



JET AVIATION

A GENERAL DYNAMICS COMPANY

Draft Environmental Assessment Site Safety and Efficiency Improvements Project

Hoyle, Tanner Project Number: 304903



Prepared for:
Jet Aviation
L.G. Hanscom Field
Bedford, Massachusetts

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This environmental assessment becomes a Federal document when evaluated, signed, and dated by the Responsible FAA Official.

Responsible FAA Official

Date



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October 2013

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1 INTRODUCTION

1.1 Project Overview

Jet Aviation is a Fixed Based Operator (FBO) located at L.G. Hanscom Field (BED) that handles a range of needs for based and transient aircraft, their operators and their passengers such as cleaning, maintaining, fueling, and parking/hangaring aircraft, providing flight planning services for the pilots, and arranging for the specific needs of those flying. Jet Aviation is proposing facility improvements in order to improve the safety and efficiency of their operations; these actions would cause Massport and FAA to modify the existing Hanscom Field Airport Layout Plan (ALP). The existing Jet Aviation facilities are unable to safely accommodate newer aircraft that occupy a larger footprint than the existing fleet. In order to hangar larger aircraft and limit taxiing and re-positioning of all existing aircraft, Jet Aviation is proposing replacement of Hangar 17 with a new, 40,000 sf Hangar with 16,000 sf office/shop space; other project components include a new 12,000 sf FBO facility, 94,160 sf of ramp areas, a new landside access road, and replacement automobile parking. The new hangar would be connected to the existing ramp via 94,000 sf of new ramp space. Hangar 17, 21,315 sf in size, was constructed in 1945 and is inefficient, outdated and undersized for newer aircraft.

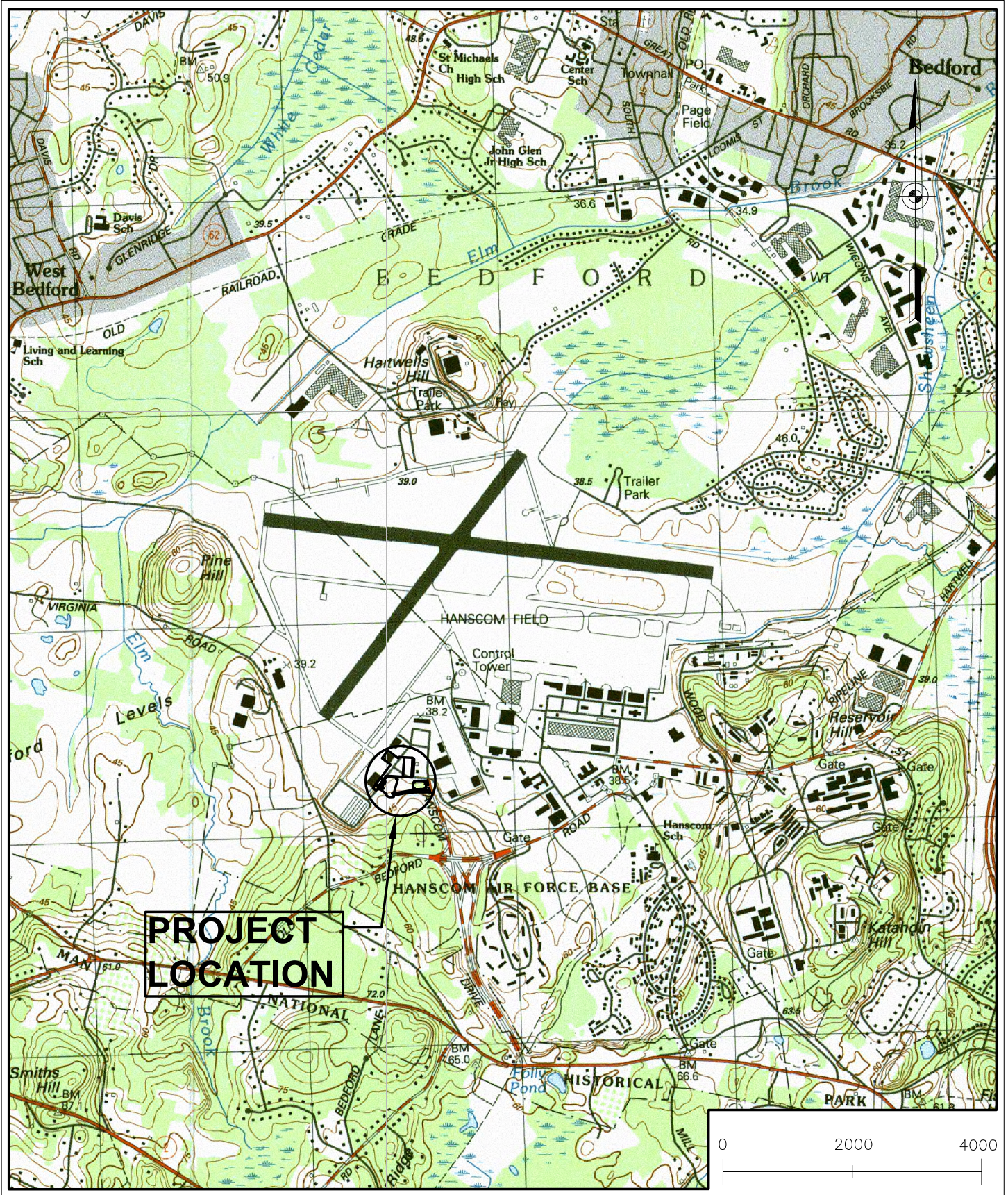
Jet Aviation is committed to designing and certifying the proposed Hangar, office/shop space and FBO facility in accordance with LEED (Leadership in Energy and Environmental Design) Silver certification standards. LEED is a voluntary, consensus-based, market-driven program that provides third-party verification of green buildings through the US Green Building Council (USGBC). Participation in the LEED process demonstrates leadership, innovation, environmental stewardship and social responsibility. LEED for new construction takes an integrative approach to producing buildings that are designed to be efficient and have a lower impact on their environment. LEED measures eco-friendly construction practices based on a point system. It awards silver, gold or platinum certification according to the number of credits accrued in five green design categories: sustainable sites, water efficiency, energy and atmosphere, materials and resources and indoor environmental quality. The *LEED 2009 Reference Guide for Green Building Design and Construction* is the most comprehensive guide for the design, construction and major renovations of commercial and institutional buildings (USGBC 2009; www.usgbc.org/resources/leed-reference-guide-green-building-design-and-construction-global-acps).

1.2 Project Location

Hanscom Field is located in Bedford, Concord, Lexington and Lincoln, Massachusetts (Figure 1). Hanscom is a full-service general aviation airport with convenient access to Eastern Massachusetts. Located about 20 miles northwest of Boston, Hanscom Field plays a critical role as a corporate reliever for Boston Logan International Airport.

Jet Aviation offers private aircraft handling and full FBO services, including domestic and international flight handling, line maintenance services, refueling, and passenger and crew transportation. Jet Aviation provides routine or unscheduled maintenance services and offers 24-hours Aircraft on Ground (AOG) services. The company is an approved repair station by the Federal Aviation Administration (FAA) #JARV120F and European Aviation Safety Agency (EASA) #145.5359. Jet Aviation serves all major business jet models and component makers and provides clients with comprehensive services. The project would include areas within the lease boundary as shown on Figure 2; Jet Aviation also leases abutting areas to the north and west of this specific lease area that would not be affected.

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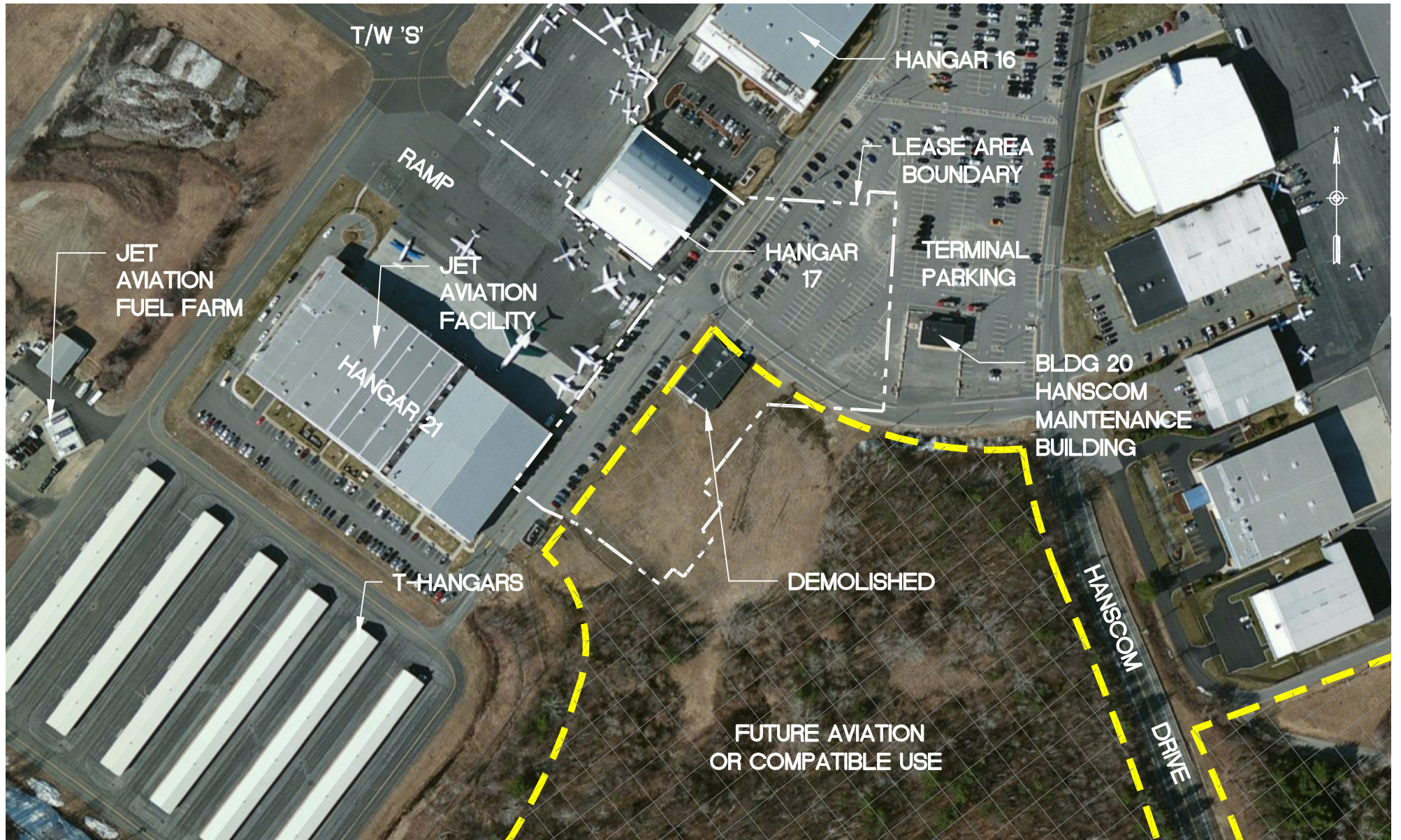
FIGURE

PROJECT LOCATION MAP
 JET AVIATION PROJECT

1

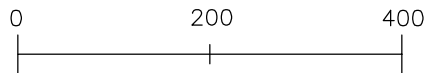
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EXISTING SITE CONDITIONS AND
 TERMINAL AREA PLAN

FIGURE

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1.3 National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) of 1969 is a key piece of federal legislation designed to raise environmental awareness. Any project involving action by the federal government that could significantly affect the environment requires a federal environmental determination. The Federal Aviation Administration (FAA) complies with and supports both the policies and procedures of NEPA. To address NEPA in airport development, FAA developed and issued *Order 1050.1E: Environmental Impacts: Policies and Procedures*, and *Order 5050.4B: Implementing Instructions for Airport Actions*. These documents identify three project categories: Actions which are Categorically Excluded (CatEx); Actions requiring an Environmental Assessment (EA); and Actions requiring an Environmental Impact Statement (EIS).

1.4 Environmental Assessment Requirement

The FAA protocols and procedures for implementing NEPA and addressing the requirements set in the Council on Environmental Quality regulations (40 CFR 1502, 1978) at airports have outlined airport-specific development actions and the required permitting for each. CEQ states that an EA is a “concise document” that takes a “hard look” at expected environmental effects of a proposed action.

In this instance, the proposed federal action includes FAA approval of the proposed revisions to the approved ALP for L.G. Hanscom Field. Jet Aviation, a tenant of the Massachusetts Port Authority (Massport), proposes facility modifications that require a modification of the ALP. Based on preliminary review of concept plans for the proposed improvements, FAA New England Division determined that the Project exceeds the minimal expansion intent for actions eligible for CatEx (FAA communication October 17, 2012). Therefore, further environmental impact analysis is required through a more detailed EA.

1.5 Federal, State And Local Agency Jurisdiction

The proposed project could require state and local permitting as listed in Table 1-1, pending final review and choice of alternative.

Table 1-1. Agency Coordination and Permitting

Resource	Agency	Permit	Regulatory Requirement/Threshold
Wetlands	Town of Lincoln Conservation Commission and Massachusetts Department of Environmental Protection (DEP)	Notice of Intent/Order of Conditions	Massachusetts Wetland Protection Act; Work conducted within 100 feet of a wetland
Stormwater	US Environmental Protection Agency (EPA) and DEP	National Pollutant Discharge Elimination System (NPDES): Construction General Permit (CGP)/NOI and Stormwater Pollution Prevention Plan (SWPPP)	MA Stormwater Management Standards; Stormwater discharge from construction activities; Construction over one (1) acre

2 PURPOSE AND NEED

2.1 Overview

The Purpose and Need within a NEPA document is a formal statement approved by a federal agency agreeing to the need for the project and the overall project purpose. The statement documents the justification for the project study and provides the basis for evaluating the effectiveness of alternatives.

2.2 Purpose And Need

There is a *need* to improve overall airport safety, operations and aircraft traffic flow at Jet Aviation's lease site at Hanscom Field. Manufacturers of aircraft for business and private use have developed larger, quieter and more fuel-efficient aircraft for their fleet. Jet Aviation provides maintenance and storage services for these types of aircraft. The new aircraft occupy a larger footprint and requires larger wingtip clearances from other aircraft and permanent structures. The current ramp apron does not provide enough space to safely maneuver these newer generation aircraft.

The *purpose* of the project is to increase the safety and efficiency of aircraft operations of the new aircraft design and to improve maintenance operations at the Jet Aviation facilities. Providing additional space in the hangar and ramp areas would improve safety for all operations and maintenance personnel by allowing for increased spacing between aircraft, particularly in areas where propeller aircraft are parked.

Jet Aviation proposes to develop a storage and maintenance hangar, increased apron area, and a new FBO facility to address the physical requirements of larger aircraft at the Jet Aviation lease site. These actions require a revision to the Airport Layout Plan (ALP) for Hanscom Field and would allow Hanscom Field to better serve the overall air demand of eastern Massachusetts, New England and the Nation. Hanscom Field is the primary general aviation reliever airport for Boston's General Edward Lawrence Logan International Airport.

The proposed project area is located partially within the area identified for "Future Aviation or Compatible Use" on the Airport Layout Plan, Terminal Area Plan, as shown on Figure 2.

2.3 Background And Public Involvement

As part of the initial project planning, Jet Aviation filed an Abbreviated Notice of Resource Area Delineation (ANRAD) with the Lincoln Conservation Commission for verification of wetland resources. The ANRAD public hearing was held on October 5, 2012 at the Temporary Town Offices on Ballfield Road in Lincoln. This hearing was publicly advertised. The project was identified and discussed with the Conservation Commission as well as members of the public. In preparation for the ANRAD, a publicly advertised site visit was held on August 29, 2012 with members of the Conservation Commission. The Order of Resource Area Delineation (ORAD) was issued by the Town of Lincoln Conservation Commission on October 17, 2012 (Appendix A).

