Draft Environmental Assessment and
Draft Environmental Impact Report
(EEA No. 16640)

CAPE COD GATEWAY AIRPORT

MASTER PLAN IMPROVEMENT PROJECTS

DECEMBER 15, 2023



This Environmental Assessment becomes a Federal document when evaluated, signed and dated by the responsible FAA official.

December 15, 2023

Subject: **EEA No. 16640 Draft Environmental Assessment and Environmental Impact Report, Cape Cod Gateway Airport, Barnstable, MA**

Dear Interested Party:

On behalf of the Cape Cod Gateway Airport and the Airport Commission, I am pleased to submit a joint Draft Environmental Assessment (EA) and Environmental and Impact Report (DEIR) for proposed Projects at Cape Cod Gateway Airport (EEA No. 16640).

The Airport's mission is to provide a safe and convenient air travel experience and high quality aviation activities to the citizens of the Cape Cod region and the Commonwealth of Massachusetts. As a non-hub primary airport and a major transportation facility for Cape Cod, the Airport's goal is to foster local economic growth and to ensure that the airport remains an integral part of the regional transportation plan to meet the demand for present and future air travel for local Cape Cod residents and visitors.

Furthermore, the Massachusetts Department of Transportation (MassDOT) Aeronautics Division 2019 Economic Impact Analysis demonstrates the Cape Cod Gateway Airport (including tenants and associated businesses) provides employment for 1,724 people with an annual payroll in excess of $73.8 million and a regional economic output in excess of $157.2 million from over 65 airfield businesses.

Consistent with its safety mission, the proposed Projects, included in the Airport's recent Master Plan (2022) update, are needed to meet facility requirements, enhance safety and efficiency of the airfield, and achieve compliance with Federal Aviation Administration ("FAA") standards (FAA AC 150/5300-13B, Airport Design).

Since the filing of the ENF (filed November 30, 2022) and based on comments received from the public during outreach meetings and agency input, the Projects included for consideration in this joint draft EA/EIR have been revised. Projects discussed in the Draft EA/EIR only include those anticipated to receive federal and state funding in the near-future (next 5 to 7 years). The Projects include the extension of Runway 15, modification of taxiways A, B and D, construction of a run-up area and noise wall, removal of Taxiway E, and aeronautical development within the North and East Ramp areas. Future projects anticipated to take place beyond a 7+ year timeframe, including terminal building improvements, are excluded from discussion.

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This Draft EA/EIR provides extensive and detailed analysis of the Projects and potential environmental impacts, alternatives considered, and proposed environmental mitigation measures.

The Proponent anticipates the Draft EA/EIR will be noticed in the Environmental Monitor on December 22, 2023. We would like to request an extended Public Comment period to February 9, 2024 with a Secretary's certificate issued on February 16, 2024.

Comments on the Draft EA/EIR can be submitted to the Public Comment Portal (https://eeaonline.eea.state.ma.us/EEA/PublicComment/Landing/) or emailed to Purvi Patel at mepa@mass.gov (please reference the Project name [Cape Cod Gateway Airport, EEA No: 16640] in the subject line).

Comments can also be mailed to:

Secretary, Rebecca Tepper
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
Purvi Patel, EEA No. 16640
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A copy of the draft EA/EIR may be requested from Ms. Corinne Snowdon at 978-897-7100 or csnowdon@epsilonassociates.com.

Sincerely,

Katie R. Servis

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Airport Manager
Cape Cod Gateway Airport

Draft Environmental Assessment and Draft Environmental Impact Report (EEA No. 16640)

CAPE COD GATEWAY AIRPORT

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LIST OF ACRONYMS

AAC	Aircraft Approach Category
AADT	Annual Average Daily Traffic
AAGR	Average Annual Growth Rate
AARFF	Aircraft Rescue and Fire Fighting
AC	Advisory Circular
ACBM	Asbestos Containing Building Materials
ACEC	Area of Critical Environmental Concern
ACM	Asbestos Containing Materials
ADC	Air Data Computer
ADG	Airplane Design Group
AED	Adult Entertainment District
AEDT	Aviation Environment Design Tool
AFFF	Aqueous Film Forming Foam
AIP	Airport Improvement Program
ALP	Airport Layout Plan
AMA	Aero Management Association
AMP	Airport Master Plan
APE	Area of Potential Effect
ARC	Airport Reference Code
ARFF	Airport Rescue and Fire Fighting
ASAPP	Archaeological Site Avoidance and Protection Plan
ASDA	Accelerated Stop Distance Available
AST	Aboveground Storage Tank
ASTM	American Society for Testing and Materials
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
ATF	Aerodrome Traffic Frequency
ATR	Automatic Traffic Recorder
AUL	Activity Use Limitation
AVGAS	Aviation Gasoline
AVO	Average Vehicle Occupancy
BBJ	Boeing Business Jets
BMP	Best Management Practices
BTEX	benzene, toluene, ethylbenzene, and xylene
BVW	Bordering Vegetated Wetlands
BWC	Barnstable Water Company
BWSC	Bureau of Waste Site Cleanup
CAA	Clean Air Act
CATEX	Categorical Exclusions
CCC	Cape Cod Commission
CCF	Centum Cubic Feet

LIST OF ACRONYMS (CONTINUED)

CCGA	Cape Cod Gateway Airport
CCGAC	Cape Cod Gateway Airport Commission
CCRT	Cape Cod Rail Trail
CCRTA	Cape Cod Regional Transit Authority
CCTA	Cape Cod Regional Transit Authority
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGP	Construction General Permit
CIP	Capital Improvement Plan
CMP	Construction Management Plan
CMR	Code of Massachusetts Regulations
CO	Carbon Monoxide
COC	Contaminants of Concern
CSA	Comprehensive Site Assessment
CVP	Certified Vernal Pool
CWA	Clean Water Act
CY	cubic yards
CZM	Coastal Zone Management
CZMA	Coastal Zone Management Act
dBA	decibels A
DC	Direct Current
DEIR	Draft Environmental Impact Report
DER	Division of Ecological Restoration
DFW	Division of Fisheries and Wildlife
DGA	Designated Geographic Area
DME	Distance Measuring Equipment
DNL	Day Night Average Sound Level
DOT	Department of Transportation
DPH	Department of Public Health
DPS	Downgradient Property Status
DRI	Developments of Regional Impact
EA	Environmental Assessment
EDR	Environmental Data Resources
EEA	Energy and Environmental Affairs
EH	Estimated Habitat
EIR	Environmental Impact Report
EIS	Environmental Impact Statement
EJ	Environmental Justice
EMAS	Engineered Material Arresting System
ENF	Environmental Notification Form
EO	Executive Order

LIST OF ACRONYMS (CONTINUED)

EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
EV	Electric Vehicles
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulations
FBO	Fixed-Base Operator
FCTV	Falmouth Community Television
FEMA	Federal Emergency Management Agency
FFRMS	Federal Flood Risk Management Standard
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
Ft	Feet
GA	General Aviation
GHG	Greenhouse Gases
GIS	Geographical Information Systems
GPD	Gallons per day
HA	Health Advisories
HB	Highway Business
HG	Hyannis Gateway
HIRL	High Intensity Runway Edge Lights
HTC	Hyannis Transportation Center
HWG	Horsley Witten Group
HYA	Cape Cod Gateway Airport
IFR	Instrument Flight Rules
ILS	Instrument Landing System
IND	Industrial
IRA	Immediate Response Action
ISI	Initial Site Investigation
ISO	Independent System Operator
JBCC	Joint Base Cape Cod
LBP	Lead Based Paint
LBW	Low Birth Weight
LDA	Landing Distance Available
LF	Linear Feet
LSP	License Site Professional
LTBI	Location to be Investigated
LUHPPL	Land Uses with Higher Potential Pollutant Loads
LUW	Land Under Water
MALSF	medium intensity approach lighting system with sequenced flashers
MALSR	medium intensity approach lighting system with runway alignment indicator lights

LIST OF ACRONYMS (CONTINUED)

MassDEP	Massachusetts Department of Environmental
MBTA	Massachusetts Bay Transit Authority
MC-FRM	Massachusetts Coast Flood Risk Model
MCL	Maximum Contaminant Level
MCP	Massachusetts Contingency Plan
MEMA	Massachusetts Emergency Management Agency
MEPA	Massachusetts Environmental Policy Act
MESA	Massachusetts Endangered Species Act
MHC	Massachusetts Historical Commission
MITL	Medium Intensity Taxiway Lights
MOHML	Massachusetts Oil and Hazardous Material List
MOS	Modification of Standards
MSGP	Multi-Sector General Permit
MSL	Mean Sea Level
MT	Metric Tons
MTCO2E	Million Tonnes of Carbon Dioxide Equivalent
MTOW	Maximum Takeoff Weight
MVP	Municipal Vulnerability Preparedness
MW	megawatt
NAAQS	National Ambient Air Quality Standards
NAVAIDS	Navigational Aids
NDS	Not a Disposal Site
NEM	Noise Exposure Maps
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Pollutants
NFA	No Further Action
NHESP	No Further Action
NLEB	Northern Long Eared Bat
NM	Nautical Mile
NMFS	Natural Heritage and Endangered Species Program
NO	Northern Long Eared Bat
NO2	Nitrogen Dioxide
NOAA	National Oceanic and Atmospheric Administration
NOI	Notice of Intent
NOR	Notice of Responsibility
NPDES	National Pollutant Discharge Elimination System
NPIAS	National Plan of Integrated Airports System
NRCC	Natural Resource Conservation Service
NRCS	Natural Resource Conservation Service
NRI	Nationwide Rivers Inventory
NWSR	National Wild and Scenic River System

LIST OF ACRONYMS (CONTINUED)

O3	Ozone
OHM	Oil and Hazardous Materials
ORW	Outstanding Resource Waters
OWS	Oil Water Separator
PAH	Polycyclic Aromatic Hydrocarbons
PAPI	Precision Approach Path Indicators
PAVE	Perimeter Acquisition Vehicle Entry
PAWS	Phased Array Warning System
Pb	Lead
PFAS	Per- and polyfluoroalkyl substances
PFBS	Perfluorobutanesulfonic acid
PFDA	Perfluorodecanoic Acid
PFHpA	Perfluoroheptanoic Acid
PFHxS	Perfluorohexanesulfonic Acid
PFNA	Perfluorononanoic Acid
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonic acid
PH	Priority Habitat
PM	Particulate Matter
PSC	Permanent Solution with Conditions
PSNC	Permanent Solution with no Conditions
PV	Passenger Vehicle
PVP	Potential Vernal Pools
RAO	Response Action Outcome
RCS	Reportable Concentration for Soil
RDC	Runway Design Code
RMAT	Resilient MA Action Team
RNF	Release Notification Form
ROFA	Release Notification Form
RP	Runway Object Free Area
RPP	Regional Policy Plan
RPZ	Runway Protection Zones
RSA	Runway Safety Area
RTN	Release Tracking Number
RVR	Runway Visual Range
RVZ	Runway Visibility Zone
RWY	Runway
SEL	Sound Exposure Level
SF	square foot
SHMCAP	State Hazard Mitigation and Climate Adaptation Plan
SHPO	State Historic Preservation Officer

LIST OF ACRONYMS (CONTINUED)

SIP	State Implementation Plan
SMART	Strengthening Mobility and Revolutionizing Transportation
SMS	Stormwater Standards
SO2	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasure
SRE	Snow Removal Equipment
SSA	Sole Source Aquifer
SSC	Species of Special Concern
SW	Southwest
SWPPP	Stormwater Pollution Prevention Plan
SY	Square Yards
TCDS	Traffic Count Database System
TDG	Taxiway Design Group
TDM	Transportation Demand Measures
TFMSC	Traffic Flow Management System Counts
THPO	Tribal Historic Preservations Office
TLOFA	Taxilane Object Free Areas
TNC	Transportation Network Company
TODA	Takeoff Distance Available
TOFA	Taxiway Object Free Area
TORA	Takeoff Run Available
TPH	Total Petroleum Hydrocarbons
TRI	Toxic Release Inventory
TSA	Taxiway Safety Areas
TSA office	Transportation Security Administration
TSS	Total Suspended Solids
TWY	Taxiway
UHI	Urban Heat Island
UIC	Underground Injection Control
URAM	Utility Release Abatement Measure
US	United States
USACE	U.S. Army Corps of Engineers
USCG	U.S. Coast Guard
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
UST	Underground Storage Tanks
VFR	Visual Flight Rule
VMT	Vehicle Miles Travelled
VOC	Volatile Organic Compounds
WMA	Wildlife Management Area

LIST OF ACRONYMS (CONTINUED)

WP	Wellhead Protection
WPA	Wetlands Protection Act
WQC	Water Quality Certification
WSS	Web Soil Survey
WWTP	Wastewater Treatment Plant

Chapter 1.0

Introduction

1.0 INTRODUCTION

Cape Cod Gateway Airport Commission (the Commission) proposes to implement a series of airport improvement projects identified in the Federal Aviation Administration (FAA)-approved 2022 Cape Cod Gateway Airport Master Plan Update (the Projects). The 2022 Master Plan Update provides a framework to guide future Airport development that will enhance safety, cost-effectively satisfy current and future aviation demand, meet FAA standards for airport design and geometry for the families of aircraft that use the airport for corporate, military, small general aviation, large general aviation, medical evacuation, light sport, and commercial/air taxi/charter services, while considering potential environmental and socioeconomic impacts.

The Cape Cod Gateway Airport (HYA or the Airport) is located in the village of Hyannis in the Town of Barnstable, Massachusetts, and is owned and operated by the Town of Barnstable as an Enterprise Fund within the Town of Barnstable (see Figure 1.1-1). As such, the Airport sets rates and charges for the services offered to cover its operating expenses. The Town of Barnstable's General Operating Fund and citizen taxes are not used to operate the airport or to supplement funding for the Airports operation. As the owner and operator, the Town of Barnstable is also identified by the FAA as the designated Sponsor of the airport and accepts federal and state grants and the associated grant assurances. The Airport also serves as an important regional transportation hub to area attractions and recreational venues and provides a key role in emergency response activities. The Airport is identified in the National Plan of Integrated Airports System (NPIAS) with a service level of Non-Hub Commercial Service.

The analysis presented in this joint Draft Environmental Assessment and Draft Environmental Impact Report (Draft EA/EIR) refines the projects recommended in the Master Plan and provides a focused analysis of environmental impacts and proposed mitigation measures of these Projects. This document has been prepared in accordance with FAA Order 1050.1F, Environmental Impacts: Policies and Procedures, FAA's 1050.1F Desk Reference, and FAA Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions, the MEPA Certificate on the Environmental Notification Form dated January 23, 2023 (**Appendix A**) and MEPA Regulations (301 Code of Massachusetts Regulations [CMR] 11.07), and most importantly, feedback and comments received through the public engagement process.

The proposed Projects are based on the recent 2022 Airport Master Plan (AMP) and Airport Layout Plan (ALP). The AMP and ALP serve as the framework for planning future development at the Airport and identify not only airport components that do not meet current design criteria established by the FAA, but also address forecasted demand, capacity requirements, and operational improvements . The previous ALP update was conducted as part of a Master Plan Update in 2008, and since then the Airport has undergone several changes in the form of facilities, operations, and other issues that need to be formally documented. The 2022 AMP and ALP allow for the planning necessary to preserve the Airport's role in the state, region, and national transportation system and to reaffirm and maintain the future function of the Airport.

This Draft EIR/EA will provide a brief description of the Airport and contents in the EA/EIR (Chapter 1.0); a discussion of the purpose and need for the Proposed Action (Chapter 2.0); a description of the Proposed Projects (Chapter 3.0); an overview of the identification and screening of alternatives considered as part of the environmental evaluation process (Chapter 4.0); a description of existing

environmental conditions within the Project and general study areas (Chapter 5.0); an evaluation of the environmental impacts associated with the Proposed Action, the No Action alternative, and other alternatives considered for analysis (Chapter 6.0); mitigation or avoidance/minimization measures (Chapter 7.0); a description of compliance with applicable federal, state, and local regulations (Chapter 8.0); coordination and public involvement associated with the EA/EIR process (Chapter 9.0); responses to comments received during the MEPA public comment period (Chapter 10.0); and a list of individuals involved in preparing the EA/EIR (Chapter 11.0).

The Proponent began outreach efforts in October 2022 and continues to engage the public and interested stakeholders through a series of virtual and in person public meetings and feedback opportunities during the environmental review process. The Airport has assembled a communications and outreach team to enhance public participation as part of the EA/EIR process. Public participation is a key tenant throughout the entire EA/EIR process, providing opportunities for the public to receive information on the proposed Projects as well as to provide feedback and comments to the Airport. Outreach and public participation opportunities have been provided in addition to the regulatory required public meetings and comment periods.

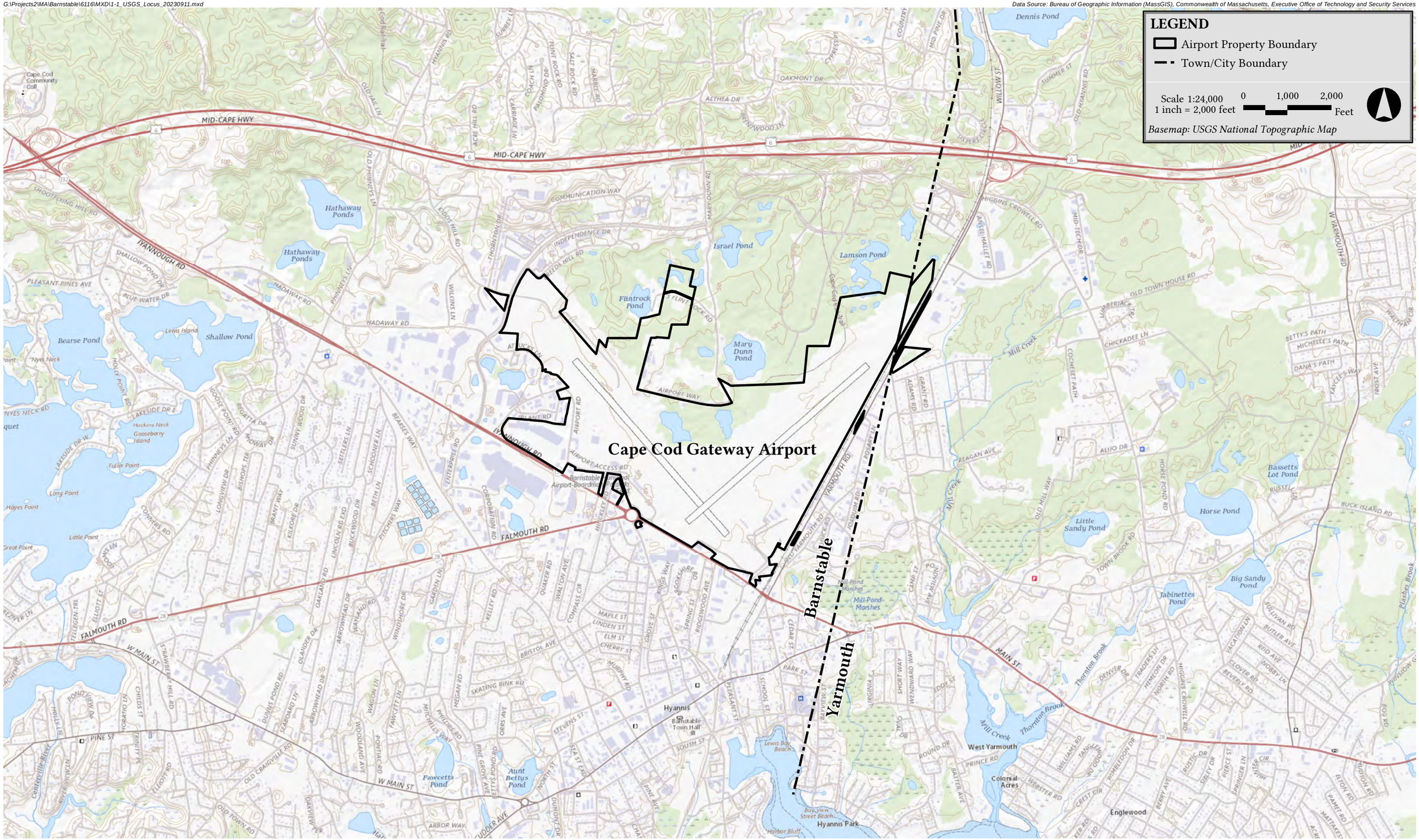
A list of past meetings is provided in **Table 1.1-1**. Additional details are provided in Chapter 9.0 regarding all public outreach efforts.

Table 1.1-1 Public Meetings and Outreach Efforts

Date	Outreach/Meeting	Description
October 27, 2022	Public Meeting #1	Public meeting held at the Airport to introduce EJ communities to the Projects and answer questions and comments.
November 30, 2022	Environmental Notification Form	Noticed in Environmental Monitor on December 7, 2022. 30-day review period with agency and public comment period through January 12, 2023
January 5, 2023	MEPA Site Visit & Public Meeting#2	Meetings were held both in person at the airport and virtually at separate times.
June 21, 2023	Public Meeting #3	Meetings were held both in person at Barnstable Town Hall in the afternoon and virtually in the evening.
December 12, 2023	Public Meeting #4	Meetings will be held both virtually in the afternoon and at Barnstable Town Hall in the evening.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport **Barnstable, Massachusetts**

Figure 1.1-1
USGS Locus Map

1.1 2022 Cape Cod Gateway Airport Master Plan Background

Public-use airports periodically conduct Master Plan update planning in conjunction with the FAA and state aeronautical agencies (Massachusetts Department of Transportation Aeronautics [MassDOT Aeronautics]) to identify critical airport development needs, determine funding, and plan construction scheduling for future projects. The 2022 Master Plan identified a list of recommendations for airside and landside safety and efficiency enhancements needed to meet current and future needs of the airport. The recommendations developed during the Master Plan Update planning process are reviewed and approved by FAA and MassDOT Aeronautics before they can proceed to subsequent phases including environmental review and permitting.

As part of its Master Plan long-term planning efforts, the Airport evaluated its current infrastructure for compliance with FAA design standards and ability to meet safety and efficiency needs of the facility for existing and anticipated future users (see **Figure 1.1-2** Existing Airport Conditions). Aviation demand forecasts, facility requirements, Airport access, Airport geometry, and navigation aids over a 20-year planning horizon were assessed, resulting in the development of a list of recommendations for future airport infrastructure investments. Projects discussed in this document are those that have been identified as occurring in the reasonably foreseeable future, including those whose design and permitting will occur within the next 5-7 years. Master Plan projects that are to be implemented further into the future are identified herein with a * but not analyzed or discussed further unless noted and are summarized in Section 6.15, Cumulative Impacts. Master Plan Projects to be implemented over the next 20-year period include:

- Airside:
  - Runway 15 Extension;
  - Runway Safety Area Enhancements;* and
  - Taxiway Modifications;
- Landside:
  - Terminal Improvements;*
  - General Aviation (GA) Improvements; and
  - Non-Aeronautical Land Use Development Areas.
- Airspace Safety Improvements:
  - Runway Safety Area (RSA) and Runway Object Free Area (ROFA) Avigation Easements
  - Airport control over Runway Protection Zone (RPZ) Properties

In May 2022, the Proponent, MassDOT Aeronautics Division, and the FAA approved the Master Plan Update. Please see **Figure 1.1-3** for the locations of these proposed Projects.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

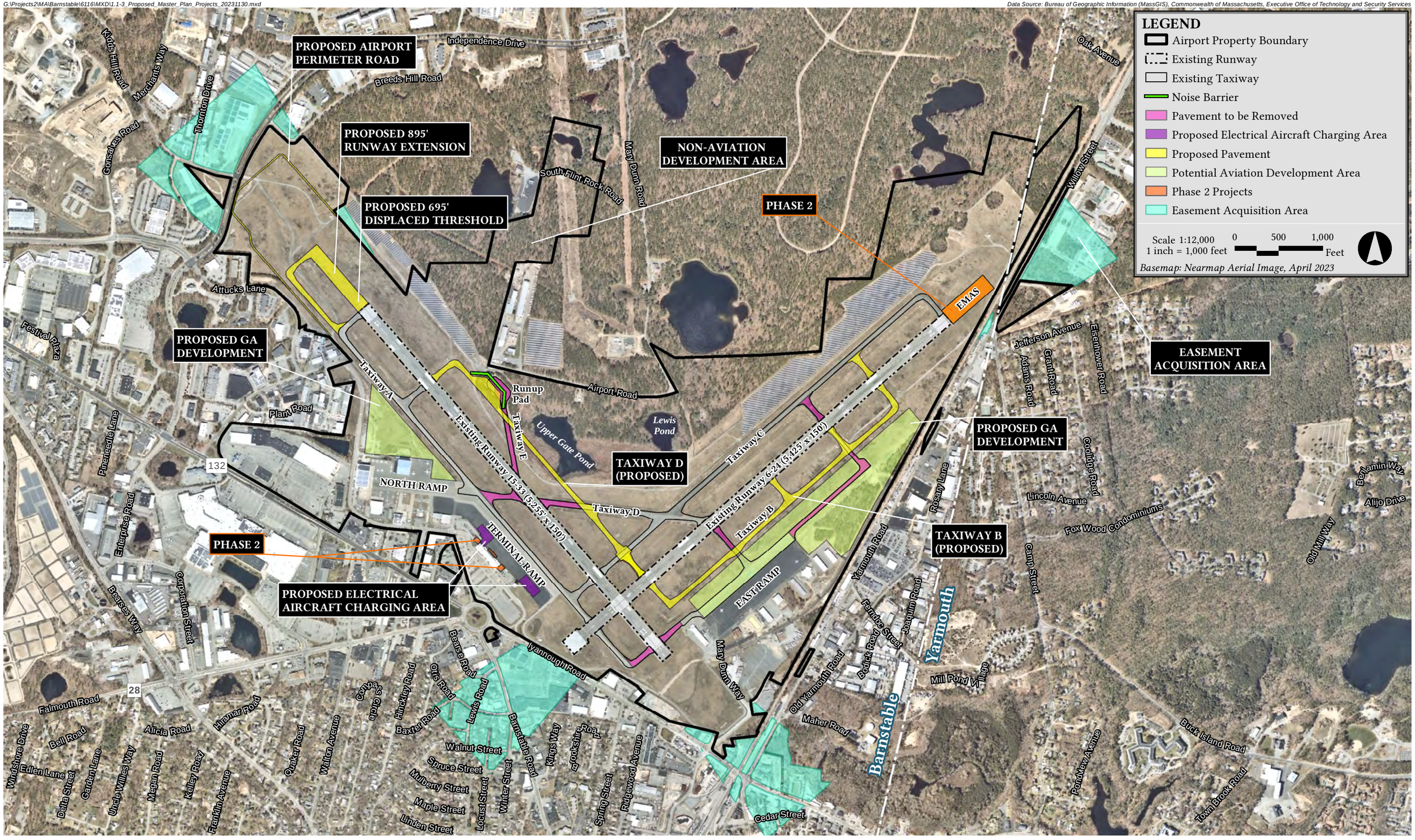


Cape Cod Gateway Airport **Barnstable, Massachusetts**

Figure 1.1-2
Existing Conditions

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport **Barnstable, Massachusetts**

Figure 1.1-3
Proposed Master Plan Projects

The Airport intends to apply all practicable mitigation measures to prevent, avoid, and minimize anticipated environmental impacts. Mitigation measures are discussed in greater detail in Chapters 6.0 and 7.0 of this document.

1.2 Purpose and Need

The Projects are designed to meet safety and efficiency standards for the aircraft family operating at the Airport, both currently and within future planning horizons, and to support the financial self-sufficiency of the Airport. The Projects are designed to meet the operational and efficiency requirements of the existing and future design Critical Aircraft as required by FAA.

As summarized below and with more detail provided in Chapter 2.0, the Airport is not seeking to meet airfield geometry standards for a larger class of aircraft but to meet recommendations for runway length and FAA safety and design criteria (for the current family of aircraft operating at the Airport) deficiencies such as runway length, taxiway configurations, and safety area geometry.

Determining an existing Critical Aircraft and a future Critical Aircraft are required by FAA during the master planning process to apply the most up-to-date FAA design criteria. The existing Critical Aircraft determination is based on current aeronautical use. For future Critical Aircraft, the determination is made based on an FAA-approved forecast that considers aircraft "highly likely" or "expected" to regularly use the airport (i.e., minimum 500 operations per year). Future Critical Aircraft may often be different than the existing Critical Aircraft, due to the airport's operational growth, and the industry's changes in fleet (e.g., retirement of older aircraft types), and the introduction of newer efficient aircraft. Airports with a stable fleet mix and operations, may have one aircraft type (or grouping with similar characteristics) for both the existing and future Critical Aircraft.

Airports should consider plans by operators to retire aircraft and replace them with new types. This is the case at HYA, with the imminent retirement of the Embraer 190 (E190) as operated by JetBlue as they transition to the Airbus 220 (A220) as well as Cape Air with the shift to the Tecnam P2012. To ensure the safety of future operations, the future Critical Aircraft determination must consider ongoing trends in the aircraft fleet. This consideration applies to both general aviation (particularly business aviation) and commercial airline operations. Based on the range of the most demanding aircraft that operate at HYA (described in detail in Section 2.2.1), two critical design aircraft were identified for HYA: one representing general aviation activities and one representing commercial service activities. The future general aviation critical aircraft remains the Gulfstream V/G500 while the future commercial design aircraft shifts to the Airbus 220 due to the indicated retirement of the E190 by Jet Blue.

The future design critical aircraft maintain the same approach speed category (C/D) and design group (III) as existing aircraft and there is no change in the design criteria requirements for the existing versus future design aircraft.

In general, proposed Projects are designed to address areas of airfield geometry that are either non-standard based on current FAA airport design criteria or are deficient for both the existing and the future critical design aircraft identified above. These improvement needs are detailed in **Table 1.2-1**. Landside improvements are proposed to better meet operational forecasts and Airport needs such as terminal improvements and hangar developments. In addition, the Airport is addressing future

needs of the Airport due to provided forecasts, changing markets resulting from industry-wide shifts in aviation, as well as more local travel nuances due to COVID- and post-COVID motivated behavioral shifts.

Table 1.2-1 Airfield Geometry Needs at Cape Cod Gateway

FAA Guideline	Airport Need	Design Criteria
Airfield Capacity	Existing capacity is only 12-27% of the maximum weight for Class C/III aircraft in wet pavement conditions	FAA AC 150/5300-13B – meet capacity to extent feasible to improve safety
Runway Length	Extend runway to meet existing design critical aircraft needs to 6,000 feet.	FAA AC 150/5325-4B Runway Length Requirements for Airport Design
Runway Width	Current conditions meet requirements	n/a
Direct Access to Runway	Taxiway D at RW 15-33	AC 150/5300-13B – remove direct access
Runway / Taxiway high energy intersections and/or low visibility	RWY 15-33 at TWYs D & E RWY 6-24 at TWY D (RWY 24 & RWY 6 departures) RWY 6-24 at TWYs B & C1	AC 150/5300-13B – remove non-standard angles and improve visibility
Runway Protection Zones (RPZ)	Areas within the RPZ may have current or future incompatible land uses.	Enhance airport control over RPZs for existing conditions and future runway length
Runway Safety Area (RSA) Improvements	Penetrations into safety areas and non-standard configurations	FAA AC 150/5300-13B, FAA Order 5200.8 – RSA Program
Runway Object Free Areas (ROFA)	Multiple penetrations	Existing modifications to standards need to be updated every 5 years per Order 5300.1G. Acquire easements as feasible.
Taxiway Object Free Areas (TOFA)	East Ramp contains areas with only clearances for ADG 1 aircraft	AC 150 5300-13B – Correct non-standard taxilane widths by east ramp through relocation of Taxiway B
General Aviation Hangars	Currently has waiting list of over 25 applicants	Identify additional areas of ramp space for hangar construction by relocating TWY B.

1.3 Airport Background (MEPA)

Cape Cod Gateway Airport (the Airport or "Project site") is located on Cape Cod in Hyannis, Massachusetts, one of seven villages in the Town of Barnstable (see **Figure 1.1-1** USGS Locus Map). The Airport is bordered by a Massachusetts Fish and Wildlife designated conservation area (Hyannis Ponds Wildlife Management Area) and Route 6 to the north, Barnstable Road (Route 132) to the south, Yarmouth Road to the east, and an industrial park (Independence Park) to the west. Access to the Airport is provided by state highway Route 28 and Route 132 (Iyannough Road), which connects Route 6 to the Airport. Local access to the Airport is provided by Hinckley Road, Barnstable Road, and Mary Dunn Way.

The Airport encompasses 639 acres of land, of which approximately 140 acres make up developed areas for Airport facilities and operations including runways, taxiways, an approximately 43,097 square foot (sf) Passenger Terminal Building, Air Traffic Control Tower (ATCT), parking facilities, aircraft ramps, hangars, an Airport Rescue and Fire Fighting (ARFF) building, and an aircraft fuel farm. The remaining approximately 460 acres of Airport property are undeveloped areas.

The Airport is owned by the Town of Barnstable and managed by the seven member Cape Cod Gateway Airport Commission and Airport staff. The Airport provides general aviation and both year-round and seasonal commercial services to Boston, New York, the islands of Martha's Vineyard and Nantucket, and beyond. It is home to Cape Air and Nantucket Airlines along with other charter, corporate, and general aviation aircraft operators. JetBlue operates daily seasonal service (May – October) to JFK-New York and LGA-New York. MedFlight operates out of the Airport, providing key emergency response medical services, along with the U.S. Coast Guard (USCG). More than 45 private tenants lease space at the Airport (see **Figure 1.3-1** Current Airport Facilities).

The leases and services offered at the Airport contribute to the economic output of the Airport and, more importantly, to Barnstable and the Cape Cod region as a whole. Cape Air is the third largest employer in Barnstable (behind only Cape Cod Hospital and the municipality itself).

Table 1.3-1 Economic Output of Airport

	Total Employment	Total Payroll	Total Output
Cape Cod Gateway	2,135	$85,358,000	$208,023,000

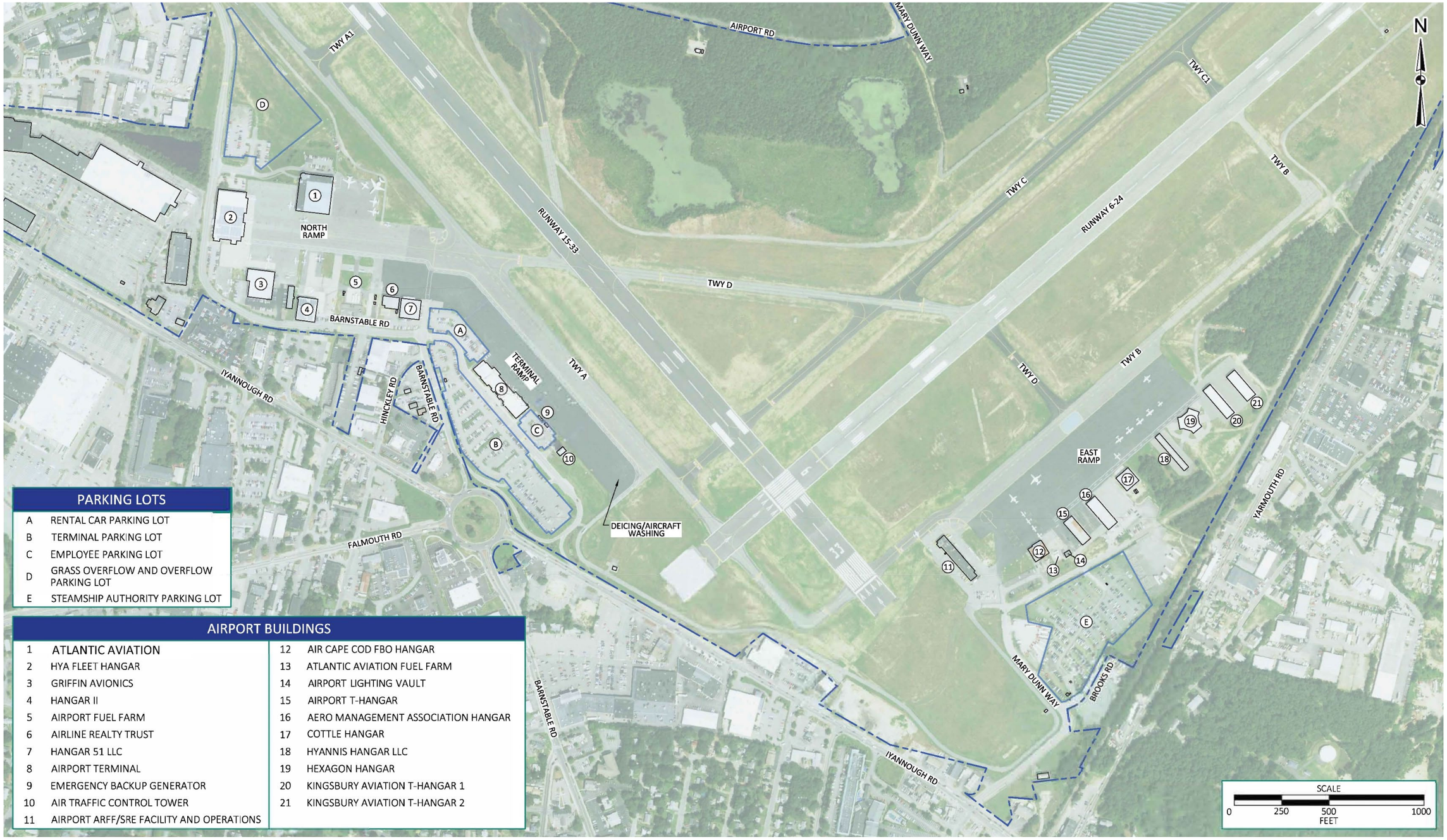
https://flyhya.com/wp-content/uploads/2021/08/MA-Statewide-Economic-Impact-Study_Exec-Summary-rdc.pdf

1.3.1 Airport History

The Airport, initially named Hyannis Airport, first opened as a single grass airstrip. The Airport saw the first landing on June 17, 1928. Scheduled air service began at the Airport on July 2, 1931. A plane left Hyannis at 7:45 a.m. every day, carrying five passengers to Boston. By 1937, an average of four planes were landing each day during the summer season. In the 1930s, the Town of Barnstable took ownership of the Airport and eventually renamed the Airport, "Barnstable Municipal Airport". The Airport gained popularity, seeing daily deliveries of the Boston Herald Traveler newspaper, and hosting numerous air shows, which attracted the public to the Airport.

In 1940, the Airport expanded to three 4,000-foot runways for armed forces use. The Navy assumed control of the Airport for pilot training during World War II, and after the war, the Airport reverted to its use as a municipal airport and resumed civilian flights in February 1946. In 1957, Runway 6-24 was extended to 5,600 feet and a new terminal was constructed and in 1961, a new ATCT was built.

Given increasing popularity and operations, the FAA and the Airport continued to improve infrastructure to accommodate capacity and ensure the safety of aviators and the public. In 2003, an Engineered Material Arresting System (EMAS) was installed at the end of Runway 6 to reduce the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.



PARKING LOTS	
A	RENTAL CAR PARKING LOT
B	TERMINAL PARKING LOT
C	EMPLOYEE PARKING LOT
D	GRASS OVERFLOW AND OVERFLOW PARKING LOT
E	STEAMSHIP AUTHORITY PARKING LOT

AIRPORT BUILDINGS			
1	ATLANTIC AVIATION	12	AIR CAPE COD FBO HANGAR
2	HYA FLEET HANGAR	13	ATLANTIC AVIATION FUEL FARM
3	GRIFFIN AVIONICS	14	AIRPORT LIGHTING VAULT
4	HANGAR II	15	AIRPORT T-HANGAR
5	AIRPORT FUEL FARM	16	AERO MANAGEMENT ASSOCIATION HANGAR
6	AIRLINE REALTY TRUST	17	COTTLE HANGAR
7	HANGAR 51 LLC	18	HYANNIS HANGAR LLC
8	AIRPORT TERMINAL	19	HEXAGON HANGAR
9	EMERGENCY BACKUP GENERATOR	20	KINGSBURY AVIATION T-HANGAR 1
10	AIR TRAFFIC CONTROL TOWER	21	KINGSBURY AVIATION T-HANGAR 2
11	AIRPORT ARFF/SRE FACILITY AND OPERATIONS		

Figure 1.3-1
Current Airport Facilities

This engineered system requires significantly less land area than a traditional runway safety area and was the first EMAS installed in New England. Improvements to the Airport infrastructure continued throughout the 2000s, and between 2011 and 2012, the Airport demolished the old ATCT and Terminal Building and constructed new facilities as part of a $40 million Airport Improvement Program(AIP).

In 2021, Barnstable Municipal Airport was renamed Cape Cod Gateway Airport to reflect the airport's role connecting air travel destinations to the Cape Cod region.

1.3.2 Airport Classification

The NPIAS 2023-2027, published in September 2022, identifies nearly 3,300 public-use airports that are included in the national airport system, the roles they currently serve, and the amounts and types of airport development eligible for federal funding under the AIP. NPIAS classifies Cape Cod Gateway Airport as a Primary Non-Hub Commercial Service Airport.

- **Primary Airports** are Commercial Service Airports that have more than 10,000 passenger boardings each year. Hub categories for Primary Airports are defined as a percentage of total passenger boardings within the United States in the most current calendar year ending before the start of the current fiscal year.
- **Non-hub** is defined as receiving less than 0.05 percent but more than 10,000 of the annual U.S. commercial enplanement (passenger boardings at airports that receive scheduled passenger service).
- **Commercial Service Airports** are publicly owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service. Passenger boardings refer to revenue passenger boardings on an aircraft in service in air commerce, whether or not in scheduled service.

1.3.3 Airport Facilities

Airport facilities are generally categorized as airside facilities, landside facilities, and airspace control areas. The facilities function and interact to ensure efficient and safe operations at the Airport. These facilities are further discussed below.

1.3.3.1 Airside Facilities

Airside facilities include Airport areas where aircraft movements take place between the air and ground. Typically, airside facilities include runways, taxiways, airport lighting and markings, and navigational aids. **Figure 1.1-2** depicts all airside facilities located at the Airport.

1.3.3.1.1 Runways

The Airport has two runways; Runway 15-33 and Runway 6-24. **Table 1.3-2** lists existing runways and their respective lengths and widths. Both runways have instrument approach aids and precision approach markings for Runway 15 and Runway 24 approaches, respectively. Detailed usage data for each runway is provided in Section 5.9.

Table 1.3-2 Existing Airport Runways

Runway	Function	Length (ft)	Width (ft)
RWY 15-33	Primary Instrument Flight Rules (IFR) runway	5,255	150
RWY 6-24	Primary Visual Flight Rule (VFR) runway	5,425	150

The conditions under which a runway will be utilized are based on a number of factors, including wind conditions. Aircraft generally will take off and land in the direction of the wind and the pilot will select the runway accordingly. However, runway characteristics including length and width, and weather conditions, will also influence a pilot's selection of a runway. Winds predominantly favor Runway 15-33 for approximately 75 percent of operations during the winter months, while winds favor Runway 6-24 for approximately 75 percent of operations during the summer months.

All runways have declared distances[1] which provide details regarding runway length usage for takeoff and landings due to current airport conditions.

Table 1.3-3 Declared Distances

Runway	6/24 (feet)	15/33 (feet)
Takeoff Run Available (TORA)	5,425 / 5,425	5,255 / 5,255
Takeoff Distance Available (TODA)	5,425 / 5,425	5,255 / 5,255
Accelerate-stop Distance Available (ASDA)	5,425 / 5,425	5,255 / 5,255
Landing Distance Available (LDA)	5,019 / 5,425	5,255 / 5,105

Source: FAA Form 5010-1, effective 2/27/2020 (viewed 3/23/2020), McFarland-Johnson 2022.

1.3.3.1.1.1 Runway 15-33

Runway 15-33 serves as the current primary instrument flight rules (IFR) runway. It measures 5,255 feet long by 150 feet wide and is generally aligned in a northwest to southeast direction. The runway is constructed of grooved asphalt and has high intensity runway edge lights (HIRL). Runway 15 is equipped with a 2,400-foot medium intensity approach lighting system with runway alignment indicator lights (MALSR). Runway 33 is equipped with 4-box precision approach path indicator (PAPI)

[1] Defined per FAA AC 150/5300-13B as "maximum distances available and suitable for meeting takeoff, rejected takeoff, and landing distances performance requirements for turbine powered aircraft."

with a standard 3-degree glide path. Runway 15-33 can accommodate all weight Class A and B aircraft and up to 75 percent of weight Class C aircraft in dry conditions. In wet conditions, this reduces to approximately 12 percent of weight Class C aircraft.

1.3.3.1.1.2 Runway 6-24

Runway 6-24 serves as the current primary visual flight rule (VFR) runway; however, ILS is also present. It measures 5,425 feet long by 150 feet wide. It is generally aligned in a southwest to northeast direction. The runway is constructed of grooved asphalt and has HIRL. Runway 24 is equipped with a 1,400-foot medium intensity approach lighting system with sequenced flashers (MALSF). The runway is equipped with 4-box PAPI on both runway ends, and both have a standard 3-degree glide path. Runway 6-24 has precision instrument markings in good condition. An EMAS bed is located at the approach end of Runway 6. Similar to Runway 15-33, Runway 6-24 can accommodate all weight Class A and B aircraft and up to 75 percent of weight Class C aircraft in dry conditions. In wet conditions, it can accommodate approximately 12 percent of weight Class C aircraft.

1.3.3.1.2 Taxiways

The Airport has seven taxiways designated A, A1, B, C, C1, D, and E. **Table 1.3-4** lists existing taxiways and their respective lengths and widths. All the taxiways are of asphalt construction and are equipped with LED medium intensity taxiway lights (MITL) except for a portion of Taxiway B between Taxiway D and the hold position for Runway 24 lit with incandescent edge lights. The exception is Taxiway E, which is unlit. Reflective markers mark the pavement edge of the run-up area near Runway 24 on Taxiways B and the no-taxi island on the East Ramp beyond the intersection of Taxiways B and D. The taxiway system at the Airport, as illustrated on **Figure 1.1-2**, consists of parallel, connecting, access, and entrance/exit taxiways.

Table 1.3-4 Existing Taxiways

Pavement	Length (ft)	Width (ft)
TWY A	5,800	50
TWY A1	400	65
TWY B	3,750	40
TWY C	5,800	50
TWY C1	400	55
TWY D	3,600	65
TWY E	990	50

The existing taxiways include:

- Taxiway A serves as a full-length parallel taxiway to Runway 15-33 adjacent to the Terminal Ramp;
- Taxiway A1 is a stub taxiway that connects Runway 15-33 to Taxiway A approximately 1,120 feet from the Runway 15 threshold;
- Taxiway B serves as a partial parallel taxiway to Runway 6-24 adjacent to the East Apron. It connects with Taxiway A near the threshold of Runway 33 and terminates at the intersection of Runway 6-24;

- Taxiway C serves as a full-length parallel taxiway to Runway 6-24. Taxiway C crosses Runway 15-33 approximately 1,200 feet from the Runway 33 threshold;
- Taxiway C1 located on the north side of Runway 6-24, is a stub taxiway that connects Taxiway C to Runway 6-24;
- Taxiway D, which measures approximately 65 feet wide at the hold bar west of Runway 15-33, 75 feet wide at the hold bar north of Runway 6-24, and 50 feet wide everywhere else. The majority of Taxiway D intersects both Runways 15-33 and 6-24 at an acute angle. Taxiway D extends from the North ramp, across Taxiway A and Runway 15-33 to Taxiway B, east of Runway 6-24; and
- Taxiway E connects to Runway 15-33 to a run-up pit located north of Runway 15-33.

1.3.3.1.3 Ramps

The Airport has three ramps; the Terminal Ramp, the East Ramp, and the North Ramp, that provide approximately 369,500 sf of based aircraft parking, itinerant aircraft parking (transient aircraft parking), aircraft fueling ramp, and staging and maneuvering areas. These ramps are defined as areas intended for use by aircraft for loading and unloading passengers and cargo, parking, refueling, or maintenance.

- The Terminal Ramp is located adjacent to the terminal on the west side of Runway 15-33 and spans approximately 24,000 square yards (SY). The Terminal Ramp is used for passengers boarding and deboarding aircraft. The northern section of the Terminal Ramp was rehabilitated in 2013. Other portions of the Terminal Ramp were rehabilitated in 2015 and a deicing pad and aircraft wash rack area were installed as environmental protection enhancements.
- The East Ramp is located east of Runway 6-24 and spans approximately 45,600 SY. The majority of hangars that provide storage for single engine aircraft are found on the East Ramp. There are 55 tie-downs on the East Ramp, with 18 located in front of the 110 Mary Dunn Way hangar and 37 in front of the Hyannis Hangar LLC T-hangars and the Hexagon hangar.
- The North Ramp is connected to the Terminal Ramp closest to the Runway 15 end and spans approximately 55,500 SY. The ramp has limited space available for aircraft tie-downs and is the busiest ramp in the summer months.

1.3.3.2 Landside Facilities

Landside facilities support the aircraft and pilot/passenger functions, as well as other non-aviation facilities typically providing a revenue stream to the Airport. These facilities include the terminal building, general aviation facilities, and support facilities, such as fuel storage, vehicle parking, roadway access, and ARFF. The primary landside facilities at the Airport are identified in **Figure 1.3- 1**.

1.3.3.2.1 Hangars

Hangar space at the Airport is provided for both based and itinerant aircraft. There are currently eight conventional hangars, approximately 24,850 sf in total, located on both the East and North Ramps. Six of the eight conventional hangars are located on the North Ramp: Atlantic Aviation, Airport-owned hangar leased by Cape Air/Nantucket Airlines, Griffin Avionics, Airport-own Hangar II

leased by Cape Air/Nantucket Airlines, and Gull Air (Hangars 1 and 2). The other two conventional hangars are located on the East Ramp: 110 Mary Dunn Way Hangar and Cottle Hangar space is sectioned based on type of aircraft:

- 1,200 sf for Single Engine and Rotor Aircraft
- 1,600 sf for Multi-Engine Aircraft
- 3,200 sf for Jet Aircraft

There are currently 33 individual unit hangar buildings located on the East Ramp: Airport owned T-hangar, Aero Management Associates Hangar, Hyannis Hangar LLC, Hexagon Hangar, and Kingsbury (Hangars 1 and 2). There are currently 32 entities on a waitlist for Airport hangars.

Table 1.3-5 Airport Assets - Buildings

Asset	Size	Use
Ross Rectrix Aerodrome Center	35,000 sf	FBO, FAA and Cape Air office Space, and aircraft storage
HYA Fleet Hangar (Leased by Hyannis Air Service aka Cape Air and Nantucket Airlines)	39,500 sf	Aircraft storage, offices, and maintenance (Hyannis Air Service only)
Griffin Avionics	19,000 sf	FBO, aircraft storage, aircraft maintenance and offices
HYA Hangar II (Leased by Cape Air)	12,500 sf	Cape Air office and storage space, Airport SRE storage
Airline Realty Trust (Leased by Allies Aviation)	5,000 sf	Aircraft charters and aircraft storage
Hangar 51 LLC (Leased by Allies Aviation)	10,500 sf	Aircraft charters and aircraft storage
110 Mary Dunn Way Hangar	6,000 sf	FBO and aircraft storage
Cottle Hangar	7,500 sf	Aircraft storage
Airport T-hangar	8,900 sf (6-units)	Aircraft storage, maintenance and SRE storage
Aero Management Association (AMA), Inc	11,450 sf (3-units)	Aircraft maintenance and storage
Hyannis Hangar LLC	7,550 sf (8-units)	Aircraft storage
Hexagon Hangars (Privately Owned)	10,250 sf (6-units)	Aircraft storage
Kingsbury Aviation	10,000 sf (4-units)	Aircraft storage
Kingsbury Aviation	9,700 sf (6-units)	Aircraft storage

1.3.3.2.2 Airport Terminal Building

Constructed in 2011, the approximately 32,000 sf terminal building is located on the southwest side of the Airport property and serves as the point of transition for travelers between surface and air transportation utilizing commercial airlines. The Airport terminal also serves as the airport administration building and a community asset for artists to display their work, the Massachusetts Air and Space Museum to showcase historic aviation artifacts, and as a public gathering space for various community events. The current Airport terminal building was constructed in 2011 and has two floors. The first floor, approximately 26,600 sf, provides secure and non-secure areas for passengers (food and beverage, retail, and service-based concessions). The second floor,

approximately 5,400 sf, is comprised entirely of office space, including Airport and TSA offices, and support and storage space.

1.3.3.2.3 Vehicle Parking

The Airport provides parking in five locations: main terminal lot, rental car parking, employee parking, overflow grass parking lot and a gravel lot leased to the Steamship Authority. The passenger parking lots contain a total of approximately 585 spaces, while the overflow parking lot accommodates approximately 400 parking spaces. Current demand for parking is approximately 313 cars. In addition, approximately 100 car rental spaces are provided.

1.4 Airport Activity (MEPA)

The FAA defines an aircraft operation as a takeoff or a landing and categorizes the operations by aircraft type and purpose. These categories include commercial/air taxi, General Aviation, and military. The forecasting of all these different types of operations, combined with the requirements of the design critical aircraft, is used in the planning and size criteria of terminal buildings, runways, taxiways, and other airport infrastructure. At Cape Cod Gateway Airport, the:

Air taxi and commuter operations are those commercial in nature with less than 60 seats. They include charter operator activities such as Cape Air, Gull Air, and similar type operators.

Air Carrier are all those operations on aircraft with greater than 60 seats.

Commercial operations are all those which are all airline operations at the passenger terminal.

General Aviation (GA) refers to all civil aviation non-commercial operations. This includes recreational, corporate, and medical evacuation operations. **Itinerant** GA refers to flights traveling to/from the Airport. **Local** operations include those operations on Airport-based aircraft.

Aircraft activity at the Airport is tracked via a third-party service which utilizes cameras and radar to identify each individual aircraft that takes off and lands at the Airport since 2015. This information is tracked online and reported annually to the FAA. Prior to 2015, the data was collected via air traffic records.

Table 1.4-1 presents data for historical aircraft operations at the Airport by type. Overall, operations began to decline in 2007 and were accelerated with the departure of air taxi operator Colgan Air in 2010, followed by Island Air in 2015. Collectively, these services conducted 188,000 operations annually; a capacity that could not be served by Cape Air. Additionally, high speed ferry service started serving the islands from Hyannis provided a less expensive alternative.

JetBlue commenced operations at the Airport in 2014 and is forecasted to have 240 operations in 2023 with the same schedule as 2022. Aircraft operations trends also illustrate an increase in general aviation operations from 2021 to 2022.

Table 1.4-1 2008-2023 Historical Aircraft Operations (Calendar Year)

Year	Air Carrier	Air Taxi	GA Itinerant	GA Local	Military	Total Ops
2008	0	118,418	35,603	5,546	292	159,859
2009	12	84,246	20,774	7,070	271	112,373
2010	1	77,929	20,325	5,543	202	104,000
2011	0	69,238	19,783	7,058	201	96,280
2012	0	70,956	23,693	9,167	333	104,149
2013	0	67,798	24,796	9,067	367	102,028
2014	149	64,419	26,513	8,220	222	99,523
2015	159	58,758	24,067	6,733	251	89,968
2016	255	58,001	29,316	9,381	212	97,165
2017	186	47,092	26,521	7,081	136	81,016
2018	183	35,595	22,340	9,009	223	67,350
2019	167	32,483	22,241	10,839	387	66,117
2020	60	25,939	18,021	9,049	330	53,399
2021	84	26,628	18,455	9,177	364	58,361
2022	240	23,254	19,369	10,245	248	53,569
2023	399	20,298	14,640	14,331	456	14

Source : 2023 https://adip.faa.gov/agis/public/#/airportData/HYA

1.4.1 Commercial Passenger Enplanements

Historical data for passenger enplanements is presented in **Table 1.4-2**. This commercial airline data includes both the larger air carriers as well as air taxi operators. Evidently, this shows that the Airport has experienced a decline in passenger growth over the past ten years. The overall decrease in enplanements is likely due to many factors, including competition with other modes of transportation such as the high-speed ferry service, the Great Recession (2008-2009), and the loss of two airlines (Colgan Air and the bankruptcy of Island Airlines). Collectively, those two airlines served over 150,000 passengers per year. Most recently, the COVID pandemic had a dramatic impact on commercial air travel overall and locally evident in the dip in enplanements in 2020. Air travel began to rebound in 2021.

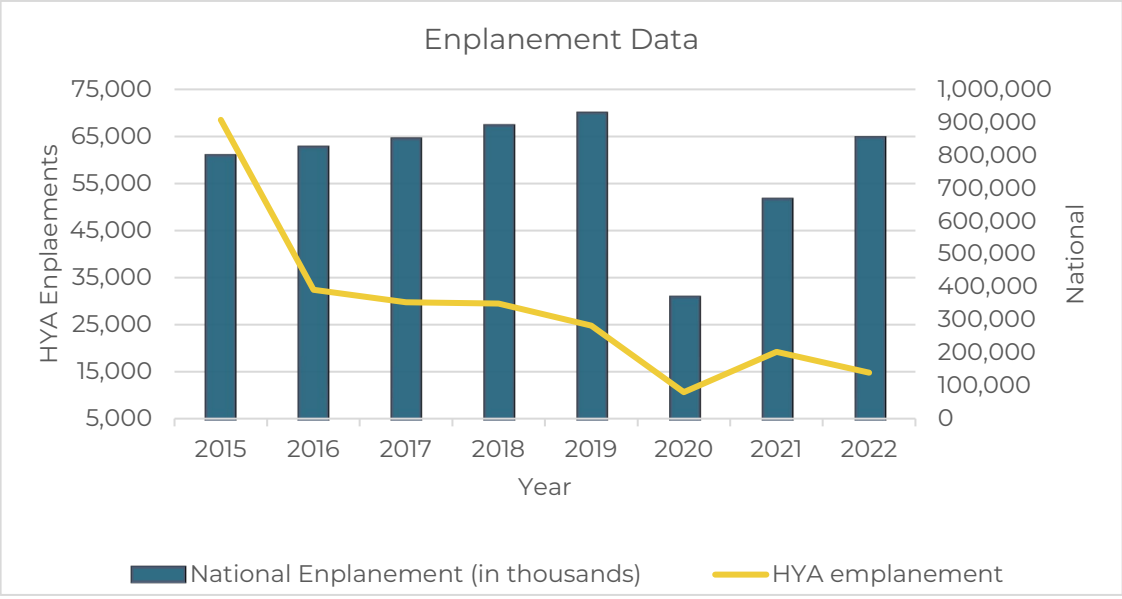
Table 1.4-2 HYA Passenger Enplanements Between 2008 and 2022

Year	Enplanements
2008	191,837
2009	138,451
2010	124,164
2011	100,450
2012	94,466
2013	86,745
2014	84,764
2015	68,519
2016	32,397
2017	29,719
2018	29,457
2019	24,799
2020	10,627
2021	19,175
2022	14,753

NOTE: July 2017 - Began to report revenue only activity

In 2022, total global flight volume was 18% below 2019 levels[2] and this trend is similar at Cape Cod Gateway Airport as reflected in the recovering operational trend discussed above and enplanement data graphed below. Industry-wide, a decline in the use of regional jets and an increase in narrow-bodied jets is trending. This is partially due to pilot shortages as regional airlines typically provide the training required for larger aircraft, an industry-wide factor. Locally, the ferries have played a role in the reduced aircraft operations and passenger volumes to Nantucket and Martha's Vineyard. However, there is a trend of increased private and charter flight operations post-COVID as more users have switched to private charter services. That data is not tracked in the enplanement data identified herein.

Graph 1.4-1 HYA and National Enplanement Data Trends



[2] Oliver Wyman. Airline Economic Analysis 2022-2023. https://www.oliverwyman.com/our-expertise/insights/2023/may/airline-economic-analysis-2022-2023.html

1.4.2 Operational Forecasts

The FAA requires that all airport planning efforts be based upon an approved forecast methodology as the resulting analysis assists in determining the facility requirements for meeting future demand. In the 2022 Master Plan, different operational forecasting methodologies utilizing key metrics were determined to be the most appropriate to use for each type. Operational forecasting is a key component of all airport master plan development. Air carrier and air taxi operations utilized the FAA National Aerospace Forecast methodology. GA jet operations utilized a blended forecast of the New England Region market share and the national growth rate. Light GA operations utilized a forecast that is a blend of the ten-year trend analysis and the National Aerospace forecast. Air carrier and air taxi operations at the Airport are year-round with seasonal activity occurring by JetBlue with flights to/from Hyannis and New York (JFK and LGA). The forecasted growth in air carrier growth at the Airport is 2.1 percent annually. This percentage reflects the national trends associated with the air carrier operations throughout the national airspace system. The National Aerospace Forecast projects a decline of 0.6 percent in air taxi operations segment over the next 20 years due to declines in the use of small regional airplanes and the up gauge in larger jet aircraft (increasing from 50 to 70+ passenger seats) and the increased strain on available pilots for smaller capacity aircraft flying. The latter of those factors has been one of the reasons for decreased frequency on routes to Nantucket and Boston. Flying to the Islands is expected to continue to decline as result of increased high-speed ferry service. Based on these factors, a negative growth rate of 0.6 percent was utilized in the FAA-approved Master Plan forecast analysis for this market segment.

The FAA issues an annual aerospace forecast that is a top-down (national level) forecast for aviation activity in the United States for the next 20 years. The national forecast examines current commercial operations (passenger and cargo) and general aviation, as well as emerging aircraft operations (e.g., commercial space, UAS, and AAM) and projects future activity. The FAA also develops a bottom-up TAF for each individual NPIAS airport. These forecasts are prepared to meet the budget and planning needs of the FAA and to provide information that may be useful for State and local authorities, the aviation industry, and other stakeholders. – FAA

GA operations use forecasts based on the New England Region market share and the national growth rate for itinerant GA as provided by the National Aerospace Forecast. The GA local preferred methodology was the average annual growth rate (AAGR) of the 10-year historic trend and the national growth rate for local GA as provided by the National Aerospace Forecast. **Table 1.4-3** shows current and projected annual operations by operation type.

Table 1.4-3 Annual Operations Forecast by Type

			Itinerant			Local			Total
Year	Air Carrier	Air Taxi	GA	Military	Total	GA	Military	Total	Ops
Baseline	183	35,595	22,340	95	58,213	9,009	128	9,137	67,350
2025	197	32,360	24,639	95	57,291	9,800	128	9,928	67,219
2030	219	31,401	26,514	95	58,229	10,447	128	10,575	68,804
2040	270	29,567	30,956	95	60,888	11,985	128	12,113	73,001

Sources: Cape Cod Gateway Airport Management, 2019; McFarland Johnson, 2019.

However, annual operations numbers, when divided equally over the year and throughout the day, do not exactly identify capacity constraints or facility needs during busier periods. To accurately identify airport requirements for facility planning, peaking characteristics are incorporated into the analysis such as the busiest month (peak month) of the year, what is an average day of the peak month, and peak hour.

Table 1.4-4 Peaking Characteristics

	Baseline	2025	2030	2040
Operations	67,350	67,219	68,804	73,001
Peak month	7,745	7,730	7,912	8,395
Average Day Peak Month	258	249	255	271
Peak Hour	44	42	43	46

Sources: Cape Cod Gateway Airport Management, 2019 and McFarland Johnson, 2019.

In summary, operation forecasts are anticipated to grow 8.3 percent through 2040, while based aircraft will experience a slight decline from baseline-based aircraft of 48 to 44 based aircraft in 2040. In addition to this summary, a detailed forecast analysis and discussion of data from Chapter 5 of the 2022 Master Plan is provided in **Appendix B**.

1.4.2.1 Commercial Passenger Enplanement Forecasts

Passenger enplanements – the number of people boarding commercial aircraft each year - are an important measure for forecasting activity at commercial service airports. The enplanements forecast focuses on the total annual enplanements as well as the peak hour characteristics of busier traffic periods (see **Table 1.4-5**). These forecasts are used in the assessment of the passenger terminal building and associated facilities such as auto parking lots. Additionally, beyond the terminal area, impacts on roadways and transportation networks may result from future demand.

Table 1.4-5 Forecasted Commercial Passenger Enplanements

Year	Master Plan Forecast
2020	26,104
2025	27,121
2030	28,193
2040	30,484

1.5 Environmental Review and Permitting

The Projects are subject to the following, federal, state, and regional environmental review processes.

1.5.1 Massachusetts Environmental Policy Act (MEPA)

MEPA (301 CMR 11.00) has jurisdiction over projects that meet certain thresholds and require state permits or receive state funding. The Airport's 2022 Master Plan Update includes projects which, individually or together, will meet certain established thresholds under MEPA regulations. MEPA

regulation 301 CMR 11.01(2)(c) does not allow related projects to be "segmented" or considered individually. Therefore, the various project impacts are considered collectively in determining MEPA jurisdiction.

Thresholds under 301 CMR 11.03 anticipated to be met or exceeded based on the selected preferred alternatives reviewed as a result of the EA/EIR review process include:

- 11.03(1)a(1) Alteration of greater than 50 acres of land
- 11.03(1)a(2) Creation of ten or more acres of impervious area.
- 11.03(6)b(iii) Expansion of an existing runway at an airport
- 11.03(6)b(iv) Construction of a New taxiway at an airport
- 11.03(6)(b)(1)f) Alteration of one-half or more acres of other wetlands (LUW)

In accordance with MEPA requirements, the Airport prepared and submitted an ENF on November 30, 2022 for the Projects. The Secretary's Certificate (EEA# 16640) on the ENF was received on January 23, 2023, requiring the preparation of an EIR. The MEPA Certificate on the ENF is provided in **Appendix A.**

1.5.1.1 Changes to the Project since the Submittal of the ENF

Since the submittal of the ENF on November 30, 2022, the Proponent has continued to refine the projects proposed through conceptual design, additional need analysis, and input from the community. This has resulted in additional alternatives evaluated for the Project, including refined runway alternatives, options for an operational shift to Joint Base Cape Cod (JBCC), taxiway configurations, and airport terminal needs. As a result of this feedback, the Airport has shortened the proposed runway extension by 400 feet to address community concerns regarding noise and safety, among other modifications. Additionally, the Airport has continued to engage neighbors to provide updates on environmental practices related to ongoing remediation efforts on Airport related to PFAS.

Ultimately, modification of the ENF-identified Preferred Alternative for the runway extension of Runway 15-33 to a 440 foot shorter extension and only on the 15-end was selected. The modified Preferred Alternative of an 895-foot extension is presented in Chapter 4.0 along with an updated alternatives analysis. No additional runway length is proposed to be added to the existing Runway 33-end. Additionally, an updated noise analysis has been completed per FAA's required methodology, evaluating the updated preferred runway extension length. This data is presented in Section 6.6.

There have been minor changes to the phasing of these projects, as annual Capital Improvement Plan (CIP) budgets are implemented at the state and federal level based on funding availability. These updates are shown in the construction phasing discussion in Chapter 3.0. Projects that have been determined to commence later than 2029 (including design phases) have been removed from the analysis provided herein. That includes any terminal modifications or expansion as well as the Runway 6 RSA enhancements. This analysis has been moved to **Appendix C** for information purposes only.

Conceptual grading plans have progressed for the runway and taxiway projects, determining the limits of work, areas of new land disturbance, wetland impacts, and required safety area tree removal on Airport. An updated obstruction analysis for easement acquisition has also been completed and the easements are further discussed in Section 3.3.

Table 1.5-1 Summary of ENF vs DEIR Impacts

	Existing	Change ENF	DEIR Update
Total Site Acreage (in acres)	639	0	0
New acres of altered land (in acres)	--	63	50*
Acres of Impervious Area (in acres)	167	27	40
Square feet of new bordering vegetated wetlands alteration (in sf)		3,427	4,600
Square feet of new other wetland alteration		+/-23,000	12,700 sf LUW 300 lf Bank
Footprint of buildings (in acres)	121	0.25	0.25**
Gross square footage	43,097	55,000	55,000
Internal roadways (in acres)	902	21	14***
Parking and other paved areas (in acres)	50	--	26.4
Vehicle trips per day	88	88	70 - 171****
Parking spaces	1,135	0	0
Other altered areas (in acres)	27	--	--
Undeveloped areas (in acres)	460	-21	-40
Water Use (Gallons per day [GPD])	7,0004	--	--
Water withdrawal (GPD)	7,000	--	--
Wastewater generation/treatment (GPD)	13,000	--	--

* Overall footprint of the Proposed Action includes vegetation converted to impervious surface and impacts of grading.

** This number does not include potential hangars which may be up to a total of 5 acres. These 5 acres overlap with the impervious surface number under "other paved areas."

*** Paved apron and ramp space is now included in" other paved surfaces."

**** 100% growth scenario (increase in 200 peak hour passenger design capacity). Increased trips represent between a 0.51% and 1.30% increase in daily and peak hour volumes, respectively, along the major travel routes.

1.5.2 National Environmental Policy Act (NEPA)

NEPA (40 Code of Federal Regulations [CFR] 1500-1508 and 23 CFR 771) requires federal agencies to determine whether there are significant impacts associated with federal actions, including federally funded projects.

The Airport's Master Plan Update identifies and recommends several projects that are eligible for federal funding and as a result, subject to NEPA. Per NEPA and FAA Implementing Instructions for airport projects under its authority in FAA Order 5050.4B, an EA must be prepared. Similar to the MEPA process, the EA process includes opportunities for public comment. After environmental impacts and mitigation measures are assessed, the FAA determines the significance of impacts. If significant, an Environmental Impact Statement (EIS) will be required, if not significant, the FAA will issue a Finding of No Significant Impact (FONSI).

1.5.3 Permit and Approval Requirements

The Projects are anticipated to require the following permits and approvals from local, state, and federal agencies listed in **Table 1.5-2.**

Table 1.5-2 Permits and Approvals Required for the Project

Permit/Review	Agency	Status and Relevant Project(s)	Measures to Comply with Applicable Performance Standards
Federal			
National Environmental Policy Act (NEPA)	Federal Aviation Administration (FAA)	Draft EA to be filed November 2023	An Environmental Assessment (EA) and associated Finding of No Significant Impact (FONSI) will be prepared in accordance with FAA Order 1050.1F.
Section 404 General Permit (Pre-Construction Notification)	Army Corps of Engineers (Corps)	PCN to be filed (Date TBD) for Taxiway D only	Selection of the least environmentally damaging practicable alternative including measures designed to avoid, minimize, and mitigate impacts to wetlands and other waters of the U.S.
Coverage under National Pollutant Discharge Elimination System (NPDES) Construction Activities Permit	Environmental Protection Agency	Notice of Intent (NOI) to be filed one to two months prior to start of construction of all Projects over 1 acre of impact.	Stormwater Pollution Prevention Plan to be developed and implemented, involving series of construction BMPs to reduce potential for erosion and sedimentation.
FAA planning, design, and safety Standards: AC 150/5300-13B Airport Design	Federal Aviation Administration (FAA)	Conceptual design complete. Final construction design to be completed in permitting phase.	Taxiways / runways will be designed to comply with FAA requirements.
Table 1-Section 7 Consultation under U.S. Endangered Species Act	Department of Interior, U.S. Fish and Wildlife Service (USFWS)	FAA lead agency to consult with USFWS when EA is filed	The Project will be reviewed by the USFWS through the Section 404 permitting process with the Corps as well as NEPA.
Review under Section 106 of the National Historic Preservation Act (36 CFR 800)	FAA, U.S. Army Corps of Engineers; Tribal Consultation; State Historic Preservation Officer (SHPO)	FAA lead agency to consult with SHPO when EA is filed	The Project will be designed to avoid or minimize impacts to historic resources. Consultation will be led by FAA and a determination of "no effect" is anticipated to be made by the MA SHPO based on based on consultation letter.
State			
Individual 401 Water Quality Certificate	Department of Environmental Protection (MassDEP)	WQC to be filed Date TBD for Taxiway D	Similar BMPs are to be employed as required by NPDES and the Corps and under the Massachusetts Wetlands Protection Act. Avoid, minimize, and mitigate impacts to wetlands and waterbodies.
Wetlands Protection Act M.G.L. c. 131 § 40	MassDEP	Notice of Intent To be filed Date TBD for Taxiway D	Avoid, minimize, and mitigate impacts to wetlands and other waterbodies including a minimum of 1:1 replication for unavoidable fill placed in BVW
M.G.L. c. 90 § 35B, 780 CMR 111.7	Massachusetts Department of Transportation (MassDOT) – Aeronautics Division	Conceptual design complete. Final construction design to be completed in permitting phase.	Taxiway / runway surfaces will be designed to comply with MassDOT requirements.

Table 1.5-2 Permits and Approvals Required for the Project (Continued)

Permit/Review	Agency	Status and Relevant Project(s)	Measures to Comply with Applicable Performance Standards
State			
Review under Massachusetts Endangered Species Act	Natural Heritage and Endangered Species Program	No impacts anticipated. MESA Checklist filed TBD if necessary.	Avoid and minimize impacts to state listed species habitats.
State Historic Register Review (Chapter 256)	Massachusetts Historical Commission (MHC)	FAA to consult with MHC upon submittal of the EA.	The Project will be designed to avoid or minimize impacts to historic resources. Consultation will be led by FAA and a determination of "no effect" is anticipated to be made by the MA SHPO based on consultation letter.
Regional			
Development of Regional Impact	Cape Cod Commission	DRI application to be submitted upon completion of MEPA.	
Local			
Wetlands Bylaw Order of Conditions	Barnstable Conservation Commission	Notice of Intent to be filed Date TBD For Taxiway D	Avoid, minimize, and mitigate impacts to wetlands and other waterbodies including a minimum of 1:1 replication for fill placed in BVW and compensatory flood storage. Similar BMPs to be employed during construction as required by NPDES, the Corps, and MassDEP to prevent erosion and sedimentation that could result in discharges to wetlands.

Chapter 2.0

Purpose and Need

2.0 PURPOSE AND NEED

The FAA must approve proposed airport layout changes to the Cape Cod Gateway Airport; such an approval constitutes a federal action requiring NEPA review. The purpose and need for a project are key elements of the NEPA review. It explains the reasons for the action and what the project sponsor expects to achieve. Further, it provides the basis for evaluating the effectiveness of the alternatives (*i.e.*, how each alternative achieves the purpose of the project by addressing the documented needs).

The need for each Project discussed below addresses the Airport's operational and safety needs while minimizing environmental and community impacts and responding to community questions and comments. Airports receiving federal funding are obligated by grant conditions to comply with FAA planning and airfield design standards that are detailed in multiple FAA advisory circulars, orders, and other regulations. At the most basic level, these requirements are rooted in maximizing safety and efficiency for those in the air and those on the ground.

FAA's AC 150/5300-13B (revised 2022) contains the FAA standards and recommendations for the geometric layout and engineering design of runways, taxiways, aprons, and other facilities at civil airports. These airport design standards represent a concerted effort by the FAA to establish new taxiway design standards to improve overall airport operational safety by requiring airfield taxiway geometries be upgraded to meet the new standards. FAA AC 150/5325-4B Runway Length Requirements for Airport Design provides design standards and guidelines for determining appropriate runway lengths based on the critical design aircraft. The current runway lengths do not meet these criteria for the current design aircraft. The proposed runway extension is needed to meet the recommended runway length based on the operational needs and efficiency of the design aircraft. The proposed Projects are part of the overall FAA effort to improve airfield operational safety by modifying current taxiway geometries to conform with new or revised design standards and Airport operational needs. Often the need for geometric modifications is the result of the design of older airfields and the geometries that existed in the 1920s and 1940s when they were first constructed; as is the case with Cape Cod Gateway Airport. The current non-standard airfield geometries and design at the Airport are identified where applicable and summarized in **Table 2.2- 5.**

Information is provided to demonstrate a balanced approach to achieving the purpose and need for the proposed Projects, along with data analysis, to address and respond to community feedback received at public meetings and during formal comment periods. The individual Projects are described further in Chapter 3.0. The evaluation of the alternatives and selection of alternatives to meet the purpose and need is described in Chapter 4.0.

2.1 Purpose

The proposed Projects from the 2022 Master Plan for the Cape Cod Gateway Airport have the following purposes:

- To improve airfield safety and compliance with FAA airport design standards by eliminating nonstandard taxiway designs and geometries including direct taxiway connections from apron areas to runways and non-standard taxiway intersections;
- To provide a reasonable and balanced approach in meeting runway length recommendations for safety and operational efficiency as identified in the Master Plan for the current and future families of aircraft using the Airport including general aviation, air carrier, air taxi, military, and private and corporate aircraft;
- To enhance and maintain safe and efficient landside facilities that are compliant with FAA airport design standards and MassDOT Aeronautics Division regulations; and
- To develop opportunities to promote financial self-sufficiency and energy sustainability at Cape Cod Gateway Airport and economic growth for the community.

2.2 Need

As described in more detail below, the proposed Projects are needed to enhance overall operational safety and efficiency at the Cape Cod Gateway Airport. The Projects are based on the need to reasonably accommodate existing and anticipated aviation demand for the current families of aircraft, FAA and MassDOT safety and security requirements, and Airport financial self-sufficiency. The Airport operates as an enterprise fund and is financially self-sufficient from the town in meeting its operating obligations and future infrastructure needs. References to FAA airport design standards, unless otherwise noted, refer to FAA Advisory Circular (AC) 150/5300-13B, *Airport Design*. Descriptions of the need for the individual Projects are provided below. All proposed Projects are shown in **Figure 1.1-3**.

2.2.1 Airside Facilities

2.2.1.1 Construct Partial Parallel Taxiway D to Runway 15-33

Currently, the existing Taxiway D ranges in width from 50 to 75 feet wide and begins at the North Ramp apron area and crosses both Taxiway A and Runway 15-33 to existing Taxiway B east of Runway 6-24. It intersects both runways at an acute angle, a non-standard geometry per FAA AC 150/5300-13B, *Airport Design*. A non-right-angle taxiway approaching a runway can lead the taxiing aircraft to inadvertently enter the runway. In addition, the non-right-angle connection reduces the ability to see runway ends which may contribute to the loss of situational awareness. This is similar to if your car was parked at an intersection, and you had the inability to clearly see cars coming from either direction. The geometry of Taxiway D also currently provides direct access from the ramp to the runway, a nonstandard condition that can lead to a runway incursion[1].

This Proposed Action involves construction of a new partial parallel taxiway east of Runway 15-33 with a standard 400-foot runway centerline to taxiway centerline separation. It will extend from the existing Taxiway A1 across existing Taxiway D and Runway 6-24 to the proposed relocated Taxiway B (see Section 2.2.1.3 below). This taxiway would be approximately 3,200 feet in length, 50 feet wide,

[1] Any occurrence at an airport involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.

and tie in with the existing/remaining taxiway. Ultimately, this new partial parallel taxiway will be named Taxiway D. This Project also includes the removal of the portion of existing Taxiway D between existing Taxiway A across Runway 15-33 and up to the proposed new partial parallel taxiway. See **Figure 2.2-1**.

The proposed new partial parallel taxiway (future Taxiway D) would eliminate direct access from the North Ramp to Runway 15-33, the acute angle access points to Runway 15-33, as well as the high-energy crossing location. The future Taxiway D would also prevent existing operational concerns due to two-way taxiing occurring directly in front of the terminal building.

2.2.1.2 Remove Taxiway E and Existing Runup Area/Construct an Engine Run-up Area for Partial Parallel Taxiway D

The existing Taxiway E measures 50 feet wide and connects Runway 15-33 to an approximately ±42,000 square foot (sf) engine run-up area, which currently does not have a sound barrier. The existing engine run-up area is currently used by aircraft for pre-flight testing and maintenance operations and is used to buffer the noise for those types of operations. The current geometry of Taxiway E is non-standard per FAA AC 150/5300-13B, *Airport Design*.

This proposed Project will eliminate existing non-right-angle geometry to Runway 15-33 by removing the existing Taxiway E and the associated aircraft engine runup area (pit). Removal of the existing run-up area will require the construction of a new run-up area, immediately adjacent to the existing run-up area, designed to accommodate the existing aircraft fleet. The new run-up area, proposed for construction on the future Taxiway D, will be used for the same purposes.

A noise barrier is proposed to be constructed adjacent to the run-up area to provide additional noise mitigation for the surrounding areas. See **Figure 2.2-1**.

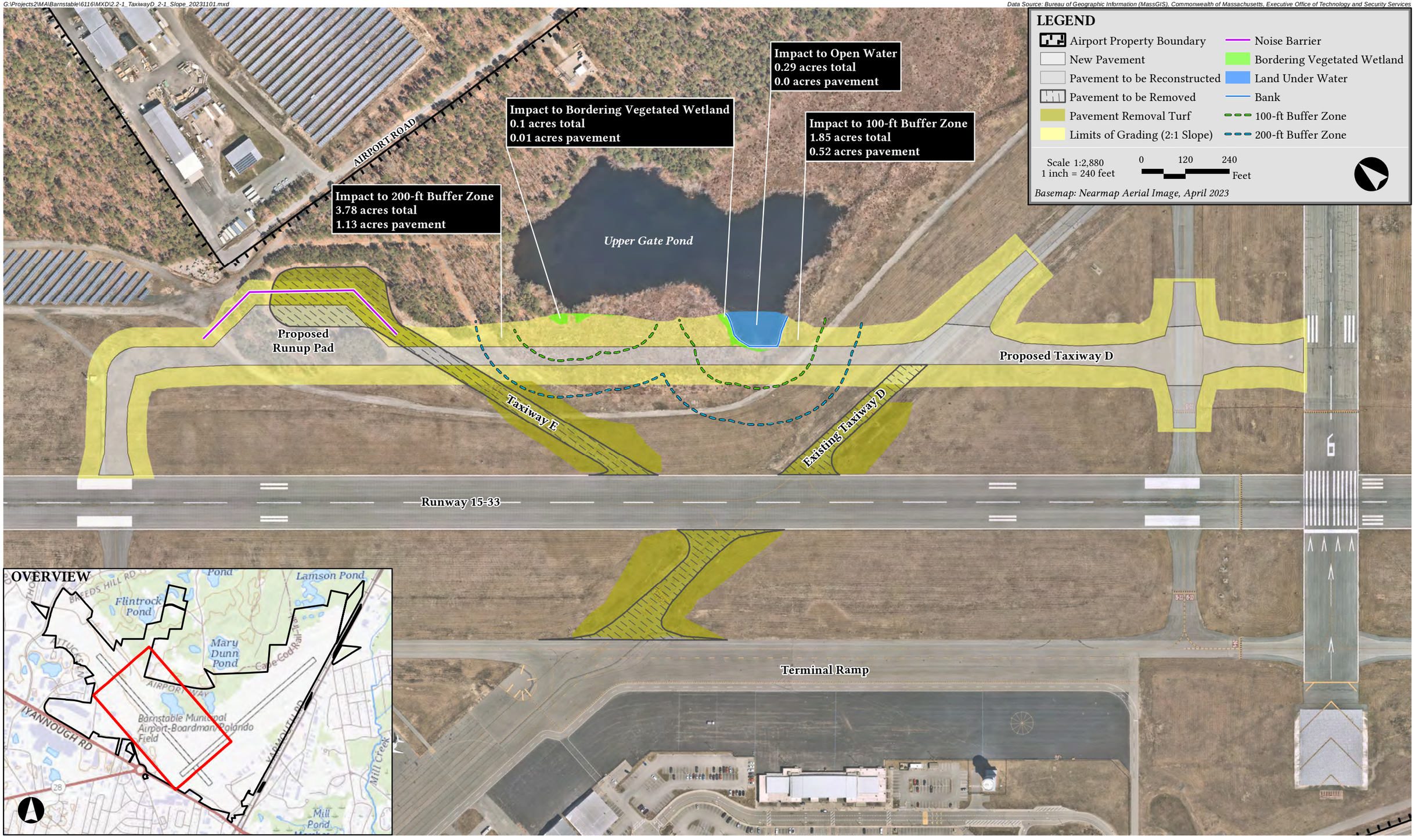
In conformance with the FAA's goals to correct nonstandard airfield geometries, enhance aircraft safety, and ensure compliance with regulatory guidance, this Project serves to correct deficiencies associated with existing Taxiway D (circa 1998) and Taxiway E (circa 1980) that will ultimately improve safety and operational efficiency.

2.2.1.3 Relocate and Reconstruct Taxiway B

Adjacent to the East Apron, the existing Taxiway B is 40 feet wide and serves as a partial parallel taxiway to Runway 6-24. It connects with Taxiway A near the threshold of Runway 33 and terminates south of the Runway 24 approach end. It is also the oldest piece of pavement on the airfield and needs replacement due to failing conditions. Taxiway B's dual use pavement, high energy intersection, and intersection departure due to its physical connection with the East Apron make it a nonstandard geometry taxiway per FAA AC 150/5300-13B, Airport Design. Other deficiencies include its narrow width and pavement condition.

G:\Projects2\MA\Barnstable\6116\MXD\2.2-1_TaxiwayD_2-1_Slope_20231101.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport Barnstable, Massachusetts

Figure 2.2-1
Taxiway D 2:1 Slope Alternative

This proposed Project involves widening Taxiway B to a design standard 50 feet to meet FAA design requirements for the families of aircraft that use the Airport and relocation to an FAA design standard 400-foot runway centerline to taxiway centerline separation south of Runway 6-24; this would separate the taxiway from the East Apron and remove a direct connection from the apron to the taxiway. This new configuration would not only separate the taxiway pavement from the apron

pavement, but it would also extend Taxiway B northward to just south of the existing glide slope antenna and allow for additional room for apron expansion. The new taxiway configuration/length would provide for aircraft to taxi closer to the runway ends and reduce/eliminate the need for "back-taxiing" operations and enables runway crossings to occur at runway ends, the safest location to cross a runway. The associated taxiway object free area (TOFA) would remain clear of the glide slope used for navigational purposes. See **Figure 2.2-2**.

The Project would enhance safety by removing dual purpose pavements (i.e., combined apron and taxiway), lengthening the taxi distance, and relocating the taxiway crossing of Runway 6-24 to a lower energy location. A short distance between the apron and the runway requires flight crews to complete the same number of checklist items in a shorter timeframe and requires more heads-down time during taxi.

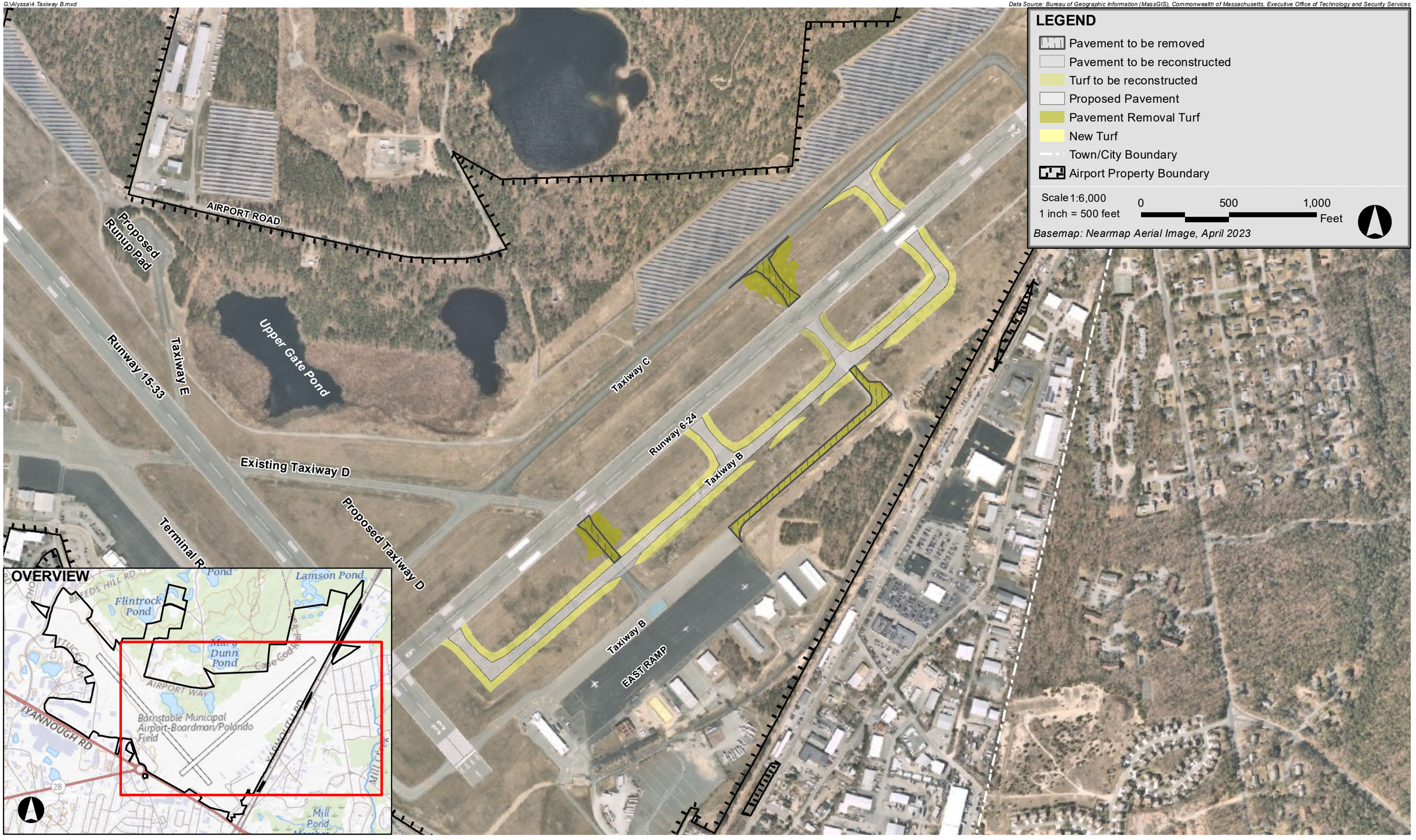
2.2.1.4 Extend Runway 15-33

This proposed Project will extend Runway 15-33 from 5,255 feet to a total length of 6,150 feet (see **Figure 2.2-3**). This length is based on the 2022 Airport Master Plan analysis conducted for the Airport's current family of aircraft using the Airport facility and those projected to use the Airport with typical stage lengths (i.e., distances of travel to/from the Cape Cod Gateway Airport). The length analysis is also based on additional screening that has taken place during the environmental review process, including input from surrounding communities. This analysis eliminates the 33-end extension, reducing the runway length recommendation identified in the Master Plan Preferred Alternative by approximately 400 feet. The Airport Master Plan Facility Requirements, which identified the recommended length of 6,550 feet based on FAA design formulas, has been included in **Appendix B** of this Draft EIR/EA.

Currently, Runway 6-24 (5,425 feet long by 150 feet wide) serves as the primary visual flight rule (VFR) or "good weather" runway, while Runway 15-33 (5,255 feet long by 150 feet wide) serves as the current primary instrument flight rules (IFR) or "bad weather" runway. Extension of Runway 6-24 was eliminated from further study during the Master planning process due to the anticipated community impacts. The extension of the runway ends is constrained by the need to relocate Yarmouth Road, railroad tracks, existing EMAS, Iyannough Road Rotary, and residential property acquisition. See further discussion in Section 4.1.1.7.

G:\Alyssa\4.Taxiway B.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport Barnstable, Massachusetts

Figure 2.2-2
Proposed Taxiway B Relocation

G:\Alyssa\RW 15.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

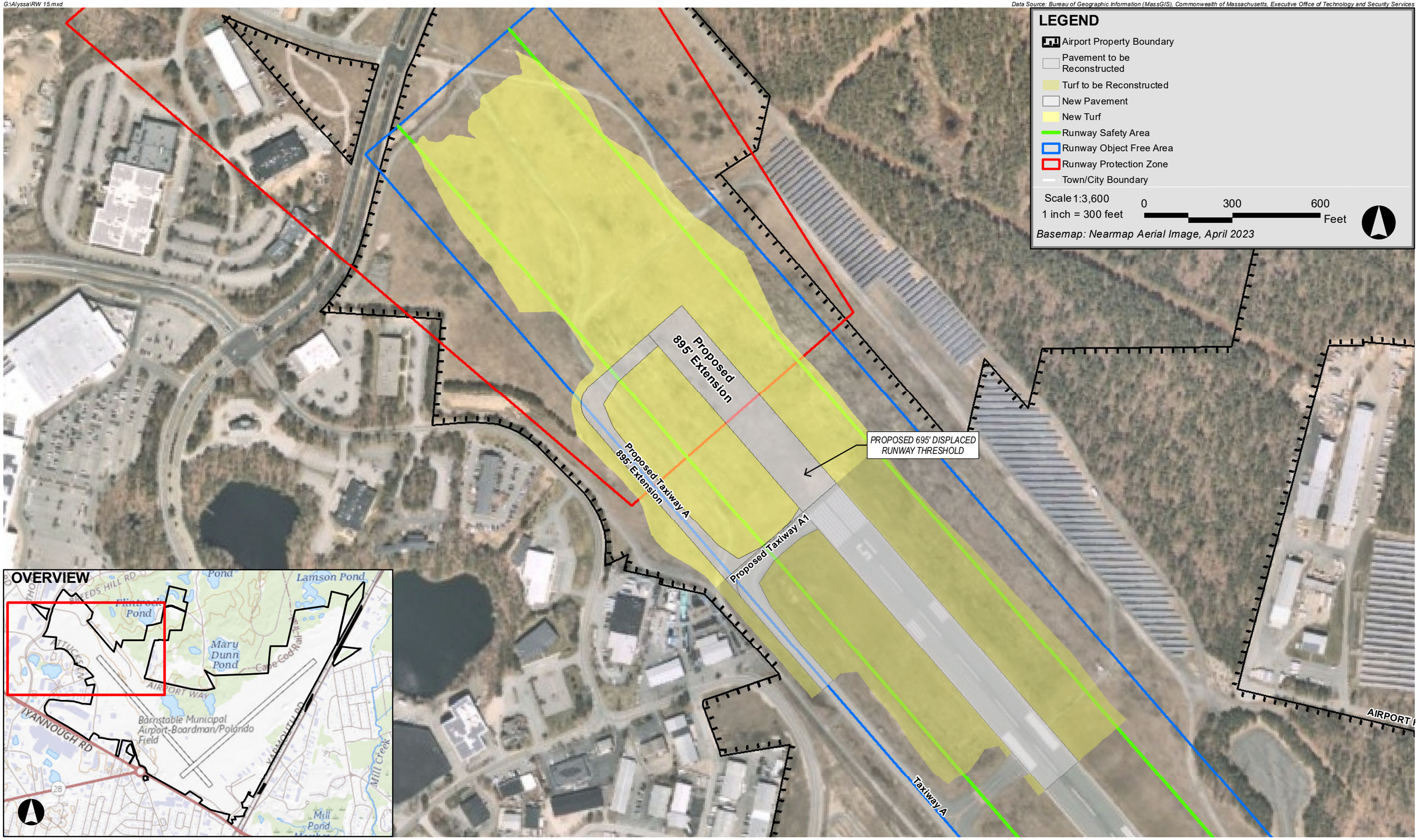


Figure 2.2-3
Proposed Runway 15 Extension

Background

During normal operating procedures, the pilot of an aircraft must determine the runway takeoff distance required to fly to a specific destination based on current weather conditions (temperature, humidity, prevailing wind direction, and speed), mission requirements (destination/fuel load, passenger load, and cargo load), specific airport conditions (airport elevation, runway condition, obstructions, etc.), among other factors. Once that runway takeoff distance determination is made, the pilot will compare the existing runway length available with the requirement for that specific mission. If that existing runway length is deficient, the pilot will be forced to reduce the overall weight of the aircraft to lower the takeoff distance required to match the airport's existing runway length. This is done by reducing the amount of fuel (shortening flight distance) and/or payload (passengers or cargo) that the aircraft can take on that flight; this is also known as a weight penalty.

While this is the standard operating procedure for aircraft operators to adjust accordingly to ensure safe operations, it is also generally a goal of airports to optimize aircraft functional safety by reasonably and practicably providing appropriate runway length to accommodate the needs of the majority of their operators.

The planning challenge for airports is to strike an appropriate balance in providing runway length that will meet the requirements of the forecasted critical design aircraft while taking into consideration airport constraints and the surrounding community.

Airports receiving federal funding in the form of grants are required to comply with a wide variety of grant assurances which include the requirement to comply with FAA planning and design standards that are detailed in multiple FAA advisory circulars, orders, and other regulations. At the most basic level, these regulations are rooted in maximizing safety for those in the air and those on the ground. In general, airport infrastructure, including runway length, is designed to accommodate the most demanding aircraft type that will utilize the infrastructure on a regular basis. The FAA refers to this aircraft as the critical design aircraft, which it defines as "*the most demanding aircraft type, or grouping of aircraft [families of aircraft] with similar characteristics, that make regular use of the airport. Regular use is 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations.*"[2] The primary purpose of identifying the critical aircraft is to ultimately translate the operational requirements of that aircraft into the design for airport facilities and infrastructure.

The FAA has developed a system to connect the physical characteristics of the critical aircraft to airport planning and design standards. This system detailed in FAA AC 150/5300-13B Airport Design includes the following codes used to develop the Runway Design Code (RDC).

- The first code, designated with a letter, is the Aircraft Approach Category (AAC) which is based on the approach speed (landing speed) of an aircraft.

[2] FAA AC No: 150/5000-17, Critical Aircraft and Regular Use Determination, (June 20, 2017)

- The second code, the Airplane Design Group (ADG), is determined by the wingspan and tail height of an aircraft and is represented by a Roman numeral.

Every aircraft, runway, and the airport as a whole is assigned a reference code. The RDC of a runway and airport is based on the aircraft or combination of aircraft with the highest approach speed and greatest wingspan that either use or are expected to make regular use of the airport. **Figure 2.2-4** lists the AACs/RDCs and illustrates example aircraft for each.

As documented in the 2022 Master Plan, the current and future critical design aircraft for Cape Cod Gateway Airport was established by conducting an aircraft operations analysis. As shown in **Table 2.2-1**, aircraft operations data from the FAA's Traffic Flow Management System Counts (TFMSC) database was used to evaluate historical operations at Cape Cod Gateway Airport to help identify the appropriate critical design aircraft. The TFMSC operations data for this report has been updated to include data through 2022 to confirm the validity of the Master Plan analysis, which was based on 2019 operational data.

It is important to recognize that TFMSC data represents actual flights recorded and validated by the FAA through means of flight plans, instrument flight operations, and/or other radar-based tracking applications. It is the most accurate FAA flight data currently publicly available and identifies aircraft type, flight dates, flight origins and destinations, etc. It must also be recognized that TFMSC data represents a subset of the total number of operations experienced at an airport; thus, there are many operations that occur at an airport that are not recorded in TFMSC.

Specific to the Airport, the total number of civilian operations that occurred in 2022 was 53,946[3], whereas TFMSC recorded details for only 15,681 of those operations or 29.1 percent of the overall total. Most of the operations not captured in the TFMSC can reasonably be assumed to be comprised of smaller general aviation aircraft as their users are typically the least likely to engage in flight recording activities that would register their operations in the TFMSC. Conversely, users of larger aircraft (e.g., multi-engine aircraft, turbine aircraft, business jet aircraft, etc.) tend to regularly utilize those services and therefore their activities are more likely to be captured in the TFMSC. Given this basis of understanding, the fidelity and detail of the TFMSC data provides excellent perspective and insights into the most demanding types of aircraft that regularly operate at an airport.

As documented in the 2022 Master Plan and reflected in **Table 2.2-1**, Cape Cod Gateway Airport's existing and future AAC/ADG is C/D-III. This is established not on the individual categories (i.e., C-III or D-III) meeting the 500 annual operations thresholds, but on a composite approach whereby AAC C and AAC D meet that annual threshold and likewise ADG III now currently meets that 500 operations threshold. This methodology and designation have been reviewed and formally approved by the FAA in May 2022.

[3] Aircraft operations data are collected via ATC tower counts, and by a third-party company (Vector) via airfield cameras that record activity.

