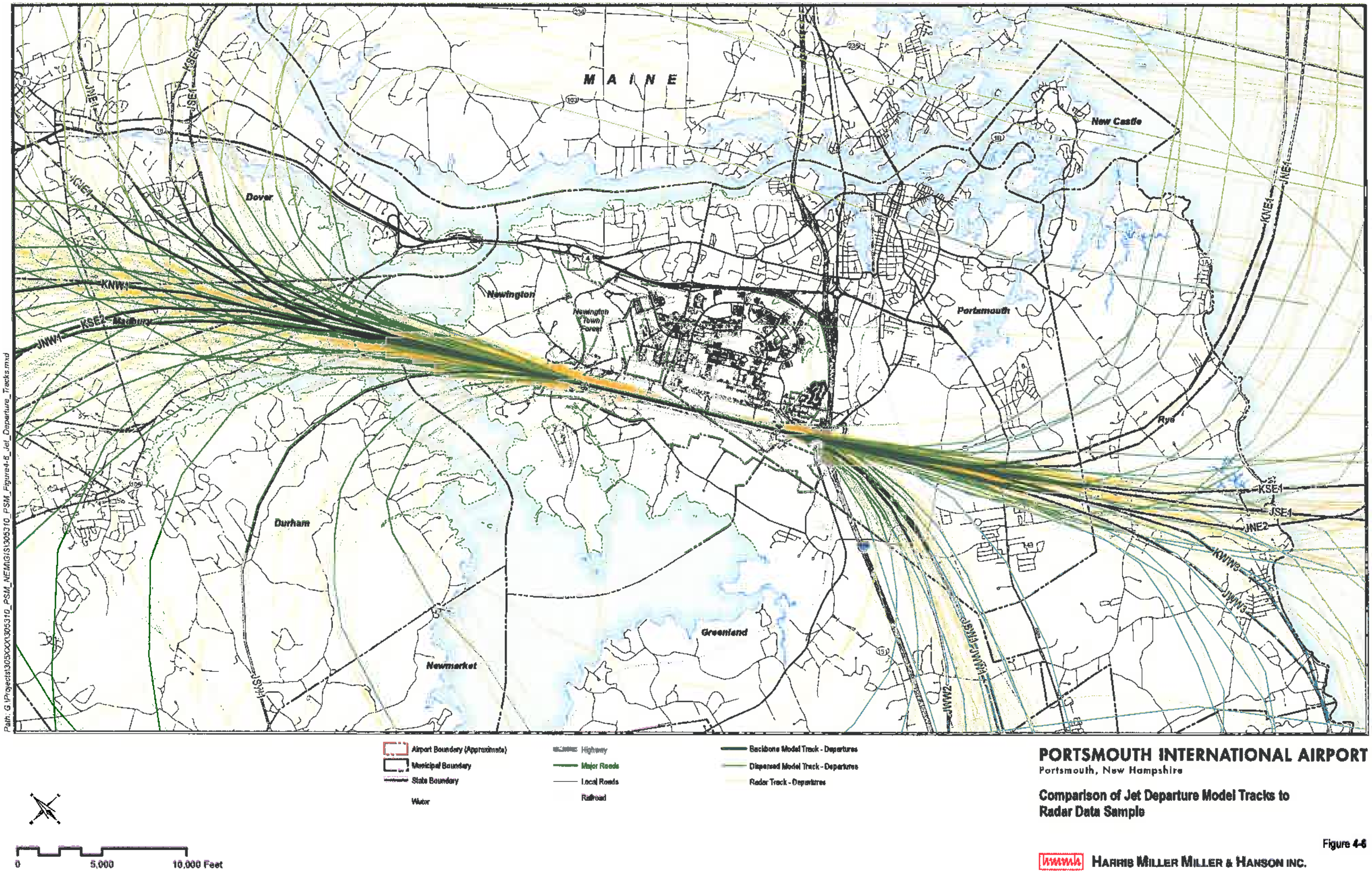


PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire

Comparison of Jet Arrival Model Tracks to Radar Data Sample

Figure 4-5

HARRIS MILLER MILLER & HANSON INC.



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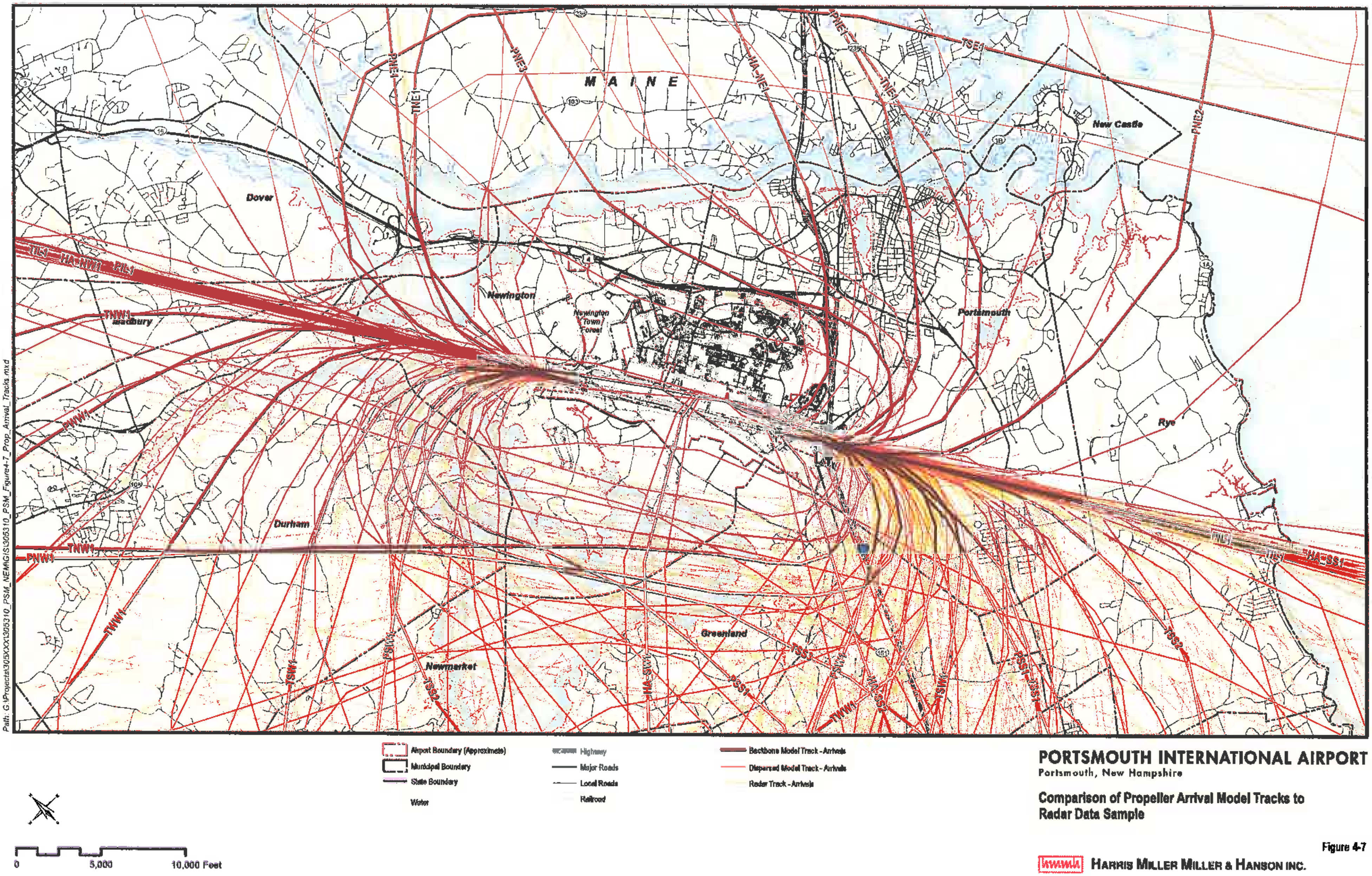
PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire

Comparison of Jet Departure Model Tracks to Radar Data Sample

Figure 4-6

HARRIS MILLER MILLER & HANSON INC.

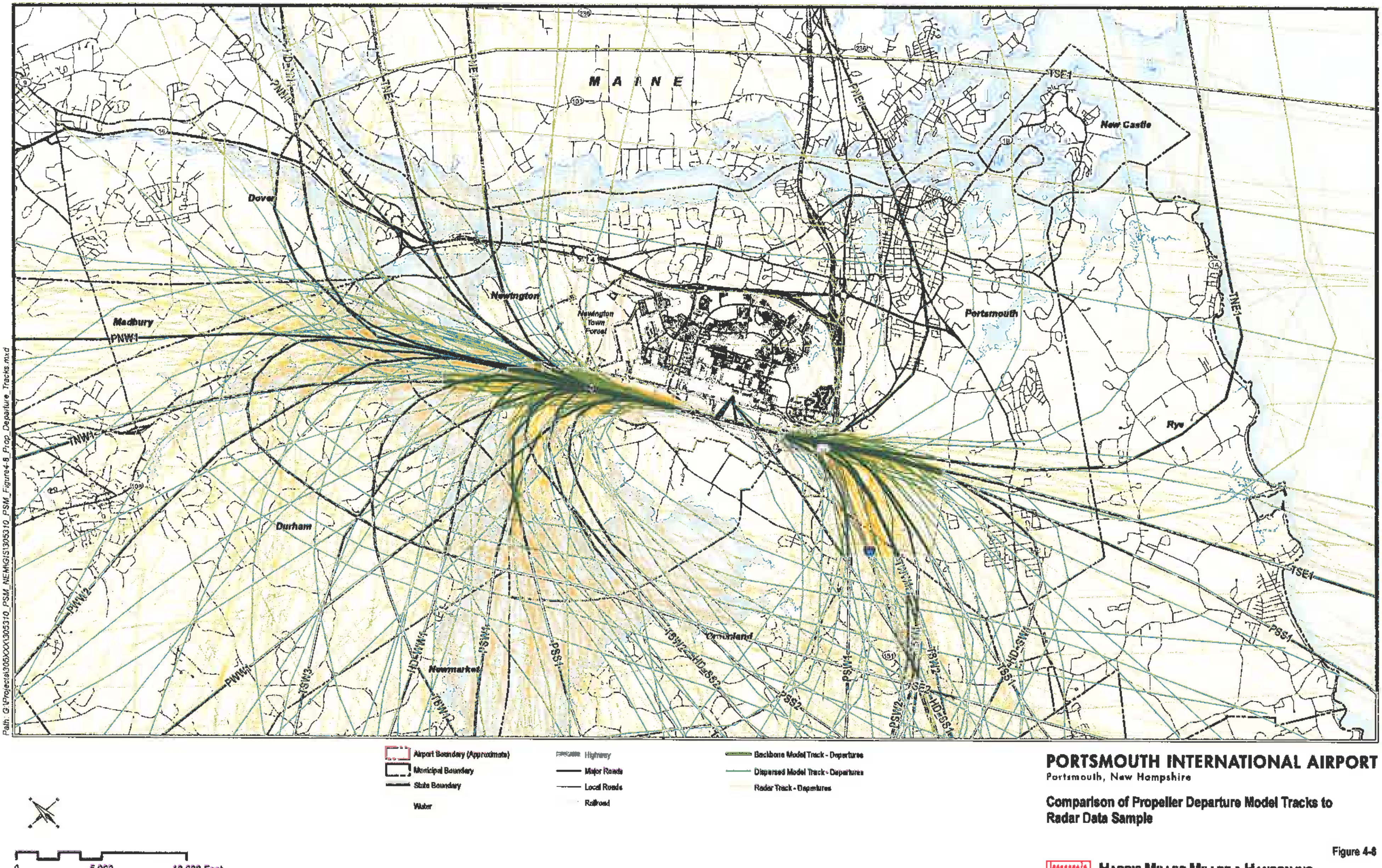


PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire

Comparison of Propeller Arrival Model Tracks to Radar Data Sample

Figure 4-7

HARRIS MILLER MILLER & HANSON INC.



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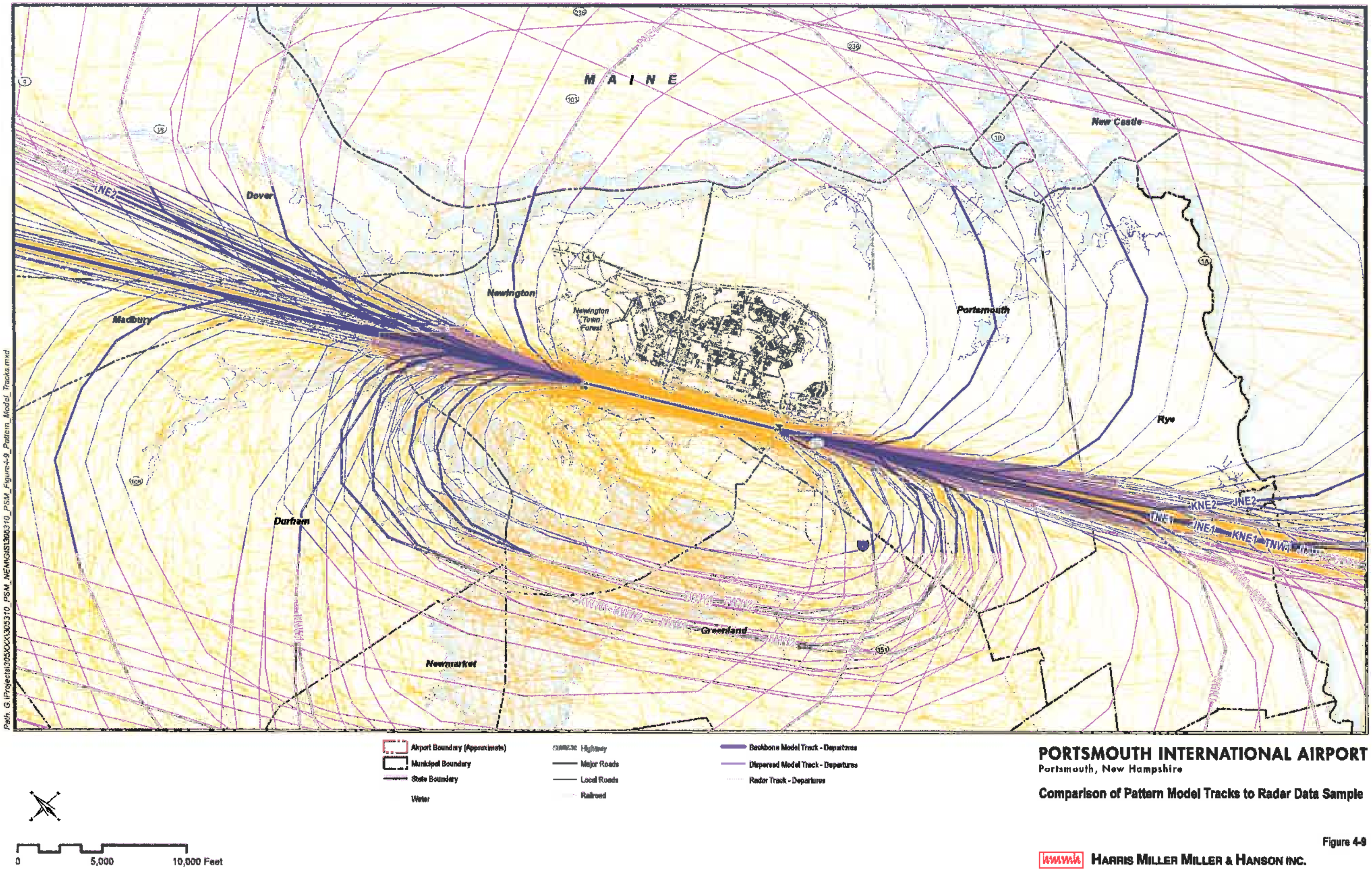
PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire

Comparison of Propeller Departure Model Tracks to Radar Data Sample

Figure 4-8

HARRIS MILLER MILLER & HANSON INC.



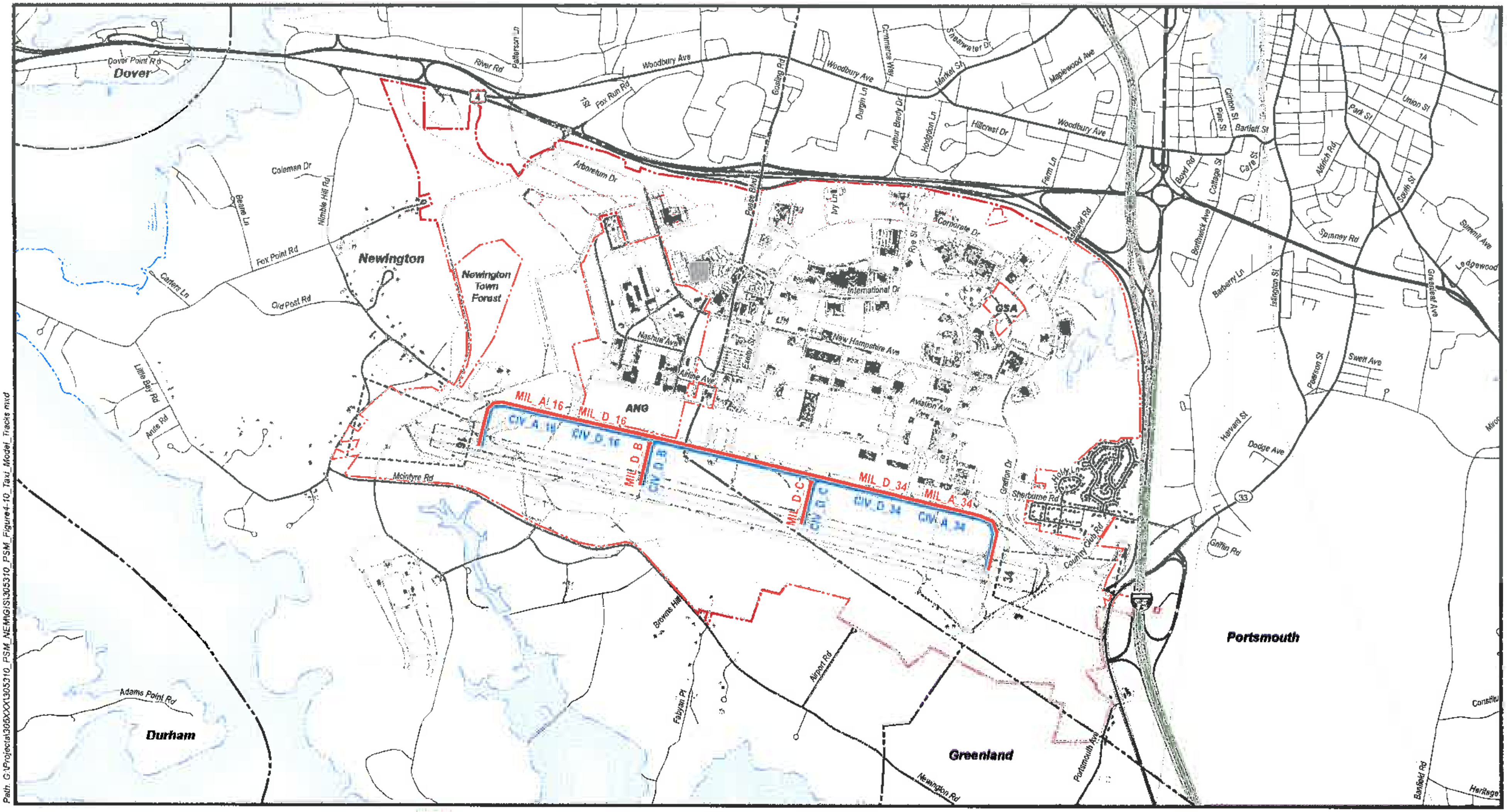
PORTSMOUTH INTERNATIONAL AIRPORT

Portsmouth, New Hampshire

Comparison of Pattern Model Tracks to Radar Data Sample

Figure 4-9

HARRIS MILLER MILLER & HANSON INC.



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PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire

Taxi Model Tracks

Figure 4-10

HARRIS MILLER MILLER & HANSON INC.

Table 4-9 Arrival Track Utilization

Engine Type	Runway	Track Group	Day	Night
Jet	16	IL1	41%	42%
		NE1	22%	3%
		SE1	6%	3%
		SS1	5%	3%
		SW1	13%	26%
		WW1	13%	23%
	Sub Total		100%	100%
	34	IL1	47%	44%
		NE1	14%	14%
		NW1	14%	11%
		SS1	21%	28%
		WW1	5%	3%
	Sub Total		100%	100%
KC-135R	16	IL1	50%	100%
		NE1	25%	0%
		WW1	25%	0%
	Sub Total		100%	100%
	34	IL1	64%	80%
		WW1	36%	20%
	Sub Total		100%	100%
Turboprops	16	IL1	33%	47%
		NE1	3%	3%
		NW1	9%	6%
		SE1	5%	0%
		SS2	16%	6%
		SS3	16%	14%
		SW1	10%	14%
		WW1	9%	11%
	Sub Total		100%	100%
	34	IL1	44%	35%
		NE1	6%	2%
		NW1	10%	6%
		SS1	10%	23%
		SS2	8%	14%
		SW1	14%	12%
		WW1	8%	9%
	Sub Total		100%	100%
Props	16	IL1	20%	25%
		NE1	18%	19%
		SS1	29%	38%
		SW1	20%	19%
		WW1	13%	0%
	Sub Total		100%	100%
	34	IL1	26%	15%
		NE1	9%	2%
		NW1	3%	0%
		SS1	6%	2%
		SS2	9%	0%
		SW1	18%	6%
		WW1	30%	75%
	Sub Total		100%	100%

Table 4-10 Departure Track Utilization

Engine Type	Runway	Track Group	Day	Night
Jet	16	NE1	12%	9%
		NE2	4%	9%
		SE1	21%	27%
		SW1	12%	18%
		WW1	17%	27%
		WW2	21%	9%
		WW3	13%	0%
	Sub Total		100%	100%
	34	NE1	19%	29%
		NW1	50%	48%
		SE1	16%	23%
		SW1	14%	0%
	Sub Total		100%	100%
KC-135R	16	NE1	38%	50%
		SE1	0%	33%
		WW3	62%	17%
	Sub Total		100%	100%
	34	NE1	11%	100%
		NW1	50%	0%
		SE1	28%	0%
		SE2	11%	0%
	Sub Total		100%	100%
Turboprops	16	NE1	7%	0%
		SE1	18%	17%
		SS1	7%	0%
		SW1	26%	17%
		SW2	25%	17%
		WW1	17%	50%
	Sub Total		100%	100%
	34	NE1	10%	9%
		NW1	27%	27%
		SE1	7%	9%
		SE2	7%	0%
		SW1	13%	18%
		SW2	4%	0%
		SW3	33%	36%
	Sub Total		100%	100%
Props	16	NE1	23%	8%
		SS1	17%	0%
		SW1	27%	42%
		SW2	33%	50%
	Sub Total		100%	100%
	34	NE1	14%	0%
		NN1	7%	0%
		NW1	10%	4%
		SS1	13%	15%
		SS2	15%	4%
		SW1	28%	62%
		WW1	6%	12%
		WW2	7%	4%
	Sub Total		100%	100%

Table 4-11 Pattern Track Utilization

Engine Type	Runway	Track Group	Day	Night
Jet	16	NE2	19%	40%
		NW2	69%	40%
		WW2	13%	20%
	Sub Total		100%	100%
	34	NE1	20%	17%
		NW1	60%	83%
		WW1	20%	0%
	Sub Total		100%	100%
KC-135R	16	NE2	39%	40%
		NW2	37%	60%
		WW2	24%	0%
	Sub Total		100%	100%
	34	NE1	25%	11%
		NW1	31%	49%
		WW1	44%	40%
	Sub Total		100%	100%
Turboprops	16	NE2	38%	0%
		NW2	31%	60%
		WW2	31%	40%
	Sub Total		100%	100%
	34	NE1	9%	9%
		NW1	55%	55%
		WW1	35%	35%
	Sub Total		100%	100%
Props	16	NE2	26%	N/A
		NW2	74%	N/A
	Sub Total		100%	N/A
	34	NE1	22%	N/A
		NW1	78%	N/A
	Sub Total		100%	N/A

Table 4-12 Arrival Helicopter Track Utilization

Track Group	Day	Night
HA_NE1	13%	20%
HA_NW1	19%	0%
HA_SS1	25%	20%
HA_SS2	31%	60%
HA_SW1	13%	0%
Total	100%	100%

Table 4-13 Departure Helicopter Track Utilization

Track Group	Day	Night
HA_NE1	13%	0%
HA_NW1	13%	0%
HA_SS1	50%	100%
HA_SS2	13%	0%
HA_SW1	13%	0%
Total	100%	100%

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5 PUBLIC CONSULTATION

The PDA prepared this Noise Exposure Map update with public consultation including the following principal elements:

- A public kick-off workshop was held from 6 to 7:30 p.m. on January 17, 2013 at the PDA offices at 55 International Drive, Portsmouth, NH. The workshop was organized around a set of "boards" which presented information on various aspects of the study. Staff from the PDA, HTA, and HMMH were present to answer questions about the study. At 7 p.m., HMMH gave a presentation and facilitated a question and answer period. The boards, which were also used as slides in the presentation, are presented in Appendix E. Appendix E also contains the public notice for the first workshop, the distribution list for the notice, and the sign-in sheet.
- The Draft Noise Exposure Map was presented at a public workshop from 6:30 to 8:00 p.m. on May 8th, 2014. The workshop was in "open house" format, so that interested parties could come at any time. Staff from the PDA, HTA, and HMMH were present to answer questions about the boards which displayed information on the results of the study. At 7 p.m., HMMH gave a presentation and facilitated a question and answer period. The boards, which were also used as slides in the presentation, are presented in Appendix F along with the public notice.
- Copies of the draft Noise Exposure Map were provided for attendees to review at the second workshop and comment sheets were provided for the reviewers to fill out and submit to the PDA, at the meeting or by the comment deadline. No written comments were submitted at the workshop.
- A month-long opportunity, starting on April 23rd and ending on May 23rd, was provided for public review and comment of the draft Noise Exposure Map. Copies of the draft document were available for public review at the PDA offices throughout this period and comment sheets were provided for reviewers to fill out and submit to the PDA, on-site or by the comment deadline. A single comment was submitted via email. It is presented in Appendix A.
- The Draft Noise Exposure Maps were also distributed to:
  - Richard Doucette, FAA New England
  - Tricia Lambert, NHDOT/Bureau of Aeronautics
  - Carol Niewola, NHDOT/Bureau of Aeronautics
  - Durham Library
  - Newington Library
  - Portsmouth Library
  - Greenland Library
  - Rye Library
  - Todd Selig, Town Administrator Durham
  - William St. Laurent, NCC
  - Margaret F. Lamson, NCC
  - Christopher Cross, NCC

  - Cynthia Cooley, Durham
  - Gary Ellmer
  - Troy Leedberg, Newington
  - Andrew Smith, NHANG Environmental Engineer
  - Gregory Harville, President New England Helicopter Council
- In the spirit of Part 150 requirements, copies of any further "written comments received during consultation"[22] should be filed with the FAA, including comments received after the deadline. No such comments were received.

