SECTION 5.0 ENVIRONMENTAL CONSEQUENCES

Alternatives to the various CIP projects were presented in Section 3. This section evaluates their potential to result in environmental impacts. A list of all environmental impact categories considered in this document and either evaluated or dismissed from further analysis is discussed in Section 1.0 and outlined in Table 1-1. NEPA requires consideration of context, intensity, duration of impacts, indirect (secondary) impacts, cumulative impacts, and measures to mitigate for impacts. The definitions used for these terms in this document are provided below. Additionally, NPS policy requires that "impairment of park resources" be evaluated in all environmental documents.

Consequences, including direct and indirect impacts, were assessed by impact topic for the No Action, Preferred Alternative, and other alternatives for each CIP project element.

This section describes and compares the impacts of the Preferred Alternative (Proposed Action), other alternatives, and the No Action Alternative for each of the CIP project elements. Impact categories include: Transportation, Wetlands and Buffer Zones, Floodplain, Coastal Dunes, Cultural Grasslands, Rare Species Habitat, Drainage/Stormwater Management, Visual, Section 4(f) Properties, Impairment of Park Resources, and Cumulative Impacts.

Two impact categories are discussed in aggregate terms rather than by individual project element. These categories include Impairment to Park Resources (Section 5.14) and Cumulative Impacts (Section 5.15). This approach has been suggested by NPS because of the similarity of the projects and associated impacts. These topics are addressed in the overall context of the combined CIP projects, rather than as each CIP project individually. As with the general discussion of the environmental consequences of each alternative for each CIP project, the impacts are assessed by intensity as outlined in Table 5-1 as a means of assessing cumulative impacts and the potential for impairment to the Park's resources. Table 5-1 provides a framework for establishing whether the CIP project impacts would be negligible, minor, moderate, or major. Table 5-3 provided impacts of the preferred alternative for each project element in terms of wetland types. Table 5-5 provides a summary of impacts for each impact category for the alternatives evaluated. Impacts to Section 4(f) resources are discussed in a separate 4(f) Evaluation provided in Section 9.

5.1 Introduction and Methodology

5.1.1 Definitions

The following definitions for context, intensity, duration of impacts, indirect impacts, cumulative effects, and mitigation measures were used to characterize and evaluate the impacts associated with project alternatives for the CIP projects. Terms not defined have the standard NEPA definitions.

Context: Context is the setting within which an impact is analyzed. In this FEIR/EA, the context for all areas affected by the proposed actions is within the Airport lease area and the Province Lands region of the Park, although impacts to public use, access, and safety would extend regionally outside the limits of the Park, as they would affect the general public.

Intensity: Intensity refers to severity: negligible, minor, moderate or major. For this FEIR/EA, "negligible" is a barely perceptible and not measurable impact confined to a small area. "Minor" is measurable, localized, and would not require mitigation. "Moderate" is a clearly detectable, measurable impact that could be minimized with mitigation. "Major" is a significant impact that could not be offset by mitigation. The intensity of the project impacts is further broken down by impact topic, as outlined in Table 5.1 for discussion purposes when addressing cumulative impacts and impairment to park resources and values. This assessment methodology is developed from guidance within NPS's Director's Order-12 (DO-12; 1982) and the DO-Handbook and is adopted from similar projects undertaken by NPS in the vicinity of the Airport.

Duration: Duration would be either short-term or long-term. For this FEIR/EA, short-term refers to the construction period, with impacts that would last less than one year. Long-term impacts are impacts that last longer than one year.

Direct and Indirect Impacts: For the purposes of assessing the potential impacts associated with the safety/security fence, impacts to natural resource areas (freshwater wetlands and coastal dunes) have been identified as falling into one of two general categories: direct or indirect. These categories are based upon discussions with MA DEP and other regulatory agencies specific to characterizing impacts associated with the installation and maintenance of the safety/security fence.

The term Direct Impact is used in this document to identify alterations which would involve permanent fill (e.g., from fence posts), and vegetation management that would significantly alter the plant community (and the functions and values that it currently provides) within the clear areas along the fence. Vegetation management where the wetland plant community would be appreciably altered from an existing forested community (PFO) or a dense shrub community (PSS) to one that is permanently maintained as a low-growing plant community has been included as a direct impact. Other than the fence, Direct Impacts are impacts resulting from construction of the project as stated.