Airplane Design Group (ADG) (Wing Span) (Tail Height)	Aircraft Approach Category (AAC) (Approach Speed)			
	Category A (<91 kts)	Category B (91 - <121 kts)	Category C (121 - <141 kts)	Category D (141 - <166 kts)
Group I (<49') / (<20')	**A-I** Cessna 172, Beech Bonanza, Vans RV-6	**B-I** Piper Navajo, Cessna 421, Beech Baron 58	**C-I** Learjet 25, Israel Westwind Astra	**D-I** Learjet 35, F-16C Fighting Falcon
				
Group II (49' - <79') (20' - <30')	**A-II** Pilatus PC-12, Cessna 208, Aero Commander 500	**B-II** EMB Brasilia, Super King Air 350, Air Tractor 802-A	**C-II** Gulfstream III, Canadair Challenger 600, Citation X	**D-II** Gulfstream G200 and IV
				
Group III (79' - <118') (30' - <45')	**A-III** Fairchild F-27, Douglas DC-3	**B-III** Boeing B-17, Douglas DC-4, Dash 8	**C-III** Airbus A318, Gulfstream 550, Global 6000, PBY Catalina	**D-III** Boeing 737-800, Douglas DC-9
				
Group IV (118' - <171') (45' - <60')		**B-IV** Ilyushin Il-76, Boeing C97 Stratocruiser, Douglas DC-7	**C-IV** Boeing 757 and 767, Boeing KC-135	**D-IV** Boeing 767, Douglas DC-10, Douglas MD-11
				
Group V (171' - <214')(60' - < 66')			**C-V** Boeing 777-200 and 787-8 Dreamliner, Airbus A340-300	**D-V** Boeing 747-400 and 777-300, Airbus A340-500
				

Figure 2.2-4

FAA Airport Reference Code Designations

Table 2.2-1 Cape Cod Gateway Airport TFMSC Annual Operations by AAC/ADG (2018-2022)

	2018	2019	2020	2021	2022
A-I	2,178	1,962	1,857	2,016	2,094
A-II	445	476	410	670	676
A-III	0	0	0	0	0
B-I	6,348	6,151	6,314	6,998	5,592
B-II	4,684	4,203	3,022	4,464	4,366
B-III	20	29	12	64	72
B-IV	0	0	0	0	0
C-I	596	499	506	710	615
C-II	964	972	982	1,439	1,257
C-III	274	265	134	369	423
C-IV	7	0	1	1	12
D-I	35	28	20	29	13
D-II	310	263	261	404	341
D-III	100	128	72	225	220
D-IV	0	0	0	0	0
Totals:	*15,961*	*14,976*	*13,591*	*17,389*	*15,681*
AAC A	2,623	2,438	2,267	2,686	2,770
AAC B	11,052	10,383	9,348	11,526	10,030
AAC C	1,841	1,736	1,623	2,519	2,307
AAC D	445	419	353	658	574
ADG I	9,157	8,640	8,697	9,753	8,314
ADG II	6,403	5,914	4,675	6,977	6,640
ADG III	394	422	218	658	715
ADG IV	7	-	1	1	12

Source: FAA TFMSC

The AAC/ADG C/D-III designation includes general aviation aircraft such as Gulfstream variants, the Bombardier Global Express, and other large business jets, as well as commercial service aircraft such as the Embraer E190 and the Airbus 220, all of which either currently operate at the Airport or are projected to in the future. Based on the range of the most demanding aircraft that operate at the Airport, two critical design aircraft were identified for Cape Cod Gateway Airport: one representing general aviation activities and one representing commercial service activities. Specifically, the existing general aviation design aircraft and commercial service design aircraft were determined to be the Gulfstream V/G500 and the Embraer E190, respectively. **Table 2.2-2** below provides supporting FAA TFMSC operational data for all those aircraft with an ADG of III that flew into and out of Airport in 2022, including the critical design aircraft.

Table 2.2-2 Total Annual Operations of ADG III Aircraft (2022)

Airplane Approach Category (AAC)	Airplane Design Group (ADG)	Aircraft Type	Total Annual Operations (2022)
B	III	GL7T - Bombardier Global 7500	30
B	III	FA7X - Dassault Falcon F7X	38
C	III	E190 - Embraer E190*	241
C	III	GL5T - Bombardier BD-700 Global 5000	40
C	III	GLEX - Bombardier BD-700 Global Express	142
D	III	GLF5 - Gulfstream V/G500*	165
D	III	GA6C - G-7 Gulfstream G600	22
D	III	GLF6 - Gulfstream	33

Source: FAA TFMSC Database
* Designated as a critical design aircraft for Cape Cod Gateway Airport

Runway Length Recommendations

The purpose of this section is to present a summary of the runway length analysis included in the 2022 Cape Cod Gateway Airport Master Plan. Runway length requirements are based on the greater of the takeoff or landing performance characteristics of the critical design aircraft. Note that the takeoff length requirement nearly always dictates runway length requirements since takeoffs are typically the most demanding operation on a runway.

It should be understood that in practical application, specific runway takeoff length requirements must be generated for each flight that originates at any airport. These requirements are dependent on a wide range of variables (e.g., temperature, humidity, winds, runway condition and gradient, obstructions, aircraft type, length of haul, payload, etc.), many of which can vary dramatically daily or even hourly. However, for airport planning purposes, the FAA endorses applying a generalized methodology for establishing a recommended runway length; this is either computed from FAA composite aircraft fleet operational performance curves (typically used for critical airplanes with maximum takeoff weights (MTOW) between 12,500 pound and 60,000 pounds), or are determined from specific aircraft manufacturer performance data (typically applied for airplanes with a MTOW of greater than 60,000 pounds), or a combination of both.

Since Cape Cod Gateway Airport realizes a significant volume of traffic of aircraft operating in either category (with MTOW below and above 60,000 pounds), both FAA-recommended methodologies were applied. This was done specifically to balance the various needs of the full range of aircraft currently and projected to operate at the Airport over the long term. For those aircraft with a MTOW between 12,500 pounds and 60,000 pounds, the standard FAA methodology was applied to establish a baseline recommended runway length. This approach reflected the steps and requirements dictated in FAA AC 150/5325-4B, Runway Length Requirements for Airport Design, and through application of the FAA Airport Design Software v4.d; the results of this analysis are shown in **Table 2.2-3**.

It should also be recognized that runway length requirements will differ for some aircraft depending on whether the runway is dry or wet/contaminated (i.e., due to rain, snow, or ice)[4] with the latter conditions typically resulting in aircraft requiring additional runway length to operate safely.

Table 2.2-3 FAA Runway Length Recommendation

Input		
Airport Elevation	54' MSL	
Mean Daily Maximum Temp. in Hottest Month	78.0° F	
Maximum Difference in Runway Centerline Elevation	12'	
Estimated Stage Length	1,000 mi	
Runway Lengths Recommended for Airport Design		
	Dry Runway	Wet Runway
Large airplanes of 60,000 pounds or less:		
75 percent of these large airplanes at 60 percent useful load:	4,700'	5,270'
75 percent of these large airplanes at 90 percent useful load:	6,030'	6,800'
100 percent of these large airplanes at 60 percent useful load:	5,120'	5,500'
100 percent of these large airplanes at 90 percent useful load:	7,450'	7,450'
Large airplanes of greater than 60,000 pounds	Individual Assessment Required	

Source: FAA Airport Design Software

In reviewing the results of this analysis for Cape Cod Gateway Airport over a span of various aircraft types and useful loads, the recommended runway lengths ranges between 4,700 feet and 7,450 feet based on dry runway conditions. However, when considering wet runway conditions, which is not atypical at Cape Cod Gateway Airport, the minimum runway length increases from 5,270 feet to 7,450 feet, which exceeds the existing Runway 15-33 length of 5,255 feet. (It should also be noted that when such inclement weather is experienced at the Airport, aircraft will tend to operate on Runway 15-33 since it is considered to be the bad weather runway).

In essence, this analysis results in drawing the reasonable conclusion that Runway 15-33 is currently at the absolute minimum length required to safely accommodate the majority of the families of aircraft with a MTOW between 12,500 pounds and 60,000 pounds, which encapsulates most general aviation turbine-engine aircraft. Any enhancement to the existing length would increase the level of safety and operational effectiveness for the aircraft operating on Runway 15-33.

The second runway length methodology applied within the 2022 Cape Cod Gateway Airport Master Plan was based on conducting individual operational assessments for the range of the largest aircraft (with a MTOW of greater than 60,000 pounds) anticipated to operate on Runway 15-33 in the near future. This included both critical design aircraft (Embraer E190 and Gulfstream V/G500) as well as other large aircraft including Bombardier Global 5000/Express, Airbus A220, and Airbus A320.

[4] AC No. 35-21, *Takeoff Performance Data for Operations on Contaminated Runways*, provides guidance and standardized methods for developing takeoff performance data for operations on contaminated runways.

As suggested above, runway length recommendations for aircraft are a function of a wide variety of factors, and for aircraft with MTOW, of greater than 60,000 pounds, those variables and the resultant runway length recommendations are often amplified. Thus, to take a measured and balanced approach, the runway length analysis for each of these aircraft not only included a complete runway length recommendation assessment based on their individual MTOWs, but it also established a typical stage length for each aircraft that is normally experienced at Cape Cod Gateway Airport. The two-step runway length analysis was done to help ensure that the recommendations were moderated and scaled to the actual needs of Cape Cod Gateway Airport.

Table 2.2-4 provides a summary of the detailed analysis conducted within the Master Plan. For each aircraft type, the range of potential runway lengths were determined (variability of the lengths is based on temperatures and payloads), as well as the runway length required to execute a typical flight from Cape Cod Gateway Airport, assuming standard weather conditions. The latter analysis incorporated data relative to the takeoff weight of the typical aircraft based on reasonable payload assumptions (e.g., passengers, luggage, etc.) and fuel weights of a typical operation airport within a 1,500 nautical mile (approximately 1,726 miles) range (stage length). This results in a more conservative analysis with reduced runway length recommendations as part of this EA/EIR analysis.

This approach reflects what is typically experienced at Cape Cod Gateway Airport as opposed to a maximum capability analysis, which is typical of a master plan study. Using information on typical destinations aircraft flying from the Airport are traveling to balance typical operational requirements and optimal operational requirements. However, it must be recognized that while these length requirements reflect operations that might be most typically expected, it is important for an airport to also consider actively enhancing aircraft capabilities beyond just those normal operations.

Table 2.2-4 Runway Length Analysis

Aircraft Type	Runway Length Recommendation - Standard Analysis at MTOW (feet)	Runway Length Recommendation - HYA Adjusted Analysis (feet, assumptions)
Embraer E190* (Existing Commercial)	6,115 – 8,915	5,290 (HYA-JFK)
Gulfstream V/G500* (Existing GA)	6,585 – 6,585	6,054 (1,500 NM)
Bombardier Global Express (Existing GA)	5,540 – 6,540	5,958 (1,500 NM)
A220 (Future Commercial)	6,200 – 9,415	5,865 (HYA-JFK)
A320 (Future Commercial)	5,515 – 7,515	6,000 (HYA-JFK)

McFarland Johnson analysis, 2020.
* Cape Cod Gateway Airport (HYA) Critical Design Aircraft per 2022 Cape Cod Gateway Airport Master Plan

As shown in this table, the fleet mix operating at MTOW has a range of runway length recommendations that extends from a minimum of 5,515 feet to a maximum of 9,415 feet (existing Runway 15-33 is 5,255 feet). In terms of runway lengths based on typical operations at Cape Cod Gateway Airport, the range extends from 5,290 feet to 6,054 feet, which happens to reflect the requirements for the existing design aircraft.

The previous sections presented the three different runway length evaluation methodologies employed within the 2022 Master Plan, all of which resulted in consistent results. **Figure 2.2-5** below aggregates those results into a single graphic that presents a range of aircraft that typically operate at Cape Cod Gateway Airport and their general takeoff runway length requirements compared against Runway 15-33's existing length, the range of lengths identified by the two FAA methodologies (for aircraft with MTOWs below and above 60,000 pounds), and range of lengths identified by the modified methodology designed to reflect typical operations at Cape Cod Gateway Airport.

Also included in **Figure 2.2-5** is the Airport Master Plan recommended runway length of 6,550 feet, which was established through an internal coordination process that weighed the various runway requirements against the physical constraints of the Airport site. The runway length of 6,550 feet represented the maximum runway length that could reasonably be achieved for Runway 15-33 without experiencing excessive physical, operational, and community impacts.

Additionally, the regional role of Cape Cod Gateway Airport must be acknowledged and evaluated. Per H.R.302 - FAA Reauthorization Act of 2018, Section 47106 of title 49 of the United States Code, *"When evaluating the master plan of an airport [...], the Secretary shall take into account (1) the role an airport plays with respect to medical emergencies and evacuations; and (2) the role the airport plays in emergency or disaster preparedness in the community served by the airport*."[5]

Cape Cod Gateway Airport is the only public-use airport on Cape Cod having runways that exceed 5,000 feet. In an emergency, the Airport would play an essential role for the region including providing access to first responders, landing, and storing supplies for the area, as well as potentially facilitating evacuations of large portions of the population. For these purposes, aircraft similar to Boeing 737(BBJ)/A320-type aircraft must be factored into the runway length determination. These aircraft have takeoff distance requirements of approximately 6,500 feet with a full payload (to operate at that length and at full payload, these aircraft would have to take severe weight penalties that would limit the distance they could travel).

Conclusion

Based on the Airport Master Plan length analysis of the existing general aviation fleet mix as well as each of the individual aircraft greater than 60,000 pounds that regularly use the Airport, the range for runway length of between 6,000 and 6,400 feet was identified to meet the existing and future demands of the family of aircraft using the Airport while minimizing community impacts. As Cape Cod Gateway Airport's primary bad weather runway and the runway with the greatest ability to be extended, Runway 15-33 is the preferred runway for an extension. The Proposed Action to extend the runway to a total length of 6,150 feet meets the need to enhance airport operational safety by largely meeting the runway length requirements of aircraft that regularly utilize the Airport and balances community impacts by maintaining the runway and safety areas on the Airport. A displaced

[5] https://www.congress.gov/115/plaws/publ254/PLAW-115publ254.pdf



Bombardier Global Express 700



Embraer E 190



Dassault Falcon F7X



Gulfstream G500

Figure 2.2-5

Current Family of Aircraft at the Airport

threshold on Runway 15 increases the takeoff clearance. The Proposed Action also enhances overall regional safety and emergency response capabilities by providing needed runway length. This runway extension length is reduced from the Master Plan's recommended length by 400 feet through the elimination of the 33-end extension. The revised runway length reduction is based on community commentary and additional feasibility analyses.

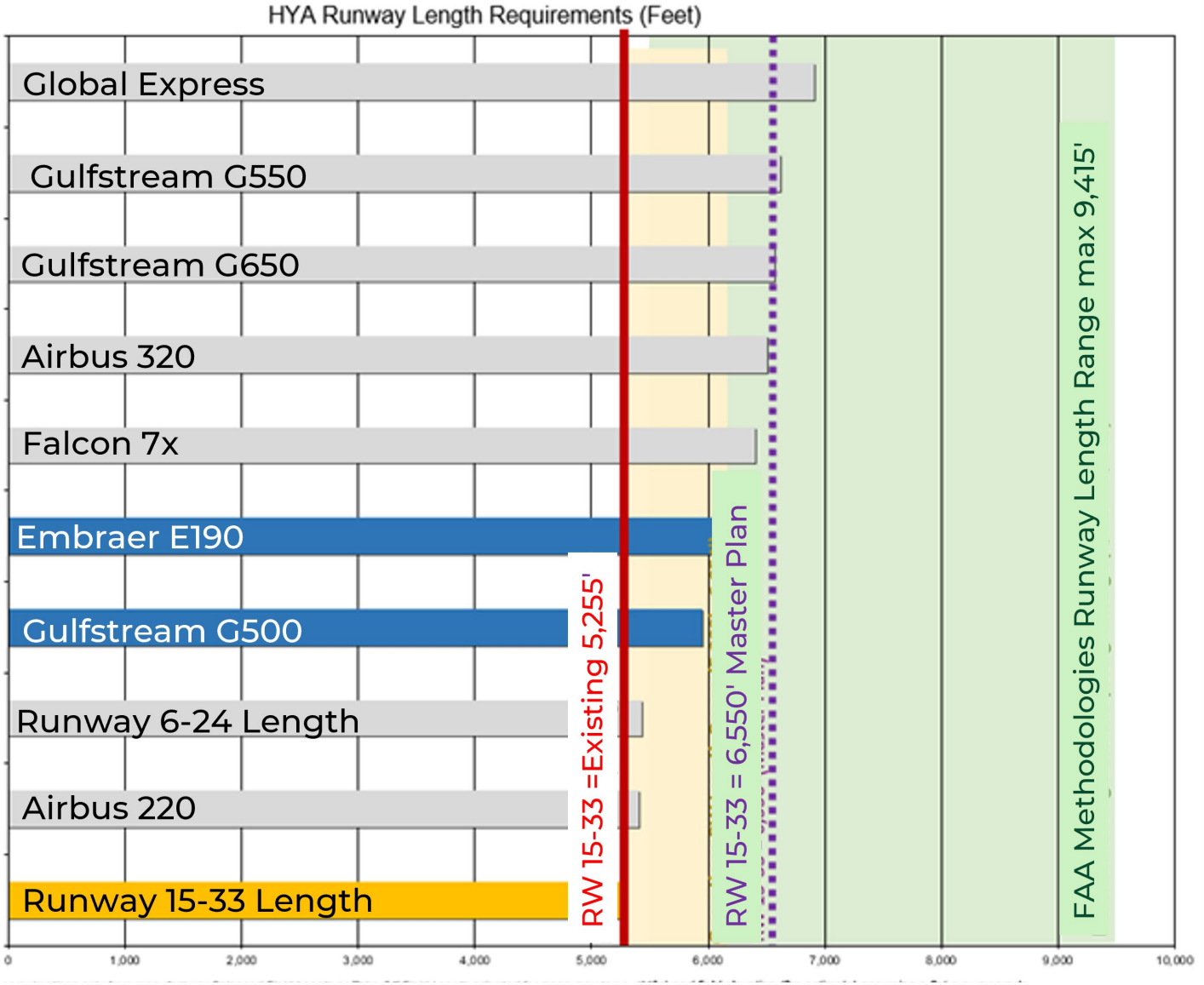
2.2.1.5 Extend Taxiway A (including new Taxiway A1 and Taxiway A4)

Existing Taxiway A measures 50 feet wide and serves as a full-length parallel taxiway to Runway 15-33 adjacent to the Terminal Ramp. The Proposed Action proposes to extend Taxiway A and construct new connectors (Taxiway A1 and Taxiway A4) to align with the new Runway 15 end as described in Section 2.2.1.4. Full parallel taxiways are recommended as a standard airport design element. To optimize operational safety and efficiency, taxiways must extend to the runway ends. This eliminates the need for "back-taxiing" operations and enables runway crossings to occur at runway ends, the safest location to cross a runway. This Project maintains this functionality as part of the proposed runway extension project. See **Figure 2.2-6**.

2.2.1.6 Aeronautical Development Areas

Based on the Airport Master Plan forecasted demand, between 40,000 sf and 67,000 sf of additional apron space will be required by 2040. There is an existing shortage of conventional hangar space per the Airport Master Plan and a waiting list for existing Airport hangars. During the preparation of this Draft EA/EIR, the list has 25 aircraft owners actively waiting for a hangar. The Master Plan recommends planning for a mix of both new individual hangars and conventional hangars to account for growing demand and new businesses' needs. See **Figures 2.2-7** and **2.2-8**.

The Proposed Action allocates a combined 42 acres of Airport land divided into two areas (East and North Ramps) for additional aeronautical development. The relocation of Taxiway B described above would open up additional space to the areas that are currently in use for aeronautical activities at the East Ramp. These ramp development areas include future space for transient aircraft parking as well as additional hangars or other aeronautical businesses and will be developed as opportunities for growth arise. Future hangar development will accommodate longer wingspans to reflect the needs associated with newer aircraft types. For example, the typical existing T-hangar door width is 42 feet, while newer ADG I aircraft often have wingspans of 44 to 48 feet.



Source: Airport Solutions Group 2023.

** HYA Critical Design Aircraft are shown in yellow*

Figure 2.2-6

Runway Length Analysis Summary



Figure 2.2-7

Conceptual Layout of East Ramp Development

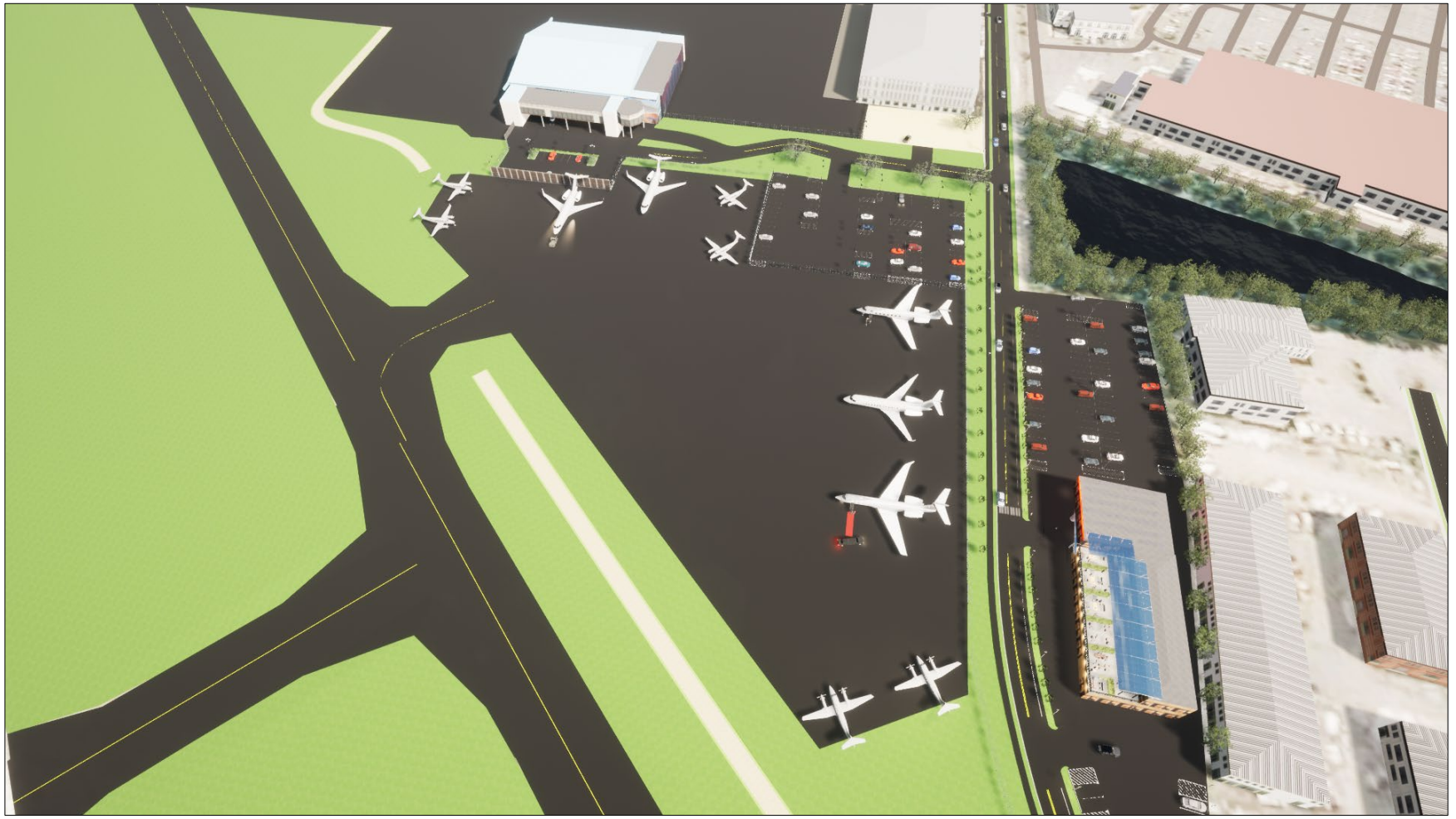


Figure 2.2-8

Conceptual Layout of North Ramp Aircraft Tie-Down and Parking

Table 2.2-5 Summary of Need and Purpose of Proposed Projects

Measure	Deficiency	Need and Purpose
Construction of Partial Parallel Taxiway D	♦ Non-Standard FAA airfield geometry ♦ Non-right-angle taxiway ♦ Provides direct access from the ramp to the runway	♦ Increases airfield safety and efficiency. ♦ Eliminates direct ramp to runway access. ♦ Eliminates high-energy crossing. ♦ Prevents two-way taxing.
Removal of Taxiway E and Runup Area and Construction of Engine runup Area	♦ Non-Standard FAA airfield geometry ♦ Non-standard taxiway to runway separation ♦ Non-right-angle taxiway	♦ Increases airfield safety and efficiency.
Reconstruction and Relocation of Taxiway B	♦ Does not meet taxiway width for TDG 3. ♦ Relocation to allow for future hangar development within East Apron ♦ Does not meet runway ends	♦ Increases safety of aircraft operating at the airport. ♦ Maximizes aeronautical development within existing developed / disturbed areas. Allows access via new roadway along Mary Dunn Way.
Runway 15-33 extension	♦ Current runway lengths do not meet operational and efficiency requirements of the critical design aircraft	♦ Increases safety of aircraft operating at the airport.
Construction of Runway 6-24 EMAS	♦ Runway 6-24 Runway Safety Area does not meet design standards due to existing land constraints.	♦ Increases safety of aircraft operating at the airport.

2.2.2 Landside Improvements

2.2.2.1 Construct Electric Aircraft Support Equipment

Aircraft manufacturers have begun investing in the development of all-electric aircraft. The development has focused predominantly on nine-seat and smaller aircraft. The key planning considerations associated with the development of electric aircraft include the provision of the necessary airport facilities for charging, maintenance, and storage.

To respond to industry developments, the Proposed Action includes ramp space for up to six electric aircraft parking for itinerant ADG II aircraft. The Airport has identified space on either side of the terminal ramp (see **Figure 1.1-1**) to plan for electric aircraft infrastructure for both GA and commercial aircraft. As electric aircraft technology continues to advance, the Airport is planning for access to charging and parking options for electrical aircraft.

MassDOT Aeronautics recently received a US$1.95 million grant award to be used in the planning of a smart microgrid at Cape Cod Gateway Airport. The microgrid will generate and distribute clean, reliable power, not only to the Airport, but for charging electric aircraft, and electric ground vehicles

(including buses). In collaboration with the Cape Cod Regional Transit Authority (CCRTA), the initiative will increase access to clean energy independence while supporting communities near the Airport.

2.2.3 Airspace Control Improvements

2.2.3.1 Runway 15-33 RSA and Runway Object Free Area Avigation Easements

The FAA defines Runway Object Free Areas (ROFAs) as an area cleared of all objects except those that are related to navigational aids and aircraft ground maneuvering. ROFA is also centered around runways to enhance the safety of aircraft operations. The Proposed Action will acquire avigation easements from willing parties designed to enhance the Airport's control of the existing ROFAs. FAA design standards for ROFAs surrounding runways serving AAC-ADG C-III aircraft are a width of 800 feet, a length that extends 600 feet prior to the landing threshold, and a length that extends 1,000 feet beyond the runway end. ROFAs and objects within it should be at or below the nearest Runway Safety Area elevation. A total of four easements for 0.8 acres have been identified for future easement acquisition (on a seller willing basis) for existing airfield conditions.

2.2.3.2 Enhance Airport control over Runway Protection Zones

Runway Protection Zones (RPZs) are large trapezoidal areas on the ground off each runway end that are within aircraft approach and departure paths (see FAA AC 150/5300-13 Change 11, Appendix 14 for approach and departure RPZs). The RPZ is intended to enhance the protection of people and property on the ground. Many land uses including residential, churches, and fuel storage are prohibited by FAA standards within these areas. These limitations are only applicable if the RPZ is owned or controlled by the Airport sponsor.

Under existing conditions at the Airport, areas within RPZs that are not under Airport control via avigation easements or fee simple include all portions of the Runway 6 RPZs west of Iyannough Road (71 parcels), the north and southwest corners of the Runway 15 RPZ (15 parcels), the southern corner of the Runway 24 RPZ (12 parcels), and the eastern portion of the Runway 33 RPZ (36 parcels), for a total of 44 acres/134 parcels. Airport control of these areas could be obtained through direct property acquisition or easements or zoning to control development and land use activities.

Avigation easement acquisition off the 15-end, to prevent future obstructions, is required for the runway extension. A total of four additional full or partial easements will be pursued on a willing seller basis (see **Figure 2.2-3**). These easements are primarily commercial properties located on Independence Drive, Thornton Drive and Kidd's Hill Road. Layout plans depicting these parcels identified for easement acquisition for existing or proposed RPZs are included in **Appendix D**.

The Proposed Action will acquire avigation easements from willing parties designed to bring both existing RPZs and the proposed Runway 15 RPZ into Airport control.

Chapter 3.0

Proposed Action Description

3.0 PROPOSED ACTION DESCRIPTION

This chapter describes the 2022 Master Plan projects, both airside, airspace, and landside facility requirements, necessary to enhance safety and efficiency and meet requirements of existing aircraft families at Cape Cod Gateway Airport (the Airport) in accordance with Federal Aviation Administration (FAA) design criteria and safety standards over the next 20 years. Additionally, projects are identified that enhance economic activity and revenue for the Airport, as well as projects to achieve green energy goals.

3.1 Airside Facilities

Airside facilities are those airport layout components that are directly related to the arrival and departure of aircraft, primarily runways and taxiways and their associated safety areas. This section addresses the projects determined to be necessary to bring the airside portion of the airport into compliance with FAA design criteria and standard geometry.

3.1.1 Construct Partial Parallel Taxiway D to Runway 15-33

This Proposed Action involves construction of a new partial parallel taxiway east of Runway 15-33 with a standard 400-foot runway centerline to taxiway centerline separation. It will extend from the existing Taxiway A1 across existing Taxiway D and Runway 6-24 to the proposed relocated Taxiway B (see Section 3.1.3 below). This taxiway would be approximately 3,700 feet in length, 50 feet wide, and tie in with the existing/remaining taxiway. Ultimately, this new partial parallel taxiway will be named Taxiway D. This Project also includes the removal of the portion of existing Taxiway D between existing Taxiway A across Runway 15-33 and up to the proposed new partial parallel taxiway. Unpaved Airport perimeter vehicular access would be provided on the north side of the new taxiway. Construction of Taxiway D will result in a net increase of 3.78 acres of pavement. Stormwater management infrastructure will be designed to comply with regulatory requirements for managing runoff associated with this impervious surface.

Due to the required runway to taxiway separation distance, the taxiway pavements and associated taxiway object free and safety area construction will impact wetland resource areas associated with Upper Gate Pond, requiring approximately 6,000 cubic yards (cy) of fill material. Approximately 12,700 sf of Land Under Water (LUW) and approximately 4,600 sf of Bordering Vegetated Wetlands (BVW) will be permanently filled. Grading associated with the taxiway and runup area will result in an excess of 17,500 cy of material that can be re-used on other projects on Airport property. Additionally, approximately 1.54 acres of forested upland areas and approximately 3.37 acres of shrub-scrub upland areas will be impacted for the construction of this Project.

The proposed new partial parallel Taxiway D enhances safety by eliminating direct access from the North Ramp to Runway 15-33 that can lead to pilots missing hold lines and causing a runway incursion. The new taxiway also eliminates the y-shaped (non-right angle) runway crossing for Runway 15-33 and the high-energy crossing on Runway 15-33. A non-right angle taxiway approaching a runway can lead the taxiing aircraft to inadvertently enter the runway.

3.1.2 Remove Taxiway E and Existing Runup Area/Construct a Runup Area for Partial Parallel Taxiway D

The Proposed Action will remove existing Taxiway E and the aircraft runup area (pit), correcting non-right angle geometry at Runway 15-33 (taxiway Intersecting runway at non-right angle). The existing Taxiway E measures 50 feet wide and connects Runway 15-33 to an approximately ±42,000 sf engine run-up area, which currently does not have a sound barrier.

Construction of a new run-up area along the north side of the proposed partial parallel Taxiway D (discussed above) will accommodate the existing fleet of aircraft using the current run-up pad (including the Cessna 402 and Tecnam P2012). A noise wall would be constructed adjacent to the runup area to provide noise mitigation for surrounding areas.

3.1.3 Realign and Reconstruction Taxiway B

The Proposed Action would re-align Taxiway B to a standard 400-foot separation south of Runway 6-24 to separate the taxiway from the East Apron. The proposed Taxiway B would be widened to 50 feet to meet taxiway Design Group 3 standards to optimize existing and future aircraft movement. Taxiway B would be 4,000 feet long. The Proposed Action would also extend Taxiway B northward by 750 feet to the south of the existing glide slope while the TOFA would remain clear of the glide slope. Portions of the taxiway safety areas are not currently up to standard. All safety areas would be brought to the correct grades. Unpaved Airport perimeter vehicular access would be provided from the East Ramp / end of Mary Dunn Way along the south side of the new taxiway, meeting the existing access road near the end of the runway by the fenceline.

The total area of disturbance including pavement removal, turf removal and grading is approximately 19.2 acres. The net gain in impervious surface is 5.2 acres. There will be no impacts on wetland resource areas as part of this realignment. Due to the grading required associated with the safety areas and taxiway construction, this Project will require a net import of fill material of approximately 23,865 cy. Stormwater management infrastructure will be designed to comply with standards and provide an improvement over existing conditions.

3.1.4 Runway 15-33 and Taxiway A Extension

The Proposed Action would extend Runway 15-33 by 895 feet on the 15-end (western end) to a total length of 6,150 feet from 5,255 feet, based on the runway length analysis for the critical aircraft for the Airport identified in the Master Plan and updated analysis in Chapter 4.0 of this document. The extension would maintain the existing width of 150 feet. Grading of a new turf runway safety area would extend from the end of the runway by 1,000 feet. Taxiway A will be extended to the new end of the runway (see discussion below). Additionally, Runway 15 Precision Approach Path Indicators (PAPI) will be relocated for the new end of runway. These lights consist of four light boxes arranged perpendicular to the end of the runway and provide a red and white light projection pattern along the descent path to the touchdown point on the runway. There will be no impacts on wetland resource areas as part of this extension nor required tree removals.

The Proposed Action would also extend Taxiway A by 895 feet to meet the new runway end to allow aircraft to exit the runway efficiently. The current width of 50 feet would be maintained for this extension. A full-length parallel taxiway enhances safety by reducing "back-taxiing" and runway crossings. Currently, Taxiway A measures 50 feet wide and serves as a full-length parallel taxiway to Runway 15-33 adjacent to the Terminal Ramp. As part of the extension of Taxiway A, a new stub taxiway, Taxiway A4, would be constructed to connect Runway 15-33 to Taxiway A approximately 5,380 feet from the Runway 15 threshold.

Due to the grading required associated with the safety areas and runway construction, a portion of the existing runway will also be reconstructed. This includes elevating the grades of a portion of the existing runway to meet the new runway extension. Because of this change in grade, this Project will require a net import of fill material of 23,865 cy. Impacts to existing turf area will comprise 42.63 acres, inclusive of the new runway safety areas extending from the end of the runway and the edges of pavement along with taxiway safety areas. These areas will be restored to turf. There will be a net increase in pavement of approximately 3.25 acres. Approximately 5.7 acres of existing runway and taxiway pavement will be reconstructed. Stormwater management infrastructure will be designed to comply with Massachusetts Stormwater Management Standards and will seek to both provide an improvement over existing conditions and increased rainfall events.

3.1.5 Aeronautical Development Areas

The Proposed Action includes two areas for additional aeronautical development on the Airport for a combined 42 acres - East Ramp and North Ramp - as opportunities for growth arise. These ramp development areas would include space for transient aircraft parking as well as additional hangars or other aeronautical businesses. Future hangar development could consider longer wingspans, which are a feature of modern single- and multiengine- aircraft. The typical T-hangar door width is 42 feet and modern ADG I aircraft have wingspans of 44 to 48 feet. The North Ramp area is already paved.

Based on forecasted demand, between 40,000 sf and 67,000 sf of additional apron space will be required by 2040. There is also an existing shortage of conventional hangar space per the Master Plan and current waiting list for hangars maintained by the Airport. The additional space proposed at the East Ramp would require the clearing of 6.11 acres of trees and the addition of 9.1 acres of impervious surface, inclusive of potential hangar buildings. There are no wetland resource area impacts associated with this Project. Any development projects at the East Ramp would be required to avoid disturbance of the cap of the PFAS disposal area (see Section 6.13.6 for additional discussion). Stormwater management infrastructure will be designed to comply with Massachusetts Stormwater Management Standards and will seek to provide an improvement over both existing conditions and increased rainfall events. Hangars at the East Ramp would have all water and sewer service provided by existing mains installed in 2022 along Mary Dunn Way. Connections to these mains would be required by the individual hangar developers. Conceptual layouts of these ramp development areas are shown in **Figure 2.2-7**.

3.2 Landside Improvements

Landside improvements are those projects which support the operations of the Airport.

3.2.1 Construct Seasonal SRE and Maintenance Facility

The Proposed Action will construct a new 20,000 sf building for storage of the existing maintenance vehicles and snow removal equipment (SRE). This Project will supplement the existing storage facility and meet the needs of the Airport for SRE storage. The Airport operations staff performs daily maintenance and inspection of airfield facilities, including snow removal in the winter months. Airfield maintenance and SRE are housed in a shared facility with Aircraft Rescue and Fire Fighting (ARFF). Space for all vehicles and maintenance equipment is not currently available in the existing building. It has been determined that a 20,000 sf building will meet storage needs. Currently, there is not enough space in the SRE/maintenance building to store all necessary equipment. A seasonal vehicle storage structure would be constructed on the northeast side of the Airport, within the East Ramp. This facility would function as winter vehicle and equipment storage in the summer and as summer vehicle and equipment storage in the winter.

3.2.2 Construct Electric Aircraft Support Equipment

To respond to industry developments, the Proposed Action includes space for up to six electric aircraft parking for itinerant Airplane Design Group (ADG) II aircraft. The Airport has identified space on either side of the terminal (see **Figure 1.1-3**) to plan for electric aircraft infrastructure for both GA and commercial aircraft. This equipment will support the charging of electric aircraft.

3.2.3 Smart Microgrid

MassDOT Aeronautics recently received a US$2 million grant award to be used in the planning of a smart microgrid at the Airport. A microgrid is a local energy production and distribution network that can function independently when disconnected from the main electrical grid (via battery storage and onsite renewables). The microgrid is an important component to the Airport's plan to reduce future emissions based on new abilities to generate and store green energy.

The microgrid will generate and distribute clean, reliable power, not only to the Airport, but for charging electric aircraft, and electric ground vehicles (including buses). In collaboration with the Cape Cod Regional Transit Authority (CCRTA), the initiative will increase access to clean energy independence while supporting communities near the Airport with cleaner transportation options. The microgrid enhances the Airport's plans to implement electric aircraft charging infrastructure described above and pursue opportunities that are less reliant on external/conventional power sources.

Phase I involves the study and planning of a microgrid placed at the Airport. Phase II will consist of funding to construct the microgrid infrastructure.

3.3 Airspace Control Improvements

3.3.1 Runway 33 RSA and Runway Object Free Area (ROFA) Avigation Easements

The Proposed Action will acquire avigation easements from willing parties designed to bring existing Runway Object Free Areas (ROFAs) into Airport control. Currently, not all the ROFAs are within airport control for existing conditions. A total of four (4) easements for 0.8 acres have been identified as out of airport control, associated with Runway 33 end. These are identified as Parcels 33-1 through 33-4 on the Town parcel map (see **Figure 3.3-1**). Roadways such as Iyannough Road and Yarmouth Road are not proposed for acquisition. Existing airport penetrations into ROFA are managed through modification to standards approved by the FAA every five years.

Table 3.3-1 ROFA Penetrations

Location	Penetration
Runway 33 End	Iyannough Road, Mary Dunn Way, four off-Airport buildings, Airport perimeter fence, ARFF/Maintenance/SRE Ramp;
Runway 24 End	Yarmouth Road, railroad tracks, Airport perimeter fence
Runway 15	Glideslope runway visual range (RVR), wind cone
Runway 15-33 along the side of the runway	Distance measuring equipment (DME), precision approach path indicator (PAPI) power and control units
Runway 6-24 along the side of the runway	Localizer, DME, PAPI power and control units, glideslope, ASOS

3.3.2 Enhance Airport control over off-Airport Property within Runway Protection Zones

The Proposed Action will acquire avigation easements from willing parties designed to bring existing Runway Protection Zones (RPZs) into Airport control. Under existing conditions at the Airport, areas within RPZs that are not under Airport control via either avigation easements or fee simple include all portions of the Runway 6 RPZs west of Iyannough Road (70 parcels), the north and southwest corners of the Runway 15 RPZ (15 parcels), the southern corner of the Runway 24 RPZ (12 parcels), and the eastern portion of the Runway 33 RPZ (36 parcels), for a total of 44 acres/133 parcels. Airport control of these areas could be obtained through direct property acquisition or easements or zoning to control development and land use activities.

Existing avigation easements are identified on Sheet 23 of the Airport Layout Plan in **Appendix D**. Avigation easement acquisition off the 15-end, to prevent future obstructions, is required for the runway extension within the Town of Barnstable. A total of 12 additional partial easements will be pursued on a willing seller basis (see **Figure 3.3-2** and **Table 3.3-2**). These easements are primarily commercial properties located on Independence Drive, Thornton Drive, and Kidd's Hill Road. Layout plans depicting these parcels identified for easement acquisition for existing or proposed RPZs are included in **Appendix D**.

Property ID	Lot Size (Ac)	Lot Size (sqft)*	Owner	Location	RPZ	Easement Type	Additional Easement Area (RPZ)	Additional Easement Area (ROFA)	Existing Easement Area
327_156_001	9.53	414257	MASSACHUSETTS, COMMONWEALTH OF	215 IYANNOUGH ROAD/RTE 28, HYANNIS	EXISTING	PARTIAL	23315.7		0
328_109	0.11	4792	R&C LLC	250 IYANNOUGH ROAD/RTE 28/PRINTABLE	EXISTING	PARTIAL	151.3	2543.6	0
328_110	0.22	9683	CVS, LLC& (A/T/U/), A LLC	266 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	FULL	4303.9	2808.5	0
328_111	0.22	10010	GEARDS, SCOTT P, TR	240 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	FULL	12303.3	COVERED BY RPZ	0
328_113	0.37	16117	MBE ET AL LLC, ARE	220 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	FULL	17870.2	COVERED BY RPZ	0
328_126	0.21	9458	HOP LLC	30 BROOKS ROAD, HYANNIS	EXISTING	PARTIAL	11874.2		0
328_127	1.04	45313	BARNSTABLE, TOWN OF	37 BROOKS ROAD, HYANNIS	TYPE 6 APPROACH	NONE	-		0
328_131	0.86	37362	IYUNITS IYANNOUGH REALTY LLC	189 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	47869.0		0
328_132_001	0	0	BAKER, ROBERT S & DONNA & WHITE, DEBRA T	155 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	20786.4		0
328_132	0.48	20909	MASSACHUSETTS, COMMONWEALTH OF	201 WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	21056.9		0
328_134	0.35	15484	MASSACHUSETTS, COMMONWEALTH OF	211 WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	15817.7		0
328_136	0.21	13939	ROBICHAUD, JOHN K & JAMES FRANCIS	279 WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	7018.7		0
328_142_001	20.8	906888	BARNSTABLE, TOWN OF	47 OLD WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	50881.9		0
328_142_002	1.86	78711	BARNSTABLE, TOWN OF	0 WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	63767.1		0
328_143	0.17	7401	KOMPELA, TERRI TANA ESTER ESTATE OF	118 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	FULL	7001.5		0
328_144	0.21	9248	LOPES-MORRIS, CAROL	116 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	FULL	7343.6		0
328_145	0.18	7833	KOMPELA, TERRI TANA ESTER ESTATE OF	114 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	2254.0		0
328_147	0.8	34846	MASSACHUSETTS, COMMONWEALTH OF	126 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	29553.5		0
328_149	0.29	12653	SHACKERSON, J KRUGE TR	100 WINDMOUTH ROAD, HYANNIS	EXISTING	FULL	11206.8		0
328_169	0.35	15346	MACDONALD, DOUGLAS E TR	261 WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	18534.7		0
328_151	0.81	35253	WEST RETAIL STORES LLC	156 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	FULL	39341.0		0
328_156_002	0.13	5627	TRACY, CONSTANCE	219 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	2465.6		0
328_157	0.24	10318	150 NEW PV LLC	150 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	20890.7		0
328_158	0.21	9248	MAHONEY, RICHARD G & MAHONEY	139 CAMP STREET, HYANNIS	EXISTING	FULL	12319.9		0
328_159	0.17	7405	ALLEGIALTY CORPORATION	116 CAMP STREET, HYANNIS	EXISTING	PARTIAL	6482.0		0
328_160	0.99	43186	IACOBELLI, JOSEPH T III & EVANS, SUSAN	114 CAMP STREET, HYANNIS	EXISTING	PARTIAL	62.4		0
328_161	10.17	443007	MASSACHUSETTS, COMMONWEALTH OF	0 WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	42044.1		0
328_166	0.09	3897	189 WINDMOUTH ROAD LLC	189 WINDMOUTH ROAD, HYANNIS 0 HYANNOUGH ROAD/RTE 28	EXISTING	PARTIAL	4661.4		0
328_168	0.08	3631	MASSACHUSETTS, COMMONWEALTH OF	BARNSTABLE	EXISTING	PARTIAL	1461.3		0
328_170	0.14	6210	GM INC	160 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	2424.7		0
328_201	0.73	31799	ABERNAKI, HOWARD LF	185 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	17521.8		0
328_204	0.17	7355	HYANNIS SEVEN ONE LLC	225 IYANNOUGH ROAD/RTE 28, H YANNIS	EXISTING	PARTIAL	253.9		0
328_205	0.15	6670	MASSACHUSETTS, COMMONWEALTH OF	187 WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	6678.9		0
328_231	0.0	31780	KIMEL, HOWARD ETR	148 CEDAR STREET, HYANNIS	EXISTING	PARTIAL	2750.5		0
328_237	0.72	31363	SHORE, CARVIN & CORD M TRS	207 IYANNOUGH ROAD/RTE 28, HYANNIS	EXISTING	PARTIAL	7986.0		0
328_238	5.02	44431	CARLIN CORNER, LLC	165 WINDMOUTH ROAD, HYANNIS	EXISTING	PARTIAL	21914.7		0

EXISTING
RW33 No Extension
RUNWAY PROTECTION ZONE (RPZ)

LEGEND

= 0 EXISTING EASEMENTS

= 36 EASEMENTS REQUIRED FOR EXISTING CONDITIONS

THE AIRSPACE DEPICTED HEREIN IS BASED ON THE FOLLOWING:

1. POINT DATA OF EXISTING CONDITIONS WAS OBTAINED FROM THE 2021 AIRPORT MASTER PLAN; AREAS NOT SHOWN IN RED OR GREEN REFLECT NO AVAILABLE DATA.
2. THE PROPOSED PAVEMENT LAYOUT, LANDING THRESHOLDS, AND AIRSPACE SURFACES FOR THE PREFERRED ALTERNATIVE WAS OBTAINED FROM THE 2021 AIRPORT MASTER PLAN.
3. THE PROPOSED PAVEMENT LAYOUT, LANDING THRESHOLDS, AND AIRSPACE SURFACES FOR EIR ALTERNATIVES #1 AND #2 REFLECT DRAFT PROPOSALS UNDER THE 2022 EIR PROJECT.

RUNWAY OBJECT FREE AREA (ROFA)

EXISTING RW END (NO RW EXTENSION)

Type 6 Approach Penetration (1371sqft)

DEPARTURE RUNWAY PROTECTION ZONE (RPZ)

PROPOSED ROFA EASEMENTS

APPROACH RUNWAY PROTECTION ZONE (RPZ)

PROPERTY LINE

ROFA

ASG
AVIATION SOLUTIONS GROUP, LLC
AIRPORT CONSULTANTS
P.O. BOX 81, SANDY HILL, MASSACHUSETTS
PHONE (781) 491-5083 FAX (781) 491-0560
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NO.	DATE	DESCRIPTION	BY

PROJECT: KHYA AMPU EA

OWNER: CAPE COD GATEWAY AIRPORT, TOWN OF BARNSTABLE, MA, 480 BARNSTABLE RD, HYANNIS, MA 02601

PROJECT NO.	119-005
DESIGNED BY	JJV
DRAWN BY	JJV
CHECKED BY	RJM
DATE	OCTOBER 2023
DRAWING SCALE	1" = 100'

SHEET TITLE: EXISTING RW 33 RPZ PROPOSED EASEMENTS

GRAPHIC SCALE: 0 50 100 200

DRAWING NO. 3

3 OF 3

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Figure 3.3-1: Runway 33 ROFA Easements and Proposed RPZ Easements for Existing Conditions

Property ID	Lot Size (Ac)	Lot Size (sq ft)*	Owner	Location	RPZ	Easement Type	Additional Easement Area (Existing Runway)	Additional Easement Area (Extended Runway)	Existing Easement Area
294_079	2.46	107,238.03	FORTE FITNESS CENTER LLC	665 ATTUCKS LANE, HYANNIS	PROPOSED	PARTIAL			57,597.0
295_004_001	4.38	190,793.56	CAPE COD HOSPITAL	0 WILKENS LANE, BARNSTABLE	PROPOSED	PARTIAL	33,488.1	4,672.2	-
295_006_00A	0	-	THE LOTTY CLOTH LLC	57 THORNTON DRIVE, BARNSTABLE	PROPOSED	FULL		752.6	22,992.7
295_007_00F	0	-	JM BURKE PROPERTIES LLC	30 PERSEVERANCE WAY, BARNSTABLE	PROPOSED	FULL		95,409.8	-
295_008	2.07	90,169.56	SWITCH GEARS LP	60 PERSEVERANCE WAY, BARNSTABLE	PROPOSED	FULL		79,468.7	13,871.6
295_009	2.07	90,169.56	SWITCH GEARS LP	225 PERSEVERANCE WAY, BARNSTABLE	PROPOSED	PARTIAL		12,585.8	22,183.2
295_011	13.46	586,319.95	SWITCH GEARS LP	75 PERSEVERANCE WAY, BARNSTABLE	PROPOSED	PARTIAL	31,610.9	51,389.1	-
295_013_B01	0.49	21,344.49	INDEPENDENCE PARK INC	765 ATTUCKS LANE BARNSTABLE 02601	PROPOSED	PARTIAL			6,724.9
295_013_H01	2.32	101060	INDEPENDENCE PARK INC	765 ATTUCKS LANE, HYANNIS	PROPOSED	PARTIAL			18.7
295_018_01D	0	-	NADER, ALEXANDRE	700 ATTUCKS LANE #3D, BARNSTABLE	PROPOSED	PARTIAL			11,801.6
295_018_B01	2.07	90,169.56	RENAISSANCE 2000 LLC	750 ATTUCKS LANE, BARNSTABLE	PROPOSED	PARTIAL			65,678.6
295_020_B01	0.5	21,780.09	ZION CHURCH	805 ATTUCKS LANE BARNSTABLE 02601	PROPOSED	PARTIAL			21,274.3
295_020_H01	2.13	92,783.17	ZION CHURCH	805 ATTUCKS LANE, HYANNIS	PROPOSED	PARTIAL			37,873.3
295_030	2.18	94,961.18	BARNSTABLE, TOWN OF	0 INDEPENDENCE DRIVE, BARNSTABLE	PROPOSED	FULL		90,811.8	-
296_005_001	2.57	111,949.65	DAVLIN REALTY LLC	11 THORNTON DRIVE, BARNSTABLE	PROPOSED	PARTIAL	48,660.3	14,248.2	2,688.4
296_005_002	4.73	206,039.62	VICTORY CHAPEL CHRIST FELLOW CHURCH CC	20 MERCHANTS WAY, BARNSTABLE	PROPOSED	PARTIAL	534.8		-
296_007	0.49	21,344.49	THORNTON DRIVE LP	31 THORNTON DRIVE, BARNSTABLE	PROPOSED	FULL	21,316.9	308.9	-
296_008_00A	0	-	AMARAL, WILLIAM A & RITA A	30 THORNTON DRIVE, BARNSTABLE	PROPOSED	FULL	4,938.8		3,772.8
296_009	0.48	20,908.88	GLOWACKI, WALTER J & WALTER J GLOWACKI	53 THORNTON DRIVE, BARNSTABLE	PROPOSED	PARTIAL	8,865.8	12,558.9	-
296_010	0.49	21,344.49	52 THORNTON DRIVE LLC	52 THORNTON DRIVE, BARNSTABLE	PROPOSED	FULL	21,494.5	294.4	-
296_012_004	0	-	HULTEN, MARC R	72 THORNTON DRIVE, BARNSTABLE	PROPOSED	PARTIAL	7,942.0		-
296_025	9.73	423,840.50	ONE CENTER PLACE LP	600 KIDD'S HILL ROAD, BARNSTABLE	PROPOSED	FULL	66,565.6	88,550.9	275,736.9
296_031	6.31	274,864.70	COASTAL SUN LP	270 COMMUNICATION WAY, BARNSTABLE	PROPOSED	PARTIAL	61,760.7	65,732.4	-
313_005_B00	53.88	2,347,022.39	BARNSTABLE FIRE DISTRICT	223 BREED'S HILL ROAD, BARNSTABLE	PROPOSED	PARTIAL		79,051.9	-
314_023	5.63	245,243.78	S L SNACK MA LLC	100 BREED'S HILL ROAD, BARNSTABLE	PROPOSED	PARTIAL		2,088.3	51,541.6
314_041_005	0	-	HYANNIS OFFICE PARK CENTER LP	270 COMMUNICATION WAY, BARNSTABLE	PROPOSED	PARTIAL	742.9		-

Runway 15 895 foot Extension

LEGEND

= 14 EXISTING EASEMENTS

= 15 EASEMENTS REQUIRED FOR EXISTING CONDITIONS

= 12 EASEMENTS REQUIRED FOR EXTENSION

THE AIRSPACE DEPICTED HEREIN IS BASED ON THE FOLLOWING:

1. POINT DATA OF EXISTING CONDITIONS WAS OBTAINED FROM THE 2021 AIRPORT MASTER PLAN; AREAS NOT SHOWN IN RED OR GREEN REFLECT NO AVAILABLE DATA.
2. THE PROPOSED PAVEMENT LAYOUT, LANDING THRESHOLDS, AND AIRSPACE SURFACES FOR THE PREFERRED ALTERNATIVE WAS OBTAINED FROM THE 2021 AIRPORT MASTER PLAN.
3. THE PROPOSED PAVEMENT LAYOUT, LANDING THRESHOLDS, AND AIRSPACE SURFACES FOR EIR ALTERNATIVES #1 AND #2 REFLECT DRAFT PROPOSALS UNDER THE 2022 EIR PROJECT.

EASEMENT FOR FUTURE CONDITIONS

EASEMENT FOR EXISTING CONDITIONS

PROPERTY LINE

EXISTING RPZ

895FT RW EXTENSION

DEPARTURE RUNWAY PROTECTION ZONE (RPZ) (FUTURE)

EXISTING EASEMENT

APPROACH RUNWAY PROTECTION ZONE (RPZ) (FUTURE)

ASG
AVIATION SOLUTIONS GROUP, LLC
AIRPORT CONSULTANTS
AIRPORT CONSULTING, LLC ■ 300 BU Street
ARUNDEL-ON-THE-BAY, ANNAPOLIS, MARYLAND 21403 PHONE (781) 491-0083 FAX (781) 891-0360
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NO.	DATE	DESCRIPTION	BY

PROJECT: KHYA AMPU EA

OWNER: CAPE COD GATEWAY AIRPORT, TOWN OF BARNSTABLE, MA, 480 BARNSTABLE RD, HYANNIS, MA 02601

PROJECT NO.	119-005
DESIGNED BY	JJV
DRAWN BY	JJV
CHECKED BY	RJM
DATE	OCTOBER 2023
DRAWING SCALE	1" = 150'

SHEET TITLE: EIR ALTERNATIVE #1 RW 15 RPZ PROPOSED EASEMENTS

GRAPHIC SCALE: 0 75 150 300

DRAWING NO. 2

2 OF 3

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Figure 3.3-2: Runway 15 Proposed RPZ Easements Acquisition for Runway Extension

Table 3.3-2 Avigation Easements Needed for Proposed Conditions associated with Runway 15 Extension

Parcel ID	Address	Acres	Full or Partial Easement
314-041-00S	270 Communication Way	0.017	Partial
296-005-001	11 Thornton Drive	1.11	Partial
296-009	53 Thornton Drive	0.2	Partial
296-025	400 Kidd's Hill Road	1.57	Partial
295-004-001	0 Wilkins Lane	0.77	Partial
295-011	75 Perseverance Way	0.72	Partial
296-008-0A	30 Thornton Drive	0.11	Partial
296-010	52 Thornton Drive	0.49	Partial
296-031	270 Communication Way	1.42	Partial
296-007	31 Thornton Drive	0.49	Partial
296-005-002	20 Merchants Way	0.01	Partial
296-012-00H	72 Thornton Drive	0.18	Partial
Total		7.11 ac	

3.4 Project Schedule

The Master Plan Projects are anticipated to be constructed in phases over the 20-year planning period. **Table 3.4-1** identifies the proposed phasing approach for the projects described in this Draft EA/EIR

The phasing periods have been developed to coordinate with the aviation forecasts presented in Chapter 1.0. The forecasts project aviation demand through 2040 from a base year of 2019. The Airport's Capital Improvement Plan (CIP) details the potential funding mechanisms and costs for implementing the Projects and is generally provided for a five-year period with updates annually. The ALP, Project Phasing Plan, Federal Aviation Administration (FAA) Airport Capital Improvement Plan (ACIP) which is typically the first five years of the CIP are all subject to review and comment by the FAA. Based on the current CIP and the current approved ALP, the Project's presented herein are proposed to be phased as follows for permitting and construction:

Table 3.4-1 Proposed Project Schedule

Project	2024	2025	2026	2027	2028	2029
Airside						
Relocate and Extend Taxiway B	--	-	Design/ Construct		-	-
Reconstruct and Realign Taxiways D/E, new run up ramp	Permit	Permit	-	Design/ Construct		-
Extend Runway 15-33	-	-	-	-	-	Design
Extend Taxiway A (including new Taxiway A and A4)	--	-	-	-	-	Design

Table 3.4-1 Proposed Project Schedule (Continued)

Project	2024	2025	2026	2027	2028	2029
Airside						
Construct SRE / maintenance seasonal facility	-	-	-	-	Construct	-
Construct electric aircraft support equipment	Construct	Construct	-	-	-	-
East Ramp Development	On-going pending leasing					
North Ramp Development	On-going pending leasing					
Airspace Enhancements						
Proposed RPZ Easements Phase I	-	-	-	Design /Acquire	Design /Acquire	Design /Acquire
Proposed RPZ Easements Phase II	-	-	-	Design/ Acquire	Design/ Acquire	Design/ Acquire

3.5 Summary of Impacts of Proposed Action

Table 3.5-1 Land Impacts of Proposed Actions

Project	Temporary Disturbance to grassed areas	Existing Vegetated to Impervious	Removal of Existing Impervious	Net Increase in Impervious	Impacts to Wetland Resource Areas
Reconstruct and Realign Taxiways D and E / Remove Taxiway D/E and the existing runup pit, new run up ramp	12.75 ac	7.23 ac	3.45 ac	3.78 ac	12,700 sf LUW 4,600 sf BVW 300 lf Bank
Extend Runway 15-33	42.63 ac	3.25 ac	0	3.25 ac	0
Relocate and Extend Taxiway B	12.22 ac	7.58 ac	2.39 ac	5.2 ac	0
Extend Taxiway A (including new Taxiway A and A4)	included in RW extension #s	1.69 ac	0	1.69 ac	0
Construct SRE / maintenance seasonal facility	0	0	0	0	0
Construct electric aircraft support equipment	0	0	0	0	0

Table 3.5-1 Land Impacts of Proposed Actions (Continued)

Project	Temporary Disturbance to grassed areas	Existing Vegetated to Impervious	Removal of Existing Impervious	Net Increase in Impervious	Impacts to Wetland Resource Areas
East Ramp Development	Included in TWY B #'s	17.3 ac	0	17.3 ac	0
North Ramp Development	0	9.1 ac	0.81 ac	8.25 ac	0
Runway Extension RPZ Easements	0	0	0	0	0
RPZ Easements for existing conditions	0	0	0	0	0
Acquire the existing Runway 33 RSA and ROFA properties on a willing seller basis.	0	0	0	0	0
Enhance Airport control over RPZ properties for all runway ends in easement or fee on a willing seller basis.	0	0	0	0	0
Total	**67.6 ac**	**46.15 ac**	**6.65 ac**	**39.47 ac**	**12,700 sf LUW 4,600 sf BVW 300 lf Bank**

Chapter 4.0

Alternatives Analysis

4.0 ALTERNATIVES ANALYSIS

This chapter provides information on alternatives identified for evaluation in this EA/EIR consistent with the purpose and need for the proposed Projects. As required by the Council on Environmental Quality (CEQ) regulations (Title 40 Code of Federal Regulations [C.F.R.] section 1502.14), and MEPA Regulations. During the Master Plan development, the alternatives were initially screened based on the ability of the proposed Projects (and alternatives) to meet the following purpose and need screening criteria:

- Accommodate forecasted aviation demand and satisfy the corresponding facility requirements,
- Meet applicable FAA design and airfield geometry standards, and
- Provide methods to meet local constraints and address community concerns.

The Master Plan analyzed alternatives against Level 1 screening criteria (infrastructure constraints) and Level 2 screening criteria (FAA standards and facility requirements). In addition to the Master Plan screening criteria described above, this EA/EIR evaluates additional alternatives based on preliminary design concepts used to identify environmental impacts community impacts, and estimated cost.

The following alternatives analysis presents considered alternatives in comparative form based on the information and analysis presented in Chapter 5.0, Affected Environment and Chapter 6.0, Environmental Consequences. Consistent with this goal, the following analysis on alternatives considers what effect changing the parameters of a project, or components, will have on the environment. The following information is provided within this alternatives analysis:

- The Proposed Action,
- Reasonable alternatives to the Proposed Action, including alternatives that the agency eliminated from detailed study and reasons for their elimination,
- Information on the No- Action (i.e., No-Build) Alternative, and
- Preferred alternative or alternatives, if one or more exists.

FAA Order 5050.4B, paragraph 706 (d)(7), notes that when an alternative is considered but judged "not reasonable," the EA should concisely explain why the sponsor or FAA eliminated the alternative from further consideration. Environmental impacts, avoidance, minimization, and mitigation measures for the proposed Projects are briefly described in this chapter and expounded upon in Chapter 5.0 – Affected Environment and Chapter 6.0 – Environmental Consequences.

As part of the alternatives analysis, a "No-Build Alternative" is considered for each proposed Project. The No-Build Alternative leaves existing conditions unchanged. No improvements would be made. The No Build Alternative serves as the baseline to which the other alternatives are compared. A No-Build scenario assumes preventive or routine maintenance activities on existing infrastructure and considers other ongoing Airport-sponsored projects.

Project locations are shown in **Figure 1.1-3** and the alternatives are individually shown in **Figures 4.1-1 through 4.1-9**. Details on impacts to resources from impervious surfaces and grading within the Airport are listed in **Table 4.1-5**.

4.1 Airside Alternatives

Airside alternatives include projects directly related to the arrival and departure of aircraft, primarily runways and taxiways and associated safety areas. Airside alternatives are provided to identify potential solutions to non-standard FAA geometry or design conditions as identified in the Airport Master Plan.

As noted in the Master Plan, a variety of aircraft types, both large and small, using the Airport have different runway requirements. The Master Plan's Airfield Capacity analysis provides factors relative to runway length that are used to determine aircraft performance and the runway requirements that must be met for an aircraft to use a particular runway. Additional review of alternatives has been conducted as part of environmental review, and as appropriate, alternatives that reduce and minimize impacts, primarily community and environmental impacts, over the Master Plan recommendation are discussed below.

FAA Advisory Circular 150/5300-13B, Airport Design contains Airport design standards that provide guidelines for a safe, efficient, and economic airport system. The Master Plan undertook a review of the design standards to ensure safety and efficiency of current and future Airport users, and to identify the basic aircraft characteristics which the Airport design will need to meet. Airport design parameters that are based only on the existing aircraft can limit the Airport's ability to expand and meet future safety requirements for aircraft anticipated to use the airport in the future due to factors such as fleet changes over time. As discussed in Section 2.2.1.4, determination of the design critical aircraft is an important aspect of airport planning and design as it sets dimensional requirements on an airport, such as the separation distance between taxiways and runways, and the size of certain areas protecting the safety of aircraft operations and passengers. The critical aircraft determination, identified in the Master Plan, ensures proper development of airport facilities. It also matches aircraft operational area dimensions to the most demanding aircraft that regularly use the runways, taxiways, and apron areas.

The critical aircraft is defined as "the most demanding aircraft type or grouping of aircraft (family of aircraft) with similar characteristics, which make regular use of the airport." Regular use is 500 annual operations, including both itinerant and local operations but excluding touch-and-go operations. An operation is either a takeoff or landing. The existing and proposed design aircraft should be reviewed on an individual basis per **FAA AC 150/5325-4B *Runway Length Requirements for Airport Design***. The existing commercial and GA design aircraft are the Embraer 190 (E190) and Gulfstream V/ Gulfstream G500 (G500), respectively; The future commercial design aircraft for the Airport is the Airbus 220 (A220). However, the runway length analysis looked at the family of aircraft using the facility now and proposed to use the facility in the future.

The Master Plan utilized a screening process to analyze alternatives created to address aircraft operational requirements and FAA design and geometry standards (as identified in FAA Advisory Circular (AC) 150/5300-13B).

4.1.1 Runway 15-33 Extension

Runway 15-33 is currently 5,255 feet long and 150 feet wide and is the primary Instrument Flight Rules (IFR) runway at the Airport. The existing critical design aircraft for Runway 15-33 are the Airbus A220-300 and Gulfstream V/G500. Alternatives to meet the Master Plan's requirements relative to runway length are identified below. These alternatives are limited by the need for the Runway 15 Runway Safety Area (RSA) to remain on Airport property as well as to keep Runway 33 RSA in its existing location.

As discussed above, and in *Chapter 2.0, Purpose and Need*, additional runway length is needed at the Airport to meet the requirements of the critical aircraft to enhance safety and efficiency of operations. Airport design and safety guidelines to meet runway length recommendation are detailed in FAA **AC 150/5325-4B**, ***Runway Length Requirements for Airport Design***, and are discussed for each runway alternative. Because Runway 15-33 is the IFR runway at the Airport, it was selected for extension. However, an evaluation of the extension alternatives of Runway 6-24 was completed as part of the Master Plan (see **Appendix B**) and is also discussed summarized in Alternative 5 below. This alternative was eliminated from further evaluation during Master Plan alternatives screening.

Additionally, an evaluation of the use of Joint Base Cape Cod (JBCC) as a public-use airport was considered as Runway 15-33 Alternative 6 (see Section 4.1.1.8). Prior MEPA analysis provided a rational decision on this alternative, concluding that the use of JBCC as a public-use airport is not a feasible alternative for several reasons (see EEA 12267, ENF Certificate, September 2000). Most importantly, the use of JBCC would merely shift environmental impacts of this project to another community and that the property itself is owned by the Commonwealth of Massachusetts and leased by the Federal Government, and hosts five different military commands, compounding jurisdictional issues.

4.1.1.1 Runway 15-33 Alternative 1 – No-Build Alternative

The No-Build Alternative (see **Figure 1.1-1**) keeps the runway length of Runway 15-33 at its current length of 5,255 feet. The No-Build Alternative was dismissed because it does not meet the existing and future requirements and purpose and needs related to runway length for the identified families of aircraft.

4.1.1.2 Runway 15-33 Alternative 2 – 1,295-foot extension to Runway 15 end and 400-foot extension to Runway 33 end

This alternative proposes extending Runway 15-33 to meet the runway length recommendation presented in the Master Plan (see **Figure 4.1-1**). This alternative includes a 1,295-foot extension to the Runway 15 end and a 400-foot extension to the Runway 33 end for a total length of 7,281 feet.

The Runway 33 extension would include a displaced threshold with the Runway 33 landing threshold remaining in its current location. Taxiway A would be extended, and new connectors (Taxiway A1 and Taxiway A4) constructed to align with the new Runway 15 end at 90-degree angles. All areas within the taxiway object free areas (TOFAs) and the relocated perimeter road located off Airport property would be acquired when the land becomes available on a willing seller basis.

McFarland Johnson

DECLARED DISTANCES		
	RUNWAY 15	RUNWAY 33
TORA	6,950'	6,950'
TODA	6,950'	6,950'
ASDA	6,550'	6,550'
LDA	6,550'	6,000'

1. PROTECT FOR RSA ONLY.
2. EXISTING RSA DETERMINATION ON THE RUNWAY 33 END STILL APPLIES.
3. THIS ALTERNATIVE INCLUDES ADDITIONAL OBSTRUCTION REMOVAL ABOVE AND BEYOND WHAT IS SHOWN IN THE INSET.

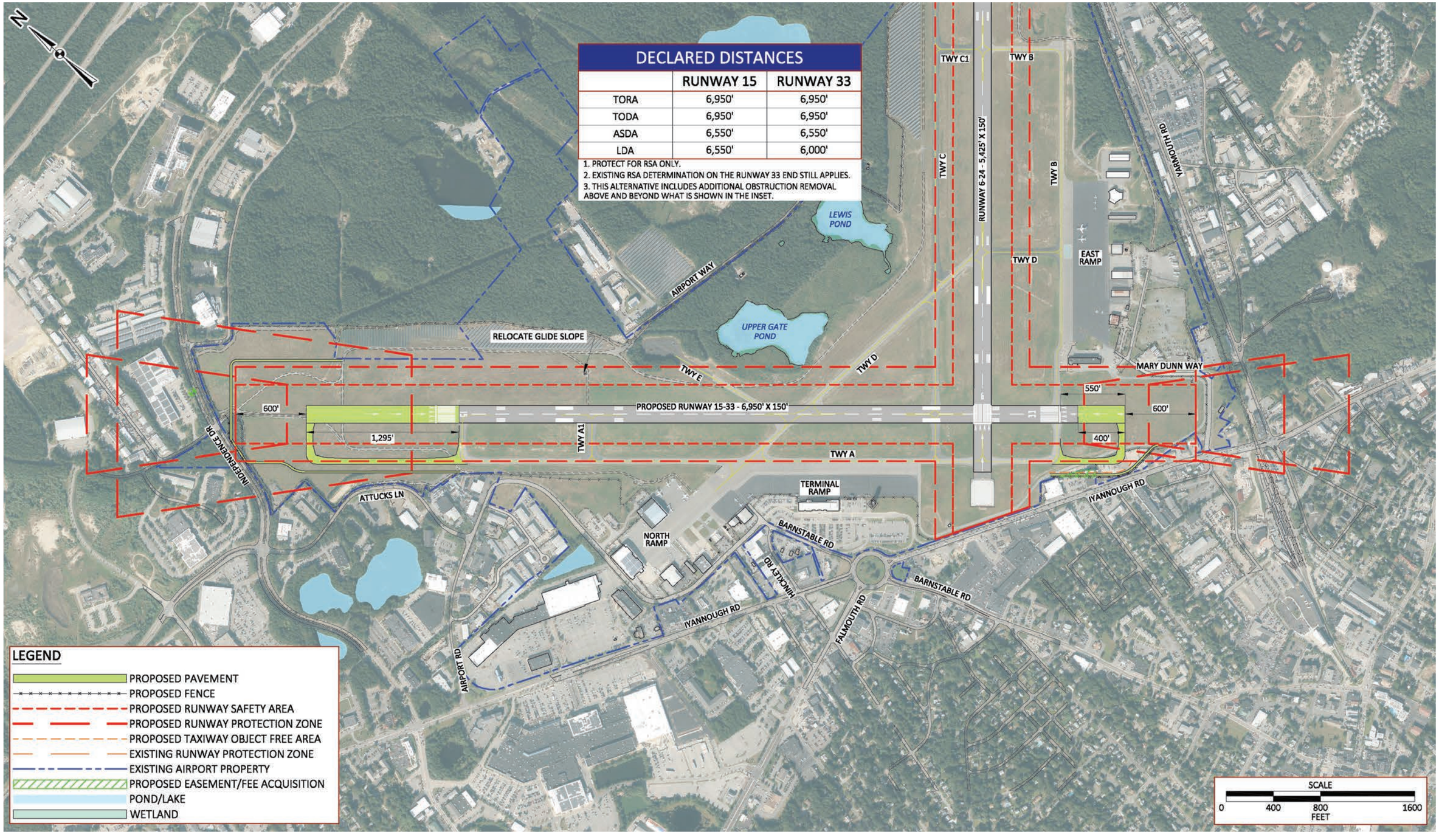


Figure 4.1-1

Runway 15-33 Alternative 2: 1,295-foot Extension to RW 15 End and 400-foot Extension to RW 33 End (Master Plan Preferred Alternative)

Alternative 2 meets the requirement for a runway length of 6,000 feet for both accelerated stop distance available (ASDA) and landing distance available (LDA) in both directions of Runway 15 and 33. Moving the Runway 15 landing threshold (i.e., removing the displacement to the threshold) would require additional obstruction removal and would result in incompatible land uses since the runway extension moves the RPZs further out and over Victory Chapel. A house of worship within an RPZ is an incompatible land use. Obstruction removal that would be required for this alternative would result in difficulties and high costs for construction challenging. The obstructions include above utilities poles that would require re-location along Independence Drive as well as other man-made structures and natural obstructions.

4.1.1.3 Runway 15-33 Alternative 3 – 1,258-foot extension to the Runway 15 end and a 400-foot extension to the Runway 33 end (with increased displaced thresholds)

Alternative 3 (see **Figure 4.1-2**) proposes a 1,258-foot extension to the Runway 15 end and a 400-foot extension to the Runway 33 end for a total length of 7,181 feet. This alternative includes a 1,058-foot displaced landing threshold on the Runway 15 end and a 550-foot displaced threshold on the Runway 33 end. In this alternative, Taxiway A would extend to the new runway ends and connect to the runway at a 90-degree angle at each end. All areas within the TOFAs and the relocated perimeter road located off Airport property would be acquired when the land becomes available on a willing seller basis.

Runway 15-33 Alternative 3 results in reduced obstruction impacts and provides greater land use compatibility compared to Runway 15-33 Alternative 2. This alternative does not meet the Runway 15 recommended LDA of 6,000 feet; however, it improves the Runway 15 LDA by 200 feet compared to existing conditions. It also requires the acquisition of additional off Airport property.

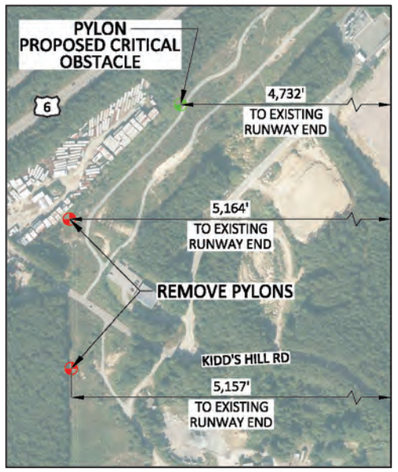
4.1.1.4 Runway 15-33 Alternative 4 – 895-foot extension to the Runway 15 end and a 400-foot extension to the Runway 33 end (6,550 feet)

Alternative 4 (see **Figure 4.1-3**) proposes an 895-foot extension to the Runway 15 end and a 400-foot extension to the Runway 33 end for a total length of 6,550 feet. This alternative includes a 695-foot displaced threshold on the Runway 15 end and a 550-foot displaced threshold on the Runway 33 end. Taxiway A would be extended to the new runway ends and connect to the Runway 15 and 33 ends at 90-degree angles. All areas within the TOFAs and relocated perimeter road located off Airport property would be acquired when the land becomes available on a willing seller basis. Compared to Alternatives 2 and 3, Alternative 4 results in fewer obstruction impacts to Runway 15-33. This alternative improves Runway 15 LDA by 200 feet compared to existing conditions to 5,855 feet.

Runway 15-33 Alternative 4 provides a runway length balanced in terms of enhancing safety and operations and minimizing impacts to the community. The additional runway length that is proposed in Runway 15-33 Alternative 3 only aids take-offs and does not help bring the Airport closer to meeting the facility requirements for LDA due to the presence of obstructions on the Runway 15 approach. Runway 15-33 Alternative 4 removes excess pavement and focuses on the key pavement necessary to meet the facility requirements, where possible.

McFarland Johnson

SCALE : 1" = 600'



DECLARED DISTANCES

	RUNWAY 15	RUNWAY 33
TORA	6,913'	6,913'
TODA	6,913'	6,913'
ASDA	6,513'	6,550'
LDA	5,455'	6,000'

1. PROTECT FOR RSA ONLY.
2. EXISTING RSA DETERMINATION ON THE RUNWAY 33 END STILL APPLIES.
3. THIS ALTERNATIVE INCLUDES ADDITIONAL OBSTRUCTION REMOVAL ABOVE AND BEYOND WHAT IS SHOWN IN THE INSET.

RELOCATE GLIDE SLOPE

POLE
PROPOSED CRITICAL
OBSTACLE

PROPOSED RUNWAY 15-33 - 6,913' X 150'

1,258'
637'
1,058'
550'
600'
400'

TWY A
TWY A1
TWY B
TWY C
TWY C1
TWY D
TWY E

RUNWAY 6-24 - 5,425' X 150'

LEWIS POND
UPPER GATE POND

AIRPORT WAY
MARY DUNN WAY
YARMOUTH RD
EAST RAMP
NORTH RAMP
TERMINAL RAMP
VICTORY CHAPEL
INDEPENDENCE DR
ATTUCKS LN
BARNSTABLE RD
HINCKLEY RD
IYANNOUGH RD
FALMOUTH RD
AIRPORT RD

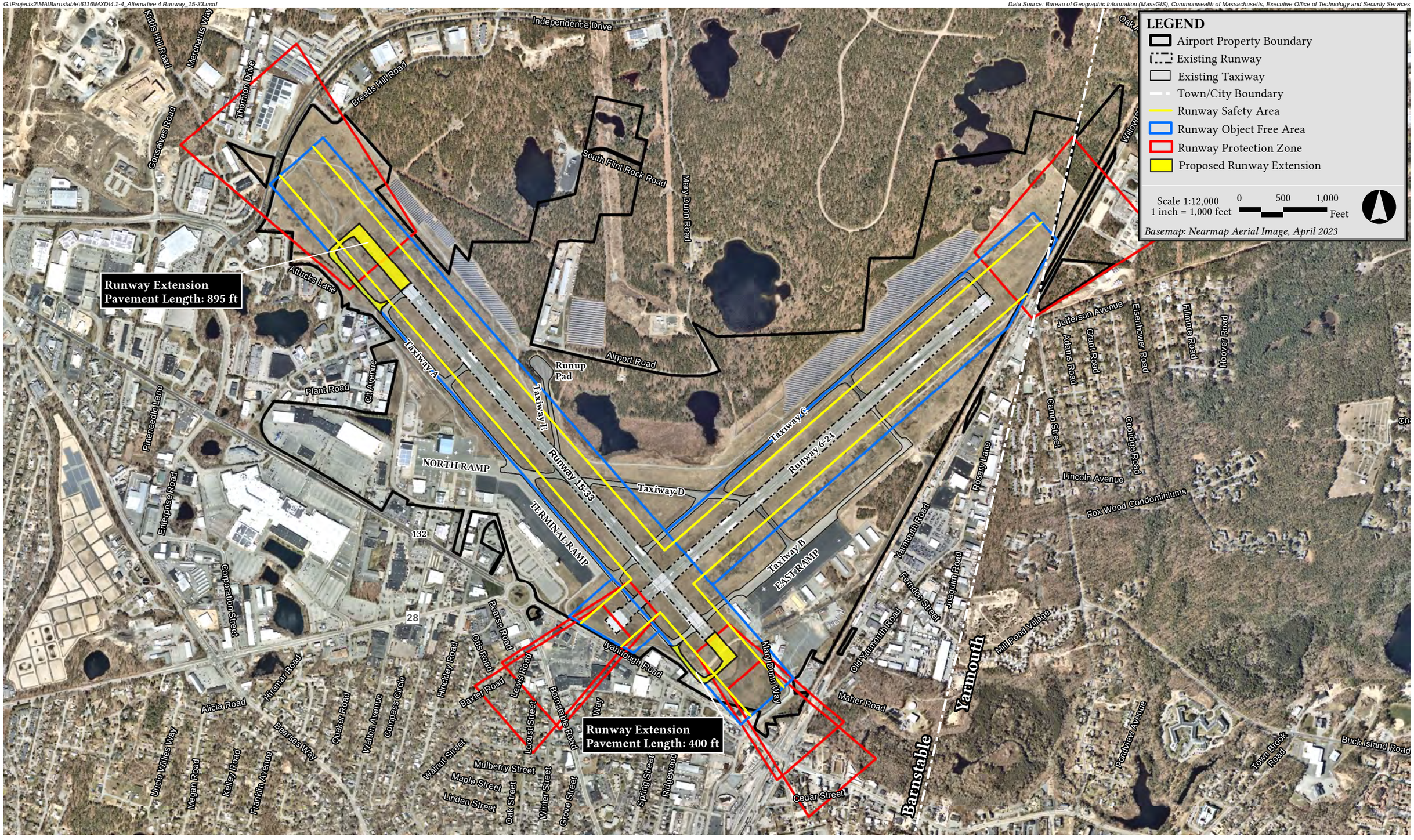
LEGEND
- PROPOSED PAVEMENT
- PROPOSED RUNWAY SAFETY AREA
- PROPOSED RUNWAY PROTECTION ZONE
- PROPOSED TAXIWAY OBJECT FREE AREA
- EXISTING RUNWAY PROTECTION ZONE
- EXISTING AIRPORT PROPERTY
- PROPOSED EASEMENT/FEE ACQUISITION
- POND/LAKE
- WETLAND

SCALE
0 400 800 1600
FEET

Figure 4.1-2
Alternative 3: 1,258-foot Extension to RW 15 end and 400-foot Extension to RW 33 end

G:\Projects2\MA\Barnstable\611\MXD\4.1-4_Alternative 4 Runway_15-33.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport Barnstable, Massachusetts

Figure 4.1-3

Runway 15-33 Alternative 4: 895-foot Extension to RW 15 End and 400-foot Extension to RW 33 End

4.1.1.5 Runway 15-33 Alternative 4A – 801-foot extension to the Runway 15 end only (total runway length of 6,054 feet)

Alternative 4A (see **Figure 4.1-4**) proposes an 801-foot extension only to the Runway 15 end for a total runway length of 6,055 feet. This alternative includes a 695-foot displaced threshold on the Runway 15 end. Taxiway A would be extended to the new runway end and connect to Runway 15 at a 90-degree angle.

This alternative meets the runway length needs of the critical aircraft for takeoff on both runways, while also providing a balanced approach to limiting and avoiding off Airport impacts to surrounding communities. This alternative results in the following:

- Additional reduced obstruction impacts over Runway 15-33 Alternatives 2, 3, 4, and 5.
- Less impervious surfaces compared to other alternatives.
- Minimizes costs and off Airport property needed to be acquired to extend Taxiway A to the ends of the extended Runway 33 end compared to other alternatives that include an extension to the Runway 33 end.
- As with other alternatives, Runway 15-33 Alternative 4A provides a runway length balanced in terms of enhancing safety and operations and minimizing impacts.
- The additional runway length that is proposed in Runway 15-33 Alternative 4A meets TORA recommendations for critical aircraft and does not meet the facility requirements for landing needs for Runway 15/33.
- Minimizes increases in new pavement and focuses on the key pavement necessary to meet the runway length needs of the critical aircraft identified in the facility requirements.

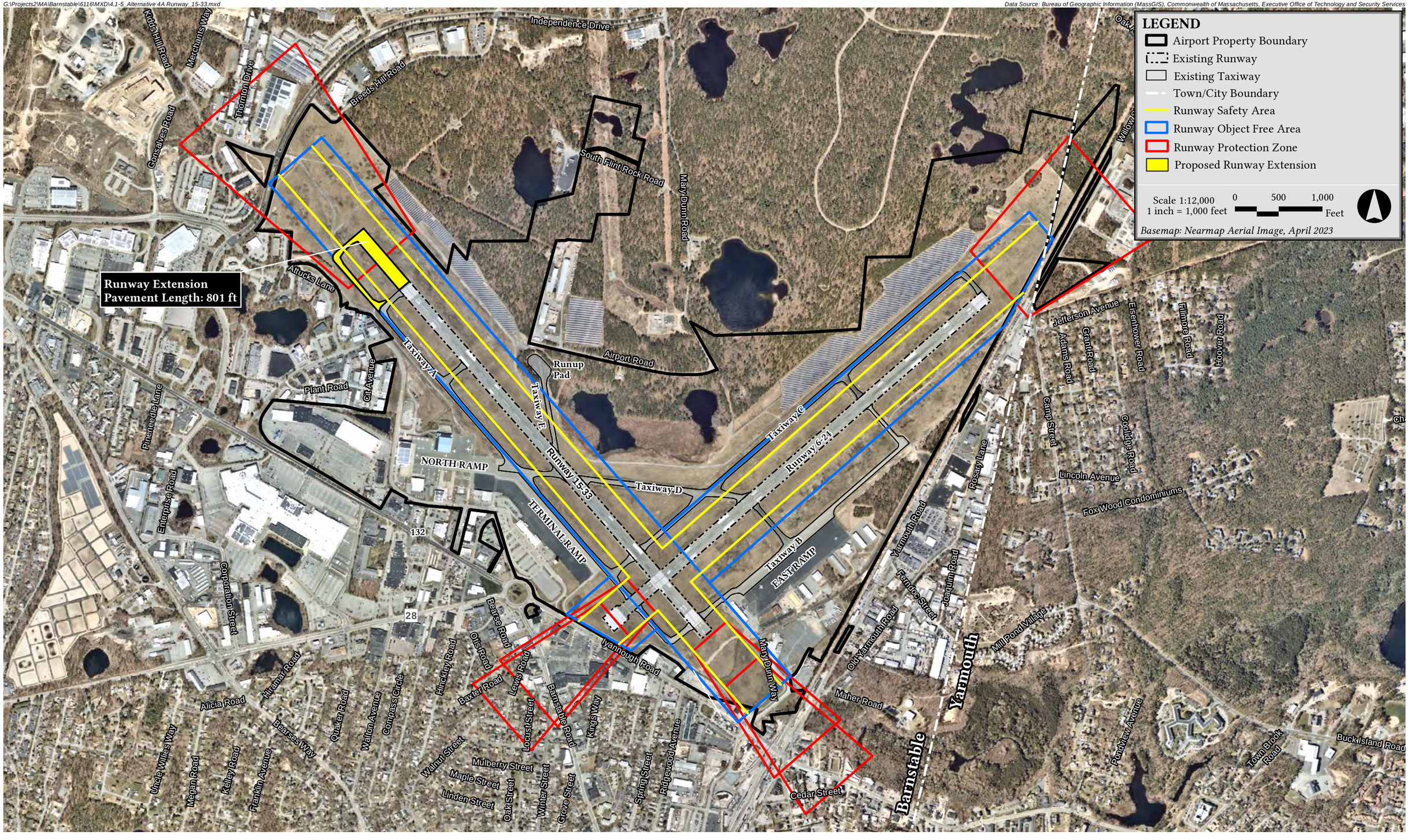
4.1.1.6 Runway 15-33 Alternative 4B – 895-foot extension to the Runway 15 end only (total runway length of 6,148 feet) – Preferred Alternative

After the additional analysis described in Section 2.2.1 was completed, Alternative 4B was selected as the Preferred Alternative as it meets the purpose and need of the runway length recommendation. Alternative 4B (see **Figure 4.1-5**) proposes an 895-foot extension only to the Runway 15 end for a total runway length of 6,150 feet. This alternative includes a 695-foot displaced threshold on the Runway 15 end resulting in a TORA of 6,150 feet and an LDA of 5,455 feet. Runway 33 TORA would increase to 6,150 feet also, and more importantly, LDA increases to 6,000 feet. This provides the Airport with a runway that meets the LDA for the critical aircraft. Taxiway A would be extended to the new runway end and connect to Runway 15 at a 90-degree angle.

- Runway 15-33 Alternative 4B results in reduced airspace obstruction impacts over Runway 15-33 Alternatives 2, 3, and 5.
- This alternative also reduces the amount of impervious surface compared to other alternatives.
- Compared to alternatives that include extension to the Runway 33 end, this alternative minimizes costs and impacts associated with off Airport property needed to be acquired for the construction of the Taxiway A extension to the ends of the extended Runway 33 end.

G:\Projects2\MA\Barnstable\6116\MXD\4.1-5_Alternative 4A Runway_15-33.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

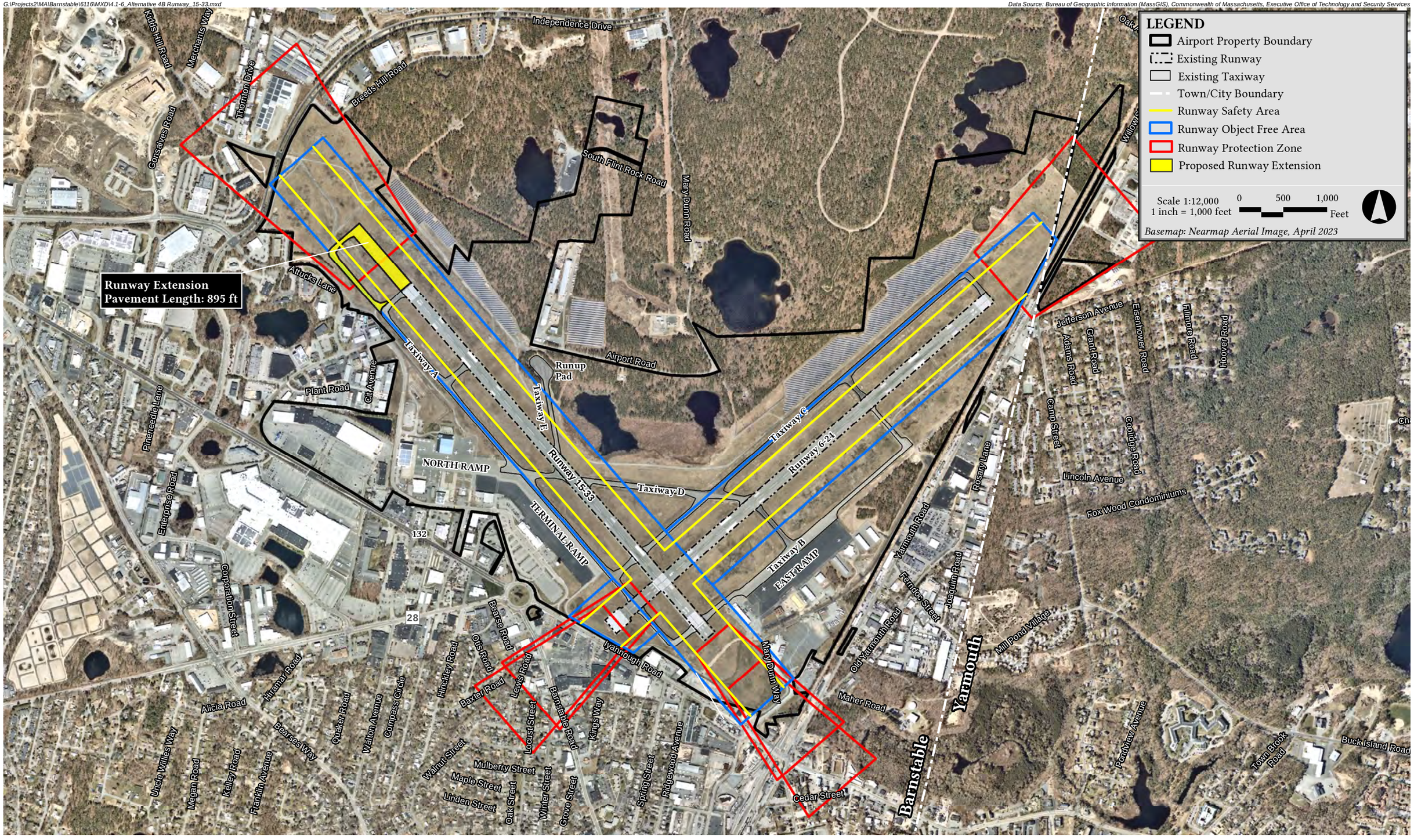


Cape Cod Gateway Airport **Barnstable, Massachusetts**

Figure 4.1-4
Alternative 4A Runway 15-33: 801-Foot Extension to RW 15 End

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport Barnstable, Massachusetts

Figure 4.1-5

Alternative 4B Runway 15-33: 895-Foot Extension to RW 15 End

- As with other alternatives, Runway 15-33 Alternative 4B provides a runway length balanced in terms of enhancing safety and operations, meeting the runway length recommendation identified in the 2022 Master Plan, while minimizing community impacts.
- Runway 15-33 Alternative 4B minimizes an increase in new pavement and land disturbance and focuses on adding the minimum pavement necessary to meet the facility requirements for both take-offs and landings on at least one runway (Runway 33).

4.1.1.7 Runway 15-33 Alternative 5 – Extend Runway 6-24

This alternative would extend both ends of Runway 6-24 to meet the desired Master Plan runway length of 6,550 feet. Both ends of Runway 6-24 are constrained by the Airport property limits and adjacent land uses. An extension to the Runway 24-end would require the relocation of Yarmouth Road, railroad tracks, existing EMAS, and Iyannough Road Rotary. An extension to the Runway 6-end would also require the acquisition of residential properties. This alternative was dismissed due to the immediate vicinity community impacts.

4.1.1.8 Runway 15-33 Alternative 6 – Closure of Cape Gateway Airport and Operational Shift to Joint Base Cape Cod

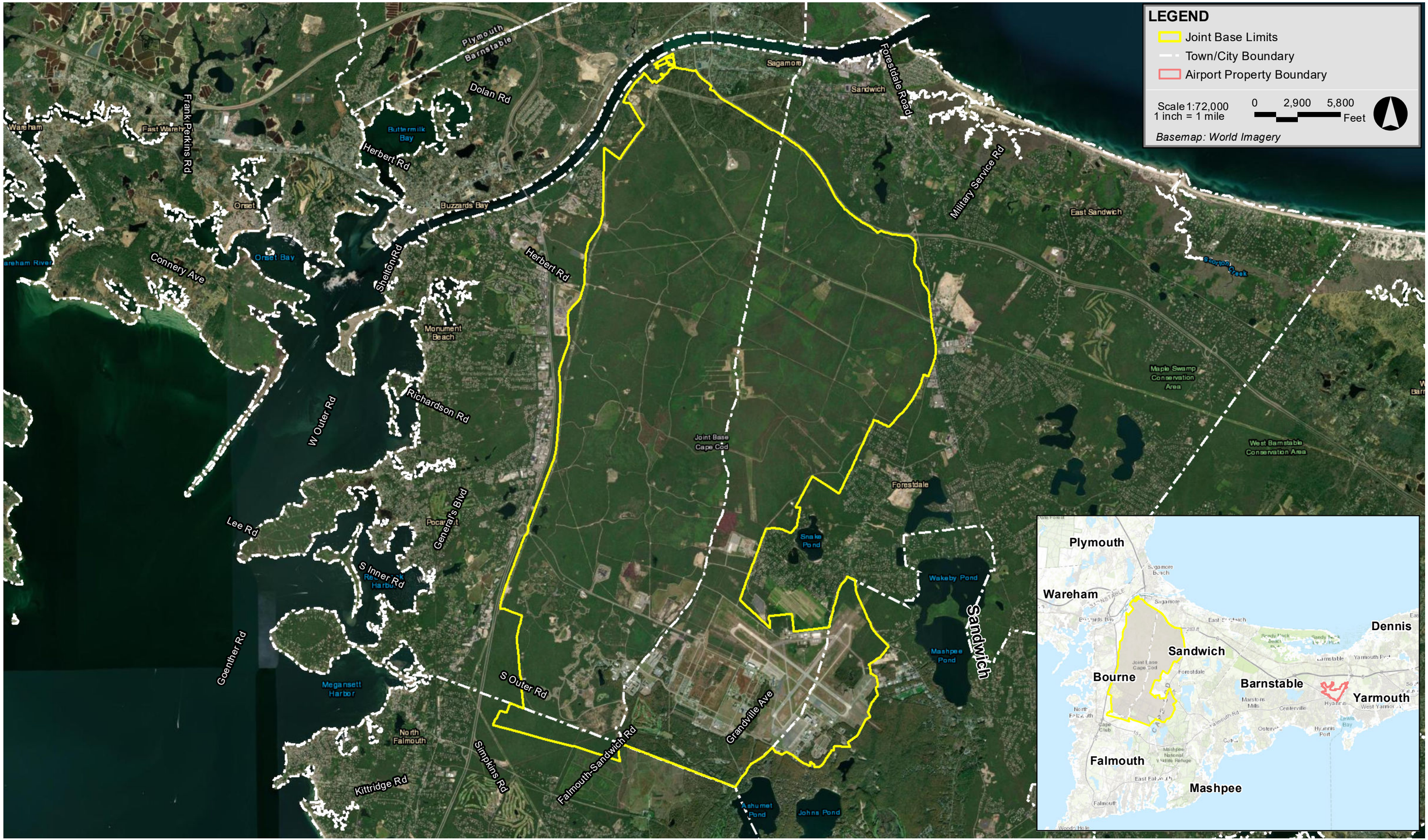
This alternative proposes the closure of the Airport in its entirety and operational shifts to JBCC (see **Figure 4.1-6**). JBCC is a joint-use base home to five military commands, a 22,000-acre tract of land in Bourne, Sandwich, Falmouth, and Mashpee between Route 28 and Route 6. The Otis Air National Guard base controls approximately 3,830 acres in the southeast corner of JBCC. The rest of the property is divided between the Army National Guard (14,500 acres), the Coast Guard (1,407 acres), other federal agencies (1,100 acres), and the Veteran's Administration (750 acres).

The Massachusetts General Court created the military installation in 1935 authorizing the acquisition of 12,600 acres in Bourne, Sandwich, Falmouth, and Mashpee, establishing a campsite for the use and training of military forces of the Commonwealth. Since then, the reservation was enlarged by converting part of the Shawme-Crowell State Forest to military use. Currently, the Army, Air Force, and Coast Guard all lease land on the JBCC. The land, owned by the Commonwealth, is leased to the Federal government, and licensed back to the Commonwealth for National Guard purposes.

The JBCC airfield is located in the southeast corner of the base. Aviation facilities include two runways and numerous aprons and taxiways around the airfield. The main runway runs NW/SE and is approximately 9,500 feet long. The second runway runs NE/SW and is approximately 8,000 feet long. The Air National Guard and US Coast Guard operate workshops and maintenance facilities around the airfield. Army National Guard helicopter/ aviation facilities, fire station and the existing air traffic control tower and FAA building are also in this area. Areas surrounding the runways provide habitat for protected species of grassland birds. Runway conditions are such that reconstruction would be required for conversion to a public use airport as well as review and approval by FAA for Part 150 Certification as a commercial-use airport.

G:\Alyssa\Alt6_JointBase_CapeCod_20231012.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport Barnstable, Massachusetts

Figure 4.1-6
Alternative 6 Joint Base Cape Cod

The 5,000-acre JBCC consists of developed land, including runways and supporting facilities, and disturbed native grassland. The native grassland surrounding the runways at JBCC is habitat for several rare bird species monitored by the Army National Guard, Environmental Protection Office, and the NHESP. Other terrain at JBCC includes mixed hardwood and conifer woods on the northern edge, immature pine forests scattered throughout the base, and pitch pine scrub oak forest on the south and western edges of the base. JBCC is located over the Sagamore groundwater lens, a portion of the Cape Cod sole source aquifer. There is one water supply well (Well J), and there are two CCC Identified Wellhead Protection Areas in the northern and southern portions of the base. Identified Wellhead Protection Areas, as defined by the CCC Regional Policy Plan, are those areas that contribute groundwater to existing public and private water supply wells. These areas are recognized by the CCC as equivalent to DEP-approved Zone II's. Also present on the base are identified freshwater recharge areas to Ashumet Pond and Johns Pond, extending across the southeast corner. Past activities by various military organizations utilizing JBCC property have resulted in the contamination of soil and groundwater in several locations.

The relocation of Cape Cod Gateway Airport functions to JBCC is not a viable alternative. The Cape Cod Gateway Airport Commission is an agency of the Town of Barnstable, entrusted with the management of the Airport, a public facility of the Town of Barnstable. M.G.L Chapter 90 creates the legal framework to empower the Airport Commission as the responsible entity for the "custody, care and management of the municipal airport of said city or town." The statues within M.G.L Chapter 90 are instrumental in creating a governance structure for municipal airports to ensure their control is secure from influence that would detract from their mission as a public-use transportation asset to the flying public, and to guide its operation and future development.

For the Commission to address an alternative outside municipal borders is inconsistent with both its powers and its obligations. The Commission has no current rights to operate outside Barnstable Municipal limits. The alternatives under consideration are limited to Airport property, or, in the case of improved access, to changes to be made within Barnstable with the cooperation and consent of the Barnstable Town Council.

JBCC is the property of the Commonwealth of Massachusetts and is leased by the Federal Government under the Department of the Air Force. As stated above, the Proponent has no authority to plan for the use of that property. In Massachusetts, the only state entity which is constituted to own and operate airports is the Massachusetts Port Authority (Massport). Massport has no statutory authorization to develop or operate an airport at JBCC. Such an undertaking would necessitate significant state commitments of funds, a programmatic expansion of Massport powers and responsibilities, and a major change in state transportation structures and policies and could only be undertaken as directed by the Massachusetts legislature. Any suggestion that a public airport be established at JBCC can only be addressed by the legislature, and only if a majority of the legislature so directs such an alternative be able to be considered.