[22] In 150.21(b).

APPENDIX A FAA ACCEPTANCE OF 1995 PART 150 NOISE EXPOSURE MAPS

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Federal Register / Vol. 60, No. 162 / Tuesday, August 22, 1995 / Notices 43641

shrimp trawl fisheries in the Gulf of Mexico, Caribbean and Western Atlantic Ocean (Belize, Brazil, Colombia, Guyana, Honduras, Mexico, Nicaragua, Panama, and Venezuela) have adopted programs to reduce the incidental capture of sea turtles in such fisheries comparable to the program in effect in the United States. The Department certified that the fishing environment in two other countries (Costa Rica and Guatemala) does not pose a threat of the incidental taking of sea turtles protected under Public Law 101-162. The Department was unable to issue certifications on April 28 for Suriname, Trinidad and Tobago, and French Guiana and, as a result, shrimp imports from these countries were prohibited effective May 1, 1995, pursuant to Public Law 101-162. The Department of State subsequently issued a certification for Trinidad and Tobago on August 15, 1995 and, as a result, the ban on shrimp imports that had been in effect since May 1, 1995, was lifted.

EFFECTIVE DATE: August 22, 1995.

FOR FURTHER INFORMATION CONTACT: Hollis Summers, Office of Marine Conservation, Bureau of Oceans and International Environmental and Scientific Affairs, Department of State, Washington, DC 20520-7818; telephone: (202) 647-3940.

SUPPLEMENTARY INFORMATION: Section 609 of Public Law 101-162 prohibits imports of shrimp from certain nations unless the President certifies to the Congress by May 1 of each year either: (1) That the harvesting nation has adopted a program governing the incidental capture of sea turtles in its commercial shrimp fishery comparable to the program in effect in the United States; or (2) that the fishing environment in the harvesting nations does not pose a threat of the incidental taking of sea turtles. The President has delegated the authority to make this certification to the Department of State. Revised State Department guidelines for making the required certifications were published in the Federal Register on February 18, 1993 (58 FR 9015).

The countries subject to the provisions of Public Law 101-162 include Belize, Brazil, Colombia, Costa Rica, French Guiana (EU), Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Suriname, Trinidad and Tobago, and Venezuela. On April 28, 1995, the Department of State certified that 11 of the 14 affected countries have met, for the current year, the requirements of the law. The countries that did not receive a certification at that time were Trinidad and Tobago, Suriname, and French Guiana. As a result, shrimp imports from Trinidad and Tobago were prohibited pursuant to Public Law 101-162 effective May 1, 1995. The ban on shrimp imports from Suriname (in effect since May 1, 1993) and French Guiana (in effect since May 1, 1992) remained in place.

The countries that received a certification on April 28, 1995, were Belize, Brazil, Colombia, Costa Rica, Guatemala, Guyana, Mexico, Honduras, Nicaragua, Panama, and Venezuela; with Trinidad and Tobago certified on August 15, 1995. Of these, the Department certified that the fishing environment in Costa Rica and Guatemala does not pose a threat of the incidental taking of sea turtles protected by Public Law 101-162. (In both these countries, the commercial shrimp trawl fleet operates exclusively in the Pacific Ocean with no activity on the Caribbean side.) The Department certified that the other ten countries have adopted a program to reduce the incidental capture of sea turtles in the commercial shrimp trawl fishery comparable to the U.S. program.

In reviewing information for the purpose of making the certifications, the Department looked at three principal elements of each country's program: (1) The legal and regulatory framework establishing the TED requirement for all commercial shrimp trawl vessels, except those specifically exempt under the Department's guidelines; (2) the implementation of that requirement and the extent to which TEDS are in use on all such vessels; and (3) the efforts of each country to monitor and enforce the TED requirement to ensure compliance. Because each country that received certification this year has established and is implementing the legal requirement to use TEDS, the Department will place particular emphasis in making future certifications on the third element, monitoring and enforcement of the TED requirement.

Finally, in implementing the ban on shrimp imports from Trinidad and Tobago which was in effect from May 1, 1995, to August 15, 1995, any shipment with a recorded date of export prior to May 1, 1995, was allowed entry into the United States even if it arrived on or after May 1, 1995. That is, shipments in transit prior to the effective date of the ban were not barred from entry.

Dated: August 16, 1995.

R. Tucker Scully,

Acting Deputy Assistant Secretary For Oceans.

[FR Doc. 95-20792 Filed 8-21-95; 8:45 am]

BILLING CODE 4710-09-M

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

Noise Exposure Map Notice; Receipt of Noise Compatibility Program and Request for Review, Pease International Tradeport, Portsmouth, New Hampshire

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice.

SUMMARY: The Federal Aviation Administration (FAA) announces its determination that the noise exposure map for Pease International Tradeport, as submitted by the Pease Development Authority under the provisions of Title I of the Aviation Safety and Noise Abatement Act of 1979 (Pub. L. 96-193) and 14 CFR part 150, is in compliance with applicable requirements. The FAA also announces that it is reviewing a proposed noise compatibility program that was submitted for Pease International Tradeport under Part 150 in conjunction with the niose exposure map, and that this program will be approved or disapproved on or before February 10, 1996.

EFFECTIVE DATE: The effective date of the FAA's determination on the noise exposure map and of the start of its review of the associated noise compatibility program is August 14, 1995. The public comment period ends on October 13, 1995.

FOR FURTHER INFORMATION CONTACT: John C. Silva, Federal Aviation Administration, New England Region, Airports Division, ANE-600, 12 New England Executive Park, Burlington, Massachusetts 01803.

Comments on the proposed noise compatibility program should also be submitted to the above office.

SUPPLEMENTARY INFORMATION: This notice announces that the FAA finds that the noise exposure map submitted for Pease International Tradeport is in compliance with applicable requirements of part 150, effective August 14, 1995. Further, FAA is reviewing a proposed noise compatibility program for that airport which will be approved or disapproved on or before February 10, 1996. This notice also announces the availability of this program for public review and comment.

Under section 103 of Title I of the Aviation Safety and Noise Abatement Act of 1979 (hereinafter referred to as "the Act"), an airport operator may submit to the FAA a noise exposure map which meets applicable regulations and which depicts non compatible land uses as of the date of submission of such map, a description of projected aircraft operations, and the ways in which such operations will affect such map. The Act requires such map to be developed in consultation with interested and affected parties in the local community, government agencies, and persons using the airport. An airport operator who has submitted a noise exposure map that is found by FAA to be in compliance with the requirements of Federal Aviation Regulation (FAR) part 150, promulgated pursuant to Title I of the Act, may submit a noise compatibility program for FAA approval which sets forth the measures the operator has taken, or proposes, for the introduction of additional non compatible uses.

The Pease Development Authority submitted to the FAA on August 1, 1995, a noise exposure map, descriptions, and other documentation which were produced during the Airport Noise Compatibility Planning (part 150) study at Pease International Tradeport from May 1991 to June 1995. It was requested that the FAA review this material as the noise exposure map, as described in section 103(a)(1) of the Act, and that the noise mitigation measures, to be implemented jointly by the airport and surrounding communities, be approved as a noise compatibility program under section 104(b) of the Act.

The FAA has completed its review of the noise exposure map and related descriptions submitted by Pease Development Authority. The specific maps under consideration were Figures 4-7, "Noise Exposure Map for 1993-94 Base Case", 4-10, "Noise Exposure Map for Future Scenario A", 4-15, "Noise Exposure Map for Future Scenario D", 6-16, "Ldn Contours for 1993-94 Base Case With Noise Abatement", 6-17, "Ldn Contours for Scenario A with Noise Abatement, Excluding Aircraft Access Restrictions", and 6-19, "Ldn Contours for Scenario D with Noise Abatement, Excluding Aircraft Access Restrictions", along with the supporting documentation in "Pease International Tradeport; FAR part 150 Airport Noise Compatibility Study". The FAA has determined that the maps for Pease International Tradeport are in compliance with applicable requirements. This determination is effective on August 14, 1995.

FAA's determination on an airport operator's noise exposure maps is limited to a finding that the maps were developed in accordance with the procedures contained in appendix A of FAR part 150. Such determination does not constitute approval of the applicant's data, information or plans, or a commitment to approve a noise compatibility program or to fund the implementation of that program. If questions arise concerning the precise relationship of specific properties to noise exposure contours depicted on a noise exposure map submitted under section 103 of the Act, it should be noted submitted under section 103 of the Act, it should be noted that the FAA is not involved in any way in determining the relative locations of specific properties with regard to the depicted noise contours, or in interpreting the noise exposure map to resolve questions concerning, for example, which properties should be covered by the provisions of section 107 of the Act. These functions are inseparable from the ultimate land use control and planning responsibilities of local government. These local responsibilities are not changed in any way under Part 150 or through FAA's review of a noise exposure map. Therefore, the responsibility for the detailed overlaying of noise exposure contours onto the map depicting properties on the surface rests exclusively with the airport operator which submitted the map, or with those agencies and planning agencies with which consultation is required under Section 103 of the Act. The FAA has relied on the certification by the airport operator, under § 150.21 or FAR part 150, that the statutorily required consultation has been accomplished.

The FAA formally received the noise compatibility program for Pease International Tradeport, also effective on August 14, 1995. Primarily review of the submitted material indicates that it conforms to the requirements for the submittal of noise compatibility programs, but that further review will be necessary prior to approval or disapproval of the program. The formal review period, limited by law to a maximum of 180 days, will be completed on or before February 10, 1996. The FAA's detailed evaluation will be conducted under the provisions of 14 CFR part 150, § 150.33. The primary considerations in the evaluation process are whether the proposed measures may reduce the level of aviation safety, create an undue burden on interstate or foreign commerce, or be reasonably consistent with obtaining the goal of reducing existing non compatible land uses and preventing the introduction of additional non compatible land uses.

Interested persons are invited to comment on the proposed program with specific reference to these factors. All comments, other than those properly addressed to local land use authorities, will be considered by the FAA to the extent practicable. Copies of the noise exposure map, the FAA's evaluation of the map, and the proposed noise compatibility program are available for examination at the following locations:

Pease Development Authority, Suite 1, 601 Spaulding Turnpike, Portsmount, New Hampshire 03801-2833

Federal Aviation Administration, New England Region, Airports Division, ANE-600, 12 New England Executive Park, Burlington, Massachusetts 01803

Questions may be directed to the individual named above under the heading: **FOR FURTHER INFORMATION CONTACT.**

Issued in Burlington, Massachusetts on August 14, 1995.

Vincent A. Scarano,

Manager, Airports Division, New England Region.

[FR Doc. 95-20795 Filed 8-21-95; 8:45 am]

BILLING CODE 4910-13-M

Intent To Prepare an Environmental Impact Statement and To Hold Environmental Scoping Meetings for Airside Improvements at Boston-Logan International Airport, East Boston, MA

AGENCY: Federal Aviation Administration, DOT.

ACTION: Notice of public environmental scoping meetings.

SUMMARY: The Federal Aviation Administration (FAA) is issuing notice to advise the public that an Environmental Impact Statement (EIS) will be prepared for a series of airside improvements under consideration by the Federal Aviation Administration and Massachusetts Port Authority (Massport) for Boston-Logan International Airport, in the City of Boston, Massachusetts. To ensure that all significant issues related to this planning effort are identified, public scoping meetings will be held.

FOR FURTHER INFORMATION CONTACT: John Silva, Manager, Environmental Programs, Federal Aviation Administration, New England Region, Airports Division, 12 New England Executive Park, Burlington, Massachusetts 01803. Telephone number: 617-238-7602.

SUPPLEMENTARY INFORMATION: The FAA, in cooperation with Massport, will prepare an EIS on a proposal to implement a program of airside improvements to reduce congestion and delay at Logan and to improve airfield operating efficiency. Logan is presently

APPENDIX B FAA RECORD OF APPROVAL ON 1995 PART 150 NOISE COMPATIBILITY PROGRAM

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Part 150: Records of Approval

Pease International Tradeport Portsmouth, New Hampshire

Approved on 2/9/96

1.0 INTRODUCTION

The Pease Development Authority sponsored an Airport Noise Compatibility Planning Study under a Federal Aviation Administration (FAA) grant, in compliance with Federal Aviation Regulations (FAR), Part 150. The Noise Compatibility Program (NCP) and its associated Noise Exposure Maps (NEM) were developed concurrently and submitted to FAA for review and approval on August 1, 1995. The NEM was determined to be in compliance on August 14, 1995. This determination was announced in the Federal Register on August 22, 1995.

The Part 150 Study was closely monitored by an advisory committee which represented area municipalities, airport users, and business, environmental, and community interests. A series of advisory committee meetings was held, with the airport's consultant presenting material and findings. Three public information meetings were held. The consultant addressed comments at all of these meetings, and subsequent written comments as well.

The study focused on defining an optimum set of noise and land use mitigation measures to improve compatibility between airport operations and community land use, presently and in the future.

The resultant program is described in detail in the "Noise Compatibility Program" volume of the study, Chapters 6, 7, and 8. Chapter 6 analyzes alternative operational measures. Chapter 7 analyzes potential land use control measures. Chapter 8 sets forth the Noise Compatibility Program. The program elements below summarize as closely as possible the airport operator's recommendations in the noise compatibility program and are cross-referenced to the program. The statements contained within the summarized recommendations and before the indicated FAA approval, disapproval, or other determinations do not represent the opinions or decisions of the FAA.

The approvals which follow include actions which the Pease Development Authority recommends be taken by FAA. It should be noted that these approvals indicate only that the actions would, if implemented, be consistent with the purposes of Part 150. These approvals do not constitute decisions to implement the actions. Later decisions concerning possible implementation of these actions may be subject to applicable environmental or other procedures or requirements.

2.0 PROGRAM ELEMENTS

2.1 Noise Abatement Elements

2.1.1 Formal Designation of Preferential Runway System (sections 6.2.1 and 8.2.1). Runway 34 is currently the preferred runway for calm wind conditions (less than 5 knots) and is used approximately 75 per cent of the time. Except as described in the next noise abatement element, this practice would be made formal through a Letter of Agreement between the Pease Development Authority (PDA) and the Air National Guard contracted air traffic control tower.

Approved as Voluntary . This is an administrative action that would help ensure continued use of Runway 34. This measure is being proposed in conjunction with 2.1.2 and 2.1.3.

2.1.2 Nighttime Runway Use System (sections 6.2.3 and 8.2.2). Between the hours of 10 pm and 7 am Runway 16 would be preferred for departures and Runway 34 preferred for landings, as traffic conditions permit (Pease Air Traffic Control Tower operates 24 hours per day).

Approved as voluntary. This measure would reduce noise exposure to close-in Newington residents to the north within the 65 DNL noise contour. Benefits to exposed residential populations are combined with the next measure, which addresses flight tracks. This measure is being proposed in conjunction with 2.1.1 and 2.1.3.

2.1.3 Noise Abatement Flight Tracks (sections 6.3.1, 6.7, and 8.2.3). Standard departure procedures would be established for both visual and instrument meteorological conditions as follows: (1) departures from Runway 16 to the south, west, and northwest via Lawrence (LWM), Concord (CON) or Montpelier (MPV) would maintain runway heading until passing 1.5 DME from the Pease VORTAC, then turn right to overfly Interstate Highway 95 on a magnetic heading of 220 degrees until reaching an altitude of 3000 feet MSL or until passing 5.0 DME from the Pease VORTAC; (2) departures from Runway 16 to the northeast via Kennebunk (ENE) would climb on runway heading until reaching an altitude of 3000 feet MSL; (3) west and southbound departures from Runway 34 would climb on runway heading until reaching an altitude of 2000 feet MSL.

Approved as voluntary. This measure would divert aircraft overflights away from residential areas in Portsmouth and more evenly distribute flight tracks over portions of Newington, Durham, and Dover. Combined with the nighttime runway use system proposed above (and assuming continuation of the existing preferential runway system) these measures would reduce existing noise exposure within the 60 DNL noise contour, the level of residential incompatibility adopted for use in the study, from an estimated 842 residents to an estimated 731 residents (Figure 6-19 and Table 6-9). Future (2011) noise exposure within the 60 DNL contour would be reduced from an estimated 1054 residents to an estimated 920 residents (Figure 6-5 and Table 6-10). This measure is being proposed in conjunction with 2.1.1 and 2.1.2. 2.1.4 Descent Profile for VFR Traffic Arriving from the North or East to Runway 34 (sections 6.3.2 and 8.2.4). VFR aircraft arriving from the north or east to Runway 34 would be directed to enter a 2-mile final approach at or above 700 feet MSL, traffic permitting. This measure is intended to minimize low-flying aircraft over a residential area immediately to the southeast of the runway.

Approved. This measure would apply to a relatively small number of mostly light aircraft operations. The DNL for the noise measurements conducted for the study indicate that the Sherburne neighborhood is currently exposed to DNL 60.4 dB (Table 4-10). It would experience a reduction of between .4 (scenario D) and 1.3 (scenario A) dB.

2.1.5 NAVAID Improvements (sections 6.4.3 and 8.2.5). The PDA would support existing FAA plans to install an Instrument Landing System (ILS) on Runway 16.

Approved. This approval is for the use of the ILS and does not extend to a commitment on the part of FAA to install an ILS on Runway 16; it merely acknowledges the slight improvement to the noise environment. While reduction in the size of the 60 DNL contour would be insignificant because of the small number of aircraft that would be diverted from the more easterly VOR approach course, FAA recognizes that individual turbojet Sound Exposure Levels over more populated areas of the city of Dover and town of Durham would be reduced slightly (comparison of Figures 6-19 and 6-11).

2.1.6 Establishing the Location of Run-up Areas (sections 6.4.4 and 8.2.6). PDA will work with tenants to establish the location of preferred preflight and maintenance run-up areas. The location of these areas at ramp and runway end areas permits wide latitude in conducting preflight and maintenance runups. Upon completion of the noise barrier proposed as the next noise abatement element, maintenance run-ups would be conducted at this location.

Approved. This measure would mitigate noise exposure levels at or above those adverse levels specified in Table 8-2.

2.1.7 Noise Barrier (sections 6.4.5 and 8.2.7). An optimum noise barrier for ground engine run-ups would be placed on the apron in the vicinity of the large maintenance hangar. Design of the barrier would be reviewed by a Noise Compatibility Committee prior to approval.

Approved. Table 8-2 indicates that reductions of approximately 10 dB in noise exposure to the Panaway Manor area south of the apron and Airport Road area north of the apron can be achieved through the construction of a noise barrier on the apron in the vicinity of the large maintenance hangar. Resultant noise exposure would be below levels that would normally interfere with human activity.

2.1.7 Design and Placement of Structures in the Vicinity of the Airport Apron. PDA would ensure that future building projects occurring near the airport apron consider the potential use of the buildings as noise barriers for aircraft taxiing and run-up operations. This would be implemented through site plan review and airport master planning.

Approved. Where discretion in the placement of structures is available, this measure can provide added benefits in reducing aircraft ground noise exposure.

2.1.8 Limitations on Types of Aircraft (sections 6.5.2, 6.7.4, and 8.2.9). PDA would negotiate voluntary nighttime restrictions on aircraft having a departure Lmax which exceeds 85 dBA as specified in FAA Advisory Circular AC-36-3F (or subsequent revisions). Analysis of projected future operations at Pease revealed that a few nighttime flights by relatively noisy Stage 3 aircraft would be responsible for an inordinate share of the airport's noise impacts. Voluntary restrictions of nighttime operations of aircraft above 85 dBA Lmax would provide DNL relief up to 3 dB for Newington residential areas and the Sherburne neighborhood of Portsmouth inside the 60 DNL noise contour.

Approved in concept. Where an airport operator determines that there is a need to control noise levels, FAA encourages voluntary arrangements with users rather than mandatory measures. However, the FAA is unable to confirm the NCP's quantified benefits of this recommendation since the aircraft projected to be impacted by the estimated timeframe for Scenario A (Table 6-3) do not currently serve PSM, are no longer in production, and may reach the end of their useful life and be replaced by quieter Stage 3 aircraft before their nighttime use at PSM occurs. This analysis would not be sufficient to support a mandatory restriction.

2.1.9 Continue Restrictions on Aircraft Run-ups. This measure, which is currently in effect, differs from that proposed above as "Establishing the Location of Run-up Areas" in that it restricts the location of ground run-ups by operating rule of the airport (Zoning was considered as an alternative but not adopted.). The locations are the same as those in the run-up measure 2.1.6. Appropriate restrictions will be included in any future leases with a tenant that intends to conduct maintenance operations at PSM.

Approved in part: disapproved in part pending submission of sufficient information to make an informed analysis. Approved with respect to establishing in airport rules the location of runups. This portion of the measure relates directly to measure 2.1.6, above.

The NCP does not contain the proposed regulations, including any sanctions. It is not possible for the FAA to determine whether portions of the regulations, such as time of day or partial power settings, may reduce the level of aviation safety provided (14 CFR 150.35).

For purposes of determining applicability of 14 CFR Part 161 to the airport rules and leases, there is insufficient information to determine whether time of day and partial power setting restrictions could have the effect of limiting total numbers or hours of aircraft operations (14 CFR 161.7). There is also insufficient information to determine whether restrictions other than those described in the NCP are contemplated.

2.1.10 Conduct Part 161 Study of Mandatory Access Restrictions. The PDA would study and consider implementing, under the provisions of Federal Aviation Regulation, Part 161, mandatory access restrictions. This recommendation was suggested by a preliminary noise impact study which showed that a mandatory access restriction on nighttime operations by aircraft exceeding a departure Lmax of 85 dBA would reduce the number of dwellings and therefore the people in the DNL 60 dB or greater contour. Other restrictions could be expected to produce similar or greater reductions in noise exposure, but with as yet unknown economic impacts to the airport and the region. An update to the Part 150 study should be undertaken to examine the benefits and costs of selected mandatory use restrictions in accordance with Part 161 of the Federal Aviation Regulations.

Approved for study. The airport operator proposes to evaluate mandatory airport noise or access restrictions to mitigate below levels proposed to be accomplished by non-restriction measures contained in this NCP, and to update the Part 150 study. The airport operator will update the Part 150 study to examine the benefits and costs of selected mandatory use restrictions in accordance with Part 161 of the Federal Aviation Regulations. Approval to conduct an analysis of proposed mandatory restrictions in accordance with 14 CFR Part 161 requirements may not be construed as approval of any action to implement a recommendation contained in that analysis. Neither is approval to conduct the analysis required by 14 CFR Part 161 a commitment by FAA to grant approval of any recommendation nor to otherwise concur in any recommendation.

2.2 Land Use Elements

2.2.1 Remedial Sound Insulation (sections 7.3.1 and 8.3.1). PDA would offer a sound insulation option to existing dwellings (and one church) in Newington and Portsmouth, where such structures are exposed to 65 DNL or greater under the abated 1993-1994 Base Case. This could affect approximately five homes in Newington and three in Portsmouth, as well as one church in Portsmouth.

Approved. This measure would establish and help ensure future land use compatibility beyond what can be achieved with the above operational noise abatement elements.

2.2.2 Fee-Simple Purchase for Compatible Use (sections 7.3.3 and 8.32). PDA would offer to purchase, on a voluntary basis, existing dwellings in Newington and Portsmouth which are exposed to 65 DNL or greater under the abated 1993-94 Base Case, as well as undeveloped, residentially-zoned land in Newington which would be exposed to 65 DNL or greater as depicted in "Scenario A (approximately 2011) with aircraft access restrictions." Approximately five homes in Newington and three in Portsmouth would be considered. Additionally, approximately 160 acres of residentially-zoned land in Newington would be considered.

Approved. Acquisition of vacant, noncompatibly zoned land is subject to a showing that the land cannot be rezoned and is likely to be developed incompatibly absent acquisition.. This measure would also establish and help ensure future land use compatibility.

2.2.3 Sales Assurance (sections 7.3.4 and 8.3.3). For owners of existing, remaining dwellings exposed to 60-65 DNL the PDA would offer to guarantee the sale of a home at fair market value, as funding permits.

Approved.

2.2.3 Construction Standards (sections 7.4.1 and 8.3.4). PDA would request that the Town of Newington enact mandatory sound-insulation performance standards for construction of future noise-sensitive structures within the 60 DNL noise exposure contour.

Approved. The FAA strongly discourages new noncompatible development in areas designated as airport noise-sensitive. Where the community determines that noise-sensitive uses must be allowed, 14 CFR Part 150 encourages measures to achieve appropriate outdoor to indoor noise level reduction. Soundproofing of new homes developed after approval of the NCP may not be eligible for Federal funding.

2.2.4 Construction Guidance (sections 7.4.2 and 8.3.5). PDA would request Greenland, Newington, Portsmouth, and Rye provide advisory sound-insulation performance guidelines for construction of future noise-sensitive structures exposed to noise levels of 55-60 DNL (55 DNL and above in Portsmouth). Newington and Portsmouth would be requested to provide such guidance for construction of future public-oriented, commercial, and industrial structures to be exposed to 60 DNL and greater. PDA would adopt similar guidelines for future development within PDA jurisdiction.

Approved. The FAA strongly discourages new noncompatible development in areas designated as airport noise-sensitive. Where the community determines that noise-sensitive uses must be allowed, 14 CFR Part 150 encourages measures to achieve appropriate outdoor to indoor noise level reduction. Mitigation of new noise-sensitive structures developed after approval of the NCP may not be eligible for Federal funding.

2.2.5 Subdivision and Site Review Regulations (sections 7.4.5, 7.4.6, and 8.3.6). PDA would request that Newington and Portsmouth amend their development review regulations to address compatibility of future land uses with Pease operations. The PDA would adopt similar provisions in its land use development regulations.

Approved. The FAA strongly discourages new noncompatible development in areas designated as airport noise-sensitive. Soundproofing of new homes developed after approval of the NCP may not be eligible for Federal funding.

2.2.6 Master Planning (7.4.9 and 8.3.7). PDA would request that Greenland, Newington, Portsmouth, and Rye review community master plans and capital improvement programs in order to advance policies encouraging compatibility between their land uses and Pease operations. PDA would, as necessary, adopt similar policies in its own master plan and capital improvement programs.