3 PROPOSED ACTION AND ALTERNATIVES

3.1 Proposed Action

Jet Aviation proposes to upgrade and expand its Hangar, Fixed Base Operator (FBO) and ramp facilities and parking areas to improve site safety and efficiency within their lease area boundary within Hanscom Field as shown on Figure 2. The increased hangar size would allow the modern fleet of business aircraft to use Jet Aviation facilities, and the increased interior capacity would allow for less overall movement or taxiing of planes as they are used, hangared and maintained within the Jet Aviation site as an improvement to the safety of personnel. The access road and adjacent parking areas would be constructed on Massport property outside of the current Jet Aviation lease site; Jet Aviation would retain the right to use the access road.

Massport requires individual projects to implement Best Management Practices (BMPs) to meet their stormwater management policy. The policy is that projects resulting in increases in impervious surfaces cannot increase peak runoff rates. The proposed project would also comply with the Massachusetts Stormwater Standards. The proposed improvements include three closed underground treatment systems which would allow for pre-treatment, infiltration and attenuation of stormwater before ultimately discharging to the 60" outfall pipe running below the existing ramp, across Hanscom Field to connect to the outfall pipe to the Shawsheen headwaters in the northeast corner of the Field. This new closed system would be designed to capture more of the overall stormwater runoff from the entire Jet Aviation lease site and meet the most current, stringent standards for water quality protection.

These actions, specific to the Jet Aviation site, require modification of Hanscom Field's Airport Layout Plan (ALP) since there would be new structures and Hanscom Field's secure airside/landside boundary would be adjusted to provide more airside operating space.

3.2 Sustainable Design

As noted in the Introduction of this document, Jet Aviation is committed to designing and certifying the proposed Hangar, office/shop space and FBO facility in accordance with LEED (Leadership in Energy and Environmental Design) Silver certification standards. In addition to the LEED Silver certification, Jet Aviation is also committed to incorporating Massport's *Sustainable Design Standards and Guidelines, Volume 2*, (2011a) and the Massport *Guide to Tenant Construction* (2009) into the project design. These documents are components of Massport's overall sustainability program, which include diverse sustainability initiatives ranging from facilities maintenance to innovative partnerships and public incentives. The Standards apply to new construction projects such as this one, and are intended to be used by architects, engineers, and planners working on tenant alterations on Massport property.

Jet Aviation is committed to reducing energy use. In addition to committing to using energy-efficient lighting for this project, Jet Aviation has reviewed the existing facilities for ways to reduce energy consumption. In 2012, implementation of lighting upgrades reduced electricity consumption by 10,550 watts per hour, equal to 46,209 KWH per year, resulting in an approximate \$7856 per year cost reduction and 32.6 metric tons of CO₂ sequestered. Jet Aviation has replaced 85% of their gas fueled vehicles with alternative fueled vehicles and is committed to future improvements for fleet vehicles. Examples of design initiatives suitable for LEED Silver certification and compliance with the Massport Standards to be used in the Jet Aviation project include the following: designing the building to use 20-40% less water than the USGBC baseline for buildings of similar size and occupation; implementing water conservation

measures that pertain to landscaping and wastewater technologies including procedures for water reuse; using at least 10 percent less energy than the USGBC baseline; designing an HVAC system that does not use any chlorofluorocarbon (CFC) based refrigerants; using low emitting materials for construction including paint and flooring; using renewable energy sources for building operation; using recycled materials for building construction; implementing a recycling program in daily operations; using low emitting or fuel efficient vehicles; and designing and using energy-efficient lighting systems.

3.3 Alternatives

The alternatives proposed vary in the size and locations of the proposed components: Hangar, FBO, ramp and parking areas. Table 3-1 following this section outlines the alternatives, and associated potential impacts, and acts as a decision matrix.

3.3.1 No Action – No Improvements to Existing Conditions

At the locations leased by Jet Aviation from Massport there currently exists two hangars: Hangar 17 is 21,315 sf in size, and Hangar 21 is 84,500 sf (Figure 2). These facilities house aircraft while they are being repaired or maintained. The size limitations of Hangar 17, based on its current location and footprint, limits the ability of Jet Aviation to complete repair and maintenance safely, and restricts the maximum size of aircraft that can be housed or worked on. The site thus does not function efficiently and is inefficient in energy use compared to modern hangar designs. The limited amount of space in which to maneuver and repair aircraft can cause an unsafe environment for personnel, especially when transitioning aircraft. If no action is taken on the proposed project, the existing conditions would continue as described and the project safety and efficiency needs would not be met.

3.3.2 Alternative 1 – Original configuration of ramp and hangar

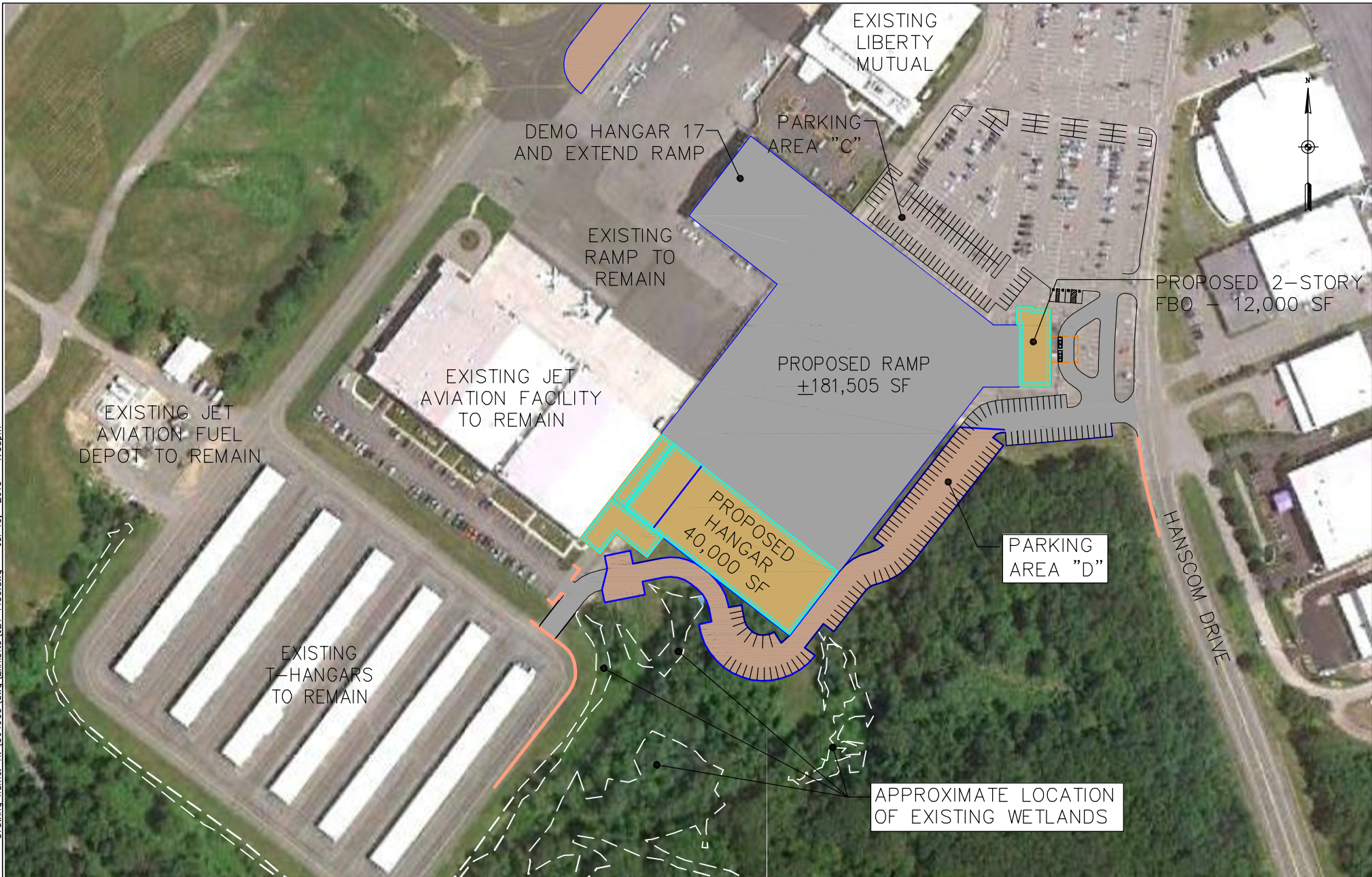
Alternative 1 presents the original project design concept prior to delineation of wetlands in the undeveloped area to the south of the existing facilities. This alternative was designed to meet the purpose and need for the project via the following components: a 40,000 sf proposed Hangar with 11,000 sf of office/shop; a 12,000 sf FBO facility; a 182,000 sf ramp area; a new landside access road; and reconfigured or new parking areas to replace parking lost to new construction (Figure 3). This alternative would result in approximately 50,090 sf of direct impacts to wetlands from new construction and grading. Hangar 17 and Building 20 would need to be removed from the site. This alternative was dismissed due to wetlands impacts.

3.3.3 Alternative 2 – Revised configuration of ramp and hangar

Alternative 2 was developed after the identification of wetlands on-site and portrays the first efforts to avoid and minimize wetland impacts while meeting the purpose and need for the project. The components are similar to Alternative 1, with a 40,000 sf Hangar with 7,500 sf of office/shop, a 12,000 sf FBO facility, 240,000 sf of ramp area, and a new landside access road and parking areas (Figure 4).

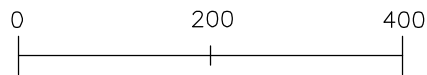
This alternative would minimize wetland impacts; however, direct impacts from the road crossing and associated culvert installation to the jurisdictional bank/or stormwater swale adjacent to Wetland 1 would result in approximately 300 sf of impact to this resource. Additionally, there would be direct impacts from grading to Wetlands 1, 2 and 4 of approximately 700 sf. This alternative would also have a visual impact to Hangar 16 as seen from Hanscom Drive (see Figure 4). The view of this building would be partially blocked by the

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FIGURE

ALTERNATIVE #1

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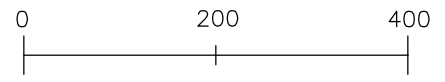
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FIGURE
4

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ALTERNATIVE #2

proposed Hangar. Hangar 17, an outdated and inefficient aircraft hangar constructed in 1945, as well as Building 20, a bulk storage and maintenance facility, would need to be removed from the site.

3.3.4 Alternative 3 - Avoidance of Direct Wetland Impacts – Proposed Action

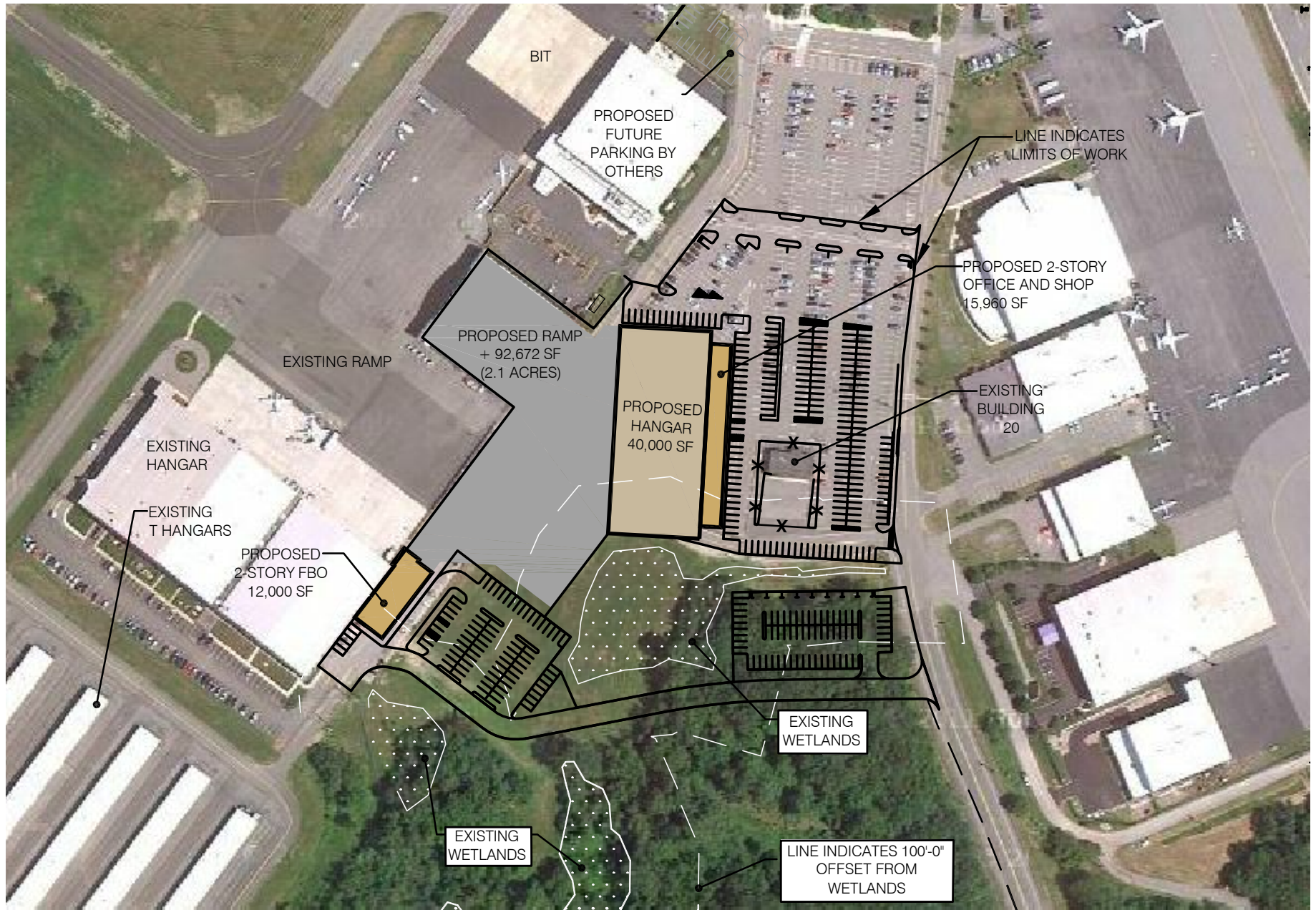
Alternative 3 was designed to completely avoid direct impacts to wetlands while meeting the purpose and need for the project. Similar to Alternatives 1 and 2, project components would include construction of a new 40,000 sf Hangar with 16,000 sf of office/shop space, a new 12,000 sf FBO facility, 94,160 sf of ramp areas, a new landside access road, and replacement automobile parking (Figure 5). Approximately 466 parking spaces will be displaced, with approximately 348 spaces replaced, for a net loss of 85 parking spaces on Massport property. Demolition of Hangar 17 would occur but Building 20 would be left in place. The configuration of Alternative 3 would result in no direct impacts to the wetlands on site, but would require approximately 101,146 square feet of impacts to the wetland buffer areas. These impacts are detailed and further discussed in Section 5.14. The ramp size would be significantly reduced from Alternatives 1 and 2 to shift the Hangar south and west on the site, avoiding the visual impact of blocking the Liberty Mutual building from being seen from Hanscom Drive.

3.4 Alternatives Reviewed But Eliminated From Detailed Analysis

Alternatives exist which although initially meet the spirit of the purpose and need, are not reasonable or financially/technically feasible enough to carry through the full analysis of impacts in this document. There were approximately fourteen design iterations between the original design and the design presented in Alternative 3. Each of these designs were reviewed and found inadequate to carry through alternative analysis for the following reasons: the design would result in direct wetland impacts; the design would reduce existing parking areas while not allowing for new parking to be created; or, the proposed ramp area would be too small to allow for increases in efficiency of moving planes.