For Airport functions to be relocated to JBCC, a major change in land use for Falmouth would be required. Activities at JBCC have in the past been a subject of considerable controversy (the PAVE PAWS radar system in the 1970s, open burning in the 1980s, and groundwater contamination in the 1990s), and it seems reasonable to anticipate that the proposal of the Town of Barnstable to shift

Airport operations might not be positively received. Should the Commonwealth, led by the legislative delegation, undertake a significant campaign to create a major public-use regional airport at JBCC, then (and only then) should further investigation of this alternative be required.

The CCGA is the only full-service airport with a precision runway most proximate to Nantucket. Air travel from the Airport to Nantucket is closer, hence less costly, than from other airports, including JBCC. Nantucket residents rely heavily on access to the Airport for their access to mainland Massachusetts. Hundreds of residents of Barnstable and other mid-Cape communities use the Airport to commute to Nantucket for work, and thus their livelihoods depend on a functioning Airport (the ferry is not an alternative, owing to the duration of the trip and weather dependency). Conversely, Nantucket businesses and services rely on a mainland workforce that is simply not available in the employment market on Nantucket proper.

CCGA also supports emergency response. For individuals on Cape Cod and the islands of Nantucket and Martha's Vineyard seeking emergency medical assistance, the Airport provides efficient access to the Cape Cod Hospital. The Airport also hosts Boston Med Flights and supports military operations, such as the U.S. Coast Guard's sea search and rescue missions, which are part of its role in providing emergency response and ensuring public safety on Cape Cod and the islands. These benefits are not transferable to JBCC due to the less central location and longer distance from Cape Cod Hospital. JBCC is over 20 miles away from Cape Cod Hospital and over 40 minutes away whereas Cape Cod Gateway Airport is approximately one mile, less than 10 minutes, from Cape Cod Hospital.[1] Several local newspaper articles have attributed the proximity of CCGA to Cape Cod Hospital as an important contribution to positive outcomes in situations where Cape residents needed emergency medical care.

Moreover, according to the 2019 MassDOT Aeronautics study titled "The Economic Impact of Public-use Airports in Massachusetts," the Airport has the second largest economic output of all Massachusetts airports (exclusive of Massport facilities) and provides economic benefits of approximately $157.2 million annually to the local economy. Businesses dependent on the Airport employ approximately 1,725 workers and commit approximately $73.8 million dollars to payroll annually. To shut down the Airport entirely, or to channel all future growth to a JBCC alternative, is anticipated to adversely impact the entire economy of the mid-Cape. Furthermore, significant financial impacts would be experienced by the CCGA's numerous tenants (leaseholders), their facilities and infrastructure, and the taxes they pay to the town. Not all tenants would be willing to relocate their businesses and if they did, a substantial investment in new structures would be required. These significant adverse economic impacts deem this alternative infeasible.

As one of nine Enterprise Funds of the Town of Barnstable, the Airport makes an annual profit and requires no financial support from the Town of Barnstable. The Airport has received approximately $87 million in state and federal funding for airport purposes since 1982. Grant conditions require that the improvements thus funded be used for aviation purposes. A closure of the Airport could require

[1] *Boston MedFlight provides a critical airborne Island lifeline* https://www.mvtimes.com/2016/08/03/boston-medflight-provides-critical-airborne-island-lifeline/

the Town of Barnstable to reimburse the United States and the Commonwealth for these past expenditures of airport grant funding received, which could have significant negative economic impacts to the Town of Barnstable and its residents.

For all the above reasons, this alternative was dismissed for further consideration in this environmental assessment.

Table 4.1-1 Runway 15-33 Extension Alternatives (FAA AC 150/5325-4B, Runway Length Requirements for Airport Design)

	Meets FAA Recommendations for LDA and TODA of 6,000 feet	Community Impacts	Env. Impacts (Land Alteration, Stormwater)	Easement Acquisition	Cost	Notes
Alterative 1 (No Build Alternative) Maintain current length of 5,255 ft	No	None	None	Yes.	★★☆	Does not meet existing and future facility requirements.
Alternative 2 Extend Runway 15 end by 1,295 ft, Extend Runway 33 end by 400 ft. Total Length 6,950 ft	Yes. the LDA is 6,500' for the Runway 15 and 6,000' for Runway 33. TODA is 6,950' for both RW15 and RW33	★★★	★★★	Yes.	★★★	Extensive obstruction removal required. Incompatible land uses within RPZ. Requires relocation of roadways. Cost and offsite impacts resulted in the dismissal of this alternative.
Alternative 3 Extend Runway 15 end by 1,258 ft, Extend Runway 33 end by 400 ft. Total Length 6,913 ft	Yes, but not for LDA of RW 15. The LDA is 5,455' for the Runway 15 and 6,000' for Runway 33. TODA is 6,913' for both RW15 and RW33	★★★	★★★	Yes.	★★★	Moderate obstruction removal. Requires relocation of roadways. Cost and offsite impacts resulted in the dismissal of this alternative.
Alternative 4 Extend Runway 15 end by 895 ft. Extend Runway 33 end by 400 ft. Total Length 6,550 ft	Yes, but not for LDA of RW 15. The LDA is 5,455' for the Runway 15 and 6,000' for Runway 33. TODA is 6,550' for both RW15 and RW33	★★☆	★★☆	Yes.	★★☆	Land acquisition needed for TW A extension. Balances community impacts with longer extension on 15 end
Alternative 4A Extend Runway 15 end by 801 ft. Total Length 6,056 ft	No. The LDA is 5,361' for RW 15 and 5,906 for RW 33. The TODA is 6,056' for RW 15 and RW 33.	★☆☆	★☆☆	Yes.	★☆☆	Meets takeoff requirements. Reduces community impacts further by only extending one runway end.
Alternative 4B (Preferred Alternative) Extend Runway 15 end by 895 ft. Total Length 6,148 ft	Yes, but not for LDA of RW 15. LDA is 5,455 for RW 15 and 6,000' for RW33. The TODA is 6,150' for RW 15 and RW 33.	★☆☆	★☆☆	Yes.	★☆☆	Runway 33 meets LDA requirements for critical aircraft. Meets takeoff requirements. Reduces community impacts further by only extending one runway end.

Table 4.1-1 Runway 15-33 Extension Alternatives (FAA AC 150/5325-4B, Runway Length Requirements for Airport Design) (Continued)

	Meets FAA Recommendations for LDA and TODA of 6,000 feet	Community Impacts	Env. Impacts (Land Alteration, Stormwater)	Easement Acquisition	Cost	Notes
Alternative 5 Extend Runway 6-24 to meet runway length of 6,550 feet	Yes.	★★★	★★★	Yes.	★★★	Requires relocation of infrastructure, acquisition of residential and commercial properties
Alternative 6 Close the Airport / shift to Joint Base Cape Cod (JBCC).	Presumed to be yes.	★★★	TBD	No.	★★★	Requires major change in land use Falmouth/Mashpee/Sandwich. Shifts impacts, does not reduce impacts., owned by state, leased by federal entities.

★★★ Large impact

★★☆ Moderate impact

★☆☆ Minimal impact

4.1.2 Taxiway Alternatives

FAA **AC 150/5300-13B, *Airport Design*** (2022-03-31) contains FAA standards and recommendations for the geometric layout and engineering design of runways, taxiways, aprons, and other facilities at civil airports. The Master Plan update reviewed the Airport's existing taxiway system with the design standards in AC 150/5300-13B to evaluate compliance with current standards for taxiway width, taxiway safety areas, TOFAs, taxiway shoulders, taxiway gradient, and for parallel taxiways, the distance between the runway and taxiway centerlines.

The term "taxiway standards" describes FAA standards and recommended practices for both taxiways and taxilanes. Some of the design standards for taxiways and taxilanes vary given the different aircraft speeds and uses of taxiways versus taxilanes. Taxiways typically reside in movement areas, while taxilanes are more common in non-movement areas such as terminal apron areas.

The dimensions for taxiways vary based on the identified Airplane Design Group (ADG) and taxiway design group (TDG) for each taxiway. The ADG is based on the wingspan and tail height of an aircraft, while the TDG is based on the distance between an aircraft's cockpit to main gear, as well as the width of the main gear. There are six ADG groups and seven TDG groups.

FAA provides airport design standards, recommended practices, and design considerations for taxiways and taxilanes. Specifically, these design standards provide guidance to enhance safety and efficiency for 1) Taxiway and taxilane dimensions, configuration, and separation standards, 2) Taxiway turns and intersection design, and 3) Surface gradients.

The following standards from FAA AC 150/5300-13B, *Airport Design*, are listed below and their applicability to the proposed Projects discussed.

Taxiway / Apron Geometry Taxiways connecting an apron directly to a runway ("direct connection") can lead to confusion by creating a false expectation of a parallel taxiway prior to a runway. This loss of situational awareness can result in a pilot entering a runway unknowingly, thus, resulting in a runway incursion.

- Taxiways leading from an apron to a runway should make at least one turn between 75 and 90 degrees prior to reaching the runway hold line.
- For existing conditions with direct access from an apron to a runway: Develop a plan (e.g., ALP) to meet the standard when it becomes practical to make such improvements, and reconfigure existing direct-access taxiways, including those not designated as hot spots, when the associated taxiway is subject to reconstruction.
- To the extent practicable, design taxi routes between the apron and runway ends to include a turn onto a parallel taxiway and a second turn onto a connecting taxiway leading to the runway.
- During taxiway rehabilitation projects, evaluate the feasibility of reconfiguring existing direct-access taxiways (even those not designated as hot spots).

- Evaluate whether an increase to the standard runway to taxiway separation is necessary to allow the critical aircraft to hold 90 degrees, plus or minus 15 degrees, to the runway centerline. Airport should consider providing a partial parallel taxiway if the existing runway does not have a parallel taxiway.

Taxiway Clearance Pilots need ample wingtip clearance due to the pilots' limited ability to see their aircraft's wingtips from the cockpit. Wingtip clearance values ensure an acceptable level of safety when one airplane on a parallel taxiway wanders off the taxiway centerline toward an airplane on the adjacent taxiways. The ADG of the critical aircraft determines the minimum separation distance between a taxiway/taxilane centerline and fixed or moveable objects.

Taxiway Safety Area (TSA) The TSA is a defined surface prepared to support the occasional passage of aircraft and ARFF equipment. The TSA width equals the maximum wingspan of the ADG. The TSA is free of objects, except for objects that need to be located in the TSA because of their function. The TSA is designed to be capable, under dry conditions, of supporting SRE, ARFF equipment, and the occasional passage of aircraft without causing structural damage to the aircraft.

The dimensions of the taxiway safety areas vary based on the identified ADG and TDG for each taxiway. The ADG is based on the wingspan and tail height of an aircraft, while the TDG is based on the distance between an aircraft's cockpit to main gear, as well as the width of the main gear. These ADG and TDG groups are utilized to determine applicable design standards for taxiways, see **Table 4.1-2.**

Table 4.1-2 Taxiway Design Standards for Safety Areas, Object Free Area, and Separation Areas

Design Standard[2]	ADG I	ADG II	ADG III	ADG IV	ADG V	ADG VI
Taxiway Safety Area (feet)	49	79	118	171	214	262
Taxiway Object Free Area (feet)	89	124	171	243	285	335
Runway/Taxiway Separation (feet)	225-400[1]	240-400[1]	400	400	400	500[1]

Source: FAA AC 150/5300-13B
1: Runway/Taxiway separation vary based on approach visibility minimums
2: Existing and future design aircraft are in the AAC-ADG C-III family of aircraft for airfield dimensional standards.

Taxiway Object Free Area (TOFA) The TOFA/TLOFA is an area adjacent to the TSA that is clear of objects not fixed-by function to provide vertical and horizontal wingtip clearance. Applying the taxiway/taxilane centerline to object separation values in **Table 4.1-3** to both sides of the centerline establishes the TOFA/TLOFA.

The FAA Airport Design Advisory Circular states the side safety areas, which extend 200 feet off each side edge of pavement into the grass should be: clear and graded and have no hazardous ruts, humps, depressions, or other surface variations; drained by grading or storm sewers to prevent water accumulation; capable under dry conditions of supporting snow removal equipment, aircraft rescue

firefighting equipment, and the occasional passage of aircraft without causing damage to the aircraft; and free of objects, except those required because of their function, greater than 3 inches above grade.

Table 4.1-3 Taxiway Design Group – Design Width Standards

Design Standard[1]	TDG 1A	TDG 1B	TDG 2A	TDG 2B	TDG 3	TDG 4	TDG 5	TDG 6
Taxiway Width (feet)	25	25	35	35	50	50	75	75
Taxiway Shoulder (feet)	10	10	15	15	20	20	30	30

Source: FAA AC 150/5300-13B
1: The future design aircraft (A220) for both runways is a TDG 3 aircraft

Parallel Taxiways A parallel taxiway eliminates using the runway for taxiing, thus increasing runway capacity, and protecting the runway under low visibility conditions. A dual parallel taxiway provides ATCs flexibility in staging aircraft for takeoff and in routing inbound and outbound (opposite direction) traffic.

Runway/Taxiway Intersections Right-angle taxiways provide the best visual perspective to a pilot approaching an intersection with the runway to observe aircraft in both the left and right directions. They also provide the optimum orientation of the runway holding position signs to maximize visibility for the pilot.

- Design right-angle intersections for runway/taxiway intersections, except where there is a need for acute angled exit taxiways, such as a high-speed exit.
- If a true 90-degree angle with the runway is not practicable, it is acceptable to adjust the angle such that the critical aircraft is ±15 degrees from a 90-degree angle when at the hold line.
- Limit runway crossings to the outer thirds of the runway, keeping the middle third (high-energy area) of the runway clear so a pilot can maneuver to avoid a potential collision.

4.1.2.1 Taxiway D

Taxiway D Alternatives include the No Build and two build alternatives to improve multiple existing non-standard geometry conditions (see **Table 4.1-4**). This section provides further details on the constructability, cost, and environmental impacts for each alternative identified.

Table 4.1-4 Taxiway D – Non-Standard Geometry/Design Conditions

Airfield Geometry / Design Standard	Description of Taxiway D Non-Standard Conditions
Taxiway Intersection Angle	Taxiway D crosses Runway 6-24 and Runway 15-33 at non- 90 degree angles. Taxiway design standards specify right-angle intersections for runway/taxiway intersections, except where there is a need for acute angled exit taxiways, such as a high-speed exit. Right angle intersections, both between taxiways and runways, allow pilots the best visibility to the left and right. A right angle at the end of a parallel taxiway is a clear indication of approaching a runway.

Table 4.1-4 Taxiway D – Non-Standard Geometry/Design Conditions (Continued)

Airfield Geometry / Design Standard	Description of Taxiway D Non-Standard Conditions
High Energy Intersections	Runway 15-33 at Taxiway D crosses at a high-energy segment of the runway. Runway crossings should be limited to the outer thirds of the runway, keeping the middle third (high-energy area) of the runway clear so a pilot can maneuver to avoid a potential collision.
Direct Access	Taxiway D provides direct access from the Airport's North Ramp to Runway 15-33. This airfield geometry is problematic because taxiways leading directly from an apron to a runway without requiring a turn can cause confusion when a pilot expects to encounter a parallel taxiway but instead accidentally enters a runway. Also, when exiting a ramp area, hold lines may approach quickly. Pilots may not observe them and cause a runway incursion.
Multiple Taxiways Crossing	Taxiway D crosses RWY 15-33 at the vicinity of Taxiway E crossing. Multiple taxiways crossing each other between the hold line and the runway could cause confusion, additional time on the runway, and wrong turns/loss of pilot situational awareness.

Alternatives identified below seek to resolve existing non-standard geometry outlined in **Table 4.1- 4** above as much as practicable. Design options for relocation and extension of Taxiway D are provided below.

4.1.2.1.1 Taxiway D Alternative 1 – No-Build

The No-Build Alternative leaves the current taxiway configuration serving Runway 15-33. In the No-Build Alternative, Taxiway D remains in its current location and does not address existing non-standard conditions with potential safety concerns, including a non-90 degree taxiway angle, high energy crossing, direct access, and multiple crossings. The No-Build Alternative does not meet the existing and future facility requirements related to taxiway geometry and safety enhancements and therefore was dismissed from further consideration.

4.1.2.1.2 Taxiway D Alternative 2 – Preferred Alternative

Taxiway D Alternative 2 **(Figure 2.2-1)** would construct a partial parallel taxiway east of Runway 15-33 with a 400-foot standard runway centerline to taxiway centerline separation. Alternative 2 would extend from the existing Taxiway A1 across existing Taxiway D and Runway 6-24 to the proposed relocated Taxiway B. The Preferred Alternative would also construct an engine run-up area along the north side of the proposed partial parallel taxiway D and adjacent to the existing Taxiway E run-up pit, which would be removed. A blast fence/wall would be constructed next to the proposed run-up pit both for blast and noise protection.

This alternative removes Taxiway D between existing Taxiway A across Runway 15-33 and up to the new partial parallel taxiway, consistent with the Project's purpose and need. The Preferred Alternative implements geometry changes to meet FAA taxiway design standards thereby enhancing safety for aircraft using the Airport.

This alternative proposes a partial parallel taxiway to Runway 15-33, preventing safety concerns of two-way taxiing (conflicts between arriving and departing aircraft) occurring in front of the terminal building. This alternative also addresses the following FAA airfield geometry and design standards:

- Direct access from apron areas to the runway.
- Taxiway and Runway at acute angles, and
- High energy crossing.

The proposed location for Taxiway D would result in impacts on wetland resources (Bordering Vegetated Wetlands (BVW), Bank, and Land Under Water (LUW)) associated with Upper Gate Pond. Design options for reducing wetland resource area impacts include conventional fill on the north side of the taxiway with steep side slopes to limit the extent of impacts and a concrete retaining wall to further limit the extent of impacts. Design alternatives relative to slide slope grading/construction investigation to limit the extent of impacts (see **Figures 4.1-7 to 4.1-9**) were considered and are discussed below.

Build Alternatives 2A, 2B, 2C, 2D – Construct Partial Parallel Taxiway D and Runup Pad

These alternatives **(Figures 2.2-1 and 4.1-7 through 4.1-9)** would construct a partial parallel taxiway east of Runway 15-33 with a 400-foot standard runway centerline to taxiway centerline separation, from the existing Taxiway A1 across existing Taxiway D and Runway 6-24 to the proposed relocated Taxiway B. Within design options for Alternative 2, the requisite dimensions for safety areas and object free areas, as required by FAA standards, are proposed. Impact to resource areas associated with Upper Gate Pond are summarized in **Table 4.1-5** below.

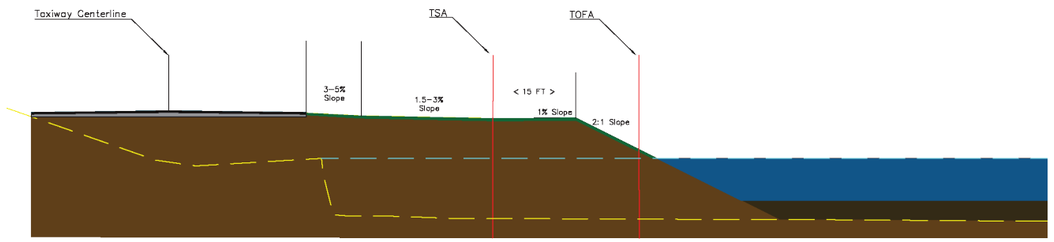
Table 4.1-5 Wetland Resource Area Impacts for Alternative 2 Options

Alternative	Resource Area Impacts		
	BVW (sf)	Bank (lf)	LUW (sf)
Alternative 2A – 4:1 Slope	11,790	540	27,980
Alternative 2B – 2:1 Slope	4,600	300	12,700
Alternative 2C – Retaining Wall	3,500	230	7,100
Alternative 2D - Bridge	0	100 (shadow)	10,000 (shadow)

- **Alternative 2A - Standard side slope**

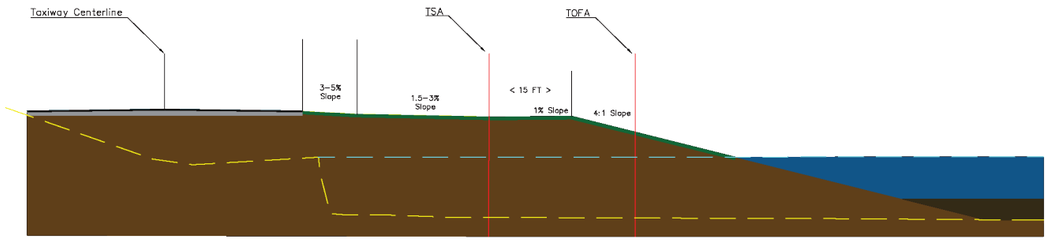
Taxiway D Alternative 2A proposes a parallel taxiway along the north side of Runway 15-33. This design alternative contains standard side slope aeras, Safety Areas, and TOFA for TDG 3/ADC III aircraft. This alternative for Taxiway D results in the largest impacts on BVW, Bank, and LUW associated with Upper Gate Pond due to fill on the north side of the taxiway (see **Figure 4.1-8**).

2:1 Slope



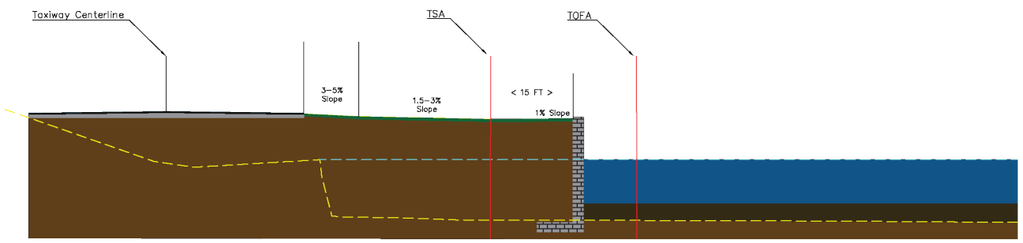
2:1 is increased slope grading within Taxiway OFA. To minimize impacts associated with Upper Gate Pond

4:1 Slope



4:1 is standard grading within Taxiway OFA

Retaining Wall



Alternative with the smallest impacts to Pond ($$$)

Figure 4.1-7
Side Slope Alternatives for Taxiway D

G:\Projects2\MA\Barnstable\6116\MXD\4.1-X_TaxiwayD_20231005.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

Impact to 200-ft Buffer Zone
3.48 acres total
1.13 acres pavement

Impact to 100-ft Buffer Zone
1.75 acres total
0.52 acres pavement

AIRPORT ROAD

Upper Gate Pond

Proposed Runup Pad

Taxiway E

Existing Taxiway D

Proposed Taxiway D

Runway 15-33

Terminal Ramp

LEGEND

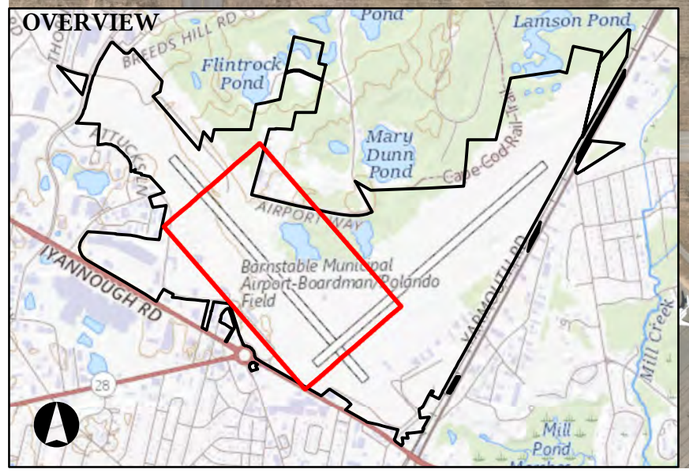
- Airport Property Boundary
- New Pavement
- Pavement to be Reconstructed
- Pavement to be Removed
- New Turf
- Turf to be Reconstructed
- Pavement Removal Turf
- Bordering Vegetated Wetland
- Land Under Water
- Bank
- 200-ft Buffer Zone
- 200-ft Buffer Zone

Scale 1:2,880
1 inch = 240 feet

0 120 240 Feet

Basemap: Nearmap Aerial Image, April 2023

OVERVIEW



Cape Cod Gateway Airport Barnstable, Massachusetts

Figure 4.1-8

Taxiway D Alternative 2A - Standard side slope (4:1)

- **Alternative 2B/Preferred Alternative - Steeper side slope (higher slope within TOFA)**

Alternative 2B, similar to Alternative 2A, would construct a partial parallel taxiway with a 400-foot standard separation east of Runway 15-33 from Taxiway B to the existing Taxiway A1 (see **Figure 2.2- 1**). This alternative also prevents safety concerns of two-way taxiing (conflicts between arriving and departing aircraft) occurring in front of the terminal building and addresses the following FAA airfield geometry and design standards: Direct access from apron areas to the runway, taxiway and runway acute angles, and high energy crossing.

Impacts on Upper Gates Pond (BVW, Bank, and LUW) from this alternative will be lower due to the increased sides slopes to the north of Taxiway D and wider area of Taxiway Safety Area and TOFA.

- **Alternative 2C - Retaining Wall**

Alternative 2C is similar to both Alternative 2A and 2B as it would construct a partial parallel taxiway with a 400-foot standard separation east of Runway 15-33 from Taxiway B to the existing Taxiway A1. This alternative, as with the others, meets the Project's purpose and need by preventing safety concerns of two-way taxiing (conflicts between arriving and departing aircraft) occurring in front of the terminal building, and addresses the following FAA airfield geometry and design standards: Direct access from apron areas to the runway, Taxiway and Runway acute angles, and High energy crossing.

Alternative 2C includes the construction of a retaining wall at the bottom of the taxiway side slopes. The construction of a retaining wall would result in reduced impacts on Upper Gates Pond (BVW, Bank, and LUW) over the impacts from 2A and 2B, due to the ability to create steeper side slopes to the north of Taxiway D and wider area of Taxiway Safety Area and TOFA.

Higher side slopes do not meet the TSA and TOFA standards. Also, this alternative still results in impacts on Upper Gate Pond, and a high cost due to anticipated subsurface work associated with constructing a structure retaining wall. Therefore, this alternative has been eliminated.

- **Alternative 2D Bridge /Elevated Taxiway Surface**

Alternative 2D includes the construction of a structural bridge component to Taxiway D at the segment crossing Upper Gate Pond, spanning the bottom of the taxiway side slopes. The construction of a bridge/elevated taxiway structure would result in the lowest direct impacts on Upper Gate Pond (BVW, Bank, and LUW) over the impacts from Alternatives 2A, 2B, and 2C. This alternative requires extensive structural design, significant amounts of new construction, as well as high costs. Therefore, it has been eliminated from consideration.

4.1.2.1.3 Taxiway D Alternative 3 – Reduced Length Partial Taxiway

Taxiway D Alternative 3 is similar to the Taxiway D Alternative 2B (Preferred Alternative) but would maintain the run-up pad in its existing location and include the removal of Taxiway D between Taxiway A and the proposed partial parallel Taxiway D (see **Figure 4.1-9**). The partial parallel taxiway in this alternative is shorter than other alternatives, extending less toward Runway 15 end.

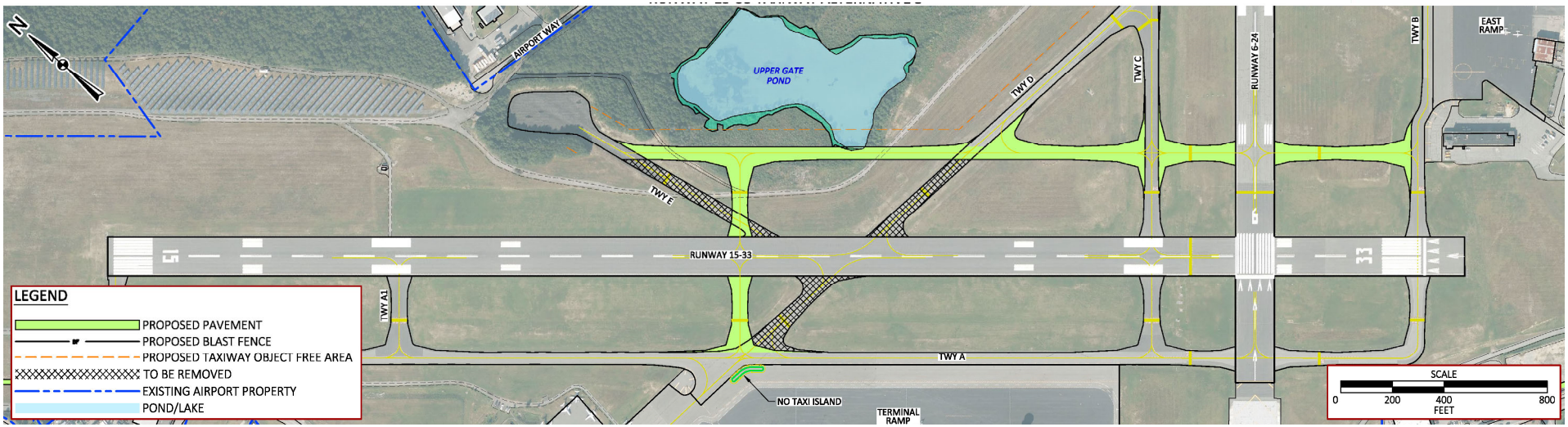


Figure 4.1-9

Taxiway D Alternative 3 – Reduced Taxiway Length

This alternative resolves safety concerns of two-way taxiing occurring in front of the terminal building and eliminates direct access from two points but results in a high-energy crossing on Runway 15-33. While this alternative improves safety compared to the No-Build Alternative by providing a standard 400-foot runway-taxiway centerline separation and improves non-standard FAA geometry conditions (eliminates non-standard runway taxiway intersection angles, the y-shaped runway crossing, and direct access), it does not meet FAA geometry standards due to the high-energy runway crossing.

4.1.2.1.4 Taxiway D Alternative 4 – Reduced Taxiway/Runway Separation

Alternative 4 would locate a parallel Taxiway D south of Upper Gate Pond closer to Runway 15-33, compared to prior alternatives, to avoid impacts associated with BVW, Bank and LUW entirely. In Alternative 4, Taxiway D would be located approximately 300 feet from the runway centerline. Additionally, there would be less tree removal required for obstructions.

Locating the taxiway less than 400 feet from Runway 15-33 would not meet FAA separation standards. Separation distances are measured from runway/taxiways (centerline to centerline) and are based on ADG. The separation distance dimensions in Alternative 4 would not meet the FAA Runway Design Standards for the critical aircraft of these runway and taxiway surfaces. Taxiway/Runway separation distances are a safety-based standard to protect the safety of the flying public. This alternative results in a non-standard geometry on the airfield, which results in unsafe conditions, and would not be approved by FAA. Therefore, this alternative has been eliminated from further consideration.

4.1.2.2 Taxiway B

The existing taxiway system to Runway 6-24 has multiple non-standards geometry conditions. One build alternative was created to resolve these existing deficiencies. *4.1.2.2.1 Alternative 1 – No-Build Alternative*

Alternative 1, the No-Build alternative, leaves Taxiway B in its current location and does not address existing non-standard conditions with potential safety concerns, including non 90-degree taxiway angle, high energy crossing, direct access, and multiple crossings. The No-Build Alternative does not meet the existing and future facility requirements related to taxiway geometry and safety enhancements and was dismissed from further consideration.

4.1.2.2.2 Alternative 2 – Preferred Alternative

Alternative 2 would include the reconstruction of Taxiway B (parallel to Runway 6-24), shown in **Figure 2.2-2**.

Taxiway B would be relocated to a standard 400-foot separation distance (runway centerline to taxiway centerline) from Runway 6-24. By configuring Taxiway B in a standard separation distance, aircraft taxi time is reduced. Also, this alternative would achieve complaint TOFAs and provide an opportunity for the Airport to pursue additional planned aeronautical development on the East Ramp as discussed in Section 3.1.5.

- This alternative enhances safety by constructing a perpendicular crossover taxiway south of the existing glide slope allowing the new taxiway's TOFA to remain clear of the glide slope critical area (no obstructions are allowed within this area).
- Taxiway B Alternative 2, removes Taxiway C1 and keeps the existing portion of the stub taxiway connecting to Runway 6-24.
- Construct a midfield taxiway to Taxiway B to enhance efficiency of taxiway turnoff options for aircraft exiting the runway. This alternative also keeps the existing Taxiway D exit to Taxiway C as an acute-angled exit only taxiway.

The taxiway configuration in Alternative 2 allows heavy/large aircraft landing on Runway 6 the full-length available and could use Taxiway C to taxi back to the terminal or North Ramp area of the Airport. Additionally, single- and twin-engine (small) aircraft landing via Runway 24 would be able to exit prior to the Runway 15-33 intersection, and large aircraft would have the opportunity to exit prior to the Runway 15-33 intersection. These taxiway enhancements would allow aircraft to efficiently exit the runway after landing and increase safety for Airport users.

Alternative 2 limits runway crossings of aircraft using Runway 6-24, which limits the number or time with which potential incursions or accidents can take place. This alternative enhances safety by removing the crossing within the high-energy portion of the runway and achieves compliance with FAA standards.

Table 4.1-6 Summary of Taxiway B and D Alternatives

Alternative	Proposed	Compliance	Notes
Taxiway B			
Alternative 1 (No Build Alternative)	Leave Taxiway B in its current location		Does not physically separate taxiway from apron
Alternative 2 (Preferred Alternative)	Reconstruct Taxiway B parallel to Runway 16-24 with standard 400-foot separation distance (centerline to center line) from Runway 6-24	Achieve compliant TOFA. Remove high-energy crossing	Approximately 226,200 sf (5.193 acres) net increase in pavement area
Taxiway D			
Alternative 1 (No Build Alternative)	Leave the Taxiway D in its current configuration		Does not address existing non-standard conditions with potential safety concerns. Does not meet the existing and future facility requirements related to taxiway geometry and safety enhancements. Approximately 164,700 sf (3.781 acres) net increase in pavement area
Alternative 2 (Preferred Alternative)	Construct partial parallel taxiway with a 400-foot standard separation east of Runway 15-33 from the existing Taxiway A1 across existing Taxiway D and Runway 6-24 to proposed relocated Taxiway B Construct a run-up area along the north side of the proposed taxiway. Remove Taxiway D between existing Taxiway A across Runway 15-33 and up to the new partial parallel taxiway	Consistent with the Project's purpose and need. Prevents safety concerns of two-way taxiing	Impacts to wetland resource areas associated with Upper Gate Pond
Alternative 2A	Construct a partial parallel taxiway with a 400-foot standard separation east of Runway 15-33 from Taxiway B to existing Taxiway A1 Standard side slope of 4:1, Safety Areas and TOFA for TDG 3/ADC III aircraft	Prevents safety concerns of two-way taxiing (conflicts between arriving and departing aircraft) occurring in front of the terminal building. Addresses FAA airfield geometry and design standards	Largest impacts associated with Upper Gate Pond 11,800 sf BVW, 28,000 sf LUW and 540 lf of Bank
Alternative 2B	Construct a partial parallel taxiway with a 400-foot standard separation east of Runway 15-33 from Taxiway B to existing Taxiway A1	Prevents safety concerns of two-way taxiing (conflicts between arriving and departing aircraft) occurring in front of the terminal building.	Reduced impacts associated with Upper Gate Pond 4,600 sf BVW 12,700 sf LUW

	Steeper side slope (higher slope within TOFA)	Addresses FAA airfield geometry and design standards	300 lf Bank

Table 4.1-6 – Summary of Taxiway Alternatives (Continued)

Alternative	Proposed	Benefits	Notes
Alternative 2C	Construct a partial parallel taxiway with a 400-foot standard separation east of Runway 15-33 from Taxiway B to existing Taxiway A1. Construct a retaining wall at the bottom of the taxiway side slopes	Does not meet Taxiway Safety Area requirements	Reduced permanent impacts to Upper Gates Pond. Wall over 16 feet tall required 3,500 sf BVW 7,100 sf LUW 230 lf Bank
Alternative 2D	Construct a structural bridge component to Taxiway D at the segment crossing Upper Gate spanning the bottom of the taxiway side slopes	Does not meet Taxiway Safety Area requirements	Extensive amounts of new construction High costs
Alternative 3	Construct a partial parallel taxiway with a 400-foot standard separation east of Runway 15-33 from Taxiway B to existing Taxiway A1 Maintain the run-up pad in its existing location. Remove Taxiway D between Taxiway A	Resolves safety concerns of two-way taxiing occurring in front of the terminal building	Does not meet FAA geometry standards - results in a high-energy crossing on Runway 15-33
Alternative 4	Locate a parallel Taxiway D south of Upper Gate Pond closer to Runway 15-33, approximately 300ft from the runway center line. Compared to prior alternatives, will avoid impacts associated with BVW, Bank and LUW. located.		Does not meet FAA defined separation standards. It results in a non-standard geometry on the airfield, that results in unsafe conditions

4.2 Airspace Control Improvements

4.2.1 Runway 33 RSA and Runway Object Free Area (ROFA) Avigation Easements

The FAA defines ROFAs as an area cleared of all objects except those that are related to navigational aids and aircraft ground maneuvering. ROFA is also centered around runways to enhance the safety of aircraft operations. FAA design standards for ROFAs surrounding runways serving AAC-ADG C-III aircraft are a width of 800 feet, a length that extends 600 feet prior to the landing threshold, and a length that extends 1,000 feet beyond the runway end. ROFAs and objects within it should be at or below the nearest Runway Safety Area elevation. Any penetration to the ROFA requires a modification to standards (MOS) under **FAA Order 5300.1G *Modifications to Agency Airport Design, Construction, and Equipment Standards***.

4.2.1.1 Alternative 1 – No-Action Alternative

The No-Action Alternative would not seek to acquire, on a willing seller basis, the approximately 1.3 acres of land within Runway 33 needed for use as object free areas. This Alternative does not address the multiple penetrations to the ROFA including Iyannough Road, Mary Dunn Way, off-Airport buildings, Airport perimeter fence, and ARFF / SRE Ramp. The penetrations to the ROFA would continue to exist, and under FAA Order 5300.1G *Modifications to Agency Airport Design, Construction, and Equipment Standards*, a Modification to Standards (MOS) would need to be updated every five years.

4.2.1.2 Alternative 2 – Acquire Easements

The Proposed Action will acquire avigation easements from willing parties designed to bring existing ROFAs into Airport control. Currently, not all ROFAs are within Airport control for existing conditions. A total of four (4) easements for 0.8 acres have been identified as out of airport control, associated with Runway 33 end. These are identified as Parcels 33-1 through 33-4 on the Town parcel map (see **Figure 3.3-1**). Roadways such as Iyannough Road and Yarmouth Road are not proposed for acquisition.

4.2.2 Enhance Airport Control Over RPZ Properties

RPZs are large trapezoidal areas on the ground off each runway end that are within aircraft approach and departure paths. The RPZ is intended to enhance the protection of people and property on the ground. Many land uses including residential, churches, and fuel storage are prohibited by FAA standards within these areas. These limitations are only applicable if the RPZ is owned or controlled by the Airport sponsor.

4.2.2.1 Alternative 1 – No-Action Alternative

The No-Action Alternative would not provide incremental enhancements to safety by increasing the Airport's control of the land area in the RPZs, on a willing seller basis.

Areas within RPZs that are not currently under Airport control in avigation easement or fee simple include all portions of the Runway 6 RPZs west of Iyannough Road, the north and southwest corners of the Runway 15 RPZ, the southern corner of the Runway 24 RPZ, the eastern portion of the Runway 33 RPZ, which total 44 acres/134 parcels. Airport control of these areas could be obtained through direct property acquisition or easements or zoning to control development and land use activities.

The No-Action Alternative would not seek to enhance control of approximately 44 acres within current RPZs off Airport property. Enhancing control of these areas allows the Airport to meet FAA standards for controlling obstructions, preventing future obstruction, and protecting airspace surfaces. However, the current RPZ conditions are grandfathered into the standards, and as a result, are considered standard by the FAA. The no Action Alternative would not acquire an additional 9.95 acres of easements for the proposed runway extension.

4.2.2.2 Alternative 2 – Preferred Alternative

The Proposed Action will acquire avigation easements from willing parties designed to bring existing RPZs and the proposed Runway 15 RPZ into Airport control. A total of four (4) easements for 9.95 acres have been identified as out of Airport control.

Chapter 5.0

Affected Environment

5.0 AFFECTED ENVIRONMENT

5.1 Introduction

This chapter describes the environmental conditions of the potentially affected geographic areas of the Proposed Actions at the Airport. The following discussion, designed to meet the requirements of both NEPA and MEPA, is based on analyses conducted to understand potential impacts of the Proposed Actions. Resource categories identified for analysis are in accordance with FAA Orders 1050.1F, *Environmental Impacts: Policies and Procedures* (Order 1050.1F) and 5050.4B, *NEPA Implementing Instructions for Airport Actions* (Order 5050.4B) and MEPA 301 CMR 11.07 (6)(g) "Existing Environment".

5.2 Project Area

For the purposes of discussing existing conditions, the Airport refers to the entirety of the Airport's property limits, and the Project Area(s) (or Project Site per MEPA Certificate) refers to the portion of the property on which improvements are proposed. The locations of each identified Project vary on the Airport property. **Figure 1.1-3** identifies all proposed Projects at the Airport.

All the proposed airside and landside improvement projects are located on Airport property and are consistent with existing aviation uses. The "study area" for each of the resource categories varies according to area of potential impact. Potential off-Airport property avigation easement acquisition areas are briefly discussed below and in more detail in Chapter 6.0.

5.3 Topography, Geology, and Soils (MEPA/NEPA)

5.3.1 Topography

The Airport is situated at elevations ranging from 30 feet to 60 feet above mean sea level (MSL). The topography at the Airport is generally flat with a general downward slope from the center of the Airport to the Runway 24 end. The Airport also has a rising gradient from the center of the Airport (approximately 40 feet) towards the northwest end of the Airport near Runway 15 end (approximately 60 feet). According to Massachusetts GIS contour data, the central portion of the Airport is at an elevation of approximately 40 feet, while the northeastern portion of the Airport is approximately 30 feet (Runway 24 end), and the northwestern portion elevation is at approximately 50-65 feet. The runways are elevated at 54.1 feet (15-end), 42.6 feet (33-end), 44.4 feet (6-end), and 39.2 feet (24-end).

The lower elevations of the Project Sites are associated with Upper Gate Pond. For example, the Upper Gate Pond's embankment is at an elevation of around 45 feet and the pond's water elevation is around 25 feet above MSL, resulting in a relatively steep drop of 20 feet down to the pond itself.

5.3.2 Geology

Geology in the Cape Cod region contains sorted and stratified sediments composed of gravel, sand, silt, and clay deposited in layers by glacial meltwater. Sediments can occur as four basic textural units: gravel deposits, sand and gravel deposits, sand deposits, and fine deposits. On **Figure 5.3-1**, showing surficial geologic conditions, gravel and sand deposits are shown as Coarse Deposits where they occur at the land surface. Fine Deposits also are shown where they occur at the land surface.

Within the Airport site, geology is characterized as "Coarse deposits."[1] Coarse deposits consist of gravel deposits, sand and gravel deposits, and sand deposits.

- Gravel deposits are composed of at least 50 percent gravel-size clasts; cobbles and boulders predominate; minor amounts of sand that occur within gravel beds, and sand comprises a few separate layers. Gravel layers generally are poorly sorted, and bedding commonly is distorted and faulted due to post depositional collapse related to melting of ice.
- Sand and gravel deposits occur as mixtures of gravel and sand within individual layers and as layers of sand alternating with layers of gravel. Sand and gravel layers generally range between 25 and 50 percent gravel particles and between 50 and 75 percent sand particles. Layers are well sorted to poorly sorted; bedding may be distorted and faulted due to post depositional collapse.
- Sand deposits are composed mainly of very coarse to fine sand, commonly in well-sorted layers. Coarser layers may contain up to 25 percent gravel particles, generally granules and pebbles; finer layers may contain some very fine sand, silt, and clay.

The geology of the Airport is typical for areas on the Cape and more specifically with sites generally within the Town of Barnstable.

5.3.3 Soils

Natural Resource Conservation Service (NRCS) soil survey data, accessed via the Web Soil Survey (WSS) shows two primary soil units mapped at the Airport. The airfield soils surrounding Runway 15 are mapped Hinckley loamy sand, 0 to 3 percent slopes, which accounts for approximately 80 acres. The area around Runway 24 end is mapped as Carver loamy coarse sand, 0 to 3 percent slopes, which accounts for approximately 127 acres of the Airport. Additionally, areas of soil mapped as Urban Land account for approximately 264 acres of the Airport.

Soils that exhibit good drainage are typically considered by the U.S. Department of Agriculture Soil Conservation Service to be prime farmland. The Farmland Protection Policy Act (FPPA) requires coordination with the local office of the NRCS if the proposed project entails irreversible conversion of prime farmland to nonagricultural uses. Farmland subject to this requirement does

[1] U.S. Department of the Interior, U.S. Geological Survey. 2018. Surficial Materials of Massachusetts— A 1:24,000-Scale Geologic Map Database.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

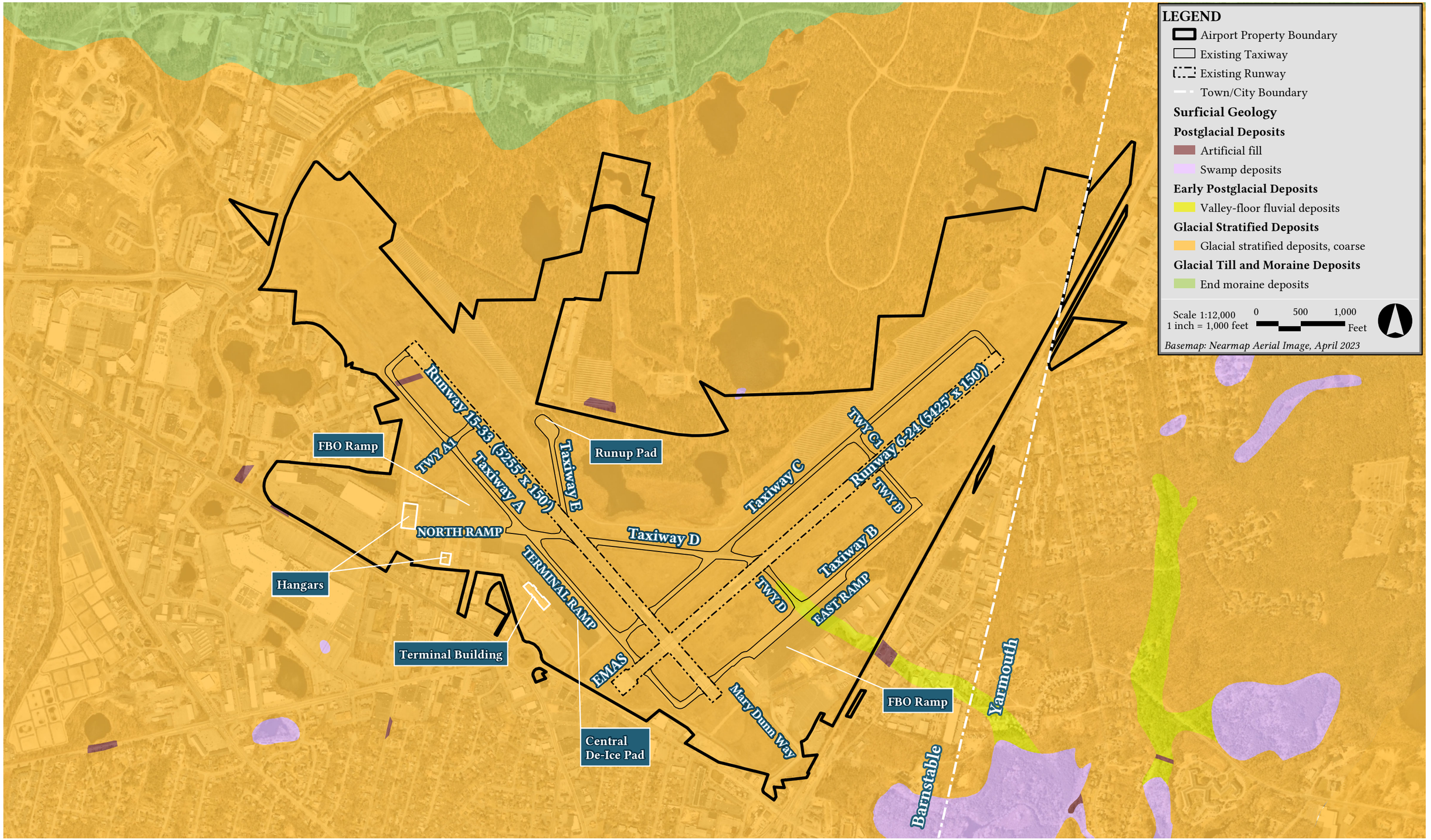


Figure 5.3-1
Surficial Geology

not have to be currently used for cropland; it may also be forestland or pastureland, but not urban or built-up land. This requirement is intended to monitor the impact that federal programs or federally funded projects have on the conversion of this resource. The Farmland Protection Policy Act (7 U.S.C. 4201-4209) (PL 97-98 amended by Section 1255 of the Food Security Act of 1985, PL 99-198) addresses the conversion of farmland to non-agricultural uses.

In Massachusetts, Executive Order 193 (March 19, 1981) is likewise intended to avoid or minimize the conversion of farmland to non-agricultural uses. According to the NRCS WSS, approximately 99 acres, which is approximately 19 percent of the airfield, is classified as prime farmland soil (Hinckley loamy sand, 0 to 3 percent slopes and Hinckley loamy sand, 3 to 8 percent slopes). Mapped farmland soils are shown on **Figure 5.3-2**. These two locations at the Airport are classified as prime farmland; however, none of those areas are in, or have been in, agricultural production since the Airport started operating.

Since the No Action and Proposed Action Alternatives would not affect topography, geology and farmlands in the primary study areas, these resources are dismissed from further consideration.

5.4 Water Resources (MEPA/NEPA)

Water resources are surface waters and groundwater that are important in providing drinking water and in supporting recreation, transportation and commerce, industry, agriculture, and aquatic ecosystems. Surface water, groundwater, floodplains, and wetlands do not function as separate and isolated components of the watershed, but rather as a single, integrated natural system. Disruption of any one part of this system can cause impacts to the functioning of the entire system.

5.4.1 Surface Waters

Ponds proximate to and within the Project Sites include Upper Gate Pond and Lewis Pond located in between Runway 15-33 and Runway 6-24 (see **Figure 5.4-1**). The surface area of Upper Gate Pond is approximately 5.7 acres and that of Lewis Pond is approximately 4.4 acres. Upper Gate Pond is one of two small ponds located within the most northerly part of the Airport parcel; the second being Lewis Pond which is approximately 700 feet to the east. A third pond, Mary Dunn Pond, has a surface area of approximately 19.2 acres and extends only slightly into the property along the Airport's northern boundary, outside the Project Sites. Each of these waterbodies are located within distinct topographic depressions that are typical features of the pitted outwash plain upon which the Airport is located.

Upper Gate Pond has a perimeter measuring approximately 2,500 feet. It has a complex shape that is elongated along the north-south axis and somewhat resembles a goldfish. Its meandering shoreline presents itself as a series of small coves, two of which are occupied by culverts and spillways associated with the Airport's stormwater management system along the southeastern edge. A bathymetric survey of the pond's western portion was completed by CR Environmental in the Fall of 2022. During surveying, the water depth was measured and recorded at 182 locations on a 25 by 25-foot grid and recorded depths ranged between 0.9 and 6.8 feet. The complete results of the bathymetric survey are provided in **Appendix E**.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

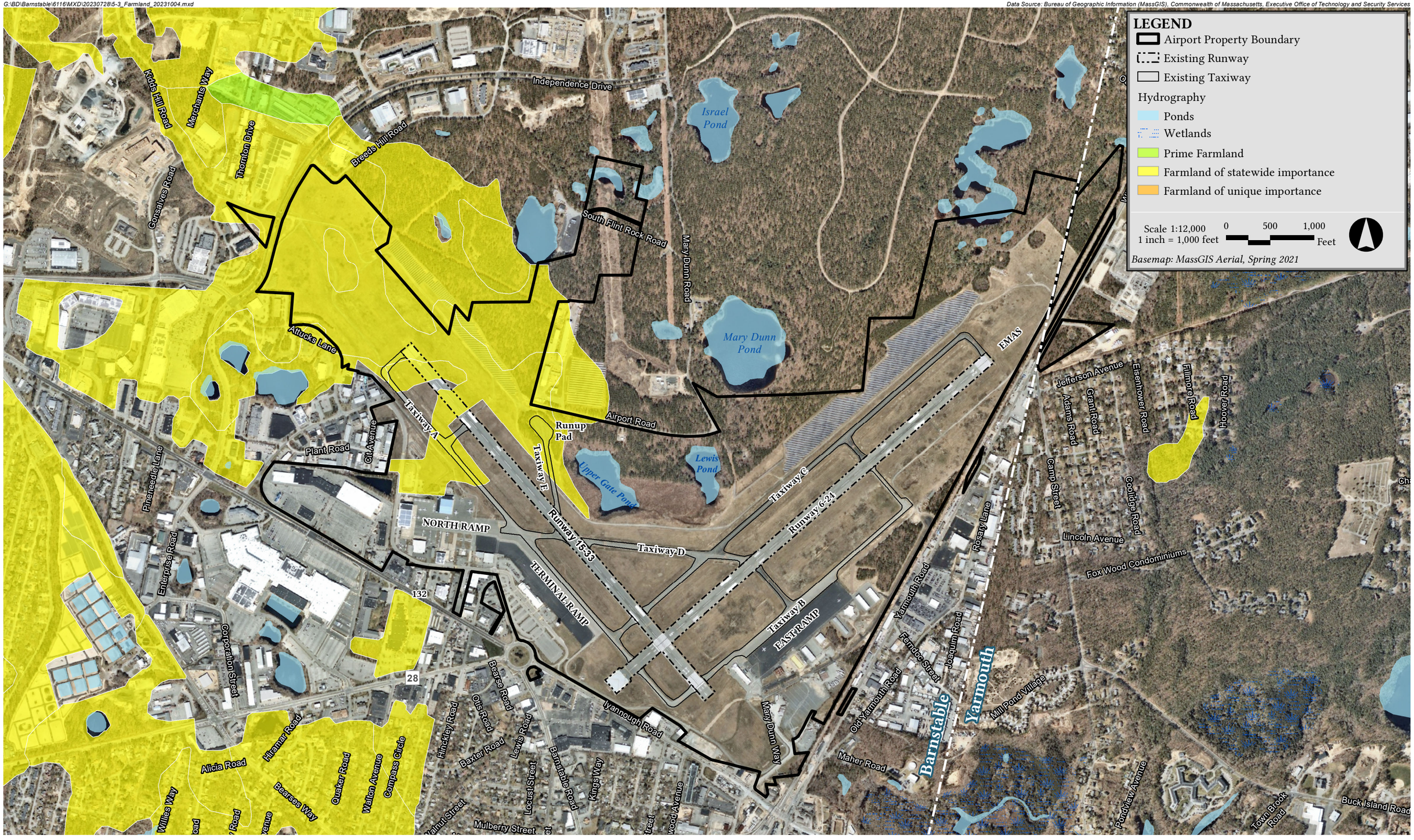


Figure 5.3-2
Mapped Farmland Soils

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

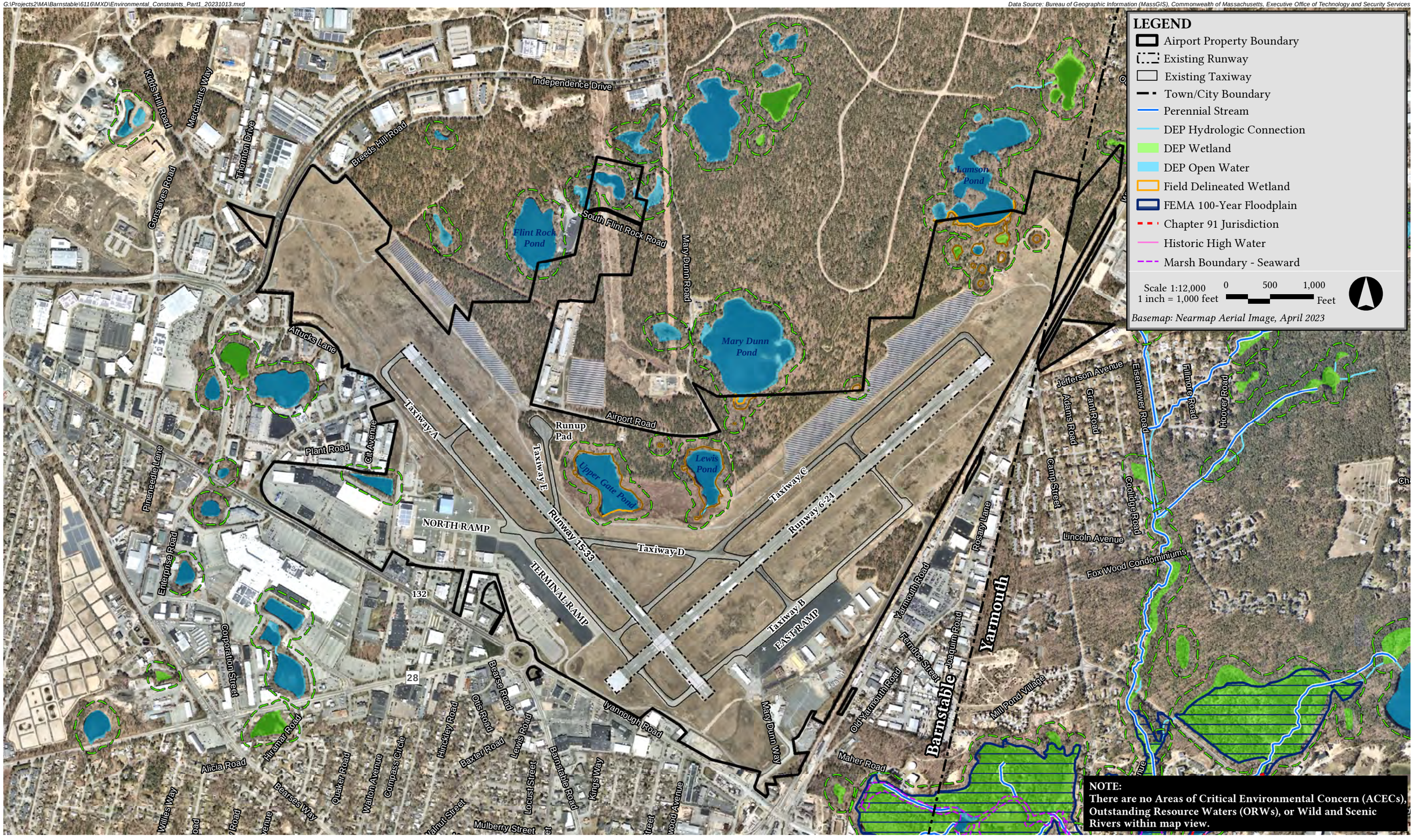


Figure 5.4-1

Wetlands Resource Areas, FEMA Flood Hazard Areas, and Chapter 91 Tidelands Jurisdiction

The terrain surrounding Upper Gate and Lewis Pond contains steep embankments and bordering vegetated wetlands associated with the ponds. Vegetation surrounding the southern segments of the ponds is disturbed frequently due to maintenance mowing by the Airport operations staff. Additional historical disturbance within buffers around the ponds is due to debris from historically placed materials near the outfall at Lewis Pond, surrounding Lewis Pond, and along the southern and eastern shores of Upper Gate Pond creating irregular embankments. These ponds have historically served as outfalls for stormwater discharge from the Airport property (as required by past permits).

The Runway Visibility Zone (RVZ) between the two runways is maintained free of tall/dense vegetation to allow aircraft to verify the location and actions of other aircraft and vehicles on the ground. The northern portions of the pond (outside of the RVZ) contain densely forested embankments, extending into the Hyannis Ponds Wildlife Management Area (WMA). The ponds are separated by an area of forested upland and are not hydrologically connected through any surface water features.

In addition to Upper Gate and Lewis Ponds, Mary Dunn Pond and Lamson Pond and associated bordering vegetated wetlands extend onto Airport property, outside the limits of the Project Site. Mary Dunn Pond, the largest of the four ponds, located to the north of Taxiway C, supports a classic Coastal Plain Ponds Community consisting of narrow concentric bands of vegetation that can provide habitat for some of Massachusetts' rare plant species. Lamson Pond, located to the northeast quadrant of the Airport, also supports Coastal Plain Pond communities.

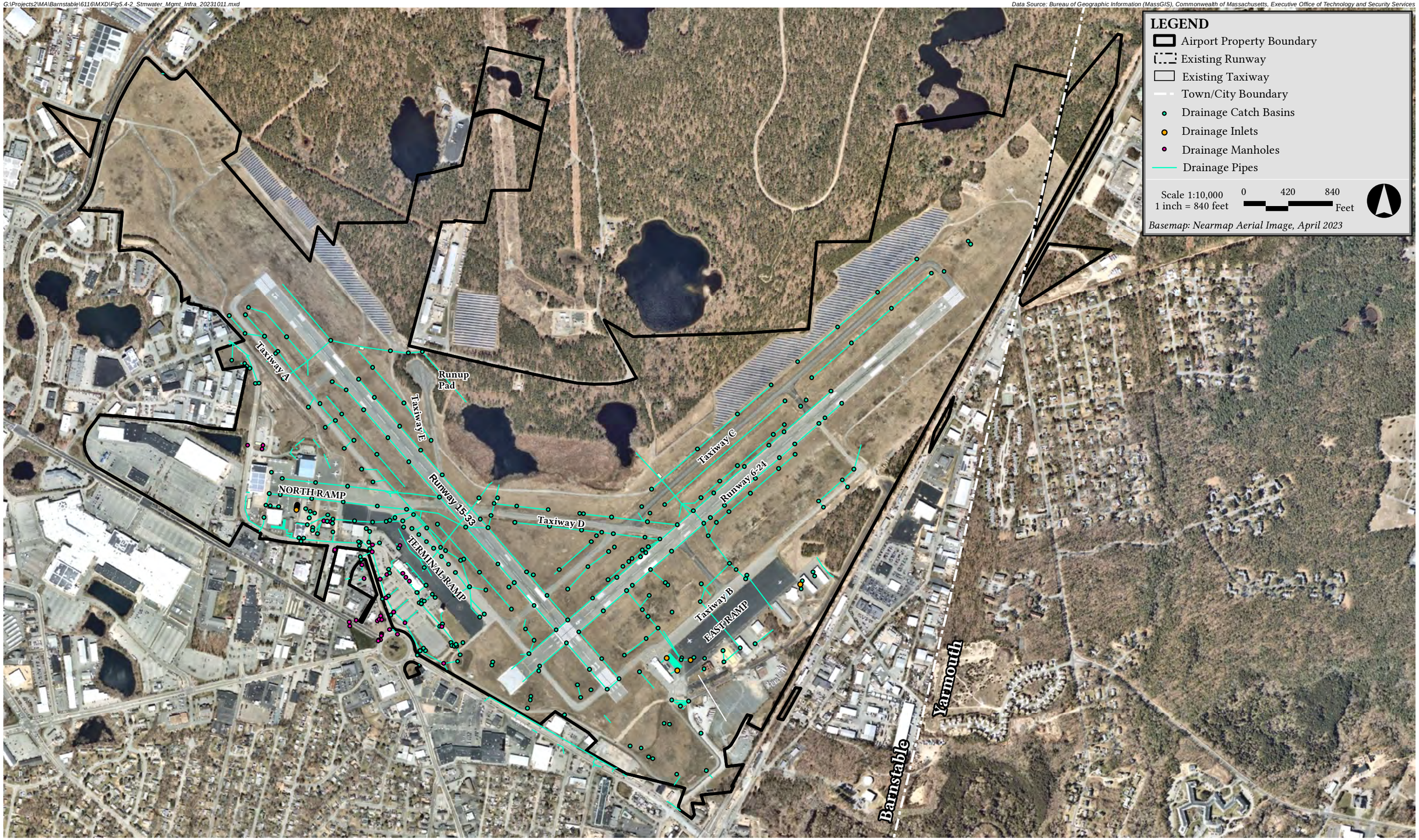
These ponds and their associated wetlands may be subject to regulation under the federal Clean Water Act, the Massachusetts Wetlands Protection Act, the CCC RPP, and the Town Wetlands Ordinance. Like other ponds on Cape Cod, both ponds are classified as a Class B water body, meaning that they have been designated as habitat for fish, other aquatic life, and wildlife, and for primary or secondary contact recreation, according to the Massachusetts Surface Water Standards (314 CMR 4.00). The ponds are listed on the Massachusetts Division of Watershed Managements' integrated list of impaired waters, Final Listing of the Condition of Massachusetts' Waters Pursuant to Sections 305(b), 314 and 303(d) of the Clean Water Act, 2018-20.

5.4.1.1 Stormwater Management Infrastructure

The Airport maintains a Stormwater Pollution Prevention Plan (SWPPP) in accordance with EPA's National Pollutant Discharge Elimination System (NPDES) Stormwater Multi-Sector General Permit (MSGP) issued on January 15, 2021 (Airport NPDES ID MAR 053164, see **Appendix F**). The majority of stormwater collected on impervious surfaces at the Airport is managed through a network of 300 catch basins discharging to surface water outfalls, seven bioretention basins which discharge to infiltration basins, vegetated swales, and Class V injections wells (more commonly known as leaching catch basins) (see **Figure 5.4-2**). A portion of stormwater in each drainage area is also infiltrated at the edge of impervious surfaces in the form of sheet-flow runoff. The boundaries of these areas are controlled primarily by the topography of the land, and in some cases, the surrounding roads, taxiways, and runways. The majority of Airport property is pervious

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport **Barnstable, Massachusetts**

Figure 5.4-2
Existing Stormwater Management Infrastructure

vegetated airfield surfaces in areas characterized by little to no potential for potential pollutants to be exposed to stormwater. See **Table 5.4-1** for a summary of drainage areas and treatment best management practices.

Upper Gate Pond receives stormwater from a 31-acre drainage area including portion of Runway 15/33, portions of Taxiways A and D, and a portion of the North Ramp including the Gate F Fuel Farm which is collected through a network of catch basins discharging to Outfalls B and C. Two Oil/Water Separators are located within the Gate F Fuel Farm to intercept petroleum prior to entering the stormwater system in the event of a release. Prior to discharge at either location, stormwater is treated by Vortechs® hydrodynamic separators. Since the installation of these units in 2011, 100% of stormwater discharged to the pond receives pretreatment.

Table 5.4-1 Existing Stormwater Management Drainage Areas

Drainage Area ID	Size (acres)	Uses	Existing BMPs
A	25.9	Runway 15/33 and Taxiway A	Catch basins with sediment traps and a Vortechs water quality unit
B	14.9	Main Terminal apron, South Ramp, and Taxiway A	Catch basins with sediment traps, an oil/water separator and a Vortechs water quality unit
C	31.1	Runway 15/33, Taxiways A and D, North Ramp, and Gate F Fuel Farm	Catch basins with sediment traps, two Oil/Water Separators, Stormtech system, and Vortechs water quality units
D	130.2	Runway 6/24, Runway 33 approach of Runway 15/33, Taxiway C, and Taxiways B and D	Catch basins with sediment traps and a Vortechs water quality unit
E	7.7	Rectrix Aerodrome Center, Inc. and its associated paved apron, access road from Barnstable Road to the hangar, and several paved parking lots	bioretention basin and catch basins with sediment traps
F	14.5	Airport access road connecting Attucks Lane to Barnstable Road, Barnstable Road, tenant parking lots, overflow parking lots, the Griffin Avionics apron area, and the Cape Town Shopping Center parking lot	Catch basins, O/WS, Stormtech underground recharge structures, and an infiltration basin
G	10.7	North Ramp, Taxiway D, and paved apron areas adjacent to tenant hangars	Catch basins with sediment sumps and oil/water separator
H	8.9	Taxiway B, Perimeter Road, transient area for aircraft, aircraft support vehicles, and ARFF/OPS and Maintenance vehicles	Catch basins with sediment sumps
I	5.2	Hexagon hangar and Kingsbury Aviation hangars	Catch basins with sediment sumps
J	10.0	East Ramp apron, Taxiway B, and tenant hangars	Catch basins with sediment sumps and vegetated swale

Table 5.4-1 Existing Stormwater Management Drainage Areas (Continued)

Drainage Area ID	Size (acres)	Uses	Existing BMPs
K	7.3	East Ramp apron, Taxiway B, Gate P Fuel Farm, and tenant hangars	Catch basins, vegetated swale and Vortechs water quality unit
L	10.3	Steamship Authority parking lot	None, stormwater infiltrates directly into the ground surface.
M	38.5	Taxiway B, ARFF building, East Ramp apron area, the Rectrix / Air Cape Cod hangar, the Airport perimeter road, Mary Dunn Road, and the unpaved runway safety areas of the airfield at the southern ends of Runways 6/24 and 15/33	None, stormwater infiltrates directly into the ground surface.
N	13.5	Parking areas and access roads	Catch basins with sediment sumps and bioretention areas
O	1.2	Car service and rental facilities	Catch basins with sediment sumps

5.4.2 Floodplains

Floodplains are lowland areas adjoining inland and coastal waters which are periodically inundated by flood waters, including flood-prone areas of offshore islands. Floodplains are often discussed in terms of the 100-year flood. The 100-year flood is a flood having a 1 percent chance of occurring in any given year. The 100-year flood is also known as the base flood. Floodplains are valued for their natural flood and erosion control, enhancement of biological productivity, and socioeconomic benefits and functions. Airport development actions must avoid impacting floodplains if a practicable alternative exists to comply with Executive Order 11988 (1977) *Floodplain Management* and the US Department of Transportation (USDOT) Order 5650.2 *Floodplain Management and Protection*. In addition, the FAA has provided guidance for floodplain analysis that needs to be incorporated in NEPA evaluations to adhere to EO 14030 *Climate-Related Financial Risk* (May 20, 2021) and the earlier EO 13690 (January 30, 2015) *Establishing a Federal Flood Risk Management Standard [FFRMS] and a Process for Further Soliciting and Considering Stakeholder Input*.

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (25001C0566J, effective on 07/16/2014 and 25001C0567J, effective on 07/16/2014) show the Airport is not within the 100-year floodplain (**Figure 5.4-3**). The Airport property is not at a high risk of flooding. A small amount of forested area near Mary Dunn Pond, within the Airport property boundary but outside the Project Area, is within an area with a 0.2 percent annual chance of flood hazard.

There will be no impacts to mapped floodplains as part of this project. The nearest mapped floodplain to the Airport is located approximately 1,000 feet to the southeast. The identified flood elevation for this Zone AE is elevation 9 feet NAVD 88. As identified in Section 5.3.1 above, the Airport's runway elevation is 52 feet NAVD 88.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

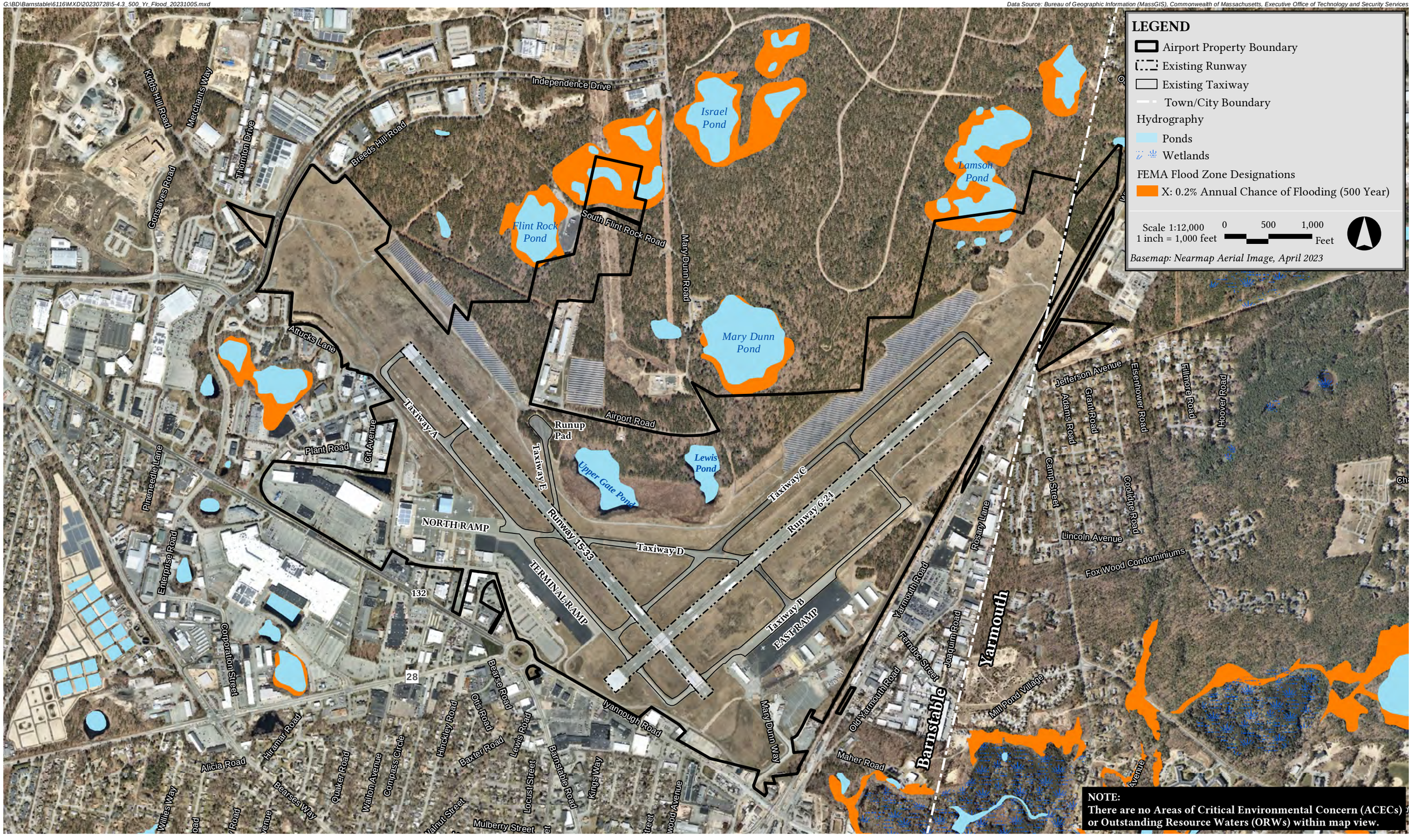


Figure 5.4-3
Environmental Constraints: FEMA Flood Hazard Areas

5.4.3 Wetlands

The Airport contains several areas of freshwater ponds (see Section 5.4.1 above), wetlands bordering these ponds, and isolated vegetated wetlands, see **Figure 5.4-1**. The majority of these wetlands are located on the northern and northeastern portions of the airfield. Adjacent to the Airport's northern boundary is the Hyannis Ponds WMA.

Wetlands areas have been identified during past field surveys as well as recent targeted wetland delineations of resource areas within limits of disturbance of the Projects in the Airport's Master Plan. Wetland and aquatic resources within the Airport's boundary are protected by state, local, and federal statutes including the Massachusetts Clean Water Act, administered by MassDEP under the M.G.L. Ch 21 § 26-53, the Massachusetts Wetlands Protection Act (M.G.L. Ch. 131 § 40), the Town of Barnstable Wetlands Protection Bylaw (Chapter 237), and the Cape Cod Commission Regional Policy Plan, approved as Barnstable County Ordinance 19-01 and amended in 2021. A description of wetland resources areas in or near the Project limits is provided below.

Upper Gate Pond and Lewis Pond experience large growths of submerged aquatic vegetation and emergent species that cover the surface of the ponds during the growing season. Bordering Vegetated Wetlands (BVW)/Freshwater Wetlands surround the two ponds. Various tree species are found along the banks such as willow (*Salix spp.*) and red maple (*Acer rubrum*) with occasional tupelo (*Nyssa sylvatica*). Dominant shrub species include fetterbush (*Leucothoe racemosa*), sweet pepperbush (*Clethra alnifolia*), northern arrowwood (*Viburnum dentatum*), winterberry (*Ilex verticillata*), maleberry (*Lyonia ligustrina*) highbush blueberry, inkberry, nannyberry (*Viburnum lentago*), and European buckthorn (*Frangula alnus*). Poison Ivy (*Toxicodendron radicans*) is also located throughout the wetland areas. Portion of the pond edges contain common greenbrier in densely grown thickets. Groundcover species include sheep laurel (*Kalmia angustifolia*), and sensitive fern *(Onoclea sensibilis*).

Upper Gate Pond north of Taxiway D hosts a subaquatic community dominated by white water lily *(Nymphaea adorata).* Palustrine wetland vegetation observed along the shoreline includes highbush blueberry, sweet pepperbush, and Bebb's willow *(Salix bebbiana).*

Within the northeast quadrant of the Airport, eleven isolated freshwater depressions, ranging in size, are located within a forested area adjacent to the (Runway 24 end). One larger isolated wetland is located in the far northeastern corner of the Airport property and is greater than 0.5 acres.

These isolated freshwater wetlands are situated in a kettle hole-like depression supported by standing water as observed in the fall/winter of 2019-2020 by Horsley Witten Group (HWG). Vegetation within these freshwater wetlands is similar to that observed within the BVW/Freshwater wetlands around Upper Gate Pond and Lewis Pond, including a stand of red maple, eastern white pine (*Pinus strobus*), and gray birch (*Betula populifolia*). Open areas in the central portions of these wetlands also commonly support sphagnum moss (*Sphagnum spp.*). Approximately one third of these isolated wetland areas are identified as potential vernal pools by the Massachusetts NHESP (see **Figure 5.10-1**). These isolated wetlands are outside of the proposed Project Areas.

5.4.4 Groundwater

Groundwater is subsurface water that occupies the space between sand, clay, and rock formations. The term aquifer is used to describe the geologic layers that store or transmit groundwater to wells, springs, and other water sources. Nearly the entire Airport and most of the land area between Route 132, Route 6, and Yarmouth Road, is situated within a zone of groundwater contribution to public water supplies. These areas are protected at the federal, state, and local level as discussed below.

The Airport is located above a Sole Source Aquifer (SSA) as designated by the U.S. Environmental Protection Agency (EPA) under Section 1424(e) of the Federal Safe Drinking Water Act. A SSA is one that supplies at least 50 percent of the drinking water consumed by the human population in the area overlying the aquifer where there is no other alternative to this water supply. This designation gives EPA authority to review all proposed federal financially assisted projects which have the potential to contaminate the area of the Sole Source Aquifer. Under the SDWA, EPA has the authority to withhold use of federal funding for construction of any proposed project within a designated SSA which it believes poses a significant threat of contamination to an aquifer.

The Cape Cod Aquifer provides 100% of the Cape's drinking water, and its highly permeable aquifer deposits make it one of the most productive groundwater systems in New England. These water supplies are susceptible to contamination from development and land uses within their watersheds. Based on previous groundwater investigations, groundwater flows in a southeasterly direction from the Airport towards Lewis Bay. The Cape Cod Aquifer is recharged solely by precipitation, with approximately 60% of rainfall and snowmelt contributing to recharge annually. All developed impervious areas and most developed open space areas within the Airport property are classified as medium yield non-potential drinking water source areas.

There are public drinking water supply wells near the Airport and the Airport is located within their wellhead protection areas, or Zone II as defined by the Massachusetts Department of Environmental Protection (MassDEP). Wellhead protection areas represent the land area where rain soaks into the ground, enters groundwater, and flows to one of the wells. See **Figure 5.4-4** for a map of wells and protection areas within the Airport.

5.4.4.1 Existing and Potential Public Drinking Water Wells

Public drinking water wells have been developed to the north and east of the Airport. The Maher Wellfield is located approximately 0.1 miles southeast from the Airport and consists of three production wells that supply approximately 30 to 35 percent of the Town of Barnstable's Water Supply Division service connections in Hyannis and Hyannis Port.

Existing wells proximate to the Airport are operated by the Barnstable Water Company (BWC) and the Barnstable Fire District. Additional wells operated by the Yarmouth Water Department are located east of Willow Street in Yarmouth. While these wells are further away from the Airport than the Maher Wells, the groundwater resources associated with them occupy a larger area of the Airport Property than those linked to the Maher Wellfield. **Figure 5.4-4** also shows potential

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

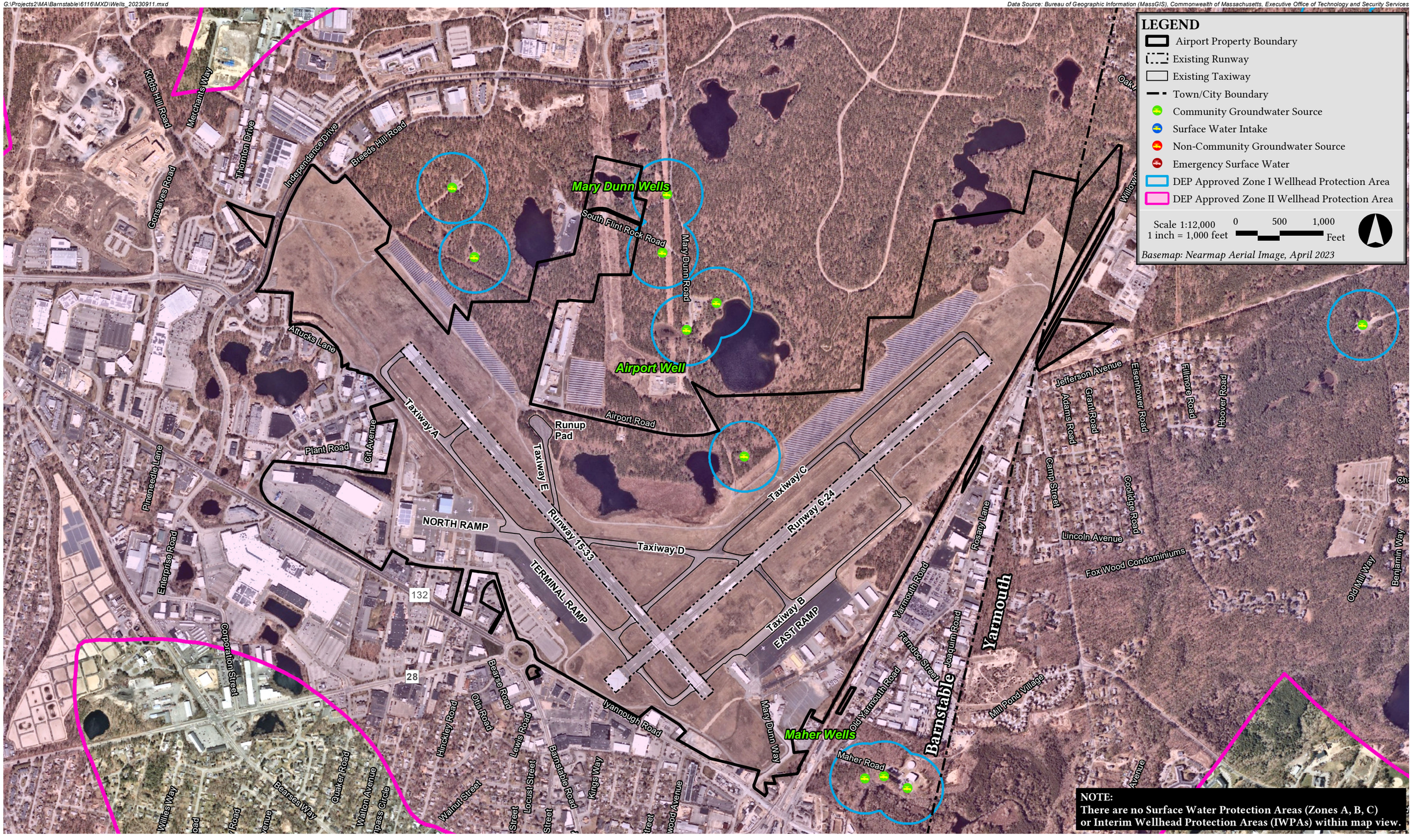


Figure 5.4-4
Groundwater Resources

future well locations, including two locations leased by the Airport to the Barnstable Water Company, and two locations on Airport property that are identified as future well sites on the Town of Barnstable's zoning map.

MassDEP regulations protect both Zone I and Zone II of public water supplies. The Zone I area is a protective area – usually a 400-foot radius - which must be owned or controlled by the public water supplier, and within which current and future land uses must be limited to those land uses directly related to the provision of the public water system or to other land uses which the public water system has demonstrated have no significant impact on water quality. Zone II is a larger area, denoting the area of an aquifer which contributes water to a well under the most severe pumping and recharge conditions that can be realistically anticipated (180 days of pumping at approved yield, with no recharge from precipitation). MassDEP has strict Zone I protective requirements. Zone II protection is provided through local wellhead protection zoning, passed by cities and towns under impetus from MassDEP.

The Airport is located within wellhead protection areas (land area where rain soaks into the ground, enters groundwater, and flows to one of the wells), or Zone II areas as defined by MassDEP. As shown on **Figure 5.4-4**, Zone II areas protecting wells located proximate to the Airport underlies the entire Airport property. Areas within Zone II defined by the five-year time of travel as described below reflect areas of highest sensitivity due to their direct connection to existing drinking water supplies. This area represents the portion of the larger Zone II that is most closely connected to the source well. The Barnstable Groundwater Protection Overlay District and associated regulations impose stronger restrictions on the five-year time of travel area, which is known under local zoning as the Wellhead Protection (WP) Overlay District. Additionally, several of the Cape Cod Commission policies and procedures are designed to protect groundwater resources. Project compliance with these above protection policies is discussed further in Chapter 8.0.

5.4.5 Wild and Scenic Rivers (NEPA)

Wild and Scenic Rivers are identified as rivers having remarkable scenic, recreational, geologic, fish, wildlife, historic, or cultural values as defined by the Wild and Scenic Rivers Act. If the FAA is taking an action that would physically impact resources covered by the Wild and Scenic Rivers Act, there may be consultation requirements under the Act. The Proposed Action is not located within 5 miles of a designated Wild and Scenic River as determined by the NWSR System or of a river segment identified in the NRI (see **Figure 5.4-1**). The only currently designated Wild and Scenic Rivers in Massachusetts are Nashua, Squannacook and Nissitissit Rivers; Sudbury, Assabet and Concord Rivers; Taunton River; and Westfield River.

Since the No Action and Proposed Action Alternatives would not affect Wild and Scenic Rivers in the primary study areas, this resource is dismissed from further consideration.

5.5 Coastal Resources (MEPA/NEPA)

Coastal resources include all natural resources occurring within coastal waters and their adjacent shorelands. Coastal resources include islands, transitional and intertidal areas, salt marshes, wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as fish and wildlife and their respective habitats within these areas.

The Coastal Zone Management Act (CZMA) provides for the management of U.S. coastal resources. Requirements of the CZMA ensure that activities conducted or authorized by federal agencies are consistent with approved state coastal zone management programs. Consistency requirements, as listed in the National Oceanic and Atmospheric Administration's (NOAA) implementing regulations (15 CFR part 930), apply to activities that would have reasonably foreseeable effects on land or water uses or natural resources in a coastal zone.

Cape Cod and the islands of Nantucket and Martha's Vineyard are included in the Massachusetts Coastal Zone Boundary, as identified in the Massachusetts Office of Coastal Zone Management (CZM) Policy Guide.

The Airport is located within the Massachusetts Coastal Zone (see **Figure 5.5-1**); therefore, the Project is required to undergo CZM consistency review under Section 307 of the Federal Coastal Zone Management Act of 1972. Projects requiring review under NEPA, such as those funded by the FAA would also require CZM consistency review.

Documentation of consistency is provided in Section 8.3.7, Massachusetts Coastal Zone Management Policies.

5.6 Air Quality (MEPA/NEPA)

Air quality impacts are evaluated based on requirements outlined in FAA Orders 1050.1F and 5050.4B. Specifically FAA Order 1050.1F and accompanying 1050.1F Desk Reference establishes guidelines for compliance with NEPA. The FAA establishes thresholds for determining significant impacts for the various impact categories. For air quality, the significance level is: "The action would cause pollutant concentrations to exceed one or more of the National Ambient Air Quality Standards (NAAQS), as established by the EPA under the Clean Air Act, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations (FAA Order 1050.1F, Exhibit 4-1)." In addition to FAA requirements, there are state regulations that may apply to air quality analyses. For example, those established by MEPA.

This section presents an overview of the regulatory process, a determination of the need for an air quality assessment, and description of the existing air quality conditions at the Airport.

5.6.1 Regulatory Framework

In 1970, the CAA was enacted by the U.S. Congress to protect the health and welfare of the public from the adverse effects of air pollution. As required by the CAA, the EPA promulgated NAAQS for the following criteria pollutants: nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter

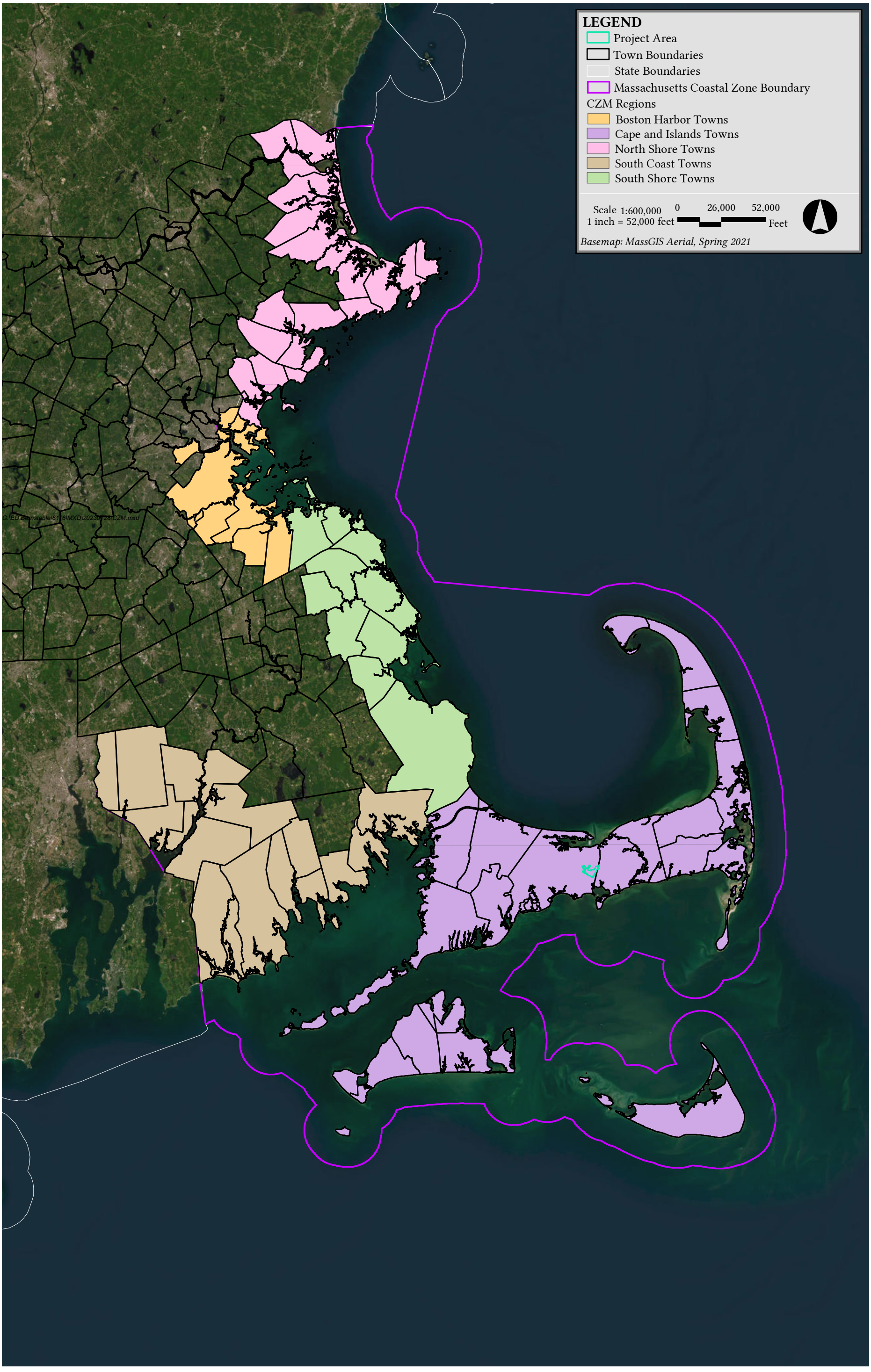


Figure 5.5-1
Coastal Zone Management Resources

(PM) (PM_{10} and $PM_{2.5}$), carbon monoxide (CO), ozone (O_3), and lead (Pb). US EPA reports air pollution concentrations with respect to how the health-based NAAQS are defined. These are called design values. For example, some standards are not to be exceeded such as the annual NO_2 standard, and some standards are compared to the 98th percentile of 24-hr averages or a 1-hr daily maximum, averaged over 3 years, such as the short-term $PM_{2.5}$ and the NO_2 standards, respectively. The NAAQS are listed in **Table 5.6-1**. Massachusetts recently revised their codified standards to be identical to NAAQS.

NAAQS specify concentration levels for various averaging times and include both "primary" and "secondary" standards. Primary standards are intended to protect human health, whereas secondary standards are intended to protect public welfare from any known or anticipated adverse effects associated with the presence of air pollutants, such as damage to vegetation. The NAAQS also reflect various durations of exposure. The short-term periods (24 hours or less) refer to exposure levels not to be exceeded more than once a year. Long-term periods refer to limits that cannot be exceeded for exposure averaged over three months or longer.

The NAAQS are applicable to all of the US and territories. An area that is not in compliance with the NAAQS is deemed in nonattainment. If there is insufficient data to determine compliance, then an area is deemed unclassified and is treated as if in compliance.

Table 5.6-1 National Ambient Air Quality Standards (NAAQS)

Pollutant	Averaging Period	NAAQS (µg/m³) *Primary*	*Secondary*
NO_2	Annual [1]	100	Same
	1-hour [2]	188	None
SO_2	3-hour [3]	None	1300
	1-hour [4]	196	None
$PM_{2.5}$	Annual [1]	12	15
	24-hour [5]	35	Same
PM_{10}	24-hour [3]	150	Same
CO	8-hour [3]	10,000	Same
	1-hour [3]	40,000	Same
Ozone	8-hour [6]	147	Same
Pb	3-month [1]	0.15	Same

Source: http://www.epa.gov/ttn/naaqs/criteria.html and 310 CMR 6.04
[1] Not to be exceeded.
[2] 98th percentile of one-hour daily maximum concentrations, averaged over three years.
[3] Not to be exceeded more than once per year.
[4] 99th percentile of one-hour daily maximum concentrations, averaged over three years.
[5] 98th percentile, averaged over three years.
[6] Annual fourth-highest daily maximum eight-hour concentration, averaged over three years.

Attainment with the NAAQS is based on data that is collected from a network of air monitoring sites across the country. The primary responsibility to ensure compliance with the NAAQS is assigned in the CAA to the individual states and any nonattainment areas require states to establish a State Implementation Plan (SIP) to reach compliance. The FAA is responsible for ensuring that airports' actions conform with SIPs, which is also known as General Conformity (Title 40 CRF Part 93). The general conformity rules only apply to areas that have been deemed to be

in nonattainment or in maintenance (i.e., areas that were formally in nonattainment but have been in attainment for a period of 10 to 20 years).

Although not considered a criteria air pollutant in terms of having an air quality standard protective of human or welfare effects, carbon dioxide (CO_2) is considered a greenhouse gas and analysis of CO_2 emissions is required. This assessment is presented in Section 5.7 Climate and Greenhouse Gas Emissions.

5.6.2 Attainment Status and Conformity

The EPA is required to publish a list of the geographic areas that are either not in compliance or in compliance with the NAAQS (Section 107 of the 1977 CAA Amendments). The attainment status for Barnstable County is shown in **Table 5.6-2**. As the Table shows, all of Massachusetts is in attainment of all the NAAQS; therefore, the General Conformity regulations do not apply to Barnstable County.

Table 5.6-2 Attainment Status for Barnstable County

Pollutant	Attainment Status
NO_2 (1-hour and annual)	Unclassifiable/Attainment
SO_2 (1-hr)	Unclassifiable/Attainment
PM-2.5	Unclassifiable/Attainment (2012)
PM-10 (24-hour)	Unclassifiable/Attainment
CO (1 and 8-hour)	Unclassifiable/Attainment
Ozone (8-hour)	Unclassifiable/Attainment (2015)
Pb (rolling 3-month)	Unclassifiable/Attainment

Source: 40 CFR 81.322, EPA's Green Book, and Massachusetts 2021 Air Quality Report

5.6.3 Background Air Quality

To estimate background pollutant levels representative of the area, the most recent US EPA design values[2] were obtained for 2019 to 2021 for the criteria pollutants. The closest and most representative monitoring station for which data are available for all air pollutants is generally selected. The monitoring station at Harrison Avenue in Boston was selected for this Project. This station is located in an urban area near major roads so would be considered a conservative estimate of background air concentrations.

Table 5.6-3 presents the background air quality concentrations for all the criteria air pollutants.

[2] Air Quality Design Values | US EPA. A design value is reported by US EPA in the correct format for comparison with the NAAQS.

Table 5.6-3 Observed Ambient Air Quality Concentrations and Background Levels

Pollutant	Averaging Time	Background Concentration (µg/m³)	NAAQS	Percent of NAAQS
NO_2 (1)	1-Hour	84.6	188	45%
	Annual	18.8	100	19%
SO_2(2)	1-Hour	5.2	196	3%
$PM_{2.5}$	24-Hour (3)	15	35	43%
	Annual (3)	6.2	12	52%
PM_{10}	Max 24-hr	28	150	19%
CO (4)	1-Hour	1833.6	40000	5%
	8-Hour	1260.6	10000	13%
Ozone(5)	8-Hour	119.7	147.0	81%
Pb	Max 24-hr	0.003	0.15	2%

Notes:
From Air Quality Design Values | US EPA. or EPA's AirData Website
NO_2 concentrations are reported in ppb. Converted to µg/m³ using factor of 1 ppb = 1.88 µg/m³.
SO_2 reported ppb. Converted to µg/m³ using factor of 1 ppb = 2.62 µg/m³.
Background level is the average concentration of the three years.
CO is reported in ppm. 1 ppm = 1150 µg/m³.
O_3 reported in ppm. Converted to µg/m³ using factor of 1 ppm = 1963 µg/m³.

As shown in **Table 5.6-3**, the air quality at background air quality is generally very good even in urban areas with high traffic volumes, with air concentrations that are well below the current NAAQS. Emission sources from airport operations include aircraft, auxiliary power units, ground support equipment, stationary/area sources, ground access vehicles, and construction. Criteria air pollutants and GHGs are primarily emitted from the burning of fossil fuels. As noted above, the FAA has established significance thresholds to serve as indicators of what constitutes a significant impact.[3] For air quality, the significance threshold is any action that would result in criteria air pollutant concentrations that would lead to an exceedance of the NAAQS or increase the severity of any existing exceedance.

5.7 Climate Resiliency and Greenhouse Gas Emissions (MEPA/NEPA)

A variety of GHG emission sources are associated with the operations at the Airport. GHG emissions are linked to equipment and energy use owned by the Airport and with equipment that is operated by its tenants and the general public. Airport-owned sources of emissions include ground service equipment, fleet vehicles, parking lots, buildings, and stationary sources such as emergency generators. Tenant emissions are associated with the operation of the aircraft, ground service equipment, and fleet vehicles. Emissions associated with the general public include vehicle travel to and from the Airport.

Emissions from Airport buildings are associated with electricity consumption and fuel consumption. Lighting, plug loads, fans, and pumps are all examples of building equipment that consume electricity. Kitchen equipment and boilers for space heating and water heating are sources of fuel combustion. In 2017, the Cape Cod Commission estimated that aviation activity to

[3] FAA Order 1050.1F

and from Barnstable County (inclusive of Cape Cod Gateway, Chatham, and Provincetown municipal airports as well as Joint Base Cape Cod) results in 19,614 MTCO2E annually.[4] Of this, the Airport accounted for 11,700 MTCO2E in 2019, or 59.7%. Overall, within the transportation sector, aviation accounts for only 0.1% of air emissions on Cape Cod.

The Airport is committed to energy conservation and over the years has invested in several improvements to promote energy conservation and efficiency at the Airport:

- Maintains two solar fields (24,640 solar panels in total) on the northern side of the Airport property, occupying approximately 25 acres of Airport property and the adjacent Fire District property. The solar fields generate approximately 6.7 megawatts (direct current or DC) of energy and are estimated to offset more than 5,000 metric tons of CO2 emissions annually;
- Upgraded Airport street and parking lot lights to LED using Cape Light Compact's lighting program;
- Has installed electric vehicle charging stations in three parking lot locations;
- Worked with Cape Air to install roof mounted solar arrays on two leased hangars; and
- Has purchased electric, solar and propane mowing equipment.