Indirect impacts, while modifying the vegetation communities, would not significantly alter the wetlands or dunes and would not impair the ability of these resource areas to continue to provide the same or similar functions and values as those provided by these areas prior to disturbance. An example of indirect impacts may be reducing the height of shrubby vegetation, but still maintaining a shrub swamp community. Indirect Impacts associated with the removal of vegetation have been further broken down by the estimated degree of cutting (i.e., removal of select branches vs. complete removal of canopy or shrub cover), and mitigation has been provided accordingly (see Section 7).

Table 5-1 Impact Intensity Definitions for CIP Projects at PVC

RESOURCE	INTENSITY DEFINITIONS
Natural Resources (wetlands, buffers, floodplains, coastal dunes, wildlife habitat, and grasslands)	**Negligible**: The impact on biological communities, natural processes, species, soils, or wetlands functions and values would be either non-detectable or if detected, would have effects that would be considered slight and localized. **Minor**: The impact is detectable and could affect the abundance or distribution of individuals in a localized area, but would not affect the viability of the local population or overall community size, structure, or composition. Changes to the natural processes, soil characteristics, or wetlands functions and values would be measurable, although the changes would be limited and affect only a localized area. Mitigation would not be required. **Moderate**: The impact is clearly detectable and could have appreciable effects on the resource. This would include impacts that affect the abundance or distribution of local populations but would not affect the viability of the regional population. Changes to community size, structure, composition, ecological processes, wetland functions and values, or soil characteristics could be substantial and occur over a larger area. Mitigation measures would offset adverse effects upon successful implementation. **Major**: The impact is severely adverse or exceptionally beneficial. Impacts would have a substantial, highly noticeable, or widespread influence, affecting the abundance or distribution of a local or regional population to the extent that the population would not be likely to recover (adverse) or would return to a sustainable level (beneficial). Community size, structure, composition, ecological processes, wetlands functions and values, or soil characteristics would be highly altered and landscape level changes would be expected.
State-Listed Rare Species and their Priority Habitat	**Negligible**: The action could result in a change to a population or individuals of a species or designated critical habitat, but the change would be so small that it would not be of any measurable or perceptible consequence and would be well within natural variability. No "Take" would occur and no permit would be required from the Massachusetts Natural Heritage and Endangered Species Program (NHESP). **Minor**: The action could result in a change to a population or individuals of a species or designated critical habitat. The change would be measurable, but small and localized and of little consequence. Mitigation measures, if needed to offset the adverse effects, would be simple and successful, and would not require a permit from NHESP. **Moderate**: Impacts on state-listed rare species, their habitats, or the natural processes sustaining them would be detectable and occur over a large area. Mitigation measures would offset adverse effects. **Major**: The action would result in noticeable effects to the viability of a population or individuals of a species, or its critical supporting habitat. Impacts on a state-listed species, critical habitat, or the natural processes sustaining them would be detectable, both in and out of the natural resource area. Loss of habitat might affect the viability of at least some state-listed rare species. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.
Public Use and Access and Safety (transportation, Section 4(f) properties and visual impacts)	**Negligible**: Visitors would not be affected or there would be no noticeable change in visitor experience or safety. **Minor**: Changes in visitor experience or safety would be detectable, although the changes would be slight. The changes would affect a relatively small number of visitors, be very localized in area, or have barely perceptible consequences to the majority of visitors. **Moderate**: Changes in visitor experience or safety would be readily apparent and would affect a relatively large number of visitors. Mitigation measures would offset adverse effects upon successful implementation. **Major**: Changes in visitor experience or safety would be severely adverse or exceptionally beneficial, highly noticeable, and would affect relatively large numbers of visitors.

Areas of minimal, if any, vegetation cutting and maintenance would not be considered an impact. For example, when the fence alignment would traverse existing low-growing plant communities, this area would not be included as an impact. In addition, vegetation management practices that would necessitate the cutting of Phragmites within the wetland along the fence alignment would not be considered an adverse impact. Phragmites is currently cut by the Airport in the ILS area and the plant is also cut by other agencies for mosquito control or drainage.