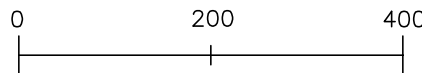
Table 3-1. Alternatives Matrix

Alternative	Description	Preliminary Impacts	Comparison
No Action	No improvements	Does not meet purpose and need	NA
Alternative 1	40,000 sf Hangar; 11,000 sf office/shop; 12,000 sf FBO facility; 182,000 sf ramp; remove Hangar 17 and Building 20	Meets purpose and need; direct and sizable impacts to wetlands and buffer areas	245,000 sf construction; demolition of two structures; 50,090 sf of direct impacts to wetlands and bank/swale
Alternative 2	40,000 sf Hangar; 7,500 sf office/shop; 12,000 sf FBO facility; 240,000 sf ramp; remove Hangar 17 and Building 20	Meets purpose and need Direct impacts to wetlands, bank and buffer areas View of Liberty Mutual building would be blocked from Hanscom Drive	299,500 sf construction; demolition of two structures; removes an unacceptable number of existing parking spaces; 1,000 sf impact to wetlands and bank/swale; visual impacts
Alternative 3	40,000 sf Hangar; 16,000 sf office/shop; 12,000 sf FBO facility; 94,000 sf ramp; remove Hangar 17	Meets purpose and need; no direct impacts to wetlands or bank	162,000 sf construction; demolition of single structure; no direct wetland impacts, impacts only to buffer areas; no visual impacts; least amount of new impervious surface created



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FIGURE

ALTERNATIVE #3
 PROPOSED ACTION

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4 AFFECTED ENVIRONMENT

4.1 Project Location And Existing Conditions

Hanscom Field has been a major part of aviation in New England since 1941, when the Commonwealth of Massachusetts acquired 500 acres of land in the towns of Bedford, Concord, Lexington, and Lincoln. Military operations dominated Hanscom until it became a joint military and civilian facility in the 1950's. In 1959, the Massachusetts Port Authority was formed and assumed control of the state land. In 1974, general operations and maintenance of the airfield became the responsibility of Massport and military operations declined to approximately 1% of total operations. Hanscom has since been managed as a regional aviation facility, whose major users are a mix of corporate aviation, recreational pilots, flight schools, commuter/commercial air services, as well as some charters and light cargo (Massport/Hanscom website 2013).

In general, the existing conditions for the proposed project location consist mostly of a relatively level paved parking and roadway areas near Hangar 17 adjacent to an area of open field that is mowed. The proposed landside access road would be located within an undeveloped, wooded area within the eastern section of the site. The area for the proposed ramp expansion mainly consists of paved parking areas, Hangar 17, the pad where Building 18 was recently demolished, and a small portion of the mowed field (Figure 2).

4.2 Operations And Future Forecasting

Analysis of the potential impacts for this project focus on the environmental data recorded in the *L.G. Hanscom Field 2005 Environmental Status and Planning Report* (ESPR; Massport 2006). This document was submitted to and approved by the Massachusetts Executive Office of Environmental Affairs (EOEA) in accordance with the provisions of the Massachusetts Environmental Policy Act (MEPA). This document functions as a status report on environmental conditions on and surrounding Hanscom Field. It is intended to be utilized as a planning tool for Hanscom Field and the communities surrounding it. Additional information was used to supplement the data from the ESPR where available and appropriate.

The ESPR compares conditions to historic data from the 2000 ESPR (Massport 2000) and other available sources, and evaluates the cumulative environmental effects of Moderate and High Growth scenarios for 2010 and 2020. The 2010 and 2020 scenarios analyzed by the 2005 ESPR represent estimates of what could occur in the future using certain planning assumptions and include expanded development of the Jet Aviation lease area. The future scenarios describe a range of operations that were projected to occur at that time, and can provide a basis for sensitivity analysis, the evaluation of potential environmental impacts including traffic, air quality and noise, and an assessment of potential future facility needs at Hanscom Field. Assessment of the potential impacts of this project will use in part and where appropriate, data from the future scenarios in the ESPR. A 2012 updated ESPR is currently being developed but is not available at this time.

Hanscom Field was divided into six planning areas for the future forecasts in the ESPR. Jet Aviation is located in the "Terminal Area" and forecasted highlights for this area for 2010 and 2020 include additional General Aviation (GA) facilities, including new hangars, and associated parking spaces on existing and in-fill areas, and ramp areas for new GA hangars; thus, the proposed project is included within this forecast. General aviation (GA) operations accounted for 97.3 percent of aircraft operations in 2005. Forecasted projections for GA operations (which include Jet Aviation) for Moderate and High Growth scenarios for 2010 and 2020 from the 2005

ESPR were based on historic trends at Hanscom Field, national historic trends in GA activity, and industry projections for the national GA market as shown in Table 4-1.

Table 4-1. 2005 ESPR Forecasts of General Aviation Activity

	2005 Actual	2010		2020	
		Moderate	High	Moderate	High
GA Operations	165,424	184,032	191,653	228,052	246,999

To provide an update to the forecasted operations numbers, operations data provided in the Massport *Annual Noise Report* (Massport 2011) was reviewed. This report includes data for annual operations from 1987 to 2010 from FAA Tower counts, which include all arrivals and departures for both civilian and military aircraft activity between 7 a.m. and 11 p.m. As shown in Table 4-2, there were 163,737 recorded total operations in 2010, a 9.2 increase over 2009. Multiplying the operations values by 97% gives an estimated value of GA operations of 158,825 for 2010. *This value is significantly less than the predicted Moderate or High future forecasts for 2010 from the ESPR.* Operations data for 2011 and 2012 was taken from *The State of Hanscom*, years 2012 and 2013.

Table 4-2. Hanscom Field Annual Estimated Operations

Year	Operations	Estimated GA
2005	169,955	165,424
2006	172,457	167,283
2007	165,907	160,930
2008	165,889	160,912
2009	149,911	145,414
2010	163,737	158,825
2011	162,999	161,580
2012	166,214	165,469

Source: Massport Annual Noise Report, 2011 and The State of Hanscom, 2012 and 2013

The decline in anticipated general aviation operations seen at Hanscom Field has been reflected across the US. Overall trends in GA activity are influenced by several factors including demographics, the economy, and operating costs. Over the past decade, GA operators have faced rising operating costs including escalating fuel prices, increased insurance premiums, and new security-related expenses. In addition, economic growth has been stagnant to low.

At Hanscom Field, there was a surge in business jet use after the terrorist attacks on September 11, 2001, as businesses began reevaluating the use of commercial airlines for their travel needs. This resulted in a net increase in business jet use in 2001; jet use continued to climb through 2007, when jets represented 21.0 percent of Hanscom Field's total activity (Massport 2011). The economic recession that hit in 2008 caused business jet activity levels to decrease in 2008 and sharply in 2009. In 2010, as the economy showed signs of a recovery, business jet activity increased (Massport 2011). *It is not anticipated that operations at Hanscom Field would meet the values for either the Moderate or High Growth scenarios used to evaluate environmental affects in the 2005 ESPR.*

4.3 FAA Impact Categories

There are 23 possible environmental impact categories identified by FAA Order 1050.1E, Appendix A. Per direction provided in FAA Guidance Memo #2, 2011, it is not the intent of this document to provide detailed discussion or analysis of all categories. Only those areas where there may be significant environmental impact caused by the proposed action, or where there are uncertainties which require evaluation, are identified in this document. The area of analysis for direct and indirect impacts includes the Jet Aviation lease site, and where necessary, is expanded to include Hanscom Field and the surrounding communities.

The proposed action at BED will impact the following environmental categories:

4.3.1 Air Quality

The study area for Air Quality includes the entirety of Hanscom Field. The primary air pollutant sources at Hanscom Field are aircraft operations and landside roadway traffic. Other sources include space heating emissions and fugitive emissions from fuel storage, fuel spillage, and aircraft refueling activities. Prior studies have shown that emissions from these latter sources are very small compared to the aircraft and groundside roadway traffic (Massport 2006).

Air Quality at Hanscom Field has improved over a 35-year period from 1970 to 2005 (Massport 2006). In 2005, Hanscom Field was in compliance with Massachusetts and National Ambient Air Quality Standards (NAAQS) except for the new eight-hour ozone NAAQS. Ozone levels had been in compliance with the older one-hour NAAQS for ozone in the Boston area, including the Hanscom Field communities, since 1996. Calculations of annual emissions from aircraft operations and motor vehicles accessing the airport demonstrate that Hanscom Field emissions are a very small fraction of regional emissions. Aircraft emissions for all pollutants except carbon monoxide increased between 2000 and 2005; these changes are a result of the changes in the mix of aircraft operating at Hanscom Field. Roadway emissions for all pollutants declined between 2000 and 2005 due to the effects of more stringent emission controls on motor vehicles.

The 2005 Massport, *L.G. Hanscom Field Environmental Status and Planning Report* (ESPR) presents an Analysis of Future Scenarios which could occur at Hanscom into the years 2010 and 2020 derived from an emissions burden analysis of airside operations and groundside motor vehicle traffic for the 2010 and 2020 scenarios. Because of economic conditions and as detailed in Section 4.2, GA operations numbers from 2003 through 2010 have remained below 200,000, not even reaching the forecast moderate levels predicted for 2010. Table 8-12 from the report, included in Appendix B, shows total air emissions forecasted through 2020. The FAA Terminal Area Forecast (TAF) shows only slow growth in the GA operations activity through 2020. Data in the future forecasts from the ESPR include hangar upgrades to the Jet Aviation location, as well as increased traffic on Hanscom Drive and Old Bedford Road, that would account for any potential changes in air quality as a result of increased operations in this area of Hanscom Field.

The 2005 Massport ESPR estimated maximum concentrations of Air Emissions for the 2020 (High Growth) scenario. The estimated maximum concentrations in 2020 for the worst case (High Growth) would all be in compliance with the NAAQS and the DEP 1-hour NO₂ Policy Guideline. Concentration levels for the other three future scenarios would be lower because emissions for these cases are lower. Thus, it is anticipated that air pollutant emissions for all

future growth scenarios would increase incrementally but would not have an adverse impact on local air quality in Bedford, Lexington, Concord, and Lincoln.

In 2008, KB Environmental Services, a private consultant conducted an air quality assessment for the proposed East Ramp project at Hanscom Field (KBES 2008; Appendix C). At that time, aircraft operational emissions and construction emissions used data more recent than that used in the 2005 ESPR. As a means of ensuring that continual progress toward achieving and maintaining compliance with the NAAQS for CO and O₃ were made, the General Conformity Rule established criteria (called "de minimis" levels) for NO_x/VOC and CO emissions. For the Boston metropolitan area, the applicable de minimis levels were 50 tons/year for either NO_x or VOCs and 100 tons/year for CO. Air emissions levels forecasted for 2010 and 2015 operational levels for the no action and build alternatives for the project were below the de minimis thresholds for CO, VOC and NO_x.

4.3.2 Biotic Resources

The assessment of biotic communities used existing data, field investigations, wildlife sightings, and the identification of vegetative communities. The analysis area for biotic resources affected by the proposed project includes the entire Hanscom Field.

Vegetation

The Maintained Grounds within Hanscom are comprised of the airport runways, taxiways, aprons and structures, asphalt roads, and neighboring residential and industrial lots. Most of the developed lands are vegetated with lawns and ornamental trees and shrubs. All of the upland areas have been highly influenced by human activity. Naturally vegetated plant communities in the vicinity of Hanscom Field primarily are composed of mixed hardwood/softwood forests and successional uplands, as well as wetlands and mowed grasslands.

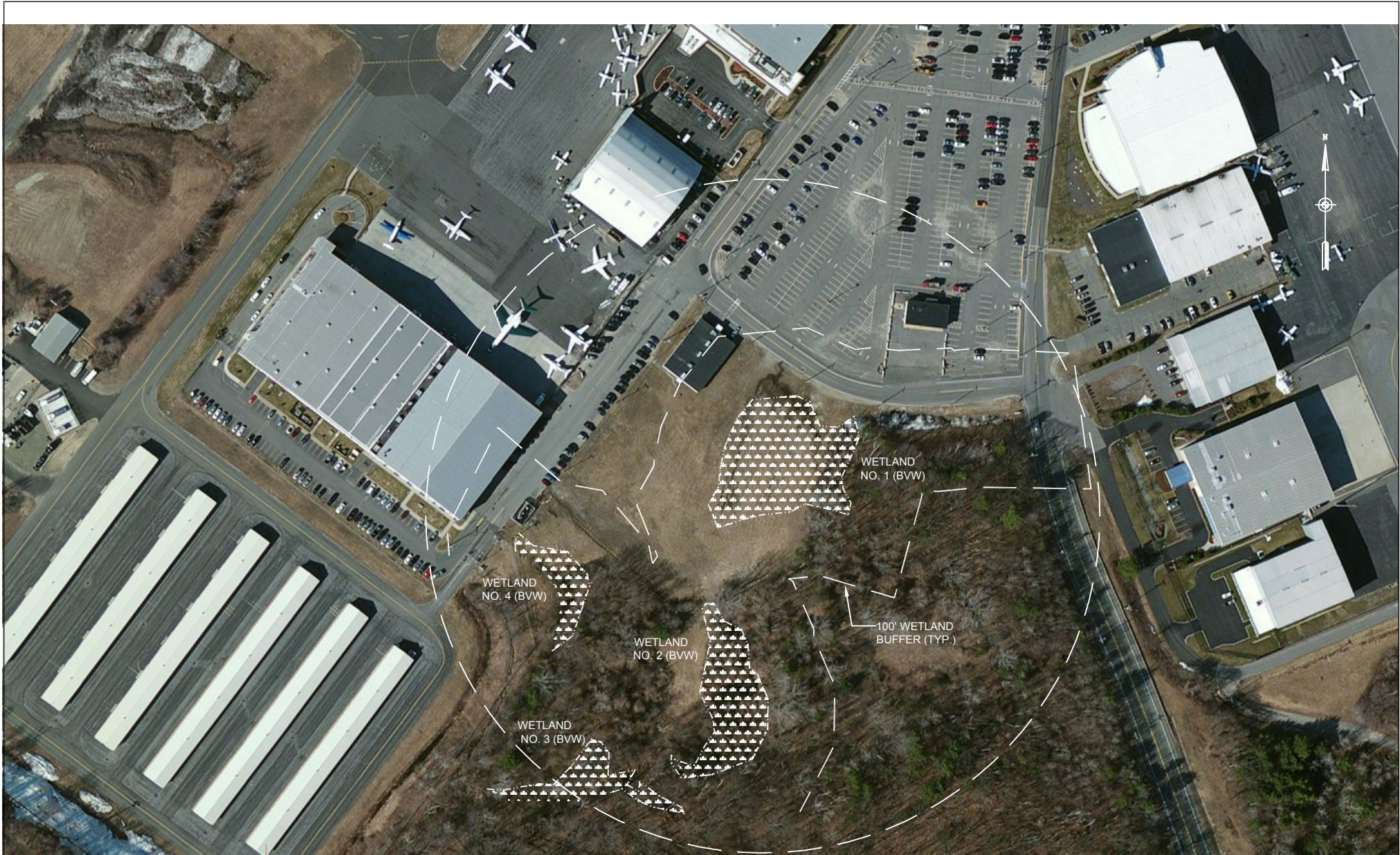
A Grassland Management Plan is implemented for airport infield areas at Hanscom Field. Within these areas, the grasslands are mowed to maintain visibility for operational safety, as well as to maintain grassland habitat for two State-listed rare bird species (see Section 4.3.5 below).

As detailed in Section 4.3.13, the area south of the proposed project location is interspersed with forested and emergent wetland communities, although some areas of scrub/shrub wetland vegetation also are present (Figure 6). The remaining lands predominantly consist of upland forest and a periodically mowed field.