Additionally, the Airport has initiated the development of a smart microgrid in conjunction with the Cape Cod Transit Authority (CCTA) and MassDOT Aeronautics Division to provide an instantaneous and dependable supplementary source of power. Microgrids are a purpose-built local electrical system that can operate either in parallel with or separate from the utility, providing their own generation and load balancing to achieve stable operations. They integrate several different local generation resources as well as some type of energy storage to allow for flexibility in peak conditions. The development of this microgrid will enhance the Airport's ability to set new airport standards for resiliency and sustainable energy.

5.7.1 Resilient MA Action Team (RMAT) Tool (MEPA)

The Executive Office of Energy and Environmental Affairs (EEA) and the Massachusetts Emergency Management Agency (MEMA) lead the Resilient MA Action Team (RMAT), an inter-agency team comprised of Climate Change Coordinators from each Secretariat who are supported by agency staff, stakeholders, and subject matter experts.

The RMAT is tasked with monitoring and tracking the State Hazard Mitigation and Climate Adaptation Plan (SHMCAP) implementation process, making recommendations to, and supporting agencies on plan updates, and facilitating coordination across state government and with stakeholders. The SHMCAP (2018) notes, relative to the aviation sector, that "high

[4] Cape Cod Regional Greenhouse Gas Inventory, 2017 Baseline. February 2021. Cape Cod Commission.

temperatures may also impact airplane operations. If the length of existing runways is not sufficient under higher temperature conditions, planes may not be able to take off when there is less lift available (MassDOT, 2017).[5]

5.7.1.1 RMAT Tool Outputs

Consistent with the MEPA Protocol for Analysis of Impacts on Environmental Justice Populations[6], the Airport has entered information on the Proposed Project, the Project site, and construction schedules, into the Design Standards Tool (the "RMAT Tool"), which was attached the ENF (RMAT report submitted on June 1, 2022).

MEPA policy notes that the RMAT Tool may indicate a "High" risk rating for certain weather related events (sea level rise/storm surge or extreme precipitation (urban or riverine flooding) as applied to the project location). RMAT tool "High" risk ratings could be an indicator of elevated climate risks for EJ populations that immediately surround the Project site (meaning all EJ populations located in whole or in part within the Project boundaries). However, MEPA guidance notes that the risk rating for the "extreme heat" parameter should not be used as a definitive indicator of elevated climate risks.

The Airport reviewed the output report generated from the RMAT Tool (see **Appendix G**) to identify whether the climate parameters for sea level rise/storm surge and extreme precipitation (urban or riverine flooding), ranked "High," would affect the applicable EJ population(s). (See **Table 5.7-1**).

Table 5.7-1 RMAT Tool - Asset Preliminary Climate Risk Rating

	Sea Level Rise/Storm Surge	Extreme Precipitation - Urban Flooding	Extreme Precipitation - Riverine Flooding	Extreme Heat
Runways and Taxiways	Low Risk	High Risk	High Risk	High Risk
Terminal Building	Low Risk	High Risk	High Risk	High Risk
Hangar Development Areas	Low Risk	High Risk	High Risk	High Risk

RMAT Tool Output Considerations

To properly understand RMAT Tool outputs and ratings, and to apply information from RMAT to the Proposed Project, the following limitations of the RMAT tool is noted in the interpretation of results:

[5] High temperatures and dense air conditions could lead to increased runway length requirements for aircraft due to diminished performance in such conditions (Resilient MA, 2018). Moreover, heat can soften the asphalt of airport runways, impairing airplane movement (page. 4-168).

[6] www.mass.gov/doc/final-mepa-interim-protocol-for-analysis-of-project-impacts-on-environmental-justice-populations-effective-date-of-january-1-2022/download

Climate projections and GIS datasets used in the RMAT tool are based on the published data available for the region at this time. Climate projections provided by others and underlying assumptions and uncertainties have not been independently reviewed by the project team that developed the Climate Resilience Design Standards and Guidance. The limitations provided in the GIS datasets and climate projections by others also apply to the Tool.

Actual climate conditions will vary and may be more or less extreme than the projections used for the Climate Resilience Design Standards Tool. The Commonwealth of Massachusetts plans to update their climate projections at least every five years through the State Hazard Mitigation and Climate Adaptation Plan process.

Statewide hydrologic flood models have not been developed to predict riverine flood exposure. The methodology used by the RMAT tool does not distinguish between near-term and longer-term riverine flood risks. Waterbodies MassGIS hydrography/DEP wetlands site are not explicitly categorized as coastal/inland or major/minor. Current RMAT tool methodology does not identify projects/areas that may experience combined flood exposure from both riverine and coastal flooding, which may affect exposure as well the recommended Climate Resilience Design Standards.

The user inputs are subject to unintentional misrepresentation of conditions. The GIS datasets queried are based on the extent of the polygon and useful life of asset(s) as provided by the user.

The Preliminary Climate Exposure and Risk Screening outputs are not intended for final opinions for site suitability, regional coordination, capital planning, permitting and/or construction and should continue to be vetted with site-specific information, updated climate projections, design alternatives, and regulatory requirements. Within the limitations of scope, schedule, and budget, the relationships informing the Preliminary Climate Exposure and Risk Screening outputs have been executed in accordance with the generally accepted practices in this area at this time based on iterative stakeholder feedback. No warranty, expressed or implied, is given.

Potential Project Exposure

Sea Level Rise/Storm Surge: The Project received a "High Exposure" because of the following: Increased impervious area; Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life. However, the model noted no historic flooding at the Project Site and existing impervious area of the Project Site is between 10% and 50% - an expected value based on the use as an air transportation facility.

Extreme Precipitation - Urban Flooding: The Project received a "High Exposure" because of the following: Increased impervious area, Maximum annual daily rainfall exceeds 10 inches within the overall project's useful life. However, the model outputs noted no historic flooding at Project Site and existing impervious area of the Project Site is between 10% and 50%.

Extreme Precipitation - Riverine Flooding: The Project received a "High Exposure" because of the following: Part of the Project is within a mapped FEMA floodplain, outside of the Massachusetts Coast Flood Risk Model (MC-FRM)**,** Part of the Project is within 100ft of a waterbody, Project is potentially susceptible to riverine erosion**.** However, no historic riverine flooding at the Project Site was noted.

Extreme Heat - The Project received a "High Exposure" because of the following: Increased impervious area, existing trees are being removed as part of the proposed Project, existing impervious area of the Project Site is between 10% and 50%, 10 to 30 day increase in days over 90 degrees F within Project's useful life and location within 100 ft of existing water body. However, MEPA guidance notes that the risk rating for the "extreme heat" parameter should not be used as a definitive indicator of elevated climate risks.

Project Related Climate Benefits

Aspects of the Project may reduce climate risks, these include measures such as improvements to stormwater management systems, use of onsite energy generation/storage via a microgrid, and use "green" construction standards for airport tenants. These measures respond to the RMAT Tool analysis output for anticipated climate change effects. Additionally, the proposed Project is consistent with, and responds to future climate scenarios (e.g., heat impacts) by adding runway length to maintain safe aircraft operations.

As described above, within the SHMCAP (2018) "high temperatures may also impact airplane operations. If the length of existing runways is not sufficient under higher temperature conditions, planes may not be able to take off when there is less lift available [and] high temperatures and dense air conditions could lead to increased runway length requirements for aircraft due to diminished performance in such conditions."

Further analysis of the RMAT Tool estimated risk ratings for climate parameters (e.g., temperature, precipitation) does not indicate an elevated climate risks for EJ populations within the DGA for the Project Site. Mitigation and minimization measures to Project impacts are discussed in Chapter 7.0 and are anticipated to adequately address potential future climate conditions.

5.8 Natural Resources and Energy Supply (NEPA)

Under FAA Order 1050.1F, the natural resources and energy section provides information relative to the Project's consumption of natural resources (such as water) and use of energy supplies (such electricity). Consumption of natural resources and use of energy supplies may result from construction, operation, and/or maintenance of the Proposed Action or Alternative(s).

To adequately describe the existing conditions for natural resources and energy supply within the Project area, this EA/EIR provides the following information:

- The suppliers of energy resources found in the area such as power plants, water utilities, sewage disposal utilities, and suppliers of natural gas and petroleum; and
- The resources a project would use in the construction, operation, and maintenance of a project and identify where the suppliers are located.

Barnstable Water Company serves the Airport. Effluent from each building's sanitary system flows into the Town of Barnstable's sanitary sewer system via a four-inch or eight-inch pipe connected to the Airport. The effluent from the kitchen area of the café flows through one of the laterals and into a 1,000-gallon grease trap before flowing into the sanitary system. At the time of document preparation, there was no active use of the kitchen within the terminal building.

The Airport's electricity needs are provided by Eversource. The Airport also has backup generators for the terminal building as well as for the airfield should power ever go out. The closest power plant is Canal Station, located on the Cape Cod Canal in Sandwich. Canal Station operates a 350 megawatt (MW) dual-fueled (natural gas and diesel) generation station which provides power during peak need. Vineyard Wind 1, the nation's first utility-scale offshore wind energy project is currently under construction offshore of Martha's Vineyard and will produce 800 MW of power to be brought onshore in Barnstable at Covell's Cove. Once this project is brought online, it will be transmitted via ISO New England.

Energy consumption at the Airport consists predominantly of electricity and fuel for aircraft and ground vehicles and lighting along runways and taxiways, approach lighting systems, ramp lighting, terminal facilities, hangar buildings, air traffic control tower, roadway, and parking lot lighting. The Airport's current energy conservation commitments are discussed above in Section 5.7. The Airport continues to seek projects that encourage energy conservation and the use of renewable sources such as the smart microgrid project discussed in Section 5.7.

5.9 Noise (MEPA/NEPA)

This sound level assessment includes computer modeling to predict future sound levels from the Project as well as a comparison to existing sound levels and FAA land use compatibility. Potential noise receptors include residential developments in all directions of the Airport – including the towns of Barnstable, Cummaquid, Yarmouth, West Yarmouth, Hyannis, and Centerville; commercial facilities directly adjacent to the Airport – including shopping centers, auto dealerships, restaurants, corporate buildings; and the Hyannis Ponds Wildlife Management Area, a state forest with associated trails to the north.

A Federal Aviation Regulations (FAR) Part 150 Noise Study was prepared for the Airport in 1987 and approved by FAA in 1989. The study was updated in 1998-99, resulting in additional practices being adopted. These studies presented an analysis of existing and future noise levels both at the Airport and in the vicinity thereof resulting from aircraft operations. It also provided suggestions that, when implemented, would help to reduce noise impacts. These suggestions are currently in effect as voluntary noise abatement flight procedures. These procedures are for use in visual flight rule (VFR) weather conditions. These procedures (1) indicate priority runway use for noise abatement; (2) identify known noise sensitive areas in the vicinity of the Airport; and (3) provide optimum noise abatement arrival and departure paths for each runway. These are to be followed unless otherwise directed by ATC, or unless, in the pilot's judgment, safety of the flight will be compromised.

At the Airport, pilots are educated in these procedures via a handout and via airfield signage. These procedures are also available on the Airport's website at https://flyhya.com/pilot-info/noise-abatement/. The Airport has established voluntary quiet hours between 10 p.m. and 6 a.m. During

these times, airlines and general aviation operators are encouraged to limit their flights so that citizens in neighboring communities are not disturbed during normal sleeping hours. Also, training, touch-and-go and certification flights are prohibited without approval of the airport management.

5.9.1 FAA Land Use Compatibility

The Project is subject to the guidelines for land use compatibility adopted by the FAA. Code of Federal Regulations, Title 14, Part 150 provides the FAA's recommended guidelines for determining noise/land use compatibility. Airport-compatible land uses are defined as those uses that can coexist with a nearby airport without constraining the safe and efficient operation of the airport or exposing people living or working nearby to potential negative environmental or safety impacts. According to these FAA guidelines, all identified land uses, including residential areas, are compatible with aircraft noise at DNL levels below 65 dB. Commercial land use areas are compatible with DNL levels below 70 dB.

5.9.2 Existing Noise Conditions

The existing noise environment surrounding the Airport has been documented through noise exposure maps. The noise exposure maps (NEMs) include annual day-night average (DNL) sound level contours computed used the FAA's Aviation Environment Design Tool (AEDT) for aircraft flights using operations data from 2019 to establish existing conditions DNL contours. The results of this noise assessment for the 2019 existing conditions are described below. Utilizing 2019 data for the baseline noise analysis is a conservative approach as the operations numbers were approximately 50% more than the number of operations in 2022 (34,190).

The FAA's AEDT was used to generate the DNL noise contours for the 2019 Existing Condition. Input data required for the AEDT noise model includes the following: aircraft fleet mix, runway geometry, runway utilization, the number and type of aircraft operations (departures and arrivals) by aircraft type, and the number of daytime (7 am to 10 pm) and nighttime (10 pm to 7 am) aircraft operations for a typical average annual day at the Airport.

5.9.2.1 Noise Model Inputs

Total operations for 2019 for all aircraft categories were 67,350. Of these, 6,203 were Touch and Go, accounting for 9.2% of Aircraft operations. Aircraft operations were broken down into the following categories: Single Engine (Piston), Jet, Turbo prop, Helicopter, and General Aviation Touch & Go aircraft. All the touch & go operations occur during the daytime period. **Table 5.9-1** summarizes the Airport's average annual daytime and nighttime operations by aircraft type for the 2019 Existing Condition. Also included in **Table 5.9-1** is the AEDT aircraft code used for each aircraft type in the AEDT model. The noise model input also includes a breakdown by arrival and departure by runway (not shown here for brevity). See **Appendix H** for all operations data included in the noise model.

Table 5.9-1 2019 Existing Conditions Operations Data

Aircraft	AEDT Code	Aircraft Type	Ann Ops	Daily op	Day Op	Night Op
Generic Single	C172	Piston	5,712	15.65	14.62	1.03
Piper Cherokee (PA28)	P28A	Piston	1,433	3.93	3.67	0.26
Cirrus SR22	SR22	Piston	1,270	3.48	3.25	0.23
Piper Navajo	PA31	Piston	9,136	25.03	23.38	1.65
Pilatus PC-12	PC12	Turboprop	1,119	3.07	2.86	0.20
Cessna 402 Businessliner	C402	Piston	26,274	71.98	67.23	4.75
Cessna 414 Chancellor	C414	Piston	889	2.44	2.27	0.16
Beechcraft Super King Air	BE30	Piston	9,021	24.72	23.08	1.63
Cessna Citation Excel	C56X	Jet	1,270	3.48	3.25	0.23
Cessna Citation Sovereign	C680	Jet	1,105	3.03	2.83	0.20
Technam P2012 Traveller	P212	Piston	268	0.73	0.69	0.05
Hawker 800	H25B	Jet	319	0.87	0.82	0.06
Learjet 45	LJ45	Jet	607	1.66	1.55	0.11
Bombardier Challenger 300	CL30	Jet	1,135	3.11	2.90	0.21
Bombardier Challenger 600	CL60	Jet	390	1.07	1.00	0.07
Embraer 190	E190	Jet	184	0.50	0.47	0.03
Gulfstream 4	GLF4	Jet	271	0.74	0.69	0.05
Gulfstream 5	GLF5	Jet	120	0.33	0.31	0.02
Bombardier Global Express	GLEX	Jet	156	0.43	0.40	0.03
Eurocopter EC 145	EC45	Helicopter	234	0.64	0.60	0.04
Sikorsky S-76	S76	Helicopter	234	0.64	0.60	0.04
Total			**61,147**			
Touch and Go			**6,203**			
Total Operations			**67,350**			

Runway utilization is a major part of AEDT modeling. At Cape Cod Gateway Airport, aircraft operations are proportionally distributed to each of the four runways. Approximately 55.4% of aircraft departure and arrival operations occur from Runways 6 and 24 and 44.6% from Runways 15 and 33. Nighttime operations total 6.6% of total operations. Touch & Go aircraft operations are similarly distributed on runways **Table 5.9-2** summarizes runway utilization for the 2019 Existing Condition used in the noise modeling analysis.

Table 5.9-2 2019 Runway Utilization

Runway 15	Runway 33	Runway 6	Runway 24
19.9%	24.7%	18.0%	37.4%

5.9.2.2 Day Night Average Sound Level Results

Using the aircraft data shown in **Table 5.9-1**, DNL noise contours were generated using the AEDT noise model for the 2019 Existing Condition at the Airport. These numbers are reflective of current post-COVID conditions, if not more conservative as operations numbers remain lower post-COVID. The 70, 65, and 60 DNL noise contours are shown in **Figure 5.9-1**. Overlaying the DNL noise contours onto a base map of the area surrounding the Airport, a determination of overall noise exposure was made based on aircraft operations. FAA guidelines indicate that all land uses are normally compatible with DNL noise levels less than 65 dBA.

Based on the 2019 noise contours, the 70 and 75 dBA DNL contours are entirely within the Airport property. The 65 dBA contour slightly extends into commercial land use east of Yarmouth Road. **Figure 5.9-1** shows that the 65 dBA DNL sound contour generally falls within the airport property, extending just beyond the property to the east near Yarmouth Road. These commercial facilities are all below a DNL of 70 dBA, which is the noise compatibility threshold of commercial land uses. These results indicate that the existing condition of land use surrounding the Airport is noise compatible. All residences are exposed to noise levels below a DNL of 65 dBA and all commercial facilities are below a DNL of 70 dBA as described by the FAA's Order 1050.1F.

5.10 Biological Resources (Fish, Wildlife, and Plants)

Biological resources include terrestrial and aquatic plant and animal species; game and non-game species; special status species (state or federally listed threatened or endangered species, marine mammals, or species of concern, such as species proposed for listing or migratory birds); and environmentally sensitive or critical habitats. Wildlife species have specific habitat requirements, such that the distribution and abundance of each species are limited by the quality and quantity of available habitat in a given area.

The study area for biological resources affected by the Project focuses on the individual Project Sites and the entire Airport. Where relevant, areas outside of the Airport's property boundaries are discussed. Certain undeveloped portions of the Airport provide suitable habitat for a number of plant and wildlife species common to Massachusetts.

5.10.1 Threatened and endangered species

5.10.1.1 Federally protected species and critical habitat

Federally listed species identified near the Project area via IPaC include one animal, Northern Long Eared Bat (*Myoptis septentrionalis,* NLEB) and two plants, American chaffseed (*Schwalbea americana)* and sandplain gerardia (*Agalinis acuta*). The U.S. Fish and Wildlife Service (USFWS) has not identified critical habitat for these species. Neither of these species is listed by the

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

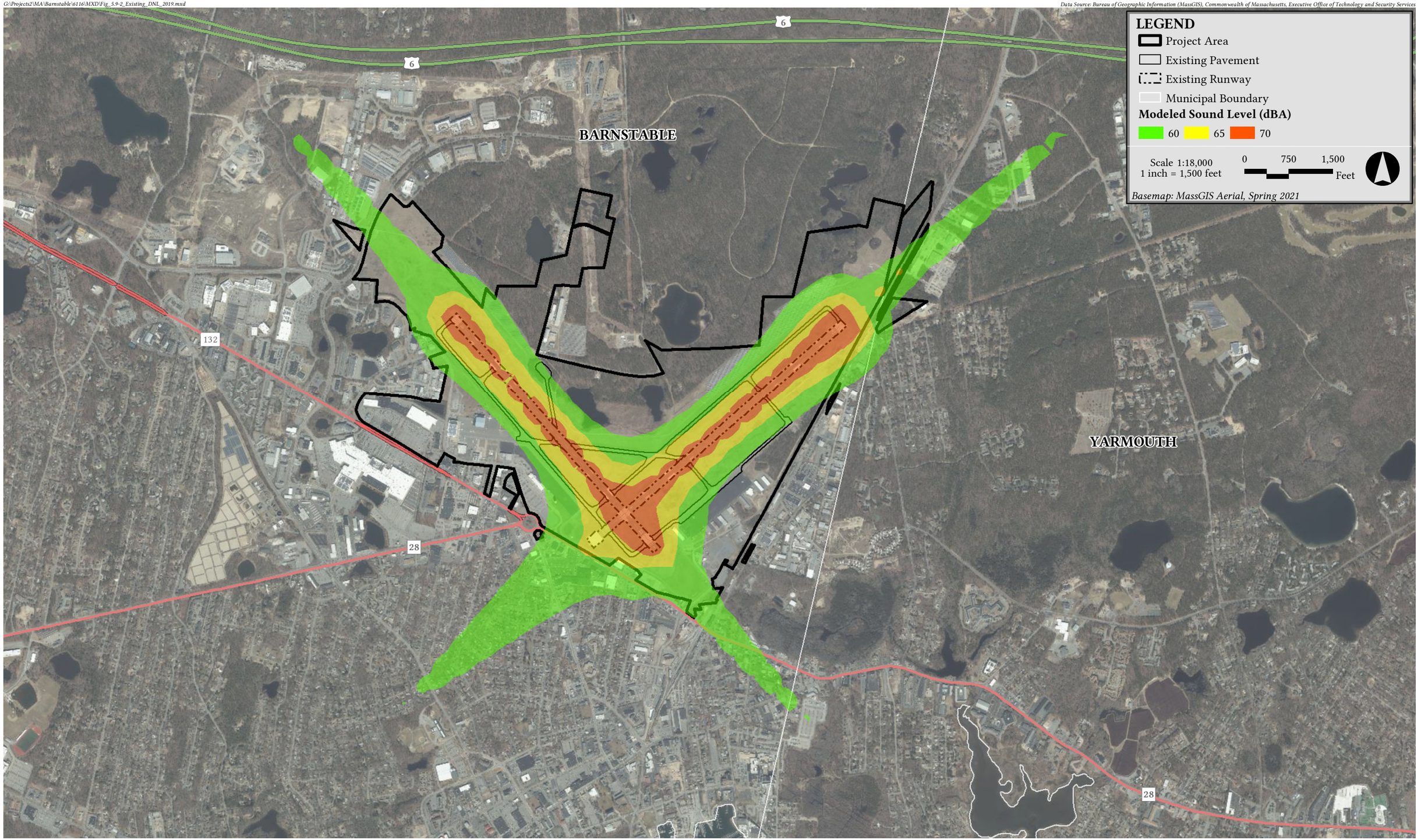


Figure 5.9-1
Existing Aircraft Only Annual Day Night Level (2019)

Massachusetts Natural Heritage and Endangered Species Program (NHESP) as within the Project area. Additionally, the USFWS identifies bald eagles, protected by the Bald and Golden Eagle Protection Act as present in the Project area.

According to NHESP mapped data (June 12, 2019), two known maternity roost trees for NLEB are located in Sandwich and several in Eastham. No known hibernacula are documented on Cape Cod. American chaffseed is found in sandplain grasslands in open sunny plant communities. There is only one known population in one location in Barnstable County. A review of the USFWS Critical Habitat for Threatened & Endangered Species Map revealed no critical habitats within the Project area. A species list via USFWS IPac is provided in **Appendix I**.

The NLEB range includes much of the eastern and north central United States and all Canadian provinces from the Atlantic Ocean west to the southern Yukon Territory and eastern British Columbia. NLEB spend winter hibernating in caves and mines called hibernacula. They use areas in various sized caves or mines with constant temperatures, high humidity, and no air currents. During the summer, NLEB roost singly or in colonies underneath bark, in cavities or in crevices of both live trees and dead trees (snags). Northern long-eared bats seem to be flexible in selecting roosts, choosing roost trees based on suitability to retain bark or provide cavities or crevices. The majority of active airfields are generally free of forest stands and thus lacks summer tree roosting habitat. However, portions of the project area proposed for development (East Ramp), or obstruction removal (north of Taxiway D) may have trees suitable for roosting and surveys would need to be implemented during the permitting phase of these projects to ascertain if bats are present.

5.10.1.2 State protected species and priority habitat

According to the Massachusetts Natural Heritage Atlas (15th Edition, August 1, 2021), areas north and northwest of the Airport contain mapped Estimated Habitat of Rare Wildlife (EH) and Priority Habitats of Rare Species (PH) including Mary Dunn Pond (EH 276 and PH 278), Lewis Pond (PH273), Lamson Pond (PH294), and northwest of Taxiway A off Airport Road (PH 274). Several Potential Vernal Pools (PVPs) are located south of Lamson Pond, south of Mary Dunn Pond, and one Certified Vernal Pool is located just west of Mary Dunn Pond (CVP 4695). Mary Dunn Pond is also identified as a state-imperiled Coastal Plain Pond Shore community. These vernal pool areas are outside the proposed Projects' limits of disturbance. Refer **Figure 5.10-1** for NHESP mapped areas.

5.10.2 Wildlife

Airport property supports habitat for many common mammal species found throughout southeastern Massachusetts as shown in **Table 5.10-1**.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

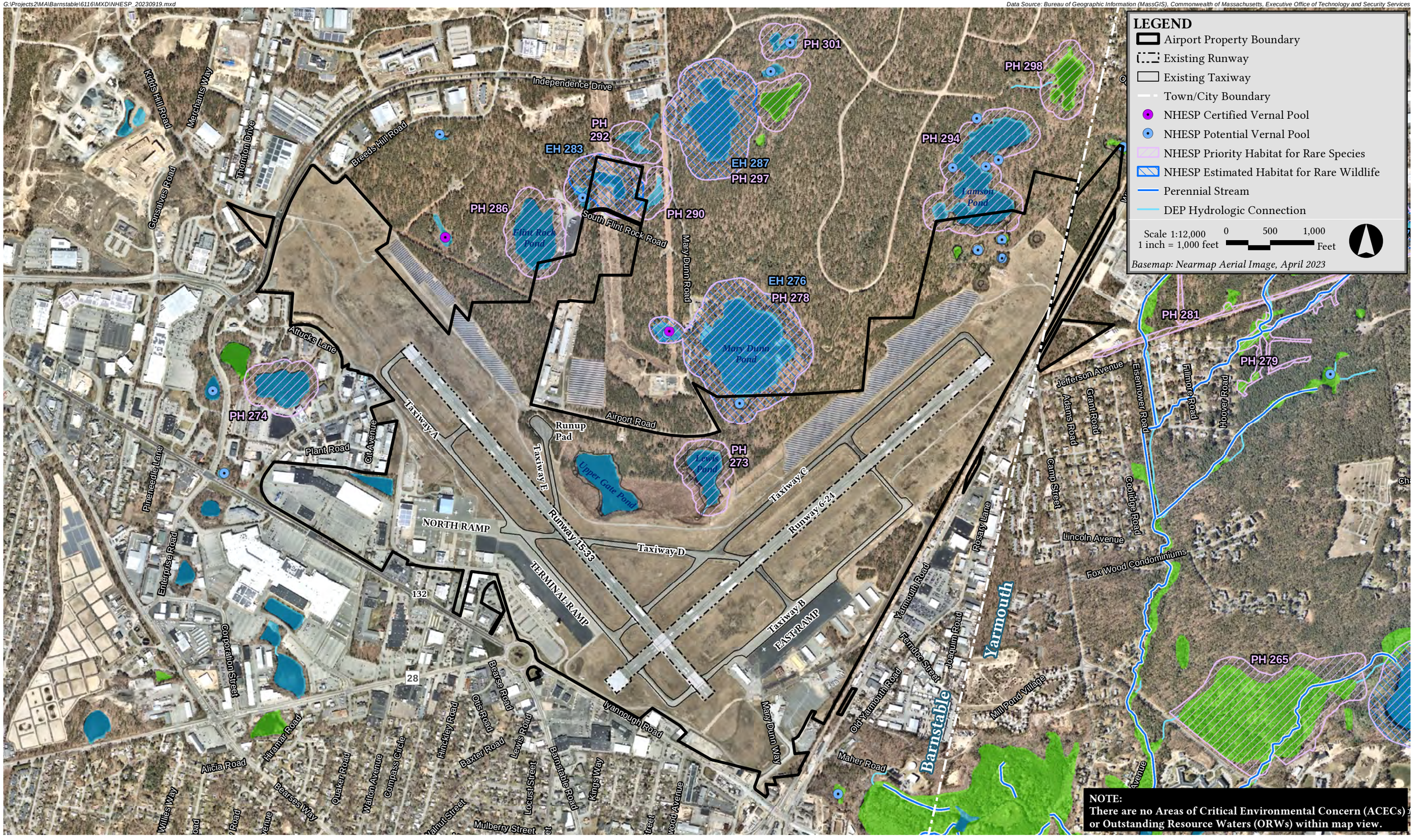


Figure 5.10-1
NHESP Habitat

Table 5.10-1 Common Mammal Species found at Cape Cod Gateway Airport

Common Name	Scientific Name.
coyote	*Canis latrans*
gray fox	*Urocyon cinreoargenteus*
red fox	*Vulpes vulpes*
white-tailed deer	*Odocoileus virginianus*
Virginia opossum	*Didelphis virginiana*
eastern gray squirrel	*Sciurus carolinensis*
woodchuck	*Marmota monax*
eastern chipmunk	*Tamias striatus*
meadow vole,	*Microtus pennsylvanicus*
common muskrat,	*Ondatra zibethicus*
white-footed deermouse	*Peromyscus leucopus*
cottontail	*Sylvilagus spp.*
shrew	*Sorex spp,*
fisher	*Martes pennanti*
American mink	*Neovison vison*
striped skunk	*Mephitis mephitis*
racoon	*Procyon lotor*
bat	*Eptesicus sp*

The Airport supports habitat for many bird species, both resident and migratory. The IPaC report (**Appendix I**) identifies several birds that are protected under the Migratory Birds Treaty Act of 1918 and/or the Bald Eagle and Golden Eagle Protection Act of 1940. The USFWS has identified migratory bird species at the Airport that are of particular concern either because they are on the USFWS Birds of Conservation Concern (USFWS 2021) or otherwise warrant special attention in the region (New England/Mid-Atlantic Coast) and at the Airport. These include several shoreline or coastal bird species, as well as woodland species listed in **Table 5.10-2**.

Table 5.10-2 Migratory Bird Species at Cape Cod Gateway Airport

Common Name	Scientific Name
American Oystercatcher	Haematopus palliatus palliates
Bald Eagle	Haliaeetus leucocephalus*
Black Skimmer	Rynchops niger
Black-Billed Cuckoo	Coccyzus erythropthalmus
Blue-winged warbler	Vermivora pinus
Bobolink	Dolichonyx oryzivorus
Canada Warbler	Wilsonia canadensis
Chimney Swift	Chaetura pelagica
Hudsonian godwit	Limosa haemastica
King rail	Rallus elegans
Lesser Yellowlegs	Tringa flavipes
Long-eared Owl	Asio otus*
Prairie Warbler	Dendroica discolor

Table 5.10-2 Migratory Bird Species at Cape Cod Gateway Airport (Continued)

Common Name	Scientific Name
Purple Sandpiper	Calidris maritima aritima/belcheri
Ruddy Turnstone	Arenaria interpres
Rusty Blackbird	Euphagus carolinus
Short-billed Dowitcher	Limnodromus griseus
Willet	Tringa semipalmata
Wood thrush	Hylocichla mustelina

While not on the IPaC report, the Osprey (*Pandion haliaetus*), a regular resident at the Airport, as well as mallard duck (*Anas platyrhynchos*) and Canada goose (*Branta canadensis*) are regularly observed at the Airport and in the ponds. Conversely, the IPaC report includes other avian species that are rare or may be only casual migrants to the region, that rarely nest on Cape Cod, such as the Black Skimmer.

5.10.3 Potential Vernal Pool Habitat/Aquatic Habitat

Multiple ponds on the Airport property have been mapped by NHESP as potential or certified vernal pools (see **Figure 5.10-1**). Prior studies (Baystate Environmental, 2002, Horsely Witten Group, 2005) have identified fish within Upper Gate Pond, and as such, this pond does not meet vernal pool criteria according to the Guidelines for Certification of Vernal Pool Habitat by the Massachusetts Division of Fisheries and Wildlife. The other identified ponds are outside of the Project site limits and will not be affected by the Project.

5.10.4 Vegetation

Vegetated communities at the Airport primarily consist of open grassy areas and forested areas, predominantly upland communities, with wetland communities associated with the various ponds. The grassy areas are maintained and consist largely of grasses and other herbaceous and low growing woody species. The community supports a relatively dense understory of black huckleberry (*Gaylussacia baccata*) and dangleberry (*Gaylussacia frondosa*). Species observed at the Airport during surveys conducted by Airport consultants are identified in **Table 5.10-3** below.

Forested communities are located to the north of the intersection of the two runways along the north side of the airfield, east of the 24-end, and along the eastern limits of Mary Dunn Way, east of the North Ramp. The forest community is a pitch pine-oak community, 60 % canopy with tallest trees (pitch pine - *Pinus rigidus*) approximately 35-40 feet high. A forested fringe is located along the southeast Airport boundary, in between the roadway and the train tracks. Often dense entanglements of common greenbrier (*Smilax rotundifolia*) and/or cat greenbrier (*Smilax glauca*) are located throughout the upland plant communities.

Table 5.10-3 Common Plant Species found at the Airport

Habitat	Common Name	Scientific Name
Grassland	Little bluestem	Schizachyrium scoparius
	Broom sedge	Andropogon virginicus
	Creeping juniper	Juniperus horizontalis
	Common dewberry	Rubus flaggellaris
	Pearly everlasting	Anaphalis margaritacea
	Pitch pine (seedlings)	Pinus rigida
	Lichens	Cladonia spp.
	Common hawkweed	Hieracium vulgatum
	Purple headed sneezeweed	Hieracium nudiflorum
	Asters	Aster spp.
	Bearberry	Arctostaphylos uva-ursi
	Wild indigo	Baptista tinctoria
	Rabbit's foot clover	Trifolium arvense
	Bush clover	Lespedeza capitata
	Rockrose	Crocanthemum sp.
	Pineweed	Hypericum gentianoides
	Pennsylvania sedge	Carex pensylvanica
	Little ladies' tresses	Spiranthes tuberosa
	Tick trefoil	Desmodium nudiflorum
	Spreading dogbane	Apocynum androsaemifoliuim
Forested Areas	Pitch pine	Pinus rigida
	White oak	Quercus alba
	Scarlet oak	Quercus coccinea
	Black oak	Quercus velutina
	Eastern white pine	Pinus strobus
Forested Areas Shrub Areas	Sassafras	Sassafras albidum
	Eastern red cedar	Juniperus virginiana
	Black cherry	Prunus serotina
	Arrowwood	Viburnum dentatum
	Highbush blueberry	Vaccinium corymbosum
	Inkberry	Ilex glabra
	Sweet pepperbush	Clethra alnifolia
	Nannyberry	Viburnum lentago
	Northern bayberry	Morella pensylvanica
	Black chokeberry	Aronia melanocarpa)
	Scrub oak	Quercus ilicifolia
Groundcover	Wild sarsaparilla	Aralia nudicaulis
	Bracken fern	Pteridium aquilinum
	Wintergreen	Gaultheria procumbens
	Pennsylvania sedge	Carex pensylanica

5.10.4.1 Runway Visibility Zone Vegetation Management

The Runway Visibility Zone (RVZ), defined by FAA as an area formed by imaginary lines connecting the two runways' visibility points, requires an area of maintained vegetation designed to facilitate runway line of sight between intersecting runways. This line of sight enables coordination between aircraft and between aircraft and vehicles that are operating on active runways. In 2015, the Airport permitted and implemented a major maintenance effort of the RVZ, cutting 20 acres of forest to bring the Airport into compliance with the FAA regulations. To remain compliant, the RVZ must remain clear. As the topography in this area is generally lower than the plain of the airfield, the Airport is able to maintain the RVZ as a low growing shrub community.

5.11 Transportation (MEPA)

Because the improvements to the airside, taxiway, and runway are primarily intended to provide stronger compliance with FAA airport safety standards and rehabilitation of existing infrastructure, they would not directly affect the Airport's level of airside or landside activity. Operational forecasts (see Section 1.4.2) indicate a modest increase in enplanements of commercial traffic (~4,000 enplanements increase over baseline by 2040) and general aviation passengers (~13,000 increase in passengers over baseline by 2040).

The baseline condition at the Airport, as presented in the Master Plan, indicates that the existing terminal, with approximately 30,000 sf, has a design capacity of approximately 100 passengers per peak hour. This section examines the transportation network serving the Airport and presents an evaluation of transportation impacts associated with the terminal expansion based on the estimated changes in landside vehicle trip activity at the Airport.

5.11.1 Existing Condition

This section presents the Airport's existing (2023) access, vehicle circulation, the condition of area roadways and key intersections, available traffic data, and public transit services.

5.11.1.1 Airport Vehicle Access and Circulation

The Airport and surrounding roadway network are shown in **Figure 5.11-1**.

5.11.1.1.1 Travel Routes

Automobiles related to airline passenger activity arrive at the Airport terminal primarily via the three roadway routes described below:

- From points northwest: Attucks Lane to Airport Road to Barnstable Road.
- From points east and northeast: Iyannough Road to Airport off-ramp southeast of the Rotary.
- From points west and south: Falmouth Road or Barnstable Road, through the Airport Rotary, to Hinckley Road.
- Automobiles exiting the Airport generally use the above routes in reverse. Most automobiles arriving at the terminal are dropping off passengers, parking, or returning rental cars.
- Access to and egress from the General Aviation facilities is provided on Mary Dunn Way, which is located approximately 500 feet northeast of the Iyannough Road (Route 28)/Yarmouth Road intersection. The Airport site also contains more than 40 local airport-related business tenants, generally located along Barnstable Road.

5.11.1.1.2 Parking

Three automobile parking areas are adjacent to the terminal building including the lot for passengers/public (585 spaces), the rental car lot (100 spaces), and the employee lot (50 usable spaces, 15 currently used for equipment storage). During periods of peak seasonal activity, an overflow parking area, with capacity for 400 vehicles, is available for use on Airport Road.

Additionally, the Airport owns the parking lot currently leased to the Steamship Authority. Current (2023) parking fees at the passenger lot are $0 for less than 30 minutes, $5 for over 30 minutes, and $1 for each additional hour. The daily and weekly rates are $11 and $70, respectively.

5.11.1.1.3 Passenger Pick-up/Drop-off

The one-way airport driveway in front of the terminal building has a right-side passenger drop-off lane adjacent to the building, one through travel lane, and a left side passenger pick-up lane, which also serves as a waiting area for taxis and transportation network company (TNC) vehicles, such as Lyft and Uber. Vehicles dropping off passengers can circulate back to the parking lot area or to the Airport exit. The estimated passenger breakdown by landside mode is as follows:

- Parking lots: 40 percent
- Pick-up/drop-off: 25 percent
- Taxis and transportation network companies (TNCs): 25 percent
- Rental cars: 10 percent

Table 5.11-1 illustrates the assumed breakdown of existing peak vehicle demand at the curb, dwell time assumptions, and passenger per vehicle assumptions. It is assumed that 50 percent of the peak hour demand will occur during the peak 20-minutes, representative of the peak conditions that occur before or after a flight. Curb front and landside elements should be planned for the peak 20-minute period.

Table 5.11-1 Peak Hour Vehicle Assumptions

	Existing Conditions Cars	Curb (LF)
Parking Lot		
Parking Lot	16	N/a
Parking Lot Peak 20 min	8	N/a
Curb Length		
Pick-up/ Drop-off Peak Hour	32	128
Curb Length		
Pick-up/ Drop-off Peak 20 min.	16	64
Taxis/TNC's Peak Hour	20	80
Taxis/TNC's Peak 20 min	10	40
Total Curb Peak Hour	52	208
Total Curb Peak 20 min	26	104
Exit Traffic	Vehicles Only, includes Parking and Rental Cars	
Total Exit Peak Hour	88	
Total Exit Peak 20 min	44	

Source: McFarland Johnson Analysis, 2020

5.11.1.2 Area Roadway Descriptions

Airport Road is an urban collector under the town of Barnstable jurisdiction generally running in a north-south direction between Barnstable Road to the north and Iyannough Road to the south. Airport Road is a two-way, two-lane roadway with a posted speed limit of 20 mph. No sidewalks nor bike lanes are provided on either side of the roadway and no crosswalks are provided at any intersection. On-street parking is not permitted along any side of the roadway.

Route 28/Iyannough Road is an urban principal arterial under MassDOT jurisdiction running in a in a southeast-northwest direction between Main Street to the northwest west and Main Street to the southeast. Within the study area, Iyannough Road is a two-way four-lane roadway with a posted speed limit of 35 mph. No sidewalks nor bike lanes are provided along the roadway and no crosswalks are provided at any intersections. On-street parking is not permitted along either side of the roadway.

Route 28/Falmouth Road is an urban principal arterial under MassDOT jurisdiction running in a northeast-southwest direction between Waquoit Highway to the southwest and the Airport Rotary to the northeast. Falmouth Road is generally a two-way, two-lane roadway with a posted speed limit of 25 mph within the study area.

Within the study area, no sidewalks are provided. Crosswalks are provided at some signalized intersections. Bike lanes are provided in both directions west of Walton Avenue. On-street parking is not permitted along either side of the roadway.

Barnstable Road is an urban principal arterial under the Town of Barnstable jurisdiction running in a north-south direction between Airport Road to the north and Ocean Street to the south. Barnstable Road is a two-way, two-lane roadway with a posted speed limit of 30 mph. Sidewalks are provided along both sides of the roadway with crosswalks provided at most signalized intersections. Bike lanes are not provided along either side of the roadway. On-street parking is not permitted along either side of the roadway.

Attucks Lane is a local roadway under the Town of Barnstable jurisdiction generally running in an east-west direction between Iyannough Road to the east and Airport Road to the west. Attucks Lane is a two-way, two-lane roadway with a posted speed limit of 35 mph. No sidewalks nor bike lanes are provided along either side of the roadway. Crosswalks are provided at some intersections. On-street parking is not permitted on either side of the roadway.

5.11.1.3 Area Intersection Descriptions

Airport Rotary is an unsignalized five-legged rotary with five approaches. The Iyannough Road eastbound approach consists of two entering lanes and two exiting lanes separated by a median. The Iyannough Road westbound approach consists of one entering lane and one exiting lane separated by a median. The Falmouth Road north eastbound approach consists of one entering lane and one exiting lane separated by a median. The Barnstable Road north-westbound approach consists of one entering lane and one exiting lane. The Barnstable Road south eastbound approach consists of one entering lane. All approaches are yield controlled. Sidewalks and crosswalks are not provided along any approach. On-street parking is not permitted along any approach.

Iyannough Road/Yarmouth Road is a four-legged signalized intersection with four approaches. The Iyannough Road eastbound approach consists of an exclusive left-turn lane with approximately 300 feet of storage, an exclusive through lane, and a shared through/right-turn lane. The Iyannough Road westbound approach consists of an exclusive through lane and a shared through/right-turn lane. Left turns are not permitted at this approach. The Yarmouth Road northbound approach consists of an exclusive left-turn lane with approximately 100 feet of

storage and a shared through/right-turn lane. The Yarmouth Road southbound approach consists of a shared left-turn/through lane and an exclusive right-turn lane with approximately 150 feet of storage. Sidewalks are provided along the northbound and southbound approaches. No crosswalks are provided across any approach. On-street parking is not permitted at any approach.

Attucks Lane/Iyannough Road is a three-legged signalized intersection with three approaches. The Iyannough Road eastbound approach consists of an exclusive left-turn lane with approximately 285 feet of storage and two exclusive through lanes. The Iyannough Road westbound approach consists of an exclusive U-turn lane with approximately 150 feet of storage, two exclusive through lanes, and a channelized right-turn. The Attucks Lane southbound approach consists of an exclusive left-turn lane with approximately 50 feet of storage and two exclusive right-turn lanes. Sidewalks are provided along the eastbound and southbound approaches with a crosswalk across the eastbound approach. On-street parking is not permitted along any approach.

5.11.1.4 Existing Traffic Volumes

An Automatic traffic recorder (ATR) is a device that continuously records the passage of vehicles, vehicle speed and classification, and direction of traffic flow. The MassDOT publishes traffic count data, including ATR data, on a Traffic Count Database System (TCDS) module. Year 2022 traffic data available for key locations near the Airport are summarized in **Table 5.11-2** and include Annual Average Daily Traffic (AADT) and the proportion of daily traffic occurring during the peak hour (K-factor, %).

Table 5.11-2 Average Daily Traffic Summary

Location/Direction	AADT	K Factor %
To/from points northwest		
Iyannough Road west of Phinneys Lane[1]		
Eastbound	13,404	10%
Westbound	14,001	9%
Total	27,405	8%
Attucks Lane west of Phinneys Lane[2]		
Eastbound	2,984	n/a
Westbound	2,767	n/a
Total	5,751	n/a
To/from points northeast		
Yarmouth Road/Willow Street south of Crowell Road[3]		
Northbound	11,619	10%
Southbound	12,382	10%
Total	24,001	9%
To/from points east/southeast		
Iyannough Road/Route 28 west of Main Street[4]		
Eastbound	6,873	n/a
Westbound	6,696	n/a
Total	13,569	n/a
To/from points west/southwest		
Falmouth Road south of Bearses Way[5]		
Northbound	10,921	9%
Southbound	10,187	9%
Total	21,108	8%

AADT Annual Average Daily Traffic; K Factor = Peak-hour Percentage

1. MassDOT Spot Location ID: S17-024-020-12
2. MassDOT Spot Location ID: RPA11-020-21019
3. MassDOT Spot Location ID: S17-024-351-20
4. MassDOT Spot Location ID:7136
5. MassDOT Spot Location ID: S17-021-020-15

5.11.1.5 Existing Public Transit

The Cape Cod Regional Transit Authority (CCRTA) operates 10 fixed routes within Barnstable County, covering all 15 Cape Cod towns. In the vicinity of the Airport, the CCRTA operates five fixed routes, including the Barnstable Villager which serves Hyannis, West Barnstable, and Barnstable with stops at the Cape Cod Gateway Airport. The Airport is also within a mile of the Hyannis Transportation Center (HTC), which provides access to CCRTA buses, intercity buses, and access to the CapeFLYER, a weekend train service that operates during the summer from South Boston to Hyannis. **Table 5.11-3** provides a summary of the routes and a map of the public transit services within the study area is shown in **Figure 5.11-2**.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

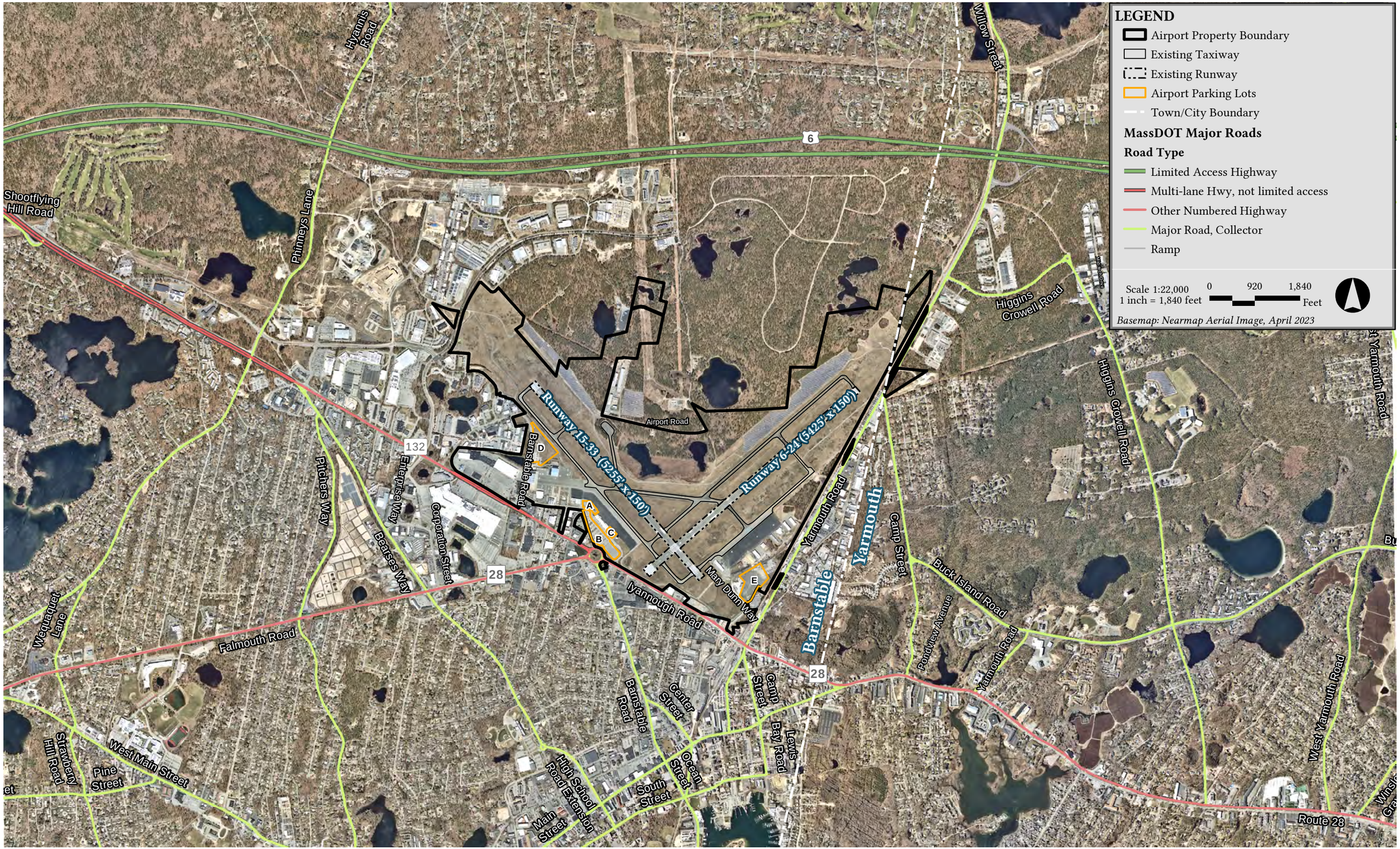
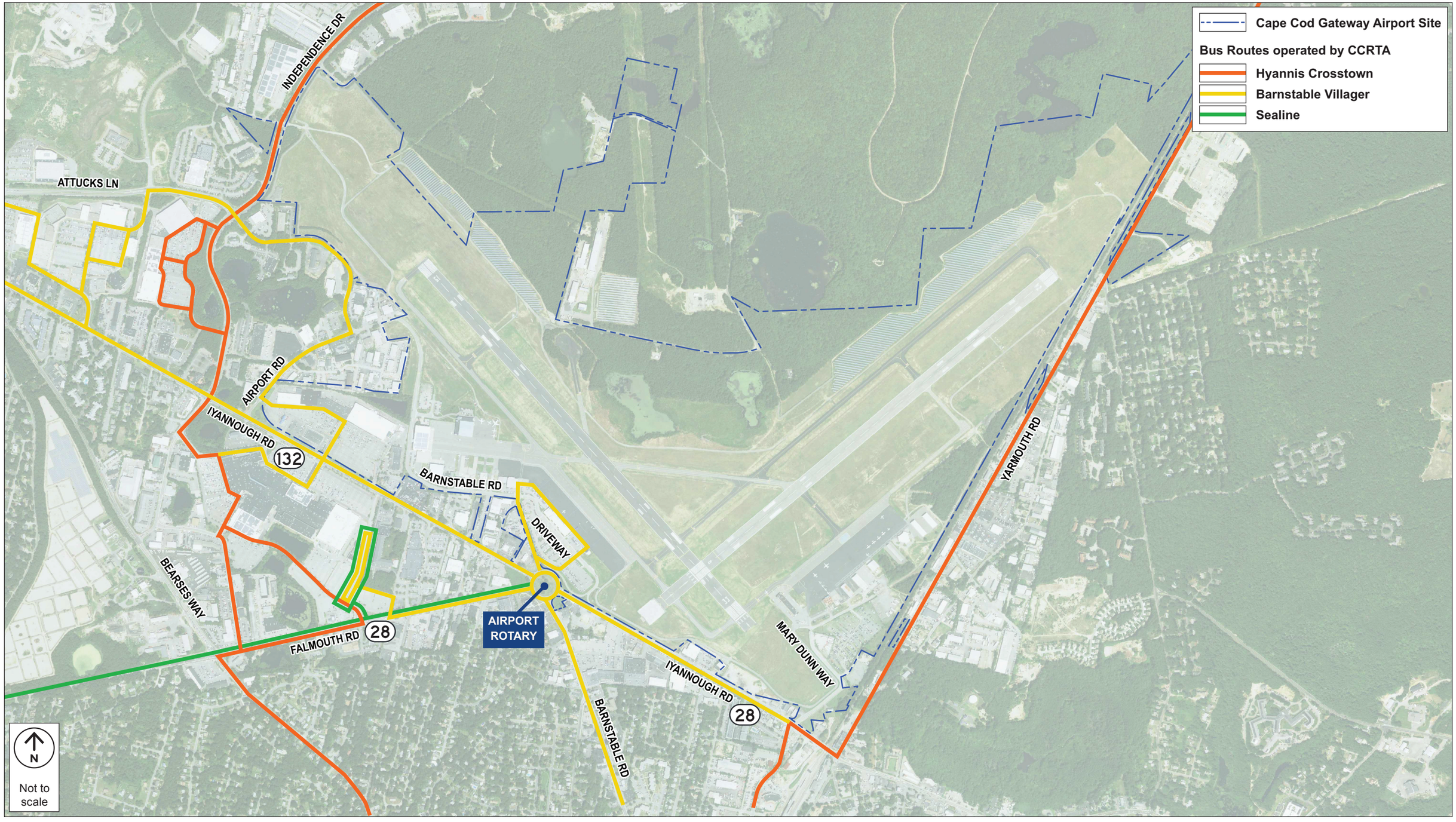


Figure 5.11-1
Roadway Network



Cape Cod Gateway Airport Barnstable, Massachusetts

HOWARD STEIN HUDSON
Engineers + Planners

Figure 5.11-2
Existing Public Transportation Services

Table 5.11-3 Existing Public Transit Services

Transit Service	Description	Peak Headway[1]
Train Service		
CapeFLYER[2]	South Station – Hyannis	-
Bus Routes		
Sealine	HTC – Woods Hole (Steamship Authority) docks via Route 28	60
H20 Hyannis – Orleans	Downtown Hyannis – Orleans Center via Route 28 and Route 39	60
Barnstable Villager	Downtown Hyannis – Barnstable Courthouse via Route 132 and Route 6A	60
Hyannis Crosstown	Downtown Hyannis – Local/Popular Hyannis Locations	60
FLEX[3]	Route 28 in Harwich – Provincetown	60
Train Service		
Bus Routes		
Bourne Run	Buzzards Bay Train Station – Mashpee Commons via Scenic Highway, County Road, Route 38A, and Route 151	60
Sandwich Line	Downtown Hyannis – Buzzards Bay Train Station	120
Provincetown Shuttle	Beach Shuttle between MacMillian Pier – North Truro	60
Hyannis Trolley	HTC – Ocean Street Docks and Waterfront attractions	45
Woosh Trolley	Falmouth – Woods Hole	60

1. Headway is the average time between trains/buses, shown in minutes. Source: Capecodrta.org and Capeflyer.com; July 2023.
2. Weekend service only. One train on Friday night at 5:42 p.m. departing South Station outbound and one train at 8:45 p.m. departing Hyannis inbound. One train on Saturday/Sunday morning at 7:45 a.m. departing South Station outbound and one train at 6:10 p.m. departing Hyannis inbound.
3. FLEX picks-up and drops-off passengers at designated stops and flexes off its route up to ¾ of a mile to serve people who have difficulty getting to a regular bus stop. For this service, reservations are required for the off route stops.

5.12 Visual Environment (Including Light Emissions) (NEPA)

The visual environment of the Airport consists of the underlying landform and the land cover (both natural and manmade development). The existing visual environment of the Airport consists of a combination of natural and manmade features. Since 1928, the Airport has been a component of the manmade visual environment of the Outer Cape. The manmade elements within the Airport include many buildings of various sizes such as the Terminal Building, air traffic control tower, hangars, maintenance equipment shared with aircraft rescue and firefighting building (ARFF), lighting vault, and various commercial buildings on land leases outside of the airfield. Additional vertical elements at the Airport include the FAA instrumentation tower and light poles. The Airport area also has flat horizontal elements including the runways, the system of taxiways, and aircraft parking areas, as well as automobile parking areas along with stormwater basins.

Light emissions at the Airport are associated with runway and taxiway edge lighting, rotating beacons, Precision Approach Path Indicators (PAPI), approach lighting systems, and other visual navigational aids that help pilots locate the Airport and execute safe landings. Additionally, apron

ramp lighting, parking lot lighting, and street lighting on access roadways create light emissions from the Airport.

5.13 Historical, Architectural, Archaeological, and Cultural Resources (MEPA/NEPA)

The Proposed Action is subject to Section 106 of the National Historic Preservation Act (36 CFR 800) and Massachusetts General Laws, Chapter 9, Sections 26-27C as amended by the Acts of 1988 (950 CMR 71). Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to consider the effects of their projects on properties that are listed in, or are eligible for listing in, the National Register of Historic Places. See **Figure 5.13-1**. The lead Federal agency for a project must determine whether any property located within the project's Area of Potential Effect (APE) is listed in, or may be eligible for listing in, the National Register. The APE for archaeological resources is defined as locations where the proposed project may alter or disturb surface and/or subsurface soils that contain, or have the potential to contain, archaeological sites. For the purposes of Section 106, FAA is the lead Federal Agency, and the process will be administered on the state level by the State Historic Preservation Officer (Massachusetts Historical Commission).

In addition to the State Historic Preservation Officer (SHPO), projects that may cause potential impacts to historic properties must consult other involved parties including local historic commissions and Native American tribes. The FAA is required to engage in government-to-government consultation consistent with FAA Order 1210.20, American Indian and Alaska Native Tribal Consultation Policy and Procedures, if an Indian Tribe is a consulting party.

MHC comments on the ENF note that the Airport contains two sites which are considered significant ancient Native American sites. No work is proposed at these archaeological site locations and as such, no impacts to these sites are anticipated. A third site, an Indian Trail, crosses north-south through the Airport property. Project sites within vicinity of this former Indian Trail have previously been disturbed during previous airfield construction activities.

5.14 Section 4(f) Resources (NEPA)

Section 4(f) of the federal Department of Transportation Act of 1966 provides that the "Secretary shall not approve any program or project which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance; or land of a historical site of national, state, or local significance as determined by the officials having jurisdiction thereof unless there is no feasible and prudent alternative to the use of such land, and such program or project includes all possible planning to minimize harm from the land use.

As described in Sections 5.4 and 5.15, the Hyannis Ponds Wildlife Management Area is located north of the Airport property, between Runways 15-33 and 6-24 and outside of the Proposed Projects limits. Further to the east of the Airport lies Yarmouth Water Supply land, part of the Zone II protection area for the Town of Yarmouth public water supply wells. Additionally, multiple golf courses are just east of this Yarmouth property. To the west of Phinneas Lane, west of the Airport, are additional Barnstable Water Supply Land parcels. See **Figure 5.12-1**, Public Owned Open Spaces. There are no known historic structures or archaeological sites within the Project areas proposed for improvements under the Preferred Alternatives.

5.15 Land Use (MEPA/NEPA)

The Airport falls under the land use designations of both the Town of Barnstable and the Town of Yarmouth. Within the Airport, land uses include tax exempt, commercial, and open land. Surrounding land uses include commercial, industrial, mixed use-other, residential multi-family, and residential single-family to the east, west, and south; agriculture, tax exempt, unknown, and water. See **Figure 5.15-1** for land uses within and surrounding the Airport.

The Airport is generally bordered by a Massachusetts Fish and Wildlife designated conservation area (Hyannis Ponds Wildlife Management Area), Barnstable County Training Facility, and Route 6 to the north, Barnstable Road (Route 132) to the south, Yarmouth Road to the east along with Barnstable Water Supply owned land, and an industrial park (Independence Park) to the west. Iyannough Road (State Route 132) is a

major arterial road connecting Hyannis Village Center with both the Airport and the Mid-Cape Highway (Route 6). Several planned unit commercial developments are located in the vicinity of the Airport, which house multiple tenants with large parking areas to accommodate the businesses. Abutting the east side of the Airport is Yarmouth Road, densely populated with low-density commercial and industrial uses such as automobile dealerships, metal recycling shops, marine repair shops, residential properties, and home improvement supply warehouses. Yarmouth Road also connects the Hyannis Village Center with the Mid-Cape Highway at Exit 7.

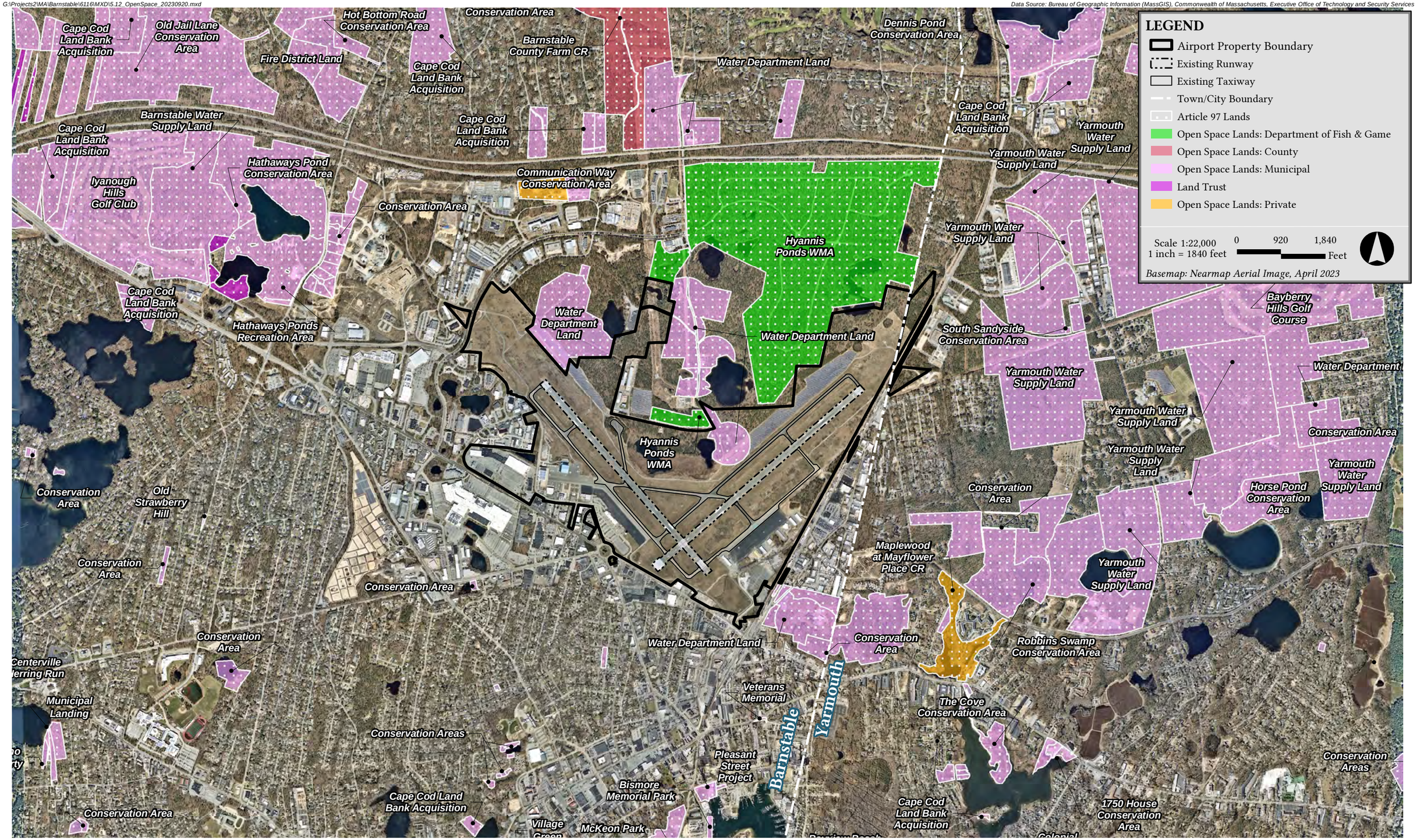
The land uses north of the Airport are generally undeveloped areas of wooded land, wetlands, and ponds. In addition to the area's environmental value, the area is deemed critical to the public health, safety, and welfare as it is designated as a Wellhead Protection District for the municipal drinking water supply. Very few land uses are present aside from municipal utility infrastructure and public infrastructure for water and power distribution.

The closest public school buildings are located greater than one-half mile from the Airport. Barnstable Community Innovation School (elementary, public) is located at 156 Bearses Way in Hyannis within the approach to Runway 24. The Academy of Early Learning (preschool, private) is located at 465 Falmouth Road in Hyannis, southwest of the Airport. Sturgis Charter Public School at 427 Main Street (high school, public) is located south of the Airport. Faith Christian Academy (elementary, private) at 270 Communication Way is directly adjacent to the Airport and in the Runway 15 approach. Trinity Christian Academy (k-12, private) is located to the north of the Airport at 979 Mary Dunn Road in Barnstable.

With a few exceptions, the Project sites are under active aviation or aviation-related use. All proposed Projects with the exception of easement acquisitions are on existing Airport property and are within Business and Industrial Zoning Districts,

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport **Barnstable, Massachusetts**

Figure 5.12-1
Open Space

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

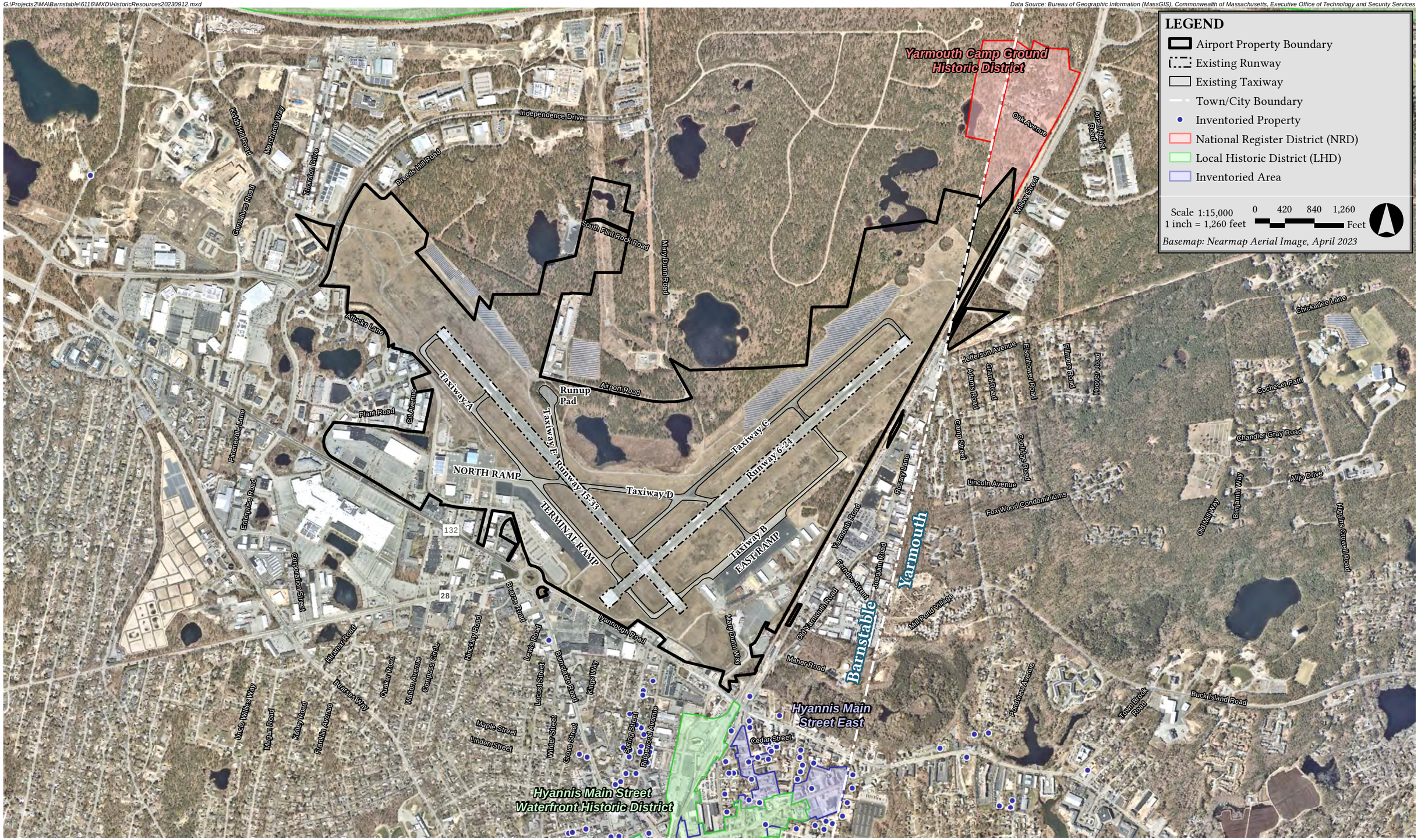


Figure 5.13-1
Historic Resources

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

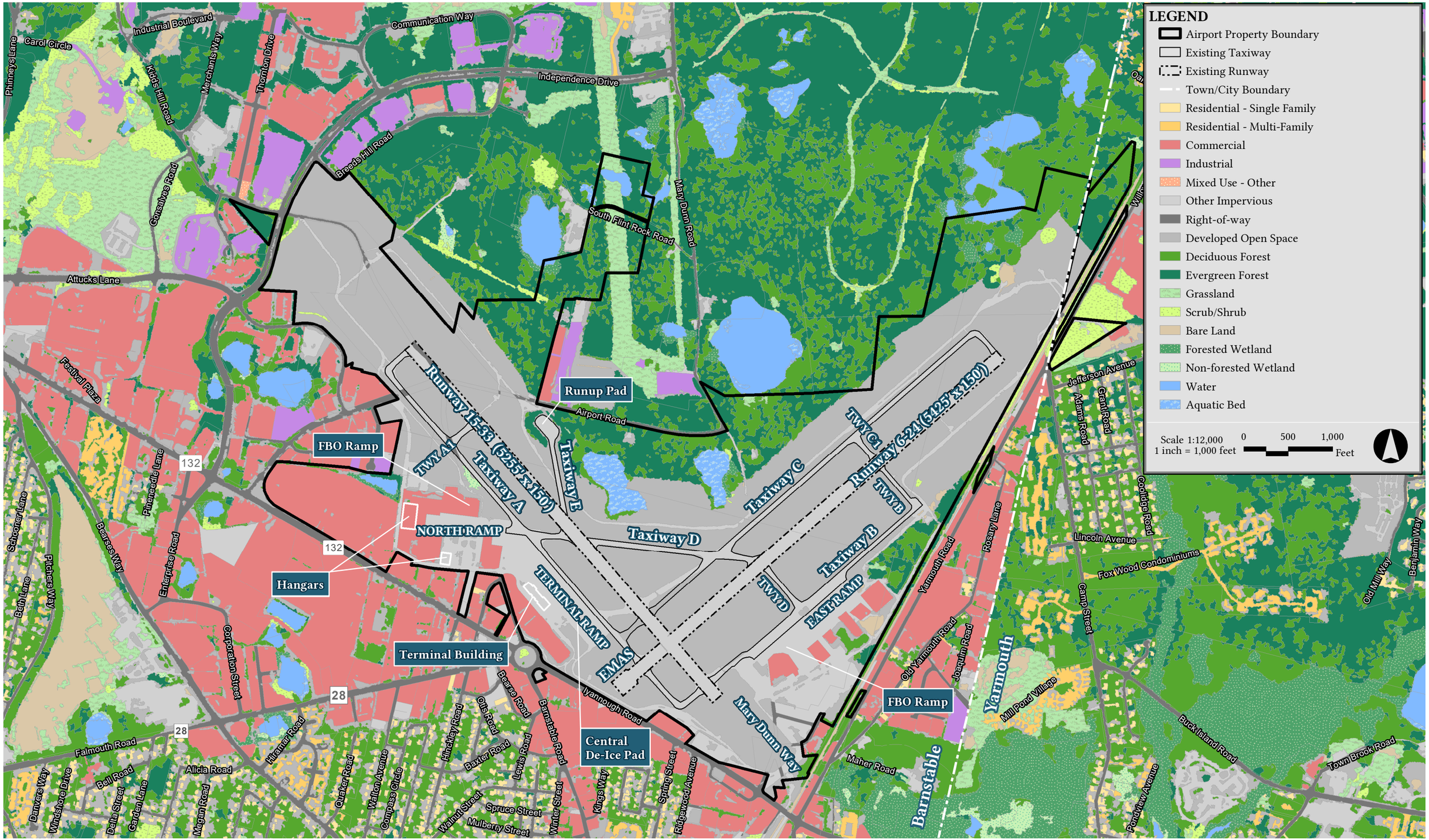


Figure 5.15-1
Land Use

5.15.1 Existing Zoning

The Airport property is currently zoned as nine different zoning codes, five in Barnstable and four in Yarmouth along with seven others in proximity to the Airport, as can be seen in **Figure 5.15-2**. The Airport property is also subject to six overlay districts in the Town of Barnstable. Zoning districts of Airport locations within Barnstable include Business District (B), Industrial (IND), Industrial Limited (IND LTD), Highway Business (HB), and Hyannis Gateway (HG). Airport zoning within Yarmouth includes the Adult Entertainment District (AED). Updated in July 2003, the Town of Barnstable implements local regulations[7] to restrict the use of land adjacent and proximate to the Airport to activities and purposes compatible with standard Airport operations.

5.15.2 Runway Approaches and Protection Zones

Runway Protection Zones (RPZs) are large trapezoidal areas on the ground off each runway end that are within aircraft approach and departure paths as shown in **Figures 3.3-1 and 3.3-2**. The RPZs are intended to enhance the protection of people and property on the ground. Many land uses (i.e., residential, places of public assembly, fuel storage) are prohibited by FAA standards within these areas. However, these limitations are only enforceable if the RPZ is owned or controlled by the Airport. The dimensions of the RPZ for each runway end are a function of the type of aircraft and the approach visibility minimums associated with operations on that runway. The RPZ begins 200 feet beyond the end of the area useable for takeoff and landing for all runways. The existing approach visibility minimums are shown in **Table 5.16-1**. The Airport currently owns land in fee or easement off Runway 15 and 24 ends to control portions of the Airport's RPZs as well as to prevent the construction of obstructions or to maintain vegetative heights to avoid impact to the 14 CFR Part 77 approach surfaces.

Areas within RPZs that are not currently under Airport control in avigation easement or fee simple include all portions of the Runway 6 RPZs west of Iyannough Road, the north and southwest corners of the Runway 15 RPZ, the southern corner of the Runway 24 RPZ, the eastern portion of the Runway 33 RPZ. There are several public roads, residences, commercial/industrial buildings, rail facilities, and parking lots located within the RPZs. These roads include, but are not limited to, Iyannough Road, Yarmouth Road, Mary Dunn Way, and Barnstable Road. According to recently published guidance by the FAA, public roads are not considered compatible land uses within RPZs and are not recommended. The current FAA guidance does not require relocation of existing roadways within RPZs unless one of the following triggers occurs:

- An airfield project (i.e., runway extension, runway shift);
- A change in the critical design aircraft that increases the RPZ dimensions;
- A new or revised instrument approach procedure that increases the RPZ dimensions; or
- A local development proposal in the RPZ (either new or reconfigured).

[7] See Town of Barnstable Code Chapter 13: Airport, effective March 4, 1958.

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

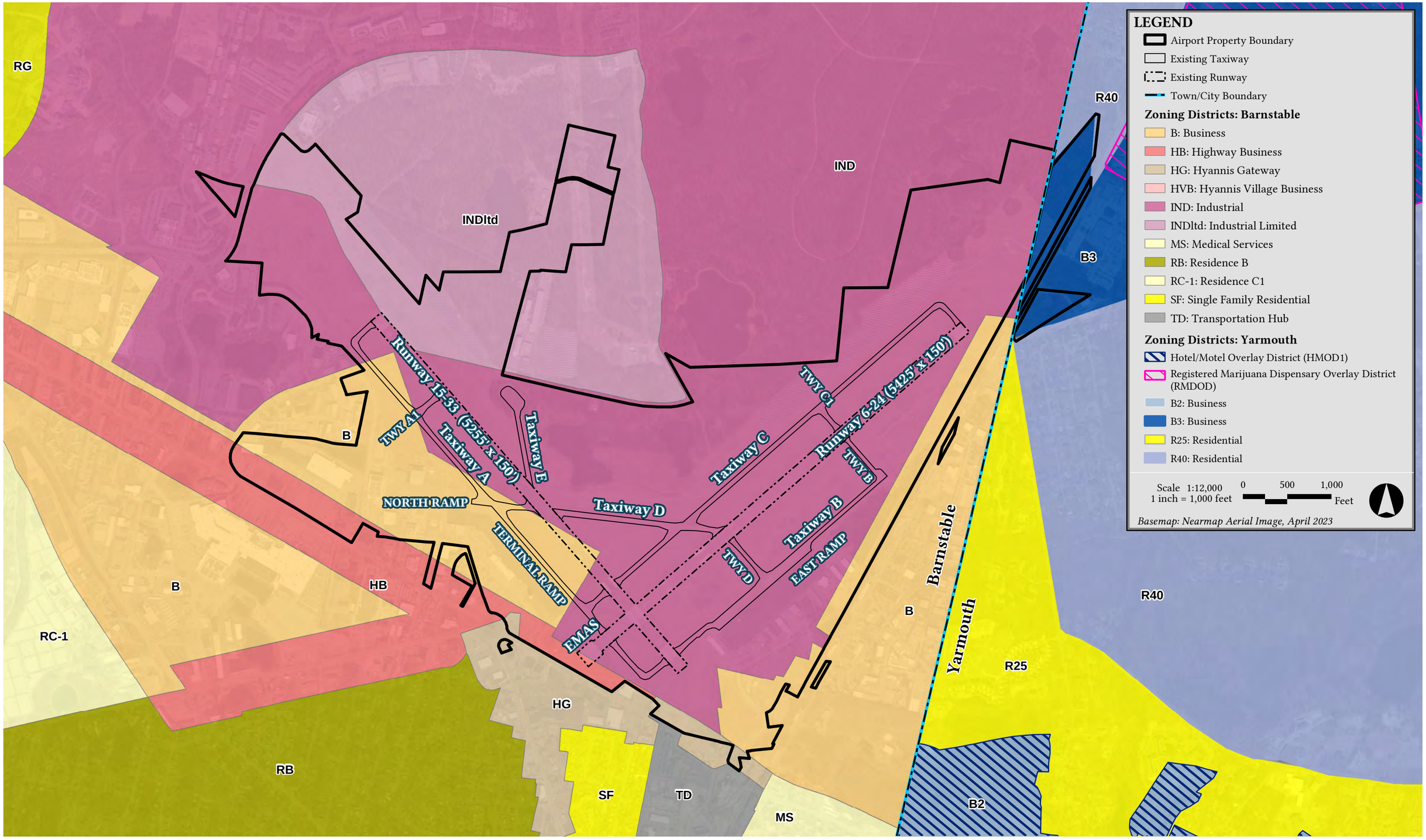


Figure 5.15-2
Zoning

Table 5.16-1 RPZ Dimensions Per Runway End

Runway	Minimums (feet)	Length (feet)	Inner Width (feet)	Outer Width (feet)	Acreage
Runway 6	1 mile	1,700	500	1,010	29.465
Runway 24	4,000 feet	1,700	1,000	1,510	48.978
Runway 15	2,400 feet	2,500	1,000	1,750	78.914
Runway 33	1 mile	1,700	500	1,010	29.465

Sources: FAA AC 150/5300-13B; FAA HYA Terminal Procedures, effective date: March 31, 2022.

5.16 Socioeconomics, Environmental Justice, and Children's Environmental Health and Safety Risks (MEPA/NEPA)

MEPA regulations (301 CMR 11.00) require that a project consider the "social conditions" of its site. In addition, the Environmental Justice Policy of the Massachusetts Executive Office of Energy and Environmental Affairs directs all agencies, offices, boards, and other entities under the Executive Office of EEA to consider environmental justice in all its programs, to the extent applicable and legally allowable.

At the federal level, FAA Order 1050.1F requires the analysis of potential impacts of alternatives on "economic activity, employment, income, population, housing, public services, and social conditions." In compliance with these regulatory frameworks, the following sections characterize the existing socioeconomic, environmental justice, and children's health and safety conditions within and proximate to the improvement Projects.

5.16.1 Socioeconomics

This section provides the socioeconomic characteristics of areas surrounding the Airport. Socioeconomics is the term used to describe aspects of a project that are either social or economic in nature, or a combination of the two. This socioeconomic information identifies how factors of the human environment such as population, employment, housing, and public services might be affected by the proposed action and alternative(s).

Section 1508.14 of the Council on Environmental Quality (CEQ) Regulations states that "economic or social effects are not2 intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact statement will discuss all of these effects on the human environment." Therefore, the requirement to prepare socioeconomic analysis in an Environmental Assessment (EA) or Environmental Impact Statement (EIS) is project specific and is dependent upon the existence of a relationship between natural or physical environmental effects and socioeconomic effects.

The study area for socioeconomic factors is generally larger than the study area for other impact categories, as a proposed action could have an effect on the social fabric of the surrounding community. Accordingly, this environmental assessment considers the impacts to the surrounding communities on the following broad indicators: economic activity, employment, income, population, housing, and services.

U.S. Census Bureau, state, and local government data is utilized in the tables below to describe baseline socioeconomic characteristics of communities surrounding the Airport. The following sections provide information to understand the demographics within the Town of Barnstable and surrounding communities, including incomes data, race, housing, and employment to provide a comparison between current conditions and projected impacts associated with the Project.

Economic Activity and Income

The Airport is a significant economic engine to the economy of the Town of Barnstable, surrounding communities, and The Cape Region. The Airport is a critical commercial transportation hub and has attracted over 40 businesses located on the Airport, with several more businesses seeking to operate from the Airport in the future**.** These businesses are important employers, and generators of economic activity, to residents of the Town of Barnstable, and surrounding Cape Cod communities.

The income of individuals, and households, within the study area communities are above the national average according to the Census Bureau QuickFacts for 2022 data. The median household income for the United States, 2017-2021 (in 2021 dollars) was $69,021 and $89,026 for the Commonwealth of Massachusetts. For Barnstable County, the median household income was $82,619, lower than the statewide median, but higher than the national median. In the Town of Barnstable, the median household income was $82,816, and within the surrounding towns of Yarmouth, Sandwich, and Mashpee, median household incomes were $72,124, $111,610, and $83,563, respectively.

Per capita income, defined as the total personal income in a geographic region divided by the total population in the region, shows similar trends to median income for the communities surrounding the Airport, with generally higher than national per capita income ($37,638) and comparable to Barnstable County's per capita income of $49,973, see **Table 5.16-2**.

Consistent with the above national household income data, poverty statistics show that Barnstable County has a lower poverty rate (8%) compared to the national (11.60%) and statewide (10.40%) rates. In the Town of Barnstable, the poverty rate is 7.90%. Surrounding towns also have below state and county poverty rates.

Table 5.16-2 Economic Activity and Income

	National	State	Barnstable County	Barnstable	Yarmouth	Sandwich	Mashpee
Median household income (in 2021 dollars), 2017-2021	$69,021	$89,026	$82,619	$82,816	$72,124	$111,610	$83,563
Per capita income in past 12 months (in 2021 dollars), 2017-2021	$37,638	$48,617	$49,973	$46,996	$45,471	$54,994	$48,569
Persons in poverty, percent	11.60%	10.40%	8.00%	7.90%	6.50%	5.20%	5.90%

Population and Housing

The overall population in Barnstable County is 232,457. In the Town of Barnstable, the population is 49,532. Communities surrounding the Airport include Yarmouth (population 25,244), Sandwich (population 20,611) and Mashpee (population 15,468). The number of residents who are age 65 and over is approximately 33% of the population in Barnstable County. Within the Town of Barnstable, 23% of the residents are 65 and in Yarmouth, Sandwich, and Mashpee 33%, 25% and 29% of the residents are 65+ respectively. These populations in the 65+ age group are above the state amount of 18% and national amount of 17%. **Table 5.16-2** provides population demographics data.

Table 5.16-3 Population Demographics for the Town of Barnstable, Town of Yarmouth, Town of Mashpee, and Sandwich

	National	State	Barnstable County	Barnstable	Yarmouth	Sandwich	Mashpee
Population	333,287,557	6,981,974	232,457	49,532	25,244	20,611	15,468
Population change (%) 2020 to 2022	0.60%	-0.70%	1.50%	1.30%	0.90%	1.70%	2.70%
Households, 2017-2021	124,010,992	2,714,448	98,163	19,748	10,704	7,918	6,603
Persons under 5 years, percent	5.60%	4.90%	3.30%	4.30%	3.90%	3.20%	4.50%
Persons under 18 years, percent	21.70%	19.20%	13.80%	17.90%	14.10%	17.30%	15.80%
Persons 65 years and over, percent	17.30%	18.10%	33.20%	23.30%	33.00%	25.40%	28.70%

Racial demographic data is provided in **Table 5.16-4**.

Table 5.16-4 Race Information

	National	State	Barnstable County	Barnstable	Yarmouth	Sandwich	Mashpee
White	75.50%	79.40%	91.80%	83.30%	85.20%	93.00%	85.30%
Black or African American	13.60%	9.50%	3.80%	5.70%	5.90%	1.50%	2.90%
American Indian and Alaska Native	1.30%	0.50%	0.70%	0.20%	0.10%	0.30%	3.70%
Asian alone	6.30%	7.70%	1.70%	0.90%	2.60%	2.60%	2.50%
Native Hawaiian and Other Pacific Islander	0.30%	0.10%	0.10%	0.00%	0.00%	0.00%	0.00%
Two or More Races	3.00%	2.70%	1.90%	6.60%	2.80%	1.90%	4.50%
Hispanic or Latino	19.10%	13.10%	3.70%	6.80%	2.90%	2.30%	1.30%
White alone, not Hispanic or Latino	58.90%	69.60%	88.90%	79.10%	84.50%	91.00%	84.60%

Table 5.16-5 provides information on the labor force and various labor force characteristics including the current number of employed and unemployed persons within an area, consumer price indexes, productivity, and demographic characteristics of the labor force.

Table 5.16-5 Employment and Home Ownership Statistics

	National	State	Barnstable County	Barnstable	Yarmouth	Sandwich	Mashpee
In civilian labor force, total, percent of population age 16 years+, 2017-2021	63.10%	67.10%	59.50%	67.00%	57.60%	64.90%	60.10%
Owner-occupied housing unit rate, 2017-2021	64.60%	62.40%	80.80%	75.60%	80.70%	89.60%	83.70%
Median value of owner-occupied housing units, 2017-2021	$244,900	$424,700	$445,500	$430,100	$382,700	$422,300	$389,400

Positive Economic Impacts

In the Town of Barnstable, and surrounding communities, many socioeconomic statistics are above statewide and national amounts. Additionally, the Airport provides significant positive economic impacts to the area.

The MassDOT Aeronautics Division conducts period studies to quantify the contributions of the state's airport to local and regional economies. In a 2019 study [8], MassDOT Aeronautics estimated that Cape Cod Gateway Airport contributed to total employment of 1,724 workers with a total payroll of $73,761,000 and a total economic contribution to the region of $157,240,000. This economic contribution includes "all on-airport business and government agency, capital improvement project, visitor, and multiplier impacts."

The report notes "Over the last 10 years, the FAA, MassDOT, and Barnstable Municipal Airport (HYA) have made significant strategic investments into airport infrastructure, which has helped to position the airport for future economic growth while enhancing airfield safety. With its new airport terminal building, HYA has been able to attract JetBlue to provide seasonal service from New York to Cape Cod."

The benefits of an airport go beyond what can be captured by statistics. There is a great deal of economic activity that takes place beyond the airport including expenditures by the airport and businesses on the airport that flow through the local and regional economy. Other economic benefits include employees working on the airport, purchasing local goods and services, such as gas or groceries, which in turn circulates through the local economy by supporting the jobs and payroll of other businesses and thereby generates additional economic activity. This effect is referred to as a "multiplier impact." Furthermore, visitors flying into airports typically spend money in the local community. These total impacts reflect the economic activity of an airport, and the benefits that extend beyond the Airport to the wider community.

Construction Related Positive Socioeconomic Impacts

Project benefits include the estimated $100+ million in construction spending to the region along with the creation of construction related jobs and spending benefits to local communities. Research indicates that higher incomes and health outcomes are positively related. A 2011 report from the National Center for Health Statistics notes that the "association between [socioeconomic] measures, such as education and income, and health is well established.[9]"

[8] Massachusetts Department of Transportation Aeronautics Division (2019). *Massachusetts Statewide Airport Economic Impact Study Update, Executive Summary.*

[9] National Center for Health Statistics. 2012. Health, United States, 2011: With Special Feature on Socioeconomic Status and Health. Hyattsville, MD: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Health Statistics. http://www.cdc.gov/nchs/data/hus/hus11.pdf

https://www.urban.org/sites/default/files/publication/49116/2000178-How-are-Income-and-Wealth-Linked-to-Health-and- Longevity.pdf

As noted above, the Project will provide economic benefits due to the anticipated positive impact of construction spending and employment. The Project will provide an estimated $74 million of infrastructure construction in Phase I and $24 million[10] in construction related spending in Phase II, providing spending in the region, along with multiplier effects of this spending throughout the surrounding communities.

The Project related construction spending supports local jobs in the construction and materials industries, energized local economies, and supports the positive trends noted above in socioeconomic factors of the Town of Barnstable and surrounding Airport communities – including higher than national and state measures of income, high labor force participation, and favorable economic measures supporting stability in the community – such as high levels of homeownership.

5.16.2 Environmental Justice

In accordance with the MEPA Public Involvement Protocol for Environmental Justice Populations (the "EJ Involvement Protocol") and the MEPA Interim Protocol for Analysis of Project Impacts on Environmental Justice Populations (the "EJ Analysis Protocol"), this section describes the efforts made and planned to engage potentially affected Environmental Justice (EJ) communities.

This section also evaluates existing health and environmental burdens including health vulnerabilities, historical or existing sources of environmental pollution, and climate risks. A summary of the Project's potential impacts is presented in Section 6.12.

5.16.2.1 Existing EJ Population

Per the Massachusetts Executive Office of EEA, EJ is based on the principle that all people have a right to be protected from environmental pollution, and to live in and enjoy a clean and healthy environment. The EEA has established an EJ Policy (updated June 2021) to "help address the disproportionate share of environmental burdens experienced by lower-income people and communities of color" and "ensure their protection from environmental pollution as well as promote community involvement in planning and environmental decision-making."

MEPA has classified areas of Massachusetts as to whether they meet the criteria of an EJ Population by using the United States Census data to determine whether a block group meets one or more of the following criteria:

- The annual median household income is not more than 65% of the statewide annual median household income;
- Minority groups comprise 40% or more of the population;
- 25% or more of households lack English language proficiency;
- Minority groups comprise 25% or more of the population and the annual median household income of the municipality in which the neighborhood is located does not exceed 150% of the statewide annual median household income; or

[10] Airport Master Plan Update (2022). Implementation Plans and Financials, pages 7-8 and 7-9.

- The Secretary has determined that a particular neighborhood should be designated as an EJ population.

Based on the updated EJ Viewer maps, the Project is located in and within one mile of communities that meet the criteria for EJ populations including minority, minority and income, and minority, income and English isolation. **Figure 5.16-1** shows the EJ populations within a one-mile radius (denoted by a dashed yellow circle) around the Project site and establishes the Designated Geographic Area (DGA) used as the basis for analyzing potential Project impacts and for public outreach purposes.

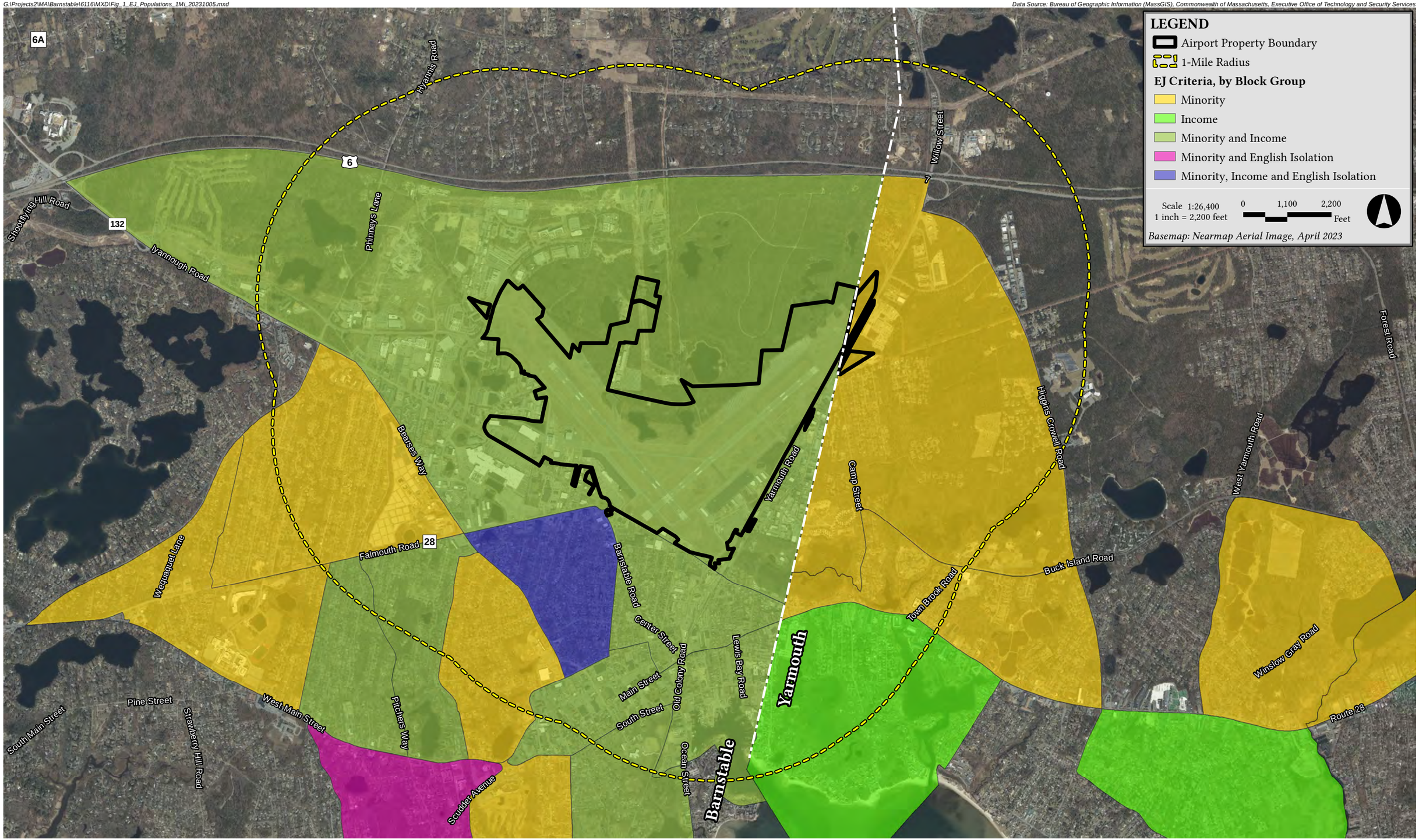
All EJ populations within the DGA are located in Barnstable and Yarmouth. The Proponent identified three EJ block groups that intersect the DGA, summarized in **Table 5.16-6**.

Table 5.16-6 Updated 2020 EJ Block Groups within the DGA

Census Tract	Block Group	EJ Designation	Municipality
1	153	Minority and income	Barnstable
1	126.01	Minority	Barnstable
2	126.01	Minority	Barnstable
1	126.02	Minority and income	Barnstable
4	126.02	Minority and income	Barnstable
3	126.02	Minority	Barnstable
2	126.02	Minority, income, and English isolation	Barnstable
2	125.02	Minority and income	Barnstable
2	153	Minority and income	Barnstable
3	153	Minority and income	Barnstable
4	121.02	Minority	Yarmouth
2	121.02	Minority	Yarmouth
3	121.02	Income	Yarmouth

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Cape Cod Gateway Airport **Barnstable, Massachusetts**

Figure 5.16-1
Environmental Justice Block Groups, 1-Mile Radius

Outreach Performed To-Date

The Proponent has been dedicated to conducting public informational meetings relative to the environmental review process for the Master Plan Projects discussed in this document. Three public meetings have been held, two of which were held both in person and virtually to maximize the opportunity for participation. Translation services in Spanish and Portuguese were offered at all meetings held so far. In addition to the public meetings, the Proponent maintains a website where all public notices, documents, and meeting information and meeting materials are posted (see www.flyhya.com/environmentalassessment) as well as a dedicated email address for requests for information (enviroHYA@epsilonassociates.com).

Public Meetings

The Proponent held the first public outreach meeting in-person public meeting at the Airport on Thursday, October 27, 2022, at 6:00 PM to notify the public of the proposed improvements at the Airport. A weekday was selected to avoid interfering with personal schedules. The date was chosen to be ahead of the ENF submission to allow for the incorporation of community input into the filing. Evening (6:00 to 8:30 PM) was selected as a meeting time to allow people to come after work. Translation services in Spanish and Portuguese were offered as well.

Prior to the ENF filing, additional efforts were made including:

- An updated EJ Reference List was obtained from the MEPA office (received from MEPA on September 26, 2023). See **Appendix J**.
- Newspaper ads, postcards, and press releases sharing a brief description of the Project as well as notifying the public of the October 27, 2022 public meeting were shared far and wide.
- The EJ Screening Form (translated to Portuguese and Spanish) was distributed on October 12, 2022. See **Appendix J**.
- A website was created to provide Project information, updates, meeting notices, and presentation materials.
- A Project email was made available to allow the public to contact the Project team with any questions or comments.
- A pamphlet with brief Project information and environmental timeline review was distributed during the October 27, 2022 public meeting.

The second public meeting was the ENF Scoping Meeting held on January 5, 2023, both virtually and in person at the Airport. This meeting was focused on the MEPA review process, a summary of the master plan projects and proposed impacts, and for those that attended in person, a site tour of the Airport was held, visiting each project area. Outreach efforts for this meeting included the following:

Newspaper ads, emails to stakeholders, and press releases sharing a brief description of the Project as well as notifying the public of the January 5, 2023 public meeting were shared far and wide.

The Airport's website was updated to include a downloadable version of all meeting notices, and translations of said notices.

After the meeting, the presentation was published on the Airport's website.

A third public outreach meeting was held virtually at 2:00 PM and in-person at the Barnstable Town Hall on Thursday, June 21, 2023, at 6:00 PM to update the public on revisions made to proposed improvements at the Cape Cod Gateway Airport. The meeting also provided an opportunity to share information on additional impact analyses conducted since the filing of the ENF. Similar to past meetings, a weekday was selected to avoid interfering with personal schedules and evening hours (6:00 to 8:30 PM) selected to allow people to come after work. Translation services were also offered in Spanish and Portuguese.

Efforts made to promote the meeting included:

- Newspaper ads on Barnstable Patriot and the Cape Cod Times and emails to stakeholders.
- The Airport's website was updated to include a downloadable version of the all meeting notices, and translations of said notices.
    - After the meeting, the presentation was published on the Airport's website.

On September 6, 2023, a FAA Noise Policy Letter was distributed to stakeholders notifying them of the opportunity to comment on FAA's Noise Policy Review Process, including evaluating use of Day-Night Average Sound Level (DNL) as the primary noise metric. The letter noted that the comment period opened on May 1, 2023, and ended on September 29, 2023.

A fourth meeting Is planned for December 12, 2023. The meeting will virtually at 2:00 PM and an in-person meeting, presenting the same information, will be held at 6 PM at Barnstable Town Hall. This meeting will be a chance to inform the public of studies conducted since the third public meeting. More details regarding this meeting will be communicated to the public.

5.16.2.2 Enhanced Environmental Justice Analysis

The EJ Analysis Protocol applies to "any project that is likely to cause damage to the environment and is located within a distance of one mile of an Environmental Justice (EJ) population." The Proposed Action does not meet or exceed MEPA review thresholds under 301 CMR 11.03(8)(a)-(b) and will not add 150 or more new adt of diesel vehicle traffic over a duration of one year or more; therefore, the Project is not subject to a 5-mile radius.

Under the EJ Analysis Protocol, the analysis must include:

- An assessment of existing unfair or inequitable environmental burdens on the EJ population;
- An assessment of the Project's impacts to determine disproportionate adverse effect (if existing unfair or inequitable environmental burdens exist) on the EJ population;
- An analysis of the Project to determine Climate Change Effects (if existing unfair or inequitable environmental burdens exist); and

- Mitigation and Section 61 Findings (if the Project impacts causes a disproportionate adverse effect or Climate Change Effects on the EJ population).

