TURNERS FALLS MUNICIPAL AIRPORT

AIRPORT MASTER PLAN UPDATE

AIP No. 3-25-0032-19-2017

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CHAPTER 1 – INTRODUCTION

This chapter provides a brief overview of the history of Turners Falls Municipal Airport (0B5 or the Airport), the objectives of the plan, and the master planning process.

1.1 TURNERS FALLS MUNICIPAL AIRPORT

0B5 is a publicly-owned, public-use general aviation airport located at 10 Aviation Way in the Village of Turners Falls, Montague, Franklin County, Massachusetts. The Airport has one runway, designated Runway 16-34. Turners Falls is the largest of five villages in the Town of Montague and comprises the entire northeastern portion of the Town. Turners Falls is located less than 10 miles from the Vermont border and approximately 90 miles west of Boston, Massachusetts and can be easily accessed via Route I-91 from the north or south and Route 2 from the east or west.

Figure 1-1 Aerial of Turners Falls Municipal Airport

The Airport is situated south of the Connecticut River, and is immediately bounded to the north and west by Industrial Boulevard, to the south by Millers Falls Road, and to the east by West Mineral Road. Aviation Way provides access to most of the Airport's facilities. 0B5 is located within the Town's industrial zone, with surrounding areas consisting of the following designations:

- Agricultural- Forest 4
- Residential

1.2 GOVERNANCE

The Turners Falls Municipal Airport (0B5) is a public-use airport owned by the Town of Montague, located in northwestern Massachusetts. 0B5 is represented by a 5-member Commission appointed by the Montague Board of Selectmen. Day to day operations at the Airport are overseen by a part-time Airport Manager, Mr. Bryan Camden. The members of the Commission are:

Montague Airport Commission Members

Peter Golrick	Chairman
Brian Carroll	Vice-Chair
Gary Collins	Treasurer
David Brule	Commissioner
Keith LaRiviere	Commissioner

1.3 MISSION STATEMENT

0B5 is recognized as an integral component of the transportation infrastructure of the Northern Tier of Massachusetts. The mission of the Montague Airport Commission is to support and promote the use of the Airport to aviation and non-aviation users as a multi-modal transportation portal, an evacuation point for emergency medical services, a corporate and general aviation facility, an access for tourism, and an educational resource in support of the region's corporate and industrial base while increasing the Airport's self-sufficiency, maximizing safety for Airport users and neighbors, and minimizing adverse environmental impacts.

1.4 AERONAUTICAL ROLE

0B5 is identified in the 2010 Massachusetts Statewide Airport System Plan as one of 37 public-use airports in Massachusetts that is considered an "essential component of the Commonwealth of Massachusetts' intermodal transportation system." According to the Airport System Plan, 0B5 is categorized as a "community/business airport", meaning that it supports GA activities such as business, emergency, recreational, and personal flying, and can accommodate smaller GA aircraft including some multi-engine, but mostly single-engine aircraft. The airport provides significant economic benefit to the local, state, and regional economies through flight activities including aviation fuel sales, tenant leases, business opportunities/jobs, and visitor expenditures in the area.

1.4.1 MA AIRPORT ECONOMIC IMPACT STUDY

Massachusetts general aviation (GA) airports, including 0B5, support thousands of local jobs and generate millions of dollars in state tax revenue. According to the Massachusetts Statewide Airport Economic Impact Study Update produced by the Massachusetts Department of Transportation/Aeronautics Division (MassDOT/AD) in 2017, GA airports accounted for $516,068,000 in total output[1], of which 0B5 accounted for $1,801,000. The estimated economic contribution by 0B5 is highlighted in Table 1-1 below.

Table 1-1: Estimated Economic Contribution of 0B5[2]

	Total Employment	*Total Payroll*	*Total Output*
0B5	14	$498,000	$1,801,000

Source: Massachusetts Statewide Airport Economic Impact Study Update

1.4.2 NATIONAL PLAN OF INTEGRATED AIRPORT SYSTEMS

0B5 is included in the National Plan of Integrated Airport Systems (NPIAS). The Airport is one of nearly 3,400 existing and proposed civilian-use airports in the U.S. that the FAA considers significant to the national air transportation system, and thus eligible to receive Federal grants under the FAA's Airport

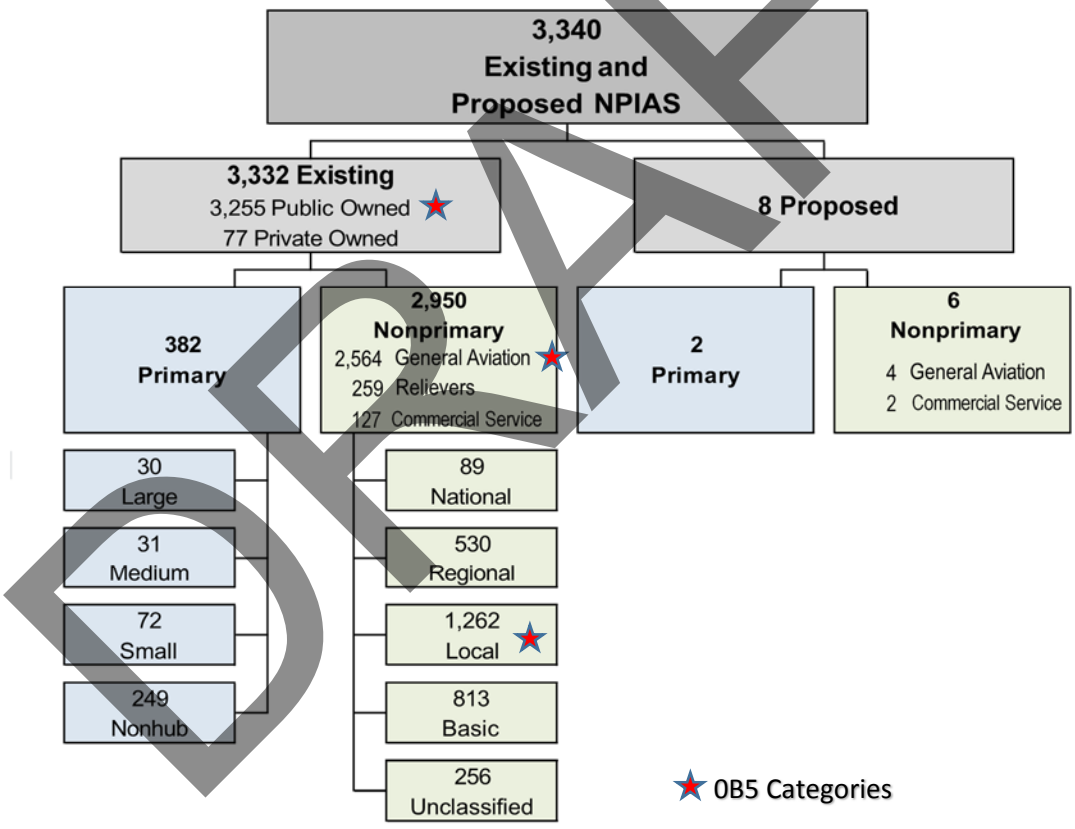
[1] Total impacts include all on-airport business, construction, visitor, and multiplier impacts.

[2] Massachusetts Statewide Airport Economic Impact Study Update 2017

Improvement Program (AIP). Within the NPIAS, airports are grouped into two major categories: primary and nonprimary as shown in Figure 1-2. 0B5 is further categorized as a General Aviation airport, which the NPIAS defines as "a public airport that does not have scheduled service or has scheduled service with [fewer] than 2,500 passenger boarding's each year." Within the NPIAS, 0B5 is further categorized as a *Local* airport. To be categorized as *Local,* an airport must demonstrate that it "supplements local communities by providing access to markets within a State or immediate region. Local airports are most often located near large population centers, but not necessarily in metropolitan or micropolitan areas. Most of the flying at local airports is by piston aircraft in support of business and personal needs. These airports typically accommodate flight training, emergency services, and charter passenger service." In addition, the airport must meet one of the following minimum criteria for annual activity:

- Public owned and 10 or more instrument operations and 15 or more based aircraft.
- Public owned and 2,500 or more annual enplanements.

Figure 2-2: NPIAS Categories of U.S. Civilian Airports



1.5 HISTORY OF PAST PROJECTS

As a NPIAS airport, 0B5 is eligible to receive Airport Improvement Program (AIP) grant funding for the planning and development of the airport. Table 1-2 provides a history of federally funded projects at 0B5 dating back to 1986.

Table 1-2: History of Federally Funded Capital Projects

FAA Grant Number	Description of Work	Total FAA Share Cost
001-1986	Extend Taxiway	$304,990.00
002-1987	Construct Taxiway	$285,491.00
003-1987	Conduct Airport Master Plan Study	$50,285.00
004-1998	Conduct Airport Master Plan Study	$31,210.00
005-1999	Install Perimeter Fencing	$153,155.00
006-2000	Acquire Land for Approaches- RELOC PY; Acquire Land for Approaches	$272,483.00
007-2001	Conduct Airport Master Plan Study	$147,428.00
008-2003	Install Perimeter Fencing; Rehabilitate Apron	$564,897.00
009-2004	Rehabilitate Runway 16-34	$179,327.00
010-2005	Extend Runway 16-34	$237,428.00
011-2007	Rehabilitate Runway (EA/permits) 16-34	$436,719.00
013-2008	Conduct Environmental Study	$151,175.00
014-2009	Rehabilitate Runway 16-34	$4,811,350.00
015-2011	Conduct Environmental Study (Tribal Investigation- Koch Property)	$148,746.72
016-2012	Conduct Environmental Study (Archaeological Investigation)	$82,665.00
017-2014	Construct Taxiway (Parallel - 34); Install Miscellaneous NAVAIDS (Airport Beacon)	$1,080,400.31
018-2015	Rehabilitate Taxiway (approx. 2,400’ x 35’; PCI 21)	$2,286,000.00
019-2017	Update Airport Master Plan Study	$202,500.00
	TOTAL:	**$11,426,250.03**

Source: FAA

1.6 MASTER PLANNING HISTORY AT TURNERS FALLS MUNICIPAL AIRPORT

In 1999, the Airport completed a *Master Plan Update Draft Technical Report* with the purpose of reevaluating key recommendations of the existing Master Plan that was completed in 1990. As a result of the 1999 Update, the Massachusetts Aeronautics Commission (now MassDOT/AD), FAA, Technical Advisory Committee, and the Airport Commission agreed that the planning process would proceed with "Option III.B" as the preferred alternative. "Option III.B" provided for the full 1,200' extension to Runway 16-34.

In 2003, the Airport completed an AMPU study titled "*Runway and Terminal Area Study and Airport Layout Plan Update"* as a follow-up to the 1999 *Master Plan Update Draft Technical Report*. The scope of the project was limited to expanding upon the recommendations of the 1999 *Master Plan Update Draft Technical Report.* Among other things, the preferred alternative from the 2003 *Runway and Terminal Area Study and Airport Layout Plan Update* included extending the Runway 16 end by 200', and the Runway 34 end by 1,000' for a total runway extension of 1,200' as previously recommended in the 1999 *Master Plan Update Draft Technical Report.*

The purpose of this current Airport Master Plan Update (AMPU) is to provide the Airport with its first comprehensive update in nearly 15 years. The objectives of this AMPU are to document future terminal and aviation needs; identify areas for terminal area expansion, possible locations for future fuel facilities, revenue producing opportunities, and land suitable for non-aviation use; and define the Airport's aviation and infrastructure needs in the short (0-5 years), medium (6-10 years), and long term (11-20 years).

1.6.1 AIRPORT MASTER PLAN UPDATE FUNDING

The FAA, MassDOT/AD and the Town of Montague (the Client Group) are contributing to the financing of this AMPU. 0B5 is eligible to receive Federal funding assistance for this project pursuant to the AIP program. AIP funding is provided through a Federal aviation trust fund, funded through "user fees" paid by passengers on commercial flights, aviation fuel tax, cargo fees, and over-flight fees. This project is receiving 90 percent of total project funding through the AIP program. MassDOT/AD is providing an additional 5 percent of total project costs, and the Town of Montague is financing the remaining 5 percent of total project costs.

1.7 PLANNING PROCESS

Guidance for the AMPU planning process comes from the FAA Advisory Circular (AC) 150/5070-6B, *Airport Master Plans*, and other relevant FAA ACs, Orders, and Federal Aviation Regulations (FARs), as applicable. This AMPU planning process considers the needs and demands of airport tenants, users, and the general public. This AMPU planning process provides opportunities for airport users, political entities, and the public to participate in the development of the Airport's aviation plans and goals. These opportunities have been built into the process through public meetings, Client Group meetings, and Airport Commission meetings.

This AMPU process will be broken down into phase at logical decision points:

- Initial data collection and aviation activity forecasts will make up the foundation from which all other decisions in this project are made;
- Aviation facility needs analysis and alternative development options will be identified for each of the three planning periods (short, intermediate, and long term); and
- Environmental, financial, and graphical depictions of the recommended airport development will complete the process.

1.8 HOW TO READ THIS REPORT

This report was written and organized so that information is presented in a logical, readable format with minimal duplication of information. The graphics contained in the report are to be found as follows:

Tables- all tables are located in the Chapters and sections to which they apply. At times, cross-references to tables are necessary, but these have been kept to a minimum. The tables are identified in numerical sequence starting with the Chapter number so that the third table in Chapter 3 is identified as Table 3-3, etc.

Figures- all figures are found in the Chapters and report sections to which they apply and are numbered sequentially starting with the Chapter number so that the second figure in Chapter 6 is identified as Figure 6-2, etc.

Sheets- sheets are Airport Layout Plan (ALP) sheets in their various stages of development. All sheets are located at the end of the report, before the appendices. Sheets will be developed in stages as the plan is developed, therefore not all plan sheets may be contained in the report until the full draft report has been prepared for final review by the Airport Commission, FAA, and MassDOT/AD. Below is a listing of ALP plan sheets as required by the Airport Commission, FAA, and MassDOT/AD that will become part of the final Master Plan Report:

Sheet 1- Title Sheet
Sheet 2- Airport Data Sheet
Sheet 3- Airport Layout Plan
Sheet 4- Terminal Area Plan
Sheet 5- Airport Airspace
Sheet 6- Runway Departure Surface
Sheet 7- Inner Portion of the Approach Surface
Sheet 8 - Existing Utilities Plan (Runway 16 End)
Sheet 9 - Existing Utilities Plan (Runway 34 End)

CHAPTER 2 – INVENTORY OF EXISTING FACILITIES

Documenting and assessing the existing inventory of Airport facilities provides a comprehensive foundation from which facility requirements and improvement recommendations can be made. An on-site inventory of Airport facilities was conducted to supplement information previously obtained through a review of Airport drawings, previous reports, and interviews with airport management and the Commission. See Figure 2-1 for a depiction of existing facilities.

2.1 GEOMETRY AND DESIGN STANDARDS

FAA AC 150/5300-13A provides design standards and recommendations for the geometric layout and engineering design for runways and runway-associated environments such as Runway Safety Areas (RSAs), Obstacle Free Zones (OFZs), Object Free Areas (OFAs), clearways, and stopways, among other elements.

2.1.1 DESIGN AIRCRAFT/DESIGN GROUP

In order to establish an airport's design group, it is important to first determine an airport's design aircraft (also referred to as the critical aircraft). A design aircraft, as defined by FAA AC 150/5000-13-A, is *"an aircraft with characteristics that determine the application of airport design standards. This aircraft can be a specific aircraft model or a composite of several aircraft using, expected, or intended to use the airport or part of the airport."*

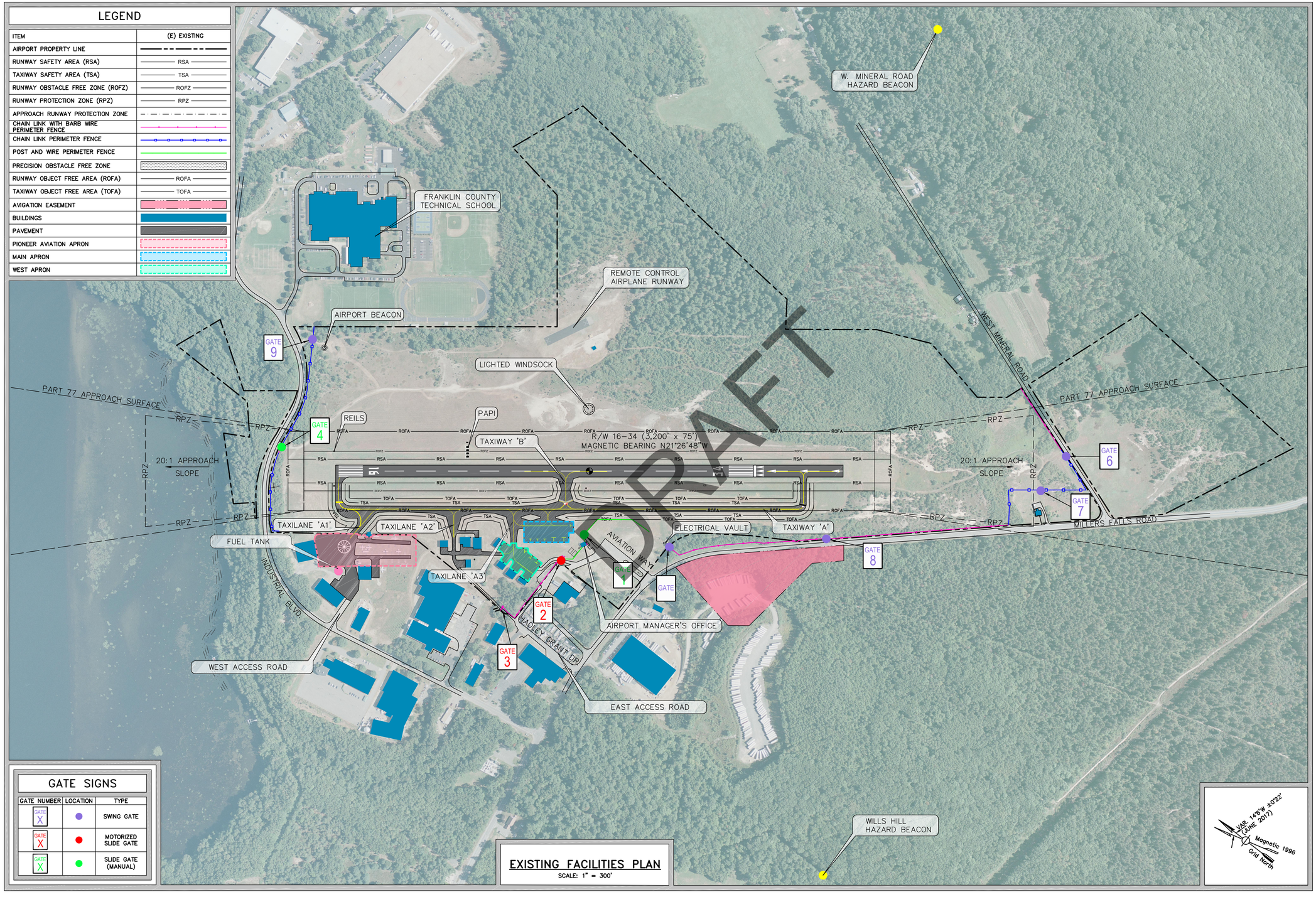
Figure 2-2 King Air 200, Source: *Flightstar Corporation*

0B5's 2003 *Runway and Terminal Area Study and ALP Update* identifies the Airport's critical (design) aircraft to be the King Air B-200 airplane. The King Air B-200 is a twin engine, turboprop business aircraft manufactured by the Beechcraft Corporation. The airplane seats up to ten passengers and has a maximum certificated takeoff weight of 12,500 pounds, wingspan of 54.5 feet, tail height of 15 feet, and an approach speed of 98 knots.

To determine 0B5's Aircraft Approach Category (AAC), the design aircraft's approach speed is examined. An aircraft approach category is a grouping differentiating aircraft based on the speed at which the aircraft approaches a runway for a landing. At 98 knots, the King Air B-200 falls under Approach Category B. Next, the Airplane Design Group (ADG) is determined by considering the King Air B-200's tail height of 15 feet and wingspan of 54.5 feet. Since the aircraft's dimensions fall in different groups, (ADG-I for tail height, and ADG-II for wingspan), the more demanding group (ADG-II) is used. The ADG for 0B5 was upgraded

LEGEND

ITEM	(E) EXISTING
AIRPORT PROPERTY LINE	
RUNWAY SAFETY AREA (RSA)	RSA
TAXIWAY SAFETY AREA (TSA)	TSA
RUNWAY OBSTACLE FREE ZONE (ROFZ)	ROFZ
RUNWAY PROTECTION ZONE (RPZ)	RPZ
APPROACH RUNWAY PROTECTION ZONE	
CHAIN LINK WITH BARB WIRE PERIMETER FENCE	
CHAIN LINK PERIMETER FENCE	
POST AND WIRE PERIMETER FENCE	
PRECISION OBSTACLE FREE ZONE	
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
AVIGATION EASEMENT	
BUILDINGS	
PAVEMENT	
PIONEER AVIATION APRON	
MAIN APRON	
WEST APRON	



GATE SIGNS

GATE NUMBER	LOCATION	TYPE
GATE X	●	SWING GATE
GATE X	●	MOTORIZED SLIDE GATE
GATE X	●	SLIDE GATE (MANUAL)

EXISTING FACILITIES PLAN
SCALE: 1" = 300'

GALE
Gale Associates, Inc.
Engineers - Planners
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Boston Baltimore Orlando

ALP SET

PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	
DRAWN BY	
CHECKED BY	
DATE	JULY, 2018

GRAPHIC SCALE
0 150 300 600
1"=300'

SHEET TITLE
EXISTING FACILITES PLAN

SHEET NO.
FIG.2-1

from ADG-I in the 1990 Master Plan to ADG-II in 1999 Master Plan Update, and subsequently confirmed in the 2003 *Runway and Terminal Area Study and ALP Update.*

As a result, 0B5 is categorized as a B-II facility. For detailed requirements of Aircraft Approach Categories and Airplane Design Groups, see Tables 2-1 and 2-2, below.

Table 2-1 Aircraft Approach Category

Aircraft Approach Category	*Approach Speed*
A	Speed less than 91 knots
B	**Speed 91 knots or more but less than 121 knots**
C	Speed 121 knots or more but less than 141 knots
D	Speed 141 knots or more but less than 166 knots
E	Speed 166 knots or more

***Bold= 0B5's Aircraft Approach Category**

Table 2-2 Airplane Design Group

Airplane Design Group	*Tail Height [ft. (m)]*	*Wingspan [ft. (m)]*
I	**< 20' (<6 m)**	<49' (<15m)
II	20' - < 30' (6m- <9m)	**49'- <79' (15m- <24m)**
III	30' - < 45' (9m- <13.5m)	79'- <118' (24m- <36m)
IV	45'- <60' (13.5m- <18.5m)	118'- 171' (36m- <52m)
V	60'- <66' (18.5m- <20m)	171'- <214' (52m- <65m)
VI	66'- <80' (20m- <24.5m)	214'- <262' (65m- <80m)

***Bold= 0B5's Airport Design Group**

2.2 INVENTORY OF AIRSIDE FACILITIES

Airside facilities include all areas of the Airport that are accessible to aircraft. At 0B5, this consists of the following:

- Runway
- Taxiway
- Taxilanes
- Hangars
- Aprons

2.2.1 RUNWAY

The Airport operates using a single runway, 16-34, which is 3,200 feet long and 75 feet wide and was last rehabilitated in 2009. Runway 16-34 is marked as a non-precision runway. Runway length requirements are determined based on FAA Advisory Circular 150/5325-4B, *Runway Length Requirements for Airport Design*. The Airport's 1999 Master Plan Update identified the Beech King Air B-200 as representative of the most demanding aircraft regularly using the Airport; therefore, it was selected as the Airport's "Design Airplane". The Beech King Air B-200 was further evaluated and validated as the "Design Airplane" in the 2003 *Runway and Terminal Area Study and Airport Layout Plan Update.*

Figure 2-3 Runway 16-34

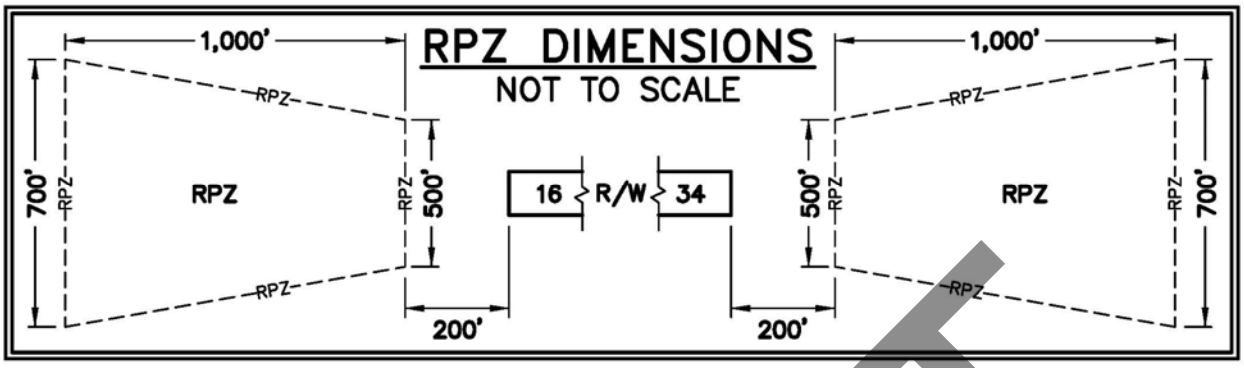
2.2.2 SAFETY AREAS

A Runway Safety Area (RSA) is a defined surface centered on the runway center line surrounding the runway prepared or suitable under dry conditions for reducing the risk of damage to airplanes or injury to persons in the event of an undershoot, overshoot, or excursion from the runway. In accordance with FAA AC 150/5300-13A, 0B5's RSA is 150 feet in width, running along the entire length of the runway and extending 300 feet in length beyond each runway end (see Figure 2-1).

2.2.3 RUNWAY PROTECTION ZONE

A Runway Protection Zone (RPZ) is a trapezoidal area located at the end of a runway designed to enhance the protection of people and property on the ground in the event an aircraft lands or overshoots the runway end. Where practical, airport owners should own the property under the runway approach and departure areas to at least the limits of the RPZ. While 0B5 does not own all of the property under the RPZ, where opportunities have presented themselves, land and avigation easements have been obtained. The dimensions of the RPZ at 0B5 is shown below on Figure 2-4.

Figure 2-4 Runway Protection Zone Dimensions



2.2.4 OBJECT FREE AREAS

The Runway Object Free Area (ROFA) is an area centered on the runway centerline. ROFA clearing standards require clearing the ROFA of objects protruding above the nearest point of the runway centerline, except where fixed by function. It is acceptable to place objects that are necessary to be located in the ROFA for air navigation or aircraft ground maneuvering purposes and to taxi and hold aircraft in the ROFA. In accordance with AC 150/5300-13A, 0B5's ROFA is 500 feet in width and 300 feet in length beyond each end of the runway.

2.2.5 TAXIWAY/TAXILANE DESIGN

0B5 has a system of taxiways and taxilanes providing access to aircraft movement areas. According to AC 150/5300-13A, a taxiway is *"a defined path established for the taxiing of aircraft from one part of an airport to another,"* and a taxilane is *"a taxiway designed for low speed and precise taxiing. Taxilanes are usually, but not always, located outside the movement area (usually an apron taxiway) to aircraft parking positions and other terminal areas."* The following is a listing of all taxiways and taxilanes at 0B5:

Figure 2-5 TW 'A' looking toward RW 34

Taxiway 'A'- is a full-length parallel taxiway serving Runway 16-34. Taxiway 'A' is a minimum of 35 feet wide and approximately 3,299 feet in length.

Taxiway 'B'- is a stub taxiway located between Runway 16-34 and Taxiway 'A'. It is located approximately midfield and provides access to the main apron. Taxiway 'B' is a minimum of 53.76 feet wide, and 185 feet in length.

Taxilane 'A1'- is located off of Taxiway 'A' at the Runway 16 end. Taxilane 'A1' provides access to Pioneer Aviation (the Airport's FBO), and the Airport's fuel facility. Taxilane 'A1' is a minimum of approximately 40 feet in width, and approximately 206 feet in length.

Taxilane 'A2'- is located off of Taxiway 'A' approximately 512 feet southeast of Taxilane 'A1'. Taxilane 'A2' provides access to a series of privately-owned hangars.

Taxilane 'A3'- is located off of Taxiway 'A' approximately 378 feet southeast of Taxilane 'A2'. Taxilane 'A3' provides access to the Main Apron, a series of privately owned hangars, and the West Ramp Transient Apron.

Each of the taxiways and taxilanes are illustrated on Figure 2-1.

2.2.6 APRONS AND TIE-DOWN AREAS

The function of aircraft aprons is to provide outdoor areas for based and transient aircraft parking, as well as aircraft fueling operations. 0B5 has two aprons. The Main Apron is located adjacent to the terminal building and has capacity for 6 aircraft (see Figure 2-1). The West Apron is located at the end of Taxilane 'A3' and serves as the Airport's transient apron. It has capacity for 3 aircraft (see Figure 2-1).

2.2.7 HANGARS

Aircraft hangars are buildings designated to store aircraft, often with office, workshop, and lounge space. There are 8 private hangars on the airport, and one small structure for use by the Radio Controlled flying club. All hangar buildings on Airport property are in good condition. Additionally, there are 2 large hangars located on Pioneer Aviation property, which are in poor condition.

2.3 NAVIGATIONAL/VISUAL/COMMUNICATION AIDS

FAA AC 150/5340-30J provides guidance and specifications for the design and installation of airport visual aids. The use of this AC is mandatory for all projects relating to the design and installation of airport visual aids funded by federal grants through the Airport Improvement Program (AIP). Navigational aids provide assistance to pilots by providing navigational, visual, and communication guidance to locate the Airport in support of safe operations in the airport environment.

2.3.1 RUNWAY LIGHTS

Runway 16-34 is equipped with medium intensity runway lights (MIRLS), which are pilot-activated. The MIRLS system is owned and operated by the Airport (see Figure 2-1).

2.3.2 RUNWAY END IDENTIFIER LIGHTS

Runway End Identifier Lights (REILS) provide rapid positive identification of the approach end of a particular runway. The system consists of a pair of synchronized flashing lights located laterally on each side of the runway threshold. REILS are located at the Runway 16 end at the runway threshold. The Runway 34 end is not equipped with RIELS (see Figure 2-1).

2.3.3 TAXIWAY LIGHTS

As part of the Taxiway 'A' reconstruction project in 2016, edge lights along Taxiway 'B' were relocated due to new geometry, and additional edge lights were added, completely lighting Taxiway 'B'. Taxiway 'A' remains mostly unlit, except for lighting that was added at the intersections where Taxiway 'A' meets the Runway 16 end and the Runway 34 end.

2.3.4 PRECISION APPROACH PATH INDICATOR

A precision approach path indicator (PAPI) is a lighting system located near a runway end that consists of light boxes that provide a visual indication of an aircraft's position on the glidepath for the runway. 0B5 has a 4-light PAPI (3.0-degree approach angle) on the Runway 16 end, which is owned and maintained by the Airport (see Figure 2-1).

2.3.5 THRESHOLD LIGHTS

Threshold lights emit green light outward from the runway and emit red light toward the runway to mark the ends of the runway. The green lights indicate the landing threshold to arriving aircraft and the red lights indicate the end of the runway for departing aircraft. The red and green lights are usually combined into one fixture, and special lenses or filters are used to emit the desired light in the appropriate direction. Runway 16-34 is equipped with Threshold Lights. In the case of Runway 34, where there is a displaced threshold, the threshold lights are located outboard from the runway at the displaced threshold.

2.3.6 AIRPORT BEACON AND HAZARD BEACONS

A rotating beacon is used to indicate to pilots the location of the airport by omitting two beams of light that are 180 degrees apart, alternating between white and green. According to the 2003 *Runway and Terminal Area Study and ALP Update*, the Airport's rotating beacon was in very poor condition and was located in an area encumbered by obstructions, and therefore it was not optimally useful. In 2014, the Airport constructed a new rotating beacon, including associated electrical modifications, in the northwest portion of the airport property, on the Runway 16 end adjacent to Industrial Drive. The project also included the rehabilitation of two (2) hazard beacons, one located on Wills Hill and the other located on Mineral Road (see Figure 2-1).

2.3.7 LIGHTED WINDSOCK

0B5 has a lighted windsock located at midfield, which is used to provide pilots with guidance on selecting the preferred runway for takeoff and landing based upon real-time wind conditions.

2.3.8 INSTRUMENT APPROACHES

Table 2-3 presents a summary of the various instrument approach procedures available by runway at the Airport.

Table 2-3: Instrument Approach Procedures

Runway	Approach Category*	Minimums by Aircraft Category**			
		A	B	C	D
16-34	Circling GPS	1480-1 1/4	1480-1 1/2	1480-3	NA
16-34	Circling VOR-A	1660-1 1/4	1660-1 1/2	1660-3	NA
		Orange Altimeter Setting Minimums			
16-34	Circling VOR-A	1720-1 1/4	1720-1 1/2	1720-3	NA

**Terminal Instrument Procedures (TERPS), Aircraft Categories (ceiling in feet, visibility in nautical miles):*
Category A- Speed less than 91 knots; weight less than 30,001 pounds.
Category B- Speed 91 knots or more but less than 121 knots, weight 30,001 pounds or more but less than 60,001.
Category C- Speed 121 knots or more but less than 141 knots; weight 60,001 pounds or more but less than 150,001.
Category D- Speed 141 knots or more but less than 166 knots; weight 150,001 pounds or more.

*** Minimums given by either (ceiling in feet- visibility in miles) or ceiling height/Runway Visibility Range)*
Source: U.S. Terminal Procedures- NE-1, 20 July 2017 to 17 August 2017

2.4 INVENTORY OF PAVEMENT MARKINGS

2.4.1 RUNWAY MARKINGS

FAA AC 150/5340-1L provides standards for surface markings used on paved airfield pavements (runways, taxiways, aprons) and paved airfield roadways. Table 2-4 provides an inventory of Runway markings at 0B5

Table 2-4: Inventory of Runway Markings

Runway 16	*Runway 34*
Threshold Markings	*Threshold Markings*
Runway End Designation Markings	*Runway End Designation Markings*
Runway Center Line	*Runway Center Line*
	Runway End Threshold Bar
	Runway 34 Arrowheads and Arrows (Displaced Threshold Markings)

Note: All runway markings are striated.

2.4.2 TAXIWAY/TAXILANE MARKINGS

Table 2-5 provides an inventory of the taxiway markings at 0B5.

Table 2-5: Inventory of Taxiway and Taxilane Markings at 0B5

Taxiway	*Marking*
'A'	Taxiway 'A' Runway 16 Hold Position Markings
	Taxiway 'A' Runway 34 Hold Position Markings
	Taxiway 'A' Enhanced Centerline Markings (Runway 16 end)
	Taxiway 'A' Enhanced Centerline Markings (Runway 34 end)
	Taxiway 'A' Centerline Markings
	Taxiway 'A' Runway 16 Surface Painted Sign
	Taxiway 'A' Runway 16-34 Surface Painted Sign
	Taxiway 'B' Runway Hold Position Marking
	Taxiway 'B' Enhanced Centerline Markings
	Taxiway 'B' Runway 16-34 Surface Painted Signs (2)
	Taxilane 'A1' Centerline Markings
	Taxilane 'A2' Centerline Markings
	Taxilane 'A3' Centerline Markings

Note: No taxiway markings are striated.

2.4.3 GUIDANCE SIGNS

Table 2-6 provides an inventory of the guidance signs at 0B5.

Table 2-6: Inventory of Guidance Signs

Sign Tag #	*Location*	*Description*
1	T/W 'A'	R/W 16 and TW 'A' position sign
2	T/W 'B'	R/W 16-34 and TW 'B' position sign
3	T/W 'B'	R/W 16-34 and TW 'B' position sign
4	T/W 'A'	R/W 34 and TW 'A' position sign

2.5 INVENTORY AND DESCRIPTION OF LANDSIDE FACILITIES

Landside facilities include all areas of the airport not required for movement of aircraft. At 0B5, this includes:

2.5.1 AIRPORT TERMNAL BUILDING

The Airport's terminal building, located south of the Main Apron, was constructed in 1998. It contains a meeting space, restroom, a manager's office, and utility space and is approximately 1,000 square feet in area.

Figure 2-6 Terminal Building

2.5.2 AUTOMOBILE PARKING

The paved parking lot for automobiles at the airport is located at the end of the driveway on Aviation Way and can accommodate approximately 25 vehicles. There are two additional parking spaces located adjacent to the terminal building.

2.5.3 MAJOR UTILITIES

2.5.3.1 Water

Water for the Village of Turners Falls is provided from both a well and Pleasant Lake by the Turners Falls Water Department. A 12-inch cast iron main that runs along Millers Falls Road supplies the Airport with its water, and a similar 12-inch line that runs along Industrial Boulevard provides Pioneer Aviation with its water.

2.5.3.2 Electric

Electric services at the Airport are provided by The Northwest Utilities/Western Mass. Electric Company. The Airport does not have a backup generator.

2.5.3.3 Gas

Gas service is provided to the airport from Berkshire Gas. The gas line is underground and enters the Airport on Millers Falls Road.

2.6 INVENTORY AND DESCRIPTION OF MISCELLANEOUS FACILITIES, SUPPORT EQUIPMENT, AND MAINTENANCE OPERATIONS

2.6.1 EQUIPMENT

2.6.1.1 Snow Removal Equipment

The Airport does not own any snow removal equipment and relies on local contractors and Town assistance for snow removal.

2.6.1.2 Mowing Equipment

The Airport's mowing equipment consists of a John Deere 5425 tractor with a flex-wing mower attachment, and a John Deere 997 Diesel zero-turn mower. All mowing equipment is approximately 10 years old and in good condition. Mowing is completed by the part-time Airport Manager, along with occasional volunteer assistance from local community members.

2.6.2 SECURITY FENCING

The Airport has approximately 3,700 feet of 8-foot high fencing with 2 feet of barbed wire. The majority of fencing is along Millers Falls Road (2,172 feet) and Hadley Grant Road (1,047 feet). There are also 464 feet of fencing along West Mineral Road. The Franklin County Technical School owns a 6-foot high fence that separates the school from Airport property.

The Airport has received an Airport Safety and Maintenance Program (ASMP) grant through the Massachusetts Department of Transportation Aeronautics Division (MassDOT/AD) to install approximately 1,400 LF of additional perimeter fencing adjacent to Industrial Boulevard at the northern end of the Airport. The fence will be eight foot (8') high galvanized chain-link fence. Fence installation includes connection to both ends of one (1) existing slide gate, and installation of one (1) non-motorized double swing gate to maintain vehicular access.

