

## TECHNICAL NARRATIVE

Request for Finding of No Adverse Effect on Coastal Dunes

Capital Improvements Plan (CIP) – Provincetown Municipal Airport



March 2015

*Prepared for:*

Provincetown Municipal Airport Commission  
Provincetown, Massachusetts

*Prepared by:*

Jacobs Engineering  
Horsley Witten Group, Inc.

*Cover Image: Outer tip of Provincetown with Provincetown Municipal Airport. Credit: Bill Richardson*

**Table of Contents**

**1. BACKGROUND ..... 1**

**2. COASTAL DUNES OF OUTER CAPE COD AND PROVINCETOWN AIRPORT..... 2**

2.1 Overview ..... 2

2.2 Coastal Dune System..... 5

    2.2.1 Northern Dune Ridge..... 5

    2.2.2 Southern Dune Ridge..... 10

    2.2.3 Dunes within the Airport Area ..... 12

    2.2.4 Parking Lot Area..... 13

2.3 Barrier Beach System..... 14

2.4 Wildlife Habitat Characteristics of the Coastal Dunes ..... 15

2.5 Rare Species Habitat ..... 17

**3. COASTAL FLOODPLAIN CHARACTERIZATION ..... 17**

3.1 Background ..... 17

3.2 Land Subject to Coastal Storm Flowage ..... 19

**4. CIP PROJECT OVERVIEW..... 21**

**5. RELEVANT SECTIONS OF THE WETLANDS PROTECTION ACT REGULATIONS .... 23**

**6. DISCUSSION OF NO ADVERSE EFFECT ..... 24**

6.1 No Adverse Effect on the ability of waves to remove sand from the dune ..... 29

6.2 No Adverse Effect by disturbing the vegetative cover so as to destabilize the dune ..... 29

6.3 No Adverse Effect by causing any modification of the dune form that would increase the potential for storm or flood damage ..... 29

6.4 No Adverse Effect by interfering with the landward or lateral movement of the dune ..... 31

6.5 No Adverse Effect by causing removal of sand from the dune artificially ..... 32

6.6 No Adverse Effect by interfering with mapped or otherwise identified bird nesting habitat.. 32

**7. NO ADVERSE EFFECT ON HABITAT SITES OF RARE SPECIES ..... 33**

**8. PROPOSED MITIGATION ..... 33**

8.1 Coastal Dune Replacement ..... 34

8.2 Coastal Dune Restoration and Enhancement ..... 34

**9. CONCLUSION..... 34**

**REFERENCES..... 35**

**LIST OF TABLES**

Table 1. Summary of CIP Project Elements with Proposed Coastal Dune Alterations.  
Provincetown Municipal Airport, Provincetown, MA ..... 22

**LIST OF FIGURES**

Figure 1. Location Map..... 3  
Figure 2. LIDAR Topography ..... 4  
Figure 3. Airport Lease Area and Coastal Dune Resources..... 6  
Figure 4. Airport Area and Coastal Dune Project Elements ..... 7  
Figure 5. Shoreline Change Project Map and Transects ..... 9  
Figure 6. Barrier Beach Limit ..... 16  
Figure 7. Natural Heritage and Endangered Species Program Estimated and Priority Habitats..... 18  
Figure 8. FEMA’s National Flood Hazard Layer ..... 20  
Figure 9. East End Taxiway ..... 25  
Figure 10. Service Access Roads ..... 26  
Figure 11. Westerly Taxiway Run-up Pad..... 27  
Figure 12. Proposed Parking Lot - Phase 1..... 28

**LIST OF PHOTOS**

Photo 1. Provincetown Municipal Airport located between two major coastal dune ridges ..... 2  
Photo Series 2. Coastal dunes located along the Northern Dune Ridge ..... 10  
Photo Series 3. Coastal dunes located south of the Airport Area ..... 11  
Photo Series 4. Examples of coastal dunes located within the active or otherwise maintained areas  
of the Airport ..... 13  
Photo Series 5. Dunes adjacent to Airport Parking lot..... 14

## 1. BACKGROUND

The Provincetown Airport Commission (Airport Commission) is proposing a Capital Improvements Plan (CIP Project) for the Airport. The purpose of the CIP Project is to enhance airport safety and security and enhance the efficiency of the Airport to meet current and anticipated demand. Implementation of the CIP will fulfill the mission of the Airport to operate a safe, secure, and reliable non-hub primary service airport receiving scheduled airline passenger service.

The elements of the CIP Project, as presented in the FEIR/EA include:

1. *Westerly Taxiway System Improvements*;\*
2. *Relocate East End Taxiway*;\*
3. Reconstruct Terminal Apron;
4. Reconstruct Easterly End of Taxiway;
5. Install Taxiway Lighting and Construct Electric Vault;
6. Repair Sightseeing Shack;
7. Improve Access Road to Approach Light System;
8. *Construct Service Access Roads to Localizer Equipment Shelter (LES) and to the Automated Weather Observation Station (AWOS)*;\*
9. *Install a Perimeter Safety/Security Fence*;\*
10. *Expand Auto Parking*;\*
11. Expand Terminal Building; and
12. Expand Turf Apron.

*\*project elements with proposed coastal dune alterations*

The CIP will require several state, regional, and federal permits including a final Order of Conditions under the Massachusetts Wetlands Protection Act (WPA), a Variance pursuant to Section 401 Water Quality Certification, a Development of Regional Impact Decision from the Cape Cod Commission, and an Individual Permit from the U.S. Army Corps of Engineers pursuant to the Clean Water Act, including Individual CZM Consistency review. Pursuant to the WPA regulations and as explained in the cover letter, the Airport Commission seeks to permit eleven of the twelve CIP Project elements this year under an Order of Conditions (OOC) issued by the Provincetown Conservation Commission (in addition to other required permits from other regulatory agencies).

The CIP Project would cumulatively alter approximately 1.03 acres of coastal dune in order to construct five of the CIP project elements as identified in the list above.

During a coordination meeting with the Massachusetts Department of Environmental Protection (MA DEP) on September 18, 2014, it was stated that in order to qualify for an OOC, rather than

require a WPA Variance, evidence must be presented to demonstrate that the project will not have an adverse effect on the coastal dunes and the interests they protect.

This Technical Narrative has been prepared to support the Request for No Adverse Effect Finding relative to coastal dunes as submitted to MA DEP by the Provincetown Airport Commission. Concurrence will be sought from the Provincetown Conservation Commission at the time of filing of the Notice of Intent. Included are descriptions of the natural environment, a discussion of the proposed CIP Project and the various project elements with coastal dune alterations, and a discussion of the effect the project elements would have on the interests protected by coastal dunes.

## 2. COASTAL DUNES OF OUTER CAPE COD AND PROVINCETOWN AIRPORT

### 2.1 Overview

The Provincetown Municipal Airport is located in Provincetown, Massachusetts, on the northern tip of Cape Cod, known as the Province Lands. Most of the land on the northern tip of the Cape is part of the Cape Cod National Seashore (CCNS) (Figure 1; Photo 1). The Province Lands are comprised of an expansive coastal dune system of primary and secondary dunes (Figure 2). As noted on the CCNS website, coastal dunes make up approximately one-third of the Cape Cod National Seashore, covering approximately 8,500 acres from Chatham to Provincetown. Dunes predominate on barrier beaches and associated spits along the coastal margins of the Atlantic Ocean and Cape Cod Bay, and across the northern tip of the peninsula. BioMap2 identifies the dunes within the outer tip of Provincetown as supporting two very large examples of Maritime Dune Communities<sup>1</sup>, one of which is noted to be the largest example of Maritime Dunes in New England, with limited human and vehicular access, and concentrated areas degraded by human use.



**Photo 1.** Provincetown Municipal Airport is located between two major coastal dune ridges. Photo credit Bill Richardson.

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<sup>1</sup> BioMap2: Provincetown. 2012. Massachusetts Division of Fisheries and Wildlife, Natural Heritage & Endangered Species Program, Commonwealth of Massachusetts, Department of Fish & Game and Division of Fisheries & Wildlife, in cooperation with The Nature Conservancy, West Boylston, MA.



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**JACOBS**

**Notes:**

Data compiled from the following source:  
Office of Geographic Information (MassGIS), Commonwealth  
of Massachusetts, Information Technology Division

- USGS Color Ortho Imagery (2008/2009)