5.16.2.2.1 Assessment of Existing Environmental Burden

Under the EJ Analysis Protocol, a 4-step process has been developed for assessing whether EJ populations have experienced existing unfair or inequitable environmental burdens within the DGA. As part of this approach, a series of mapping tools have been developed that focus on, (1) the rates of four vulnerable health criteria as it relates to statewide averages, (2) existing, past, and current potential sources of pollution, (3) an analysis using the RMAT Climate Resilience Output Tool, and (4) the optional analysis using the United States Environmental Protection Agency's (EPA) Environmental Justice Screening Tool (EJSCREEN). Each of these steps are described in detail below along with an evaluation based on the results for the EJ populations within the DGA.

5.16.2.2.1.1 Vulnerable Health Criteria

The vulnerable health EJ criteria are four environmentally related health indicators used to identify populations with evidence of higher-than-average rates of environmentally related health outcomes.[11] Any EJ population that exhibits "vulnerable health EJ criteria" could potentially bear an "unfair or inequitable" environmental burden and related public health consequences. Multiple terms are used to describe the vulnerable health EJ criteria as it relates to the EJ populations. These terms are defined and described below.

The vulnerable health EJ criteria are reported for a population in a specific area. The area can be a state, town, or census tract. Census tracts are small, relatively permanent statistical subdivisions of a county with a population typically between 1,200 and 8,000 people.

Health criteria are reported as rates, or the number of people with the identified condition divided by the population in consideration. The DPH EJ tool compares the community rate, the rate of the town or census tract of interest, to the statewide rate, the rate for the population of Massachusetts.

The first step is to determine whether EJ populations within the DGA have experienced higher rates of vulnerable health criteria when compared to the statewide rate. The MA DPH EJ tool provides information on these four different indicators: heart attack hospitalizations, childhood blood lead exposure, low birth weight, and childhood asthma for the most recent five-year period of available data. It should be noted that each of these datasets are available at different geographies: heart attack hospitalizations and childhood asthma are available at the community level, while low birth weight and childhood blood lead exposure are available at the census tract level. Each of these specific criteria are described below along with the results of the analysis for the municipalities within the DGA: Barnstable and Yarmouth.

[11] EJSCREEN Technical Documentation 2014 - environmental justice screening and mapping tool (epa.gov)

Heart Attack Hospitalizations

As described on the MA DPH website, heart attack hospitalization is a criterion used to identify vulnerable health EJ populations. Exposure to air pollution can increase the risk for heart attack and other forms of heart disease, and it is indicative of a serious chronic illness that can lead to disability, decreased quality of life, and premature death. EJ populations have higher than average heart attack hospitalization rates when compared to other communities.

Heart attack hospitalization data is based on data collected from all hospitals in Massachusetts of individuals older than 35 years of age, who have been admitted to the hospital for a heart attack. The vulnerable health criterion for Heart Attack Hospitalizations is the most recent five-year average age-adjusted rate of hospitalization for myocardial infarction that is equal to or greater than 100% of the state rate. This indicator is available on a community basis.

Heart Attack Vulnerable Health Criteria for the Project

EJ populations within the DGA do not meet this criterion.

Childhood Blood Lead Levels

As described on the MA DPH website, childhood lead exposure is a criterion used to identify vulnerable health EJ populations because lead exposure disproportionately impacts lower income communities and communities of color. Childhood exposure to relatively low levels of lead can cause severe and irreversible health effects, including damage to a child's mental and physical development.

Childhood Blood lead level data is based on data collected as part of the Massachusetts Lead Poisoning Prevention and Control Act, a state law that requires all children to be screened each year for lead poisoning through age three and children in high-risk communities must be screened through age four. DPH reports the five-year average prevalence of elevated (≥5 ug/dL estimated confirmed) childhood blood lead levels (ages 9 to 47 months) that are equal to or greater than 110 percent of the state prevalence. This indicator is available at the community and census tract level.

Childhood Blood Lead Levels Vulnerable Health Criteria for the Project

EJ populations within the DGA do not meet this criterion.

Low Birth Weight

Low birth weight (LBW) is a criterion used to identify vulnerable EJ populations because exposure to environmental contaminants can increase the risk of delivering a LBW baby and LBW is a significant predictor of maternal and infant health. Women of color and women of low income have a higher risk of delivering a LBW baby. LBW can increase the risk of infant mortality and morbidity, health problems throughout childhood, developing cognitive disorders, developmental delay and chronic diseases as an adult such as cardiovascular diseases and type 2 diabetes.

LBW data is collected by the Registry of Vital Records and Statistics. Medical data, such as birth weight and gestational age, are based on information supplied by hospitals and birthing facilities. DPH reports the five-year average low birth weight rate among full-term births that is equal to or greater than 110% of the statewide rate. This indicator is available at both the community and census tract level.

Low Birth Weight Vulnerable Health Criteria for the Project

EJ populations within the DGA, specifically census tracts 25001012102 and 25001015300 in the Towns of Barnstable and Yarmouth respectively meet this criterion.

Childhood Asthma

As described on the MA DPH website, childhood asthma is a criterion used to identify vulnerable EJ populations because people of color and low-income individuals are at greater risk for asthma exacerbations due to increased exposure to asthma triggers. Uncontrolled asthma can impact an individual's overall health and wellbeing. For example, uncontrolled asthma can reduce activity levels, negatively impact cardiovascular fitness, and increase school absenteeism.

Childhood asthma data are based on data collected from all hospitals in Massachusetts for children between the ages of 5 and 14 years that have visited an emergency room for the treatment for asthma. DPH reports the five-year average rate of emergency department visits for childhood (5 to 14 years) asthma that is equal to or greater than 110% of the state rate. This indicator is available at the community and town levels.

Childhood Asthma Vulnerable Health Criteria for the Project

EJ populations within the DGA, in the Town of Barnstable, meet the childhood asthma criterion.

Vulnerable Health Criteria Summary

Based on the information described above, the Towns of Barnstable and Yarmouth meet childhood asthma and low birth weight vulnerable health criteria.[12] The data are presented in **Table 5.16-7**. Based on the results, some of the EJ communities in the DGA are considered vulnerable or subject to at least some level of existing environmental burdens.

5.16.2.*2.1.2* Potential Sources of Pollution

As described in the MEPA Interim Protocol for Analysis of Projects Impacts on Environmental Justice Populations, the next step of the existing environmental burden analysis focuses on other potential sources of pollution within the boundaries of the EJ communities. Specifically, the MEPA Protocol specifies consultation of the data layers in the MA DPH EJ tool to review other potential sources of pollution near the EJ communities (see **Figure 5.16-2**).

[12] Although low birth rate is listed as exceeding the vulnerable health criteria, the rate is suppressed due to small numbers.

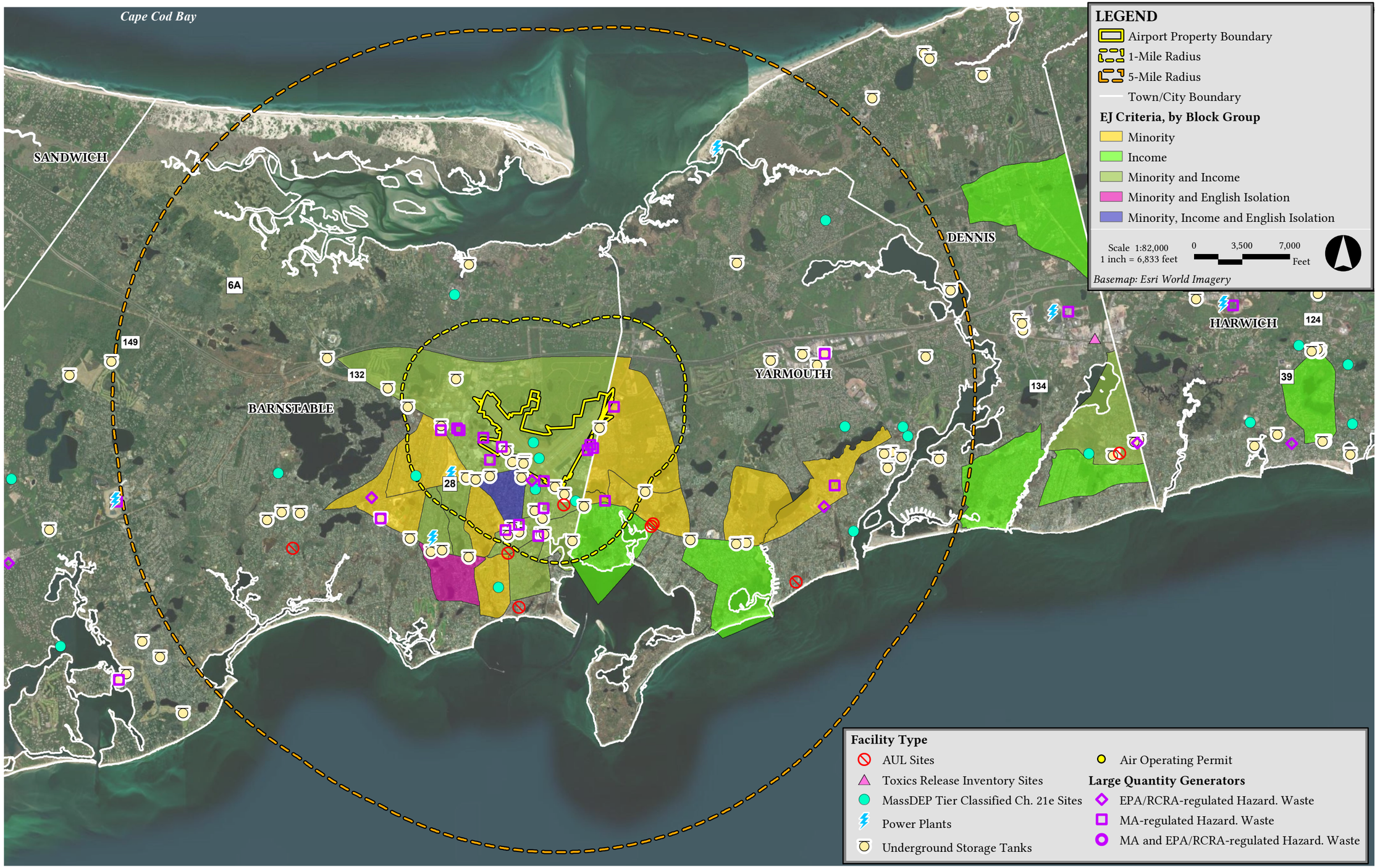


Figure 5.16-2
Environmental Justice Communities - Potential Sources of Pollution

Table 5.16-7 Vulnerable Health Criteria

Vulnerable Health Criteria	Geography Type	Community Rate	Community Rate Confidence Interval	Statistical Significance	Stability	Statewide Rate	Statewide Rate Confidence Interval	110% Statewide Rate	>110% of Statewide Rate?
Heart Attack	Barnstable	28.5	26.1, 30.9	Not statistically significantly different	Stable	26.42	26.20, 26.64	29.07	No
Heart Attack	Yarmouth	28.4	25.5, 31.4	Not statistically significantly different	Stable	26.42	26.20, 26.64	29.07	No
Childhood Asthma	**Barnstable**	**93.7**	**80.6, 106.8**	**Not statistically significantly different**	**Stable**	**83.1**	**82.19, 84.00**	**91.4**	**Yes**
Childhood Asthma	Yarmouth	78.9	61.3, 96.5	Not statistically significantly different	Stable	83.1	82.19, 84.00	91.4	No
Low Birth Weight	Barnstable	205.7	138.5, 272.9	Not statistically significantly different	Unstable	216.8	211.7, 221.9	238.5	No
Low Birth Weight	Yarmouth	230.1	129.3, 331	Not statistically significantly different	Unstable	216.8	211.7, 221.9	238.5	No
Lead Poisoning	Barnstable	6.1	3.9, 8.3	Statistically significantly lower	Stable	14.99	14.72, 15.25	16.483581	No
Lead Poisoning	Yarmouth	6.9	3.3, 10.6	Statistically significantly lower	Stable	14.99	14.72, 15.25	16.483581	No
Low Birth Weight	**25001012102**	**359.7**	**44.4-675**	**Not statistically significantly different**	**Unstable**	**216.8**	**211.71, 221.93**	**238.5**	**Yes**
Low Birth Weight	**25001015300**	**411**	**142.5-679.5**	**Not statistically significantly different**	**Unstable**	**216.8**	**211.71, 221.93**	**238.5**	**Yes**

Layers from the DPH EJ Tool were downloaded into ArcGIS and a 1-mile buffer drawn around the Project site boundary. Each of the resulting layers were used to determine the number and the types of facilities and infrastructure within the EJ communities in the DGA and the enforcement history. Where available, enforcement histories and facility history were searched in the Energy & Environmental Affairs Data Portal (EEA portal).

MassDEP major air and waste facilities

MassDEP major air and waste facilities are facilities that have air operating permits, treat, store, generate or recycle large quantities of hazardous waste, or utilize large quantities of toxics. These facilities are further specified in the following sections and include airports, facilities with air permits, draft NPDES permits, hazardous waste, treatment, storage, recycling, or disposal facilities, large quantity generators, large quantity toxic users, land disposal of solid waste, and toxics release inventory sites[13].

Two large quantity toxic users are located within the DGA: Cape Cod Chips at 100 Breeds Hill Rd., approximately 0.04 miles from the Project site and ACME Laundry co inc. at 124 Ridgewood Ave, approximately 0.15 miles from the Project site. Seventeen large quantity generators are located within the DGA.

M.G.L. c. 21E sites

21E sites are sites that have experienced a release of a hazardous material above a certain threshold. Once a release is reported to MassDEP it must be cleaned up within a year or it is classified as Tier I, Tier ID, or Tier II. A Tier I site poses an immediate hazard, a Tier 1D site has not posed a permanent solution or final classification of the site while a Tier II site does not meet the criteria for an immediate hazard.

Two Tier I sites (RTN 4-0015670 and RTN 4-0026347), two Tier ID (RTN 4-0020107 and RTN 4-0000279), and 50 Tier II sites are located within the DGA.

MassDEP sites with AULs

An Activity Use Limitation (AUL) provides notice of the presence of oil and/or hazardous material contamination remaining at the location after a cleanup has been conducted pursuant to Chapter 21E and the MCP. The AUL is a legal document that identifies activities and uses of the property that may and may not occur, as well as the property owner's obligation and maintenance conditions that must be followed to ensure the safe use of the property.

[13] https://www.mass.gov/info-details/massgis-data-massdep-major-facilities

There is one AUL site (RTN 4-0010287) within the DGA. The site is located at 74 Camp St., Barnstable, MA, approximately 0.2 miles from the Project site.

Underground Storage Tanks

MassDEP regulates the registration, installation, operation, maintenance, inspection, and closure of petroleum fuel and hazardous substances of underground storage tank (UST) systems.

There are 22 UST systems within the DGA.

EPA Facilities

EPA facilities are defined as Toxic Release Inventory (TRI) facilities. TRI facilities use and/or release over a certain threshold of toxic chemicals to the environment. There are 777 individual chemicals and 33 chemical categories covered by the TRI program.

There are 19 EPA facilities within the DGA.

Road Infrastructure

Road infrastructure includes Massachusetts Department of Transportation (MassDOT) roads, and bike lanes or shared use pathways. Route 6 and Routes 28 and 132 abut the Airport to the north and south respectively. The Claire Saltonstall Bikeway, also known as the Boston to Cape Cod Bikeway, is a 135-mile bikeway marked as Bike Route 1 that runs from Boston to Provincetown.

MBTA Bus and Rapid Transit

The Massachusetts Bay Transit Authority data includes all MBTA bus routes, stops, commuter rails, commuter rail stations, parking lots, and rapid transit stops. There is an MBTA commuter rail station, the Hyannis Transportation Center, within the DGA, approximately 0.41 miles from the Project site. The station is served by the Cape Cod Main Line Hyannis branch commuter rail line. Several parking lots including the Hy-Line Parking and Steamship Authority Parking Yarmouth Road are located within the DGA, some served by shuttles running to the ferry dock.

Other Transportation Infrastructure

Other transportation infrastructure includes airports, freight yards, water taxis, railroad tracks, and ferry routes. Cape Cod Gateway Airport (the Project site) is located within the DGA.

The Hyannis-Nantucket ferry docks at Hyannis Terminal, located approximately a mile from the DGA.

Regional Transit Agencies

Regional Transit Agency layers include the 15 bus routes for the Regional Transit Authorities of Massachusetts and their associated bus stops.

The DGA is located within the Cape Cod Regional Transit Authority, which operates 27 RTA stops within the DGA.

Energy Generation and Supply

The Energy Generation and Supply layer includes nuclear power plants, power plants, and transmission lines from Massachusetts Geographic Information Systems and the United States Geological Survey databases.

There is one power plant, Barnstable WWTP, at 617 Bearses Way and eight transmission lines within the DGA.

Summary of Contributions to Environmental Burden

In summary, there are 19 MassDEP major air and waste facilities, 54 M.G.L. c. 21E sites, one MassDEP site with AULs, 22 UST systems, 19 EPA facilities, three major routes and one bikeway that intersect the DGA, a commuter rail stop, several parking lots, Cape Cod RTA stops, and one power plant.

The Project is not anticipated to impact or contribute to any of the listed potential sources of pollution described above nor add to them. Similarly, the Project will not materially exacerbate the existing health burden of the EJ communities around the Project site.

5.16.2.2.1.3 Climate Adaptation (RMAT)

In accordance with MEPA's *Interim Protocol on Climate Change Adaptation and Resiliency* (dated October 1, 2021), the Proponent evaluated the potential climate change impacts on the Project via the RMAT Climate Resilience Design Standards Tool. See the RMAT output based on the DEIR Project updates in **Appendix G** – RMAT Tool Output.

The RMAT Tool provides the Project with information about sea level rise/storm surge, heat, and extreme precipitation impacts. A more detailed analysis of climate change and the RMAT output is provided in Section 5.7.1. Analysis of the RMAT Tool estimated risk ratings for climate parameters (e.g., temperature, precipitation) does not indicate an elevated climate risks for EJ populations within the DGA for the Project Site.

5.16.2.2.1.4 EJSCREEN Analysis

An EJ Screen analysis was conducted using the buffer function to create a 1-mile buffer around the Project site. The Community Report is attached as **Appendix K**.

EJ Screen presents results for environmental and socioeconomic indicators. There are 13 environmental indicators and seven socioeconomic indicators. In addition, data are presented in terms of EJ and supplemental indexes that combine specific environmental indicators with socioeconomic indicators to evaluate combined vulnerabilities. EJ Screen analyses are conducted at the Census "block group" level, which is the finest level of detail. Analyses can also be conducted using a buffer around a point, which is what is presented here. EJ Screen will aggregate portions of the block groups that the buffer intersects, weighted by population to provide representative data for that buffer region.

EJ Screen analyses are presented in terms of percentiles, which is a relative term that compares each block group with either the rest of the state, or the whole US. Importantly, EJ Screen is meant to be used as a screening level analysis and EPA has determined that the 80th percentile is an appropriate percentile to identify areas that warrant further investigation.

In the EJ Screen Technical Document,[14] EPA notes that "a high percentile is not necessarily a real concern from a health or legal perspective. To understand the actual health or other implications of any screening results requires looking at the actual data and the indicator represents and looking at other relevant data if available." Other data that EPA refers to includes whether the air pollution measurements exceed health-based standards.

EPA notes that there are a number of limitations to an EJScreen analysis. These limitations are generally associated with uncertainty in the underlying data for a particular indicator since often data are not available at the block group level. Also, as noted by EPA, many of the indicators are screening-level proxies of potential exposures and health risks, and do not represent actual exposures or health risks. This is especially true for the "proximity" indicators such as the indicator for traffic.

The EJScreen analysis results presented in **Appendix K** show that none of the environmental and socioeconomic indicators within one mile of the Project Site are elevated (> 80th percentile) in the block groups within one mile of the Project Site. Overall, the EJ Screen analysis suggests that there are no potential environmental vulnerabilities in the communities within one mile of the Project.

[14] EJSCREEN Technical Documentation 2014 - environmental justice screening and mapping tool (epa.gov)

5.16.3 Children's Environmental Health and Safety Risks

As specified in the FAA's 1050.1F Desk Reference, and in accordance with Executive Order 13405, Protection of Children from Environmental Health Risks and Safety Risks, the FAA requires the identification and assessment of the potential health and safety risks that could disproportionately affect children. Such risks relate to other environmental resource categories such as air quality and noise. Project risks to children are discussed in Section 6.12.

According to the US Census Bureau, the population of Barnstable County was about 232, 411 in 2021 and about 14% of the population is under 18 years of age, which is lower than the rate for all of Massachusetts (~20%). Approximately 10% of these children are below the poverty line in the County, compared to about 13% in Massachusetts.

There are several schools and seasonal camps near the Airport, including two schools about two miles southwest of the Airport (Hyannis West Elementary School and Barnstable intermediate School), two schools about one mile south of the Airport (Barnstable Community Innovation and Sturgis Charter Public School), and two schools about three miles northeast and two miles east of the Airport (Marguerite E Small Elementary and Barnstable West Elementary School, respectively). The Cape Cod Volleyball camp is two miles to the southwest of the Airport and Camp Greenough and Camp Wingate Kirkland are three and four miles to the northeast, respectively.

5.17 Hazardous Materials, Solid Waste, and Pollution Prevention (MEPA/NEPA)

Precautions against hazardous material releases at the Airport are of high importance due to the necessity of such materials for the operation and maintenance of aircraft, and the location of the Airport in drinking water recharge zones. This section provides information regarding storage and use of oil and/or hazardous materials (OHM) at the Airport.

In accordance with Code of Federal Regulations 40, Subpart 112 (40 CFR 112), a Spill Prevention, Control, and Countermeasure Plan (SPCCP) is maintained by the Airport to minimize the risk associated with bulk storage and transfer of Oil and Hazardous Materials (OHM). The Airport also maintains a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the U.S. EPA National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity. Copies of the SWPPP and SPCC plans are attached in **Appendices K and L,** respectively.

5.17.1 Fuel Storage

During typical operations, the Airport accepts, stores, handles, and transfers a variety of OHM. The Airport has implemented several programs to minimize the environmental impact associated with Airport operations, including the implementation of a SWPPP, in accordance with the U.S. EPA NPDES, a SPCC Plan, and several Best Management Practices (BMPs), to reduce the potential for a release of OHM to the Environment.

5.17.1.1 OHM Storage

OHM is staged within containers consisting of drums, ASTs, and USTs, which range in sizes from 55 gallons to 10,000 gallons. A summary of the OHM stored at the Airport is presented in **Tables 5.17-1 to 5.17-3**. Current storage locations are also shown on the Oil and Hazardous Materials Storage Map prepared by Horsley Whitten Group in **Appendix L, Figure 2**.

5.17.1.1 OHM Storage during Aircraft Refueling

During aircraft refueling activities, the petroleum products are transferred from the fuel farm or other sources by the Airport as well as tenant mobile refuelers. Further information regarding the procedures is described in the SPCC Plan (see **Appendix M**). Specific characteristics of each mobile refueler are described in **Tables 5.17-2 and 5.17-3**. All mobile refueler trucks are equipped with absorbents, drip pans, magnetic catch basin covers, and oil booms and can respond to a petroleum spill of less than 10 gallons during refueling activities. Spills greater than 10 gallons or those that trigger a reporting obligation to MassDEP are completed under the direction of the on-call Licensed Site Professional (LSP).

Table 5.17-1 Airport Virgin Petroleum Storage

Operator	Location	Product	Tank Type	Spill Protection	Volume (Gallons)
Rectrix / Air Cape Cod	Gate P fuel farm	Avgas / Jet A	AST	Overfill protection, steel secondary containment	10,000 /10,000
Griffin Avionics	Griffin fuel island	Avgas	UST	Overfill protection, cathodic protected steel, interstitial monitoring	10,000
Cape Air	Inside Cape Air Hangar	Avgas	Portable AST	Spill containment pallet	100
Hertz Car Rental	Barnstable Road – Service Lot	Unleaded gasoline	UST	In tank monitor	10,000
Barnstable Municipal Airport	Gate F fuel farm	Unleaded gasoline	AST	Overfill protection, steel secondary containment, interstitial monitoring	4,000
		Diesel	AST		4,000
		Jet A	AST		20,000

Notes:
AST - aboveground storage tank
UST - underground storage tank
Source: Barnstable Municipal Airport Spill Prevention, Control, and Countermeasure Plan, 2020.

Table 5.17-2 Airport and Tenant Mobile Refuelers

Operator	Product	Number of Refueler Trucks	Truck Designation	Storage Capacity (Gallons)
Barnstable Municipal Airport	Jet A	3	55931 / 55932 / 5251	5,000 / 5,000 / 3,000
Rectrix / Air Cape Cod	Avgas	1	44219	1,500
Rectrix Aerodrome	Jet A	1	5693	3,000
Cape Air	Avgas	1	4298	1,500
Griffin Avionics	Avgas	2	612 / 4134	620 / 1,200

Notes:
AST – aboveground storage tank
UST – underground storage tank
Source: Barnstable Municipal Airport Spill Prevention, Control, and Countermeasure Plan, 2020.

Table 5.17-3 Other Airport OHM Storage Locations

Operator	Location	Product	Storage Vessel Type	Spill Protection	Volume (Gallons)
Barnstable Municipal Airport	Outside Airport ARFF/SRE Building	Waste Oil / Anti-freeze	AST	Leak detection, double walled with reinforced concrete	350 / 150
	Inside Airport ARFF/SRE Building	Antifreeze / 15W-40 / Grease / Hydraulic Oil / ATF / 5W-30 Synthetic / Waste Oil	Drums	Spill Containment Pallet	55
Rectrix / Air Cape Cod	Gate P Fuel Farm	Waste absorbent material / waste Jet A / Avgas	Drums	Spill Containment Pallet with overhead cover	55 / 55
Rectrix Aerodrome	Inside Rectrix Hangar	Jet A / Reclaimable Jet A Fuel / Waste Oil / Waste Absorbent	AST /Drums	Double walled / Spill Containment Workstation with Lid	55 / 55
Griffin Avionics	Inside Griffin Hangar	Used Oil filters	Drums	Spill Containment Pallet	55
Cape Air	Inside Cape Air Hangar	Waste oil	AST	Overflow Detection, Double Walled	500
		Waste oil / Hydraulic Oil / Used Oil filters /Antifreeze	Drums	Spill Containment Pallet	55
Allies Air	Inside Allies Air Hangar	Waste Oil	Drums	Spill Containment Pallet	55
AMA Nantucket Inc.	Inside Hangar Nantucket Inc. Hangar	Waste Oil / Mineral Spirits	Drums / Drums	Spill Containment Pallet / Spill Containment Pallet	55 / 55
Cape Flight Instruction	Inside Hangar	Waste oil / Antifreeze / used oil filters	Drums	Spill Containment Pallet	55
Avis Car Wash	Barnstable Road – Service Lot	Car Washer Fluid	AST	OWS	250
Hertz Car Wash	Barnstable Road – Service Lot	Car Washer Fluid	AST	OWS	250

Notes:
AST - aboveground storage tank
OWS – oil water separator
SRE – snow removal equipment
ARFF – airport rescue and fire fighting
Source: Barnstable Municipal Airport Spill Prevention, Control, and Countermeasure Plan, 2020.

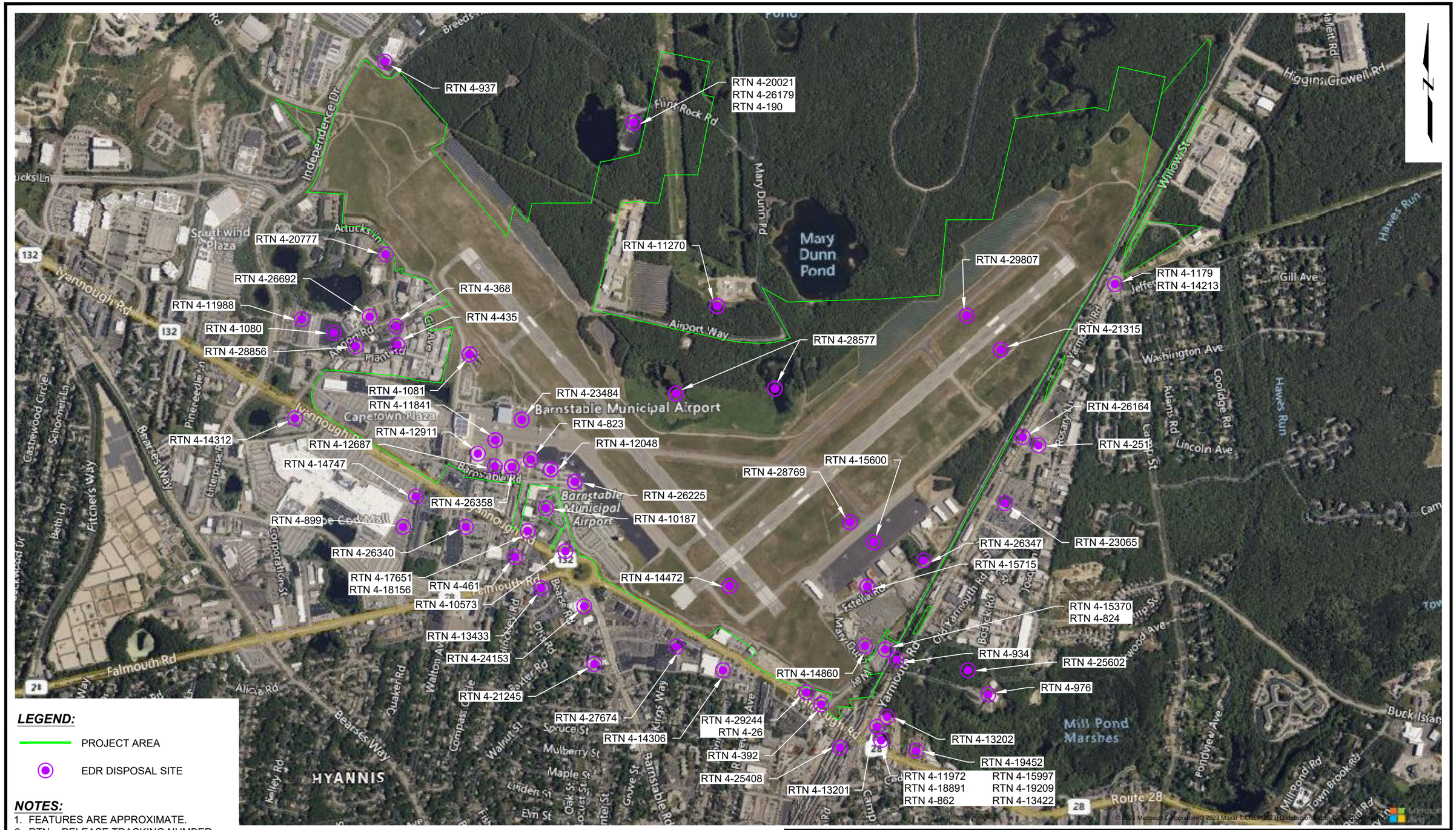
5.17.2 Database Reviews

An Environmental Data Resources (EDR) report was acquired to obtain information on documented releases of OHM that could potentially result in environmental impacts at the Airport. Information related to releases of OHM at and up to approximately 1,000 feet of the Airport property was reviewed. The EDR report included information from state/federal databases, historical maps, and MassDEP records of Disposal Sites (Sites) located within one mile of the Airport property. Based on the information reviewed, a total of 64 Sites were identified that were located at or adjacent to the Airport property (**Figure 5.17-1**). As applicable, the MassDEP Waste Site & Reportable Releases Data Portal was also reviewed to obtain additional information. A summary of findings from the database reviews is presented in **Appendix N**. A copy of the EDR report is attached in **Appendix O**.

5.17.2.1 Airport Property: Open Sites

Based on the EDR report, two Sites (see **Figure 5.17-2**) are located on Airport property and are currently undergoing response actions:

- **Release Tracking Number (RTN) 4-26347:** This RTN is associated with historical releases of per- and polyfluoroalkyl substances (PFAS) and 1,4-dioxane to soil and groundwater. The release was reported to MassDEP on November 10, 2016. Response actions are ongoing and include assessment and remediation, including soil capping at two areas on Airport property where Aqueous Film Forming Foam (AFFF) containing PFAS was used. More information is discussed in Section 5.17.3.
- **RTN: 4-28577:** This RTN is associated with the presence of Polycyclic Aromatic Hydrocarbons (PAHs) and lead in surficial sediments above the MassDEP Sediment Screening Criteria at Upper Gate and Lewis Ponds. The sediments in the ponds were sampled as part of the North Ramp Phase II Comprehensive Site Assessment (CSA) required for the investigation and remediation of a hydrocarbon and chlorinated solvent plume at the Airport's North Ramp. Because it was unclear if the source of contamination was from the release at the North Ramp or from typical compounds found in stormwater runoff on the Property, MassDEP assigned RTN 4-28577 on October 29, 2020 to the sediment investigation. According to the November 2021 Phase I Initial Site Investigation (ISI) report, a proposed Phase II Scope of Work was drafted and includes researching historical documents to determine a potential source, sampling additional ponds to evaluate anthropogenic background conditions, sampling runoff water from floor drains, and performing an ecological risk assessment. Results of this work have been documented in a Permanent Solution Statement. This work is scheduled to start in Fall of 2023.



LEGEND:

- PROJECT AREA
- EDR DISPOSAL SITE

NOTES:

1. FEATURES ARE APPROXIMATE.
2. RTN = RELEASE TRACKING NUMBER.
3. EDR = ENVIRONMENTAL DATA RESOURCES, LLC.

SOURCE:

1. PROJECT AREA DIGITIZED FROM ENVIRONMENTAL NOTIFICATION FORM, CAPE COD GATEWAY AIRPORT, EPSILON ASSOCIATES, INC., NOVEMBER 30, 2022.

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SCALE, FEET

Draft Environmental Impact Report
Cape Cod Gateway Airport
Hyannis, Massachusetts

Epsilon Associates, Inc.
Manyard, Massachusetts

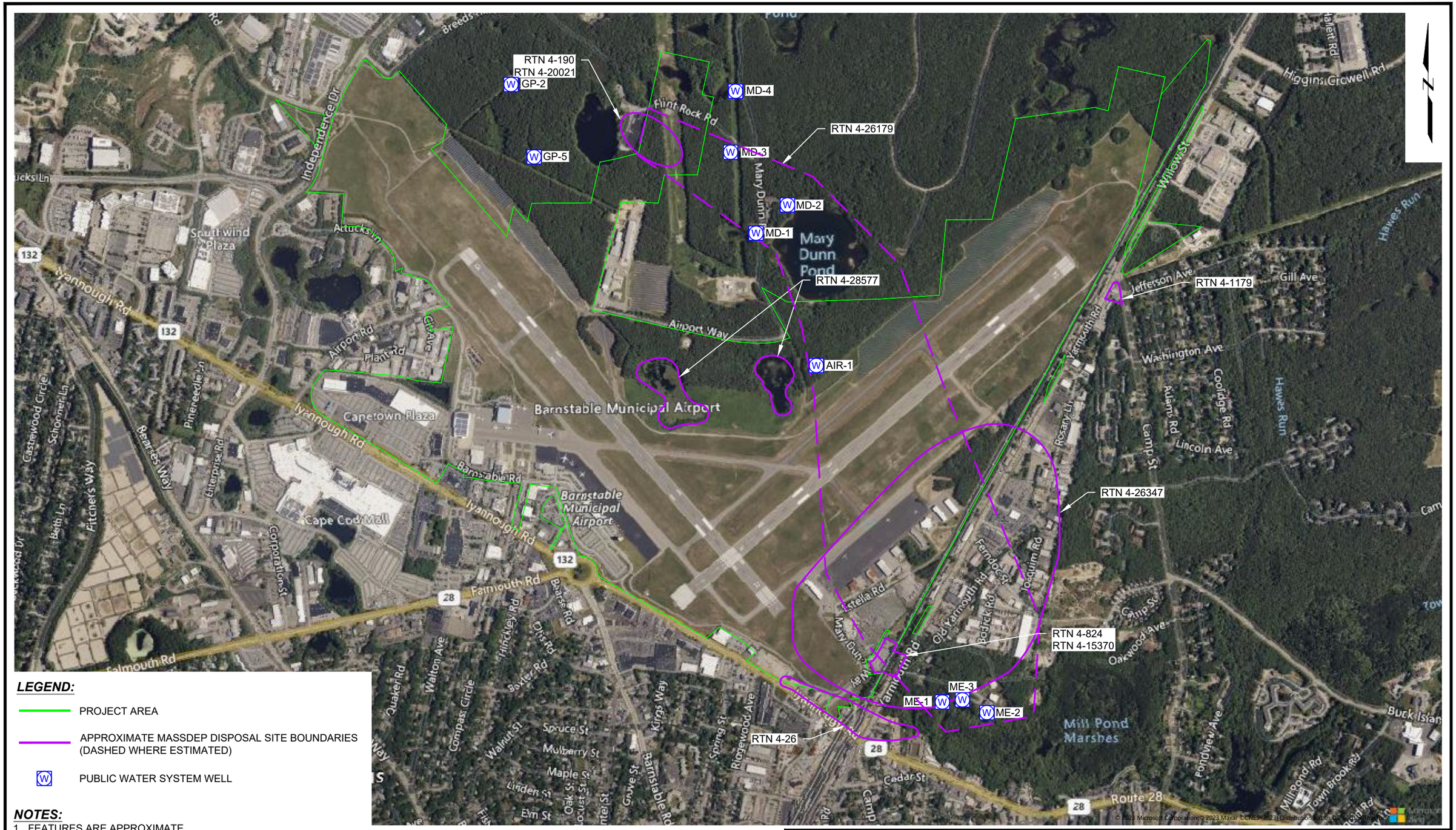
GEI Consultants

Project 2203788

SUMMARY OF MASSDEP DISPOSAL SITES

September 2023 **Figure 5.17-1**

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LEGEND:

- PROJECT AREA
- APPROXIMATE MASSDEP DISPOSAL SITE BOUNDARIES (DASHED WHERE ESTIMATED)
- (W) PUBLIC WATER SYSTEM WELL

NOTES:

1. FEATURES ARE APPROXIMATE.
2. RTN = RELEASE TRACKING NUMBER.

SOURCE:

1. PROJECT AREA DIGITIZED FROM ENVIRONMENTAL NOTIFICATION FORM, CAPE COD GATEWAY AIRPORT, EPSILON ASSOCIATES, INC., NOVEMBER 30, 2022.
2. PUBLIC WATER SYSTEM WELL DATA FROM MASSGIS (BUREAU OF GEOGRAPHIC INFORMATION), COMMONWEALTH OF MASSACHUSETTS EOTSS. FEBRUARY 13, 2023

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SCALE, FEET

Draft Environmental Impact Report
Cape Cod Gateway Airport
Hyannis, Massachusetts

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Manyard, Massachusetts

GEI Consultants

Project 2203788

ACTIVE MASSDEP DISPOSAL SITE BOUNDARIES WITHIN AND ADJACENT TO THE AIRPORT PROPERTY

September 2023 **Figure 5.17-2**

5.17.2.2 Airport Property: Closed Sites

The EDR report identified 15 Sites that have achieved regulatory closure under the Massachusetts Contingency Plan (MCP at 310 CMR 40.0000):

- 3 achieved a Class A-1 Response Action Outcome (RAO)
- 5 achieved a Class A-2 RAO
- 7 achieved a Permanent Solution with no Conditions (PSNC)
- 1 submitted a Downgradient Property Status (DPS)

Barnstable Municipal Airport, Hanger Bay #1 RTN: 4-12048: Airline Realty Trust submitted a DPS for releases of chlorinated solvents and petroleum compounds to soil and groundwater. The release was attributed to several upgradient sources including leaching pits at the Cape Air Hanger and Griffin Air, and jet fuel contamination associated with former USTs. This RTN was linked to RTN 4-823 in October 1997. RTN 4-823 was associated with releases at the Cape Air Hanger and response actions included disposal of petroleum containing liquid and solids from leaching pits, installation of a soil vapor extraction and air sparging system to treat petroleum-contaminated soil and groundwater, additional soil and groundwater sampling, and injection of remedial additives to treat the chlorinated solvents and petroleum compounds. Following response actions, the RTN 4-823 achieved regulatory closure with a PSNC.

Based on the information reviewed, none of the closed sites required conditions or deed restrictions, such as an Activity and Use Limitation (AUL), to achieve closure.

5.17.2.3 Adjacent to the Airport Property: Open Sites

Based on the EDR report, six Sites with addresses within approximately 1,000 feet of the Airport are currently undergoing response actions:

- Former Charter Station No. 6843, 258 Iyannough Road, Hyannis, MA

RTN 4-26: This RTN is associated with a release of gasoline and benzene, toluene, ethylbenzene, and xylene (BTEX) to soil and groundwater from leaking underground storage tanks at the former gasoline station. The release was reported to MassDEP on October 15, 1987. Response actions have included additional assessment, excavation and disposal of petroleum-impacted soils, and installation of a groundwater pump and treatment system. Following response actions, the Site achieved a Temporary Solution with a Class C-1 RAO in July 2010. Based on the information reviewed, the Disposal Site boundary extends onto the Airport property. Therefore, this release is likely impacting soil and/or groundwater conditions at the Airport property.

- Atwood Oil, 33 Brooks Road, Barnstable, MA

RTN 4-824: This RTN is associated with releases of petroleum to soil and groundwater from the historical use of the property as a bulk fuel plant. The release was first reported to MassDEP on November 1, 1989. Response actions included soil and groundwater sampling, removal of drums and USTs, soil excavation for offsite disposal, installation of a soil vapor extraction and air sparging system, installation of a barrier filter trench, injecting remedial additives to groundwater, and installing a cap over select contaminated areas. The Site achieved a Temporary Solution with a Class C-1 RAO in August 2012. Groundwater monitoring for dissolved-phase petroleum compounds is ongoing.

According to the latest Post-Temporary Solution Status Report (dated June 26, 2019), the release did not impact groundwater conditions at the Airport property.

RTN 4-15370: This RTN was reported to MassDEP on March 20, 2000, for release of an unknown chemical of unknown type from 55-gallon drums located at 33 Brooks Road. This RTN was linked to RTN 4-824, and a Completion Statement was received by MassDEP in August 2000.

- Former Shell-Branded Service Station #137771, 381 Camp Street, Hyannis, MA

RTN 4-1179: This RTN was listed as a Location to be Investigated (LTBI) on July 15, 1992. In January 1995, results of a Phase I Initial Site Investigation concluded that concentrations of BTEX were detected above reportable concentrations in soil and groundwater. Response actions have included additional assessment, and installation of an air sparging/soil vapor extraction remediation system. The site is currently in Remedy Operation Status. Based on this Site's location to the Airport (i.e., downgradient), and the location of disposal site boundary, it is unlikely that the release is impacting soil and/or groundwater conditions at the Airport property.

RTN 4-14213: This RTN is associated with a detection of the PAH benzo(b)fluoranthene above its applicable reportable concentration for soil (RCS-1) in a sidewall confirmatory sample, as part of a waste oil UST removal, on September 25, 1998. RTN 4-14213 was linked to RTN 4-1179 on October 1, 1999, and is currently being managed by RTN 4- 1179.

- Barnstable County Fire Training Academy, Mary Dunn Road, South Flint Rock Road, and Airport Way, Barnstable, MA

RTN 4-190: This RTN is associated with the release of petroleum compounds to soil and groundwater from historical leaking USTs and surficial spills. The release was first reported to MassDEP on August 25, 1986. Response actions included soil and groundwater sampling, and soil and groundwater treatment via operation of a pump and treat and a soil vapor and air sparging system. The site achieved a Temporary Solution with a Class C RAO in 2001 and is in Remedy Operation Status, which includes monitoring groundwater for petroleum compounds to evaluate monitored natural attenuation. Based on the groundwater sampling results from the latest report, the release has impacted the Airport property. Response actions are ongoing by both the RP and MassDEP.

RTN 4-20021: This RTN is associated with a release of perchlorate to soil and groundwater from a stockpile of flares used for training purposes. The release was first reported to MassDEP on August 25, 2006. Response actions included groundwater sampling and installation of a recovery well as part of a pump and treat system. The treatment system was shut down after perchlorate concentrations were persistently below MCP standards, and an IRA Completion report was submitted to MassDEP on November 22, 2010. Based on the compliance status, this release is not likely impacting soil and/or groundwater conditions at the Airport property. This Site is linked to RTN 4-190.

RTN 4-26179: This RTN is associated with the historical release of PFAS to soil and groundwater and is being managed under an Immediate Response Action (IRA). The release was first reported to MassDEP on August 4, 2016. Immediate Response Actions included soil Hot Spot removal, sitewide capping, select building demolition, and operation/monitoring of a groundwater pump and treat system. Based on the results of groundwater samples collected from the Airport property and the assumed groundwater flow direction, this release is likely impacting soil and/or groundwater conditions at the Airport property. The Site is currently in Phase II and response actions are ongoing by both the RP and MassDEP. This release is also linked to RTN 4-190. More information is discussed in Section 5.17.3.

5.17.2.4 Adjacent to the Airport Property: Closed Sites

EDR also identified 31 Sites that achieved regulatory closure under the MCP:

- 9 achieved a Class A-1 RAO
- 9 achieved a Class A-2 RAO
- 1 achieved a Class B-1 RAO
- 6 achieved a PSNC
- 1 achieved a DEP No Further Action (NFA)
- 2 achieved a DEP Not a Disposal Site (NDS)
- 2 achieved a LSP No Further Action (NFA)
- 1 achieved closure via a Utility Release Abatement Measure (URAM)
- 1 site (**RTN 4-25408**) achieved closure via a Permanent Solution with Conditions (PSC) related to the presence of lead associated with historic fill. No information was available regarding the extent of historic fill outside the disposal site boundary, which is not located on Airport property.

The following RTNs were filed with a DPS and listed the Airport property as a potential upgradient source:

- 210 Yarmouth Road, Hyannis, Massachusetts

RTN 4-13201: On January 26, 1998, Mrs. Milton Babcock submitted a DPS associated with TPH and naphthalene detections above the applicable GW-1 standard from monitoring wells located on her property (Grandpa's Bikes). The property owner indicated that no more than 5 quarts of waste oil was generated on a yearly basis. The source of the petroleum contamination was attributed to several possible upgradient sources, including the Barnstable Municipal Airport (RTN 4-823). Response actions for RTN 4-823 were conducted under a RAM Plan and included installation of a soil vapor extraction and air sparging system and post remediation groundwater monitoring at the Airport property. Following response actions, the site achieved regulatory closure with a PSNC.

- 202 Yarmouth Road, Hyannis, Massachusetts

RTN 4-13202: On July 23, 1998, Mr. Douglas E. MacDonald submitted a DPS associated with TPH and naphthalene detections above the applicable GW-1 standard from a monitoring well located on his property (a car and boat sales lot with a garage). Mr. MacDonald indicated that no fuel USTs have been present at the property. The source of the petroleum contamination was attributed to several possible upgradient sources, including the Barnstable Municipal Airport (RTN 4-823).

- 95 Airport Road, Hyannis, Massachusetts

RTN 4-28856: On August 5, 2021, Group 1 Automotive submitted a DPS associated with PFAS detections in monitoring wells located at the property as part of a due diligence investigation. Based on an ASTM Phase I Environmental Site Assessment (ESA), no recent or historical site activities included the storage, use and/or discharge of PFAS compounds. The sources of PFAS in groundwater were attributed to two potential upgradient sources, including the Cape Cod Municipal Airport (RTN 4-23647) and the Barnstable County Fire Training Academy (RTN 4-26179).

The following sites adjacent to the Airport filed a DPS, but did not list the Airport as a potential upgradient source:

RTN 4-19452: Lot 147, 114 Iyannough Road, Hyannis, Massachusetts

RTN 4-392: Airport Exxon (Former BP Service Station), 230 Iyannough Road, Hyannis, Massachusetts.

GEI did not identify any Sites associated with an AUL. Information regarding these 30 Sites is summarized in **Appendix N** along with the EDR report.

5.17.3 Per- and Polyfluoroalkyl Substances

PFAS are part of a large family of organofluorine synthetic chemicals used in industry and consumer products since the 1940s. Due to their unique properties, including resistance to oil and water, and ability to withstand high temperatures, they have been used in a variety of applications such as food packaging, nonstick cookware, waterproof clothing, textiles, firefighting foam, and in certain manufacturing processes.

The substances of greatest concern are the longer-chain perfluoroalkyl acids (C6 to C10), such as perfluorooctanoic acid (PFOA) and perfluorooctanesulfonic acid (PFOS), and products that can form these long-chain perfluoroalkyl acids. These compounds can be resistant to breakdown, migrate quickly in groundwater, and can bioaccumulate in the food chain. Although health risks posed by PFAS are still not completely understood, studies on laboratory animals and in people have shown that exposures to these compounds (particularly PFOA and PFOS) have been associated with a wide range of adverse health effects including reproductive, birth, developmental, behavioral, neurologic, endocrine, immunologic, metabolic, cardiovascular, and cancer outcomes.

Historic reports for the Airport indicate that a fluorotelomer-based AFFF (Chem-Guard 3% mil spec) containing PFAS was purchased and used by the Airport since the 1980s. AFFF was used by the Airport to respond to fires during aircraft accidents and during tri-annual drills and annual testing requirements to comply with FAA requirements. In 2016, the Airport purchased a foam testing system from ECOLOGIC™ to allow the FAA to verify the AFFF mixture without the need to spray the foam.

The Airport is currently assessing PFAS impacts to soil, groundwater, and sediment on and off Airport property from the historical use of AFFF for training and emergency response. The Airport is also assessing PFAS-impacted groundwater migrating onto the Airport and originating from plumes associated with upgradient sources.

5.17.3.1 Standards and Guidelines

Federal Guidelines

Between 2016 and 2022, the EPA set a non-enforceable health advisory level of 70 parts per trillion (ppt) for PFOS and PFOA in drinking water. In June 2022, the USEPA updated their health advisory by releasing the Final Drinking Water Health Advisories (HAs) for the following types of PFAS compounds: GenX, Perfluorobutanesulfonic acid (PFBS), and Interim HAs for PFOA and PFOS. No federal drinking water standards have been currently established for PFOS and PFOA.

State Standards

Hazardous Materials Regulated Under M.G.L Chapter 21E and the MCP

Under current state regulations (M.G.L. c.21E and the MCP [3104 CMR 40.0000]), MassDEP currently regulates six PFAS compounds in soil and groundwater: PFOA, PFOS, Perfluorodecanoic Acid (PFDA), Perfluoroheptanoic Acid (PFHpA), Perfluorohexanesulfonic Acid (PFHxS), and Perfluorononanoic Acid (PFNA). The RQs and RCs for PFAS are listed in Table 2 of the Massachusetts Oil and Hazardous Material List (MOHML), which can be found in Section 310 CMR 40.1600 of the MCP. For soils, each compound is regulated separately. For groundwater, because the Airport is located within a DEP-Approved Zone II public water supply area (Barnstable Water Company Maher Wellfield), category RCGW-1 applies. The RCGW-1 standard is 20 ppt for the sum of 6 PFAS listed above.

Massachusetts Maximum Contaminant Level (MCL)

In October 2020, the MassDEP set a drinking water Maximum Contaminant Level (MCL) of 20 ppt for the sum of six PFAS compounds (PFAS6), including: PFDA, PFHpA, PFHxS, PFOA, PFOS, and PFNA. This drinking water standard is set to be protective against adverse health effects for all people consuming the water.

5.17.3.2 Airport Regulatory History

Investigations for PFAS began in July 2016, when the Airport conducted an initial round of groundwater sampling at the request of MassDEP to assess impacts to soil and groundwater resulting from the Airport's historic use of AFFF. Six monitoring wells were installed at suspected PFAS and/or PFOA release areas, based on an understanding of the Airport's past use of AFFF or potential release locations. Concentrations of PFAS and PFOA were detected above laboratory detection limits in all six monitoring wells. At two of the six monitoring wells, the sum of PFOS and PFOA were detected above the EPA health advisory limit of 70 ppt. PFOS and PFOA were also detected above the EPA health advisory limit in an upgradient monitoring well on the western boundary of the Airport.

On November 10, 2016, MassDEP issued a Notice of Responsibility (NOR) to the Airport. The NOR requested that the Airport perform additional field investigations to:

- Evaluate source(s) of PFAS including PFOS and PFOA detected in groundwater at the Airport;
- Evaluate Source(s) of 1,4-dioxane detected in one monitoring well downgradient of the Airport on the Maher wellfield property; and
- Identify potential impacts to public water supply wells operated by the Hyannis Water District at the Mary Dunn and Maher wellfields (**Figure 5.4-4**).

MassDEP subsequently issued RTN 4-26347 to the release on November 10, 2016.

In response to the NOR, the Airport submitted an IRA plan in accordance with the MCP on December 16, 2016, and a Release Notification Form (RNF) on February 28, 2017. The IRA plan included a plan for additional soil and groundwater testing.

In June 2019, the MassDEP requested that the Airport modify the IRA plan to propose response actions to "reduce infiltration of precipitation through PFAS-impacted soil, such as temporarily capping the source areas; excavating and properly disposing of the PFAS-impacted soil; or some equivalent approach." In response, the Airport submitted an IRA Modification report to MassDEP in December 2019 that included details for installing caps in the Deployment Area and the Airport Rescue and Fire Fighting/Snow Removal Equipment (ARFF/SRE) Building Area, as shown in **Figure 5.17-3**.

The two caps were installed in September 2020 and cover an area of approximately 94,100 sf. These two capped areas cover a majority of the known source areas for PFAS in soils resulting from the historic application of AFFF by the Airport. The Airport continues to monitor PFAS concentrations in groundwater at and downgradient of the capped areas to measure their effectiveness. These results are presented every 6 months in status reports submitted to MassDEP.

5.17.3.3 PFAS Source(s)

The primary source of PFAS impacts to environmental media at the Airport is the historical use of PFAS-containing AFFF in various areas, including:

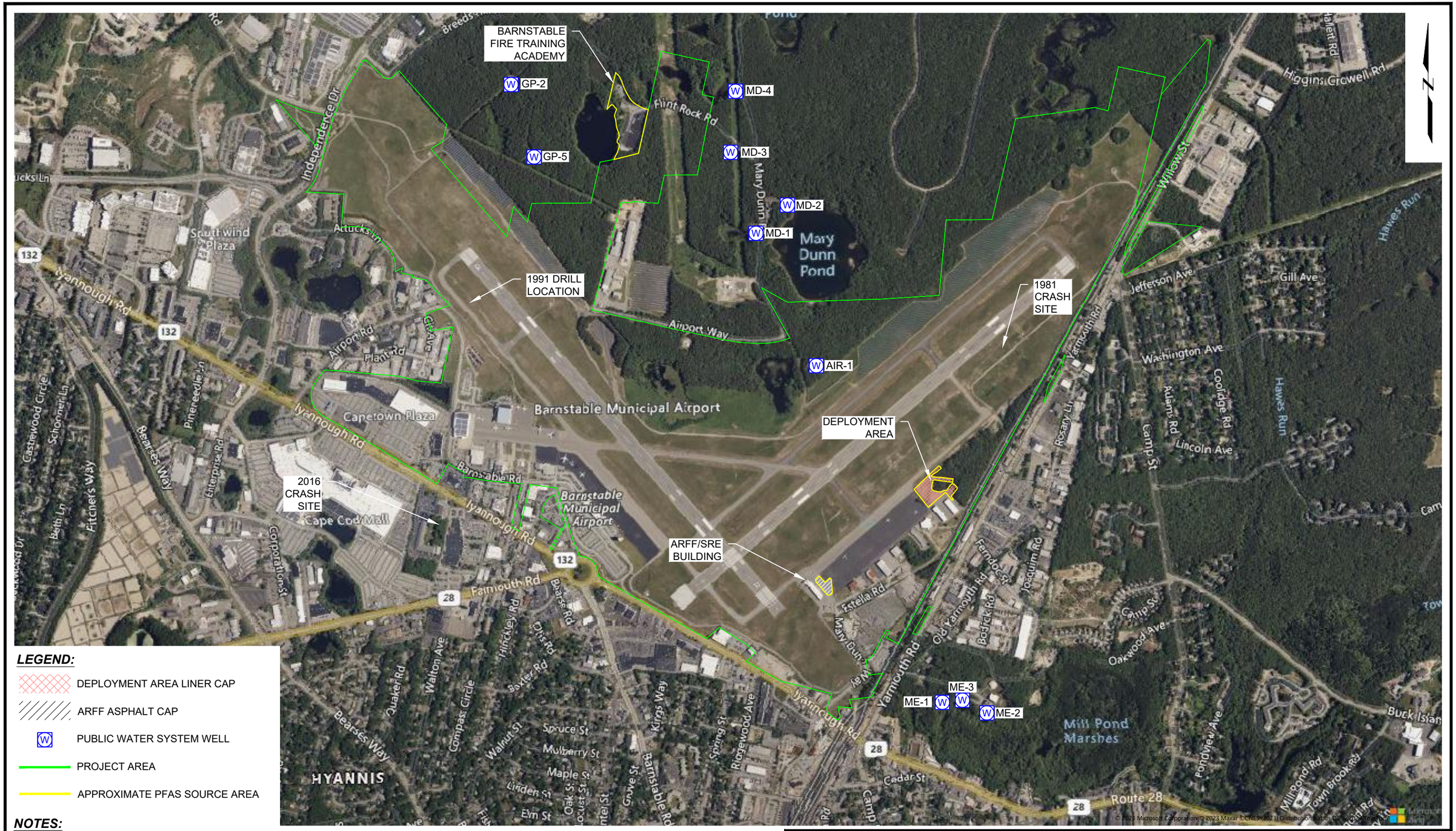
- **Deployment Area**: Historical training exercises using AFFF at the unpaved Deployment Area between 1991 and 2012;
- **ARFF/SRE Building**: Incidental spillage at the AARFF/SRE Building since 1996;
- **Incident Response**: AFFF use at aircraft incident responses in 1981 and 2016;
- **Barnstable Fire Training Academy**: PFAS-impacted groundwater from upgradient sources, including the Barnstable Fire Training Academy PFAS Release

Further information on these areas is provided below. The locations of these areas are shown in **Figure 5.17-3**.

<u>AFF Training Areas</u>

Deployment Area

The Deployment Area is an unpaved area adjacent to the East Ramp at the Airport (**Figure 5.17-3**). AFFF was used during tri-annual drills and annual compliance testing performed by the Airport between 1991 and 2015. The combination of tri-annual drills and annual compliance



LEGEND:

- DEPLOYMENT AREA LINER CAP
- ARFF ASPHALT CAP
- PUBLIC WATER SYSTEM WELL
- PROJECT AREA
- APPROXIMATE PFAS SOURCE AREA

NOTES:

1. FEATURES ARE APPROXIMATE.

SOURCE:

1. PROJECT AREA DIGITIZED FROM ENVIRONMENTAL NOTIFICATION FORM, CAPE COD GATEWAY AIRPORT, EPSILON ASSOCIATES, INC., NOVEMBER 30, 2022.
2. PUBLIC WATER SYSTEM WELL DATA FROM MASSGIS (BUREAU OF GEOGRAPHIC INFORMATION), COMMONWEALTH OF MASSACHUSETTS EOTSS. FEBRUARY 13, 2023

0 1000 2000

SCALE, FEET

Draft Environmental Impact Report
Cape Cod Gateway Airport
Hyannis, Massachusetts

Epsilon Associates, Inc.
Manyard, Massachusetts

GEI Consultants

Project 2203788

PFAS SOURCE AREAS

September 2023 **Figure 5.17-3**

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testing have contributed to the AFFF related PFAS impacts to soil and groundwater in this area. The Airport ceased use of AFFF in the tri-annual training drills in 2016 with the purchase of the foam testing system by ECOLOGIC™.

Concentrations of PFAS in soil and groundwater within the Deployment Area were reported above their applicable Method 1 Soil and Groundwater Standards.

A geomembrane cap was installed at this area in September 2020 to reduce infiltration of precipitation through PFAS-impacted soil (**Figure 5.17-3**). The cap area covers the majority of known PFAS in soil source areas relating to the historic use of AFFF; however, concentrations of PFAS above Method 1 Soil standards are still present in soil outside the capped area. Inspections of the cap are performed by the Airport every six months. Results of the most recent inspection performed in March 2023 Indicated that the sand and loam protective layer overlying the geomembrane cap were intact and no signs of significant erosion were observed.

The Airport continues to investigate PFAS concentrations in soil outside the capped area. Additionally, the Airport performs bi-annual groundwater sampling to monitor the plume originating from the Deployment Area.

1991 Drill Area

All tri-annual drills occurred at the Deployment Area, with the exception of the 1991 drill, which occurred in an area adjacent to the northwest portion of Runway 15/33. Laboratory analytical results from shallow soil samples collected from this area in December 2018 did not indicate the presence of PFAS above background levels. No further assessment has been conducted in this area since 2018.

ARFF/SRE Building

The ARFF/SRE Building was constructed in 1996 for storage of emergency response vehicles, AFFF, and firefighting apparatus. This building was investigated and determined to be a source of PFAS and assumed to have been released in the building as a result of accidental spillage, equipment cleaning, or other means. Interior floor drains inside the building had historically discharged to grassy area adjacent to the building, which leached into the underlying soil and groundwater. Concentrations of PFAS in soil and groundwater were reported above their applicable Method 1 Soil and Groundwater Standards in this area.

An asphalt cap was installed over the former grassy area adjacent to the building in September 2020 to reduce infiltration of precipitation through PFAS-impacted soil (**Figure 5.17-3**). In addition, the interior floor drains were closed and connected to a permitted discharge to the Barnstable Wastewater Treatment Plant. The cap area covers the majority of known source

area of PFAS- impacted soil relating to the historic use of AFFF outside the ARFF/SRE Building; however, concentrations of PFAS above Method 1 Soil standards are still present in soil outside the capped area. Inspections of the cap are being performed by the Airport every six months.

Airport Crashes

The following two instances of AFFF use during aircraft accidents were noted by personnel working at the Airport since 1980:

- **Runway 24**: A 1981 crash of a Beech 18 aircraft east of runway 24 between Willow Street and the Airport; and
- **Rental Car Area**: A 2016 crash of a Cirrus aircraft in the parking lot of the rental car facility west of the terminal building. Approximately 335 gallons of AFFF (10 gallons of 3% AFFF concentrate and 325 gallons of water) was used during the crash response. The information reviewed indicated that the AFFF was contained within a solid bottom manhole, and subsequently disposed of.

No further information regarding additional response actions in these areas was available in the information reviewed.

Upgradient Sources

The information reviewed indicated that a groundwater plume from the upgradient Barnstable Fire Training Academy PFAS Release Site (RTN 4-26179) and other unknown upgradient locations extend onto the Airport property. These upgradient releases are unrelated to the Airport's AFFF PFAS plume. Results of groundwater analytical testing at several wells located hydraulically upgradient of the Airport have detected concentrations of PFAS exceeding the MassDEP's MCL of 20 ppt. These upgradient releases also appear to be contributing to PFAS impacts detected at the Maher Well field. Based on the information reviewed, response actions are being performed by the Barnstable County Commissioners to address these releases. More information is discussed in Section 5.17.3.4.

5.17.3.4 Soil and Groundwater Investigations

Information from Airport resources, including when AFFF use occurred for training purposes or during an aircraft accident was used to develop a sampling plan to assess the nature and extent of PFAS at the Airport. Since 2016, the Airport has conducted many investigations to delineate the extent of PFAS impacts to soil and groundwater both on and off Airport property. As part of this effort, a review of AFFF use was performed to determine if AFFF use occurred for training purposes or during an actual aircraft accident.

The Airport currently routinely tests for 20 to 24 PFAS compounds which include the six PFAS compounds currently regulated by MassDEP. Investigations are ongoing and status reports documenting response actions at the Airport are submitted to MassDEP Bureau of Waste Site Cleanup (BWSC) every 6 months.

PFAS Impacts to Soil

As discussed in Section 5.17.3.4, historical use of AFFF has resulted in concentrations of PFAS in soil above their applicable MCP Method 1 S-1 Soil Standards at two areas of the Airport: the Deployment Area and the ARFF/SRE Building.

At these two areas, soil with PFAS concentrations above applicable MCP Method 1 S-1 Soil Standards was detected up to 16 feet below grade. These areas were capped in September 2020 to reduce infiltration of stormwater into the PFAS-impacted soil.

Concentrations of PFAS above Method 1 Soil standards are also present in soil outside of the two capped areas. The Airport intends to perform further evaluation of these areas as part of future response actions.

The Airport also performed an investigation to evaluate the background concentrations of PFAS in soil. Based on the information reviewed, 20 samples were collected from areas on and off the Airport property. The result of the sampling indicated that PFAS from multiple on and offsite sources, including from atmospheric deposition, are contributing to the presence of PFAS in soil at the Airport and throughout the Town of Barnstable. One background sample collected at the Airport, and eight collected off Airport property exceeded the applicable Method 1 Soil Standards for various PFAS compounds. PFAS was detected in 19 of the 20 samples collected.

The Airport and other Responsible Parties continue to investigate the contribution of upgradient, off-Airport PFAS sources to soil and groundwater at the Airport. Based on current data, the vertical extent of PFAS impacted media (soil and groundwater) from contribution of upgradient sources is estimated to be from the ground surface to approximately 56 feet below grade.

PFAS Impacts to Groundwater

Contributions of PFAS in groundwater are resulting from both on-Airport and off-Airport sources. Currently known on-Airport sources include the ARFF/SRE Building and Deployment Area. PFAS concentrations in groundwater at these two areas have been reported above the Method 1 GW-1 standard. As discussed above, these areas were capped in September 2020 to reduce infiltration of stormwater through the PFAS-impacted soil. Installation of the two caps has resulted in a 75-82 percent decrease in the concentration of total PFAS in groundwater that is migrating from beneath the capped area. These results indicate that the cap is achieving the goal of reducing PFAS leaching from the soil into the underlying groundwater

that was resulting from stormwater infiltration. Based on a measured southeasterly groundwater flow direction, the PFAS plume from these areas is presumed to be migrating toward the Maher Wellfield.

Off-Airport sources of PFAS in groundwater include the Barnstable Fire Training Academy and other unknown sources. The Airport is using forensic techniques to determine if PFAS in the groundwater on the Airport Property is from the Airport or from off-site sources. In September 2020, the Airport submitted groundwater samples to Batelle Memorial Institute of Columbus, Ohio (Batelle) from six monitoring wells screened at various depths at the Maher Wellfield for forensic PFAS analysis. Concentrations of PFAS were reported above the Method 1 GW-1 standard in all six monitoring wells. According to the Batelle report, groundwater samples collected from monitoring wells screened shallow (from approximately 17 feet to 27 feet) were representative of the Airports PFAS Plume. Samples collected from monitoring wells screened deeper (from approximately 32 feet to 70 feet) were representative of upgradient non-Airport related sources (i.e., the Barnstable Fire Training Academy and others). In summary, it appears that the Maher Wellfield has PFAS contributions from on-Airport and off-Airport sources.

Response Actions to assess PFAS contamination from both on-Airport and off-Airport sources are currently ongoing.

5.17.4 Solid Waste

Solid waste is generated through various airport operations and is managed in accordance with local, state, and federal regulations. Solid waste at the Airport is routinely collected by Nauset Disposal and transported to the Barnstable Transfer Station, located approximately 5.5 miles southwest of the Airport.

5.17.5 Asbestos

Due to the age and material at the Airport, it is suspected that asbestos may be present in materials if installed before 1981. Asbestos is a naturally occurring natural fiber that is used in numerous building materials and vehicles products for its strength and its ability to resist heat and corrosion. If asbestos is inhaled and becomes airborne, it can be harmful to individuals. Examples of these materials, as well as other presumed asbestos-containing materials are:

- Thermal system insulation
- Roofing and siding shingles
- Vinyl floor tiles
- Plaster, cement, putties, and caulk
- Ceiling tiles and spray-on coatings
- Industrial pipe wrapping
- Heat-resistant textiles
- Automobile brake linings and clutch pads

It is not known if an asbestos survey was performed at the Airport to identify the presence of potential asbestos containing materials (ACM). A comprehensive survey of each proposed asbestos area for compliance with the EPA National Emissions Standards for Hazardous Air Pollutants for asbestos is required for all structures to be thoroughly inspected for ACM prior to demolition or renovation activities. An asbestos survey will be needed for the purpose of identifying visible, accessible suspect ACM and materials that may be required to be abated prior to any proposed airport renovation activities.

- Friable and non-friable ACM on all buildings through various airport operations.
- Lead Based Paint (LBP) at detectable levels on all painted surfaces that will either be impacted by demolition or that will become exterior wall surfaces following demolition.

Sample analysis for suspect ACM and LBP will be performed using Polarized Light Microscopy with Dispersion Staining in accordance with the EPA Method 600/M4-82-020, or EPA Method 600/R-93/116. All work will be performed by a qualified and licensed asbestos inspector(s) who has completed an EPA approved training course for building inspection.

Chapter 6.0

Environmental Consequences

6.0 ENVIRONMENTAL CONSEQUENCES

This Chapter discusses the reasonably foreseeable environmental impacts of the proposed action, the no action alternative, and other alternatives being considered in detail. The discussion of environmental impacts focuses on substantive issues and provides sufficient evidence and analysis for determining whether to prepare an EIS or a FONSI (see 87 FR 23453, CEQ Regulations). Additionally, this Chapter includes information demonstrating compliance with applicable requirements and identifies permits, licenses, other approvals, or reviews that apply.

Federal Aviation Administration (FAA) Order 1050.1F, Environmental Impacts: Policies and Procedures (Order 1050.1F) and Order 5050.4B, National Environmental Policy Act (NEPA) Implementing Instructions for Airport Actions (Order 5050.4B) define the form and content of Environmental Assessments.

The review of the environmental consequences associated with the proposed Projects in this chapter is also consistent with requirements of the Massachusetts Environmental Policy Act (MEPA) implementing regulations (301 Code of Massachusetts Regulations [CMR] 11.00) and the Secretary's Certificate on the proposed Projects' Environmental Notification Form (ENF) (EEA# 16640).

Environmental consequences for this EA/EIR have been determined by comparing anticipated environmental conditions in the Project area after development and to the environmental conditions if no project were to be developed (i.e., the "No-Action Alternative").

The environmental consequences identified within each impact category for the above alternatives include the consideration of the following:

- Direct Impacts – Direct impacts are those which are caused by the proposed action and occur at the same time and place (40 CFR 1508.8[a]).
- Indirect Impacts – Indirect impacts are defined as those which are caused by the proposed action and are later in time or farther removed in distance but are still reasonably foreseeable (40 CFR 1508.8[b]).
- Cumulative Impacts – Cumulative impacts are defined as the incremental effect on the environment which is the result from the impacts of the proposed action along with other past, present, and foreseeable future actions, regardless of what agency or person undertakes the other actions (40 CFR 1508.7).

The FAA uses thresholds, found in Order 1050.1F Exhibit 4-1, that serve as specific indicators of significant impact for some environmental impact categories. FAA proposed actions that would result in impacts at or above these thresholds require the preparation of an EIS, unless impacts can be reduced below threshold levels. Quantitative significance thresholds do not exist for all impact categories; however, consistent with the CEQ Regulations, the FAA has identified factors that should be considered in evaluating the context and intensity of potential environmental impacts.

If these factors exist, there is not necessarily a significant impact. Some impact categories may have both a significance threshold and significance factors to consider. In these instances, a conclusion of significance can be determined based on the factors to consider even if the impacts do not meet the significance threshold criteria. As necessary, and appropriate, mitigation/avoidance measures and considerations are identified to reduce or eliminate anticipated environmental impacts for each of the alternatives.

Consistent with 706.f of FAA Order 5050.4, the following resources are not located in the Project area and would not be impacted by the Project alternatives: wild and scenic rivers, floodplains, farmland of statewide importance, geology, and topography. Accordingly, these environmental categories are not analyzed further in this section.

6.1 Water Resources (MEPA/NEPA)

Construction of new, or reconstruction of, airport facilities may temporarily or permanently affect surface waters, groundwater, or drinking water supplies. As a result, this document evaluates the proposed project's potential water quality impacts. Development projects have the potential to cause water quality impacts, including new buildings or expanding the terminal or hangars, building new aprons or ramps, new or extended runways and taxiways, and installing navigational aids (NAVAIDS).

6.1.1 No-Build Alternative

There would be no effects on water resources, including stormwater, under the No-Build Alternative. The Project areas would remain in active airport use, there would be no new construction, the amount of impervious area would not increase, and the airport's existing stormwater collection and treatment systems would not be improved. Therefore, no direct or indirect impacts are anticipated under the No-Build Alternative. The No-Build Alternative would not provide the added benefit resulting from upgrades to stormwater treatment proposed with the Preferred Alternative.

6.1.2 Preferred Alternative

6.1.2.1 Stormwater Management

As runway and taxiway projects are designed, compliance with the Massachusetts Stormwater Standards (SMS) will be met and will serve to enhance management over existing conditions. A detailed Stormwater Management Report will be developed for future permitting and final design of the airport improvements under a follow-on project. The proposed stormwater design will treat stormwater using a combination of BMPs. As part of this EA/EIR an analysis was conducted of high-level drainage concepts and potential methods of treating stormwater runoff that will be generated from new taxiway and runway pavements. This includes high level analysis of drainage concepts. Specific drainage designs, calculations, and plans for the purposes of permitting will be developed under later stages of the project (e.g., permitting phases).

The future stormwater management options to address land alteration and increased impervious surfaces, added by the project, will address potential flooding, increased impervious areas, and will identify measures to protect the water quality of the sole source aquifer including infiltration chambers and/or leaching basins with pre-treatment of runoff prior to discharge into the infiltration systems.

Portions of the existing drainage system predate the Standards and do not meet contemporary goals for stormwater management systems. Projects that will affect existing drainage systems will upgrade those systems to bring them into full compliance. Compliance with these Standards will protect the downstream receiving wetlands and water courses. In particular, Standard 5 which relates to discharges from areas designated as Land Uses with Higher Potential Pollutant Loads (LUHPPL) such as hangar ramps and apron areas will be met fully. Additionally, Standard 6, which identifies areas within Wellhead Protection Areas as a Critical Area under the Standards will also be met fully. These measures not only improve the quality of the runoff entering receiving waters but the quantity as well. Interim and post-development peak discharge rates will not exceed pre-development peak discharge rates for the 2-year, 10-year, 100-year storm events to the maximum extent practicable.

Portions of the Project site is considered a “redevelopment of a previously developed site” as defined in the Massachusetts Wetlands Act Protection Regulations (310 CMR 10.00). These portions include all existing paved areas or areas with buildings. The requirement of the Massachusetts Stormwater Standards for a redevelopment Project is that *“A redevelopment Project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment Project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.”*

Because this is an airport setting, certain Best Management Practices (BMPs) are not allowed. Per Advisory Circular (AC) No. 1501.5200-33 *"Hazardous Wildlife Attractants on and Near Airports"* new stormwater management practices that feature a permanent pool of water (i.e., wet ponds and constructed wetlands) are prohibited and underground facilities are encouraged. FAA's siting criteria for potential wildlife attractants state that wildlife attractants should not be within 10,000 feet of an airport's aircraft movement areas (including loading ramps and parking areas) or within *5* miles of approach or departure airspace. When BMPs are designed to temporarily pond water on the surface, this guidance requires that they drain within 24 hours following a 1- or 2-year storm event and within 48 hours following a 10-year storm event.

Proposed stormwater management infrastructure maintenance requirements and locations will be incorporated into the existing MSGP SWPPP when constructed. All applicable infiltration BMPs will obtain Underground Injection Control (UIC) Registration from MassDEP.

The stormwater systems will be designed to address future climate conditions utilizing MA Resilience Design Tool. The stormwater report will identify how the systems may accommodate the recommended 2070 100-Year 24-hour rainfall volume of eleven (11) inches as well as the 2050 recommendation for runway and taxiway projects corresponding to the 2050 10-Year 24-hour rainfall volume of 6.1 inches. The stormwater management systems will be designed to attenuate peak flows and meet pollutant loading requirements based on future climate conditions in 2050 and 2070. Copies of the final Stormwater Management Report will be provided to MassDEP and CCC as necessary during the permitting phase.

Runway 15-33 Extension

Under the Proposed Action, the existing Runway 15 end safety areas will be constructed to current FAA standards. The proposed new pavement will be approximately 141,500 sf runway and 73,500 sf taxiway pavements for a total of 215,000 sf (4.9 acres). The existing drainage system will be relocated to the edge of the safety area and upsized to accept stormwater from the runway extension. The airport's existing Vortech[1] unit can be relocated to the west side of the perimeter road and a new outlet pipe could connect to the existing 36-Inch pipe that connects to existing Outlet A at Upper Gate Pond. Leaching catch basins can be installed up stream of the existing Vortech unit and sized to maintain existing flows into the pond.

Table 6.1-1 Runway 15 Pavement and Turf Impacts

Proposed Airfield Work	Pavement		Turf		Total Combined Area	
	Area (sf)	Area (Acres)	Area (sf)	Area (Acres)	Area (sf)	Acres
Extend RW 15 end 895 feet	141,500	3.25	1,856,800	42.63	1,998,300	45.87

New Taxiway B

Existing Taxiway B will be relocated to be within 400 ft of the Runway 6-24 centerline. Taxiway B will also be extended approximately 750 ft toward the RW 24 End and will include removal of a portion of existing Taxiway B and Stub Taxiway D pavements. Total length will be approximately 4,000 ft. The net increase in pavement area will be approximately 226,200 sf (5.19 Acres).

[1] Vortech is a below-ground, engineered stormwater treatment device that combines swirl concentration and flow controls into a single treatment unit. Vortech is used for capturing and retaining trash, debris, sediment, and hydrocarbons from stormwater runoff. The system's large swirl concentrator and flow controls work together to create a low energy environment, capable of capturing and retaining particles down to 50 microns.

Importantly, the construction of the relocated Taxiway B will be designed to avoid increasing stormwater runoff rates to Lewis Pond located north of Taxiway C. This can be accomplished by a combination of new grading, adjusting existing leaching basins to continue functioning as designed and incorporating new leaching basins and/or new chamber systems to account for the increased paved area.

Table 6.1-2 Taxiway B: Pavement and Ground Impacts

	Pavement		Turf		Total	
	Area (sf)	Area (Acres)	Area (sf)	Area (Acres)	(sf)	(Acres)
Taxiway 'B'	330,200	7.58	532,100	12.22	862,300	19.80
Taxiway 'B' Pavement Removal	(104,00)	(2.39)	214,300	4.92	110,300	2.53

The new taxiway will impact two existing storm drains that run perpendicular to the new taxiway and approximately seven (7) existing catch basins located between Taxiway B and Runway 6-24 (see **Figure 5.4-2**). It is anticipated that these catch basins will be removed and/or relocated. Runoff from the new pavement can be collected in drainage swales located outside the taxiway safety area (59 ft either side of centerline) and infiltrated into the ground via leaching basins. Each infiltration device will have pretreatment to remove a minimum 44% TSS prior to discharge into each infiltration device, which will provide additional TSS removal.

New Parallel Taxiway D

A new parallel Taxiway D parallel to Runway 15-33 is proposed (approximately 3,700 ft) and will include removal of Taxiway E including the existing run-up pit and removal of existing portions of existing Taxiway D. The net increase in pavement area will be approximately 164,700 sf (3.781 Acres).

Table 6.1-3 Taxiway D Land Impervious /Turf Impacts

	Pavement		Turf		Total Combined Area	
	Area (sf)	Area (Acres)	Area (sf)	Area (Acres)	(sf)	(Acres)
Taxiway 'D' (2:1 slope)	315,000	7.23	555,300	12..75	870,300	119.98

Stormwater runoff from the new Taxiway D would flow toward the infield areas between the proposed taxiway and Runway 15-33. Stormwater will be discharged into new leaching catch basins, with pretreatment of stormwater designed to provide a minimum fifty (50) foot vegetated grassed filter strips prior to discharge into leaching catch basins. Pretreatment for stormwater is required because the airport is within Zone II of the Wellhead Protection Zone.

Much of Taxiway D will require fill between existing Taxiway A1 and existing Taxiway D. The preferred alternative includes either an engineered slope or a retaining wall along the outside edge of the taxiway safety area (i.e., east side) will be constructed within the Upper Gate Pond to minimize impacts to the pond. A vegetated earthen berm will be constructed along the top of the slope to prevent sheet flow from entering the slope and potentially causing erosion.

Under proposed conditions runoff from both sides of new Taxiway D can be discharged into new leaching catch basins within the infield areas. Pretreatment will be provided prior discharging into each of the new leaching catch basins. Under the Preferred Alternative, proposed conditions for new Taxiway D will impact the existing Vortech Unit A that discharges at Outfall A to Upper Gate Pond. The existing Vortech unit will be relocated due to the construction of the new taxiway. The exact location of this Vortech unit will be determined under a future design/construction project and, if necessary, it can be relocated outside of the taxiway safety area. This unit will not receive any additional runoff from the new taxiway pavement. Increase runoff over existing conditions can be controlled by the installation of additional leaching catch basins. These types of systems are currently in use throughout the airport. The exact size, dimensions and location of these systems will be determined under a future design/construction project.

6.1.2.1.1 Wellhead Protection Zone

Portions of the proposed work will take place within the Town of Barnstable wellhead protection district. Proposed infiltration within the Wellhead Protection Zone will require pretreatment of runoff entering any infiltration device such as vegetative strips or leaching basins. The existing infiltration devices (chamber systems and leaching catch basins) may require the addition of pretreatment devices to satisfy the wellhead overlay district drainage requirements. These would be designed under the permitting phase for this project and installed at the time of construction.

The new taxiway will impact two existing storm drains that run perpendicular to the new taxiway and approximately seven (7) existing catch basins located between Taxiway B and Runway 6-24. It is anticipated that these catch basins will be removed and/or relocated. Runoff from the new pavement can be collected in drainage swales located outside the taxiway safety area (59 feet either side of centerline) and infiltrated into the ground via leaching basins. Each infiltration device will have pretreatment to remove a minimum 44% TSS prior to discharge into each infiltration device, which will provide additional TSS removal.

6.1.2.1.2 Compliance with MassDEP Stormwater Management Standards

The following information lists the standards that must be met to satisfy MassDEP requirements and considers potential BMPs that may be utilized to comply with each standard.

STANDARD 1 – No untreated discharges or erosion to wetlands. Applicants must demonstrate that there are no new untreated discharges. To demonstrate that all new discharges are adequately treated, applicants may rely on the computations required to demonstrate compliance with Standards 4 through 6. No additional computations are required.

The future stormwater management report will identify measures that will be employed to protect the water quality of the sole source aquifer such as vegetative strips, water quality devices, leaching catch basins or infiltration chambers. These devices will remove 80% of total suspended solids as required by DEP.

- **Runway 15-33**: There are no wetlands proximate to the location of the runway extension, thus there will be no discharge of untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. Rather, this project will utilize leaching catch basins or underground infiltration chambers to infiltrate any increase in runoff due to increased impervious areas directly into the ground after treatment. Leaching basins and infiltration chambers have been extensively utilized throughout the airport on previous projects.
- **Taxiway B**: There are no wetlands proximate to the location of the Taxiway B project, therefore the Taxiway B project will not discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. Rather, the Proposed Action will have the opportunity to utilize leaching basins to dispose of runoff. Leaching basins and infiltration chambers are commonly used throughout the airport.
- **Taxiway D**: The Taxiway D project will not discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth. Rather, this project will utilize leaching basins to infiltrate runoff. Leaching basins are commonly used throughout the airport.

STANDARD 2 - Stormwater management systems shall be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.

The future design of the stormwater management report will utilize revised rainfall intensities by NOAA Atlas 14, Point Precipitation Frequency Estimates including for future climate conditions. Methods available to manage increase post development runoff include infiltration devices such as leaching basins and/or underground chamber systems or below ground detention basins. Pretreatment devices will need to be provided at each proposed leaching system to remove a minimum 44% TSS prior to discharging runoff into these systems to satisfy the Town's standards for work within the wellhead protection overlay district. The stormwater management report will also assess flooding risks to properties immediately adjacent to proposed projects associated with the Airport Master Plan Update.

Standard 3 – Loss of annual recharge to groundwater shall be eliminated or minimized through the use of infiltration measures including environmentally sensitive site design, low impact development techniques, stormwater best management practices and good operation and maintenance. At a minimum, the annual recharge from the post development site shall approximate the annual recharge from the pre-development conditions based on soil type. This Standard is met when the stormwater management system is designed to infiltrate the required recharge volume as determined in accordance with the Massachusetts Stormwater Handbook.

There will be no loss of annual recharge to groundwater due to new taxiway pavement because future design will include using leaching basins and infiltration chambers. The stormwater management report will identify new pavement/impervious areas and pavement removal for each of the proposed projects in the Airport Master Plan Update. New impervious areas will be minimized to the maximum extent practicable while adhering to FAA guidelines. All infiltration systems require registration under the MassDEP Underground Injection Control (UIC) program.

Standard 4 - Stormwater management systems shall be designed to remove 80% of the average annual post-construction load of Total Suspended Solids (TSS). This Standard is met when (a) Suitable practices for source control and pollution prevention are identified in a long-term pollution prevention plan and thereafter are implemented and maintained; (b) Structural stormwater best management practices are sized to capture the required water quality volume determined in accordance with Massachusetts Stormwater Handbook; and (c) Pretreatment is provided in accordance with the Massachusetts Stormwater Handbook.

TSS removal can be accomplished by a long vegetative strip (> 50 ft) within the side runway safety area prior to discharge into leaching catch basins. Proprietary treatment units are also available for use to remove 80% TSS. A minimum of 44% TSS removal is required prior to discharge into a leaching basin because the airport is in a wellhead protection zone. These types of devices are currently in use throughout the airport.

Standard 5 – Stormwater discharges from areas with higher potential pollutant loads require the use of specific stormwater management BMPs. The use of infiltration practices without pretreatment is prohibited.

This project is not considered an area of high potential pollutant loads. Pretreatment devices are required at each infiltration device within the wellhead overlay district and will be utilized for each of the proposed projects.

Standard 6 - Stormwater discharges to critical areas must utilize certain stormwater BMPs approved for critical areas. Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold water fisheries, and recharge areas for public water supplies.

This project will be subject to Standard 6 because it is within Zone II Wellhead Protection for Cape Cod. The proposed drainage design for this project will utilize water treatment units to remove 80% TSS prior to discharge into infiltration chambers and/or leaching basins to provide the required pretreatment of stormwater runoff.

Standard 7 - A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5 and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.

The runway extensions and new taxiways will be considered new development. Therefore Standard 7 does not apply.

Standard 8 - A plan to control construction-related impacts including erosion, sedimentation and other pollutant sources during construction and land disturbance activities (construction period erosion, sedimentation, and pollution prevention plan) shall be developed and implemented.

Design during the future phases of the project will identify specific construction period activities (such as dewatering activities), as part of the anticipated permitting.

Standard 9: A long-term operation and maintenance plan shall be developed and implemented to ensure that stormwater management systems function as designed.

Cape Cod Gateway Airport has an existing Stormwater Pollution Prevention Plan (SWPPP) under the National Pollution Discharge Elimination System (NPDES) 2021 Multi-Sector General Permit (MSGP) in place for all airport facilities including all existing drainage facilities (see prior discussion in Section 5.4.1.1 and **Appendix L**). The SWPPP is on file at the Airport and a project specific operation and maintenance plan will be prepared for the final design of this project and incorporated into the SWPPP.

Standard 10: All illicit discharges to the stormwater management system are prohibited.

All known non-allowable non-stormwater discharges have previously been eliminated through the closure of hangar floor drains connected to leaching basins and the implementation of a zero-discharge policy. A new Illicit Discharge Compliance Statement will be prepared for the final design of this project.

6.1.2.2 Surface Waters and Wetlands

The environmental consequences of the Preferred Alternative include unavoidable wetland resource area impacts associated with the permanent fill from the relocation of Taxiway D and associated grading on Upper Gate Pond. No other projects will impact wetland resource areas. As identified in Section 5.4, these resource areas are likely only jurisdictional under local, and statutes and implementing regulations due to the recent revised definitions of Waters of the US.

Due to site constraints, and FAA design requirements for airport geometry, this Project activity cannot be designed to fully avoid impacts to Bordering Vegetated Wetlands (BVW). Permanent fill of approximately 4,500 sf of BVW, 13,700 sf Land Under Water (LUW), 300 linear feet of Inland Bank will occur as a result of the realignment of Taxiway D. These impacts have been avoided and minimized to the maximum extent practicable through utilization of 2:1 side slope design with an engineered slope option.

Additionally, approximately 3.8 acres of vegetated upland areas within 200 feet of Upper Gate Pond, a buffer zone protected by the CCC Regional Policy Plan Objective[2] and prior Minor Modifications to DRI Decisions[3] will be impacted.

Although final design and means and methods of construction have not yet been determined, there is also the potential for up to 5,200 cubic yards of excavation (dredge) of unconsolidated organic materials (i.e., "muck") along the pond bottom in order to provide suitable base material for the taxiway slope. As part of the next phase of design, geotechnical engineers will further investigate this area to ascertain if excavation is recommended or if there are other options to adequately support the slope and meet FAA design criteria.

These permanent impacts are summarized in **Table 6.1-4** below and depicted in **Figure 6.2-1**. In addition to the proposed permanent impacts to BVW, temporary impacts of 1,500 sf of BVW generally involve a 5-foot horizontal area necessary for construction access and work associated with the Taxiway D. The proposed construction would temporarily alter these areas by a variety of construction activities including temporary excavation and backfilling, support of excavation and water control, staging and operating construction equipment, grading, and installing erosion controls. Once construction is complete, the resource areas not permanently impacted by filling would be restored to pre-existing grades and seeded with a native wetland seed mix.

Table 6.1-4 Taxiway D Impacts to Upper Gate Pond

	BVW Impact		Bank Impact	Land Under Water Impact		200-foot Buffer Zone
	Area (sf)	Area (Acres)	Linear Feet (LF)	Area (Acres)	Area (sf)	Area (Acres)
Permanent	4,600	0.11	300	0.29	12,700	3.78

Compliance with specific performance standards of the applicable regulations identified below is addressed in Chapter 8.0 for each of the applicable resource areas. Permits under local and state regulations will be required for these impacts: Massachusetts General Laws c. 21, §§ 26-53, and the MassDEP's Water Quality Certification Regulations at 314 CMR 9.00 (Water Quality Certification Regulations).

[2] Objective WET 1: Protect wetlands and their buffers from vegetation and grade changes.

[3] See Minor Modification to Decision CCC Project No. TR95006 issued on March 25, 2015.

G:\Projects2\MA\Barnstable\6116\MXD\6.2-1_TaxiwayD_2-1_Slope_Wetland_Resource_Impacts_20231012.mxd

Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

Impact to Bordering Vegetated Wetland
0.1 acres total
0.01 acres pavement

Impact to Open Water
0.29 acres total
0.0 acres pavement

Impact to 200-ft Buffer Zone
3.78 acres total
1.13 acres pavement

Impact to 100-ft Buffer Zone
1.85 acres total
0.52 acres pavement

Upper Gate Pond

LEGEND

- Airport Property Boundary
- New Pavement
- Pavement to be Reconstructed
- Pavement to be Removed
- Pavement Removal Turf
- Limits of Grading (2:1 Slope)
- Bordering Vegetated Wetland
- Land Under Water
- Bank
- 100-ft Buffer Zone
- 200-ft Buffer Zone

Scale 1:1,200
1 inch = 100 feet

0 50 100 Feet

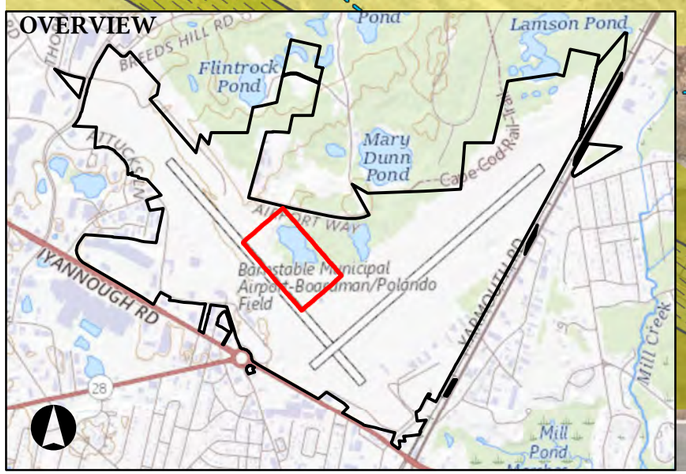
Basemap: Nearmap Aerial Image, April 2023

Proposed Taxiway D

Existing Taxiway D

Taxiway E

OVERVIEW



Cape Cod Gateway Airport Barnstable, Massachusetts

Figure 6.2-1
Wetland Resource Area Impacts

6.1.3 Indirect Impacts

The proposed Project is not anticipated to result in indirect or secondary impacts that would adversely affect water resources. Indirect or secondary impacts from stormwater runoff to water resources are prevented through the Airport's Spill Prevention, Control, and Countermeasure (SPCC) Plan and regular maintenance of management facilities. Potential indirect impacts from historical use of PFAS containing firefighting foam includes the following measures: the Town of Barnstable through the Hyannis Water System will continue to operate the Maher Wells treatment plant and will continue to provide drinking water that meets the regulatory drinking water standards. The MassDEP periodically inspects the Maher Treatment plant under the water supply/drinking water program.

Groundwater monitoring by the Airport will continue to track the PFAS plume migration and document the reduction in concentration over time until regulatory closure is achievable (estimated to be completed by 2029). A majority of the PFAS impacted soil within the two effected areas have been capped to reduce infiltration and groundwater impacts. The caps are inspected bi-annually to verify their effectiveness.

The actual time for treatment will be based on the collection of analytical samples for laboratory analysis. Groundwater monitoring beyond 2029 may be conducted at the Airport as part of an annual activity and use limitation (AUL) inspection or if plume concentrations have not dropped below the applicable GW-1. Bi-annual reports will continue to be uploaded to MassDEP until a permanent solution can be obtained.

6.1.4 Construction Impacts

6.1.4.1 Stormwater

For Projects identified herein with land disturbance of greater than 1 acre, the Airport and selected contractor will need to seek coverage under the 2022 (or its replacement) EPA NPDES Construction General Permit (CGP), including developing a stormwater pollution prevention plan (SWPPP), that reduces pollution from erosion and sedimentation from construction activities. The Airport or its designee will regularly inspect the active construction sites for compliance with the SWPPP and make sure that appropriate erosion control measures are in place and working properly.

In addition, construction will be phased out so that disturbed areas are minimized to the extent feasible. The SWPPP and selected BMPs will be finalized as construction methods and schedule are determined by the selected contractor. The SWPPP will be finalized prior to construction, updated as necessary during construction, and maintained throughout the period of construction. In addition, construction activities will comply with the FAA Advisory Circular 150/5370-10H (Latest Version), Airport Construction Standards. Site plans included in the SWPPP will depict sedimentation and erosion control measures and EPA and MassDEP BMPs to control and reduce sediments and dust in stormwater discharges to the extent feasible, in accordance with NPDES requirements.

A project specific operation and maintenance plan will be prepared for the final design of this project and incorporated into the SWPPP.

6.1.4.2 Wastewater Management

With the recent addition of a sewer line along Mary Dunn Way, any new proposed facilities will be able to connect to the Town wastewater system. Existing facilities are required to connect to the new sewer line. Typically, general aviation hangars are not anticipated to result in additional wastewater discharges as these hangars are used for aircraft storage only.

6.1.5 Mitigation Measures

6.1.5.1 Wetland Replication

Mitigation for the Preferred Alternative's unavoidable impacts to BVW will be provided in accordance with local and state wetlands regulations and performance standards. For permanent impacts resulting from filling BVW, the altered BVW would be replaced (replicated) in-kind proximate (to the extent feasible) to the water body or reach of the waterway area lost to meet mitigation requirements under the Barnstable Wetlands Protection Bylaw, Cape Cod Commission Water Resources Policy, and MassDEP Water Quality Certificate regulations (see 314 CMR 9.06) and the WPA (see 310 CMR 10.55(4)(b)). The proposed ratio of replacement area to BVW loss is at least 1:1, and a total of 4,600 sf of BVW replication would be provided on Airport property proximate to the impact location(s). The wetland replication area would be designed and constructed as per MassDEP's *Massachusetts Inland Wetland Replication Guidelines, Second Edition* (September 2022).

A desktop analysis of potential wetland replication sites on the Airport has been initiated. A preliminary constraints assessment associated with locating the replication site on Airport includes the following:

- On-site wetland mitigation must be designed with adherence to FAA's Advisory Circular regarding wildlife hazard mitigation at airports (AC 150/5200-33B) recommendation that wetlands mitigation be sited a minimum of 10,000 feet from the active runway. It also should be designed in such a manner as to inhibit the use of wildlife proximate to the taxiways and runways as it is currently managed throughout the Airport.
- Steep topography adjacent to wetland impact area at Upper Gate Pond.
- Limited wetland areas on airport property adjacent to which one could construct a wetland.
- Lack of opportunity for wetland restoration through removal of fill on airport property.
- Mapped rare species habitat and vernal pools associated with other ponds located on airport property.

Potential off-airport properties for the development of a wetland replication or restoration area within the Airport vicinity in the Town of Barnstable will be identified in consultation with the Barnstable Conservation Commission, Barnstable Department of Natural Resources, Barnstable Land Trust, Cape Cod Commission, Massachusetts Division of Ecological Restoration (DER), MA Division of Fisheries and Wildlife (DFW), and Mass Audubon. These properties will undergo a screening process to determine suitability for either wetland replication or land preservation to meet regulatory requirements. These areas will be evaluated in terms of their location within the watershed, proximity to impact area, potential for adequate replication area, potential for replication success and maintenance, potential to recreate lost functions and values, presence of invasive species, site access, cost of acquisition, and other factors. This screening process will also include site visits, if feasible.

Once potential sites are identified and site visits are complete, a conceptual replication plan will be presented to the regulatory agencies as part of the permitting phase. Once consensus is reached on a permittable plan, a draft wetland replication site plan will be developed, and accompanying narrative will be completed. The wetland replication plan, to the extent compatible with the airport's safety needs, will also incorporate important wildlife habitat features into the design including burrowable soils for small mammals, flowering herbs for pollinator species, and dense herbaceous cover, designed to replicate those functions of the impacted wetlands.

6.1.5.2 Stormwater

Stormwater Pollution Prevention Plan (SWPPP) would be generated for construction-related activities. During construction, structural and non-structural controls to minimize erosion and sedimentation, including temporary stabilization, temporary seeding, permanent seeding, dust control, temporary sediment basins and check dams, diversion swales, catch basin inlet protection, and dewatering filters.

During operation, consistency with MassDEP's Stormwater Regulations through measures including infiltration, peak runoff rate and volume control, and total suspended solids removal will be implemented. Any updates to the Airport's MSGP SWPPP will be implemented.

6.1.6 Impact Summary

The FAA uses the following significance thresholds for wetlands and surface waters to determine if the action would:

1. Adversely affect a wetland's function to protect the quality or quantity of municipal water supplies, including surface waters and sole source and other aquifers;
2. Substantially alter the hydrology needed to sustain the affected wetland system's values and functions or those of a wetland to which it is connected;
3. Substantially reduce the affected wetland's ability to retain floodwaters or storm runoff, thereby threatening public health, safety, or welfare (the term welfare includes cultural, recreational, and scientific resources or property important to the public);

4. Adversely affect the maintenance of natural systems supporting wildlife and fish habitat or economically important timber, food, or fiber resources of the affected or surrounding wetlands;
5. Promote development of secondary activities or services that would cause the circumstances listed above to occur; or
6. Be inconsistent with applicable state wetland strategies.

Wetland impacts as described above in **Table 6.1-4** Taxiway D Impacts to Upper Gate Pond include permanent fill of approximately 4,500 sf of BVW, 13,700 sf Land Under Water (LUW), 300 linear feet of Inland Bank will occur as a result of the realignment of Taxiway D – which has been minimized to the greatest extent feasible by the selection of a 2:1 slope over the FAA standard 4:1 slope for taxiway side areas. As described in Section 6.1.5., mitigation will be designed in the subsequent permitting phases of the project to meet all local, state, and federal wetlands regulations and performance standards, as applicable.

Permanent impacts resulting from filling BVW, the altered BVW would be replaced (replicated) in-kind proximate to the water body or reach of the waterway area lost to meet mitigation requirements under the Barnstable Wetlands Protection Bylaw, Cape Cod Commission Water Resources Policy, and MassDEP Water Quality Certificate regulations (see 314 CMR 9.06) and the WPA (see 310 CMR 10.55(4)(b)). The proposed ratio of replacement area to BVW loss is at least 1:1, and a total of 4,600 sf of BVW replication would be provided on Airport property proximate to the impact location(s). Mitigation measures described above will be used to reduce potentially significant adverse impacts below the level of significance.

Based on the proposed avoidance, minimization, and mitigation, in Section 6.1.5., there are no significant impacts on wetlands and surface water beyond the existing condition as a result of the Proposed Action.