Figure 2-7 Gate 1

2.6.3 MAINTENANCE PLAN

2.6.3.1 Mowing

In 2009, 0B5 applied for and received an amendment to its Conservation and Management Permit from the Massachusetts Division of Fisheries and Wildlife. Due to the presence of seven state-listed species that were deemed likely to be impacted by airport improvement projects, the Airport was required to develop a Habitat Management Plan to provide long-term and post-construction benefits to the listed

species. Consequently, 0B5's mowing operations are constrained to certain years and months, which are further discussed in Chapter 3.

2.6.3.2 Snow Removal

As previously discussed, the Airport does not own any SRE and therefore must hire contractors or rely on town assistance for snow removal. The Airport does not have an active snow removal plan.

2.6.4 FIXED BASE OPERATOR

Pioneer Aviation is the Airport's Fixed Base Operator (FBO). An FBO provides aviation services – such as aircraft parking, fueling, maintenance, and storage – to airport users. Pioneer Aviation is located at 42 Industrial Boulevard, at the northwest corner of the Airport. Pioneer Aviation offers aircraft engine and airframe repairs, aircraft storage and tie-down, fuel sales, rental aircraft, and flight instruction.

Figure 2-8 Pioneer Aviation

A "through the fence" operation is an aviation business that relies upon Airport facilities for the continued operation of their business but is not located on Airport property. Pioneer Aviation is a "through the fence" operation located adjacent to the northwest corner of the Airport. Pioneer Aviation accesses the airfield under an agreement with the Airport Commission that is due to expire in 2032.

2.6.5 FUEL FACILITIES

Pioneer Aviation maintains the Airport's only available fuel system. The system consists of one 6,000-gallon, above ground 100-LL tank. It is a constant displacement, 45 gallon per minute fuel system, and no credit card/self-service option is currently available.

Figure 2-9 Pioneer Aviation Fuel System

CHAPTER 3 – EXISTING ENVIRONMENTAL CONDITIONS AND SENSITIVE AREAS

This chapter documents existing environmental conditions and sensitive areas identified by previous studies and investigations at 0B5, and is further depicted in Figure 3-1.

FAA Orders 1050.1F, *Environmental Impacts: Policies and Procedures* and 5050.4B, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions* provide policy and procedures for compliance with the National Environmental Policy Act (NEPA), and requirements for airport actions pursuant to FAA authority. It is important to note that the environmental analysis included in this Master Plan Update is not a document intended to satisfy the need for formal NEPA analysis. Prior to the implementation of an action, the following list of applicable environmental impact categories outlined in FAA Order 1050.1F must be addressed:

- Air quality
- Biological resources (including fish, wildlife, and plants)
- Climate
- Coastal resources
- Department of Transportation Act, Section 4(f)
- Farmlands
- Hazardous materials, solid waste, and pollution prevention
- Historical, architectural, archeological, and cultural resources
- Land use
- Natural resources and energy supply
- Noise and compatible land use
- Socioeconomic, environmental justice, and children's environmental health and safety risks
- Visual effects (including light emissions)
- Water resources (including wetlands, floodplains, surface waters, groundwater, and wild and scenic rivers)

3.1 EXISTING AND PREVIOUSLY IDENTIFIED ENVIRONMENTAL CONDITIONS

As the airport plans for future improvements, the following environmental conditions, as identified by the Massachusetts Division of Fisheries and Wildlife and the Massachusetts State Historic Preservation Office, should be reviewed and considered.

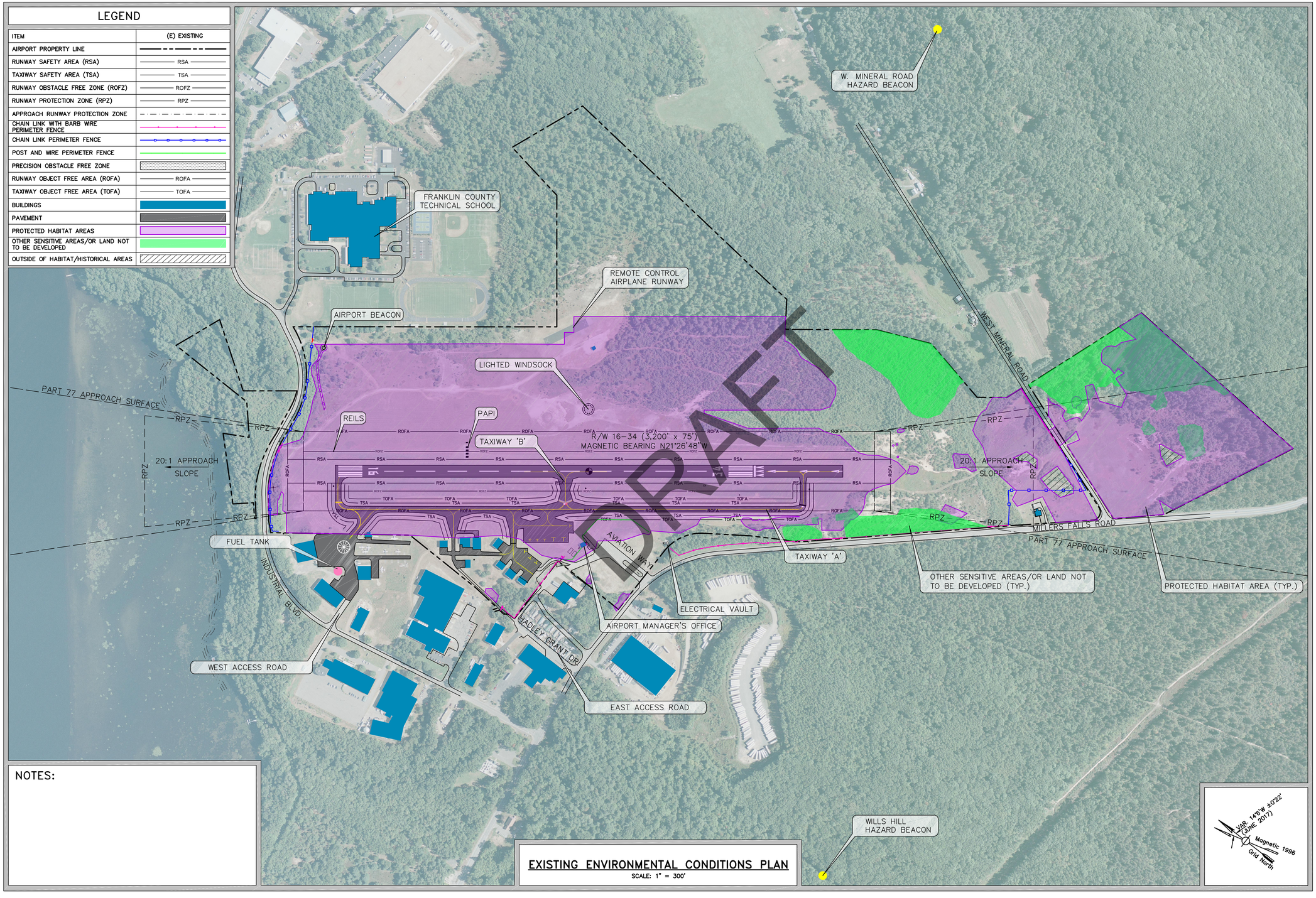
3.1.1 BIOLOGICAL RESOURCES (INCLUDING FISH, WILDLIFE, AND PLANTS)

According to correspondence dated May 9, 2005, from the Massachusetts Executive Office of Environmental Affairs, the airport is located within Priority Habitat and includes habitats for the following species:

- Eastern Box Turtle (Terrapene carolina)
- Sandplain Euchlaena (Euchlaena madusaria)
- Frosted Elfin (Callophrys irus)
- Grasshopper Sparrow (Ammodramus savannarum)
- Vesper Sparrow (Haliaeetus leucocephalus)

LEGEND

ITEM	(E) EXISTING
AIRPORT PROPERTY LINE	
RUNWAY SAFETY AREA (RSA)	RSA
TAXIWAY SAFETY AREA (TSA)	TSA
RUNWAY OBSTACLE FREE ZONE (ROFZ)	ROFZ
RUNWAY PROTECTION ZONE (RPZ)	RPZ
APPROACH RUNWAY PROTECTION ZONE	
CHAIN LINK WITH BARB WIRE PERIMETER FENCE	
CHAIN LINK PERIMETER FENCE	
POST AND WIRE PERIMETER FENCE	
PRECISION OBSTACLE FREE ZONE	
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA
BUILDINGS	
PAVEMENT	
PROTECTED HABITAT AREAS	
OTHER SENSITIVE AREAS/OR LAND NOT TO BE DEVELOPED	
OUTSIDE OF HABITAT/HISTORICAL AREAS	



NOTES:

EXISTING ENVIRONMENTAL CONDITIONS PLAN
SCALE: 1" = 300'

GALE
Gale Associates, Inc.
Engineers - Planners
15 Constitution Drive
Bedford, NH 03110
P 603.471.1887
F 603.471.1809
www.gainc.com
Boston Baltimore Orlando

ALP SET

PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	DCQ
DRAWN BY	DCQ
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE
0 150 300 600
1"=300'

SHEET TITLE

EXISTING ENVIRONMENTAL CONDITIONS PLAN (DRAFT)

SHEET NO.

FIG.3-1

It was also determined that portions of the project site area are near or within habitat for the bald eagle.

3.1.1.1 Conservation and Management Plan

In accordance with MA Endangered Species Act (G.L. c.131A), the Airport was granted a Conservation and Management Permit from the Massachusetts Division of Fisheries and Wildlife on April 15, 2007. The Permit was amended on July 16, 2009 and authorized the "taking" of state-protected species for the purposes of renovations and improvements at the Airport. As part of the application, the airport agreed to carry out a conservation and management plan to provide a long-term Net Benefit to the conservation of the following species:

- Grasshopper Sparrow (Ammodramus savannarum) – Threatened
  - Mowing plan for grassland to occur every third year with seasonal restrictions from May 1st through July 31st.
- New Jersey Tea Inchworm (Apodrepanulatrix liberaria) – Endangered
  - Mowing plan for New Jersey Tea and Pitch Pine Savannah to occur every third year with seasonal restrictions from April through August 15th.
  - New Jersey Tea plantings to be created from propagated plants and transplanted plants.
  - Wild Lupine plantings to be created from propagated plans and transplanted plants.
- Frosted Elfin (Callophyrus irus) – Special Concern
  - Mowing plan for New Jersey Tea and Pitch Pine Savannah to occur every third year with seasonal restrictions from April through August 15th.
  - New Jersey Tea plantings to be created from propagated plants and transplanted plants.
  - Wild Lupine plantings to be created from propagated plans and transplanted plants.
- Sandplain Euchlaena (Euchlaena madusaria) – Special Concern
  - Mowing plan for New Jersey Tea and Pitch Pine Savannah to occur every third year with seasonal restrictions from April through August 15th.
  - Mowing plan for grassland to occur every third year with seasonal restrictions from May 1st through July 31st.
  - New Jersey Tea plantings to be created from propagated plants and transplanted plants.
  - Wild Lupine plantings to be created from propagated plans and transplanted plants.
- Slender Clearwing Moth (Hemaris gracilis) – Special Concern
  - Mowing plan for New Jersey Tea and Pitch Pine Savannah to occur every third year with seasonal restrictions from April through August 15th.
  - Mowing plan for grassland to occur every third year with seasonal restrictions from May 1st through July 31st.
  - New Jersey Tea plantings to be created from propagated plants and transplanted plants.
  - Wild Lupine plantings to be created from propagated plans and transplanted plants.
- Pink Sallow (Psectraglea carnosa) – Special Concern
  - Mowing plan for New Jersey Tea and Pitch Pine Savannah to occur every third year with seasonal restrictions from April through August 15th.
  - Mowing plan for grassland to occur every third year with seasonal restrictions from May 1st through July 31st.

- New Jersey Tea plantings to be created from propagated plants and transplanted plants.
- Wild Lupine plantings to be created from propagated plans and transplanted plants.

- Pine Barrens Zanclognatha (Zanclognatha martha) – Threatened
  - Mowing plan for New Jersey Tea and Pitch Pine Savannah to occur every third year with seasonal restrictions from April through August 15th.
  - New Jersey Tea plantings to be created from propagated plants and transplanted plants.
  - Wild Lupine plantings to be created from propagated plans and transplanted plants.

3.1.1.2 Potential Threats to Protected Species

Eastern Box Turtle (Terrapene carolina)

According to the Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP), the Eastern Box Turtle is a species of greatest conservation need in the Massachusetts State Wildlife Action Plan and is under threat in due to:

- Habitat destruction;
- Road mortality;
- Collection as pets;
- Mowing of fields and early successional habitat during the active season;
- Inflated rates of predation;
- Disturbance of nest sites; and
- Genetic degradation due to release of non-native turtles.

Figure 3-2: Eastern Box Turtle

Grasshopper Sparrow (Ammodramus savannarum)

NHESP identifies threats to the Grasshopper Sparrow as:

- Habitat loss;
- Changes in agricultural practices (early harvesting and fewer fallow fields); and
- Natural succession (abandoned fields growing up to shrub and woods).

Figure 3-3: Grasshopper Sparrow

Vesper Sparrow (Pooecetes gramineus)

NHESP identifies threats to the Vesper Sparrow as:

- Loss of suitable breeding habitat;
- Fire suppression;
- Declining farm abandonment, leaving fewer unmanaged open fields; and
- Increasing forest succession.

Figure 3-4: Vesper Sparrow

Bald Eagle (Haliaeetus leucocephalus)

NHESP identifies historical threats to the Bald Eagle as:

- Substantial habitat loss due to conversion of forest to development and agriculture;
- Environmental degradation;
- Killing by people who incorrectly believed the eagles prey on livestock or threaten salmon fisheries; and
- Diminished reproductive success and susceptibility to death due to introduction of man-made chemicals and pollutants.

Figure 3-5: Bald Eagle

Bald eagle populations have increased in the past 25 years due to a decline in persecution and reductions in DDT use; however, populations remain threatened in several states, including Massachusetts.

Sandplain Euchlaena (Euchlaena madusaria)

NHESP identifies threats to the Sandplain Euchlaena as:

- Habitat loss;
- Fire suppression – fire promotes growth of lowbush blueberries and maintains open habitat structure needed by the Sandplain Euchlaena and its host plants;
- Invasion by exotic plants;
- Introduced generalist parasitoids;
- Insecticide spraying;
- Off-road vehicles; and
- Light pollution.

Figure 3-6: Sandplain Euchlaena

Frosted Elfin (Callophyrus irus)

NHESP identifies threats to the Frosted Elfin as:

- Habitat loss;
- Fire suppression – fire promotes growth of wild indigo and lupine and maintains open habitat structure needed by the Frosted Elfin and its host plants;
- Introduced generalist parasitoids;
- Aerial insecticide spraying;
- Non-target herbiciding;
- Excessive deer browse of larval host plants; and
- Off-road vehicles.

Figure 3-7: Frosted Elfin

New Jersey Tea Inchworm (Apodrepanulatrix liberaria)

NHESP identifies threats to the New Jersey Tea Inchworm as:

- Habitat loss;
- Fire suppression – fire promotes growth of new jersey tea and maintains open habitat structure needed by the New Jersey Tea Inchworm and its host plant;
- Introduced generalist parasitoids;
- Aerial insecticide spraying;
- Non-target herbiciding;
- Excessive deer browse of larval host plants;
- Off-road vehicles; and
- Light pollution.

Figure 3-8: New Jersey Tea Inchworm

Pine Barrens Zanclognatha (Zanclognatha martha)

NHESP identifies threats to the Pine Barrens Zanclognatha as:

- Habitat loss;
- Fire suppression;
- Introduced generalist parasitoids;
- Aerial insecticide spraying; and
- Light pollution.

Figure 3-9: Pine Barrens Zanclognatha

Pink Sallow Moth (Psectraglaea carnosa)

NHESP identifies threats to the Pink Sallow Moth as:

- Habitat loss;
- Fire suppression;
- Invasion by exotic plants;
- Introduced generalist parasitoids;
- Insecticide spraying;
- Off-road vehicles; and
- Light pollution.

Figure 3-10: Pink Sallow Moth

Slender Clearwing Sphinx Moth (Hemaris gracilis)

NHESP identifies threats to the Slender Clearwing Moth as:

- Habitat loss;
- Fire suppression;
- Hydrologic alteration (in bogs and swamps);
- Invasion by exotic plants;
- Introduced generalist parasitoids; and
- Insecticide spraying.

Figure 3-11: Slender Clearwing Sphinx Moth

3.1.1.3 New Jersey Tea

As part of the Taxiway 'A' Reconstruction project in 2014 and 2015, the airport was required to mitigate an area of New Jersey Tea plants found to be growing in the work area. This required transplanting 50 plants and planting 100 new plants. Snow fencing was used, as defined by the Conservation and Management Permit, to define routes and avoid disturbance to the planting area. The transplanted plants took well, but the new plants suffered due to a lack of snow cover during the winter, which allowed deer to eat the plants. The airport must carefully maintain these areas to prevent other plants from invading the area and crowding out the New Jersey Tea plants. Mitigation of New Jersey Tea is ongoing.

3.1.2 HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

The following is a listing of archaeological and historical investigations completed at the airport:

- 1987 Archaeological Location Survey for proposed taxiway construction and Master Plan development by UMass Amherst Archaeological Services.
- 1998 Archaeological Intensive Survey for Perimeter Fencing Project by UMass Amherst Archaeological Services.
- 2001 Phase 1B survey of areas related to a proposed runway upgrade and expansion.
- November 2001 Concurrence Letter for avoidance of two historical sites. No other potentially significant archaeological sites encountered during the survey – MAC SHPO.
- 2004 survey of excess material storage area for reconstruction of main apron project in which no additional cultural resources were identified by UMass Amherst Archaeological Services.
- 2004 Phase 2 site examination study to determine the dimensions of a historical site, which allowed planners to modify the design of the extended runway and taxiway project. Plan also required removal of trees on a historical site, which led to tree removal in 2005.
- 2006 Archaeological Site Examination Survey for runway reconstruction and extension project by UMass Amherst Archaeological Services.
- February 2007 Archaeological Site Avoidance and Protection Plan (ASAPP) Approval from MAC SHPO.
- February 2008 Evaluation of Adverse Effects Caused by Clear Cutting of Sacred Ceremonial Prayer Hill from Narragansett Indian Tribal Historic Preservation Office to FAA.

- December 2008 National Register of Historic Places Determination of Eligibility for Sacred Ceremonial Hill Site by National Park Service.
- September 2010 Request for Amendment to State Archaeologist's Permit #3161 for Runway and Taxiway Separation project from SHPO.
- 2010 Phase 1B intensive (locational) survey of four areas that would be impacted during airport runway and taxiway upgrades.
- 2013 Phase 1B intensive (locational) archaeological survey at multiple locations as part of new beacon, T-hangars, Shifted Parallel Taxiway/Main Apron/Taxiway Tie-In, and North Development area projects.
- May 2017 Intensive (Locational) Archaeological Survey for Fencing project completed by UMass Amherst.

CHAPTER 4 – FORECASTS OF AVIATION DEMAND AND CAPACITY

In order to identify Airport facility needs during the planning period, it is necessary to accurately depict the current aviation use of the Airport, and to project future aviation demand levels. This chapter summarizes current aircraft usage at the Airport and documents the projected aviation demand during the 20-year planning period of this Study.

The forecasts presented in this chapter provide short-term, mid-term, and long-term projections for the years 2022, 2027, and 2037. These represent the 5-, 10-, and 20-year estimates of aviation activity at 0B5. It is important, however, to view the projections independently of specific years and to consider the actual growth of activity as the impetus that influences the need for future airport facilities. Similarly, slower than projected growth may warrant deferment of planned improvements. Actual growth activity should be periodically (i.e. annually) compared to projected growth so that scheduled corrections can be identified and implemented.

4.1 OVERVIEW OF AVIATION FORECASTS

The objective of forecasting an airport's activity is to identify the factors that influence aviation demand so that future infrastructure and facility needs can be determined. The FAA's Terminal Area Forecast[1] (TAF) is the standard benchmark of an airport's future activity and serves as the basis for FAA planning. Therefore, this forecast uses the most recent TAF (2016-2045) as a starting point for analysis. In addition to the TAF, FAA Aerospace Forecasts[2] and historic airport reports are reviewed and analyzed to further compliment the TAF.

Forecasting aviation activity serves two primary purposes in the development of this master plan. Specifically, forecasts provide the basis for:

- Determining the necessary capacity of the airfield and terminal area; and
- Identifying the future facilities required to support demand, including determining their size and implementation schedule

The demand for aviation facilities is typically expressed in terms of based aircraft and aircraft operations. Preparation of aviation activity forecasts is essential in assessing the needs and requirements for future aviation development. 0B5 aviation forecasts serve as an overall planning guide for identifying airport capacity needs and for the basis of preparing airport alternatives. This forecast consists of layers of information that build upon each other to provide a sound foundation to support final conclusions. These layers include:

- Defining the various forecasting methodologies to be employed;
- Historical aviation data upon which forecasting methods rely;
- Analysis of the validity of the forecast; and
- Provision of a summary of the forecasts findings.

[1] FAA Terminal Area Forecasts (https://www.faa.gov/data_research/aviation/taf/)

[2] FAA Aerospace Forecasts (https://www.faa.gov/data_research/aviation/aerospace_forecasts/)

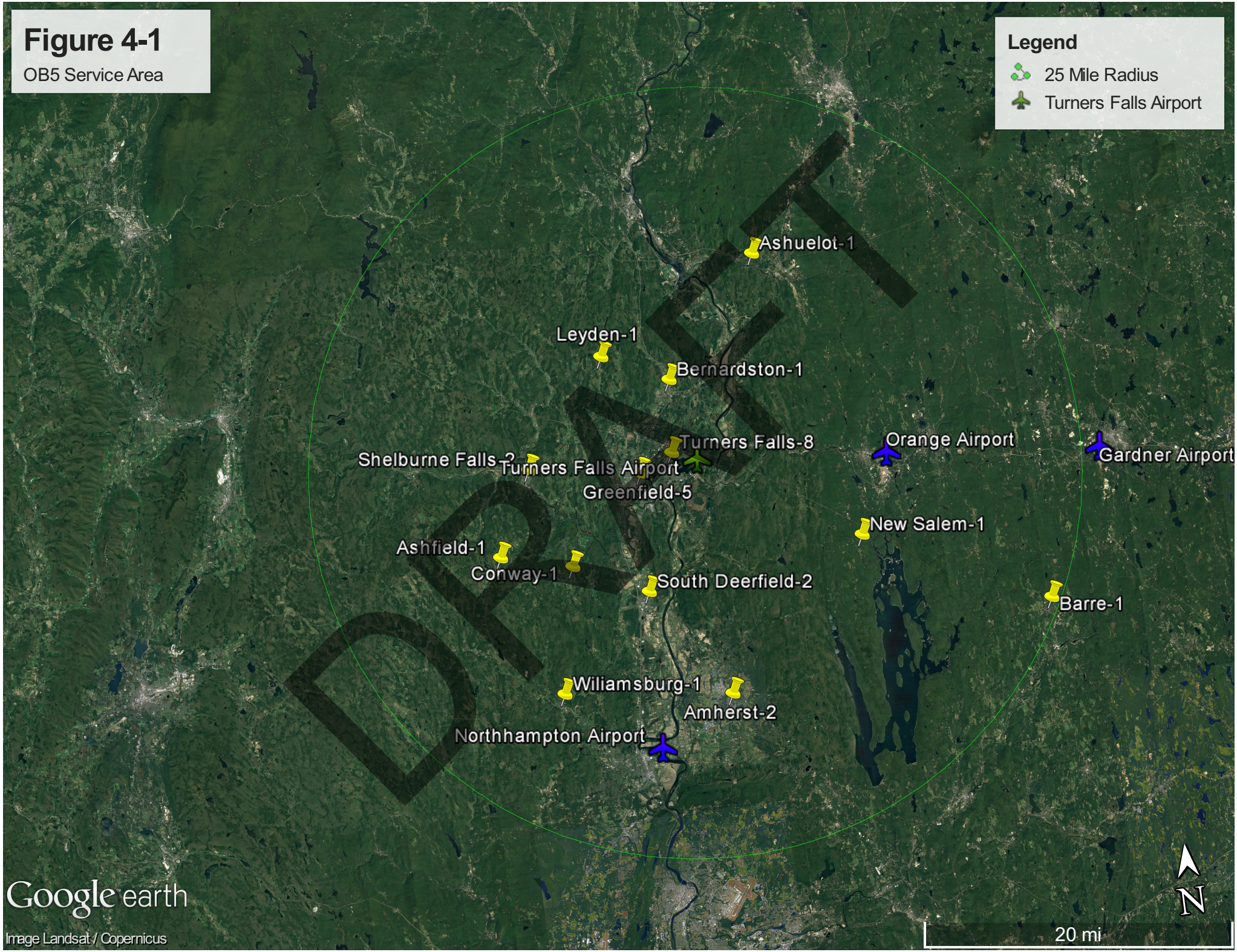


Figure 4-1
OB5 Service Area
Legend
25 Mile Radius
Turners Falls Airport
DRAFT
Ashuelot-1
Leyden-1
Bernardston-1
Turners Falls-8
Orange Airport
Gardner Airport
Shelburne Falls-2
Turners Falls Airport
Greenfield-5
New Salem-1
Ashfield-1
Conway-1
South Deerfield-2
Barre-1
Wiliamsburg-1
Amherst-2
Northhampton Airport
Google earth
Image Landsat / Copernicus
N
20 mi

Once the aviation forecasts are complete, the relationship between aviation demand, airfield capacity, and facilities can be established. This will be done in Chapter 5, *Facility Requirements.*

The following terms are often used in airport forecasts, and though they are quite different, their meanings are often confused with each other. For clarification, the meaning of each of these terms is presented below.

Based Aircraft- this term refers to where an airplane makes its home or in the case of 0B5, an aircraft whose "home" is at the Airport.

Transient Aircraft- this term refers to an airplane whose "home" is at an airport other than the airport for which the forecast is being produced. In other words, any aircraft that uses 0B5 but whose home base is at another airport is a transient aircraft.

Local Operation- a local operation is one where an aircraft operates within 20 nautical miles of the airport for which the forecast is prepared. A local operation can be performed by either a based or transient aircraft.

Itinerant Operation- an itinerant operation is one where an aircraft operates at a greater distance than 20 nautical miles of the airport for which the forecast is prepared. Again, an itinerant operation can be performed by either a based or transient aircraft.

4.1.1 TERMINAL AREA FORECAST

The TAF represents the FAA's forecast of aviation activity for U.S. airports and provides a summary of historical and forecast statistics on passenger demand and aviation activity. The TAF is prepared to meet the budget and planning needs of the FAA and provide information for use by state and local authorities, the aviation industry, and the public. Forecasts of itinerant general aviation operations and local civil operations at FAA facilities are based primarily on time-series analysis. Because military operations forecasts have national security implications, the Department of Defense provides only limited information on future aviation activity. Hence, the TAF projects military activity at its present level except when FAA has specific knowledge of a change. For non-FAA facilities, historic operations in the TAF are from the Form 5010 (Master Airport Record) data. These operation levels are held constant for the forecast unless otherwise specified by a local or regional FAA official.

4.1.2 FAA AEROSPACE FORECAST

The second set of FAA forecasts consulted were the FAA Aerospace Forecasts (2017-2037). The FAA Aerospace Forecast provides an overview of aviation industry trends and expected growth for the commercial passenger carrier, cargo carriers, and general aviation activity sectors. National growth rates in enplanements, operations, fleet growth, and fleet mix for the general aviation fleet are provided over a 20-year forecast horizon.

In its review of 2016, the FAA Aerospace Forecast highlights that the general aviation industry recorded a small decline in deliveries in 2016, with only the business jet segment seeing a year over year increase. General aviation activity at FAA contract tower airports recorded a 0.2 percent decline in 2016 as local activity fell 0.5 percent, more than offsetting a 0.1 percent increase in itinerant operations.

According to the 2017-2037 FAA Aerospace forecast, the long-term outlook for general aviation is stable to optimistic. The active general aviation fleet is forecasted to increase 0.1 percent a year between 2016 and 2037, resulting in an increase in the fleet of about 3,400 units. The Forecast expects continued growth of the turbine and rotorcraft fleets, but the largest segment of the fleet, fixed wing piston aircraft, to decrease over the forecast.

4.2 AIRPORT SERVICE AREA

Defining the 0B5 service area is an important component in estimating future aviation demand. The service area for airports is heavily influenced by a number of factors, including but not limited to:

- Proximity of an airport to an aircraft owner's home or business;
- Level of convenience, services, and capabilities available at the airport;
- Level of convenience, services, and capabilities available at competing airports; and
- Population and economic characteristics from which the airport draws its users, both existing and potential.

In an effort to define 0B5's service area, this report relies on the home address of each based-aircraft owner. Based on the proximity of the home address of each based-aircraft owner, the service area was estimated to be approximately 25 miles (see Figure 4-1). Within 0B5's service area the following airports exist:

- Orange Municipal Airport (ORE) is served by two runways: Runway 01-19 (4,999' x 75') and Runway 14-32 (4,801' x 75'). ORE offers fueling (Jet A and 100-LL), repair and maintenance for GA aircraft and operators.
- Gardner Municipal Airport (GDM) is served by one runway: Runway 18-36 (3,000' x 75'). GDM offers numerous facilities for GA aircraft and operators, including fueling (100-LL), conventional and T-hangar space, apron-tie downs, and automobile parking.
- Northampton Airport (7B2) is served by one runway: Runway 14-32 (3,335' x 50'). 7B2 offers numerous facilities for GA aircraft and operators, including fueling (100-LL), maintenance, hangars, tie-downs, flight training, scenic flights, and automobile parking.

4.3 SOCIOECONOMIC TRENDS

For purposes of this section, the socioeconomic trends affecting aviation demand at 0B5 (population, age, income, and employment) will rely on information gathered for Franklin County, which will then be compared against state and national trends.

4.3.1 HISTORIC POPULATION

Historic population growth from 2000-2016 was reviewed on a county, state, and national level. As derived from the U.S. decennial census data collected in 2000 and 2010, Franklin County experienced a decrease in population of -0.2 percent (2000-2010). During the same period, the Commonwealth of Massachusetts experienced a 3.1 percent increase, while the U.S. experienced a 9.9 percent increase. The U.S. Census estimates that during the period of 2010-2016, Franklin County experienced a decrease in population with an average annual growth rate (AAGR) of -0.2 percent, while Massachusetts and the U.S. each experienced an AAGR of 0.7 (see Table 4-1).

Table 4-1: Historic Population Growth (2010-2016)

Year	*Franklin County*	*AAGR%*	*Massachusetts*	*AAGR%*	*U.S.*	*AAGR%*
2010	71,372		6,547,629		309,348,193	
2011	71,311	-0.09	6,512,227	-0.54	311,663,358	0.75
2012	71,606	0.41	6,560,595	0.74	313,998,379	0.75
2013	71,536	-0.10	6,605,058	0.68	316,204,908	0.70
2014	70,965	-0.80	6,657,291	0.79	318,563,456	0.75
2015	70,550	-0.58	6,705,586	0.73	320,896,618	0.73
2016	70,382	-0.24	6,811,779	1.58	323,127,513	0.70
AAGR		**-0.2**		**0.7**		**0.7**

Source: United States Census Bureau

According to a population projection study conducted by the UMass Donahue Institute through an agreement with the Massachusetts Secretary of the Commonwealth, population growth during the period from 2020-2035 for Franklin County is projected to decrease by approximately 1.2 percent. During the same period, Massachusetts and the U.S. are projected to experience a 5.3 percent and 10.7 percent growth, respectively (see Table 4-2 below).

Table 4-2: Projected Population Growth (2020-2035)

Year	*Franklin County*	*Massachusetts*	*U.S.*
2020	70,703	6,950,668	334,503,000
2025	70,832	7,105,878	347,335,000
2030	70,586	7,231,126	359,402,000
2035	69,882	7,319,469	370,338,000

Source: UMASS Donahue Institute Vintage 2015 Population Projections. March 2015; U.S. Census Bureau

4.3.1.1 Median Age of Total Population

According to the U.S. Census Bureau, since 2010, the median age for Franklin County has been increasing at an AAGR of 2.3 percent. By comparison, Massachusetts and the U.S. have been increasing at an AAGR

of 1.3 percent and 1.1 percent, respectively (see Table 4-3). This sector has the potential to affect 0B5 as pilots are retiring at a higher rate than the rate at which student pilots are beginning to fly and become certified.

Table 4-3: Median Age of the Total Population

Year	*Franklin County*	*Massachusetts*	*U.S.*
2010	43.0	38.7	36.9
2011	44.0	38.9	37.0
2012	44.3	39.1	37.2
2013	44.6	39.2	37.3
2014	44.9	39.3	37.4
2015	45.1	39.3	37.6

Source: United States Census Bureau

4.3.2 PER CAPITA PERSONAL INCOME AND WAGES

Per Capita Income (PCI) data provides a measure of the income of a particular region. Generally, high income leads to higher potential for participation in GA activity. Per Capita Personal Income (historic) data on a county, statewide, and national basis was obtained from the Bureau of Economic Analysis[3].

The historical trend of PCI from 2005-2015 indicated relatively steady growth throughout the 10-year period. For Franklin County, the PCI grew at an AAGR of 3.4 percent during this period. For the same period, Massachusetts experienced an AAGR of 3.2 percent and the U.S. experienced an AAGR of 3.1 percent (see Table 4-4).

Table 4-4: Per Capita Personal Income (2005-2015)

Year	*Franklin County*	*Massachusetts*	*U.S.*
2005	$34,583	$40,922	$35,904
2006	$36,006	$43,763	$38,144
2007	$37,905	$45,199	$39,821
2008	$39,489	$46,365	$41,082
2009	$39,602	$45,742	$37,376
2010	$40,464	$47,148	$40,277
2011	$42,016	$49,557	$42,461
2012	$43,575	$51,834	$44,282
2013	$44,311	$51,608	$44,493
2014	$46,064	$53,599	$46,464
2015	$48,428	$55,296	$48,190

Source: Bureau of Economic Analysis

[3] https://www.bea.gov/regional/bearfacts/pdf.cfm?fips=25011&areatype=25011&geotype=4

4.3.2.1 Median Household Income

From 2000-2010, Franklin County experienced a 27.6 percent increase in median household income from $40,768 to $52,002. During the same period, the Commonwealth of Massachusetts and the U.S. experienced increases of 27.7 percent and 23.8 percent, respectively. However, during the period from 2010-2015, household income for Franklin County showed modest growth experiencing a AAGR of 1.2 percent with Massachusetts and the U.S. experiencing an AAGR of 1.2 percent and 0.8 percent, as depicted in Table 4-5 below. Household Income has the potential to affect 0B5 as the cost of obtaining a pilot's license varies widely depending on a number of factors such as location, type of airplane, flight school, etc.

Table 4-5: Median Household Income (dollars) 2010-2015

Year	*Franklin County*	*Massachusetts*	*U.S.*
2000	***$40,768***	***$50,502***	***$41,944***
2010	$52,002	$64,509	$51,914
2011	$52,246	$65,981	$52,762
2012	$53,298	$66,658	$53,046
2013	$53,663	$66,866	$53,046
2014	$54,072	$67,846	$53,482
2015	$55,221	$68,563	$53,899
AAGR 2010-2015	**1.2%**	**1.2%**	**0.8%**

Source: United States Census Bureau

4.3.2.2 Unemployment

This section reviews the historic unemployment rates in the region and compares them against the Commonwealth of Massachusetts and the U.S. As illustrated in Table 4-6, from 2010-2015 Franklin County has averaged 5.1 percent unemployment among those aged 16 and older. In comparison, the Commonwealth of Massachusetts and the U.S. have averaged 5.5 percent and 5.7 percent unemployment rates during the same period. Similar to median household income, this sector has the potential to affect 0B5 as lower levels of unemployment indicate better economic conditions for business. In turn, this can potentially lead to an increase in aviation demand, and/or potential for pilots being able to financially support their flying activities.

Table 4-6: Percent of Population Unemployed (16 years and older)

Year	*Franklin County*	*Massachusetts*	*U.S.*
2010	4.8	5.0	5.1
2011	5.3	5.5	5.6
2012	5.4	5.7	6.0
2013	5.6	6.0	6.2
2014	5.1	5.7	5.8
2015	4.5	5.1	5.2
Average	**5.1**	**5.5**	**5.7**

Source: United States Census Bureau

4.3.3 SOCIOECONOMIC CONDITIONS SUMMARY

General aviation airports are influenced by a number of local factors including but not limited to population, age, income and unemployment. The previous sections reviewed these sectors for Franklin County and compared them to the Commonwealth of Massachusetts and the United States.

With respect to population, according to the UMass Donahue Institute and U.S. Census Bureau (as outlined in Table 4-2) Franklin County is expected to experience negative growth through the planning period of 2020-2035, with a 1.2 percent decrease in population during this period. Both the Commonwealth of Massachusetts and the United States are projected to outpace Franklin County with increases in population of 5.3 percent and 10.7 percent, respectively.

Economically, Franklin County has experienced growth in per capita income at a slightly highly rate than the Commonwealth of Massachusetts and the United States as depicted in Table 4-4. According to the U.S. Bureau of Economic Analysis, in 2015 the Commonwealth of Massachusetts experienced a 4.7 percent growth in state personal income, which ranked 12th in the United States.

After reviewing the socioeconomic conditions, it appears from the analysis that there are no demographic factors or other local unique socioeconomic conditions that suggest an unusual or greater than average demand for aviation.

4.4 HISTORIC AVIATION DATA

This section presents the historical aviation statistics for 0B5 including based aircraft and annual operations. This information is used to help identify and evaluate factors that influence aviation demand, which in turn is used to determine forecasts of future aviation activity.

4.4.1. BASED AIRCRAFT

Prior to 2009 and the integration of FAA's National Based Aircraft Inventory Program, airport managers were responsible for counting the number of based aircraft and reporting totals to the FAA and state inspectors. These totals would then appear on the airport's master record form, also known as the "5010". At the time, little guidance was provided on how the based aircraft counts should be determined, and there was no method of validating the counts. As a result, based aircraft counts were often unreliable, and duplicated.

The FAA defines based aircraft as an aircraft that is operational and airworthy, which is typically based at the facility in question for a majority of the year. Based aircraft categories include single-engine piston, multi-engine piston, jet, and rotorcraft.

According to the Massachusetts Department of Transportation Aeronautics Division (MassDOT/AD), "All airworthy aircraft based in Massachusetts or temporarily located in Massachusetts for sixty (60) or more cumulative days during a year must be registered with the MassDOT/AD by completing and submitting a registration form and paying the applicable annual registration fee".

Based aircraft are major economic contributors to the airport. They help generate revenues in part from tie-down fees, hangar leases, fuel sales, and maintenance. Based aircraft forecasts are used to evaluate the size of the apron, number of tie-downs, and hangar facilities.