Proposed mitigation measures, as discussed in Section 7, include both on-site restoration of wetlands and habitat as well as on-site wetland enhancement, standard construction procedure controls and implementation of BMPs intended to mitigate for unavoidable direct and indirect adverse impacts to natural resources within the Park. Mitigation also includes past mitigation efforts provided through the Hatches Harbor Saltmarsh Restoration Project ("Hatches Harbor Project") in accordance with the April 28, 1997 Memorandum of Understanding between NPS and the Town of Provincetown and as reiterated in the November 5, 2010 letter from NPS to FAA (See Appendices). The Hatches Harbor Project, implemented in the early 2000s, included a substantial restoration effort of salt marsh and freshwater habitat.

5.1.2 Methodology

Wetland Buffer Zone

Project impacts to Buffer Zone (100 foot offset from delineated edge of BVW and IVW, pursuant to the Provincetown Wetland Bylaws) have been considered but are not quantified for separate projects. Impacts have been classified as Level 1 and Level 2 impacts. A Level 1 impact would convert, or maintain, existing Buffer Zone as an area managed for Airport use. A Level 2 impact would convert, or maintain, existing Buffer Zone to a naturally vegetated state (wetland or coastal dune). As discussed in Section 4, existing Buffer Zone areas at the Airport consist of pavement, managed grassland, coastal dune, or other freshwater wetland resources. Because of the location of the isolated wetlands and their proximity to one another, the Buffer Zones overlap. Except for the runway and portions of other facilities, much of the Airport operation area falls within the Buffer Zone. The Buffer Zone is shown on Figure 4.5 which includes a table of Buffer Zone impacts.

Cultural Grassland

Impacts to Cultural Grassland are identified as impacts to the human-created grassland that occurs at the Airport adjacent to the taxiway system and runway. These areas are mowed frequently to maintain aviation safety areas and navigational surfaces. The term Cultural Grassland is applied by the Massachusetts Division of Fisheries & Wildlife to describe a "human-created and maintained open community dominated by grasses, normally maintained by mowing." This community often occurs at airfields and is "a grassland community that generally occurs on sand or other droughty, low-nutrient soils." In general, the mowed grass communities observed at the Airport that meet these criteria are dominated by various grass and herbaceous species that are mowed an average of three to four times annually. The significance of identifying Cultural Grasslands in the Natural Resources Inventories is that this type of habitat may provide nesting habitat for the Vesper Sparrow and potential habitat for Broom Crowberry.

Visual

Visual impacts are based on the qualitative degree of visual resource change and viewer response. Visual resource change is the degree of change in a visual resource caused by the project separate from viewer response. Viewer response is a measure of the change in viewer exposure, sensitivity, cultural significance, and local values. A visual assessment of existing conditions is presented in Section 4. The methodology is adapted

from the Federal Highway Administration's Visual Impact Assessment for Highway Projects (FHWA-HI-88-054).

5.1.3 Field Investigations

Since the circulation of the DEIR/EA (May 31, 2007), additional wetland delineation has been completed and was approved by the Provincetown Conservation Commission. This approval has been extended to January 2013. Impacts to wetland resources are based on wetland identification and delineation reports that are included in Appendix 1. Direct impacts to BVW, IVW, and coastal dune are discussed in Sections 3, 5, and 7.

Additional field assessments of Eastern Spadefoot Toad prime and potential breeding habitat have been completed, pursuant to guidance from NHESP and NPS. The identification of impacts to rare species habitat is based on the natural resources inventory and rare species habitat assessment reports that are included in Appendix 2.

5.1.4 References

The impact analyses and conclusions are based on existing literature, FAA design standards, specific site studies, professional judgments, and public and agency input. The specific site studies are provided in the Appendices. A detailed discussion of FAA and TSA standards and regulations is provided in Section 2. Public and Agency comment letters are provided in Sections 10 and 13. CCNS publications can be found at the NPS website. Several agency coordination meetings were held with NHESP, NPS, CCC, DEP, Provincetown Conservation Commission, and ACOE staff to discuss alternatives and potential impacts to Hatches Harbor, rare species, wetlands, wildlife habitat continuity, traffic, and parking. Minutes of these meetings are provided in Section 10.1.