Approved

. **2.3** Administrative Elements

2.3.1 Noise Monitoring Equipment (sections 6.6.1 and 8.4.1). PDA would establish a noise monitoring program utilizing two portable sound monitoring units.

Approved.

2.3.2 User Education (sections 6.6.3 and 8.4.2). PDA would undertake an on-going user education program to establish and maintain an awareness of the noise abatement programs at the airport.

Approved.

2.3.3 Citizen Complaint Mechanism (sections 6.6.4 and 8.3.4). PDA would continue to operate the noise complaint system for recording, researching, and reporting on citizen complaints about aircraft noise.

Approved.

2.3.4 Community Participation Program (sections 6.6.5 and 8.4.4). PDA would establish a permanent Noise Compatibility Committee (NCC) to monitor implementation of the Part 150 study and ensure ongoing community participation in implementing the noise compatibility program.

Approved.

2.3.5 Public Outreach Program (sections 7.5.1 and 8.4.5). PDA would periodically issue a newsletter on implementation of the noise compatibility program.

Approved.

APPENDIX C OVERVIEW OF PART 36 STAGE CLASSIFICATIONS

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C.1 Introduction

The Federal Aviation Administration (FAA) has established limits on allowable levels of aircraft noise emissions, under 14 CFR Part 36, " Noise Standards: Aircraft Type and Airworthiness Certification," that sets noise standards airplanes must meet to receive new or revised "type" or "airworthiness" certificates, to operate in the U.S. The standards, measurement locations, and procedures, and noise limits vary according combinations of aircraft "design" criteria, including, but not limited to, factors such as subsonic versus supersonic speed capabilities, type of propulsion (e.g. turbojet- or propeller-driven), weight categories (e.g., "small" aircraft with maximum gross takeoff weights less than 12,500 pounds, and "large" aircraft with maximum takeoff weights of 12,500 pounds or more), helicopter versus fixed-wing aircraft, operating category (e.g., "agricultural", "transport", and "commuter"), date of initial fight, and, in limited cases, even specific engine manufacturer and model or specific characteristics of turbojet engines. In general, permissible noise levels, in terms of Effective Perceived Noise decibels (EPNdB), increase with maximum gross takeoff weight.

C.2 Initial Rule: 1969 - Establishment of Initial Certification Standards

When first promulgated in 1969, Part 36 only applied to "transport-category" large aircraft and all turbojet-powered aircraft. Transport category includes all jets with 10 or more seats or greater than 12,500 pound maximum takeoff weights, and all propeller-driven airplanes with greater than 19 seats or greater than 19,000 pound maximum takeoff weight. The regulation set separate measurement requirements and limits for takeoff, sideline, and approach locations. Also when promulgated in 1969, the regulation categorized aircraft as "certificated" or "uncertificated", to reflect whether the aircraft type had passed testing or not.

C.3 1974 Amendment - Application of Part 36 to Propeller-Driven Aircraft

The FAA added noise standards for "propeller driven small aircraft" in 1974, prior to the creation of the "stage" terminology. They continue to be termed either "certificated" or "uncertificated", with no stage references.

C.4 1977 Amendment - Introduction of Stage Classifications

In 1977, the FAA amended Part 36 to define more stringent noise limits for transport-category large aircraft and all turbojet-powered aircraft types, and introduced the concept of certification "stages", to provide terminology to differentiate between the original and revised standards. For "transport category" large airplanes and all turbojet-powered airplanes, this amendment created three stages:

- "Stage 1" aircraft have never been shown to meet any noise standards, either because they have never been tested, or because they have been tested and failed.
- "Stage 2" aircraft meet original noise limits, set in 1969.
- "Stage 3" aircraft meet more stringent limits, established in 1977.

C.5 1988 Amendment - Addition of Certification Standards for Helicopters

The FAA amended Part 36 to incorporate standards for helicopters in 1988, after the creation of stage terminology. Part 36 uses two stage classifications for helicopters. Stage 1 helicopters are uncertificated, either because they have never been tested for compliance with noise standards, or because they have been tested and failed to meet the standards. Stage 2 helicopters are certificated, because they have passed the prescribed tests. The segregation of helicopters into only two Part 36 classifications is equivalent to the manner in which the regulation treats "propeller driven small aircraft". Stage 2 does not have the same meaning for helicopters as for transport-category large aircraft and turbojet-powered aircraft, for which it reflects compliance with less stringent limits. For helicopters, it reflects compliance with the highest standards the FAA has issued to date. Measurement locations and testing requirements differ significantly for helicopters and proper-driven small airplanes, compared to each other, and to transport-category large aircraft and turbojet-powered aircraft.

C.6 2005 Amendment - Addition of Stage 4 Certification Standards

In 2005, FAA amended Part 36 to adopt a Stage 4 classification. The Stage 4 noise limits are a cumulative 10 EPNdB less than those for Stage 3. All subsonic turbojet-powered and transport-category airplanes with maximum gross takeoff weights of 12,500 pounds or more for which application of a new type design is submitted on or after January 1, 2006, must meet new noise certification levels.

It should be noted that the new Stage 4 standard applies only to application for a new airplane type design on and after January 1, 2006. It does not initiate any FAA process to phase out the production or operation of current aircraft models. Stage 1, 2, and 3 aircraft under 75,000 pounds and Stage 3 aircraft of 75,000 pounds or more may continue to operate in the U.S. However, it also should be noted that most, if not all, civil subsonic turbojet aircraft under 75,000 pounds in production today meet Stage 4 standards.

C.7 Phase-out of Stage 1 and 2 Operations

In response to the direction of the U.S. Congress, the FAA has adopted regulations that ban U.S. operations of Stage 1 and 2 civil jet operations, with limited exemptions for emergency operations, individual flights for the purpose of permanently flying the aircraft out of the U.S., or flying them in for modification to meet noise standards, etc. Specifically:

- In 1976, the FAA adopted regulations that banned essentially all U.S. civil operations in Stage 1 jet aircraft with maximum gross takeoff weights over 75,000 pounds after 1988.
- In 1991, the FAA strengthened these regulations to ban essentially all U.S. civil operations in Stage 2 jet aircraft with maximum gross takeoff weights over 75,000 pounds after 1999.
- In 2013, the FAA adopted regulations that banned essentially all U.S. civil operations in Stage and 2 jets with maximum gross takeoff weights under 75,000 pounds after 2015.

Therefore, as of January 1, 2016, essentially all civil jet aircraft operating in the U.S. will be required to meet Stage 3 standards and essentially all newly manufactured jet aircraft will be required to meet Stage 4 standards.

APPENDIX D DEVELOPMENT OF LAND USE MAP AND POPULATION ESTIMATES

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D.1 Introduction

The land uses depicted on figures in the body of this document reflect the results of a careful land use inventory and base map development process that took advantage of data provided by the local municipalities, other publicly available sources, and a field survey of land uses within the extents of the 60 dB DNL contours for the two NEMs.

Section D.2 addresses the land use and noise sensitive receptors inventory and verification. Section D.3 summarizes the population estimation process.

D.2 Land Use and Noise Sensitive Receptors

The land use classifications were developed utilizing data from several sources:

- City of Portsmouth Assessors Office
- Town of Newington
- Town of Greenland
- Pease Development Authority, Zoning Map, October 2013
- Rockingham Planning Commission: Newington and Greenland Composite Tax Maps 2006

CAD data parcel boundaries and zoning maps were combined within a Geographic Information System (GIS) and digitized into Environmental Systems Research Institute (ESRI) shapefile format. These data were coded to comply with Part150 land use categories outlined in "Guide to Airport Noise Rules and Use Restrictions; Sec 150.11 Identification of land uses", and "Table 1--Land Use Compatibility" classes, Page 47.

Noise sensitive receptor data (schools, places of worship, hospitals, and nursing homes/assisted living) were developed utilizing data from the following sources:

- New Hampshire's GRANIT Statewide GIS Clearinghouse
- Geographic Names Information System (GNIS)

Within the extents of the NEM 60 dB DNL contours, existing land uses and noise sensitive receptors were verified on a parcel-by-parcel basis through comprehensive street-by-street inspection visits. For residential parcels, this included field identification of the number of residential dwelling units.

Figure D-1 depicts the final land use base map, reflecting the field-verification.

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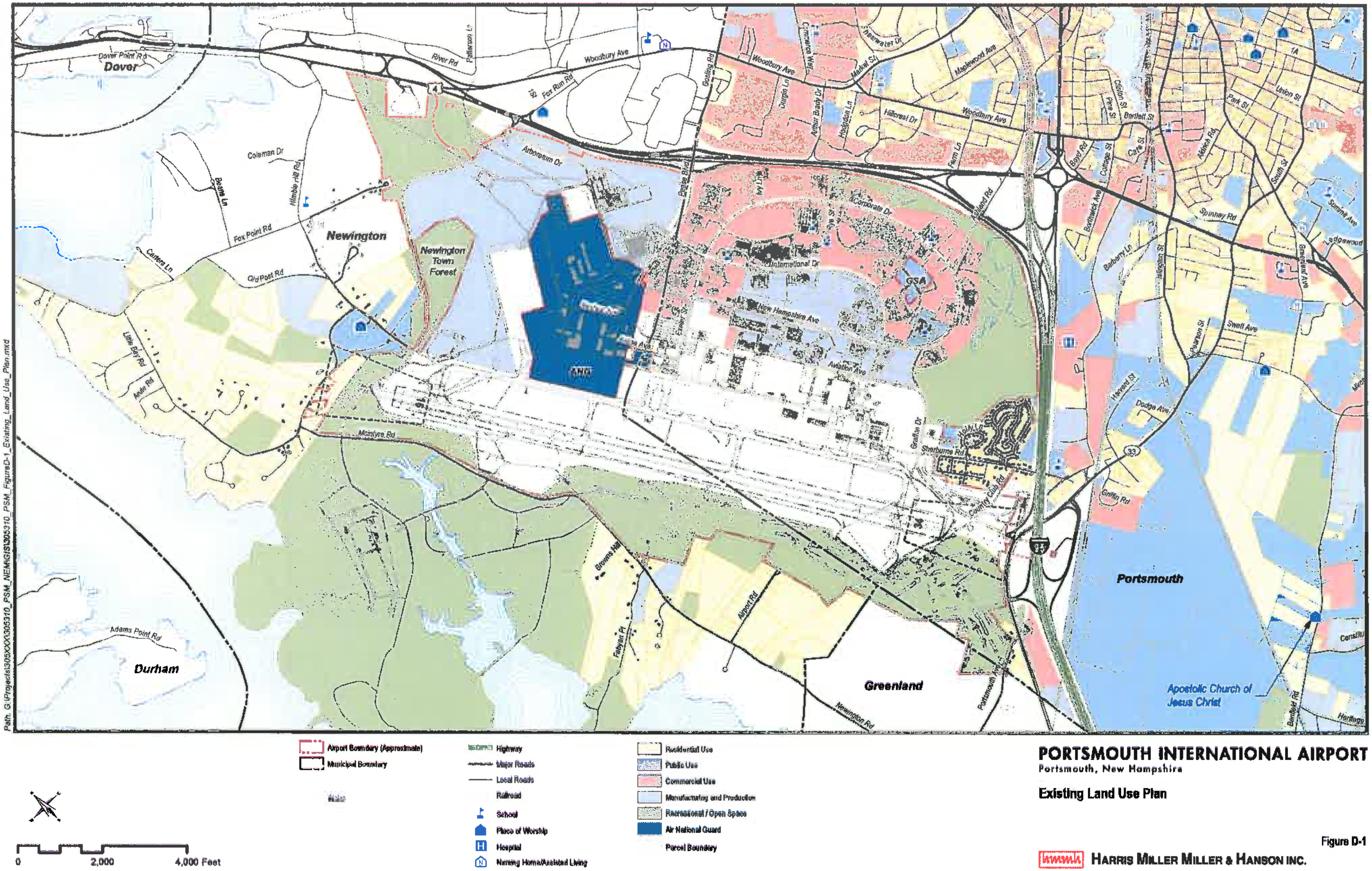

Path: G:\Projects\305XXX\305310_PSM_NEM\GIS\305310_PSM_FigureD-1_Existing_Land_Use_Plan.mxd

PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire

Existing Land Use Plan

Figure D-1

HARRIS MILLER MILLER & HANSON INC.

D.3 Population Estimation Process

In order to estimate the number of people and dwelling units within each noise contour interval, the existing land use map, described above, was overlaid on 2010 US Census TIGER file maps that depict the smallest enumeration unit; Census block boundaries. Polygons were then created using land use that concentrated the Census population into the parcels with verified residential uses within each Census block. For example, in some areas, the residential uses are concentrated along the road, rather than over several square miles of open or undeveloped land within the census block. Additionally, large parcels with residential uses were subdivided if large portions of the parcel contained primarily open space or agricultural use. The population was concentrated in area of the actual residence. This results in a more accurate count of actual residents and housing units within the contour intervals.

Using Geographic Information Systems (GIS) tools, the noise contours were intersected with these "Residential/Census" data for each DNL noise contour interval. The resultant wholly or partially encompassed Residential/Census areas were then identified; the proportion of total Residential/Census area within the contour level was then computed to determine the estimated residential population and housing unit counts and ascribed to that level.

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APPENDIX E FIRST PUBLIC WORKSHOP MATERIALS

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E.1 Presentation Slides / Boards

Welcome

to the

PSM DAW

PEASE

Portsmouth International Airport at Pease (PSM)
Part 150 Noise Exposure Map Update
Public Workshop

January 17, 2013

Workshop Overview

www.hmmh.com

The following topics are covered in individual workshop "stations:"

- **Introduction**
  - Part 150 overview
  - Prior PSM Part 150 process
  - Scope and status of this update
- **Noise analysis**
  - Terminology
  - Noise modeling
  - Land use compatibility
- **Project Schedule**
  - Including public involvement and comment opportunities

Please take your time and ask any questions of interest.

We are very interested in understanding your concerns.

2

What is "Part 150"?

www.hmmh.com

- 14 C.F.R Part 150, "Airport Noise Compatibility Planning"
- *Voluntary* FAA-defined process for airport noise studies
- Two major components
  - Noise Exposure Map – FAA "accepts"
    - Detailed description of airport layout, operations, noise exposure, land uses, and noise/land use compatibility for at least two years
  - Noise Compatibility Program – FAA "approves" individual measures
    - Noise abatement measures to reduce noise exposure
    - Land use mitigation measures to address existing non-compatible uses
    - Land use control measures to prevent new non-compatible uses
  - *This study is a Noise Exposure Map update only*
- Public involvement is a critical consideration
  - Consultation *is required* with users and land use control jurisdictions
  - Input will be sought from *all interested parties*

3

PSM Part 150 Studies

www.hmmh.com

- **Prior Part 150 Study – Completed June 1995**
  - Noise Exposure Map
    - 1992 base year noise contours and land use compatibility
    - 1993-94 base year noise contours and land use compatibility
    - Forecast noise contours for four scenarios
  - Noise Compatibility Program
    - Noise abatement measures
    - Land use management measures
    - Noise program management
- **Current Part 150 Study – To be completed by fall of 2013**
  - Noise Exposure Map Update only
    - 2013 existing conditions noise contours and land use compatibility
    - 2018 forecast year noise contours and land use compatibility
  - Noise Compatibility Program implementation will be reviewed

4

Part 150 Study Elements and Current Status

www.hmmh.com

Two study elements are underway:

1. **Design and Conduct a Public Participation Program**
   This meeting is the first of two public workshops
2. **Develop Operational, Noise, and Land Use Database**
   Will continue over the next several months

Subsequent elements include:

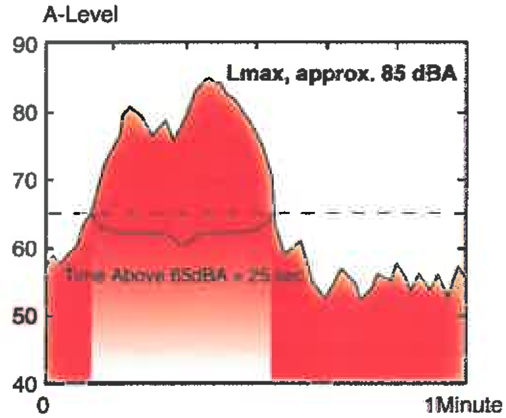
3. **Compute noise levels in FAA's Integrated Noise Model**
4. **Identify non-compatible land uses**
5. **Evaluate status of existing Noise Compatibility Program**
6. **Prepare Draft Noise Exposure Map Update document**
7. **Prepare and submit Final Noise Exposure Map Update**

5

Noise Terminology

www.hmmh.com

- **A-weighted decibel (dBA)**
  - Reflects the manner humans hear different pitches of sound
  - All federal agencies have adopted dBA for environmental studies
- **Single event metrics**
  - Maximum sound level (Lmax)
    - Easiest to understand
    - "How loud did it get?"
  - Time-Above threshold (TA)
    - "How long will it affect me?"
    - Outdoor speech interference starts at about 65 dBA
  - Sound Exposure Level (SEL)
    - Noise "dose" over entire event
    - Compresses noise into one second
  - ***FAA will not base Part 150 approvals on single event metrics***

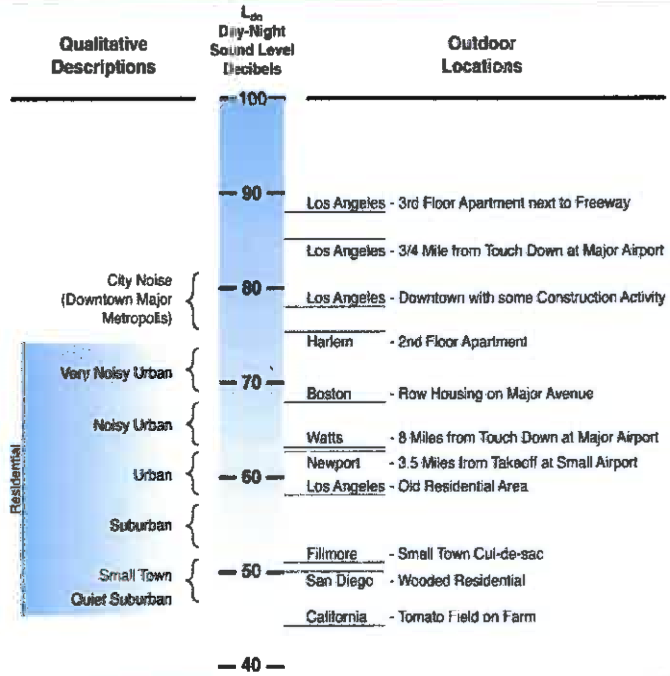


5

Day-Night Average Sound Level ("DNL" or "Ldn")

www.hmmh.com

- Cumulative noise measure
- Equal to steady level that contains same energy as the actual time-varying sound
- Increases sounds from 10 p.m. to 7 a.m. 10-fold
- Used by all federal agencies that deal with aviation noise
- Basis for FAA approval of noise abatement measures



7

Noise Modeling

www.hmmh.com

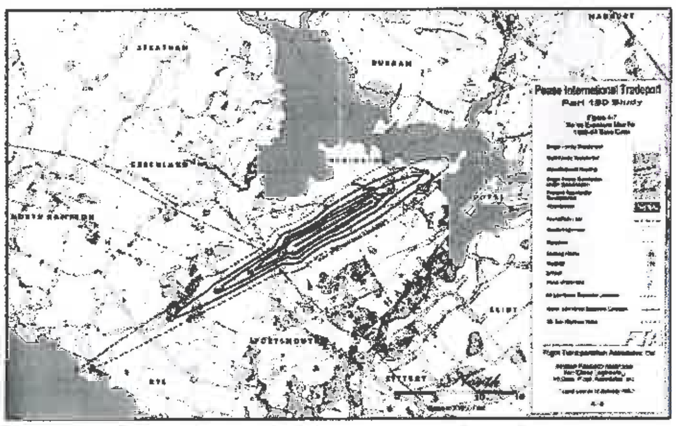
- **Part 150 requires that noise exposure be determined using the FAA's Integrated Noise Model ("INM")**
- **Noise modeling inputs include**
  - Average daily arrivals and departures
    - By aircraft type
    - By time of day
  - Arrival and departure "cockpit" procedures
  - Airfield layout
  - Percentage use of runways
  - Flight track geometry and use
  - Runup activity
  - Taxiing activity

8

Land Use Analysis

www.hmmh.com

- Conduct within 65 DNL contour for 2013 and 2018
  - Identify any noncompatible land uses based on Part 150 guidelines
  - Identify discrete noise-sensitive uses (e.g., schools)
  - Identify historic properties
  - Identify land-use control jurisdictions



9

Schedule

www.hmmh.com

Milestone	Anticipated Completion Date
Notice-to-proceed	October 2012
First public workshop	January 2013
Public comment period	Minimum 30 days in July / August 2013
Second workshop	At start of comment period
Final NEM submittal	September 2013

The public comment period and second workshop will be announced in advance via newspaper advertisements and notices on the Pease International Tradeport website (http://www.peasedev.org/).

Please indicate on the sign-in sheet if you would like to receive an emailed notification of these further public involvement opportunities.

10

Public Input and Comment Opportunities

www.hmmh.com

- Tonight's kickoff workshop
  - Comments will be accepted in any written format
  - Comment sheets are available, if desired
  - Please sign in
- Second workshop will present draft study findings
  - Draft Noise Exposure Map document will be available for review
  - Draft document also will be available for review at publicly accessible locations
  - Comments will be accepted throughout an identified 30-day comment period via mail or email
  - Comment period / second workshop notice will provide details

Thank you for attending!

11

E.2 Notice

NOTICE OF PUBLIC MEETING
Posted December 18, 2012

The Pease Development Authority be holding an open workshop style meeting to provide details on the Portsmouth International Airport at Pease noise study update that considers noise compatibility around the airport from 2013 to 2018.

This meeting will be open to the public.

Location: **PDA Board Room, 55 International Drive, Pease International Tradeport**

Date: **January 17th, 2013 at 6:00 p.m.**

******PLEASE POST IMMEDIATELY******

E.3 Distribution List

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WCSH TV CH 6
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WGIR MANCHESTER
WGME TU CH 13
WHOM MT WASH
WMTW TV CH 8

E.4 Sign-In Sheet

PEASE

Portsmouth International Airport at Pease
Part 150 Noise Exposure Map Update
First Public Workshop – January 17, 2013
Attendee Sign-In Sheet

Name	Address	Email	Phone	Would you like to receive email notices of future meetings and comment opportunities?
Bill Hopper	PDA	b.hopper@peasedev.org	603-433-6536	
Ed Pottberg	PDA	e.pottberg@peasedev.org	(603) 433-6536	
Al Frost	16 Oyster River Rd Durham	albert.frost@UNH.edu	868-7465	Yes (requests copy of 1995 study & new year contours)
Mike Rogerson	150 Dow St Manchester NH 03102	mrogerson@hoyletanner.com	603-669-5555	yes
Bob Furey	150 Dow St Manchester NH 03101	rfurey@hoyletanner.com	603 669 5555 x 158	yes
Jim Ryan	302 New market St, 157ARW (Pease ANGB)	james.ryan@ang.af.mil	603-430-3341	
Bill St. Laurent	Sherburne Civic Assoc 253 Colonial Dr. Ports	billstl60@aol.com	603-436-1378	YES
Chris Cross	327 N... Newington, N.H.	crossxx@comcast.net	603 427-7186	✓
Richard Doucette	FAA			
Ted Baldwin	HMMH			
Brad Nicholas	HMMH			
Peggy Lamson	PDA Rep Town of Newington	Bill Hopper will provide contact information		Yes

APPENDIX F SECOND PUBLIC WORKSHOP MATERIALS

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F.1 Presentation Slides / Boards

Welcome

to the

PEASE

Portsmouth International Airport at Pease (PSM)
Part 150 Noise Exposure Map Update
Public Workshop

May 8, 2014

Workshop Overview

www.hmmh.com

The following topics are covered in individual workshop "stations:"

- Introduction
  - Part 150 overview
  - Prior PSM Part 150 process
  - Scope and status of this update
- Noise analysis
  - Terminology
  - Noise modeling
  - Land use compatibility
- Project Completion Schedule
  - Including public involvement and comment opportunities

Please take your time and ask any questions of interest.

We are very interested in understanding your concerns.

