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Summary of Wetland Resource Areas

Provincetown Municipal Airport
Provincetown, Massachusetts

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TABLE OF CONTENTS

	Page
1. INTRODUCTION AND BACKGROUND	1
2. GENERAL SITE CHARACTERISTICS	2
3. REGULATORY OVERVIEW	2
3.1 Freshwater Wetlands	2
3.1.1 Bordering Vegetated Wetland	2
3.1.2 Isolated Vegetated Wetlands	2
3.1.3 Isolated Land Subject to Flooding	3
3.2 Coastal Resource Areas	3
3.2.1 Coastal Flood Zone	3
3.2.2 Coastal Dune and Barrier Beach	4
3.3.3 Salt Marsh	4
4. SOILS CLASSIFICATION AND GEOLOGIC CHARACTERISTICS	5
5. WETLAND DELINEATION METHODOLOGY	5
6. OVERVIEW OF WETLAND AREAS	6
6.1 Descriptions of Isolated Wetland Areas	7
6.1.1 Wetland A	7
6.1.2 Wetland B	7
6.1.3 Wetlands D, E, G, and L	8
6.1.4 Wetlands F, M, and N	8
6.1.5 Wetlands H and I	8
6.1.6 Wetland K	9
6.1.7 Wetlands AA, AB, AC, AD, AG, and AJ	9
6.1.8 Wetland AE	9
6.1.9 Wetland AF	9
6.1.10 Wetland AI	9
6.1.11 Wetland AK	10
6.1.12 Wetland AL	10
6.1.13 Wetland AM	10
6.1.14 Wetlands BA, BC, CA, CB, CD, CE, CG, CH, CI, CO, CP, CQ, and DB	10
6.1.15 Wetlands BB, CC, CJ, CK, CL, CN, CR, DA, DC, DD/E, DE, DF, DG, DH, DI, and DM	12
6.1.16 Wetlands CF, CM, CU, CV, and DE	13

TABLE OF CONTENTS (cont.)

6.2	Bordering Vegetated Wetland (Wetlands C, J, CS, and CT/J)	13
6.2.1	Wetlands C and J	13
6.2.2	Wetland CS	14
6.2.3	Wetland CT/J	14
6.3	Updated and Amended Isolated Freshwater Wetland Descriptions	14
6.4	Salt Marsh	14
7.	WETLANDS FUNCTIONS AND VALUES	15
8.	REFERENCES	18
	APPENDICES	

List of Figures and Tables

Figures

- Figure 1 USGS Locus of Provincetown Municipal Airport and surrounding lands
- Figure 2 Aerial Photo of Provincetown Municipal Airport and surrounding lands
- Figure 3 Federal Emergency Management Agency (FEMA) Flood Zones
- Figure 4 Massachusetts Department of Environmental Protection Wetlands and Streams (MassGIS)
- Figure 5 Soil Survey of Barnstable County, Massachusetts, Soils Map (MassGIS)
- Figure 6 Wetland Resource Area Map, December 2006 (size reduced)

Tables

- Table 1 Summary of wetland areas delineated at the Provincetown Municipal Airport, Provincetown, Massachusetts.

1. INTRODUCTION AND BACKGROUND

The Provincetown Airport Commission recently filed an Environmental Notification Form (ENF) under the *Massachusetts Environmental Policy Act* (M.G.L. c. 30 §§ 61 through 62H, inclusive, or MEPA). The ENF was based on the Provincetown Municipal Airport's 2005 Master Plan. The Master Plan was the initial step toward developing a Capital Improvement Project (CIP) program for the Airport facilities. An integral component of this planning process involves identifying the existing conditions and facility needs, while also identifying various alternatives to meeting those needs. The various improvement projects, as well as alternative project footprints, were outlined in the ENF.

The surveyed wetlands presented in the ENF were supplemented with available DEP wetlands data from MassGIS. The Certificate of the Secretary of the Executive Office of Environmental Affairs (EOEA) on the ENF (EOEA No.13789; May 26, 2006) specifically requested that the Airport definitively quantify the potential impacts for each of the proposed projects and the alternative footprints, which necessitated additional field surveys. As a result, additional wetland delineations have been completed since the ENF.

Wetland resource areas, including isolated and bordering vegetated wetlands that are protected and regulated under the *Massachusetts Wetlands Protection Act* (M.G.L. Ch. 131 § 40), its implementing Regulations (310 CMR 10.00), the Federal *Clean Water Act* (33 U.S.C. 1251, *et seq.*), the Town of Provincetown *Wetlands Protection Bylaw* (Chapter 12 of the Provincetown General Bylaws), and/or the Cape Cod Commission (CCC) Regional Policy Plan (RPP), were reviewed and approved by the Provincetown Conservation Commission under an Order of Resource Area Delineation ("Order") issued January 25, 2007. Figure 6 depicts the approved wetland areas.

Identification and delineation of all wetland areas is important to future permitting, thus additional wetland areas were identified and delineated within the Airport lease area that extend beyond the jurisdiction of State and local statutes due to their diminutive size. While shown on the existing conditions plans and discussed in the following narrative, the Airport Commission did not specifically seek State or local approval of those wetland boundaries. For clarification, these small isolated areas are identified in the table of Wetland Resource Areas at the end of this narrative. Please note that only those wetlands that occur within or near the various CIP footprints (and alternatives) have been delineated.

Additionally, the Army Corps of Engineers (ACOE), who participated in the site walk for the Abbreviated Notice of Resource Area Delineation (ANRAD), issued a separate Preliminary Jurisdictional Determination (NAE-2006-4281) indicating that "*there appear to be 'waters of the United States' and/or 'navigable waters of the United States' on the project site,*" which would be regulated under the federal *Clean Water Act*.

A summary of all wetland resource areas delineated at the Airport is provided below, including a general site description, a general regulatory overview, broad descriptions of the various types of wetland resource areas encountered, a discussion of field methodologies, and a description of each wetland area encountered within or near any identified CIP project footprint. This *Summary of Wetland Resource Areas* report incorporates all information previously reported in the *Wetland Resource Area Report* (HW, October 2005) referenced in the ENF, as well as the information presented in the ANRAD report (HW, December 2006) that was submitted to the Provincetown Conservation Commission and the Massachusetts Department of Environmental Protection (DEP).

2. GENERAL SITE CHARACTERISTICS

The Airport is situated within the bounds of the Cape Cod National Seashore (CCNS), occupying approximately 322 acres of land (Figures 1 and 2). Race Point Road and the Coast Guard Station at Race Point are located to the immediate northeast. Areas within the Airport lease area that are maintained for Airport operations include a terminal and other buildings, a paved runway and taxiways, auto parking, and navigation equipment. Additional areas are mowed to maintain various aviation safety areas and navigational surfaces. In general, the areas at the Airport that are not actively maintained as part of Airport operations are either wetland/palustrine habitats or coastal dune habitats.

The Airport contains diverse wetland resource areas, including isolated freshwater wetland areas, Bordering Vegetated Wetlands (BVW), salt marsh, and a coastal dune system. Portions of the Airport are located in the coastal floodzone. Wetland habitats present typically demonstrate physical and biological characteristics of a Coastal Interdunal Marsh/Swale, as described in the *Classification of the Natural Communities of Massachusetts* (Swain and Kearsley, 2001; “the *Classification*”). Dune habitats observed at the Airport can be classified as either Maritime Dune, Maritime Shrubland, or Maritime Pitch Pine on Dunes as described in the *Classification* depending on their individual characteristics.

3. REGULATORY OVERVIEW

Wetland Resource Areas found within the Airport lease area are subject to jurisdiction pursuant to the *Massachusetts Wetlands Protection Act*, the *Federal Clean Water Act*, the *Provincetown Wetlands Protection Bylaw*, and the CCC RPP and implementing regulations. Any activity proposed within a jurisdictional wetland or within 100 feet of certain wetland areas will require review and permitting by Federal, State, regional, and/or local regulatory authorities. A brief description of the jurisdictional definitions is provided below. Specific descriptions of individual wetland resource areas are provided in the following section.

3.1 Freshwater Wetlands

3.1.1 Bordering Vegetated Wetland

BVWs are defined under Massachusetts Wetlands Protection Act Regulations at 310 CMR 10.55(2)(a) as “*freshwater wetlands that border on creeks, rivers, streams, ponds and lakes. The types of freshwater wetlands are wet meadows, marshes, swamps and bogs. Bordering Vegetated Wetlands are areas where the soils are saturated and/or inundated such that they support a predominance of wetland indicator plants. The boundary of Bordering Vegetated Wetland is defined at 310 CMR 10.55 (2)(c) as the line within which 50% or more of the vegetational community consists of wetland indicator plants and saturated or inundated conditions exist.*” Freshwater wetlands meeting this definition are also regulated as waters of the United States under Section 404 of the *Federal Clean Water Act* (see below), and as freshwater wetlands under the *Provincetown Wetlands Protection Bylaw* (Chapter 12).

3.1.2 Isolated Vegetated Wetlands

Isolated Vegetated Wetlands are regulated under Section 404 of the *Federal Clean Water Act*, as well as under the *Provincetown Wetlands Protection Bylaw* and the CCC RPP.

Freshwater wetlands are defined by the Army Corps of Engineers (Federal Register 1982) and the U.S. Environmental Protection Agency (Federal Register 1980) as “*those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under*

normal circumstances so support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.”

Chapter 12 of the Provincetown General Bylaws regulates Isolated Vegetated Wetlands, defined as “*any area where surface or ground water or ice at or near the surface of the ground and greater than 500 square ft. which supports a plant community (cover) comprised of 50% or greater of wetland species, or which in the judgment of the Commission supports a significant community of wetland vegetation.*”

Vegetated Wetlands: A Vegetated Wetland is defined by the Provincetown Conservation Commission Bylaws as “*any area of at least 300 square feet where surface or groundwater, or ice, at or near the surface of the ground support a plant community dominated (at least 50 percent) by wetland species or have created hydric soils.*” The local wetlands bylaw specifically defines bogs and marshes as follows.

- **Bog:** A Bog is defined by the Provincetown Conservation Commission Bylaw as “*a freshwater wetland characterized by peat accumulation usually dominated by moss. Receives only direct precipitation; characterized by acid water, low alkalinity, and low nutrients.*”
- **Marsh:** A Marsh is defined by the Provincetown Conservation Commission Bylaw as “*a freshwater or coastal wetland permanently or periodically inundated characterized by nutrient-rich water.*”

Unvegetated Wetlands: An Unvegetated Wetland is defined by the Provincetown Conservation Commission Bylaw as “*coastal areas, such as flats and unvegetated intertidal areas; coastal and freshwater beaches, dunes, and banks; and land subject to flooding. Also, inland areas subject to flooding which do not support wetland vegetation or contain hydric soils, but which store at least 1/8 acre feet of water to an average depth of six inches at least once a year, or the statistical equivalent, and land areas two feet or less vertically above the high water mark of any lake or pond defined by Chapter 12 of the General By-Laws of Provincetown; regulations promulgated by the Provincetown Conservation Commission or 310 CMR. Does not include swimming pools, artificially lined ponds or pools, wastewater lagoons, or stormwater runoff basins, the construction of which may be regulated but do not themselves constitute regulated areas.*”

The CCC RPP regulates impacts to all wetlands greater than 500 square feet whether they border water bodies or not, as well as the associated 100-foot buffer zone.

3.1.3 Isolated Land Subject to Flooding

Isolated wetlands are regulated under the Massachusetts Wetlands Protection Act only if they meet a volumetric criteria as specified under the Regulations at 310 CMR 10.57(2)(b). Isolated Land Subject to Flooding (ILSF) is defined at 310 CMR 10.57(2)(b)1 as “*an isolated depression or closed basin without an inlet or an outlet. It is an area which at least once a year confines standing water to a volume of at least ¼ acre-feet and to an average depth of at least six inches.*” Chapter 12 also regulates ILSF under the definition of “Unvegetated Wetlands” (see above).

3.2 Coastal Resource Areas

3.2.1 Coastal Flood Zone

Land Subject to Coastal Storm Flowage (LSCSF) is defined in the Massachusetts Wetlands Protection Act Regulations at 310 CMR 10.04 as “*land subject to any inundation caused by coastal storms up to and including that caused by the 100-year storm, surge of record or storm of record, which ever is greater.*”

The Airport is situated within a low-lying area between parallel dune ridges. According to the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (Community Panel 255218 00001 C), this low area is within the 100-year flood zone (Zone A2, elevation 10 feet above sea level, and Zone A4, elevation 11 feet above sea level; shown as zone AE on Figure 3). The Airport facility and the immediate surrounding area are therefore located within LSCSF, a jurisdictional resource area under the *Massachusetts Wetlands Protection Act* and the local wetlands bylaw. Small pockets of Flood Zone B (X500; Areas between the 100-year flood and the 500-year flood) are located within the A flood zone. The extreme tip of the runway approach lights is located within the velocity Zone V4 (VE, elevation 13 feet above sea level). The surrounding elevated dune system is located within areas of minimal flooding. The 100-year flood zone includes flood zones A and V, but not B or C.

3.2.2 Coastal Dune and Barrier Beach

Coastal Dune is defined in the *Massachusetts Wetlands Protection Act* Regulations at 310 CMR 10.28(2) as “*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.*”

The *Massachusetts Wetlands Protection Act* Regulations at 310 CMR 10.29 defines Barrier Beach as “*a narrow low-lying strip of land generally consisting of coastal beaches and coastal dunes extending roughly parallel to the trend of the coast. A barrier beach is separated from the mainland by a narrow body of fresh, brackish, or saline water or a marsh system.*”

The coastal dune habitats located to the north and northwest of the Airport occur within the boundaries of the Race Point barrier beach system and consist of both primary and secondary dune habitats. There are no primary dunes located within the Airport lease area. The coastal dune habitats located to the southeast of the Airport are secondary coastal dune habitats that are not within the barrier beach system.