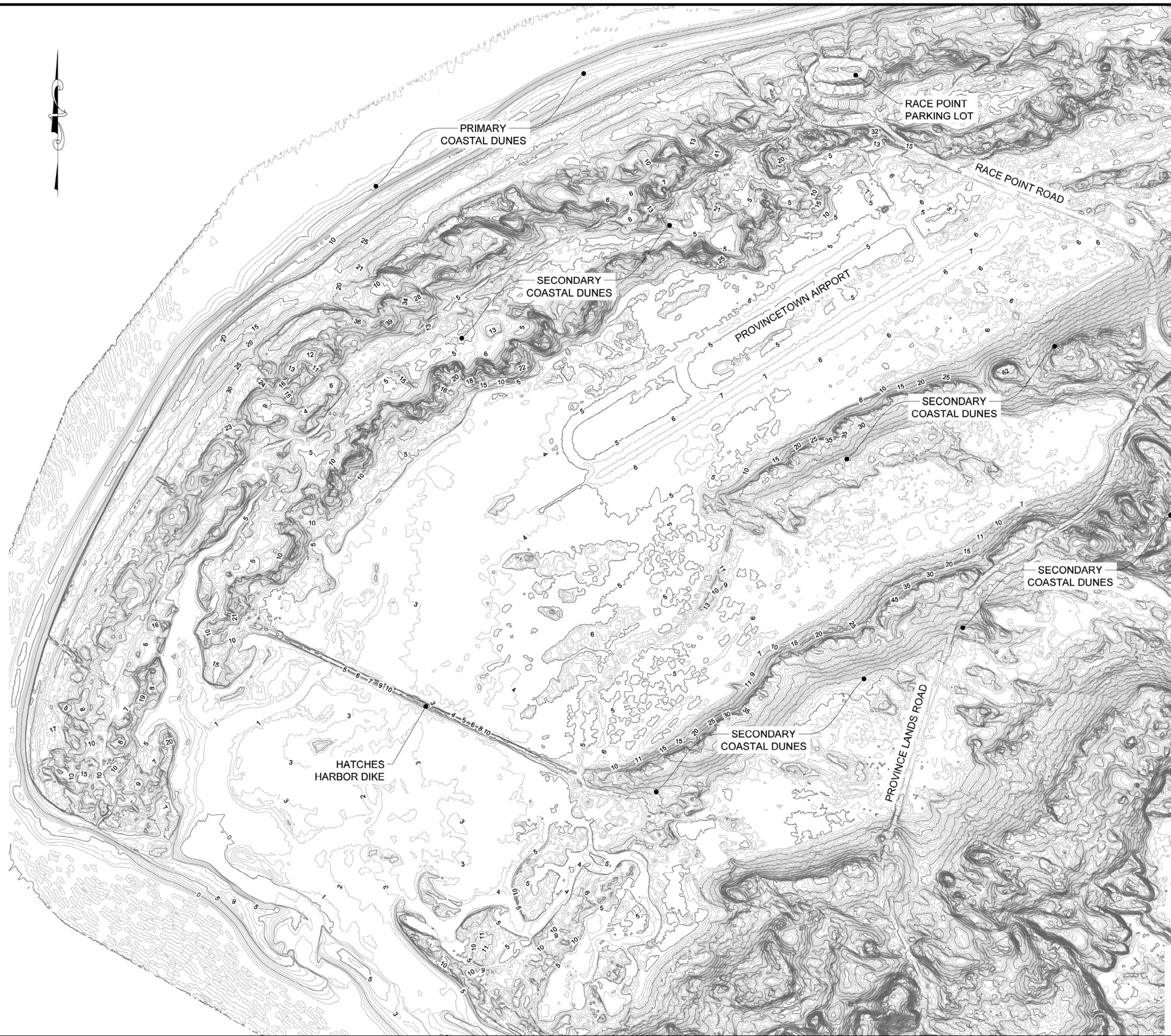
Not to Scale

Provincetown Municipal Airport  
Capital Improvements Plan  
Location Map

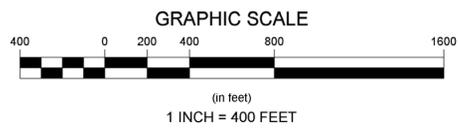
Figure 1



last modified: 03/06/15 by mc H:\Projects\2004\4027 E&K-PTown Airport\Drawings-4027\REVISED FLOOD ZONES.dwg



NOTE:  
CONTOURS TAKEN FROM LIDAR DATA PROVIDED BY MASS GIS AND IS NOT THE RESULT OF A GROUND SURVEY BY THE HORSLEY WITTEN GROUP.



Revisions	
Rev.	Description

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Plan Set:  
**PROVINCETOWN MUNICIPAL AIRPORT**  
**PROVINCETOWN, MASSACHUSETTS**

Plan Title:  
**LIDAR TOPOGRAPHY**

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Project Number: **4027** Sheet: **1 of 1**

Sheet Number:

**FIGURE 2**



The Airport leases approximately 331 acres of federally-owned land administered by the National Park Service (NPS) that has been set aside for aviation use. This area is referred to as the Airport Lease Area that is subject to a Special Use Permit from the NPS (Figure 3). Constructed in the 1940s, the Airport consists of developed airside and landside areas that are maintained for airport facilities and operations. Airport facilities occupy approximately 132 acres of the Lease Area, and are referred to in this Memo as the Airport Area (Figure 4). The CIP areas of coastal dune alteration as described in Table 1 are shown in overview on Figure 4 and in more detail in later figures.

Generally speaking, naturally-vegetated areas within the Airport Area fall into one of three categories: coastal dunes, freshwater wetlands, or managed grasslands. Vegetation immediately adjacent to the Airport facilities is routinely cut to maintain operational safety areas. Otherwise, the lands within the Airport Area are occupied by existing airport facilities and infrastructure. Much of the 331-acre Lease Area is undeveloped and consists of diverse wetland and upland habitats, including salt marsh, freshwater wetlands (interdunal swales), forested areas, and a coastal dune system.

## **2.2 Coastal Dune System**

The Airport is uniquely situated within a coastal dune system between two major coastal dune ridges (north and south) that are oriented in an approximate parallel configuration to the shoreline and the Airport runway (see Figure 2, Photo 1). This dune system consists of a series of primary dunes and secondary coastal dunes that are parabolic (horseshoe-shaped) in configuration and shaped by the prevailing winds and post-glacial coastal erosion processes.

Primary dunes are coastal dunes that are located immediately landward of, and parallel to the coastal beach, and are landforms that are more linear in form. These primary dunes are nearly always significant to storm damage prevention and flood control. The primary dune system along Race Point Beach is located several hundred feet beyond the Airport's partial parallel taxiway and approximately 1,500 feet (at the closest point) to the north of the Airport. There are no primary coastal dunes within the Airport Area.

### *2.2.1 Northern Dune Ridge*

Coastal dunes along the northern dune ridge undulate, varying in topography and vegetative cover and composition, yet are largely uniform in species diversity outside of the wetland areas. The area is classified as a Maritime Dune Community<sup>2</sup>.

Here, open areas of bare sand and occasional pebbles are interspersed with sparsely to moderately vegetated dunes, dominated by American beachgrass (*Ammophila breviligulata*) and

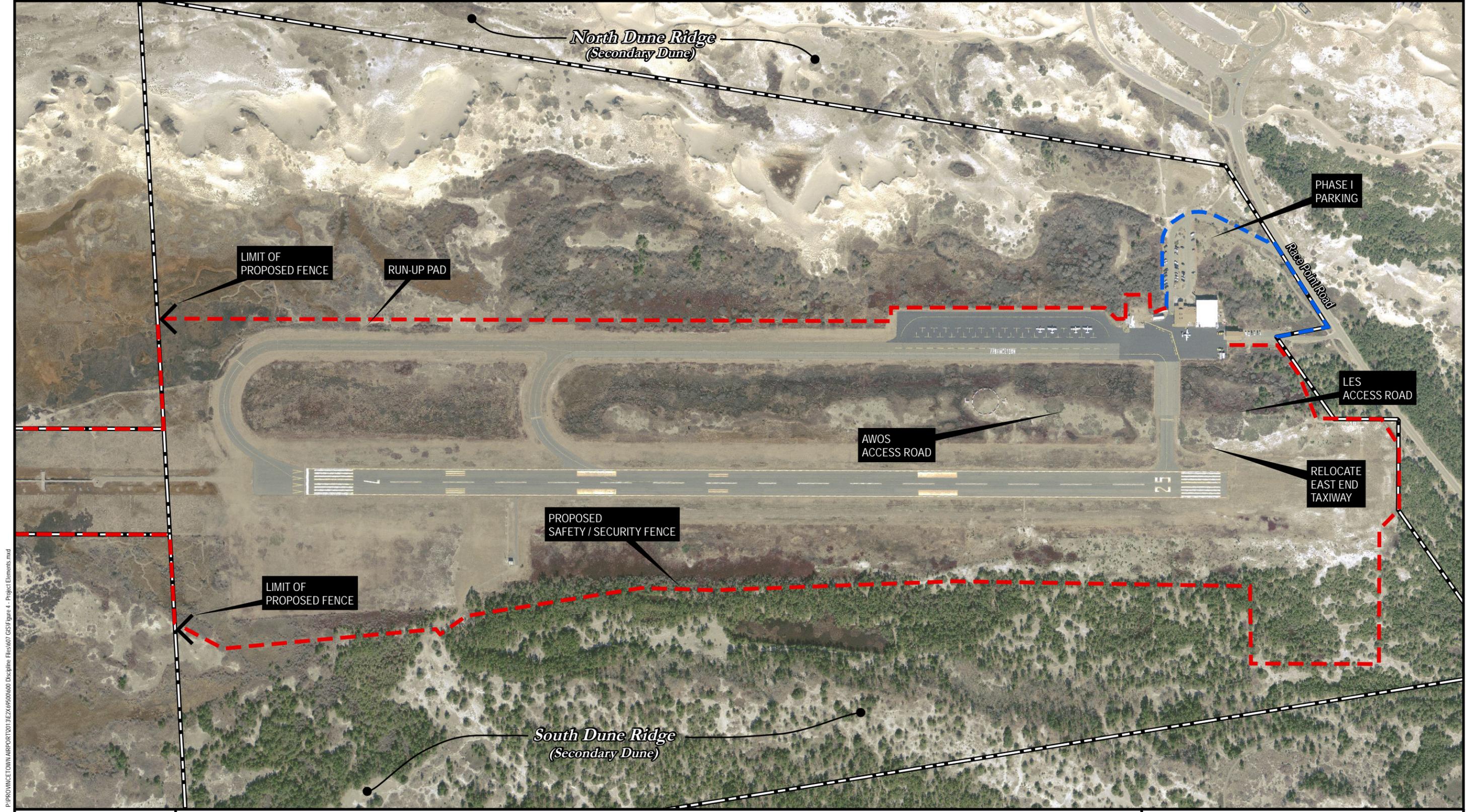
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<sup>2</sup> From Swain, P.C. and J.B. Kearsley. 2011. Classification of the Natural Communities of Massachusetts. Version 1.4. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries and Wildlife. Westborough, MA.