2

What is "Part 150"?

www.hmmh.com

- 14 C.F.R Part 150, "Airport Noise Compatibility Planning"
- *Voluntary* FAA-defined process for airport noise studies
- Two major components
  - Noise Exposure Map – FAA "accepts"
    - Detailed description of airport layout, operations, noise exposure, land uses, and noise/land use compatibility for at least two years
  - Noise Compatibility Program – FAA "approves" individual measures
    - Noise abatement measures to reduce noise exposure
    - Land use mitigation measures to address existing non-compatible uses
    - Land use control measures to prevent new non-compatible uses
  - *This study is a Noise Exposure Map update only*
- Public involvement is a critical consideration
  - Consultation *is required* with users and land use control jurisdictions
  - Input will be sought from *all interested parties*

3

PSM Part 150 Studies

www.hmmh.com

- Prior Part 150 Study – Completed June 1995
  - Noise Exposure Map
    - 1992 base year noise contours and land use compatibility
    - 1993-94 base year noise contours and land use compatibility
    - Forecast noise contours for four scenarios
  - Noise Compatibility Program
    - Noise abatement measures
    - Land use management measures
    - Noise program management
- Current Part 150 Study – Draft Document Complete
  - Noise Exposure Map Update only
    - 2014 existing conditions noise contours and land use compatibility
    - 2019 forecast year noise contours and land use compatibility
  - Noise Compatibility Program implementation was summarized

4

Part 150 Study Elements and Current Status

www.hmmh.com

Six study elements are completed or underway:

1. Design and Conduct a Public Participation Program
   This meeting is the second of two public workshops
2. Develop Operational, Noise, and Land Use Database
3. Compute noise levels in FAA's Integrated Noise Model
4. Identify non-compatible land uses
5. Evaluate status of existing Noise Compatibility Program
6. Prepare Draft Noise Exposure Map Update document

One element remains to be completed:

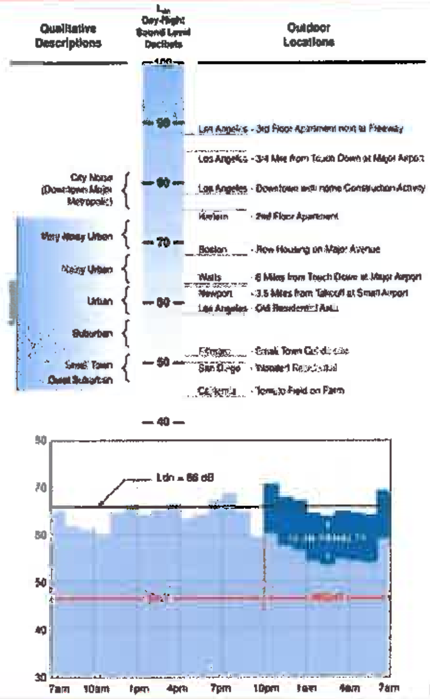
7. Prepare and submit Final Noise Exposure Map Update (expected in June of 2014)

5

Noise Terminology

www.hmmh.com

- **A-weighted decibel (dBA)**
  - Reflects the manner humans hear different pitches of sound
  - All federal agencies have adopted dBA for environmental studies
- **Day–Night Average Sound Level (DNL or Ldn)**
  - Cumulative noise measure
  - Equal to steady level that contains same energy as the actual time-varying sound
  - Increases sounds from 10 p.m. to 7 a.m. 10-fold
  - Used by all federal agencies that deal with aviation noise



6

Noise Modeling and Land Use Analysis

www.hmmh.com

- **Noise Modeling using the FAA's Integrated Noise Model ("INM")**
  - Noise modeling inputs include
    - Average daily arrivals and departures, by aircraft type, by time of day
    - Arrival and departure "cockpit" procedures
    - Airfield layout
    - Percentage use of runways
    - Flight track geometry and use
    - Run-up activity
    - Taxiing activity
- **Land Use Analysis within the 2014 and 2019 65 dB DNL Contours**
  - Identify any noncompatible land uses based on Part 150 guidelines
  - Identify discrete noise-sensitive uses (e.g., schools)
  - Identify historic properties
  - Identify land-use control jurisdictions

7

Noise Model Input

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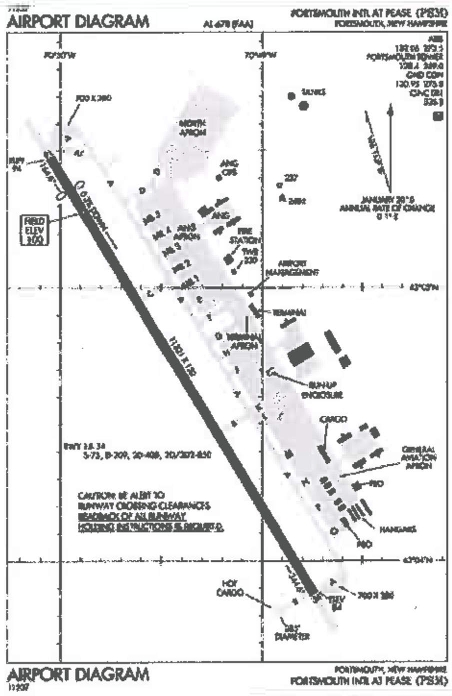


Table 4-7 Runway Use
Source: NHANG ATCT

Runway	Arrivals		Departures	
	Day	Night	Day	Night
16	35%	35%	35%	50%
34	65%	65%	65%	50%
Total	100%	100%	100%	100%

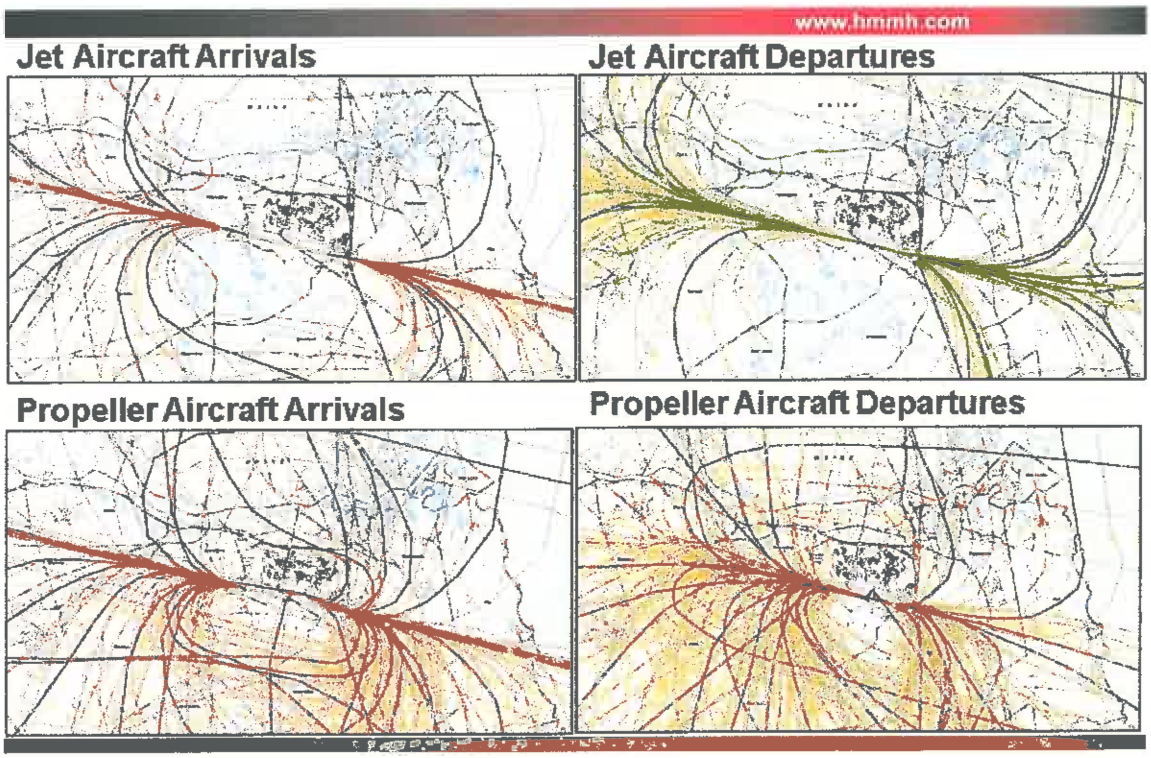
Table 4-8 Utilization of Intersection Departures by Aircraft Group

Aircraft Group	Runway End	Intersection Point			Total
		A*	B	C	
Large Jet	16	100%	0%	0%	100%
Medium Jet	16	75%	0%	25%	100%
Turboprop	16	15%	60%	25%	100%
Twin Piston	16	10%	55%	35%	100%
Single Engine Piston	16	5%	70%	25%	100%
Large Jet	34	100%	0%	0%	100%
Medium Jet	34	95%	5%	0%	100%
Turboprop	34	70%	30%	0%	100%
Twin Piston	34	90%	10%	0%	100%
Single Engine Piston	34	90%	10%	0%	100%

*Intersection A is located at the physical runway end. See Figure 4-4.

8

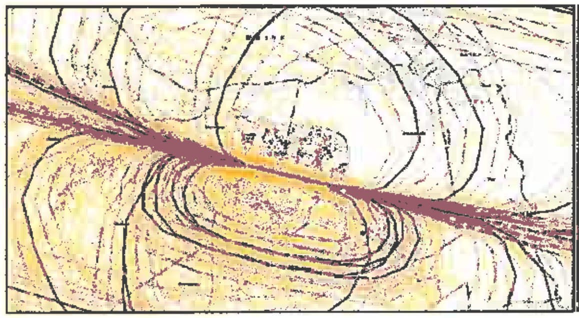
Noise Model Input



Noise Model Input

www.hmmh.com

Pattern Tracks



Taxi Tracks

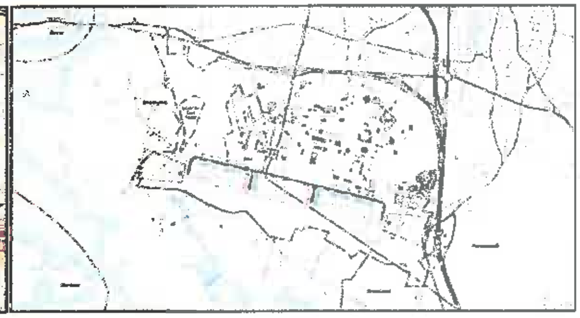
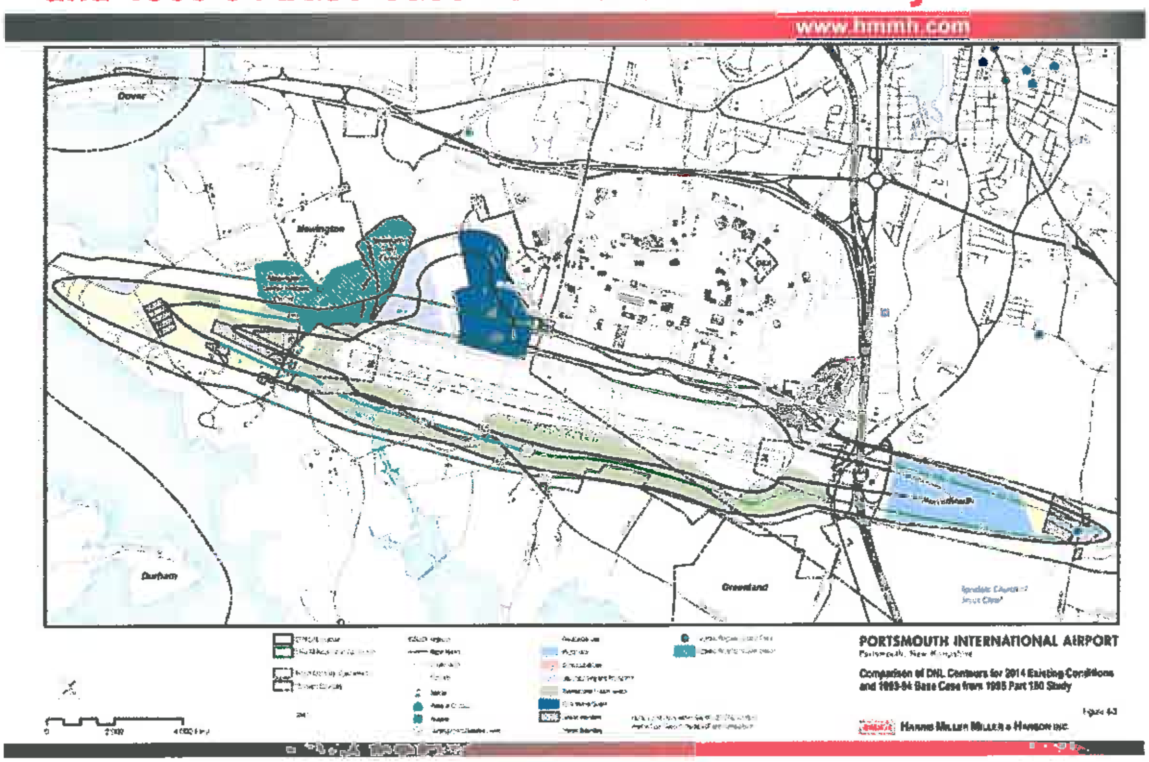


Table 4-2 2014 and 2019 NEM Operations by Aircraft Category

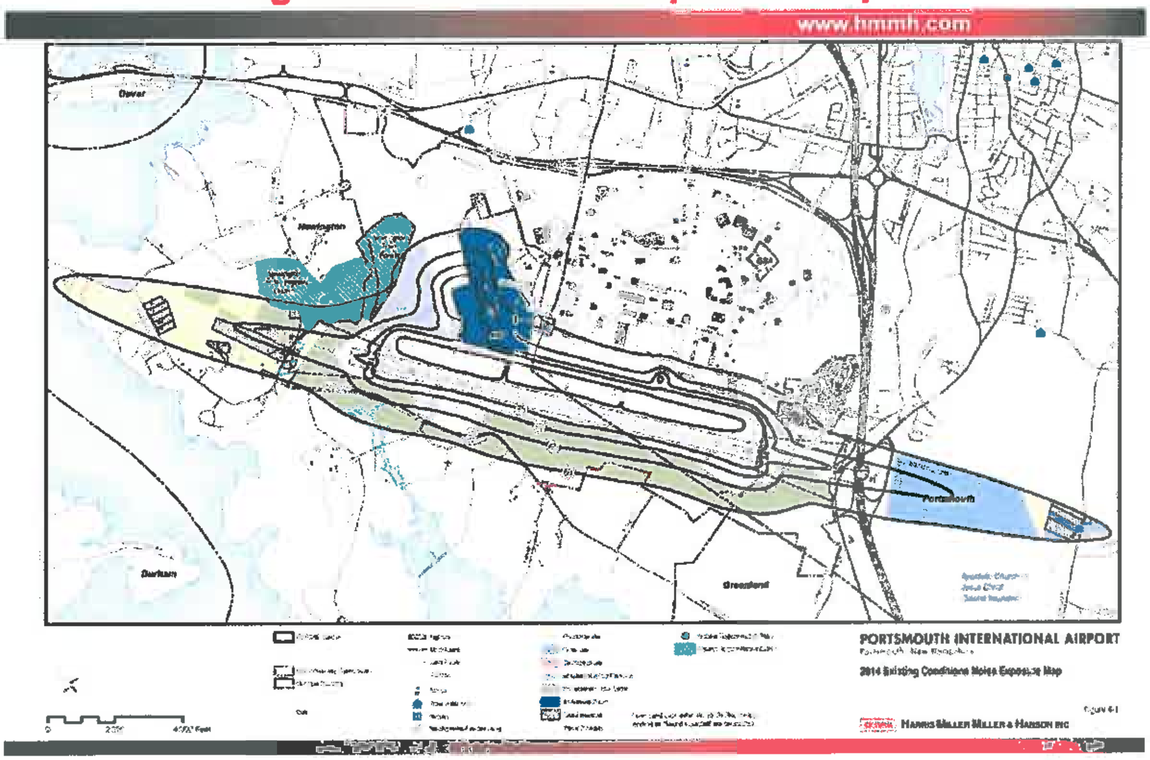
Category	2014 NEM Operations		2019 NEM Operations	
	Annual	Average Annual Day	Annual	Average Annual Day
Air Carrier	919	2.5	919	2.5
Air Taxi	6,406	17.5	7,006	19.2
General Aviation	22,340	61.2	22,340	61.2
Military	7,814	21.4	7,814	21.4
Total	**37,479**	**102.7**	**38,079**	**104.3**

10

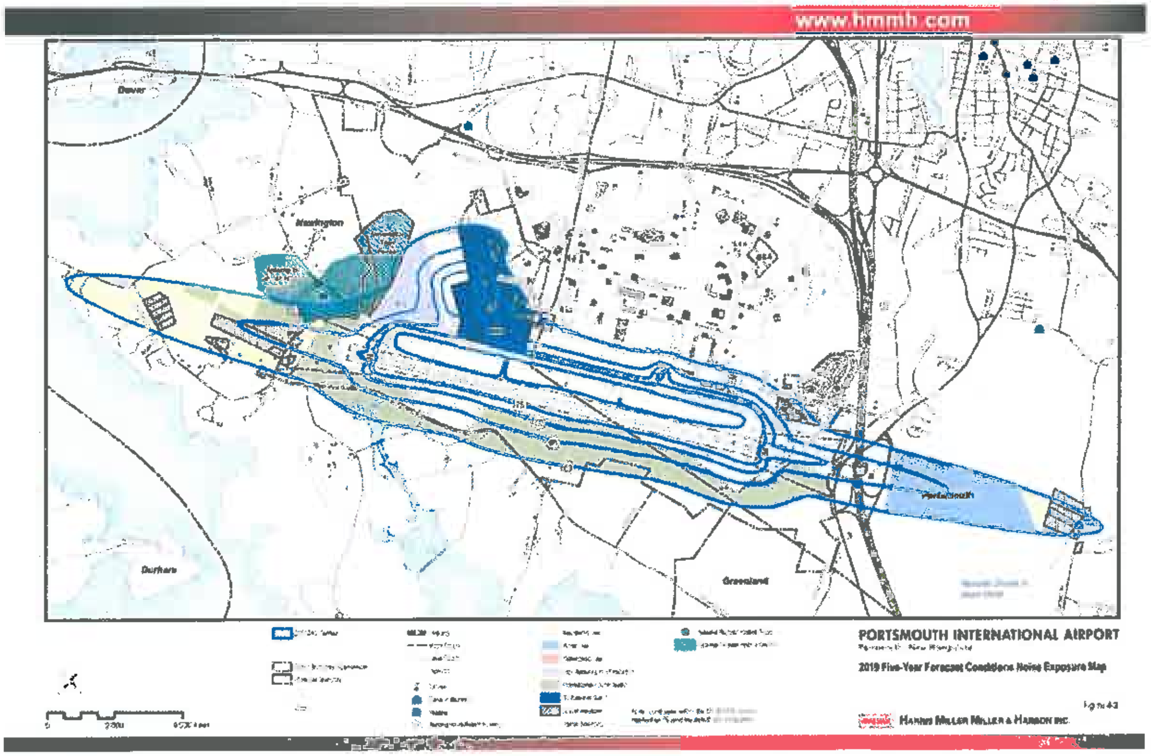
Comparison of DNL Contours for 2014 Existing Conditions and 1993-94 Base Case from 1995 Part 150 Study



2014 Existing Conditions Noise Exposure Map



2019 Five-Year Forecast Conditions Noise Exposure Map



Land Use Analysis Results

www.hmmh.com

Table 4-1 Estimated Residential Population within the DNL Contours
Source: HMMH, 2014

Case	DNL Contour Interval	Encompassed Residential Uses (Note 1)					
		Dwelling Units			Population		
		Compatible (Note 2)	Non-Compatible	Total	Compatible (Note 2)	Non-Compatible	Total
2014 Existing Conditions Noise Exposure Map	60-65	69	0	69	166	0	166
	65-70	2	1	3	5	3	8
	70-75	0	0	0	0	0	0
	>75	0	0	0	0	0	0
	Total	34	38	72	85	89	174
2019 Five-Year Forecast Conditions Noise Exposure Map	60-65	57	0	57	141	0	141
	65-70	2	1	3	4	3	7
	70-75	0	0	0	0	0	0
	>75	0	0	0	0	0	0
	Total	34	26	60	82	66	148

Table Notes:

1. Estimated using data and procedures discussed in Appendix D.
2. Estimated dwelling units and population for parcels within the 65dB DNL contour that have been sound insulated are listed as compatible.

14

Public Input and Comment Opportunities

www.hmmh.com

- **Tonight's workshop**
  - Comments will be accepted in any written format
  - Comment sheets are available, if desired
  - Please sign in
- **Written comments may be submitted by mail or in person until May 23rd**

  Part 150 Noise Exposure Map Update Comments
  Pease Development Authority
  36 Airline Avenue
  Portsmouth, NH 03801
- **Draft Noise Exposure Map document is available for review until May 23rd at the Pease Development Authority offices**
  - Call: Sandra McDonough at 603-433-6536
  - E-mail: s.mcdonough@peasedev.org

Thank you for attending!

15

F.2 Notice

Airport Management Department of the Pease Development Authority Announces Public Review and Comment Period for Draft Noise Exposure Maps and Public Informational Meeting

One-month public review and comment period for the 2014 and 2019 Draft Noise Exposure Maps begins on April 23, 2014 and includes a public informational meeting on May 8, 2014.

PORTSMOUTH – April 15, 2014 – The Pease Development Authority is pleased to invite the public to a review and presentation on the Draft Noise Exposure Maps for 2014 through 2019 aircraft operations at Portsmouth International Airport at Pease (PSM). The Noise Exposure Maps and associated documentation will be available for review by calling Sandra McDonough at 603-433-6536 or e-mailing s.mcdonough@peasedev.org to make arrangements. The documents will be available beginning April 23, 2014 at 8:00 AM and ending May 23, 2014 at 4:00 PM.

On Thursday, May 8, 2014, the public is invited to attend a presentation on the findings of the noise study. The presentation will explain the methodology and results of the study. The presentation will run in an open house format from 6:30 to approximately 8:00 PM at 55 International Drive, Portsmouth, NH, with a brief presentation at 7:00 PM. Copies of the Noise Exposure Maps and associated documentation will be available.

The noise study, referred to as a "Part 150" study after the section of the Federal Code under which it is authorized, considered the current situation in 2014 and the forecast conditions in 2019. This study resulted in comprehensive and updated "Noise Exposure Maps", which provide a detailed description of the airport, noise exposure associated with aircraft operations, surrounding land uses, and compatibility conditions.

The presentation will show the interested persons the Noise Exposure Map and process for developing the Noise Exposure Map and the findings in the draft product.

Written public comments may be submitted to the Pease Development Authority at the public meeting, mailed to the Pease Development Authority at 36 Airline Avenue, Portsmouth, NH, 03801 or emailed to s.mcdonough@peasedev.org.

APPENDIX G COMMENTS ON DRAFT NOISE EXPOSURE MAPS

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From: Harville, Greg [mailto:gharville@libertylanesvc.com]
Sent: Thursday, May 08, 2014 10:36 AM
To: Sandra McDonough
Subject: RE: NEM link

Hi Sandra –

I'm writing to let you know that I have a last minute conflict and will not be able to attend the meeting this evening.

Thanks for forwarding the report; it was well written and very thorough.

Regards,

Greg

W. Gregory Harville
President

New England Helicopter Council, Inc.
Office (603) 929-2340
Cell (603) 479-7040
gharville@libertylanesvc.com
www.nehc.org

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APPENDIX H CORRESPONDENCE TO AND FROM THE FAA REGARDING FAA APPROVAL OF NON-STANDARD "INM SUBSTITUTES", KC-135R PROFILES, AND TAXI PROFILES

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HARRIS MILLER MILLER & HANSON INC.
77 South Bedford Street
Burlington, MA 01803
T 781.229.0707
F 781.229.7939
www.hmmh.com

Subject:	Portsmouth International Airport at Pease Noise Exposure Map Update - Approval Integrated Noise Model Substitutions and Profiles
Prepared for:	Richard Doucette, FAA
Prepared by:	Brad Nicholas
Date:	December 20, 2013
Reference:	HMMH Job #305310

1. INTRODUCTION

Harris Miller Miller & Hanson Inc. (HMMH) is assisting the Pease Development Authority (PDA) in the preparation of a Noise Exposure Map (NEM) Update for the Portsmouth International Airport at Pease (PSM). Consistent with Federal Aviation Administration (FAA) policies and procedures, we submit this request for approval of the identified non-standard aircraft type substitutions, profiles for INM type KC135R, and taxi profiles included in Attachments A, B, and C.

In accordance with FAA policy, we expect that this request will be reviewed by the FAA's Airport Planning and Environmental Division (APP-400) and Office of Environment and Energy Noise Division (AEE-100). We will be happy to respond to questions regarding this request via the phone or email contact information listed below.

Thank you for your assistance in this matter.

Sincerely yours,

HARRIS MILLER MILLER & HANSON INC.

Brad Nicholas
Senior Consultant
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Attachment A: INM Aircraft Substitutions
Attachment B: INM KC135R Profiles
Attachment C: INM Aircraft Taxi Profiles
Attachment D: INM Study for KC135R Profile
Attachment E: INM Study for Taxi Profile

ATTACHMENT A

INM AIRCRAFT SUBSTITUTIONS

The aircraft types listed in Table 1-1 are included in the Noise Exposure Map (NEM) Update and require a FAA approved substitution. In each case, we have identified a substitute for each aircraft using the INM 7.0d database. The bases for our recommendations are discussed following Table 1-1.

Table 1-1. Aircraft Types and Recommended INM Substitutions

#	Group	Aircraft Code	Represented Aircraft Models	Recommended INM Substitution
1.1	Jet	E50P	Embraer EMB-500 Phenom 100	CNA510[1]
1.2	Jet	E55P	Embraer EMB-505 Phenom 300	CNA560E[1]
1.3	Jet	H25C	BAe/Raytheon Hawker 1000	LEAR35[1]
1.4	Jet	LJ40	Learjet 40	LEAR35[1]
1.5	Jet	E6	Boeing E-6 Mercury	DC870[1]
1.6	Jet	FA7X	Dassault Falcon 7X	F10062[1]
1.7	Turbo Prop	B350	Beech Super King Air 350	DO228[1]
1.8	Turbo Prop	P46T	Piper Malibu Meridian	CNA208[1]
1.9	Turbo Prop	TBM8	Socata TBM-850	CNA208[1]
1.10	Piston Prop	BE36	Beechcraft 36 Bonanza	CNA206[1]
1.11	Piston Prop	COL4	Lancair LC-41 Columbia 400	GASEPV[1]
-	Piston Prop	COL3	Lancair Columbia 300	GASEPV[1]
-	Piston Prop	DA40	Diamond 40	GASEPV[1]
-	Piston Prop	SR20	Cirrus SR-20	GASEPV[2]
-	Piston Prop	TRIN	Socata TB-21 Trinidad	GASEPV[3]
-	Piston Prop	RV10	Vans RV-10	GASEPV
-	Piston Prop	TOBA	Socata Tobago	GASEPV[3]
-	Piston Prop	HUSK	Aviat Husky	GASEPV[3]
-	Piston Prop	GLAS	Glasair	GASEPV[4]
1.12	Piston Prop	AA5	American Traveler AA-5	GASEPF
-	Piston Prop	XL2	Liberty XL-2	GASEPF[5]
-	Piston Prop	M7	Maule M7	GASEPF[5]

Notes:

1 FAA approved type for BWI NEM
2 FAA approved type for BNA NEM
3 FAA approved type for SDF NEM
4 FAA approved type for JAN NEM
5 FAA approved type for APF NEM and NCP

This discussion refers, in some cases, to recent guidance FAA provided HMMH for noise studies including:

- Baltimore-Washington International Thurgood Marshall Airport (BWI) Noise Exposure Map (NEM) Update with INM 7.0d, HMMH Project No. 305160.011, FAA approval issued October 1, 2013.
- Nashville International Airport (BNA) Noise Exposure Map (NEM) Update with INM 7.0b, HMMH Project No. 304350, FAA approval issued March 7, 2011.

- Louisville International Airport (SDF) Noise Exposure Map (NEM) Update with INM 7.0b, HMMH Project No. 304060, FAA approval issued July 13, 2010.
- Jackson-Evers International Airport (JAN) Noise Exposure Map (NEM) Update with INM 7.0b, HMMH Project No. 304140, FAA approval issued May 10, 2010.
- Naples Municipal Airport (APF) Noise Exposure Map (NEM and NCP) Updates with INM 7.0a, HMMH Project No. 302720, FAA approval issued September 16, 2009.

We can provide copies of these past submission and approval documents upon request.

1.1 Embraer EMB-500 Phenom 100 – E50P

We propose to model EMB-500 Phenom 100 operations with INM type CNA510 as most recently approved for the BWI NEM, HMMH Job # 305160.011.

1.2 Embraer EMB-505 Phenom 300 – E55P

We propose to model EMB-505 Phenom 300 operations with INM type CNA560E as most recently approved for the BWI NEM, HMMH Job # 305160.011.