3.2.3 Salt Marsh

The Regulations at 310 CMR 10.28(2) define a salt marsh as “*a coastal wetland that extends landward up to the highest high tide line, that is, the highest spring tide of the year, and is characterized by plants that are well adapted to or prefer living in, saline soils. Dominant plants within salt marshes are salt meadow cord grass (*Spartina patens*) and/or salt marsh cord grass (*Spartina alterniflora*). A salt marsh may contain tidal creeks, ditches and pools.*”

The Hatches Harbor salt marsh system represents an area of former salt marsh that developed brackish to freshwater characteristics over time due to the construction of the Hatches Harbor dike in 1930. The dike was constructed in an attempt to eradicate the problem of a flourishing mosquito population. However, the resultant near monoculture of common reed, and severe reduction of wildlife habitat values prompted the Hatches Harbor Salt Marsh Restoration Project, initiated by National Park Service (NPS) in 1998. Subsequent improvements to the tidal flushing in this area have begun to restore brackish and freshwater wetlands to salt marsh that is contiguous with undisturbed salt marsh areas located seaward of the dike.

The lands on and in the vicinity of the Airport support a barrier beach marsh system. This marsh system consists predominantly of isolated wetland habitats of various sizes that are forested, shrub-dominant, herbaceous, or some combination of these plant community habitat types. Figure 4 depicts wetland resource areas identified by MassGIS and regulated by the State.

4. SOILS CLASSIFICATION AND GEOLOGIC CHARACTERISTICS

The Natural Resources Conservation Service (NRCS) has mapped the Airport as consisting of four primary soil types (Figure 5). Soils are typically very deep and consist of loose, coarse sands according to information obtained from the Barnstable County Soil Survey (Fletcher, 1993). A brief description of the soil types is provided below.

- The marshy BVW located southwest of the Airport facilities and north of the Hatches Harbor dike is mapped as **Berryland mucky loamy coarse sand**, 0 to 2 percent slopes (BmA). This very poorly drained, hydric soil is found in depressions, swales, and low areas adjacent to streams and ponds on outwash plains and in areas of glacial lake deposits. Elsewhere, isolated wetland areas are mapped as **Pipestone loamy coarse sand**, 0 to 3 percent slopes (PeA). This poorly drained soil type is found in depressions, at the base of swales, and low areas bordering streams, ponds, and swamps.
- The dune complexes are mapped as either **Hooksan sand, rolling** (HoC), **Hooksan sand, hilly** (HoD), or **Hooksan –Dune land complex, hilly** (HxC). These excessively drained sandy soils along the vegetated dunes are distinguished primarily by the range of slope.
- **Deerfield loamy fine sand**, 0 to 5 percent slopes (DeA). This well-drained soil type is found in depressions, swales, and low areas adjacent to streams and ponds on outwash plains and in areas of glacial lake deposits. This soil type is found at the southeastern corner of the Airport. Small areas of other hydric soil types are included within mapped areas of this soil.
- **Udipsamments, smoothed** (Ud). This map unit consists of nearly level soils in areas that have been excavated or filled during construction. Commonly rectangular in shape, these areas are generally associated with roads, highways, schools, housing developments, or athletic fields.

The geologic characteristics of the Airport, combined with a fluctuating, seasonally high groundwater table, result in seasonal saturation of the upper portion of the soil profile for significantly long periods of time during early portions of the growing season. Rainfall during storm events also contributes to saturated soil and inundated land conditions. Inundated and/or saturated soil conditions favor the establishment of a hydrophyte-dominant plant communities and the deposition of organic material, which are typical of wetland habitats.

5. WETLAND DELINEATION METHODOLOGY

HW field biologists conducted field surveys and wetland delineations in August and September 2004 to support the Airport's master planning effort. At that time, HW identified and delineated 14 wetland areas, Wetlands A through N, each corresponding to an established series of sequentially numbered wetland boundary flag stations. These surveyed wetland areas are shown on Figure 6.

HW resumed field surveys in the summer and fall of 2006 (approximately August through early December), delineating and field surveying an additional 51 wetland areas that correspond to the approximate footprints of the CIP projects described in the ENF. HW assigned a two letter code to these wetland areas to distinguish these wetlands from those identified in the ENF. In some instances, wetland area boundaries that were previously partially established were expanded upon during the second round of field work.

To facilitate our field efforts, the Airport Lease Line was survey-located and marked in the field at 50- or 100-foot intervals with labeled wooden stakes. Wetland areas along the lease line were delineated in

approximately four series: AA through AM [excluding AH]; BA through BC; CA through CV; and DA through DM. These wetland areas range in size from only a few hundred square feet to expansive wetland areas associated with the Hatches Harbor salt marsh system. As stated above, some of the two letter code wetland boundaries are contiguous with and expand upon previously identified (i.e., single letter code) wetland areas. Each wetland was marked using sequentially-numbered pink wire “pin” flags and/or pink flagging tape. All recently established wetland areas were field-surveyed using a hand-held GPS (global positioning system) with sub-meter accuracy (i.e., within a 3-foot radius).

HW made all wetland boundary determinations in accordance with the 1987 Corps of Engineers Wetlands Delineation Manual (Technical Report Y-87-1) and the DEP handbook entitled *Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act* (March 1995) with consideration given to the local *Provincetown Wetlands Protection Bylaw* and the implementing regulations. The State and Federal methodologies for determining the limits of a jurisdictional wetland generally require the use of three parameters of vegetation, hydrology, and soils. The local wetlands bylaw determines the boundary of BVWs and Isolated Vegetated Wetlands that are greater than 500 square feet, by the presence of a plant community of 50% or greater of wetland species, and “soil hydrology may provide secondary criteria where necessary.” HW completed *DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Forms* within representative wetland areas, which are included within the Appendices to this document.

Each wetland area observed and delineated (partially or entirely) was classified according to the *Classification of Wetland and Deepwater Habitats of the United States* (Cowardin, et al., 1979) with respect to plant community cover types and water regime. As an example, shrub-dominant interdunal wetland marsh, which is the predominant type of wetland habitat at the Airport, is classified as palustrine scrub-shrub (or PSS) with a non-tidal, seasonally- or temporarily-flooded water regime.

6. OVERVIEW OF WETLAND AREAS

The Airport exhibits a low and flat topography and the fluctuating groundwater table elevations are relatively close to the ground surface. The wetland areas range in size from isolated areas of less than a few hundred square feet, to extensive wetland areas associated with and connected directly to the Hatches Harbor wetland system.

The Coastal Interdunal Marsh/Swale community type appears to be one of the predominant, if not the predominant, type of wetland habitat existing at the site. According to the *Classification* (Swain and Kearsley, 2001), this community type is a “*graminoid [grass-like species]- or shrub-dominant coastal community occurring in shallow basins (swales) between sand dunes.*” *With respect to environmental setting, “Interdunal swales are low, shallow depressions that form between sand dunes along the coast. They occur as part of a dune system, and the best examples are complexes of numerous swales. Soils generally have a thin, about one centimeter, organic layer over coarse sand. The water regime ranges from seasonally flooded to permanently inundated.”*

Within this Coastal Interdunal Marsh/Swale community type, HW generally encountered three basic variations: a graminoid-dominated palustrine emergent marsh (PEM), a shrub-dominated palustrine shrub swamp (PSS), and a palustrine forested swamp (PFO). Emergent marshes and shrub swamps were generally encountered north of the Airport facilities and in low-lying areas to the immediate south and west of the runway, where the wetlands are either connected to the Hatches Harbor wetland system, or else are part of the Airport-managed areas where vegetation is maintained at lower heights for Airport safety purposes. Dominant vegetation within the emergent marshes includes woolgrass (*Scirpus*

cyperinus), twig rush (*Cladium mariscoides*), black grass (*Juncus gerardii*), and soft rush (*Juncus effusus*).

Vegetation within shrub swamp communities encountered included bayberry (*Myrica pensylvanica*), willow (*Salix* spp.), winterberry (*Ilex verticillata*), arrowwood (*Viburnum dentatum*), shadbush (*Amelanchier canadensis*), Virginia rose (*Rosa virginiana*), and poison ivy (*Toxicodendron radicans*) with a diversity of herbaceous species including Joe-Pye weed (*Eupatorium* spp.), various goldenrods (*Solidago* spp.), various asters (*Aster* spp.), and ferns in more open areas within the outer dunes closest to the ocean. Within more inland areas dominant wetland vegetation includes highbush blueberry (*Vaccinium corymbosum*), swamp azalea (*Rhododendron viscosum*), and dwarf huckleberry (*Gaylussacia dumosa*) among large patches of American cranberry (*Vaccinium macrocarpon*) interspersed with clumps of woolgrass, ferns, and sphagnum moss (*Sphagnum* spp.).

Forested wetlands (PFO) are located primarily to the south of the runway beyond the managed areas. HW considered all areas conforming to a pitch pine (*Pinus rigida*), cranberry, and highbush blueberry-dominant, forested wetland habitat type (also referred to here as “cranberry-pine swales”) to be a local variant of the shrub-dominant Coastal Interdunal Marsh/Swale, where pitch pine appears to have become well adapted to seasonally wet conditions, and was considered to be a local wetland indicator species.

6.1 Descriptions of Isolated Wetland Areas

Below we provide a brief description of the vegetative and soil characteristics of each wetland area identified and delineated, beginning with those areas delineated prior to the development of the Master Plan (i.e., those wetlands delineated in 2004 and 2005), followed by areas delineated more recently (i.e., in 2006), and any updated information regarding the initial wetland delineation efforts. Wetland areas with similar characteristics have been grouped together within these descriptions as appropriate. These areas are presented on the enclosed *December 2006 Wetland Resource Area Map* prepared by HW (Figure 6). Table 1 summarizes the wetland areas, their jurisdictional status, and the functions and values of each area.

6.1.1 Wetland A

Wetland A is an isolated wetland habitat nearest the northern corner of the Airport terminal and hangar building and adjacent to the terminal parking lot. Dominant canopy species include willow and pitch pine. Plant community species including winterberry, red maple (*Acer rubrum*), meadowsweet (*Spiraea latifolia*), quaking aspen (*Populus tremula*), bayberry, poison ivy, and chokeberry (*Aronia* sp.) comprise the relatively dense shrub-dominant understory of this wetland plant community. Wetland A is a scrub-shrub/forested palustrine habitat (PSS/PFO) with a non-tidal seasonally- or temporarily-flooded water regime. While inundation within this wetland was not directly observed, indicators of past surface water inundation, specifically blackened leaves, were observed.

6.1.2 Wetland B

Wetland B is an isolated wetland habitat located to the southeast of the Airport terminal and hangar building. A gravel path traversing this wetland serves as access to the localizing transmitter. This wetland is characteristic of a Coastal Interdunal Marsh community and can also be classified as a scrub-shrub/emergent palustrine habitat (PSS/PEM). Plant species frequently observed within this wetland included American cranberry, highbush blueberry, dangleberry, meadowsweet, winterberry, pitch pine, and willow. Herbaceous plant species including various sedges (*Carex* spp.), rushes (*Juncus* spp.), and some common reed (*Phragmites australis*) were also frequently encountered. Wetland B likely has a

non-tidal seasonally- or temporarily-flooded water regime. While inundation within Wetland B was not directly observed, hydrologic indicators such as water marks were observed on the trunks of mature shrubs, indicating that this wetland had recently experienced inundation.

6.1.3 Wetlands D, E, G, and L

Wetlands D, E, G, and L are examples of the Coastal Interdunal Marsh community and can be further classified as isolated forested (PFO) and scrub-shrub palustrine (PSS) habitats. These delineated areas and other similar areas identified by MassGIS, form a wetland mosaic within the extensive pitch pine-forested habitats to the southeast of the runway. While pitch pine is the dominant tree species in these wetland areas, the typical plant community in the understory is composed primarily of highbush blueberry, American cranberry, and woolgrass. While inundation within these isolated wetlands was not directly observed, indicators of surface inundation, specifically blackened leaves and watermarks on the trunks and stems of mature woody vegetation, were observed. These non-tidal wetland habitats likely experience a seasonally- or temporarily-flooded water regime. According to the soil survey, these wetland areas are mapped within Pipestone loamy coarse sands (0-3% slopes), Deerfield loamy fine sands (0-5% slopes), and Hooksan sands, rolling map units.

While Wetlands D and G are fully contained within the pitch pine-forested dune habitat, portions of both Wetland E and Wetland L extend beyond the limit of the pitch pine forest and into the runway vegetative maintenance areas. This maintenance is necessary for safety purposes to remove woody vegetation above a certain height. In these areas, a combination of graminoid- and shrub-dominant plant communities exist. Graminoid refers to grass and grass-like plants such as sedges and rushes. Shrub species including highbush blueberry, winterberry, chokeberry, arrowwood, and bayberry are common. Herbaceous vegetation in these areas consists primarily of sedges and rushes as well as an abundance of American cranberry. Areas adjacent to these wetland areas that are at slightly higher ground elevation are low-profile coastal dune habitats dominated by a coastal heath community including scrub oak (*Quercus ilicifolia*), beach plum (*Prunus maritima*), bearberry (*Arctostaphylos uva-ursi*), American beachgrass (*Ammophila breviligulata*), bayberry, poison ivy, common hairgrass (*Deschampsia flexuosa*), and various lichens.