As previously mentioned, the vast majority of aircraft based at the airport are owned by individuals residing in roughly a 25± mile radius of the airport. According to the 2016 FAA TAF for 0B5, the number of based aircraft at the Airport in 2016 was 32. The Airport reported 30 based aircraft in 2016, and MassDOT/AD reported 44. Table 4-7 presents a comparison of based aircraft over the past 10 years at 0B5.

Table 4-7: Based Aircraft History

Year	Airport Count	FAA TAF Count	MassDOT/AD Count
2006	27	28	34
2007	24	30	34
2008	32	31	34
2009	35	31	34
2010	35	29	33
2011	32	29	36
2012	33	25	36
2013	33	25	35
2014	31	33	35
2015	29	32	35
2016	30	32	44
AAGR	**-0.9**	**1.9%**	**2.9%**

Source: Airport Data, FAA TAF 2016-2045, MassDOT/AD

4.4.2 REGIONAL BASED AIRCRAFT

According to the FAA TAF, the New England Region experienced a slight average annual decrease of 1.9 percent in based aircraft growth from 2006-2016. The FAA New England Region includes the states of Maine, New Hampshire, Vermont, Massachusetts, Connecticut and Rhode Island.

The General Aviation survey data used to produce the national FAA Aerospace Forecasts indicates that between 2010 and 2012, the number of active GA registered aircraft in the nation decreased by 6.4 percent, from 223,370 to 209,034. During that same period, Massachusetts experienced a 9.2 percent decrease from 2,144 to 1,946, according to the FAA TAF. Table 4-8 presents a comparison of based aircraft growth over the past 10 years in the FAA New England Region.

Table 4-8: New England Region Based Aircraft History

Year	ANE Based Aircraft History	AAGR%
2006	6,959	
2007	6,961	0.0
2008	6,663	-4.3
2009	6,705	0.6
2010	5,952	-11.2
2011	5,782	-2.9
2012	5,803	0.4
2013	5,985	3.1
2014	6,291	5.1
2015	5,729	-8.9
2016	5,788	1.0
	AAGR	**-1.7**

Source: FAA TAF 2016-2016

4.4.3 NATIONAL BASED AIRCRAFT

At the National level, from 2006 to 2016, based aircraft experienced a slight average annual decrease of approximately 1.6 percent. Table 4-9 presents national based aircraft growth over the past 10 years.

Table 4-9: National Based Aircraft History

Year	*National Based Aircraft History*	*AAGR%*
2006	197,301	
2007	199,608	1.2
2008	175,576	-12.0
2009	177,432	1.1
2010	165,472	-6.7
2011	160,374	-3.1
2012	163,333	1.8
2013	166,953	2.2
2014	170,375	2.0
2015	163,994	-3.7
2016	165,480	0.9
	AAGR	**-1.6**

Source: FAA TAF 2006-2016

4.5 HISTORIC ANNUAL AIRCRAFT OPERATIONS

In airport planning terms "airport operation" is defined as the number of arrivals and departures from an airport. Therefore, an airplane that arrives and then departs from an airport is considered to have made two operations. Operations are further classified as either local or itinerant.

- Local operations are performed by aircraft that: (a) operate in the local traffic pattern or within sight of the airport; (b) are known to be departing or arriving from flight in local practice areas located within a 20-mile radius of the airport; (c) execute simulated instrument approaches or low passes at the airport.
- Itinerant operations are all aircraft operations other than local operations, such as landing or take off of a flight departing from or arriving at another airport greater than 20 miles away.

Aircraft operations are also defined by type, such as air carrier, regional/commuter, air taxi, general aviation, or military. Aircraft operations at the Airport are predominantly general aviation with a small percent of air taxi, and military.

4.5.1 0B5 HISTORIC OPERATIONS

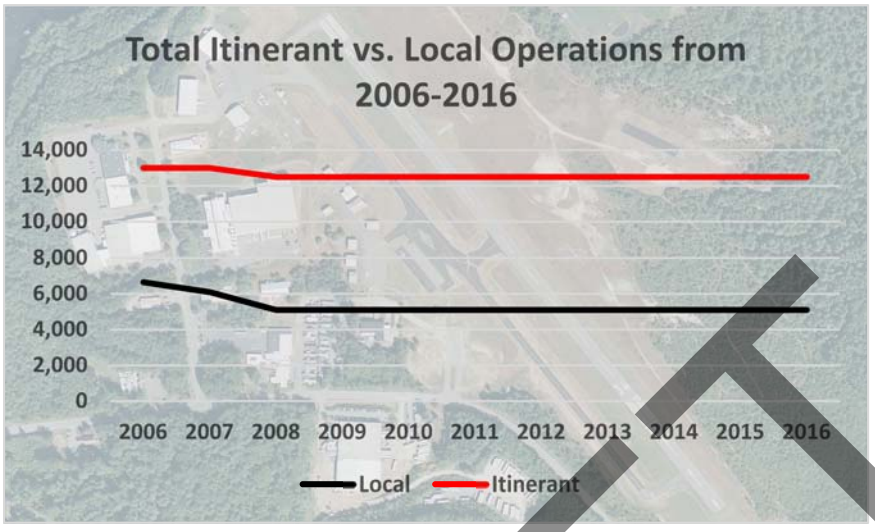
Historic aircraft operations for 0B5 were obtained from the FAA TAF, Airport Counts, and MassDOT/AD. According to the FAA TAF, the Airport has experienced a 10.4 percent decrease in operations from 2006 to 2016, with an AAGR of -1.1 percent (see Table 4-10). During this same period, 0B5 has experienced an approximate 23.3 percent decrease in itinerant operations, and a 3.8 percent decrease in local operations (see Table 4-11).

Table 4-10: Total 0B5 Operations from 2006-2016

Year	*Operations*	*AAGR%*
2006	19,650	
2007	19,100	-2.8
2008	17,600	-7.9
2009	17,600	0.0
2010	17,600	0.0
2011	17,600	0.0
2012	17,600	0.0
2013	17,600	0.0
2014	17,600	0.0
2015	17,600	0.0
2016	17,600	0.0

Source: FAA TAF 2006-2016

Table 4-11: 0B5 Itinerant vs. Local Operations from 2006-2016



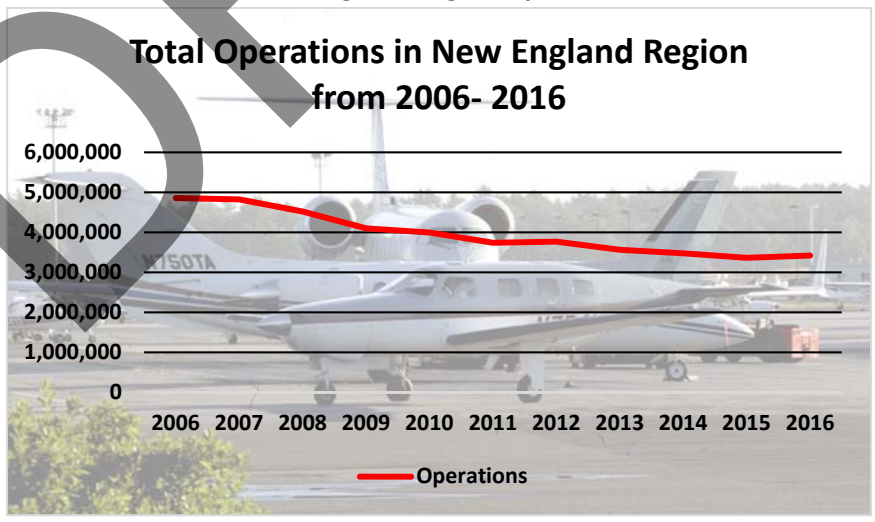
Source: FAA TAF 2006-2016

The decrease in operations and the and subsequent stagnant growth over the past 10 years is likely attributed to the *Great Recession*, which occurred from 2007-2009 and marked the longest recession in the U.S. since World War II. The *Great Recession* had a resounding impact on the GA industry as the United States GA inventory declined from 231,606 aircraft to approximately 200,000 aircraft in 2013[4].

4.5.2 NEW ENGLAND REGIONAL TRENDS

Historic aircraft operations for FAA New England Region were obtained from the FAA TAF. According to the data presented in Table 4-12 below, the New England Region has experienced a decrease in operations between 2006-2016, losing approximately 30 percent of its operations over this period, with an average annual loss of 3.4 percent per year.

Table 4-12: Total New England Region Operations from 2006-2016



Source: FAA TAF 2006-2016

[4] http://www.fi-aeroweb.com/General-Aviation.html

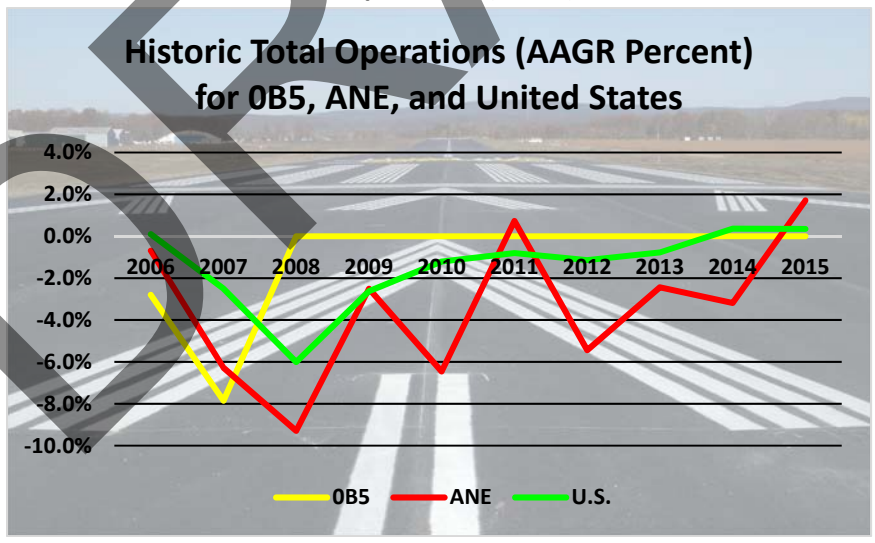
4.5.3 NATIONAL HISTORIC TRENDS

Historic aircraft operations for the Nation were obtained from the FAA TAF. According to the data shown in Table 4-13 below, the Nation experienced a decrease in operations between 2006-2016, losing approximately 13.5 percent of its operations over this period, with an average annual loss of 1.4 percent per year. A comparison of the historic AAGR for 0B5, ANE, and the Nation is highlighted in Table 4-14 below.

Table 4-13: Total Operations Nationally from 2006-2016

Source: FAA TAF 2006-2016

Table 4-14: Historic Total Operations (AAGR) 0B5, ANE, and Nation



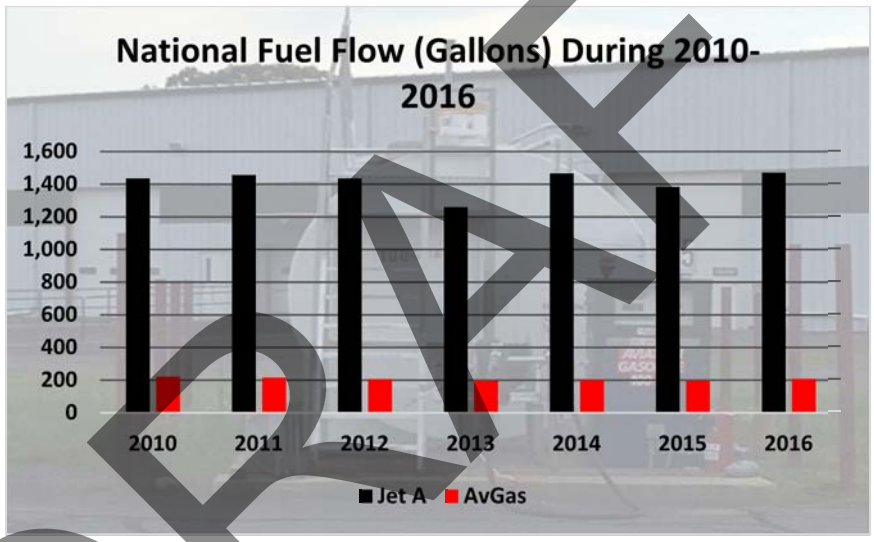
Source: FAA TAF 2006-2015

4.6 0B5 AVIATION GASOLINE CONSUMPTION

Fuel sales can often be considered a good indicator of aviation activity at an airport and help determine future fuel storage needs at an airport. Presently, Pioneer Aviation, a "through the fence" operation, maintains the Airport's only available fuel system. The system consists of a 6,000-gallon above ground metal tank containing 100-LL aviation gasoline.

The FAA Aerospace Forecast (2017-2037) reported that between 2010 and 2016, Jet-A fuel consumption for GA aircraft increased 2.5 percent with an average annual increase of 0.81 percent. AvGas, on the other hand, was reported to have decreased by approximately 5.9 percent during this same period with an average annual decrease of approximately 0.9 percent. Through the planning period the FAA Aerospace Forecast anticipates an average annual growth in Jet-A fuel consumption of 1.9 percent, and an average annual decrease of 0.4 percent per year in AvGas (see Table 4-15).

Table 4-15: National Fuel Flow 2010-2016



Source: FAA Aerospace Forecast 2017-2037

4.7 AVIATION ACTIVITY FORECASTS

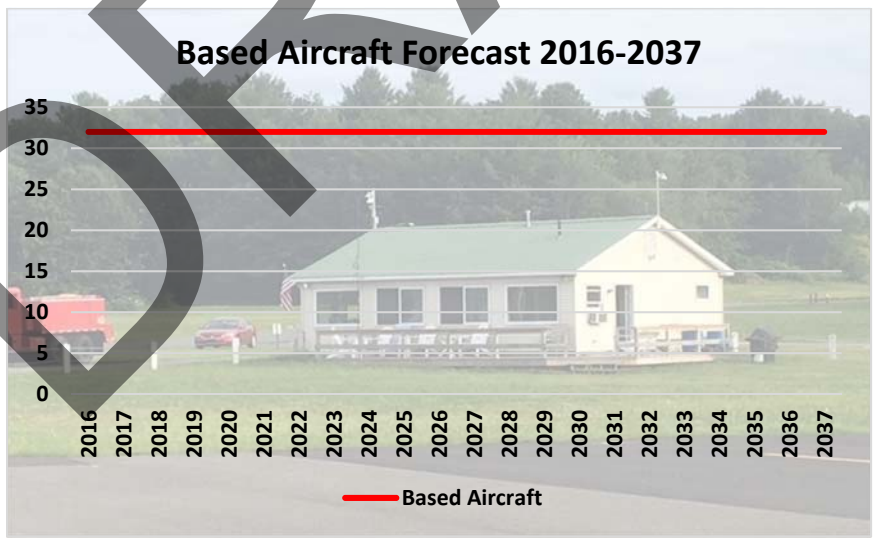
This section presents the aviation forecast for 0B5 for the planning period of 2017-2037. The forecasts provide short-term, mid-term, and long-term projections for the years 2022, 2027, and 2037. These represent the 5-, 10-, and 20-year estimates of aviation activity at the Airport. Activity projections include based aircraft, itinerant operations, local operations, and total operations. Forecasts developed by the Airport are reviewed by the FAA and compared to FAA TAF projections. FAA Order 5090.3C provides guidance on the FAA review process, and states that the FAA will find a locally developed airport planning forecast acceptable if it meets any of the following three conditions for a general aviation and reliever airport:

1. The forecast differs less than 10 percent in the 5-year forecast period, and 15 percent in the 10-year forecast period;
2. The forecast activity levels do not affect the timing or scale of an airport project; or
3. The forecast activity levels do not affect the role of the airport as defined in FAA Order 5090.3C.

4.7.1 BASED AIRCRAFT FORECAST BY TYPE

Based on the 2016 TAF projected growth rates for the Airport it is projected that based aircraft at 0B5 will remain flat with a 0.0 percent increase throughout the planning period. Single-engine aircraft are projected to remain the primary aircraft type. This flat growth rate is expected to be outpaced by the New England Region (0.9 percent per year) and Nation (0.8 percent per year). The forecast uses the TAF 2016 based aircraft count as its baseline with a total based aircraft count of 32. Table 4-16 details the TAF projected based aircraft growth rate out to 2037.

Table 4-16: Based Aircraft Forecast



Source: FAA TAF 2016-2045

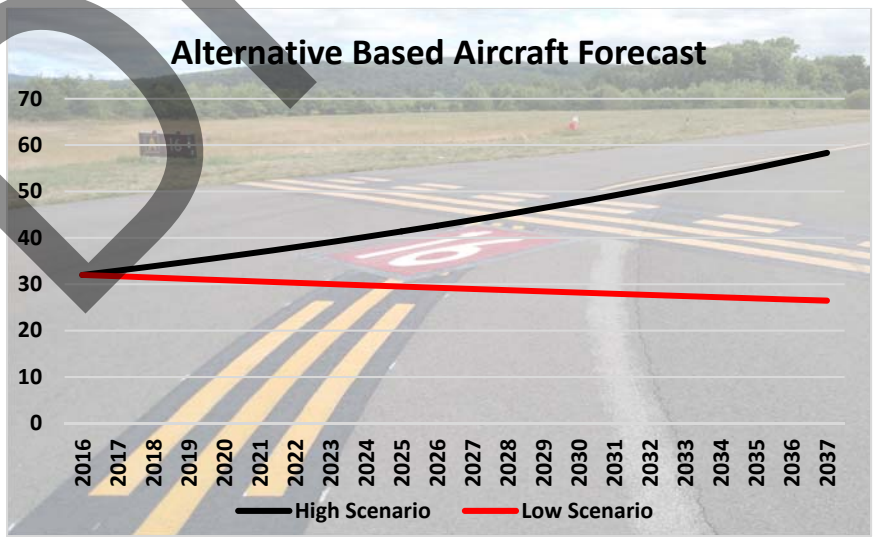
4.7.1.1 Alternative Based Aircraft Forecast

As previously discussed, based aircraft are major economic contributors to the airport. They help generate revenues from tie-down fees, hangar leases, fuel sales, and maintenance. Providing adequate facilities to accommodate based aircraft growth is important, and it influences the future development needs of the Airport. The alternative based aircraft forecast for 0B5 develops both "high" and "low" scenarios based on historic growth rates. As previously discussed, projections should be viewed independently of specific years, and the actual growth of activity should be considered as the impetus that influences the need for future airport facilities. Similarly, slower than projected growth may warrant deferment of planning improvements. Actual growth should be periodically (i.e. annually) compared to projected growth so scheduled corrections can be identified and implemented.

- **High Scenario:** as detailed in Section 4.4.1, MassDOT/AD historic based aircraft counts for 0B5 indicate an AAGR of 2.9 percent from the years 2006-2016. This rate of growth significantly outpaces that expected for both the New England Region (0.9 percent) and Nationally (0.8 percent). Thus, an average annual growth rate of 2.9 percent for 0B5 represents an "optimistic" growth rate for based aircraft growth. This rate is then applied to the TAF total based aircraft number of 32 for 2016 and projected over the planning period of 2017-2037.
- **Low Scenario:** as detailed in Section 4.4.1, the Airport's record of based aircraft counts indicates an AAGR of -0.9 percent from the years 2006-2016. The AAGR of -0.9 percent is applied to the TAF total based aircraft number of 32 for 2016 and projected over the planning period of 2017-2037. This scenario projects negative growth in based aircraft over the next 20 years.

As illustrated in Table 4-17, the high scenario projects the number of based aircraft to increase from 32 to 58 within the planning period. This equates to approximately 1.2 new based aircraft per year. The low scenario projects a decrease in based aircraft from 32 to 26 during the planning period, which equates to a loss of approximately 0.3 based aircraft per year.

Table 4-17: Alternative Based Aircraft Forecast



Source: MassDOT/AD, FAA TAF 2016-2045, Gale Analysis 2017

4.7.1.2 Recommended Based Aircraft Growth Rate

To further assist in developing a recommended based aircraft growth rate, this section compares 0B5's projected FAA TAF based aircraft growth rate against the projected FAA TAF growth rates of the three airports within 0B5's service area (Orange, Gardner, and Northampton). As illustrated in Table 4-18, the FAA TAF projects flat growth not only for 0B5, but also for the three airports within 0B5's service area.

Table 4-18: FAA TAF Projected Based Aircraft Comparisons

Year	0B5	GDM	ORE	7B2
2016	32	15	36	83
2017	32	15	36	83
2018	32	15	36	83
2019	32	15	36	83
2020	32	15	36	83
2021	32	15	36	83
2022	32	15	36	83
2023	32	15	36	83
2024	32	15	36	83
2025	32	15	36	83
2026	32	15	36	83
2027	32	15	36	83
2028	32	15	36	83
2029	32	15	36	83
2030	32	15	36	83
2031	32	15	36	83
2032	32	15	36	83
2033	32	15	36	83
2034	32	15	36	83
2035	32	15	36	83
2036	32	15	36	83
2037	32	15	36	83
AAGR	0.0%	0.0%	0.0%	0.0%

Source: FAA TAF 2016-2045

Although the FAA TAF projects no growth in based aircraft through the planning period, historic based aircraft counts at 0B5 show an AAGR of 1.7 percent from 2006-2016, from 28 based aircraft to 32 based aircraft. Comparatively, GDM and ORE experienced a decrease in total based aircraft at an AAGR of -5.1 percent and -3.3 percent respectively, and 7B2 experienced an increase in total based aircraft at an AAGR of 3.2 percent. The historic growth rates at the three airports within 0B5's service area projected through the planning period and compared against 0B5's historic growth rate in Table 4-19 below.

Table 4-19: FAA TAF Historic Growth Rates Projected Through the Planning Period

Year	*0B5*	*GDM*	*ORE*	*7B2*
2016	32	15	36	83
2017	33	14	35	86
2018	33	14	34	88
2019	34	13	33	91
2020	34	12	31	94
2021	35	12	30	97
2022	35	11	29	100
2023	36	10	28	103
2024	37	10	28	107
2025	37	9	27	110
2026	38	9	26	114
2027	39	8	25	117
2028	39	8	24	121
2029	40	8	23	125
2030	41	7	23	129
2031	41	7	22	133
2032	42	6	21	137
2033	43	6	20	142
2034	43	6	20	146
2035	44	6	19	151
2036	45	5	18	156
2037	46	5	18	161
AAGR	**1.7%**	**-5.1%**	**-3.3%**	**3.2%**

Source: FAA TAF 2016-2045

After comparing the average annual growth forecast and historic trendline analysis, an average annual growth rate of 1.2 percent was selected for the based aircraft growth rate through the planning period. A 1.2 percent growth rate represents the average of the historic FAA TAF growth rate (1.7 percent), MassDOT/AD historic growth rate (2.9 percent), and the Airport's historic growth rate (-0.9 percent). While the average annual growth rate of 1.2 percent deviates from the FAA TAF (0.0 percent growth rate) projection, it remains within 10 percent of the FAA TAF projection in the 5-year projected forecast, and within 15 percent of the FAA TAF projection in the 10-year projected forecast. Further, a 1.2 percent AAGR maintains an optimistic outlook of aviation growth at the Airport and is more consistent with what the region is expected to experience. Table 4-20 below compares the recommended 1.2 percent based aircraft growth against the high and low scenarios.

Table 4-20: Recommended Based Aircraft Growth Rate

Year	High Scenario 2.9%	Low Scenario -0.9%	Recommended 1.2%
2016	32	32	32
2017	33	32	32
2018	34	31	33
2019	35	31	33
2020	36	31	34
2021	37	31	34
2022	38	30	34
2023	39	30	35
2024	40	30	35
2025	41	29	36
2026	43	29	36
2027	44	29	36
2028	45	29	37
2029	46	28	37
2030	48	28	38
2031	49	28	38
2032	51	28	39
2033	52	27	39
2034	54	27	40
2035	55	27	40
2036	57	27	41
2037	58	26	41

Source: FAA TAF, MassDOT/AD, Gale Associates 2017

4.7.2 AIRCRAFT OPERATIONS

The total aircraft operations forecasts at 0B5 for the planning period 2017-2037 is presented in Table 4-21 below. Overall, the FAA TAF projects operations at 0B5 to remain flat throughout the planning period with a 0.0 percent growth rate. Lacking better baseline data, the TAF often assumes a zero-growth rate when forecasting future operations at non-towered airports. While this flat growth rate is below the regional average of 0.39 percent, and national average of 0.61 percent, it is in line with the three airports within 0B5's service area.

Table 4-21: 0B5 Total Projected Aircraft Operations Forecast

Year	Itinerant Operations				Local Operations			
	Air Taxi & Commuter	**GA**	**Military**	**Total**	**Civil**	**Military**	**Total**	**Total Operations**
2016	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2017	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2018	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2019	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2020	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2021	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2022	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2023	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2024	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2025	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2026	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2027	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2028	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2029	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2030	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2031	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2032	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2033	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2034	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2035	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2036	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2037	100	5,000	0	5,100	12,500	0	12,500	**17,600**
AAGR	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**

Source: FAA TAF 2016-2045

4.7.2.1 Aircraft Operations Forecast (Local vs. Itinerant Split)

The FAA TAF provides the activity split between local and itinerant operations. As shown in Table 4-22, from 2006 to 2016 local operations on average accounted for 70.3 percent of total operations, while itinerant operations accounted for approximately 29.7 percent.

Table 4-22: Historic Itinerant vs. Local Operations

Year	Itinerant Operations	Itinerant Percent	Local Operations	Local Percent	Total Operations
2006	6,650	33.8	13,000	66.2	19,650
2007	6,100	31.9	13,000	68.1	19,100
2008	5,100	29.0	12,500	71.0	17,600
2009	5,100	29.0	12,500	71.0	17,600
2010	5,100	29.0	12,500	71.0	17,600
2011	5,100	29.0	12,500	71.0	17,600
2012	5,100	29.0	12,500	71.0	17,600
2013	5,100	29.0	12,500	71.0	17,600
2014	5,100	29.0	12,500	71.0	17,600
2015	5,100	29.0	12,500	71.0	17,600
2016	5,100	29.0	12,500	71.0	17,600
Average		**29.7**		**70.3**	

Source: FAA TAF 2006-2016

As described in section 4.7.2, the TAF projects that itinerant and local operations will remain flat at 0B5 with an AAGR of 0.0 percent through the planning period. Thus, local operations are expected to continue to dominate the majority of operations at the Airport.

4.7.2.2 Baseline Operational Fleet Mix

The type of aircraft utilizing the airport plays a key role in planning future airport facilities. According to airport personnel, the Airport's annual operational fleet mix is estimated to be broken down into the following groups:

- Single engine fixed wing- 80%
- Multi engine fixed wing- 10%
- Turboprop (King Air, PC-12)- 5%
- Helicopter- 4%
- Jet- <1%

4.7.2.3 Projected Operational Fleet Mix

While 0B5 supports a variety of aircraft, the majority of current operations are estimated to be conducted by single-engine aircraft. As discussed in the previous section, the percent of operational fleet mix is based on estimates and through discussions with airport management. Utilizing the FAA TAF, Table 4-23 projects the operational fleet mix over the planning period.

Table 4-23: Projected Operational Fleet Mix

Aircraft Category	Itinerant			Local		
	2022	**2027**	**2037**	**2022**	**2027**	**2037**
Single-Engine	4,080	4,080	4,080	10,625	10,625	10,625
Multi-Engine	510	510	510	1,875	1,875	1,875
Turbo Prop	255	255	255	0	0	0
Helicopter	204	204	204	0	0	0
Jet	51	51	51	0	0	0
Total	**5,100**	**5,100**	**5,100**	**12,500**	**12,500**	**12,500**

Source: FAA TAF 2016-2045, Gale 2017 Analysis

4.7.2.4 Alternative Projected Aircraft Operations Forecast

Projecting the number of annual operations at GA airports plays an important role in understanding potential sources of revenue, facility needs, and adequacy of existing facilities. The more activity generated at an airport, the more likely revenue streams from collection of tie-downs, fuel sales, and other charges increase. The alternative projected aircraft operations forecast employs the AAGR from three alternative sources: 1) Historic Operations at 0B5; 2) FAA Aerospace Forecast; and 3) Unique Local Factors.

- **Alternative 1- 0B5 Historic Operations Growth:** According to the FAA TAF, over the past 10 years (2006-2016) 0B5 operations have be declining at an AAGR of -1.1 per year. During this same time period, operations in the FAA New England Region have experienced an AAGR of -3.4 percent, and the U.S. experienced and AAGR of -1.4 percent. Using 2016 operations as a base, an AAGR of -1.1 percent is applied to the base operations through the planning period (2017-2037). The results are outlined in Table 4-24 below.

Table 4-24: Alternative 1- 0B5 Historic Operations Growth

Year	Itinerant				Local Operations			
	Air Taxi & Commuter	GA	Military	Total	Civil	Military	Total	Total Operations
2016	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2017	104	4,943	0	5,048	12,359	0	12,359	**17,406**
2018	103	4,889	0	4,992	12,223	0	12,223	**17,215**
2019	102	4,835	0	4,937	12,088	0	12,088	**17,026**
2020	101	4,782	0	4,883	11,955	0	11,955	**16,838**
2021	100	4,729	0	4,829	11,824	0	11,824	**16,653**
2022	99	4,677	0	4,776	11,694	0	11,694	**16,470**
2023	98	4,626	0	4,724	11,565	0	11,565	**16,289**
2024	97	4,575	0	4,672	11,438	0	11,438	**16,110**
2025	96	4,525	0	4,620	11,312	0	11,312	**15,932**
2026	95	4,475	0	4,570	11,188	0	11,188	**15,757**
2027	94	4,426	0	4,519	11,064	0	11,064	**15,584**
2028	92	4,377	0	4,470	10,943	0	10,943	**15,412**
2029	91	4,329	0	4,420	10,822	0	10,822	**15,243**
2030	90	4,281	0	4,372	10,703	0	10,703	**15,075**
2031	89	4,234	0	4,324	10,586	0	10,586	**14,909**
2032	88	4,188	0	4,276	10,469	0	10,469	**14,745**
2033	87	4,142	0	4,229	10,354	0	10,354	**14,583**
2034	87	4,096	0	4,183	10,240	0	10,240	**14,423**
2035	86	4,051	0	4,137	10,127	0	10,127	**14,264**
2036	85	4,006	0	4,091	10,016	0	10,016	**14,107**
2037	84	3,962	0	4,046	9,906	0	9,906	**13,952**
AAGR	**-0.8**	**-1.1**	**0.0**	**-1.1**	**-1.1**	**0.0**	**-1.1**	**-1.1**

Source: FAA TAF 2016-2045

- **Alternative 2- FAA Aerospace Forecast:** The national forecasts for contract towered airports in the FAA Aerospace Forecast, Fiscal Years 2016-2037 show aircraft operations growing at an average annual rate of 0.8 percent over the forecast period. Average annual growth rates for this period, by user group, are as follows: air carrier, 2.3 percent; air taxi/commuter, -0.9 percent; itinerant general aviation, 0.3 percent; and local civil, 0.4 percent. Table 4-25 illustrates the projected growth by applying the average FAA Aerospace Forecast growth rates to the appropriate user groups at 0B5. The AAGR for the air carrier user group was excluded from this analysis as 0B5 does not have air carrier service.

Table 4-25: Alternative 2- FAA Aerospace Forecast

Year	*Itinerant Operations*				*Local Operations*			
	Air Taxi & Commuter	**GA**	**Military**	**Total**	**Civil**	**Military**	**Total**	**Total Operations**
2016	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2017	99	5,015	0	5,114	12,550	0	12,550	**17,664**
2018	98	5,030	0	5,128	12,600	0	12,600	**17,728**
2019	97	5,045	0	5,142	12,651	0	12,651	**17,793**
2020	96	5,060	0	5,157	12,701	0	12,701	**17,858**
2021	96	5,075	0	5,171	12,752	0	12,752	**17,923**
2022	95	5,091	0	5,185	12,803	0	12,803	**17,988**
2023	94	5,106	0	5,200	12,854	0	12,854	**18,054**
2024	93	5,121	0	5,214	12,906	0	12,906	**18,120**
2025	92	5,137	0	5,229	12,957	0	12,957	**18,186**
2026	91	5,152	0	5,243	13,009	0	13,009	**18,252**
2027	91	5,167	0	5,258	13,061	0	13,061	**18,319**
2028	90	5,183	0	5,273	13,113	0	13,113	**18,386**
2029	89	5,199	0	5,287	13,166	0	13,166	**18,453**
2030	88	5,214	0	5,302	13,218	0	13,218	**18,521**
2031	87	5,230	0	5,317	13,271	0	13,271	**18,588**
2032	87	5,245	0	5,332	13,324	0	13,324	**18,656**
2033	86	5,261	0	5,347	13,378	0	13,378	**18,725**
2034	85	5,277	0	5,362	13,431	0	13,431	**18,793**
2035	84	5,293	0	5,377	13,485	0	13,485	**18,862**
2036	83	5,309	0	5,392	13,539	0	13,539	**18,937**
2037	83	5,325	0	5,407	13,593	0	13,593	**19,000**
AAGR	**-0.9%**	**0.3%**	**0.0%**		**0.4%**	**0.0%**		**0.4%**

Source: FAA Aerospace Forecast 2017-2037

- **Alternative 3- Unique Local Factors Forecast:** Although the TAF projects no increase or decline in operations at 0B5 through the planning period, this is likely attributed to the FAA's lack of more recent and accurate baseline data, which results in an assumed zero-growth rate. However, there is a potential latent demand that exists at 0B5. Within the region, there are several medium sized companies and four (4) private boarding schools: Deerfield Academy, Eagle Brook School, Northfield Mount Hermon, and The Bement School, which are comprised of national and international students requiring travel into the region.

  Through outreach efforts (see Appendix A), each of the schools indicated that students and parents are utilizing some of the larger airports in the region throughout the school year. The majority of the schools indicated they were unsure of the exact number of operations or that they were not privy to that information. However, Deerfield Academy representatives indicated that parents and students are using Westfield-Barnes Airport, and these activities account for

approximately 100 operations per year. Deerfield Academy is located approximately 5 miles from 0B5. The enrollment at Deerfield Academy is 648 students. Using this rationale, the breakdown of enrollment and estimated aviation operations is projected for the remaining three schools.

- Eagle Brook School- 248 enrolled students resulting in approximately 40 operations.
- Northfield Mount Hermon- 650 enrolled students resulting in approximately 100 operations.
- The Bement School- 220 enrolled students resulting in approximately 30 operations.

It is not unrealistic to believe that if 0B5 had adequate runway length to accommodate B-II type aircraft that they would capture a percentage of operations currently bypassing them. As such, Table 4-26 *Alternative 3- Unique Local Factors Forecast* below reflects this increase in itinerant operations, assuming the runway is lengthened to 4,200 feet by 2023.

Table 4-26: Alternative 3- Unique Local Factors Forecast

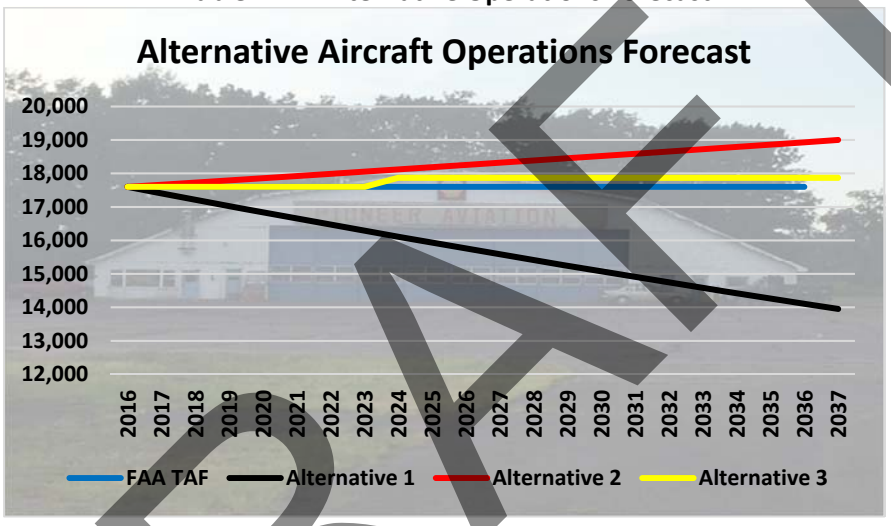
Year	*Itinerant Operations*				*Local Operations*			
	Air Taxi & Commuter	**GA**	**Military**	**Total**	**Civil**	**Military**	**Total**	**Total Operations**
2016	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2017	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2018	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2019	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2020	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2021	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2022	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2023	100	5,000	0	5,100	12,500	0	12,500	**17,600**
2024	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2025	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2026	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2027	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2028	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2029	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2030	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2031	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2032	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2033	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2034	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2035	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2036	100	5,270	0	5,370	12,500	0	12,500	**17,870**
2037	100	5,270	0	5,370	12,500	0	12,500	**17,870**
AAGR	**0.0%**	**0.25%**	**0.0%**	**0.24%**	**0.0%**	**0.0%**	**0.0%**	**0.07%**

Source: FAA TAF 2016-2045, Gale 2017

4.7.2.5 Recommended Aircraft Operations Forecast

As detailed in Table 4-27, the TAF for 0B5 projects flat growth in operations during the planning period with total operations remaining stable at 17,600. Alternative 1- *0B5 Historical Operations Growth* projects the total number of aircraft operations at the Airport to decrease by 3,648 operations from 17,600 in 2016 to 13,952 in 2037. This represents a 20.7 percent decrease in operations during the planning period with AAGR of -1.1 percent. Alternative 2- *FAA Aerospace Forecast* projects an increase of 1,400 operations from 17,600 in 2016 to 19,000 in 2037. This represents an 8.0 percent increase in operations during the planning period with an AAGR of 0.4 percent. Alternative 3- *Unique Local Factors Forecast* projects an increase of 270 operations from 17,600 in 2016 to 17,870 in 2037. This represents 1.5 percent increase during the planning period with an AAGR of 0.07 percent.

Table 4-27: Alternative Operations Forecast



Source: FAA Aerospace Forecast 2017-2037, FAA TAF 2016-2045, Gale Analysis

After comparing total aircraft operations at 0B5 and applying the three alternative growth scenarios, there appear to be unique local circumstances and/or potential influencing factors that suggest a deviation from the TAF in section 4.7.2 is warranted. There is credible evidence supporting the potential latent demand identified in the region, and it is recommended that airport employ *Alternative 3- Unique Local Factors Forecast* as the preferred growth rate. While *Alternative 3- Unique Local Factors Forecast* deviates from the TAF, the forecast differs less than 10 percent in the 5-year forecast period, and less than 15 percent in the 10-year forecast period. Additionally, the projected growth at 0B5 remains in line with what is expected at other airports within 0B5's service area, and it does not radically differ from what is projected in the FAA New England Region (AAGR 0.39 percent) and Nationally (AAGR 0.61 percent).

Although future aviation activity will rely on the FAA TAF and Unique Local Factors Forecast projections, it is recommended that the Airport monitor actual growth activity annually so scheduling of capital improvements can be identified and implemented. As previously discussed, it is important to view the projections independently of specific years and to consider the actual growth of activity as the impetus that influences the need for future airport facilities. Similarly, slower than projected growth may warrant deferment of planned improvements. Actual growth activity should be periodically (i.e. annually) compared to projected growth so scheduled corrections can be identified and implemented.