1.3 BAe/Raytheon Hawker-125-1000 – H25C

We propose to model H25C operations with INM type LEAR35 as most recently approved for the BWI NEM, HMMH Job # 305160.011.

Table 1-2 compares the Hawker 125-1000 with the Hawker 800 and LEAR35 aircraft. Based on the comparison, the LEAR35 appears to be a good match.

Table 1-2 Noise Certification Data from BAe-125-1000 and -800 and LEAR35

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (EPNdB)		
					Takeoff	Sideline	Approach
Raytheon	Hawker 125-1000	31,000	25,000	PW305	81.8	85 9	91.6
Raytheon	Hawker 125-800	27,400	23,350	TFE731-5R-1H	80.9	87.2	96.5
Learjet	LEAR 35 A	18,000	14,300	TFE731-2-2B	83.6	87.4	91.3
Source: FAA AC 36-1H, at http://www.faa.gov/about/office_org/headquarters_offices/AEP/noise_levels/media/uscert_appendix_01_030210.xls							

1.4 Learjet 40 – LJ40

We propose to model LJ40 operations with INM type LEAR35 as most recently approved for the BWI NEM, HMMH Job # 305160.011.

The LJ40 is a derivative of the Learjet 45 (LJ45) with a shorter fuselage. The LJ40 and LJ45 engines are both versions of the Honeywell TFE731-20AR. In INM 7.0d, the LJ45 is mapped to the substitution aircraft, LEAR35.

1.5 Boeing E-6 Mercury

We propose to model E6 operations with INM type DC870.

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The Boeing E-6 is a long endurance communications relay aircraft operated by the U.S. Navy. It is a derivative of Boeing's 707-320, though it has different engines than the Pratt & Whitney JT3D-7's represented by INM type 707320. It shares much commonality with the E-3 Sentry which was also derived from Boeing's 707, though it does not have the Pratt & Whitney TF33-PW-100A engines represented by INM type E3A.

Based on airframe and engine characteristics, we propose that the DC870 is the best match within the INM. Table 1-3 compares the Boeing E-6 to the McDonnell Douglas DC-8-70.

Table 1-3 Characteristics of the Boeing E-6 and McDonnell Douglas DC-8-70 Series Aircraft

Manufacturer	Model	Power Plant (4 engines each)	Operating Weight Empty (lb)	Maximum Take-off Weight (lb)
Boeing	E-6A Mercury	CFM56-2A-2 (24,000 lb st)	172,795	342,000
McDonnell Douglas	DC-8-70 series	CFM56-2-1C (24,000 lb st)	152,600-165,600	325,000-355,000

Source for Boeing E-6A:
"Jane's All the World's Aircraft 1993-1994" Jane's Information Group Inc., Alexandria, Virginia (ISBN 0 7106 1066 1), pp.454-455.
Source for DC-8-71,72,73:
"Jane's All the World's Aircraft 1982-1983" Jane's Publishing Company Limited, London, England, pp.417-418.

1.6 Dassault Falcon 7X – FA7X

We propose to model FA7X operations with INM type F10062 as most recently approved for the BWI NEM, HMMH Job # 305160.011.

The Dassault Falcon 7X is a relatively new three-engine (two are fuselage mounted, one tail mounted) corporate jet and does not have an FAA-approved INM substitution. The FA7X is powered by three Pratt & Whitney Canada PW 307A engines and is heavier than previous three-engine Dassault corporate aircraft that are powered by Allied Signal/Garrett TFE731 series engines (i.e. Falcon 50 and Falcon 900). Certification from EASA indicates that the INM F10062 would be an appropriate substitution. The Dassault Falcon 7X has a certified MTOW of 31,298 kg (69,000 lb.) and a certified MLW of 28,304 kg (62,400 lb.). For comparison, the Fokker 100 has a MTOW of 43,090 kg and a MLW of 38,780 kg. Since the FA7X has three-engines and the Fokker 100 has two engines (along with most other candidate INM 7.0b types), thrust to weight comparisons would not be effective because three-engine and two-engine aircraft have different certification requirements regarding available thrust for engine-out conditions. Table 1-4 presents a comparison of the Dassault Falcon 7X and Fokker 100 certification data.

Table 1-4 Noise Certification Data from Dassault Falcon 7X and Fokker 100

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Effective Perceived Noise Level (EPNdB)		
					Fly Over	Lateral	Approach
Dassault Aviation	Falcon 7X	31,298	28,304	Pratt & Whitney Canada PW 307 A	83.7	90.4	92.6
Fokker Services	F28 Mark 0100	43,090	38,780	Rolls-Royce Tay 620-15	83.4	89.3	93.1

Source: EASA file "TCDSN Jets (080711).xls", as posted on http://easa.europa.eu/ws_prod/c/c_tc_noise.php on November 12, 2008
Notes
Weights converted from EASA reported units of kg and rounded to tens of lb.

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1.7 Beech Super King Air 350 – B350

We propose to model the B350 operations with INM type DO228 as most recently approved for the BWI NEM, HMMH Job # 305160.011.

1.8 Piper Malibu Meridian – P46T

We propose to model the P46T operations with INM type CNA208 as most recently recommended/approved for the BWI NEM, HMMH Job # 305160.011.

1.9 Socata TBM-850 – TBM8

We propose to model the TBM8 operations with INM type CNA208 as most recently approved for the BWI NEM, HMMH Job # 305160.011.

1.10 Beechcraft Bonanza 36 - BE36

We propose to model BE36 operations with INM type CNA206 as most recently approved for the BWI NEM, HMMH Job # 305160.011.

The BE36 Beechcraft Bonanza is a single-engine propeller aircraft that is similar in weight and engines with the Cessna 206 as shown in Table 1-5.

Table 1-5 Estimated Maximum A-weighted Sound Levels for Cessna 206, Beechcraft 36

Manufacturer	Type Designation	MTOW (lb)	MLW (lb)	Engine Manufacturer / Type Designator	Noise Level (Est Lmax dB)	
					Takeoff	Approach
Cessna	206	3,300	3,300	IO-520-A	70.2	63.5
Beech	A36	3,600	3,600	IO-520-BA	71.0	64.0
Source: FAA AC 36-3H, as posted on http://www.faa.gov/regulations_policies/advisory_circulars/index.cfm/go/document.information/documentID/22945, as viewed May 30, 2013						

1.11 Single Engine Piston with Variable Pitch Propeller

We propose to model the following aircraft with INM type GASEPV:

- Lancair Columbia 400 –COL4 (as approved for the BWI NEM)
- Lancair Columbia 300 –COL3 (as approved for the BWI NEM)
- Diamond - DA40 (as approved for the BWI NEM)
- Cirrus SR-20 - SR20 (as approved for BNA NEM)
- Socata Trinidad - TRIN (as approved for SDF NEM)
- Van's RV-10 – RV10 (The RV-10, four seet kit plane, is powered by 235 -265 hp engine with a constant speed variable pitch propeller)[1]
- Socata Tobago - TOBA (as approved for SDF NEM)
- Aviat Husky - HUSK (as approved for SDF NEM)

[1] http://www.vansaircraft.com/public/rv10specs.htm

- Glasair - GLAS (as approved for JAN NEM)

1.12 Single Engine Piston with Fixed Pitch Propeller

We propose to model the following aircraft with INM type GASEPF:

- American AA-5 Traveler – AA5 (The AA-5 falls within this category of aircraft)
- Liberty XL-2 –XL2 (as approved for the APF NEM and NCP)
- Maule M-7 –M7 (as approved for the SDF NEM)

ATTACHMENT B

KC-135R PROFILES

1. BACKGROUND

HMMH is assisting the PDA with a Part 150 NEM update. The profiles described in this attachment will be used for the base year and forecast year modeling in INM 7.0d. The New Hampshire Air National Guard (NHANG) KC-135R aircraft conduct a large percentage of the military operations at PSM. This aircraft is represented by the KC135R type in INM 7.0d.

2. STATEMENT OF BENEFIT

During consultation with the NHANG, HMMH learned that several characteristics of the INM 7.0d KC134R profiles do not fall within the reasonable bounds of the NHANG KC-135R's performance at PSM.

The primary areas of discrepancy are:

- The take-off weight of the KC135R is 128,000 lbs to 158,000 lbs higher than typical KC-135R operations at PSM.
- The KC135R uses thrust reversers. The KC-135R is not equipped with thrust reversers.
- The KC135R uses max takeoff thrust. The NHANG KC-135R uses take-off thrusts of N1=82% and N1 = 75%.
- The approach speed of the KC135R is higher than typically used by the NHANG KC-135R.
- The flap settings on arrival for the KC135R do not reflect the current reduced flaps required by the Air Force for fuel conservation.
- NHANG KC-135R pattern operations are conducted at both 1,500 ft (VFR) and 3,000 ft (IFR)

The approach taken was to modify the INM 7.0d procedural profiles for the KC135R, but only as needed, to address these differences. The NHANG provided invaluable guidance and feedback during this process. Their concurrence with the outcome is presented in Section 4.

Starting with the Standard procedural profile in INM 7.0d, modifications were made to the profile weight and procedure steps. The resulting profiles were examined in the profile graphs interface. For the departures, circuits, and touch-and-gos, user thrust values in pounds were developed using INM's thrust calculator and N1 values provided by the NHANG. The appropriate N1, altitude, and speed were entered into the calculator for each procedure step. Thus, a single N1 value resulted in changing thrust values in pounds over the course of a single profile.

Although all profiles were viewed successfully in the profile graphs interface, only the arrival profiles were run successfully. The INM developed an internal error whenever a user thrust was used during a climb step. [*A quick note: This is not confined to the KC135R. Take any aircraft (I used the 737300 for testing) and make a copy of the Standard departure profile. Modify a climb step to use a user thrust and input the same value that the Standard procedural profile shows in the profile graphs interface. The new profile will show in the profile graphs interface, but will not run successfully.*] The profiles points for profiles with climb steps were exported from the profile graphs interface. These profile points were then used in the prof_pts.dbf file for noise modeling.

3. ANALYSIS DEMONSTRATING BENEFIT

The following tables compare the Sound Exposure Level (SEL) for the INM Standard and User Defined profiles at a series of points along runway centerline spaced at 0.5 nmi increments. Zero nmi is located at the runway end.

Table 3-1 Comparison of KC135R INM Standard and User Defined Arrival Noise Levels

Grid Points (nmi)	SEL (dB)		
	INM Standard Profile 220,000 lbs	User Defined Profile 150,000 lbs	Difference
-10.0	76.9	76.1	-0.8
-9.5	77.5	76.7	-0.8
-9.0	78.3	77.4	-0.9
-8.5	79.0	78.1	-0.9
-8.0	79.6	78.7	-0.9
-7.5	80.2	79.3	-0.9
-7.0	80.9	80.0	-0.9
-6.5	81.7	80.7	-1.0
-6.0	82.4	81.4	-1.0
-5.5	83.1	82.1	-1.0
-5.0	83.9	82.9	-1.0
-4.5	84.9	83.9	-1.0
-4.0	86.5	85.1	-1.4
-3.5	88.3	86.7	-1.6
-3.0	90.2	88.2	-2.0
-2.5	91.5	89.7	-1.8
-2.0	93.0	91.3	-1.7
-1.5	94.8	93.1	-1.7
-1.0	97.2	95.5	-1.7
-0.5	100.8	99.1	-1.7
0.0	107.2	105.6	-1.6
0.5	114.1	110.9	-3.2
1.0	116.1	115.3	-0.8

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Table 3-2 Comparison of KC135R INM Standard and User Defined Departure Noise Levels

Grid Points (nmi)	SEL (dB)		
	INM Standard Profile 308,000 lbs	User Defined Profile 180,000 lbs	Difference
0.0	129.6	123.2	-6.4
0.5	120.0	114.9	-5.1
1.0	117.3	104.5	-12.8
1.5	116.8	97.0	-19.8
2.0	109.3	93.4	-15.9
2.5	101.7	90.8	-10.9
3.0	98.5	88.9	-9.6
3.5	96.4	87.4	-9.0
4.0	94.7	86.4	-8.3
4.5	93.4	85.4	-8.0
5.0	92.4	84.4	-8.0
5.5	91.5	83.6	-7.9
6.0	90.7	82.8	-7.9
6.5	90.0	82.1	-7.9
7.0	89.1	81.5	-7.6
7.5	88.4	80.8	-7.6
8.0	86.7	80.2	-6.5
8.5	85.9	79.4	-6.5
9.0	85.3	78.7	-6.6
9.5	84.7	78.1	-6.6
10.0	84.2	77.4	-6.8

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Table 3-3 Comparison of KC135R INM Standard and User Defined IFR Circuit Noise Levels

Grid Points (nmi)	SEL (dB) INM Standard Profile 308,000 lbs level at 1,500 ft	User Defined Profile 155,000 lbs level at 3,000 ft	Difference
-10.0	90.0	79.9	-10.1
-9.5	90.0	79.7	-10.3
-9.0	90.0	78.0	-12.0
-8.5	90.0	78.2	-11.8
-8.0	90.0	78.8	-11.2
-7.5	90.0	79.5	-10.5
-7.0	90.0	80.2	-9.8
-6.5	90.0	80.9	-9.1
-6.0	90.0	81.6	-8.4
-5.5	90.0	82.5	-7.5
-5.0	90.0	83.2	-6.8
-4.5	86.6	84.0	-2.6
-4.0	86.6	85.2	-1.4
-3.5	87.5	86.1	-1.4
-3.0	88.8	87.3	-1.5
-2.5	92.8	89.5	-3.3
-2.0	94.1	91.1	-3.0
-1.5	96.0	92.9	-3.1
-1.0	98.4	95.3	-3.1
-0.5	101.9	98.9	-3.0
0.0	140.8	121.2	-19.6
0.5	124.5	114.7	-9.8
1.0	121.7	113.4	-8.3
1.5	117.7	96.5	-21.2
2.0	113.6	93.1	-20.5
2.5	106.2	90.7	-15.5
3.0	101.9	88.9	-13.0
3.5	100.1	87.4	-12.7
4.0	98.5	86.1	-12.4
4.5	97.2	84.8	-12.4
5.0	90.6	83.8	-6.8
5.5	90.0	82.9	-7.1
6.0	90.0	82.1	-7.9
6.5	90.0	81.5	-8.5
7.0	90.0	81.0	-9.0
7.5	90.0	80.1	-9.9
8.0	90.0	79.9	-10.1

Table 3-4 Comparison of KC135R INM Standard and User Defined VFR Circuit Noise Levels

Grid Points (nmi)	SEL (dB)		
	INM Standard Profile 308,000 lbs level at 1,500 ft	User Defined Profile 150,000 lbs level at 1,500 ft	Difference
-5.0	90.0	85.2	-4.8
-4.5	86.6	83.7	-2.9
-4.0	86.6	84.3	-2.3
-3.5	87.5	85.6	-1.9
-3.0	88.8	87.2	-1.6
-2.5	92.8	89.5	-3.3
-2.0	94.1	91.0	-3.1
-1.5	96.0	92.8	-3.2
-1.0	98.4	95.2	-3.2
-0.5	101.9	98.9	-3.0
0.0	140.8	125.2	-15.6
0.5	124.5	117.3	-7.2
1.0	121.7	110.8	-10.9
1.5	117.7	98.5	-19.2
2.0	113.6	95.0	-18.6
2.5	106.2	92.4	-13.8
3.0	101.9	90.8	-11.1
3.5	100.1	89.9	-10.2
4.0	98.5	89.2	-9.3
4.5	97.2	86.3	-10.9
5.0	90.6	85.3	-5.3
5.5	90.0	85.2	-4.8

Table 3-5 Comparison of KC135R INM Standard and User Defined IFR Touch-and-go Noise Levels

Grid Points (nmi)	SEL (dB) INM Standard Profile 308,000 lbs level at 1,500 ft	User Defined Profile 155,000 lbs level at 3,000 ft	Difference
-10.0	90.2	79.9	-10.3
-9.5	90.2	79.7	-10.5
-9.0	90.2	78.0	-12.2
-8.5	90.2	78.2	-12.0
-8.0	90.2	78.8	-11.4
-7.5	90.2	79.5	-10.7
-7.0	90.2	80.2	-10.0
-6.5	90.2	80.9	-9.3
-6.0	90.2	81.6	-8.6
-5.5	90.2	82.5	-7.7
-5.0	90.1	83.2	-6.9
-4.5	86.6	84.0	-2.6
-4.0	86.6	85.2	-1.4
-3.5	87.5	86.1	-1.4
-3.0	88.8	87.3	-1.5
-2.5	92.8	89.5	-3.3
-2.0	94.1	91.1	-3.0
-1.5	95.9	92.9	-3.0
-1.0	98.4	95.3	-3.1
-0.5	101.9	98.9	-3.0
0.0	108.2	105.4	-2.8
0.5	115.5	113.6	-1.9
1.0	106.0	98.1	-7.9
1.5	100.6	93.8	-6.8
2.0	97.7	91.1	-6.6
2.5	95.8	89.1	-6.7
3.0	94.3	87.6	-6.7
3.5	92.9	86.4	-6.5
4.0	90.2	85.2	-5.0
4.5	90.2	84.1	-6.1
5.0	90.2	83.4	-6.8
5.5	90.2	82.4	-7.8
6.0	90.2	81.7	-8.5
6.5	90.2	81.2	-9.0
7.0	90.2	80.6	-9.6
7.5	90.2	79.9	-10.3

Table 3-6 Comparison of KC135R INM Standard and User Defined VFR Touch-and-go Noise Levels

Grid Points (nmi)	SEL (dB) INM Standard Profile 308,000 lbs level at 1,500 ft	User Defined Profile 150,000 lbs level at 1,500 ft	Difference
-6.0	90.2	85.3	-4.9
-5.5	90.2	85.3	-4.9
-5.0	90.1	85.2	-4.9
-4.5	86.6	83.7	-2.9
-4.0	86.6	84.3	-2.3
-3.5	87.5	85.6	-1.9
-3.0	88.8	87.2	-1.6
-2.5	92.8	89.5	-3.3
-2.0	94.1	91.0	-3.1
-1.5	95.9	92.8	-3.1
-1.0	98.4	95.2	-3.2
-0.5	101.9	98.9	-3.0
0.0	108.2	105.4	-2.8
0.5	115.5	114.2	-1.3
1.0	106.0	97.4	-8.6
1.5	100.6	93.1	-7.5
2.0	97.7	90.4	-7.3
2.5	95.8	88.6	-7.2
3.0	94.3	87.5	-6.8
3.5	92.9	86.8	-6.1
4.0	90.2	86.1	-4.1
4.5	90.2	85.2	-5.0

4. CONCURRENCE ON AIRCRAFT PERFORMANCE

The NHANG furnished all of the data which was used in the profile modification process and reviewed both the modified procedure steps and the resulting profile points (distance, altitude, speed, and thrust). The following pages present HMMH's final memorandum describing the profiles and the resulting Memorandum for Record from the NHANG.

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TECHNICAL MEMORANDUM

Subject:	Portsmouth International Airport at Pease Noise Exposure Map Profiles Concurrence
Prepared for:	Michael Sanders, Paul Kell
Prepared by:	Brad Nicholas
Date:	December 16, 2013
Reference:	HMMH Job #305310

1. INTRODUCTION

Harris Miller Miller & Hanson Inc. (HMMH) is assisting the Pease Development Authority (PDA) in the preparation of a Noise Exposure Map (NEM) Update for the Portsmouth International Airport at Pease (PSM). A critical part of this effort is the accurate noise modeling of operations by the New Hampshire Air National Guard (NHANG) KC-135R aircraft.

The NHANG has indicated that certain aspects of the aircraft performance profiles within the Integrated Noise Model (INM) do not represent KC-135R operations at PSM. HMMH has worked with the NHANG to modify these profiles to better match the actual aircraft operations. The Federal Aviation Administration (FAA) reviews, and must approve, any modification to the aircraft performance profiles contained within the INM. As part of the review submittal, the FAA requires concurrence from the aircraft operator or manufacturer on the proposed profiles.

This memorandum summarizes the input provided by the NHANG related to aircraft performance profiles for the KC-135R. HMMH requests that the NHANG review this memorandum and provide a simple letter stating that the proposed profiles "fall within the reasonable bounds of the aircraft's performance" at PSM.

2. PROFILES

INM 7.0d contains procedural profiles for the KC-135R. Procedural profiles are defined in the INM as a series of steps (e.g. Climb at max takeoff thrust to 2,000 ft) which are then used by the INM to generate the altitude, speed, and thrust of the aircraft as a function of distance along the flight path. Our approach was to use the INM 7.0d Standard procedural profile steps as a starting point and only make modifications where indicated as necessary by the NHANG.

Each section below presents the proposed profile for a particular type of operation: arrival, departure, circuit, or touch-and-go. Both the procedural steps and the resulting altitude, speed, and thrust for this series of steps are presented. Changes to the procedural steps relative to the Standard profiles in INM 7.0d are marked with **bold text**. Note that the INM must run each of the procedure steps through its aircraft performance algorithms to determine the final altitude, speed, and thrust values. These algorithms may return values which differ somewhat from the input.

2.1 Arrival and Departure

Table 1 and Table 2 present the proposed arrival and departure profiles, respectively.

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Table 1 Proposed Arrival Profile – 150,000 lbs

Procedure Steps									Resulting Profile Points			
Step	Flaps	Thrust Type	Parameter 1	Value	Parameter 2	Value	Parameter 3	Value	Distance from Runway Threshold (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
Descend	ZERO	-	Start Altitude AFE (ft)	6,000	Start Speed CAS (kts)	250	Descent Angle (deg)	3	-114,487	6,000	271	1,261
Descend	INT	-	Start Altitude AFE (ft)	3,000	Start Speed CAS (kts)	193	Descent Angle (deg)	3	-57,243	3,000	200	1,793
Descend	D-30	-	Start Altitude AFE (ft)	1,500	Start Speed CAS (kts)	183	Descent Angle (deg)	3	-28,622	1,500	186	2,326
Descend	D-40	-	Start Altitude AFE (ft)	1,000	Start Speed CAS (kts)	153	Descent Angle (deg)	3	-19,081	1,000	154	3,051
Land	D-40	-	Touchdown Roll (ft)	495	-	-	-	-	0	0	142	2,942
Decelerate	-	Normal Thrust	Track Distance (ft)	4,451	Start Speed CAS (kts)	145	Start Thrust (% of static)	10	495	0	144	2,200
Decelerate	-	Normal Thrust	Track Distance (ft)	0	Start Speed CAS (kts)	30	Start Thrust (% of static)	10	4,946	0	30	2,200

Note: INM 7.0d Standard profile weight is 220,000 lbs.

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Table 2 Proposed Departure Profile – 180,000 lbs

Procedure Steps									Resulting Profile Points			
Step	Flaps	Thrust Type	Parameter 1	Value	Parameter 2	Value	Parameter 3	Value	Distance from Runway Threshold (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
									0	0	0	18,067
Takeoff	20	User Value	-	-	-	-	-	-	4,893	0	149	18,067
Climb	20	User Value	Final Altitude AFE (ft)	2,000	-	-	-	-	19,456	2,000	154	11,717
Accelerate	20	User Value	Climb Rate (fpm)	1,305	Final Speed CAS (kt)	207	-	-	41,268	3,597	217	11,293
Accelerate	INT	User Value	Climb Rate (fpm)	1,000	Final Speed CAS (kt)	227	-	-	46,489	3,835	239	11,108
Accelerate	ZERO	User Value	Climb Rate (fpm)	1,000	Final Speed CAS (kt)	250	-	-	52,119	4,068	264	10,893
Climb	ZERO	User Value	Final Altitude AFE (ft)	5,500	-	-	-	-	63,855	5,500	269	11,024
Climb	ZERO	User Value	Final Altitude AFE (ft)	7,500	-	-	-	-	81,627	7,500	278	11,199
Climb	ZERO	User Value	Final Altitude AFE (ft)	10,000	-	-	-	-	106,448	10,000	289	11,439

Notes: INM 7.0d Standard profile weight is 308,000 lbs. Thrust is computed using the INM's thrust calculator for an N1 of 82%.

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2.2 Pattern Operations

Pattern operations are represented in INM by two types of profiles, circuits and touch-and-goes. An aircraft conducting a circuit in the INM starts at rest on the ground, departs and enters the traffic pattern, levels off and continues around the pattern, descends, and lands on the same runway, coming to a complete stop. An aircraft conducting a touch-and-go starts in level flight in the traffic pattern, descends, lands on the runway, applies power and takes off without stopping, climbs, re-enters the pattern, and proceeds in level flight back to the location at which the track began. Actual training operations which may consist of an aircraft departing, conducting several touch-and-goes, and landing can be modeled as one INM circuit and several INM touch-and-goes.

The NHANG has indicated that two types of pattern operations are conducted: VFR patterns at an altitude of 1,500 ft and IFR patterns at an altitude of 3,000 ft. Table 3 and Table 4 present the profiles for VFR and IFR circuits, respectively. Table 5 and Table 6 present the profiles for VFR and IFR touch and goes, respectively.

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Table 3 Proposed VFR Circuit Profile - 150,000 lbs, 1,500 ft

Procedure Steps									Resulting Profile Points			
Step	Flaps	Thrust Type	Parameter 1	Value	Parameter 2	Value	Parameter 3	Value	Distance from Runway Threshold (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
									0	0	0	10,377
Takeoff	20	User Value	-	-	-	-	-	-	4,281	0	136	10,377
Climb	20	User Value	Final Altitude AFE (ft)	1,500	-	-	-	-	16,637	1,500	139	9,082
Accelerate	20	User Value	Climb Rate (fpm)	0	Final Speed CAS (kt)	207	-	-	26,615	1,500	210	8,382
Level	20	-	Altitude AFE (ft)	1,500	Speed CAS (kt)	207	Track Distance (ft)	500	26,865	1,500	210	4,602
Level-Stretch	20	-	-	-	-	-	-	-	27,115	1,500	210	4,602
Level	20	-	Altitude AFE (ft)	1,500	Speed CAS (kt)	207	Track Distance (ft)	500	27,615	1,500	210	4,602
Descend	D-30	-	Start Altitude AFE (ft)	1,500	Start Speed CAS (kts)	207	Descent Angle (deg)	3	28,615	1,500	210	2,326
									38,156	1,000	154	2,284
Descend	D-40	-	Start Altitude AFE (ft)	1,000	Start Speed CAS (kts)	158	Descent Angle (deg)	3	39,156	948	154	3,051
Land	D-40	-	Touchdown Roll (ft)	495	-	-	-	-	57,237	0	142	2,942
Decelerate	-	Normal Thrust	Track Distance (ft)	4,451	Start Speed CAS (kts)	145	Start Thrust (% of static)	10	57,731	0	144	2,200
Decelerate	-	Normal Thrust	Track Distance (ft)	0	Start Speed CAS (kts)	30	Start Thrust (% of static)	10	62,183	0	30	2,200

Notes: INM 7.0d Standard profile weight is 308,000 lbs. Thrust is computed using the INM's thrust calculator for an N1 of 75%.