P:\PROVINCETOWN AIRPORT\10131E2X65500600 Discipline: Files\607 GIS\Figure 4 - Project Elements.mxd

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**JACOBS**

Notes:  
 Data compiled from the following source:  
 Office of Geographic Information (MassGIS), Commonwealth  
 of Massachusetts, Information Technology Division  
 - USGS Color Ortho Imagery (2008/2009)

Legend:  
 - - - - - Airport Lease Line  
 - - - - - Airside Limits  
 - - - - - Landside Limits

Approx. Scale in Feet  
 0 350 700

Provincetown Municipal Airport  
 Capital Improvements Plan  
 Airport Area and  
 Coastal Dune Project Elements  
 Figure 4



common hairgrass (*Deschampsia flexuosa*) in open and more exposed areas closer to the shoreline. The secondary dune ridges located away from the immediate coastline, behind the first one or two rows of primary coastal dunes are typically more densely vegetated and therefore more stable landforms. While these areas may contribute to the interests of storm damage prevention and flood control this function would occur to a lesser degree due to their increased distance from the ocean.

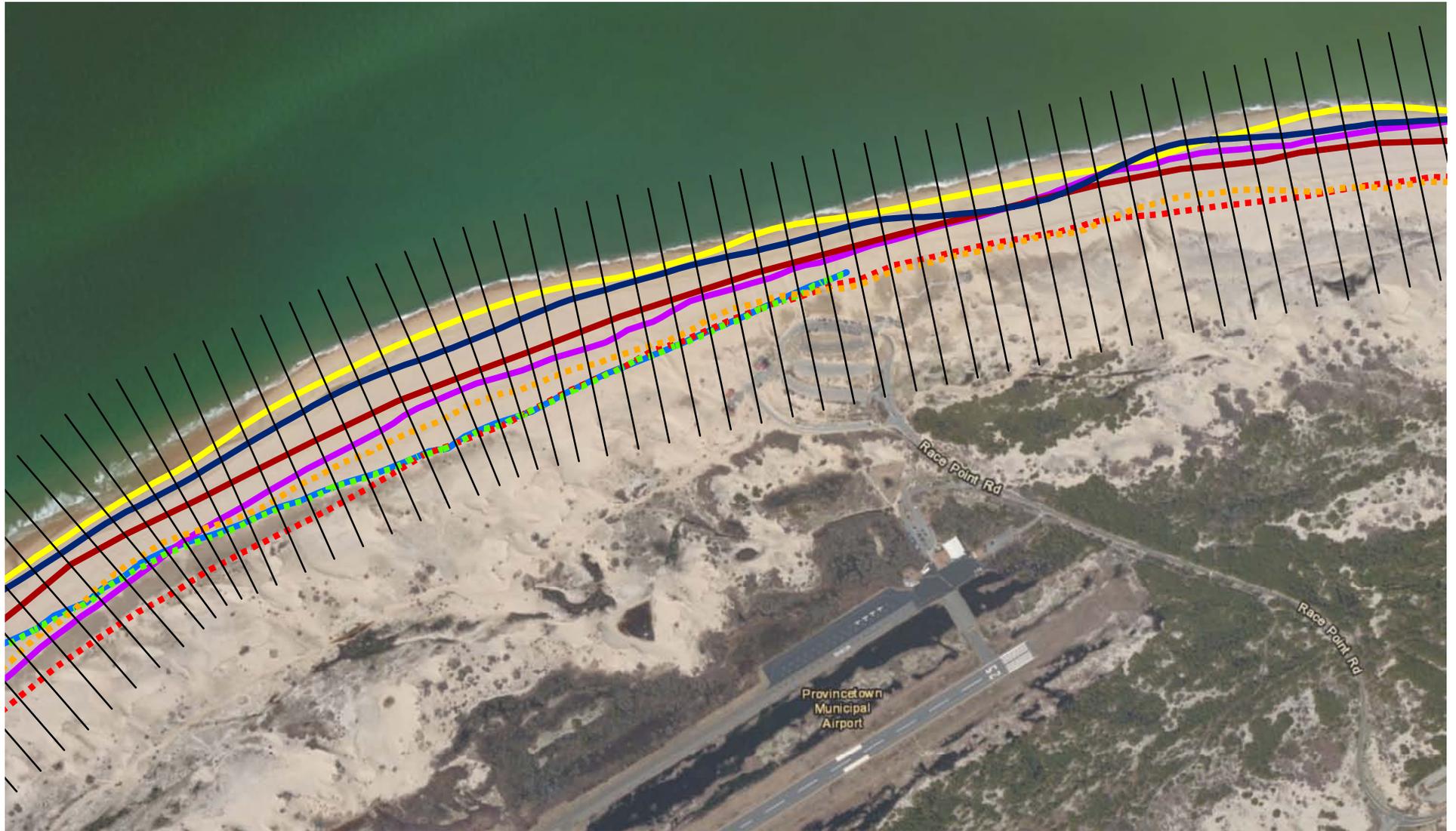
Plant diversity tends to increase on the leeward side of these secondary dunes and with distance from the ocean, where open clumps and patches of golden heather (*Hudsonia ericoides*), poison ivy (*Toxicodendron radicans*), beach plum (*Prunus maritima*), bayberry (*Myrica pensylvanica*), and various grasses were observed. Frequently, entire dune faces are completely devoid of vegetation, a characteristic typical of the parabolic nature of these dunes.

Topography along the northern dune ridge varies widely from nearly flat to steeply sloping (Photo Series 2). These dunes are generally higher in form and/or elevation, averaging from 10-15 feet to upwards of 35-40 feet in elevation, with some lower pockets, as compared to the secondary dunes located further inland in the Airport Area.

No work is proposed within the northern dune ridge.

The shoreline and the dunes north of the Airport are accreting. According to the Massachusetts Coastal Zone Management (CZM) Shoreline Change Project maps (1909-2007), the shoreline north of the Airport has consistently been subject to an accumulation of sediments deposited seaward of the previous shoreline (Figure 5). On average accretion rates have been 2.5 and 3.5 feet per year in areas due north of the Airport, with accretion rates ranging from approximately 4 to 5.5 feet to the northwest of the Airport.





**Legend**

Shoreline Change Transects

**High Water Shorelines (1909-2007)**

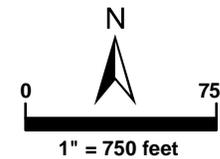
- |      |      |      |      |
|------|------|------|------|
| 1909 | 1951 | 1970 | 2000 |
| 1933 | 1954 | 1974 | 2007 |

\*GIS Data - MORIS Layers from Coastal Zone Management

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Shoreline Change Project  
Map and Transects  
Provincetown Municipal Airport  
Provincetown, MA







**Photo Series 2.** Coastal dunes located along the Northern Dune Ridge, north of the Airport Area vary in height and vegetative cover, ranging from exposed bare sands to dense vegetation, and from low mounds to tall, sometimes steeply sloping dune crests. Distant views of northern dune ridge (left, top and bottom); closer views of the variable nature of northern dune ridge in both height and vegetation cover (right, top and bottom). Photo credits Horsley Witten Group.

### 2.2.2 Southern Dune Ridge

The secondary coastal dunes located south of the Airport Area and along the southern dune ridge also tend to exhibit higher topographic relief than those dunes found within the Airport Area. These dunes rise in elevation with distance from the Airport Area (e.g., those dunes located closer to the Airport infrastructure tend to exhibit less topographic relief than those located farther south) (Photo Series 3). While the topography along the southern dune ridge is equally varied as along the northern dune ridge, the more stable substrate of these areas supports a greater diversity of vegetative species, including trees and shrubs, such as pitch pine (*Pinus rigida*) and scrub oak (*Quercus ilicifolia*).



**Photo Series 3.** Coastal dunes located south of the Airport Area vary in height and vegetative cover, ranging from exposed bare sands to dense forested vegetation, and from low mounds to tall, steep slopes. Dunes located closer to the Airport Area tend to exhibit low topographic relief (top), while rising in elevation with distance from the Airport Area (middle). Photo credits: Horsley Witten Group. Aerial views of Airport show the extent of the coastal dune system to the south (bottom). Photo credits Bill Richardson.

The predominant natural community of the southern dune ridge is Maritime Pitch Pine on Dunes and Maritime Shrubland), and supports shrubs and trees. This mature dune community is interspersed with Coastal Interdunal Marsh/Swales at the lowest land elevations. These communities are relatively consistent in vegetative makeup, within a mosaic of forested communities scattered among open communities dominated by dense patches of various lichens (*Cladonia* spp.) and clumps of common hairgrass, open areas of golden heather, occasional dense thickets of scrub oak and bayberry, and smaller areas of open bare sand.

A portion of the proposed safety/security fence is proposed to occur within the lower-lying coastal dunes closer to the Airfield (see Figure 4); no work is proposed within the higher dune ridges within the southern dune ridge. This alignment was selected following an extensive survey for Eastern Spadefoot toad breeding habitat, and a subsequent site visit with NHESP, NPS, DEP, Army Corps of Engineers ACOE, and Conservation Commission staff.

### *2.2.3 Dunes within the Airport Area*

Secondary coastal dunes found within the Airport Area generally exhibit low topographic relief (e.g., one to three feet above the elevation of adjacent wetlands and/or Airport infrastructure), and are often interspersed with low-lying wetland areas. All of the dunes located within the Airport Area are located beyond the limit of the Race Point Barrier Beach system as identified by the Massachusetts Coastal Zone Management (MA CZM) (Figure 6, below).

These dunes are generally stable as a result of often dense vegetative cover, and are not actively migrating. Woody vegetation, such as pitch pine or oak, within these dunes is maintained by the Airport, and as a result, the community generally consists of low-growing shrubs, such as golden heather (*Hudsonia ericoides*) and bearberry (*Arctostaphylos uva-ursi*), low-growing bunch-forming grasses, low-growing herbaceous species, intermingled with patches of lichen. Occasional bare patches of sand also occur within these low-lying dunes (Photo Series 4). These dunes are also typically bounded by managed facilities, structures, and mowed grassland safety areas (referred to as Cultural Grasslands) that flank the runway and taxiways, and instrument landing system.