4.8 PEAK ACTIVITY ESTIMATES

Many airport facility needs are related to the levels of activity during peak periods. Peak characteristics are typically defined as peak month, average day, and peak hour activity. When projecting future activity levels at an airport it is important to identify and project peak period activity levels. These projections help facilitate future planning decisions and highlight an airport's ability to accommodate future aviation activity demand.

The values for average day peak month and for the peak hour have been calculated by taking the number of operations calculated for the peak month and dividing that figure by the number of days in the peak month. In the case of 0B5, per the Airport's 2016 records, May represents the peak month with 31 days. It is estimated that 15 percent of the average day peak month would best represent the number of peak hour operations. The calculation of peak activity is illustrated in Table 4-28.

Table 4-28: Peak Activity Estimates

	Total Annual[1] Operations	*Peak Month[2] (May)*	*Average Day Peak Month*	*Peak Hour (ADPM)*
Base Year 2016	17,600	1,161	37	6
Forecast				
2022	17,600	1,161	37	6
2027	17,870	1,179	38	6
2037	17,870	1,179	38	6

Source: FAA TAF 2016-2045, Gale Analysis 2017, Airport Records

[1] FAA TAF 2016-2045 (2016), Unique Local Factors (2022-2037)

[2] Airport Record Counts

4.9 SUMMARY OF FORECASTS

Table 4-29 summarizes the recommended aviation demand forecasts for 0B5 for the 5-, 10-, and 20-year planning periods discussed in this chapter. In the subsequent chapters, these projections of future aviation activity will be used to assess the capacity of existing facilities and determine improvements required to satisfy future activity levels.

Table 4-29: Airport Recommended Forecast Summary

Fiscal Year	*Itinerant*			*Local*			
	Air Taxi	General Aviation	Military	Civil	Military	Total Operations	Based Aircraft
2022	100	5,000	0	12,500	0	17,600	34
2027	100	5,270	0	12,500	0	17,870	36
2037	100	5,270	0	12,500	0	17,870	41

Source: FAA TAF 2016-2045, Gale 2017

Table 4-30: Airport Recommended Forecast Summary Operational Fleet Mix

Aircraft Category	*Itinerant*			*Local*		
	2022	**2027**	**2037**	**2022**	**2027**	**2037**
Single-Engine	4,080	4,080	4,080	10,625	10,625	10,625
Multi-Engine	510	510	510	1,875	1,875	1,875
Turbo Prop	255	525	525	0	0	0
Helicopter	204	204	204	0	0	0
Jet	51	51	51	0	0	0
Total	**5,100**	**5,370**	**5,370**	**12,500**	**12,500**	**12,500**

Source: FAA TAF 2016-2045, Gale 2017

4.9.1 DESIGN AIRCRAFT

Existing Critical Aircraft

The selection of a design aircraft is a fundamental step in determining the design standards that apply at an airport. Airports are designed to accommodate a particular aircraft or similar aircraft types that either use or are reasonably expected to use the airport over a specified period of time (the planning period). With respect to the use of Turners Falls by turboprop and jet aircraft, airport personnel and users indicate that the current low usage of the airport by these aircraft is mainly due to the short runway length of 3,200 feet (with an additional 550-foot displaced threshold on the Runway 34 end). Extension of the runway to 4,200 feet would allow many small jets and turboprop aircraft to use the airfield more frequently.

The Airport's 1999 Master Plan Study indicated that itinerant use of the runway by these aircraft in 1998 consisted of 200 operations in that year. By 2009 (when the runway was presumed to be extended) the report indicated that the use of the airport by jet and turboprop aircraft was projected to increase from

200 operations per year to 425 operations and subsequently increase to 750 operations by 2019. However, due to rare species habitat issues, tribal considerations, and the economic downturn experienced in the United States in 2007-2008, the runway extension project was delayed, and the Airport subsequently hasn't experienced the type of growth previously forecasted. As outlined Section 4.7.2.2 *Baseline Operational Fleet Mix,* single-engine aircraft dominate the fleet mix. Through discussions with Airport Management and personnel, the aircraft type most commonly utilizing the airport is represented by the Cessna 182 Skylane. The Cessna 182 Skylane is a single engine aircraft with a wingspan of 35.8 feet, and an approach speed of 92 knots. The designation of the Cessna 182 Skylane as the existing critical design aircraft results in the application of an Aircraft Approach Category 'B' (Approach speed 91 knots or more but less than 121 knots), and Airplane Design Group 'I' (Wingspan <49').

Future Critical Aircraft

According to FAA AC 150/5000-17[5], the future critical aircraft is determined with an FAA-approved forecast that considers aircraft "highly likely" or "expected" to regularly use the airport. In further support of the forecasts, and particularly the use of *Alternative 3- Unique Local Factors Forecast*, discussion with local businesses, schools, and other institutions in the area regarding the current use of the Airport by small jets and turboprop aircraft was instructive (see Appendix A). Deerfield Academy, located approximately 5 miles from 0B5, is an independent, coeducational boarding and day school for students in grades 9-12. Through discussions with an Academy representative, it was indicated that many of their students and parents utilize Westfield-Barnes Airport throughout the school year because 0B5's runway cannot support the jet traffic. The Academy representative estimated that 0B5 is losing approximately 100 operations by small jets/turboprop aircraft due to its inadequate runway length. There are several other private schools located in the area of 0B5, including Eagle Brook School, Northfield Mount Hermon, and The Bement School that attract both national and international students. Through discussions with each of these schools, it was indicated that their students do use many of the larger regional airports, but had difficulty quantifying the usage, or stated that they are not privy to the information.

Based on previous documentation, the aircraft most likely to utilize the Airport is most closely represented by the Beech King Air B-200 airplane. The B-200 is a twin engine, turboprop business aircraft that seats up to ten passengers and has a maximum certificated takeoff weight of 12,500 lbs., a wingspan of 54.5 feet, and an approach speed of 98 knots. The designation of the B-200 as the future critical design aircraft results in the application of an Aircraft Approach Category 'B' (Approach speed 91 knots or more but less than 121 knots), and Airplane Design Group 'II' (Wingspan 49' - <79').

The noted existing activities in Section 4.7.2.3 *Projected Operational Fleet Mix*, and latent demand identified in Section 4.7.2.4 *Alternative 3 Unique Local Factors Forecast* account for approximately 576 operations per year by B-II type aircraft. Where the FAA TAF assumes a zero-growth rate when forecasting future operations at non-towered airports, it seems evident that these current operations will continue to grow in the future and will account for well over 500 operations per year by B-II type aircraft. The majority of these B-II type aircraft require 4,200 feet of runway length to operate safely and efficiently.

[5] https://www.faa.gov/documentLibrary/media/Advisory_Circular/AC_150_5000-17.pdf

CHAPTER 5 – FACILITY REQUIREMENTS

This chapter utilizes information collected in Chapter 2, *Inventory of Existing Facilities*; considers the projected demand and critical design aircraft for the Airport identified in Chapter 4, *Forecasts of Aviation Demand and Capacity*; and provides a review of compliance with FAA design standards, other airport requirements, and user needs. FAA standards for airport design and Federal Aviation Regulation Part 77, *Objects Affecting Navigable Airspace* (FAR Part 77), are used to analyze facility conditions to identify needed improvements, replacement or expansion. Facility improvements may also be recommended to fill a demand for services, not just to meet design or safety standards.

5.1 DESIGN AIRCRAFT

The Airport's 2003 Master Plan Update identified 0B5's design aircraft as the Beech King Air B-200, and therefore, improvements through the planning period were implemented to comply with B-II category design standards. During the development of this Master Plan, it was discovered that the most demanding aircraft currently using the airport is more accurately identified as the Cessna 182 Skylane, which falls under the B-I design category. However, as indicated in Chapter 4, *Forecasts of Aviation Demand and Capacity (Section 4.9.1 Design Aircraft)*, latent demand by B-II type aircraft (i.e., Beech King Air B-200) exists in the region, and the Airport is expected to experience a significant increase in operations by B-II type aircraft through the planning period.

Consequently, the Airport has identified an existing critical aircraft (Cessna 182 Skylane – B-I), as well as a future critical aircraft (Beech King Air B-200 – B-II). Improvements made during the short term (through 2022) should be predicated on B-I category aircraft, and mid-term (through 2027) to long-term (through 2037) improvements should be predicated on B-II category aircraft. Since previous improvements were made based on B-II design standards, most of the airport's infrastructure already meets the requirements for both B-I and B-II category aircraft, as detailed below.

5.2 AIRSIDE CAPACITY AND REQUIREMENTS

Airport facilities that aid in the movement of aircraft are generally considered to be airside facilities, and include runways, taxiways, aprons, navigational aids, and airfield lighting systems. This section will review the capacity and utility of the Airport's airside facilities and their compliance with FAA design standards. As discussed in Chapter 4, the future critical design aircraft for Turners Falls Municipal Airport is the Beech King Air B-200, which is categorized as a B-II aircraft.

5.2.1 RUNWAY CAPACITY

Airport capacity is typically expressed in terms of the number of aircraft operations that can be conducted in a given period. Capacity is most often expressed as annual capacity (or annual service volume, ASV) and hourly capacity (or throughput) for a particular runway and taxiway configuration. The FAA's Advisory Circular 150/6050-5, *Airport Capacity and Delay*, utilizes computer models developed by the FAA to evaluate airport capacity and reduce aircraft delay. These models use an airport's ASV to approximate the

capacity of the runway, while accounting for differences in runway configuration, fluctuations in aircraft fleet mix, touch and go activity levels, and weather conditions, among other factors.

The FAA models estimate 0B5's ASV capacity to be up to 230,000 operations per year. 0B5's annual operations volume in 2016 was 17,600, and the forecasted annual operations are only expected to reach 17,870 by 2037. Therefore, runway capacity is not an existing problem, nor does it appear that it will be a problem during the planning period. Further, according to FAA requirements, 0B5's runway capacity will be considered adequate until operations reach 60% of its ASV (138,000 annual operations).

Recommendation: The runway capacity at the Airport is sufficient to meet the needs of the Airport for the duration of the planning period.

5.2.2 RUNWAY REQUIREMENTS

Runway dimensional requirements for the planning period are based upon the Airport's critical design aircraft. The FAA has prescribed standards for the layout of airport facilities including runways, taxiways, approach surfaces, etc. based upon an airport's critical design aircraft. Runway dimensional requirements for Runway 16-34 and the Airport's current compliance status are presented in Table 5-1. These standards are discussed individually in the following sections.

Table 5-1: Runway 16-34 Dimensional Requirements

Facility	*FAA Design Criteria (B-II)*	*Existing RW 16-34 (B-II)*	*RW 16-34 Compliance*
Runway centerline to holdline	200'	TW 'A' RW 34 end - 218' TW 'B' - 203' TW 'A' RW 16 end - 200'	Complies
Runway centerline to parallel taxiway centerline	240'	240'	Complies
Runway centerline to edge of aircraft parking	250'	310'	Complies
Runway Protection Zone:			
Length	1000'	1000'	Complies
Inner width (200' beyond RW)	500'	500'	Complies
Outer width	700'	700'	Complies
Runway pavement width	75'	75'	Complies
Runway safety area width	150'	150'	Complies
Runway safety area length beyond runway end	300'	300'	Complies
Runway object-free area width	500'	500'	Complies
Runway object-free area length beyond runway end	300'	300'	Complies
Runway obstacle-free zone width	250'	250'	Complies
Runway obstacle-free zone length beyond runway end	200'	200'	Complies

Source: AC 150/5300-13A

5.2.2.1 Runway Length Requirements

As previously discussed, runway dimensional requirements are predicated on the capacity and safety requirements of a family of aircraft or a specific aircraft using or expected to regularly use the runway. 0B5's 2003 Runway and Terminal Area Study and ALP Update, as well as Chapter 4, *Forecasts of Aviation Demand and Capacity* of this document, identify the future critical design aircraft as the Beech King Air B-200. The King Air B-200 has an Aircraft Approach Category of 'B' (Approach speed 91 knots or more but less than 121 knots), and an Airplane Design Group 'II' (Wingspan 49' - <79').

AC 150/5325-4B "Runway Length Requirements for Runway Design" provides guidelines for calculating runway length. In accordance with the AC, the following factors were considered when determining the required runway length at 0B5:

- The King Air B-200 is categorized as a "small airplane" due to its maximum takeoff weight of 12,500 pounds;
- The King Air B-200 has an approach speed of 121 knots;
- The mean daily maximum temperature of July (the hottest month of the year) in Turners Falls, MA is 86° F[1]; and
- The Airport elevation is 359 feet above mean seal level.

According to these factors and Figure 2-2 *Small Airplanes Having 10 or More Passenger Seats* from AC 150/5325-4B, the required runway length at 0B5 was determined to be approximately 4,200 feet.

Runway 16-34, the Airport's only runway, is 3,200 feet in length and has a displaced threshold of 550 feet on the Runway 34 end.

Table 5-2 summarizes available runway distances at the airport.

Table 5-2: Available Runway Lengths at 0B5

Runway End	*Pavement Length (feet)*	*Threshold Displacement (feet)*	*Maximum Takeoff Length (feet)*	*Maximum Landing Length (feet)*
16	3,200	0	3,200	3,200
34	3,200	550	3,200	2,650

Source: Gale Analysis

Recommendation: Per FAA AC 150/5325-4B, the length of Runway 16-34 (3,200 feet) is not adequate to meet the needs of the future critical design aircraft. The Airport should take action to recapture the existing displaced threshold on the Runway 34 end and further extend Runway 16-34 by an additional 1,000 feet to achieve a total runway length of 4,200 feet. In addition to satisfying the runway length requirements of the future critical design aircraft, it is anticipated that a 1,000-foot runway extension would eliminate existing ground penetrations to the Runway 34 approach surface.

[1]Runway Length Analysis, Turners Falls Municipal Airport 1999 AMPU Technical Report

5.2.2.2 Runway Approach Requirements

This section will review the current and preferred runway approach types and will provide an overview of the protected surfaces associated with the new runway approaches.

Existing Approaches:

Currently, 0B5 has an *RNAV (GPS) Approach with Lateral Navigation (LNAV).* This approach does not provide guidance to a specific runway, and because the final approach course is not aligned with any runway, the approach only provides circling minima. This approach is supported by the following navigational/visual/ communication aids:

- Runway lighting
- Threshold lights
- Precision Approach Path Indicator
- Medium Intensity Approach Lighting System
- Airport Rotating Beacon
- Runway End Identifier Lights (REILS)

Table 5-3 outlines the required standards for Instrument Approach Procedures.

Table 5-3 Standards for Instrument Approach Procedures

Visibility Minimums	*< ¾ statute mile*	*¾ to < 1 statue mile*	*≥ 1 statute mile straight-in*	*Circling*
Height Above Touchdown Zone	< 250’	≥ 250’	≥ 250’	≥ 350’
TERPS Chapter 3, Section 3	34:1 clear	20:1 clear	20:1 clear, or penetrations lighted for night minimums	
Precision Obstacle Free Zone	Required		Recommended	
Minimum Runway Length	4,200’ (paved)		3,200’ (paved)	
Runway Markings	Precision	Non-Precision	Non-Precision	Visual (Basic)
Holding Position Sign & Markings	Precision	Non-Precision	Non-Precision	Visual (Basic)
Runway Edge Lights	*HIRL/MIRL*	*HIRL/MIRL*	*MIRL/LIRL*	*MIRL/LIRL (Required only for night minimums)*
Parallel Taxiway	Required	Required	Recommended	Recommended
Approach Lights	MALSR, SSALR, or ALSF	Recommended	Recommended	Not Required
Airport Layout Plan	Required	Required	Required	Recommended

Source: FAA AC 150/5300-13A, Table 3-4

Future Proposed Approaches: In April 2018, the Airport consulted with the FAA New England Region Flight Procedures Team regarding the establishment of a Straight-In approach to Runway 16. Per discussions with the Flight Procedures Team, in order to publish a Straight-In approach to Runway 16, Runway markings will need to be updated to Non-Precision Instrument[2]. Additionally, Flight Procedures data indicated that a vertically guided approach to Runway 16 is possible with preliminary DA/HAT (Decision Altitude/Height Above Touchdown) of 703 feet/350 feet and 1 statue mile of visibility with the removal of three trees identified off the Runway 16 end.

As part of the Runway 16-34 reconstruction and precision approach path indicator (PAPI) project in 2009, the Airport cleared on-airport vegetation in the Runway 16 end. Further, the Town of Montague cleared additional vegetation off-airport, along Industrial Boulevard around the same time. As a result, the trees identified through discussions with Flight Procedures as controlling penetrations are believed to have been removed. On April 19, 2018, the Airport Manager GPS-located the area of suspected trees and confirmed they have been removed.

Recommendation: Provide FAA Flight Procedures with written certification that the trees have been removed and begin the Instrument Flight Procedures request process by completing an IFP request form in order to establish a straight-in approach to Runway 16. If Runway 16-34 is extended by 1,000 feet, the airport must install pavement "aiming point" markings.

5.2.2.3 Part 77 Requirements

The airspace surrounding public use airports is governed by regulations found within 14 Code of Federal Regulations (CFR) Part 77. This regulation is known by its more common title as "14 CFR, Federal Aviation Regulation (FAR) Part77- Objects Affecting Navigable Airspace (Part 77)", which was promulgated by the FAA and includes areas around airports (sometimes called Imaginary or Protected Surfaces) that must be kept clear of penetrating objects, called "obstructions". By accepting FAA funding, an airport agrees to make all reasonable efforts to keep its Part 77 and other protected surfaces clear of obstructions. Part 77 also includes guidance for analysis and marking of penetrating objects in specific cases. Objects are defined by Part 77 as:

"any object of natural growth, terrain, or permanent or temporary construction or alteration, including equipment and materials used therein, and apparatus of a permanent or temporary character; and alteration of any permanent or temporary existing structure by a change in its height (including appurtenances), or lateral dimensions, including equipment or materials used therein."

[2] Per FAA AC 150/5340-16, the Airport's current runway surface markings comply with the threshold approach category; however, if the runway is lengthened 1,000 feet, aiming points would be required.

Part 77 specifies the dimensions of imaginary surfaces for each individual airport based on the type and size of aircraft using the facility, the runway surface treatment, as well as the type of navigation and approach aids available to pilots. Five imaginary surfaces are identified and defined under Part 77, they are:

- Primary Surface
- Approach Surface
- Transitional Surface
- Horizontal Surface
- Conical Surface

Figure 5-1 depicts these surfaces to a typical runway. Dimensions for each of these surfaces are stipulated in Part 77. Depending upon the application of criteria outlined in the regulation, surface dimensions may vary from runway to runway. The surfaces are defined as follows:

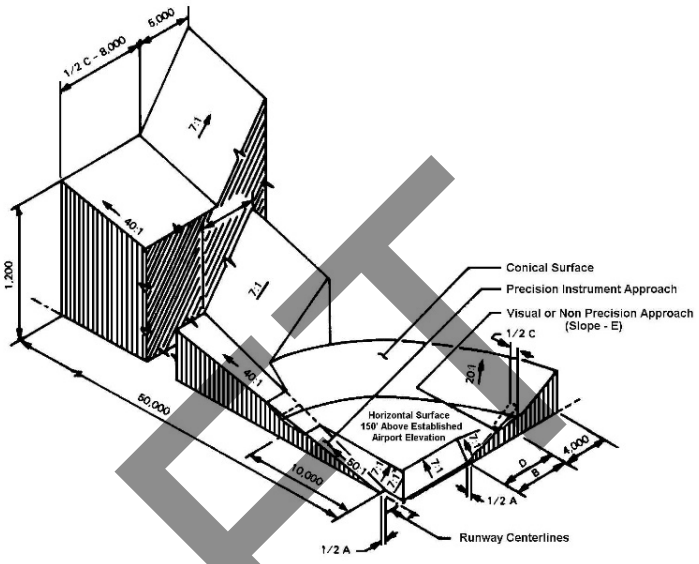


Figure 5-1: Part 77 Surfaces

- Primary Surface- A rectangular shaped surface longitudinally centered on the runway centerline with the same elevation as the nearest corresponding point on the runway centerline. The primary surface dimensions will vary depending on the runway approach type and the type of runway surface.
- Approach Surface- A trapezoidal shaped surface centered on the runway centerline and extending outward and upward from each end of the primary surface at a prescribed slope angle. Approach surface dimensions and slope angle will vary according to the runway approach type.
- Transitional Surface- This surface is an inclined plane running parallel to the runway centerline beginning at the edges of the primary and approach surfaces. They then extend upward and outward at a slope of seven feet horizontally for every one foot vertically (7:1) from the sides of the primary and approach surfaces to the horizontal surfaces (150' above the Airport elevation).
- Horizontal Surface- This surface is an oval shaped, horizontal plane established by Part 77 to be 150 feet above the Airport elevation. It is established by swinging arcs from the intersection of the extended runway centerline and primary surface at each end of the runway then closing each area with tangent lines. In areas where the primary, approach, and transitional surfaces may overlap, the surface with the lowest elevation is the controlling surface.
- Conical Surface- This surface extends upward and outward from the edge of the horizontal surface at a slope of twenty feet horizontally for every one-foot vertically (20:1) for 4,000 horizontal feet from the edge of the horizontal surface.

The Part 77 surface dimensions and their compliance status for Runway 16-34 at the Airport are shown in Table 5-4. The Part 77 surfaces are shown on Sheet 5 of the ALP set, *FAR Part 77 Surfaces Plan.*

Compliance, as defined in Table 5-4, means that the surface is unobstructed by penetrating objects, or that penetrating objects are property mitigated through FAA approved lighting or other means.

Table 5-4: Runway 16-34 Part 77 Compliance

Protected Surfaces		*Dimensions (Non-Precision Instrument RW 16)*	*Dimensions (Non-Precision Instrument RW 34)*	*Compliance*
Primary Surface	Width	500’	500’	
	Length beyond R/W End	200’	200’	Contains Ground Obstructions
Approach	Width at Inner end	500’	500’	Clear
	Width at Outer end	2,000’	2,000’	Clear
	Length	5,000’	5,000’	
	Slope	20:1	20:1	
Transitional surface	Slope	7:1	7:1	Contains Ground and Vegetative Obstructions
Horizontal surface	Radius	5,000’	5,000’	Contains Ground and Vegetative Obstructions
Conical surface	Slope	20:1	20:1	Contains Ground and Vegetative Obstructions
	Radius	4,000’	4,000’	Contains Ground and Vegetative Obstructions

Source: AC 150/5300-13A

5.2.2.4 TERPS Approach Requirements

FAA Order 8260.3B, United States Standards for Terminal Instrument Procedures (TERPS), contains the criteria used to formulate, review, approve, and publish procedures for instrument flight operations to and from civil and military airports. TERPS regulations recommend minimum obstacle clearances considered by the FAA to supply a satisfactory level of vertical protection to aircraft approaching the Airport. These are not requirements, but rather guidelines for enhancing aircraft safety. Table 5-X shows the dimensional standards for TERPS approach surfaces.

Table 5-5: Approach/Departure Standards Table

Runway		*Dimensional Standards* Start of Surface	Inner Width	Length	Outer Width	Slope
16	Category 4 – Approach end of runways expected to support instrument night operations, serving approach Category A and B aircraft only.	200' from Threshold	400'	10,000'	3,800'	20:1
34	Category 2 – Approach end of runways expected to serve small airplanes with approach speeds of 50 knots or more. (Visual runways only, day/night)	At the Threshold	250'	2,250'	700'	20:1

Source: AC 150/5300-13A, Table 3-2 Approach/Departure Standards Table

Recommendations: Initially, the Airport should coordinate with the FAA Airports Division to determine appropriate mitigation of Part 77 Obstructions. In many instances, this results in the need for obtaining property rights (fee simple or easement acquisition) on off-airport properties to clear, mark, or light identified obstructions to the Airport's Part 77 surfaces. However, where the TERPS document specifies the minimum measure of obstacle clearance that is considered by the FAA to supply a satisfactory level of vertical protection, the recommendation from the FAA may be to pursue clearing activities in accordance with the TERPS guidance. Further, it is recommended that the Airport develop a Vegetation Management Plan to guide short-, medium-, and long-term vegetation management removal from the airport's protected surfaces.

5.2.2.5 Runway Pavement Conditions

Runway 16-34, the Airport's only runway, was last rehabilitated in 2009. In 2016, MassDOT/AD conducted a statewide airport pavement management study, the results of which can be found on MassDOT's Airport Pavement Management System (APMS) website[3]. The system contains pavement condition information and photographs of runways, taxiways, aprons, T-hangars, and helipads for several airports across Massachusetts, including 0B5, and projects future pavement deterioration through 2022. The system rates the pavement conditions on a Pavement Condition Index scale of 0-100 using an interactive, color-coded system that allows users to click on a pavement segment to view the rating and supporting photographs for that particular section of pavement. The PCI scale is based on FAA guidance contained in

[3] https://www.appliedpavement.com/hosting/massachusetts/index.html

AC 150/5380-7B "Airport Pavement Management Program" (APMP). The rating scale can be found in Table 5-6, below.

Table 5-6: MassDOT/AD Pavement Condition Index Rating Scale

Condition	*Rating Number*
Good	100-86
Satisfactory	85-71
Fair	70-56
Poor	55-41
Very Poor	40-26
Serious	25-11
Failed	10-0

Source: FAA AC 150/5380-7B, MassDOT/AD Pavement Management System

The information contained in MassDOT/AD's APMS is the basis for the pavement condition recommendations contained in this chapter. The APMS evaluated Runway 16-34 at a 76 rating (Satisfactory) in 2016 and projects deterioration of the Runway to a 65 (Fair) rating by 2022. According to the APMS, any runway with a PCI below 75 is considered to be below "critical PCI" and requires major rehabilitative actions, such as overlay or reconstruction.

Recommendations: Runway 16-34 is currently listed in "satisfactory" condition with a 76 rating and is expected to deteriorate to a "fair" condition with a rating of 65 by 2022. The runway was last rehabilitated in 2009 and is not eligible for reconstruction until 2029. In an effort to prolong the useful life of Runway 16-34, the Airport should consider scheduling maintenance and preservation treatments to extend the life of the pavement.

5.2.3 TAXIWAY CAPACITY

Taxiway capacity calculations are typically computed only at airports where aircraft operational demand levels are very high and have taxiways that cross active runways where a capacity-limiting condition would exist. Since these situations aren't applicable at the Airport, taxiway capacities are considered adequate through the planning period. The Airport has two taxiways, Taxiway 'A' and Taxiway 'B', plus Taxilanes 'A1', 'A2', and 'A3' (see Figure 2-1).

5.2.3.1 Taxiway 'A' Requirements

Taxiway design requirements are based on the guidelines contained in AC 150/5300-13A. According to the AC guidelines, taxiways are categorized into Taxiway Design Groups (TDG), based on the design aircraft's cockpit to main gear and main gear width dimensions. Taxiway 'A' is the airport's primary full-length parallel taxiway, and 0B5 uses dimensions from the King Air B-200 (15 ft. cockpit to main gear and 17.14 ft. main gear width) to calculate its TDG. Based on this information, 0B5 is categorized under TDG-2. Table 5-7 presents the design criteria for TDG-2 and current Taxiway 'A' dimensions:

Table 5-7: Taxiway 'A' Compliance

Facility	*Design Criteria*	*Current Compliance*
Taxiway Width	35'	Complies
Taxiway Edge Safety Margin	7.5'	Complies
Taxiway Shoulder Width	15'	Complies
Taxiway Object-Free Area Width	131'	Complies
Taxiway Centerline to Runway Centerline Width	240'	Complies

Source: AC 150/5300-13A

5.2.3.2 Taxiway 'B' Requirements

Taxiway 'B' is the connecting taxiway between Runway 16-34 and Taxiway 'A'. Standards contained in AC 150/5300-13A require that Taxiway 'B' complies with TGD-2 standards. Table 5-8 presents the design criteria for TDG-2 and current Taxiway 'B' dimensions:

Table 5-8: Taxiway 'B' Compliance

Facility	*Design Criteria*	*Current Compliance*
Taxiway Width	35'	Complies
Taxiway Edge Safety Margin	7.5'	Complies
Taxiway Shoulder Width	15'	Complies
Taxiway Object-Free Area Width	131'	Complies
Taxiway Centerline to Runway Centerline Width	240'	N/A

Source: AC 150/5300-13A

5.2.3.3 Taxiway Pavements

Table 5-9 below outlines the dimensions, type of pavement, and year of construction or most recent major rehabilitation of each taxiway.

Table 5-9: Taxiway Pavements

Taxiway	*Dimensions*	*Type of Pavement*	*Year of Construction or most recent Major Rehab.*
Taxiway 'A'	Varies x 3,299'	Flexible	2010 & 2016
Taxiway 'B'	Varies x 185'	Flexible	2016
Taxilane 'A1'	40' x 189'	Flexible	2010
Taxilane 'A2'	Varies x 249'	Flexible	2016
Taxilane 'A3'	Varies x 212'	Flexible	2016

Source: Gale Associates Analysis 2017

According to the MassDOT/AD APMS, any taxiway with a PCI below 70 is considered to be below "critical PCI" and requires major rehabilitative actions. According to the MassDOT/AD, pavement ratings of the taxiways and taxilanes at 0B5 are as follows:

- **Taxiway 'A':** The majority of Taxiway 'A' was evaluated at a rating of 100 (Good condition) in 2016 and is projected to deteriorate to a rating of 90 (Good condition) by 2022. The Runway 16 end of Taxiway 'A' was evaluated at a rating of 78 (Satisfactory condition) in 2016 and projected to deteriorate to a rating of 68 (Fair condition) by 2022.
- **Taxiway 'B':** Taxiway 'B' was evaluated at a rating of 100 (Good condition) in 2016 and is projected to deteriorate to a rating of 90 (Good condition) by 2022.
- **Taxilane 'A1':** Taxilane 'A1' was evaluated at a rating of 78 (Satisfactory condition) in 2016 and is projected to deteriorate to a rating of 68 (Fair condition) by 2022.
- **Taxilane 'A2':** Taxilane 'A2' was reconstructed as part of the Taxiway 'A' rehabilitation project and was evaluated at a rating of 100 (Good condition) in 2016. Taxilane 'A2' is projected to deteriorate to a rating of 86 (Good condition) by 2022.
- **Taxilane 'A3':** Taxilane 'A3' was reconstructed as part of the Taxiway 'A' rehabilitation project and was evaluated at a rating of 100 (Good condition) in 2016. Taxiway 'A3' is projected to deteriorate to a rating of 95 (Good condition) by 2022.
- **Hangar Taxilanes off of Taxilane 'A2':** Taxilanes serving the hangars off of Taxilane 'A2' were evaluated at a rating of 52 (Poor condition) in 2016 and projected to deteriorate to a rating of 40 (Very Poor condition) by 2022.
- **West Apron Connecting Taxilane:** The connecting Taxilane to the West Apron was evaluated at a rating of 42 (Poor condition) in 2016 and is projected to deteriorate to a rating of 31 (Very Poor condition) by 2022.

Recommendation: The Airport should continue to monitor the condition of its taxiways and taxilanes and schedule maintenance and preservation treatments as required to extend the useful life of each pavement segment. The Airport should program in its CIP the rehabilitation and reconstruction of taxiway and taxilane pavement that is considered to be in failing condition. Upon extending Runway 16-34 by 1,000 feet, the Airport should consider extending Taxiway 'A' so that it serves as a full-length parallel taxiway.

5.2.4 APRON CAPACITY

The airport has two aprons, the Main Apron and the West Apron, which together can accommodate up to 9 aircraft. In addition to these spaces, Pioneer Aviation, the Airport's Fixed Base Operator (FBO) has apron tie-down spaces, which can accommodate up to 13 aircraft.

In 2016, the Airport had 32 based aircraft. In 2037, at the end of the planning period, the based aircraft fleet is forecasted to grow by approximately 1.2 percent to 41 total based aircraft. Assuming that 50 percent of the based aircraft will require tie-downs at the end of the planning period, 21 aircraft tie-downs will be needed to accommodate them.

Additionally, transient aircraft make use of the parking aprons. The Airport experienced 17,600 operations in 2016, with 5,100 (28.9 percent) being performed by itinerant aircraft. In order to identify the number

of required parking spaces for potential transient aircraft, the formula listed below was used. This number was identified by multiplying the number of operations per peak month (1,161) by the percent of itinerant aircraft at the Airport (29 percent), divided by the number of days in the month (31) multiplied by 100 percent and then divided by 2, assuming that half of the itinerant operations will require apron space.

{[1,161 x 29%}/31] x 100%}/2d = 5 transient aircraft parking spaces

The calculation concluded that 5 transient parking spaces are needed to accommodate the transient fleet during the planning period. Based upon the calculations, it is reasonable to conclude that the Airport will require 26 tie-down spaces to accommodate aircraft through the planning period. Since the Airport currently has 9 tie-down spaces and Pioneer Aviation has 13 tie-down spaces, totaling 22 spaces, additional spaces should be considered as demand warrants. In the case that Pioneer Aviation is no longer able to accommodate the Airport's tie-down space needs, the airport should consider reserving supplementary tie-down spaces on airport property.

A portion of the Main Apron was reconstructed as a part of the Taxiway 'A' reconstruction project in 2016, with the remaining area being constructed in 2004. The West Apron was reconstructed in 2004. Table 5-10 outlines the dimensions, type of pavement, and year of construction or most recent major rehabilitation of each apron.

Table 5-10: Apron Pavements

Apron	*Dimensions*	*Type of Pavement*	*Year of Construction or most recent Major Rehab.*
Main Apron	39,000 SF	Flexible	2016/2004
West Apron	33,100 SF	Flexible	2004

Source: Airport Management, Gale Associates Analysis 2017

According to the MassDOT/AD APMS, any apron with a PCI below 65 is considered to be below "critical PCI" and requires major rehabilitative actions. Pavement ratings of the aprons at 0B5 are as follows:

- **Main Apron:** The portion of the Main Apron reconstructed in 2016 was evaluated at a rating of 100 (Good condition) and is projected to deteriorate to a rating of 95 (Good condition) by 2022. The remaining portion of the Main Apron was evaluated at 91 (Good condition) in 2016 and is projected to deteriorate to a rating of 81 (Satisfactory condition) by 2022.
- **West Apron:** The West Apron was evaluated at a rating of 81 (Satisfactory condition) in 2016 and is projected to deteriorate to a rating of 68 (Fair condition) by 2022.

Recommendation: The Airport should continue to monitor its operations and demand for tie-downs and plan for the expansion of the Main Apron and/or reserve additional areas to safely accommodate future growth and B-II type aircraft, particularly in the event that Pioneer Aviation is no longer able to accommodate the tie-down needs of the Airport. Additionally, the Airport should perform maintenance and preservation treatments as required to extend the useful life of apron pavements.

5.2.5 NAVIGATIONAL AND APPROACH AIDS

Navigational and approach aids provide pilots with information to assist in locating the Airport and horizontal and/or vertical guidance during landing operations. Additionally, navigational aids (NAVAIDs) are critical to providing access to the Airport during poor weather conditions. Navigation guidance at the Airport is provided in the form of lighting instruments, precision approach path indicator (PAPI), beacons, etc. Each of these are further described below.

5.2.5.1 Rotating Beacon and Hazard Beacons

As part of a FY-2014 grant, the Airport constructed a new rotating beacon in the northeast portion of airport property and rehabilitated two hazard beacons, one located on Wills Hill and the other located on Mineral Road. The Airport's beacons are considered to be in excellent condition.

Recommendation: Maintain the existing beacons and replace when conditions require.

5.2.5.2 Lighted Windsock

The Airport has one lighted windsock, located at midfield, on the east side of Runway 16-34. The electrical components were upgraded as a part of the 2009 Runway 16-34 rehabilitation project and are in good condition. The windsock pole is being replaced in 2018 using ASMP grant funding.

Recommendation: Maintain the existing lighted windsock.

5.2.5.3 Runway Lights

Runway 16-34 is equipped with medium intensity runway lights (MIRLS). The lighting system, installed in 2011, is in good condition and is eligible for replacement in 2031. The Airport has expressed a desire to install LED lighting on Runway 16-34 as a means of lowering the facility's energy consumption, thereby reducing spending; however, runway lighting is typically installed as part of a runway reconstruction project and not as a stand-alone project.

Recommendation: Upgrade the runway lighting to LED lights at the time the Runway 34 displaced threshold is eliminated or during the proposed runway extension project.

5.2.5.4 Precision Approach Path Indicator (PAPI)

The Airport has a 4-light PAPI (3.0-degree approach angle) on the Runway 16 end, which is maintained by the Airport. The Runway 16 end PAPI was installed in 2009 and is in good condition.

Recommendation: None.

5.2.5.5 Runway End Identifier Lights

Runway End Identifier Lights (REILs) are located at the Runway 16 at the runway threshold. Runway 34 is not equipped with REILs.

Recommendation: It is recommended that the omni-directional REILS be retained on Runway 16 and installed on Runway 34 when the runway is reconstructed and/or extended.

5.2.5.6 Taxiway Lights

In 2016, taxiway edge lights along Taxiway 'B' were relocated, and additional edge lights were installed to completely light Taxiway 'B'. According to the 2003 Runway and Terminal Area Study and ALP Update, the airport utilized reflectors instead of taxiway lights on Taxiway 'A'. While this condition may have been acceptable for local aviation traffic, it is not for expanded use by B-II aircraft or transient traffic. Presently, Taxiway 'A' is not served by taxiway lights.

Recommendation: During the short-term, the Airport should consider installing medium intensity taxiway lights (MITLS) on the existing taxiway to accommodate B-II aircraft. As part of the runway and taxiway extension, the Airport should install medium intensity taxiway lights (MITLS) along the entire taxiway to accommodate B-II aircraft.

5.2.5.7 Threshold Lights

Runway 16-34 is equipped with threshold lights. In the case of Runway 34, where there is a displaced threshold, the threshold lights are located outboard from the runway at the displaced threshold.

Recommendation: When the Airport eliminates the existing displaced threshold on the Runway 34 end, threshold lights should be relocated.

5.2.5.8 Automated Weather Observing System

Currently, the Airport must rely on weather data from nearby Orange Municipal Airport (ORE) when local weather data cannot be obtained on the Common Traffic Advisory Frequency (CTAF) or Unicom frequency (123.0 MHz). Pilots have reported that weather data from ORE is often inaccurate due to varying local topographic and other conditions, particularly the relatively high terrain and the proximity of the Connecticut River. Pilot users requested that the Airport Commission investigate the feasibility of installing an Automated Weather Observing System (AWOS).

The installation of a basic AWOS system would provide local wind speed, wind direction, wind gusts, variable wind direction, temperature, dew point, altimeter setting, and density altitude. This information, obtained locally, would greatly assist pilots particularly in IFR conditions. An AWOS also has the potential of providing the Airport with a decrease in the Airports IFR minimum ceiling requirement.