5.2 Westerly Taxiway System

The Westerly Taxiway System consists of:

- West End Connector Taxiway
- Westerly End of Parallel Taxiway
- Mid Connector Taxiway

5.2.1 No Action

5.2.1.1 Transportation and Traffic

The No Action Alternative would have moderate adverse impacts on Transportation and Traffic in terms of airport operational safety. The West End TW would continue to be within the runway approach and the TW would not have the right angle connection at the end of the runway. The parallel TW would not be reconstructed to remove pavement.

5.2.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction and wetlands would not be altered.

5.2.1.3 Floodplain

Under the No Action Alternative there would be no impacts to floodplain because there would be no construction within flood zone elevations (i.e., within wetland, low-lying coastal dune or grassland) and the floodplain would not be altered.

5.2.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to Coastal Dunes because there would be no construction and coastal dunes would not be altered for the project.

5.2.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts to Cultural Grasslands because there would be no construction within cultural grasslands.

5.2.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts to Rare Species Habitat because there would be no construction within resources used by listed species.

5.2.1.7 Drainage / Stormwater Management

The drainage system would not change under the No Action Alternative. There are no impacts to the drainage system associated with the No Action alternative.

5.2.1.8 Visual Environment

There would be no change to the visual environment under the No Action Alternative. The No Action Alternative will not impact visual resources.

5.2.2 Westerly TW System Improvements (Preferred Alternative)

The Westerly Taxiway System Improvements consist of:

A. Relocate the West End TW out of the RW Approach with a standard right angle
B. Re-align the Westerly End of the Parallel Taxiway and construct a run-up pad
C. Re-align the Mid Connector TW with a standard right angle

5.2.2.1 Transportation and Traffic

Construction of the Westerly TW system would have moderate beneficial impacts on Transportation and Traffic. The project would provide safety and operational improvements but would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project. Therefore, there would be minor short-term adverse impacts and moderate beneficial long-term impacts on Transportation and Traffic.

5.2.2.2 Wetlands and Wetland Buffer Zones

The Westerly TW System Improvements would result in a total of 28,655 SF of unavoidable impacts to Wetland I. The relocation of the West End TW will result in the unavoidable alteration of approximately 25,665 SF of Wetland I. The realignment of the westerly end of the Parallel TW will result in the unavoidable alteration of approximately 2,880 SF of Wetland I. The realignment of the mid connector TW will result in the unavoidable alteration of approximately 110 SF of Wetland I. These areas are shown on Figure 3.1 in Section 3.

As for most of the CIP project elements proposed adjacent to wetland areas, unless otherwise noted, work within the buffer zone will typically be limited to the installation of erosion control measures at the limit of work prior to construction to prevent unintended impacts from sedimentation or debris to adjacent wetlands during construction activities. Erosion control barriers (i.e., silt fencing or straw bales) will be installed immediately down gradient of the proposed activities and will serve as the limit of work. Erosion control measures will remain in place and be maintained in good condition during and immediately following all construction activities. Upon completion of these activities and once all soils have been stabilized with native vegetation, the erosion control barriers will be removed and disposed of properly.

Relocation of the West End TW will provide locations for on-site wetland restoration of approximately 64,000 SF as shown on Figures 7.1 and 7.2 in the end of Section 7. This area will also serve as a mitigation area for the other CIP projects that have direct impacts to IVW. Wetland enhancement is also proposed to mitigate for direct and indirect adverse impacts to wetland resources to satisfy federal wetland regulatory requirements. The Hatches Harbor Project will provide the necessary wetland mitigation for impacts to wetland resource areas for the CCNS. Additional information about the proposed mitigation is provided in Section 7. A Statement of Findings is provided in Section 9 to comply with NPS NEPA requirements.

In conclusion, the Preferred Alternative will have a moderate adverse direct short-term impact on wetlands until the construction of the restoration and implementation of wetland enhancement are ~~is~~ successfully completed. Mitigation measures presented will compensate for these impacts such that there will be a net long-term minor to moderate beneficial impact with no net loss of wetland resources.