**Photo Series 4.** Examples of coastal dunes located within the active or otherwise maintained areas of the Airport. Coastal dunes in these locations exhibit generally low topographic relief and are vegetated with low-growing shrubs or grass and herbaceous species. Photo credits: Horsley Witten Group.

Work within these low-lying coastal dunes is proposed to accommodate construction of three of the five CIP Project elements, including the run-up pad at the west end taxiway, the east end taxiway, and access roadways. Portions of the proposed fence would also traverse these low-lying coastal dunes (see Figure 4).

#### 2.2.4 *Parking Lot Area*

The coastal dunes in the parking lot area are at the closest distance from the accreting shoreline along Race Point Beach (approximately 1,500 feet) and are sheltered behind the higher secondary dunes. Phase 1 of the proposed parking lot would occur within the dune area situated between Airport Road, the existing paved bike path (part of the CCNS bike path system), and the existing parking lot (Photo Series 5). Dunes in this location occur at elevations at or slightly below the adjacent infrastructure. Dunes in this specific location are stable, with densely vegetated with grasses, low-growing shrubs, and occasional pitch pine.



**Photo Series 5.** Dunes adjacent to Airport Parking lot. View from dunes along Race Point Road overlooking the existing Airport parking lot. Airport Road enters from the left (top); closer view of coastal dunes near parking lot (lower left). Photo credits: Horsley Witten Group. Aerial view of airport parking lot showing Airport Road, the CCNS bikepath, and Race Point Road (lower right). Photo credit: Bill Richardson.

## 2.3 Barrier Beach System

A barrier beach, by regulatory definition means “a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. It is separated from the mainland by a narrow body of fresh, brackish or saline water or a marsh system. A barrier beach may be joined to the mainland at one or both ends” (310 CMR 10.28(2)).

The boundary of the Race Point Barrier Beach System as identified by MA CZM (Unit Pt-2), consists of both primary and secondary dune habitats, and overlaps the northern limit of the Lease Area, but does not extend into the Airport Area where work is proposed (Figure 6). No

work is proposed within the designated Barrier Beach, including work associated with the proposed Phase 1 parking area.

## 2.4 Wildlife Habitat Characteristics of the Coastal Dunes

Overall, there are thousands of acres of undeveloped habitat in the CCNS<sup>3</sup>. Within the 331-acre Lease Area and beyond the limits of the existing airport infrastructure (e.g., paved surfaces, buildings, etc.), the undeveloped areas of the Airport support a variety of wildlife and associated habitat. Vegetation provides food and cover for resident and migratory wildlife species. Nearby freshwater interdunal swales provide water and seasonal breeding areas for several species. Extensive field work has been completed over the past several years to evaluate wildlife and rare species habitat at the Airport. These reports were included in the FEIR/EA (EEA #13789) and are incorporated by reference.

Wildlife observations or evidence of wildlife use of the dunes within and around the Airport Area, were nearly always made during field assessments. Field personnel have observed various large and small mammals, reptiles, amphibians, and birds, as well as wildlife paths and corridors traversing the dune habitats and cavities or dens. Primary dunes and areas immediately along the shoreline provide important habitat for nesting shorebirds. NPS has been monitoring piping plover (*Charadrius melodus*) nests, American oystercatcher (*Haematopus palliatus*), and tern (*Sterna* spp.) colonies as well as observing other shorebird activity for more than 20 years, documenting nesting habitats within the CCNS, including the lands along Race Point Beach (north and south)<sup>4</sup>. Generally, shorebird nesting occurs along the beach strand area and within the primary dunes. Casual observations of shorebirds flying overhead have been made in and around the Airport through field studies; however, after extensive field investigations, there are no known or documented shorebird nesting areas within the Airport Area.

Within the Airport Area, managed grasslands (“Cultural Grasslands”) provide another type of habitat, primarily for grassland bird species. However, with this exception, there is no habitat type present within the Airport Area or the larger Lease Area that is not present in other nearby areas of the National Seashore.

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<sup>3</sup> The Cape, Cape Cod National Seashore encompasses 44,600 acres, largely undisturbed.

<sup>4</sup> See Annual Shorebird Monitoring and Management Reports (The most recently posted report is for 2013.) available at <http://www.nps.gov/caco/learn/nature/cape-cod-ecosystem-monitoring-program-reports-and-publications.htm>

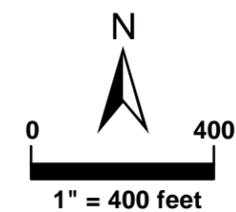


**Legend**

-  Lease Line
-  Barrier Beaches (Executive Order No. 181) - Unit Pt-2

*\*Barrier Beaches - MORIS Layers from Coastal Zone Management*

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**Barrier Beach Limit  
 Provincetown Airport  
 Provincetown, MA**

Date: 3/12/2015

Figure 6



## 2.5 Rare Species Habitat

According to the 2008 Massachusetts Natural Heritage Atlas (13<sup>th</sup> Edition), the entire Airport Lease Area is located within both Priority Habitat of Rare Species (PH 15) and Estimated Habitat of Rare Wildlife and Certified Vernal Pools (EH 79) as designated by the Massachusetts Division of Fisheries and Wildlife, Natural Heritage and Endangered Species Program (NHESP) (Figure 7). NHESP reported that the Priority Habitat is mapped for State-listed Species of Special Concern, the Eastern Box Turtle (*Terrapene carolina*) and the Vesper Sparrow (*Pooecetes gramineus*), and for one State-Threatened Species, the Eastern Spadefoot (*Scaphiopus holbrookii*). The Airport has been working with NHESP since the onset of the master planning for the CIP Project, providing habitat assessments for these species, and modifying project alternatives to avoid adverse effects to these species. Most recently, NHESP has issued a conditional “no take” decision in response to the MESA Project Review. The Airport will continue to work with NHESP throughout CIP Project permitting to ensure compliance with that decision under Massachusetts Endangered Species Act (M.G.L. Ch. 131A; MESA).

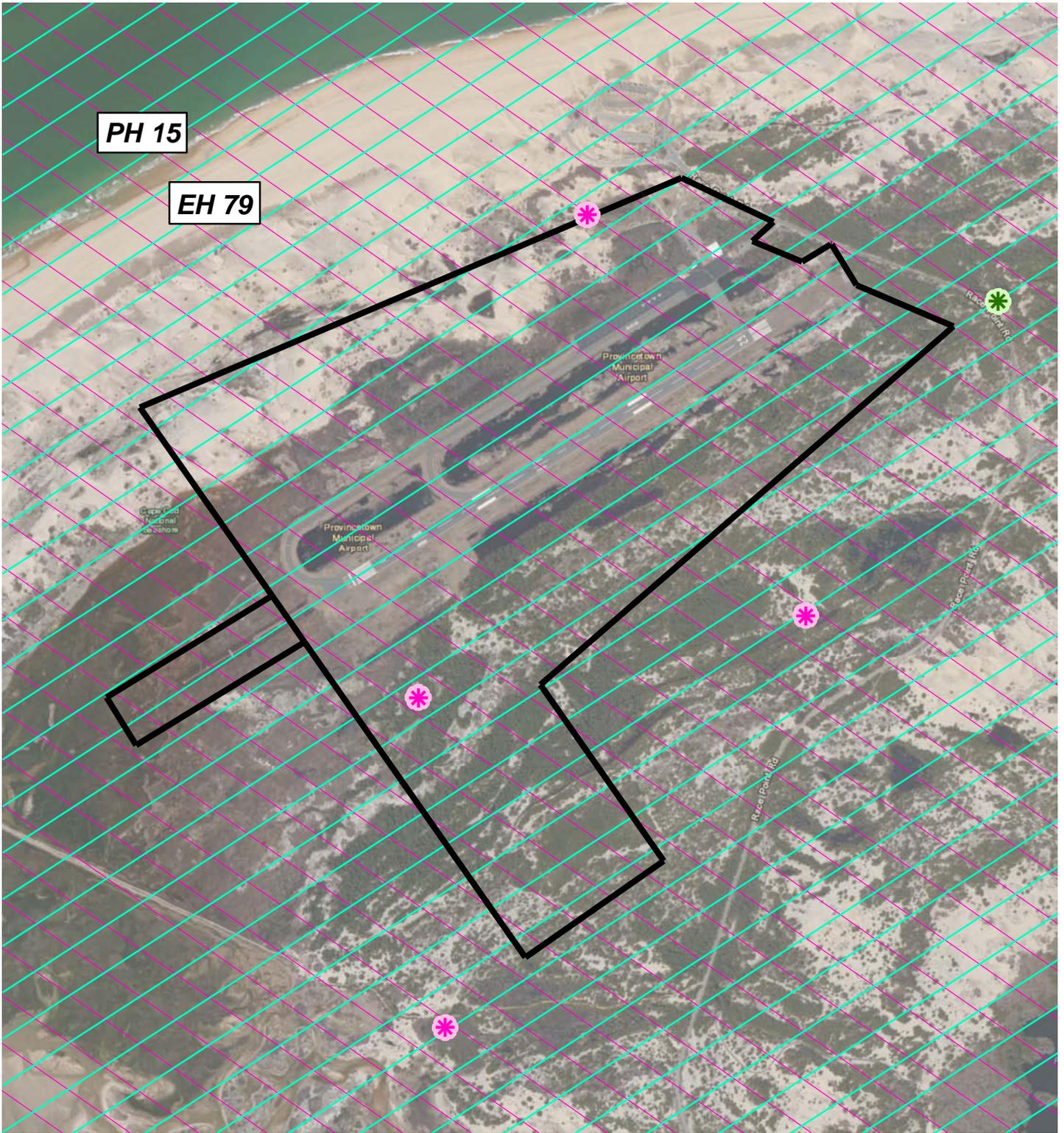
## 3. COASTAL FLOODPLAIN CHARACTERIZATION

### 3.1 Background

In 1930, a dike was constructed across the Hatches Harbor salt marsh in an attempt to control salt marsh mosquitoes. Due to the dike restriction, approximately half of the 200 acres of salt marsh floodplain (base flood elevation 12 feet NAVD 88) became isolated from tidal flow. The Airport was constructed in the 1940s on land that was filled in behind the dike. The presence of the Hatches Harbor dike has likely influenced the ebb and flow of tides in this area. As this is a coastal floodplain, rising tide levels will inundate only those low-lying areas that are able to receive floodwaters. Within the Airport Area, this flooding is somewhat attenuated by the presence of the Hatches Harbor dike.