6.1.4 Wetlands F, M, and N

Wetlands F, M, and N, each isolated wetlands, are emergent marsh palustrine (PEM) habitats that likely have temporarily-flooded water regimes. Located to the east of the Airport runway, these freshwater wetlands are relatively small and are located in close proximity to one another. Herbaceous plant species including various sedges (*Carex* spp.) and rushes (*Juncus* spp.) comprise the plant community in Wetland F, while Wetlands M and N support American cranberry as well as sedges and rushes. Wetland N may be non-jurisdictional because of its small size. Areas adjacent to these wetland areas that are at slightly higher ground elevations are low-profile coastal dune habitats dominated by American beachgrass, scrub oak, beach plum, bearberry, bayberry, and common hairgrass. These wetlands are non-tidal and probably have a seasonally- or temporarily-flooded water regime.

6.1.5 Wetlands H and I

Wetlands H and I are isolated scrub-shrub palustrine habitats (PSS) confined by the runway and taxiway. Plant community members consist primarily of red chokeberry (*Aronia arbutifolia*), winterberry, meadowsweet, steplebush (*Spiraea tomentosa*), highbush blueberry, American cranberry, bayberry, and poison ivy. Commonly observed plant species at and upslope of the wetland margin include winged

sumac (*Rhus copallinum*), bayberry, and little bluestem (*Schizachyrium scoparius*). These wetlands are non-tidal and probably have a seasonally- or temporarily-flooded water regime.

6.1.6 Wetland K

Wetland K is a Coastal Interdunal Marsh community supporting a characteristic freshwater emergent marsh habitat (PEM). While American cranberry provides nearly 100 percent cover, other species including wide-leaf cattail (*Typha latifolia*), soft rush, St. John's-wort (*Hypericum* sp.), and other graminoids are also relatively abundant. Two separate, relatively small common reed communities were observed within Wetland K. The boundary of this wetland includes a portion of the pitch pine-forested (PFO) interdunal marsh habitat. This non-tidal wetland likely experiences a seasonally- or temporarily-flooded water regime. Measurable inundation was observed in Wetland K, which makes this wetland unique as compared to other observed wetland habitats at the Airport in which no inundation was directly observed at any time during the field observation period. The soil survey depicts this wetland as lying within the Pipestone loamy coarse sands (0-3% slopes) map unit.

6.1.7 Wetlands AA, AB, AC, AD, AG, and AJ

Wetlands AA and **AB** are each small isolated wetlands consisting of clumps of woolgrass, twig rush, soft rush, and black grass. **Wetlands AC** and **AD** are also small isolated wetlands with a slightly greater vegetative diversity, including clumps of woolgrass, pilewort (*Erechtites hieracifolia*), and slender-leaf goldenrod (*Euthamia tenuifolia*) interspersed with patches of bayberry and willow (*Salix* sp.). Each of these wetlands is located along the outer Airport lease line. **Wetland AG** is a larger isolated wetland that extends well beyond the northern lease line. The vegetation within this wetland includes bayberry, twig-rush, woolgrass, black grass, and hyssop-leaved boneset. **Wetland AJ** is a very small, linear wetland, located adjacent to AI. The vegetation is limited to black grass and twig-rush, with obvious surficial indicators of hydrology (soil staining), indicating a seasonally- or temporarily-flooded water regime.

6.1.8 Wetland AE

Wetland AE is a somewhat larger isolated wetland that meanders along the northern lease line. This densely vegetated wetland consists of a large, central patch of common reed with clumps of willow, woolgrass, Gray's Flatsedge (*Cyperus grayii*), hyssop-leaved boneset (*Eupatorium hyssopifolium*), bayberry, pilewort, and black grass.

6.1.9 Wetland AF

Wetland AF is an isolated wetland consisting of large clumps of willow dominating the wetland interior with large clumps and patches of American cranberry, bayberry, hyssop-leaved boneset, slender-leaf goldenrod, common reed, poison ivy, twig-rush, black grass, and woolgrass. Scattered pitch pine seedlings were observed within the wetland interior.

6.1.10 Wetland AI

Wetland AI is an isolated wetland containing a small island of coastal dune within its interior. The vegetation is dominated by bayberry and poison ivy, both species extending beyond the boundary of the wetland itself. Additional vegetation includes willow, twig-rush, woolgrass, black grass, and patches of hyssop-leaved boneset.

6.1.11 Wetland AK

Wetland AK is a larger isolated wetland which displays two different types of vegetative communities: the western half of the wetland is dominated by willow (*Salix* sp.) and dwarf huckleberry with the remaining areas dominated by Virginia rose, bayberry, poison ivy, spotted Joe-Pye weed, meadowsweet, woolgrass, twig-rush, and steeplebush. Individual winterberry, arrowwood, and shadbush were observed in the eastern half of this wetland.

6.1.12 Wetland AL

Wetland AL is also a large isolated wetland consisting of large clumps of pussy willow and winterberry. There is a dense low shrub community of Virginia rose, bayberry, and poison ivy interspersed with clumps and patches of woolgrass, marsh fern (*Thelypteris palustris*), twig-rush, and black grass. Dense patches of American cranberry were observed in the wetland interior. A small stand of poplar seedlings (*Populus* sp.) was observed in the southeast corner of this wetland.

6.1.13 Wetland AM

Wetland AM is a smaller isolated wetland in the northern corner of the Airport lease area. This densely vegetated wetland is dominated by clumps and patches of American cranberry along with bayberry, winterberry, woolgrass, slender-leaf goldenrod, twig-rush, poison ivy, reed canary-grass, sea myrtle (*Baccharis halimifolia*), Virginia rose, marsh St. Johns wort (*Triadenum virginicum*), and New England aster (*Aster novae-angliae*).

6.1.14 Wetlands BA, BC, CA, CB, CD, CE, CG, CH, CI, CO, CP, CQ, and DB

Wetland areas described below generally are larger isolated areas consisting of transitional shrub swamp to forested swamp communities (PSS/PFO) found largely east and south of the Airport facilities. Frequently, these areas contain small “islands” of coastal dune within interior portions.

Wetland BA is an isolated wetland located in the southeastern corner of the Airport lease area. The vegetation in this transitional shrub-swamp/forested swamp wetland includes woolgrass, twig-rush, American cranberry, English plantain (*Plantago lanceolata*), black grass, and highbush blueberry, with scattered pitch pine throughout.

Wetland BC also consists of a transitional shrub swamp/forested swamp with small patches of emergent marsh along the wetland exterior in more open areas that are dominated by twig-rush, black grass, and woolgrass. The vegetative community within the interior consists of a canopy of pitch pine with clumps and patches of highbush blueberry, American cranberry, sphagnum moss, and bayberry. Wetland BC is an extensive wetland with a meandering wetland boundary encompassing a large portion of the southeastern corner of the Airport lease area. Four coastal dune islands were located within the interior of Wetland BC. Wetland BC is contiguous with Wetlands F and G, which were previously identified by HW in 2004/2005.

Wetland CA is an isolated wetland with a vegetative community including pitch pine, dwarf huckleberry, American cranberry, twig-rush, woolgrass, and patches of sphagnum moss. As this area extends well off-site, only a portion of this area was delineated.

Wetland CB is a large isolated wetland located in close proximity to Wetlands BB and BC. The vegetation within this forested wetland includes an overstory of pitch pine with occasional swamp tupelo

(*Nyssa sylvatica*), clumps of woolgrass, twig-rush, black grass, bayberry, patches of American cranberry, and occasional clumps of American beachgrass along the wetland periphery.

Wetland CD is a larger isolated wetland consisting of a transitional shrub swamp/forested swamp includes a canopy of pitch pine with highbush blueberry and scattered gray birch (*Betula populifolia*), patches of American cranberry and sphagnum moss, woolgrass, black grass, and twig-rush.

Wetland CE is a large isolated wetland with a vegetative community similar to that found within Wetlands CC and CD with the addition of clumps and patches of inkberry (*Ilex glabra*).

Wetland CG is an extensive isolated wetland located along the lease line that extends well beyond this boundary. The vegetation within this wetland includes expansive patches of American cranberry, patches and clumps of sphagnum moss, twig-rush, black grass, fireweed (*Epilobium angustifolium*), and woolgrass. Shrub species encountered include sweet pepperbush (*Clethra alnifolia*) and highbush blueberry, with a canopy of pitch pine and swamp tupelo.

Wetland CH is a large open isolated wetland that was delineated in several non-contiguous flagging series due to its proximity to the Airport lease corner. Several linear-shaped islands of coastal dune were encountered within the interior of this wetland area. The vegetation of this wetland includes expansive areas of American cranberry interspersed with clumps and patches of sheep laurel (*Kalmia angustifolia*), highbush blueberry, individual pitch pine (in forested portions of this wetland), dwarf huckleberry, patches of sphagnum moss, twig-rush, woolgrass, and small entanglements of common greenbrier (*Smilax rotundifolia*).

Wetland CI is an isolated wetland that was only partially delineated due to its location along the lease line. Vegetation in this wetland includes pitch pine, woolgrass, black grass, twig-rush, winterberry, American cranberry, and highbush blueberry.

Wetland CO is an expansive linear wetland containing several upland islands of secondary coastal dune habitat. The vegetation of this transitional shrub swamp/forested wetland includes a pitch pine canopy with a diverse shrub community of swamp azalea (*Rhododendron viscosum*), bayberry, sheep laurel, and highbush blueberry. Additional vegetation consists of soft rush, sphagnum moss, common greenbrier, royal fern, cinnamon fern, twig-rush, black grass, poison ivy, and dense scattered patches of American cranberry.

Wetland CP is an isolated wetland containing a large upland island of coastal dune within its interior. The vegetation of this wetland is forested with a canopy of pitch pine including highbush blueberry, bayberry, swamp dewberry (*Rubus hispidus*), American cranberry, black grass, soft rush, woolgrass, broom sedge (*Andropogon virginicus*), twig-rush, dwarf huckleberry, New England aster, scattered common reed, occasional black cherry (*Prunus serotina*), slender-leaf goldenrod, and poison ivy.

Wetland CQ is a smaller isolated wetland consisting of bayberry, twig-rush, black grass, woolgrass, swamp dewberry, and poison ivy with a pitch pine overstory.

Wetland DB is an expansive wetland that incorporates several small islands of secondary dune. Vegetation of this transitional forested wetland includes a canopy of pitch pine, with dense carpets of American cranberry, scattered woolgrass, black grass, twig-rush, and sphagnum moss.

6.1.15 Wetlands BB, CC, CJ, CK, CL, CN, CR, DA, DC, DD/E, DE, DF, DG, DH, DI, and DM

Several smaller isolated wetlands were also encountered south and east of the Airport facilities. These areas, often with developing emergent marsh communities (PEM), are generally sparsely vegetated, and occasionally support a sparse canopy of pitch pine (i.e., PFO) but lacking a definite shrub community.

Wetland BB is a small isolated wetland located immediately adjacent to Wetland BC, separated by a small dune ridge. The vegetation within this small wetland is limited to twig-rush and black grass and surficial indicators of hydrology.

Wetland CC is an isolated, forested wetland consisting of pitch pine with twig-rush, highbush blueberry, swamp tupelo, black grass, patches of sphagnum moss, and an occasional scrub oak (*Quercus ilicifolia*).

Wetland CJ is a very small triangular isolated wetland with a vegetative community limited to black grass and twig-rush. **Wetland CK** is a somewhat larger isolated wetland with a similar vegetative composition along the exterior and an interior canopy of pitch pine.

Wetland CL is a small isolated wetland, and the only wetland located among the secondary dune system in the southern “tail” of the Airport lease area. As with Wetland CK, the vegetation within this wetland is limited to pitch pine and black grass, along with obvious surficial indicators of hydrology (soil staining).

Wetland CN is a small isolated wetland comprised of clumps of black grass with surficial evidence of hydrology (soil staining) and subsurface hydric soils.

Wetland CR is a small isolated wetland consisting of an open emergent marsh community dominated by woolgrass, twig-rush, and black grass.

Wetland DA is an isolated wetland with a pitch pine canopy. The vegetative community is limited to clumps and patches of woolgrass, black grass, and sphagnum moss.

Wetland DC is a small isolated wetland that is relatively “deep” as compared to most of the more shallow depressions found within the Airport with an estimated depth of approximately 2 to 3 feet at the lowest point. This area contains small patches of sphagnum moss surrounded by surficial evidence of seasonal hydrology. A canopy of pitch pine surrounds this isolated depression.

Wetland DD/E is a larger isolated wetland area that constitutes an extension of Wetland E. The dominant vegetation along this section includes American cranberry, black grass, and twig-rush with a pitch pine canopy.

Wetlands DF, DG, and DM are all small isolated wetlands with a plant community of black grass, twig-rush, and occasional woolgrass beneath a pitch pine canopy. **Wetland DI** is a small isolated wetland with a similar vegetative community as found within **Wetlands DF** and **DH**, with the addition of dense patches of American cranberry. Vegetation within **Wetland DG** is limited to twig-rush, pitch pine, and a single bayberry shrub.

Wetland DJ is a smaller isolated wetland located just north of Wetland DI. The vegetative community is comprised of pitch pine, black grass, and twig-rush. **Wetlands DK** and **DL** are also isolated wetlands located along the eastern edge of the Airport lease line with similar vegetative communities as Wetland DJ.

6.1.16 Wetlands CF, CM, CU, CV, and DE

Wetlands described below are generally shrub swamps (PSS) with a somewhat greater species diversity than the smaller isolated wetlands encountered.

Wetland CF is an isolated shrub swamp with a vegetative community dominated by highbush blueberry along with clumps and patches of black grass, sphagnum moss, and cinnamon fern (*Osmunda cinnamomea*).

Wetland CM is an isolated wetland located just off-site of the southernmost lease corner. Vegetation within this shrub swamp included large patches of American cranberry, with clumps and patches of sphagnum moss, woolgrass, dwarf huckleberry, sheep laurel, highbush blueberry, bayberry, poison ivy, inkberry, and twig-rush. A large patch of common reed and scattered pitch pine cover the wetland periphery.