Recommendation: It is recommended that the Airport install an AWOS.

5.3 LANDSIDE CAPACITY AND REQUIREMENTS

Airport facilities that are not required for the movement of aircraft are considered landside facilities. These facilities usually consist of terminal and maintenance buildings, hangars, and automobile parking areas. This section will provide a review of the capacity and functionality of the Airport's landside facilities.

5.3.1 AIRPORT TERMINAL BUILDING

The primary purpose of a terminal building is to serve as a place for the Airport to conduct business. The Airport's current terminal building was constructed in 1998. The facility is approximately 1,000 square feet in area and contains a meeting space, one restroom, the Airport Manager's office, and a closet. The existing location of the terminal building makes it difficult to site airside facilities in their optimal location and configurations. Additionally, the Airport Commission has expressed interest in expanding the facility to include an on-airport restaurant.

Recommendation: Consider relocating and expanding the terminal building to a more suitable site that does not impede future airside development, provides easy access to any future fueling facility on the Airport, and allows for the construction of an on-airport restaurant.

5.3.2 HANGARS

Demand for aircraft hangars depends on a number of variables, including airport location, aircraft type, cost, seasonal and climatic conditions. Currently, there are eight private hangars on the airport and one small structure for use by the Radio Controlled flying club. There are two additional large hangars located on Pioneer Aviation property.

Consideration should be given to the possibility that local corporations currently operating out of other airports may wish to base their aircraft at 0B5 once the runway is extended. Typically, these aircraft are expensive, and owners wish to house them in hangars where the aircraft can be protected and light maintenance can be accomplished. Therefore, a secure area for corporate and/or T-hangars should be reserved on Airport property.

Due to limited space in the terminal area, as demand for hangar space grows, the Airport may need to consider purchasing additional property. The Airport should pursue the acquisition of the Hillside Plastics property for the construction of corporate hangars south of the West Apron, as those needs arise.

Recommendation: The Airport should reserve an area for the development of box and T-hangar construction on Airport property to account for unforeseen demand. Additionally, the Airport should consider acquiring the Hillside Plastics property for the development of corporate hangars as demand warrants.

5.4 SUPPORT FACILITY CAPACITY AND REQUIREMENTS

Support facilities are amenities that assist the airport in maintaining efficient operations. 0B5's support facilities include automobile parking, security fencing, FBO and a fuel facility, which must be maintained and upgraded as needed to sustain efficient day to day operations.

5.4.1 AUTOMOBILE PARKING

The main vehicular access to the Airport is located on the north side of Millers Falls Road. The Airport driveway is extremely wide, and parking is not well defined. Currently, cars simply drive down the driveway and park at the terminus near the terminal building, which can accommodate approximately 25 vehicles. There are two additional parking spaces located adjacent to the terminal building. Many aircraft owners currently park their vehicles near or in their hangars, a practice that is generally being discouraged due to safety and security concerns.

Recommendations:

1. **The Airport driveway should be relocated and redesigned to enhance safety, properly guide traffic, and access defined parking areas.**
2. **Well-defined vehicular parking facilities should be constructed in areas that are convenient for pilots, passengers, and visitors. Convenient vehicular access should be provided to aircraft storage areas (i.e. hangars, tie-downs).**

5.4.2 SECURITY FENCING

The Airport has approximately 3,700 feet of 8-foot high fencing with two feet of barbed wire and will be adding approximately 1,695 LF of additional 8-foot high perimeter fencing along Industrial Boulevard at the northern end of the Airport through the MassDOT/AD's Airport Safety and Maintenance Program (ASMP).

Recommendation: Currently, the Airport lacks full perimeter fencing to prevent people and wildlife from inadvertently or intentionally accessing the airfield. Through discussions with Airport Management there is an issue with wildlife (mainly deer) accessing the airport and movement areas. It is recommended that the Airport construct approximately 5,000 LF of fencing to completely enclose the airport property.

5.4.3 FUEL FACILITIES

Pioneer Aviation provides aircraft engine and frame repairs, aircraft storage and tie-down, fuel sales, rental aircraft, and flight instruction to airport users. Pioneer Aviation is a "through the fence" operation, which is an aviation business that relies on airport facilities for the continued operation of their business but is not located on Airport property. Pioneer Aviation accesses the airfield under an agreement with the Airport Commission that is due to expire in 2032.

Pioneer Aviation maintains the Airport's only available fuel system. The system consists of one 6,000-gallon, above ground 100-LL tank. It is a constant displacement, 45 gallon-per-minute fuel system, and no credit card/self-service option is available. Through discussions with the Airport Manager, Pioneer Aviation's current fuel storage capacity appears adequate through the planning period. However, provisions may need to be made to provide jet fuel for use by the turboprops expected to utilize and base at the Airport in the future. It is assumed that Pioneer Aviation will provide the jet fuel necessary to service these aircraft.

In the case where an agreement cannot be reached between the Airport and Pioneer Aviation, the Airport should consider the following:

1. Prepare to assume control over aircraft fueling and parking on Airport property. In the case where Pioneer Aviation abandons its use or loses its ability to utilize airport facilities, the Airport should be prepared to accommodate aircraft users.
2. Purchase the Pioneer Aviation property should it come up for sale on the general real estate market. The FAA and MassDOT/AD both recommend that the Pioneer Aviation property be shown on the ALP as "proposed property to be acquired". This notation on the ALP is prudent to allow the Airport to secure federal and state funding for the purchase should the property be offered for sale during the planning period.

Recommendations:

1. **The Airport should discuss the fuel situation with Pioneer Aviation to assure that fuel (both Jet and AvGas) will be available if needed in the future.**
2. **The Airport should set aside an area for aircraft fueling operations on airport property.**
3. **The Airport should prepare for the potential purchase of the Pioneer Aviation property should it become available for sale during the planning period.**
4. **The Airport should pursue the acquisition of a portion of the Charter NEX property to allow for the construction of a taxilane providing access to fuel and other facilities.**

5.4.4 SNOW REMOVAL EQUIPMENT

The Turners Falls Municipal Airport does not own any AIP-funded SRE. The Airport owns one (1) piece of SRE; a small tractor with one (1) cubic yard bucket. This tractor is used for digging out runway and taxiway lights and touching up drift areas following a snow storm. The tractor is not suitable for airport-wide snow removal purposes.

The Airport currently hires an outside contractor to provide snow removal services and pays the contractor on a per-storm basis. This is a highly variable cost depending on the snowfall in a given year and can consume a large portion of the airport's operating budget. Purchasing a new piece of SRE would decrease costs of snow removal and provide more consistent budgeting for snow removal.

Advisory Circular 150/5200-30D defines the Priority 1 clearance areas as those that directly contribute to safety and re-establishment of aircraft operations at a minimum level of acceptance. For 0B5, this

includes Runway 16-34, parallel Taxiway 'A', stub Taxiway 'B', Taxilane 'A1', and the main parking apron. The total Priority 1 clearance area is 460,000 square feet. Per Advisory Circular 150/5220-20A, for a non-commercial service airport with greater than 10,000 annual operations, and greater than 15 inches of annual snowfall, the Airport is eligible for one (1) high-speed plow, supported by two (2) snow plows.

Recommendation: Through the Airport Improvement Program, the Airport is currently pursuing the acquisition of snow removal equipment in the form of a dump truck with one (1) fixed-angle rollover plow and one (1) power reversible plow in Federal Fiscal Year 2018.

5.4.5 SNOW REMOVAL EQUIPMENT STORAGE FACILITY

Snow removal equipment buildings are intended to protect AIP-funded snow removal equipment and materials. Funding snow and ice control buildings is limited to space in the building necessary for eligible Snow Removal Equipment as well as storing chemicals used in treatment of paved areas. FAA AC 150/5220-18A, *Buildings for Storage and Maintenance of Airport Snow and Ice Control Equipment and Materials,* provides recommendations for equipment storage based on the number and type of equipment comprising the fleet.

In Table 3-1 of the *Minimum Equipment Space Allocations Using the Equipment Safety Zone Concept*[4], Equipment Safety Zone (ESZ) clearance standards are provided. The Airport is eligible for approximately 3,230 square feet of storage area by applying the ESZ dimensional standards to the dimensions of the existing SRE fleet.

Space allocations for support items are provided in Table 3-3, *Typical Storage Space Allocations for Support Items*[5]. Support areas fall into two basic categories: (1) an area dedicated to administrative duties and employee areas such as a kitchen, training/conference room, restrooms, etc., and (2) an area dedicated to the maintenance and repair of equipment such as mechanic's bench area, parts area associated directly to snow vehicles, lubrication, oil, grease storage, etc. Table 3-3 indicates that the Airport qualifies for approximately 3,230 square feet of storage space for the above-referenced support items.

Recommendation: Construct an approximately 3,230 square-foot SRE building for equipment storage.

[4] FAA Advisory Circular 150/5220-18A, September 14, 2007, page 13

[5] FAA Advisory Circular 150/5220-18A, September 14, 2007, page 15

5.5 CONCLUSION

The Airport is a quality facility offering a wide variety of General Aviation services to the region. Improvements to the facility are needed to meet basic safety requirements per the applicable FAA standards and to provide adequate space for the Airport's current and future aircraft fleet, as well as, airport tenants and visitors. The following is a list of facility needs for the Airport through the planning period. It is possible that some of the long-term needs may not be required at all should adequate demand fail to materialize. Those facility requirements needed immediately or in the mid-term should be actively pursued.

Facilities Exceeding Useful Life/Other Considerations

Short Term (2018-2022) Improvement Requirements

- Purchase a dump truck with fixed-angle rollover plow and power reversible plow.
- Reconstruct hangar taxilanes off of taxilane 'A2' and west apron connecting taxilanes.
- Perform maintenance activities on Runway 16-34.
- Conduct vegetation removal from the TERPS approach surface.
- Take steps to remove the threshold displacement on the Runway 34 end.
- Purchase the Pioneer Aviation property should it become available for sale during the planning period.
- Purchase a portion of the Charter NEX property after the Pioneer Aviation property is acquired.
- Develop a Vegetation Management Plan.

Mid-Term (2023-2027) Improvement Requirements

- Relocate the existing driveway and construct clearly-delineated parking spaces both inside and outside of the fence.
- Install an AWOS system.
- Construct an approximately 3,230 square foot SRE building for equipment storage.
- Relocate and expand the terminal building to include an on-airport restaurant.
- Construct additional tie-down space as demand warrants.
- Reconstruct West Apron (2004) as its design life is exceeded.
- Reconstruct and extend Runway 16-34 by 1,000 feet to meet the requirements of the design aircraft, including upgrading to LED lighting, adding omni-directional REILS to Runway 34, relocating threshold lights on Runway 34 after displaced threshold is removed, constructing a "taxiway turnaround" area on the Runway 34 end, and installing medium intensity taxiway lights (MITLS).
- Establish a non-precision, straight-in approach to Runway 16 and update runway markings when the approach is approved by FAA Flight Procedures.
- Construct fencing to complete a full-perimeter fence around Airport property.

Long-Term (2028-2037) Improvement Requirements

- Reserve an area on airport property for future hangar development.
- Construct a fuel facility on Airport property if Pioneer Aviation is not acquired.
- Reconstruct Taxiway 'B' (2016) as its design life is exceeded.
- Reconstruct Taxilane 'A1' (2010) as its design life is exceeded.
- Reconstruct Taxilane 'A2' (2016) as its design life is exceeded.
- Reconstruct Taxilane 'A3' (2016) as its design life is exceeded.
- Reconstruct and expand the Main Apron (2016) as its design life is exceeded.
- Purchase the Hillside Plastics property to accommodate future hangar facilities as demand warrants.
- Construct corporate and T-hangars as demand warrants.

CHAPTER 6 – FUTURE AIRPORT DEVELOPMENT

This chapter will identify the Airport's ability to accommodate future aviation and/or non-aviation uses and growth, and confirm the suitability of, or make recommendations for, the proposed layout of airside and landside facilities. Specifically, this chapter will evaluate a 1,000-foot runway extension and land acquisition; explore locations for corporate hangars, T-hangars, tie-downs, terminal building, restaurant, and SRE building; identify potential areas for future fuel facilities, AWOS, and solar panels; and outline FAA requirements for nonaeronautical land use, designation of areas not to be developed, land swaps, and through-the-fence operations.

6.1 RUNWAY EXTENSION

As outlined in Chapter 5, *Facility Requirements*, Runway 16-34, the Airport's only runway, is 3,200 feet in length with a displaced threshold of 550 feet on the Runway 34 end. This length is not adequate to meet the needs of the King Air B-200, the Airport's future design aircraft. In order to accommodate the needs of the King Air B-200, the Airport Commission wishes to extend Runway 16-34 by 1,000 feet, to achieve a total runway length of 4,200 feet, which would eliminate existing ground penetrations to the Runway 34 approach surface, allowing for the removal of the displaced threshold. At the time of reconstruction, the Airport Commission wishes to upgrade the lighting to LED runway lights.

6.2 LAND ACQUISITION

The Airport is heavily constrained by environmentally-sensitive areas (see Figure 3-1 – Existing Environmental Conditions Plan), limiting the Airport's ability to expand. As highlighted in Chapter 5, *Facility Requirements*, the Airport should make efforts to acquire properties currently owned by Pioneer Aviation and Hillside Plastics to allow for the expansion and addition of facilities such as fuel, hangars, and tie-down spaces. The Airport should also make efforts to acquire a portion of the Charter NEX Films property to allow for the construction of a taxilane connecting the Pioneer Aviation property to existing airport property, providing airport users with convenient access to all facilities.

6.3 AWOS

As outlined in Chapter 5, *Facility Requirements*, the Airport is currently lacking an AWOS and instead relies on weather data from the Orange Municipal Airport (ORE), which is frequently inaccurate due to varying topographic conditions between 0B5 and ORE. In an effort to enhance the reliability of weather conditions information at 0B5 and increase airport users' safety, the Commission wishes to install its own AWOS.

6.4 TERMINAL BUILDING

As highlighted in Chapter 5, *Facility Requirements*, the terminal building is situated just south of the main apron. In its current location, the building impedes the Airport's ability to expand airside facilities. The Airport Commission wishes to relocate the existing building to a more optimal location adjacent to the proposed T-hangar development to allow for future expansion of landside facilities. The Airport

Commission would also like to see the terminal building expanded to allow for the addition of an airport restaurant.

6.5 HANGARS/TIE-DOWNS

As identified in Chapter 4, *Forecasts of Aviation Demand and Capacity*, there are several medium sized companies and four (4) private boarding schools within close proximity of the Airport. Through extensive outreach efforts, the Airport believes that the addition of a 1,000-foot runway extension will attract a percentage of B-II type aircraft operations currently bypassing them. Additionally, according to the Airport's based aircraft growth rate, the Airport is expecting an average annual growth rate of 1.2 percent through the planning period. As a result, the Airport recognizes a potential for increased based and transient aircraft and the possible need for additional hangar and tie-down space. Therefore, the Airport Commission wishes to reserve a secure area for the construction of box hangars, T-hangars, and tie-down space as demand warrants.

6.6 AUTOMOBILE PARKING

As highlighted in Chapter 5, *Facility Requirements*, airport users currently park at the end of the Airport's driveway, which is large enough to accommodate approximately 25 vehicles. Though the space is sufficient, the areas are not well-defined, and aircraft owners often park their vehicles near or in their hangars. These practices present both safety and security concerns. In order to minimize these practices, the Airport Commission wishes to redesign and relocate the Airport's driveway to include well-defined parking spaces and convenient vehicular access to aircraft storage areas.

6.7 FUEL FACILITIES

As identified in Chapter 5, *Facility Requirements*, Pioneer Aviation owns and maintains the Airport's only available fuel system, which consists of a 6,000-gallon 100-LL tank. Pioneer Aviation is a "through-the-fence" operation accessing the airfield under an agreement with the Commission that is due to expire in 2032. While the Airport Manager believes that Pioneer Aviation's current fuel storage capacity appears adequate through the planning period, provisions may need to be made to provide jet fuel for turboprops expected to utilize the Airport in the future. In the case that an agreement cannot be reached between the Airport and Pioneer Aviation to add jet fuel as needed in the future, the Airport Commission wishes to either assume control over aircraft fueling on Airport property or purchase Pioneer Aviation if it becomes available for sale.

6.8 SRE BUILDING

Chapter 5, *Facility Requirements* emphasized the Airport' s need for an SRE building to store current and future equipment, as the Airport is in the process of acquiring a dump truck with fixed-angle rollover plow and power reversible plow in FY-2018. The Airport Commission wishes to construct an approximately 3,230 square foot SRE storage building to protect existing and newly-acquired snow removal equipment.

6.9 RESTAURANT

One amenity that has the potential to attract both transient pilots and local community members to an airport is an onsite restaurant. Through discussions with the Airport Commission, it was discovered that a local restaurant, The Country Creemee, was once located across the street from the Airport and attracted both community members and pilots to the airport. Patrons would sit in the Airport's parking lot as they ate their food, watching the planes take off and land. Since the Country Creemee was forced to relocate due to circumstances beyond their control, the Airport Commission has noticed a decrease in local patrons at the Airport. Addition of an onsite restaurant by expanding the Airport's terminal building would provide an added benefit to visitors and assist the Airport in its goal of attracting and accommodating additional traffic.

6.10 NONAERONAUTICAL LAND USE

The Airport's Grant Assurances do not prohibit the use of airport land for nonaeronautical purposes, however, FAA places certain restrictions on such use. The FAA defines "Aeronautical Use" as *"all activities that involve or are directly related to the operation of aircraft, including activities that make the operation of aircraft possible and safe. Services located on the airport that are directly and substantially related to the movement of passengers, baggage, mail, and cargo are considered aeronautical uses. All other uses of the airport are considered nonaeronautical.[1]"* Restrictions on non-aeronautical use include, but are not limited to, the following:

- Use of land for nonaeronautical purposes must be approved by the FAA before such use is allowed.
- Rates charged for nonaeronautical use (e.g. concessions) of the airport must be based on fair market value. Fair market pricing of airport facilities can be determined by reference to negotiated fees charged for similar uses of the airport or by appraisal of comparable properties.
- Rental of land to, or use of land by, the sponsor for nonaeronautical purposes at less than fair market value rent is considered a subsidy of local government and is a prohibited use of airport revenue.
- The airport owner must demonstrate that all aeronautical uses have been accommodated and that any future aeronautical users can be reasonably accommodated.
- Approved interim or concurrent revenue-production uses will terminate as soon as the land is needed for aeronautical use.
- The location of all existing and proposed nonaviation areas and of all existing improvements must be shown on the Airport Layout Plan.

Designation of land for nonaeronautical use will permit the Airport to pursue revenue-generating activities on airport property to provide funding to help cover the local share for future AIP projects. Future revenue-generating endeavors may include the installation of a solar facility on Airport property.

[1] FAA Order 5190.6B – FAA Airport Compliance Manual

To accommodate for potential nonaeronautical uses, the Airport Commission wishes to designate the area of land adjacent to Franklin County Technical School for nonaeronautical purposes.

6.11 DESIGNATION OF AREAS NOT TO BE DEVELOPED

Though FAA does not offer specific procedures for designation of areas not to be developed, all land use areas are required be identified on the ALP. In the case of archaeologically-sensitive areas, any change in designation must first be coordinated through the National Environmental Protection Agency (NEPA) in accordance with Section 106 of the National Historic Preservation Act.

6.12 LAND SWAPS

Any property, when described as part of an airport in an agreement with the United States or defined by an airport layout plan (ALP) or listed in the Exhibit 'A' property map, is considered to be "dedicated" or obligated property for airport purposes by the terms of the agreement. If any of the property so dedicated is not needed for present or future airport purposes, an amendment to, or a release from, the agreement is required.

The FAA grants funds for the purchase of real property for aeronautical use. Over time, however, such acquisitions may result in parcels that are no longer needed for aeronautical use. Per FAA Order 5190.6B, grant-acquired real property can be exchanged for other property not held by the sponsor but that serves an airport purpose more effectively than the originally acquired parcel. However, a grant land swap cannot result in a net loss in the value of the federal interest in the grant land.

6.13 THROUGH-THE-FENCE OPERATIONS

The FAA defines "through-the-fence" operations as "*activities permitted by an airport sponsor through an agreement that permits access to the public landing area to independent entities or operators offering an aeronautical activity or to owners of aircraft based on land adjacent to, but not part of the airport property. The obligation to make an airport available for the use and benefit of the public does not impose any requirement for the airport sponsor to permit access by an aircraft from adjacent property.*[2]" Although the Airport is permitted to allow through-the-fence activities, the Airport is not required to do so. Regulations governing such activity state that any through-the-fence access should be subject to a written agreement between the airport sponsor and the party granted access. The agreement should specify:

- What specific rights of access are granted;
- Payment provisions that provide, at minimum, parity with similarly situated on-airport tenants and equitable compensation for the use of the airport;
- Expiration date;
- Default and termination provisions;
- Insurance and indemnity provisions;

[2] FAA Order 5190.6B – FAA Airport Compliance Manual

- A clear statement that the access agreement is subordinate to the grant assurances and/or federal property conveyance obligations and that the sponsor shall have the express right to amend or terminate the access agreement to ensure continued compliance with all grant assurances and federal property conveyance obligations; and
- The sponsor is encouraged, but not required, to expressly prohibit the sale or assignment of the access agreement from one party to another.

Currently, Pioneer Aviation, a flight instruction and aircraft rental company, is the only business operating "through-the-fence" at 0B5. Pioneer Aviation's Access and Use License Agreement serves as a "through-the-fence" agreement, granting the business non-exclusive access to existing and future public use areas of the Airport for the purposes of providing aircraft storage and parking facilities, aircraft repair and maintenance, sale of aviation fuel, flight instruction, and aircraft rental. The agreement states that if the business terminates or changes from an aviation business, the agreement will also terminate. The agreement term is defined as beginning on July 1, 2012 and terminating on June 30, 2032 with Pioneer Aviation and the Airport having the option to terminate the agreement with no penalty by giving six (6) months' notice.

CHAPTER 7 – DEVELOPMENT AND EVALUATION OF ALTERNATIVES

This chapter outlines and evaluates two (2) proposed alternatives, plus a no-build alternative, designed to assist in the advancement of airport-development needs. These alternatives account for operational, environmental, security, and financial considerations, given the existing constraints presented in previous chapters. This chapter compares each alternative, resulting in a preferred alternative.

7.1 METHODOLOGY

The evaluation of alternatives first presents a no-build scenario to identify the practical and environmental impacts of leaving the airport in its current configuration. Next, the evaluation presents Alternative No. 1, which is centered around constructing a 1,000-foot runway extension with a "taxiway turnaround" area on the Runway 34 end as an alternative to a full-length parallel taxiway extension, acquiring the Pioneer Aviation and Hillside Plastics properties, and expanding the airport's facilities to include a new fuel facility, among other amenities. Finally, the evaluation presents Alternative No. 2, which is centered around constructing a 1,000-foot runway extension with full-length parallel Taxiway 'A' extension and runup area. Alternative No. 2 also explores the acquisition of the Pioneer Aviation property and expansion of various facilities. This evaluation will provide the Airport with the information necessary to select a preferred alternative that best suits the goals of the airport.

7.2 PERMITTING

Permitting costs associated with each Alternative described below will vary drastically depending on the type of project(s) the Airport pursues, including size of impact, location, resources affected, etc. Therefore, permitting costs need to be addressed on an as-needed basis as the Airport develops. This includes coordination with the agencies responsible for oversight of natural and cultural resources (U.S. Fish and Wildlife Service, Massachusetts Department of Environmental Protection, Massachusetts Division of Fisheries and Wildlife – Natural Heritage Program, Massachusetts Historical Commission, etc.) to better understand each project's requirements, and in some cases reduction in permitting requirements, particularly for projects that are safety related (e.g., tree removal). Where permitting costs cannot be ascertained at this time, they are described as "variable" in the Alternatives below.

7.3 NO-BUILD ALTERNATIVE

The No-Build Alternative presumes that no action will be taken to pursue development projects at the Airport over the planning period. For a graphic representation of this alternative, refer to Figure 7-1 – No-Build Alternative. In this alternative, all Airport facilities remain in their existing locations and configuration without enhancements or upgrades.

Objectives: The objective of this alternative is to:

- Provide a baseline condition upon which to contrast and compare other alternative development concepts.

Impacts: The practical and environmental impacts of this alternative are:

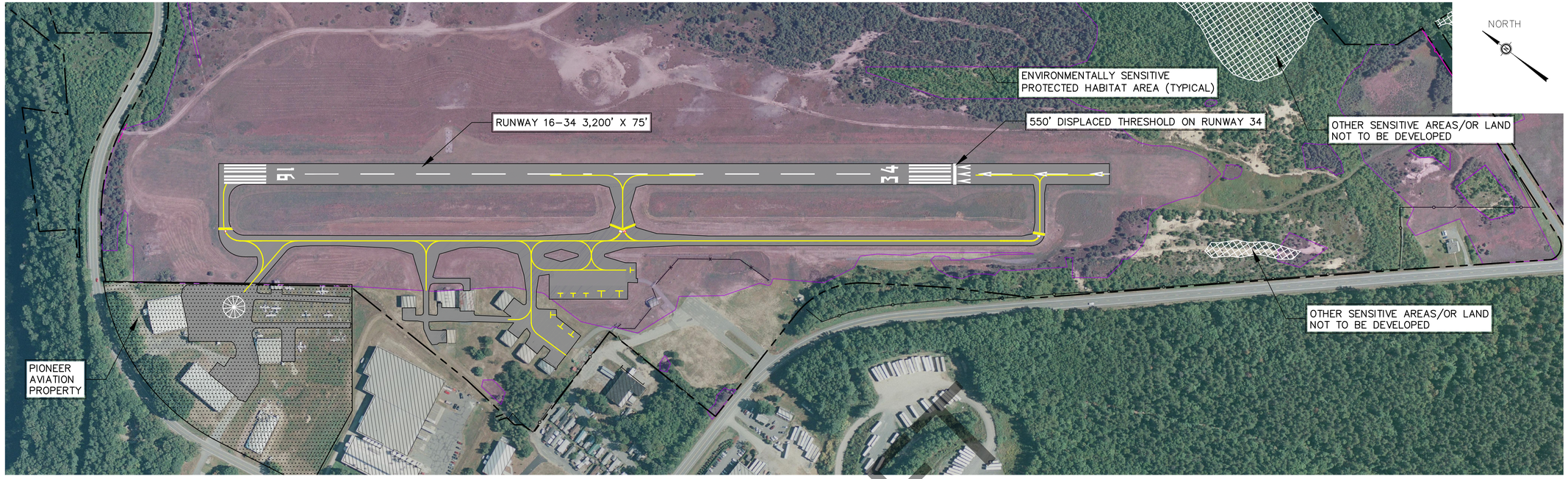
Practical Impacts

- The Airport's runway continues to lack adequate length to accommodate B-II type aircraft and latent demand identified in Chapter 4, *Forecasts of Aviation Demand and Capacity*.
- Taxiway 'A' continues to lack proper taxiway lighting thereby reducing the safety of aircraft users.
- The Airport continues to lack adequate apron space to accommodate demand identified in *Chapter 4, Forecasts of Aviation Demand and Capacity.*
- The Airport continues to rely on weather data from nearby airports, which have often been reported as being inaccurate due to varying local topography and other conditions, particularly the relatively high terrain and the proximity of the Connecticut River.
- The Airport's ability to expand airside facilities remains hindered due to the location of the terminal building.
- The Airport's ability to pursue the construction of additional hangars remains limited.
- Parking at the airport remains disjointed with users parking their vehicles near or in their hangars.
- The Airport continues to lack adequate storage for AIP acquired/eligible snow removal equipment.
- Pioneer Aviation remains a through-the-fence business, rather than being acquired and operated by the Airport.
- The Airport's fueling operations remain disjointed from other terminal facilities.

Environmental Impacts

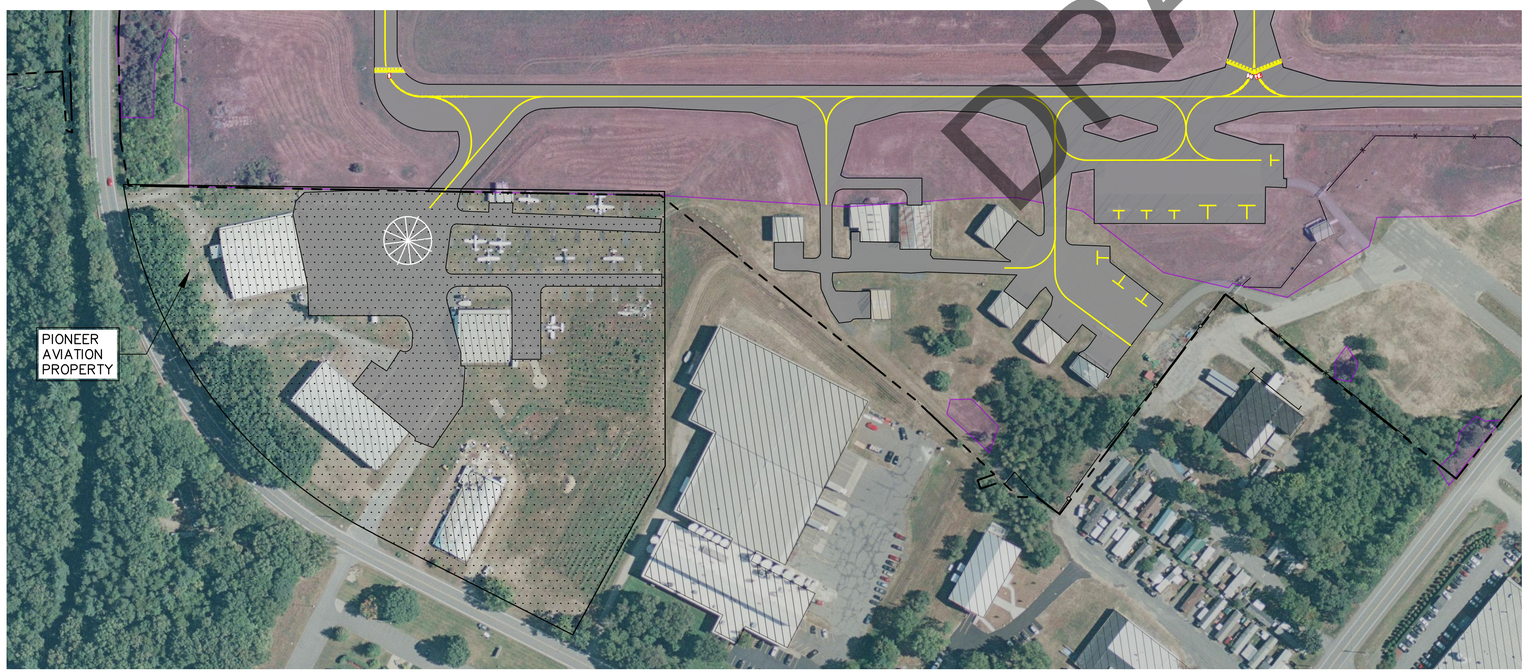
- Since no construction activities are included as a part of this alternative, there are no impacts to historical or archaeological resources, rare species, or their habitats resulting from implementation of this alternative.

Estimated Cost: Since no construction is proposed as part of the No-Build alternative, there are no financial costs associated with the implementation of this alternative.



AIRFIELD OVERVIEW

SCALE: 1"=400'



TERMINAL AREA

SCALE: 1"=250'

LEGEND

- AIRPORT PROPERTY LINE
- EXISTING FENCE
- EXISTING GUARDRAIL
- EXISTING BUILDING
- EXISTING PAVEMENT
- OTHER SENSITIVE AREAS/OR LAND NOT TO BE DEVELOPED
- ENVIRONMENTALLY SENSITIVE PROTECTED HABITAT AREAS
- PIONEER AVIATION PROPERTY (EXISTING)

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ALTERNATIVES

PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	CAR
CHECKED BY	JCM
DATE	JUNE, 2018

GRAPHIC SCALE
VARIES

SHEET TITLE

NO–BUILD
ALTERNATIVE

SHEET NO.

FIG. 7–1

7.4 ALTERNATIVE NO. 1

Alternative No. 1 (Figure 7-2) highlights major development projects to be achieved at the Airport over the planning period.

Objectives: The objectives of Alternative No. 1 are to:

- Expand airside facilities to accommodate future demand identified in Chapter 4, *Forecasts of Aviation Demand and Capacity*, including a 1,000-foot runway extension to Runway 16-34.
- Avoid environmental impacts associated with the construction of a full-length parallel taxiway.
- Install an AWOS to provide accurate weather data to airport users.
- Relocate the terminal building to allow for the expansion of airside facilities.
- Expand the terminal building to include room for a restaurant.
- Construct hangar facilities.
- Create a user-friendly parking area with clearly-delineated spaces.
- Provide adequate storage for AIP acquired/eligible snow removal equipment.
- Improve taxilane pavements to improve access to hangars and other facilities.
- Acquire Pioneer Aviation and a portion of the Charter NEX Films property to construct improvements and make the property contiguous with existing terminal facilities, accessible, and secure.
- Acquire Hillside Plastics property for the expansion of airside and landside facilities.
- Reserve land for non-aeronautical development.

Alternative No. 1 explores the impacts of pursuing a number of proposed development projects at the Airport. These projects are identified below and are further discussed in the subsequent sections for clarity.

- Pioneer Aviation Property Acquisition (see Section 7.4.1 and Figure 7-2)
- Charter NEX Films Property Acquisition (see Section 7.4.2 and Figure 7-2)
- Hillside Plastics Property Acquisition (see Section 7.4.3 and Figure 7-2)
- Hangar Complex Construction (see Section 7.4.4 and Figure 7-2)
- T-Hangar, Access Road, and Parking Lot Construction (see Section 7.4.5 and Figure 7-2)
- Perimeter Fence Construction (see Section 7.4.6 and Figure 7-2)
- Runway 16-34, 1,000-foot Runway Extension with “Taxiway Turnaround” Area (see Section 7.4.7 and Figure 7-2)
- Fuel Facility Construction (see Section 7.4.8 and Figure 7-2)
- Taxilane Rehabilitation and Expansion (see Section 7.4.9 and Figure 7-2)
- AWOS Construction (see Section 7.4.10 and ALP, Sheet 3)
- Driveway Relocation and Parking Lot Construction (see Section 7.4.11 and Figure 7-2)
- SRE Building Construction (see Section 7.4.12 and Figure 7-2)
- Terminal Building and Restaurant Construction (see Section 7.4.13 and Figure 7-2)
- Corporate Hangar Construction (see Section 7.4.14 and Figure 7-2)

- T-Hangar Complex Construction (see Section 7.4.15 and ALP, Sheet 3)
- Reservation of Land for Non-Aeronautical Development (see Section 7.4.16 and Figure 7-2)

7.4.1 (ALTERNATIVE NO. 1) PIONEER AVIATION PROPERTY ACQUISITION

This project is for the acquisition of the Pioneer Aviation property for the purposes of facility expansion.

Aviation Related Impacts

- Acquisition of property allows the Airport to expand airside facilities such as aprons, hangars, and fuel facilities.

Environmental Impacts

- No anticipated wetland impacts.
- No addition of impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Pioneer Aviation Property Acquisition[1]		$ 900,000.00
	TOTAL	**$ 900,000.00**

7.4.2 (ALTERNATIVE NO. 1) CHARTER NEX FILMS PROPERTY ACQUISITION

This project is for the acquisition of a portion of the Charter NEX Films property for the purposes of connecting existing airport property to the Pioneer Aviation property.

Aviation Related Impacts

- The acquisition of a portion of this property allows for the future expansion of taxilanes to connect existing airport property to the newly-acquired Pioneer Aviation property.

Environmental Impacts

- No anticipated wetland impacts.
- No addition of impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Charter NEX Film partial acquisition[2]		$ 20,000.00
	TOTAL	**$ 20,000.00**

[1] Estimated cost from the Airport's CIP, which assumes a cost based on 125% of the property's assessed value.

[2] Estimated cost based on 25% of the property's assessed value.

7.4.3 (ALTERNATIVE NO. 1) HILLSIDE PLASTICS PROPERTY ACQUISITION

This project is for the acquisition of the parcel of land across from Hillside Plastics on Millers Falls Road for the purposes of facility expansion.

Aviation Related Impacts

- Acquisition of property allows the Airport to expand airside facilities such as aprons, hangars, and fuel facilities.

Environmental Impacts

- No anticipated wetland impacts.
- No anticipated additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Hillside Plastics Property Acquisition[3]	$ 311,000.00
TOTAL	**$ 311,000.00**

7.4.4 (ALTERNATIVE NO. 1) HANGAR COMPLEX CONSTRUCTION (ON ACQUIRED HILLSIDE PLASTICS PROPERTY)

This project is for the construction of three (3) corporate hangar buildings with aprons, taxilane connection to the West Apron, and a vehicle parking lot with access from the main parking lot.

Aviation Related Impacts

- Construction of hangar facilities provides additional sources of revenue for the Airport.
- It is anticipated that the new corporate hangars referenced above will be funded by private developers and that the Airport will incur no costs associated with their construction.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 53,804 SF of additional impervious surface.

Other Impacts or Considerations

- **Estimated Cost:**

Construction of Corporate Hangar with Aprons and Parking Lot	$ TBD (Privately Developed)
TOTAL	**$ TBD (Privately Developed)**

[3] Estimated cost based on 125% of the property's assessed value.

7.4.5 (ALTERNATIVE NO. 1) T-HANGER, ACCESS ROAD, AND PARKING LOT CONSTRUCTION

This project is for the construction of one (1) T-hangar building with taxilane connection to the West Apron taxilane, and a parking lot. This project also includes the reconstruction and extension of Hadley Grant Drive.

Aviation Related Impacts

- Construction of hangar facilities provides additional sources of revenue for the Airport.
- It is anticipated that the hangar building with associated parking and access road will be funded by private developers and that the Airport will incur no costs associated with their construction.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 39,400 SF of additional impervious surface.

Other Impacts or Considerations

- **Estimated Cost:**

Construction of T-Hangar with Access Road and Parking Lot	$ TBD (Privately Developed)
TOTAL	**$ TBD (Privately Developed)**

7.4.6 (ALTERNATIVE NO. 1) PERIMETER FENCE CONSTRUCTION

This project is for the construction of approximately 5,000 LF of fencing to completely enclose airport property, including approximately 1,695 LF of perimeter fencing along Industrial Boulevard with one (1) pedestrian gate and four (4) vehicle gates to enclose the newly-acquired Pioneer Aviation and Charter NEX Films properties.

Aviation Related Impacts

- Construction of fencing to enclose all airport property, including newly-acquired properties provides added security and safety by preventing inadvertent access to the airfield.

Environmental Impacts

- No anticipated wetland impacts.
- No addition of impervious surface.