The Hatches Harbor Restoration Project was implemented in the late 1990s by the NPS in partnership with the Town of Provincetown to restore up to 90 acres of salt marsh behind the dike. During the winter of 1998-99, new culverts with adjustable tide gates were installed in the dike to gradually allow tidal flow into the marsh with the overall objective of restoring native salt marsh functions and values to the tidally restricted wetlands to the extent possible without compromising safety at the Airport.

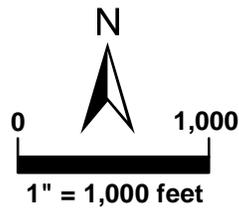




**Legend**

-  Lease Line
-  Potential Vernal Pools
-  NHPSP Certified Vernal Pools
-  NHPSP Priority Habitats of Rare Species
-  NHPSP Estimated Habitats of Rare Wildlife

\*Data Source: MassGIS



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Natural Heritage &  
Endangered Species Program  
(NHPSP)  
Provincetown Municipal Airport  
Provincetown, MA

Date: 3/11/2015

Figure 7



### 3.2 Land Subject to Coastal Storm Flowage

The Airport is located in the 100-year coastal floodzone/floodplain (Land Subject to Coastal Storm Flowage or LSCSF) and is largely within the stillwater coastal floodplain (Figure 8). This area is between parallel dune ridges and is behind the Hatches Harbor Dike. The majority of the Airport is located within Zone AE, elevation 12 feet above mean sea level, NAVD 88. Some of the supports for the approach lights, which extend westerly beyond the Runway 25 End, lies within Zone AE, elevation 13 feet above mean sea level NAVD 88. The limit of the Velocity Zone or “VE” (elevation 14 feet above mean sea level NAVD 88), an area of 100-year coastal flood with velocity (wave action), is confined to areas seaward of the Hatches Harbor dike to the west of the Airport.

The coastal floodplain overlaps portions of the designated Barrier Beach (Figure 6), and fully encompasses the Airport Area (Figure 8). However, the Airport Area is located outside of the velocity zone. Further, the Limit of Moderate Wave Action as depicted on FIRM Panel 25001C0103J (not included), is located only at the far western end of the MALSF lighting system, and outside of the Airport Area.

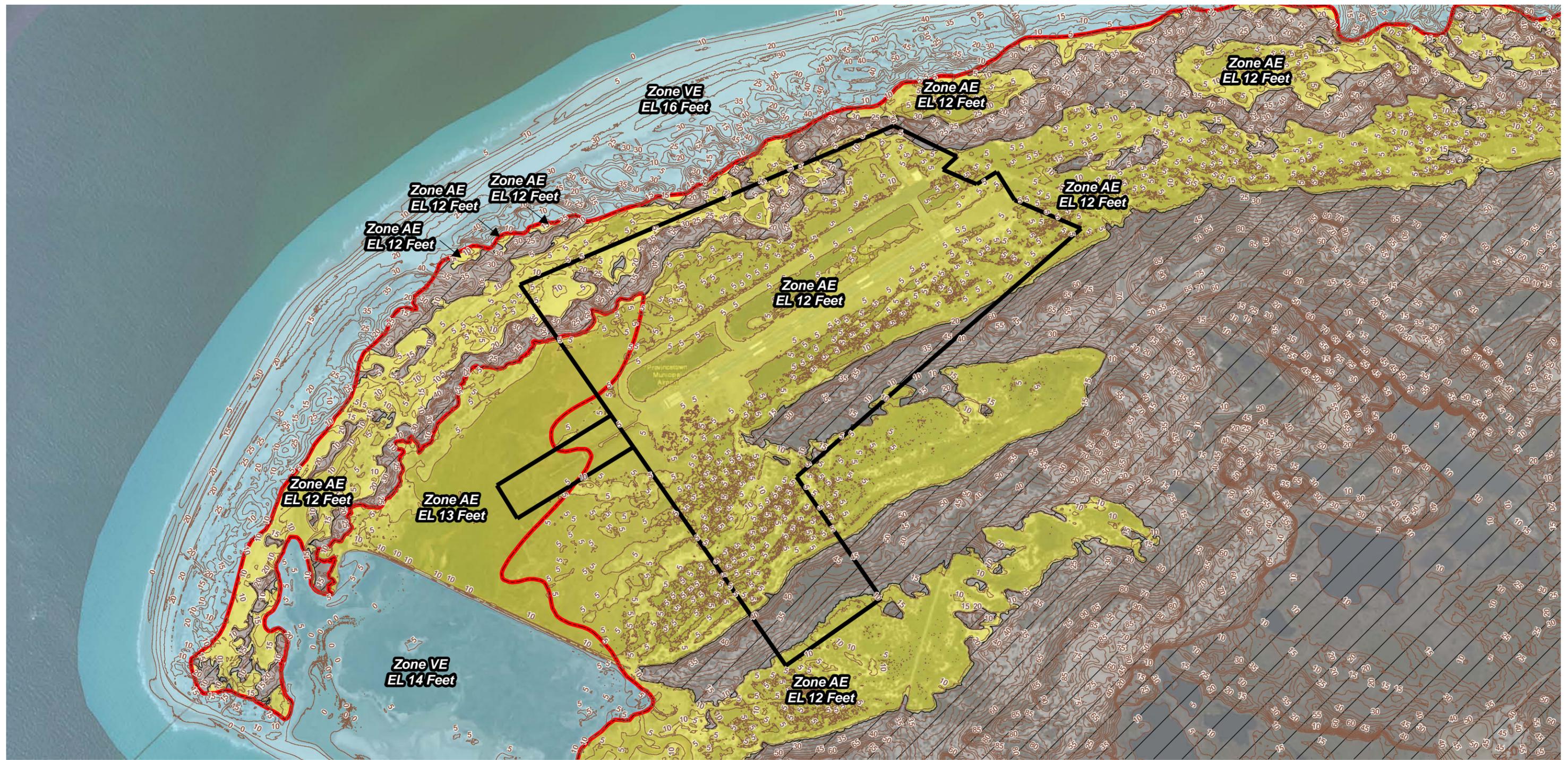
Portions of the coastal dunes are located within the floodzone, while dunes at higher elevations are located within Zone X, defined as “*areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.*” Thus, the Airport is located within the stillwater coastal floodplain.

HW conducted a floodplain volume assessment to determine the effect, if any, of placement of fill material within the coastal floodplain associated with the CIP Project using available LiDAR (Light Detection And Ranging) data for the Provincetown area from MassGIS. While this study used somewhat artificial limits of the flood areas to define a flood basin, with Race Point Road and the two major dune ridges on either side of the airfield defining the study area and extending the study area out to the Atlantic Ocean, it was determined that there are more than 15.5 million cubic yards (CY) of available flood storage in this area<sup>5</sup>. Removal of coastal dunes or placement of fill with subsequent removal of impervious surfaces associated with all of the CIP Project elements would result in a negligible loss of coastal flood storage.

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<sup>5</sup> This study was conducted in 2013 and was based upon the previous flood maps, which have since been updated by FEMA with higher 100-year flood limits. The limit of available flood storage is actually greater than calculated.





**Legend**

Lease Line

**Flood Zones**

- 100-year Flood Zone - Zone AE
- 100-year Flood Zone - Zone VE
- Zone X

Limit of Moderate Wave Action (LIMWA)

Area of Minimal Flood Hazard

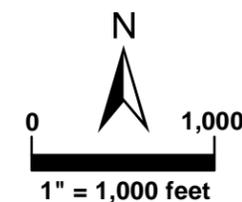
5ft. Contours

\*FEMA's National Flood Hazard Layer, July 2014

**Horsley Witten Group**  
 Sustainable Environmental Solutions  
 90 Route 6A • Sandwich, MA • 02563  
 Tel: 508-833-6600 • Fax: 508-833-3150 • www.horsleywitten.com



FEMA's National Flood Hazard Layer  
 Provincetown Airport  
 Provincetown, MA





#### 4. CIP PROJECT OVERVIEW

The Airport Commission evaluated 12 project elements, as listed in Section 1, for the CIP Project in the 2011 Final Environmental Impact Report/Environmental Assessment (FEIR/EA). The Commission seeks to obtain permits in 2015 for 11 of the 12 elements. The Terminal Building expansion project element has been deferred to further evaluate design parameters related to changes to the floodzone elevations and the FAA’s recent policy change regarding new construction within the Airport’s secure airspace. The Terminal Building project, as evaluated in the FEIR/EA, would not result in alterations to wetland resource areas and this is not anticipated to change.

The elements of the CIP Project involving work within coastal dunes include<sup>6</sup>:

CIP Project No.	Project Element
1	Installation of the run-up pad associated with the Westerly Taxiway System Improvements;
2	Relocation of East End Taxiway;
8	Construction of the Service Access Roads to the LES and the AWOS;
9	Installation of a Perimeter Safety/Security Fence; and
10	Expansion of the Auto Parking.

Each of the CIP Project elements is described in detail in the FEIR/EA. For purposes of this Technical Memo, only those CIP Project elements resulting in temporary or permanent alterations to coastal dune are shown within Table 1 below. The approximate location of each element is depicted on Figure 4 and in more detail in following figures.