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Table 4 Proposed IFR Circuit Profile - 155,000 lbs, 3,000 ft

Procedure Steps									Resulting Profile Points			
Step	Flaps	Thrust Type	Parameter 1	Value	Parameter 2	Value	Parameter 3	Value	Distance from Runway Threshold (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
									0	0	0	10,377
Takeoff	20	User Value	-	-	-	-	-	-	4,573	0	139	10,377
Climb	20	User Value	Final Altitude AFE (ft)	3,000	-	-	-	-	32,201	3,000	145	9,135
Accelerate	20	User Value	Climb Rate (fpm)	0	Final Speed CAS (kt)	207	-	-	44,340	3,000	215	8,461
Level	20	-	Altitude AFE (ft)	3,000	Speed CAS (kt)	207	Track Distance (ft)	500	44,590	3,000	215	5,025
Level-Stretch	20	-	-	-	-	-	-	-	44,840	3,000	215	5,025
Level	20	-	Altitude AFE (ft)	3,000	Speed CAS (kt)	207	Track Distance (ft)	500	45,340	3,000	215	5,025
Descend	D-30	-	Start Altitude AFE (ft)	3,000	Start Speed CAS (kts)	207	Descent Angle (deg)	3	46,340	3,000	215	2,540
									84,503	1,000	154	2,360
Descend	D-40	-	Start Altitude AFE (ft)	1,000	Start Speed CAS (kts)	158	Descent Angle (deg)	3	85,503	948	154	3,152
Land	D-40	-	Touchdown Roll (ft)	495	-	-	-	-	103,584	0	144	3,040
Decelerate	-	Normal Thrust	Track Distance (ft)	4,451	Start Speed CAS (kts)	145	Start Thrust (% of static)	10	104,078	0	144	2,200
Decelerate	-	Normal Thrust	Track Distance (ft)	0	Start Speed CAS (kts)	30	Start Thrust (% of static)	10	108,530	0	30	2,200

Notes: INM 7.0d Standard profile weight is 308,000 lbs. Thrust is computed using the INM's thrust calculator for an N1 of 75%

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Table 5 Proposed VFR Touch-and-Go Profile - 150,000 lbs, 1,500 ft

Procedure Steps									Resulting Profile Points			
Step	Flaps	Thrust Type	Parameter 1	Value	Parameter 2	Value	Parameter 3	Value	Distance from Touch-down (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
									-30,122	1,500	210	4,602
Level	20	-	Altitude AFE (ft)	1,500	Speed CAS (kt)	207	Track Distance (ft)	500	-29,622	1,500	210	4,602
Descend	D-30	-	Start Altitude AFE (ft)	1,500	Start Speed CAS (kts)	207	Descent Angle (deg)	3	-28,622	1,500	210	2,326
									-19,081	1,000	154	2,284
Descend	D-40	-	Start Altitude AFE (ft)	1,000	Start Speed CAS (kts)	153	Descent Angle (deg)	3	-18,081	948	154	3,051
Land	D-40	-	Touchdown Roll (ft)	989	-	-	-	-	0	0	142	2,942
									989	0	127	9,097
Takeoff	20	User Value	-	-	Start Speed CAS (kts)	180	-	-	1,676	0	136	9,097
Climb	20	User Value	Final Altitude AFE (ft)	1,500	-	-	-	-	14,032	1,500	139	9,082
									24,010	1,500	210	8,382
Accelerate	20	User Value	Climb Rate (fpm)	0	Final Speed CAS (kt)	207	-	-	24,260	1,500	210	4,602
Level	20	-	Altitude AFE (ft)	1,500	Speed CAS (kt)	207	Track Distance (ft)	500	24,510	1,500	210	4,602

Notes: INM 7.0d Standard profile weight is 308,000 lbs. Thrust is computed using the INM's thrust calculator for an N1 of 75%

Table 6 Proposed IFR Touch-and-Go Profile - 155,000 lbs, 3,000 ft

Procedure Steps									Resulting Profile Points			
Step	Flaps	Thrust Type	Parameter 1	Value	Parameter 2	Value	Parameter 3	Value	Distance from Touch-down (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
									-58,743	3,000	215	5,025
Level	20	-	Altitude AFE (ft)	3,000	Speed CAS (kt)	207	Track Distance (ft)	500	-58,243	3,000	215	5,025
Descend	D-30	-	Start Altitude AFE (ft)	3,000	Start Speed CAS (kts)	207	Descent Angle (deg)	3	-57,243	3,000	215	2,540
									-19,081	1,000	154	2,360
Descend	D-40	-	Start Altitude AFE (ft)	1,000	Start Speed CAS (kts)	153	Descent Angle (deg)	3	-18,081	948	154	3,152
Land	D-40	-	Touchdown Roll (ft)	989	-	-	-	-	0	0	144	3,040
									989	0	129	9,097
Takeoff	20	User Value	-	-	Start Speed CAS (kts)	180	-	-	1,711	0	139	9,097
Climb	20	User Value	Final Altitude AFE (ft)	3,000	-	-	-	-	29,339	3,000	145	9,135
									41,478	3,000	215	8,461
Accelerate	20	User Value	Climb Rate (fpm)	0	Final Speed CAS (kt)	207	-	-	41,728	3,000	215	5,025
Level	20	-	Altitude AFE (ft)	3,000	Speed CAS (kt)	207	Track Distance (ft)	500	41,978	3,000	215	5,025

Notes: INM 7.0d Standard profile weight is 308,000 lbs. Thrust is computed using the INM's thrust calculator for an N1 of 75%

2.3 Taxi Profile

The NHANG has provided a taxi speed of 25 kts and taxi thrust of "19% N1 or ground idle (lowest possible)". The INM aircraft type for the KC-135R use pounds of thrust, not N1, and assumes a static thrust of 22,000 lbs per engine. The lowest thrust provided in any INM standard profile for the KC-135R, 10% of static thrust (2,200 lbs) per engine, will be used as the thrust for taxiing consistent with the "lowest possible" recommendation by the NHANG.

NEW HAMPSHIRE AIR NATIONAL GUARD
HEADQUARTERS 157TH AIR REFUELING WING
PEASE AIR NATIONAL GUARD BASE NEW HAMPSHIRE

18 Dec 13

MEMORANDUM FOR RECORD

FROM: Maj Michael Sanders

SUBJECT: Pease ANGB Noise Study Parameters

Mr. Bradley Nicholas performed a noise study for Pease ANGB in his role as a senior consultant for Harris, Miller, Miller, & Hanson Inc. During this study he met with various members of the 157th Air Refueling Wing about current KC-135R flight profiles. Profiles from the previous study needed updating because they were based upon KC-135E flight profiles and outdated governing regulations. The profiles presented in HMMH's December 16, 2013 memorandum closely match our current flight patterns.

Specifically, the KC-135R no longer has thrust reversers, changing some of the parameters on landing ground roll. Additionally, regulatory changes require us to take off and land at the lightest fuel loads feasible, changing the gross weights for takeoffs, patterns, and landing profiles. Also, the Air Force now requires reduced flap landings for fuel conservation reasons.

Thank you for your time and consideration.

//SIGNED//
Michael Sanders, Maj, NHANG
157 OSS/OST

5. CERTIFICATION OF NEW PARAMETERS

HMMH certifies that for the departure, touch-and-go, and circuit profiles:

1. Altitudes are above field elevation in feet.
2. Speed is true airspeed in knots
3. All thrusts are in pounds, which is the unit used in the KC135R's noise-power-distance curves.

HMMH certifies that for the arrival profile:

1. No new performance coefficient data were developed.
2. The procedure step data conform to the rules given in the INM User's Guide.
3. The profile used 10% of the Standard static thrust value of 22,000 lbs for the landing roll.
4. The profile did not use RPM, EPR, or other parameters converted to pounds.

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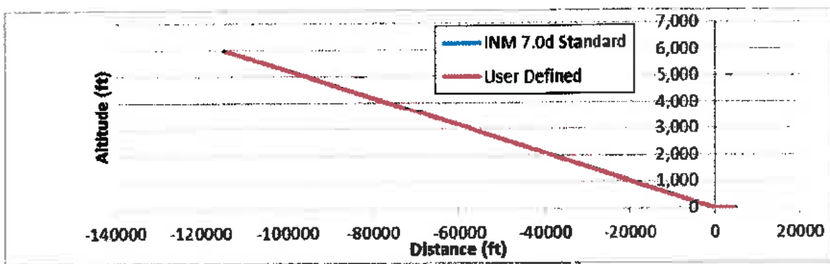
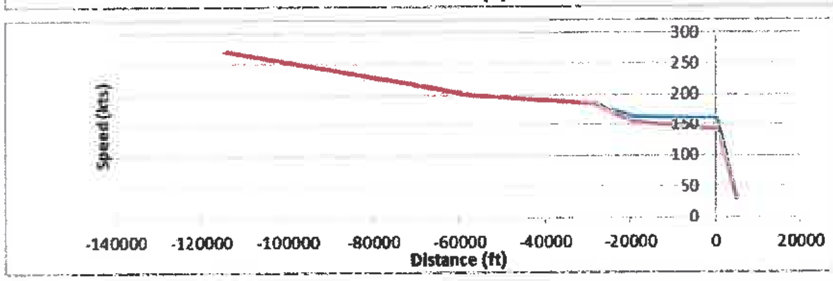
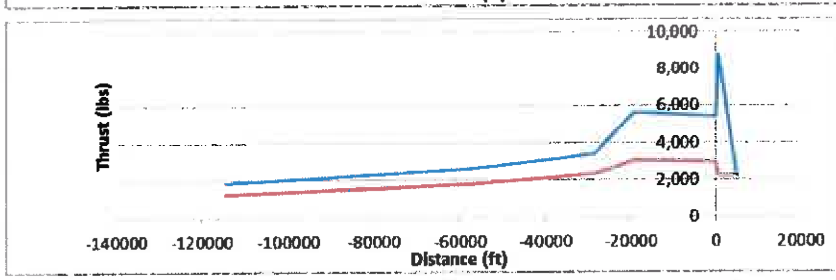
6. GRAPHICAL AND TABULAR COMPARISON

6.1 Arrival

INM Standard (220,000 lbs)				User Defined (150,000 lbs)			
Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)	Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
-114486.8	6000	271.4	1849.63	-114486.8	6000	271.4	1251.11
-57243.4	3000	200.3	2629.35	-57243.4	3000	200.3	1792.74
-28621.7	1500	185.8	3411.73	-28621.7	1500	185.8	2326.18
-19081.1	1000	164.2	5598.02	-19081.1	1000	154.2	3050.51
0	0	161.9	5399.61	0	0	141.8	2941.85
494.6	0	153.5	8800	494.6	0	144	2200
4946	0	29.8	2200	4945.6	0	29.8	2200







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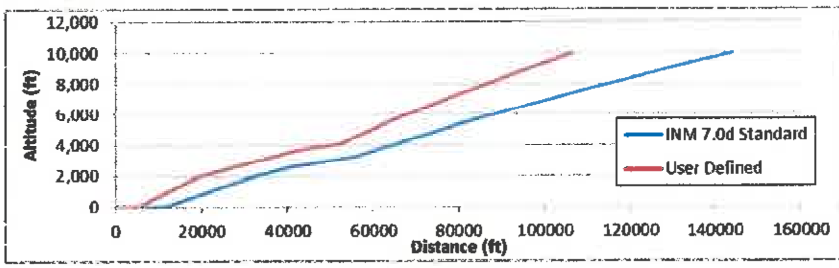
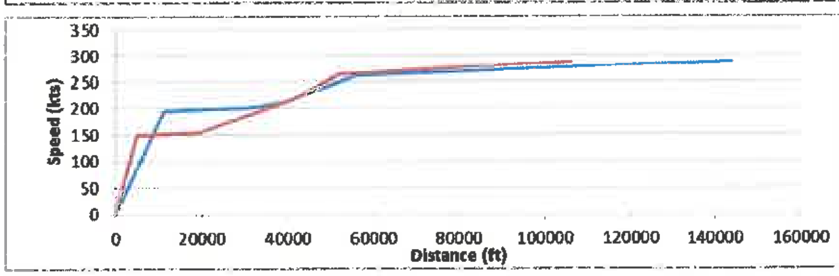
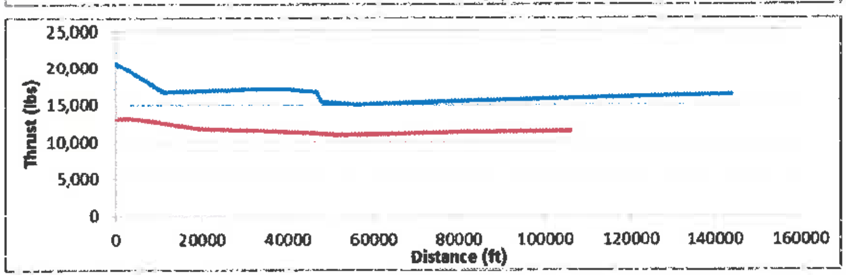
6.2 Departure

INM Standard (308,000 lbs)				User Defined (180,000 lbs)			
Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)	Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
0	0	0	20740.02	0	0	0	13067
11273.1	0	195.5	16675.19	4892.5	0	149.4	13067
31958.1	2000	201.3	17119.37	19455.5	2000	153.9	11737
40163.8	2536.8	213.4	17028.87	41267.7	3596.5	216.8	11293
46927.3	2850.4	235.1	16685.51	46488.8	3834.9	238.6	11103
47927.3	2892.3	238	15346.91	52119	4068	263.6	10893
55915.9	3227.5	260.3	15010.15	63855.2	5500	269.4	11024
82204.5	5500	269.4	15463.13	81626.6	7500	277.7	11199
107794.3	7500	277.7	15861.79	105447.6	10000	288.7	11439
143717.5	10000	288.7	16360.11	#N/A	#N/A	#N/A	#N/A







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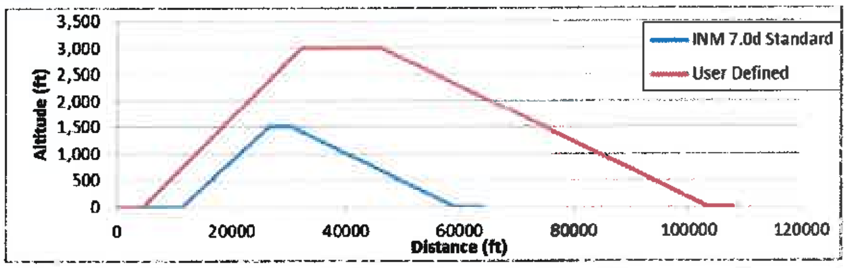
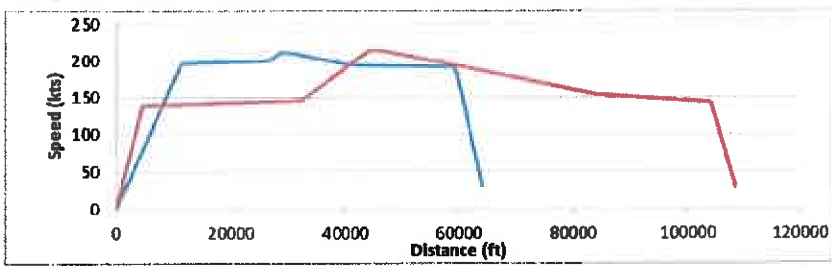
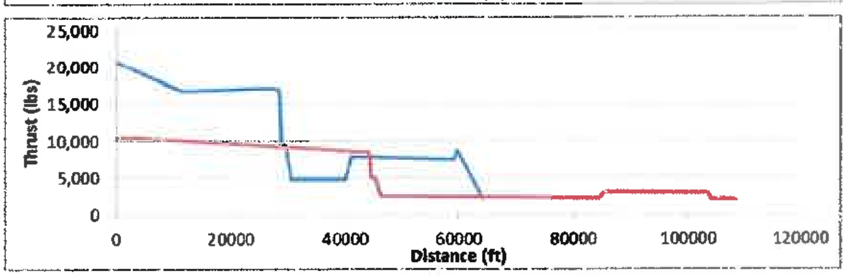
6.3 Circuit - IFR

INM Standard (308,000 lbs, 1,500 ft)				User Defined (155,000 lbs, 3,000 ft)			
Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)	Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
0	0	0	20740.02	0	0	0	10377
11273.1	0	195.5	16675.19	4573.1	0	138.7	10377
26587.4	1500	199.8	17008.33	32201.4	3000	144.9	9135
28529.1	1500	210.1	16798.6	44340.2	3000	214.8	8461
28779.1	1500	210.1	9450.21	44590.2	3000	214.8	5025.04
29029.1	1500	210.1	9450.21	44840.2	3000	214.8	5025.04
29029.1	1500	210.1	9450.21	44840.2	3000	214.8	5025.04
29529.1	1500	210.1	9450.21	45340.2	3000	214.8	5025.04
30529.1	1500	210.1	4776.43	46340.2	3000	214.8	2539.81
40069.7	1000	194.4	4690.15	84502.5	1000	154.2	2360.3
41069.7	947.6	194.2	7837.22	85502.5	947.6	153.7	3152.2
59150.8	0	191.5	7558.06	103583.6	0	144.2	3039.92
59645.4	0	181.6	8800	104078.2	0	144	2200
64096.8	0	29.8	2200	108529.6	0	29.8	2200







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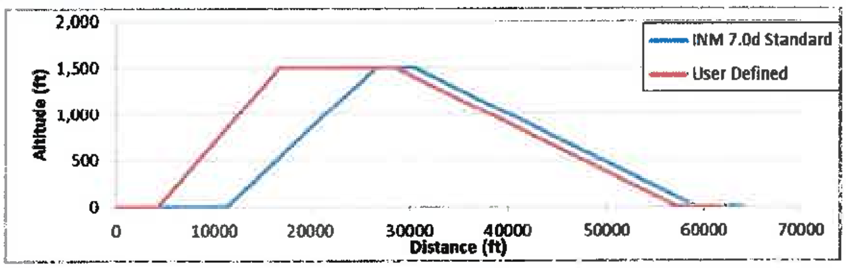
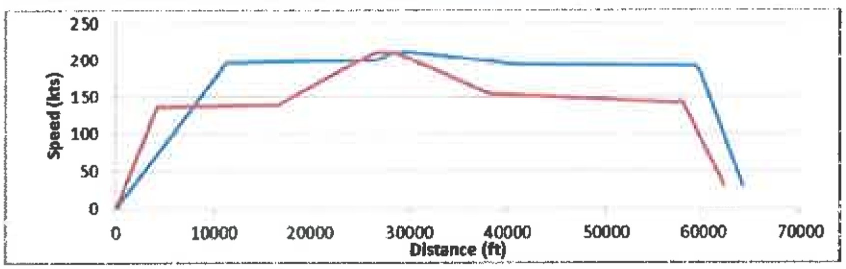
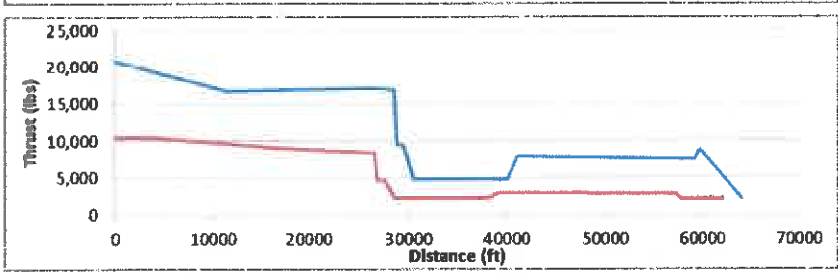
6.4 Circuit - VFR

INM Standard (308,000 lbs, 1,500 ft)				User Defined (150,000 lbs, 1,500 ft)			
Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)	Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
0	0	0	20740.02	0	0	0	10377
11273.1	0	195.5	16675.19	4281	0	136.4	10377
26587.4	1500	199.8	17008.33	15637	1500	139.4	9082
28529.1	1500	210.1	16798.6	25614.9	1500	210.1	8382
28779.1	1500	210.1	9450.21	25864.9	1500	210.1	4602.37
29029.1	1500	210.1	9450.21	27114.9	1500	210.1	4602.37
29029.1	1500	210.1	9450.21	27114.9	1500	210.1	4602.37
29529.1	1500	210.1	9450.21	27614.9	1500	210.1	4602.37
30529.1	1500	210.1	4776.43	28514.9	1500	210.1	2326.18
40069.7	1000	194.4	4690.15	38155.5	1000	154.2	2284.16
41069.7	947.6	194.2	7837.22	39155.5	947.6	153.5	3050.51
59150.8	0	191.5	7558.06	57236.6	0	141.8	2941.85
59645.4	0	181.6	8800	57731.2	0	144	2200
64096.8	0	29.8	2200	62182.6	0	29.8	2200







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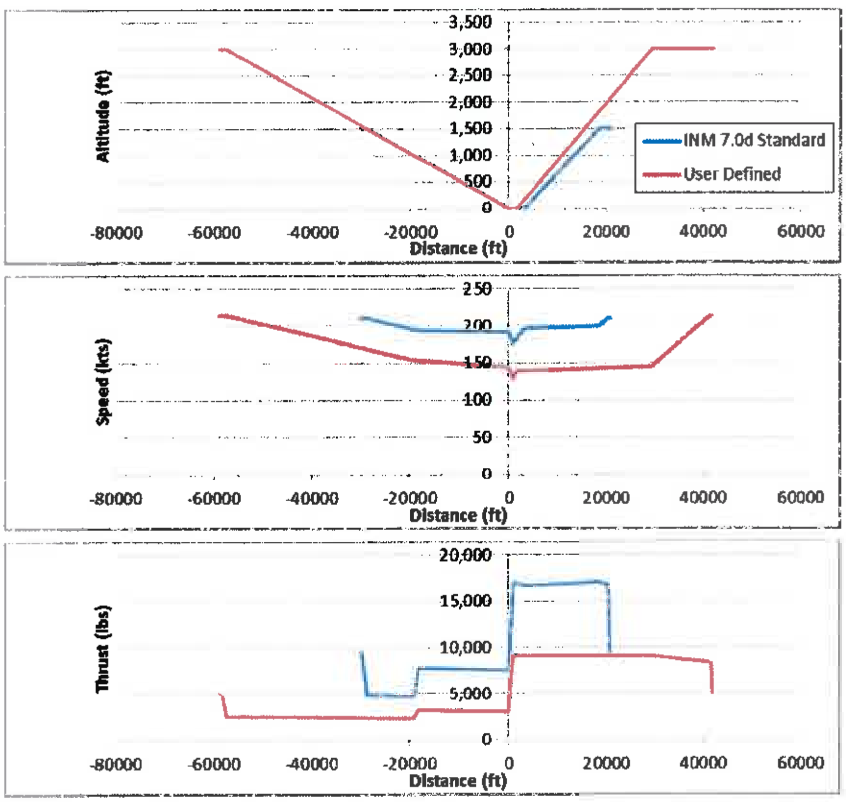
6.5 Touch-and-go - IFR

INM Standard (308,000 lbs, 1,500 ft)				User Defined (155,000 lbs, 3,000 ft)			
Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)	Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
-30121.7	1500	210.1	9450.21	-58743.4	3000	214.8	5025.04
-29521.7	1500	210.1	9450.21	-58243.4	3000	214.8	5025.04
-28621.7	1500	210.1	4776.43	-57243.4	3000	214.8	2539.81
-19081.1	1000	194.4	4690.15	-19081.1	1000	154.2	2360.3
-18081.1	947.6	194.2	7837.22	-18081.1	947.6	153.7	3152.2
0	0	191.5	7558.06	0	0	144.2	3039.92
989.2	0	175.9	17082.9	989.2	0	128.7	9097
3137.2	0	195.5	16675.19	1711	0	138.7	9097
18451.5	1500	199.8	17008.33	29339.2	3000	144.9	9135
20393.2	1500	210.1	16798.6	41478	3000	214.8	8461
20643.2	1500	210.1	9450.21	41728	3000	214.8	5025.04
20893.2	1500	210.1	9450.21	41978	3000	214.8	5025.04
20893.2	1500	210.1	9450.21	41978	3000	214.8	5025.04



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NEM Update for Portsmouth International Airport at Pease
INM 7.0d KC-135R Profiles
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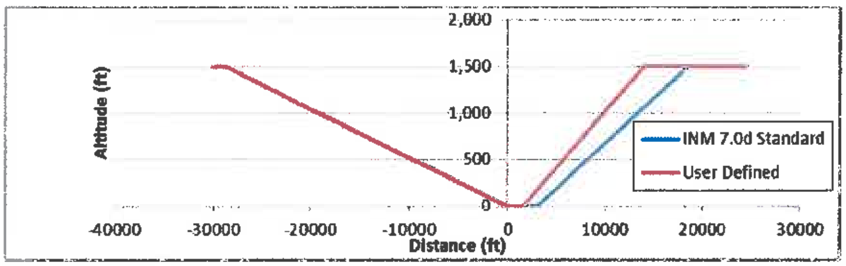
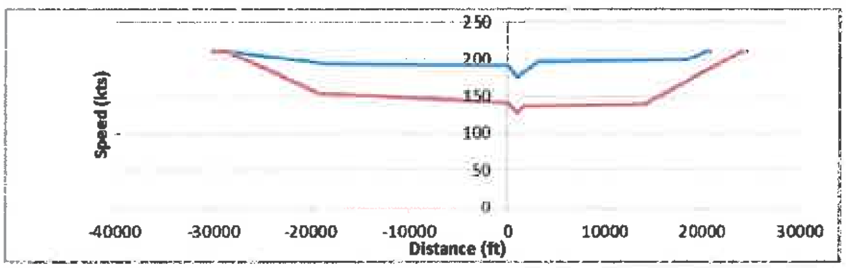
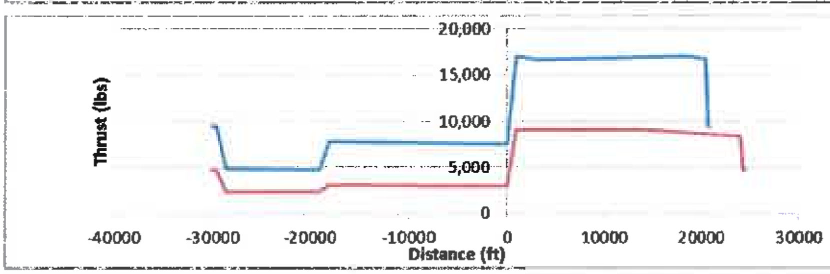
6.6 Touch-and-go - VFR

INM Standard (308,000 lbs, 1,500 ft)				User Defined (150,000 lbs, 1,500 ft)			
Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)	Distance (ft)	Altitude (ft)	Speed (kts)	Thrust (lbs)
-30121.7	1500	210.1	9450.21	-30121.7	1500	210.1	4602.37
-29621.7	1500	210.1	9450.21	-29621.7	1500	210.1	4602.37
-28621.7	1500	210.1	4776.43	-28621.7	1500	210.1	2326.18
-19081.1	1000	194.4	4690.15	-19081.1	1000	154.2	2284.16
-18081.1	947.6	194.2	7837.22	-18081.1	947.6	153.5	3050.51
0	0	191.5	7558.06	0	0	141.8	2941.85
989.2	0	175.9	17082.9	969.2	0	126.5	9097
3137.2	0	195.5	16675.19	1675.6	0	136.4	9097
18451.5	1500	199.8	17008.33	14031.6	1500	139.4	9082
20393.2	1500	210.1	16798.6	24009.5	1500	210.1	8382
20643.2	1500	210.1	9450.21	24259.5	1500	210.1	4602.37
20893.2	1500	210.1	9450.21	24509.5	1500	210.1	4602.37
20893.2	1500	210.1	9450.21	24509.5	1500	210.1	4602.37







ATTACHMENT C

TAXI PROFILES

1. BACKGROUND

HMMH is assisting the PDA with a Part 150 NEM Update using INM 7.0d to compute the noise for the base and future years. The airport has residences in close proximity to the taxiways. The edge of Taxiway A is approximately 750 ft from the closest residential properties near the departure end of Runway 34. HMMH and the PDA feel that we cannot dismiss the ground noise contribution from taxi operations. We would like to conduct a reasonable ground noise analysis without adversely affecting the project's cost and schedule constraints. This memorandum and accompanying INM v7.0d study present our taxiway noise analysis.