Other Impacts or Considerations

- Permitting needs.
- Environmental Assessment.
- **Estimated Cost:**

Construction of Perimeter Fencing	$620,000.00
TOTAL	**$620,000.00**

7.4.7 (ALTERNATIVE NO. 1) RUNWAY 16-34, 1,000-FOOT RUNWAY EXTENSION WITH "TAXIWAY TURNAROUND" AREA

This project is for the extension of the Runway 34 end with "taxiway turnaround" area to the southeast by 1,000 feet, upgrade of runway lights to LED, construction of REILS on the Runway 34 end, relocation of threshold lights, and application of new pavement markings.

Aviation Related Impacts

- Extension and upgrades to Runway 16-34 allows the airport to accommodate B-II type aircraft.
- Extension of Runway 16-34 shifts the RPZ away from existing ground penetrations, allowing for the removal of the displaced threshold.
- "Taxiway turnaround" area eliminates the need for a full-length parallel taxiway, reducing impacts to sensitive areas.

Environmental Impacts

- Approximately 102,780 square feet of additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment required.
- **Estimated Cost:**

Runway 16-34 Extension with "taxiway turnaround" area	$ 1,900,000.00
TOTAL	**$ 1,900,000.00**

7.4.8 (ALTERNATIVE NO. 1) FUEL FACILITY CONSTRUCTION

This project is for the construction of a 100-LL fuel facility consisting of one (1) 10,000-gallon storage tank with fueling apron on the Main Apron in place of two existing tie-down spaces.

Aviation Related Impacts

- The addition of a fuel facility in this location provides aircraft with a centralized place to obtain fuel.
- Construction of the fuel facility in this location requires the removal of two tie-down spaces on the Main Apron.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 1,150 square feet of additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Fuel Facility Construction		$ 325,000.00
	TOTAL	**$ 325,000.00**

7.4.9 (ALTERNATIVE NO. 1) TAXILANE REHABILITATION AND EXPANSION (ON ACQUIRED CHARTER NEX FILMS PROPERTY)

This project is for the rehabilitation of the West Apron taxilane, and rehabilitation and extension (approximately 5,514 SF) of the 'A2' hangar taxilane.

Aviation Related Impacts

- Pavement repair enhances user safety by preventing foreign object debris (FOD) from failed pavements, which risks damage to aircraft and injury to people.
- Expansion of the 'A2' hangar taxilane provides access to the newly-acquired Pioneer Aviation property.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 5,514 square feet of additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Taxilane Rehabilitation and Expansion		$ 695,000.00
	TOTAL	**$ 695,000.00**

7.4.10 (ALTERNATIVE NO. 1) AWOS CONSTRUCTION

This project is for the construction of an AWOS in the vacant area to the northeast of the existing Runway 34 end (future center point of Runway 16-34).

Aviation Related Impacts

- The Airport is able to provide users with current, accurate, local weather conditions to enhance safety and improve navigation to the airfield.

Environmental Impacts

- No anticipated wetland impacts.
- Minimal anticipated additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment.

- **Estimated Cost:**

AWOS Construction	$ 595,000.00
TOTAL	**$ 595,000.00**

7.4.11 (ALTERNATIVE NO. 1) DRIVEWAY RELOCATION AND PARKING LOT CONSTRUCTION

This project is for the construction of a relocated driveway to the west of the existing driveway, and a new parking lot with clearly-delineated parking spaces.

Aviation Related Impacts

- Relocation of the driveway provides users with a convenient entrance to the airport, and a clearly-delineated lot provides users with a distinct, safe place to park.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 25,050 square feet of additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Driveway Relocation and Parking Lot Construction	$ 550,000.00
TOTAL	**$ 550,000.00**

7.4.12 (ALTERNATIVE NO. 1) SRE BUILDING CONSTRUCTION

This project is for the construction of an SRE storage building (approximately 3,230 SF) in the vacant area southwest of the West Apron.

Aviation Related Impacts

- Construction of an SRE storage building provides a secure place for the airport to store its federally-funded equipment.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 11,031 square feet of additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

SRE Building Construction	$ 1,100,000.00
TOTAL	**$ 1,100,000.00**

7.4.13 (ALTERNATIVE NO. 1) TERMINAL BUILDING AND RESTAURANT CONSTRUCTION

This project is for the relocation and expansion of the Airport's terminal building from its current location to the area adjacent to the newly-constructed parking lot, to include an Airport Manager's office, restroom, pilots' lounge, meeting space, and restaurant.

Aviation Related Impacts

- The relocation of the terminal building allows the Airport to expand airside facilities.
- The expansion of the terminal building to include a restaurant provides an added amenity for airport users and the general public.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 1,080 square feet of additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Terminal Building Relocation	$ 875,000.00
TOTAL	**$ 875,000.00**

7.4.14 (ALTERNATIVE NO. 1) CORPORATE HANGAR CONSTRUCTION

This project is for the construction of a 15,000 SF corporate hangar to replace the existing Pioneer Aviation hangar building.

Aviation Related Impacts

- Construction of a corporate hangar allows the airport to accommodate anticipated B-II type aircraft hangar demand.

Environmental Impacts

- No anticipated wetland impacts.
- No addition of impervious surface.

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Construction of Corporate Hangar	$ 750,000.00
TOTAL	**$ 750,000.00**

7.4.15 (ALTERNATIVE NO. 1) T-HANGAR COMPLEX CONSTRUCTION

This project is for the construction of two (2) 12,500 SF nested T-Hangar buildings with aprons and taxilane access to Taxiway 'A' and the Main Apron.

Aviation Related Impacts

- Construction of T-hangar facilities provides additional sources of revenue for the Airport.
- It is anticipated that the new T-hangars referenced above will be funded by private developers and that the Airport will incur no costs associated with their construction.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 99,460 square feet of additional impervious surface

Other Impacts or Considerations

- Environmental Assessment.
- **Estimated Cost:**

Construction of Corporate Hangar	$	TBD (Privately Developed)
TOTAL	**$**	**TBD (Privately Developed)**

7.4.16 (ALTERNATIVE NO. 1) RESERVATION OF LAND FOR NON-AERONAUTICAL DEVELOPMENT

This project is for the reservation of an area of land to the east of Runway 16-34 for non-aeronautical development. For graphic representation of this project, refer to Sheet 3 of the ALP. It is important to note that any property, when described as part of an airport in an agreement with the United States, defined by an airport layout plan (ALP), or listed in the Exhibit 'A' property map, is considered to be "dedicated" or obligated property for airport purposes by the terms of the agreement. Airport land proposed to be designated for "non-aeronautical" purposes requires FAA approval.

Aviation Related Impacts

- Designation of land to the east of Runway 16-34 for non-aeronautical use gives the airport the ability to pursue non-aviation revenue projects, including but not limited to the construction of a solar farm.

Environmental Impacts

- Designation of land for non-aeronautical purposes does not present any environmental concerns; however, implementation of future projects has the potential to impact wetlands located within those areas, including the addition of impervious surface.

Other Impacts or Considerations

- Designation of land for non-aeronautical development requires FAA approval.

- **Estimated Cost:**

Land Release for Non-Aeronautical Development	$20,000.00
TOTAL	**$20,000.00**

7.4.17 ALTERNATIVE NO. 1 CONCLUSION

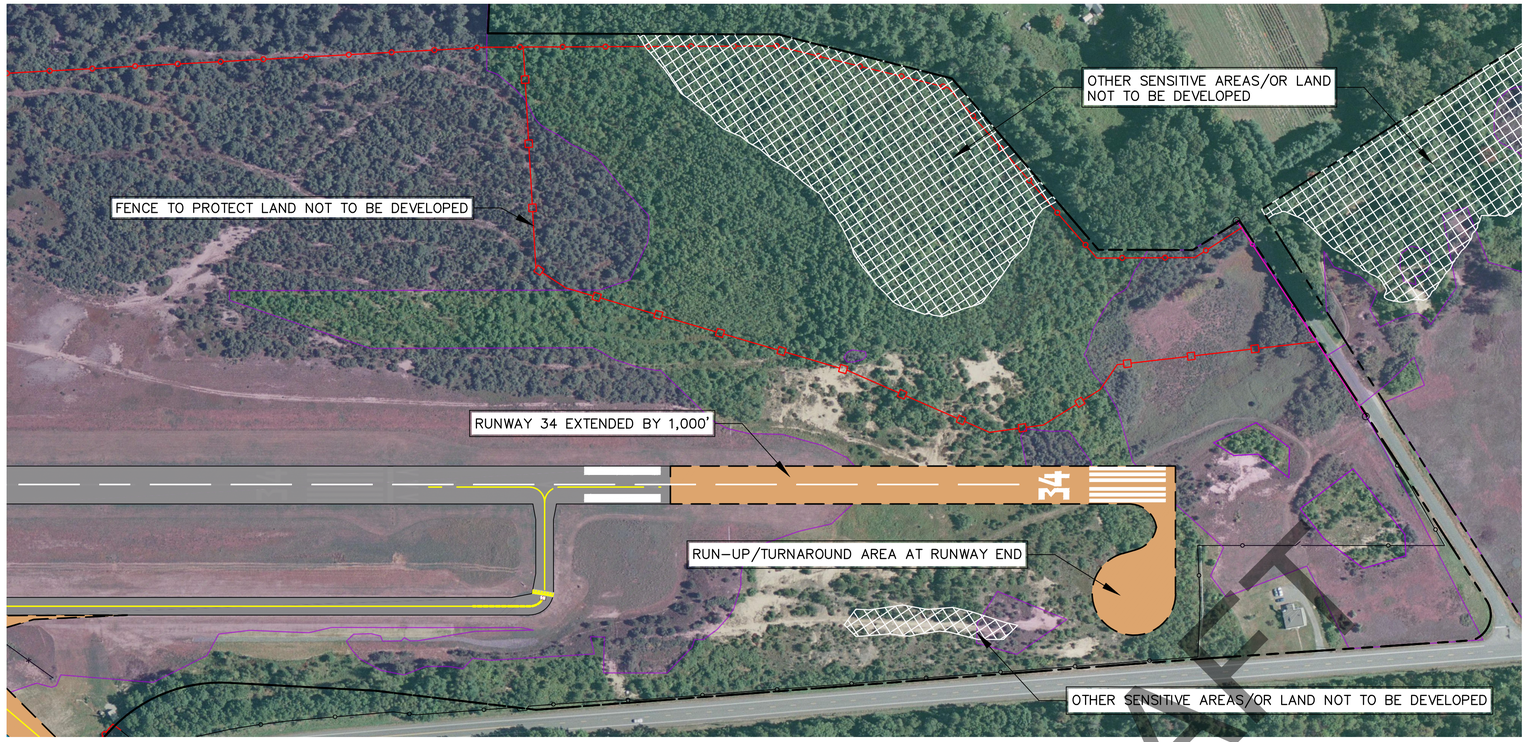
Total environmental impacts:

- Approximately 339,269 square feet of additional impervious surface.

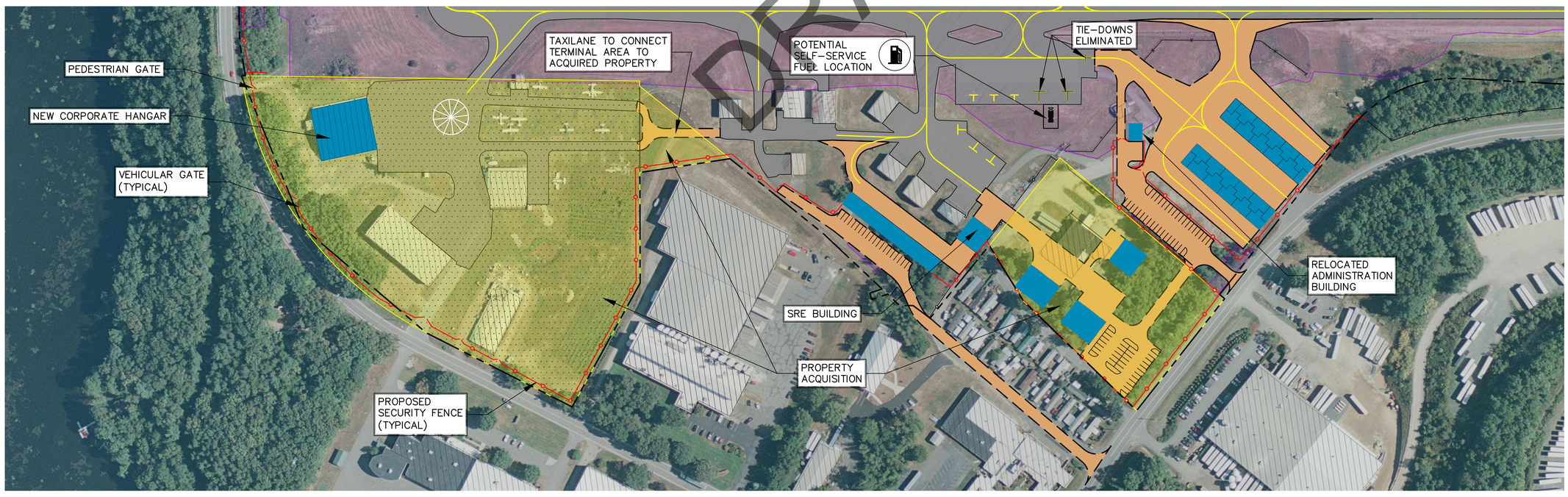
Summary of Costs:

- Project Costs: $8,661,000.
- Permitting: Variable depending on actual development proposed.

After careful consideration, Alternative No. 1 was selected as the Preferred Alternative as this option at this time represents the most practicable option limiting potential impacts on archaeological, cultural, and/or environmental resources.



RUNWAY 34 END SCALE: 1"=300'



TERMINAL AREA SCALE: 1"=250'

NORTH

LEGEND

- AIRPORT PROPERTY LINE
- EXISTING FENCE
- EXISTING GUARDRAIL
- PROPOSED SECURITY FENCE
- PROPOSED FENCE
- EXISTING BUILDING
- PROPOSED BUILDING
- EXISTING PAVEMENT
- PROPOSED PAVEMENT
- OTHER SENSITIVE AREAS/OR LAND NOT TO BE DEVELOPED
- ENVIRONMENTALLY SENSITIVE PROTECTED HABITAT AREAS
- PIONEER AVIATION PROPERTY (EXISTING)
- PROPERTY TO BE ACQUIRED

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ALTERNATIVES

PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	CAR
CHECKED BY	JCM
DATE	JUNE, 2018

GRAPHIC SCALE
VARIES

SHEET TITLE
ALTERNATIVE #1

SHEET NO.
FIG. 7-2

7.5 ALTERNATIVE NO. 2

Alternative No. 2 (Figure 7-3) highlights major development projects to be achieved at the Airport over the planning period.

Objectives: The objectives of Alternative No. 2 are to:

- Expand airside facilities to accommodate B-II type aircraft, including a 1,000-foot runway extension to Runway 16-34.
- Construct a full-length parallel taxiway to Runway 16-34.
- Construct an AWOS to provide accurate weather data to airport users.
- Relocate the terminal building to allow for the expansion of airside facilities.
- Expand the terminal building to include a restaurant.
- Construct hangar facilities.
- Create a user-friendly parking area with clearly-delineated spaces
- Provide adequate storage for FAA-funded snow removal equipment.
- Improve taxilane pavements to improve access to hangars and other facilities.
- Acquire Pioneer Aviation and a portion of the Charter NEX Films property to construct improvements and make the property accessible and secure.
- Reserve land for non-aeronautical development.

Alternative No. 2 explores the impacts of pursuing all of the projects from Alternative No. 1, with the following changes to the projects listed below and described in the following sections for clarity.

- Hillside Plastics Property Acquisition not pursued as part of Alternative No. 2.
- Hangar Complex Construction on Hillside Plastics property not pursued as part of Alternative No. 2.
- Fuel Facility to be constructed adjacent to the West Apron as part of Alternative No. 2, as opposed to being constructed adjacent to the Main Apron.
- Runway 16-34 Extension with full-length parallel Taxiway 'A' (see Section 7.5.1 and Figure 7-3), as opposed to "Taxiway Turnaround" Area.

7.5.1 (ALTERNATIVE NO. 2) RUNWAY 16-34, 1,000-FOOT RUNWAY EXTENSION WITH FULL-LENGTH PARALLEL TAXIWAY 'A' EXTENSION

This project is for the extension of the Runway 34 end to the southeast by 1,000 feet, upgrade of runway lights to LED, construction of REILS on the Runway 34 end, relocation of threshold lights, extension of Taxiway 'A' by 1,250 feet, installation of Medium Intensity Taxiway Lights (MITLS), and application of new pavement markings.

Aviation Related Impacts

- Extension and upgrades to Runway 16-34 allows the airport to accommodate B-II type aircraft.

- Extension of Runway 16-34 shifts the RPZ away from existing ground penetrations, allowing for the removal of the displaced threshold.
- Extension of Taxiway 'A' creates a full-length parallel taxiway to Runway 16-34, eliminating the need for aircraft to back taxi, increasing efficiency and safety.

Environmental Impacts

- No anticipated wetland impacts.
- Approximately 75,000 square feet of additional impervious surface.

Other Impacts or Considerations

- Environmental Assessment required.
- Section 106 coordination.
- NHESP coordination.
- **Estimated Cost:**

Runway 16-34 Extension with Full-Length Parallel Taxiway 'A'	$ 2,400,000.00
TOTAL	**$ 2,400,000.00**

7.5.2 ALTERNATIVE NO. 2 CONCLUSION

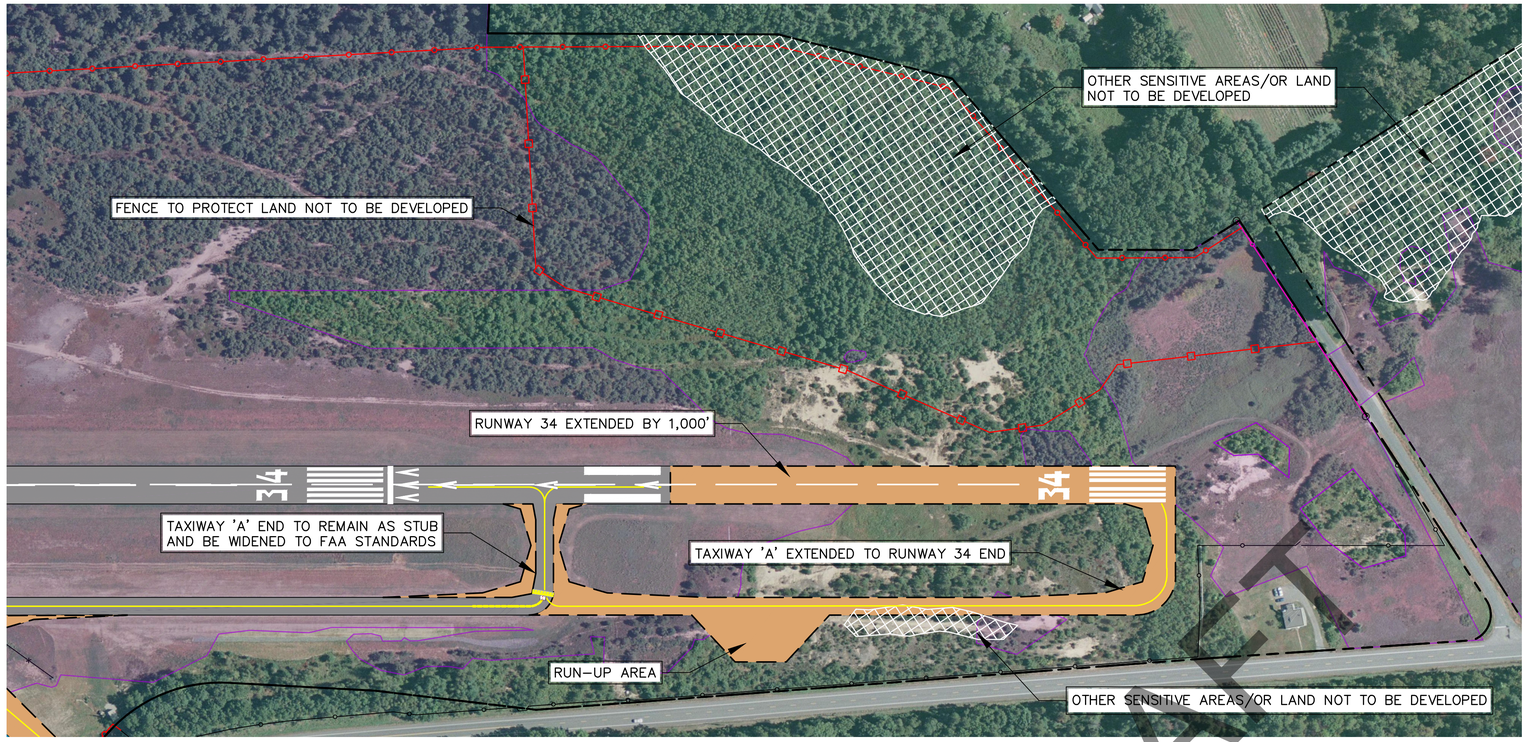
Total environmental impacts:

- Approximately 257,685 square feet of additional impervious surface.

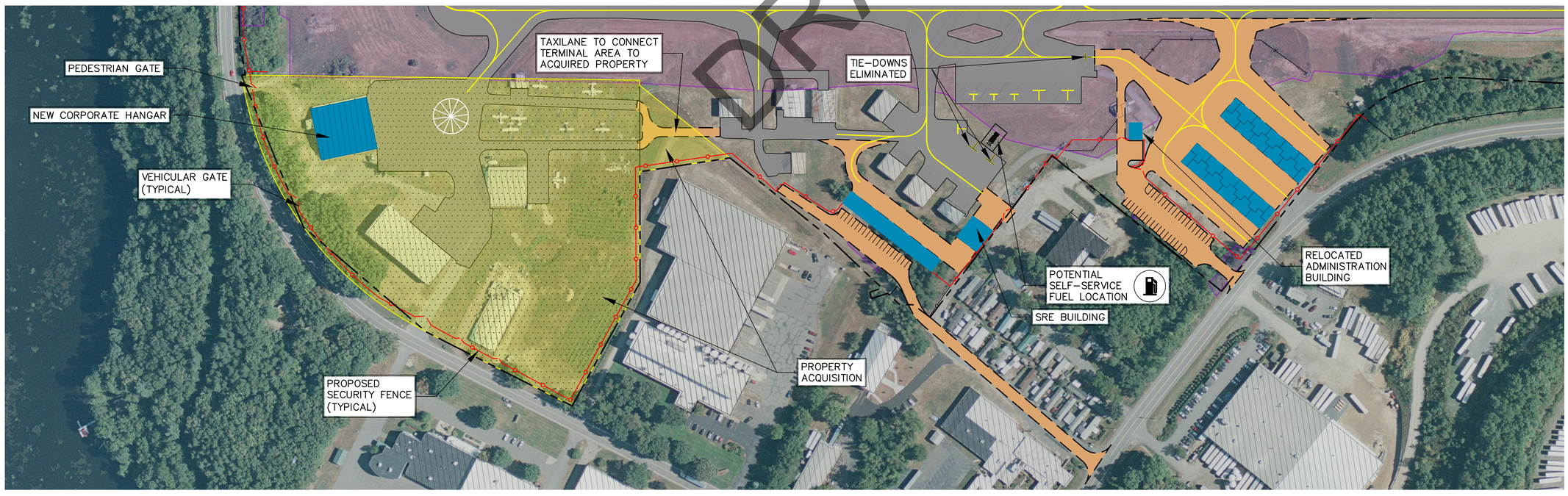
Summary of Costs:

- Project Costs: $8,850,000.
- Permitting: Variable depending on actual development proposed.

After careful consideration, Alternative No. 2 was rejected as the Preferred Alternative largely due to lack of detailed information regarding topography, soil, environmental and/or cultural impacts, etc., which are beyond the scope of this study. Implementation of Alternative No. 2 requires further investigation and was determined not practical at this time. It was agreed upon by the Airport and Funding Agencies that further planning efforts would be necessary before implementation of this alternative.



RUNWAY 34 END SCALE: 1"=300'



TERMINAL AREA SCALE: 1"=250'

NORTH

LEGEND

- AIRPORT PROPERTY LINE
- EXISTING FENCE
- EXISTING GUARDRAIL
- PROPOSED SECURITY FENCE
- PROPOSED FENCE
- EXISTING BUILDING
- PROPOSED BUILDING
- EXISTING PAVEMENT
- PROPOSED PAVEMENT
- OTHER SENSITIVE AREAS/OR LAND NOT TO BE DEVELOPED
- ENVIRONMENTALLY SENSITIVE PROTECTED HABITAT AREAS
- PIONEER AVIATION PROPERTY (EXISTING)
- PROPERTY TO BE ACQUIRED

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ALTERNATIVES

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AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	CAR
CHECKED BY	JCM
DATE	JUNE, 2018

GRAPHIC SCALE
VARIES

SHEET TITLE
ALTERNATIVE #2

SHEET NO.
FIG. 7-3

CHAPTER 8 – SCHEDULE OF IMPROVEMENTS

This chapter presents the recommended Schedule of Improvements for addressing facility needs shown on the Airport Layout Plan (ALP) and described in Chapter 5, *Facility Requirements* in an effort to develop a Capital Improvement Plan in accordance with FAA and MassDOT guidelines. This schedule includes estimated project costs, including costs associated with obtaining required permits and completing project design, project administration, and resident engineering; and reflects the Airport's desired implementation schedule.

8.1 CONSIDERATIONS FOR INFLATION

The total cost of implementing a particular project is based upon estimates of construction costs, the costs of engineering and design work, and minor construction items and contingencies. These preliminary estimates are based, in most cases, on unit prices common to airport and highway construction in Massachusetts in 2018. The costs cited are estimates only and should not be interpreted as final or conclusive.

It is important to consider that inflation will likely affect future CIP project costs. Project cost estimates should be updated at the time a project is ready to be implemented using data contained in the Construction Cost Index presented in Engineering News Record, in order to reflect current labor rates and material costs.

8.2 ENVIRONMETNAL PLANNING PROJECT COSTS

Costs associated with obtaining environmental permits are estimated using assumed scopes of work and from experience with similar types of projects and cannot be accurately estimated until a project scope of work is developed. Developing the scope of work is a process that takes place approximately one year prior to the start of a project in preparation for funding applications. As previously noted, actual costs of planning or environmental review and permitting projects are not known with any degree of accuracy until the project scope of work is developed. Therefore, the costs of these types of projects may vary from the estimated costs due to changes in the actual scope of the project at the time of implementation.

8.3 FORECASTED VS. ACTUAL DEMAND

Although it is the intent of the Schedule to program improvements required to meet the projected demand through the short-, mid-, and long-term planning periods, it is recommended that facilities be built as demand for the improvements are recognized. In all probability, demand will likely not occur exactly as forecasted, which in turn may affect development timetables. In addition, any noticeable delays in environmental and other review processes may require alterations to the Schedule. In such a case, some of the work items for a given period may have to be postponed or moved into a later planning period.

Because some of the long-term improvements are based on forecasts alone, there is no guarantee that these improvements will need to be constructed. Thus, the Airport should closely monitor demand and be prepared to initiate steps to implement long-term recommendations as demand dictates. However,

the Airport should begin the process of implementing short-term recommendations as soon as practicable, given funding constraints, as the demand for these projects is evident.

8.4 SHORT-TERM IMPROVEMENTS

This section provides summary descriptions of the individual projects included in the Airport's short-term Capital Improvement Program from FY 2018-2022. The following descriptions are for planning purposes only and may require refinement and review prior to starting work on a particular project.

8.4.1 PIONEER AVIATION PROPERTY ACQUISITION

This project is for the acquisition of the Pioneer Aviation property for the purposes of facility expansion. This project will include appraisal, review appraisal, and negotiation.

Land acquisition projects are eligible for reimbursement only after the sponsor has submitted evidence that the sponsor will obtain good title to the land. Typical examples of this evidence are a binding purchase agreement that will convey good title, evidence of a condemnation deposit, a condemnation award, or a court settlement.

Estimated project cost: $900,000.00

8.4.2 CHARTER NEX FILMS PROPERTY ACQUISITION

This project is for the acquisition of a portion of the Charter NEX Films property for the purposes of connecting existing airport property to the newly-acquired Pioneer Aviation property. This project will include appraisal, review appraisal, and negotiation. Land acquisition projects are eligible for federal funding assistance.

Estimated project cost: $20,000.00

8.4.3 TAXILANE REHABILITATION AND EXPANSION

This project is for the rehabilitation of the West Apron taxilane, and rehabilitation and extension of the 'A2' hangar taxilane to provide convenient user access to the newly-acquired Pioneer Aviation property. This project will include:

- Full-depth reconstruction including the removal of existing pavement and base materials, subgrade preparation, placement of a gravel subbase and aggregate base layers, and placement of bituminous concrete pavement.
- Reconstruction of taxiway safety areas.
- Application of taxiway markings.
- Erosion control.
- Restoration of disturbed areas.

Taxilane reconstruction is eligible for federal funding assistance provided that the taxilane is for public use. Based on this criterion, this project is eligible for state and federal funding.

Estimated project cost: $695,000.00

8.5 MID-TERM IMPROVEMENTS

This section provides summary descriptions of the individual projects included in the Airport's mid-term Capital Improvement Program from FFY 2023-2027. The following descriptions are for planning purposes only and may require refinement and review prior to starting work on a particular project.

8.5.1 DRIVEWAY RELOCATION AND PARKING LOT CONSTRUCTION

This project is for the construction of a new driveway and parking lot with delineated parking spaces adjacent to the existing driveway and parking lot. This project will include the following:

- Full-depth construction, including the removal of existing pavement and base materials, subgrade preparation, placement of a gravel subbase and aggregate base layers, and placement of bituminous concrete pavement.
- Delineation of parking spaces.
- Installation of drainage improvements.
- Erosion control.
- Restoration of disturbed areas.

Public use, non-revenue producing parking lots are eligible for construction or rehabilitation at general aviation airports. Based on these criteria, this project is eligible for federal funding assistance.

Estimated project cost: $550,000.00

8.5.2 AWOS INSTALLATION

This project is for construction of an AWOS in the vacant area east of Runway 16-34. In order to move forward with this project, the Airport must enter into a reimbursable agreement with FAA. When planning for this project, the Airport should take into account the FAA's processing period of 6-8 months to implement the reimbursable agreement.

AWOS relocation projects are eligible for federal funding assistance.

Estimated project cost: $595,000.00

8.5.3 PERIMETER FENCE CONSTRUCTION

This project is for the construction of perimeter fencing to completely enclose Airport property, including fencing along Industrial Boulevard to encompass the newly-acquired Pioneer Aviation property, with:

- 1 Pedestrian Gate.
- 4 Vehicle Gates.

Fencing projects are eligible for federal funding assistance.

Estimated project cost: $620,000.00

8.5.4 RUNWAY 16-34, 1,000-FOOT RUNWAY EXTENSION WITH "TAXIWAY TURNAROUND" AREA

This project is for the extension of the Runway 34 end with "taxiway turnaround" area to the southeast by 1,000 feet, upgrade of runway lights to LED, construction of REILS on the Runway 34 end, relocation of threshold lights, and application of new pavement markings. This project will include:

- Full-depth construction, including the removal of existing pavement and base materials, subgrade preparation, placement of a gravel subbase and aggregate base layers, and placement of bituminous concrete pavement.
- Removal of displaced threshold and relocation of threshold lights.
- Installation of LED runway lights.
- Installation of Medium Intensity Taxiway Lights.
- Installation of REILS on the Runway 34 end.
- Application of runway markings.
- Installation of drainage improvements.
- Erosion control.
- Restoration of disturbed areas.

Runway and taxiway reconstruction projects are eligible for federal funding assistance.

Estimated project cost: $1,900,000.00

8.5.5 SRE BUILDING CONSTRUCTION

This project is for the construction of an SRE Storage building (approximately 3,230 SF) in the vacant area south of the West Apron, including the following:

- Two-bay, drive-through design.
- Paved ramp access.

SRE building construction is eligible for federal funding assistance; however, costs for the construction of SRE building space for personnel quarters, training space, or other non-equipment storage functions are not eligible.

Estimated project cost: $1,100,000.00

8.5.6 TERMINAL BUILDING AND RESTAURANT CONSTRUCTION

This project is for the relocation and expansion of the Airport's terminal building to a location south of its current location, adjacent to the existing driveway and parking lot, including:

- Airport Manager's office.
- Restroom.
- Pilots' lounge.
- Meeting space.
- Restaurant.

Only areas of the terminal building considered to be "public-use" areas will be eligible for federal funding. The Airport will be responsible for securing funding (other than AIP funding) for those areas of the terminal building that are ineligible.

Estimated project cost: $875,000.00

8.5.7 WEST APRON REHABILITATION

This project is for the rehabilitation of the West Apron as its design life is exceeded. This project will include:

- Full-depth reconstruction including removal of existing pavement and base materials, subgrade preparation, placement of a gravel subbase and aggregate base layers, and placement of bituminous concrete pavement.
- Installation of drainage improvements.
- Erosion control.
- Application of apron markings.
- Restoration of disturbed areas.

Apron construction is eligible for AIP funding provided that it will be used for aircraft parking. The project cannot include pavement for auto parking, other non-aeronautical uses, or exclusive use areas (must be open to the public to park their aircraft).

Estimated project cost: $425,000.00

8.5.8 RESERVATION OF LAND FOR NON-AERONAUTICAL USE

This project is for the designation of a vacant area of land east of Runway 16-34 for non-aeronautical use to allow for the construction of future revenue-generating facilities, such as a solar farm. This project will require FAA approval of land release.

Estimated project cost: $20,000.00

8.5.9 HILLSIDE PLASTICS PROPERTY ACQUISITION

This project is for the acquisition of the Hillside Plastics property for the purposes of facility expansion. This project will include appraisal, review appraisal, and negotiation. Land acquisition projects are eligible for federal funding assistance.

Estimated project cost: $311,000.00

8.6 LONG-TERM IMPROVEMENTS

This section provides summary descriptions of the individual projects included in the Airport's long-term Capital Improvement Program from FY 2028-2037. The following descriptions are for planning purposes only and may require refinement and review prior to starting work on a particular project.

8.6.1 APRON RECONSTRUCTION AND EXPANSION

This project is for the reconstruction and expansion of the Main Apron as its design life is exceeded to include additional tie-down spaces as necessary to accommodate future demand. This project will include:

- Full-depth construction, including the removal of existing pavement and base materials, subgrade preparation, placement of a gravel subbase and aggregate base layers, and placement of bituminous concrete pavement.
- Construction of additional tie-downs.
- Application of apron markings.
- Installation of drainage improvements.
- Erosion control.
- Restoration of disturbed areas.

Apron construction is eligible for AIP funding provided that it will be used for aircraft parking. The project cannot include pavement for auto parking, other non-aeronautical uses, or exclusive use areas (must be open to the public to park their aircraft).

Estimated project cost: $505,000.00

8.6.2 CORPORATE HANGAR CONSTRUCTION

This project is for the construction of a corporate hangar building (approximately 15,000 SF) to replace the existing Pioneer Aviation building. Hangar construction is eligible for AIP funding provided that the airport is a nonprimary airport, only nonprimary entitlements are used, the sponsor does not plan to use discretionary funding to meet the future three years of needs, the building is used only for aeronautical purposes, and the apron in front of the building is not used for public parking, among other requirements as specified in FAA Order 5100.38D.

Estimated project cost: $750,000.00

8.6.3 TAXIWAY REHABILITATION

This project is for the rehabilitation of Taxiway 'A' and 'B' as their design life is exceeded. This project will include:

- Full-depth reconstruction including the removal of existing pavement and base materials, subgrade preparation, placement of a gravel subbase and aggregate base layers, and placement of bituminous concrete pavement.

- Reconstruction of taxiway safety areas.
- Installation of MITLS on Taxiway 'A'.
- Application of taxiway markings.
- Erosion control.
- Restoration of disturbed areas.

Taxiway reconstruction projects are eligible for federal funding assistance.

Estimated project cost: $2,595,000.00

8.6.4 FUEL FACILITY CONSTRUCTION

This project is for the construction of a 100-LL self-serve fuel facility in the area adjacent to the Main Apron. This facility will include one (1) 10,000-gallon storage tank. This project will include:

- Installation of containment system.
- Installation of electrical components.
- Installation of apron lighting.

Fuel farm construction is eligible for state and federal funding assistance provided that the construction occurs at a nonprimary airport and that nonprimary entitlements are used. Additionally, the fuel farm must be owned by the sponsor, but may be operated by an FBO. Eligibility includes bulk fuel storage tanks, containment area, pavement area, pumps, and equipment. Based on these criteria, this project is eligible for federal funding assistance.

Estimated project cost: $325,000.00

8.6.5 NESTED T-HANGAR COMPLEX CONSTRUCTION

This project is for the construction of a new T-hangar complex in the vacant area adjacent to the Airport's existing driveway. This facility will consist of two (2) nested T-hangar buildings with taxilanes and access points to Taxiway 'A' and the Main Apron.

It is anticipated that this T-hangar complex will be funded by private developers and that the Airport will incur no costs associated with its construction.

Estimated project cost: $TBD (Privately Developed)

8.6.6 TAXILANE REHABILITATION

This project is for the rehabilitation of Taxilanes 'A1', 'A2', and 'A3' as their design life is exceeded. This project will include:

- Full-depth reconstruction including the removal of existing pavement and base materials, subgrade preparation, placement of a gravel subbase and aggregate base layers, and placement of bituminous concrete pavement.
- Reconstruction of safety areas.
- Application of markings.

- Erosion control.
- Restoration of disturbed areas.

Taxilane reconstruction projects are eligible for federal funding assistance.

Estimated project cost: $725,000.00

8.6.7 T-HANGAR, ACCESS ROAD, AND PARKING LOT CONSTRUCTION

This project is for the construction of a new T-hangar building with taxilane connection to the West Apron, the construction of a new parking lot, and the reconstruction and extension of Hadley Grant Drive.

It is anticipated that this project will be funded by private developers and that the Airport will incur no costs associated with its construction.

Estimated project cost: $TBD (Privately Developed)

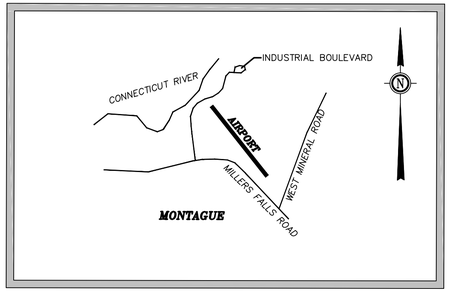
8.6.8 HANGAR COMPLEX CONSTRUCTION

This project is for the construction of three (3) corporate hangar buildings with individual aprons, a taxilane connecting the hangars to the West Apron, and a vehicle parking lot with access from the main parking lot.

It is anticipated that the corporate hangar project will be funded by private developers and that the Airport will incur no costs associated with its construction.