---

<sup>6</sup> The numbering sequence follows the numbering of the CIP project elements as presented in the FEIR/EA

**Table 1. Summary of CIP Project Elements with Proposed Coastal Dune Alterations. Provincetown Municipal Airport, Provincetown, MA**

CIP PROJECT ELEMENT	Area of Proposed Alteration		Type of Dune
	(SF)	acres	
(1) Westerly TW System Improvements (run-up pad)	6,460 <sup>(1)</sup>	0.15	Low-Lying Secondary Dunes <sup>3</sup>
(2) Relocate East End TW	5,000	0.11	Low-Lying Secondary Dunes <sup>3</sup>
(8a) Construct Service Access Roads – LES Road	7,610	0.17	Low-Lying Secondary Dunes <sup>3</sup>
(8b) Construct Service Access Roads – AWOS Road	10,560	0.24	Low-Lying Secondary Dunes <sup>3</sup>
(9) Install Perimeter Fence (“FEIR/EA Concept 6”)	8,060 (direct) <sup>(2)</sup>	0.19	Secondary Dunes located at the base of north and south dune ridges
	24,028 (indirect) <sup>(2)</sup>	0.55	
(10) Expand Auto Parking (“Phase 1 of FEIR/EA Concept 4”) <sup>(4)</sup>	7,315 (Phase 1)	0.17	Low-Lying Secondary Dunes <sup>3</sup>
<b>TOTAL DIRECT ALTERATION</b>	<b>45,005</b>	<b>1.03</b>	
<b>TOTAL INDIRECT ALTERATION</b>	<b>24,028</b>	<b>0.55</b>	

<sup>(1)</sup> Approximately 2,200 SF will be converted to grassland as part of the runway safety areas.

<sup>(2)</sup> Direct fence alterations have been calculated based upon direct fill for the fence posts and conversion of forested and dense shrub areas to low growing communities as a result of vegetation management. Indirect/secondary alterations are based upon areas where either (1) vegetation is already open and/or low-growing and will not require vegetation management, or else (2) consists of a monoculture of *Phragmites*.

<sup>(3)</sup> Coastal Dunes within the Airport Area are low-profile dunes that occur within the coastal floodplain, interspersed between freshwater wetlands. These dunes support different characteristics than the secondary dunes that occur along the dune ridges to the north and south of the Airport as shown on Figure 3.

<sup>(4)</sup> Phase 2 of the FEIR/EA Concept 4 would result in an additional 5,700 SF of coastal dune alterations as reported in the FEIR/EA. For permitting purposes, only Phase 1 will be pursued, as the second phase will require additional traffic studies and has not yet been designed, and will be deferred to a future review process.

## 5. RELEVANT SECTIONS OF THE WETLANDS PROTECTION ACT REGULATIONS

The following are relevant terms and performance standards in 310 CMR 10.00: (310 CMR 10.23):

*Adverse Effect means a greater than negligible change in the resource area or one of its characteristics or factors that diminishes the value of the resource area to one or more of the specific interests of M.G.L. c. 131, § 40, as determined by the issuing authority. Negligible means small enough to be disregarded.*

Excerpt from Preamble at 310 CMR 10.28(1):

*When a coastal dune is significant to storm damage prevention, flood control or the protection of wildlife habitat, the following characteristics are critical to the protection of those interest(s):*

- (a) the ability of the dune to erode in response to coastal beach conditions;*
- (b) dune volume;*
- (c) dune form, which must be allowed to be changed by wind and natural water flow;*
- (d) vegetative cover;*
- (e) the ability of the dune to move landward or laterally; or*
- (f) the ability of the dune to continue serving as bird nesting habitat.*

310 CMR 10.28(2) Definition:

*Coastal Dune means any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash. Coastal dune also means sediment deposited by artificial means and serving the purpose of storm damage prevention or flood control.*

310 CMR 10.28 (3) Performance Standards:

*Any alteration of, or structure on, a coastal dune or within 100 feet of a coastal dune shall not have an adverse effect on the coastal dune by:*

- (a) affecting the ability of waves to remove sand from the dune;*
- (b) disturbing the vegetative cover so as to destabilize the dune;*
- (c) causing any modification of the dune form that would increase the potential for storm or flood damage;*
- (d) interfering with the landward or lateral movement of the dune;*
- (e) causing removal of sand from the dune artificially; or*
- (f) interfering with mapped or otherwise identified bird nesting habitat.*

## 310 CMR 10.28 (6) Performance Standard

*Notwithstanding the provisions of 310 CMR 10.28(3) through (5), no project may be permitted which will have any adverse effect on specified habitat sites of Rare Species, as identified by procedures established under 310 CMR 10.37.*

### **6. DISCUSSION OF NO ADVERSE EFFECT**

The proposed Airport CIP Project elements will alter approximately 1.03 acres of coastal dune in four locations within the managed Airport Area. Coastal Dune is a resource protected under the Massachusetts Wetlands Protection Act (WPA) and its implementing Regulations at 310 CMR 10.00. As shown in Table 1 and located in overview on Figure 4, these alterations are associated with five of the CIP Project elements. These locations are:

- Between the runway and parallel taxiway (TW) for East End TW and Access Roads (Figures 9 and 10);
- Adjacent to the parallel TW for the Run-Up Pad near the West End TW (Figure 11);
- Adjacent to existing parking lot and Airport Drive for Phase 1 Parking (Figure 12); and
- Various locations near proposed run-up pad and south of the runway for the safety security fence (Figure 4).

As stated in the WPA regulations:

*The following six characteristics of coastal dunes are critical to the protection of the interests of storm damage prevention, flood control or the protection of wildlife habitat:*

- (a) the ability of the dune to erode in response to coastal beach conditions;*
- (b) dune volume;*
- (c) dune form, which must be allowed to be changed by wind and natural water flow;*
- (d) vegetative cover;*
- (e) the ability of the dune to move landward or laterally; or*
- (f) the ability of the dune to continue serving as bird nesting habitat.*

A discussion of the dune alterations associated with the proposed CIP Project on the interests of the Wetlands Protection Act is provided below.



Coastal Dune  
Impact = 5,000 SF

Prepared By:

**JACOBS**

Provincetown Municipal Airport  
Capital Improvements Plan

East End Taxiway

Figure 9





AWOS  
Service Road  
10,560 SF

Localizer (LES)  
Service Road  
Coastal Dune  
Impact = 7,610 SF

Hold Line

25

Prepared By:

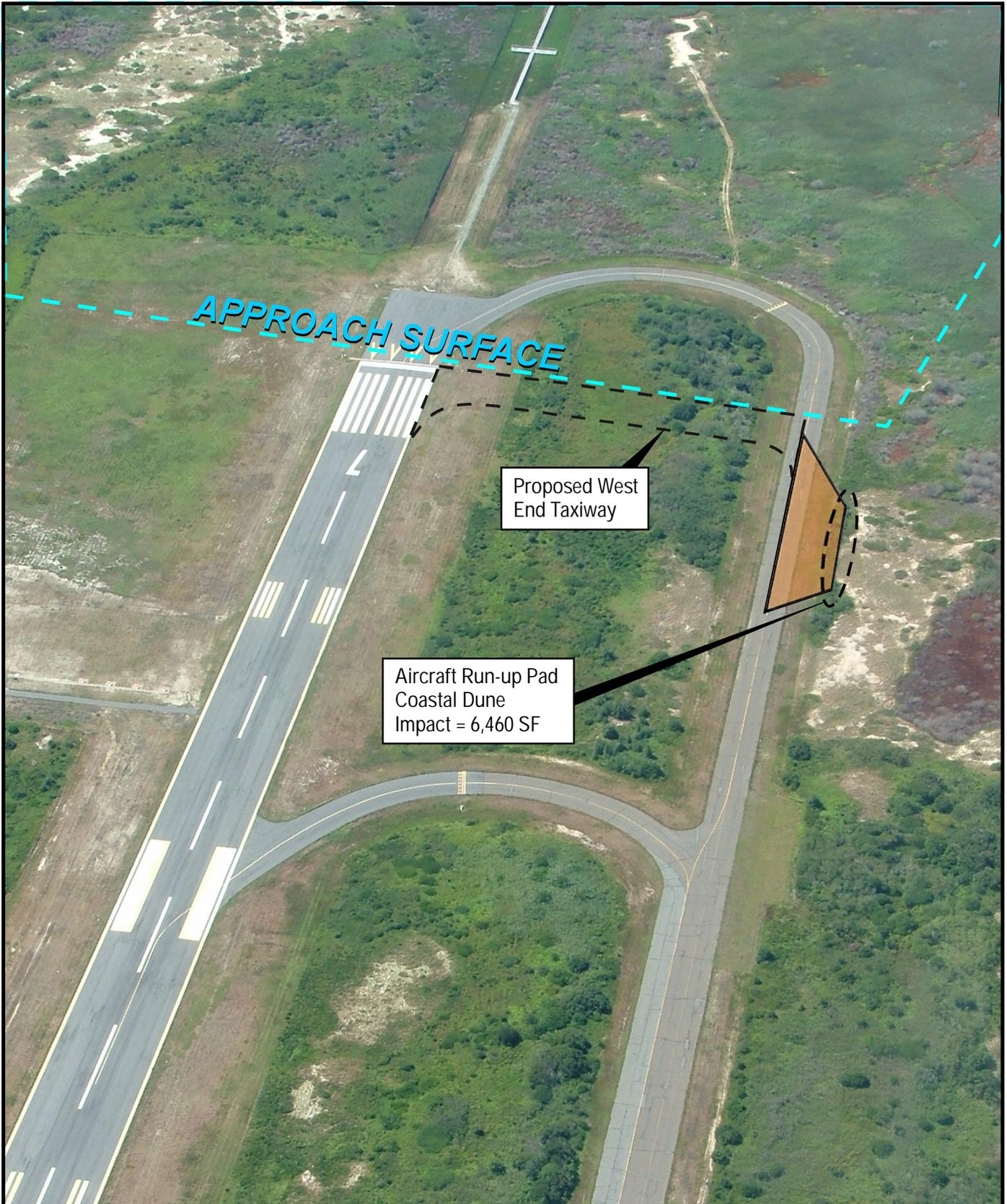
**JACOBS**

Provincetown Municipal Airport  
Capital Improvements Plan

Service Access Roads

Figure 10





Prepared By:

**JACOBS**

Provincetown Municipal Airport  
Capital Improvements Plan  
Westerly Taxiway  
Run-up Pad

Figure 11





Coastal Dune  
Impact = 7,315 SF

Prepared By:

**JACOBS**

Provincetown Municipal Airport  
Capital Improvements Plan

Proposed Parking Lot - Phase 1

Figure 12



## **6.1 No Adverse Effect on the ability of waves to remove sand from the dune**

The preamble for coastal dunes at 310 CMR 10.28 (1) states that “*Coastal dunes aid in storm damage prevention and flood control by supplying sand to coastal beaches. Coastal dunes protect inland coastal areas from storm damage and flooding by storm waves and storm elevated sea levels because such dunes are higher than the coastal beaches which they border.*”

The secondary coastal dunes within the Airport Area that are associated with the CIP Project elements do not directly face the coastal beach. Primary dunes by definition face the coastal beach. There are no primary dunes within the Airport Area. At the closest point (near the existing Airport parking lot), the dunes within the Airport Area are 1,500 linear feet from the beach at Race Point, and are not subject to wave action. Although the dunes within the Airport Area are part of the larger coastal dune system, they are so geographically distant and physically isolated from the shoreline, that their contribution to the supply of sands supporting the coastal beaches would be negligible, if any.

Therefore, alterations to coastal dunes within the Airport Area would not adversely affect the wave-dune interaction, and therefore, none of the proposed CIP Project elements would adversely affect the ability of waves to remove sand from primary coastal dunes.

## **6.2 No Adverse Effect by disturbing the vegetative cover so as to destabilize the dune**

The coastal dunes within the footprints of the proposed CIP Project elements (including the dunes within the proposed parking lot expansion) are generally low-lying and densely vegetated, and therefore, relatively stable dunes. These dunes are inland of the secondary dune ridge to the north and less subject to landward or lateral movement of sand. Topography within the Airport Area varies only by one to two feet across the airfield (see Figure 2).

Although construction of the CIP Project elements within these dunes will result in the loss of vegetation within the immediate footprint of the Project elements, this loss would be negligible because the disturbance is such a small percentage of the overall area of the surrounding dune system within the CCNS (approximately 0.012%). Grading within the generally low, flat areas will be minimal, and any disturbance of adjacent dune areas would be revegetated with beachgrass or other low growing shrubs or groundcover, ensuring that the overall dune system within the Airport Area will remain stable. The effect on the stability of the overall coastal dune system would be negligible.

## **6.3 No Adverse Effect by causing any modification of the dune form that would increase the potential for storm or flood damage**

Implementation of the CIP Project elements affecting the coastal dunes within the Airport Area will not result in an adverse effect on the ability of the coastal dunes to provide protection to the coastal resource areas from flooding, nor increase the potential for storm or flood damage.

The preamble within the regulations states that “*In order to protect this function [storm damage prevention and flood control], coastal dune volume must be maintained while allowing the coastal dune shape to conform to natural wind and water flow patterns.*” According to Massachusetts Coastal Zone Management (CZM, 1994), the coastal dune volume and form (height and width) are “*the characteristics which allow coastal dunes to resist wave approach during storms and retards stormline retreats.*” This would be most apparent with coastal dunes that are located within the primary dunes or the first line of secondary dunes in closest proximity to the ocean. The low-lying secondary dunes within the Airport Area, while a part of the overall dune system that is thousands of acres in size, contribute only negligible benefits to this interest due to their distance from the ocean.

As noted above, the entire Airport Area is located within the coastal flood zone, at elevations several feet below the 100-year flood elevation. It has been determined that the primary source of coastal flooding at the Airport is from coastal waters located to the west of the Airport within Hatches Harbor (see Figure 8). However, as noted above, the Hatches Harbor dike influences the ebb and flow of tides at the Airport. In the late 1990s/early 2000s, the Town of Provincetown, in conjunction with other project partners, including NPS, undertook the Hatches Harbor Wetland Mitigation Project to restore tide-restricted wetlands to the extent possible. As part of that project, tide gates were installed within the dike to allow for greater flushing of saline waters landward of the dike. The tide gates were then opened incrementally to increase flushing to the maximum extent practicable without compromising safety conditions at the Airport. Follow up monitoring studies conducted by NPS and others revealed that even when fully opened, tidal waters at the highest tidal cycles (e.g., spring tides) are restricted by the presence of the dike and would not flood the airport infrastructure<sup>7</sup>.

Acknowledging the effects of the Hatches Harbor dike, the low-lying coastal dunes within the Airport Area may still provide some protection from flooding or storm damage during smaller storm events (e.g., less than a 100-year storm event); however, in general, topography within the Airport Area varies only by one to two feet across the airfield (see Figure= 2). Modification of the low-lying coastal dunes adjacent to other generally low, flat areas will result in insignificant changes in the ability of the coastal dunes to function as physical barriers to backshore flooding or storm damage, even from backwater flooding. As a result, implementation of the CIP Project will have only negligible effects on the ability of these dunes to provide flood storage capacity and storm damage prevention at the Airport or off-site. Likewise, the CIP Project will not result in the displacement of coastal floodwater in a way that would result in storm damage or other adverse effects to other resource areas.

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<sup>7</sup> Portnoy, J. et al. Hatches Harbor Salt Marsh Restoration: 2005 Annual Report, Cape Cod National Seashore, 19 pp.

Coastal dune alterations associated with the proposed fence are limited to the placement of fence posts at grade. Secondary or indirect alterations to coastal dunes associated with the fence are limited to cutting of taller vegetation along the fence. No grading is proposed that would modify the form of these more outlying secondary coastal dunes. As such, implementation of the CIP Project will not decrease flood storage capacity at the Airport, nor will it displace coastal floodwater in a way that would result in storm damage or other adverse effects to other natural resource areas.

#### **6.4 No Adverse Effect by interfering with the landward or lateral movement of the dune**

Many of the secondary coastal dunes within the footprints of the proposed CIP Project elements (including the secondary dunes within the proposed parking lot expansion) are generally densely vegetated and therefore relatively stable dune areas that are less subject to landward or lateral movement of sand.

The secondary coastal dunes within the Airport Area are adjacent to, and between, the runway and taxiways at the Airport, or adjacent to Race Point Road and Airport Drive. Those low-lying dune areas that would be altered by the proposed CIP Project elements have limited opportunity to move or migrate naturally. Current airport safety regulations require the maintenance of object free zones, including clear, unobstructed pavement surfaces and low-growing vegetation that will not interfere with the object free airspace. The low-lying dune areas within the airfield are densely vegetated and stable and are actively managed within the airfield. Maintenance of safe conditions at the Airport will not change as a result of the proposed CIP Project.

As noted above, the low-lying secondary dune areas near the existing parking lot and airport access road are confined by, and occur at elevations lower than, the existing paved infrastructure in these locations. Proposed alterations to coastal dunes in the context of the extensive dune system within the Province Lands comprise a small percentage of the 8,500 acres of dunes within the CCNS.<sup>8</sup> Accordingly, construction of the CIP Project within the Airport Area (adjacent to existing built environment) would alter only a negligible amount (0.012%) of the overall dune system<sup>9</sup>.

Coastal dune areas that are more distal (but still within the managed Airport Area) that would be altered by the proposed security fence, would be allowed to continue to naturally shift, consistent with existing aeolian conditions, since the only obstructions would include the fence posts and open chain-link fence. The open chain-link design will also incorporate small wildlife “gaps” at regular intervals (every 100 feet) to allow for unobstructed passage of reptiles and small mammals (while also serving the purpose of obstructing larger wildlife). As such, the presence of the fence, placed in close proximity to the airfield within generally stable, low-lying coastal

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<sup>8</sup> Cape Cod National Seashore website: <http://www.nps.gov/caco/learn/nature/sanddunes.htm>

<sup>9</sup> This percentage was calculated based upon a previous study conducted by HW using prior flood maps, and a larger amount of proposed fill material.

dunes, is not anticipated to significantly alter the existing dune form, nor the ability of these dunes to be allowed to shift as a result of wind action.

While a part of the larger coastal dune system, the alterations associated with the implementation of the CIP Project would have a negligible effect on the ability of these stable, low lying dunes to naturally shift landward or laterally in response to wind or water movement.

### **6.5 No Adverse Effect by causing removal of sand from the dune artificially**

Many of the low-lying secondary coastal dunes associated with the proposed CIP Project elements are relatively stable with vegetation. Some of these areas are subject to airport safety regulations requiring vegetation maintenance, and therefore are already somewhat altered by the current activities associated with the Airport (i.e., vegetation management and sand sweeping).

As previously mentioned, topography within the Airport Area varies only by one to two feet across the airfield (see Figure 2). As a result, proposed grading activities within the generally low, flat areas will be minimal, and any disturbance of adjacent dune areas would be revegetated with beachgrass or other low growing shrubs or groundcover. As such, the overall dune system within the Airport Area will remain stable, and the CIP Project is unlikely to result in any secondary adverse effect that may result in the artificial removal of sand from the dunes. The effect on the stability of the overall coastal dune system would be negligible.

The fence itself is not anticipated to alter the existing dune form nor is its long-term presence anticipated to cause artificial removal of sand from these dunes. Sand may move through the open chain-link fence freely.

In sum, the alterations associated with the CIP Project with respect to the potential for artificial removal of sand from the coastal dunes, would be negligible, in part due to the low and relatively flat topography and the continued low-lying nature of the built environment within the Airport Area.