Wetland CU is a small isolated wetland comprised of scattered individuals of woolgrass, bayberry, slender-leaf goldenrod, and swamp dewberry vines.

Wetland CV is another small isolated shrub swamp wetland encompassing clumps and patches of woolgrass, twig-rush, and slender-leaf goldenrod, with scattered bayberry and swamp dewberry vines.

Wetland DE is an isolated wetland with a similar vegetative community as found within Wetland DD/E with the additional of highbush blueberry and bayberry in the shrub layer.

6.2 Bordering Vegetated Wetland (Wetlands C, J, CS, and CT/J)

Wetland areas described below are freshwater wetlands contiguous with the larger Hatches Harbor wetland system.

6.2.1 Wetlands C and J

Wetlands C and J are BVWs due to their direct connections to the Hatches Harbor tidal wetland system. The easternmost portions of both wetland areas are characteristic of the Coastal Interdunal Marsh community and can be further classified as scrub-shrub palustrine habitats (PSS) with areas of palustrine emergent marsh (PEM) interspersed. Commonly observed plant species included winterberry, arrowwood, meadowsweet, blue-joint (*Calamagrostis canadensis*), American cranberry, and rose (*Rosa* spp.). Lesser amounts of purple loosestrife (*Lythrum salicaria*) (a non-native species), wide-leaf cattail (*Typha latifolia*), and woolgrass were also observed within these interdunal swales. In addition, there are significantly large communities of common reed within Wetland C, particularly to the north of the taxiway. The eastern corner of Wetland C nearest the Airport terminal and parking lot is a forested palustrine habitat (PFO) supporting a mature community of willow trees. The easternmost portions of these wetlands are non-tidal and probably have a seasonally- or temporarily-flooded water regime.

The westernmost portions of both wetlands are common reed-dominant emergent marshes (PEM), likely have a ground water table at or near the surface for most of the year, and likely experience an irregularly flooded tidal water regime. The soil survey indicates that the Berryland mucky loamy coarse sand (0-2% slopes) and Pipestone loamy coarse sand (0-3% slopes) are the two soil types that comprise these wetland areas.

6.2.2 Wetland CS

Wetland CS represents a portion of the larger BVW along Hatches Harbor. The vegetation within this wetland area is comprised of woolgrass, bayberry, twig-rush, black grass, and occasional pitch pine.

6.2.3 Wetland CT/J

Wetland CT/J is also a BVW associated with the Hatches Harbor wetland system. Flagging stations represent the southwestern boundary of Wetland J, which abuts managed areas near the approach to the Runway 7 end. While the wetland boundary is representative of a freshwater wetland (BVW), the vegetative community transitions from freshwater to brackish to saline, and contains a large diversity of wetland indicator species. Species encountered include black grass, slender-leaf goldenrod, St. John's wort, marsh fern, twig-rush, swamp dewberry, American cranberry, poison ivy, and common greenbrier. Interior sections contain a large area dominated by common reed, while the upper edge of the brackish community is comprised of several shrub species, including highbush blueberry, bayberry, winterberry, meadowsweet, and scattered eastern red cedar (*Juniperus virginiana*).

6.3 Updated and Amended Isolated Freshwater Wetland Descriptions

Throughout the descriptions of the isolated wetlands delineated in 2006, HW references wetland areas delineated prior to the development of the Master Plan (i.e., areas delineated in 2004 and 2005 under a more limited assessment area), in particular Wetlands F, G, E, K, and L. Below is a discussion of modifications or expansions to these areas.

Wetlands K and L. Portions of Wetlands K and L that had had been delineated for the purposes of the ENF and were previously identified as two separate isolated wetlands. Once revisited for the purposes of supporting DEIR, HW determined that these two areas constitute a single larger isolated wetland, interrupted by small ridges of secondary coastal dune. HW identified and delineated several of these dune ridges as they relate to various CIP project footprints, but did not delineate all of these dune areas.

Wetlands F and G. Wetlands F and G, previously delineated in part for the purposes of the ENF, were incorporated within the larger Wetland BC. As a result, the designations for Wetlands F and G were eliminated from the updated plans (see Figure 6).

Wetland E. As described above, Wetland E is hydrologically connected to the area labeled as Wetland DD. As a result, the designation on the site plans is Wetland E/DD.

6.4 Salt Marsh

Salt Marsh associated with the Hatches Harbor wetland system is found along the base of a secondary dune ridge running approximately perpendicular to the Lease Line in the northwestern part of the Airport. HW delineated a segment of this salt marsh as it relates to the Lease Line, where previously freshwater vegetation has begun to die back (due to tidal flushing). In this area, HW observed dead or dying shrubs of bayberry, sumac (*Rhus* sp.), rugosa rose, and highbush blueberry, among developing patches of saltmarsh cordgrass (*Spartina patens*). A small ridge of dune was also identified in this area. This area and its immediate surroundings have not taken on the full distinctions of a salt marsh. The Hatches Harbor Salt Marsh Restoration Project is relatively recent, as compared to the geologic development of the entire wetland system, but it is clear that this area is characteristic of a salt marsh. This portion of developing salt marsh is contiguous with Wetland areas CT and J.

7. WETLANDS FUNCTIONS AND VALUES

Freshwater wetlands contribute to the protection of groundwater supply, public and private water supplies, storm damage prevention and flood storage control, water quality, protection of fisheries and preservation of wildlife habitat, and in some instances preservation of rare species habitat. The majority of the wetlands delineated at the Airport provide many of the same functions and values, depending on location and cover type. Most, if not all, of the wetland areas contribute to flood storage and flood storage control by retaining stormwater runoff and allowing for slow groundwater recharge. These wetlands also contribute to water quality by removing sediments and attenuating pollutants.

The topography, soil structure, plant community composition and structure, and hydrologic regime of certain wetlands contribute to the protection of wildlife habitat by providing food, shelter, migratory and overwintering areas, and breeding areas for birds, mammals, reptiles, and amphibians. Some of the wetland areas, particularly those within the coastal interdunal marsh/swales, may also provide habitat for rare species.

A summary of the potential functions and values of the delineated wetland areas is provided in Table 1. Further discussion of the wildlife habitat values of these areas is provided in a separate *Summary of Natural Resources and Rare Species Habitat Assessments* report (HW, April 2007).

Table 1. Summary of jurisdictional wetland areas delineated at the Provincetown Municipal Airport, Provincetown, Massachusetts.

WETLAND AREA	CLASSIFICATION	JURISDICTION ¹	FUNCTIONS AND VALUES
Salt Marsh	EEM	ACOE, DEP, PCC, CCC	Protection of Marine Fisheries, Wildlife Habitat; Storm Damage Prevention; Groundwater and Water Quality;
Wetland AA	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AB	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AC	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AD	PSS/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AE	PSS/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AF	PSS/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AG	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AI	PSS/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AJ	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland AK	PSS/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality
Wetland AL	PFO/PSS/PEM	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality
Wetland AM	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland BA	PSS/PEM/PFO	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland BB	PEM	ACOE, PCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland BC	PSS/PEM/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CA	PSS/PEM/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CB	PSS/PEM/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CC	PSS/PEM/PFO	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CD	PSS/PEM/PFO	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CE	PSS/PEM/PFO	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CF	PSS/PEM/PFO	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CG	PSS/PEM/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CH	PSS/PEM/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CI	PSS	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CJ	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CK	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CL	PFO/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CM	PSS/PEM/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CN	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CO	PSS/PEM/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CP	PFO/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CQ	PFO/PSS/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CR	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CS	PFO/PSS/PEM	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CT	PFO/PSS/PEM	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland CU	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality
Wetland CV	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality
Wetland DA	PSS/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DB	PSS/PEM/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DC	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DD	PSS/PEM/PFO	ACOE, PCC, CCC (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DE	PSS/PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DF	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DG	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DH	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DI	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DJ	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DK	PSS/PEM/PFO	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DL	PSS/PEM/PFO	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland DM	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat

¹ Note: the jurisdictional status of Isolated Land Subject to Flooding (ILSF) under the State Regulations at 310 CMR 10.57(2)(b) has not yet been determined.

Table 1 (cont.)

WETLAND AREA	CLASSIFICATION	JURISDICTION	FUNCTIONS AND VALUES
Wetland A	PSS/PFO	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland B	PSS/PEM	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland C	PSS/PEM/PFO	ACOE, PCC, CCC (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland D	PFO	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland E	PFO/PSS	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland F	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland G	PSS	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland H	PSS	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland I	PSS	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland J	PSS/PEM	ACOE, PCC, CCC (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland K	PEM	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland L	PFO/PSS	ACOE, PCC, CCC, (DEP)	Flood Storage/Flood Control; Groundwater and Water Quality; Wildlife Habitat
Wetland M	PEM	ACOE, PCC, CCC	Flood Storage/Flood Control; Groundwater and Water Quality
Wetland N	PEM	ACOE	Flood Storage/Flood Control; Groundwater and Water Quality

KEY**Classification** (Cowardin, et al., 1979)

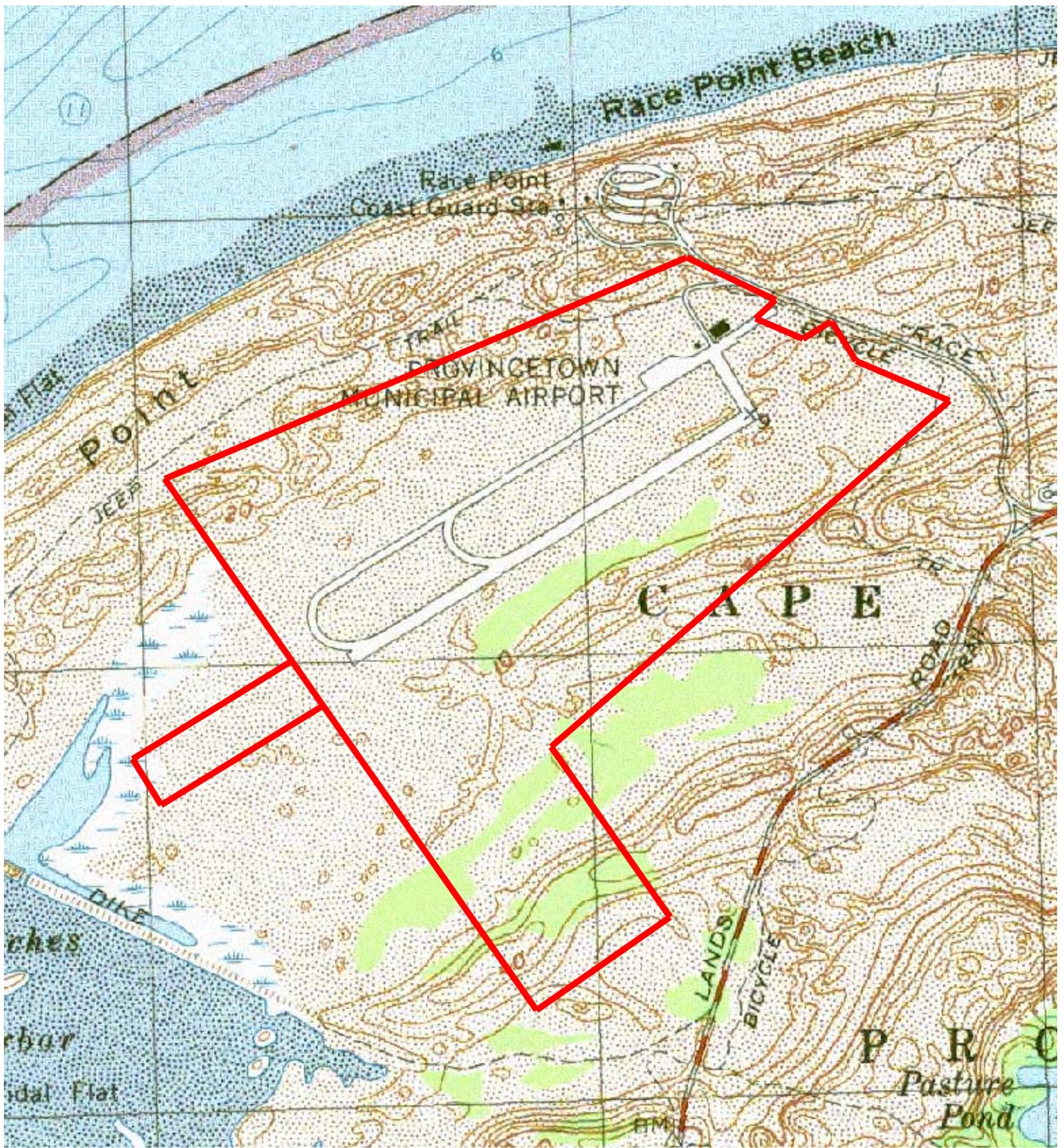
PSS Palustrine Scrub-Shrub wetland
PFO Palustrine Forested habitat
PEM Palustrine Emergent Marsh
EEM Estuarine Emergent Marsh

Jurisdiction

DEP Massachusetts *Wetlands Protection Act* (M.G.L. Ch. 131 § 40) and Regulations (310 CMR 10.00)
ACOE Section 404 of the Federal *Clean Water Act* (33 U.S.C. 1251, *et seq.*) (Army Corps of Engineers)
PCC Provincetown *Wetlands Protection Bylaw* (Chapter 12)
CCC Cape Cod Commission Regional Policy Plan

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- Horsley Witten Group, Inc. 2007. Summary of Natural Resources and Rare Species Habitat Assessments (April 2007).
- Jackson, S. 1995. Delineating Bordering Vegetated Wetlands Under the Massachusetts Wetlands Protection Act, A Handbook. K.W. Peterson, R. W. Golledge, Jr., and R. Tomczyk, Eds. Massachusetts Department of Environmental Protection, Division of Wetlands and Waterways.
- Swain, P.C. and J.B. Kearsley. 2001. Classification of the Natural Communities of Massachusetts. Version 1.3. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife. Westborough, MA.