Estimated project cost: $TBD (Privately Developed)

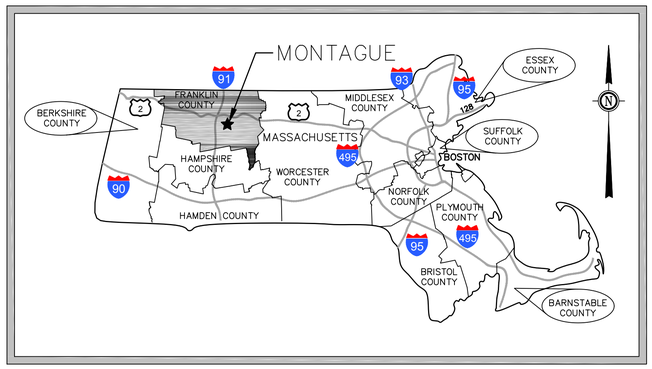
AIRPORT LAYOUT PLAN UPDATE



VICINITY MAP

3000 0 3000 6000

SCALE IN FEET



LOCATION MAP

30 0 30 60

SCALE IN MILES

AIP NO. 3-25-0032-19-2017

DATE: OCTOBER 2018

INDEX TO DRAWINGS

SHEET	SHEET TITLE	REVISION DATE
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3 OF 9	AIRPORT LAYOUT PLAN	
4 OF 9	TERMINAL AREA PLAN	
5 OF 9	AIRPORT AIRSPACE	
6 OF 9	RUNWAY DEPARTURE SURFACE	
7 OF 9	INNER PORTION OF APPROACH SURFACE	
8 OF 9	EXISTING UTILITIES PLAN RUNWAY 16 END	
9 OF 9	EXISTING UTILITIES PLAN RUNWAY 34 END	

SPONSOR'S APPROVAL

APPROVED _____
MR. PETER GOLRICK, CHAIRMAN
MONTAGUE AIRPORT COMMISSION

DATE _____

APPROVED _____
MR. BRYAN CAMDEN, AIRPORT MANAGER

DATE _____

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Boston Baltimore Orlando

ALP SET

PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	CAR
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE

NO SCALE

SHEET TITLE

TITLE SHEET

SHEET NO.

1

1 OF 9

AIRPORT DATA

		EXISTING	ULTIMATE
AIRPORT ELEVATION (NAVD 88, MSL)		358.7'	TBD
AIRPORT REFERENCE POINT (ARP)	LATTITUDE:	N042° 35' 29.7428"	N042° 35' 25.8107"
	LONGITUDE:	W072° 31' 22.8111"	W072° 31' 18.7637"
AIRPORT REFERENCE CODE (ARC)		B-I	B-II
CRITICAL DESIGN AIRCRAFT	AIRCRAFT:	BEECH KING AIR B-200	
	WINGSPAN:	54' 6"	
	MAIN GEAR WIDTH:	19' +/-	
	COCKPIT TO MAIN GEAR WIDTH (CMG):	6' 2"	
	APPROACH SPEED:	103 KNOTS	
AIRPORT IDENTIFIER		0B5	
MEAN MAX. TEMPERATURE OF HOTTEST MONTH		86° F (JULY)	
MAGNETIC DECLINATION (NEAREST MIN)		15° W (2001)	
NAVIGATIONAL AIDS		ROTATING BEACON	
MISC. FACILITIES		LIGHTED WINDSOCK	
NPIAS SERVICE LEVEL		GA	
MASSDOT AERONAUTICS DIVISION EQUIVALENT SERVICE ROLE		COMMUNITY/BUSINESS	

RUNWAY DATA

		EXISTING		ULTIMATE	
		RUNWAY 16	RUNWAY 34	RUNWAY 16	RUNWAY 34
RUNWAY PAVEMENT STRENGTH		30,000 LBS SW (SRE EQUIPMENT)		30,000 LBS SW (SRE EQUIPMENT)	
RUNWAY DESIGN CODE (RDC)		B-I-5000		B-II-5000	
PAVEMENT CLASSIFICATION NUMBER (PCN)		XXX/X/X/X/X		XXX/X/X/X/X	
SURFACE TYPE		ASPHALT		ASPHALT	
EFFECTIVE RUNWAY GRADIENT		0.70% (1)		TBD	
RUNWAY DIMENSIONS (LENGTH X WIDTH)		3,200 LF X 75 FT		4,200 LF X 75 FT	
DISPLACED THRESHOLD		NONE	550'	NONE	NONE
THRESHOLD SITING SURFACE	APPROACH:	20:1	20:1	20:1	20:1
	DEPARTURE:	40:1	40:1	40:1	40:1
	PENETRATIONS:				
14 CFR PART 77 APPROACH CATEGORY		20:1	20:1	20:1	20:1
VISIBILITY MINIMUMS		1480'-1¼ MILE (A), 1480'-1½ MILE (B) 1480'-3 MILE (C)	1480'-1¼ MILE (A), 1480'-1½ MILE (B) 1480'-3 MILE (C)	TBD	
FAR PART 77 APPROACH TYPE		NON-PRECISION	NON-PRECISION	NON-PRECISION	NON-PRECISION
RUNWAY SAFETY AREA	LENGTH/(DESIGN STANDARD):	300 LF / (300 LF)	300 / (300 LF)	300 LF / (300 LF)	300 / (300 LF)
	WIDTH/(DESIGN STANDARD):	150 FT / (150 FT)	150 FT / (150 FT)	150 FT / (150 FT)	150 FT / (150 FT)
RUNWAY OBJECT FREE AREA	LENGTH BEYOND RW END:	300 LF	300 LF	300 LF	300 LF
	WIDTH:	500 FT	500 FT	500 FT	500 FT
RUNWAY OBSTACLE FREE ZONE	LENGTH BEYOND RW END:	200 LF	200 LF	200 LF	200 LF
	WIDTH:	250 FT	250 FT	250 FT	250 FT
RUNWAY APROACH RPZ	LENGTH	1,000 LF	1,000 LF	1,000 LF	1,000 LF
	INNER WIDTH:	250 FT	250 FT	250 FT	250 FT
	OUTER WIDTH	450 FT	450 FT	450 FT	450 FT
RUNWAY END COORDINATES	LATITUDE:	N42°35'42.37"	N42°35'17.23"	N42°35'42.37"	N42°35'09.38"
	LONGITUDE:	W072°31'35.77"	W072°31'09.84'	W072°31'35.77"	W072°31'01.75"
	ELEVATION:	352.6' MSL	358.7' MSL	352.6' MSL	358.7' MSL
DISP. THRESHOLD COORDINATES	LATITUDE:	N/A	N42°35'21.55"	N/A	N/A
	LONGITUDE:	N/A	W072°31'14.29'	N/A	N/A
	ELEVATION:	N/A	354.90' MSL	N/A	N/A
RUNWAY LIGHTING		MIRLS		MIRLS	
NAVIGATIONAL AIDS		PAPI, REILS	NONE	PAPI, REILS	PAPI, REILS
RUNWAY MARKINGS		NON-PRECISION		NON-PRECISION	
AERONAUTICAL SURVEY REQUIRED		NVGS	NVGS	NVGS	NVGS
RUNWAY DEPARTURE OCS APPLICABILITY		N/A	N/A	N/A	N/A
TOUCHDOWN ZONE ELEVATION		357.4'	354.9'	357.4'	358.7'

*ALL INFORMATION USED IN THIS DATA TABLE IS BASED ON THE NAD83 HORIZONTAL DATUM AND NAVD-88 VERTICAL DATUM. THE DATA ON THIS SHEET IS CONSISTENT WITH AC 150/5300-13A.

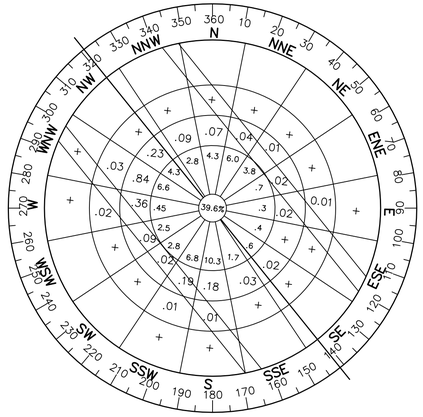
TABLE REFERENCES:
(1) - RUNWAY MEETS LINE OF SIGHT REQUIREMENTS

TAXIWAY DATA

	EXISTING	ULTIMATE
TAXIWAY/TAXILANE WIDTH	35 FT	35 FT
TAXIWAY/TAXILANE SAFETY AREA WIDTH	79 FT	79 FT
TAXIWAY/TAXILANE OBJECT FREE AREA WIDTH	131 FT/115 FT	131 FT/115 FT
TAXIWAY TO TAXILANE CENTERLINE TO CENTERLINE SEPARATION	105 FT	105 FT
TAXIWAY/TAXILANE CENTERLINE TO FIXED OR MOVABLE OBJECT	65.5 FT/57.5 FT	65.5 FT/57.5 FT
TAXIWAY LIGHTING	MITLS ON T/W 'B' & STUB ENDS OF T/W 'A'	MITLS

ALL WEATHER WIND ROSE*

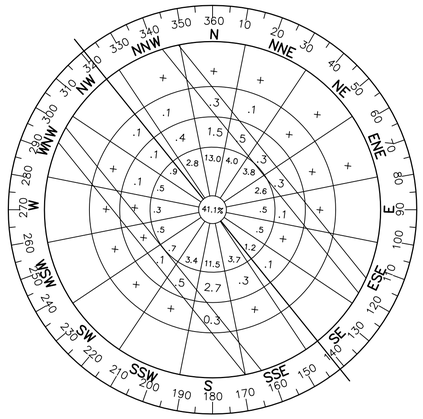
WIND LEVEL = 70 FT



ALL WEATHER COVERAGE (%)

RUNWAY	12 MPH	15MPH
16-34	99.95	99.91
16	43.94	44.05
34	55.91	56.13

IFR WIND ROSE*



IFR COVERAGE (%)

RUNWAY	12 MPH	15MPH
16-34	97.6	99.0

SOURCE: NATIONAL CLIMATIC DATA CENTER, ASHEVILLE, N.C.

* PER 1990 AIRPORT MASTER PLAN

DECLARED DISTANCES

	EXISTING		ULTIMATE	
	RUNWAY 16	RUNWAY 34	RUNWAY 14	RUNWAY 32
TAKEOFF RUN AVAILABLE (TORA)	3,200 LF	3,200 LF	4,200 LF	4,200 LF
TAKEOFF DISTANCE AVAILABLE (TODA)	3,200 LF	3,200 LF	4,200 LF	4,200 LF
ACCELERATE-STOP DISTANCE AVAILABLE (ASDA)	3,200 LF	3,200 LF	4,200 LF	4,200 LF
LANDING DISTANCE AVAILABLE (LDA)	3,200 LF	2,650 LF	4,200 LF	TBD

MODIFICATION TO STANDARDS APPROVAL TABLE

APPROVAL DATE	AIRSPACE CASE NO.	STANDARD TO BE MODIFIED	DESCRIPTION

GALE
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www.gainc.com
Boston Baltimore Orlando

ALP SET

PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	CAR
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE
NO SCALE

SHEET TITLE
AIRPORT DATA SHEET

SHEET NO.
2

LEGEND

ITEM	(E) EXISTING	(F) FUTURE
AIRPORT PROPERTY LINE		
RUNWAY SAFETY AREA (RSA)	RSA	RSA
TAXIWAY SAFETY AREA (TSA)	TSA	TSA
RUNWAY PROTECTION ZONE (RPZ)	RPZ	RPZ
14 CFR PART 77 APPROACH SURFACE		
GUARDRAIL		
8' CHAIN LINK PERIMETER FENCE		
RUNWAY OBJECT FREE AREA (ROFA)	ROFA	ROFA
TAXIWAY OBJECT FREE AREA (TOFA)	TOFA	TOFA
PAPI		
REILS		
AWOS BUILDING AND ANTENNA		
BUILDINGS		
PAVEMENT		
PROPERTY TO BE ACQUIRED		

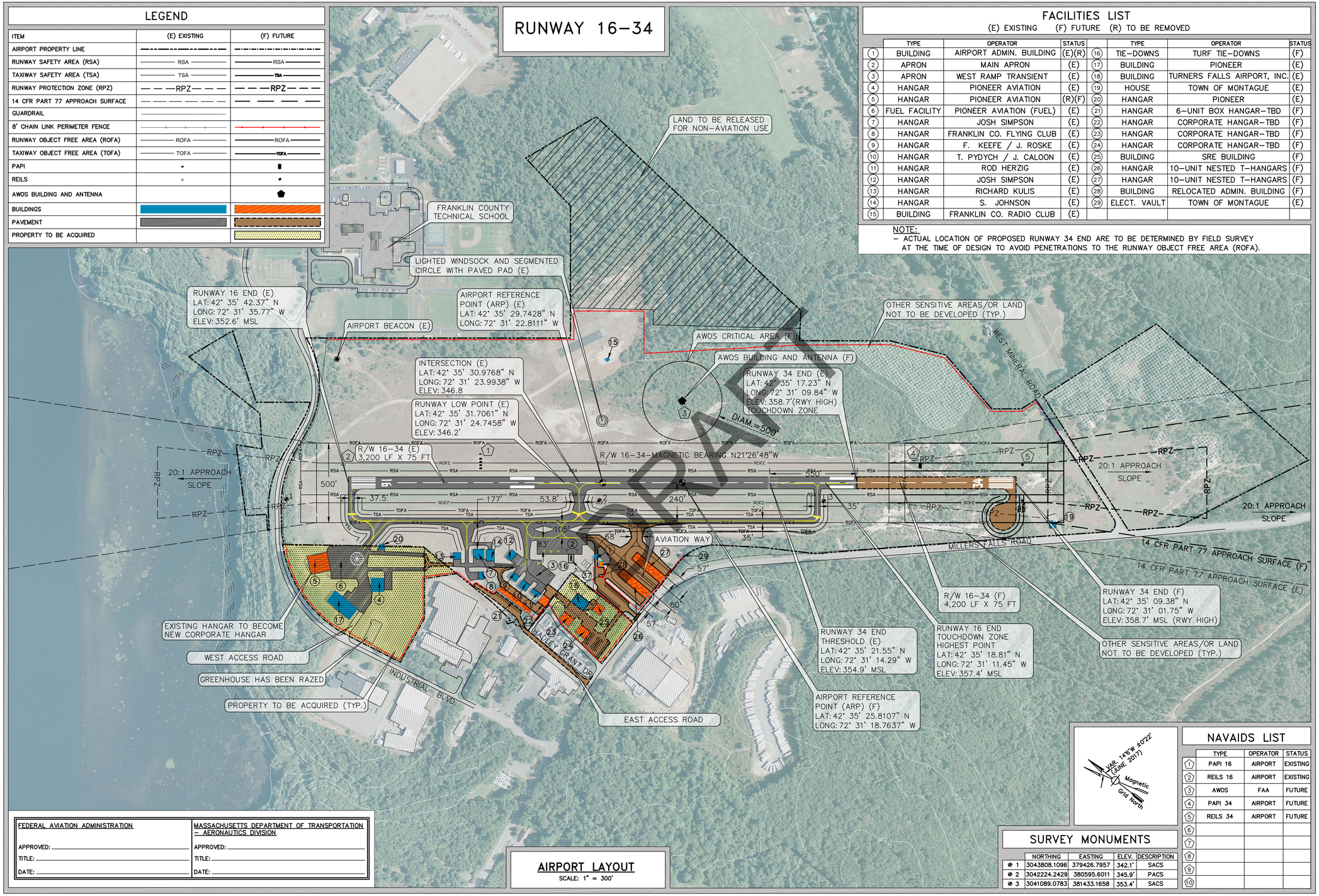
RUNWAY 16–34

FACILITIES LIST

(E) EXISTING (F) FUTURE (R) TO BE REMOVED

	TYPE	OPERATOR	STATUS		TYPE	OPERATOR	STATUS
1	BUILDING	AIRPORT ADMIN. BUILDING	(E)(R)	16	TIE–DOWNS	TURF TIE–DOWNS	(F)
2	APRON	MAIN APRON	(E)	17	BUILDING	PIONEER	(E)
3	APRON	WEST RAMP TRANSIENT	(E)	18	BUILDING	TURNERS FALLS AIRPORT, INC.	(E)
4	HANGAR	PIONEER AVIATION	(E)	19	HOUSE	TOWN OF MONTAGUE	(E)
5	HANGAR	PIONEER AVIATION	(R)(F)	20	HANGAR	PIONEER	(E)
6	FUEL FACILITY	PIONEER AVIATION (FUEL)	(E)	21	HANGAR	6–UNIT BOX HANGAR–TBD	(F)
7	HANGAR	JOSH SIMPSON	(E)	22	HANGAR	CORPORATE HANGAR–TBD	(F)
8	HANGAR	FRANKLIN CO. FLYING CLUB	(E)	23	HANGAR	CORPORATE HANGAR–TBD	(F)
9	HANGAR	F. KEEFE / J. ROSKE	(E)	24	HANGAR	CORPORATE HANGAR–TBD	(F)
10	HANGAR	T. PYDYCH / J. CALOON	(E)	25	BUILDING	SRE BUILDING	(F)
11	HANGAR	ROD HERZIG	(E)	26	HANGAR	10–UNIT NESTED T–HANGARS	(F)
12	HANGAR	JOSH SIMPSON	(E)	27	HANGAR	10–UNIT NESTED T–HANGARS	(F)
13	HANGAR	RICHARD KULIS	(E)	28	BUILDING	RELOCATED ADMIN. BUILDING	(F)
14	HANGAR	S. JOHNSON	(E)	29	ELECT. VAULT	TOWN OF MONTAGUE	(E)
15	BUILDING	FRANKLIN CO. RADIO CLUB	(E)				

NOTE:
– ACTUAL LOCATION OF PROPOSED RUNWAY 34 END ARE TO BE DETERMINED BY FIELD SURVEY AT THE TIME OF DESIGN TO AVOID PENETRATIONS TO THE RUNWAY OBJECT FREE AREA (ROFA).



FEDERAL AVIATION ADMINISTRATION	MASSACHUSETTS DEPARTMENT OF TRANSPORTATION – AERONAUTICS DIVISION
APPROVED:	APPROVED:
TITLE:	TITLE:
DATE:	DATE:

AIRPORT LAYOUT
SCALE: 1" = 300'

VAR: 14°W ±0°22' (JUNE 2017)
Magnetic
Grid North

SURVEY MONUMENTS

	NORTHING	EASTING	ELEV.	DESCRIPTION
⊕ 1	3043808.1096	379426.7957	342.1'	SACS
⊕ 2	3042224.2429	380595.6011	345.9'	PACS
⊕ 3	3041089.0783	381433.1658	353.4'	SACS

NAVAIDS LIST

	TYPE	OPERATOR	STATUS
1	PAPI 16	AIRPORT	EXISTING
2	REILS 16	AIRPORT	EXISTING
3	AWOS	FAA	FUTURE
4	PAPI 34	AIRPORT	FUTURE
5	REILS 34	AIRPORT	FUTURE
6			
7			
8			
9			
10			

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PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3–25–0032–19–2017
AIRPORT

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

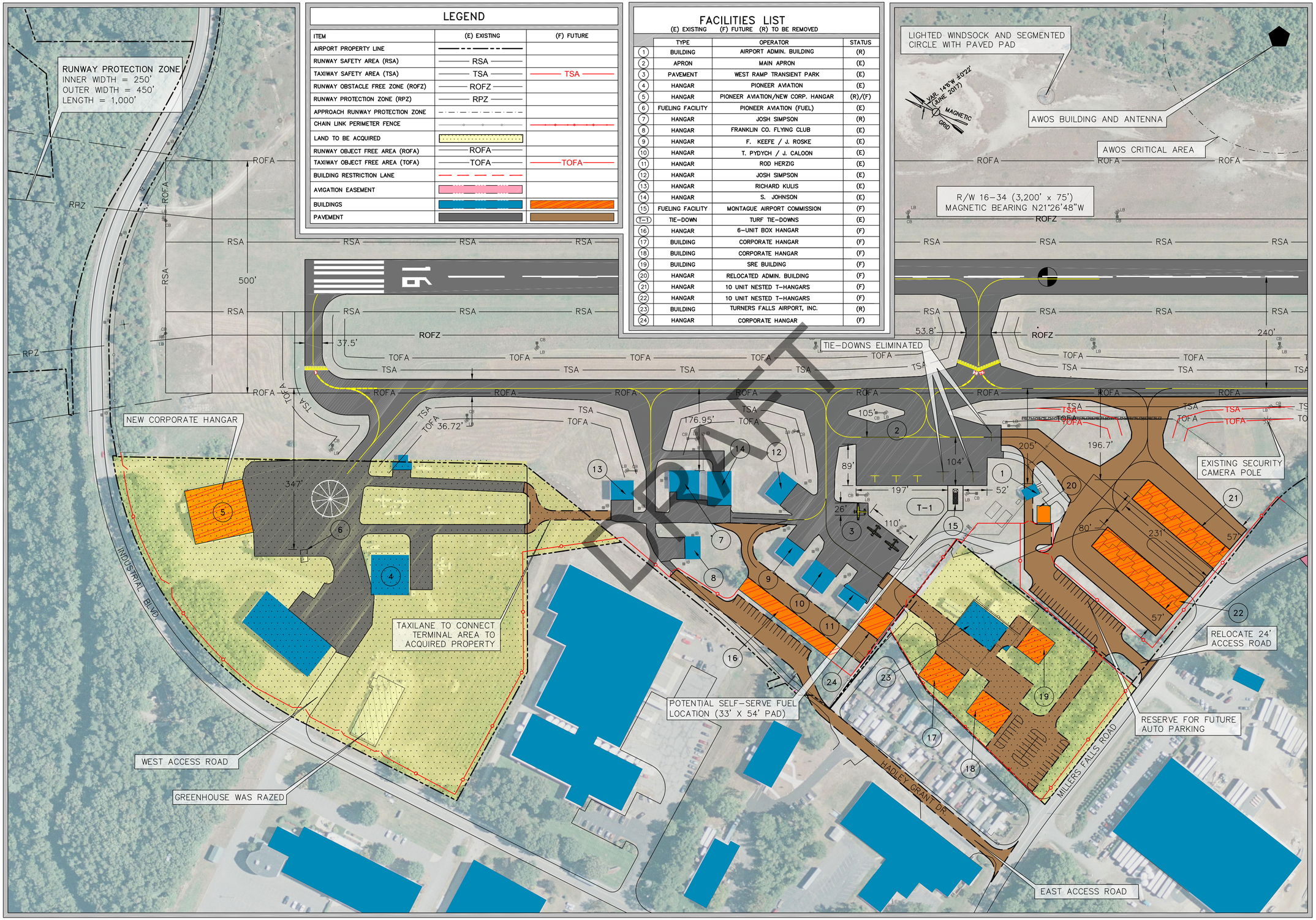
NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	DCQ
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE
0 150 300 600
SCALE: 1"=300'

SHEET TITLE
AIRPORT LAYOUT PLAN

SHEET NO.
3
3 OF 9



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AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

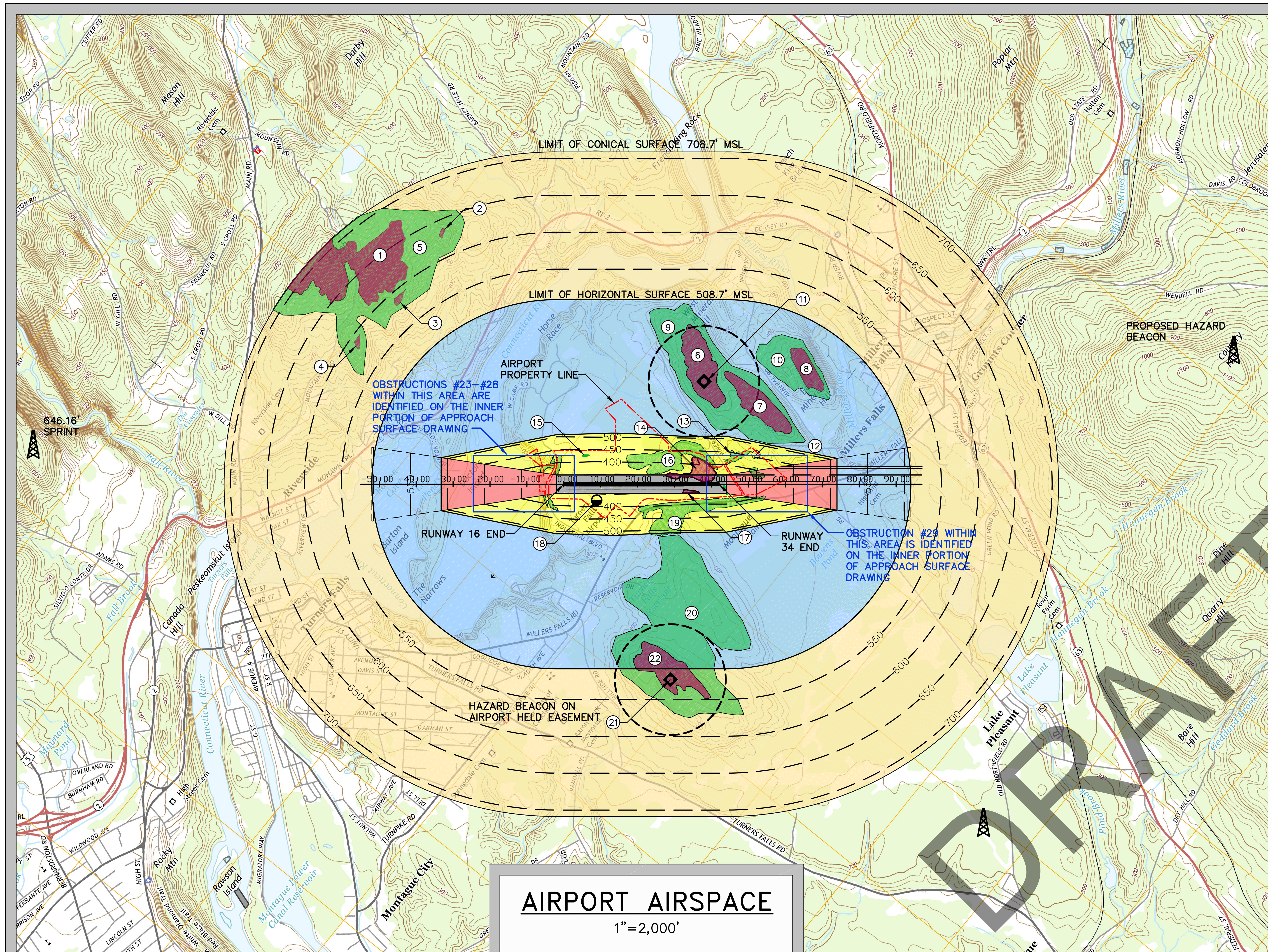
PROJECT NO.	777043
DESIGNED BY	DCQ
DRAWN BY	DCQ
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE
0 50 100 200
SCALE: 1"=100'

SHEET TITLE
TERMINAL AREA PLAN

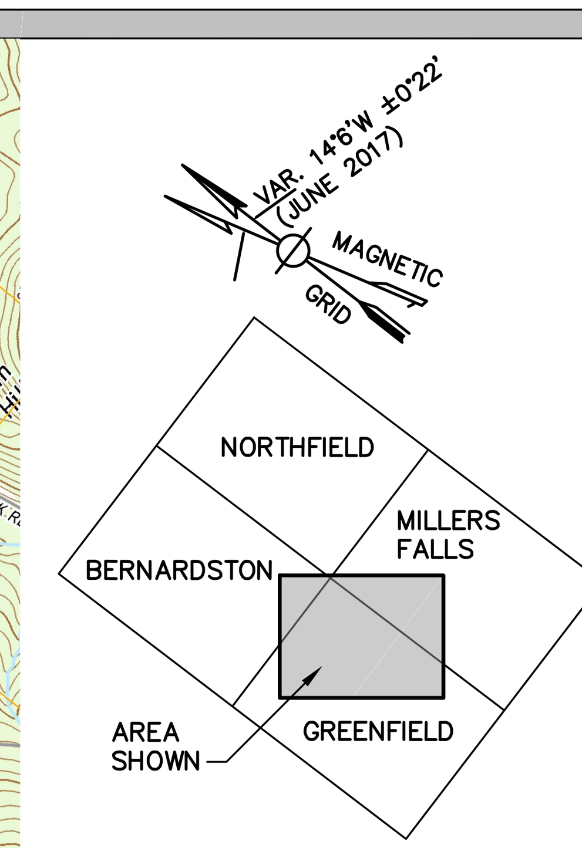
SHEET NO.
4

4 OF 9

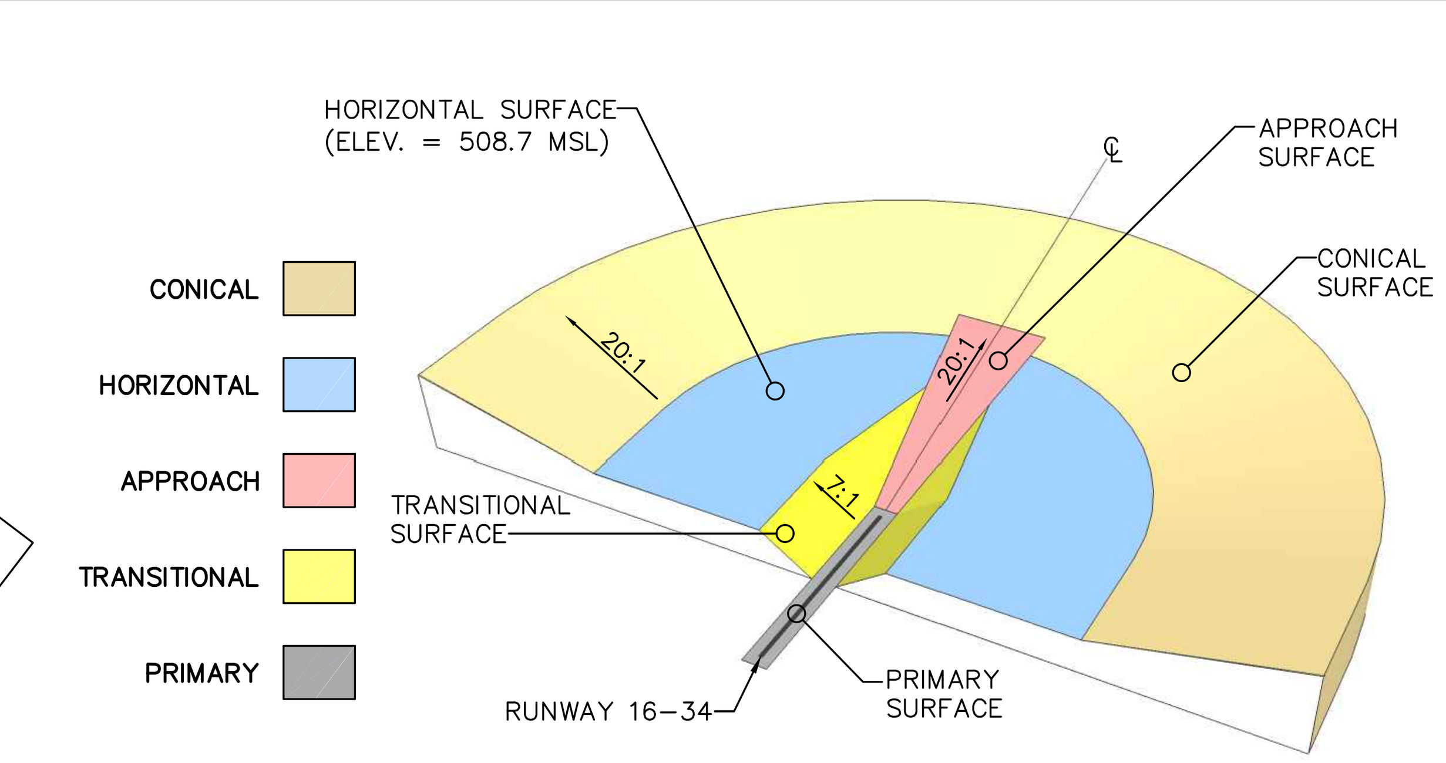


AIRPORT AIRSPACE

1"=2,000'



SOURCE: USGS "THE NATIONAL MAP" US TOPO QUADRANGLES 7.5 MINUTE SERIES



14 CFR PART 77 SURFACES

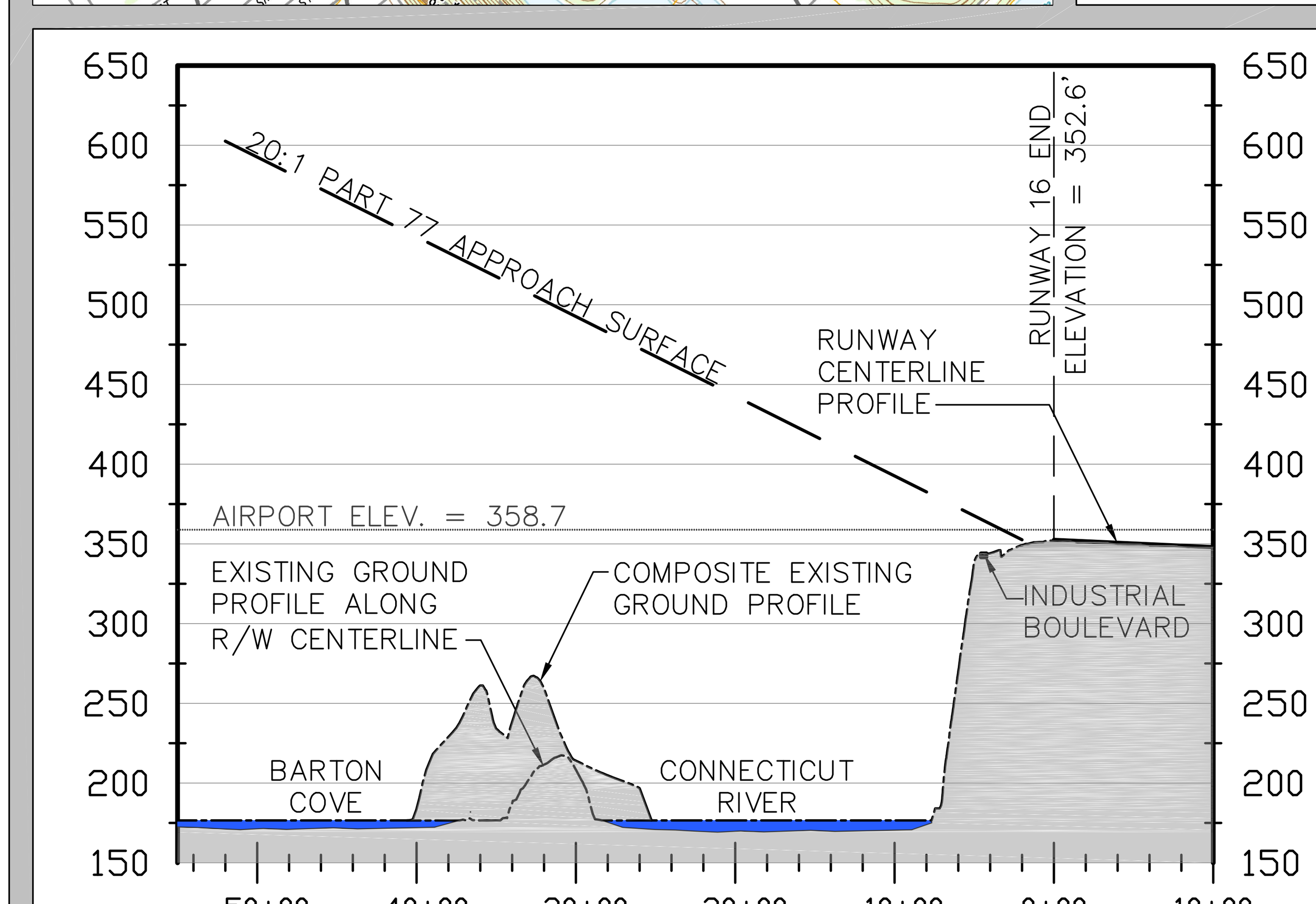
N.T.S.