6.2 Coastal Resources (MEPA/NEPA)

The MA Office of Coastal Zone Management is being provided an opportunity to comment on this document relative to the consistency of the project with Massachusetts Coastal Policies. Specifically, the project will be reviewed to ensure that it conforms with policies for water quality, habitat, protected areas, coastal hazards, port and harbor infrastructure, public access, energy, and ocean resources, which are embodied in relevant state regulations. A discussion on each coastal policy and discussion relative to the proposed projects provided in Section 8.3.7 determined that the proposed project will be consistent to the maximum extent practicable with the enforceable policies of the *Massachusetts Office of Coastal Zone Management Policy Guide*. Section 8.3.7 contains a discussion on each coastal policy and discussion relative to the proposed projects. Furthermore, the Projects are not located near any coastal landforms (e.g., dunes, beaches, salt marshes).and would not pose an impact to human safety, property or cause adverse impacts to the coastal environment. Based on this information, there are no significant impacts on coastal resources beyond the existing condition as a result of the Proposed Action based on the Preferred Alternative Projects.

6.3 Air Quality (MEPA/NEPA)

6.3.1 No-Build Alternative

The No-Build Alternative assumes that the Projects would not be implemented; therefore, there would be no impacts on air quality.

6.3.2 Proposed Action

The Airport is located in a NAAQS attainment area; is not in an Indirect Source Review designated area of Massachusetts; and is not located in an area with State Implementation Plan requirements. Therefore, no formal Emissions Dispersion and Modeling System or other air quality modeling is required. Instead, a qualitative analysis examining the background pollutant levels (see Table 5.6-3), which are well within applicable air quality standards, and potential for changes and/or increases in air emissions was completed. The Project is not anticipated to result in additional emissions from any changes in operation due to several factors. This includes a near-term shift in commercial aircraft to a more fuel-efficient model which provides over 10% improvement in fuel and carbon emissions[4] .Temporary emissions associated with construction are anticipated from the Project and will be mitigated to the extent possible as discussed below. Some additional emissions may result from increased vehicle traffic as discussed in Section 6.8. However, this additional traffic will not result in emissions sufficient to result in an exceedance of the NAAQS.

Furthermore, the Proposed Actions are anticipated to have little effect on air traffic volume over the next 5-7 years as shown in Table 1.4-3, showing a modest increase of 1,000 operations by 2030, and will have minor effects on air traffic patterns, and therefore are not expected to have an adverse effect on air quality. Mitigation for permanent impacts to air quality is not proposed.

6.3.3 Construction Impacts

The construction phases of each proposed action are expected to temporarily increase air emissions from both fugitive dust generated from earth moving activities and the exhaust of non-road construction equipment. Emissions from the operation of construction machinery (i.e., carbon monoxide [CO], nitrogen oxide [NOx], particulate matter [PM10, PM2.5], volatile organic compounds [VOCs], and GHG emissions) are short-term and not generally considered substantial. Temporary air quality impacts during construction periods will be mitigated as described in the Mitigation section below under “Temporary Impacts.”

6.3.4 Mitigation Measures

Several strictly enforced measures would be used by contractors to reduce potential emissions and minimize impacts including:

- Using wetting agents on areas of exposed soil on a scheduled basis;

[4] Need reference here.

- Using covered trucks;
- Monitoring actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized;
- Minimizing storage of debris on the site;
- Periodic street and sidewalk cleaning with water to minimize dust accumulations; and
- The contractor would comply with the National Emission Standards for Hazardous Pollutants (NESHAP) throughout demolition and construction activities.

In addition to measures to control earth material particulate dust, the contractor would also strive to minimize diesel emissions during construction. Emissions from the operation of construction machinery (i.e., carbon monoxide [CO], nitrogen oxide [NOx], particulate matter [PM10, PM2.5], volatile organic compounds [VOCs], and GHG emissions) are short-term and not generally considered substantial. Specific measures to be taken to reduce diesel emissions and other construction related air quality impacts include the following measures:

- Using equipment retrofitted with diesel emissions control devices. The Proponent would specify during the procurement of the subcontractors, that the majority of the heavy equipment operating on the site be retrofitted with diesel emissions control devices;
- Maintaining an "idle free" work zone of fossil fuel trucks and equipment by providing supplemental hoisting and pumping equipment along with "just-in-time" delivery methods. On-site idling would be limited to five minutes. "Do Not Idle" signs would be posted at appropriate locations;
- By locating combustion engines away from sensitive receptors such as fresh air intakes, air conditioners and windows; and
- Using Ultra Low Sulfur Diesel for all trucks and construction machinery as required by the US EPA.

6.3.5 Impact Summary

As described in Section 5.6, the FAA has established significance thresholds to serve as indicators of what constitutes a significant impact. For air quality, the significance threshold is any action that would result in criteria air pollutant concentrations that would lead to an exceedance of the NAAQS or increase the severity of any existing exceedance. Based on this information, there are no significant impacts on the air quality (neither onsite within project area nor vicinity/regional) beyond the existing condition as a result of the Proposed Action.

6.4 Climate and Greenhouse Gas Emissions (MEPA/NEPA)

Greenhouse gas (GHG) emissions contribute to climate change. Carbon dioxide (CO2) is the primary greenhouse gas emitted through human activities. In 2020, CO2 accounted for about 79% of all U.S. greenhouse gas emissions from human activities. Carbon dioxide is naturally present in the atmosphere as part of the Earth's carbon cycle (the natural circulation of carbon among the atmosphere, oceans, soil, plants, and animals).

The carbon cycle exists between carbon dioxide entering the atmosphere through fuels sources (coal, natural gas, and oil), solid waste, trees, and other biological materials. Carbon dioxide is removed from the atmosphere (or "sequestered") when it is absorbed by plants as part of the biological carbon cycle. Sequestration occurs in forests and soils primarily through photosynthesis. Carbon dioxide in the atmosphere is incorporated as fixed carbon into the roots, trunk, branches, and leaves of trees, with roughly 50 percent of tree carbon storage occurring in the woody biomass (EPA 2007).[5]

Carbon sequestration occurs in four parts of a forest: soil, trees, the forest floor, and understory vegetation. The share of total sequestration attributable to each part differs greatly depending on the region, the type and age of the forest, the quality of the site, and previous land use. On average, soil contains 59 percent of the carbon stored in a forest, trees contain 31 percent, forest litter holds 9 percent, and understory vegetation accounts for 1 percent.[6]

Sources of greenhouse gas emissions at the Airport include existing buildings, vehicles, and aircraft. The project does not result in permanent sources of GHG emissions as future terminal building enhancements are anticipated to be 100% electrically powered by the Airport's microgrid project underway (currently in planning phases as of September 2023). While electric power is not carbon neutral, with Massachusetts electrical sector resulting in 8,388 MT of CO2 in 2021[7], the Airport's future microgrid will utilize both battery storage and renewable energy sources (airport solar array) to effectively result in neutral carbon emission or negative emissions. Being carbon negative requires a facility or building to remove more CO2 from the atmosphere than it emits.

An increase in aircraft activity is not anticipated as a result of the proposed Projects, rather, the Projects are to enhance the safety of aircraft flying into and out of the airport and to comply with FAA standards for airfield geometry. Aircraft operations are anticipated to maintain their existing levels and future growth is forecasted by models in the master plan. Information regarding the potential for air quality impacts is provided in Section 6.3.2 above. As noted above, the Projects are

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5 U.S Environmental Protection Agency. 2007. Carbon Sequestration in Agriculture and Forestry: Basic Information

6 Birdsey, Richard A. 1992. Carbon Storage and Accumulation in United States Forest Ecosystems, General Technical Report W0-59 (Department of Agriculture, Forest Service, August 1992).

7 U.S. Energy Information Administration, Form EIA-860, *Annual Electric Generator Report*, U.S. Energy Information Administration, Form EIA-861, *Annual Electric Power Industry Report,* U.S. Energy Information administration, Form EIA-923, *Power Plant Operations Report* and predecessor forms, accessed from https://www.eia.gov/electricity/state/massachusetts/

proposed primarily to safely accommodate current operations. A temporary increase in emissions is anticipated as part of the construction period. Measures will be adopted to minimize impacts from temporary emissions as described in Section 6.3.4 above.

The Airport is committed to curbing GHG emissions long-term through various strategies including improving the energy efficiency of buildings on-site, evaluating the installation of solar canopies at the Airport parking lot, limiting idling by aircrafts, upgrading airport maintenance vehicles/requiring low sulfur diesel fuel use by contractors, and carrying out regular energy audits on on-site buildings. A discussion of GHG emissions associated with proposed tree removal resulting from Taxiway D, hangar development (East Ramp), and future potential off-airport obstruction removal is discussed in Section 6.4.1.4. below.

6.4.1 Greenhouse Gas Analysis (MEPA)

The Proponent is taking strong, practical steps to reduce carbon emissions while balancing its development goals to create a successful Project. In keeping with the Airport's carbon reduction goals, the Project is being designed to minimize energy use to the maximum extent practicable, and with an understanding of the need to reduce greenhouse gas (GHG) emissions.

This Section presents a GHG analysis that complies with the MEPA Greenhouse Gas Emissions Policy and Protocol ("GHG Policy") of May 2010. In addition, the Proponent has evaluated the impacts of land clearing alterations required for two discrete projects, Taxiway D and East Ramp expansion.

6.4.1.1 Introduction and Project Overview

The GHG Policy requires, for certain projects undergoing review by the MEPA Office and required to prepare an EIR, that GHG emissions be quantified and that measures to avoid, minimize, or mitigate such emissions be identified. The GHG Policy requires proponents to quantify the impact of proposed mitigation in terms of energy savings and GHG emissions.

In this case, the Projects evaluated herein include the future expansion of the airport terminal building which MEPA has identified as requiring a GHG analysis. The airport does not plan to build any expansions or additions for at least five years, if at all. The potential expansion will happen as passenger demand necessitates. Because of this, there are no architectural plans or designs to model for energy use at this time. In lieu of the preparation of a GHG model, the Proponent is committing to a series of GHG mitigation commitments as identified below.

6.4.1.2 GHG Analysis - Stationary Source Mitigation Commitments

The Airport is located in the Town of Barnstable. Barnstable is not a Stretch Code community. However, in order to support the Airport's decarbonization goals, the Proponent would be willing to commit to the 2023 Stretch Energy Code measures. In lieu of modeling, the Proponent is committing to a series of GHG mitigation commitments. For any new buildings, expansions, or additions, the Proponent will commit:

- High performing envelope that complies with the 2023 Stretch code envelope performance requirements;
- 100% heat pump space heating;
- Energy recovery ventilation per the 2023 Stretch code update;
- Electric domestic hot water heating, specific method to be determined. Heat pump domestic hot water heating to be analyzed;
- Roof to be constructed PV-ready;
- Installed electric vehicle (EV) charging spaces, quantity to be determined;
- EV infrastructure for additional future EV-parking spaces to be installed, quantity to be determined.

Should any future Energy Code Updates occur prior to the commencement of work, the Project will comply with future Energy Code Updates. Specific GHG reduction has not been quantified, as there are no actual plans in place to model. The Proponent's ongoing GHG Commitments have been detailed in Section 5.7. Upon completion of the potential future buildings, additions, or expansions, the Proponent will submit a self-certification to the MEPA Office, prepared in accordance with the GHG Policy. This certification will identify the GHG mitigation measures incorporated into the building and will illustrate the degree of GHG reduction achieved. Details of the Proponent's implementation of operational measures will also be included in this submittal.

6.4.1.3 GHG Analysis - Mobile Source Assessment

A mobile source emissions analysis was conducted to calculate the changes in CO2 emissions as a result of the proposed Projects and identifies options for potential reductions associated with improvements via TDM and other green initiatives at the Airport.

As specified in the MEPA Greenhouse Gas Emissions Policy and Protocol (May 5, 2010), an estimate of CO2 emissions from mobile sources was calculated based on existing and estimated new trips, approximate distances traveled, and GHG emissions factors for vehicle trips. Potential reductions in mobile source CO2 emissions may be achieved via transportation demand management measures (e.g., subsidized bus passes, biking incentives).

Direct emissions from transportation sources (e.g., fleet vehicles) are not included in this assessment because the Airport does not anticipate additional fleet vehicles as a result of the Proposed Action.

6.4.1.3.1 Baseline Indirect Emissions from Transportation

The baseline condition for indirect transportation emissions is calculated from existing daily trips to the airport (472 vehicle trips). The improvements proposed in the Preferred Alternative include a potential range of terminal building expansions. As a result of the Preferred Alternatives, the 100

peak hour passenger scenario for the terminal building, would generate approximately 236 net new daily vehicle trips. These net new daily trips are estimated to increase annual CO2 emissions by approximately +1,139 tons of CO2 per year.

The 150 peak hour passenger scenario for the terminal building would generate approximately 472 net new daily vehicle trips. These net new daily trips are estimated to increase annual CO2 emissions by approximately +2,279 tons of CO2 per year, as shown in Table 6-5.1.

Table 6.4-1 Mobile Source CO2 Emissions

	Daily Trips	Miles/Round Trip	VMT/Day	Annual VMT	Annual CO2 Emissions (tons/year)[8,9]	Increase in GHG over baseline
Existing (Baseline/No Build Condition)	472	30	14,160	5,168,400	2,279	
Vehicle Trips (Preferred Alternative -100 Peak Hour Passengers)	708	30	21,240	7,752,600	3,418	+1,139 tons/year
Vehicle Trips (Preferred Alternative -150 Peak Hour Passengers)	944	30	28,320	10,336,800	4,558	+2,279 tons/year

Mobile Source Related Improvements

The Airport has committed to investigate several Transportation Demand Management (TDM) strategies to reduce emissions from mobile sources. The Airport proposes to investigate the feasibility of providing airport employees (and tenant employees) with subsidized public transportation options (e.g., reduced CCCRTA bus passes) to reduce mobile source CO2 emissions. Additionally, the airport is committed to providing employee facilities (lockers and changing areas) to increase the number of employees traveling to the airport by walking or biking. In addition, to the above identified TDM strategies, the airport's future micro/smart grid infrastructure (currently in planning) will allow the Airport to achieve additional TDM strategies, not yet feasible, including adding EV vehicle and bus charging infrastructure utilizing onsite generated and stored renewable energy. The future micro grid is a key component to promoting trips to the airport using zero emissions vehicles. The Airport has committed to providing eight charging stations for electric vehicles.

[8] The average passenger vehicle emits approximately 400 grams of CO2 per mile. EPA, Office of Transportation and Air Quality. *Tailpipe Greenhouse Gas Emissions from a Typical Passenger Vehicle,* EPA-420-F-23-014 June 2023.

[9] 1 ton (t) is equal to 907184 grams (g)

6.4.1.4 GHG Analysis - Land Alterations/Tree Removal (MEPA)

The MEPA Certificate requests that the Airport provide an analysis of tree clearing related changes to carbon sequestration and storage with the Project site, along with opportunities to reduce, minimize and mitigate losses to these functions. Specifically, the MEPA Office requests that "*To the extent the degree of tree removal is substantial as determined in consultation with the MEPA Office, the DEIR should develop a methodology to develop the analysis, identify associated impacts on GHG emissions, and identify measures to avoid, minimize and mitigate impacts. The DEIR should provide a quantitative carbon analysis of tree clearing activities that should consider both the one-time direct emissions from tree cutting as well as loss of potential carbon sequestration over a certain time period (e.g., 30 or 40 years).*"

While the preferred alternatives proposed herein results in less than 50 acres of land alteration (not counting previously disturbed turf to be regarded and remain as turf), tree removal is proposed on approximately 8.65 acres which is forested and approximately 3 acres of it is shrub-dominated. Trees sequester relatively large amounts of carbon, and as a result a land alteration GHG analysis was completed, focusing on the project components resulting in vegetation removal where pavement is proposed resulting in loss of carbon sequestration potential of the land, see **Table 6.4-2.**

Table 6.4-2 Summary of Tree Cutting Impacts by Area

Project	Total Impacts	Tree Removal and Change to Pavement (acres)	Tree Removal with Vegetation Remaining (acres)	Brush/Shrub Removal and Change to Pavement (acres)	Proposed Work Components
Aeronautical Development (East Ramp)	6.11 ac (266,151 sf)	6.11 ac	0	0	Tree cutting and removal of vegetation for construction of future aircraft hangars
Taxiway D and Runup Pad Relocation	2.54 ac (80,150 sf)	0.96 ac	0.88 ac	~0.70 ac[(a)]	Tree cutting and removal within areas of proposed pavement - along Taxiway safety area and side slopes, tree removal area will be graded and restored to grass.
TOTAL	**8.65 ac (346,302 sf)**	**7.07 ac (307,969 sf)**	**0.88 ac (38,332)**	**0.70 ac (30,492 sf)**	

a) The Airport currently maintains vegetation around the areas of Upper Gate Pond and Lewis Pond within the Runway Visibility Zone to prevent trees from visually obstructing this area. The proposed Taxiway D will result in approximately 3 acres of this area comprised of a shrub layer to be graded and maintained as grass within the side slopes adjacent to Upper Gate Pond. For the purposes of this analysis, grasses and shrub layers are assumed to provide comparable levels of carbon sequestration, as grasses sequester carbon year-round without releasing it. Of the total area, approximately 0.70 acres will be converted from a brush/shrub layer to pavement.

6.4.1.5 Carbon Sequestration Calculations

According to the MEPA Greenhouse Gas Policy, projects that alter over 50 acres of land must include the analysis of the carbon loss associated with the removal of trees and soil disturbance during the construction period and loss of carbon sequestration.

The first step in analyzing carbon sequestration losses from trees removed as part of the proposed Project is understanding the potential for trees to sequester carbon, and how that may be impacted by cutting (with areas cut either changed to impervious surfaces or left to regrow). Based on estimate provided by EPA[10], in this analysis, the following methodology is applied to changes in forested areas to estimate reductions in carbon sequestration:

> *Conversion Factor for Carbon Sequestered in One Year by 1 Acre of Average U.S. Forest - 0.23 metric ton C/acre/year* × (44 units CO_2/12 units C) = -0.84 metric ton CO_2/acre/year sequestered annually by one acre of average U.S. forest. The negative value in this equation indicates carbon sequestration.*

While there may be geographical variations to the estimates provided above, the methodology presented is sufficient to provide for planning level estimates of carbon sequestration potential of forested areas and estimated reductions associated to tree removal. To estimate carbon sequestered (in metric tons of CO_2) for an acre of forest in one year, multiply the number of acres by -0.84 metric ton CO_2 acre/year, see **Table 6.4-3.**

Table 6.4-3 Carbon Sequestration Estimates

Project	Area of Tree Removal and Conversion to Non-vegetated Land (Pavement)	Carbon Sequestration by Acre Per Year (MTs) (a)(b)	Total Change in Carbon Sequestration (MT) (c)
Aeronautical Development Areas (East Ramp)	6.11 ac (266,151 sf)	-0.84 metric ton CO_2 acre/year	+5.13 MT Carbon/Year
Taxiway D and Runup Pad Relocation	1.66 ac (72,309 sf)	-0.84 metric ton CO_2 acre/year	+1.40 MT Carbon/Year
TOTAL	**7.77 ac (338,461 sf)**		**+6.52 MT Carbon/Year (14,374 lbs./Year) +195 MT Carbon over 30-Year Period**

1 Metric Ton (1.1 Short Tons) = 2,204 lbs.
A carbon sequestration factor was derived from EPA's estimate in *U.S. Greenhouse Gas Emissions and Sinks: 1990–2020* of 0.57 metric tons of carbon sequestered per hectare per year (or 0.23 metric tons of carbon sequestered per acre per year). https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references, 9/7/2023.

a. The negative value in this equation indicates carbon sequestration. A positive value indicates a loss in carbon sequestration.

[10] USEPA. (2020). "Greenhouse Gases Equivalencies Calculator- Calculations and References." Accessed September 7, 2023. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

The above analysis of carbon sequestration, and project related losses to carbon sequestration from tree removals, within areas of the Airport being converted from forested area to pavement, equals, in a one-year, an estimated loss to carbon sequestration of +6.52 MT Carbon/Year (14,374 lbs./Year), and approximately +195 MT Carbon over 30-Year Period.

One-Time Release of Carbon from Tree Cutting

The proposed project related to tree cutting also results in a one-time release of carbon emissions due to the release of carbon stored within above ground and below ground forest related carbon stores. A quantitative analysis of one-time carbon releases from tree clearing activities is provided below, based on the EPA's emissions estimates of carbon stores for 1 acre of forest land[11] as follows:

- U.S. forests in 2020 carbon stock is estimated at 206 metric tons of carbon per hectare (or 83 metric tons of carbon per acre) (EPA 2022),
- The estimate is composed of the five carbon pools: above ground biomass (55 metric tons C/hectare), below ground biomass (11 metric tons C/hectare), dead wood (10 metric tons C/hectare), litter (14 metric tons C/hectare), and
- Soil carbon, which includes mineral soils (90 metric tons C/hectare) and organic soils (26 metric tons C/hectare).

The analysis uses 55 MT/C/Hectare (22.26 MT/C/Acre)[12] for the above ground forest biomass store of carbon to arrive at an estimate of up to 175 MT/C released from carbon stores due to cutting. However, the project is anticipated to result in a lower amount as carbon stores being released as harvested wood products post-harvest will continue to contain carbon within the harvested tree (e.g., lumber).

Carbon Offsets and Future Forest Preservation

The Project related carbon releases and loss in carbon sequestration are proposed to be offset from the Airport's extensive forested areas north of the airfield. In this undeveloped area, approximately 110 acres of dense forest exists north of Upper Gate Pond and Lewis Pond, adjacent to the Hyannis Pond Wildlife Management Area (365 Acres). Within the 110-acre area, approximately 37.5 acres is identified in the Master Plan/Airport Layout Plan as Non-Aeronautical Development Areas. Using the above factors for carbon sequestration (-0.84 MT/C/Acre) the Airport's forests land within this area results in 92.40 MT/C/Year in carbon sequestration.

[11] EPA, Greenhouse Gases Equivalencies Calculator - Calculations and References, 2023. https://www.epa.gov/energy/greenhouse-gases-equivalencies-calculator-calculations-and-references

[12] 1 Hectare = 2.47 Acres

Thes Airport's sufficient amount of forested areas remaining will continue to provide an overall positive impact on carbon sequestration. The Airport will investigate opportunities for tree planting/replanting within compatible areas of the airport, as part of future Projects and within the Town of Barnstable, as feasible, with future grant and funding opportunities from FAA and MassDOT

The Airport will also pursue options to preserve and protect forested land through a conservation restriction/easement. However, it should be noted that any release of obligated airport property invokes certain Federal requirements. The airport must seek FAA for review and approval for changes to its land use. If Federal funds were originally used to acquire the land, the FAA must also approve disposition of the Federal share of the sale proceeds.

6.4.2 Climate Adaptation and Resiliency (MEPA)

Cape Cod Gateway Airport recognizes the increasing importance of climate resilience and adaptation in ensuring the long-term sustainability and functionality of its facilities. Located in a region vulnerable to the impacts of climate change, the Airport is committed to proactively addressing climate change challenges. An updated Resilient Massachusetts Action Team (RMAT) report generated for the Project is included as **Appendix F**. The RMAT model identifies urban and riverine flooding, extreme precipitation, and extreme heat as potential climate related threats to the Airport. The Climate and Resiliency Interim Protocol encourages, but does not require, projects to utilize the recommended design standards and associated methodologies associated with Tier 1, 2, or 3 classified projects.

According to the Town of Barnstable 2022 Hazard Mitigation Plan Update, workshops conducted through the Municipal Vulnerability Preparedness (MVP) Program identified the Town's vulnerability to several natural hazards including flooding, high winds, winter or extreme weather, coastal erosion, sea level rise, wildfire, and climate change and ocean acidification. The risk assessment conducted is based on past occurrences and identifies windstorms and severe winter weather particularly threatening to the Airport.

Windstorms

Massachusetts is susceptible to both extreme wind events such as hurricanes and tornadoes but also windstorms that do not have any other associated characteristics other than the movement of air (i.e., no precipitation). According to the Hazard Mitigation Plan Update, the Town of Barnstable is located in a Zone II, "which means the community is susceptible to winds of up to 160 mph and is also located in a hurricane susceptible region." Windstorm events can occur regularly in Barnstable and can lead to fallen trees or power lines, roof damage and dangerous marine conditions. Climate change has the potential to lead to increased severe storms that can cause more damage across the state.

Severe Winter Weather

The Hazard Mitigation Plan Update lists severe winter weather as a climate relates risk to the Barnstable area. Severe winter weather such as blizzards and ice storms are common on an annual basis throughout Massachusetts, with the Town of Barnstable being susceptible to a combination of both snow and coastal flooding during a winter storm event. These storms can down trees, cause lengthy, widespread power outages, damage property and even cause fatalities.

Infrastructure is at risk and may be impacted directly by the winter storm event or by associated power outages and the inability to use safe transportation routes. Research indicates that the entire state is at risk for frequent winter storms.

Wildfire

Wildfires are typically non-structural fires that occur in vegetated areas such as grass, shrubs, and forested areas. Wildfires not only destroy the vegetated areas where they occur, but they can also impact the built environment including structures, if in close proximity. According to the 2018 Massachusetts Integrated State Hazard Mitigation and Climate Adaptation Plan, the southern part of Massachusetts is particularly susceptible to wildfire due to the availability of fuel, impact of offshore winds and increasing development. Barnstable and Plymouth Counties are identified as the most fire-prone due to their vegetation, sandy soil, and the presence of a drying wind.

The proposed Projects described herein do not increase the risk of wildfire in the vicinity of the Airport. The Airport's emergency response firefighting equipment enables the Airport to provide rapid response to surrounding communities should a wildfire erupt.

Increased Flooding/Extreme Precipitation

Future climate predictions for the Northeast suggest more frequent and intense rainfall, with an average annual precipitation increase of 4.42 inches by 2090 (ReslientMA.org/maps, RCP4.5 scenario). All current and future upgrades to the stormwater management system will be designed and sized to accommodate for 10-year storm events and peak precipitation values derived from the National Regional Climate Center (NRCC) for each rain event to account for the predicted increase in rainfall quantities and frequency for the region. The Airport is not located within a mapped floodplain.

The Project is designed to meet the stormwater management requirements for reconstruction of existing infrastructure and additional pavement associated with the runway extension. These stormwater features will upgrade outdated or undersized stormwater infrastructure as construction takes place.

Extreme Heat

The Municipal Vulnerability Preparedness (MVP) report for the Town of Barnstable[13] predicts future weather conditions to include more frequent heat waves and droughts, as well as changes to coastal resource areas, with significant implications for the seasonal economy, In Massachusetts, temperatures are projected to increase significantly over the next century. Winter average temperatures are likely to increase more than those in summer.

Estimates for the rise in temperatures is up to 3.6°F by 2030 (Resilientma.org, Interactive Map). To address extreme heat, and heat related impacts, municipalities can adopt and encourage green infrastructure, white roofs, landscaping for parking lots and redevelopment. The Airport's open space, including the significant areas of grassland, along with forested areas, functions as green infrastructure providing evapotranspiration and cooling to surrounding helping to minimize and reduce the potential for heat island impacts beyond the Airport boundaries.

Urban Heat Island Effect

Urban heat island (UHI) effect from cutting trees associated with Taxiway D, East Apron aviation development areas, and offsite within easement areas for airspace protection, is not anticipated. UHI effect results from thermal radiation of paved surfaces in proximity to residential and business structures, which results in higher ambient air temperature relative to natural, vegetated, rural areas. UHI is influenced by several parameters such as reduction in evapotranspiration, building materials, impervious cover, and wind speed (Myrup, 1969).[14]

UHI is not expected as a result of the Project. Pavement proposed in areas of the airport are balanced by ample vegetation (trees, grass, shrubs) on the airfield surrounding impervious/paved areas. Obstruction removal activities (off-airport) within future easement areas consists of selectively cutting trees that penetrate the airspace. Tree removal as a result of airspace allows for forest understory for regrowth to heights that do not penetrate the protected airspace.

Vegetated areas, including grassland areas, on and off the airport, will continue to function as a vegetation buffer (providing cooling via evapotranspiration) to surrounding neighborhoods, reducing the potential for UHI surrounding the airport. No pavement is being added in obstruction removal easements, and therefore, not adding impervious cover that would contribute to UHI.

The assessments reviewed above form the basis for adaptation strategies discussed in this section. Listed as a critical facility to the Town of Barnstable and the region, the Airport is committed to investing in infrastructure improvements to withstand the changing climate and to continue to play

[13] Town of Barnstable Municipal Vulnerability Preparedness Report, 2020.

[14] Myrup, Leonard O., A Numerical Model of the Urban Heat Island, Journal of Applied Meteorology and Climatology, Dec 1969.

a pivotal role in aiding in disaster response and recovery. In alignment with local and regional plans including the Cape Cod Regional Policy Plan, the Airport has made efforts to ensure adaptation and resilience.

The Airport plans to enhance flood protection through installing new leaching catch basins and infiltration chambers, according to airport drainage design guidelines, to maintain existing runoff. Efforts will also be made to minimize new impervious areas to the maximum extent practicable while adhering to FAA guidelines.

The Airport has also developed and regularly updates its emergency response plans to ensure the safety and well-being of passengers, staff, and the community in the event of climate-related emergencies. Moreover, the Airport is committed to reducing its carbon footprint through initiatives (listed in section 6.5.2) such as adopting energy-efficient technologies, smart grid, installing renewable energy sources, and implementing sustainable land use practices.

6.4.3 Impact Summary

The FAA has not established a significant threshold for Climate. It is assumed that climate related impacts to aircraft and the Airport will be positively enhanced by adding additional length to Runway 15-33 and enhancing the efficiency of the taxiway layout and geometry. The Massachusetts State Hazard Mitigation and Climate Adaptation Plan (2018), notes that "high temperatures may also impact airplane operations. If the length of existing runways is not sufficient under higher temperature conditions, planes may not be able to take off when there is less lift available."

Under future scenarios for high temperatures and resulting less density to air (reduced lift for taking off aircraft) could lead to need for increased runway length requirements for aircraft due to diminished performance in such conditions. (Resilient MA, 2018). It is noted that high heat can soften the asphalt of airport runways, impairing airplane movement" (page 4-168) and reducing the life span of the pavement. The proposed Projects are consistent with, and respond to, potential future climate scenarios of higher by increasing runway length to maintain safe aircraft operations.

Furthermore, as it relates to Project impacts to the environment, no flooding or heat island effects are anticipated based on the Projects limited impacts to natural resources. Where tree cutting Is proposed for the East Ramp aviation development areas, and from Taxiway D, the overall impacts to climate are minimal given the large areas of forested lands in the northern section of the Airport, as detailed in the carbon sequestration analysis in section 6.4.1.5.

Based on this information, there are no significant impacts on the climate as a result of the Proposed Action based on the Preferred Alternative.

6.5 Natural Resources and Energy Supply (NEPA)

6.5.1 No-Build Alternative

The No-Build Alternative assumes that the existing Airport footprint and infrastructure would remain unchanged. No natural resources would be used for construction activities. Moreover, energy demand would not increase as a result of the terminal expansion.

6.5.2 Proposed Action

This section addresses the impact associated with the Proposed Action's consumption of natural resources, including water, asphalt, wood, and energy supplies (e.g., natural gas, and aircraft fuel). FAA Order 1050.1F, Exhibit 4-1, indicates that FAA has not established a significant threshold for Natural Resources and Energy Supply. However, within the EA/EIR review process, project proponents need to consider factors with "the potential to cause demand to exceed available or future supplies of these resources." The following paragraph provides further details on the Project's use of natural resources and potential for environmental consequences.

Natural Resource Materials

Construction materials considered under this category would be used during construction of the proposed Project. As noted above, construction materials for typical airport construction projects contain asphalt, aggregates (sand, gravel), and wood, and fuels. The highest consumption of natural resources related to the project will be the use of asphalt to extend the runway and related to taxiway reconstruction and geometry reconfiguration (Taxiway D and Taxiway B). This will result in a net increase in asphalt surfaces and the related materials as noted previously in sections on Land Alterations.

The total amount of fill and excavation quantities are provided in **Table 6.5-1** for the new and reconstructed surfaces, at a planning level estimate, based on preliminary design >10%. The proposed Project is only at the conceptual phase and will not advance to further design until the project has received permitting approvals.

Calculations of natural resources are approximate totals and based on the assumption that cut/fill materials (e.g., soils) will be comprised of existing onsite materials to the extent possible.

Table 6.5-1 Cut/Fill Volumes

Project	Cut (CY)	Fill (CY)	Waste (CY)	Borrow (CY)
Runway 15-33 Extension	88,400	33,700	54,700	0
Taxiway B	11,300	40,000	0	23,865
Taxiway D (2:1 Slope)	60,800	43,300	17,500	0

Material from the onsite excavation to the extent feasible, will be used to fill areas of the airport (to increase elevation from existing to proposed) to limit material borrowed from outside the construction limits. Excavated material in excess of fill requirements needed, may require disposal of the material offsite. Where feasible, the designer of the project during the design phase will balance cuts and fill to avoid the need for offsite disposal.

Energy Consumption

Electricity consumption is associated with airfield lighting as well as terminal building/hangars. New or reconstruction of infrastructure represents an improvement to the Airport's electrical system via the use of efficient materials reducing the expected energy requirement of the airport overall.

As noted previously, the Airport's future microgrid project will utilize both renewable energy generation and storage technology, reducing the Airport's requirements for energy from the Region's electrical grid.

Table 6.5-2 Proposed Electric Use Reduction Strategies

	Thermal Limits	Envelope, air infiltration, energy recovery	Electrification	PV, EV, Energy Storage
Proposed Stretch Code & Opt-In Code	Sets maximum allowable heating and cooling demand limits (applicable to certain commercial buildings)	Envelope backstops, better energy recovery and air infiltration	Electrification readiness	PV readiness and EV readiness
MEPA Best Practices	Same	Same	Full electrification strategy	PV readiness and EV readiness + % installation targets

In particular, the future micro grid will allow the Airport to commit to MEPA best practices for reducing building heating fuel usage, and commit to electrical sources for heating, lighting, and building systems. These proposed new electrical commitments are anticipated to be supplied from the microgrid in the near future (2026), and ample onsite renewable energy sources (e.g., Solar PV).

As a result, the proposed Project will reduce reliance on traditional fuel sources, lower emissions by committing to best practices for efficient and decarbonized buildings and enhance overall regional grid efficiency and resilience when combined with the microgrid. During the construction phase, a temporary increase in energy consumption is anticipated. This temporary increase in fuel (e.g., construction vehicles and machinery) can be met by available local/regional fuel supplies.

Aviation Fuels

While aircraft activity at the Airport is forecasted to increase into the future, this is the result of national and regional/local trends. The proposed Projects do not per se increase aviation activity at the Airport. Accordingly, the use of aviation fuels at the Airport is not anticipated to increase as a result of the Projects. Assuming no future development of electric aircraft (manned and unmanned) overall, the use of aviation fuels, nationally, at CCGA is anticipated to decrease in future planning scenarios – based on zero carbon emissions from all sectors of the economy anticipated adoption of various types of electric aircraft. In July 2023, the FAA released an implementation plan detailing the steps it will need to take to safely enable advanced air mobility (AAM) operations[15] in the near term. The "Innovate28" plan[16] includes various components and the sequence they will occur in for operations to be at scale at one or more sites by 2028. The plan addresses how the FAA will certify aircraft and pilots, manage airspace access, ensure pilot training, develop infrastructure, maintain security, and engage communities.

FAA is supporting a Sustainable Aviation Fuels (SAFs) initiatives[17]. SAF is a biofuel used to power aircraft that has similar properties to conventional jet fuel but with a smaller carbon footprint. Depending on the feedstock and technologies used to produce it, SAF can reduce life cycle GHG emissions dramatically compared to conventional jet fuel.

Some emerging SAF pathways even have a net negative GHG footprint. SAFs lower carbon intensity makes it an important solution for reducing aviation GHGs, which make up 9%–12% of U.S. transportation GHG emissions, according to the U.S. Environmental Protection Agency. As appropriate, CCGA will seek providers of SAFs at the Airport in coordination with based aviation companies, fuel suppliers, and aircraft owners' organizations.

Water and Sewer

The proposed Project, mainly the terminal building enhancements, is anticipated to result in a slight increase in water and wastewater usage. Water usage by the airport in 2022 is 904 CCF (one hundred cubic feet)[18] or 676,192 gallons. All the municipal systems have an adequate supply of these resources.

6.5.3 Impact Summary

The proposed Projects are not anticipated to result in a significant impact to regional or local energy sources, including electricity, fuels, and use of water and wastewater resources. As confirmed by the information provided above, adequate regional and national energy/material supplies are available

[15] Advanced Air Mobility (AAM) is an umbrella term for aircraft that are likely highly automated and electric. These aircraft are often referred to as air taxis or electric Vertical Takeoff and Landing (eVTOL) aircraft.

[16] https://www.faa.gov/sites/faa.gov/files/AAM-I28-Implementation-Plan.pdf, accessed Nov. 2023.

[17] https://www.faa.gov/sustainability

[18] 1 CCF = 748 gallons of water

for the resources needed for the Projects. The increase in energy usage will be offset by the Airport's future microgrid through generation of renewable energy sources and storage – and anticipated to result in less dependence of grid supplied electricity and gases, as well as fuel for transportation including cars, regional buses, and aircraft.

Construction activities are anticipated to result in temporary energy and fuel needs that are met by the regional and local fuel supplies. The Proposed Action will have no significant effect on energy consumption, and the use of building materials or natural resources are anticipated to be adequately supplied for the actions proposed in this EA.

6.6 Noise (MEPA/NEPA)

For aviation noise analyses, through FAA Order 105014 CFR part 150, the Federal Aviation Administration (FAA) has determined that cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of the Day Night Average Sound Level (DNL). The DNL accounts for the noise levels of all individual aircraft events and the time period that these events occur. The DNL logarithmically averages aircraft sound levels over a complete 24-hour period, with a 10-decibel adjustment added to all events occurring during nighttime hours (10:00 pm to 7:00 am). The adjustment accounts for increased sensitivity to noise during the quietest nighttime hours.

The FAA has approved the Aviation Environmental Design Tool (AEDT) modeling software for predicting DNL sound level impacts from airports. Noise compatibility or non-compatibility of land use is determined by comparing the aircraft DNL values surrounding an airport to the FAA's land use compatibility guidelines. These guidelines indicate that all land uses are compatible with a DNL below 65 dBA. Under FAA Order 1050.1F, paragraph 4-3.3, the Significance Threshold for Noise and Noise-Compatible Land Use is:

"The action would increase noise by DNL 1.5 dB or more for a noise sensitive area that is exposed to noise at or above the DNL 65 dB noise exposure level, or that will be exposed at or above the DNL 65 dB level due to a DNL 1.5 dB or greater increase, when compared to the No Action alternative for the same timeframe. For example, an increase from DNL 65.5 dB to 67 dB is considered a significant impact, as is an increase from DNL 63.5 dB to 65 dB."

6.6.1 No-Build Alternative

The AEDT model was utilized to assess future no-build conditions. This included utilizing the future operations data developed in the 2022 Master Plan based on existing runway length conditions. Utilizing the data shown in **Tables 6.6-1 and 6.6-2** below, annual DNL Contours were generated using the AEDT noise model. Total operations forecasted for 2040 for all aircraft categories were 73,002, an increase of 5,652 operations, or 8.3% over the 2019 data (67,350 total operations in 2019). Of these, 5,564 were Touch and Go, accounting for 7.6% of Aircraft operations, a decrease of 1.6% from 2019 data (6,203 operations touch and go operations total).

Based on the modeling, assuming the no-build alternative, the 70 and 75 dBA DNL contours are entirely within the Airport property. The 65 dBA contour slightly extends into commercial land use across Yarmouth Road. **Figure 6.6-1** shows that the 65 dBA DNL sound contour (green polygon) generally falls within the airport property, extending just beyond the property to the east near Yarmouth Road. These commercial facilities are all below a DNL of 70 dBA, which is the noise compatibility threshold of commercial land uses. Therefore, the land use surrounding the Airport under the future No-Build Alternative is noise compatible as all residences are exposed to noise levels below a DNL of 65 dBA and all commercial facilities are below a DNL of 70 dBA as described by the FAA's Order 1050.1F. Under this scenario, no changes in the number of flights, flight patterns, aircraft types, or other factors that may affect noise would occur. Noise levels would be similar to current noise levels.

Table 6.6-1 2040 Runway Utilization

Runway 15	Runway 33	Runway 6	Runway 24
24.4%	30.2%	14.8%	30.6%

Table 6.6-2 2040 Forecasted Operations Data

Aircraft	AEDT Code	Aircraft Type	Ann Ops	Daily op	Day Op	Night Op
Generic Single	C172	Piston	7,136	19.55	18.26	1.29
Piper Cherokee (PA28)	P28A	Piston	1,558	4.27	3.99	0.28
Cirrus SR22	SR22	Piston	1,381	3.78	3.53	0.25
Pilatus PC-12	PC12	Turboprop	11,146	30.54	28.52	2.02
Tecnam P2012 Traveller	P212	Piston	28,850	79.04	73.83	5.22
Cessna Chancellor	C414	Piston	691	1.89	1.77	0.12
Beechcraft King Air	B360	Turboprop	9,806	26.87	25.09	1.77
Cessna Citation Excel	C56X	Jet	1,380	3.78	3.53	0.25
Cessna Citation Sovereign	C680A	Jet	1,201	3.29	3.07	0.22
Hawker 800	H25B	Jet	347	0.95	0.89	0.06
Pilatus PC-24	PC24	Jet	660	1.81	1.69	0.12
Bombardier Challenger 300	CL30	Jet	1,233	3.38	3.16	0.22
Embraer Phenom 300	E55P	Jet	424	1.16	1.08	0.08
Airbus 220	A220	Jet	270	0.74	0.69	0.05
Gulfstream 4	GLF4	Jet	469	1.28	1.20	0.08
Gulfstream 5	GLF5	Jet	208	0.57	0.53	0.04
Bombardier Global Express	GLEX	Jet	170	0.47	0.44	0.03
Eurocopter EC 145	EC45	Helicopter	254	0.70	0.65	0.05
Sikorsky S-76	S76	Helicopter	254	0.70	0.65	0.05
	Total		67,438			
Touch and Go Operations			5,564			
Total Operations			**73,002**			

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services



Figure 6.6-1
Aircraft Only Annual Day Night Level - No Build Alternative

6.6.2 Proposed Action

The proposed Projects are not anticipated to generate an increase in different aircraft operational activity at the Airport as operations are forecasted to increase regardless of the implementation of these projects (see Table 1.4-3 Annual Operations Forecast by Type). Consequently, impacts to community noise levels are not expected. Based on the future runway conditions using the above referenced operations data, AEDT modeling indicates that the 70 and 75 dBA DNL contours are entirely within the Airport property. The 65 dBA contour slightly extends into the commercial land use across Yarmouth Road, similar to the no-build conditions. **Figure 6.6-2** shows that the 65 dBA DNL sound contour generally falls within the airport property, extending just beyond the property to the east near Yarmouth Road. These commercial facilities are all below a DNL of 70 dBA, which is the noise compatibility threshold of commercial land uses. Therefore, the land use surrounding the Airport under the future Proposed Action condition is noise compatible as all residences are exposed to noise levels below a DNL of 65 dBA and all commercial facilities are below a DNL of 70 dBA as described by the FAA's Order 1050.1F. Under this scenario, noise levels would be similar to current noise levels.

6.6.3 Construction Noise Impacts

There will be a temporary increase in aviation-related noise during the construction of Runway 15 extension within the take-off and landing approach paths of Runway 6-24. All aviation activity would shift to Runway 6-24. This is consistent with the recent past project of reconstructing Runway 6-24, where all activity was shifted to Runway 15-33.

Noise impacts anticipated would be minimal and temporary due to demolition and construction activities. While sound levels resulting from construction activities vary greatly depending on the type of equipment and various conditions, as a conservative measure, the Project will include a noise mitigation plan to minimize, to the extent practicable, the generation of sound levels that will impact off-site receptors. The noise mitigation plan will involve mitigation measures such as:

- Allowable construction timeframes will adhere to local requirements, which are anticipated to be work hours between 7:00 a.m. and 5:00 p.m., and major activities such as excavation or demolition will typically be limited to normal working hours;
- In accordance with Massachusetts Vehicle Idling Regulations, idling of construction equipment will comply with 310 CMR 7.11;
- Instituting a proactive program to ensure compliance with the applicable regulations or ordinances for noise limitation;
- Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers;
- Muffling enclosures on continuously running equipment, such as air compressors and welding generators;
- Replacing specific construction operations and techniques by less noisy ones where feasible;
- Selecting the quietest of alternative items of equipment where feasible;

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Data Source: Bureau of Geographic Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Technology and Security Services

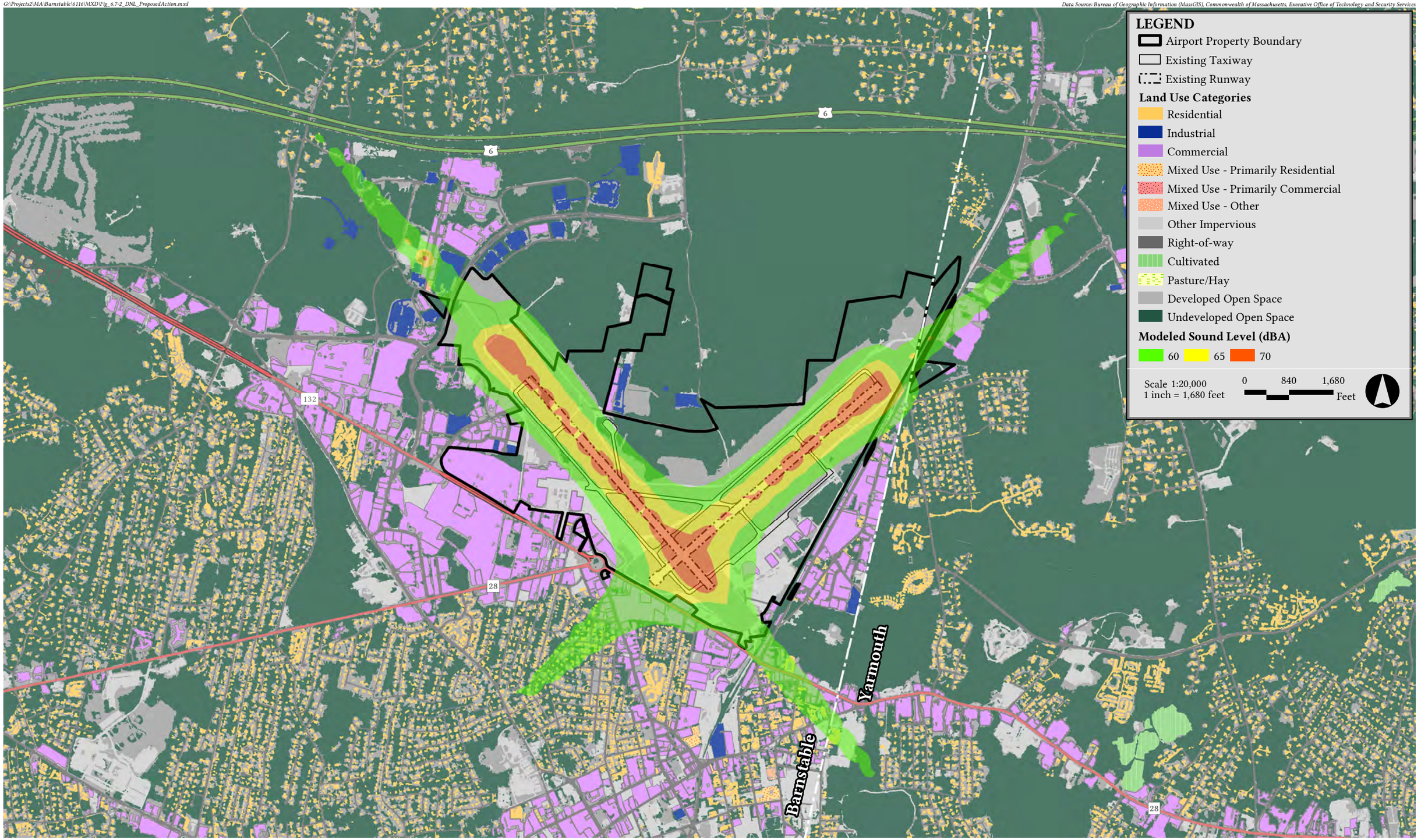


Figure 6.6-2
Aircraft Only Annual Day Night Level - Proposed Action

- Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels;
- Locating noisy equipment at locations that protect sensitive locations by shielding or distance;
- Construction equipment will be required to be properly maintained, lubricated, and fitted with properly functioning muffler systems; and
- To the extent practicable, specific activities such as crushing and pulverizing, as well as equipment staging areas, will be located at appropriate distances from residential receptors.

Specific mitigation measures will be incorporated into the contract document based on the anticipated activities and impacts related to each of the Project construction phases. Project activities will adhere to MassDEP's Noise Pollution Policy at 310 CMR 7.10.

6.6.4 Indirect/Secondary Impacts

Indirect and/or secondary impacts from noise are not expected from the Proposed Action, such as those occurring later in time or farther removed in distance. The Project is not expected to result in an increase in noise, including impacts from changes to traffic patterns or growth induced noise. No indirect or secondary impacts are expected for noise compatible land uses.

*6.6.5 **Mitigation** Measures*

The proposed Projects do not exceed FAA noise thresholds, and no mitigation is necessary. While the proposed Projects are not anticipated to exceed FAA noise thresholds, the preferred alternative for Taxiway D/Taxiway E removal, includes a noise barrier along the runup pad for the relocated Taxiway D adjacent to the existing runup pit. The noise wall would help buffer noise from aircraft to areas surrounding the airport, particularly the north.

FAA prohibits restrictions from the Airport on flight paths, hours of operation and restricted access to airports. Federal law prohibits restricting the route by which an aircraft has access to the airport to aid in noise abatement. As discussed in Section 5.9, the airport has a long-standing voluntary noise abatement flight procedures for visual flight rules. These procedures are periodically re-evaluated and updated, as necessary.

Additionally, there are voluntary quiet hours between 10 p.m. and 6 a.m. when airport users are encouraged to restrict their flights. Touch and go nighttime flights are also prohibited. These noise abatement measures are guided by safety considerations as well as federal law. Ultimately, pilots must have control over their flight procedures to ensure safe takeoff and landings based on weather conditions and aircraft capabilities. The Airport coordinates with all users of the airport to mitigate noise issues and maintains multiple ways to report complaints when made including in person, over the phone and online reporting (see https://flyhya.com/pilot-info/noise-abatement/).

Please note that low flying is prohibited by Federal regulations except under certain conditions such as take-off or landing. See Title 14 Code of Federal Regulations, Section 91.119 Minimum Safe Altitudes.

With regards to consideration of noise mitigation for current and future operations, the Airport will consult with FAA and primary Airport air taxi operators such as Cape Air on flight path modifications that may serve to minimize noise impacts.

6.6.6 Impact Summary

The proposed Projects do not exceed FAA noise thresholds, and no mitigation is necessary. While the proposed Projects are not anticipated to exceed FAA noise thresholds, the preferred alternative for Taxiway D/Taxiway E removal, includes a noise wall along the runup pad for the relocated Taxiway D adjacent to the existing runup pit. The noise wall would help buffer noise from aircraft to areas surrounding the airport, particularly the north. Based on this information, there are no significant impacts on noise as a result of the Proposed Action.

6.7 Biological Resources (MEPA/NEPA)

FAA Order 1050.1F (Paragraph 4-3.3; Exhibit 4-1; 7/16/15) includes "Factors to Consider" for Biological Resources, as follows:

- "The action would have the potential a long-term or permanent loss of unlisted [sic] plant or wildlife species, i.e., extirpation of the species from a large project area (e.g., a new commercial service airport);
- Adverse impacts to special status species (e.g., state species of concern, species proposed for listing, migratory birds, bald and golden eagles) or their habitats;
- Substantial loss, reduction, degradation, disturbance, or fragmentation of native species' habitats or their populations; or
- Adverse impacts on a species' reproductive success rate, natural mortality rates, non-natural mortality (e.g., road kills and hunting), or ability to sustain the minimum population levels required for population maintenance."

There will be no significant impacts on biological resources associated with this project.

6.7.1 No-Build Alternative

The no build alternatives will not impact biological resources on the Airport.

6.7.2 Proposed Action

6.7.2.1 Threatened and Endangered Species

With regards to the federally listed species identified as possibly present at the Airport, northern long-eared bat (NLEB) and the American chaffseed, review and consultation with USFWS through IPaC's Determination Key was completed. A "no effect" for the American chaffseed was determined for all Projects Airport wide (see **Appendix I**). As per the determination for the American chaffseed, the Proponent will re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the

Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated.

For NLEB, a determination of "may affect" resulted for the bat for the Taxiway D and East Ramp projects due to these projects requiring mature tree removal greater than 3-inches diameter at breast height. Taxiway D and the East Ramp expansion area contains portions of forested upland areas. There are no known hibernacula (e.g., caves) on the Airport property or on off-airport avigation easement parcels, or within 0.25 miles.

As a mitigation measure, any necessary tree removal will be accomplished during time periods appropriate for minimizing impacts to any potential bat populations. If necessary, the timing of any tree removals will be consistent with recommended conservation measures designed to take place outside of the summer roosting period (April through September), and optimally during the winter months (October 1 through March 31 when possible).

No work will occur within NHESP mapped habitat and there will be no impacts to state-listed species.

6.7.2.2 Wildlife

The majority of the proposed Projects will take place in previously developed areas and/or actively used portions of the airfield. The majority of wildlife is incompatible with aviation activities due to the safety hazards it presents with aircraft. The Airport maintains a wildlife exclusion fence to prevent larger mammals from accessing the airfield and implements other measures to dissuade wildlife from grazing, nesting, or feeding within the active operating areas.

With regards to potential habitat impacts associated with wetland resource areas, the altered areas associated with Taxiway D and work within Upper Gate Pond will be assessed as part of a Wildlife Habitat Evaluation completed as outlined in the Massachusetts Department of Environmental Protection's *Wildlife Habitat Protection Guidance for Inland Wetlands*[19] (the Guidance), Appendix B: Detailed Wildlife Habitat Evaluations. he important wildlife habitat features documented in the proposed impact areas will be incorporated into the wetland replication plan to further contribute to the protection of the wildlife habitat interest of the WPA by meeting the general conditions of 310 CMR 10.60(3)[20] and other applicable performance standards relative to restoration or replication of altered resource areas. As such, the Project will not have an adverse effect on important wildlife habitat features either locally or in the region.

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19 Massachusetts Department of Environmental Protection. Wildlife Habitat Protection Guidance for Inland Wetlands (2006). http://umasscaps.org/pdf/wldhab.pdf.

20 310 CMR 10.60(3) contains general conditions for the restoration and replication of altered habitat to ensure that wildlife habitat replication areas, with features similar to the altered wildlife habitat, are incorporated into the Project to the extent such replication or restoration is deemed necessary to demonstrate that there is no substantial reduction in the resource area's capacity to provide important wildlife habitat functions.

6.7.3 Impact Summary

Consultation regarding tree removal in these areas will continue with USFWS under Section 7 under the Interim Consultation Framework as per the determination letter. To identify, and mitigate for possible impacts, it is anticipated that habitat surveys for NLEB will be conducted prior to construction to exclude the presence of any potential bat roosting habitats – which are found generally in mature, upland forested areas.

With the mitigation measures described above, the Proposed Action is not anticipated to alter suitable habitats for the two federally listed species, pursuant to Section 7 of the Endangered Species Act. As such, the Project will not have an adverse effect on important wildlife habitat features either locally or in the region.

6.8 Transportation (MEPA)

6.8.1 No-Build Alternative

Under the No-Build Alternative, the Airport would not implement the Projects. The number and types of vehicles accessing the Airport would be similar to existing trends and projections. The Airport access road would continue to have congestion and traffic delays in certain seasons and at certain times of the day.

6.8.2 Proposed Action

The forecasted increase in terminal passenger design capacity from the current level of approximately 100 passengers per peak hour to a future level of approximately 150 to 200 passengers per peak hour was developed with consideration of many market and operational factors (including, for example, airline and hub consolidation, low-cost airline growth, technology advances, fuel prices, and pilot supply). Such forecasted increases, if they occur, will happen gradually over time.

The following sections present traffic volume changes for three levels of peak passenger activity under the Preferred Alternative, including 0%, 50%, and 100% growth scenarios.

6.8.2.1 Project Trip Generation

As presented in the Master Plan, the estimated landside travel modes and associated average vehicle occupancy (AVO) for Airport passengers and visitors are shown in **Table 6.8-1**.

Table 6.8-1 Travel Mode Shares and AVOs

Characteristic	Personal Auto		Taxi/TNC	Rental Car
	Parking	Pick-up/Drop-off		
Mode Share	40%	25%	25%	10%
Average vehicle occupancy (AVO)	1.25		1.0 [1]	1.0

1. Number of passengers per vehicle, not including driver.

Based on the values in **Table 6.8-1** and recent (2022/2023) parking data from the Airport, the study team estimated the vehicle trips associated with the Baseline Condition and the Preferred Alternative as shown in **Table 6.8-2**.

Table 6.8-2 Daily and Peak Vehicle Trips under Baseline Condition and Preferred Alternative Condition with Various Terminal Activity Levels

Baseline/No Build Condition Terminal Activity Level of 100 Peak Hour Passengers		
	Vehicle Trips	Change from Baseline/ No-Build Condition
Daily	472	0
Peak Hour	81	0
Preferred Alternative with Terminal Activity Level of 150 Peak Hour Passengers		
	Vehicle Trips	Change from Baseline/ No-Build Condition
Daily	708	+236
Peak Hour	122	+41
Preferred Alternative with Terminal Activity Level of 200 Peak Hour passengers		
	Vehicle Trips	Change from Baseline/ No-Build Condition
Daily	944	+472
Peak Hour	122	+82

6.8.2.2 Trip Distribution

As described in the Master Plan, the Airport's market catchment area for commercial passengers is considered all of Cape Cod and towns that abut the Cape Cod Canal to the north. To estimate the geographic distribution of Airport vehicle trips, including the new trips related to the proposed terminal improvements, travel patterns were modeled based on the daily volumes along major roadways serving the Airport, as presented in Section 5.11.1.4. **Table 6.8-3** presents the AADT volumes and associated percentage distribution.

Table 6.8-3 Airport Vehicle Trip Distribution

Direction of Travel	AADT	Percent Distribution
To/from points northwest		
Combined: Iyannough Road, west of Phinneys Lane Attucks Lane, west of Phinneys Lane	33,156	36%
To/from points northeast		
Yarmouth Road/Willow Street, south of Crowell Road	24,001	26%

Table 6.8-3 Airport Vehicle Trip Distribution (Continued)

Direction of Travel	AADT	Percent Distribution
To/from points east/southeast		
Iyannough Road/Route 28, west of Main Street	13,569	15%
To/from points west/southwest		
Falmouth Road, south of Bearses Way	21,108	23%

6.8.2.3 Trip Assignment and Impact to Area Roadways

Based on the Project's trip generation shown in Section 6.8.2.1. and the trip distribution pattern shown in Section 6.8.2.2, the estimated new vehicle trips were calculated by major travel route. **Tables 6.8-4** and **6.8-5** present the resulting daily and peak hour vehicle trips for the 50% and 100% growth scenarios, respectively. As noted earlier, no change in volumes is expected under the 0% growth scenario.

Table 6.8-4 New Project Vehicle Trips under 50% Growth Scenario

Location	Baseline Roadway Volume		New Project Vehicle Trips		Percent Increase in Roadway Volume	
	Daily	Peak Hour	Daily	Peak Hour	Daily	Peak Hour
Combined: Iyannough Road west of Phinneys Lane Attucks Lane west of Phinneys Lane	33,156	2,654	86	16	0.26%	0.60%
Yarmouth Road/Willow Street, south of Crowell Road	24,001	2161	62	11	0.26%	0.51%
Iyannough Road/Route 28, west of Main Street	13,569	1086	35	7	0.26%	0.64%
Falmouth Road, south of Bearses Way	21,108	1689	55	10	0.26%	0.59%

Note: Due to rounding, the sum of new vehicle trips may not match Table 6.9-2 values.

Table 6.8-5 New Project Vehicle Trips under 100% Growth Scenario

Location	Baseline Roadway Volume		New Project Vehicle Trips		Percent Increase in Roadway Volume	
	Daily	Peak Hour	Daily	Peak Hour	Daily	Peak Hour
Combined: Iyannough Road west of Phinneys Lane Attucks Lane west of Phinneys Lane	33,156	2,654	171	31	0.51%	1.14%
Yarmouth Road/Willow Street, south of Crowell Road	24,001	2161	124	22	0.51%	1.30%

Table 6.8-5 New Project Vehicle Trips under 100% Growth Scenario (Continued)

Location	Baseline Roadway Volume		New Project Vehicle Trips		Percent Increase in Roadway Volume	
	Daily	Peak Hour	Daily	Peak Hour	Daily	Peak Hour
Iyannough Road/Route 28, west of Main Street	13,569	1086	70	13	0.51%	1.02%
Falmouth Road, south of Bearses Way	21,108	1689	109	19	0.51%	1.12%

Note: Due to rounding, the sum of new vehicle trips may not match Table 6.8-2 values.

As summarized in **Table 6.8-4**, with a 50% increase in peak hour passenger design capacity at the terminal, area roadways could experience an increase in traffic volume of between 35 and 86 vehicle trips per day and between 7 and 16 vehicle trips per peak hour. These increased trips represent less than a 1% increase in overall traffic volume along each major route to and from the Airport.

As summarized in **Table 6.8-5**, with a 100% increase in peak hour passenger design capacity at the terminal, area roadways could experience an increase in traffic volumes between 70 and 171 vehicle trips per day and between 13 and 31 vehicle trips per hour. These increased trips represent between a 0.51% and 1.30% increase in daily and peak hour volumes, respectively, along the major travel routes.

Under either scenario, such a small number of daily and peak hour increases in traffic volumes travelling to and from the Airport would be imperceptible to local traffic patterns and not have an impact on area roadway or intersection operations. It should also be emphasized that any increase in passenger enplanements, and therefore associated roadway activity, is dependent on a myriad of influencing factors such as airline and hub consolidation, low-cost airline growth, technology advances, fuel prices, and pilot supply. Forecasted increases in enplanements, if they occur, will happen gradually over time. The changes in traffic volumes presented in this chapter reflect a future condition that would evolve over the 20-year planning horizon and not occur as a direct result of the terminal improvements planned under the Preferred Alternative.

6.8.2.4 Parking

As presented in the Master Plan, the existing parking lot in front of the terminal, with 585 spaces. will have sufficient capacity to meet parking demand under the baseline and various forecasted growth scenarios.

6.8.2.5 Other Airport Vehicle Activity

The 645-acre Airport site, in addition to being a commercial transportation facility, also contains more than 40 local business tenants related to passenger airline services, general aviation services, maintenance and servicing of aircraft and aviation equipment, aviation fuel transfer, temporary aircraft parking and long-term aircraft storage, and light transportation warehousing. The majority of the 1,700 on-site employees work for Cape Air, Atlantic Aviation, Griffin Avionics, and the FAA.

The terminal improvements are not anticipated to affect activity associated with these other local business tenants. While the improvements may influence terminal-related services, such as security or food service, any increase in such travel activity is expected to be minor.

6.8.3 Area Transportation Plans

Independent of the Airport plans, a review of on-going studies and planned improvements to roadway, bicycle, and pedestrian facilities was conducted to understand future transportation changes in the surrounding roadway network.

Barnstable Complete Streets – The Town of Barnstable in cooperation with the Cape Cod Commission (CCC) has launched the following studies in the immediate Airport area, which aim to improve safety for all users, including motorists, pedestrians, transit users, and bicyclists. The CCC has drafted a list of priority roadway improvements and include the following projects within a two-mile radius of the Airport:

- *Attucks Lane Share Use Path* – Installation of an approximate 1.3 miles of a shared use path along Attucks Lane from Independence Drive to Route 132.
- *Route 132* – Corridor improvements to include safety improvements for all users. Key intersection upgrades between Bearses Way and the Airport Rotary, which will consist of shared use path and upgrades to pedestrian crossing.
- *Airport Rotary Retrofit/Route 28 Sidewalk* – Converting the existing Airport Rotary into a modern roundabout design with sidewalks on Route 28 from Walton Avenue to Airport Rotary. This project is being conducted by MassDOT staff.
- *Route 28 Shared Use Path* – Installation of approximately 0.8 miles of a shared use path from Airport Rotary to Yarmouth Road. This project is being conducted by MassDOT staff.
- *Barnstable Road Streetscape and Safety Upgrades* – Improvements include incorporating street trees, benches, lighting, assessing mid-block crosswalk locations and upgrades to the existing pedestrian signal equipment and crossings at the intersection of Winter Street and Charles Street.
- *Route 28 at Pitchers Way Intersection Improvements* – Intersection upgrades with multimodal accommodations, including the installation of new signal equipment. This project is being conducted by MassDOT staff.
- *Yarmouth Road Shared Use Path* – Construction of an approximately 1.1 miles of a shared use path from the intersection of Route 28 to the Yarmouth town Line.
- *Phinney's Lane Shared Use Path* – Construction of approximately 2 miles of shared use path from Route 132 to Route 28.
- *Pitchers Way Sidewalk* – Installation of a sidewalk along Pitchers Way from Bearses Way to West Main Street.

Barnstable Airport Rotary - In 2019, a Road Safety Audit (RSA) was prepared for MassDOT for the Falmouth Road (Route 28) at Iyannough Road (Route 132) rotary, also known as the Airport Rotary. The study included several dozen recommendations for potential short-, mid-, and long-term safety enhancements related to traffic operations, roadway geometry, emergency vehicle operations, heavy vehicle operations, and pedestrian and bicycle accommodations.

Route 28 East Hyannis Transportation Corridor Study – The study area spans from Yarmouth Road in Barnstable to East Main Street in Yarmouth, including assessing the signalized intersection of Route 28 and East Main Street. The purpose of the study is to address congestion, safety, and access management concerns, as well as the lack of pedestrian and bicycle facilities along the corridor. Ultimately, the study will develop alternatives that will provide safe and convenient access within the study area for all users of the corridor.

Cape Cod Rail Trail (CCRT) – The CCRT is a protected off-road paved bike and pedestrian path that runs between South Yarmouth to Wellfleet. The existing trail will be extended within Yarmouth to Mary Dunn Road in Barnstable (Phase III). Construction is expected to begin in 2024.

6.8.4 Construction Impacts

Prior to any construction projects detailed in this document, the Airport's selected engineer will produce a Construction Management Plan (CMP) for review and approval by the Town. The CMP will detail the schedule, staging, parking, delivery, and other associated impacts of the construction of the Project. Construction activities will be accommodated within the current Project Site boundaries. Details of the overall construction schedule, working hours, number of construction workers, worker transportation and parking, number of construction vehicles, and routes will be addressed in detail in the CMP to be filed with the Town.

Temporary construction-period air quality impacts are a potential source of negative health impacts for the local community. To avoid or minimize the effects of fugitive dust and exhaust emissions from construction vehicles, appropriate mitigation measures will be employed, such as the use of diesel retrofitted equipment and wetting down areas during construction. To avoid, mitigate, or minimize temporary construction-period noise pollution impacts, the Project will comply with the local ordinances. Efforts will be made to minimize the noise impact of construction activities, including appropriate mufflers on all equipment such as air compressors and welding equipment, maintenance of intake and exhaust mufflers, turning off idling equipment, replacing specific operations and techniques with less noisy ones, and other appropriate noise reduction measures.

6.8.5 Mitigation Measures

The Airport is committed to increasing the number of electric vehicle (EV) charging stations and providing electrical conduit for future EV stations. Additionally, in 2022, the Airport received a $1.95M grant through the US Department of Transportation's Strengthening Mobility and Revolutionizing

Transportation (SMART) Grants Program, to plan, permit, and design a smart microgrid project. The microgrid will ultimately generate and distribute clean, reliable power to the airport and facilitate reliable charging of electric ground fleet vehicles (including buses) and in the future, aircraft.

The Airport does not have an existing Transportation Demand Management (TDM) program and the increase in trips from the terminal improvements, as detailed under different peak hour increase scenarios (see **Tables 6.8-4 and 6.8-5**), will be minimal. Some typical "low hanging" TDM commitments include the following:

- Orientation packets for employees, including information about alternative means of transportation such as rideshare services, tenant-employee carpool options and rideshare matching service with other nearby employers.
- Showers and lockers for employees;
- Lunchroom with a microwave and refrigerator for employees;
- Flexible work schedules for employees;
- Telecommuting accommodations for employees (where applicable);
- "Guaranteed Ride Home" program;
- Transit pass subsidies;
- Secure bicycle parking;
- Carpool and vanpool program; and
- Preferential parking for carpool/vanpool.

6.8.6 Impact Summary

Because of the small number of daily and peak hour increases in traffic volumes travelling to and from the Airport under different peak hour increase scenarios (**Tables 6.8-4 and 6.8-5**) would be minimal and not have an impact on area roadways or intersection operations, impacts from construction and operations associated with the preferred alternative would be considered short-term and minor.

It should also be emphasized that any increase in passenger enplanements, and therefore associated roadway activity, is dependent on a myriad of influencing factors such as airline and hub consolidation, low-cost airline growth, technology advances, fuel prices, and pilot supply. Forecasted increases in enplanements, if they occur, will happen gradually over time. The changes in traffic volumes presented in this chapter reflect a future condition that would evolve over the 20-year planning horizon and not occur as a direct result of the terminal improvements planned under the Preferred Alternative.

6.9 Socioeconomics

6.9.1 No-Build Alternative

Under the No-Build Alternative, the existing Airport footprint would remain unchanged; therefore, no change in scenic qualities, open space or recreational resources would occur.

6.9.2 Proposed Action

Principal social impacts typically resulting from Airport actions include relocation of residences and businesses, alteration of surface transportation patterns, disruption of established communities or planned developments, and significant changes in employment. The Preferred Alternatives would not result in the above-mentioned social impacts. On the contrary, as a major construction project, the Preferred Alternative would result in positive economic impacts to the region and the Commonwealth. The generation of new, temporary construction jobs are anticipated during construction and the purchase of construction materials and services would result in direct and indirect impacts throughout the Commonwealth, along with induced impacts as the initial rounds of spending circulate through the economy.

Potential secondary or induced social impacts related to airport development typically include shifts in patterns of population movement and growth, increased public service demands, and changes in business and economic activity. As stated herein, the purpose and need of the proposed improvements at the Airport is to enhance safety for existing Airport users by meeting FAA Standards. The Preferred Alternative is not designed to increase growth or demand at the Airport, or to change the type or size of aircraft using the Airport. No shifts in population growth or public service demands would be created by the Preferred Alternative; therefore, it is reasonable to assume that there would be no adverse socio-economic impacts as a result of the Preferred Alternative.

6.10 Historical, Architectural, Archaeological, and Cultural Resources (MEPA/NEPA)

6.10.1 No-Build Alternative

The No-Build alternative would not meet the need for Airport infrastructure that complies with FAA planning and design standards and improves overall operational safety and efficiency at the Airport.

6.10.2 Proposed Action

Preparation of an archaeological site avoidance and protection plan (ASAPP) is underway and being drafted by the Project's Cultural Resource Consultant, for submittal to the MHC in December 2023 for review and comment. Available documentation and mapping for the two significant ancient Native American sites (19-BN-827 and 19-BN-828) have been reviewed and field visits made to the locations of sites 19-BN-827 and 19-BN-828 by a Senior Archaeologist, confirming that the sites are outside of proposed Project work areas. The ASAPP will address Pre-Construction, Construction and Post-Construction Activities. Avoidance and protection measures will include installing high-visibility temporary fencing (i.e., orange construction fence) around and barring access to the two significant sites (sensitive cultural resource areas).

6.10.3 Construction Impacts

Based on the mitigation measures noted below, there will not be any construction related impacts to historic resources.

6.10.4 Mitigation Measures

Signs with *No Trespassing* will be posted along the fence to indicate that the sensitive cultural resource areas are off-limits. No access or impact will be allowed within the fenced areas. Construction personnel and contractors will be instructed to neither perform nor permit any construction, excavation, grading, tree stumping, filling, dumping, or the storage or staging of equipment vehicles, or supplies within the boundaries of the fenced area. Trained cultural resource personnel will assist in facilitating the installation of protection measures (i.e., placement of fencing) with monitoring and/or flagging of the limits of the sensitive cultural resource areas. Cultural resource personnel will make field visits to ensure that the avoidance and protective measures are carried out as specified, with photographic documentation prior to, during and after construction. A pre-construction meeting will be held with Project personnel and contractors and cultural resource personnel to review these measures.

The pre-construction activities will involve the following:

- Pre-construction site inspection;
- Photography;
- Construction personnel briefing; and
- High visibility fencing with No Trespassing signs around the sensitive cultural resource areas to be protected.

The construction activities will include avoidance of fenced sensitive site resource areas; and response, reporting, and corrective actions if these conditions are not met. The post-construction activities will include the following:

- Fence and sign removal;
- Post-construction site inspection;
- Photography; and
- Post-construction memorandum.

Cultural resource personnel will conduct a post-construction inspection immediately after the construction phase of the Project to evaluate the condition of the sensitive areas and determine whether or not project-related impacts had taken place within the protected areas. The findings of the inspection will be reported to the MHC and the FAA via a memorandum.

The FAA has not established a significance threshold for Historical, Architectural, Archeological, and Cultural Resources. The Proposed Action is anticipated to result in a finding of No Adverse Effect through the Section 106 process.

6.11 Land Use (MEPA/NEPA)

6.11.1 No-Build Alternative

Under the No-Build Alternative, the existing Airport footprint would remain unchanged; therefore, no incompatible land uses would be introduced, and no surrounding land uses would be altered.

6.11.2 Proposed Action

As discussed in Sections 2.2.3 and 3.3, avigation easement acquisition would be pursued on a willing seller basis for those parcels within both the existing Runway Protection Zones (RPZ) for both runways and the future RPZ for the runway extension of Runway 15. As avigation easements are acquired, some land uses would shift as a result from residential to those more compatible with aviation. Some land uses within the RPZ are already compatible and would not change.

Additionally, four parcels containing buildings that are penetrations into the Runway Object Free Area (ROFA). Should these easements be obtained, or parcels obtained outright, these buildings (or portions thereof) would be removed from the ROFA.

Unless the Airport has control (either through easement or ownership) of parcels, there will be no other change in land uses outside of the current Airport property boundary.

Within the Airport property boundary, there will be some modification of undeveloped, vegetated areas converting to either impervious surface (runway, taxiway, etc.) or maintained turf areas. Please see Table 3.5-1.

6.11.3 Impact Summary

The FAA has not established a significance threshold for land use. There are no specific independent factors to consider for land use. The determination that significant land use impacts is dependent on the significance of other impacts.

The proposed Projects are located on existing Airport property and are consistent with existing aviation uses. The land use alterations summarized in **Table 3.5-1** are not anticipated to have impacts on land use and zoning surrounding the Airport. The proposed Projects are anticipated to have minimal changes in Airport operations, the land use and zoning areas are anticipated to remain compatible, and no adverse effects are anticipated. The Proposed Action will not result in community disruption, business relocations, or negative induced socioeconomic impacts. Based on this information, there are no significant impacts on land use as a result of the Proposed Action.

6.12 Public Health, Environmental Justice, and Children's Environmental Health and Safety Risks (MEPA/NEPA)

6.12.1 No-Build Alternatives

Under the No-Build Alternatives, the Airport would not alter infrastructure or the nature of operations within the Project areas. The existing and projected levels of passenger and aircraft operations at the Airport would not be affected. Therefore, no disproportionate and adverse Project-related public health or environmental effects to environmental justice populations and children's health and safety are anticipated from the No-Build Alternatives.

Conversely, the No-Build Alternatives could result in negative socioeconomic impacts by limiting the ability of the Airport to operate safely and efficiently. In addition, the No-Build Alternatives do not support jobs creation within the community, including direct and induced jobs associated with the construction phase.

6.12.2 Proposed Action (Preferred Alternatives)

6.12.2.1 EJ Analysis

The EJ Analysis Protocol applies to "any project that is likely to cause damage to the environment and is located within a distance of one mile of an Environmental Justice (EJ) population." The Proposed Action does not meet or exceed MEPA review thresholds under 301 CMR 11.03(8)(a)-(b) and will not add 150 or more new adt of diesel vehicle traffic over a duration of one year or more; therefore, the Project is not subject to a 5-mile radius.

The one-mile radius around the Project areas (the Designated Geographic Area [DGA]) was used as the basis for analyzing potential Proposed Action impacts. All EJ populations within the DGA are located in Barnstable and Yarmouth.

The EJ analysis conducted (see Section 5.16.2) identified existing EJ populations and assessed potential existing unfair or inequitable environmental burdens within the DGA. The analysis conducted and findings are summarized below.

- A comparison of rates of four vulnerable health criteria (heart attack hospitalizations, childhood blood lead levels, childhood asthma, and low birth weight) as they relate to statewide averages.
    - Based on the study of vulnerable health criteria, the Towns of Barnstable and Yarmouth meet childhood asthma and low birth weight vulnerable health criteria (see Table 5.16-2). The results show that some of the EJ communities in the DGA are considered vulnerable or subject to at least some level of existing environmental burdens.
- Identification of existing, past, and current potential sources of pollution within a mile of the Airport,

- Analysis of the sources of pollution found that there are 19 MassDEP major air and waste facilities, 54 M.G.L. c. 21E sites, one MassDEP site with AULs, 22 UST systems, 19 EPA facilities, three major routes and one bikeway that intersect the DGA, a commuter rail stop, several parking lots, Cape Cod RTA stops, and one power plant. However, the Project is not anticipated to impact or contribute to any of the listed potential sources of pollution described above nor add to them. Similarly, the Project will not materially exacerbate the existing health burden of the EJ communities around the Project site.

- An analysis using the RMAT Climate Resilience Output Tool to understand potential climate change risks surrounding the Airport and surrounding EJ populations, and
  - Analysis of the RMAT Tool estimated risk ratings for climate parameters (e.g., temperature, precipitation) does not indicate an elevated climate risks for EJ populations within the DGA for the Project Site.
- An analysis using the United States Environmental Protection Agency's (EPA) Environmental Justice Screening Tool (EJSCREEN).
  - The EJScreen analysis results show that none of the environmental and socioeconomic indicators are elevated (> 80th percentile) in the block groups within one mile of the Project Site. Overall, the EJ Screen analysis suggests that there are no potential environmental vulnerabilities in the communities within the DGA.

6.12.2.2 Potential Impacts to Health and Safety

The Proponent has taken steps to minimize and mitigate overall Project impacts. To the extent that impacts exist, the Project's location within an EJ community means that EJ communities will be affected. However, impacts on transportation, air, and climate are diffused and would be present regardless of the Project. The beneficial aspects of the Project are expected to outweigh anticipated impacts.

6.12.2.2.1 Transportation Impacts

The Project is expected to generate approximately 41 additional peak hour vehicle trips for an anticipated increase of 150 peak hour passengers, and approximately 82 additional peak hour vehicle trips for an anticipated increase of 200 peak hour passengers. According to the transportation analysis presented in Section 6.8.2, an addition of 150 peak hour passengers could result in an estimated traffic volume increase of between 7 and 16 vehicle trips per peak hour. These increased trips represent less than a one percent increase in overall traffic volume along each major roadway to and from the Airport. Under the 200 peak hour passengers' scenario, roadways could experience an increase in traffic volumes between 13 and 31 vehicle trips per hour. These increased trips represent between a 0.51 and 1.3 percent increase in peak hour volumes along the major travel routes.

The Project, as currently designed, is expected anticipated to result in +1,139 tons/year to +2,279 CO2 tons per year increase in vehicle related greenhouse gas (GHG) emissions. The mobile source greenhouse emissions are discussed in detail in Section 6.4.1.3.

The Project is not expected to result in a significant increase in vehicle and truck traffic. Impacts on surrounding roadways are anticipated to be minor under both future growth scenarios. The Airport's transportation improvement program that has been developed and will be advanced as a part of the Project.

6.12.2.2.2 Air Quality Impacts

The Preferred Alternatives' effect on air quality will primarily be the result of vehicle and aircraft emissions. It should be noted that the Proposed Action is not anticipated to result in an increase in air traffic operations. In addition, the Airport is located in a NAAQS attainment area. Project-related contributions from vehicles are anticipated to be minor and will not contribute to air pollutant concentrations that would result in an exceedance of the health-based NAAQS. Therefore, no disproportionate adverse effect on EJ populations is anticipated as a result of the Project.

Minor temporary air quality impacts such an increase in air emissions from fugitive dust and construction vehicles are anticipated during construction-period activities. However, various mitigation measures such as appropriate mufflers on all equipment such as air compressors and welding equipment, maintenance of intake and exhaust mufflers, turning off idling equipment, will be taken to reduce and prevent potential impacts.

Air quality impacts and mitigation measures are described in greater detail in Section 6.3.

6.12.2.2.3 Climate Impacts

Future climate conditions are expected to produce conditions which will require adaptation and resiliency from existing facilities. The Project is not expected to produce any direct adverse climate impacts that will affect EJ populations. Aspects of the Project may reduce climate risks including improvements to the stormwater management system, use of onsite energy generation/storage via a microgrid, and use of "green" construction standards for airport tenants. These measures respond to the RMAT Tool analysis output for anticipated climate change effects. Additionally, the proposed Project is consistent with, and responds to future climate scenarios (e.g., heat impacts) by adding runway length to maintain safe aircraft operations.

6.12.2.2.4 Stormwater and Flooding Impacts

The Project is not anticipated to contribute to additional risk to the surrounding areas and to EJ Populations. Although the Project will create approximately 38.5 acres of impervious area, the Project site has been designed to mitigate any impacts that are created as a result of the new impervious area. The Airport intends to install new leaching catch basins and infiltration chambers to enhance flood protection during storms and flooding events.

6.12.2.2.5 EPA's Endangerment Finding for Lead Emissions from Aircraft Engines

In October 2023, EPA issued a final determination for emissions of lead from aircraft that operate on leaded fuel cause or contribute to air pollution which may reasonably be anticipated to endanger public health and welfare under the Clean Air Act.

EPA's determination advances its L*ead Strategy to Reduce Lead Exposures and Disparities in U.S. Communities*[21] aimed at reducing lead exposure in communities. With the endangerment finding, EPA under the Clean Air Act, will propose and promulgate regulatory standards for lead emissions from certain aircraft engines. Concurrently, the FAA will develop standards that address the composition, chemical, or physical properties of an aircraft fuel or fuel additive to control or eliminate aircraft lead emissions. EPA and FAA have started work on regulatory options to address lead emissions from aircraft engines.

Aircraft that use leaded aviation gasoline are generally small piston-engine aircraft. Jet aircraft used for commercial transport do not operate on leaded fuel. EPA notes that, levels of airborne lead in the United States have declined 99% since 1980, while acknowledging that emissions from aircraft that operate on leaded fuel may still pose risks to nearby communities, including those with environmental justice concerns.

While EPA's actions on leaded aviation fuel represent an important national level to address the concerns associated with leaded aviation fuels, piston aircraft operations are not expected to increase due to the proposed project activities.

6.12.2.3 Public Health and Children's Environmental Health and Safety Risks

In response to the DEIR scope, this section provides a discussion of reasonably foreseeable public health consequences from any environmental impacts of the Project, including any impacts that might exacerbate the vulnerable health EJ criteria discussed in Chapter 5.0. In accordance with the MEPA Protocol for Analysis of EJ Impact and FAA's 1050.1F Desk Reference, and in accordance with Executive Order 13405, Protection of Children from Environmental Health Risks and Safety Risks, this section also serves to identify and assess the potential health and safety risks that could disproportionately affect children, specifically related to air quality and noise.

A comprehensive review of the vulnerable health criteria and information included in the DPH EJ Tool to assess public health conditions in the area surrounding the Project Site is provided in Section 5.16.2 as part of the EJ evaluation. The key vulnerability criteria that are likely to be associated with air quality impacts from traffic include heart attacks and asthma. Childhood asthma was exceeded in the EJ communities within a one-mile radius of the Project Site. Childhood asthma can be caused and exacerbated by a large number of environmental exposures, including many indoor sources and allergens. Although outdoor air pollution could be a contributing factor, the air quality analysis discussed in Section 6.3, shows that air quality near the Project Site is improving and current levels

[21] https://www.epa.gov/system/files/documents/2022-11/Lead%20Strategy_1.pdf

are well below health-based standards that are protective of health effects such as asthma, with a margin of safety for protecting vulnerable population groups (e.g., children). Furthermore, any Project-related impacts will not contribute to an exceedance of these health-based standards. The low-birth-weight health indicator also met the criteria, but there is little data to suggest that air quality is associated with this health outcome. However, air quality below the current health-based standards will be protective with regards to this health outcome as well.

Overall, the Proposed Action is not expected to have disproportionate, adverse impacts on public health and on children's environmental health and safety, particularly nearby schools or camps listed in section 5.16.3. The FAA has not established a significance threshold for Children's Environmental Health and Safety Risks. Factors to consider include whether the action would have the potential to lead to a disproportionate health or safety risk to children. Overall, the Proposed Action is not expected to have disproportionate, adverse impacts on public health and on children's environmental health and safety, particularly nearby schools or camps as described in section 5.16.3

6.13 Hazardous Materials, Solid Waste, and Pollution Prevention (MEPA/NEPA)

As discussed in Chapter 5.0, a total of 64 Sites with documented releases of OHM to soil and/or groundwater were identified on or adjacent to the Airport property. The locations of the Sites were compared to proposed improvements for the Airport. Based on this comparison, 13 of the 64 Sites may result in environmental consequences as follows:

- Taxiway B: Five Sites are located in or adjacent to this project area.
- Taxiway D: One Site is located in or adjacent to this project area.
- Runway 15: No Sites were identified in this project area.
- Runway 33: Two Sites were located in or adjacent to this project area.
- Aviation Development Area near Taxiway A: Two Sites are located in or adjacent to this project area.
- Aviation Development Area near Taxiway B: One Site is located in or adjacent to this project area.
- Proposed Electric Aircraft Charging Areas: Two Sites are located in or adjacent to this project area.

It is anticipated that each project area will be evaluated independently, and as required, work will be performed in accordance with either the Preliminary or Comprehensive Response Actions of the MCP (310 CMR 40.0000).

A summary of Sites in relation to proposed or potential Airport improvements are discussed below. The proposed work areas and Sites are on **Figure 6.13-1**.

6.13.1 No-Build Alternative

The No-Build Alternatives would not result in any new construction; therefore, there would be no new solid waste generation, disturbance of soil/groundwater or need for disposal of hazardous materials. Active Massachusetts Contingency Plan (MCP) disposal sites would continue to be assessed and remediated to achieve regulatory closure under the No-Build Alternatives.

PROPOSED AIRPORT ACCESS ROAD

PROPOSED 895' RUNWAY EXTENSION

PROPOSED 695' DISPLACED THRESHOLD

RTN 4-1081

RTN 4-23484

RTN 4-823

RTN 4-26225

PROPOSED ELECTRIC VEHICLE CHARGING AREA

RTN 4-14860

RTN 4-14472

RTN 4-26

RTN 4-26179

RTN 4-28577

RTN 4-29807

RTN 4-21315

RTN 4-28769

RTN 4-26347

Barnstable Municipal Airport

Mary Dunn Pond

Mill Pond Marshes

RUNWAY 15

RUNWAY 15-33

RUNWAY 6

RUNWAY 33

RUNWAY 6-24

RUNWAY 24

TAXIWAY A

TAXIWAY B

TAXIWAY C

TAXIWAY D

TAXIWAY E

TAXIWAY P

NORTH RAMP

EAST RAMP

Flint Rock Rd

Mary Dunn Rd

Airport Way

Barnstable Rd

Iyannough Rd

Attucks Ln

Independence Dr

Jefferson Ave

Washington Ave

Gill Ave

Lincoln Ave

Coolidge Rd

Hawes Run

Higgins Crowell Rd

Route 28

Capetown Plaza

Southwind Plaza

LEGEND:

- PROJECT AREA
- APPROXIMATE MASSDEP DISPOSAL SITE BOUNDARIES WITHIN OR IMMEDIATELY ADJACENT TO PROPOSED IMPROVEMENTS (DASHED WHERE ESTIMATED)
- EXISTING PAVEMENT
- PROPOSED PAVEMENT
- PAVEMENT TO BE REMOVED
- PROPOSED ELECTRICAL AIRCRAFT CHARGING AREA
- PROPOSED BUILDING
- POTENTIAL AVIATION DEVELOPMENT AREA
- PROPOSED EASEMENT/FEE ACQUISITION AREA

NOTES:

1. FEATURES ARE APPROXIMATE.
2. RTN = RELEASE TRACKING NUMBER.

SOURCE:

1. PROJECT AREA DIGITIZED FROM ENVIRONMENTAL NOTIFICATION FORM, CAPE COD GATEWAY AIRPORT, EPSILON ASSOCIATES, INC., NOVEMBER 30, 2022.

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SCALE, FEET

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Draft Environmental Impact Report
Cape Cod Gateway Airport
Hyannis, Massachusetts

Epsilon Associates, Inc.
Manyard, Massachusetts

GEI Consultants

Project 2203788

APPROXIMATE DISPOSAL SITE BOUNDARIES AT PROPOSED CONSTRUCTION AREAS

October 2023 **Figure 6.13-1**

6.13.2 Taxiway D

The current Taxiway D is located on the northwest side of the airport adjacent to runway 15-33 (Fig. 4). The goal of the project is to reconfigure the taxiway as a partial-length, parallel, taxiway with a 400-foot standard separation from Taxiway B to Taxiway A1. Approximately 60,000 cubic yards of soil will be excavated for this work. The project will also include the following excavation areas:

- Constructing a run-up area along the north side of the new partial parallel Taxiway D.
- Removing Taxiway D between Taxiway A and the new partial parallel Taxiway D.
- Removing Taxiway D between Taxiway B and Runway 6-24.
- Installation of new stormwater utilities and structures.

Based on the review of existing conditions presented in Chapter 5.0, one release of OHM tracked under RTN 4-28577 was identified in the proposed Taxiway D improvement area. RTN 4-28577 is associated with the presence of PAHs and lead in soil and sediments above the MassDEP Sediment Screening Criteria at Upper Gate and Lewis Ponds. A summary of existing conditions is presented in Chapter 5.0.

Since the proposed work is being performed within a portion of this open Site, soil, sediment, groundwater, and surface water will be managed in accordance with requirements of the MCP. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable.

At this time, it is anticipated that excess soil or sediment will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal. Groundwater and surface water will either be treated and discharged to surface water in accordance with requirements of the NPDES DRGP, recharged in accordance with local, state, and federal regulations, or collected and transported offsite for disposal.

6.13.3 Taxiway B Relocation

The existing Taxiway B is located on the southeast side of the airport adjacent to runway 6-24 (Fig. 4). The goal of the proposed improvements to Taxiway B is to remove the existing taxiway and move/extend it to a standard, 400-foot, separation south of Runway 6-24. Approximately 11,000 cubic yards of soil will be excavated for this work. This project will also include:

- Constructing two midfield taxiways to Runway 6-24.
- Constructing a northern taxiway spanning Runway 6-24 to Taxiway C.
- Installation of new stormwater utilities and structures.

Based on the review of existing conditions presented in Chapter 5.0, the following five releases of OHM were identified in or adjacent to the proposed Taxiway B Improvement area:

- **RTN 4-26347:** This RTN is associated with historical releases of PFAS and 1,4-dioxane to soil and groundwater at the airport. Response actions to address these releases are ongoing.

- **RTN 4-28769:** This RTN is associated with the sudden release of approximately 16 gallons of aviation fuel and 3 gallons of motor oil to an unpaved area from an aircraft accident in April 2021. Following response actions, the site achieved regulatory closure with a PSNC.
- **RTN 4-29807:** This RTN is associated with the release of over 10 gallons of hydraulic fluid onto soil from a hydraulic hose on a dump truck. Following response actions, the site achieved regulatory closure with a PSNC.
- **RTN 4-21315:** This RTN is associated with the release of approximately 160 gallons of aviation jet fuel that occurred during an aircraft transportation accident. Following response actions, the site achieved regulatory closure with a Class A-2 RAO.
- **RTN 4-14472:** This RTN is associated with the sudden release of 10-20 gallons of aviation jet fuel when an aircraft inadvertently steered off the runway resulting in the rupture of the plane's fuel tank. Following response actions, the site achieved regulatory closure with a Class A-2 RAO.

Contaminants of concern (COCs) that may be encountered during construction of the proposed improvements for Taxiway B include PFAS and residual petroleum compounds in soil, and PFAS and 1,4-dioxane in groundwater.

An additional release tracked under RTN 4-26179 is also estimated to be within the Taxiway B Improvement area. This RTN is associated with historic releases of PFAS from the Barnstable County Fire Training Academy, resulting in impacted groundwater 32 feet to 70 feet below ground surface. Due to the depth of groundwater impacts, it is unlikely that the proposed work will encounter groundwater conditions at these depths, and therefore, releases of PFAS from the Barnstable Fire Training were not included as a site of concern for this area. A summary of existing conditions is presented in Chapter 5.0.

Since the proposed work is being performed in portions of an open MassDEP Disposal Site (e.g., RTN 4-26347) and there is potential for encountering residual contamination from closed releases, soil and groundwater will be managed in accordance with requirements of the MCP. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable.

MCP submittals will include the following:

- Plans, as necessary, to sample and analyze asphalt and soil beneath Taxiway B during airport upgrades for the presence of PFAS.
- Descriptions of how the PFAS-containing asphalt and soil, if identified, will be managed, and whether the findings impact the remediation options being performed under RTN 4-26347.
- During this effort, the Airport will maintain the existing monitoring wells to the extent feasible. Wells that cannot be maintained due to their location with respect to improvement effort will be decommissioned in accordance with MassDEP requirements and replaced, if necessary.

- At this time, it is anticipated that soil will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal. While it is not expected that significant groundwater management will be encountered as part of this project, if groundwater is encountered it will either be recharged in accordance with local, state, and federal regulations, treated and discharged to surface water in accordance with requirements of the National Pollution Discharge Elimination System Dewatering and Remedial General Permit (NPDES DRGP), or collected and transported offsite for disposal.

6.13.4 Runway 15 and Taxiway A Extension

The current Runway 15 is located on the northwest end of the airport (**Figure 1.1-1**). The goal of the project is to extend the runway approximately 895 feet, which includes an approximately 695-foot displaced threshold. Approximately 60,000 cubic yards of soil will be excavated for this work. The project will also include installation of new stormwater utilities and structures.

Based on the review of existing conditions presented in Chapter 5.0, no releases of OHM were identified in or adjacent of proposed improvements to Runway 15. However, due to atmospheric deposition, background concentrations of PFAS may be present in surficial soils. Since there is potential for encountering background levels of PFAS in shallow soil, soil will be managed in accordance with requirements of the MCP. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable.

At this time, it is anticipated that soil will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal. While it is not expected that groundwater will be encountered as part of this project, if groundwater is encountered it will either be recharged in accordance with local, state, and federal regulations, treated and discharged to surface water in accordance with requirements of the NPDES DRGP, or collected and transported offsite for disposal.

6.13.5 North Ramp Aviation Development Area

The existing North Ramp is located on the western side of the airport adjacent to Taxiway A and Runway 15-33 (**Figure 1.1-1**.). The goal of the potential work at the North Ramp Aviation Development Area is general aviation improvements for apron and/or hanger development. The proposed construction encompasses approximately 8.7 acres.

Based on the review of existing conditions presented in Chapter 5.0, the following two releases of OHM were identified in or adjacent to potential improvements to the Aviation Development Area at Taxiway A:

- **RTN 4-1081:** This RTN is associated with historical releases of OHM resulting from the site's former use as an auto salvage facility. Following response actions, the site achieved regulatory closure with a Class A-2 RAO.

- **RTN 4-23484:** This RTN is associated with a release of approximately 15 gallons of aviation fuel to the paved tarmac during overfilling of on airplane in August 2011. Following response actions, the Site achieved regulatory closure with a Class A-1 RAO.

Contaminants of concern associated with these Sites include petroleum compounds and lead in soil, and petroleum compounds in groundwater.

Since there is a potential for encountering residual contamination from closed releases (e.g., RTN 4-1081), soil and groundwater will be managed in accordance with requirements of the MCP. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable.

As discussed in Section 5.17.3, the 1991 drill location, located near the north end of Taxiway A, had documented use of AFFF. When development begins for Taxiway A, MCP submittals will include a plan to sample and test disturbed soil in areas not previously sampled for PFAS. Further, this submittal will describe how PFAS-containing soils will be managed, if identified.

At this time, it is anticipated that soil will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal. While it is not expected that significant groundwater management will be encountered as part of this project, if groundwater is encountered it will either be recharged in accordance with local, state, and federal regulations, treated and discharged to surface water in accordance with requirements of the NPDES DRGP, or collected and transported offsite for disposal.

6.13.6 East Ramp General Aviation Development

The existing East Ramp is located on the southeast side of the airport, adjacent to Taxiway B and Runway 6-24 (**Figure 1.1-1**). The proposed available space for new aviation development encompasses approximately 31.3 acres within the East Ramp, inclusive of space made available via the re-alignment of Taxiway B.

Based on the review of existing conditions presented in Section 5.17, one release of OHM tracked under RTN 4-26347 was identified in the potential East Ramp Aviation Development Area for Taxiway B. As discussed above, this RTN is associated with historical releases of PFAS and 1,4-dioxane to soil and groundwater. Response actions to address these releases are ongoing.

An additional release tracked under RTN 4-26179 is also estimated to be within the potential East Ramp Aviation Development Area. As previously discussed, this RTN is associated with historic releases of PFAS from the Barnstable County Fire Training Academy, resulting in impacted groundwater 32 feet to 70 feet below ground surface. Due to the depth of groundwater impacts, it is unlikely that the proposed work will encounter groundwater conditions at these depths. Therefore, releases of PFAS from the Barnstable Fire Training were not included as a site of concern for this area. A summary of existing conditions is presented in Section 5.17.

Since the proposed work is being performed in portions of an open MassDEP Disposal Site (e.g., RTN 4-26347) and there is potential for encountering residual contamination from closed releases, soil and groundwater will be managed in accordance with requirements of the MCP. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable.

This area coincides with the asphalt caps located at the ARFF area and the Deployment area. As discussed in Section 5.17.3, these caps were installed to mitigate the leaching of PFAS from the soil to the groundwater. MCP submittals will describe how the caps' integrity will be maintained during and after construction. Any asphalt removed from the taxiway, including the capped area, will be sampled, and analyzed for PFAS and managed appropriately if PFAS is detected.

During this effort, the Airport will maintain the existing monitoring wells to the extent feasible. Wells that cannot be maintained due to their location with respect to improvement effort will be decommissioned in accordance with MassDEP requirements and replaced, if necessary.

At this time, it is anticipated that soil will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal. While it is not expected that significant groundwater management will be encountered as part of this project, if groundwater is encountered it will either be recharged in accordance with local, state, and federal regulations, treated and discharged to surface water in accordance with requirements of the NPDES DRGP, or collected and transported offsite for disposal.

6.13.7 Proposed Electrical Aircraft Charging Area

The goal of this work is to install EV charging spaces and electric aircraft charging stations.

Based on the review of existing conditions presented in Chapter 5.0, the following two releases of OHM were identified in or adjacent to the proposed electrical aircraft charging areas:

- **RTN 4-26225:** This RTN is associated with the release of approximately 30 gallons of aviation fuel to pavement and a catch basin during an aircraft accident in 2016. Following response actions, the site achieved regulatory closure with a PSNC.
- **RTN 4-823:** This RTN is associated with the release of VOCs and petroleum-related compounds to soil and groundwater from historical leaching pits. Three other RTNs (4-11841, 4-12048, and 4-12687) are linked to this RTN. Following response actions, the site achieved regulatory closure with a PSNC.

COCs associated with these Sites include petroleum compounds in soil and groundwater.

Since there is a potential for encountering residual contamination from closed releases (e.g., RTN 4-26225), soil and groundwater will be managed in accordance with the requirements of the MCP. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable.

At this time, it is anticipated that soil will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal. While it is not expected that significant groundwater management will be encountered as part of this project, if groundwater is encountered it will either be recharged in accordance with local, state, and federal regulations, treated and discharged to surface water in accordance with requirements of the NPDES DRGP, or collected and transported offsite for disposal.

6.13.8 Solid Waste

The selected contractor will apply relevant and practicable procedures to allow for the reuse and recycling of construction materials. Prior to construction, the contractor will develop a Construction Waste Management Plan to ensure that a minimal amount of waste debris is disposed in landfills. For materials that cannot be recycled, solid waste will be transported in covered trucks to an approved solid waste facility per the DEP Regulation for Solid Waste Facilities, 310 CMR 16.00.