5.2.2.3 Floodplain

While at least a portion of the project will occur at elevations below the 100-year floodplain (10 to 11 feet above mean sea level), the project is not anticipated to have any adverse effect on the flood storage capacity relative to the ability of the low-lying areas to temporarily retain and release coastal waters during and following a flooding event at the Airport or within the surrounding CCNS lands.

Because of the flood storage capacity of the other isolated wetlands on-site there will be negligible adverse short-term impacts with construction of the Preferred Alternative. Flood storage capacity will be compensated by the proposed wetland restoration upon successful completion. The proposed project will not displace flood waters nor will it minimize the area available for flood storage. In addition, mitigation measures undertaken during the Hatches Harbor Project have resulted in greater flushing of tidal waters within the harbor and have in part allowed for alleviated attenuation of flood waters following major storm events. A Statement of Findings is provided in Section 9 to comply with NPS NEPA requirements. The Preferred Alternative will have no long-term impacts on floodplain. Proposed mitigation will compensate for the impacts such that there may be a minor beneficial increase in flood detention and storage during large storm events upon successful implementation of wetland restoration.

5.2.2.4 Coastal Dunes

Realigning the westerly end of the Parallel TW will result in approximately 6,460 SF of coastal dune alteration for construction of the run-up pad, as shown on Figure 3.1. Of this, approximately 2,220 SF will be converted from coastal dune to cultural grassland and the remaining area will be converted to pavement.

Approximately 27,500 SF of dune creation is proposed adjacent to the proposed freshwater wetland restoration area within Restoration Areas A and C as mitigation. Therefore, the Preferred Alternative will have a moderate adverse short-term impact and minor adverse long-term impact on coastal dunes because proposed mitigation for the overall CIP projects results in a minor loss of coastal dune..

5.2.2.5 Cultural Grasslands

Construction of the Preferred Alternative will impact existing Cultural Grasslands associated with the existing TW safety areas. The Preferred Alternative will also have adjacent safety areas consisting of Cultural Grasslands at varying widths.

Cultural Grasslands will be re-established along the newly constructed taxiway entrances and within the abandoned paved areas adjacent to the Runway 7 end as shown on Figures 7.1 and 7.2. Overall there will be no net loss of Cultural Grassland resource at the Airport. Therefore, the Preferred Alternative will have negligible adverse short-term and no long-term impacts on Cultural Grassland.

5.2.2.6 Rare Species Habitat

Construction of the Preferred Alternative would impact wetlands, coastal dune, and Cultural Grassland which are potential habitats for Eastern Box Turtle, Vesper Sparrow, and Eastern Spadefoot Toad.

Minor short-term adverse impacts to Eastern Box Turtle habitat are expected, as this species is a generalist (as discussed in Section 4) and utilizes a variety of habitat types found within the Airport. There would be negligible adverse long-term impacts. To avoid direct impacts to this species, pre-construction “turtle sweeps” within the limit of work will be conducted as part of the Turtle Protection Plan discussed in Section 7.

Wetland resource area restoration is proposed in Restoration Areas A and B in which isolated freshwater wetlands will re-create potential breeding habitat for the Eastern Spadefoot Toad. Construction activities within the wetlands will be scheduled in accordance with NHESP agency avoidance dates to avoid direct impacts to Eastern Spadefoot Toad and further mitigate any adverse construction effects. Proposed wetland enhancement measures will restore the native plant communities within these habitats over time.

Although Vesper Sparrows have not been observed at the Airport in recent years, this species has been documented at the Airport by NPS, and the grassland provides potential habitat for the Vesper Sparrow. Construction activities within Cultural Grasslands will be scheduled for the fall (i.e., after the active breeding and nesting season for this species) which will avoid direct impacts to Vesper Sparrow.

In summary, the Airport will mitigate for impacts to rare species habitat through a combination of habitat restoration, habitat enhancement, and other efforts that are discussed in detail in Section 7. Vegetation management will help to maintain natural habitat areas, such as Cultural Grassland. Strategic timing of construction activities will also help to avoid direct and indirect impacts to rare species. To the extent practicable, construction will be timed to avoid peak activity for these species. As such, adverse impacts to rare species will be minor for the short-term and negligible for the long-term because of the proposed mitigation measures.