Our proposed modeling techniques are almost identical to the techniques submitted to, and approved for the Part 150 Noise Exposure Map Update at Burlington International Airport (HMMH Project 301320). Approval was provided in July of 2006. The proposed technique of modelling the aircraft operations on the taxiways with INM overflight profiles is consistent with the methodology described in section 9.8.7 of the INM v7.0 User Guide.

2. PROPOSED PROFILES

Several overflight profiles are used to represent the operations for the taxiways in this project, all of which are described below and found in and the accompanying INM v7.0d electronic files. These profiles include various stationary segments where appropriate. These stationary segments include:

- One-minute average hold before departure for jets and turboprops (based on estimate by tower staff)
- Two-minute hold before departure for piston aircraft to account for average hold and pre-flight checks at runway ends (based on estimate by tower staff)

As per the INM 7.0 User's Guide, the stationary positions are modeled with a slow moving aircraft through the area. This slow movement representation is used because INM overflight profiles cannot model 0 velocity profile segments, and the slow movement area represent multiple "average annual" positions at which individual aircraft may actually stop.

Each INM aircraft used in this study has up to ten unique proposed overflight profiles which correspond to the correct length and speeds of the particular taxi-way ground track and the parameters for the particular aircraft (although not all INM aircraft will use all of the profiles). Therefore, the following profile description uses variables to describe several of the parameters.

In summary, all of the profiles use an OP_MODE setting of A and an ALTITUDE of 10 ft[2]. The taxiing portion (i.e. moving) of the profile will be at a constant speed (10 knots) at an idle power setting defined as 10% of the static thrust for that aircraft[3]. The stationary positions are represented with several profile points and are described below.

---

[2] Previous analyses have shown no effect for small changes in the elevation. Therefore, we simplified the analysis by assuming all engines were 10 ft. above airport elevation.

[3] When the aircraft thrust in the noise-power-distance curves is not expressed in pounds (as determined from the THRSET_TYP field in nois_grp.dbf and milnois_grp.dbf), the thrust is modeled using 10% of the highest thrust value in the noise-power-distance curves.

Each stationary position portion of the profile is represented with six points entered in the prof_pts.dbf file, as described in Table 2-1. The points represent the deceleration from 10 knots to "0 knots" over 50 ft, slow movement over a respective distance to represent the desired stationary time and aircraft movement through that same area at 10 knots, and then acceleration from "0 knots" to 10 knots. The acceleration portions include segments at 30% of the static thrust value for the respective aircraft. The derivation of using 30% of the static thrust value is provided in Section 1.1.1.

Table 2-2 presents the profile points for taxi after arrival. These profiles are much simpler, with only two points. The aircraft taxi with a constant speed of 10 kts and idle thrust for the full length of the profile.

Table 2-1 Profile Points for Taxi to Departure

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	PT_NUM	DISTANCE (ft)	ALTITUDE (ft)	SPEED (Knots)	THR_SET	OP_MODE
	V	[TX]	1	1	0	10	10.0	[IDLE]	A
	V	[TX]	1	2	[START]-50	10	10.0	[IDLE]	A
	V	[TX]	1	3	[START]	10	[AS]	[IDLE]	A
	V	[TX]	1	4	[END]-10	10	[AS]	[IDLE]	A
	V	[TX]	1	5	[END]	10	[AS]	[ACL]	A
	V	[TX]	1	6	[END]+50	10	10.0	[ACL]	A
	V	[TX]	1	7	[END]+60	10	10.0	[IDLE]	A
	V	[TX]	1	8	[S]	10	10.0	[IDLE]	A

Where,
[TX] = Name of the taxi way track
[START] = Profile distance to beginning of stationary area (ft)
[END] = Profile distance to end of stationary area (ft)
[S] = The length of the taxiway track.
[AS] = Adjust speed – speed that will provide the desired stationary time in the stationary area and the necessary time to taxi through the area at 10 knots.
[IDLE] = Idle thrust setting represented by 10% of the aircraft's static thrust; for aircraft with NPD curves where the thrust is not expressed in lbs, 10% of the highest thrust in the departure NPD curves
[ACL] = Accelerating thrust for taxi, 0 to 10 knots in 50 ft., 30% of the static thrust associated with the aircraft; for aircraft with NPD curves where the thrust is not expressed in lbs, 30% of the highest thrust in the departure NPD curves.

Table 2-2 Profile Points for Taxi from Arrival

ACFT_ID	OP_TYPE	PROF_ID1	PROF_ID2	PT_NUM	DISTANCE (ft)	ALTITUDE (ft)	SPEED (Knots)	THR_SET	OP_MODE
	V	[TX]	1	1	0	10	10.0	[IDLE]	A
	V	[TX]	1	2	[S]	10	10.0	[IDLE]	A

Where,
[TX] = Name of the taxi way track
[S] = The length of the taxiway track.
[IDLE] = Idle thrust setting represented by 10% of the aircraft's static thrust; for aircraft with NPD curves where the thrust is not expressed in lbs, 10% of the highest thrust in the departure NPD curves

1.1.1 Derivation of taxiing acceleration thrust

The derivation of accelerating thrust uses basic physics and some simplifying assumptions. This analysis assumes that aerodynamic drag and wheel friction are negligible, that the aircraft is on a level surface, and the only force (thrust) required is to accelerate the mass of the aircraft to the desired speed and within the desired distance. This analysis also assumes that an aircraft's static thrust is approximately 30% of the aircraft weight[4]. The result of the analysis is that approximately 30% static thrust is required to accelerate the aircraft from 0 to 10 knots (16.88 ft/s) within 50 ft. The derivation is presented below.

Equation 1 represents one of the equations of motion and relates acceleration and distance to a change in velocity.

$$\text{Velocity}_{\text{Final}}^2 = \text{Velocity}_{\text{Initial}}^2 + 2*\text{Acceleration}*\text{Distance} \qquad (1)$$

Equation 2 uses Equation 1 and gives the acceleration required to change velocity from 0 to 10 knots (16.88 ft/s) within 50 ft. This is the desired acceleration.

$$\text{Acceleration}_{\text{Desired}} = (16.88\ \text{ft/s})^2/(2*50\ \text{ft}) = 2.85\ \text{ft/s}^2 \qquad (2)$$

Equation 3 represents the relationship between force, mass and acceleration (Newton's Second Law of Motion).

$$\text{Force} = \text{Mass}*\text{Acceleration} \qquad (3)$$

Equation 4 relates the weight of the aircraft to its mass based on Equation 3 and the acceleration of gravity (32.17 ft/s^2)

$$\text{Weight} = \text{Mass}*32.17\ \text{ft/s}^2 \qquad (4)$$

Equation 5 is based on Equation 3 and relates the desired thrust to the desired acceleration.

$$\text{Thrust}_{\text{Desired}} = \text{Mass} * \text{Acceleration}_{\text{Desired}} \qquad (5)$$

[4] Estimated by comparison of static thrust and maximum take-off weights for various INM types used in this study.

Equation 6 is replaces the mass using equation 4.	
$\text{Thrust}_{Desired} = (\text{Weight}/32.17\ \text{ft/s}^2) * \text{Acceleration}_{Desired}$	(6)
Equation 7 presents the observed relationship between the static thrust and aircraft weight.	
$\text{Thrust}_{Static} = 0.30 * \text{Weight}$	(7)
Equation 8 replaces the weight in equation 6 with the function of static thrust given in equation 7, yielding the final relationship between the desired thrust and static thrust.	
$\text{Thrust}_{Desired} = ((\text{Thrust}_{Static}/0.30)/32.17\ \text{ft/s}^2) * \text{Acceleration}_{Desired}$	(6)
$\text{Thrust}_{Desired} = ((\text{Thrust}_{Static}/0.30)/32.17\ \text{ft/s}^2) * 2.85\ \text{ft/s}^2$	
$\text{Thrust}_{Desired} = 0.30 * \text{Thrust}_{Static}$	

3. EFFECT ON DNL CONTOURS

DNL contours for the draft NEM DNL contours, taxi DNL contours, and draft NEM DNL contours with taxi noise are presented in the figures on the following pages.

For reference the FAA airport diagram is shown below as Figure 3-1. The taxi tracks, as shown in Figure 3-3, originate and terminate on Taxiway A near either the General Aviation Apron for civil operations or the ANG Apron for military operations. The other end of the track is at a runway end or intersections of Taxiways B and C with the runway. The tower has provided estimates of intersections departures for various aircraft groups. These intersection departures are implemented in both the departure flight tracks as well as the taxi tracks.

Note that the bulk of the effect of the addition of the taxiway noise occurs on-airport. The exception to this is the residential area near the end of Runway 34. This area can be seen in Figure 3-4 **Error! Reference source not found.** as the area of enclosed squares within the 60 dB DNL contour to the east of the runway end.

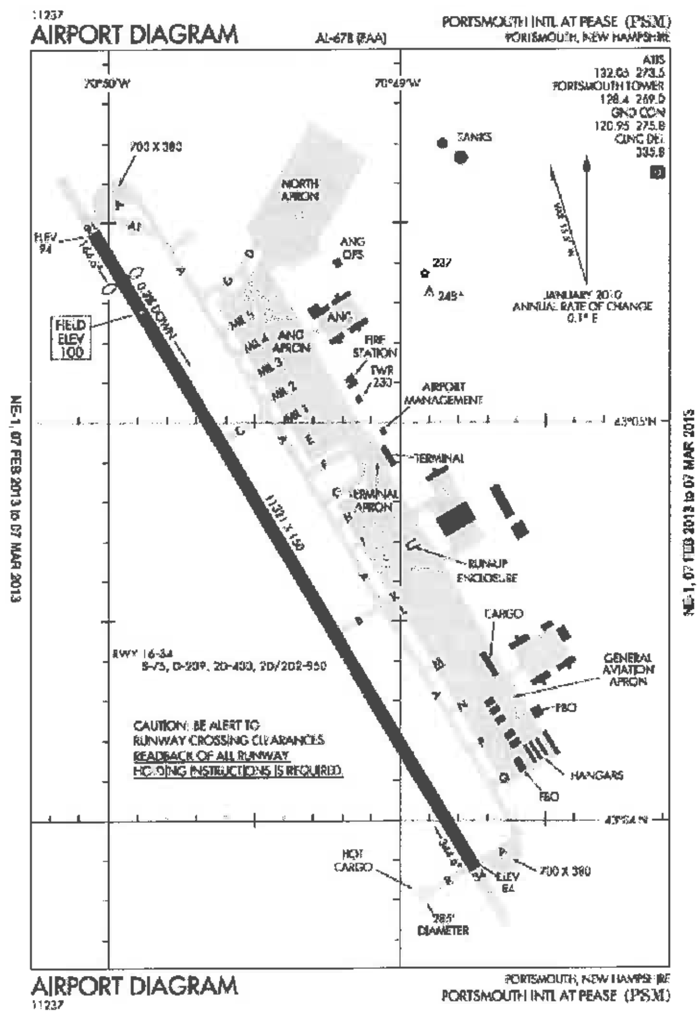


Figure 3-1 FAA Airport Diagram

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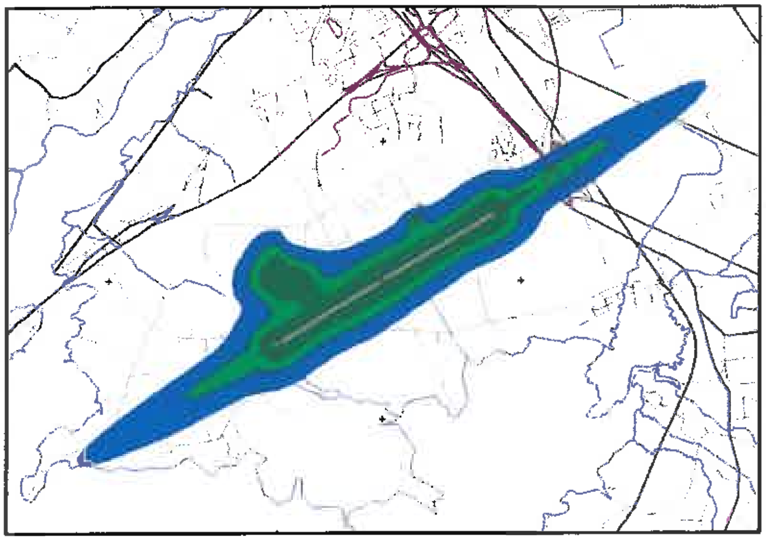

Figure 3-2 Draft NEM 60, 65, and 70 dB DNL Contours (Rotated for comparison to Figure 2)

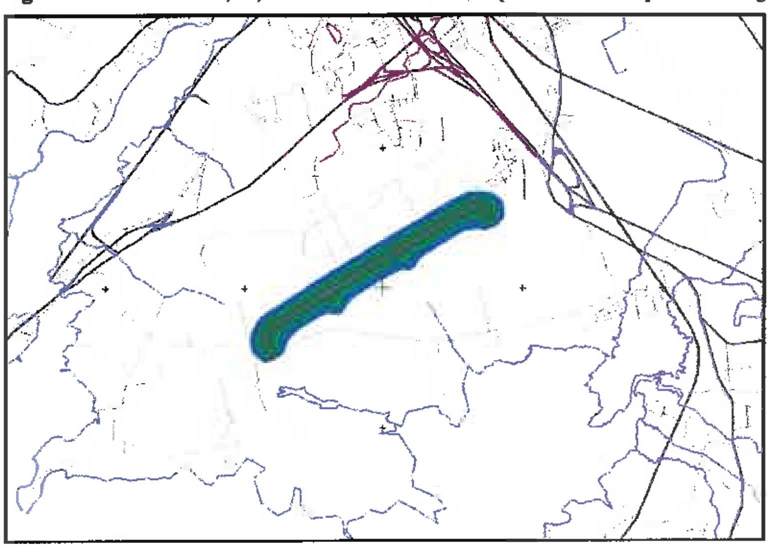

Figure 3-3 Draft 60, 65, and 70 dB Taxi DNL Contours (Rotated for comparison to Figure 1)

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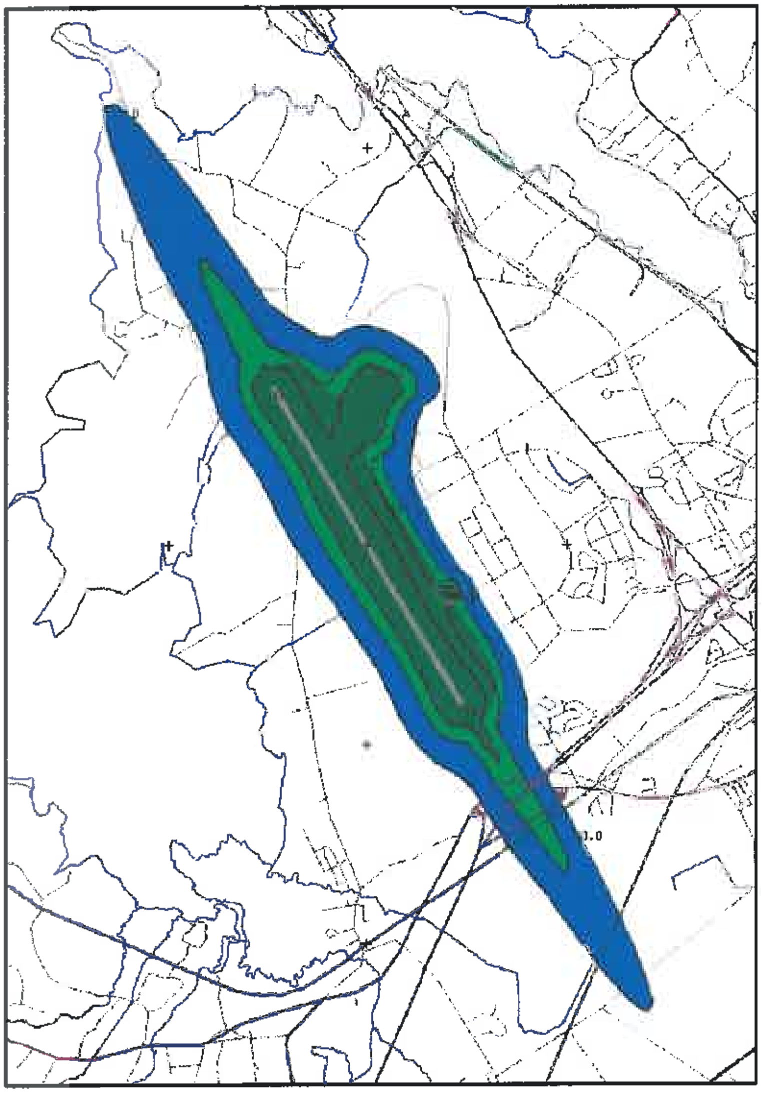

Figure 3-4 Draft NEM 60, 65, and 70 dB DNL Contours with Taxi Noise (black line shows contours without the inclusion of taxiway noise)

4. ATTACHED INM FILES

The attached INM files include:

- All taxi profiles used in the modeling presented in this attachment
- A scenario modeling taxiway DNL for the base year NEM

U.S. Department of Transportation
Federal Aviation Administration

Office of Environment and Energy

800 Independence Ave., S.W.
Washington, D.C. 20591

January 28, 2014

Richard Doucette
Environmental Program Manager
FAA New England Region, Airports Division

Dear Richard,

The Office of Environment and Energy (AEE) has reviewed the proposed non-standard Integrated Noise Model (INM) aircraft substitutions and profiles for the Portsmouth International Airport at Pease (PSM) Noise Exposure Map Update.

Harris Miller Miller & Hanson Inc. (HMMH) is assisting the Pease Development Authority (PDA) with the Noise Exposure Map (NEM) Update for PSM. The updated NEM will be modeled using the most current release of the INM; i.e., Version 7.0d. HMMH has proposed substitutions for 22 aircraft types that currently do not have standard substitutions in the INM aircraft database. AEE concurs with the aircraft substitutions proposed by HMMH summarized in the table below.

Aircraft	HMMH Proposed Substitution	AEE Recommendation
Embraer EMB-500 Phenom 100	CNA510	Concur
Embraer EMB-505 Phenom 300	CNA560E	Concur
BAe/Raytheon Hawker 1000	LEAR35	Concur
Learjet 40	LEAR35	Concur
Boeing E-6 Mercury	DC870	Concur
Dassault Falcon 7X	F10062	Concur
Beech Super King Air 350	DO228	Concur
Piper Malibu Meridian	CNA208	Concur
Socata TBM-850	CNA208	Concur
Beechcraft 36 Bonanza	CNA206	Concur
Lancair LC-41 Columbia 400	GASEPV	Concur
Lancair Columbia 300	GASEPV	Concur
Diamond 40	GASEPV	Concur
Cirrus SR-20	GASEPV	Concur
Socata TB-21 Trinidad	GASEPV	Concur
Vans RV-10	GASEPV	Concur
Socata Tobago	GASEPV	Concur

Aviat Husky	GASEPV	Concur
Glasair	GASEPV	Concur
American Traveler AA-5	GASEPF	Concur
Liberty XL-2	GASEPF	Concur
Maule M7	GASEPF	Concur

HMMH has also requested approval of non-standard profiles developed for the INM type KC-135R aircraft. The INM 7.0d standard profiles for the KC-135R do not fall within the bounds of the New Hampshire Air National Guard (NHANG) KC-135 aircraft operations. The non-standard profiles for the KC-135R were developed by HMMH in consultation with the NHANG to better reflect the operations of the KC-135 at PSM. HMMH has provided a Memorandum for Record from the NHANG indicating concurrence with the non-standard profiles. AEE approves the use of these profiles for the KC-135R for this NEM Update at PSM.

Finally, HMMH is conducting a ground noise analysis to incorporate the noise contribution from taxi operations for residences that are in close proximity to the taxiways. The proposed method for modelling the aircraft operations on the taxiways with INM overflight profiles is consistent with the methodology described in the INM v7.0 User Guide. AEE approves the use of the method proposed by HMMH for the modeling of taxi noise at PSM.

Please understand that this approval is limited to this particular NEM Update for PSM. Any additional projects or non-standard INM input at PSM or any other site will require separate approval.

Sincerely,

Rebecca Cointin, Manager
AEE/Noise Division

cc: Jim Byers, APP-400

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APPENDIX I CORRESPONDENCE TO AND FROM THE FAA REGARDING FAA APPROVAL OF OPERATIONS FORECASTS

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TECHNICAL MEMORANDUM

Subject:	Review and Approval of Portsmouth International Airport at Pease Noise Exposure Map Update Forecast
Prepared for:	Richard Doucette, FAA
Prepared by:	Brad Nicholas
Date:	August 1, 2013
Reference:	HMMH Job #305310

1. INTRODUCTION

Harris Miller Miller & Hanson Inc. (HMMH) is assisting the Pease Development Authority (PDA) in the preparation of a Noise Exposure Map (NEM) Update for the Portsmouth International Airport at Pease (PSM). This memorandum requests that the Federal Aviation Administration (FAA) review and approve a forecast of operations at PSM for use in the NEM Update. The PDA plans to submit the PSM NEM Update to FAA during calendar year 2013. Therefore the base year of the NEM will be 2013 and the forecast year for the NEM will be 2018.

1. FORECAST ASSUMPTIONS

In its June 2008 document entitled "Review and Approval of Aviation Forecasts",[1] the FAA describes its guidelines for comparing locally-prepared forecasts to the FAA's Terminal Area Forecast (TAF): For all classes of airports, forecasts for total enplanements, based aircraft, and total operations are considered consistent with the TAF if they meet the following criterion:

> *Forecasts differ by less than 10 percent in the 5-year forecast period and 15 percent in the 10-year period.*

The most recent TAF, published in January of 2013 and included in Appendix A, contains historical operations data for PSM for the years of 1990 through 2010. Operations for 2011 through 2040 remain identical to 2010. The apparent intention of the forecast is for operations to remain constant relative to the most recently collected set of actual operations (i.e. a growth rate of 0%). The PDA receives regular updates on the number of monthly operations from the Air Traffic Control Tower (ATCT) which operates under contract to the Air National Guard (ANG). The PDA has provided HMMH with the tower counts for 2012, the most recent complete year. These tower counts are two years more recent than the latest actual operations data presented in the TAF and form the basis of the forecast presented here.

The PDA proposes to use the 2012 tower counts for PSM with the 0% growth rate from the January 2013 issue of the FAA's TAF for aircraft operational activity levels in the PSM NEM Update analyses.

[1] http://www.faa.gov/airports/planning_capacity/media/approval_local_forecasts_2008.pdf

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Review and Approval of Portsmouth International Airport at Pease Noise Exposure Map Update Forecast
August 1, 2013
Page 2

The total proposed modeled operations are presented in Table 1. The TAF reports aircraft operational activity levels in one of four categories listed below.[2]

- Air Carrier – Operations by aircraft capable of holding 60 seats or more and are flying using a three letter company designator.
- Air Taxi - Operations by aircraft less than 60 seats and are flying using a three letter company designator or the prefix "Tango".
- Military –all classes of military operations.
- General Aviation – Civil (non-military) aircraft operations not otherwise classified under air carrier or air taxi.

Table 1 – Summary of Current Activity Levels at PSM and Proposed Modeled Operations for the 2013 and 2018 Noise Exposure Map

FAA Operational Category[1]	2012 Operations[2]		Proposed 2013 NEM Operations		Proposed 2018 NEM Operations	
	Annual	Average Annual Day	Annual	Average Annual Day	Annual	Average Annual Day
Air Carrier	502	1.4	501	1.4	501	1.4
Air Taxi	5,220	14.3	5,206	14.3	5,206	14.3
General Aviation	24,995	68.3	24,927	68.3	24,927	68.3
Military	7,917	21.6	7,895	21.6	7,895	21.6
Total[3]	38,634	105.6	38,528	105.6	38,528	105.6

Notes:
1. Operational Categories are those defined in FAA Order 7210.3X at Chapter 9, Section 9-1-2 (February 9, 2012). http://www.faa.gov/documentLibrary/media/Order/FAC.pdf
2. 2012 actual operations are provided for reference. Average annual day operations were developed assuming 366 days since 2012 was a leap year.
3. Totals may not match exactly due to rounding.
Sources: PSM ATCT, TAF 2013

For both the 2013 NEM and the 2018 NEM, 38,528 annual operations would be modeled. Table 1 also presents, for reference, the 2012 actual airport operations, as reported by the ATCT. Note that the average annual daily operations are equal in all years, consistent with the 0% growth rate in the TAF. Differences in the annual operations are due to 2012 being a leap year. The NEM forecast total operations for 2013 and 2018 are approximately 11% higher than the TAF total of 34,565 operations. Though outside of the 10% range specified in FAA's guidance, the NEM forecast reflects the most recent actual operations data available for PSM as well as the growth rate of the 2013 TAF.