6.13.9 Pollution Prevention

It is estimated that up to approximately 200,000 cubic yards of soil may be generated over the course of the various projects being executed. As discussed above several Sites with documented releases of OHM are located within or adjacent to areas of proposed Airport improvements. Based on the location of these Sites, it is anticipated that potentially contaminated soil or groundwater may be encountered during the implementation of the various projects.

Excavation and management of soil contaminated with, or potentially contaminated with, OHM will be conducted in general accordance with Response Action Performance Standards (RAPS) as defined in the MCP (310 CMR 40.0191). RAPS considers testing requirements, disposal options, and construction-period mitigation measures to minimize impacts to public health and the environment associated with the excavation and handling of contaminated soil, at a minimum.

Due the presence of at least background concentrations of PFAS in soil and the limited options for offsite disposal of PFAS-impacted soil of any concentration currently available, the airport will attempt to reuse soil during construction to the extend feasible. If reuse of soil is not possible for a specific project, the excess soil will be stockpiled and managed in accordance with the MCP for future reuse at the airport. If the excess material is not suitable or, ultimately will not be reused at the airport, the excess soil will be transported offsite for reuse, recycling, or disposal, as applicable, and in accordance with local, state, and federal regulations.

If soil is reused during construction, it is anticipated that the soil will be reused in the general proximity of the location of the original excavation. If excess soil is retained for future reuse, it will be placed in an area designated by the Airport for materials management. Soils placed in the Airport materials management area(s) will be covered with polyethylene sheeting to minimize potential fugitive dust or otherwise stabilized. Secondary containment such as berms or siltation fence will be installed, as necessary, to prevent sediment in runoff from leaving the material management area.

6.13.10 Impact Summary

The FAA has not established a significance threshold for Hazardous Materials, Solid Waste, and Pollution Prevention. Based on the information provided in Section 6.13, the Proposed Action does not exceed the considerations, per the FAA Order 1050.1F, as the Project does not have the potential to: Violate applicable Federal, state, tribal, or local laws or regulations regarding hazardous materials and/or solid waste management; Involve a contaminated site; Produce an appreciably different quantity or type of hazardous waste; Generate an appreciably different quantity or type of solid waste or use a different method of collection or disposal and/or would exceed local capacity; or adversely affect human health and the environment.

6.14 Light Emissions and Visual Effects (including Open Space, Scenic Values)

6.14.1 No-Build Alternative

The No-Build Alternatives would not result in any new construction; therefore, there would be no changes in light emissions or visual effects.

6.14.2 Proposed Action

Taxiway D construction and East Ramp construction will have mature tree removal. However, this tree removal is not anticipated to change the view for passing motorists or pedestrians as it is interior to the Airport property and there are not any public streets within the vicinity. The closest roadway to Taxiway D is Airport Road to the north within a heavily vegetated area. The East Ramp abuts Mary Dunn Way, an internal roadway. Between this roadway and the nearest public road are a corridor of trees as well as the railroad tracks. This visual screening will remain.

There would be additional lighting for any new hangars at the East Ramp and extended Runway 15 and Taxiway A. Lighting (primarily lighted signs and taxiway lights) would be relocated for Taxiway B and D. PAPI lights would be located on the north side of Runway 15 by the new extension, a significant distance from any roadway. Any new lighting would mostly be toward the interior of airport property; would be consistent in character with existing lighting; and are not likely to noticeably alter views from off airport property.

No other Projects are expected to affect local scenic or aesthetic qualities during the construction period.

6.14.3 Construction Impacts

Any visual impacts from the presence of construction vehicles and equipment would be temporary. Only discrete portions of the airport closest to the various Project areas are visible from the roadway.

6.14.4 Impact Summary

The Proposed Action does not exceed the considerations as per the FAA Order 1050.1F, and does not have the potential to: Create annoyance or interfere with normal activities from light emissions; Affect the visual character of the area due to the light emissions; Affect the nature of the visual character of the area; or Block or obstruct the views of visual resources, including whether these resources would still be viewable from other locations

6.15 Cumulative Impacts

The proposed project is not expected to result in any negative or long-term significant indirect or cumulative impacts.

Indirect Effects

Under NEPA, "indirect effects" are those "caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable." Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems 40 CFR Part 1501(40 CFR 1508.8).

The proposed projects are not expected to cause any significant indirect impacts in any of the impact categories considered in this EA/EIR. All impacts are expected to occur only at the specific locations where construction will occur. The potential for indirect impacts occurring later on or distant from the site due to on-going operations will be minimized by mitigation measures, such as wetland restoration/replication, stormwater management, carbon emission mitigation, and use of sustainable energy sources. The project will not create any significant secondary air quality impacts as it is not expected to significantly affect the amount of air traffic.

Cumulative Effects

Cumulative effects are defined as "effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time."[22] Therefore, this evaluation considered those effects that are "reasonably foreseeable" and within the geographic area of concern for this analysis, which is generally the Airport and its immediate vicinity, i.e., the land adjacent to the Airport.

[22] CEQ regulations at 40 CFR § 1508.1(g) (revised April 20, 2022)

Table 6.15-1 below presents the Airport projects overtime since the first MEPA filing. This section considers recent Airport projects, those included in the Airport's 2022 Master Plan Update, and other past, present, and reasonably foreseeable future projects located within the project vicinity. Past projects include reasonably foreseeable projects include miscellaneous projects anticipated to occur on and around the Airport property within the next five years.

Potential future development, from a cumulative standpoint, is consistent with The Town of Barnstable's Comprehensive Plan (2010) to promote positive economic change and to support the prioritization of building and maintaining appropriate infrastructure. The plan is also intended to promote sustainable development and encourage the growth of new economic sectors. The proposed Projects will have a cumulative effect of supporting these economic development goals identified in the Plan by maintaining the facilities at the Airport, responding to the Airport's current and future aviation needs, and positioning the Airport to meet future aviation industry shifts (integration of electric aircraft).

6.15.1 Past Projects

Past Projects

The Airport has, since its inception in 1928 as a single grass runway, continuously improved and maintained its assets in an economically responsible manner consistent with its purpose and in collaboration as a part of the Massachusetts Airport System. Today, the airport consists of a 35,000 sq. ft. passenger terminal, 85 ft. air traffic control tower, extensive parking facilities, aircraft ramps, taxiways, an airport rescue firefighting team, maintenance building and an aircraft fuel farm. More than 40 private tenants lease hangar space on parts of the airport property.

Since MEPA was enacted, the following projects have been undertaken at the Airport:

Table 6.15-1 Past Projects and MEPA Submissions

EEA No.	Year	Projects
14642	2012	Master Plan Improvements: up to 210,000 sf of additional corporate and general aviation hangars on the East and North Ramp; and leasing of the former Mildred's Restaurant site
12267	2010	New terminal building, air traffic control tower (ATCT), access roads, apron areas, parking areas, and various airfield improvements.
10078	1994	Rescue fire and snow removal building
9206	1992	Airport 5-Year Capital Plan improvements
8017	1982	Rehabilitate and strengthen Runway 6-24
4480	1982	Runway 15-33 Extension
4247	1981	Land Acquisition of multiple sites adjacent to the airport
2522	1977	Pave Auto Parking
2315	1976	Construct Six T-Hangars

6.15.2 Current Projects (2023 through 2029)

Runway 06-24/EMAS Reconstruction: The airport is currently undertaking a $25 million project to reconstruct Runway 06-24 and replace the Engineered Materials Arresting System (EMAS). The project improves safety and usability at the airport facility for both passengers and airport personnel. The reconstructed Runway 06-24 is expected to extend the design life of the pavement for 20-30 years and improve safety and operational flows.

Reconstruction includes in-pavement and edge lighting, regarding turf safety areas, and miscellaneous related airfield improvements to navigational aids and power sources. The EMAS, located at the approach end of Runway 06-24, is comprised of high-energy absorbing materials which reliably and predictably deform under the weight of an aircraft. The construction is scheduled to be completed in late 2023. This project is considered a maintenance project, conducted within the footprint of the previous surfaces, and therefore is not subject to NEPA/MEPA review.

Micro/Smart Grid: The airport is planning a Micro/Smart Grid, via a $1.95 million SMART grant received by MassDOT Aeronautics Division, to provide robust infrastructure for the electrification of ground vehicles and aircraft. Power from the smart grid will facilitate the charging of electric ground vehicles, including buses, and in the future, electric aircraft. In collaboration with the airport and the Cape Cod Regional Transit Authority, the initiative aims to increase clean energy independence while helping to support the disadvantaged community living near the airport in Hyannis. Construction is anticipated to occur in 2025-2026.

6.15.3 Future Projects (2030-2040)

Terminal Building Improvements: The Proposed Action will renovate the terminal building and expand it by up to 5,000 sf to current Airport needs and standards, including Transportation Security Administration (TSA) requirements (TSA's Recommended Security Guidelines for Airport Planning, Design, and Construction). The current terminal building capacity is insufficient to meet current needs and future demand. The current terminal building has existing deficiencies which include check-in space; inbound/outbound baggage screening; passenger holdroom; and terminal support space. To meet the potential future needs of 200 peak hour passengers, an expansion of up to 20,000 sf for a total terminal space of 55,000 sf is required. Future terminal building improvements, based on demand, of up to 25,000 sf to meet anticipated Airport needs and standards, including Transportation Security Administration (TSA) requirements[23].

Furthermore, the Airport has committed to meet the provisions of the 2023 Stretch Code update, even though Barnstable is not a Stretch Code community. The 2023 Stretch Code includes energy efficiency strategies that provide a pathway to meet 2050 decarbonization goals. These commitments include, for any new buildings, expansions, or additions:

- High performing envelopes that comply with the 2023 Stretch code envelope performance requirements;

[23] 49 CFR Part 1544 – Aircraft Operator Security: Air Carriers and Commercial Operators

- 100% heat pump space heating;
- Energy recovery ventilation per the 2023 Stretch code update;
- PV-ready roofs.

Runway 6-24 Runway Safety Area EMAS: The Runway 24 end currently has a non-standard Runway Safety Area (RSA) that does not fully meet the FAA standard sizing of 800 feet by 1,000 feet per FAA AC 150/5300-13B. Per FAA Order 5200.8, *Runway Safety Area Program*, construction of a 200-foot by 400-foot engineered material arresting system (EMAS) on the approach end of Runway 24 is proposed to correct the non-standard RSA and enhance safety for aircraft landing on Runway 6. An EMAS is built at the end of a runway to reduce the severity of the consequences of a runway overrun and is equivalent to a full-dimension RSA.

Self-fueling Fuel Tanks: The Airport currently offers both Jet-A and 100LL Avgas fuel. All fuel is provided via full-service fuel trucks. The existing fuel farm has space for an additional 20,000-gallon Jet-A fuel tank to be constructed as demand arises. The Airport will add a self-fueling option for 100LL Avgas. A card reader would be installed to provide a 100LL self-fueling option. Should these additional tanks be installed, a supplemental air emissions analysis will be completed prior to installation to assess air quality impacts**.**

Non-Aeronautical Development Areas: The Master Plan designates existing Airport-owned land for non-aeronautical development. Airport currently has nine land leases on Airport property that are used for non-aviation purposes. These land leases generate additional revenue for the Airport outside of those leases inside the terminal or leases used for aeronautical purposes. There are additional vacant lease spaces that may be developed at some point in the future should demand arise. Any buildings or structures would be required to meet the same commitments to the 2023 Stretch Code as listed above under Terminal Improvements. Should any MEPA thresholds be exceeded for the planned development of these areas, MEPA review will be initiated at that time.

Chapter 7.0

Mitigation & Draft Section 61 Findings

7.0 MITIGATION AND DRAFT SECTION 61 FINDINGS

This Chapter provides a summary of proposed mitigation and Proposed Section 61 Findings for the Project. In addition, it describes measures to which the Proponent has committed to mitigate potential impacts on wetlands, air quality and greenhouse gas emissions, noise, and stormwater quality or quantity, as well as construction period mitigation measures.

7.1 Introduction

M.G.L.c.30, s.61 requires that "[a]ll authorities of the Commonwealth … review, evaluate, and determine the impact on the natural environment of all works, projects or activities conducted by them and … use all practicable means and measures to minimize [their] damage to the environment. … Any determination made by an agency of the Commonwealth shall include a finding describing the environmental impact, if any, of the project and a finding that all feasible measures have been taken to avoid or minimize said impact." Each state agency that issues a permit for the Project shall issue a Section 61 Finding in connection with permit issuance, identifying mitigation that is relied upon to satisfy the Section 61 requirement. A proposed Section 61 Finding is provided in Section 7.3, and a table of mitigation measures is included as part of Section 61 Findings. All mitigation will be the responsibility of the Proponent.

7.2 Anticipated State Permits and Approvals

Table 7.2-1 identifies the state Agencies that are expected to take Agency Action on the Project and, therefore, issue Section 61 Findings. It also identifies the Agency Actions anticipated to be required.

Table 7.2-1 State Agency Actions Required for the Project

Permit/Review	Agency	Status and Relevant Project(s)
Individual 401 Water Quality Certificate	Department of Environmental Protection (MassDEP)	WQC to be filed Date TBD for Taxiway D during Phase II
Wetlands Protection Act M.G.L. c. 131 § 40	MassDEP	Notice of Intent To be filed Date TBD for Taxiway D during Phase II
M.G.L. c. 90 § 35B, 780 CMR 111.7	Massachusetts Department of Transportation (MassDOT) – Aeronautics Division	Conceptual design complete. Final construction design to be completed in CIP phase.
Review under Massachusetts Endangered Species Act	Natural Heritage and Endangered Species Program	No impacts anticipated. MESA Checklist filed TBD if necessary.

7.3 Draft Section 61 Findings

Project Name:	Cape Cod Gateway Airport Master Plan Projects
Project Location	Barnstable, MA
Project Proponent	Cape Cod Gateway Airport
EEA Number	16640
Date Noticed in Monitor	December 7, 2022

The potential environmental impacts of the Project have been characterized and quantified in the ENF dated November 30, 2022 and this Draft EIR/EA, which are incorporated by reference into this Section 61 Finding. Throughout the planning and environmental review process, the Proponent has been working to develop measures to mitigate significant impacts of the Project. With the mitigation proposed and carried out in cooperation with state agencies, [AGENCY] finds that there are no significant unmitigated impacts.

The Proponent recognizes that the identification of effective mitigation, and implementation of that mitigation throughout the life of the Project, is central to its responsibilities under the Massachusetts Environmental Policy Act (MEPA). The Proponent has accordingly prepared the annexed Table of Impacts and Mitigation Measures that specifies the mitigation that the Proponent will provide.

Now, therefore, [AGENCY], having reviewed the MEPA filings for the Project, including the mitigation measures itemized on the annexed Table of Impacts and Mitigation Measures, finds pursuant to M.G.L. C. 30, S. 61, that with the implementation of the aforesaid measures, all practicable and feasible means and measures will have been taken to avoid or minimize potential damage from the Project to the environment.

_____

[Agency]

_____

By

_____

[Date]

Table 7.3-1 describes the measures to be implemented to mitigate the effects of the Project related to the required state actions and the schedule for implementation. **Table 7.3-2** identifies construction period mitigation measures. The Proponent will be responsible for all mitigation measures.

Table 7.3-1 Summary of Mitigation Measures

Mitigation Measures	Schedule	Cost
Water Resources		
♦ Use of a 2:1 side slope to construct Taxiway D to minimize impacts to wetland and water resource areas associated with Upper Gate Pond ♦ Construction of an approximately 4,500 sf BVW replication area for mitigation compliance for MassDEP ♦ Full compliance with Massachusetts Stormwater Management Standards for impervious surface addition of xx acres ♦ Utilization of revised rainfall intensities by NOAA Atlas 14, Point Precipitation Frequency Estimates including for future climate conditions. ♦ Stormwater Best Management Practices to be incorporated into design include: o Infiltration chambers or leaching basins with pre-treatment o Vegetative strips o Oil/Water separators ♦ Updates to Airport's MSGP SWPPP and SPCC plans, as necessary. ♦ Groundwater monitoring to track PFAS plume at Airport. ♦ Construction period stormwater management best practices	During and post construction.	Included in the overall Project cost
Wetland resource areas will be protected from direct impacts, including erosion and sedimentation, during construction. ♦ EPA NPDES Construction General Permit will be obtained for each project and a construction period SWPPP will be developed and implemented. ♦ Work in the water of Upper Gate Pond will require the use of a coffer dam in two discrete areas. Water within the work zone encompassed by the coffer dam will need to be pumped out. This area will be pumped into straw bale basins or filter bags. The basins will consist of a ring of staked straw bales overlain by non-woven geotextile filter fabric and crushed stone. Discharge water will be pumped into the basin and allowed to drain through the fabric onto relatively-flat stabilized surfaces. ♦ Dewatering structures will be placed as far away from vegetated wetland resources as possible.	During operation	Included in the overall Project cost

Table 7.3-1 Summary of Mitigation Measures (Continued)

Mitigation Measures	Schedule	Cost
Water Resources		
♦ No fueling or lubrication of equipment will be performed within 100 feet of vegetated wetlands, streams, or vernal pools. A spill kit will be kept on site by the site contractor.		
Climate and Greenhouse Gas Emissions		
♦ New or renovated buildings will meet 2023 Stretch Energy Code measures including: o High performing envelope that complies with the 2023 Stretch code envelope performance requirements; o 100% heat pump space heating; o Energy recovery ventilation per the 2023 Stretch code update; ♦ Electric domestic hot water heating, specific method to be determined. Heat pump domestic hot water heating to be analyzed; ♦ Roof to be constructed PV-ready; ♦ Installation of electric vehicle (EV) charging spaces, quantity to be determined; ♦ EV infrastructure for additional future EV-parking spaces to be installed, quantity to be determined. ♦ 110 acres of dense forest exists north of Upper Gate Pond and Lewis Pond, Airport's forests land within this area results in 92.40 MT/C/Year in carbon sequestration.	Design and post construction	Included in the overall Project cost
Natural Resources		
♦ Recycling of asphalt for new taxiway and runway surfaces ♦ Stockpiling of excess aggregate from grading and excavation activities for use as fill material ♦ Commitment to development of a microgrid for renewable energy and storage technology ♦ Terminal improvements have committed to the current stretch code building requirements for energy efficiency and decarbonization (described above)	Ongoing, During and post-construction	Included in the overall Project cost

Table 7.3-2 Summary of Construction Period Mitigation Commitments (Continued)

Mitigation Measures	Schedule	Cost
Noise		
♦ Installation of noise barrier along the runup pad for the relocated Taxiway D adjacent to the existing runup pit ♦ Continued implementation and evaluation of voluntary noise abatement flight procedures for visual flight rules ♦ Voluntary quiet hours between 10 p.m. and 6 a.m. ♦ Voluntary avoidance of touch and go nighttime operations	Ongoing, During and post-construction	Included in the overall Project cost
♦ Multiple noise complaint reporting mechanisms including in person, over the phone or online https://flyhya.com/pilot-info/noise-abatement/) ♦ Consultation with FAA and primary Airport air taxi operators such as Cape Air on flight path and approach angle modifications for take-offs and landings that may serve to minimize noise impacts.		
Every reasonable effort will be made to minimize the noise impacts of from construction activities, including: ♦ Limiting construction to weekdays between 7 AM and 5 PM; ♦ Using appropriate mufflers on all equipment and ongoing maintenance of intake and exhaust mufflers; ♦ Muffling enclosures on continuously running equipment, such as air compressors and welding generators; ♦ Replacing specific construction operations and techniques by less noisy ones where feasible; ♦ Selecting the quietest of alternative items of equipment where feasible; ♦ Scheduling equipment operations to keep average noise levels low, to synchronize the noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels; ♦ Turning off idling equipment; and ♦ Locating noisy equipment at locations that protect sensitive locations by shielding or distance.		

Table 7.3-2 Summary of Construction Period Mitigation Commitments (Continued)

Mitigation Measures	Schedule	Cost
Biological Resources		
♦ Necessary tree removal of 8.65 acres will be accomplished during time periods appropriate for minimizing impacts to any potential bat populations outside of the summer roosting period (April through September), and optimally during the winter months (October 1 through March 31 when possible). ♦ No work will occur within NHESP mapped habitat and there will be no impacts to state-listed species. ♦ Wildlife habitat features to be incorporated into wetland replication area	Ongoing, During and post-construction	Included in the overall Project cost
Hazardous Materials		
♦ Soil, sediment, groundwater, and surface water will be managed in accordance with the requirements of the MCP. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable. ♦ At this time, it is anticipated that excess soil or sediment will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal in accordance with all local, state, and federal regulations. ♦ If soil is reused during construction, it is anticipated that the soil will be reused in the general proximity of the location of the original excavation. If excess soil is retained for future reuse, it will be placed in an area designated by the Airport for materials management. Soil placed in the Airport materials management area(s) will be covered with polyethylene sheeting to minimize potential fugitive dust or otherwise stabilized. Secondary containment such as berms or hay bales will be installed, as necessary, to prevent sediment in runoff from leaving the material management area. ♦ Groundwater and surface water will either be treated and discharged to surface water in accordance with requirements of the NPDES DRGP, recharged in accordance with local, state, and federal regulations, or collected and transported offsite for disposal. ♦ Existing PFAS disposal site caps will not be altered or impacted.	Ongoing, During and post-construction	Included in the overall Project cost

Table 7.3-2 Summary of Construction Period Mitigation Commitments (Continued)

Mitigation Measures	Schedule	Cost
Hazardous Materials		
♦ Excavation and management of soil contaminated with, or potentially contaminated with, OHM will be conducted in general accordance with Response Action Performance Standards (RAPS) as defined in the MCP (310 CMR 40.0191). ♦ Construction projects to be completed in accordance with requirements of Massachusetts Contingency Plan provisions for the various response actions across the Airport ♦ Groundwater and surface water will either be treated and discharged to surface water in accordance with requirements of the NPDES DRGP, recharged in accordance with local, state, and federal regulations, or collected and transported offsite for disposal. ♦ excess soil or sediment will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal.		
Air Quality		
Measures to mitigate construction-related air quality impacts will include: ♦ Using wetting agents on areas of exposed soil on a scheduled basis; ♦ Using covered trucks; ♦ Minimizing spills on the construction site; ♦ Monitoring actual construction practices to ensure that unnecessary transfers and mechanical disturbances of loose materials are minimized; ♦ Minimizing storage of debris on the Project site; ♦ Periodic street and sidewalk cleaning with water to minimize dust accumulations; and ♦ The contractor will comply with the National Emission Standards for Hazardous Pollutants (NESHAP) throughout demolition and construction activities. ♦ Using equipment retrofitted with diesel emissions control devices. The Proponent will specify during the procurement of the subcontractors, that the majority of the heavy equipment operating on the Project site be retrofitted with diesel emissions control devices;	During construction.	Included in the overall Project cost

Table 7.3-2 Summary of Construction Period Mitigation Commitments (Continued)

Mitigation Measures	Schedule	Cost
Air Quality		
♦ Maintaining an "idle free" work zone of fossil fuel trucks and equipment by providing supplemental hoisting and pumping equipment along with "just-in-time" delivery methods. On-site idling will be limited to five minutes. "Do Not Idle" signs will be posted at appropriate locations; ♦ By locating combustion engines away from sensitive receptors such as fresh air intakes, air conditioners and windows; and ♦ Using Ultra Low Sulfur Diesel for all trucks and construction machinery as required by the US EPA.		
Stormwater Management		
For construction period stormwater management: ♦ Each project disturbing greater than 1 acre will develop a Stormwater Pollution Prevention Plan (SWPPP) that complies with the EPA construction general permit for stormwater discharges will be developed. ♦ Construction will be planned so that disturbed areas are minimized to the extent feasible ♦ Sedimentation and erosion controls will be incorporated into design and construction practices.	Before and during construction	Included in the overall Project cost
Historical, Archeological, and Cultural Resources		
♦ Protection of archeological sites during construction will include: ♦ Construction personnel briefing; ♦ High visibility fencing with No Trespassing signs around the sensitive cultural resource areas to be protected. ♦ Pre-and post-construction inspections.	Before and during construction	Included in the overall Project cost
Traffic and Transportation		
Construction period traffic will be managed to minimize off-airport impacts including the following: ♦ The Proponent will coordinate with the Town of Barnstable to discuss transportation-related construction-period impacts; ♦ Designated truck routes will be established to govern how trucks access the Project sites;	Before and during construction	Included in the overall Project cost

Table 7.3-2 Summary of Construction Period Mitigation Commitments (Continued)

Mitigation Measures	Schedule	Cost
Traffic and Transportation		
♦ Police detail officers will be used as necessary and as required by the towns to facilitate and maintain safe and efficient passage of vehicles and pedestrians during construction; ♦ Prior to the start of construction, the general contractor will submit a Construction Period Traffic Management Plan to the Town. The plan will identify designated construction truck routes and any temporary roadway improvements necessary to accommodate truck traffic, while maintaining safe and efficient passage for vehicles, pedestrians, and bicyclists; ♦ The Proponent will avoid full or partial street closures to the extent possible. Should a partial street closure be necessary to accommodate materials transport or construction-related activities, the closure will be limited to off-peak hours; and		
♦ Parking for construction workers will be provided within the Project site, and workers will be prohibited from parking along adjacent roadways.	Before and during construction	Included in the overall Project cost
♦ Evaluation of traffic demand management opportunities ♦ Electric Vehicle charging stations and providing electrical conduit for future EV stations	Post construction.	Included in the overall Project cost
EJ & Public Health		
♦ The Project is consistent with the MEPA Public Involvement Protocol for Environmental Justice Populations (effective date of January 1, 2022). Public participation will meet or exceed the requirements of the EJ Policy. ♦ The Project has made and will continue to make diligent effort to promote public participation opportunities for all members of the public, including those with limited English proficiency (see Table 9.2-1).	Prior to and during construction	Included in the overall Project cost
The Project is also consistent with the MEPA Interim Protocol for Analysis of Project Impacts on Environmental Justice Populations (effective date of January 1, 2022). An enhanced analysis of potential impacts to all populations, including EJ populations, has been conducted and mitigation measures identified (see section 5.16.2). Impacts are anticipated to primarily result from construction-related activities. They will be temporary and minimized through several measures described above under traffic, air quality, and noise.	During construction	Included in the Project cost

Table 7.3-2 Summary of Construction Period Mitigation Commitments (Continued)

Mitigation Measures	Schedule	Cost
The Project will promote climate change resiliency and minimize potential effects from climate change to surrounding communities including EJ populations. The Airport has adopted several green initiatives to reduce greenhouse gas emissions including installation of EV charging stations and will install a stormwater management system designed to reduce runoff and flooding.	During construction and operation	Included in the Project cost

Chapter 8.0

Regulatory Compliance

8.0 REGULATORY COMPLIANCE (MEPA)

8.1 Summary of Regulatory Compliance

A number of regulatory agencies will review the proposed Project. Federal agencies that will be involved include the Federal Aviation Administration and U.S. Environmental Protection Agency. State programs will include several divisions within the MA Department of Environmental Protection along with the Massachusetts Department of Transportation Aeronautics Division. No further review by MA Natural Heritage and Endangered Species Program is anticipated to be required.

The Project triggers review as a Development of Regional Impact (DRI) under the Cape Cod Commission Act and as such the project must be consistent with the CCC's Regional Policy Plan. Local review will be conducted by the Barnstable Planning Board, Conservation Commission, and Board of Health.

This section summarizes the specific regulatory programs and performance standards that are applicable to the Project and describes how the project meets those performance standards.

Table 8-1 List of Federal, State and Local Permits

Agency Name	Permit or Action
Federal	
Environmental Protection Agency	Coverage under National Pollutant Discharge Elimination System (NPDES) Construction Activities Permit
	Sole Source Aquifer Review
Federal Aviation Administration (FAA), U.S. Army Corps of Engineers; Tribal Consultation; State Historic Preservation Officer (SHPO)	Review under Section 106 of the National Historic Preservation Act (36 CFR 800)
FAA	Federal Aviation Administration (FAA) planning, design, and safety Standards: AC 150/5300-13B Airport Design, Part 77
Department of Interior, U.S. Fish and Wildlife Service (USFWS)	Section 7 Consultation under U.S. Endangered Species Act
State	
Massachusetts Environmental Policy Act Office ("MEPA")	MEPA Certificate
Massachusetts Department of Environment (MassDEP)	401 Water Quality Certification pursuant to Section 401 of the Clean Water Act
	Massachusetts Contingency Plan Review
	Underground Injection Control
Massachusetts Historical Commission (MHC)	State Historic Register Review (Chapter 256)
Massachusetts Office of Coastal Zone Management (CZM)	Federal Consistency Determination

Table 8-1 List of Federal, State and Local Permits (Continued)

Agency Name	Permit or Action
Regional	
Cape Cod Commission	Development of Regional Impact (DRI) determination pursuant to the Cape Cod Commission Act.
Town of Barnstable	
Barnstable Conservation Commission	Local Wetlands Ordinance Chapter 237
Barnstable Planning Department	Local Zoning Code Chapter 240

8.2 Federal Permits/Approvals

8.2.1 Federal Aviation Administration Standards

FAA design standards control matters such as penetration of airspace by fixed objects (e.g., antennas, utility poles), proximity of taxiways to runways, maneuvering of aircraft the ground both when the Air Traffic Control Tower (ATCT) is open and when it is closed, dimensions of runway safety areas, and interference with aircraft guidance systems. The purpose of the standards is to promote safe and efficient operation of Airports. The following points are important considerations for airport projects.

Part 77 primary surface: is an imaginary sloped surface extending up and out from the ends and sides of a runway; penetrations of the primary surface require a waiver of FAA standards. At HYA, the Part 77 primary surface is 1,000 feet wide, centered on the runway, and its elevation matches that of the runway. Beginning 500 feet from the runway centerline on each side, the "Part 77 transitional surface" begins and climbs at a ratio of one foot of height for every seven feet of horizontal distance to a height of 150 feet above the runway elevation. For design purposes, this means that no fixed obstructions should be at ground level within 500 feet of the runway, and a fence 9' high should be no closer than 563 feet (7X9=63) from the runway centerline (assuming the ground at the fence is at the same elevation as the runway). Higher objects must be correspondingly more distant; a 25-foot-tall building should be 675' (500+7X25) from the runway.

Taxiway separation requirements: depend on the size of planes that use the airport and the approach visibility minimums, the minimum height at which the pilot of an approaching plane must see the runway end to complete the landing. For RW 15-33 and RW 6-24, the taxiway centerline should be at least 400' distance from the runway centerline.

Runway Safety Area: is a defined surface surrounding the runway prepared or suitable for reducing the risk of damage to airplanes in the event of an undershoot, overshoot, or excursion from the runway.

Runway Protection Zone (RPZ) is an area off the runway end to enhance the protection of people and property on the ground.

Runway Object Free Area (ROFA) / Taxiway Object Free Area (TOFA) is an area on the ground centered on a runway or taxiway provided to enhance the safety of aircraft operations by having the area free of objects, except for objects that need to be located in the Object Free Area for air navigation or aircraft ground maneuvering purposes.

A glide slope antenna is a navigation device that beams out to approaching aircraft the proper glide slope to maintain for a safe landing. Many but not all aircraft have avionics equipment in the cockpit to "read" and interpret this beam for the pilot. Following the graphic symbols used by the equipment, pilots will adjust their angle of approach if they stray above or below the signal thus sent out. This navigation aid is critical in inclement weather conditions when visibility is restricted.

A glide slope antenna has a defined critical area around it. Since the signal transmitted by the antenna may be affected and altered by nearby metallic objects, this critical area establishes safe distances insuring the proper operation of the device. In circumstances where a taxiway crosses a glide slope antenna field, the taxiway pavement is marked with a defined "hold line." Before proceeding beyond this point during periods when the ATCT is open, the pilot must be granted specific instructions to proceed by ATCT personnel, who are monitoring approaching aircraft. When clearance is given, the pilot then proceeds into the critical area to the takeoff point.

When the ATCT tower is closed, it is the responsibility of the pilot on the taxiway to monitor radio traffic to ascertain whether there are any aircraft on final approach to the runway end served by the glide slope antenna. If so, that aircraft must land before the pilot can proceed through the critical area to the runway end for takeoff. At HYA, there is a glide slope antenna field east of the RW 24 end, and one north of the RW 15 end.

A **localizer antenna** is an antenna that provides horizontal (directional) control for airplanes making instrument landings. At HYA, localizer antennas south of RW 6 end and east of RW 33 end, to provide guidance to aircraft approaching for landing on RW 24 and RW 15. Each localizer antenna has a critical area 250' in diameter around it.

8.2.2 Airport Layout Plan Approval

FAA is responsible for considering the environmental impacts of proposed FAA approvals of Airport Layout Plan (ALP) modifications (regardless of funding sources), FAA-funded airport actions, and ensuring compliance with NEPA requirements and other Federal environmental laws, regulations, and orders. FAA personnel must comply with the NEPA requirements in Order 1050.1F, supplemented by the current version of FAA Order 5050.4, *National Environmental Policy Act (NEPA) Implementing Instructions for Airport Projects*.

8.2.3 National Environmental Policy Act and the Council on Environmental Quality Regulations

NEPA the CEQ Regulations establish a broad national policy to protect and enhance the quality of the human environment and require Federal agencies to develop programs and measures to meet national environmental goals. Section 102(2) of NEPA provides specific directions to Federal agencies on how to implement the goals of NEPA. The major provisions of NEPA include the requirement to

use a systematic, interdisciplinary approach and develop implementing methods and procedures. Section 102(2)(C) requires detailed analysis in the form of Environmental Impact Statements (EISs) for proposed major Federal actions significantly affecting the quality of the human environment. The CEQ Regulations additionally provide for Environmental Assessments (EAs) to assist agencies in determining whether potential environmental impacts are significant and Categorical Exclusions (CATEXs), which are categories of actions that the FAA has determined, based on previous experience, do not have significant individual or cumulative impact on the quality of the human environment except in extraordinary circumstances. The CEQ Regulations direct Federal agencies to list all Federal permits, licenses, and other approvals that must be obtained in implementing the proposed action, and, to the fullest extent possible, integrate compliance with such requirements with the NEPA process.

8.2.4 Clean Water Act, Section 404

Section 404 of the Clean Water Act (CWA) regulates the discharge of dredged or fill materials into the Waters of the United States (waters of the U.S.), including adjacent wetlands. Any discharge of dredged or fill material into Waters of the U.S. and/or adjacent wetlands within the project will require approval from the U.S. Army Corps of Engineers (USACE) in accordance with Section 404 of the CWA. For the purposes of this document, based on recent rule issued by EPA on the definition of the waters of the U.S.[1], the ponds and associated wetlands on Airport do not appear to be jurisdictional under Section 404.

8.2.5 Section 7 of the Endangered Species Act

The purpose of the U.S. Endangered Species Act (ESA) is to protect and recover imperiled species and the ecosystems upon which they depend. It is administered by the Interior Department's U.S. Fish and Wildlife Service (USFWS) and the Commerce Department's National Marine Fisheries Service (NMFS). The USFWS has primary responsibility for terrestrial and freshwater organisms, while the responsibilities of NMFS are mainly marine wildlife such as whales and anadromous fish species. Under the ESA, species may be listed as either endangered or threatened. "Endangered" means a species is in danger of extinction throughout all or a significant portion of its range. "Threatened" means a species is likely to become endangered within the foreseeable future. The ESA protects endangered and threatened species and their habitats by prohibiting the "take" of listed animals and the interstate or international trade in listed plants and animals, including their parts and products, except under Federal permit.

Before initiating an action, under Section 7 of the ESA the Federal agency (i.e., FAA) must coordinate with the USFWS as to the species that may be within their action area. If a listed species is present, the Federal agency must determine whether the project may affect it. If so, consultation may be required. During consultation, the "action" agency receives a "biological opinion" or concurrence letter addressing the proposed action. If the action agency determines (and the USFWS agrees) that the project is not likely to adversely affect a listed species or designated critical habitat, and the

[1] Revised Definition of "Waters of the United States" 88 Fed. Reg. 3004 (January 18, 2023) (to be codified at 33 CFR 328, 40 CFR 120)

USFWS concurs in writing, then the consultation (informal to this point) is concluded. Initial consultation regarding the American chaffseed resulted in a "no effect" determination. Initial consultation with regards to the Northern Long-eared Bat resulted in a "may effect" and consultation will continue with construction period specifics to be provided to USFWS.

8.2.6 Section 106 of the National Historic Preservation Act

Section 106 of the National Historic Preservation Act of 1966 requires Federal agencies to consider the effects of their projects on properties that are listed in, or are eligible for listing in, the National Register of Historic Places. The lead Federal agency for a project must determine whether any property located within the project's Area of Potential Effect (APE) is listed in, or may be eligible for listing in, the National Register. The APE for archaeological resources is defined as locations where the proposed project may alter or disturb surface and/or subsurface soils that contain, or have the potential to contain, archaeological sites. For the purposes of Section 106, FAA is the lead Federal Agency and the process will be administered on the state level by the State Historic Preservation Officer (Massachusetts Historical Commission.

The Barnstable Historical Commission was included in the distribution of the ENF. Per MHC comment letter, the Proponent is in the process of preparing an avoidance plan to be submitted to MHC for review prior to any land disturbing project which will likely result in a "no effect" determination. FAA will initiate consultation with the Tribal Historic Preservation Officers.

8.2.7 National Pollutant Discharge Elimination System (NPDES) – Construction General Permit

The NPDES Construction General Permit (CGP) authorizes stormwater discharges from construction activities that result in a total land disturbance of equal to or greater than one acre, where those discharges enter Waters of the U.S. or a municipal separate storm sewer system (MS4) leading to Waters of the U.S. subject to the conditions set forth in the CGP. Constructing the proposed improvements will alter more than one acre of land and stormwater may be discharged to Waters of the U.S.; therefore, compliance with the CGP is required.

As part of the Notice of Intent Form, the Airport must certify that it has developed and will implement a Stormwater Pollution Prevention Plan (SWPPP) during construction. The SWPPP describes measures that will be taken during construction to ensure that construction activities do not cause impact to wetlands and water resources. These include structural measures to temporarily store runoff and trap sediment; an inventory of hazardous materials used during construction and measures to prevent a spill; schedule for inspecting measures; and contact information for personnel responsible for implementing the SWPPP.

- Silt fences and/or hay bales will be located along the edges of the construction area.
- Disturbed portions of the site where construction activity will cease temporarily for 21 or more will be stabilized with temporary seed, mulch or geotextiles.
- Stockpiles will be located as far away from wetland resource areas as is practical with a minimum distance of 100 feet unless otherwise authorized.

- Runoff water will be intercepted and directed from work areas to appropriate sediment traps.
- Inlets to active catch basins will be protected from sedimentation by hay bales.
- During construction, all potential contaminants will be stored, handled and disposed of so that accidental releases to the environment are avoided. Spill prevention and control measures will be implemented consistent with the Airport's Spill Prevention, Control and Countermeasure Plan (SPCCP), and will include measures to prevent spills, provide emergency response measures and training of all construction personnel.
- All refueling activities and equipment maintenance activities will be conducted on impervious area, with containment. Equipment maintenance in the field will be limited to the minimum necessary to keep equipment functioning (i.e., greasing of fittings and joints).
- All erosion and sediment control measures will be maintained in effective operating condition. Regular inspections of the controls will be conducted and documented. Inspections will be conducted after significant rainfall events to ensure that sediment control measures are functioning as intended.
- Permanent site stabilization (e.g., planting and seeding) will be undertaken upon completion of the applicable project phase. After the entire site is permanently stabilized, temporary erosion and sediment control measures will be removed.
- All measures outlined in FAA AC 150/5370-10A Standards for Specifying Construction of Airports will be incorporated into project plans and specifications.

8.3 State Permits and Approvals

8.3.1 Massachusetts Wetlands Protection Act (M.G.L. c.131, s.40; 310 CMR 10.00)

The Massachusetts Wetlands Protection Act (WPA) regulates alteration of state jurisdictional wetland resource areas and the Massachusetts Wetlands Protection Act Regulations (WPA Regulations) identify wetland resource areas subject to protection and outline the regulations for work in these wetland resource areas. Although a state law, the WPA is administered at the local level by the municipal Conservation Commission. Areas subject to protection within the project site include the Upper Gate Pond, associated Bordering Vegetated Wetlands and other state wetland resource areas as described in Section 5.4. Generally speaking, the WPA requires the preparation of a Notice of Intent (NOI) for work within a wetland resource area and/or work within 100 feet of certain wetland resource areas (i.e., the 100-foot Buffer Zone). The performance standards for work or activities occurring within each state regulated wetland resource area are identified in the WPA regulations.

A NOI will be prepared and submitted to the Barnstable Conservation Commissions for activities within areas subject to protection under the WPA requesting an Order of Conditions. The NOI will be submitted following receipt of the Final Certificate from MEPA on the EIR and the Decision on the DRI. See Section 5.4 of this DEIR for more detail regarding onsite wetland resources, Section 6.1 for anticipated wetland alteration and Section 7.0 for proposed mitigation measures.

8.3.1.1 Compliance with Wetlands Protection Act Regulations and Performance Standards

Work in BVW consists of grading and fill associated with the relocation of Taxiway D totaling 4,600 sf associated with BVW along the southern edge of Upper Gate Pond.

Bordering Vegetated Wetlands

310 CMR 10.55(4)(a) – Where the presumption set forth in 310 CMR 10.55(3) is not overcome, any proposed work in a Bordering Vegetated Wetland shall not destroy or otherwise impair any portion of said area.

See 310 CMR 10.55(4)(b) below.

310 CMR 10.55(4)(b) - Notwithstanding the provisions of 310 CMR 10.55(4)(a), the issuing authority may issue an Order of Conditions permitting work which results in the loss of up to 5,000 square feet of Bordering Vegetated Wetland when said area is replaced in accordance with the following general conditions and any additional, specific conditions the issuing authority deems necessary to ensure that the replacement area will function in a manner similar to the area that will be lost:

1. The surface of the replacement area to be created (the replacement area) shall be equal to that of the area that will be lost (the lost area);

A wetland replication area of at least 4,600 sf, a ratio of replication of 1:1 will be designed in accordance with this standard.

2. The ground water and surface elevation of the replacement area shall be approximately equal to that of the lost area;

The proposed replication area will be designed so that the ground water and surface elevations are approximately equal to those of the lost area.

The overall horizontal configuration and location of the replacement area with respect to the bank shall be similar to that of the lost area;

A replication area will be located within the same wetland complex and hydrologic system as the impacted wetland resource. The site was selected to provide on-Airport, in-kind wetland mitigation. The horizontal configuration of the wetland mitigation area will be designed to approximate that of the BVW impact area to the extent feasible.

3. The replacement area shall have an unrestricted hydraulic connection to the same waterbody or waterway associated with the lost area;

The proposed wetland replication area would have an unrestricted hydraulic connection to the contiguous BVW system on the Airport. The impact area is along the border of Upper Gate Pond. The primary hydrologic input to the wetland replication area would be derived from the same existing surface water and rainfall sources that currently contribute to the BVW impact area.

4. The replacement area shall be located within the same general area of the water body or reach of the waterway as the lost area;

The proposed wetland replication area will be located within the same general area of the lost area to the extent feasible.

At least 75% of the surface of the replacement area shall be reestablished with indigenous wetland plant species within two growing seasons, and prior to said vegetative reestablishment any exposed soil in the replacement area shall be temporarily stabilized to prevent erosion in accordance with standard U.S. Soil Conservation Service methods;

The wetland replication plan would be designed to create a shrub scrub habitat within two growing seasons, providing a minimum of 75 percent surface coverage with indigenous wetland plant species. Exposed substrates would be protected against erosion until re-establishment of wetland vegetation occurs. Exposed soils would be temporarily stabilized using straw mulch or other appropriate erosion control measures in the event that seasonal conditions result in a delay in seeding. Following final grading, an entrenched staked haybale and silt fence barrier would be installed around the outside perimeter of the wetland replication area, as necessary. In addition, the replication area would be monitored during at least two complete growing seasons by a qualified Wetland Scientist as is typically required by an Order of Conditions.

5. The replacement area shall be provided in a manner which is consistent with all other General Performance Standards for each resource area in Part III of 310 CMR 10.00.

The proposed replacement area is being provided in a manner that is consistent with all other General Performance Standards. More specifically, construction of the replacement area would occur in the buffer zone to BVW and would not alter other resource areas.

310 CMR 10.55(4)(d) - Notwithstanding the provisions of 310 CMR 10.55(4)(a),(b) and (c), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

This standard is not applicable. The Preferred Alternative site is not located in Estimated Habitat.

310 CMR 10.55(4)(e) Any proposed work shall not destroy or otherwise impair any portion of a Bordering Vegetated Wetland that is within an Area of Critical Environmental Concern designated by the Secretary of Energy and Environmental Affairs under M.G.L. c. 21A, § 2(7) and 301 CMR 12.00: Areas of Critical Environmental Concern. 310 CMR 10.55(4)(e):

1. supersedes the provisions of 310 CMR 10.55(4)(b) and (c);
2. shall not apply if the presumption set forth at 310 CMR 10.55(3) is overcome;

3. shall not apply to work proposed under 310 CMR 10.53(3)(l); and

6. shall not apply to maintenance of stormwater detention, retention, or sedimentation ponds, or to maintenance of stormwater energy dissipating structures, that have been constructed in accordance with a valid order of conditions.

The Airport is not located within an Area of Critical Environmental Concern (ACEC) and therefore complies with this Standard.

1. Land Under Water

According to 310 CMR 10.56 (4)(a), "any proposed work within LUW shall not impair the following:

(1) The water carrying capacity within the defined channel, which is provided by said land in conjunction with the banks;

As the impacted bank is associated with a pond and thus does not have a defined channel, water carrying capacity will not be impeded.

(2) Ground and surface water quality

Appropriate sediment control methods would be utilized during installation of the taxiway slope — excavation, dewatering, fill installation placement processes.

(3) The capacity of said land to provide breeding habitat, escape cover and food for fisheries;

The Proposed Action would provide similar habitat as to the impacted areas through native plantings along the new bank of Upper Gate Pond created by the slope construction.

(4) The capacity of said land to provide important wildlife habitat functions.

The Proposed Action would permanently impact 12,700 sf of LUW. This is a small percentage of the LUW, and open water habitat present among Upper Gate Pond and other ponds at the Airport including Lewis Pond and Mary Dunn Pond. Additionally, based on existing field investigations, the area of impact is shallow and heavily impacted by sediment, aquatic vegetation, and fluctuating water levels and unlikely to provide suitable habitat for fisheries. Therefore, this Proposed Action would not significantly alter the habitat available in this area.

(b) Notwithstanding the provisions of 310 CMR 10.56(4)(a), the issuing authority may issue an Order in accordance with M.G.L. c.131, §40 to maintain or improve boat channels within Land Under Water Bodies and Waterways when said work is designed and carried out using the best practical measures so as to minimize adverse effects such as the suspension or transport of pollutants, increases in turbidity, the smothering of bottom organisms, the accumulation of pollutants by organisms or the destruction of fisheries habitat or nutrient source areas.

The Proposed Action does not involve maintenance or improvement of boat channels; therefore, this standard does not apply.

(c) Notwithstanding the provisions of 310 CMR 10.56(4)(a) or (b), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

According to current mapped habitat identified by the NHESP, no Estimated habitats exist within the Preferred Alternative area. Therefore, the Preferred Alternative would comply with this standard.

2. Inland Bank

The Preferred Alternative's impacts to Inland Bank are 300 lf along the bank of Upper Gate Pond. This bank would be re-created along the toe of slope of the new taxiway embankment.

WPA Regulations (310 CMR 10.54(4)(a) stipulate that *"any proposed work on a Bank shall not impair the following:"*

1. the physical stability of the Bank;

This Preferred Alternative would create permanent impacts to bank during Taxiway D construction. All temporary impacts would be restored in place.

2. the water carrying capacity of the existing channel within the Bank;

The Preferred Alternative does not have an impact on water carrying capacity within a channel. This standard is not applicable.

3. ground water and surface water quality;

The Preferred Alternative would serve to improve ground and surface water quality by improving stormwater management facilities within the Proposed Action area to the extent feasible.

4. the capacity of the bank to provide breeding habitat, escape cover and food for fisheries;

The Preferred Alternative would not impair the capacity of the Bank to provide breeding habitat, escape cover, and food for fisheries. Bank restoration in kind would occur upon the completion of construction and would provide a wider variety of native species and plantings than currently exist.

5. the capacity of the Bank to provide important wildlife habitat functions. A project or projects on a single lot, for which Notice(s) of Intent is filed on or after November 1, 1987, that (cumulatively) alter(s) up to 10% or 50 feet (whichever is less) of the length of the bank found to be significant to the protection of wildlife habitat, shall not be deemed to impair its capacity to provide important wildlife habitat functions. Additional alterations beyond the above thresholds may be permitted if they will have no adverse effects on wildlife habitat, as determined by procedures contained in 310 CMR 10.60.

A Wildlife Habitat Evaluation will be prepared to evaluate the proposed work on 300 lf of Bank. The intent would be to replicate wildlife habitat functions within the wetland replication area as well as the re-created bank of the pond at the toe of slope of the new taxiway.

310 CMR 10.54(4)(b)

WPA Regulations (310 CMR 10.54(4)(b)) state that "Notwithstanding the provisions of 310 CMR 10.54(4)(a), structures may be permitted in or on a bank when required to prevent flood damage to facilities, buildings and roads constructed prior to the effective date of 310 CMR 10.51 through 10.60 or constructed pursuant to a Notice of Intent filed prior to the effective date of 310 CMR 10.51 through 10.60 (April 1, 1983), including the renovation or reconstruction (but not substantial enlargement) of such facilities, buildings and roads, provided that the following requirements are met:

1. The proposed protective structure, renovation or reconstruction is designed and constructed using best practical measures so as to minimize adverse effects on the characteristics and functions of the resource area;

The Preferred Alternative does not propose any structures on the Bank. This standard is not applicable.

2. The applicant demonstrates that there is no reasonable method of protecting, renovating or re-building the facility in question other than the one proposed.

The Preferred Alternative does not propose any structures on the Bank. This standard is not applicable.

310 CMR 10.54(4)(c)

Notwithstanding the provisions of 310 CMR 10.54(a) or (b), no project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species, as identified by procedures established under 310 CMR 10.59.

This standard is not applicable. There are no mapped Estimated Habitat of Rare Species on the Proposed Action site (NHESP, 2021).

8.3.2 401 Water Quality Certification Program (314 CMR 9.00)

Section 401 of the Clean Water Act requires that states certify that Federal actions will not prevent the attainment of state water quality criteria. The proposed airport improvements will involve work in Waters of the U.S. and associated wetlands, thereby requiring a permit from the USACE per Section 404. Consequently, a Water Quality Certification is required from MassDEP per 314 CMR 9.00. For minor impact projects, i.e., projects that alter less than 5,000 square feet of federal and state jurisdictional wetlands and/or involve dredging less than 100 cubic yards of material and receive an Order of Conditions (wetlands permit) per the Massachusetts Wetlands Protection Act, no individual Water Quality Certification is needed. For projects that exceed those thresholds, an Individual Water Quality Certification is needed from MassDEP.

Constructing the proposed Airport improvements will require work in state wetlands and waterways and will exceed the above thresholds and require an Individual Water Quality Certification. Estimates of the total area of wetland resources that will be altered are greater than 5,000 square feet (see Section 6.1.2.3). Therefore, a Section 401 Water Quality Certification permit will be required.

Whereas this is a state permit, and the project requires MEPA review, the MassDEP cannot issue the WQC until the Final Certificate on the EIR is issued. The MassDOT anticipates submitting the WQC after MEPA and CCC review is complete.

8.3.2.1 Massachusetts Stormwater Regulations (314 CMR 9.06)

Massachusetts Stormwater Regulations found in 314 CMR 9.06, establish stormwater standards as a regulatory requirement. These standards were developed to regulate the quantity (flow) of stormwater runoff from project sites as well as stormwater quality. The proposed improvements will require stormwater runoff control features and will need to comply with the standards to the maximum extent practicable for areas considered to be redevelopment. Stormwater management measures will comply with the Standards fully for areas considered to be new development. These provisions are reviewed by the Conservation Commission pursuant to the WPA and MassDEP via WQC application review.

See Section 6.1.2 – Stormwater Management for a discussion of stormwater assessment, best management practices (BMPs) and compliance with the Massachusetts Stormwater Standards.

8.3.2.2 Compliance with Criteria for the Evaluation of Application for Discharge of Dredged or Fill Material

Under 314 CMR 9.06(1) through (7), the proposed activities conform to the 401 WQC criteria as follows.

314 CMR 9.06(1) (in part) - No discharge of dredge or fill material shall be permitted if there is a practicable alternative to the proposed discharge that would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences …

The proposed impacts to Upper Gate Pond are necessary for the construction of the relocated Taxiway D, which must be designed to provide overflow contingency for major rain events. As demonstrated in Section 4.1 (Alternatives Analysis), several alternatives were assessed for the drainage system design, and the proposed drainage system was determined to be the most feasible and least impactful alternative.

314 CMR 9.06(2) - No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps have been taken which will avoid and minimize potential adverse impacts to the bordering or isolated vegetated wetlands, land under the water or ocean, or the intertidal zone. For discharges to bordering or isolated vegetated wetlands, such steps shall include a minimum of 1:1 restoration or replication. The Department may waive the requirement for 1:1 restoration or replication for projects which will restore or otherwise improve the natural capacity of any wetland

or other water of the Commonwealth pursuant to 314 CMR 9.06(8). However, no such project may be permitted which will have any adverse effect on specified habitat sites of rare vertebrate or invertebrate species as specified in 310 CMR 10.00.

The Project is not located within NHESP-mapped habitat.

314 CMR 9.06(3)(a) through (k) (in part) – No discharge of dredged or fill material shall be permitted to Outstanding Resource Waters, except for the activities specified in 314 CMR 9.06(3)(a) through (k), which remain subject to an alternatives analysis and other requirements of 314 CMR 9.06 and/or 314 CMR 9.07 …

This criterion is not applicable. No discharge of dredged or fill material is proposed within vernal pools or other Outstanding Resource Waters.

314 CMR 9.06(4) – Discharge of dredged or fill material to an Outstanding Resource Water specifically identified in 314 CMR 4.06(1)(d) (e.g., vernal pools, within 400 feet of a water supply reservoir and any other areas so designated) is prohibited as provided therein unless a variance is obtained under 314 CMR 9.08.

This criterion is not applicable. No discharge of dredged or fill material is proposed within an Outstanding Resource Water per 314 40.06(1)(d).

314 CMR 9.06(5) – No discharge of dredged or fill material is permitted for the impoundment or detention of stormwater for purposes of controlling sedimentation or other pollutant attenuation. Discharge of dredged or fill material may be permitted to manage stormwater for flood control purposes only where there is no practicable alternative and provided that best management practices are implemented to prevent sedimentation or other pollution. No discharge of dredged or fill material is permitted for the impoundment or detention of stormwater in Outstanding Resource Waters for any purpose.

The Project does not involve a discharge of fill material in a wetland for the impoundment or detention of stormwater for purposes of controlling sedimentation or other pollutant attenuation.

314 CMR 9.06(6)(a) through (f) (in part) – Except as otherwise provided in 314 CMR 9.06(6), stormwater discharges shall be provided with stormwater best management practices to attenuate pollutants and to provide a setback from the receiving water or wetland in accordance with the following Stormwater Management Standards as further defined and specified in the Massachusetts Stormwater Handbook …

Stormwater discharges during construction will be managed in accordance with MassDEP's Stormwater Standards that were incorporated into the WQC regulations on January 2, 2008 at 314 CMR 9.06(6). The Project, as a redevelopment project, will comply with the Stormwater Standards to the maximum extent practicable. A summary of the proposed stormwater management system is discussed in Section 6.1.2.

314 CMR 9.06(7) – No discharge of dredged or fill material shall be permitted in the rare circumstances where the activity meets the criteria for evaluation but will result in substantial adverse impacts to the physical, chemical, or biological integrity of surface Waters of the Commonwealth.

The Project will not result in substantial adverse impacts on the physical, chemical, or biological integrity of surface Waters of the Commonwealth.

8.3.3 Massachusetts Endangered Species Act (M.G.L c.131A; 321 CMR 10.00)

The Massachusetts Endangered Species Act (MESA) prohibits the "take" of any rare plant or animal species listed as Endangered, Threatened, or of Special Concern by the Massachusetts Division of Fisheries & Wildlife (DFW). "Take" is defined in the Act as to harass, harm, pursue, hunt, shoot, hound, kill, trap, capture, collect, process, disrupt the nesting, breeding, feeding or migratory activity of an animal or to collect, pick, kill, transplant, cut or process a plant.

Consultation with the Massachusetts Natural Heritage and Endangered Species Program (NHESP) within the DFW, has identified the presence of MESA listed species on the Airport, although not in the project area, see Section 5.4 for more details.

When projects involve MESA review and also require approval pursuant to the Massachusetts Wetlands Protection Act, MESA review can be initiated by submitting the NOI (wetland permit application) to DFW. Through this review, the DFW will determine whether a Take Permit is required.

Coordination and review of this work by the DFW is anticipated to occur during MEPA review. As no work is proposed within mapped Priority Habitat, further permitting under MESA is not anticipated.

8.3.4 Massachusetts Environmental Policy Act

The project is undergoing MEPA review and is subject to a mandatory EIR pursuant to 301 CMR 11.03(1)(a)(1)5 and 11.03(1)(a)(2) because it requires Agency Actions and will result in direct alteration of 50 or more acres of land and creation of 10 or more acres of impervious area, respectively. The project is also required to prepare an EIR pursuant to 301 CMR 11.06(7)(b) because it is located within a DGA (1 mile) around one or more EJ Populations. The project exceeds ENF thresholds at 11.03(6)(b)(3) for expansion of an existing runway at an airport, 11.03(6)(b)(4) for construction of a New taxiway at an airport, and 11.03(3)(b)(1)(f)6 for alteration of one-half or more acres of other wetlands (LUW). The project requires a Section 401 Water Quality Certification (WQC) from the Massachusetts Department of Environmental Protection (MassDEP). It is subject to the MEPA GHG Emissions Policy and Protocol.

8.3.5 Massachusetts Underground Injection Program

The purpose of the MassDEP Underground Injection Control regulations, provided in 310 CMR 27.00, is to protect underground sources of drinking water by regulating the underground injection of hazardous wastes, fluids used for extraction of minerals, oil, and energy and any other fluids having potential to contaminate groundwater as required by the Federal Safe Drinking Water Act. Based

on future project designs (not completed until later project phases, i.e., permitting) details of the stormwater system will be reviewed to determine whether an underground injection permit from DEP will be required for any proposed stormwater treatment systems

8.3.6 Massachusetts Contingency Plan

Massachusetts General Law Chapter 21E is regulated through the Massachusetts Continency Plan (310 CMR 40.000 as implemented by MassDEP. The MCP creates the program for required assessment, risk assessment and remediation of oil and hazardous materials contamination. The MCP establishes the process regulating the assessment and remediation of oil and hazardous materials.

Since a portion of the proposed Projects will be performed in portions of an open MassDEP Disposal Site (see Section 6.13 for discussion of which sites) and there is potential for encountering residual contamination from closed releases, soil and groundwater will be managed in accordance with requirements of the MCP. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable. All activities and submittals will be done in coordination with the Airport's Licensed Site Professional of Record to ensure compliance with all existing managed sites.

8.3.7 Massachusetts Coastal Zone Management Policies'

The MA Office of Coastal Zone Management is being asked to comment on this document relative to the consistency of the project with Massachusetts Coastal Policies. Specifically, the project will be reviewed to ensure that it conforms with policies for water quality, habitat, protected areas, coastal hazards, port and harbor infrastructure, public access, energy, and ocean resources, which are embodied in relevant state regulations. Each coastal policy is listed below and discussed relative to the proposed project.

The following Massachusetts Coastal Program Policies apply to the Projects:

Coastal Hazards Policy #1

Preserve, protect, restore, and enhance the beneficial functions of storm damage prevention and flood control provided by natural coastal landforms, such as dunes, beaches, barrier beaches, coastal banks, land subject to coastal storm flowage, salt marshes, and land under the ocean.

The Airport is not located in an area that could affect water circulation or sediment transport in coastal areas and thus this resource would not be impacted by the Projects.

Coastal Hazards Policy #2

Ensure that construction in water bodies and contiguous land areas will minimize interference with water circulation and sediment transport. Flood or erosion control projects must demonstrate no significant adverse effects on the project site or adjacent or downcoast areas.

The Airport is not physically located in an area that could affect water circulation or sediment transport in coastal areas and thus this resource would not be impacted by the Projects.

Coastal Hazards Policy #3

Ensure that state and federally funded public works projects proposed for location within the coastal zone will:

- Not exacerbate existing hazards or damage natural buffers or other natural resources.
- Be reasonably safe from flood and erosion-related damage.
- Not promote growth and development in hazard-prone or buffer areas, especially in velocity zones and Areas of Critical Environmental Concern.
- Not be used on Coastal Barrier Resource Units for new or substantial reconstruction of structures in a manner inconsistent with the Coastal Barrier Resource/Improvement Acts.

The FEMA Flood Insurance Rate Maps shows the Airport is not within the 100-year floodplain (**Figure 5.4-3**). The Airport property is not at a high risk of flooding. A small amount of forested area near Mary Dunn Pond, within the Airport property boundary, is within an area with a 0.2 percent annual chance of flood hazard.

The Airport is not located within an ACEC. ACECs are designated areas across Massachusetts that receive special recognition because of the quality, uniqueness, and significance of their natural and cultural resources. These unique landscapes are identified and nominated at the community level and reviewed and designated by the state's Secretary of Energy and Environmental Affairs. This designation increases environmental oversight by increasing state permitting standards through elevated performance standards and lowering thresholds for review.

The Airport is not located within a Coastal Barrier resource. Naturally occurring vegetated buffers around sensitive wetland areas exist to varying degrees around Mary Dunn Pond and Lamson Pond and the various isolated freshwater wetlands.

Energy Policy #2

Encourage energy conservation and the use of renewable sources such as solar and wind power in order to assist in meeting the energy needs of the Commonwealth.

The Airport is committed to energy conservation and maintains two solar fields (24,640 solar panels in total) on the northern side of the property, occupying approximately 20 acres of Airport property and the adjacent Fire District property.

The solar fields generate approximately 6.7 megawatts (direct current or DC) of energy and are estimated to offset more than 5,000 tons of CO2 emissions annually. Additionally, the Airport has implemented electric vehicle charging stations in three parking lot locations; has worked with Cape Air to install roof mounted solar arrays on two leased hangers; and has purchased electric and

sustainable mowing equipment. The Airport will continue to seek opportunities, including support infrastructure for electric aircraft, that encourage energy conservation and the use of renewable sources.

Growth Management Policy #1

Encourage sustainable development that is consistent with state, regional, and local plans and supports the quality and character of the community.

Construction projects associated with the Airport Master Plan are consistent with state, regional, and local plans to maintain a vital transportation link for the Cape Cod transportation system. These include adherence to the goals and objectives of the Cape Code Commission (CCC) Regional Policy Plan (RPP), and the Town of Barnstable Local Comprehensive Plan (2010).

Growth Management Policy #2

Ensure that state and federally funded infrastructure projects in the coastal zone primarily serve existing developed areas, assigning highest priority to projects that meet the needs of urban and community development centers.

Construction associated with the Airport Master Plan will be designed to enhance safety operations and improve the economic impact of the community and Airport, such that the Airport will continue to provide a critical node in the transportation system for the Cape Cod region and beyond.

Growth Management Policy #3

Encourage the revitalization and enhancement of existing development centers in the coastal zone through technical assistance and financial support for residential, commercial, and industrial development.

Projects recommended by the Airport Master Plan are designed to enhance development within the commercial areas, including the Hyannis Gateway and Transportation Hub within the Downtown Hyannis Growth Incentive Zone to promote growth of existing commercial businesses.

Habitat Policy #1

Protect coastal, estuarine, and marine habitats—including salt marshes, shellfish beds, submerged aquatic vegetation, dunes, beaches, barrier beaches, banks, salt ponds, eelgrass beds, tidal flats, rocky shores, bays, sounds, and other ocean habitats—and coastal freshwater streams, ponds, and wetlands to preserve critical wildlife habitat and other important functions and services including nutrient and sediment attenuation, wave and storm damage protection, and landform movement and processes.

The Airport is not located within or adjacent to coastal, estuarine, or marine habitats and thus this resource is not anticipated to be impacted by the proposed Project. Measures to avoid and/or minimize impacts to the freshwater wetlands and wildlife habitat located within and immediately adjacent to the Airport are evaluated in Section 6.7.2.

Habitat Policy #2

Advance the restoration of degraded or former habitats in coastal and marine areas.

The Airport currently does not have any degraded or former habitats in coastal and marine areas. Accordingly, these resource areas would not be impacted by the proposed Projects. Minimization of impacts and restoration of the natural vegetation communities surrounding the freshwater wetland habitats are incorporated within the Project and detailed in Section 6.1.

Protected Areas Policy #1

Preserve, restore, and enhance coastal Areas of Critical Environmental Concern, which are complexes of natural and cultural resources of regional or statewide significance.

The Airport is not located within or adjacent to an ACEC and thus this resource would not be impacted by proposed projects.

Protected Areas Policy #2

Protect state designated scenic rivers in the coastal zone.

State designated scenic rivers, as depicted on the National Wild and Scenic Rivers Map, are not located on the Airport, and thus this resource would not be impacted by proposed projects.

Protected Areas Policy #3

Ensure that proposed developments in or near designated or registered historic places respect the preservation intent of the designation and that potential adverse effects are minimized.

Through the MEPA/NEPA process, federal agencies are required to consult with the State Historic Preservation Offices (SHPO) and with the Tribal Historic Preservations Offices (THPO) through the Section 106 process. Appropriate mitigation measures will be evaluated to avoid and/or minimize impacts to designated or registered historic places.

Water Quality Policy #1

Ensure that point-source discharges and withdrawals in or affecting the coastal zone do not compromise water quality standards and protect designated uses and other interests.

The proposed Projects will not contribute to existing point-source discharges or withdrawals in or affecting the coastal zone do not compromise or provide only minimal reduction in water quality standards and protect designated uses and other interests. Appropriate stormwater management measures are identified in Section 6.1.2.

Water Quality Policy #2

Ensure the implementation of nonpoint source pollution controls to promote the attainment of water quality standards and protect designated uses and other interests.

Water quality standards and measures to minimize/avoid nonpoint source pollution is identified in Section 6.2.2. For each project involving impervious surfaces, a detailed drainage system will be installed at the Airport that meets the MA Stormwater Standards. Stormwater generated from new impervious surfaces will be detained to control the 100-year flood event and prevent flood impacts. Since discharge is to "critical waters" (Zone II of public water supply, and potentially Vernal Pool), the first inch of rainfall will be treated prior to discharge.

Water Quality Policy #3

Ensure that subsurface waste discharges conform to applicable standards, including the siting, construction, and maintenance requirements for on-site wastewater disposal systems, water quality standards, established Total Maximum Daily Load limits, and prohibitions on facilities in high-hazard areas.

The Airport is in compliance with applicable standards subsurface waste discharges, including the siting, construction, and maintenance requirements for on-site wastewater disposal systems, water quality standards, established Total Maximum Daily Load limits, and prohibitions on facilities in high-hazard areas.

8.4 Regional

8.4.1 Development of Regional Impact

The Cape Cod Commission (CCC) regulates a project of a certain size or magnitude as a Development of Regional Impact. Such projects must be consistent with the minimum performance standards contained in the CCC Regional Policy Plan (RPP). The 2018 RPP, as amended in 2021, adopts goals to promote the values and purposes of the CCC Act and to protect Cape Cod's assets.

This Project will require a DRI Application to the CCC and public hearings on the application. The DRI Application will address to the extent feasible, each project's consistency with applicable goals including Natural Systems (i.e. Water Resources, Wetland Resources, Wildlife and Plant Habitat and Open Space), Built Systems (i.e. Community Design, Coastal Resiliency, Capital Facilities and Infrastructure, Transportation, Energy, Waste Management, and Climate Mitigation) and finally, Community Systems (Cultural Heritage, Economy, and Housing). The DRI application will also discuss public benefits.

Chapter 9.0

Public and Agency Coordination

9.0 PUBLIC AND AGENCY COORDINATION

9.1 Consultation with Agencies

Cape Cod Commission

Agency	Date	Notes
Cape Cod Commission	August 23, 2023	Internal meeting with FAA, MassDOT, Airport and consultant team

9.2 Public Outreach

Table 9.2-1 Summary of Communications to Community and General Public

Communications		
Date	**Format**	**Notes**
N/A	Project Website Frequently Asked Questions Project Email	https://flyhya.com/airport-info/environmental-assessment/ Posted on Project website Public is welcome to send questions to the Project email: **enviroHYA@epsilonassociates.com**
09/06/2023 09/20/2023	FAA Noise Policy Letter	Sent via Project email to gather feedback from stakeholders on aircraft noise.
6/2023	Public Access TV advertisements for June 21, 2023 meeting	Shared on: ♦ Falmouth Community Television (FCTV) ♦ Cape Cod Community Media Center ♦ Provincetown
06/16/2023	Newspaper Ad Public Notice for 06/21/2023 meeting	Run in Barnstable Patriot in English, Portuguese, and Spanish
06/07/2023	Newspaper Ad Public Notice for 06/21/2023 meeting	Run in Cape Cod Times in English, Portuguese, and Spanish
05/26/2023	Stakeholder Informational Letter	Sent to stakeholders on the Project Distribution List
03/06/2023	Stakeholder Informational Letter	Promoting 06/21/2023 meeting
12/26/2022-1/5/2023	Public Access TV advertisements for January 5, 2023 meeting	Shared on: ♦ Falmouth Community Television (FCTV) ♦ Cape Cod Community Media Center ♦ Bourne TV
12/21/2022	Stakeholder Informational Letter Public Notice for 01/05/2023 meeting	Sent via Project email to those on the Project distribution list
12/01/2022	Stakeholder Informational Letter Follow-Up on 10/27/22 Meeting	Sent via Project email to those on the Project distribution list
10/17/2022- 10/21/2022	Pop-up event to promote public meeting and flyer throughout the community	Held at the Barnstable Town Hall
10/17/2022- 10/21/2022	Postcard	Promoting 10/27/2022 meeting, translated to Spanish and Portuguese. Distributed within a 5-mile radius of the Airport.

Table 9.2-1 Summary of Communications to Community and General Public (Continued)

Communications		
10/07/2022	Press Release	Promoting 10/27/2022 meeting
10/27/2022	Project Summary Handout	Provided during 10/27/22 public meeting
10/16/2022, 10/19/2022, 10/21/2022 and an online ad every day for 2 weeks leading up to the meeting	Newspaper Ad Public Notice for 10/27/22 Meeting	Published in Cape Cod Times
10/14/2022	Newspaper Ad Public Notice for 10/27/22 Meeting	Published in Barnstable Patriot
10/12/2022	EJ Screening Forms	Translated to Spanish and Portuguese Sent to MEPA EJ Distribution List

Table 9.2-2 Summary of Public Meetings

Date Held	Meeting	Description
12/12/2023	Public Meeting #4	2:00 PM (virtual via Zoom) 6:00 PM (in-person at Town Hall)
12/1/2023	PFAS Meeting #2	6:00 PM (in-person at Town Hall)
8/7/2023	PFAS Meeting #1	6:00 PM (in-person at Town Hall) Presentation published on website
06/21/2023	Public Meeting #3	2:00 PM (virtual via Zoom) 6:00 PM (in-person at Town Hall) Meeting video published on website
01/05/2023	MEPA Site Visit and Consultation Session, Public Meeting #2	11:00 AM (in-person at Airport) 6:00 PM (virtual via Zoom)
10/27/2022	Public Meeting #1	Virtual at 6 PM Slides shared on Project website

Chapter 10.0

Response to Comments

10.0 RESPONSE TO COMMENTS

This Section provides responses to comment letters from government agencies, private organizations and others received on the ENF submitted on November 30, 2022. The comment letters are reprinted in this Section, and specific comments within each letter are noted in the margin with an abbreviation and a sequential numbering. Following the letter is a listing of the comments accompanied by a response to each.

10.1 MEPA Certificate and Associated Comment Letters

Each letter has been assigned an abbreviation; the MEPA Certificate and related comment letters are listed below in Table 10-1.

Table 10-1 Secretary's Certificate and Comment Letters

Commenter	Abbreviation
EEA Secretary's Certificate on the ENF	MEPA
Massachusetts Historical Commission (MHC)	MHC
Massachusetts Department of Environmental Protection (MassDEP) – Southeast Regional Office (SERO)	DEP
Department of Energy Resources	DOER
Cape Cod Commission	CCC
Robert Writenour, Town of Yarmouth	RW
Hyannis Park Civic Association	HPCA
Paul Phalan	PP
Susan Sulkoski	SS
Thomas Sullivan	TS
Christine Greeley	CG
Betty Ludtke	BL
Donald Englert	DE
Elissa Buja	EB
Lucinda Van Doren-Abrecht	LDA
Anonymous	AN
Richard Mikolajczak	RM
Robert Berry and Kathleen Benson	RK
Susan Ascher	SA
Susan Brita	SB
Karen Ingemie	KI
George Doble	GD

SECRETARY'S CERTIFICATE ON THE DRAFT EIR (MEPA)

MEPA 01 **The DEIR should provide a detailed description of all project activities. It should include plans of existing and proposed conditions at a legible scale that clearly identify all major project components (existing and proposed buildings, access roadways, runways, taxiways, etc.), public areas, impervious areas, subsurface utilities, surface elevations, wetland resource areas, rare species habitat, ownership of parcels including easements, and stormwater and utility infrastructure.**

A Draft EA/EIR has been developed following National Environmental Policy Act (NEPA) requirements, along with Section 11.07 of the MEPA regulations and follows the DEIR Scope dated January 23, 2023, from the MEPA office, along with extensive public input.

MEPA 02 **Conceptual plans should be provided for onsite work as well as any proposed off-site work for transportation or utility improvements that will benefit the project.**

Chapter 3 – Proposed Action Description provides information on the projects included in the Proposed Action including conceptual plans for all major project components on-site. No off-site improvements are proposed at this time.

MEPA 03 **The DEIR should clearly describe the number, location and size of existing avigation easements and proposed avigation easements that will be acquired.**

Easement plans in Appendix D include a table of information specific to each runway end. Section 3.3 discusses these proposed easement acquisitions.

MEPA 04 **It should identify any changes to activities contemplated under the Master Plan, including changes in proposed phasing or additional proposed activities, since the filing of the ENF.**

Section 1.5.1.1 and Table 1.5-1 provides a summary table describing changes to activities since the submittal of the ENF on November 30, 2022. Changes to the Project are the result of the Proponent (Airport) continuing to refine the projects proposed through conceptual design, additional need analysis, and input from the community.

Based on community input, the Airport has also investigated the feasibility of additional alternatives for the Project, including refined runway alternatives, options for an operational shift to Joint Base Cape Cod (JBCC), taxiway configurations, and airport terminal needs. As a result of this feedback, the Airport has shortened the proposed runway extension by 400 feet to address community concerns regarding noise and safety, among other modifications.

MEPA 05 **The DEIR should identify and describe applicable state, federal and local permitting and review requirements associated with the project and provide an update on the status of each of these pending actions.**

Please refer to Chapter 8, Table 8-1 for a list of federal, state and local permits

MEPA 06 **The DEIR should include a description and analysis of applicable statutory and regulatory standards and requirements, and a discussion of the project's consistency with those standards.**

Chapter 8 summarizes specific regulatory programs and performance standards that are applicable to the Project and how the project meets those performance standards.

MEPA 07 **To provide context for the proposed activities under the Master Plan, the DEIR should provide an overview of the airport's functions and activities related to GA and commercial services, with a focus on the role each of the project components plays in the operation of the airport.**

Chapter 1 provides an overview of the airport's functions and activities related to GA and commercial services, including operations and enplanement data. Chapter 2: Purpose and Need provides information on the role that each of the project components play in meeting the safety and efficiency goals of the Airport, as required by FAA and State aeronautical regulations and guidelines. Specific details on each project are provided in Chapter 3: Proposed Action Description.

MEPA 08 **It should provide a general description of airport operations, including hours of operation, conditions under which each runway is used, airplane taxiing and parking, and use of hangars and other Airport buildings.**

Please refer to Section 1.3 - Airport Background.

MEPA 09 **It should include data on past (at least for the last 15 years), current and projected levels of passenger volumes and aircraft operations on both an annual basis and for peak summer months, so as to provide a clear and full justification for the need to expand runway and taxiway capacity to accommodate projected airport and passenger growth over time.**

Please refer to Section 1.4 - Airport Activity. Additional information on activity is provided in Appendix B – Airport Master Plan Update excerpt Chapters 4-6 .

MEPA 10 **The DEIR should clarify which project components are intended to support a growth in airport operations, and how implementation of each project component will be phased to accommodate growth projections over a specified time horizon.**

Aeronautical development areas within the East Ramp, North Ramp and Terminal Building enhancements are identified within the 2022 Airport Master Plan Update as needed to support the future growth in airport operations. The Airport, under FAA regulations, is focused on operating safety and efficiency (as efficiency is related to safety). The aeronautical development areas are existing areas of the airport sited for their proximity to existing infrastructure (terminal building, ramps, and FBOs). Additional development within existing aviation development areas has been noted in previous master plans (2008), and reaffirmed in the recent Master Plan in 2022. This development responds to Airport users waiting for hangars to be built on the airfield.

Development of hangars (both size and configuration) is dependent upon a private developer's need and business plan. Any future hangar development will be subject to the Airport's *Guidelines for Construction and Alteration at Cape Cod Gateway Airport*. For over twenty years, the Airport Commission has worked with tenants to provide guidance on airport development for both new development and improvements to existing infrastructure that is either owned or leased by its tenants and associated businesses. *Guidelines for Construction and Alteration* were developed to assist tenants in receiving approvals from the Airport Commission for development projects.

MEPA 11 **It should clearly identify relevant FAA design guidelines or standards to be addressed by each project, as applicable.**

Table 1.2-1 in Section 1.2 lists the relevant design criteria and FAA Advisory Circulars (AC) including AC 150/5320-5D Airport Drainage Design AC 150/5300-13B Airport Design and AC 150/5325-4B Runway Length Requirements for relevant design guidelines and/or standards to be utilized in the design for each of the projects identified in the AMPU. Airport Drainage Design AC provides guidance to engineers, airport managers and the public about the design and construction of airport surface and subsurface storm drainage systems for airport pavements.

The Airport Design AC provides standards and recommendations for airport design. The standards contained in the aforementioned advisory circulars are standards, guidelines and practices the FAA recommends for establishing an acceptable level of safety, efficiency and capacity for airport development projects. The drainage system(s) will also be designed in accordance with the MassDEP Stormwater Handbook and subsequent permitting requirements, as may be applicable at the time of final design.

MEPA 12 **It should describe the existing terminal building and proposed expansion.**

Since the filing of the ENF, there have been minor changes to the project phasing. These updates are shown in the construction phasing discussion in Chapter 3.0. Projects that have been determined to commence later than 2029 (including design phases) have been removed from the analysis provided herein. That includes any terminal modifications or expansion as well as the Runway 6 RSA enhancements.

MEPA 13 **The alternatives analysis should be supplemented in the DEIR to provide a full comparison of environmental impacts for each category of alternatives described below.**

An alternatives analysis is provided in Chapter 4.

MEPA 14 **The ENF identifies four Airside Alternatives including the No Build, FAA Recommended Length (Alternative 2), FAA Recommend Length with Displaced Thresholds (Alternative 3), and the Preferred Alternative (as described herein). It provides a limited analysis of these alternatives which does not include plans for Alternatives 2 or 3 or a detailed comparison of impacts in a narrative or tabular format.**

An alternatives analysis is provided in Chapter 4, and a detailed comparison of runway length extension alternatives in Section 4.1.1. Since the submission of the ENF, additional analysis described Chapter 2: Section 2.2.1.4 was completed, Runway 15-33 Alternative 4B was selected as the Preferred Alternative as it meets the purpose and need of the runway length requirement.

Alternative 4B proposes an 895-foot extension only to Runway 15 end for a total runway length of 6,150 feet. This alternative includes a 695-foot displaced threshold on the Runway 15 end. Taxiway A would be extended to the new runway end and connect to Runway 15 at a 90-degree angle.

MEPA 15 **The ENF indicates that this alternative [Preferred Alternative] would add 27 acres of new impervious pavement; however, the Summary Table in the ENF also notes that the total impervious creation would be 21 acres for all proposed improvements in the Master Plan. The DEIR should confirm the total amount of impervious area creation.**

The preferred alternative includes approximately 4.94 acres of new pavement (Runway and Taxiway) as updated with the elimination of the 33-end extension. There are approximately 5.7 acres of existing pavement that will be reconstructed. Pavement to be reconstructed should not be considered as new pavement

(reconstruction of other airfield pavements will add to the area of "reconstructed pavement"). The total amount of impervious has been updated to 39.47 acres project-wide, considering a full buildout scenario over the 20 year plan.

MEPA 16 **The objective of the MEPA review process is to provide disclosures of all feasible measures to avoid, minimize and mitigate Damage to the Environment. Consistent with that goal, an alternatives analysis is required to consider what effect changing the parameters and/or siting of a project, or components thereof, will have on the environment.**

An alternatives analysis is provided in Chapter 4. This chapter provides a review of the proposed Project and discusses the alternatives considered along with the potential for environmental impacts to each alternative.

MEPA 17 **The DEIR should clearly identify the purpose and need of each project. Several of the proposed improvements will be designed to meet FAA safety guidelines; however, improvements are also intended to facilitate future growth in airport operations.**

The Purpose and Need for each project is discussed in detail in Chapter 2.

MEPA 18 **The DEIR should clearly evaluate the basis for the proposed improvements, particularly the proposed runway length.**

Please refer to Chapter 2.0 which details the basis for the proposed improvements, and particularly Section 2.2.1.4 for the proposed runway extension.

MEPA 19 **The DEIR should describe how much expansion is anticipated in each of the three phases within the 20-year period.**

All projects listed in the CIP are contingent upon funding availability, environmental review approvals and receipt of permits (if applicable). Section 3.4 provides an updated project schedule.

The projects within the CIP, programmed for a specific year, may move up or down years based on the factors listed above and also FAA and MassDOT Aeronautics Division programs and priories. As noted previously, the potential hangar development within the East and North Ramp areas is contingent upon private development and the specific year is unknown.

MEPA 20 **The DEIR should describe the relevant safety guidelines and how the proposed design will achieve safety goals.**

Relevant safety guidelines per Advisory Circular AC 150/5300-13B Airport Design will be utilized to achieve FAA design safety goals. Use of the standards and guidelines contained in this advisory circular are practices the FAA recommends for establishing an acceptable level of safety, efficiency and capacity for airport development projects. Table 1.2-1 details the airfield geometry improvements at the Airport.

MEPA 21 **For each of the runway and taxiway improvements, the DEIR should identify one or more alternatives that minimize land alteration and impervious area and direct impacts to wetlands and evaluate these alternatives with respect to the FAA safety guidelines.**

Each of the runway and taxiway alternatives identified in the ENF will meet FAA design standards and safety guidelines as presented in Advisory Circular 150/5300-13B Airport Design for each of the runway and taxiway projects. The location, layout and orientation of all proposed improvements are already designed to the minimum FAA standards. With respect to the proposed Taxiway D project, there are three alternatives presented for side slope grading within the Taxiway Object Free Area (TOFA): a) 4:1 slope; 2:1 slope; retaining wall. The 4:1 slope meets standard practice for airport design, the other two alternatives are offered as a potential mitigation measure for limiting wetlands impacts.

None of the three alternatives are ideal with respect to FAA safety guidelines for proposed Taxiway D. Ideally, the entire TOFA would be graded with a 4:1 side slope to the edge of the TOFA, and beyond for use by airport operations purposes. The three alternatives included in the ENF are presented in an attempt at a reasonable compromise, balancing safety against wetlands impacts.

MEPA 22 **For improvements that are not directly safety related, the DEIR should identify any alternative configurations or locations that would avoid or minimize impacts to land alteration and impervious area.**

Alternative project configurations or locations are identified in detail in Chapter 4: Alternative Analysis. As noted above, in MEPA 18, several different iterations of the proposed Taxiway D reconfiguration were analyzed to minimize impacts to Upper Gate Pond.

MEPA 23 **For the alternatives that were studied in the ENF (described above), the DEIR should quantify the environmental impacts of each alternative, and provide a clear explanation of why the Preferred Alternative was chosen when considering the relative environmental impacts of each of the studied alternatives. The alternatives analysis and project narrative should support the selection of the Preferred Alternative for each project component that includes all feasible**

measures to avoid Damage to the Environment, or to the extent Damage to the Environment cannot be avoided, to minimize and mitigate Damage to the Environment to the maximum extent practicable.

Please refer to the alternatives analysis provided in Chapter 4 for detailed information on selection of Preferred Alternatives.

MEPA 24 **the DEIR should provide a detailed comparison of the alternatives, including more detailed descriptions and plans of each alternative. It should compare the environmental impacts of each alternative, quantitatively to the extent practicable, with respect to trip generation, parking supply, water use, wastewater generation, wetlands, impervious area and GHG emissions. The comparison should be provided in the narrative and in a tabular format.**

Chapter 4 provides information on the selection of Preferred Alternatives and a discussion of anticipated environmental considerations. Environmental impacts are further quantified in Chapter 6: Environmental Consequences.

MEPA 25 **The DEIR should address comments from the Town of Yarmouth regarding the purpose and need for the project. It should also analyze the feasibility of runway extension alternatives that provide the required runway length and consider balancing community aircraft noise impacts by factoring in location and density of residential development in areas surrounding the Airport.**

The DEIR details the purpose and need for the runway extension within Chapter 2, Section 2.2.1.4. Runway extension alternatives are discussed further in Chapter 4.0. Results from the noise analysis are presented in Section 5.9 and Section 6.6.

MEPA 26 **I note that, as of November 12, 2022, the Executive Office of Energy and Environmental Affairs (EEA) published an updated EEA EJ Maps Viewer ("Updated 2020 Environmental Justice Block Groups" tab), which indicates that the project site is now located within one EJ population characterized by Minority and Income, which was not previously mapped; within 1 mile of 11 EJ populations characterized by Minority, Income, Minority and Income, and Minority, Income and English Isolation (eight in Barnstable and three in Yarmouth), some of which were not previously mapped; and within 5 miles of 17 EJ populations characterized by Minority, Income, Minority and Income, and Minority and English Isolation (10 in Barnstable and seven in Yarmouth), some of which were not previously mapped.**

The DEIR uses the Updated 2020 Environmental Justice Block Groups via the EEA EJ Maps viewer.

MEPA 27 **Under the new regulations and protocols, all projects located in a DGA around one or more EJ populations must take steps to enhance public involvement opportunities for EJ populations, and must submit analysis of impacts to such EJ populations in the form of an EIR.**

An EJ analysis is presented in Section 5.16 including a summary of project outreach and public meetings efforts.

MEPA 28 **The DEIR should include a separate section on "Environmental Justice," and contain a full description of measures the Proponent intends to undertake to promote public involvement by such EJ populations during the remainder of the MEPA review process, including a discussion of any of the best practices listed in the MEPA EJ Public Involvement Protocol that the project intends to employ. The DEIR, or a summary thereof, should be distributed to all CBOs and tribes included in the EJ Reference List that was used to provide notice of the ENF. The Proponent should obtain a revised EJ Reference List from the MEPA Office to ensure that contact information is updated.**

A detailed EJ analysis is provided in Section 5.16

MEPA 29 **The DEIR should include a baseline assessment of any existing unfair or inequitable Environmental Burden and related public health consequences impacting EJ Populations in accordance with 301 CMR 11.07(6)(n)1 and the MEPA Interim Protocol for Analysis of EJ Impacts. Specifically, the DEIR should use the DPH EJ Tool to identify any census tract or municipality in which the EJ populations are located as exhibiting "vulnerable health EJ criteria"; this term is defined in the DPH EJ Tool to include any one of four environmentally related health indicators that are measured to be 110% above statewide rates based on a five-year rolling average.**

Please refer to the EJ analysis provided in Section 5.16.

MEPA 30 **In addition, sources of potential pollution should be identified within the identified EJ populations, based on the mapping layers available in the DPH EJ Tool.**

Pollution sources within EJ populations are identified in Figure 5.16-2.

MEPA 31 **The DEIR should provide an estimate of the increase in vehicular traffic that may be associated with the proposed terminal building expansion, as well as the total number of adt of diesel vehicles that the project is anticipated to generate including during construction.**

See response to MEPA #12

MEPA 32 **The DEIR should describe the anticipated routes of travel for project-generated vehicular traffic to determine whether such traffic would extend near EJ populations, and should discuss whether air quality may be affected in those neighborhoods.**

The anticipated travel routes are presented in Section 5.11 and the associated transportation impact to EJ communities is presented in Section 5.16.2.2.

MEPA 33 **The DEIR should discuss the extent to which Transportation Demand Management (TDM) measures will serve to reduce vehicle traffic, associated with project operations and construction.**

The Airport currently does not employ TDM measures, however, the increase in trips from the terminal improvements is anticipated to be minimal. The Airport will continue to investigate the feasibility of a TDM program, or specific TDM measures, for employees at working at the airport including the following options to enhance travel to the Airport:

- Orientation packets for employees, including information about alternative means of transportation such as rideshare services, tenant-employee carpool options and rideshare matching service with other nearby employers.
- Showers and lockers for employees;
- Flexible work schedules for employees;
- Telecommuting accommodations for employees (where applicable);
- "Guaranteed Ride Home" program;
- Transit pass subsidies;
- Secure bicycle parking;
- Carpool and vanpool program;
- Preferential parking for carpool/vanpool; and
- Provision of electrical conduit for future EV charging stations

The Airport is committed to increasing the number of electric vehicle (EV) charging stations and providing electrical conduit for future EV stations. Additionally, in 2022, the Airport received a $1.95M grant through the US Department of Transportation's Strengthening Mobility and Revolutionizing Transportation (SMART) Grants Program, to plan, permit, and design a smart microgrid project.

The future microgrid will ultimately generate and distribute clean, reliable power to the airport and facilitate reliable charging of electric ground fleet vehicles (including buses) and in the future, aircraft.

MEPA 34 **The DEIR should also discuss other potential mitigation, such as measures to discourage single occupancy vehicle (SOV) trips to the airport by passengers and visitors and installation of electric vehicle (EV) infrastructure on site.**

The US Department of Transportation's SMART Grant, awarded to the Airport in 2023 is currently selecting a project team to begin the planning phase (anticipated to start in early 2024). The smart microgrid project, as discussed above, will generate and distribute clean, reliable power to the Airport and facilitate reliable charging of electric ground fleet vehicles (including buses) and in the future, aircraft.

The project is in collaboration with MassDOT Aeronautics Division and the Cape Cod Regional Transit Authority (CCRTA) to increase clean energy independence while helping to support the disadvantaged community living near the airport in Hyannis. The microgrid will allow for the RTA to adopt electric bus infrastructure, using locally produced energy (e.g., solar and wind), serving the Airport and the region. Utilizing the CCRTA routes, to be enhanced environmentally by the development of a micro grid at the Airport, travelers and employees, if they so desire, can access the Airport via public transportation, and thereby reduce reliance on SOV trips.

MEPA 35 **The DEIR should also analyze land alteration and impervious surfaces added by the project, including implications for potential stormwater flooding and urban heat island effects in the surrounding neighborhoods.**

Land alteration quantities are detailed in Table 3.5-1. All state and federal requirements for stormwater management are addressed in Chapter 6, Section 6.1.2.1. Urban heat island effects are not anticipated as a result of the Proposed Project. A discussion of urban heat island effect is provided in Section 6.4.2.

MEPA 36 **Consistent with the Scope related to Climate Change and Land Alteration below, analysis of the stormwater management system should specifically assess whether flooding risks may be exacerbated for nearby EJ populations, including under future climate conditions, and whether existing conditions would be worsened or improved by the project design.**

The Airport is not located in a floodplain, and contains extensive areas of permeable surfaces (grass, shrub, and treed areas). No flooding risks of the Airport are anticipated. Stormwater management for the Proposed Projects is addressed in further detail in Chapter 6.

MEPA 37 **The DEIR should assess whether tree removal near EJ populations may affect urban heat island effects, and should discuss whether anticipated growth in airport operations may disproportionately affect EJ neighborhoods in terms of noise, air pollution, and traffic.**

Please refer to Section 6.4.1.4 for details on impacts from tree removals.

MEPA 38 **The DEIR should analyze any other relevant short-term and long-term environmental or public health impacts of the project, including construction period activities.**

See section 6.12.2.2.

MEPA 39 **If any disproportionate adverse effects or increased risks of climate change are identified, the DEIR must include a discussion of proposed mitigation and include such measures in draft Section 61 findings.**

Mitigation and draft Section 61 findings are provided in Chapter 7.0.

MEPA 40 **I note that generalized project benefits should not be analyzed to "net out" project impacts, unless the benefit serves to mitigate the specific impact analyzed. Particular focus should be given to benefits that serve to promote the equitable distribution of Environmental Burdens, or reduce any existing Environmental Burdens identified for the EJ population.**

Comment noted. Project benefits are not analyzed to net out project impacts. Included in the Projects is proposed mitigation, specific to the impact analyzed.

MEPA 41 **The DEIR should include a separate section on "Public Health," and discuss any known or reasonably foreseeable public health consequences that may result from the environmental impacts of the project. Particular focus should be given to any impacts that may materially exacerbate "vulnerable health EJ criteria," in accordance with the MEPA Interim Protocol for Analysis of EJ Impacts. In addition, other publicly available data, including through the DPH EJ Tool, should be surveyed to assess the public health conditions in the immediate vicinity of the project site, in accordance with 301 CMR 11.07(6)(g)10. Any project impacts that could materially exacerbate such conditions should be analyzed.**

A comprehensive review of the vulnerable health criteria and information included in the DPH EJ Tool to assess public health conditions in the area surrounding the Project Site is provided in Section 5.16.2.2 as part of the EJ evaluation. An analysis of EJ related environmental consequences is provided in Section 6.12.2.

MEPA 42 **To the extent any required Permits for the project contain performance standards intended to protect public health, the DEIR should contain specific discussion of such standards and how the project intends to meet or exceed them.**

Potential Impacts to Health and Safety are detailed in Section 6.12.2.2.

MEPA 43 **As discussed below, the DEIR should contain a comprehensive discussion of PFAS contamination on site, and should assess whether such contamination or cleanup activities will disproportionately affect EJ neighborhoods or other vulnerable populations near the site.**

PFAS is being comprehensively addressed by the Airport, and a full summary of the activities it has undertaken to respond to PFAS, including holding several public information sessions, is provided on its website https://flyhya.com/airport-info/pfas/

The Airport has continued to engage neighbors to provide updates on environmental practices related to ongoing remediation efforts on Airport related to PFAS.

The Airport has completed the following:

- 2015: ceased use of AFFF in 2015 for tri-annual exercises and annual testing.
- 2016: Cape Cod Gateway Airport was the first airport in Massachusetts to purchase an ecologic unit to test AFFF consistency to meet annual FAA testing requirements without the need to deploy AFFF on the ground for testing. HYA bought this unit before it was approved by FAA as an alternative testing platform to be as proactive as possible.
- 2016: the Airport successfully recovered AFFF used in a 2016 aircraft accident response. All 10 gallons of AFFF concentrate applied at the accident site was captured in an enclosed concrete catch basin, vacuumed out and appropriately disposed of off-site.
- 2016: initiated the process of reporting and analysis following requirements outlined in Massachusetts General Law, and the Massachusetts Contingency Plan (MCP)

Additionally, the Airport continues to coordinate with MassDEP and the Town of Barnstable as they complete ongoing investigations into the impacts of PFAS in soil and groundwater. The Airport will continue reporting, testing, mitigation, and monitoring as necessary to meet MassDEP Bureau of Waste Site Cleanup reporting requirements.

Consistent with these efforts, the PFAS considerations for the proposed Projects, if applicable, are discussed in detail within Chapter 5.0/Chapter 6.0.

MEPA 44 **The DEIR should provide a detailed response to the comments from the Town of Yarmouth and residents regarding existing and proposed aircraft noise including an aircraft noise analysis and noise mitigation.**

A response to the issues and concerns raised by the Town of Yarmouth and residents is provided in Section 5.9. The sound level assessment in this document includes the use of FAA AEDT approved computer modeling to predict future sound levels from the Project as well as a comparison to existing sound levels and FAA land use compatibility.

MEPA 45 **The DEIR should include an assessment of noise levels associated with existing airport operations, as well as anticipated increases that are projected as a result of future expansion of the airport in Phases 1, 2, and 3.**

Noise associated with the existing airport operations (no-build alternative) and the Proposed Action are discussed in Section 6.6.

MEPA 46 **The noise analysis should determine the increase in noise levels caused by operations at the Airport over the 20-year period described in the Master Plan.**

The noise analysis for future conditions is discussed in Section 6.6.

MEPA 47 **It should describe existing noise levels, identify all noise-generating activities and components of the project and model noise levels under proposed conditions.**

See response to MEPA #43.

MEPA 48 **The DEIR should discuss what regulatory requirements, such as FAA guidelines or MassDEP regulations or policies, apply to noise impacts of airport operations.**

Regulatory information and sound level assessment background information is provided in Section 5.9.

MEPA 49 **The DEIR should discuss whether noise impacts are likely to disproportionately affect surrounding EJ neighborhoods or other vulnerable populations (including those that may be considered "sensitive receptor") and what mitigation could be considered to minimize the noise impacts of airport operations.**

Impacts from noise are discussed in Section 6.6.

MEPA 50 **The Town of Yarmouth's comment letter requests that aircraft noise impacts include the average annual day-night contours shown as the 55 Ldn through 80 Ldn in five-level increments, as well as single-event contours for the same Ldn increments as applicable to a range of aircraft types (identified in comments); comparable aircraft models should be used if the FAA noise model database does not include these aircraft types. The DEIR should present these contours for the existing flight routes commonly flown at the Airport on each of the four runway**

ends, and for any future flight path recommended for aircraft noise mitigation measures. The intent of these single-event aircraft noise is to better reflect the aircraft noise impact that residents experience on a daily basis.

Please refer to Section 6.6 for a comprehensive discussion on the noise assessment.

MEPA 51 **The DEIR should provide an updated table which quantifies the land alteration and impervious area associated with each project component in a tabular format. The DEIR should clarify the amount of alteration including the type of vegetation that will be cleared (i.e., mature trees, scrub shrub, etc.). It should clarify the location, type and amount of alteration in previously undisturbed areas.**

A table of land alteration including impervious areas is included in Section 3.5.

MEPA 52 **The DEIR should identify how the project is designed to avoid and minimize land alteration and impervious area. It should provide a comprehensive evaluation of all measures preserve open space and tree cover, to reduce the amount of land alteration, and to convert impervious areas to pervious materials, including reductions in pavement associated with runways and taxiways, reductions in size of aprons and hangars, and supplemental landscaping or tree planting to mitigate impacts associated with clearing.**

Chapter 4.0 provides information on alternatives identified for evaluation in the EA/EIR and discusses the opportunities to minimize land alteration and impervious area. Section 4.1.2.1 discusses Taxiway D Alternatives to reduce impacts.

MEPA 53 **The DEIR should quantify open space that will remain undisturbed and/or restored upon completion of construction.**

Please refer to Table 1.5-1 for quantities of open space and temporarily disturbed areas.

MEPA 54 **The DEIR should include site plans that clearly locate and delineate areas proposed for development and those to be left undisturbed.**

Project related land disturbances both permanent and temporary are quantified in Section 3.5 - Summary of Impacts of Proposed Action.

MEPA 55 **The DEIR should identify all easements and public utilities on-site and off-site and provide information on the parties to the easements and location and condition of public infrastructure. It should describe any constraints on project design or use of the site posed by these conditions.**

On-site utilities include drainage structures, airfield electrical systems including airfield lights, signs and Navaids, and waterlines. The location and condition of all such public infrastructure will be investigated further during the design of each project. The future design of all proposed improvements will accommodate the future use of public infrastructure. For security reasons, that information is not provided in this document.

MEPA 56 **The DEIR should identify all measures that will be employed to protect the water quality of the sole source aquifer, provide a description of the proposed stormwater management system for each project/phase and identify BMPs that will be incorporated into its design.**

Please see Table 7-3: *Summary of Mitigation Measures*.

MEPA 57 **The DEIR should describe how the proposed stormwater management system will fully comply with the MassDEP Stormwater Management Standards (SMS).**

MassDEP stormwater management standards will be met by adhering to the standards in the DEP Stormwater Handbook including methods for erosion control and methods for managing pre and post stormwater flows. Please see Section 6.1.4.1.

None of the proposed improvements are expected to result in any off-site impacts. There is no off-site increase in stormwater runoff anticipated. On-site stormwater runoff will be treated with appropriate water quality units and the design will comply with TSS removal requirements.