5.2.2.7 Drainage / Stormwater Management

The project involves the relocation of pavement, removal of pavement, and construction of new paved surfaces. Following construction, stormwater runoff will continue to be managed on the taxiways with infiltration through sheet flow into the grass safety areas. Runoff from the Airport's runways and taxiways has negligible contaminants because salt is not applied and engine repair does not take place.

In addition, the CIP projects will result in an overall net decrease in pavement at the Airport as shown in Table 5.2 and on Figure 5.2 at the end of this section. Erosion control measures will be in place during construction and there will be minor beneficial short-term and long-term impacts to drainage and stormwater management.

5.2.2.8 Visual Environment

The project would relocate existing taxiways and would not be a new element or an expansion of an existing element in the visual environment. Therefore, there would be no impact to the Visual Environment.

5.3 East End TW

5.3.1 No Action

5.3.1.1 Transportation and Traffic

The No Action Alternative would have moderate adverse impacts on Transportation and Traffic in terms of Airport operations both in the short- and long-term. The East End TW would not connect with the end of the runway and planes would be required to back-taxi on the active runway.

5.3.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction and wetlands would not be altered.

5.3.1.3 Floodplain

Under the No Action Alternative there would be no impacts to floodplain because there would be no construction within flood zone elevations (i.e., within wetland, low lying coastal dune or grassland).

5.3.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction.

5.3.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts to cultural grasslands because there would be no construction.

5.3.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts to rare species habitat because there would be no construction.

5.3.1.7 Drainage / Stormwater Management

The drainage system would not change under the No Action Alternative because there would be no construction.

5.3.1.8 Visual Environment

As there would be no construction under the No Action Alternative, there would be no change to the visual environment.

5.3.2 Relocate East End TW with Standard Right Angle (Preferred Alternative)

5.3.2.1 Transportation and Traffic

Construction of the East End TW relocation would have minor adverse short-term impacts on transportation and traffic. The project would provide safety and operational improvements but would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project. Therefore, there would be minor adverse short-term impacts and moderate beneficial long-term impacts on Transportation and Traffic.

5.3.2.2 Wetlands and Wetland Buffer Zones

Relocating the East End TW to align with the Runway 25 end would result in direct wetland impacts of 28,300 SF within an isolated shrub swamp, Wetland B, as shown on Figure 3.2.

Relocation of the East End TW will allow for on-site wetland restoration of up to 14,000 SF within the footprint of the existing paved area (Restoration Area C), as shown on Figure 7.2 in Section 7. Additional isolated wetland restoration will be provided in Restoration Area A (Figure 7.1 and 7.3), ~~to~~ providing for an overall on-site restoration at an approximately 1:1 ratio. However, since the Corps (as well as other regulatory authorities) is seeking greater than 1:1 mitigation, the Airport proposes additional mitigation measures that include on-site wetland enhancement to be provided at a 7.4:1 ratio. Off-site mitigation previously implemented through the Hatches Harbor Project is also proposed to mitigate for direct and indirect adverse impacts to wetland resources within the Park, such that the overall mitigation ratio is greater than 8:1. Mitigation ratios will be refined during the permitting process. Additional information about the proposed wetland restoration and mitigation plan is provided in Section 7. The Preferred Alternative will have a moderate adverse short-term impact on wetlands. Proposed on-site wetland restoration and enhancement, combined with previous mitigation completed as part of the Hatches Harbor Project are intended to mitigate for all on-site impacts such that there will be a net long-term minor to moderate beneficial impact to wetland resources upon successful wetland mitigation.

5.3.2.3 Floodplain

While at least a portion of the project will occur at elevations below the 100-year floodplain elevations (10 to 11 feet above mean sea level), the project is not anticipated to have any adverse effect on the flood storage capacity relative to the ability of the low-lying areas to temporarily retain and release coastal waters during and following a flooding event at the Airport or within the surrounding CCNS lands.