Figure 1 displays the TAF's historical and forecast operations, the ATCT counts for 2012, and the NEM forecast operations.

[2] FAA Joint Order JO 7210.3X, Section 9-1-2. Categories of Operations, Published 2/9/2012. Latest version is available at http://www.faa.gov/documentLibrary/media/Order/FAC.pdf The 2012 TAF is based on historical operations data http://www.faa.gov/about/office_org/headquarters_offices/apl/aviation_forecasts/taf_reports/media/TAF_summary_report_FY2012.pdf, pp. 3-5.

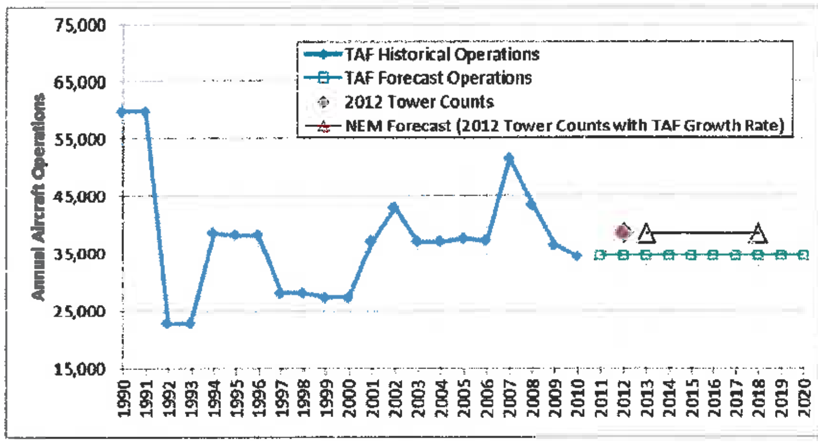

Figure 1 FAA TAF and NEM Forecast Operations

2. FLEET MIX ASSUMPTIONS

The 2013 fleet will be developed using a full year of data from the FAA's Traffic Flow Management System Counts (TFMSC) and input from the ANG regarding military operations. The fleet mix for 2018 relies on several general assumptions concerning changes to the fleet within the PSM NEM Update time frame. These changes would be made relative to the 2013 fleet.

We propose that the assumptions for 2018 would be:

- All aircraft certified to 14 CFR Part 36 Stage 2 will be retired from the fleet after December 31, 2015; therefore they will remain in the 2013 fleet but be replaced by in-production Stage 3 or higher versions of similar aircraft.[3]
- The day/night ratio and departure stage length ratio for aircraft will remain the same as the 2013 base-year for each aircraft type.
- Additional changes in fleet mix may be added in response to input from the ANG or other aircraft operators.

[3] Federal Register Volume 78, No. 127. Available at http://www.gpo.gov/fdsys/pkg/FR-2013-07-02/pdf/2013-15843.pdf

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Review and Approval of Portsmouth International Airport at Pease Noise Exposure Map Update Forecast
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APPENDIX A – JANUARY 2013 FAA TERMINAL AREA FORECAST (TAF)

	Itinerant					Local			
Year	Air Carrier	Air Taxi	General Aviation	Military	Total	General Aviation	Military	Total	Total
1990	0	24	0	59,740	59,764	0	0	0	59,764
1991	0	20	0	59,740	59,760	0	0	0	59,760
1992	0	493	7,636	11,292	19,421	3,381	0	3,381	22,802
1993	0	429	7,636	11,292	19,357	3,383	0	3,381	22,738
1994	0	11,137	12,340	9,672	33,149	5,440	0	5,440	38,589
1995	400	7,071	17,146	7,216	31,833	6,419	0	6,419	38,252
1996	100	7,371	17,146	7,216	31,833	6,419	0	6,419	38,252
1997	0	1,462	11,695	7,562	20,719	7,448	0	7,448	28,167
1998	0	1,462	11,695	7,562	20,719	7,448	0	7,448	28,167
1999	1,326	324	12,990	7,640	22,280	5,136	0	5,136	27,416
2000	1,326	324	12,990	7,640	22,280	5,136	0	5,136	27,416
2001	1,500	3,052	17,512	7,720	29,784	7,354	0	7,354	37,138
2002	3,577	1,660	17,787	10,188	33,212	9,838	0	9,838	43,050
2003	1,500	3,052	17,512	7,720	29,784	7,354	0	7,354	37,138
2004	1,500	3,052	17,512	7,720	29,784	7,354	0	7,354	37,138
2005	1,316	2,665	2,877	7,797	14,655	23,085	0	23,085	37,740
2006	716	2,624	2,919	8,223	14,482	22,851	0	22,851	37,333
2007	1,477	3,757	3,883	11,373	20,490	31,183	0	31,183	51,673
2008	1,696	2,458	2,827	8,711	15,692	27,811	0	27,811	43,503
2009	345	1,254	2,676	7,953	12,228	24,405	0	24,405	36,633
2010	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2011	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2012	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2013	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2014	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2015	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2016	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2017	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2018	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2019	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2020	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2021	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2022	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2023	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2024	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2025	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565

HARRIS MILLER MILLER & HANSON INC.

Review and Approval of Portsmouth International Airport at Pease Noise Exposure Map Update Forecast
August 1, 2013
Page 5

Year	Itinerant					Local			Total
	Air Carrier	Air Taxi	General Aviation	Military	Total	General Aviation	Military	Total	
2026	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2027	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2028	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2029	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2030	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2031	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2032	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2033	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2034	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2035	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2036	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2037	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2038	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2039	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565
2040	386	1,079	2,463	7,514	11,442	23,123	0	23,123	34,565

Brad L. Nicholas

From:	richard.doucette@faa.gov
Sent:	Wednesday, August 07, 2013 10:02 AM
To:	Brad L. Nicholas
Cc:	Ed Pottberg; Rogerson, Mike C.
Subject:	Re: PSM NEM - Forecast Review and Approval

The Portsmouth-Pease forecasts are approved. Thank you.

Richard Doucette
Environmental Program Manager
FAA New England Region, Airports Division
(781) 238-7613

From: "Brad L Nicholas" <bnicholas@hmmh.com>

To: Richard Doucette/ANE/FAA@FAA

Cc: Ed Pottberg <E.Pottberg@peasedev.org>, "Rogerson, Mike C." <mrogerson@hoyletanner.com>

Date: 08/01/2013 04:54 PM

Subject: PSM NEM - Forecast Review and Approval

Richard,

On behalf of the Pease Development Authority (PDA) , HMMH is requesting that you review and approve the attached operations forecast for use in the Noise Exposure Map analysis for the Portsmouth International Airport at Pease. Our original intent was to utilize the Terminal Area Forecast, however it appears that it is a bit out of date. Given that, we are proposing to use the latest available tower counts (2012) for the operations in 2013 and 2018.

If you have any questions, please let me know.

Take care,

Bradley L. Nicholas

Senior Consultant

Harris Miller Miller & Hanson Inc.
77 South Bedford Street Burlington, MA 01803 T 781.229.0707 | F 781.229.7939 bnicholas@hmmh.com | LinkedIn

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[attachment "20130801_FAA_Forecast_Approval_Request.pdf" deleted by Richard Doucette/ANE/FAA]

HARRIS MILLER MILLER & HANSON INC.

TECHNICAL MEMORANDUM

Subject:	Update of Portsmouth International Airport at Pease Noise Exposure Map Update Forecast
Prepared for:	Richard Doucette, FAA
Prepared by:	Brad Nicholas
Date:	November 12, 2013
Reference:	HMMH Job #305310

1. INTRODUCTION

Harris Miller Miller & Hanson Inc. (HMMH) is assisting the Pease Development Authority (PDA) in the preparation of a Noise Exposure Map (NEM) Update for the Portsmouth International Airport at Pease (PSM). HMMH submitted a forecast for 2013 and 2018 operations at PSM to the FAA on August 1, 2013 and received approval via email on August 7, 2013. Subsequently, three carriers have initiated new service at PSM. Seacoast Helicopters initiated operations at PSM during the first week of September. Evergreen International Airlines began cargo operations on September 30th. Allegiant Air announced new passenger service to PSM starting in October of 2013.

Additionally, recent conversations with the manager of the air traffic control tower have revealed that the 2012 tower counts provided by the Air National Guard, included operations which do not arrive or depart PSM. These operations should not have been included in the forecast.

This memorandum requests that the Federal Aviation Administration (FAA) review and approve an updated forecast which includes these changes in operations for use in the PSM NEM Update.

1. APPROVED FORECAST

The approved forecast operations from HMMH's August 1, 2013 memorandum are presented in Table 1.

Table 1 – Approved Operations for the 2013 and 2018 Noise Exposure Maps

FAA Operational Category	Approved 2013 NEM Operations		Approved 2018 NEM Operations	
	Annual	Average Annual Day	Annual	Average Annual Day
Air Carrier	501	1.4	501	1.4
Air Taxi	5,206	14.3	5,206	14.3
General Aviation	24,927	68.3	24,927	68.3
Military	7,895	21.6	7,895	21.6
Total	38,528	105.6	38,528	105.6

Source: HMMH PSM NEM Forecast Memo, 8/1/13.

2. NEW SERVICE AT PSM

Seacoast Helicopters initiated operations at PSM during the first week of September, operating one Robinson R-22 and one Robinson R-44. At the end of September, the owner estimated approximately 80 monthly operations. At the current rate of business growth, he estimated approximately 100 monthly operations by the end of 2013. With his current fleet and facilities, he

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estimated a maximum of 150 monthly operations. *The annualized additional air taxi operations for the proposed NEM forecast are 1,200 for the end of 2013 and 1,800 for 2018.*

Evergreen International Airlines began cargo operations on September 30th using two Boeing 747-400 aircraft. The current schedule of operations is comprised of two arrivals and two departures per week for a total of four weekly operations. This is equivalent to 209 annual operations. No estimate of future operations is available. *The annualized additional air carrier operations for the proposed NEM forecast are 209 for the end of 2013 as well as for 2018.*

On August 20, 2013, Allegiant Air announced that twice weekly service between PSM and Orlando-Sanford International Airport (SFB) would begin on October 25, 2013[1]. At two arrivals and two departures per week, Allegiant would conduct four operations per week for the remainder of 2013[2] This is equivalent to 209 annual operations. No estimate of future operations is available. *The annualized additional air carrier operations for the proposed NEM forecast are 209 for the end of 2013 as well as for 2018.*

3. REMOVAL OF OVERFLIGHTS FROM THE FORECAST

The air traffic control tower at PSM is operated by the Air National Guard. The approved PSM NEM forecast is based on tower counts provided to HMMH by the Guard through the PDA. These tower counts included operations marked as itinerant and local. For an FAA tower, both itinerant and local operations are aircraft which arrive or depart the airport. The tower counts at PSM are categorized using AFI 13-204, v3, Air Traffic Control, paragraph 5.8, which defines itinerant operations as those that do not originate or terminate at the airport (flying through the airspace).

Due to this discrepancy in terminology, these overflights were included in the original forecast. *The revised forecast removes 2,587 annual general aviation and 81 annual military operations in both 2013 and 2018.*

4. REVISED FORECAST

Table 2 presents the updated operations forecast for the 2013 and 2018 NEMs including the new service by Seacoast, Evergreen, and Allegiant and the removal of overflights. Note that the air carrier and air taxi operations have increased and the general aviation and military operations have decreased relative to the previously approved forecast.

Table 2 – Proposed Operations for the 2013 and 2018 Noise Exposure Maps

FAA Operational Category	Proposed 2013 NEM Operations		Proposed 2018 NEM Operations	
	Annual	Average Annual Day	Annual	Average Annual Day
Air Carrier	919	2.5	919	2.5
Air Taxi	6,406	17.5	7,006	19.2
General Aviation	22,340	61.2	22,340	61.2
Military	7,814	21.4	7,814	21.4
Total	**37,479**	**102.7**	**38,079**	**104.3**

Sources: HMMH PSM NEM Forecast Memo, 8/1/13; Seacoast Helicopters email, Evergreen International Airlines email, Allegiant Air Press Release, Air National Guard email.

[1] Allegiant Air Press Release: http://ir.allegiantair.com/phoenix.zhtml?c=197578&p=irol-newsArticle&ID=1848610&highlight=, Accessed August 27, 2013

[2] The schedule of operations at http://www2.allegiantair.com/ shows one arrival and departure each on Monday and Friday. Accessed August 27, 2013.

Brad L. Nicholas

From: richard.doucette@faa.gov
Sent: Wednesday, November 27, 2013 8:58 AM
To: Brad L. Nicholas
Cc: Rogerson, Mike C.; Sandra McDonough; tracey.mcinnis@faa.gov
Subject: Re: PSM NEM - Revised Forecast

Hello Brad:
I have reviewed the Pease forecasts submitted for the Part 150 noise study.
Approved.

Richard Doucette
Environmental Program Manager
FAA New England Region, Airports Division
(781) 238-7613

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| From: |
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|"Brad L. Nicholas" <bnicholas@hmmh.com> |
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| To: |
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|Richard Doucette/ANE/FAA@FAA |
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| Cc: |
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|"Rogerson, Mike C." <mrogerson@hoyletanner.com>, Sandra McDonough <S.McDonough@peasedev.org>
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|PSM NEM - Revised Forecast |

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Richard,

I have attached a revised PSM NEM forecast memorandum for your review and approval. Some new air carrier and air taxi operations have been added to reflect the start of new service by three operators. The general aviation and military operations have been reduced somewhat. Our original forecast mistakenly included overflight operations which were labeled as "itinerant"
operations in the tower counts using the military's classification system.

If you have any questions at all, please let me know.

Take care,

Bradley L Nicholas

Senior Consultant

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[attachment "20131112_FAA_Forecast_Update_Approval_Request.pdf" deleted by Richard Doucette/ANE/FAA]

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77 South Bedford Street
Burlington, Massachusetts 01803
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F 781.229.7939
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TECHNICAL MEMORANDUM

Subject:	Request for Approval of 2014 and 2019 Noise Exposure Map Forecasts for Portsmouth International Airport at Pease
Prepared for:	Richard Doucette, FAA
Prepared by:	Brad Nicholas
Copies to:	Sandra McDonough, Mike Rogerson, Ted Baldwin
Date:	January 22, 2014
Reference:	HMMH Job #305310

1. INTRODUCTION

Harris Miller Miller & Hanson Inc. (HMMH) is assisting the Pease Development Authority (PDA) to prepare a Noise Exposure Map (NEM) Update for the Portsmouth International Airport at Pease (PSM). HMMH submitted a forecast for 2013 and 2018 operations at PSM to the Federal Aviation Administration (FAA) on August 1, 2013, received approval via email on August 7, 2013, submitted a revised forecast on November 12, 2013, and received approval via email on November 27, 2013. The approved forecasts are for 2013 Existing Conditions and 2018 Five-Year Forecast Conditions.

The year of submission for this document will now be 2014. This memorandum presents forecasts for 2014 Existing and 2019 Forecast Conditions and requests FAA approval for their use in the NEM Update.

2. 2014 AND 2019 NEM FORECASTS

As detailed in HMMH's two prior submissions, the operations previously approved for 2013 Existing Conditions represent the estimated end-of-2013 conditions using the best available data at the time of the analysis. The analysis used a full year of 2012 tower counts from the New Hampshire Air National Guard (NHANG) for operations totals by aircraft category, data from the FAA's Traffic Flow Management System Counts (TFMSC) for aircraft type percentages, and additional operational input to represent new service that has been initiated during the latter half of 2013. HMMH's August 1, 2013 memorandum also discussed the flat growth rate for PSM in the FAA's Terminal Area Forecast (TAF).

The PDA and HMMH believe that the approved 2013 and 2018 Existing and Five-Year Forecast predictions represent the best projections for 2014 and 2019, due to:

- the recent nature of the data collection
- the inclusion of updates to reflect the initiation of new service
- the TAF projection that there will be no growth in operations growth at PSM through the time period of interest (and for several years beyond)

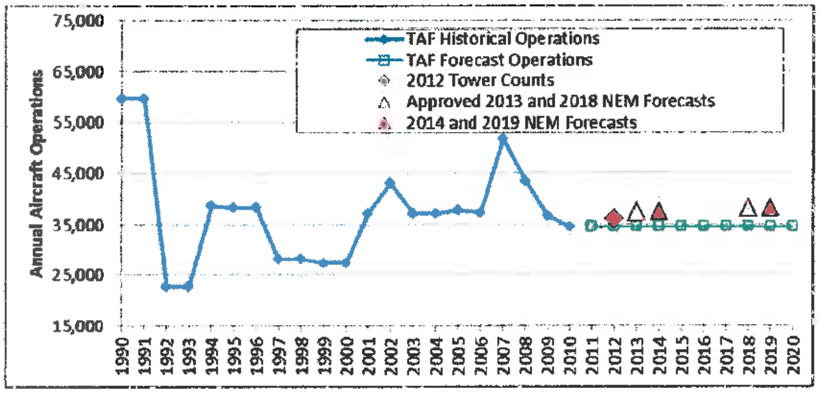
Therefore the PDA and HMMH request that the FAA approve the use of the previously approved operations forecasts for 2013 and 2018 for use as the operations for a submittal containing a 2014 Existing Conditions NEM and a 2019 Forecast NEM.

For reference, Figure 1 compares historical and forecast operations from the most recent TAF to the previously approved 2013 and 2018 forecast operations and the proposed 2014 and 2019 forecasts.

HARRIS MILLER MILLER & HANSON INC.

Update of Portsmouth International Airport at Pease Noise Exposure Map Update Forecast
January 22, 2014
Page 2

Figure 1 Historical and Forecast Operations at PSM



Brad L. Nicholas

From: richard.doucette@faa.gov
Sent: Thursday, January 23, 2014 8:51 AM
To: Brad L. Nicholas
Subject: Re: PSM NEM - 2014 and 2019 Forecast Approval

The forecasts as described in your January 22, 2014 letter for the PSM NEM are hereby approved.

Richard Doucette
Environmental Program Manager
FAA New England Region, Airports Division
(781) 238-7613

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|"Brad L. Nicholas" <bnicholas@hmmh.com> |
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| To: |
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|Richard Doucette/ANE/FAA@FAA |
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|"Rogerson, Mike C." <mrogerson@hoyletanner.com>, Sandra McDonough <S.McDonough@peasedev.org>, Ted Baldwin <ebaldwin@hmmh.com> |
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|PSM NEM - 2014 and 2019 Forecast Approval |
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1

Richard,

The year of submission for the PSM NEM will now be 2014. The attached memorandum requests your review and approval of forecast operations for
2014 and 2019. If you have any questions, please let me know.

Take care,

Bradley L. Nicholas

Senior Consultant

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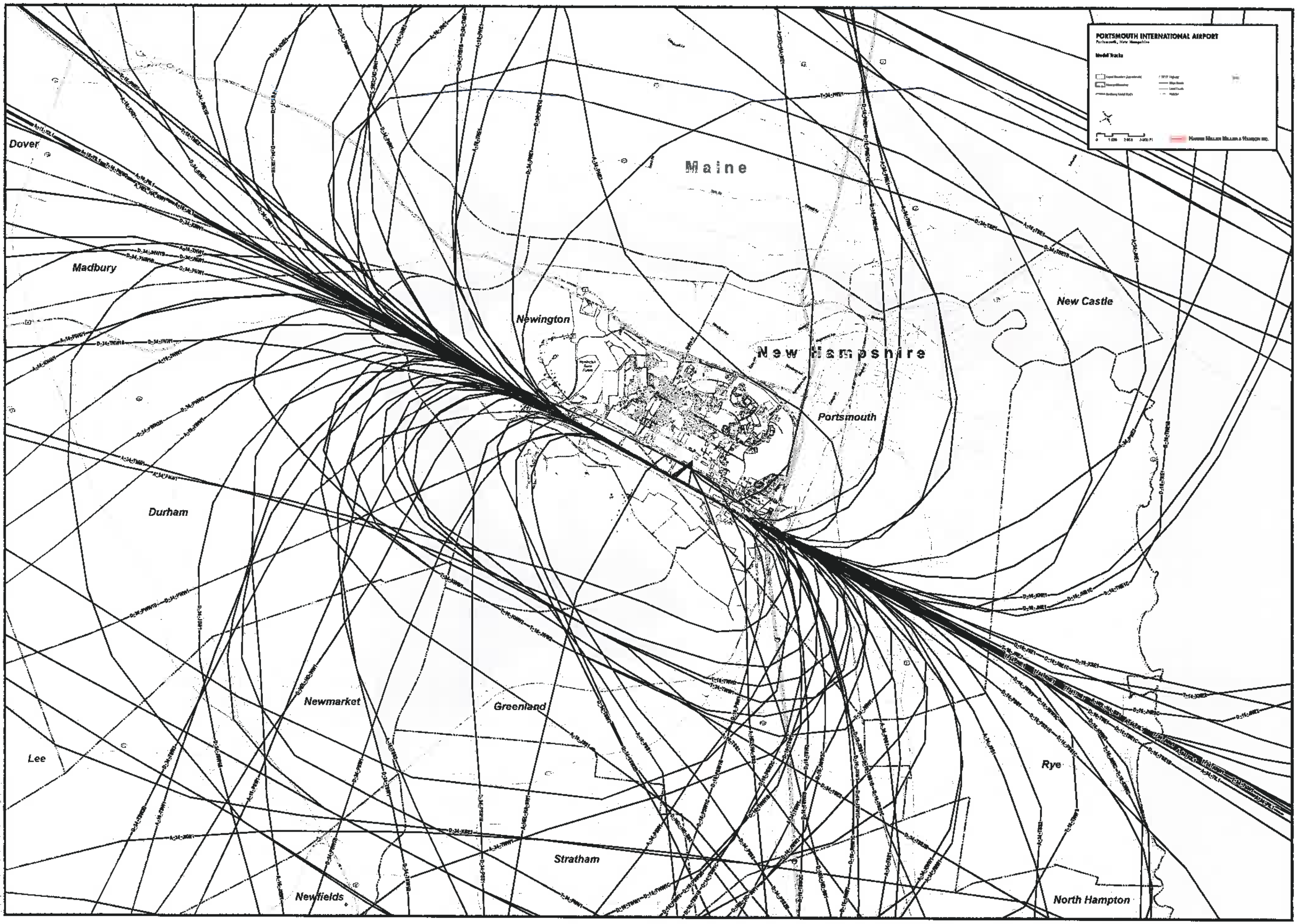
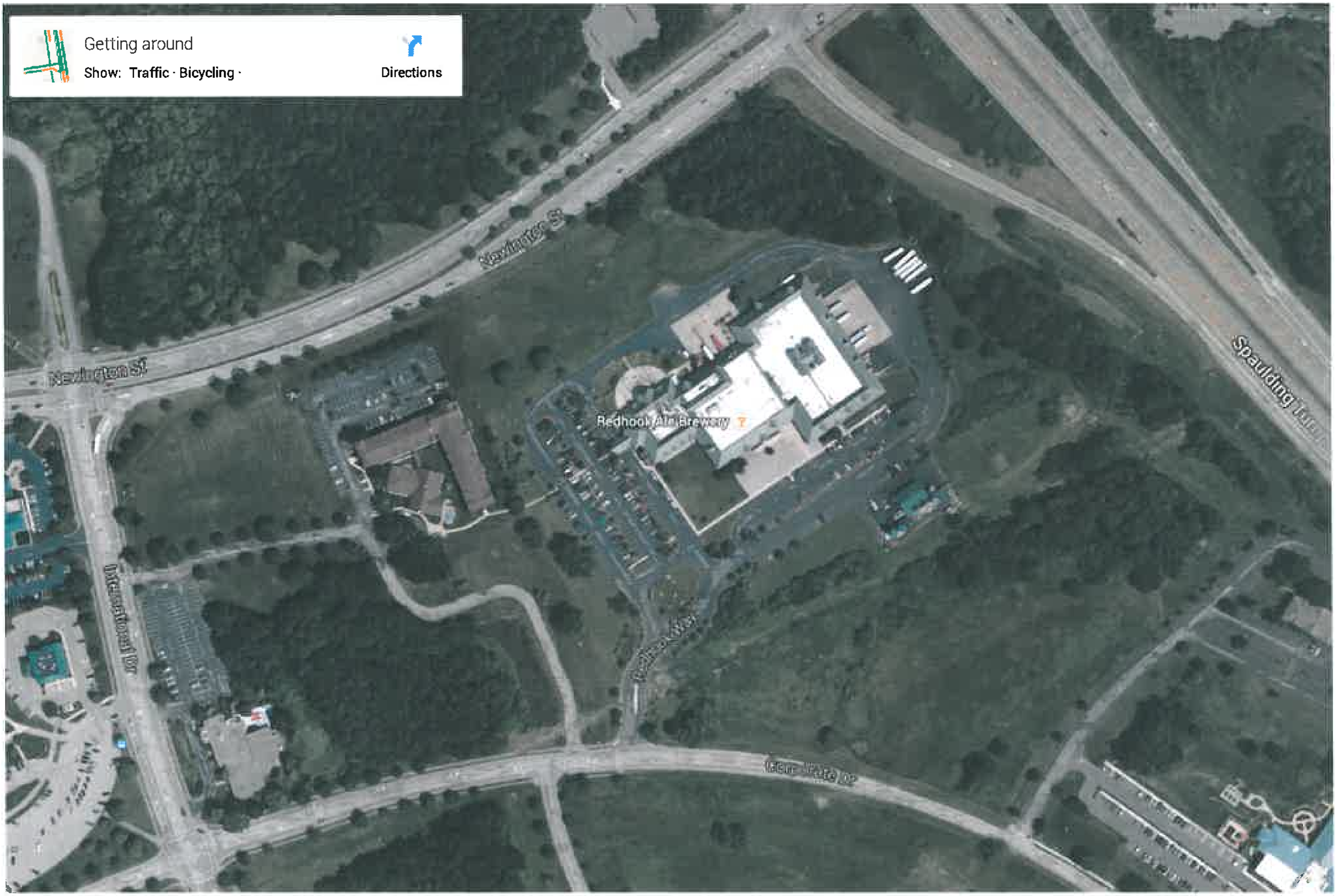
[attachment "20140122_FAA_2014_2019_Forecast_Approval_Request.pdf" deleted by Richard Doucette/ANE/FAA]


PORTSMOUTH INTERNATIONAL AIRPORT
Portsmouth, New Hampshire
Model Tracks
Maine
New Hampshire
Dover
Madbury
Newington
Portsmouth
New Castle
Durham
Newmarket
Greenland
Lee
Rye
Stratham
Newfields
North Hampton


Getting around
Show: Traffic · Bicycling ·
Directions
Newington St
Newington St
Redhook Ale Brewery
International Dr
Spaulding Tpke