### **6.6 No Adverse Effect by interfering with mapped or otherwise identified bird nesting habitat**

Primary dunes and areas immediately along the shoreline and within the beach strand typically provide important habitat for nesting shorebirds. The CCNS has been observing shorebird activity and monitoring nesting shorebird colonies since the early 1990s. Shorebird nesting activity, as mapped by CCNS, occurs hundreds of feet north of the Airport as previously discussed in Section 2.4. Occasional observations of shorebirds flying overhead have been made in and around the Airport through field studies conducted by Horsley Witten Group and others. There are no known or documented shorebird nesting areas within the Airport Area. These areas are subject to continual human presence and disturbance that render these dunes less suitable for certain species that are intolerant of anthropogenic influence. This frequent human activity is

presumed to be disruptive to nesting activity. Accordingly, it is unlikely that the dune areas within the Airport Area provide significant nesting habitat as compared to more outlying dunes that are located farther from the built environment. In addition, these dunes may be less suitable for nesting shorebirds due to the distance from feeding habitat along the coastal beaches.

Therefore, implementation of the proposed CIP Project within the coastal dunes will have no adverse effect on the ability of these dunes to provide nesting habitat for shorebirds.

## **7. NO ADVERSE EFFECT ON HABITAT SITES OF RARE SPECIES**

The Airport is mapped in its entirety as both Estimated and Priority Habitat of Rare Species as discussed in Section 2.5. The Airport has been working with NHESP since the onset of the master planning for the CIP Project, providing habitat assessments for these species, assessing project alternatives and modifying the location of the preferred alternative for each of the CIP Project elements to avoid adverse effects on these species and their habitats. NHESP has issued a conditional “no take” decision in response to the MESA Project Review that was submitted in July 2014 (attached). The Airport will be required to submit project element-specific construction protocols to ensure the protection of the rare species and their habitats at the Airport.

The Airport will continue to work with NHESP throughout CIP Project permitting to ensure compliance with that decision under Massachusetts Endangered Species Act (M.G.L. Ch. 131A; MESA). Therefore, the proposed CIP Project will have no adverse effect on the habitat for state-listed rare species.

## **8. PROPOSED MITIGATION**

Notwithstanding the negligible effects to the secondary coastal dunes resulting from the implementation of the CIP Project, the Airport Commission is committed to replacing altered secondary dunes associated with the construction of the run-up pad, the relocation of the East End Taxiway, construction of the Service Access Roads and the Parking Lot, and installation of the security fence in a manner that is consistent with upholding the interests under the WPA and to further allow the replacement dunes to function as storm damage prevention and flood control. Approximately 0.63 acres of secondary coastal dunes will be created in two locations at the East End and West End Taxiways. Proposed dune replacement areas are designed to mimic the altered areas as well as provide secondary coastal dunes and the storm damage and flood control functions. In addition, dune restoration and enhancement activities are proposed within dunes that have become degraded as a result of colonization by invasive species. Proposed mitigation measures will further allow the existing secondary coastal dunes at the Airport to serve the interests under the Wetlands Protection Act and contribute to a finding of No Adverse Effect to coastal dunes associated with the proposed CIP Project. Details and plans of the proposed mitigation measures will be submitted with permit applications. A brief description of the proposed mitigation measures is provided below.

## **8.1 Coastal Dune Replacement**

Altered coastal dunes are proposed to be replaced, utilizing salvaged dune sands and vegetation (as practicable). With the East End Taxiway relocation this will occur in an area immediately adjacent to other low-lying coastal dunes between the Airport runway and the relocated East End taxiway. Along the West End, coastal dunes will also be created that will also physically shield the proposed replacement wetlands and the newly relocated West End taxiway and run-up pad from flooding that may occur stemming from Hatches Harbor. The approximately 0.63 acres of replacement dunes will be planted with native species similar to the surrounding vegetation, and will be designed to blend with the surrounding, unaltered areas.

## **8.2 Coastal Dune Restoration and Enhancement**

Additional measures to further the ability of the coastal dunes to provide for flood control and storm damage prevention will occur through the implementation of an invasive species removal plan. This is proposed to be implemented within affected dunes in the Airport Area that are not otherwise affected by the CIP Project, and is designed to further stabilize these dunes with native vegetation. In those affected areas, existing colonies of spotted knapweed (*Centaurea stoebe*) will be removed and disposed of properly, and the dunes will be revegetated with American beachgrass and other native dune species, as appropriate. This will result in dunes that are more physically stable and likely to provide better native habitat for local wildlife.

In addition, and overall, taking into account all other CIP Project elements, implementation of the CIP Project will also result in a net reduction of impervious surface and fill within the 100-year coastal floodplain that will further allow the resource areas, including the coastal dunes, to support the interests under the Wetlands Protection Act.

## **9. CONCLUSION**

The Provincetown Airport is located on land with a unique setting. The history of Hatches Harbor indicates that the entire Airport Area was filled and graded or else used as borrow areas to construct the airfield in the 1940s. Given the landscape setting and context of the existing Airport infrastructure, the proposed CIP Project elements will not have an adverse effect on the six characteristics of coastal dunes that are critical to the interests of storm damage prevention, flood control, or the protection of wildlife habitat for nesting shorebirds

An extensive alternatives analysis was presented in the FEIR/EA demonstrating that the preferred alternative for each of the CIP Project elements minimizes alterations to the resource areas while still meeting the project purpose. Due to the nature (i.e., volume, form, and location/landscape setting) of the existing coastal dunes, we conclude that there will be no adverse effect on these coastal dunes as a result of the CIP Project implementation. Further, the Airport has worked extensively with NHESP to avoid adverse effects on rare species habitat, and

NHESP has rendered a decision that the proposed Project will not result in a regulatory “take” under MESA.

In addition, implementation of all proposed CIP Project elements will result in an overall net decrease in impervious surfaces. The abandonment of previously paved areas, in turn, creates an opportunity to increase the area of low-lying isolated wetlands and to provide coastal dune habitat within the Airport Area through resource area creation (replication). In addition, the reduction in impervious surfaces will ultimately improve flood control at the Airport through increased flood storage/volume as well as greater infiltration and greater groundwater recharge.

We believe that this Technical Narrative demonstrates that the proposed CIP Project will not result in adverse effects on the six characteristics of the coastal dunes to prevent storm damage, provide flood control, or protect wildlife habitat for nesting shorebirds. Proposed mitigation involving both replacement of dunes as well as dune enhancement further supports the determination that the proposed CIP Project will have no adverse effect on these coastal dunes. The Airport Commission seeks concurrence from DEP.

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## REFERENCES

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**MassWildlife**

Commonwealth of Massachusetts

# Division of Fisheries & Wildlife

Wayne F. MacCallum, *Director*

August 8, 2014

Arthur Lisenby  
Provincetown Airport Commission  
176 Race Point Road  
Provincetown, MA 02657

George Price  
Cape Cod National Seashore  
99 Marconi Site Road  
Wellfleet, MA 02667

RE:	Project Location:	Provincetown Municipal Airport
	Project Description:	Capital Improvements Program
	<b>NHESP File No.:</b>	<b>04-15716</b>

Dear Applicant:

The Natural Heritage & Endangered Species Program of the Massachusetts Division of Fisheries & Wildlife (the "Division") received the MESA Project Review Checklist other required materials for review pursuant to the Massachusetts Endangered Species Act (MESA) (MGL c.131A) and its implementing regulations (321 CMR 10.00).

The Division is concerned that the proposed projects will either directly harm and/or disrupt the breeding and foraging behavior of state-listed species during construction, including the Eastern Box Turtle (*Terrapene carolina*), Eastern Spadefoot (*Scaphiopus holbrookii*), and the Vesper Sparrow (*Pooecetes gramineus*). Based on the information provided and the information contained in our database, the NHESP finds that this project, as currently proposed, **must be conditioned in order to avoid a prohibited "take"** of state-listed species (321 CMR 10.18(2)(a)). We note that you have been regularly consulting with the Division on the design and implementation of the various proposed project elements. As stated in the most recently submitted information, a final "Construction Management Plan for Environmental Compliance" will be developed to include information on construction timing, phasing, methods, and rare species protective measures. Said plan shall be submitted to the Division for review and written approval and shall be implemented during construction.

Provided the above-noted condition is fully implemented and there are no changes to the project plans, this project will not result in a "take" of state-listed species. We note that all work is subject to the anti-segmentation provisions (321 CMR 10.16) of the MESA. This determination is a final decision of the Division of Fisheries and Wildlife pursuant to 321 CMR 10.18. Any changes to the proposed project or any additional work beyond that shown on the site plans may require an additional filing with the Division pursuant to the MESA. This project may be subject to further review if no physical work is commenced within five years from the date of issuance of this determination, or if there is a change to the project.

[www.mass.gov/nhesp](http://www.mass.gov/nhesp)

Division of Fisheries and Wildlife

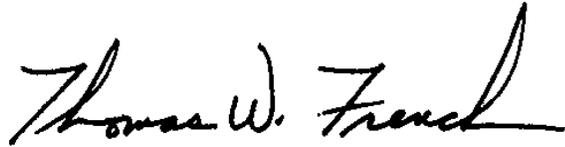
Temporary Correspondence: 100 Hartwell Street, Suite 230, West Boylston, MA 01583

Permanent: Field Headquarters, North Drive, Westborough, MA 01581 (508) 389-6300 Fax (508) 389-7890

An Agency of the Department of Fish and Game

Please note that this determination addresses only the matter of state-listed species and their habitats. If you have any questions regarding this letter please contact Eve Schlüter, Ph.D., Senior Endangered Species Review Biologist, with any questions about this letter at (508) 389-6346 or [eve.schluter@state.ma.us](mailto:eve.schluter@state.ma.us).

Sincerely,

A handwritten signature in black ink that reads "Thomas W. French". The signature is written in a cursive style with a large, sweeping flourish at the end of the word "French".

Thomas W. French, Ph.D.  
Assistant Director

cc: Michael Garrity, Jacobs Engineering