Legend

 Airport Lease Line

*Data Source: MassGIS, Commonwealth of Massachusetts EOEA

Horsley Witten Group
 phone: 508-833-6600
 www.horsleywitten.com 

USGS Locus
 Provincetown Municipal Airport
 Provincetown, MA

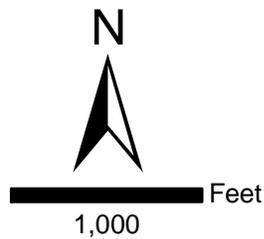
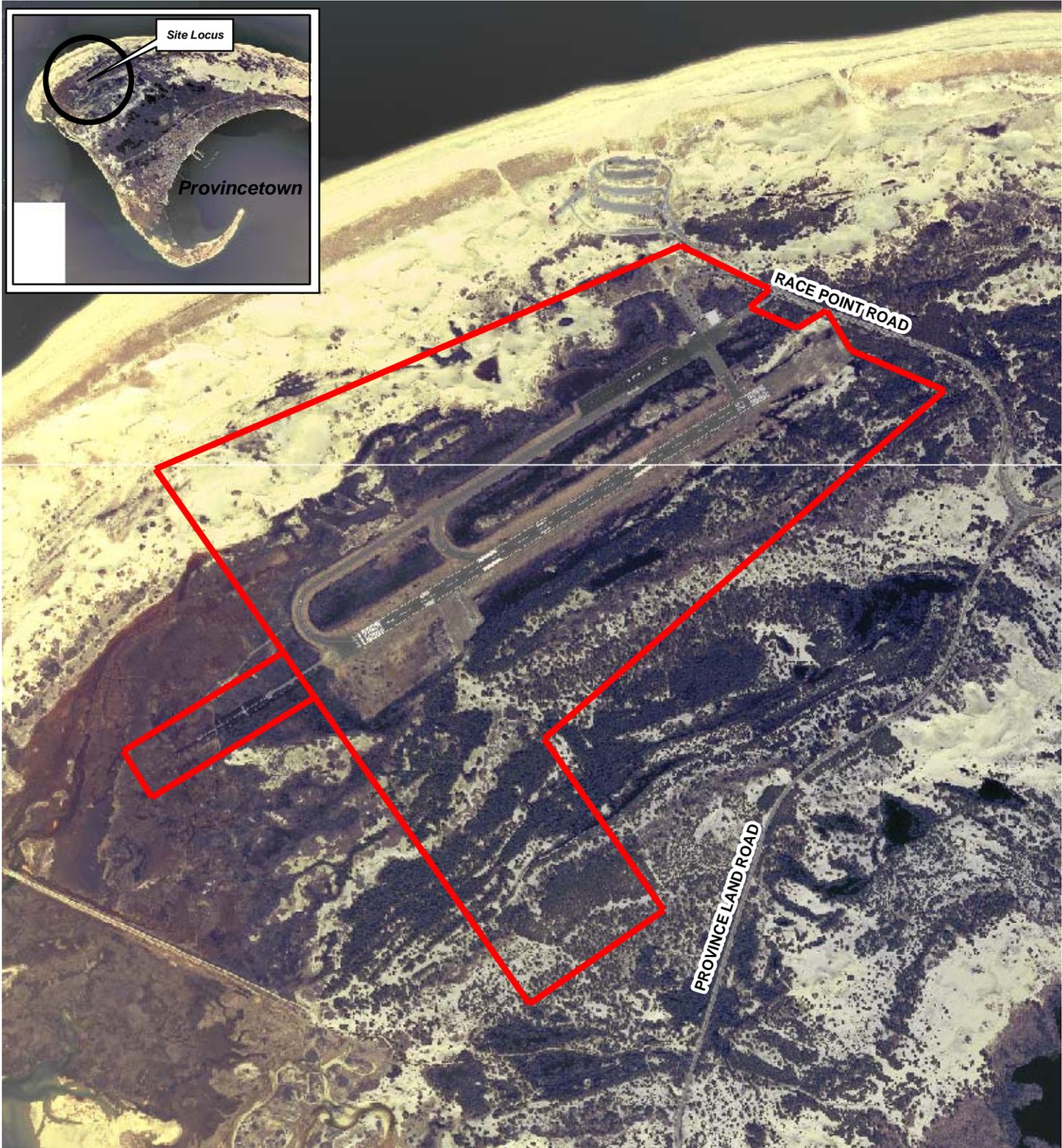


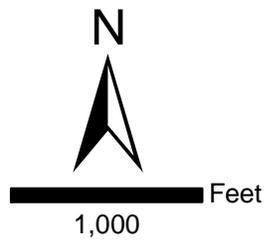
Figure 1



Legend

 Airport Lease Line

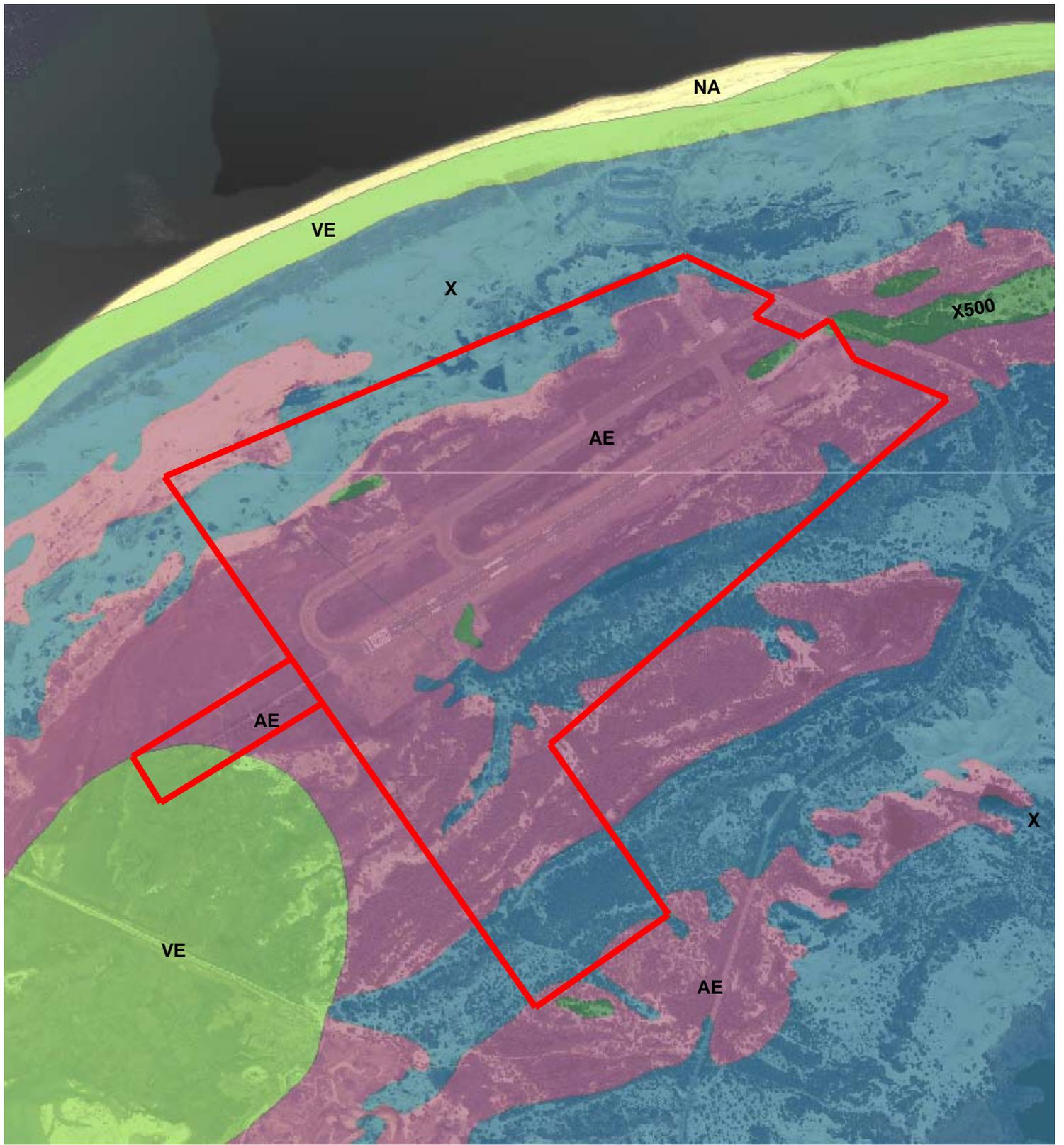
*Data Source: MassGIS, Commonwealth of Massachusetts EOE



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Aerial Photo
 Provincetown Municipal Airport
 Provincetown, MA

Figure 2



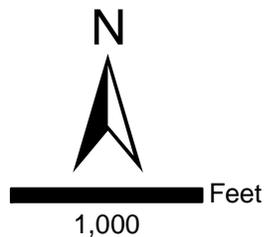
Legend

*Data Source: MassGIS, Commonwealth of Massachusetts EOEAA

 Airport Lease Line

FEMA Flood Zones

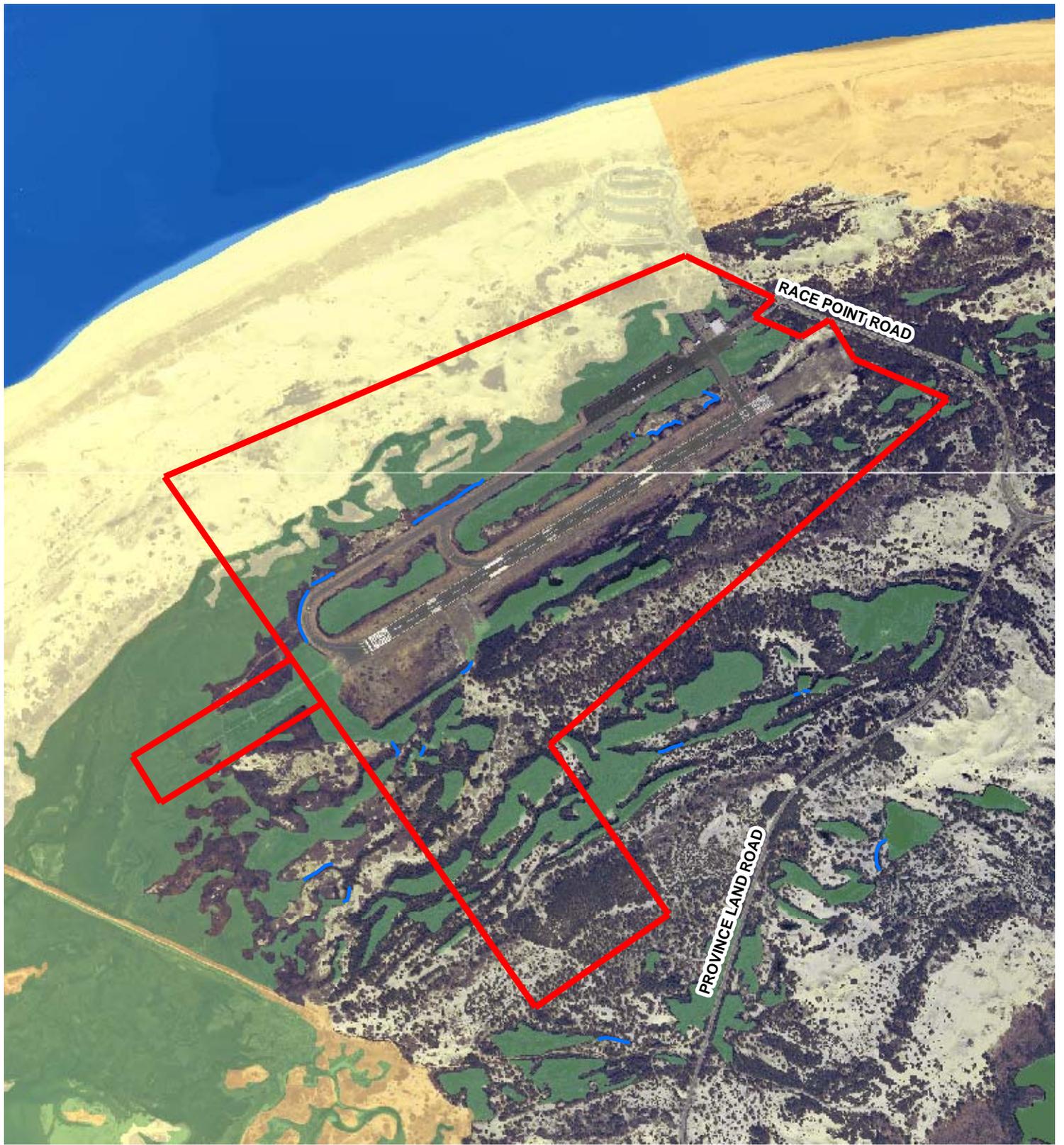
- | | | |
|--|---|--|
|  A |  AO |  VE |
|  AE |  D |  X |
|  AH |  UNDES |  X500 |
|  ANI |  V | NA = Not Available |



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FEMA Flood Zones
 Provincetown Municipal Airport
 Provincetown, MA