Wildlife and Fish Habitat

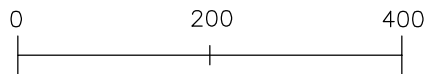
Plant communities within the analysis area provide a range of importance to wildlife species which utilize the area. The variety of vegetative cover types, presence of wetlands and waterways, and undeveloped parcels on and in the vicinity of Hanscom Field provide potential habitat for wildlife species capable of coexisting with human activities and development. Wildlife species that may be expected to inhabit the area include larger mammals such as whitetail deer (*Odocoileus virginianus*), Eastern coyote (*Canis latrans*) and red fox (*Vulpes vulpes*), and smaller mammals such as raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), opossum (*Didelphis virginiana*), gray squirrel (*Sciurus carolinensis*) and various species of mice, voles, moles and shrews. Bird species that would typically populate such habitat include various

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LAURENCE G. HANSCOM FIELD
 BEDFORD, MASSACHUSETTS

WETLAND RESOURCES
 LOCATION PLAN

FIGURE

6

CHKD. BY KRP	DR. BY JLC	DES. BY NEG	DATE: MAR, 2013	SCALE: AS SHOWN
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insectivorous and seed-eating passerines, ground-oriented species such as woodcock (*Scolopax minor*), and predators such as red-tailed hawks (*Buteo jamaicensis*), among others. Various reptiles and amphibians may be expected to occupy portions of the property as well, including the Eastern garter snake (*Thamnophis sirtalis*), Northern water snake (*Nerodia sipedon*), painted turtle (*Chrysemys picta*), snapping turtle (*Chelydra serpentina*), green frog (*Lithobates clamitans*) and wood frog (*L. sylvatica*).

Perennial streams (Elm Brook, Shawsheen River) within and along the periphery of Hanscom Field are Class B surface waters according to Massachusetts Surface Water Quality Standards (314 CMR 4.06), suitable as "habitat for fish, other aquatic life, and wildlife, and for primary and secondary contact recreation" [314 CMR 4.05(3)(b)]. Based on Hartel, Halliwell and Launer (2002), fish species anticipated to occur in these surface waters include such warm water species as the common shiner (*Luxilus cornutus*), golden shiner (*Notemigonus crysoleucas*), white sucker (*Castostomus commersoni*), creek chubsucker (*Erimyzono blongus*), brown bullhead (*Ameiurus nebulosus*), chain pickerel (*Esox lucius*) and pumpkinseed (*Lepomis gibbosus*), among others.

4.3.3 Construction

Massport has in place requirements for construction contractors that are aimed at minimizing environmental impacts. Massport requires contractors to adhere to construction guidelines relating to, construction debris and demolition waste recycling, selection of high efficiency spaceheating/cooling systems, soil treatment and reuse on site (Soil Management Plan), construction worker vehicle trip limitation, and adherence to the Clean Construction Initiative.

As part of the Hanscom Environmental Management System (EMS) implementation and Massport's continued commitment to reduce impacts to the environment, Massport implemented the DEP Clean Air Construction Initiative/EPA's voluntary Diesel Retrofit Program. Implementation of the initiative requires contractors to retrofit their heavy equipment with advanced pollution control devices during construction of all Massport projects. Contractor owned equipment such as front-end loaders, backhoes, cranes and excavators will be retrofitted with oxidation catalysts and low particulate filters. These devices filter out and break down harmful diesel emissions of hydrocarbons, particulate matters and carbon dioxide.

Jet Aviation is committed to adherence to Massport Sustainable Design Standards, and achieving LEED Silver certification, at a minimum. Construction contractors would be chosen who can adhere to these standards. As noted in Section 3.2, project initiatives for reducing construction impacts may include: using low emitting materials for construction including paint and flooring; using renewable energy sources for construction activities; using recycled materials for building construction; and implementing a recycling program for used or remnant construction materials.

4.3.4 Section 4(f)

Section 4(f) relates to historic sites, properties and parks, recreation areas, and wildlife and waterfowl refuges. The analysis area for these resources is limited to the potential project site as shown on Figure 5. Although the entirety of Hanscom Field is surrounded by several listed 4(f) sites, including Great Meadows National Wildlife Refuge as detailed fully in Chapter 10 of the 2005 ESPR, none of these sites are within the project site boundaries.

The Massachusetts Historical Commission is the entity that functions as the State Historic Preservation Office (SHPO) for Massachusetts. Review of their database via use of the online search tool Massachusetts Cultural Resource Information System (MACRIS) resulted in no listed sites within the proposed project area.

Letters requesting concurrence have been sent to the Massachusetts Historical Commission. Although the existing Hangar 17 is over fifty years old, it is not anticipated that this facility would qualify for listing as a historic structure due to its lack of historic architectural or design features, however a historic building survey may be performed at their request.

4.3.5 Federal- and State-Listed Threatened or Endangered Species

The analysis area for listed species affected by the proposed project includes the entire Hanscom Field. According to the Massachusetts Natural Heritage Atlas (NHESP; 13th Edition; Effective October 1, 2008], the airside portion of Hanscom is located within Priority Habitat 459. Two species have been identified by NHESP (Appendix D) as existing at Hanscom Field: the endangered upland sandpiper (*Bartramia longicauda*) and the threatened grasshopper sparrow (*Ammodramus savannarum*).

A review of the species listing by county in Massachusetts developed by the U.S. Fish and Wildlife Service (USFWS) New England Office revealed no listed, proposed, or candidate species (T/E species) are likely to occur within the proposed project county. A copy of this listing and the associated official correspondence is provided in Appendix D.

Upland sandpipers and grasshopper sparrows have been observed within several areas of maintained grassland vegetation between runways and taxiways at Hanscom Field. The specific locations of nesting pairs of these species vary and include locations adjacent to the Field and can be seen in detail in the 2005 ESPR. No portion of the proposed Jet Aviation project area, as shown on Figure 1, affects grasslands that would serve as habitat for either of these species.

4.3.6 Energy Supplies, Natural Resources, And Sustainable Design

The analysis area for these resources is limited to the proposed project area as shown on Figure 5. As detailed in Section 3.2, Massport is a leader among Massachusetts agencies in the promotion and implementation of sustainable designs. The new hangar facilities proposed for the project will achieve the US Green Building Council's LEED Silver Certification, at a minimum, as well as adhere to Massport's *Sustainable Design Standards and Guidelines*.

There are multiple permanent structures located within and neighboring the Jet Aviation lease site requiring energy. These structures are used for maintenance, storage, and terminal operations. Each structure requires heating in the winter months and electricity for their specific purpose.

Jet Aviation is committed to reducing energy use and using energy-efficient lighting. In 2012, implementation of lighting upgrades reduced electricity consumption by 10,550 watts per hour, equal to 46,209 KWH per year, resulting in an approximate \$7856 per year cost reduction and 32.6 metric tons of CO₂ sequestered. On the outside of the facility, 10 fixtures totaling over 4000 watts were replaced with 6 fixtures totaling 1680 watts. This resulted in an annual savings for a typical 13 hour run-time of \$1,862 per year or a reduction of .598 metric tons of CO₂ emitted. An additional 4 metal halide fixtures were replaced with 1 LED light fixture, and 3 new

60 watt and 7 new 140 watt LED fixtures replaced 9 450 watt metal halides, resulting in a savings of 2,980 watts per hour, or \$6 per 13-hr day.

Inside the facilities and offices, Jet Aviation replaced a total of 79 2x4 and 4x4 fixtures averaging 135 watts consumption per fixture, or 10,665 watts per hour with new LED fixtures, which are 100% brighter and consume only 50 watts per fixture.

Landscaped areas around the buildings require regular mowing in the growing season and the runway, taxiway, ramp and parking lots requires snow removal in the winter months. These operations require fuel for the maintenance vehicles. Jet Aviation has replaced 85% of their gas fueled vehicles with alternative fueled vehicles and is committed to future improvements for fleet vehicles.

4.3.7 Hazardous Materials

The analysis area for hazardous materials is limited to the proposed project area as shown on Figure 5. There are no Mass DEP-listed disposal sites within the project site or active, unremediated Massachusetts Contingency Plan (MCP) sites. Jet Aviation has currently five registered underground and aboveground storage tanks. Jet Aviation was responsible for two releases of oil or hazardous materials: Release Tracking Number 3-20326 dated 1/18/2001; Release Tracking Number 3-19404 dated 3/27/2000. These releases were remediated and have reached regulatory closure under the MCP.

A Notice of Activity and Use Imposition (AUL) for an area adjacent to Building 20 was issued for Release Tracking Number 3-11652 on November 22, 1995. A portion of this property is listed as a disposal site as a result of a release of oil or hazardous materials. The response actions listed in the AUL include permitted and restricted uses of the site. This site, although near the proposed project area, would not be disturbed by the project.

Massport works with the tenants like Jet Aviation to identify ways to reduce the amount and toxicity of certain products used at Hanscom Field. Massport involves its tenants in achieving environmental compliance and pollution prevention. Massport provides ongoing technical assistance to tenants regarding new regulations and means for compliance through an inspection program. In addition, educational materials are distributed on pollution prevention, storm water best management practices, spill prevention and response procedures, and other topics. Ongoing implementation of Hanscom Field's Spill Prevention Control and Countermeasure Plan to ensure that all of Massport's hazardous material storage tanks are in compliance with current regulations and to monitor the age, condition, and regulatory compliance status of these tanks on an ongoing basis through the Tank Management Program. Massport employs pollution prevention measures as they apply to site drainage, material storage, material transfer, truck unloading operations, and site security as part of this plan.

4.3.8 Historic And Archaeological

Procedures in Section 106 of the National Historic Preservation Act of 1966 and the Archaeological and Historic Preservation Act of 1974 are used to evaluate impacts to archaeological, architectural, and cultural resources, including those listed or eligible for listing on the National Register of Historic Places. The analysis area for these resources is limited to the potential project site as shown on Figure 5. The entirety of Hanscom Field is surrounded by

many listed Historical and Archaeological sites, including Minuteman National Historical Park. Hanscom Field is not visible from most of the Battle Road Interpretive Trail, a part of this park.

As detailed fully in Chapter 10 of the 2005 ESRP, none of the listed or potentially listed sites are within the project site boundaries. Per this document, most of the potential new corporate hangar locations in the Terminal Area, including facilities proposed by Jet Aviation, are located on existing developed areas, entirely within an area assessed as having a low archaeological sensitivity.

As part of the ESRP development, a survey and inventory of the buildings located within the Hanscom Field boundary was conducted by Public Archaeology Laboratory (PAL; Doherty et al. (PAL), Architectural Building and Inventory Survey, Hanscom Air Force Base, 2003). Only one building listed would be affected by this project: Building/Hangar 17 was built in 1945. No contributing factors for listing were associated with this building in the ESRP.

The Massachusetts Historical Commission is the entity that functions as the state historic preservation office or SHPO for Massachusetts. Review of their database via use of the online search tool Massachusetts Cultural Resource Information System (MACRIS) resulted in no sites which are listed or eligible for listing on the National Register within the proposed project area.

Letters requesting concurrence have been sent to the Massachusetts Historical Commission.

4.3.9 Induced Socioeconomic

The study area for Induced Socioeconomic resources includes the entirety of Hanscom Field and the surrounding communities. Massport's facilities at Hanscom Field enable the region's residents and leading industries to make connections with new markets, products, customers, family, and friends. In just about every aspect of life in Massachusetts, Massport is helping the local economy grow.

Hanscom Field has been a vital link to domestic and international destinations for individual pilots, commuter airlines and local employers, including high technology corporations, research and development firms, and educational institutions. Businesses look for accessible air travel when deciding where to locate, and Hanscom provides local businesses with easy access to corporate travel opportunities.

In FY11, Massport invested \$3.7 million in airfield, terminal, equipment and other facility improvements required to maintain the airport (Massport 2012).

The Massachusetts Department of Transportation conducted an economic impact study for 2010 activity levels at Massachusetts' airports. It was determined that there were 1,551 full-time equivalent jobs related to Hanscom Airfield activity. Annual wages for those workers whose employment is directly related to airport activity are over \$75 million. Hanscom generated estimated economic benefits of \$250 million when all the direct, indirect and induced economic benefits of the airport were considered (Massport 2012).

4.3.10 Light Emissions And Visual Effects

The analysis area for these resources is limited to the proposed project area as shown on Figure 5. In accordance with FAA Order 5050.4A, Airport Environmental Handbook, the sponsor

of an airport development project shall “consider the extent to which any lighting associated with an airport action will create an annoyance among people in the vicinity of the installation.” It is also prudent to consider whether lighting associated with a proposed project might confuse or interfere with the vision of the air traffic controller’s directing the aircraft in the vicinity of the Field, or the vision of the pilots on approach to an airport runway.

Existing lighting emission sources include airfield lighting and terminal/landside lighting. Airfield lighting includes high-intensity runway lights, taxiway edge lights, runway end strobe lights, runway centerline and touchdown zone lights. Building security lighting consists of common lighting sources such as roof perimeter lights and lighting from the interior of the structures. Existing and future roof perimeter and parapet lights would be shielded and directed down and would not spill far from the source. Roadway lighting and parking lot lights would consist of amber security lighting or older low profile street lights (lower intensity white light). Such lighting, similar to building light, is directed downward and does not typically spill more than 30-50 feet away from the light source.

As noted in Section 4.3.6, Jet Aviation is committed to reducing impacts from light emissions, using energy-efficient lighting and adhering to Massport’s *Sustainable Design Standards and Guidelines*. In 2012, lighting upgrades on the exterior of the facility resulted in replacing 10 fixtures totaling over 4000 watts with 6 fixtures totaling 1680 watts. These new light fixtures have a directed, downlit design and reduce light bleed offsite.

4.3.11 Noise

The study area for Noise includes Hanscom Field and areas of the surrounding communities. Data from the 2005 ESPR, the *Technical Memo Regarding Proposed Development of the East Ramp* that included data and trends from 2006 and 2007 (HMMH 2008), and the *Hanscom Field Annual Noise Report* (Massport 2011b) show noise levels at Hanscom Field have decreased over the past decade, due primarily to technological trends toward quieter and better performing aircraft and an overall reduction in operations.

The FAA first issued noise standards for civil aircraft in 1969, when regulations established that minimum noise performance levels must be demonstrated for new turbojet and transport category large airplane designs. In 1977, more stringent standards were adopted, and Stage 1, 2, and 3 classifications were introduced. Stage 1 airplanes do not meet either the 1969 or 1977 standards. Stage 2 airplanes meet the 1969 standards but do not meet the 1977 standards. Stage 3 airplanes meet the 1977 standards.

Each year, the Massport prepares a noise report for Hanscom Field to report on aircraft activity and the noise environment at the airport. It includes data on the numbers and types of operations and overall noise exposure for the most recent calendar year. The 2011 report presented data on Hanscom Field’s 2010 operations and used comparable data from previous study years to demonstrate trends in aviation activity and noise levels. This report included a comparison of 1995, 2000, and 2005 through 2010 noise levels recorded at six noise-monitoring sites located in the communities and on the airfield. Relevant noise data from this report include the following:

- While military flights represented approximately one percent of the total activity, they contributed 43 percent of the total departure noise exposure.

- Business jet activity, which represented 16.7 percent of the total activity, contributed 89.1 percent of the civilian departure noise.
- Despite the decrease in Stage 2 jet operations (the noisiest civilian aircraft) from 11 percent of the jet fleet in 2000 to 1.4 percent in 2010, Stage 2 jets contributed over 16 percent of the civilian jet departure noise in 2010.
- The 2010 departure noise exposure for civilian aircraft was 109.2 dB, approximately 1.8-2.0 decibels (dB) less than the noise exposure in 1978. Civilian departure noise exposure in 2009 and 2010 are the lowest of all the study years since 1978.
- Concepts for a new initiative to reduce touch and go traffic over Minute Man National Historical Park have resulted in an average of 13.5 percent fewer flights over the Park since the inception of the program in 2009.
- 2007 was the first year that an increase in noise level was driven by increases in Stage 3 jet operations, which occurred during both the daytime and nighttime hours.

These trends in activity levels are anticipated to continue into the future, with the increases in Stage 3 general aviation jet activity driving a potential incremental increase in overall noise levels. The total population exposed to Day-Night Sound Level (DNL) greater than 65 dB, which is the level typically associated with the sound of normal conversation, has decreased (Massport 2006).