MEPA 58 **Given the significant amount of impervious area to be added to the project site, the Proponent should take all feasible measures to manage stormwater runoff, including by exceeding stormwater management standards and incorporating Low Impact Design (LID) strategies and green infrastructure wherever practicable; such measures should be described in the DEIR.**

All stormwater from new impervious pavements will be collected and discharged into the ground via infiltration devices and shall conform to MassDEP standards. MassDEP stormwater management standards will be met by adhering to the standards in the DEP Stormwater Handbook including methods for erosion control and methods for managing pre and post stormwater flows. Certain strategies cannot be used due to FAA airport design restrictions. Please see Section 6.1.4.1.

MEPA 59 **LID designs should be carefully considered, and where not used, the DEIR should provide a thoughtful explanation as to why they are infeasible for implementation on-site.**

Given the Airport environment, and FAA requirements for reducing wildlife hazards, stormwater management options that result in standing water are not allowed. Details on the proposed stormwater management are included in Section 6.1.4.

MEPA 60 **The DEIR should describe the extent to which the project will preserve existing tree canopies and plant additional trees, including estimates of the number of trees that will be planted.**

Carbon related emissions from tree removal are analyzed in Section 6.4.1.4. Trees are preserved to the extent that it is feasible and practicable to do so, however, the location for Projects related to existing airfield infrastructure reconstruction and pavement geometry upgrades are dictated by FAA design standards.

The DEIR also notes the Airport contains extensive forested areas north of the airfield. In this undeveloped area, approximately 110 acres of dense forest exists north of Upper Gate Pond and Lewis Pond.

The Airport maintains substantial forested areas that will continue to provide an overall net positive impact on carbon storage, sequestration, and recycling, for both the local area, and region. These forested areas would not otherwise exist if different land use (e.g., private residential development) were to take place where the Airport is located.

Accordingly, based on the Airport's "green" vision and sustainable leadership within the airport community, it will investigate opportunities to for tree planting/replating within compatible areas of the airport, as part of future Projects and within the Town of Barnstable, as feasible, using state and federal grant and funding opportunities. E.g., FAA and MassDOT Aeronautics Division (e.g., Airport Safety and Maintenance grants).

The Airport will also pursue options to preserve and protect forested land through a conservation restriction/easement. However, any release of obligated airport property invokes certain Federal requirements. The airport must seek FAA for review and approval for changes to its land use. If Federal funds were originally used to acquire the land, the FAA must also approve disposition of the Federal share of the sale proceeds.

MEPA 61 **The DEIR should demonstrate the system will be designed to accommodate larger storm events.**

All new projects will be designed to meet MassDEP stormwater standards in effect at the time of design. The stormwater systems will be designed to address future climate conditions utilizing MA Resilience Design Tool. The stormwater report will identify how the systems may accommodate the recommended 2070 100-Year 24-hour

rainfall volume of eleven (11) inches as well as the 2050 recommendation for runway and taxiway projects corresponding to the 2050 10-Year 24-hour rainfall volume of 6.1 inches. The stormwater management systems will be designed to attenuate peak flows and meet pollutant loading requirements based on future climate conditions in 2050 and 2070. Copies of the final Stormwater Management Report will be provided to MassDEP and CCC as necessary during the permitting phase.

MEPA 62 **The DEIR should provide quantitative modeling and analysis to assess the rainfall volumes that will be accommodated by the stormwater design, including under future climate conditions.**

All new projects will be designed, during the permitting phase (expected to commence in late 2024 upon completion of environmental review phases (MEPA, NEPA, CCC DRI) to meet MassDEP stormwater standards, including quantitative modeling and analysis to assess the rainfall volumes that will be accommodated by the stormwater design, including under future climate conditions if required.

MEPA 63 **It should include a plan showing the location of BMPs.**

All new projects will be designed to meet MassDEP stormwater standards. At this point of design, conceptual plans showing the location of specific BMPs have not yet been funded or developed.

MEPA 64 **The DEIR should identify any infiltration systems that may require registration under MassDEP's Underground Injection Control (UIC) program.**

The final design for each of the projects herein will identify proposed infiltration systems and will register the same with the MassDEP's Underground Injection Control (UIC) program.

MEPA 65 **The DEIR should address how the Airport will seek required MSGP permitting and describe how the project will comply any applicable NPDES performance standards related to discharges of pollutants from airplane deicing operations and other discharges covered by the MSGP.**

The Airport filed a Notice of Intent (NOI) for stormwater discharges under the 2021 Stormwater Multi-Sector General Permit (MSGP) issued on January 15, 2021 (Airport NPDES ID MAR 053164, see **Appendix F**). In accordance with NPDES permit classifications, the Airport is designated as Standard Classification Code (SIC) 4581, "Airports, flying fields, and Terminal Services", Sector S "Air Transportation Facilities."

The SWPPP is designed to assist the Airport in identifying potential sources of stormwater pollutants on Airport property and minimizing or eliminating the potential for those pollutants to enter stormwater discharges from the airport. The SWPPP describes the existing stormwater drainage system, identifies potential

pollutant sources and locations, and best management procedures (BMPs) and controls for the prevention of stormwater pollution, and establishes reporting and annual monitoring requirements.

MEPA 66 **The DEIR should use available water quality monitoring data from the Upper Gate and Lewis Ponds to demonstrate whether installed stormwater management systems are performing as designed in these areas.**

The Airport has completed additional sampling required for Upper Gate Pond and Lewis Pond. This is discussed on page 4 of the Phase I report, included in **Appendix Q**. The Airport's on-call environmental consultants have determined that sediment contamination is related to anthropogenic background conditions (i.e. those conditions of oil and/or hazardous material that would exist in the absence of the disposal site of concern which are ubiquitous and consistently present in the environment) and associated with the normal operation of a stormwater discharge outfall that is permitted and allowable by the EPA under the MSGP.

The Airport filed a Permanent Solution Statement with No Conditions in based on conversations with regulatory agencies and laboratory results in November 2023. Additionally, as indicated on page 6 of the Phase I report, testing of select monitoring wells that are in proximity to the Ponds did not indicate exceedances of the groundwater (Method 1 GW-1 or GW-3) standards for dissolved RCRA 8 metals (these eight metals include: arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver) or PAHs (polycyclic aromatic hydrocarbons (PAHs) are a class of chemicals that occur naturally in coal, crude oil, and gasoline) that you mentioned.

This confirms that the sediment impacts are not migrating to groundwater and site conditions and laboratory samples indicate that of normal operation of a stormwater discharge, meeting EPA standards with no RCRA 8 metals or PAHs present that exceed EPA standards.

MEPA 67 **The DEIR should provide updated wetlands calculations which reflect the most recent design of the project and identify all temporary and permanent impacts to wetland resource areas. … . It should provide an updated summary table of all wetland resource area and Buffer Zone impacts…. The DEIR should ensure that estimates for impacts to wetland resource areas are conservative and account for all temporary impacts.**

Wetland impacts consist of permanent fill of approximately 4,600 square feet (sf) of BVW, 13,700 sf Land Under Water (LUW), 300 linear feet of Inland Bank will occur as a result of the realignment of Taxiway D. These unavoidable impacts have been avoided and minimized to the maximum extent practicable through utilization of 2:1 side slope design with an engineered slope option.

Additional details on impacts are summarized in Table 6.1.2.2 and detailed in Figure 6.1-4.

MEPA 68 **The DEIR should demonstrate how the project will comply with performance standards outlined in the WPA for each resource area.**

Demonstration of compliance with performance standards is discussed in Chapter 8.0.

MEPA 69 **The DEIR should consider impacts associated with surface and subsurface hydrology, wildlife habitat, and describe compliance with BMPs for stormwater management and sedimentation and erosion control.**

Impacts to these categories are discussed in Chapter 6.0.

MEPA 70 **The DEIR should assess whether the taxiway relocation could be designed to avoid work within the wetland buffer, and if not, provide additional detail about potential mitigation.**

Taxiway D relocation requirements and alternatives are detailed in Section 4.1.2.1. Proposed wetland mitigation measures relative to impacts from Taxiway D are outlined in Section 6.1.4.

MEPA 71 **The DEIR should provide further detail on any proposed tree clearing, invasive species management and potential vernal pools across the project site.**

Details on tree clearing/land alteration are provided in Section 6.4.1.3. There are no vernal pools within the proposed project limits.

MEPA 72 **The DEIR is required to provide sufficient information to adequately describe cumulative impacts to "Waters of the Commonwealth" (BVW, Isolated Vegetated Wetland (IVW) and LUW) pursuant to 314 CMR 9.00 and identify efforts to avoid, minimize, and mitigate impacts.**

Impacts to water resources are discussed in Chapter 6.0. Impact quantities are summarized in Table 6.1.4 and detailed in Figure 6.2-1.

MEPA 73 **Impacts to IVWs that meet federal jurisdictional requirements defined at 33 CFR 328 through 329 are subject to review under 314 CMR 9.00. The DEIR should clarify if the project will impact IVW, and if yes, the DEIR should include a current Jurisdictional Determination from ACOE that verifies whether any or all the impacted IVWs are federal wetlands.**

No impacts to federally jurisdictional IVWs are anticipated. Discussion on jurisdiction of resource areas is provided in Section 6.1.

MEPA 74 **The DEIR should describe the volumes associated with proposed dredging and filling within Upper Gate Pond. The Proponent should review the requirements in 314 CMR 9.06 and determine whether a practicable alternative is available that has less adverse impact to the aquatic ecosystem. The alternatives analysis should include a thorough analysis to demonstrate why the geometry of certain elements cannot be modified to decrease wetland impacts.**

The three proposed alternatives for Taxiway D impact Upper Gate Pond. The proposed 4:1 side slope involves the greatest impact; the proposed 2:1 side slope involves less impact; and the proposed retaining wall involves the least impact and offers the least impact to the aquatic ecosystem.

Based on a conceptual design utilizing a 2 foot water depth and approximately 10 feet depth of muck the following table summarizes these impacts.

	Dredging (CY)	Fill (CY)
4:1 side slope:	9,600	11,500
2:1 side slope:	5,200	6,200
Retaining Wall:	2,900	3,500

Each of the runway and taxiway alternatives identified in the ENF must meet FAA design standards and safety guidelines as presented in Advisory Circular 150/5300-13B Airport Design for each of the runway and taxiway projects. The location, layout and orientation of all proposed improvements are already designed to the minimum FAA standards. These quantities are based on conceptual design and limited topographic data. Final quantities will be based on actual survey data.

MEPA 75 **The DEIR should propose appropriate mitigation measures to demonstrate consistency with the WQC regulations.**

Wetland mitigation measures are detailed in Section 6.1.5 and in Chapter 7.

MEPA 76 **The DEIR should commit to preparation and implementation of an archaeological site avoidance and protection plan (ASAPP) which describes how the archaeological sites will be protected and preserved from inadvertent construction-related impacts or future land use impacts. The ASAPP should be submitted to MHC for its review and comment.**

Preparation of the ASAPP is underway and being drafted by the Project's Cultural Resource personnel for submittal to the MHC for review and comment. Available documentation and mapping for the two significant ancient Native American sites have been reviewed by project archaeologist and field visits made to the locations of these sites, confirming that the sites are outside of proposed Project work areas.

The ASAPP will address Pre-Construction, Construction and Post-Construction Activities. Avoidance and protection measures will include installing high-visibility temporary fencing (i.e., orange construction fence) around and barring access to the two significant sites (sensitive cultural resource areas). Signs with *No Trespassing* will be posted along the fence to indicate that the sensitive cultural resource areas are off-limits. No access or impacts will be allowed within the fenced areas. Construction personnel and contractors will be instructed to neither perform nor permit any construction, excavation, grading, tree stumping, filling, dumping, or the storage or staging of equipment vehicles, or supplies within the boundaries of the fenced area. Trained cultural resource personnel will assist in facilitating the installation of protection measures (i.e., placement of fencing) with monitoring and/or flagging of the limits of the sensitive cultural resource areas. Cultural resource personnel will make field visits to ensure that the avoidance and protective measures are carried out as specified, with photographic documentation prior to, during and after construction. A pre-construction meeting will be held with Project personnel and contractors and cultural resource personnel to review these measures.

Cultural resource personnel will conduct a post-construction inspection immediately after the construction phase of the Project to evaluate the condition of the sensitive areas and determine whether or not project-related impacts had taken place within the protected areas. The findings of the inspection will be reported to the MHC and the FAA via a memorandum.

MEPA 77 **The DEIR should describe measures that will be implemented to avoid impacts to archaeological resources.**

The pre-construction activities will involve the following:

- Pre-construction site inspection;
- Photography;
- Construction personnel briefing; and
- High visibility fencing with No Trespassing signs around the sensitive cultural resource areas to be protected.

The construction activities will include avoidance of fenced sensitive site resource areas; and response, reporting, and corrective actions if these conditions are not met. The post-construction activities will include the following:

- Fence and sign removal;
- Post-construction site inspection;
- Photography; and
- Post-construction memorandum.

MEPA 78 **The DEIR should provide a summary of the outcome of any consultation with MHC.**

The Massachusetts Historical Commission (MHC) has reviewed the Project ENF and had the following comments and requests: Review of the MHC's Inventory of Historic and Archaeological Assets of the Commonwealth indicates that there are two significant ancient Native American sites (19-BN-827 and 19-BN-828) that are located on the airport grounds. It appears that these sites are not located within the direct project impact areas and can be protected and preserved from inadvertent construction-related damage or future land use damage through the development of an archaeological site avoidance and protection plan (ASAPP).

See MEPA 76 and 77 above.

MEPA 79 **The DEIR should estimate water use and wastewater generation associated with the terminal building expansion and any other activities that will increase water use.**

As the terminal building expansion has not yet been designed, nor size yet determined, an estimate of water use, and wastewater generation is not yet feasible.

MEPA 80 **The DEIR should describe the existing and proposed drinking water and wastewater facilities and review any capacity constraints.**

The Airport is on Town water and wastewater service.

MEPA 81 **The DEIR should identify opportunities for water conservation at the airport and associated facilities including water conserving plumbing and reuse of rainwater and greywater for irrigation.**

The Airport does not utilize irrigation.

All plumbing fixture water use is regulated by state law. An *Act Creating a Next-Generation Roadmap for Massachusetts Climate Policy* was signed by Governor Baker on March 26, 2021. Energy and water efficiency standards for products were a key policy adopted in this bill. Massachusetts had standards for other products prior to the passage of the act, but the earlier standards were preempted by federal government regulations

The law bans the sale of plumbing fixtures that do not meet the water use conservation requirements. These requirements are prescribed in the Department of Energy Resources (DOER) *Guidelines for Implementing the Appliance Efficiency Standards* via 225 CMR 9.00.

Please see https://www.mass.gov/doc/225-cmr-9-appliance-energy-efficiency-standards-testing-and-certification-program/download

MEPA 82 **It should describe provisions for collecting wastewater containing extinguishing agents and measures for its treatment and/or disposal in accordance with applicable requirements.**

The Airport was the first airport in Massachusetts to purchase the ecologic unit to eliminate the need to use foam during annual firefighting equipment testing.

MEPA 83 **The DEIR should provide information responsive to the EPA Region 1 Sole Source Aquifer Project Review Information document to allow EPA to determine whether project construction and operation have the potential to contaminate the underlying aquifer.**

The Draft EA/EIR contains information responsive to requirements of EPA Sole Source Aquifer Review. A copy of this document will be sent to EPA for review and comment.

MEPA 84 **The DEIR should include information and analyses that provide delineation of the aquifer, description of groundwater flow, location of private and public water supply wells, identification of surface water discharges, management of stormwater and liquid and solid waste at the Airport, location of underground storage tanks (UST), and mitigation measures to minimize impacts to water quality.**

Existing groundwater conditions are provided in Section 5.4. Surface water discharges are identified on Figure 5.4-4. Location of USTs and mitigation measures are discussed in Section 5.17.

MEPA 85 **The DEIR should summarize the result of past (and current) groundwater monitoring conducted at or near the Airport. It should explain whether monitoring shows any adverse impacts to public water supplies and private wells associated with airport activities.**

The Airport continues to monitor PFAS concentrations in groundwater at and downgradient of the capped areas to measure their effectiveness. These results are presented every 6 months in status reports submitted to MassDEP. Please see Section 5.17.3 for a detailed discussion.

MEPA 86 **The DEIR should describe the Proponent's coordination with the local Water Department and Board of Health based on the proximity of private wells.**

The Town of Barnstable's Water Supply Division and Board of Health have been included in the Project's Draft EA/Draft EIR Circulation List (Appendix P) to provide each department with any opportunity to provide comments on relevant sections of the report to be addressed in the final EA/EIR.

MEPA 87 **The DEIR should identify the project site's vulnerabilities to climate change and potential features incorporated into the design of the project that will increase the resiliency of the site to likely climate change impacts.**

See Section 5.7, *Climate Resiliency and Greenhouse Gas Emissions*

MEPA 88 **I encourage the Proponent to consult the data available from the Town of Barnstable, the Cape Cod Commission, and the resilientMA.org website to develop climate change scenarios for the site and identify potential adaptation measures.**

See Section 5.7, for details on climate change scenarios for the site and potential adaptation measures.

MEPA 89 **The Proponent should consult with the Town regarding the findings of its community resilience workshops, including priority hazards, vulnerabilities, strengths, and actions. The DEIR should provide a review of the Town's studies and resiliency plans on climate vulnerabilities and potential solutions, including regional solutions requiring coordination between the Proponent and abutters and other stakeholders.**

Section 6.4.2 identifies findings detailed in the Town's studies and measures to be implemented to meet climate resiliency. Additionally, Section 6.4 provides information on the microgrid technology currently in the planning phase at the Airport.

MEPA 90 **The DEIR should include a comprehensive discussion of the potential effects of climate change on the project site and describe features incorporated into the project design (including climate-related design specifications and standards) that will increase the resiliency of the site to these changes.**

See mitigation/adaptation measures in Section 6.4.

MEPA 91 **The DEIR should include information about the potential adaptation of the project to future conditions.**

See response to MEPA # 89

MEPA 92 **The DEIR should describe the precipitation data used for the design of the stormwater management system. The DEIR should discuss how the stormwater system will be sized to address future climate conditions.**

All new projects will be designed to meet MassDEP stormwater standards at the time of design. With regards to future climate conditions, each project will be designed utilizing current stormwater design principles in place at the time of design.

MEPA 93 **The DEIR should discuss whether the proposed stormwater design will accommodate the recommended 2070 100-year return period (24-hour rainfall volume of 11.0 inches) from the Tool, as well as the 2050 recommendation for runway and taxiway areas corresponding to the 10-year return period as of 2050 (24-hour rainfall volume of 6.1 inches).**

To the extent practicable and affordable, the proposed stormwater design will utilize the recommended 2070 100-yr return period corresponding to the 24-hour rainfall of 11.0 inches as well as the 2050 recommendation for runway and taxiways corresponding to the 10-yr 24 hour rainfall volume of 6.1 inches.

All new projects will be designed to meet MassDEP stormwater standards including calculations for the attenuation of peak flows and pollutant loading requirements in place at the time each project is implemented.

MEPA 94 **The DEIR should discuss whether the stormwater management system will attenuate peak flows and meet pollutant loading requirements based on future climate conditions in 2050 and 2070 and should provide a copy of the Stormwater Report for the project. Estimates can be provided in lieu of exact calculations, to the extent stormwater design is not advanced enough by the time of the DEIR.**

All new projects will be designed to meet MassDEP stormwater standards including calculations for the attenuation of peak flows and pollutant loading requirements in place at the time each project is implemented.

The designs will be initiated under a permitting effort for each specific project. The final design process will develop a stormwater management report that will provide a management plan that will demonstrate attenuation of the peak flows and will meet pollutant loading requirements in place at the time of final design.

A copy of the final Stormwater Report for each project will be provided to DEP during the design phase for each project.

MEPA 95 **The DEIR should discuss whether the elevation of the terminal building is anticipated to be resilient to flood elevations at the site associated with future storm scenarios such as the 10-year, 25-year, and 50-year storms as of 2070. The**

project site is located outside of the 100-year floodplain; however, a small section of forested area near Mary Dunn Pond, within the Airport property, is within the 500-year floodplain.

Please note, the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (25001C0566J, effective on 07/16/2014 and 25001C0567J, effective on 07/16/2014) show the Airport is outside the 100-year floodplan (see Figure 5.4-3).

The Airport property is not at a high risk of flooding. A small amount of forested area near Mary Dunn Pond, within the Airport property boundary but outside the Project Area, is within an area with a 0.2 percent annual chance of flood hazard.

MEPA 96 **The DEIR should provide information on any base flood elevations that have been established for adjacent areas, and discuss how the proposed building elevation compares to existing BFEs and whether it is likely to accommodate storm conditions based on future storm scenarios.**

The Flood Insurance Rate Maps for Barnstable indicates that the existing terminal building and surrounding buildings including proposed hangar developments along both runways are not within any flood hazard areas. There is no base flood elevation available on record; and any proposed development is not anticipated to be within any flood hazard area.

MEPA 97 **To the extent the project is unable to accommodate future year storm scenarios, the DEIR should discuss whether the project has engaged in flexible adaptative strategies, and whether current designs allow for future upgrades to be made to adapt to climate change.**

The ability to accommodate future year storm scenarios will be investigated during the permitting phase, as design is only at a conceptual stage. Please refer to Section 6.1.2.1 for additional details.

MEPA 98 **This project is subject to review under the May 5, 2010, MEPA GHG Policy, which requires Proponents to quantify carbon dioxide (CO2) emissions and identify measures to avoid, minimize or mitigate such emissions. The analysis should quantify the direct and indirect CO2 emissions of the project's energy use (stationary sources) and transportation-related emissions (mobile sources). Direct emissions include on-site stationary sources, which typically emit GHGs by burning fossil fuel for heat, hot water, steam and other processes. Indirect emissions result from the consumption of energy, such as electricity, that is generated off-site by burning fossil fuels, and from emissions from vehicles used by employees, vendors, customers and others.**

The number of new vehicle trips associated with the terminal expansion are presented in Section 6.8.2. These trips can be utilized to develop estimates of mobile source emissions, however, given the rapid transition to electric vehicles, with all leading automobile manufactures discounting internal combusting engine (ICE) technology, and the timeframe of the Airport's Master Plan project (from 2024 to 2040), the Project assumes that the projection of emissions from mobile and stationary sources emissions will be effectively zero.

MEPA 99 **The DEIR should include a GHG analysis for stationary sources prepared in accordance with the GHG Policy, guidance provided in the comment letter submitted by the Massachusetts Department of Energy Resources (DOER), which is incorporated in this Certificate in its entirety, and this Scope.**

Please refer to Section 6.5 Climate and Greenhouse Gas Emissions.

MEPA 100 **For the terminal expansion project, the DEIR should include an analysis that calculates and compares GHG emissions associated with a Base Case and a Preferred Alternative that achieves greater reductions in GHG emissions. Hyannis, which is located within Barnstable, is not a stretch code community. Baseline for this project, therefore, would be Massachusetts base code.**

Please refer to Section 6.4 Climate and Greenhouse Gas Emissions and the discussion pertaining to the Airport's commitment to meet the new stretch code requirements for any terminal or building improvements.

MEPA 101 **However, because the updated code contains numerous provisions which deliver emissions reductions, DOER comments recommend that the project, as a mitigation measure, follow the provisions of the July 2023 stretch code for the proposed expansion.**

A GHG Analysis on Stationary Sources and mitigation is provided in section 6.4.1.2.

MEPA 102 **In addition, DOER recommends that the project adopt, as a mitigation measure, efficient electric space and water heating.**

Stationary source mitigation measures are provided in section 6.4.1.2.

MEPA 103 **The DEIR should identify the model used to analyze GHG emissions, clearly state modeling assumptions, explicitly note which GHG reduction measures have been modeled, and identify whether certain building design or operational GHG reduction measures will be mandated by the Proponent to future occupants or merely encouraged for adoption and implementation.**

Estimates of GHG emissions, modeling, and assumptions are detailed in Section 6.4.1

MEPA 104 **The DEIR should include the modeling printouts for each alternative and emission tables that compare base case emissions in tons per year (tpy) with the Preferred Alternative showing the anticipated reduction in tpy and percentage by emissions source.**

The Airport is committing to adopt the 2023 Stretch Energy Code measures, and In lieu of modeling, a series of GHG mitigation commitments is proposed.

MEPA 105 **The DEIR should present an evaluation of mitigation measures and recommendations identified in DOER's comment letter. In particular, the feasibility of each of the mitigation measures outlined below should be assessed for the building expansion, and if feasible, GHG emissions reduction potential associated with major mitigation elements should be evaluated to assess the relative benefits of each measure.**

See Section 6.4.1.2 for GHG Mitigation Commitments.

MEPA 106 **The DEIR should present an evaluation of mitigation measures and recommendations identified in DOER's comment letter. In particular, the feasibility of each of the mitigation measures outlined below should be assessed for the building expansion, and if feasible, GHG emissions reduction potential associated with major mitigation elements should be evaluated to assess the relative benefits of each measure.**

See Section 6.4.1.2.

MEPA 107 **If financially infeasible, the DEIR should describe the cost effectiveness metrics that were used to evaluate feasibility, whether energy savings that would accrue to future tenants were considered, and what "payback period" the Proponent would deem to be reasonable given the financial constraints identified. It should include a review of available financial incentives potentially available for the project, as described in DOER's comment letter.**

Please see response to MEPA #12

MEPA 108 **At a minimum, the DEIR should consider the following GHG mitigation measures:**

- **Building design and construction practices that result in low heating and cooling thermal energy demand intensity (TEDI) by maintaining envelope integrity with framed, insulated walls with continuous insulation, minimizing glazed wall systems (e.g., curtain walls), low air infiltration (confirmed with in-building testing), eliminating thermal bridging, ventilation energy recovery and management of solar heat gains**

- **Minimizing glass curtain wall assemblies and excessive windows**

- **Efficient electrification of space heating with either full electrification of space heating with air source heat pumps (ASHPs), or, for highly ventilated buildings, a hybrid of air source space heating for primary heating and gas space heating for secondary heating**
- **Efficient electrification of water heating with ASHPs**
- **Maximized rooftop solar-readiness (at least 80%) and installed PV**
- **Maximized electric vehicle (EV) charging equipment (10-15% of spaces) and EV ready spaces (20-25% of spaces)**

The Airport is committing to a series of GHG mitigation commitments. For any new buildings, expansions, or additions, the Proponent will commit to:

- High performing envelope that complies with the 2023 Stretch code envelope performance requirements;
- 100% heat pump space heating;
- Energy recovery ventilation per the 2023 Stretch code update;
- Electric domestic hot water heating, specific method to be determined. Heat pump domestic hot water heating to be analyzed;
- Roof to be constructed PV-ready;
- Installed electric vehicle (EV) charging space,;
- EV infrastructure for additional future EV-parking spaces to be installed, quantity to be determined.

Should any future Energy Code Updates occur prior to the commencement of work, the Project will comply with future Energy Code Updates.

MEPA 109 **The DEIR should review transportation-related emissions associated with vehicular trips to and from the Airport resulting from the proposed improvements to support future airport growth and identify any Transportation Demand Management (TDM) measures implemented by the Airport to minimize single occupancy vehicle trips to and from the site including promotion of alternative modes of travel.**

Please see response to MEPA # 33.

MEPA 110 **It should review measures to promote the use of low-emissions vehicles.**

As noted in the Transportation Section of the draft EA/EIR, the Massachusetts Department of Transportation Aeronautics Division received a $1.95 million grant award from the U.S. Department of Transportation's Strengthening Mobility and Revolutionizing Transportation (SMART) Program for the planning of the smart microgrid at the Airport to generate and distribute clean, reliable energy.

Energy created from the smart grid would support electric ground vehicles, including buses, and in the future, electric aircraft. This project is In collaboration with the airport and the Cape Cod Regional Transit Authority (CCRTA) to support the transportation options of the community living in the area.

MEPA 111 **The DEIR should describe the number of EV charging stations that will be installed and commit to providing designated parking spaces for these vehicles.**

A total of eight (8) EV charging stations will be installed by the Airport.

MEPA 112 **It should provide additional information regarding implementation of electric aircraft charging stations.**

Additional information on implementation of electric aircraft charging stations is still preliminary. While locations are identified on the Airport's terminal ramp, specific technologies would be identified as part of the newly awarded smart grid planning project.

MEPA 113 **The project will alter ±63 acres of land, though the extent of tree clearing is not quantified in the ENF. In addition, tree clearing will occur on easements outside of the Airport property. The DEIR should identify the total areal extent of proposed tree clearing on-site and off-site.**

The only currently foreseeable off-site impact may be associated with possible obstruction removal in a runway approach area and/or RPZ, this can be verified with a future tree-top canopy mapping effort. At this time, it does not appear that any offsite tree clearing is necessary. There is a very small amount in the Runway 33 approach which is located on airport property. On site tree clearing is estimated at 7.07 ac. See Table 6.4.-2 for more details.

MEPA 114 **The Proponent should consult with the MEPA Office on the development of a carbon analysis for tree clearing activities. To the extent the degree of tree removal is substantial as determined in consultation with the MEPA Office, the DEIR should develop a methodology to develop the analysis, identify associated impacts on GHG emissions, and identify measures to avoid, minimize and mitigate impacts. The DEIR should provide a quantitative carbon analysis of tree clearing**

activities that should consider both the one-time direct emissions from tree cutting as well as loss of potential carbon sequestration over a certain time period (e.g., 30 or 40 years).

Pease see carbon analysis in Section 6.4.1.4 and 6.4.1.5.

MEPA 115 **The DEIR should account for carbon sequestration from any trees that are removed and not replaced/converted to scrub shrub.**

Pease see response to MEPA #114.

MEPA 116 **I expect the DEIR to identify significant mitigation measures commensurate with the project's impacts on the site's capacity to sequester and store carbon. Potential mitigation measures may include funding programs that add or maintain biomass for sequestration purposes (such as tree planting, carbon credits, forest conservation or commitments to implement forest restoration practices) and preserving/protecting forested land through a Conservation Restriction or other means.**

Carbon offsets and future forest preservation are discussed in Section 6.4.1.5.

MEPA 117 **The DEIR should clearly explain the Proponent's plan for disposition of the trees cleared through the project, including the process for identifying potential markets for reuse of wood. The Proponent should commit to reuse of cleared trees for long-lived wood products to the greatest extent practicable and should indicate how the ultimate disposition of the trees will be tracked and documented.**

Pease see carbon analysis in Section 6.4.1.5.

MEPA 118 **The DEIR should describe if proposed improvements will be located within any of the disposal sites previously or currently regulated under the MCP. The DEIR should include a plan that clearly identifies the location of disposal sites and project elements. It should describe if conditions associated with any disposal sites may require remedial measures in the areas where proposed improvements will occur.**

This item is addressed in Section 6.13 for sites regulated under the MCP.

MEPA 119 **The DEIR should describe any potential excavation or disturbance in disposal sites and identify any necessary mitigation measures or handling and disposal requirements.**

Details regarding potential disturbance within disposal sites are discussed in Section 6.13.

MEPA 120 **The DEIR should comprehensively respond to MassDEP comments regarding preparation of a Release Abatement Measure (RAM) Plan, prior to construction, for Taxiway B Potential Aviation Development Area, Taxiway A Potential Aviation Development Area, and Proposed Building near the Terminal Ramp and North Ramp including. As requested in greater detail in MassDEP comments, the RAM Plan should describe sampling and analysis of soil and asphalt for the presence of PFAS and managing PFAS-contaminated soil and asphalt in Taxiway A and Taxiway B development areas.**

The Airport will maintain the existing monitoring wells to the extent feasible. Wells that cannot be maintained due to their location with respect to improvement effort will be decommissioned in accordance with MassDEP requirements and replaced, if necessary.

MEPA 121 **The DEIR should confirm if a RAM Plan will be required under 310 CMR 40.0000 based on review of this development by a Licensed Site Professional (LSP).**

This item is addressed in Section 6.13.

MEPA 122 **The DEIR should confirm that existing monitoring wells will be maintained for future assessment of groundwater for PFAS, 1,4-dioxane, and potentially other contaminants, otherwise, replacement wells will be installed.**

The Airport will maintain the existing monitoring wells to the extent feasible. Wells that cannot be maintained due to their location with respect to improvement effort will be decommissioned in accordance with MassDEP requirements and replaced, if necessary.

MEPA 123 **The DEIR should describe if project activities will be located within areas where PFAS or firefighting foam has been used.**

Section 6.13 identifies the projects that may occur within areas where PFAS has been identified.

MEPA 124 **The DEIR should include an update on the Proponent's ongoing coordination with MassDEP regarding locations where firefighting foam has been used and its potential to be a source of PFAS.**

This item is addressed in Section 5.17.3.

MEPA 125 **The DEIR should describe any areas to be excavated that may contain soil or groundwater contaminated by PFAS and describe necessary mitigation measures.**

This item is addressed in Section 6.13.1.

MEPA 126 **The DEIR should describe if the Proponent plans to test soils in these areas prior to construction, characterize soil with respect to PFAS contamination and, if necessary, maintain a pavement cover over any contaminated areas.**

See Section 6.13.9 for project related hazardous materials, solid waste, and pollution prevention measures.

MEPA 127 **The DEIR should provide an estimate of the volume of material to be excavated.**

The estimated volume of material to be excavated for the Runway preferred alternative and for Taxiway A, Taxiway B and Taxiway D are based on conceptual (25%) design drawings. Below are estimated volumes for each of the proposed projects. These are estimated volumes only and will change based on future preliminary and final designs for each individual project.

Project	Estimated Excavation Volume (CY)
Runway 15-33 AMPU Preferred Alternative	160,900
Runway 15-33 Alternate 1	106,100
Runway 15-33 Alternate 2	267,000
Taxiway B	11,300
Taxiway D w/4:1 Side Slope	70,900
Taxiway D w/2:1 Side Slope	66,000
Taxiway D w/Retaining Wall	63,600

MEPA 128 **Based on the Proponent's review of disposal sites at the Airport and potential areas where PFAS may have been released, the DEIR should identify the presence of soil and/or groundwater contaminants in the areas where excavation is proposed.**

This item is addressed in Section 6.13.

MEPA 129 **It should estimate the volume of contaminated material, review testing, treatment and disposal options and identify construction-period mitigation measures to minimize impacts to public health and the environment associated with the excavation and handling of contaminated soil.**

This item is addressed in Section 6.13.9

MEPA 130 **The Proponent should work with MassDEP to resolve any issues regarding PFAS before conducting any work for the project.**

The Airport will continue to address issues regarding PFAS in accordance with the requirements of the MCP (310 CMR 40.0000).

MEPA 131 **The DEIR should discuss any generation of hazardous waste and/or waste oil at the Airport and identify potential measures to reduce, recover and reuse hazardous waste.**

This item is addressed in Section 5.17.

MEPA 132 **The DEIR should describe implementation of a spills contingency plan that addresses prevention and management of potential releases of OHM from pre- and post-construction activities and will be presented to workers at the site and enforced.**

This item is addressed in Section 5.17.

MEPA 133 **The plan should include but not be limited to, refueling of machinery, storage of fuels, and potential on-site activity releases.**

This item is addressed in 5.17.

MEPA 134 **The DEIR should identify the nature and volume of solid waste to be generated by the project. It should describe handling, reuse, recycling and disposal of solid waste.**

The project is not able to estimate volumes of solid waste volumes at this stage. All solid waste handling, reuse, recycling and disposal will be conducted in compliance with applicable laws and C&D regulations.

MEPA 135 **The Proponent should review MassDEP's comment letter for solid waste handling and disposal requirements. The DEIR should describe how the project will comply with all applicable requirements.**

This item is addressed in Section 6.13.

MEPA 136 **The DEIR should describe how construction activities will be managed in accordance with applicable MassDEP regulations regarding Air Pollution Control (310 CMR 7.01, 7.09-7.10), and Solid Waste Facilities (310 CMR 16.00 and 310 CMR 19.00, including the waste ban provision at 310 CMR 19.017).**

This item is addressed in Section 6.13.8.

MEPA 137 **The DEIR should describe all construction-period impacts and mitigation relative to wetlands, stormwater, noise, air quality, water quality, and traffic. It should describe truck routes and other mitigation measures that may be implemented to minimize impacts to residential areas by trucks travelling to the site during the construction period.**

Construction period impacts and mitigation measures are described in Chapter 6.0 and summarized in Tables 7.3-1 and 7.3-2. While none of the proposed projects have been progressed past conceptual design, future projects will include a detailed description and graphical depiction of proposed truck routes, construction-period impacts, and proposed mitigation relative to wetlands, stormwater, noise, air quality, water quality, and traffic commensurate with the commitments made in this document.

MEPA 138 **Construction equipment should use engines meeting Tier 4 federal emissions standards, or if unavailable, confirm that the project will require its construction contractors to use Ultra Low Sulfur Diesel fuel, and discuss the use of after-engine emissions controls, such as oxidation catalysts or diesel particulate filters.**

Construction Impacts and mitigation relative to air quality is discussed in Section 6.3.3. See Table 7.3-2 for construction related mitigation commitments.

MEPA 139 **The DEIR should provide detailed information regarding the project's generation, handling, recycling, and disposal of construction and demolition debris (C&D) and identify measures to reduce solid waste generated by the project. I strongly encourage the Proponent to commit to C&D recycling activities as a sustainable measure for the project. The Proponent is reminded that any contaminated material encountered during construction must be managed in accordance with the MCP and with prior notification to MassDEP.**

This item is addressed in Section 6.13.8.

MEPA 140 **The project will be required to develop a Stormwater Pollution Prevention Plan (SWPPP) in accordance with its NPDES CGP to manage stormwater during the construction period.**

Each project will submit a Notice of Intent and develop a construction period SWPPP in accordance with the most current NPDES CGP. See Section 6.1.3.

MEPA 141 **The DEIR should describe stormwater management measures that will be implemented during construction. It should describe potential construction period dewatering activities and associated permitting (i.e., NPDES) and identify mitigation measures.**

See Section 6.1 and Chapter 7.0 Mitigation and Draft Section 61 findings.

MEPA 142 **All construction-period mitigation measures should be listed in the draft Section 61 Findings. I refer the Proponent to the comprehensive review of construction-period regulatory requirements in MassDEP's letter. The DEIR should describe how the project will comply with all applicable requirements.**

See Chapter 7.0 Mitigation and Draft Section 61 findings and Tables 7.3-1 and 7.3-2.

MEPA 143 **The DEIR should include a separate chapter summarizing proposed mitigation measures including construction-period measures. This chapter should also include a comprehensive list of all commitments made by the Proponent to avoid, minimize and mitigate the environmental and related public health impacts of the project, and should include a separate section outlining mitigation commitments relative to EJ populations.**

See Chapter 7.0 Mitigation and Draft Section 61 findings.

MEPA 144 **The DEIR should include a commitment to provide a GHG self-certification to the MEPA Office upon expansion of the terminal building signed by an appropriate professional indicating that all of the GHG mitigation measures, or equivalent measures that are designed to collectively achieve identified reductions in stationary source GHG emission and transportation-related measures, have been incorporated into the project.**

Pease see MEPA #12.

MEPA 145 **The DEIR should contain a copy of this Certificate and a copy of each comment letter received. It should include a comprehensive response to comments on the DEIR that specifically address each issue raised in the comment letter; references to a chapter or sections of the DEIR alone are not adequate and should only be used, with reference to specific page numbers, to support a direct response.**

A copy of the Certificate and each comment letter received is provided in **Appendix A.** Additionally responses are provided in this Chapter 10 Response to Comments.

MEPA 146 **In accordance with 301 CMR 11.16, the Proponent should circulate the DEIR to each Person or Agency who commented on the ENF, each Agency from which the project will seek Permits, Land Transfers or Financial Assistance, and to any other Agency or Person identified in the Scope. Pursuant to 301 CMR 11.16(5), the Proponent may circulate copies of the DEIR to commenters in a digital format (e.g., CD-ROM, USB drive) or post to an online website.**

A circulation list is provided in Appendix P.

MASSACHUSETTS HISTORICAL COMMISSION (MHC)

MHC 01 **It appears that these sites are not located within the direct project impact areas and could be protected and preserved from inadvertent construction-related damage or future land use damage through the development of an archaeological site avoidance and protection plan (ASAPP). MHC requests that an ASAPP be prepared and implemented. The draft plan should be submitted to the MHC for review and comment.**

Please refer to the responses to MEPA #76 and #77.

MHC 02 **The MHC looks forward to consultation with the FAA in compliance with Section 106 of the National Historic Preservation Act (36 CFR 800).**

Comment noted. The proposed Projects will undergo consultation with MHC in compliance with Section 106 of the National Historic Preservation Act.

MASSACHUSETTS DEPARTMENT OF ENVIRONMENTAL PROTECTION (MASSDEP) –SOUTHEAST REGIONAL OFFICE (SERO)

DEP 01 **The Project will require a Superseding Order of Conditions from the Department or a Final Order of Conditions from the local Conservation Commission before any activity commences.**

Comment noted. A Superseding Order of Conditions from the Department or a Final Order of Conditions from the local Conservation Commission will be received before any activity commences.

DEP 02 **An alternative analysis that demonstrates measures taken to avoid, minimize and mitigate for the dredging and fill must be submitted with the 401 Water Quality Certificate application.**

Future permit applications for the 401 Water Quality Certificate will include a detailed alternatives analysis. A summary alternatives analysis is provided in Chapter 4.0 relative to Taxiway D.

DEP 03 **The Project will result in approximately 21 acres of new impervious area, and as such, the Project is subject to the Stormwater Regulations at [310 CMR 10.05(6)(k)-(q)] and [314 CMR 9.06 (6)(a)-(f)]. According to the ENF, stormwater management for the proposed individual projects will comply with these regulations. The Stormwater Report will be reviewed by the Department as part of the NOI filing.**

A Stormwater Management required by specific project(s) will be prepared in accordance with MassDEP requirements and will be reviewed by MassDEP. Further, the projects will conform to 310 CMR 10.05 (6) regarding Orders of Conditions Regulating Work and Orders of Resource Area Delineation and 314 CMR 9.06 regarding Stormwater Discharges.

DEP 04 **The Project Proponent acknowledges its permitting coverage under National Pollutant Discharge Elimination System (NPDES) Construction Activities Permit under the Clean Water Act. The Project Proponent is advised it is illegal to discharge any pollutants to navigable waters of the United States from a point source unless the discharge is authorized by a National Pollutants Discharge Elimination System (NPDES) permit.**

Each project will submit a Notice of Intent and develop a construction period SWPPP in accordance with the most current NPDES CGP. See Chapter 8 - Regulatory Compliance.

DEP 05 **The stormwater section of the ENF does not know acknowledge states that the Project Proponent may require an EPA NPDES Multi Sector General Permit (Industrial Stormwater) Program (https://www.epa.gov/sites/production/files/2016-04/documents/sectors airtransmaint.pdf). Based on the Department's investigation, the Project Proponent is operating without the required permit that falls under the requirements of Sector S Vehicle Maintenance Areas, Equipment Cleaning Areas, or Deicing Areas located at Air Transportation Facilities.**

The Airport obtained MSGP coverage in 2021. A copy of the permit and supporting SWPPP is provided in **Appendix L.**

DEP 06 **The Proponent is advised in the event that the conveyances of stormwater through underground infiltration structures are planned that they are subject to the jurisdiction of the MassDEP Underground Injection Control (UIC) program. These structures must be registered with Mass UIC program through the submittal of a BRP WS-06 UIC Registration application through MassDEP's electronic filing system, eDEP. The statewide UIC program contact is Joe Cerutti, can be reached at (617) 292-5859 or at joseph.cerutti@state.ma.us. All information regarding online (eDEP) UIC registration applications may be obtained at the following web page under the category "Applications & Forms": https://www.mass.gov/underground-injection-control-uic.**

Each underground infiltration structure will be registered in accordance with the UIC program.

DEP 07 **Waste Water Management. Cape Cod Gateway Airport is required to demonstrate the ability to apply extinguishing agent as part of its FAA Part 139 safety certification. The capital improvements to the airport should include provisions to collect the wastewater containing the extinguishing agents generated during these demonstrations and/or training events so that proper treatment and/or disposal can occur in conformance with Massachusetts requirements.**

An ecologic cart is used for testing firefighting equipment to ensure that it is operational. Use of this cart prevents its release of foam into the environment. The Airport was the first airport in the Commonwealth to obtain such a cart in 2018.

DEP 08 **a. Prior to the anticipated construction activities, a MassDEP Release Abatement Measure (RAM) Plan should be submitted for the following areas:**

i. Taxiway B "Potential Aviation Development Area"

1. Based on a review of the Phase II for the Cape Cod Gateway Airport, some areas were not previously sampled for PFAS including the area under Taxiway B. The RAM should include a plan to sample and analyze soil beneath Taxiway B during airport upgrades for the presence of PFAS. The RAM shall also describe how the PFAS- containing soil, if detected, will be properly managed and discuss whether this finding affects the remediation options under R TN 4-002634 7.

2. The "Potential Aviation Development Area" along Taxiway B coincides with the asphalt caps located at the ARFF area and the Deployment area. These caps were installed to mitigate the leaching of PFAS from the soil to the groundwater. Any asphalt removed from the taxiway, including the capped area, should be sampled/analyzed for PFAS and managed appropriately if PF AS is found to be present. Furthermore, the RAM Plan should also include provisions to manage any PFAS-contaminated soils encountered under the cap.

3. The RAM Plan shall describe how the caps' integrity will be maintained during and after construction. The RAM Plan shall include a plan to replace the caps if the integrity of the caps cannot be maintained.

4. The RAM should also include a plan to sample the asphalt from both the taxiway and the asphalt caps for PF AS and, if detected, the RAM Plan shall describe how the asphalt will be managed.

This item is addressed in in Section 6.13. Pending the project sequencing, the work will be performed under the Preliminary Response Action or Comprehensive Response Action provisions of the MCP, as applicable.

DEP 09

ii. Taxiway A "Potential Aviation Development Area"

1. **Available records in MassDEP's files indicate that the 1991 drill location, located near the north end of Taxiway A, had documented use of AFFF. The area abutting the 1991 drill location is slated as "Potential Aviation Development Area". When development begins here, the RAM shall include a plan to sample disturbed soil in areas not previously sampled/analyzed. Further, the RAM Plan shall include the requirements for proper soil management if PFAS is detected.**

This item is addressed in in Section 6.13. When development begins for Taxiway A, MCP submittals will include a plan to sample and test disturbed soil in areas not previously sampled for PFAS. Further, this submittal will describe how PFAS-containing soils will be managed, if identified.

At this time, it is anticipated that soil will either be reused on-site during construction, stockpiled in accordance with the MCP for future reuse, or transported offsite for reuse, recycling, or disposal. While it is not expected that significant groundwater management will be encountered as part of this project, if groundwater is encountered it will either be recharged in accordance with local, state, and federal regulations, treated and discharged to surface water in accordance with requirements of the NPDES DRGP, or collected and transported offsite for disposal.

DEP 10 **iii. "Proposed Building" near the Terminal Ramp and North Ramp Some development is proposed within the disposal site boundary for R TN 4-0000823. The LSP should review the anticipated development to determine if a RAM Plan is required under 310 CMR 40.0000.**

This item is addressed in Section 6.13.

DEP 11 **b. Existing monitoring wells should be maintained for future assessment of groundwater for PF AS, 1,4-dioxane, and potentially other contaminants. If the wells cannot be maintained, then replacement wells should be installed.**

This item is addressed in Section 6.13. The Airport will maintain the existing monitoring wells to the extent feasible. Wells that cannot be maintained due to their location with respect to improvement effort will be decommissioned in accordance with MassDEP requirements and replaced, if necessary.

DEP 12 **Spills Prevention Control. A spills contingency plan addressing prevention and management of potential releases of oil and/or hazardous materials from pre- and post-construction activities should be presented to workers at the site and enforced. The plan should include but not be limited to, refueling of machinery, storage of fuels, and potential on-site activity releases.**

In accordance with Code of Federal Regulations 40, Subpart 112 (40 CFR 112), a Spill Prevention, Control, and Countermeasure Plan (SPCCP) is maintained by the Airport to minimize the risk associated with bulk storage and transfer of Oil and Hazardous Materials (OHM). The Airport also maintains a Stormwater Pollution Prevention Plan (SWPPP) in accordance with the U.S. EPA National Pollutant Discharge Elimination System (NPDES) Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity. Copies of the SWPPP and SPCC plans are attached in **Appendices L and M** respectively.

DEP 13 **Air Quality. Construction and operation activities shall not cause or contribute to a condition of air pollution due to dust, odor or noise. To determine the appropriate requirements please refer to:**

310 CMR 7 .09 Dust, Odor, Construction, and Demolition

310 CMR 7.10 Noise

Please refer to Table 7.3-1 for air quality measures to be implemented to mitigate the effects of the Project.

DEP 14 **MassDEP requests that all non-road diesel equipment rated 50 horsepower or greater meet EPA 's Tier 4 emission limits, which are the most stringent emission standards currently available for off-road engines. If a piece of equipment is not available in the Tier 4 configuration, then the Proponent should use construction equipment that has been retrofitted with appropriate emissions reduction equipment.**

Please see response to DEP #13

DEP 15 **MassDEP reminds the Proponent that unnecessary idling (i.e., in excess of five minutes), with limited exception, is not permitted during the construction and operations phase of the Project (Section 7 .11 of 310 CMR 7 .00). Regarding construction period activity, typical methods of reducing idling include driver training, periodic inspections by site supervisors, and posting signage. In addition, to ensure compliance with this regulation once the Project is occupied, MassDEP requests that the Proponent install permanent signs limiting idling to five minutes or less on-site.**

Please see response to DEP #13

DEP 16 **Hazardous Waste Management. If any occupant of the Project generates hazardous waste and/or waste oil, that entity must register with the MassDEP or EPA to obtain a permanent identification number, as applicable, in accordance with 310 CMR 30.000 for legally generating and managing regulated waste.**

In accordance with Code of Federal Regulations 40, Subpart 112 (40 CFR 112), a Spill Prevention, Control, and Countermeasure Plan (SPCCP) is maintained by the Airport to minimize the risk associated with bulk storage and transfer of Oil and Hazardous Materials (OHM).

DEP 17 **Source reduction, recovery, and reuse are recommended to significantly decrease or eliminate airport waste as well as an airport's operation costs for treatment and/or disposal. To determine the potential saving of these operational costs, a study should be made of all the airport's industrial and hazardous waste management. When completed this study would monitor inventory, pollutant streams, and ultimately how to maximize the potential to reduce pollutant**

loading/toxicity and how to reuse/recycle to the maximum extent feasible while complying with all requirements on a regular cycle for evaluation and permit re authorization.

This item is addressed in Section 6.13.8.

DEP 18 **MassDEP requests that the Proponent state specifically how the Proponent plans to address the Department's solid waste regulations concerning the disposal of materials resulting from proposed roadway work resulting from the proposed CWMP roadway-related construction.**

This item is addressed in Section 6.13.8.

DEP 19 **Compliance with Waste Ban Regulations: Waste materials discovered during construction (e.g., metal, asphalt, brick, and concrete) shall be disposed, recycled, and/or otherwise handled in accordance with the Solid Waste Regulations including 310 CMR 19.017: Waste Bans.**

The Airport ensures compliance with all applicable state regulations, including 310 CMR 19.017 through the contracting process. In addition, the Airport maintains its own "Guidelines for Construction and Alteration at Cape Cod Gateway" that are referenced in the construction contracts.

DEP 20 **MassDEP recommends the Proponent consider source separation or separating different recyclable materials at the job site. Source separation may lead to higher recycling rates and lower recycling costs. Further guidance can be found at:**

https://recyclingworksma.com/construction-demolition-materials-guidance/

The Proponent will consider incorporation of source separation in its contract language.

DEP 21 **Asphalt, brick, and concrete (ABC) rubble, such as the rubble generated during construction must be handled in accordance with the Solid Waste regulations. These regulations allow, and MassDEP encourages, the recycling/reuse of ABC rubble. The Proponent should refer to MassDEP's Information Sheet, entitled" Using or Processing Asphalt Pavement, Brick and Concrete Rubble, Updated February 27, 2017 ", that answers commonly asked questions about ABC rubble and identifies the provisions of the solid waste regulations that pertain to recycling/reusing ABC rubble.**

The Proponent routinely recycles asphalt millings and stockpiles for future use, as evidenced by the recent Runway 6-24 project during Summer 2023. To the maximum extent possible, that will be incorporated into these Project construction contract requirements as well.

DEP 22 **The Proponent should be aware that wood is not allowed to be buried or disposed of at the Site pursuant to 310 CMR 16.00 & 310 CMR 19.000 unless otherwise approved by MassDEP. Clean wood may be handled in accordance with 310 CMR 16.03(2)(c)7 which allows for the on-site processing (i.e., chipping) of wood for use at the Site (i.e., use as landscaping material) and/or the wood to be transported to a permitted facility (i.e., wood waste reclamation facility) or other facility that is permitted to accept and process wood.**

Comment noted.

DEPARTMENT OF ENERGY RESOURCES (DOER)

DOER 01 **Hyannis, which is located with Barnstable, is not a stretch code community. Baseline for this project, therefore, would be Massachusetts base code. Note, however, that an updated version of the Massachusetts commercial stretch code goes into effect on 1 July (herein called the "July 2023 commercial stretch code".) Because this updated code contains numerous provisions which deliver emissions reduction, we recommend that the project, as a mitigation measure, follow the provisions July 2023 commercial stretch code for the proposed expansion. (In addition, we recommend that the project adopt, as a mitigation measure, efficient electric space and water heating, more below.)**

In order to support the Airport's decarbonization goals, the Proponent would be willing to commit to the 2023 Stretch Energy Code measures. In lieu of modeling, the Proponent is committing to a series of GHG mitigation commitments. Should any future Energy Code Updates occur prior to the commencement of work, the Project will comply with future Energy Code Updates.

- High performing envelope that complies with the 2023 Stretch code envelope performance requirements;
- 100% heat pump space heating;
- Energy recovery ventilation per the 2023 Stretch code update;
- Electric domestic hot water heating, specific method to be determined. Heat pump domestic hot water heating to be analyzed;
- Roof to be constructed PV-ready;
- Installed electric vehicle (EV) charging spaces, quantity to be determined;

DOER 02 **Thermal breaks should be thoroughly incorporated into the design to ensure that the intended wall, window, and roof performance is being delivered. The project can use the thermal bridge accounting method described in the Building Envelope Thermal Bridging Guide2. This design guide now has a web-based database3.**

See DOER 01 response.

DOER 03 **We recommend adopting C406.8 of the July 2023 commercial stretch code as a mitigation measure for all buildings. This section requires air infiltration of 0.2 cfm/sf or less at 75 Pa, confirmed with testing in the field.**

See DOER 01 response.

DOER 04 **Ventilation energy recovery includes systems that recover energy in a building's ventilation system. Note that the July 2023 commercial stretch code increases the minimum ventilation energy recovery effectiveness to 75% for dwelling**

spaces, 70% for Class 1 and Class 2 exhaust, and 50% for Class 3 and 4 exhaust. A recommended above-code mitigation measure is to improve Class 3 and 4 exhaust effectiveness to at least 70%.

See DOER 01 response.

DOER 05 **Solar gains can be managed with a combination of external shading, set-back windows, reduced window aperture (e.g. "window to wall ratio"), and/or improved solar heat gain coefficient (SHGC) vision glass. We recommend using cooling TEDI to evaluate these strategies. Note that cooling TEDI limits are now mandatory for some building types in the July 2023 commercial stretch code.**

See DOER 01 response.

DOER 06 **The proposed terminal expansion can be readily fully electrified for space heating using air source heat pumps systems, which is recommended.**

See DOER 01 response.

DOER 07 **Service water can be readily fully electrified with air source heat pump water heating for the proposed terminal, which is recommended.**

See DOER 01 response.

DOER 08 **Rooftop PV can provide significant GHG benefits as well as significant financial benefits. Even if PV is not installed during building construction, it is important to plan the project to ensure that roof space is set aside for PV and that roof space doesn't become unnecessarily encroached with HVAC appurtenances, diminishing the opportunities for future PV.**

The Airport encourages tenants to consider rooftop PV during their construction projects. In fact, Griffon Avionics is in the process of installing rooftop PV to their building on Airport. The Airport encourages tenants to adopt sustainable building practices as part of our "Gateway to Green" initiative and to do their part to reduce environmental impact. Any modifications to the terminal building itself will ensure that the roof will be PV-ready.

DOER 09 **EV charging stations are critical for the continual transition towards electric mobility. Both EV charging stations and spaces that are EV ready are recommended.**

As a mitigation measure, we recommend providing EV equipment to at least 10-15% of the spaces and having at least 20-25% of spaces be EV ready.

See DOER 01 response.

DOER 10

1. A combination of high-performing, thermally broken envelope, heat recovery, and solar gain management should be used throughout with an aim toward reducing heating and cooling TEDI. Strategies to achieve this include:

a. Above code-threshold envelope (vertical walls, windows, roofs and exposed lower-level floors). Priority should be given to increasing continuous insulation and framed insulated wall sections.

b. Account for thermal bridges in assemblies. Use thermal bridge free assemblies and components to thermally break:

i. Hangers, girts, ties, and brick shelfs

ii. Intersections between balconies and vertical walls

iii. Intersections between the floor and vertical walls

iv. Transitions from wall to window

v. Parapets

vi. Vertical wall to vertical wall transitions (where the wall "turns")

c. Minimize glazed wall systems as much as possible. Avoid these systems where possible, as these are the lowest performing wall systems.

d. If glazed wall systems are used, evaluate systems having opaque the "spandrel" portion between R-4 through R-10. Opaque spandrel systems with performance higher than R-10 are not recommended as there are significant difficulties to achieving performance higher than this in practice. Consult https://thermalenvelope.ca/catalogue/ for pre-solved opaque curtain wall performance values. Note that the 2023 commercial stretch code now mandates that the vision portion of the glazed wall system has at least R-4 vision glass.

e. For all wall sections adjacent to office and similar spaces, use the thermal comfort tool to help evaluate reduction/elimination of perimeter heating systems. https://www.payette.com/glazing-and-winter-comfort-tool/

f. Reduce air infiltration to at least 0.2 cfm at 75 Pa per C406.9. Note that air infiltration testing is now mandatory.

g. Incorporate ventilation energy recovery with an effeteness of at least 70% for class 3 and 4 exhaust.

h. Manage solar gains with external shading and/or low solar heat gain coefficient (SHGC).

See DOER 01 response.

DOER 11 **2. Incorporate efficient electrification as follows:**

a. Utilize full electrification of space heating with air source or ground source heat pumps.

b. Utilize air source heat pump water heating.

See DOER 01 response.

DOER 12 **3. Develop the following proposed scenario:**

a. Building meeting July 2023 commercial stretch code

b. Air source heat pump space and hot water heating

See DOER 01 response.

DOER 13 **4. Evaluate incentives, including:**

a. Estimate of Alternative Energy Credits;

b. Estimates of MassSave® incentives, based on meeting with utility.

See DOER 01 response.

DOER 14 **5. Evaluate 80% rooftop solar PV readiness for all buildings. Evaluation should include creating building roof plans showing location of PV readiness areas and location of roof HVAC equipment and other appurtenances. Provide table showing areas needed for code required PV readiness and proposed, above-code PV readiness.**

See DOER 08 response.

DOER 15 **Provide EV equipment to at least 10-15% of the spaces and having at least 20-25% of spaces be EV ready.**

The Airport has committed to eight (8) EV charging stations as well as electric aircraft charging infrastructure.

DOER 16 **7. Include the following table for each proposed building (add rows as necessary):**

Project design for buildings has not progressed to be able to fill out the below table. As terminal building expansion is not anticipated for at least five years, this will be addressed when applicable.

	% of above grade vertical envelope	**U-value**
Framed wall		
Glazed wall system – vision		
Glazed wall system - opaque		
Operable fenestration (which is not part of glazed wall system)		
Inoperable fenestration (which is not part of glazed wall system)		
Doors		

CAPE COD COMMISSION (CCC)

CCC 01 **The DEIR should assess whether the taxiway relocation could be designed to avoid work within the wetland buffer, and if not, provide additional detail about potential mitigation.**

Section 4.1.2.1 provides a detailed alternatives analysis regarding Taxiway D relocation design. Potential mitigation for impacts is provided in Section 6.1.4.

CCC 02 **The Applicant should provide further detail on any proposed tree clearing, invasive species management and potential vernal pools across the Project site.**

Proposed tree clearing is quantified in Section 6.4.1.4 There are no potential vernal pools identified within the proposed project limits. These are identified in Figure 5.4-1.

CCC 03 **The Applicant should use available water quality monitoring data to demonstrate whether installed stormwater management systems are performing as designed in these areas.**

See response to MEPA #66.

CCC 04 **The proposed Project would increase impervious surfaces by approximately 21 acres over current conditions. While the ENF includes goals to create no net increase in stormwater runoff, provide treatment where needed, and follow post-construction best management practices ("BMPs"), additional detail should be provided in the DEIR.**

The airport currently utilizes many types of drainage structures and different types of proprietary stormwater BMPs on the airport for conveying and treating stormwater runoff. Final design for each of the proposed runway and taxiway projects will incorporate project specific devices similar to those currently in use on the airfield to convey and treat stormwater runoff. All devices used shall be in conformance with MassDEP requirements. Please see Section 6.1.2.1 for a discussion on conceptual stormwater management design and compliance with MA Stormwater Management Standards.

CCC 05 **Commission staff recommend the Applicant specify which stormwater treatment systems will be used, installation location, capacity, and treatment performance.**

Final design for each of the projects identified in the AMPU will require the designer to specify each stormwater treatment device including location, capacity, and treatment performance. Each infiltration system will require pretreatment of

stormwater runoff to remove a minimum 80% TSS prior to discharge into each proposed infiltration system. Each system will be designed in accordance with MassDEP standards.

CCC 06 **The DEIR should also include any available stormwater management plans and assess whether additional units could be added to treat runoff and capture pollutants.**

Additional leaching basins will be required to accommodate runoff from new runway and taxiway pavements. Final design for each of the proposed projects will include pretreatment devices to remove a minimum 80% TSS as required by MassDEP prior to discharging into underground leaching systems.

CCC 07 **The ENF indicates that analysis of wastewater generation and treatment changes will be developed in the EIR process. The Applicant should include this analysis for review, and coordinate with the Town of Barnstable to ensure there is adequate sewer capacity to accommodate any additional flow.**

The project is still in a planning phase, and design for buildings has not progressed to be able to determine meaningful wastewater generation volumes. As the terminal building expansion is not anticipated for at least five years, the Airport will, in the future, once design is advanced, coordinate with the Town of Barnstable to ensure there is adequate sewer capacity to accommodate any additional flow.

ROBERT WRITENOUR, TOWN OF YARMOUTH (RW)

RW 01 **We take this opportunity to note that in our earlier comments, we took exception to the use of a 15 percent margin in the runway length analysis for wet and contaminated runway surface conditions for turbojet-powered aircraft under takeoff conditions. This is contradictory to the FAA guidance, which allows for this margin only for landing runway length requirements.**

Because the Airport is currently served by JetBlue Airlines and specific business jet operators, we strongly recommend that the scope of work incorporate the following text for the Purpose and Need section:

JetBlue Airlines and known and specific operators of business jet aircraft based at or that frequently use the Airport be queried with respect to (1) frequency of flight/weight restrictions and cancellations experienced due to the current Runway 15-33 length, and (2)the required runway lengths (takeoff and landing) to serve their current and anticipated specific aircraft models and equipage, and flight mission when operated in accordance with their Federal Aviation Administration (FAA) approved flight operations manual.

In the event these operators are unable to provide this data, it is available from commercial sources as opposed to interpretation of the generalized aircraft performance charts offered by the FAA and/or aircraft manufacturers. These commercial sources often serve as flight dispatchers for airlines and high-performance aircraft users and, consequently, have the ability to provide an equivalent level of data to support the analysis of the required runway length for specific aircraft and equipage, and flight missions when these aircraft operate at the Airport.

Comment noted.

RW 02 **Should any extension to the length Runway 15-33 be justified as described above, the scope of work for the environmental reports should re-examine those options presented in the AMPU to provide that length for takeoff and landing. In this regard, we note that the AMPU presents a "balanced" approach to lengthening the runway at each end so as to equalize the distribution of aircraft noise impacts on communities northwest (Barnstable) and southeast (Yarmouth) of the Airport in terms of its size (area of impact). However, in our opinion, this "balanced" approach failed to consider the extent and density of residential land use in these impacted areas. Observation of aerial views and the source of continuous noise complaints from residents clearly demonstrate that areas to the southeast of the Airport are more impacted by aircraft noise. Our earlier comments on the AMPU suggested that the then proposed extension of Runway 15-33 and that which we**

determined in our independent analysis take this and other factors into consideration. Accordingly, we offered a more preferred solution that would result in lesser aircraft noise impact on land uses to the southeast of the Airport.

During the course of the public meetings since the submittal of the ENF the Airport revised its proposal to extend Runway 15-33 by eliminating the proposed 400-foot extension at the Runway 33 end. This reduces the overall proposed extension to just 895 feet (versus 1,295 feet as recommended in the AMPU), all of which is proposed for the Runway 15 end. Extending Runway 15 end, with no proposed extension at the Runway 33 end, effectively results in departing aircraft flying slightly higher over properties located southeast of the airport. Higher aircraft are theoretically slightly less noisy than would otherwise occur under existing conditions.

RW 03 **Consequently, we recommend that the scope of work for the environmental reports that address alternative means to provide a runway extension, if any is justified, be incorporated as indicated in the text below.**

Alternative means to provide the required runway length should consider balancing community aircraft noise impacts that take into consideration the location and density of residential development in areas surrounding the Airport. To the extent feasible and consistent with FAA airport planning guidance, runway extension alternatives that maximize the extension of Runway 15-33 to the northwest (Runway 15 end) be particularly evaluated. The continued application of displaced runway landing thresholds should be included in these analyses, especially at the Runway 33 end.

See RW 02. Additionally, please note that displaced thresholds are maintained on Runway 15-33 as described in Chapter 3.0.

RW 04 **Although not included in our earlier comments, we recognize the concern of our citizens that the use of average annual day-night aircraft noise contours is insufficient to address their concerns. This has been and continues to be a topic of considerable research by the FAA and others, and additional means to depict aircraft noise impacts are of value in assessing this component of the environmental reports. Consequently, we recommend that the following text be incorporated in the scope of work for applicable sections of the environmental documents.**

Aircraft noise impacts should include the average annual day-night contours shown as the 55 Ldn through 80 Ldn in five-level increments, as well as single-event contours for the same Ldn increments as applicable to a range of aircraft types. These include the Embraer 190AR and Airbus A320 Classic as operated and configured by JetBlue Airlines; Cessna 402C and Tecnam P2012 Traveler as operated by Cape Air; Gulfstream JV, Bombardier Global 5000, King Air 200, and

Cessna 172. These contours should be presented for the existing flight routes commonly flown at the Airport on each of the four runway ends, and for any future flight path recommended for aircraft noise mitigation measures. In the event that the FAA noise model database does not include these aircraft types, comparable aircraft models should be utilized. The intent of these single-event aircraft noise is to better reflect the aircraft noise impact that residents experience on a daily basis.

A detailed noise analysis conducted with the FAA-approved Aviation Environmental Design Tool (AEDT) modeling software for predicting DNL sound level impacts from airports (as required by the Code of Federal Regulations, Title 14, Part 150 FAA) has determined that cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of the Day Night Average Sound Level (DNL). Sections 5.9 and 6.6 provide details on this analysis on existing and proposed conditions, respectively.

RW 05 **we earlier encouraged and gained the support of the Airport and the chief of the air traffic control tower to evaluate a standard instrument departure procedure for Runway 15. Accordingly, we request that the scope of work for the environmental reports include the following text:**

Aircraft noise impact mitigation measures should include a feasibility study of the implementation of a standard instrument departure procedure for Runway 15 that serves to provide a definitive flight path and altitudes that minimize aircraft noise impacts on residential land uses southeast of the Airport. The feasibility study should utilize applicable FAA Orders and take into consideration the use of the airspace by aircraft operating to and from other airports in the region and radar coverage limitations as a means to define waypoints and/or ground-based navigational aids for the recommended procedure. Up to three alternative standard instrument departure procedures may be evaluated. Aircraft noise contours may be incorporated in the analysis to qualitatively and quantitatively demonstrate the mitigation results. The alternative procedures will be reviewed with the Airport and air traffic control tower staff in the early and interim phases of the study, and then as part of identifying the preferred instrument departure procedure.

When determined to be beneficial in reducing aircraft noise impacts, the recommended standard instrument departure procedure should be referred to the FAA for its final design and implementation. The schedule for such procedure implementation is subject to FAA internal coordination, however, its need should be included as a condition of the approval of the recommended capital projects evaluated in the environmental documents.

Additionally, a graphic of the Airport-suggested voluntary aircraft noise abatement flight routes be prepared to accompany the current text as a means to better inform pilots and enhance aircraft noise mitigation measures. The analysis of aircraft noise impacts may signal a need to modify the existing voluntary noise abatement program.

FAA prohibits restrictions from the Airport on flight paths, hours of operation and restricted access to airports. Federal law prohibits restricting the route by which an aircraft has access to the airport to aid in noise abatement. As discussed in Section 5.9, the Airport has a long-standing voluntary noise abatement flight procedures for visual flight rules. These procedures are periodically re-evaluated and updated as necessary.

Additionally, there are voluntary quiet hours between 10 p.m. and 6 a.m. when airport users are encouraged to restrict their flights. Touch and go nighttime flights are also prohibited. These noise abatement measures are guided by safety considerations as well as federal law. Ultimately, pilots must have control over their flight procedures to ensure safe takeoff and landings based on weather conditions and aircraft capabilities. The Airport coordinates with all users of the airport to mitigate noise issues and maintains multiple ways to report complaints when made including in person, over the phone and online reporting (see https://flyhya.com/pilot-info/noise-abatement/).

With regards to consideration of noise mitigation for current and future operations, the Airport will consult with FAA and primary Airport air taxi operators such as Cape Air on flight path modifications that may serve to minimize noise impacts.

RW 06 **Higher aircraft activity levels and the increased area of impervious surfaces associated with the proposed capital projects at the Airport introduces larger volumes of water runoff that need to be accommodated and treated before release. Additionally, Airport firefighting operations generate volumes of PFAS (per- and polyfluoroalkyl substances) contaminant, as does normal aircraft deicing activity. These impacts should be addressed in their respective portions of the scope of work for the environmental documents. At this time, we have not identified specific text for this component of the environmental documents. Our intent is to highlight this concern so that it may be addressed.**

Details regarding how the Airport is addressing stormwater management and potentially contaminated sites are provided in Sections 6.1 and 6.13.

HYANNIS PARK CIVIC ASSOCIATION (HPCA)

HPCA 01 **Since the inception of the Master Plan process, all dissemination of information has strictly been formalized in legal notification formats. Community Work Groups were halted. In lieu of our CWGs, we were invited to Airport Commission meetings. These meetings were no longer friendly, Hyannis Park-centric discussions. We became interlopers, devoid of any "standing" in these meetings. We sent representation to keep some semblance of a dialogue. But no one was listening. We were told that pilots could not be briefed about flights over our Park. They were now autonomous. Our complaints were viewed as petty. We were deemed "noise sensitive." We are being sacrificed.**

Comment noted. All public outreach for the Draft EA/EIR process is identified in Chapter 9 – Public and Agency Coordination and has extended beyond legal notification formats.

HPCA 02 **Air traffic noise is a problem. Single event noise testing would be more appropriate to evaluate noise levels. Many residents cannot sit on their porches or patios because of singe-event noise. Conversation interruptions are commonplace. Those of us who work remotely are interrupted in our remote conferencing. This is a real problem. Residents have stopped complaining to the Airport, because no solutions are being offered. This had not been the case with previous administrations. Pilots were talked to and advised before taking off to respect the relative quiet of our neighborhood.**

The noise contours that were initially presented in the Master Plan presentation (not the ones presented at the MEPA presentation) were shocking to our community.

The proposed Projects are not anticipated to generate an increase in different aircraft operational activity at the Airport. Consequently, impacts to community noise levels are not expected. Based on the future runway conditions using the above referenced operations data, AEDT modeling indicates that the 70 and 75 dBA DNL contours are entirely within the Airport property. The 65 dBA contour slightly extends into the commercial land use across Yarmouth Road, similar to the no-build conditions.

Figure 6.6-2 shows that the 65 dBA DNL sound contour generally falls within the airport property, extending just beyond the property to the east near Yarmouth Road and to the west by Independence Drive. These commercial facilities are all below a DNL of 70 dBA, which is the noise compatibility threshold of commercial land uses.

Please refer to Section 6.6 for additional details on the noise analysis.

HPCA 03 **The second issue and the most devastating is the contamination of our Mill Creek. Cape Cod Gateway Airport shares the Lewis Bay Watershed with Hyannis Park. Whatever toxic spills occur on the Airport flow to our homes. The fragility of our shared watershed is well documented in Cape Cod Commission documents. With Yarmouth's Hyannis Park directly downstream of the Airport, this has proven to be disastrous. In the case of Mill Creek, we were never notified by any entity of our exposure to PFAS. We learned of the contamination from a Silent Spring Institute webcast that cited the research by Harvard's T.H. Chan School of Public Health entitled "Isolating the AFFF Signature in Coastal Watersheds Using Oxidizable PFAS Precursors and Unexplained Organofluorine", by Bridger J. Ruyle,* Heidi M. Pickard, Denis R. LeBlanc, Andrea K. Tokranov, Colin P. Thackray, Xindi C. Hu, Chad D. Vecitis, and Elsie M. Sunderland, Environ. Sci. Technol. 2021, 55, 3686−3695. … We need a real remediation solution in order for Mill Creek to eventually clear out. Capping the Airport plume is inadequate when considering the downstream contamination.**

Comment noted. The Airport is working with the Town on addressing mitigation at the Maher Wells.

HPCA 04 **Any expansion of operations into our already inadequate buffer zone is deemed unacceptable.**

There is no proposed expansion of airport operations beyond the current airport property boundary. Potential easement acquisition on a willing seller basis only to enhance safety within the Runway Protection Zones is proposed as discussed in Section 3.3.

PAUL PHALAN (PP)

PP 01 **1-The sound testing presented so far has been shoddy, old and inaccurate!**

It is unclear what this comment is referring to relative to sound testing, as it does not provide any information on what "sound testing" it is referencing.

The Project team refers the commenter to Section 5.9 and Section 6.6 for a discussion of the noise analysis conducted as part of the EA/EIR process.

PP 02 **3-the proposed work isn't required by the FAA!**

This comment is inaccurate. The FAA requires airports to strive towards compliance with airfield design, capacity, and safety standards, which are contained within FAA's Advisory Circulars, regulations, standards, and policies. The Master Plan update is a precursor to qualifying projects for FAA and State funding, as well as to assess the airport's facility requirements based on the users of the airport, and compliance with FAA standards.

We respectfully suggest that the commenter review the FAA resources on its webpage for Airport Planning and Capacity to learn more:

https://www.faa.gov/airports/central/planning_capacity

PP 03 **4-the CCGA is empty every day I drive by. It has periods in the summer of being busier. This project is only beneficial to a few corporations and affluent citizens!**

We note the anecdotal information provided by the commenter; however, it is not substantiated.

SUSAN SULKOSKI (SS)

SS 01 **I find the proposed plan a more than fair compromise to the neighbors of 15-33 and a necessity for safety and a thriving community. The airport has worked very hard to address current and future environmental issues. I believe they will continue to do so.**

Comment noted.

THOMAS SULLIVAN (TS)

TS 01 **The Barnstable / Gateway Airport has a long history of pollution on the ground. A plume was discovered in front of the old terminal and was moving in an easterly direction. Today that same plume which starts at the Cape Air Hangar, has immigrated off the Airport to the Mahar Water Wells. The Town of Barnstable had to spend 500,000 dollars to put in a Water filtration system to clean out the contaminants, contrary to what the airport is saying that the plume didn't go to the Marhar water wells; the same wells are now showing PFAS contamination. …Any extension of 15/33 should require all groundwater pollution to be removed adjutant to Runway 15/33 to include Lead contamination from the Cesena 402s owned by Cape Air. It has been found in the Storm Water runoff system, before any project is approved.**

Please see Section 6.13 for a discussion of construction period mitigation measures relative to managed release sites at the Airport.

TS 02 **Upper Gates Pond sits in between both runways. The Stormwater system discharges into this pond. It was discovered that the pond had high levels of lead in the pond sediment, and the decision was made not to remove the sediment because it's sitting on top of the aquifer. With Delta Taxiway modifications being planned, Upper Gates Pond sediment should be eradicated before it seeps into the Aquifer.**

Evaluation of sediments in Upper Gate Pond will be conducted as part of the ongoing Phase II site assessment of this area.

TS 03 **With Modifications to Delta Taxiway and a New Engine run up area, the present plan is not acceptable. The Run-up pad should be in-closed to suppress the sound to support turbine and piston aircraft. The Airport is located in a densely populated area.**

The proposed runup pad moves the location of run-up pad closer to the airfield and runway. A proposed noise barrier is being evaluated for sound mitigation and attenuation.

TS 04 **I mentioned at the public hearing that it was brought to my attention that the Army/ Navy buried lots of materials before they gave the airfield back to the Town. The Army/Navy used the field from 1940 to 1946 for flight training. The mentioned items are vehicles, the fuselage of aircraft, and 55 gallons drums. It was mentioned at the public meeting that the Airport, through Ground Wave Sonar, detected an anomaly in the ground near runway 06. This has to be further investigated, and if any buried items are found, they must be removed along with any ground contamination. It was also mentioned at the hearing that there are**

several areas at the airport where items are buried; this also has to be investigated, and remedial action must be taken before the airport can expand the runways and taxiways.

Recent reconstruction and grading of Runway 6-24 in summer 2023 has not identified any buried materials. The Airport's Licensed Site Professional of record, Horsely Witten Group, has not identified such buried materials in their site investigations. Construction period material management is discussed in Section 6.13.

TS 05 **The Airport showed a slide of the present noise contours. The contours need to be updated since they were made in a study in 1998 with Cape Air piston aircraft, using Cape Air Pilots. The owner of Cape Air was a member of the Barnstable Airport Commission sub-committee at the time and had a finical interest in the study since his HQ is located at the Airport. Cape Air should never have been used.**

A new Noise Study (Part 150) should be conducted with a mix of Piston aircraft and Turbines, including Commercial and Corporate Jets. The study would have to include different Turbine Stages, especially Stage 1 aircraft since the airport now allows them into the airport. A new Part 150 would also show an increase in the 65 noise area around the airport and an expansion of the Flight Paths into the Town of Dennis and Harwich, possibly putting an air restriction over the Towns as the Airport has over the Town of Yarmouth with no Easements granted. The Town was denied by the Airport and FAA to allow a wind Turbine to be put up at the Landfill.

A detailed noise analysis conducted in accordance with Code of Federal Regulations, Title 14, Part 150 was completed with the FAA-approved Aviation Environmental Design Tool (AEDT) modeling software for predicting DNL sound level impacts from airports. modeling software. FAA has determined that cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of the Day Night Average Sound Level (DNL). Sections 5.9 and 6.6 provide details on this analysis on existing and proposed conditions, respectively.

TS 06 **There is an Alternate site for this Airport and that site is at Otis where it should be moved.**

This alternative is discussed within Section 4.1.1.8 and identified as Runway 15-33 Alternative 6 – Closure of Cape Gateway Airport and Operational Shift to Joint Base Cape Cod.

CHRISTINE GREELEY (CG)

CG 01 **This truly is a "If you build it, they will come" proposal.**

Yarmouth derives no benefit from their operations, but incurs environmental issues and impingement on the quality of life in our town.

FAA provides funding to airport projects via a Capital Investment Plan (CIP) covering a 5-year plan that lists projects intended for that period. Funding is derived from FAA's Airport Improvement Program (AIP), and guidelines are presented in FAA's AIP Handbook. The requirements/justification to receive project funding per the AIP Handbook is accessible via the following link:

https://www.faa.gov/sites/faa.gov/files/AIP-Handbook-Order-5100-38D-Chg1.pdf

FAA can only add airport infrastructure projects to the CIP if they are justified based the following three basic tests in contained in the FAA AIP Handbook, Table 3-4:

1. The Project Advances an AIP Policy;
2. There is an Actual Need; and
3. The Project Scope is Appropriate

The FAA is not allowed to fund projects or project elements that are not justified based on the three tests listed above and further explained in the AIP Handbook Table 3-4 (Page 3-7)..

To be eligible for FAA funding, a runway extension needs to be justified based on documented actual need, and not "speculative" as in "if you build it, they will come". The need for the proposed runway length extension is based on FAA's guidance for determining the runway length recommendations for the existing families of aircraft currently using the airport. Runway length recommendations are discussed in detail, along with backup data and analysis, in Chapter 5 -Facility Requirements of the Master Plan update (included within Appendix B).

The statement that "Yarmouth derives no benefit from [the airport's] operations is inaccurate. The leases and services offered at the Airport contribute to the economic output of the Airport and more importantly, to Barnstable and the Cape Cod region as a whole. Cape Air is the third largest employer in Barnstable (behind only Cape Cod Hospital and the municipality itself). MedFlight operates out of the Airport, providing key emergency response medical services, along with the U.S. Coast Guard (USCG). The Airport supports a total employment of 2,135 people with a total payroll of

$85,358,000, money that is returned to the community in the form of purchases from local business, rent, taxes, etc. Please refer to the discussion of key Airport services in Section 1.3.

CG 03 **Runway 6/24 will be closed for the majority of 2023 as an extension and runway improvements are undertaken. Why then, with that new FAA standards runway, is an additional runway truly needed to meet the hoped-for arrival of jets they are trying to attract?**

Runways are constructed to align with historical wind patterns specific to each airport because aircraft land and take off into the wind. Appendix B of FAA's AC 150/5300-13B – Airport Design provides design guidance for determining the necessary runway configurations to address wind patterns.

Accurate analysis of the wind coverage adds substantially to the safety and utility of an airport. Airport planners and designers conduct an accurate wind analysis to determine primary runway orientation and coverage, and if a crosswind runway is necessary at an airport.

The desirable wind coverage for an airport is 95 percent of the time based on the total number of weather observations during the recording period of at least ten consecutive years. If the primary runway orientation provides less than 95 percent wind coverage, a crosswind runway is needed. Specific information and wind coverage analysis to support the current runway configuration at CCGA is contained in the Master Plan – Section 5.2.5 Runway Orientation.

We also note: Runway 6/24 was temporarily closed for reconstruction in Spring/Summar 2023 and was not extended. No additional length is being added to Runway 6/24 as part of the current project.

Why would it not be more appropriate to open the new runway, clean up and further assess the significant environmental issues of the entire site and see what demand will truly be. Then take a look at what and where there is need?

The alternative site repeatedly mentioned would be at Otis where so many of the issues are either already addressed or not a concern.`

This alternative is discussed within Section 4.1.1.8 and identified as Runway 15-33 Alternative 6 – Closure of Cape Gateway Airport and Operational Shift to Joint Base Cape Cod.

CG 04 **Runway 6/24 is already a deeply concerning hazard given the major roadway and busy shopping plaza at its end. There does not need to be increased air traffic in such vulnerable areas that abut both runways at this airport.**

Air traffic for Runway 6-24 is not anticipated to increase as a result of the proposed Projects. Overall, the Master Plan forecasts shows enplanements and operations slightly increasing from the baseline of 67,350 (operations) in 2020, to 67,219, and 68,804 in 2025 and 2030 respectively. Please refer to the Master Plan Section 4.6.2 Forecast Methodologies and Section 4.6.2 Growth Influencers for details on these projections.

Please see discussion in Section 3.3 regarding Runway Protection Zones - the protective area maintained off of the runway end, along with the installation of EMAS system, to address concerns with airplane overruns on the Runway 6 end.

CG 05 **I believe that the Noise Contours diagrams presented with this project are significantly flawed as they are based on averaging events at this airport in such a way as to make the contours look smaller and insignificant. A Noise Study based more realistically on actual air traffic hourly patterns and the actual seasonal nature of air traffic would show that the true contours and range of noise pollution is occurring in seriously larger areas to higher numbers of abutters.**

A detailed noise analysis conducted in accordance with Code of Federal Regulations, Title 14, Part 150 was completed with the FAA-approved Aviation Environmental Design Tool (AEDT) modeling software for predicting DNL sound level impacts from airports. modeling software.

FAA has determined that cumulative noise energy exposure of individuals to noise resulting from aviation activities must be established in terms of the Day Night Average Sound Level (DNL). Please refer to FAA's webpage on the use of DNL here https://www.faa.gov/faq/what-dnl-and-why-does-faa-use-it

Sections 5.9 and 6.6 provide details on this analysis on existing and proposed conditions, respectively.

CG 06 **The idea of expanding this runway for more uncontrolled air traffic so closely over our homes is a major environmental issue- for noise and any fuel residue/emissions pollution generated during take-offs and departures! This is something that needs much more study and documentation before any runway expansion.**

See CG 05 response and Sections 6.3 and 6.6 of this document for a discussion of Air Quality analysis and noise analysis.

BETTY LUDTKE (BL)

BL 01 **While I find the ENF to be well written and comprehensive, I believe a viable alternative has not been appropriately studied. My request, as we move forward to the Draft Environmental Impact Report (DEIR) stage is to include this alternative. That alternative is the joint use of the airfield at Joint Base Cape Cod. On our current path, we are committing a substantial amount of resources to expand operations at the already congested Cape Cod Gateway airport. Before we do this, we should study a joint use solution at the air eld at Joint Base Cape Cod.**

This alternative is discussed within Section 4.1.1.8 and is identified as Runway 15-33 Alternative 6 – Closure of Cape Gateway Airport and Operational Shift to Joint Base Cape Cod.

DONALD ENGLERT (DE)

DE 01 **In addition to constant noise pollution from the planes a big concern is potential pollution of Mills Creek and Lewis Bay resulting from plane exhaust.**

The Airport does not currently have any information to suggest that potential pollution in Mills Creek or Lewis Bay is the result of plane exhaust.

We note that FAA's Environment and Energy Emissions Division (AEE-300) supports efforts to achieve a quiet, clean, and efficient air transportation system. Relative to that goal, FAA's AEE-300 works with the Aviation Sustainability Center (ASCENT), the FAA's Center of Excellence (COE) for Alternative Jet Fuels and Environment. The FAA is supporting Research and Development (R&D) to develop new aircraft and engine technologies, and evaluate sustainable aviation fuels (SAF). Technologies developed by this program will result in a fleet of aircraft that have lower noise, use less fuel, and produce fewer emissions. Information on the ASCENT center can be accessed from https://ascent.aero/

ELISSA BUJA (EB)

EB 01 **This "Gateway" needs to worry about current problems before creating newer, larger ones.**

We acknowledge the comment, but note that it reflects an opinion rather than a question.

LUCINDA VAN DOREN-ABRECHT (LDA)

LDA 01 **I am very concerned about all the gas, oil and other plane and jet emissions that are being released and filtering down on our homes, residents and vegetable gardens. What exactly are we being exposed to daily and has anyone thoroughly researched these ill effects?**

Air quality is regulated by EPA, and under The Clean Air Act, EPA is required to set National Ambient Air Quality Standards (NAAQS) for six common air pollutants (also known as "criteria air pollutants"). The proposed Project's compliance with EPA's air quality regulations is provided in Section 5.6

We note that FAA regulates emissions from aircraft and currently Federal actions are underway to reduce the footprint of the aviation sector. See FAA' webpage https://www.faa.gov/sustainability

Among FAA's efforts includes investments in sustainable aviation fuels (SAFs) produced from renewable and waste feedstock that provide the greatest impact to reduce greenhouse gas emissions.

LDA 02 **...research has shown that the Lead levels [Pb] in children's blood are significantly higher in children living closer [1 1/2 mile radius of airport] than children who live farther away. This was shocking and I had to do my own research on this, which I suggest you do as well. The study revealed aviation gasoline is currently the largest source of air pollution by Lead in the U.S.. Lead's toxicity is known for adversely affecting the nervous system, immune system and kidney function, as well as interfering with the reproductive and developmental systems and the cardiovascular system. This Lead, although banned from automobile gasoline, is still present in aviation gasoline. This alone should be of utmost concern.**

Public health concerns are discussed in Section 6.12. Data specific to the community around Hyannis was analyzed. The above comment cannot be independently verified relative to the Cape Cod Gateway Airport. Furthermore, jet fuel (commonly used Jet A and Jet A-1) is not leaded, and only piston-engine powered aircraft use leaded fuel (i.e, avgas) .g., 100LL). The proposed Projects are not expected to result in an increase in aircraft that use avgas

We also note that "The FAA is committed to removing lead from aviation gasoline without adversely affecting the safe and efficient operation of more than 220,000 general aviation aircraft. The Environmental Protection Agency's endangerment finding requires the FAA to regulate fuel composition and with this decision, the FAA will initiate rulemaking aimed at controlling or eliminating aviation lead emissions from piston engine aircraft.

The transition to a new fuel is a national initiative and it is important for the safety of aviation that 100-octane low-lead fuel continues to be available for piston engine aircraft that require its use.

For more information on FAA's EAGLE Program (Eliminate Aviation Gasoline Lead Emissions), can be found here https://www.faa.gov/unleaded.

LDA 03 **Of course I also would like to address the enforcement of flight paths and who would be accountable for enforcing that.**

The FAA's Air Traffic and Flight Procedures are accountable for flight paths.

We also note that flight paths are established based on runway orientation, surrounding terrain and navigational aids at a given airport.

The FAA encourages airports to establish voluntary noise abatement procedures, these cannot jeopardize aircraft operational safety and therefore are not always feasible.

LDA 04 **Secondly, how will toxic chemicals be tested for on a yearly basis in surrounding water sources and grounds, and who would be held accountable for that.**

The Airport has collected over 125 soil samples and 187 groundwater samples for PFAS analysis. The network of groundwater monitoring wells will be maintained and samples taken in accordance with MassDEP requirements under the Massachusetts Contingency Plan. Please see https://flyhya.com/airport-info/pfas/ for all available reports and methodologies as reported to MassDEP.

ANONYMOUS (AN)

AN 01 **The noise will greatly increase and have a horrible impact on quality of life, environment and NOISE in our small, middle class neighborhood. At a time when climate crisis is having big impacts on the Mid-Cape and the environment being degraded with algae and bacteria blooms, it is no time to increase noise and pollution in this area of the Cape. Additionally the plans to rejuvenate the bog/vegetation near Cape Cod Hospital to improve the environment, the Airport would take away and delete any improvements by that expensive and much needed project.**

Noise analysis results indicate that noise levels will not increase in residential areas as discussed in Section 6.6. The Airport project will have no impact on environmental restoration projects proposed elsewhere.

AN 02 **Additionally, this airport has LOST airline usage over the last 10 years and there is LESS of a need for air travel moving forward. With the electrification of personal vehicles and the tremendous cost to the climate of air travel, this plan goes against what the area will need over the next 10-30 years.**

As detailed in Chapter 2.0, the need for each Project is identified and discussed in detail. Decrease in operations is discussed in Chapter 1.0.

RICHARD MIKOLAJCZAK (RM)

RM 01 **By increasing the airport in Hyannis is absolutely NOT necessary…Why not bring the train in on a full time schedule instead of only the summer? More people that actually live here and can afford transportation would be happy to use another option to go to Boston other than a bus, car or plane.**

Comment noted. To clarify, the Airport is not expanding beyond its current property boundary nor implementing projects designed to increase operational capacity. The Airport cannot speak to rail operations and schedules and would refer the commenter to MassDOT Rail and Transit Division and the Massachusetts Bay Transportation Authority.

ROBERT BERRY AND KATHLEEN BENSON (RK)

RK 01 **Assuming the airport is wholly owned by the Town of Barnstable, it appears that the Town will ultimately be responsible for bearing the entire cost of the expansion of the airport including financing costs (which could entail a bond issue unless the Town receives funds from the FAA's AIP program).**

The issue facing the Airport and the Town is the proportion of the cost of expansion borne by those using the airport and that borne by the Town itself.... It is unclear why the Town and its residents, not airport users, should cross-subsidize the proposed expansion.

The Airport operates as an enterprise fund, and is financially self-sufficient from the town in meeting its operating obligations and future infrastructure needs.

RK 02 **Moreover, the reason for expansion implies use by larger aircraft.**

The Projects are based on the need to reasonably accommodate existing and anticipated aviation demand for the current families of aircraft, FAA and MassDOT safety and security requirements, and Airport financial self-sufficiency. The Airport is not proposing infrastructure to support the use of larger families of aircraft.

RK 03 **To justify the expansion, the Airport Commission should have completed a cost-benefit analysis similar to that required under the FCC AIP. There appear to be three potential reasons: first, to accommodate larger planes, given current demand; second, to accommodate increased expected demand due to local air traffic (i.e., with a destination of Barnstable or Nantucket); or third, to accommodate larger planes in order for the Airport to assume a larger role in serving neighboring areas as a 'micro-hub'.**

No change to the size of the aircraft serving the Airport is proposed. Please see Section 2.2 for a detailed discussion on the need for the project.

RK 04 **With respect to the second issue of increased traffic to local destinations (i.e., the Cape and Nantucket) independent of the relative price effect, the source of the increased demand is unclear. There seem to be two potential sources: first, the offer of first class seating in a larger plane; and second, the expansion of existing on-Cape resorts or building of new resorts.**

See RK 03 above.

RK 05 **The apparent absence of the expansion of the Sagamore Bridge from Federal infra-structure legislation does imply that car traffic and bridge wait times will increase which will favor air traffic. However, if the Airport Commission supports the runway expansion to accommodate such increased demand, how does the**

Commission serve interests of year-round residents, particularly those under flight paths? Instead, if possible, the Commission should consider serving such interests by directly limiting landings or indirectly limiting by, for example, imposing an annual charge to recover expansion costs from all potential carriers, which while inefficiently discouraging entry serves the (equity) interests of year-round residents.

The leases and services offered at the Airport contribute to the economic output of the Airport and more importantly, to Barnstable and the Cape Cod region as a whole. Cape Air is the third largest employer in Barnstable (behind only Cape Cod Hospital and the municipality itself). MedFlight operates out of the Airport, providing key emergency response medical services, along with the U.S. Coast Guard (USCG). The Airport supports a total employment of 2,135 people with a total payroll of $85,358,000, money that is returned to the community in the form of purchases from local business, rent, taxes, etc. Please see a discussion of key Airport services in Section 1.3.

RK 06 **With respect to the third issue, changing the size and scope of the airport from one primarily serving the local market (i.e., the Cape and Nantucket) to one becoming a 'micro hub' which serves communities of the neighboring southern New England coast, this expansion could be driven primarily by the objectives of the current major air traffic provider on the Cape (i.e., Cape Air) to build a bigger business, but is this business objective one which necessarily serves the interest of a majority of year-round Town residents?.**

See responses above (RK 02, 03, 05).

SUSAN ASCHER (SA)

SA 01 **1. Pollution, both air and noise. The beaches are visibly dirtier and more polluted since Jet Blue began flying into Cape Cod. More aircraft, both large and small, would greatly compound the problem. Who wants dirty beaches and polluted air, not only on the beaches but throughout the Cape? The constant noise of aircraft over our houses and beaches is extremely annoying, starting at 6 am and continuing until late at night (I have heard planes after 10 pm - and do not live particularly close to the airport). This has a large impact on the quality of life for Cape residents.**

Comment noted. Air Quality and compliance with required Federal Clean Air Act standards is discussed in Sections 5.6 and 6.6.

SA 02 **Clear cutting the trees to allow for a larger airport will substantially add to the pollution and destruction of this beautiful, fragile ecosystem. We need trees, not asphalt! As for the usual 'business' reasons, there are already long waiting lines at most restaurants all summer long and plenty of 'no vacancy' signs.**

Tree removal is addressed within the greenhouse gas assessment in Section 6.4.1.4 relative to Land Alterations/Tree Removal. A larger airport is not proposed and no tree removal off property is proposed either.

SUSAN BRITA (SB)

SB 01 **The FAA did not adequately study the use of Otis Airforce Base as an alternative to expanding Hyannis. A transportation hub at Otis could have combined air, rail, water and other public transport modes at a point on the Cape where it made the most sense - before traffic gets deeply into the cape. Although the military does not like to "share" airports with civilian aircraft, Otis is large enough that separation could have been achieved.**

This alternative is discussed within Section 4.1.1.8 and is identified as Runway 15-33 Alternative 6 – Closure of Cape Gateway Airport and Operational Shift to Joint Base Cape Cod.

KAREN INGEMIE (KI)

KI 01 **FAA's current metric for quantifying noise exposure does not adequately capture the effects of aircraft noise on the lives of affected residents, their families or the current health issues associated with jet emissions and noise pollution.**

FAA is currently reviewing its noise policies. It has recently collected comments from the public relating to airport noise.

In September of 2023, the EA/EIR Project Team provided a courtesy reminder to all airport stakeholders of FAA's current noise policy review, the FAA is soliciting public input on a number of issues and questions concerning the impact of aviation noise exposure on communities in the vicinity of air transportation operations and overflight communities. https://www.faa.gov/noisepolicyreview

KI 02 **I handed Purvi Patel after the Environmental Assessment Meeting at the Airport, January 6th a USB drive showing multiple videos of planes flying over this area. On August 20, 2020 I recorded 28 planes flying between 1:28pm – 6:03pm. These videos show the actual path of aircraft and the flight track data I collected shows the airport flight tracking system is incorrect showing the wrong flight path.**

Comment noted. Cape Cod Gateway Airport is very conscious of its location in urbanized Barnstable and on the border of the Town of Yarmouth. It works cooperatively with the airlines and their pilots to reduce aircraft noise and maintain a constructive dialogue with neighbors who may be affected.

We direct the commenter to the Airport's Noise FAQ page for further assistance https://flyhya.com/pilot-info/noise-abatement/noise-faqs/

KI 03 **Were any health impact assessments done or environmental studies conducted in our area regarding flight patterns, frequency of traffic, effects of jet emissions, the risk factor of low altitudes aircraft flying over our homes and the decibel levels?**

The EA evaluated the effects of the Proposed Action on the quality of the human and natural environment in accordance with the CEQ and policies and procedures from the FAA such as Orders 5050.4B and 1050.1F. Health effect is considered by the FAA in their significant threshold limits. The EA concluded that the proposed Federal Action is consistent with existing national environmental policies and objectives as set forth in Section 101(a) of the NEPA, and environmental impacts will be less than significant and mitigable per current regulations. A Public Health Impact Assessment is not required.

KI 04 **Studies should be conducted to measure the health consequences of exposure to aviation noise, aircraft exhaust gases and exposure of PFAS and flight paths so families can have their quality of life back?**

This document addresses these considerations in compliance with MEPA's scope as detailed in the ENF Certificate provided in Appendix B and FAA Order 1050.1F.

KI 05 **Consideration should also be given to moving the airport to Otis AFB where the impact on the environment and residential quality of life would be less.**

This alternative is discussed within Section 4.1.1.8 and is identified as Runway 15-33 Alternative 6 – Closure of Cape Gateway Airport and Operational Shift to Joint Base Cape Cod.

GEORGE DOBLE (GD)

GD 01 **It seems that there was a hearing about expanding the airport for landing larger planes and that the hearing was not widely publicized and the hearing did not discuss issues and concerns that would be important to area properly owners.**

Public outreach efforts have been detailed within Section 9.2 - Public Outreach. Also, the airport maintains a webpage dedicated to the EA/EIR project and includes information on all upcoming meetings along with materials and recordings from past meetings https://flyhya.com/airport-info/environmental-assessment/. Furthermore, all public meeting information from the Master Plan process is also posted on the website at https://flyhya.com/master-plan/ including meeting recordings, slide shows and Frequently Asked Questions.

GD 02 **Expanding the airport for the benefit of a few to the detriment of most homeowners/taxpayers is unconscionable. I can't imagine those taxpayers who live closer to the airport to have to deal with this potential increase noise & risk. Yes, they purchased their homes knowing the closeness to the airport but to expand it to accommodate even larger aircraft should not be allowed.**

The proposed extension of Runway 15-33 is to meet the runway length needs of the existing families of aircraft currently using the airport. Please refer to Chapter 2: Purpose and Need for a discussion of how runway length requirements are determined.

GD 03 **As one exits route 6 at exit 7, driving … it almost seems one can reach out and touch the aircraft-I would not like to see any larger aircraft using this airport.**

Comment noted. Please see Section 3.3 for a discussion on proposed airspace control improvements as part of the Project.

Chapter 11.0

List of Preparers

11.0 LIST OF PREPARERS

This Draft EA/DEIR/DRI has been prepared under the direction of the Cape Cod Gateway Airport, along with Epsilon Associates, Inc., ASG, GEI Consultants, and HSH to fulfill the requirements of NEPA for the Cape Cod Gateway Airport Master Plan Improvements Project at Cape Cod Gateway Airport, Barnstable, MA.

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