Figure 3



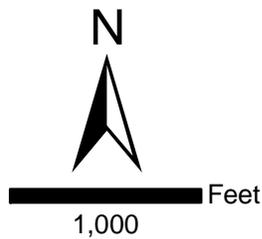
Legend

*Data Source: MassGIS, Commonwealth of Massachusetts EOE

-  Airport Lease Line
-  Streams

DEP Wetlands

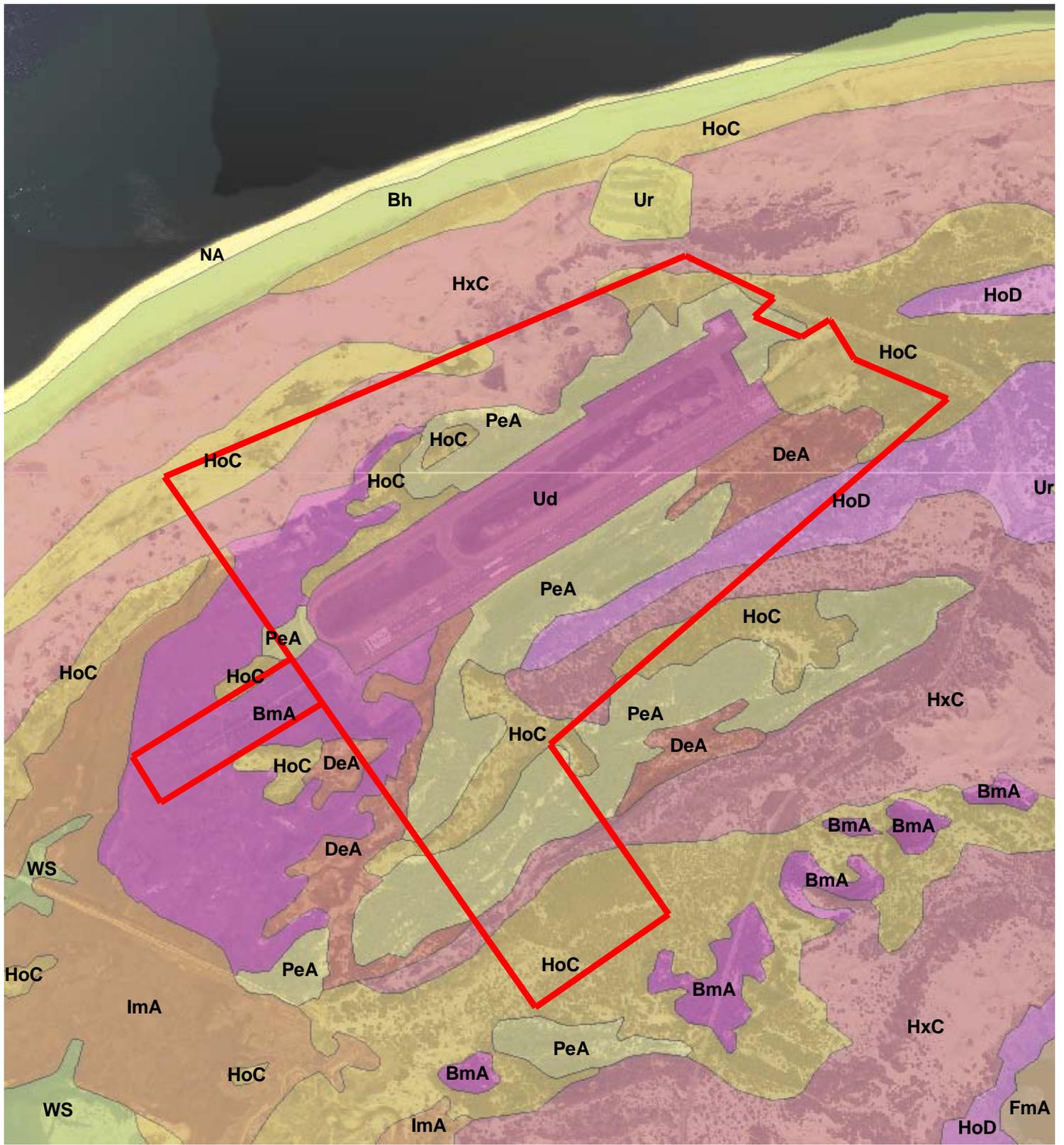
-  Barrier Beach
-  Coastal Bank, Bluff, Dune, Beach or Sea Cliff
-  Surface Water
-  Wetlands



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DEP Wetlands & Streams
 Provincetown Municipal Airport
 Provincetown, MA

Figure 4



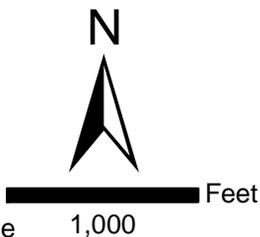
Legend

*Data Source: MassGIS, Commonwealth of Massachusetts EOE

Airport Lease Line

Soils

- | | | | |
|-----|-----|-----|--------------------|
| Bh | FmA | HxC | Ur |
| BmA | FsA | ImA | W |
| DeA | HoC | PeA | WS |
| DmA | HoD | Ud | NA = Not Available |

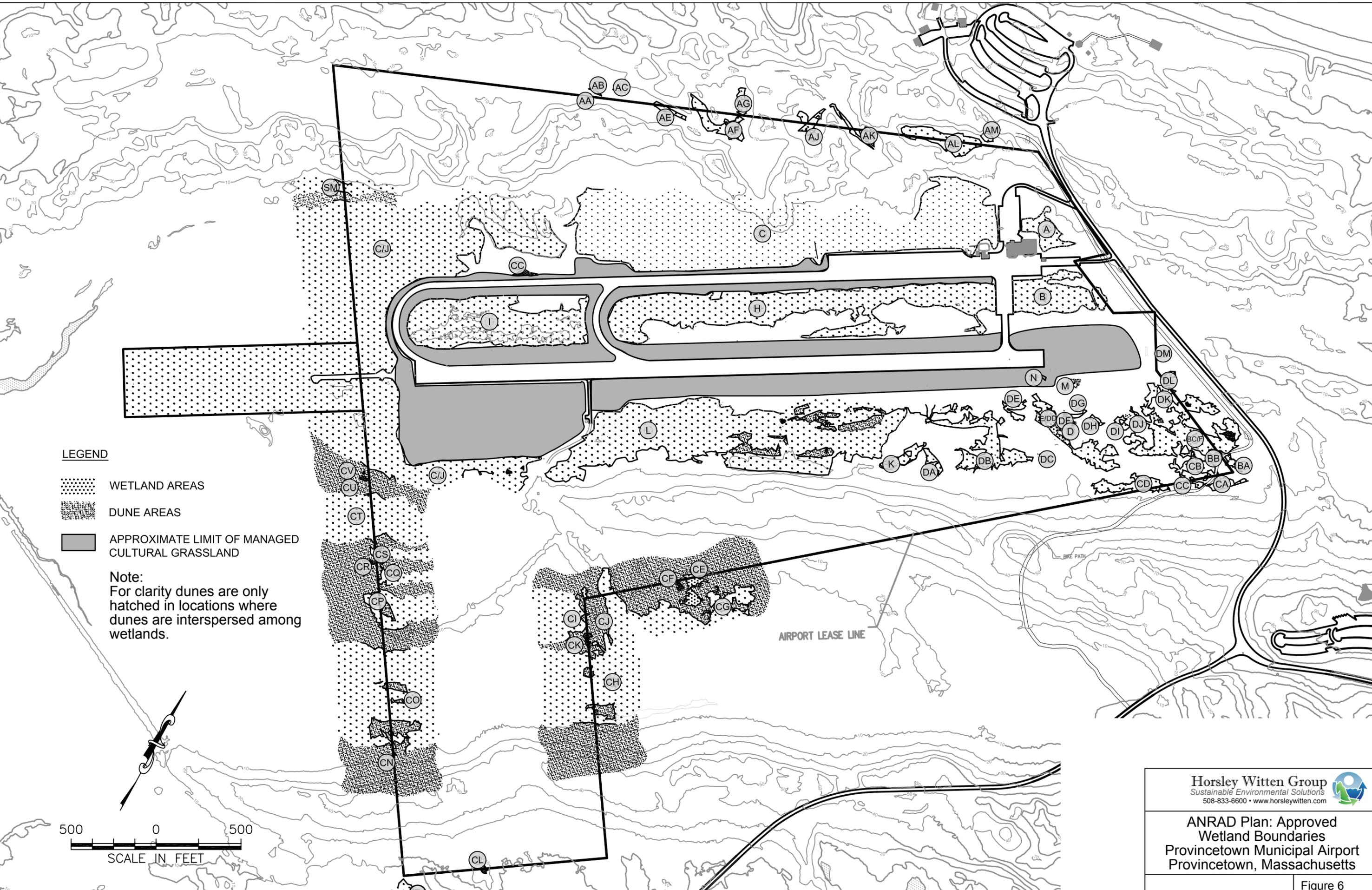


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Soils
 Provincetown Municipal Airport
 Provincetown, MA

Figure 5

last modified: 03/07/07 printed: 03/07/07 by ew J:\4027 E&K-PTown Airport\Drawings-4027.dwg\4027 WETLANDS 2006.dwg



LEGEND

-  WETLAND AREAS
-  DUNE AREAS
-  APPROXIMATE LIMIT OF MANAGED CULTURAL GRASSLAND

Note:
For clarity dunes are only hatched in locations where dunes are interspersed among wetlands.



Horsley Witten Group
Sustainable Environmental Solutions
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**ANRAD Plan: Approved
Wetland Boundaries
Provincetown Municipal Airport
Provincetown, Massachusetts**

Figure 6

APPENDICES

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Forms

Order of Resource Area Delineation (issued January 25, 2007)

U.S. Army Corps of Engineers Jurisdictional Determination

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: _____ Prepared by: HOBSEY WITTEN Project location: PRINCETON MUNICIPAL AIRPORT DEP File #: _____

Check all that apply:

- Vegetation alone presumed adequate to delineate BVW; fill out Section I only
- Vegetation and other indicators of hydrology used to delineate BVW boundary; fill out Sections I and II
- Method other than dominance test used (attach additional information)

Section I. Vegetation Observation Plot Number: E1-WET Transect Number: TE-1 Date of Delineation: 11 AUG 2004

A. Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. NWI Wetland Indicator
<u>TREES</u> (species abundance determined through DBH measurements and basal area calc's): pitch pine <i>Pinus rigida</i>	85.5	100.0	YES	FACU
<u>SAPLINGS</u> (species abundance determined by estimating aerial cover class): no species of sapling size observed within limits of this vegetation community sampling plot				
<u>SHRUBS</u> (species abundance determined by estimating aerial cover class): Northern bayberry <i>Myrica pensylvanica</i> highbush blueberry <i>Vaccinium corymbosum</i>	20.5 20.5	50.0 50.0	YES YES	FAC FACW
<u>GROUND COVER</u> (species abundance determined by estimating aerial cover class): wool grass <i>Scirpus cyperinus</i> large cranberry <i>Vaccinium macrocarpon</i>	5.0 85.5	5.5 94.5	NO YES	FACW+ OBL
<u>MOSESSES & LIVERWORTS</u> (species abundance determined by estimating aerial cover class): no mosses or liverworts observed within limits of this vegetation community sampling plot				
<u>CLIMBING WOODY VINES</u> (species abundance determined by estimating aerial cover class): no climbing woody vines observed within limits of this vegetation community sampling plot				

HW established this soil profile and plant community observation transect in a location along the boundary of Wetland E. Plant community was typical of the pitch pine / cranberry-dominant interdunal forested swale habitats common at this site.

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:
 Number of dominant wetland indicator plants: 3 Number of dominant non-wetland indicator plants: 1
 Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability, ANRAD, or Notice of Intent.

Section II. Indicators of Hydric Soils & Hydrology

Hydric Soil Interpretation (WETLAND HABITAT)

1. Soil Survey

Is there a published soil survey for this site? YES no
 title/date: Barnstable County - 1993
 map number: 1
 soil type mapped: Pipestone Loamy Crs Sand
 0 - 3 percent slopes
 hydric soil inclusions: Pipestone is a listed hydric.
 Berryland and Walpole are listed
 Are field observations consistent with soil survey descrip? YES no
 Remarks:

2. Soil Morphology (Soil Profile Description)

Horiz/Layer Depth Texture Matrix Color Redoximorphic Features

ORGANIC MATERIAL ACCUMULATION ON
 SOIL SURFACE
 w/ ORGANIC STREAKING IN SOIL MATRIX
 IMMEDIATELY BELOW,
 AND
 w/ REDOX CONCENTRATIONS w/in 12"
 (DISTINCT, REDDISH-BROWN, 10-15%)

Remarks:

3. Other:

Conclusion: Is soil hydric? (yes) no

Other Indicators of Wetland Hydrology: (check/describe all that apply)

- Site inundated: OBSERVED IN SPRING 05
- Depth to free water in observation hole: _____
- Depth to saturation in observation hole: _____
- Water marks: _____
- Drift lines: _____
- Sediment deposits: _____
- Drainage patterns in BVW: _____
- Oxidized rhizospheres: _____
- Water-stained/blackened leaves: _____
- Recorded data (stream, lake, or tidal gauge; aerial photo; other): _____
- Other: _____

Plant Community and Hydrology Conclusion		yes	no
Number of wetland indicator plants =>	number of non-wetland indicator plants	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Wetland hydrology:			
hydric soil present		<input checked="" type="checkbox"/>	<input type="checkbox"/>
other wetland hydrology indicators		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Sample location is in a BVW		<input checked="" type="checkbox"/>	<input type="checkbox"/>

Submit this form with the Request for Determination of Applicability or Notice of Intent.