Massport has implemented several policies that have had a positive impact on noise levels at Hanscom since 1978. The 1978 Hanscom Field Master Plan and Environmental Impact Statement (The Master Plan) and the 1980 General Rules and Regulations for Lawrence G. Hanscom Field include the policies and regulations that continue to guide Massport as it operates Hanscom Field. Since the adoption of these documents, Massport has worked closely with the Hanscom Field Advisory Commission (HFAC) and the Hanscom Area Towns Committee (HATS), as well as other interested parties, to balance its commitment to regional transportation and the business community with the need to recognize and minimize the airport's impact on the surrounding communities. For example, concepts for a new initiative to reduce touch and go traffic over Minute Man National Historical Park have resulted in an average of 13.5 percent fewer flights over the Park since the inception of the program in 2009 (Massport 2011b).

In 2001, Massport distributed "Fly Friendly" videos to all Hanscom pilots, flight schools, and FBOs. Massport is now asking all pilots who receive a Hanscom ID badge to watch a video about quiet flying techniques. The quiet flying techniques are also described on Massport's website, on posters that are prominently displayed by the flight schools and the FBOs, and on handouts that are available for pilots to include with their airport flight materials.

4.3.12 Water Quality

The analysis area for water quality resources is limited to the project area as shown in Figure 5. There are no navigable waterways, municipal drinking water supplies, sole-source aquifers or protected groundwater supplies within the proposed project site. Expanded review of these resources as they relate to Hanscom Field can be found in the 2005 ESPR but are not relevant to this project and are not included here.

As authorized by the Clean Water Act, the National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as

pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. Stormwater discharges from construction activities (such as clearing, grading, excavating, and stockpiling) that disturb one or more acres, such as the proposed project, are regulated under NPDES stormwater program. Prior to discharging stormwater, construction operators must obtain coverage under an NPDES permit, which is administered in Massachusetts by the US Environmental Protection Agency (EPA).

Where EPA is the permitting authority, construction stormwater discharges are almost all permitted under the Construction General Permit (CGP). The CGP requires compliance with effluent limits and other permit requirements, such as the development of a SWPPP. Construction operators intending to seek coverage under EPA's CGP must submit a Notice of Intent (NOI) certifying that they have met the permit's eligibility conditions and that they will comply with the permit's effluent limits and other requirements.

Airports in the United States, including Hanscom Field, are required to obtain a Stormwater Multisector General Permit under the NPDES permit program. Tenants such as Jet Aviation who lease property on Hanscom Field and engage in activities covered under the permit program are listed as co-permittees.

Massport has updated its Stormwater Pollution Prevention Plan (SWPPP) to include best management practices for stormwater management and snow removal (Massport 2012). Massport performs periodic visual inspections of water quality at Hanscom Field stormwater outfalls in compliance with the NPDES permit.

As detailed in Section 5.13, impacts from new impervious surface areas will be offset by a new stormwater treatment system that would capture more of the overall stormwater runoff from the Jet Aviation lease site in a new closed system which would be designed to meet the most current, stringent standards for water quality.

4.3.13 Surface Water and Wetlands

The analysis area for these resources is limited to the potential project site as shown on Figure 5. The surface water and wetland resources associated with Hanscom Field are, with the exception of those described below, outside of the potential for impact from this project.

Surface Water

Hanscom Field is included in the watershed drainage area of two perennial waterways: the Shawsheen River and Elm Brook. The Shawsheen River has a total drainage area of approximately 78 square miles, and encompasses all or part of 12 Massachusetts municipalities, including Bedford where its headwaters originate (Figure 1). Representing one of the smaller watersheds in the state, the mainstem of the Shawsheen River flows 25 miles from the east side of Hanscom Field, losing 70 feet in elevation as it travels to its confluence with the Merrimack River in Lawrence. The watershed has an urban character throughout and supports a population of approximately 250,000 people. Elm Brook is a tributary of the Shawsheen with a watershed of 5.8 square miles located in Lincoln, Concord and Bedford. The confluence of these waterbodies is located northeast of the airport property as seen on Figure 1.

Neither of these resources is located within the project boundary, however stormwater runoff from Hanscom Field does outfall to Elm Brook and the Shawsheen River, after appropriate

treatment has been applied. Examination of the potential effects of such outfall was conducted and detailed in the 2005 ESPR. Overall, samples from the Elm Brook location upstream from Hanscom Field outfalls exceeded benchmarks more frequently, and for more water quality parameters, than did those from either Hanscom Field's Elm Brook or Shawsheen River outfalls.

Wetlands

In accordance with Federal and State guidelines, on-site wetland boundaries were delineated by Wetlands & Wildlife, Inc. in April, 2012 and subsequently approved by the Lincoln Conservation Commission in October 2012 (Appendix A) through the ANRAD process. These areas, four of which occur on or proximate to the project site, constitute vegetated wetlands. These wetlands are subject to regulation at the Federal level by the U.S. Army Corps of Engineers pursuant to Section 404 of the Clean Water Act. At the State level, these wetlands consist of Bordering Vegetated Wetland (BVW) and one Bank area as shown on Figure 6.

Wetland 1 consists of the emergent plant community within the open field adjacent to former Building 18. Besides a preponderance of soft rush (*Juncus effusus*), field investigations also confirmed the presence of hydric soils in this area. The soil was abundantly mottled and saturated at the surface with some standing water, as well. Nowhere within Wetland 1 were soil sampling depths of greater than 10-12 inches achieved, conditions indicative of underlying fill material.

Wetland 2 is a forested, scrub/shrub and emergent wetland located south of Wetland 1. The two wetlands are not hydrologically connected. Red maple (*Acer rubrum*) and cottonwood (*Populus deltoides*) constitute the most abundant canopy species, while alder (*Alnus rugosa*), pussy willow (*Salix discolor*), oriental bittersweet (*Celastrus orbiculatus*), jewel weed (*Impatiens capensis*) and cattail (*Typha latifolia*) are common understory species.

Wetland 2 originates in an area of seasonal standing water surrounded by upland forest vegetation. Within this pool, two (2) wood frog egg masses were observed on 4 April, 2012. On 17 April 2013, 18 wood frog egg masses and one (1) adult wood frog were observed in the Wetland 2 pool. Based on the MA Natural Heritage & Endangered Species Program (NHESP) Guidelines for the Certification of Vernal Pool Habitat (March 2009), at least five (5) wood frog egg masses are required for an area of standing water to be certified as a vernal pool. The subject pool also must not exhibit a permanently flowing outlet. The area of standing water within Wetland 2 meets these criteria (see photos in Appendix E); this pool is anticipated to be eligible for NHESP certification.

Wetland 3 is located southwest of Wetland 2, is primarily forested, and drains in a westerly direction to the drainage channel adjacent to the existing T hangars. Dominant canopy species throughout Wetland 3 include red maple and yellow birch (*Betula lutea*), while understory species consist of arrowwood (*Viburnum dentatum*), spicebush (*Lindera benzoin*), skunk cabbage (*Symplocarpus foetidus*) and sensitive fern (*Onoclea sensibilis*), among others.

Wetland 3 also contains an area of standing water. Other than water striders (Order: Hemiptera, Family: Gerridae), a facultative vernal pool species, no other obligate or facultative species were observed during field investigations on 4 April 2012. On 17 April 2013, however, 13 wood frog egg masses were observed, and no flow was observed being discharged from the criteria pool (see photos in Appendix E). As such, Wetland 3 pool also is anticipated to be eligible for State NHESP certification.

Wetland 4 is located north of Wetland 2, adjacent to and up-gradient of the Jet Aviation parking lot. This primarily scrub/shrub and emergent wetland is characterized by pussy willow, blue vervain (*Vervena hastata*), wool grass (*Scirpus cyperinus*) and tussock sedge (*Carex stricta*), among other wetland plant species. Groundwater and surface runoff from Wetland 4 flow in the direction of the drainage channel adjacent to the existing T-hangars.

The "bank" resource is associated with the small intermittent stormwater swale located in the northeastern portion of the project area, immediately south of the road that leads to the existing Jet Aviation facility. This drainage-way discharges to the Hanscom stormwater management system at a headwall located at the junction of the above-referenced road and Hanscom Drive. From this point, stormwater flows through variable sized landside and airside culverts, ultimately discharging to the headwaters of the Shawsheen River south of Runway-End 29. As noted in Section 4.3.12, Massport and Jet Aviation have implemented measures to reduce impervious pavement and stormwater impacts to the Shawsheen River.

4.4 Secondary And Cumulative Impacts

Massport and its tenants continue to develop improvements to Hanscom Field. Past, present and recently foreseeable future actions at Hanscom include the following (Massport 2012):

- In 2012, Massport completed a project to relocate portions of the perimeter road at the approach of Runway 11.
- Massport will complete the project to relocate portions of the perimeter road at the approach of Runway 29 in 2013. Massport will also rehabilitate the pavement around the Old T-hangars.
- The Hangar 24 redevelopment project, which includes development of a new FBO facility commenced in 2013.

4.5 Not Affected

For the following potential impact categories, some are not applicable to Hanscom Field due to its location, such as:

- Coastal Resources- the project is not located in a Coastal Resource Area and would not be under the jurisdiction of the Massachusetts Office of Coastal Zone Management.
- Farmlands- there are no important farmlands such as pasturelands, croplands, or forests considered to be prime, unique, or statewide or locally important lands affected by the project.
- Floodplains- the project is not located within an area identified as a floodplain on a FEMA-developed Flood Insurance Rate Map (FIRM).
- Wild and Scenic Rivers- the Departments of the Interior and Agriculture manage the Wild and Scenic Rivers Act (Act) via the National Park Service (NPS). No designated Wild and Scenic Rivers would be affected by the project.

Other potential impact categories are not applicable because of the nature of the proposed action, thus analysis is not required because the resource is not present within the project boundary, or the no action, proposed action, and reasonable alternatives would not affect the impact category:

- Compatible Land Use- The proposed project has been included in the 2005 ESPR and identified for future aviation development. No changes or restrictions of use of land adjacent to or in the immediate vicinity of the airport to activities and purposes compatible with normal airport operations, including the landing and takeoff of aircraft, need to be made.
- Solid Waste- the solid waste generated during project implementation, including construction waste, would be disposed of appropriately per Federal, state, and local regulations addressing such materials.
- Environmental Justice- Environmental justice ensures no low-income or minority population bears a disproportionate burden of effects resulting from Federal actions. The project would not cause disproportionate and adverse effects on low-income or minority populations.
- Social Impacts- The project would not require moving homes or businesses, would not divide or disrupt established communities, significantly change surface transportation patterns, disrupt orderly, planned development, or create a large change in employment. Section 5.10 discusses the Induced Socioeconomic consequences in detail.

5 ENVIRONMENTAL CONSEQUENCES

5.1 Environmental Consequences Evaluation Process

In this chapter, the effects of the proposed action are described for each environmental impact category identified in Chapter 4, Affected Environment. The cumulative impact of the proposed action is determined by the significance and duration of these impacts in conjunction with impacts from previous and anticipated future projects.

For each of the impact categories listed below, impacts would be similar in nature for each of the three project build alternatives, unless otherwise noted.

5.2 Air Quality

The proposed project is expected to have temporary air emissions from construction, but in the long-term would have an overall positive effect on Air Quality. As noted in Section 4.3.1, calculations of annual emissions from aircraft operations and motor vehicles accessing the airport demonstrate that Hanscom Field emissions are a very small fraction of regional emissions. Air Quality has improved at Hanscom over the past three decades due to a variety of factors, including modification of aircraft design to decrease air emissions.

Jet Aviation anticipates that the replacement hangar will meet the future corporate aviation fleet needs. Existing customers will upgrade their fleet to modern aircraft which are more fuel efficient, cleaner and quieter; examples of these types of aircraft are shown in Table 5-1. Fleet upgrades would occur over time, with or without the project, as aircraft age and are replaced, but the increased hangar would allow these existing customers to upgrade sooner. Existing transient customers would become based customers, thus reducing the number of ferry flight operations.

Direct air emissions resulting from the change in aircraft located at Jet Aviation would decrease, as the newer aircraft are designed to be more efficient and have fewer emissions. Even with slight increases to operations, the improvements in air quality emissions from these engines would not be expected to increase air emissions beyond those predicted in the ESPR future forecasts.

Table 5-1. Potential Aircraft at Jet Aviation as New or Replacement

Tenant Name	Type of A/C
Managed Client	Gulfstream-650
Real Estate investment firm	Gulfstream-650
Venture Capital Group	Gulfstream-650
Venture Capital Group	Challenger - 601
Current JA Tenant	Bombardier Global Express
Current JA Tenant	Bombardier Global Express
Current Signature Tenant	Gulfstream - 450
Aircraft Management company	Gulfstream - 450

As an example of reduced air emissions, the Gulfstream 650 is the largest, most technologically advanced aircraft in the Gulfstream fleet. The G650 is powered by the new Rolls-Royce BR725 engine featuring a 50-inch swept fan with 24 blades for improved flow, increased efficiency, reduced fuel use and noise, and a 21 percent improvement in NOx emissions compared to

similar engines on older aircraft. The G650 has fuel-burn levels comparable to those of smaller aircraft. In addition, Gulfstream has a commitment to green fuels by adapting new aircraft to use a 50-50 blend of biofuel and Jet A (a common jet fuel which is kerosene and paraffin oil-based). The biofuel, dubbed Honeywell Green Jet Fuel, is made from camelina—a non-food plant that can be grown in rotation with wheat and other cereal crops. Gulfstream says that based on lifetime cycle studies, burning each gallon of the biofuel instead of Jet A reduces carbon dioxide equivalent emissions by 68 percent. The Gulfstream 450 can currently be modified so that one of its Rolls-Royce engines is powered by a 50/50 blend of Honeywell Green Jet Fuel and petroleum-based jet fuel. The Bombardier Global Express 5000 and 6000 are brand new to the industry, powered by two BMW Rolls Royce BR-710 turbofans; these engine's Stage 4 low emissions exceed the industry's current Stage 3 requirement, with a high bypass ratio for significant noise reduction. The Challenger 601 is powered by updated General Electric CF34-3A engines which have also been designed to reduce air emissions compared to older engines.

Jet Aviation would not significantly add to the existing fleet and operations, but rather it is expected that tenants would upgrade their existing fleet with these newer aircraft. Thus, air emissions would not be expected to increase above existing levels, and may, in fact, decrease.

Direct emissions caused by the proposed action would also result from the temporary construction activities. Construction related activities are expected to result in short-term impacts associated with vehicle emissions from material delivery trucks and construction equipment operation. As noted in Sections 3.2 and 4.3.3, Jet Aviation is committed to reducing environmental impacts via the use of contractors who adhere to Massport and DEP Clean Air Construction Initiative/EPA's voluntary Diesel Retrofit Program. Implementation of the initiative requires contractors to retrofit their heavy equipment with advanced pollution control devices during construction of all Massport projects. Construction activities also have the potential to result in short-term emission of small amounts of particulate matter, in the form of fugitive dust, which typically occurs during ground disturbance, on-site movement of equipment, stockpiling and transportation of construction materials. Dust is more likely to occur during dry and windy conditions and can be managed with the application of water. Stockpiles of earth material will be covered, encircled with erosion controls, or seeded to shield from weathering forces. These methods, or other approved means, will be used to mitigate the particulate matter released into the air. The construction impact to the ambient air quality is temporary by nature and not expected to be significant.

5.3 Biotic Resources

The proposed project is expected to have impacts to biotic resources. Approximately 113,000 sf of currently vegetated areas would be converted from vegetated (permeable) to paved (impermeable) for the hangar, ramp, parking areas and access road (including the newly grassed area under Building 18 which was removed); the majority of this land, approximately 101,146 sf, lies within the 100-foot wetland buffer. See Section 5.14 for more information on wetland impacts. These actions are expected to result in minimal impacts on the wildlife that currently use these areas, particularly due to the relatively limited extent of upland forest and periodically mowed open field habitat to be affected. Extensive areas of upland forest will remain following project implementation that can be utilized by wildlife, thus a slight shift in habitat location would be anticipated rather than direct effects to individuals using the field and forest areas. Wetlands would not be disturbed and would continue to provide their respective functions. Unaffected portions of the open field would continue to be periodically mowed in

order to maintain the diversity of existing habitats. The proposed project would not result in any impacts to the perennial streams within the region, thus, no impacts to fisheries.