OBSTRUCTION DATA

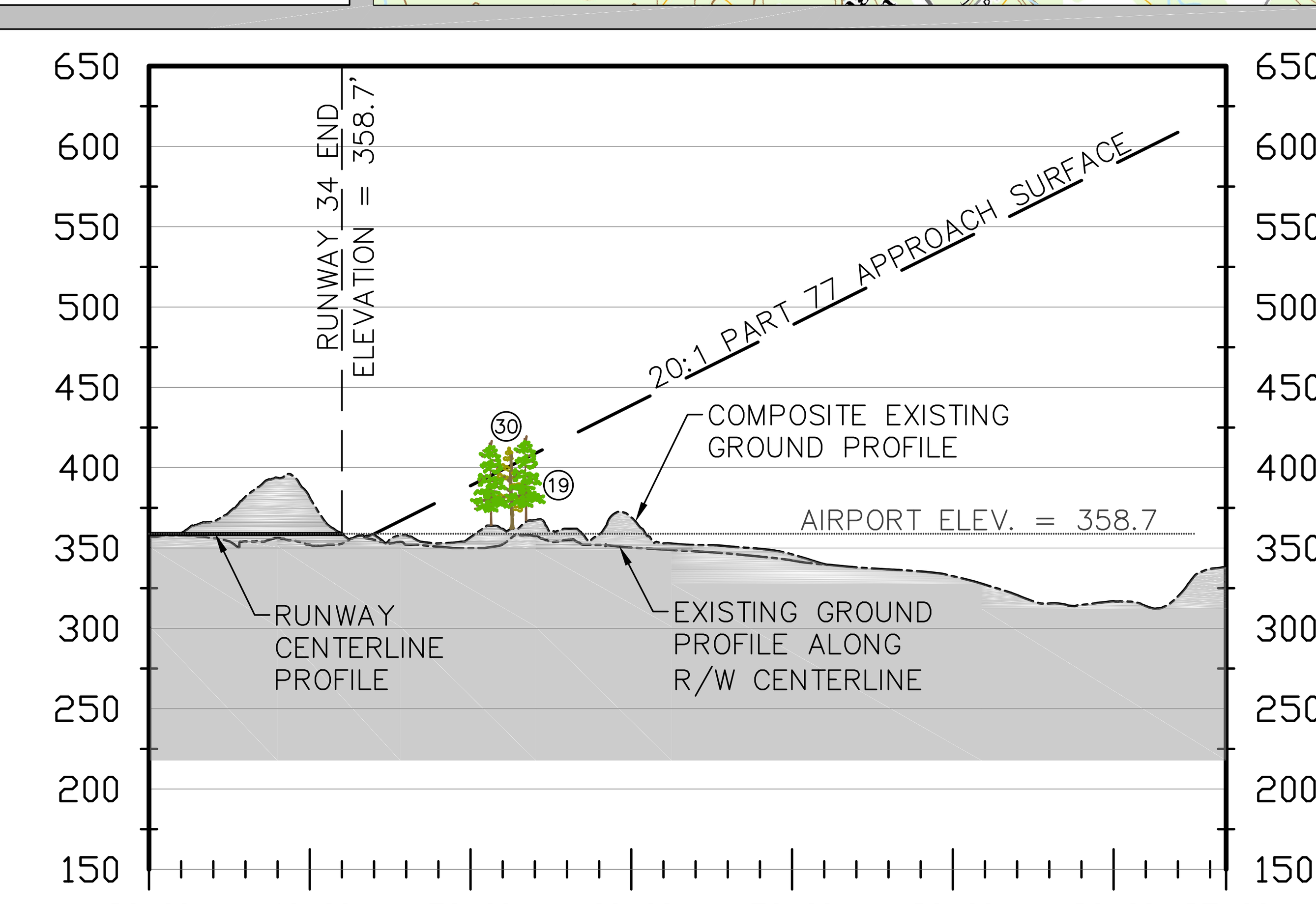
OBJECT ID	DESCRIPTION	GROUND ELEVATION (FT. MSL)	PENETRATION (FT)	PART 77 SURFACE(S)	PROPOSED ACTION
1	GROUND	611–817	109	CONICAL	LIGHT
2	GROUND	622–634	4	CONICAL	LIGHT
3	GROUND	579–610	18	CONICAL	LIGHT
4	GROUND	588–599	7	CONICAL	LIGHT
5	GROUP OF TREES	490–817	189	CONICAL	LIGHT
6	GROUND	497–613	104	HORIZONTAL	LIGHT
7	GROUND	499–581	72	HORIZONTAL	LIGHT
8	GROUND	492–559	50	HORIZONTAL	LIGHT
9	GROUP OF TREES	412–613	184	HORIZONTAL	LIGHT
10	GROUP OF TREES	414–559	130	HORIZONTAL	LIGHT
11	HAZARD BEACON	608	200	HORIZONTAL	EXISTING HAZARD BEACON
12	TREE	390	22	TRANSITIONAL	MITIGATE
13	GROUP OF TREES	364–395	36	TRANSITIONAL	MITIGATE
14	GROUND	357–428	34	TRANSITIONAL, PRIMARY	MITIGATE AND LIGHT
15	GROUP OF TREES	345–348	3	TRANSITIONAL	MITIGATE
16	GROUP OF TREES	348–428	90	TRANSITIONAL	MITIGATE
17	GROUND	360–368	9	PRIMARY	MITIGATE
18	TREE	345	–4	TRANSITIONAL	MITIGATE
19	GROUP OF TREES	345–462	64	TRANSITIONAL, HORIZONTAL	MITIGATE
20	GROUP OF TREES	440–565	123	HORIZONTAL, CONICAL	MITIGATE AND LIGHT
21	HAZARD BEACON	558	143	CONICAL	EXISTING HAZARD BEACON
22	GROUND	511–560	43	HORIZONTAL, CONICAL	LIGHT

OBSTRUCTION DATA NOTES:

1. AN OBSTRUCTION SURVEY WAS NOT PERFORMED AS PART OF THIS AIRPORT LAYOUT PLAN (ALP) UPDATE. MOST OBSTRUCTION INFORMATION IS SOURCED FROM TURNERS FALLS MUNICIPAL AIRPORT'S 2003 ALP UPDATE.
2. AN 80' TREE HEIGHT WAS ASSUMED, EXCEPT WHERE OTHERWISE INDICATED, OR WHERE INDIVIDUAL TREE HEIGHTS WERE PROVIDED IN THE 2003 ALP UPDATE.
3. HAZARD BEACON HEIGHTS WERE ASSUMED TO BE 101 FT AND 108 FT, RESPECTIVELY, FOR OBJECT ID'S 11 AND 22.
4. EXISTING GROUND ELEVATIONS ON AND IN THE VICINITY OF AIRPORT PROPERTY WERE DETERMINED BY COMBINING INFORMATION FROM THE FOLLOWING SOURCES: BASE PLAN COMPILED FROM AERIAL MAPPING PERFORMED BY AEROTEC IN 1999, GROUND SURVEY PERFORMED BY CLARK ENGINEERING & SURVEYING IN 2001 (HORIZONTAL DATUM NAD 83, VERTICAL DATUM NAVD 88), AND AS-BUILT INFORMATION FROM RUNWAY AND TAXIWAY RECONSTRUCTION PROJECTS. THESE SOURCES WERE SUPPLEMENTED BY TERRAIN DATA DERIVED FROM USGS 10 METER DIGITAL ELEVATION MODELS (DEMS) FROM THE NATIONAL ELEVATION DATASET.

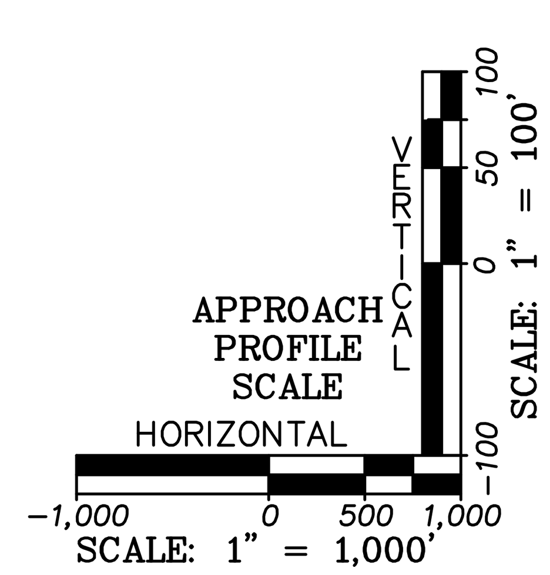


RUNWAY 16 APPROACH PROFILE



RUNWAY 34 APPROACH PROFILE

PART 77 SURFACES:
- WIDTH OF PRIMARY SURFACE = 500'
- RADIUS OF HORIZONTAL SURFACE = 5,000'
- APPROACH SURFACE WIDTH AT END = 2,000'
- APPROACH SURFACE LENGTH = 5,000'



LEGEND

AIRPORT PROPERTY LINE	
GROUND PENETRATING PART 77 SURFACES	
VEGETATION PENETRATING PART 77 SURFACES (ASSUMED 80' TREE HEIGHT)	
OBSTRUCTION ID	#
TREE PENETRATING PART 77 SURFACES	
TREE NEAR PENETRATING PART 77 SURFACES	
HAZARD BEACON	
TOWER	

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ALP SET

PREPARED FOR:

MONTAGUE

PROJECT: AIRPORT MASTER PLAN UPDATE AIP NO. 3-25-0032-19-2017

OWNER: TURNERS FALLS MUNICIPAL AIRPORT MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	CAR
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE

0 500 1,000 2,000

SCALE: 1"=2,000'

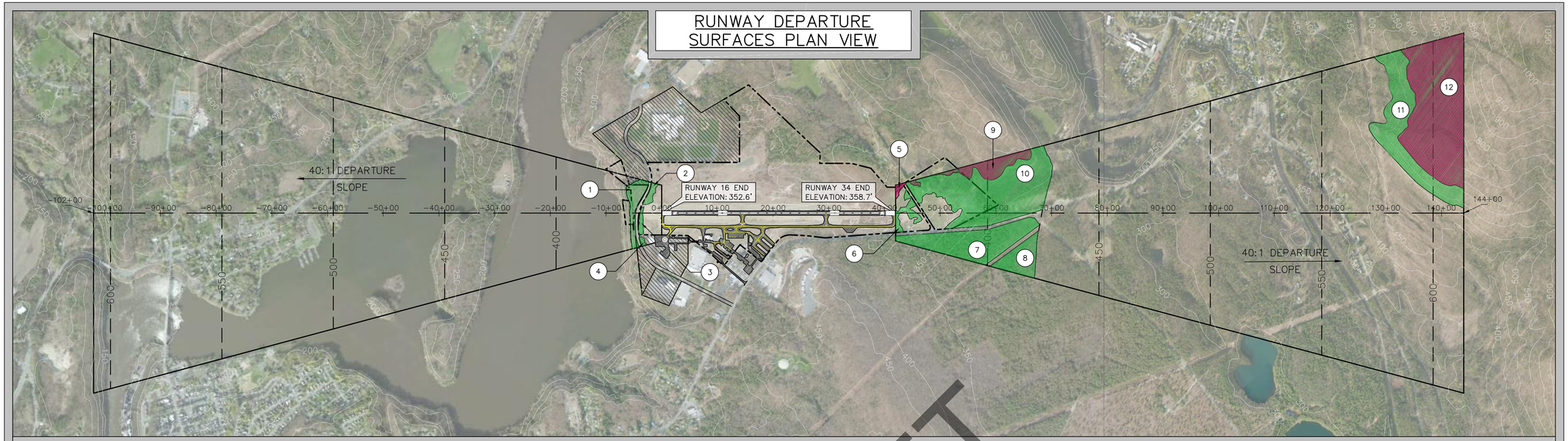
SHEET TITLE

AIRPORT AIRSPACE

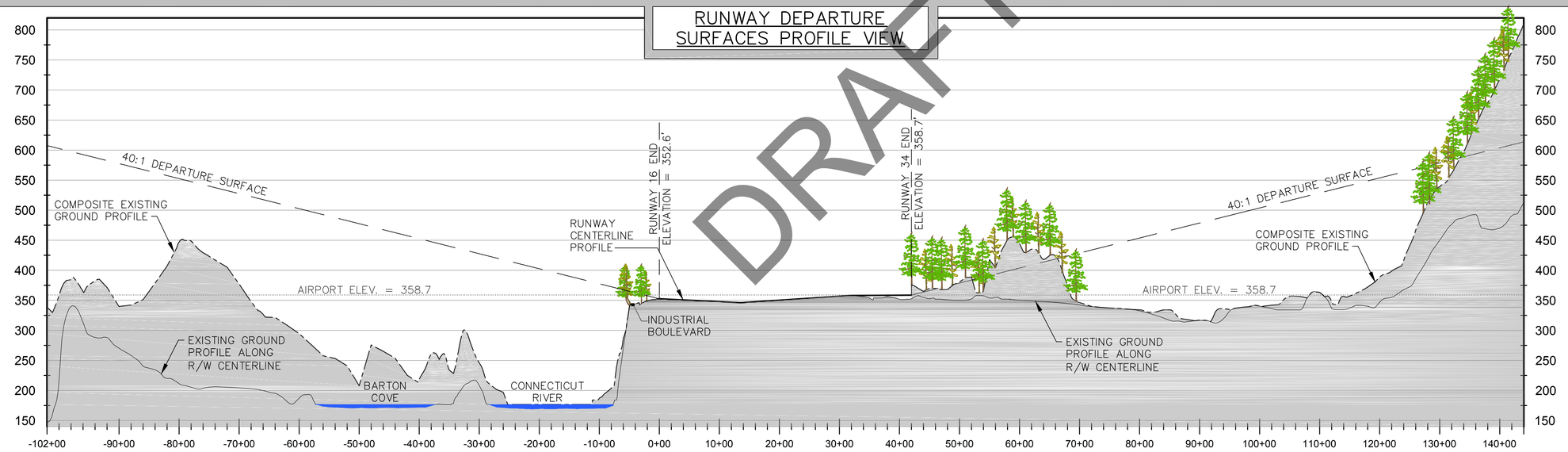
SHEET NO.

5

RUNWAY DEPARTURE SURFACES PLAN VIEW



RUNWAY DEPARTURE SURFACES PROFILE VIEW



40:1 DEPARTURE SURFACE OBSTRUCTIONS: RUNWAY 16 END

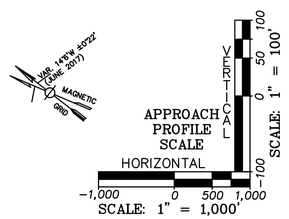
OBJECT ID	DESCRIPTION	GROUND ELEVATION (FT. MSL)	MAXIMUM PENETRATION (FT)	PROPOSED ACTION
1	GROUP OF TREES	283–346	64	MITIGATE
2	GROUP OF TREES	342–346	71	MITIGATE
3	GROUP OF TREES	344–346	65	MITIGATE
4	GROUP OF TREES	340–345	64	MITIGATE

OBSTRUCTION DATA NOTES:

1. THIS PLAN ASSUMES AN 80' TREE HEIGHT IN ALL AREAS. AN OBSTRUCTION SURVEY WAS NOT PERFORMED AS PART OF THIS AIRPORT LAYOUT PLAN UPDATE.
2. EXISTING GROUND ELEVATIONS WERE DETERMINED BY COMBINING INFORMATION FROM THE FOLLOWING SOURCES: AERIAL MAPPING PERFORMED BY AEROTEC IN 1999, GROUND SURVEY PERFORMED BY CLARK ENGINEERING & SURVEYING IN 2001, AS-BUILT INFORMATION FROM RUNWAY AND TAXIWAY RECONSTRUCTION PROJECTS, AND TERRAIN DATA DERIVED FROM USGS 10 METER DIGITAL ELEVATION MODELS (DEMS) FROM THE NATIONAL ELEVATION DATASET.

LEGEND

- AIRPORT PROPERTY LINE
- 40:1 DEPARTURE SURFACE CONTOUR (50' INTERVALS) — 150
- EXISTING GROUND CONTOUR (50' INTERVALS) — 750
- OBSTRUCTION I.D. — #
- EASEMENT
- VEGETATION PENETRATING PART 77 SURFACES
- GROUND PENETRATING PART 77 SURFACES



40:1 DEPARTURE SURFACE OBSTRUCTIONS: RUNWAY 34 END

OBJECT ID	DESCRIPTION	GROUND ELEVATION (FT. MSL)	MAXIMUM PENETRATION (FT)	PROPOSED ACTION
5	GROUND	360–376	17	LIGHT
6	GROUP OF TREES	352–359	76	MITIGATE
7	GROUP OF TREES	344–355	77	MITIGATE
8	GROUP OF TREES	341–346	25	MITIGATE
9	GROUND	377–455	54	LIGHT
10	GROUP OF TREES	345–419	134	MITIGATE
11	GROUP OF TREES	491–614	272	LIGHT
12	GROUND	584–806	192	LIGHT

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ALP SET

PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

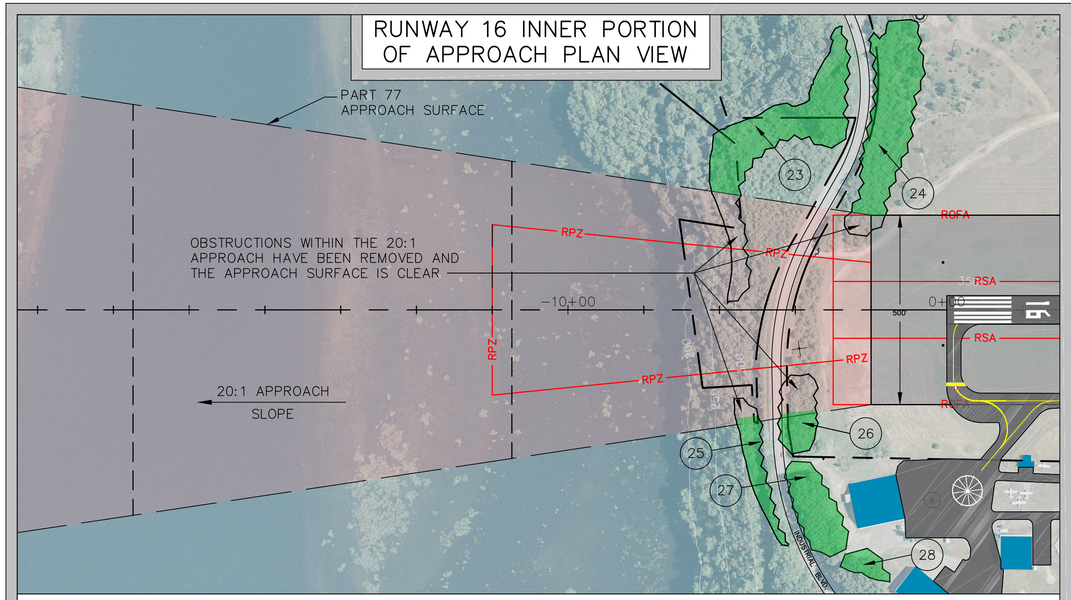
PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	CAR
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE
0 500 1,000 2,000
SCALE: 1"=1,000'

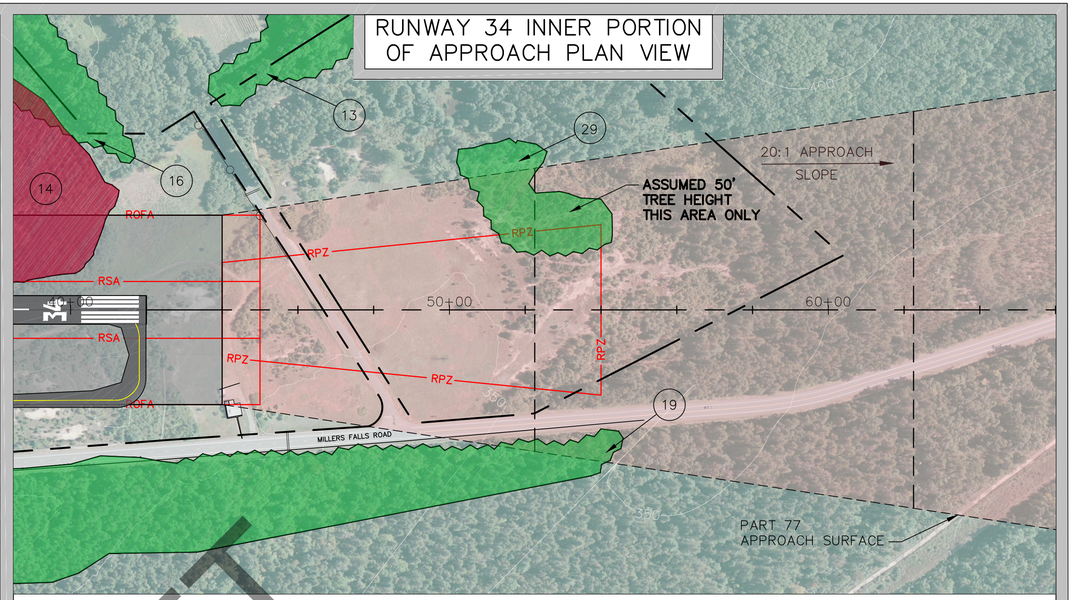
SHEET TITLE
RUNWAY DEPARTURE SURFACE

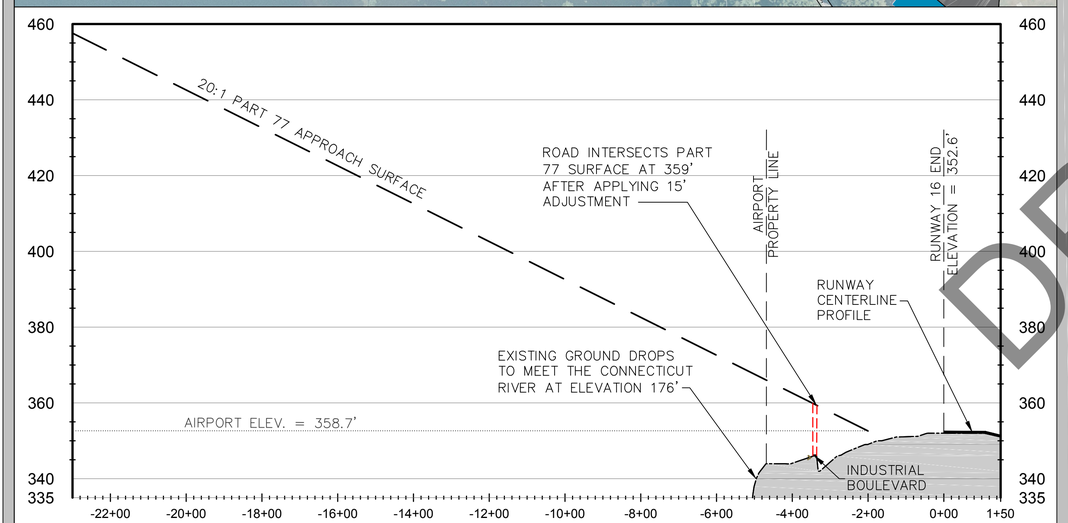
SHEET NO.
6

RUNWAY 16 INNER PORTION OF APPROACH PLAN VIEW

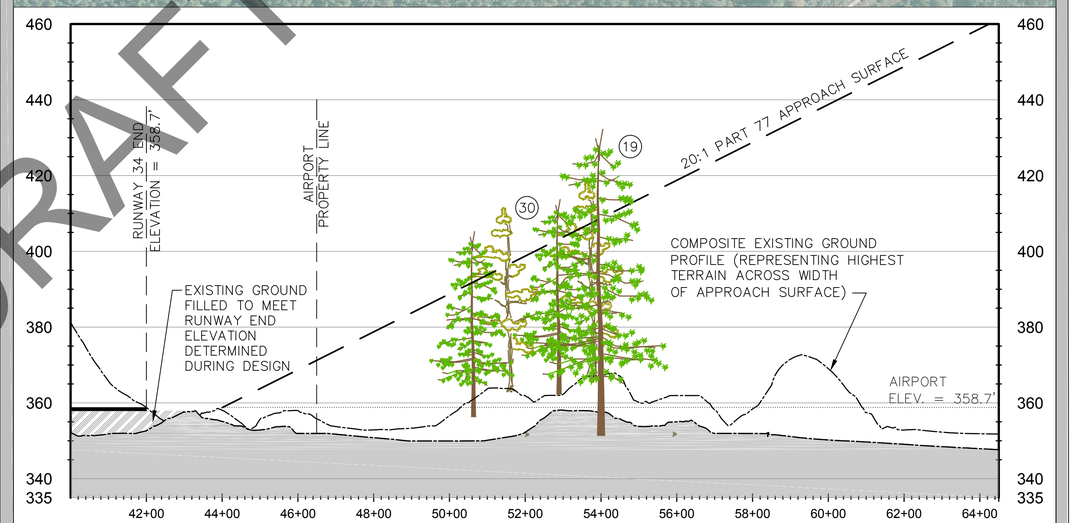


RUNWAY 34 INNER PORTION OF APPROACH PLAN VIEW





RUNWAY 16 APPROACH PROFILE



RUNWAY 34 APPROACH PROFILE

OBSTRUCTION DATA NOTES:

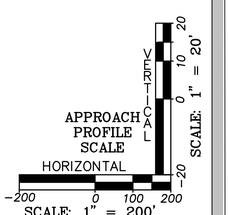
1. AN OBSTRUCTION SURVEY WAS NOT PERFORMED AS PART OF THIS AIRPORT LAYOUT PLAN (ALP) UPDATE. MOST OBSTRUCTION INFORMATION IS SOURCED FROM TURNERS FALLS MUNICIPAL AIRPORT'S 2003 ALP UPDATE.
2. AN 80' TREE HEIGHT WAS ASSUMED, EXCEPT WHERE OTHERWISE INDICATED.
3. EXISTING GROUND ELEVATIONS ON AND IN THE VICINITY OF AIRPORT PROPERTY WERE DETERMINED BY COMBINING INFORMATION FROM THE FOLLOWING SOURCES: BASE PLAN COMPILED FROM AERIAL MAPPING PERFORMED BY AEROTEC IN 1999, GROUND SURVEY PERFORMED BY CLARK ENGINEERING & SURVEYING IN 2001 (HORIZONTAL DATUM NAD 83, VERTICAL DATUM NAVD 88), AND AS-BUILT INFORMATION FROM RUNWAY AND TAXIWAY RECONSTRUCTION PROJECTS. THESE SOURCES WERE SUPPLEMENTED BY TERRAIN DATA DERIVED FROM USGS 10 METER DIGITAL ELEVATION MODELS (DEMS) FROM THE NATIONAL ELEVATION DATASET.

OBSTRUCTION DATA

OBJECT ID	DESCRIPTION	GROUND ELEVATION (FT. MSL)	PENETRATION (FT)	PART 77 SURFACE(S)	PROPOSED ACTION
13	GROUP OF TREES	SEE OBSTRUCTION DATA ON AIRPORT AIRSPACE DRAWING			
14	GROUND				
16	GROUP OF TREES				
19	GROUP OF TREES				
23	GROUP OF TREES	288-343	49	TRANSITIONAL, APPROACH	MITIGATE
24	GROUP OF TREES	342-345	72	TRANSITIONAL, APPROACH	MITIGATE
25	GROUP OF TREES	285-337	43	TRANSITIONAL, APPROACH	MITIGATE
26	GROUP OF TREES	341-346	66	TRANSITIONAL, APPROACH	MITIGATE
27	GROUP OF TREES	340-345	46	TRANSITIONAL	MITIGATE
28	GROUP OF TREES	340-342	15	TRANSITIONAL	MITIGATE
29	GROUP OF TREES	354-370	15	TRANSITIONAL, APPROACH	MITIGATE

LEGEND

AIRPORT PROPERTY LINE	
RUNWAY SAFETY AREA (RSA)	RSA
RUNWAY PROTECTION ZONE (RPZ)	RPZ
RUNWAY OBJECT FREE AREA (ROFA)	ROFA
BUILDINGS	
PAVEMENT	
VEGETATION PENETRATING PART 77 SURFACES	
GROUND PENETRATING PART 77 SURFACES	



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ALP SET

PREPARED FOR:

PROJECT
AIRPORT MASTER PLAN UPDATE
AIP NO. 3-25-0032-19-2017

OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	CAR
DRAWN BY	CAR
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE
0 100 200 400
SCALE: 1"=200'

SHEET TITLE
INNER PORTION OF THE APPROACH SURFACE

SHEET NO.
7

LEGEND

ITEM	(E) EXISTING
DRAINAGE PIPE	
CATCHBASIN	CB
LEACHING BASIN	LB
INFILTRATION BASIN	IB
UNDERDRAIN	
UNDERDRAIN CLEANOUT	
WATER LINE	
HYDRANT	
DIRECT–BURIED ELECTRICAL CABLE	
ELECTRICAL DUCT	
OVERHEAD ELECTRICAL WIRE	OHW
BASE MOUNTED, RUNWAY EDGE LIGHTS	
STAKE MOUNTED, RUNWAY EDGE LIGHTS	
BASE MOUNTED, TAXIWAY EDGE LIGHTS	
STAKE MOUNTED, TAXIWAY EDGE LIGHTS	

LEGEND NOTE: SEE SHEET NO. 9 FOR ADDITIONAL LEGEND NOTES

VAR: 14°6'W ±0°22' (JUNE 2017)
Magnetic
Grid North

ROTATING BEACON
ELECTRICAL JUNCTION CAN (TYP.)
TREE LINE (TYP.)
DIRT ROAD (TYP.)
DIRECT BURIED ELECTRICAL CABLES (TYP.)
CABLE MARKER
REMOTE CONTROL AIRPLANE RUNWAY
LIGHTED WINDSOCK
ELECTRICAL HANDHOLE
PAPI
ELECTRICAL MANHOLE (TYP.)
REILS POWER PEDISTAL
REILS
STAKE MOUNTED, RUNWAY EDGE LIGHT (TYP.)
REILS
STAKE MOUNTED, TAXIWAY EDGE LIGHT (TYP.)
GUIDANCE SIGN (TYP.)
TAXIWAY 'A'
TAXILANE 'A1'
AIRPORT PROPERTY LINE
FUEL TANK
INFILTRATION BASIN (TYP.)
BUILDING (TYP.)
GREENHOUSE WAS RAZED
DIRECT BURIED ELECTRICAL CABLES (TYP.)
CATCH BASIN (TYP.)
LEACHING BASIN (TYP.)
STAKE MOUNTED, RUNWAY EDGE LIGHT (TYP.)
DUCT MARKER (TYP.)
BASE MOUNTED, TAXIWAY EDGE LIGHT (TYP.)
TAXIWAY 'B'
TAXILANE 'A2'
TAXILANE 'A3'
SEPTIC SYSTEM
ELECTRICAL DUCT (TYP.)
UNDERDRAIN (TYP.)
DRAINAGE PIPE (TYP.)
RIP–RAP SWALE
TWO WIRE FENCE WITH CONCRETE POSTS
SECURITY CAMERA POLE
ELECTRICAL VAULT
AIRPORT MANAGER'S OFFICE
AIRPORT SIGN
UTILITY POLE (TYP.)
R/W 16–34 (3,200' x 75')
MAGNETIC BEARING N21°26'48"W
INDUSTRIAL BLVD.
HADLEY GRANT DR.
AVIATION WAY
MILLERS FALLS ROAD

DRAFT

MATCHLINE – CONT. ON SHEET NO. 9

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OWNER
TURNERS FALLS MUNICIPAL AIRPORT
MONTAGUE, MASSACHUSETTS

NO.	DATE	DESCRIPTION	BY

PROJECT NO.	777043
DESIGNED BY	DCQ
DRAWN BY	DCQ
CHECKED BY	MPC
DATE	JULY, 2018

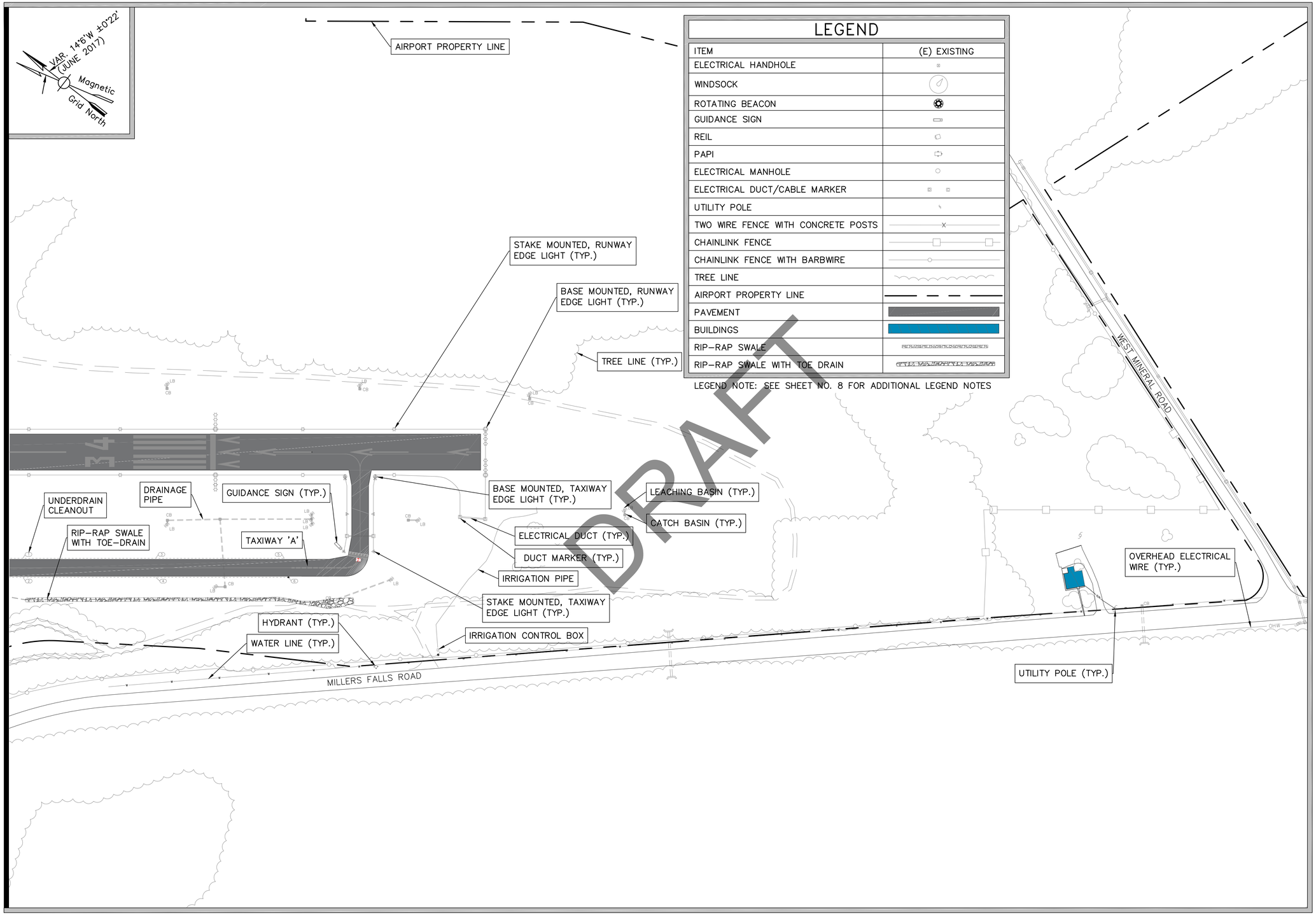
GRAPHIC SCALE
0 50 100 200
SCALE: 1"=100'

SHEET TITLE

EXISTING UTILITIES PLAN (RUNWAY 16 END)

SHEET NO.
8

MATCHLINE – CONT. ON SHEET NO. 8



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PROJECT NO.	777043
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DRAWN BY	DCQ
CHECKED BY	MPC
DATE	JULY, 2018

GRAPHIC SCALE
0 50 100 200
SCALE: 1"=100'

SHEET TITLE

EXISTING UTILITIES PLAN (RUNWAY 34 END)

SHEET NO.

9

Appendix A

Unique Local Factors Outreach Summary

Unique Local Factors Outreach Summary
Turners Falls Municipal Airport

Responses:

- Deerfield Academy
  - Spoke with Dave Gendron, Director of Safety and Security on 2/14/18. Parents of students fly into BAF in Learjets approximately 50 times per year (100 operations). Dave estimates that these people would utilize 0B5 if the runway could accommodate their jets.
- Eagle Brook School
  - Spoke with Cindy Fox, Travel Coordinator, on 2/13/18. Students at Eagle Brook utilize commercial airlines at JFK, Bradley, or Logan. If parents fly in, it would happen on an individual basis, and she would not be privy to this information. She approximated that students may be flown in privately once a year.
- Australis Acquaculture, LLC
  - Spoke with Jonathan Dane, CEO, on 2/14/18. Australis uses Bradley and flies 100% commercial. One of the board members flies and has flown into Turners Falls once to Jonathan's knowledge (0B5 meets the needs of his small aircraft).
- Judd Wire Company
  - Spoke with Pat Fernandez on 2/22/18. Judd wire is owned by a Japanese firm, so much of their travel is international. Both international and domestic use commercial airlines out of Boston or Bradley. No smaller jets/private planes.
- Northfield Mount Hermon
  - Spoke with Charley Tierney, Head of Schools, on 2/22/18. Northfield Mount Hermon visitors, students, and parents fly commercial out of Bradley, Hartford or Logan. Practice for breaks (winter/spring) is to bus students to the larger airports, especially because they have a significant number of international students.
- BETE Fog Nozzle
  - Spoke with Tom Fitch, President, on 2/27/18. BETE only utilizes aviation services a few times a year and flies commercial. The company does not charter private flights.
- Pioneer Valley
  - Spoke with Bill Bonnette, Owner, on 2/14/18. Flight school flies 450 hours per year. Approximately half of these are takeoffs/landings, amounting to approximately 10 operations per hour (225 hours x 10 = 2,250 operations/year). Pioneer Valley primarily flies a Skyhawk 172.
- Valley Steel Stamp
  - Spoke with Kate McVety on 2/14/18. Valley Steel Stamps does not use aviation services for corporate travel or shipping. They are a small, locally-based company and any shipping goes through UPS.
- Southland Log Homes
  - Spoke with reception on 2/22/18. Southland uses only commercial airlines for air travel and flies out of Albany or Hartford.
- The Bement School
  - Spoke with Kenneth Cuddeback, Business Manager, on 2/14/18. Students and parents traveling to Bement School use commercial airlines.

- Stainless Source of New England
    - Spoke with reception on 2/22/18. Stainless Source does not use aviation services for travel or shipping.
- SWM Greenfield
    - Spoke with reception on 2/14/18. Visitors to SWM fly commercial.
- Small Corp
    - Spoke with Frank Degnan, Business Manager, on 2/15/18. Small Corp uses only commercial airlines for travel and does not charter private flights.
- First Light and Power
    - Spoke with Lori Amarosa, Site Administrator, on 2/14/18. First Light was doing a lot of corporate business travel at one time; however, due to the expense, they now either elect to drive or take commercial flights. If there were an economically efficient option, they may use services in the future, but right now she does not foresee that happening.
- Hillside Plastics
    - Spoke with Susan, Office Manager, on 2/14/18. Hillside Plastics does not utilize aviation services.
- Applied Dynamics Corporation
    - Spoke with Dave Cunningham, Vice President, on 2/15/18. Applied Dynamics only uses commercial airline services.
- Charter Nex Films
    - Spoke with Nancy Kopec on 2/23/18. Nex Films only uses commercial airlines for corporate travel.
- Franklin Country Technical School
    - Spoke with Superintendent Rick Martin (also a pilot) on 3/1/18. Though the Franklin County Technical School does a lot of work with Turners (construction of admin building, landscaping efforts for improvement projects, co-op education programs with maintenance company for mechanic program, etc.), students from the school do not account for missed jet operations at the Airport. He mentioned that Bill Cosby flies in and out of 0B5 in his twin turbo (10-12 passenger), but he did not have specific information about aircraft make/model or how often he flies in. Also mentioned that he is a pilot and provided information about the FCTC's annual car show, which brings in approximately 12 aircraft from the Cessna 150-152 Club.
- Mayhew Steel Products
    - Spoke with Larry Geyser, General Manager, on 3/1/18. The President of Mayhew Steel Products owns a small airplane (2-seater), which is hangered at 0B5. Didn't have an estimate of how often the President flies in and out. Other executives fly out of Hartford for domestic flights and Boston or NYC for international flights. No private charters.

No Response:

- Stoneleigh Burnham School
    - Message to on 2/13/18
    - Follow-up message on 2/22/18
    - Follow-up message on 3/1/18
- Kennametal
    - Message on 2/14/18
    - Follow-up message on 2/20/18
    - Follow-up message on 2/22/18

    - Follow-up message on 2/27/18
- Mayhew Steel Products
    - Message on 2/14/18
    - Follow-up message on 2/20/18
    - Follow-up message on 2/22/18
- Lightlife Foods, Inc.
    - Message on 2/14/18
    - Follow-up call on 2/20/18 – voicemail not working
    - Follow-up message on 2/22/18
    - Follow-up message on 2/27/18
- YCC Holdings (Yankee Candle)
    - Message on 2/14/18
    - Follow-up message on 2/22/18
    - Call back from marketing on 2/22/18 – suggested I reach out to travel coordinator
    - Message for travel coordinator on 2/22/18
- Jetvizor
    - Message with receptionist on 2/15/18
    - Follow-up message with receptionist on 2/22/18
- Stratos Jet Charters
    - Email inquiry sent on 2/15/18
    - Follow-up email 3/1/18
- Executive Charter Service
    - Email inquiry sent on 2/15/18
    - Follow-up email 3/1/18
- Netjets
    - Email inquiry sent on 2/15/18
    - Follow-up email 3/1/18
- Lyon Aviation
    - Email inquiry sent on 2/16/18
    - Follow-up email 3/1/18
- Pro Airways
    - Email inquiry through website sent on 2/16/18
    - Follow-up email 3/1/18