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: _____ Prepared by: HORSLEY WITTEN GROUP, INC. Project location: PROVINCE TOWN MUNICIPAL AIRPORT DEP File #: _____

- Check all that apply:
- Vegetation alone presumed adequate to delineate BVW: fill out Section I only
 - Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
 - Method other than dominance test used (attach additional information)

Section I. Vegetation Observation Plot Number: EL-UPL Transect Number: TE-1 Date of Delineation: 11 AUG 2004

A. Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. NWI Wetland Indicator
TREES (species abundance determined through DBH measurements and basal area calc's):				
pitch pine <i>Pinus rigida</i>	85.5	100.0	YES	FACU
SAPLINGS (species abundance determined by estimating aerial cover class):				
no species of sapling size observed within limits of this vegetation community sampling plot				
SHRUBS (species abundance determined by estimating aerial cover class):				
Northern bayberry <i>Myrica pensylvanica</i>	20.5	28.5	YES	FACU
pitch pine <i>Pinus rigida</i>	20.5	28.5	YES	FACU
scrub oak <i>Quercus ilicifolia</i>	20.5	28.5	YES	UPL
highbush blueberry <i>Vaccinium corymbosum</i>	10.5	14.6	NO	FACU -
GROUND COVER (species abundance determined by estimating aerial cover class):				
bearberry <i>Arctostaphylos uva-ursi</i>	63.0	68.5	YES	UPL
common hairgrass <i>Deschampsia flexuosa</i>	10.0	10.9	NO	UPL
American beachgrass <i>Ammophila brevifolula</i>	10.0	10.9	NO	UPL
lowbush blueberry <i>Vaccinium angustifolium</i>	3.0	3.3	NO	UPL
starflower <i>Trientalis borealis</i>	3.0	3.3	NO	FACU
bracken fern <i>Pteridium aquilinum</i>	3.0	3.3	NO	FACU
MOSESSES & LIVERWORTS (species abundance determined by estimating aerial cover class):				
no mosses or liverworts observed within limits of this vegetation community sampling plot				
CLIMBING WOODY VINES (species abundance determined by estimating aerial cover class):				
no climbing woody vines observed within limits of this vegetation community sampling plot				

HW established this soil profile and plant community observation transect in a location along the boundary of Wetland E. This plant community was typical of the dune habitats adjacent to the pitch pine / cranberry-dominant interdunal forested swale habitats common at this site.

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations describe the adaptation next to the asterisk.

Vegetation conclusion: _____ Number of dominant wetland indicator plants: _____ Number of dominant non-wetland indicator plants: 4

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes (no)

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability, ANRAD, or Notice of Intent.

Section II. Indicators of Hydric Soils & Hydrology
(UPLAND AREA)

Hydric Soil Interpretation

1. Soil Survey

Is there a published soil survey for this site? **YES** no
 title/date: **Barnstable County - 1993**
 map number: **1**
 soil type mapped: **Deerfield Loamy Fine Sand**
 hydric soil inclusions: **Pipestone is listed**

Are field observations consistent with soil survey descrip? **YES** no
 Remarks:

2. Soil Morphology (Soil Profile Description)

Horiz/Layer Depth Texture Matrix Color Redoximorphic Features

TYPICAL DUNE HABITAT SOIL PROFILE.
NO ORGANIC ACCUMULATION.
NO REDOX FEATURES.

Remarks:

3. Other:

Conclusion: Is soil hydric? yes (no)

Other Indicators of Wetland Hydrology: (check/describe all that apply)

- Site inundated: _____
- Depth to free water in observation hole: _____
- Depth to saturation in observation hole: _____
- Water marks: _____
- Drift lines: _____
- Sediment deposits: _____
- Drainage patterns in BVW: _____
- Oxidized rhizospheres: _____
- Water-stained/blackened leaves: _____
- Recorded data (stream, lake, or tidal gauge; aerial photo; other): _____
- Other: _____

Plant Community and Hydrology Conclusion		yes	no
Number of wetland indicator plants =/ > number of non-wetland indicator plants		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Wetland hydrology:			
hydric soil present		<input type="checkbox"/>	<input checked="" type="checkbox"/>
other wetland hydrology indicators		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Sample location is in a BVW		<input type="checkbox"/>	<input checked="" type="checkbox"/>

Submit this form with the Request for Determination of Applicability or Notice of Intent.

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: _____ Prepared by: HUBERT WITTEN Project location: PROVINCE TOWN DEP File #: _____
ERDOP, INC. MUNICIPAL AIRPORT

Check all that apply:
 Vegetation alone presumed adequate to delineate BVW: fill out Section I only
 Vegetation and other indicators of hydrology used to delineate BVW boundary: fill out Sections I and II
 Method other than dominance test used (attach additional information)

Section I. **Vegetation** Observation Plot Number: A1-WET Transect Number: TA-1 Date of Delineation: 8-10-04

A. Sample Layer and Plant Species (by common/scientific name)	B. Percent Cover (or basal area)	C. Percent Dominance	D. Dominant Plant (yes or no)	E. NWI Wetland Indicator
TREES (species abundance determined through DBH measurements and basal area calc's):				
Bebb willow <i>Salix bebbiana</i>	85.5	100.0	YES	FACW
SAPLINGS (species abundance determined by estimating aerial cover class):				
no species of sapling size observed within limits of this vegetation community sampling plot				
SHRUBS (species abundance determined by estimating aerial cover class):				
Northern bayberry <i>Myrica pensylvanica</i>	3.0	5.5	NO	FAC
Bebb willow <i>Salix bebbiana</i>	10.5	19.1	YES	FACW
trembling aspen <i>Populus tremula</i>	10.5	19.1	YES	FACU
winterberry <i>Ilex verticillata</i>	20.5	37.3	YES	FACW+
dwarf huckleberry <i>Gaylussacia dumosa</i>	10.5	19.1	YES	FAC

GROUND COVER (species abundance determined by estimating aerial cover class):

broad-leaf meadowsweet <i>Spiraea latifolia</i>	38.0	33.3	YES	FAC+
poison ivy <i>Toxicodendron radicans</i>	38.0	33.3	YES	FAC
dwarf huckleberry <i>Gaylussacia dumosa</i>	38.0	33.3	YES	FAC

MOSSES & LIVERWORTS (species abundance determined by estimating aerial cover class):
 no mosses or liverworts observed within limits of this vegetation community sampling plot

CLIMBING WOODY VINES (species abundance determined by estimating aerial cover class):

poison ivy <i>Toxicodendron radicans</i>	5.0	100.0	YES	
--	-----	-------	-----	--

HW established this soil profile and plant community observation transect in a location between flag stations A-41 and A-42.

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*: plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:
 Number of dominant wetland indicator plants: 7 Number of dominant non-wetland indicator plants: 1
 Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? (yes) no
If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability, ANRAD, or Notice of Intent.

Section II. Indicators of Hydric Soils & Hydrology

Hydric Soil Interpretation (WETLAND HABITAT)

1. Soil Survey

Is there a published soil survey for this site? YES no
 title/date: Barnstable County - 1993
 map number: 1
 soil type mapped: Pipestone Loamy Crs Sand
 0 - 3 percent slopes
 hydric soil inclusions: Pipestone is a listed hydric.
 Berryland and Walpole are listed
 Are field observations consistent with soil survey descrip? YES no
 Remarks:

2. Soil Morphology (Soil Profile Description)

Horiz/Layer Depth Texture Matrix Color Redoximorphic Features

APPROX 4 INCHES OF ORGANIC MATERIAL
 AT / ON SOIL SURFACE.
 WITH ORGANIC STREAKING IN MEDIUM
 SAND SOIL MATRIX IMMEDIATELY
 BELOW SURFACE ORGANICS

Remarks:

3. Other:

Conclusion: Is soil hydric? (yes) no

Other Indicators of Wetland Hydrology: (check/describe all that apply)

- Site inundated: _____
- Depth to free water in observation hole: _____
- Depth to saturation in observation hole: _____
- Water marks: ON TRUNKS / STEMS OF WOODY PLANTS
- Drift lines: _____
- Sediment deposits: _____
- Drainage patterns in BVW: _____
- Oxidized rhizospheres: _____
- Water-stained/blackened leaves: _____
- Recorded data (stream, lake, or tidal gauge; aerial photo; other): _____
- Other: _____

Plant Community and Hydrology Conclusion

Number of wetland indicator plants =/ > number of non-wetland indicator plants
 yes [x] no []

Wetland hydrology:
 hydric soil present [x] []

other wetland hydrology indicators
 [x] []

Sample location is in a BVW [x] []

Submit this form with the Request for Determination of Applicability or Notice of Intent.

DEP Bordering Vegetated Wetland (310 CMR 10.55) Delineation Field Data Form

Applicant: HOBSEY WITTEN GAP Project location: PROVINCETOWN MUNICIPAL AIRPORT DEP File #: _____

Check all that apply:

- Vegetation alone presumed adequate to delineate BVW; fill out Section I only
- Vegetation and other indicators of hydrology used to delineate BVW boundary; fill out Sections I and II
- Method other than dominance test used (attach additional information)

Section I. **Vegetation** Observation Plot Number: A1-UPL Transect Number: T A-1 Date of Delineation: 8-10-04

A. Sample Layer and Plant Species (by common/scientific name) **B. Percent Cover (or basal area)** **C. Percent Dominance** **D. Dominant Plant (yes or no)** **E. NWI Wetland Indicator**

TREES (species abundance determined through DBH measurements and basal area calc's):

pitch pine	<i>Pinus rigida</i>	28.3	43.8	YES	FACU
Bebb willow	<i>Salix bebbiana</i>	36.3	56.2	YES	FACW

SAPLINGS (species abundance determined by estimating aerial cover class):

no species of sapling size observed within limits of this vegetation community sampling plot

SHRUBS (species abundance determined by estimating aerial cover class):

Northern bayberry	<i>Myrica pensylvanica</i>	20.5	55.4	YES	FAC
beach plum	<i>Prunus maritima</i>	10.5	28.4	YES	UPL
trembling aspen	<i>Populus tremula</i>	3.0	8.1	NO	FACU
lowbush blueberry	<i>Vaccinium ananquifolium</i>	3.0	8.1	NO	UPL
pitch pine	<i>Pinus rigida</i>	T	0.0	NO	FACU

GROUND COVER (species abundance determined by estimating aerial cover class):

bearberry	<i>Arctostaphylos uva-ursi</i>	20.5	43.6	YES	UPL
poverty grass	<i>Danthonia spicata</i>	20.5	43.6	YES	UPL
common hairgrass	<i>Deschampsia flexuosa</i>	3.0	6.4	NO	UPL
little bluestem	<i>Schizachyrium scoparium</i>	3.0	6.4	NO	FACU

MOSESSES & LIVERWORTS (species abundance determined by estimating aerial cover class):

no mosses or liverworts observed within limits of this vegetation community sampling plot

CLIMBING WOODY VINES (species abundance determined by estimating aerial cover class):

no climbing woody vines observed within limits of this vegetation community sampling plot

HW established this soil profile and plant community observation transect in a location between flag stations A-41 and A-42.

*Use an asterisk to mark wetland indicator plants: plant species listed in the Wetlands Protection Act (MGL c.131, s.40); plants in the genus *Sphagnum*; plants listed as FAC, FAC+, FACW-, FACW, FACW+, or OBL; or plants with physiological or morphological adaptations. If any plants are identified as wetland indicator plants due to physiological or morphological adaptations, describe the adaptation next to the asterisk.

Vegetation conclusion:

Number of dominant wetland indicator plants: 2 Number of dominant non-wetland indicator plants: 4

Is the number of dominant wetland plants equal to or greater than the number of dominant non-wetland plants? yes no

If vegetation alone is presumed adequate to delineate the BVW boundary, submit this form with the Request for Determination of Applicability, ANRAD, or Notice of Intent.

Section II. Indicators of Hydric Soils & Hydrology

Hydric Soil Interpretation (UPLAND AREA)

1. Soil Survey

Is there a published soil survey for this site? **YES** no
 title/date: **Barnstable County - 1993**
 map number: **1**
 soil type mapped: **Hooksan Sand, Rolling**

hydric soil inclusions: **None listed by survey**

Are field observations consistent with soil survey descrip? **YES** no
 Remarks:

2. Soil Morphology (Soil Profile Description)

Horiz/Layer Depth Texture Matrix Color Redoximorphic Features

**NO ORGANIC MATERIAL ACCUMULATION
 OR STREAKING.
 TYPICAL LOOSE, DRY MEDIUM SAND.**

Remarks:

3. Other:

Conclusion: Is soil hydric? yes (no)

Other Indicators of Wetland Hydrology: (check/describe all that apply)

- Site inundated: _____
- Depth to free water in observation hole: _____
- Depth to saturation in observation hole: _____
- Water marks: _____
- Drift lines: _____
- Sediment deposits: _____
- Drainage patterns in BWV: _____
- Oxidized rhizospheres: _____
- Water-stained/blackened leaves: _____
- Recorded data (stream, lake, or tidal gauge; aerial photo; other): _____
- Other: _____

Plant Community and Hydrology Conclusion

Number of wetland indicator plants =/>> yes no
 number of non-wetland indicator plants [] []

Wetland hydrology:
 hydric soil present [] []

other wetland hydrology indicators

Sample location is in a BWV

Submit this form with the Request for Determination of Applicability or Notice of Intent.



WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Order of Delineation

The Conservation Commission has determined the following (check whichever is applicable):

Accurate: The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):

Bordering Vegetated Wetlands

Other Resource Area(s), specifically:

isolated vegetated wetland, vegetated wetlands, unvegetated wetlands, isolated land subject to flooding, coastal flood zone, coastal dune and barrier beach, salt marsh.

Modified: The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):

Bordering Vegetated Wetlands

Other Resource Area(s), specifically:

Inaccurate: The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):

Bordering Vegetated Wetlands

Other Resource Area(s), specifically:

The boundaries were determined to be inaccurate because:



WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Order of Delineation (cont.)

This Order of Resource Area Delineation determines the boundaries of those resource areas noted above and is binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c.131, § 40) and its regulations (310 CMR 10.00) regarding such boundaries. This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation.