5.4 Construction

Impacts from construction activities would be temporary in nature. Emissions from and noise generated by construction vehicles would have no long-term impacts on either a micro or macro scale; this same finding also would apply to the consumption of energy supplies, light emissions, and the generation of solid waste. With respect to ground disturbances, soil erosion controls and other Best Management Practices (BMP's) will be implemented in accordance with the SWPPP to preclude potential impacts to adjacent wetlands and down-gradient waterways.

5.5 Section 4(F)

No Section 4(f) resources are located within the project area, and therefore no impacts to such resources would occur.

5.6 Federal- And State-Listed Endangered And Threatened Species

The proposed project alternatives would not impact Federally-listed species since there are no listed species within the project area. The State-listed upland sandpiper and grasshopper sparrow would not be impacted by the project. There would be no net loss of habitat for either species since no areas of airfield grassland will be altered. Massport suspends mowing activities in some areas (excluding runway safety areas) during the critical nesting season of these birds.

5.7 Energy Supply, Natural Resources And Sustainable Development

Jet Aviation is committed to designing and certifying the proposed Hangar, office/shop space and FBO facility in accordance with LEED (Leadership in Energy and Environmental Design) Silver certification standards. In addition to the LEED Silver certification, Jet Aviation is also committed to incorporating Massport's *Sustainable Design Standards and Guidelines, Volume 2*, (2011a) and the Massport *Guide to Tenant Construction* (2009) into the project design. It is anticipated that the newer aircraft to be serviced by Jet Aviation would be more fuel efficient than the aircraft currently serviced, as detailed in Section 5.2. Ground service equipment and fleet vehicles at Hanscom Field and Jet Aviation have converted to alternative fuels, either electric or propane. Jet Aviation has replaced 85% of their gas fueled vehicles with alternative fueled vehicles and is committed to future improvements for fleet vehicles.

The proposed project would not significantly affect energy supply or natural resources, and would work towards the sustainable development goals identified by Massport. As identified in Massport's *Sustainable Design Standards and Guidelines*, Massport has several programs and initiatives in place that contribute to the sustainable operation and maintenance of Hanscom Field and its facilities. Jet Aviation has shown a strong commitment to implementing such programs and initiatives and will continue to do so with this project, including:

- implementation of a comprehensive solid waste and recycling program;
- development of an Energy Master Plan;
- development and documentation of greenhouse gas and emissions inventories;
- development and implementation of a green cleaning program;
- and, examining the potential for installation of energy-reducing and renewable power systems such as wind turbines or solar panels.

In addition, as previously noted, Examples of design initiatives suitable for LEED Silver certification and compliance with the Massport Standards to be used in the Jet Aviation project include the following: designing the building to use 20-40% less water and 12% or more less energy than the USGBC baseline for buildings of similar size and occupation; implementing water conservation measures that pertain to landscaping and wastewater technologies including procedures for water reuse; using at least 10 percent less energy than the USGBC baseline; designing an HVAC system that does not use any chlorofluorocarbon (CFC) based refrigerants; using low emitting materials for construction including paint and flooring; using renewable energy sources for building operation; using recycled materials for building construction; implementing a recycling program in daily operations; using low emitting or fuel efficient vehicles; and designing and using energy-efficient lighting systems.

5.8 Hazardous Materials

The proposed project would not result in a release of hazardous materials and is not anticipated to generate hazardous waste. Hangar 17, 21,315 sf in size, may contain hazardous materials such as asbestos or lead, however any such materials would be removed at the time of demolition and BMPs would be implemented in accordance with local, state and federal regulations to ensure compliance.

5.9 Historic And Archaeological

No Historic or Archaeological resources are located within the project area. Impacts to such resources would not occur.

The FAA requested input from the Indian Nation as shown in Appendix G and the Nation and State Historical Commission would be informed of any artifacts revealed during construction of improvements.

Per the future scenarios of the 2005 ESPR, the proposed new corporate hangar locations are entirely within areas assessed as having a low archaeological sensitivity. Most of the potential new corporate hangar locations in the Terminal Area are located on existing developed areas, entirely within an area assessed as having a low archaeological sensitivity. These potential development sites would not affect potentially significant archaeological resources.

5.10 Induced Socioeconomic

The project would result in positive induced socioeconomic impacts. Implementation of the proposed alternatives would allow Jet Aviation to increase their client base, reduce the potential for injuries to workers, and provide jobs for local residents. Such effects are positive and stabilizing for Jet Aviation's economic profile, which in turn allows for local economic stability.

The increase in hangar size and office/shop space would allow Jet Aviation to hire additional employees. Some of the new office/shop space would be available for rental to aviation related businesses, thus increasing jobs on the Airport. Because of this, the project would result in direct positive effects to those who would have new jobs, as well as indirect or secondary positive effects (increases) in local services such as restaurants, gas stations, etc. within the Airport and local areas.

5.11 Light Emissions And Visual Effects

The project would not increase light emissions or create visual effects. The characteristics of most airport lighting systems create potential sources of annoyance to nearby residents, such as visual navigational aids, edge lights, and others, which may emanate disturbing emissions. There will be no net increase of such lighting emissions. Lights around the ramp area would be repositioned as needed but would not increase significantly in number. Building lighting and parking lot areas would comply with the lighting specifications in Massport's *Sustainable Design Standards and Guidelines*, as well as the *Guide to Tenant Construction*, so as to not increase light emissions significantly. Final design has not been completed, however, Jet Aviation would commit to using LED lighting fixtures or compact fluorescent light bulbs where feasible. All lights would be directional to send light down to the surface to eliminate bleeding of light offsite. EnergyStar equipment would be used where feasible. Advanced lighting technologies would be implemented where practicable, and lighting systems, as a part of the entire energy use system, would be periodically reviewed for potential energy-reducing improvements.

There are no nearby residential areas. The closest residential buildings are located over 700 feet to the south of the proposed project area along Old Bedford Road. The existing forested areas between Jet Aviation and these houses will remain in place, screening these residents from potential light emissions.

Construction vehicles must have proper identification according to a Construction Safety and Phasing Plan. Any vehicle operating in the movement area during hours of darkness or reduced visibility must be equipped with a flashing amber dome-type light. These flashing lights would be temporary and utilized only during periods of construction activity within airport property. Proposed construction activities are expected to be conducted almost exclusively in daylight hours.

5.12 Noise

For noise analysis of airport actions, FAA Order 1050.1E CHG 1 requires identification of the number of people newly exposed to noise levels greater than DNL 65 dB, as well as any areas projected to experience an increase in long-term noise level of 1.5 dB or more (within DNL 65). As previously noted, the 2005 ESPR the total population exposed to Day-Night Sound Level (DNL) greater than 65 decibels (dB), which is the level typically associated with the sound of normal conversation, has decreased (Massport 2006). The population estimates within the 65 and 55 DNL contours for the 2010 and 2020 future forecast scenarios in the 2005 ESPR suggest that the greatest noise exposures would occur in the 2020 High Growth Scenario, yet even in this scenario, no noise analysis locations (including historic sites) would experience a DNL value greater than 65 dB. In addition, operations data predicted in the future forecast for 2010 have not been met (Massport 2011b) and the 2020 forecast scenarios are not anticipated to be met in the current economic climate.

To further support this analysis, in the HMMH 2008 study, noise contours for 2010 and 2015 were computed using updated data from 2006 and 2007 combined with future forecasts from the 2005 ESPR for a proposed development. The revised forecasts for both 2010 and 2015 listed fewer operations than that predicted in the 2005 ESPR, reflecting actual reduced operations values, and smaller contours than the 2005 ESPR forecasts and contours for 2010 and 2020 (moderate or high growth). The analysis showed a slight increase in the size of the DNL 65 dB contour for both forecast years; in neither case was there an increase of 1.5 dB or more in any area within the DNL 65 contour. The only residential area included within the DNL

65 dB contour is just to the northeast of Runway 29. This neighborhood is separated from the airport by trees and a 20' high berm built by Massport to reduce noise levels in this area (the berm reduces aircraft noise levels by as much as 10 dB at the nearby homes). Although the noise levels in this area were projected to increase by approximately 0.4 dB from the proposed development, they would still be well below 65 DNL due to the effectiveness of the berm.

The aircraft proposed for future fleet located at Jet Aviation, as detailed in Section 5.2, are all Stage 3 or Stage 4 aircraft and are designed to reduce noise levels from take-off, operation and landing. It is anticipated that the change in aircraft serviced would result in continuing the trend of decreased noise emissions at Jet Aviation and would not affect the local residential population. The construction vehicles will have a temporary and insignificant impact on noise during operation.

5.13 Water Quality

The proposed project would not impact water quality at Hanscom Field. The potential to impact water quality stems from ground disturbance due to sedimentation caused by erosive forces. This potential will be mitigated by best management practices such as erosion control, implementation of a Stormwater Pollution Prevention Plan (SWPPP), and soil stabilization using native seeding or other approved means. The extent of soil disturbance will be limited during construction.

Facilities analyzed in the ESPR future scenarios, including the proposed project, are not anticipated to result in any impacts to water quality. Massport will continue to require all development and facility operations, including those by tenants, to conform to the requirements of the NPDES permit for Hanscom Field. Also, all activities would continue to be required to meet applicable standards for stormwater management required for site development or redevelopment by DEP.

Massport directs new development to areas with existing impervious surfaces and to take advantage of existing infrastructure wherever possible. Jet Aviation is committed to assisting Massport and meeting their *Sustainable Design Standards and Guidelines* by minimizing the surface area of new impervious pavement and re-using areas of existing impervious pavement to the extent practicable. Comparison of the alternatives shows a good faith effort of reducing the ramp size from Alternative 1 (182,000 sf ramp) and Alternative 2 (240,000 sf ramp) to the configuration in Alternative 3 (94,160 sf ramp); these values are approximate and reflect the initial steps in the process of reducing impervious area and do not include pavement that can be re-used. Alternative 3 ramp areas would include the following existing impervious areas: land beneath Hangar 17 (to be demolished), parking areas, and the access road beside the existing western hangar. New impervious area for the ramp and hangar is estimated at approximately 31,000 sf. New impervious area for the access road and parking lots would approximate 82,000 sf. The EA will be issued before designs are finalized, so these areas have been approximated and may change slightly during final design and project construction.

Massport requires individual projects to implement Best Management Practices (BMPs) to address Massport's policy regarding stormwater runoff requirements that projects resulting in increases in impervious surfaces do not increase peak runoff rates. The proposed project would comply with the Stormwater Management Standards. The proposed action would include three closed underground treatment systems which would allow for pre-treatment, infiltration and attenuation via an open bottom lined with gravel to allow water to infiltrate or penetrate into the ground. Remaining water would ultimately discharge to the 60" outfall pipe running below

the existing ramp, across Hanscom Field to connect to the outfall pipe to the Shawsheen headwaters in the northeast corner of the Field. Installation and operation of this system will follow BMPs.

The new stormwater treatment system would be an improvement over the existing system, in that more of the overall stormwater runoff from the Jet Aviation lease site would be captured in the new closed system which has been designed to meet the most current, stringent standards for water quality. Although this water eventually outlets into the headwaters of the Shawsheen River, the treatment process is designed to ensure that this river would not be affected.

5.14 Surface Water And Wetlands

Wetland impacts were avoided and minimized to the extent practicable via design alteration, and is the notable difference between Alternatives 1, 2 and 3 as shown in Table 5-1. The proposed Alternative 3 configuration would not result in direct impacts to surface waters, wetlands or areas of standing water that may or may not meet the criteria for State certification as vernal pools. For the proposed development in Alternative 3, approximately 101,146 sf of new pavement or building construction, clearing and grading would occur in the upland buffer surrounding wetlands 1, 2, 4 and the bank resource as shown on Figures 5 and 6. This alternative provides the least amount of impact to the wetland and buffers.

Table 5-2. Wetland Impacts by Alternative

Alternatives	Wetland Impacts
Alternative 1	50,090 sf direct impacts, impacts to wetland buffers
Alternative 2	1,000 sf direct impacts, impacts to wetland buffers
Alternative 3	No direct impacts, impacts to buffers only

With respect to vernal pool species, wood frogs were the only vertebrate species observed in association with the areas of standing water in Wetlands 2 and 3. As described by Klemens in *Amphibians and Reptiles of Connecticut and Adjacent Regions* (Klemens, Michael W. PhD; 1993. State Geological and Natural History Survey of Connecticut Bulletin 112), “[Wood frog] Adults prefer heavily forested areas with a thick cover of herbaceous vegetation and duff.” As designed, the proposed landside access road would traverse an area of upland forest. This forested area, however, is near the northern periphery of the overall forest stand. Unlike the contiguous woodlands to the south, this stand contains an abundance of conifers which inhibit the establishment and growth of understory plant species. As such, the wooded area associated with the proposed landside access road does not constitute preferred wood frog terrestrial habitat. Impacts to local wood frog populations, if any, would be negligible.

5.15 Secondary And Cumulative Impact Analysis

The proposed project would not cause secondary or cumulative impacts to any of the analyzed criteria. Cumulative effects may result from individually minor but collectively significant actions taken place over a period of time. Mitigation for the previous improvements or modifications to the ALP reduces the effect of cumulative impacts. None of the categories of potential impacts that were mitigated for that project would be cumulative with the effects from the proposed project. The proposed impacts to traffic on Virginia Road from the Hangar 24 project would not be added to by this project. Noise and air quality impacts are dependent on aviation forecasts; the FAA stated in the Final EA for the Hangar 24 project that it is unlikely to induce increases in operations beyond that which is predicted and evaluated in the 2005 ESPR, and would not add

cumulatively to other operations-related impacts. Thus, the Jet Aviation project as proposed would not add cumulatively to noise or air quality impacts as compared to the ESPR forecasts.

6 MITIGATION

Mitigation is used to offset the impacts caused by the selected airport improvements. There are several methods used to mitigate the environmental impacts. The primary methods to reduce environmental impacts are to avoid the resource when possible or minimize the impacts to the resource being impacted. When that is not possible mitigation is often necessary to reduce the adverse effects of the improvements. Each method of mitigation is proposed to the regulatory agency where it is revised through an interim process. Ultimately, mitigation is confirmed through the permitting process with local, state, and federal resource agencies.

The above-listed impact categories detail mitigation measures where necessary. They are summarized here briefly:

Air Quality

Direct emissions would result from temporary construction activities as particulate matter or fugitive dust. Dust is more likely to occur during dry and windy conditions and can be managed with the application of water. Stockpiles of earth material would be covered, encircled with erosion controls, or seeded to shield from weathering forces to prevent fugitive dust.

Water Quality

A National Pollutant Discharge Elimination System (NPDES) Stormwater General Permit for construction would be required and a Stormwater Pollution Prevention Plan (SWPPP) would be generated for construction-related activities. The SWPPP, anticipated to be prepared by the contractor, would include a plan incorporating the soil erosion and sediment controls relative to proposed project elements, and any other structural and non-structural controls that may be used, as appropriate, to control erosion/sedimentation within the construction zone. Best Management Practices (BMPs) would be listed in the stormwater management plan, in accordance with the MA DEP Stormwater Management Standards/Handbook (effective 2 January 2008).

The SWPPP would also document procedures for the inspection of erosion/sedimentation controls to ensure that all such controls are functioning properly. The SWPPP requires that all erosion and sediment control measures and other protective measures be maintained in effective operating condition. The SWPPP also requires regular inspections of the erosion and sediment controls to assess the effectiveness of these measures in controlling the quality of stormwater discharges from the construction activities. Based on the results of these inspections, the SWPPP would be modified, as necessary, to include additional or modified BMPs designed to correct any identified problems.

Surface Water and Wetlands

Throughout the initial planning and design phase of the project, measures were identified and incorporated into the project design to avoid or minimize potential direct impacts to wetlands. This effort culminated in Alternative 3; this Alternative completely avoids direct impacts to wetland resources.

Prior to construction, the boundaries of adjacent wetlands and the limits of construction would be re-flagged to clearly identify wetland boundaries and preclude unnecessary disturbances. Soil erosion and sedimentation controls would be installed for resource protection purposes,

such as straw bales, silt fencing and other measures. The installation of these controls would comply with the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas (MA Department of Environmental Protection; Reprinted 2003). These controls would be inspected daily and after rainfall events, and maintained periodically, as required, until such time that their removal is approved by all pertinent regulatory agencies, including the Lincoln Conservation Commission.

Energy Supply, Natural Resources and Sustainable Development

Jet Aviation and Massport are committed to implementing programs aimed at sustainable development relative to energy usage and natural resources.

Hazardous Materials

Any hazardous materials encountered during demolition of Hangar 17 would be removed or managed in place in accordance with Massport *Sustainable Design Standards and Guidelines* as well as the *Guide to Tenant Construction* (2009) at the time of demolition. BMPs would be implemented in accordance with local, state and federal regulations to ensure compliance.

Construction

Construction BMPs would be incorporated into the contract documents and specifications governing the activities of contractors and subcontractors. All construction activities would be monitored to ensure that mitigation measures are properly implemented, particularly at locations adjacent or proximate to wetland resources.

Light Emissions and Visual Effects

As detailed in Section 4.3.6 and 4.3.10, light emission impacts would be minimized via design details as specified in the Massport *Sustainable Design Standards and Guidelines*. All lighting would be designed with reduced energy use in mind. Lighting requirements would be carefully designed and reviewed such that improvements could be made where feasible. LED lighting would be utilized for lighting, signage (including internal "exit" signs) and signals; compact fluorescent light bulbs would be used where feasible. Building lighting and parking lot areas would comply with lighting design specifications so as to not increase light emissions significantly.

Construction vehicles would be equipped with a flashing amber dome-type light. These flashing lights would be temporary and utilized only during periods of construction activity within airport property.

In summary, potential project-related impacts have been mitigated to the maximum extent practicable, such that project implementation will have no long-term effects to natural resources, or airport facilities and operations.

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Agencies Contacted/Consulted

US Fish and Wildlife Service, New England Field Office. 70 Commercial Street, Suite 300 Concord, NH 03301-5087. (603) 223-2541 Review of website for Federally-listed species

Massachusetts Natural Heritage and Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. 100 Hartwell Street, Suite 230, West Boylston MA 01583. (508) 389-6300 Review for State-listed species

Massachusetts Historical Commission. 220 Morrissey Boulevard, Boston, MA 02125. (617) 727-8470 Review of website for impacts to historical, cultural and archaeological resources

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Appendix A

Town of Lincoln Conservation Commission ORAD



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
WPA Form 4B - Order of Resource Area Delineation
 Massachusetts Wetlands Protection Act M.G.L. c. 131 S40

Provided by MassDEP:
 MassDEP File #:203-0851
 eDEP Transaction #:513207
 City/Town:LINCOLN

A. General Information

1. Conservation Commission LINCOLN
2. This Issuance is for (Check one):
 - a. Order of Resource Area Delineation
 - b. Amended Order of Resource Area Delineation

3. Applicant Details

a. First Name	FRANK	b. Last Name	DIGLIO	
c. Organization	JET AVIATION			
d. Mailing Address	380 HANSCOM DRIVE			
e. City/Town	BEDFORD	f. State	MA	g. ZIP

4. Property Owner (if different from applicant):

a. First Name	THOMAS	b. Last Name	ENNIS	
c. Organization	MASSACHUSETTS PORT AUTHORITY			
d. Mailing Address	ONE HARBORSIDE DRIVE			
e. City/Town	EAST BOSTON	f. State	MA	g. ZIP 02128

5. Project Location

a. Street Address	OFF HANSCOM DRIVE			
b. City/Town	LINCOLN	c. Zip		
d. Assessors Map/Plat#	4	e. Parcel/Lot#	41-0	
f. Latitude	42.46014N	g. Longitude	71.29212W	

6. Dates

a. Date ANRAD Filed	9/25/2012	b. Date Public Hearing Closed	10/17/2012	c. Date Of Issuance	10/17/2012
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7. Final Approved Plans and Other Documents

Plan Title	Plan Prepared By	Plan Signed By	Plan Final Date	Plan Scale
WETLAND RESOURCES LOCATION PLAN	HOYLE TANNER & ASSOCIATES		August 2012	1" = 50'

B. Order of Delineation

1. The Conservation Commission has determined the following (check whichever is applicable)
 - a. **Accurate:** The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):
 1. Bordering Vegetated Wetlands
 2. Other resource area(s), specifically
 - a. BANK
 - b. **Modified:** The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):
 1. Bordering Vegetated Wetlands
 2. Other resource area(s), specifically
 - a.



Massachusetts Department of Environmental Protection
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- c. **Inaccurate::** The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):
1. Bordering Vegetated Wetlands
 2. Other resource area(s), specifically
 - a.
 3. The boundaries were determined to be inaccurate because:

C. Findings

This Order of Resource Area Delineation determines that the boundaries of those resource areas noted above, have been delineated and approved by the Commission and are binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c.131, S 40) and its regulations (310 CMR 10.00). This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation. This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see <http://www.mass.gov/dep/about/region/findyour.htm>).

D. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Resource Area Delineation. When requested to issue a Superseding Order of Resource Area Delineation, the Department's review is limited to the objections to the resource area delineation(s) stated in the appeal request. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant. Any appellants seeking to appeal the Department's Superseding Order of Resource Area Delineation will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order or Determination, or providing written information to the Department prior to issuance of a Superseding Order or Determination. The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, S 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.



Massachusetts Department of Environmental Protection
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E. Signatures

[Handwritten signatures]
 James Meadros
 David M. Beaudin
[Signature]

- 1. Date of Original Order _____
- 2. No. of Signatures required **6**

[Handwritten signature]
 Julie Deane

This Order is valid for three years from the date of issuance.

If this Order constitutes an Amended Order of Resource Area Delineation, this Order does not extend the issuance date of the original Final Order, and the Amended Order will expire on the date of the Original Final Order unless extended in writing by the Department.

This Order is issued to the applicant and the property owner (if different) as follows:

3. By hand delivery on _____

4. By certified mail, return receipt requested on _____

a. Date _____

a. Date 10/18/12

Appendix B

Total Air Emissions Forecasted Through 2020 From ESPR

Table 8-10 Emissions from Aircraft Operations at Hanscom Field for 2005 and Forecast Scenarios (1,000s of kg/yr.)

Year	CO	NOx	VOC	PM10	PM2.5	CO2
2005	483.6	28.0	58.1	3.0	3.0	11,806.6
2010 Moderate	534.3	37.1	74.0	3.3	3.3	15,691.4
2010 High	577.7	56.1	79.3	3.6	3.6	22,352.5
2020 Moderate	652.0	60.4	108.8	4.3	4.3	25,466.8
2020 High	718.7	90.2	127.4	5.4	5.4	36,285.3

Appendix C

Memorandum: Hanscom Field Air Quality Assessment for East Ramp, 2008



Memorandum

To: Tom Ennis, Massport
From: Michael Kenney
Subject: **Hanscom Field Air Quality Assessment for East Ramp**
Date: December 10, 2008

I. Introduction

This memorandum presents the result of the air quality assessment for the proposed East Ramp at Hanscom Field. The purpose of this assessment is to demonstrate compliance with the General Conformity Rule of the federal Clean Air Act (CAA). Both the project-related operational and construction emissions are evaluated.

II. General Conformity Rule Applicability

Currently, the Boston metropolitan area (including the area surrounding Hanscom Field) is designated by the U.S. Environmental Protection Agency (EPA) and Massachusetts Department of Environmental Protection (DEP) as an “attainment” area for all of the Ambient Air Quality Standards (AAQS); with the exception of carbon monoxide (CO) and the eight-hour standard for ozone (O₃).^{1,2} The “non-attainment” designation for O₃ is further classified as “moderate” and is based upon air quality monitoring data collected by DEP at various locations throughout the area.³ The “maintenance” designation for CO signifies that violations of the AAQS for this pollutant have occurred in the past but the area is transitioning to the full attainment designation.

As a result of these designations and in accordance with the federal CAA, the DEP has developed a State Implementation Plan (SIP) which focuses on the reduction and control of CO as well as nitrogen oxides (NO_x) and volatile organic compounds (VOC) – the two primary precursors to O₃-formation.⁴

¹ NAAQS have been established for the following “criteria” pollutants: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO₂), particulate matter less than or equal to 10 and 2.5 microns (PM_{10/2.5}), sulfur dioxide (SO₂) and ozone (O₃).

² This current non-attainment designation applies to the eight-hour NAAQS for O₃ established by the EPA in 1997. The EPA has replaced this standard in 2008 and updated “attainment/non-attainment” designations will be made in the 2010/2011 timeframe.

³ This ozone non-attainment area comprises 11 counties, including Barnstable, Bristol, Dukes, Essex, Middlesex, Nantucket, Norfolk, Plymouth, Suffolk, and Worcester). Logan Airport is in Suffolk County.

⁴ *Eight-hour Ozone Attainment Demonstration for the Massachusetts Portion of the Boston-Lawrence-Worcester, Massachusetts-New Hampshire Ozone Non-attainment Area*, prepared by the Massachusetts Department of Environmental Protection.

As a means of ensuring that continual progress toward achieving and maintaining compliance with the AAQS and SIP for CO and O₃ are made, the General Conformity Rule establishes criteria (called “de minimis” levels) for NO_x/VOC and CO emissions.⁵ In brief, project-related emissions below these de minimis levels are automatically assumed to comply with the SIP and no further assessment of these emissions is required.⁶ For the Boston metropolitan area, the applicable de minimis levels are 50 tons/year for either NO_x or VOCs and 100 tons/year for CO.

III. Analysis Years and Conditions

For the purposes of this assessment and consistent with Federal Aviation Administration (FAA) guidelines, the air quality analysis analyzed the following conditions:

- 2010 and 2015 No Action Condition
- 2010 and 2015 Build Condition

The years of 2010 and 2015 were selected based on the expected construction completion dates for Phase I and full Build schedules for the East Ramp Project. Comparisons between No Action and Build Conditions reveal the expected changes in emissions that are attributable to the proposed project.

IV. Approach and Methodology

The emissions inventory was conducted using methods, models and emission factors approved by the FAA, EPA and DEP combined with development plans and operational data specific to the East Ramp Project. The emissions inventory includes aircraft, ground support equipment (GSE), auxiliary power units (APU), and motor vehicles (both on and off airport) as well as construction activities.

The operational emissions inventory was prepared following FAA guidelines (i.e., FAA Orders 1050.1E, Change 1 and 5050.4B) and using the most recent version of the FAA Emissions and Dispersion Modeling System (EDMS).^{7, 8, 9, 10}

Aircraft operations were based on and consistent with documentation prepared for the East Ramp Project noise assessment (HMMH, *Analysis of the Proposed Development of the East Ramp at Hanscom Field*, dated July 9, 2008). Aircraft operating time-in-mode,

⁵ 40CFR Part 51, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*, November 30, 1993.

⁶ In cases where total emissions of NO_x/VOC and/or CO exceed the applicable de-minimis levels, the project is not automatically assumed to conform to the SIP and a formal General Conformity Determination must be made.

⁷ EDMS5.1 is the most recent version available.

⁸ Federal Aviation Administration, Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions, April 26, 2006.

⁹ Federal Aviation Administration, Order 1050.1E, Environmental Impacts: Policies and Procedures, Change 1, March 20, 2006.

¹⁰ Federal Aviation Administration, *An Environmental Desk Reference for Airport Actions*, October 10, 2007.

GSE and APU assignments were based on EDMS defaults pertaining to each aircraft type.

Motor vehicle traffic volumes were derived based on the *2005 Environmental Status and Planning Report* (Chapter 6) and include on-airport roadway (Hanscom Drive) and off-airport roadways (Lexington Road and Virginia Road). Motor vehicle emission factors were obtained from the U.S. EPA MOBILE6.2 using DEP-recommended input data reflecting Massachusetts motor vehicle fleet mix and operating characteristics.¹¹

For the construction emissions inventory, the construction schedules and requirements (i.e., work crews, equipment types, etc.) for the project were estimated by qualified construction planners. These data and information were then combined with appropriate emission factors obtained from the EPA NONROAD2005 and MOBILE6.2 emission models to obtain estimates of total annual construction emissions. Emissions of fugitive dust were calculated using emission factors listed within the U.S. EPA's *Compilation of Air Pollution Emissions Factors* (i.e., AP-42).¹²

V. Results

Tables 1 and 2 provide the emissions inventories for 2010 and 2015 for the No Action and Build Alternative and includes operational emissions from aircraft, GSE, APU, and motor vehicles, as well as construction activities (for the Build Alternative). The total difference between the Build and No Action Alternatives is also shown. Notably, the operational and construction emissions are added together as if they will occur in the same year – a “worst-case” assumption.

For comparative purposes, the applicable General Conformity Rule *de minimis* levels also are provided for CO, NO_x and VOCs . From this comparison, “yes/no” statements show whether the project-related emissions are less than the *de minimis* thresholds. Emissions of SO₂, PM₁₀ and PM_{2.5} are also shown for disclosure purposes, although the General Conformity Rule does not apply to these pollutants.

¹¹ Communications between DEP and KB Environmental Sciences, March, 2008.

¹² A fugitive dust emission factor of 1.2 tons per acre disturbed per month was used; with a maximum disturbed area of 7.6 acres during 2010 and 9.7 acres during 2015. For PM emissions resulting from demolition and upset of ground-based fugitive dust, a dust control efficiency of 75 percent due to daily watering and other measures was estimated based on EPA AP-42. PM_{2.5} was assumed to be 10 percent of PM₁₀ for fugitive dust-based calculations.

Table 1
2010 Air Emissions Inventory Results

Alternative	Emission Source	Pollutant (tpy)					
		CO	VOC	NO _x	SO ₂	PM ₁₀	PM _{2.5}
No Action	Aircraft	477	62.5	43.9	7.0	1.5	1.5
	GSE	109	3.9	12.7	0.3	0.4	0.3
	APU	4.9	0.1	1.3	0.2	0.2	0.2
	Onsite Motor Vehicles	3.4	0.2	0.2	<0.1	<0.1	<0.1
	Offsite Motor Vehicles	6.7	0.3	0.3	<0.1	<0.1	<0.1
	No Action Totals	600	67.0	58.4	7.6	2.1	2.1
Build	Aircraft	493	68.0	46.9	7.6	1.7	1.7
	GSE	119	4.2	13.8	0.3	0.4	0.4
	APU	5.5	0.2	1.5	0.3	0.2	0.2
	Onsite Motor Vehicles	3.6	0.2	0.2	<0.1	<0.1	<0.1
	Offsite Motor Vehicles	7.1	0.4	0.3	<0.1	<0.1	<0.1
	Construction	12.3	1.23	13.8	0.2	4.5	1.0
	Build Totals	640	74.2	76.5	8.4	6.8	3.3
	Difference	39.5	7.2	18.1	0.8	4.7	1.3
	De minimis threshold	100	50	50	n/a	n/a	n/a
	Less than De minimis?	Yes	Yes	Yes	n/a	n/a	n/a

Source: KB Environmental Sciences, Inc, 2008.

Differences = Build – No-Build/No-Action

The applicable *de minimis* levels are 50 tons/year for either NO_x or VOC and 100 tons/year for CO. Emissions below these levels are automatically assumed to comply with the State Implementation Plan (SIP).

n/a means not applicable to the General Conformity Rule.

Yes means the emissions are below the de minimis levels and the project emissions conform to the SIP.