This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see Appendix A)

Signatures:

[Handwritten signatures: Gordon, Paul Moody, Lynn L. Martin, Peter L. Gold]

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

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

by hand delivery on

by certified mail, return receipt requested on

Date

Date

1/25/07

C. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office (see Appendix A) to issue a Superseding Order of Resource Area Delineation. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Appendix E: Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
DEP Regional Addresses
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Mail transmittal forms and DEP payments, payable to:

Commonwealth of Massachusetts
 Department of Environmental Protection
 Box 4062
 Boston, MA 02211

DEP Western Region
 436 Dwight Street
 Suite 402
 Springfield, MA 01103
 Phone: 413-784-1100
 Fax: 413-784-1149

Adams	Colrain	Hampden	Monroe	Pittsfield	Tyringham
Agawam	Conway	Hancock	Montague	Plainfield	Wales
Alford	Cummington	Hatfield	Monterey	Richmond	Ware
Amherst	Dalton	Hawley	Montgomery	Rowe	Warwick
Ashfield	Deerfield	Heath	Monson	Russell	Washington
Becket	Easthampton	Hinsdale	Mount Washington	Sandisfield	Wendell
Belchertown	East Longmeadow	Holland	New Ashford	Savoy	Westfield
Bernardston	Egremont	Holyoke	New Marlborough	Sheffield	Westhampton
Blandford	Erving	Huntington	New Salem	Shelburne	West Springfield
Brimfield	Florida	Lanesborough	North Adams	Shutesbury	West Stockbridge
Buckland	Gill	Lee	Northampton	Southampton	Whately
Charlemont	Goshen	Lenox	Northfield	South Hadley	Wilbraham
Cheshire	Granby	Leverett	Orange	Southwick	Williamsburg
Chester	Granville	Leyden	Northampton	Springfield	Williamstown
Chesterfield	Great Barrington	Longmeadow	Palmer	Stockbridge	Windsor
Chicopee	Greenfield	Ludlow	Peru	Sunderland	Worthington
Clarksburg	Hadley	Middlefield		Tolland	

DEP Central Region
 627 Main Street
 Worcester, MA 01605
 Phone: 508-792-7650
 Fax: 508-792-7621
 TDD: 508-767-2788

Acton	Charlton	Hopkinton	Millbury	Rutland	Uxbridge
Ashburnham	Clinton	Hubbardston	Milville	Shirley	Warren
Ashby	Douglas	Hudson	New Braintree	Shrewsbury	Webster
Athol	Dudley	Holliston	Northborough	Southborough	Westborough
Auburn	Dunstable	Lancaster	Northbridge	Southbridge	West Boylston
Ayer	East Brookfield	Leicester	North Brookfield	Spencer	West Brookfield
Barre	Fitchburg	Leominster	Oakham	Sterling	Westford
Bellingham	Gardner	Littleton	Oxford	Stow	Westminster
Berlin	Grafton	Lunenburg	Paxton	Sturbridge	Winchendon
Blackstone	Groton	Marlborough	Pepperell	Sutton	Worcester
Bolton	Harvard	Maynard	Petersham	Templeton	
Boxborough	Hardwick	Medway	Phillipston	Townsend	
Boylston	Holden	Mendon	Princeton	Tyngsborough	
Brockfield	Hopedale	Milford	Royalston	Upton	

DEP Southeast Region
 20 Riverside Drive
 Lakeville, MA 02347
 Phone: 508-946-2700
 Fax: 508-947-6557
 TDD: 508-946-2795

Abington	Dartmouth	Freetown	Mattapoisett	Provincetown	Tisbury
Acushnet	Dennis	Gay Head	Middleborough	Raynham	Truro
Attleboro	Dighton	Gosnold	Nantucket	Rehoboth	Wareham
Avon	Duxbury	Halifax	New Bedford	Rochester	Wellfleet
Barnstable	Eastham	Hanover	North Attleborough	Rockland	West Bridgewater
Berkley	East Bridgewater	Hanson	Norton	Sandwich	Westport
Bourne	Easton	Harwich	Norwell	Scituate	West Tisbury
Brewster	Edgartown	Kingston	Oak Bluffs	Seekonk	Whitman
Bridgewater	Fairhaven	Lakeville	Orleans	Sharon	Wrentham
Brockton	Fall River	Mansfield	Pembroke	Somerset	Yarmouth
Carver	Falmouth	Marion	Plainville	Stoughton	
Chatham	Foxborough	Marshfield	Plymouth	Swansea	
Chilmark	Franklin	Mashpee	Plympton	Taunton	

DEP Northeast Region
 1 Winter Street
 Boston, MA 02108
 Phone: 617-654-6500
 Fax: 617-556-1049
 TDD: 617-574-6868

Amesbury	Chelmsford	Hingham	Merrimac	Quincy	Wakefield
Andover	Chelsea	Holbrook	Methuen	Randolph	Walpole
Arlington	Cohasset	Hull	Middleton	Reading	Waltham
Ashland	Concord	Ipswich	Millis	Revere	Wartown
Bedford	Danvers	Lawrence	Millis	Rockport	Wayland
Belmont	Dedham	Lexington	Milton	Rowley	Wellesley
Beverly	Dover	Lincoln	Nahant	Salem	Wenham
Billerica	Dracut	Lowell	Natick	Salisbury	West Newbury
Boston	Essex	Lynn	Needham	Saugus	Weston
Boxford	Everett	Lynnfield	Newbury	Sherborn	Westwood
Braintree	Framingham	Malden	Newburyport	Somerville	Weymouth
Brookline	Georgetown	Manchester-By-The-Sea	Newton	Stonham	Wilmington
Burlington	Gloucester	Marblehead	Norfolk	Sudbury	Winchester
Cambridge	Groveland	Medfield	North Andover	Swampscott	Winthrop
Canton	Hamilton	Medford	North Reading	Tewksbury	Woburn
Carlisle	Haverhill	Melrose	Norwood	Topsfield	
			Peabody		



Massachusetts Department of Environmental Protection
 Bureau of Resource Protection - Wetlands
Request for Departmental Action Fee Transmittal Form
 Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Request Information

Important:
 When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



1. Person or party making request (if appropriate, name the citizen group's representative):

(fee exempt - municipal)

Name _____

Mailing Address _____

City/Town _____

State _____

Zip Code _____

Phone Number _____

Fax Number (if applicable) _____

Project Location _____

Mailing Address _____

City/Town _____

State _____

Zip Code _____

2. Applicant (as shown on Notice of Intent (Form 3), Abbreviated Notice of Resource Area Delineation (Form 4A); or Request for Determination of Applicability (Form 1)):

Name _____

Mailing Address _____

City/Town _____

State _____

Zip Code _____

Phone Number _____

Fax Number (if applicable) _____

3. DEP File Number:

B. Instructions

1. When the Departmental action request is for (check one):

- Superseding Order of Conditions (\$100 for individual single family homes with associated structures; \$200 for all other projects)
- Superseding Determination of Applicability (\$100)
- Superseding Order of Resource Area Delineation (\$100)

Send this form and check or money order for the appropriate amount, payable to the *Commonwealth of Massachusetts* to:

Department of Environmental Protection
 Box 4062
 Boston, MA 02211



Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

Request for Departmental Action Fee Transmittal Form

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

B. Instructions (cont.)

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.
3. Send a **copy** of this form and a **copy** of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office.
4. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant.

DISTRICT OFFICE: New England District
FILE NUMBER & APPLICANT: Provincetown Airport Commission, NAE-2006-4281

PROJECT LOCATION INFORMATION:

State: Massachusetts
County: Barnstable
Center coordinates of site (latitude/longitude):
Approximate size of area (parcel) reviewed, including uplands: acres.
Name of nearest waterway: Cape Cod Bay
Name of watershed: Cape Cod Bay

JURISDICTIONAL DETERMINATION

Completed: Desktop determination Date:
Site visit(s) Date(s): January 8, 2007

Jurisdictional Determination (JD):

- Preliminary JD - Based on available information, *there appear to be* (or) *there appear to be no* "waters of the United States" and/or "navigable waters of the United States" on the project site. A preliminary JD is not appealable (Reference 33 CFR part 331).
- Approved JD – An approved JD is an appealable action (Reference 33 CFR part 331).
Check all that apply:
- There are* "navigable waters of the United States" (as defined by 33 CFR part 329 and associated guidance) within the reviewed area. Approximate size of jurisdictional area: .
- There are* "waters of the United States" (as defined by 33 CFR part 328 and associated guidance) within the reviewed area. Approximate size of jurisdictional area: .
- There are* "isolated, non-navigable, intra-state waters or wetlands" within the reviewed area.
 Decision supported by SWANCC/Migratory Bird Rule Information Sheet for Determination of No Jurisdiction.

BASIS OF JURISDICTIONAL DETERMINATION:

A. Waters defined under 33 CFR part 329 as "navigable waters of the United States":

- The presence of waters that are subject to the ebb and flow of the tide and/or are presently used, or have been used in the past, or may be susceptible for use to transport interstate or foreign commerce.

B. Waters defined under 33 CFR part 328.3(a) as "waters of the United States":

- (1) The presence of waters, which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide.
- (2) The presence of interstate waters including interstate wetlands¹.
- (3) The presence of other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use, degradation or destruction of which could affect interstate commerce including any such waters (check all that apply):
- (i) which are or could be used by interstate or foreign travelers for recreational or other purposes.
- (ii) from which fish or shellfish are or could be taken and sold in interstate or foreign commerce.
- (iii) which are or could be used for industrial purposes by industries in interstate commerce.
- (4) Impoundments of waters otherwise defined as waters of the US.
- (5) The presence of a tributary to a water identified in (1) – (4) above.
- (6) The presence of territorial seas.
- (7) The presence of wetlands adjacent² to other waters of the US, except for those wetlands adjacent to other wetlands.

Rationale for the Basis of Jurisdictional Determination (applies to any boxes checked above). *If the jurisdictional water or wetland is not itself a navigable water of the United States, describe connection(s) to the downstream navigable waters. If B(1) or B(3) is used as the Basis of Jurisdiction, document navigability and/or interstate commerce connection (i.e., discuss site conditions, including why the waterbody is navigable and/or how the destruction of the waterbody could affect interstate or foreign commerce). If B(2, 4, 5 or 6) is used as the Basis of Jurisdiction, document the rationale used to make the determination. If B(7) is used as the Basis of Jurisdiction, document the rationale used to make adjacency determination:*

Lateral Extent of Jurisdiction: (Reference: 33 CFR parts 328 and 329)

- Ordinary High Water Mark indicated by:
- clear, natural line impressed on the bank
 - the presence of litter and debris
 - changes in the character of soil
 - destruction of terrestrial vegetation
 - shelving
 - other:
- High Tide Line indicated by:
- oil or scum line along shore objects
 - fine shell or debris deposits (foreshore)
 - physical markings/characteristics
 - tidal gages
 - other:
- Mean High Water Mark indicated by:
- survey to available datum; physical markings; vegetation lines/changes in vegetation types.
- Wetland boundaries, as shown on the attached wetland delineation map and/or in a delineation report prepared by:

Basis For Not Asserting Jurisdiction:

- The reviewed area consists entirely of uplands.
- Unable to confirm the presence of waters in 33 CFR part 328(a)(1, 2, or 4-7).
- Headquarters declined to approve jurisdiction on the basis of 33 CFR part 328.3(a)(3).
- The Corps has made a case-specific determination that the following waters present on the site are not Waters of the United States:
- Waste treatment systems, including treatment ponds or lagoons, pursuant to 33 CFR part 328.3.
 - Artificially irrigated areas, which would revert to upland if the irrigation ceased.
 - Artificial lakes and ponds created by excavating and/or diking dry land to collect and retain water and which are used exclusively for such purposes as stock watering, irrigation, settling basins, or rice growing.
 - Artificial reflecting or swimming pools or other small ornamental bodies of water created by excavating and/or diking dry land to retain water for primarily aesthetic reasons.
 - Water-filled depressions created in dry land incidental to construction activity and pits excavated in dry land for the purpose of obtaining fill, sand, or gravel unless and until the construction or excavation operation is abandoned and the resulting body of water meets the definition of waters of the United States found at 33 CFR 328.3(a).
 - Isolated, intrastate wetland with no nexus to interstate commerce.
 - Prior converted cropland, as determined by the Natural Resources Conservation Service. Explain rationale:
 - Non-tidal drainage or irrigation ditches excavated on dry land. Explain rationale:
 - Other (explain):

DATA REVIEWED FOR JURISDICTIONAL DETERMINATION (mark all that apply):

- Maps, plans, plots or plat submitted by or on behalf of the applicant.
- Data sheets prepared/submitted by or on behalf of the applicant.
- This office concurs with the delineation report, dated _____, prepared by (company):
 - This office does not concur with the delineation report, dated _____, prepared by (company):
- Data sheets prepared by the Corps.
- Corps' navigable waters' studies:
- U.S. Geological Survey Hydrologic Atlas:
 - U.S. Geological Survey 7.5 Minute Topographic maps:
 - U.S. Geological Survey 7.5 Minute Historic quadrangles:
 - U.S. Geological Survey 15 Minute Historic quadrangles:
 - USDA Natural Resources Conservation Service Soil Survey:
 - National wetlands inventory maps:
 - State/Local wetland inventory maps:
 - FEMA/FIRM maps (Map Name & Date):
 - 100-year Floodplain Elevation is: _____ (NGVD)
 - Aerial Photographs (Name & Date):
 - Other photographs (Date):
 - Advanced Identification Wetland maps:
 - Site visit/determination conducted on: January 8, 2007
 - Applicable/supporting case law:
 - Other information (please specify):

¹Wetlands are identified and delineated using the methods and criteria established in the Corps Wetland Delineation Manual (87 Manual) (i.e., occurrence of hydrophytic vegetation, hydric soils and wetland hydrology).

²The term "adjacent" means bordering, contiguous, or neighboring. Wetlands separated from other waters of the U.S. by man-made dikes or barriers, natural river berms, beach dunes, and the like are also adjacent.