Table 2
2015 Air Emissions Inventory Results

Alternative	Emission Source	Pollutant (tpy)					
		CO	VOC	NO _x	SO ₂	PM ₁₀	PM _{2.5}
No Action	Aircraft	537	80.3	54.3	8.9	2.0	2.0
	GSE	80.1	2.8	8.4	0.3	0.3	0.3
	APU	6.9	0.2	1.8	0.3	0.3	0.3
	Onsite Motor Vehicles	4.0	0.1	0.1	0.0	0.0	0.0
	Offsite Motor Vehicles	7.6	0.2	0.2	0.0	0.0	0.0
	No Action Totals	636	83.7	64.8	9.5	2.6	2.6
Build	Aircraft	568	90.7	60	10.0	2.3	2.3
	GSE	90.6	3.2	9.4	0.3	0.3	0.3
	APU	8.1	0.2	2.2	0.4	0.3	0.3
	Onsite Motor Vehicles	4.2	0.1	0.1	<0.1	<0.1	<0.1
	Offsite Motor Vehicles	8.2	0.3	0.2	<0.1	<0.1	<0.1
	Construction	11.2	1.1	10.1	<0.1	5.3	1.0
	Build Totals	690	95.6	82.2	10.7	8.3	3.9
	Difference	54.0	11.9	17.4	1.2	5.7	1.4
	De minimis threshold	100	50	50	n/a	n/a	n/a
	Less than De minimis?	Yes	Yes	Yes	n/a	n/a	n/a

Source: KB Environmental Sciences, Inc, 2008.

Differences = Build – No-Build/No-Action

The applicable *de minimis* levels are 50 tons/year for either NO_x or VOC and 100 tons/year for CO. Emissions below these levels are automatically assumed to comply with the State Implementation Plan (SIP).

n/a means not applicable to the General Conformity Rule.

Yes means the emissions are below the de minimis levels and the project emissions conform to the SIP.

VI. Conclusions

As discussed previously, the General Conformity provisions of the CAA require federal agencies to demonstrate that projects and actions approved, funded, and/or permitted under their authorization to conform to the applicable SIP. Under General Conformity, an applicability test is first applied to determine if a formal determination is necessary. If the project-related emissions are within prescribed *de minimis* levels, no further analysis is required. Project-related emissions are derived from the future-year emissions inventory results and are based on the differences (+/-) in total emissions between the No Action Alternative and the Build Alternative.

Because the area surrounding Hanscom Airport is currently designated as a maintenance CO area and a non-attainment area for O₃, the applicable *de minimis* level is 100 tpy (for CO) and 50 tpy (for NO_x and VOC). Therefore, if project-related emissions of CO and NO_x/VOC are less than 100 and 50 tpy, respectively, the General Conformity Rule does not apply.

As shown in **Tables 1 and 2**, the operational and construction-related emissions associated with the East Ramp Project are well within the *de minimis* levels. Therefore, these emissions conform to the SIP and no further analysis or conformity demonstration is required.

End of memo.

Appendix D

Federal- and State-listed Species Correspondence and Supplemental Information

5.0 EXISTING/AFFECTED ENVIRONMENT

5.4 BIOTIC COMMUNITIES

A variety of biotic communities typical to the region can be found on airport property and in adjoining areas. The developed portion of the airport is surrounded by wetland, forested upland, commercial, residential, and industrial development, as well as a network of roads. The airport contains five primary habitat types, each defined in the natural community guidelines established by the Massachusetts Natural Heritage and Endangered Species Program (NHESP), including: grassland, scrub/shrub wetland, forested wetland, wetland/upland mixed forest, and upland forest. Other important biotic communities, including vernal pools, are located on airport property and in its vicinity. Each of the primary biotic communities is described below, including their locations and typical biological and physical characteristics. Vegetation management areas identified in the 2002-2006 *Vegetation Management Plan* are shown in Figure 5-4.

Grassland: The airport is dominated by a community defined as “Cultural Grassland” according to NHESP guidelines. This managed community encompasses vegetated areas adjacent to runways and taxiways, as well as portions of the clear zones of the primary, approach, and transitional surfaces of each runway. The community is dominated by grasses, grass-like species, and some herbaceous plants. This vegetative community covers a substantial portion of the airfield in the Towns of Bedford, Concord, and Lincoln. This community is human created, maintained with mechanized turf mowing equipment, and frequently associated with airports. Portions of the grassland at Hanscom are considered habitat for two state-listed rare bird species, the upland sandpiper and the grasshopper sparrow, along with other, more common grassland bird species. Mowing in designated grassland management areas is timed to avoid nesting periods for the bird species, as recommended by the Massachusetts Audubon Society. Management includes scheduled periodic mowing of these areas to restrict the establishment of woody vegetation, and to maintain the height of the vegetation at or near the runway surface elevation. The areas outside of the grassland management areas are mowed regularly during the growing season, consistent with airport operational procedures.

5.5 THREATENED AND ENDANGERED SPECIES

This section describes the threatened and endangered species which have been identified on airport property. The Massachusetts *Endangered Species Act* (MESA) defines “Endangered” as any species of plant or animal in danger of extinction throughout all or a significant portion of its range and species of plants or animals in danger of extirpation as documented by biological research and inventory. A “Threatened” Species is any species of plant or animal likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range and any species declining or rare as determined by biological research and inventory and likely to become endangered in the foreseeable future. MESA also classifies “Species of Special Concern.” Species of Special Concern are any species of plant or animal that have been documented by biological research and inventory to have suffered a decline that could threaten the species if allowed to continue unchecked or that occurs in such small numbers or

with such a restricted distribution or specialized habitat requirements that it could easily become threatened in Massachusetts.

Portions of Hanscom Field are situated within an area identified as priority habitat for rare species according to the Massachusetts Natural Heritage and Endangered Species Program (NHESP). The priority habitat consists of the human-maintained turfgrass areas that support small breeding populations of two species of state-protected rare birds. Grasslands are a vegetative community gradually declining in the New England region, as a result of development, ecological succession, and the decline in farming. The extensive grass areas found at airports can supply habitat for rare grassland species. Based on the Massachusetts Natural Heritage Atlas (NHESP; 11th Edition; Valid July 1, 2003), approximately 6.33 acres of the project site is located within Priority Habitat 459.

The rare species observed at Hanscom Field, within areas of Priority Habitat as defined by the Massachusetts Natural Heritage Atlas, are the upland sandpiper (*Bartramia longicauda*), a state-endangered species, and the grasshopper sparrow (*Ammodramus savannarum*), a state-threatened species (see Figure 5-5). Neither rare species is included in the federal endangered species list for Massachusetts, maintained by the United States Fish and Wildlife Service. The presence of both bird species has been documented in several areas of managed grassland located between the runways and taxiways at Hanscom Field. The Massachusetts Audubon Society observed Hanscom Field from 1993 to 1998, documenting specific locations for nesting. Massport implemented a mowing schedule in 1996, following consultation with the Massachusetts Audubon Society, to avoid mowing in particular areas during critical portions of the nesting seasons of the upland sandpiper and the grasshopper sparrow. Massport has noted increased nesting success since implementation of grassland management techniques. Vegetation management techniques were assessed in the aforementioned 2002-2006 Vegetation Management Plan, prepared in 2002. Specific grassland management goals and objectives, and implementation recommendations were developed in a *Grassland Management Plan* developed by Massport in 2004 (see Figure 5-6).

The goal of the *Grassland Management Plan* is to provide safe aircraft operating conditions at Hanscom Field while protecting endangered and threatened grassland bird species. A set of grassland management techniques was developed with the specific goal of managing the airport's grasslands for the grasshopper sparrow and upland sandpiper, along with other declining grassland bird species. Grassland management is conducted in designated grassland management areas where it is compatible with airport operations and will not result in the attraction of wildlife species known to be aviation hazards. The management plan is designed to encourage nesting and brood-rearing in areas outside of established runway and taxiway safety areas. The mowing schedule was developed to maintain managed grassland areas at a height of 6 to 15 inches. Safety areas adjacent to the runways and taxiways are mowed throughout the growing season, which discourages nesting in these areas, thus confining nesting to areas that are away from aircraft movement areas. Mowing is not conducted in grassland management areas throughout the breeding season (May 1 to July 31). After the breeding season, the habitat areas are inspected for active nests, and mowing can resume when it is clear that all the birds have fledged.

One other formerly and one other currently NHESP-listed species have been observed in the vicinity of Hanscom Field. The eastern box turtle (*Terrapene carolina*) is listed as a species of special concern. The elderberry long-horned beetle (*Desmocerus palliatus*) is no longer listed as a rare species based on the July 2006 NHESP list of rare species¹. Neither the eastern box turtle nor the elderberry long-horned beetle are known to occur on airport property. Consultation with the NHESP conducted for the Draft 2000 L.G. Hanscom Field Environmental Status and Planning Report (ESPR) confirmed that these two species occupy habitat near, but not within, Hanscom Field.

Runway End 5 Project Site

The proposed safety area at Runway End 5 is not managed for grassland bird breeding habitat and is mowed frequently for airport operations and to discourage nesting. Grassland birds may utilize this area as foraging habitat, but alternative foraging areas are available throughout the airfield. Any birds identified here would be considered transient, and would not be a constraint on project implementation.

Runway End 23 Project Site

The proposed safety area at Runway End 23 is not managed for grassland bird breeding habitat and is mowed frequently for airport operations and to discourage nesting. Grassland birds may utilize this area as foraging habitat, but alternative foraging areas are available throughout the airfield. Any birds identified here would be considered transient, and would not be a constraint on project implementation.

¹ “2006 MESA List Changes”, <http://www.mass.gov/dfwele/dfw/nhESP/mesalistchang06.pdf>

MASSACHUSETTS NATURAL HERITAGE ATLAS

13TH EDITION

This Atlas contains maps displaying:

PRIORITY HABITATS OF RARE SPECIES

ESTIMATED HABITATS OF RARE WILDLIFE

CERTIFIED VERNAL POOLS

Effective October 1, 2008



Priority Habitats and Estimated Habitats - Effective October 1, 2008

Priority Habitats for use with the MA Endangered Species Act Regulations (321 CMR)
Estimated Habitats for use with the MA Wetlands Protection Act Regulations (310 CMR)

Produced by the Natural Heritage & Endangered Species Program

website: www.nhesp.org





Commonwealth of Massachusetts

Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, Director

11 October 2006

Robert Golledge, Secretary
Executive Office of Environmental Affairs
Attention: MEPA Office
William Gage, FOEA No.13594
100 Cambridge St, Suite 900
Boston, MA 02114

RECEIVED

OCT 13 2006

MEPA

Project Name: L.G. Hanscom Field Runway 5/23 Safety Improvement Project
Proponent: Massport
Location: Hanscom Field, Bedford, Concord, and Lincoln
Document Reviewed: Draft Environmental Assessment/Draft Environmental Impact Report
NHESP File Number: 06-19316

Dear Secretary Golledge:

The Natural Heritage & Endangered Species Program (NHESP) of the MA Division of Fisheries & Wildlife has reviewed the Draft Environmental Impact Report (DEIR) for the L.G. Hanscom Field Runway 5/23 Safety Improvement Project (dated July 2006), and would like to offer the following comments.

According to the Massachusetts Natural Heritage Atlas, 12th Edition (effective 10/1/06), the proposed work area is mapped as Priority Habitat of Rare Species (PH 1146). As noted in the DEIR, the site provides habitat for the Upland Sandpiper and Grasshopper Sparrow, two state-listed species. Pursuant to 321 CMR 10.18, this project must be reviewed by the NHESP for compliance with the Massachusetts Endangered Species Act (MESA). In order to initiate a MESA review, the project proponent should submit a MESA Filing Checklist, required filing information, and fee to the NHESP (see www.nhesp.org "Regulatory Review" tab for additional information). Based on a preliminary review of the information in our database and the information provided by the project proponent, it appears that impacts to state-listed species associated with the Safety Area Improvements project could be avoided if the work were to be conducted outside of the Grasshopper Sparrow and Upland Sandpiper breeding season.

The NHESP is concerned that the Grassland Management Program depicted in Figure 5-6 of the DEIR could result in a "take" of state-listed bird species. We request that the project proponent contact Jon Regosin, Ph.D. of our office to discuss endangered species concerns associated with grassland management and mowing at Hanscom Field (508-792-7270, ext. 316). We appreciate the opportunity to comment on this project.

Sincerely,

Thomas W. French, Ph.D.
Assistant Director

www.masswildlife.org

Division of Fisheries and Wildlife
Field Headquarters, One Rabbit Hill Road, Westborough, MA 01581 (508) 792-7270 Fax (508) 792-7275
An Agency of the Department of Fisheries, Wildlife & Environmental Law Enforcement

Bedford Conservation Commission
Bedford Planning Board
Bedford Board of Selectmen
Concord Conservation Commission
Concord Planning Board
Concord Board of Selectmen
Lincoln Conservation Commission
Lincoln Planning Board
Lincoln Board of Selectmen
DEP Northeast Regional Office



Commonwealth of Massachusetts

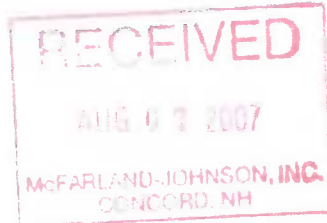
Division of Fisheries & Wildlife

MassWildlife

Wayne F. MacCallum, *Director*

August 1, 2007

Bedford Conservation Commission
Town Hall
10 Mudge Way
Bedford, MA 01730



RE: Applicant: Thomas Ennis, Massachusetts Port Authority
 Project Location: Hanscom Field, Runway 5/23
 Project Description: Increase Runway End Safety Areas to comply with FAA
 standards, alteration of BVW

 DEP Wetlands File No. 103-0635
 NHESP Tracking No. 07-22599

To Whom It May Concern:

The applicant listed above has submitted a Notice of Intent with site plans (dated May 2007) to the Natural Heritage & Endangered Species Program (NHESP) of the Massachusetts Division of Fisheries & Wildlife, in compliance with the rare wildlife species section of the Massachusetts Wetlands Protection Act Regulations (310 CMR 10.59). The NHESP also received the MESA Review Checklist and supporting documentation for review pursuant to the MA Endangered Species Act Regulations (321 CMR 10.18).

WETLANDS PROTECTION ACT (WPA)

Based on a review of the information that was provided and the information that is currently contained in our database, the NHESP has determined that this project, as currently proposed, will **not** adversely affect the actual Resource Area Habitat of state-protected rare wildlife species. Therefore, it is our opinion that this project meets the state-listed species performance standard for the issuance of an Order of Conditions.

Please note that this determination addresses only the matter of rare wildlife habitat and does not pertain to other wildlife habitat issues that may be pertinent to the proposed project.

MASSACHUSETTS ENDANGERED SPECIES ACT (MESA)

Based on a review of the information that was provided and the information that is currently contained in our database, the NHESP has determined that this project, as currently proposed, will **not** result in a prohibited "take" of state-listed rare species, **provided the work, including all re-seeding, is completed during 1 September - 15 April**. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the NHESP pursuant to the MESA. This project may be subject to further review if no physical work is commenced within three-years from the date of issuance of this determination, or if there is a change to the project.

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Amy Coman, Endangered Species Review Assistant, at (508) 389-6364.

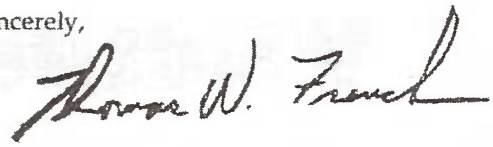
www.masswildlife.org

Division of Fisheries and Wildlife

Field Headquarters, North Drive, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7891

An Agency of the Department of Fish and Game

Sincerely,

A handwritten signature in black ink that reads "Thomas W. French". The signature is written in a cursive style with a large, sweeping initial 'T'.

Thomas W. French, Ph.D.
Assistant Director

cc: Thomas Ennis, Massachusetts Port Authority
Jed Merrow, McFarland-Johnson, Inc
DEP Northeast Region, Wetlands Section

Appendix E

Potential Vernal Pool Photos

LG Hanscom Field - Environmental Assessment
Site Safety and Efficiency Improvements Project
Potential Vernal Pool Photos



Wetland 2, wood frog egg masses



Wetland 2, lack of outlet

LG Hanscom Field - Environmental Assessment
Site Safety and Efficiency Improvements Project
Potential Vernal Pool Photos



Wetland 3, wood frog egg masses



Wetland 3, lack of outlet

Appendix F

Correspondence from Massachusetts Historical Commission

Appendix G

Correspondence with Indian Nations