Flood storage capacity of Isolated Land Subject to Flooding (ILSF) on-site will not be impaired with construction of the Preferred Alternative. Any loss of flood storage capacity will be compensated upon successful implementation of on-site wetland restoration. The proposed project~~s~~ will not displace flood waters nor will it reduce the area available for flood storage because of the proposed wetland mitigation. A Statement of Findings is provided in Section 9 to comply with NPS NEPA regulations. The Preferred Alternative will have a negligible adverse short-term impact on floodplain during construction. Proposed mitigation will compensate for the impacts so that there will be no long-term impact.

5.3.2.4 Coastal Dunes

Relocating the East End Taxiway will result in approximately 5,000 SF of coastal dune alteration, as shown on Figure 3.2. A total of 27,500 SF (See Figures 7.1 and 7.2 in Section 7) of dune creation is proposed adjacent to the proposed freshwater wetland restoration areas (Restoration Areas A and C) as mitigation for this project and other CIP projects with impacts to coastal dunes. Management of invasive species within other existing coastal dune habitat is also proposed (see Section 7.0). The Preferred Alternative will have a moderate adverse short-term direct impact and minor adverse long-term impact on coastal dunes because of proposed mitigation.

5.3.2.5 Cultural Grasslands

Relocating the East End Taxiway will alter some of the existing Cultural Grassland within the TW safety area. The relocated East End TW will be constructed with similar safety areas which will be maintained as Cultural Grassland (see Figures 7.2 and 7.4). Overall, there will be no net loss of Cultural Grassland at the Airport, so the Preferred Alternative will have minor adverse short-term and negligible adverse long-term impacts on Cultural Grassland.

5.3.2.6 Rare Species Habitat

Relocating the East End TW would involve a shift of the existing TW entrance to the southeast. This may have potential impacts to habitat for the Eastern Box Turtle, to breeding and non-breeding habitat for the Eastern Spadefoot Toad, and to a lesser degree, to Vesper Sparrow nesting habitat. Abandonment of the existing paved areas provides an opportunity for habitat creation and/or restoration as discussed in Section 7.

Impacts to Vesper Sparrow nesting habitat are not anticipated given that the grassland in this area is in close proximity to active Airport operational areas (i.e., existing human activity in these areas may deter nesting in these managed grasslands). Construction activities within Cultural Grasslands will be scheduled for the fall to avoid impacts to Vesper Sparrow.

Habitat surveys for the Eastern Spadefoot Toad indicate that while portions of Wetland B provide suitable breeding habitat for this species, the proposed taxiway entrance would be located in areas uncharacteristic of prime breeding habitat for the Eastern Spadefoot Toad. Construction activities within the wetlands will be scheduled consistent with specific NHESP agency avoidance dates which will avoid direct adverse impacts to Eastern Spadefoot Toad and their potential breeding habitat. Proposed on-site wetland restoration and enhancement will mitigate for the shift in Eastern Spadefoot Toad breeding habitat and should improve the habitat characteristics through invasive species management.

In order to avoid direct impacts to the Eastern Box Turtle, pre-construction “turtle sweeps” within the limit of work will be conducted as part of the Turtle Protection Plan discussed in Section 7. Therefore, direct adverse impacts to rare species habitat will be minor for the short-term and negligible for the long-term because of the proposed mitigation measures.

5.3.2.7 Drainage / Stormwater Management

The project involves the relocation of pavement, removal of pavement, and construction of new paved surfaces. Following construction, stormwater runoff will continue to be managed on the taxiways with infiltration through sheet flow into the grass safety areas. Runoff from the Airport’s runways and taxiways has negligible contaminants because salt is not applied and engine repair does not take place. Potential contaminants include material from tire wear, but a *de minimis* amount that could not be measured.

Overall, the CIP projects will result in a net decrease in pavement at the Airport as shown in Table 5.2 and Figure 5.2 at the end of this section. Therefore, there will be minor short-term and long-term beneficial impacts to drainage and stormwater management.

5.3.2.8 Visual Environment

The project would relocate an existing taxiway and would not be a new element in the visual environment. As a result there would be no impact to the Visual Environment.

5.4 Terminal Apron

5.4.1 No Action

The Certificate issued on the NPC/DEIR/EA by the Secretary of Energy and Environmental Affairs allowed the Airport to proceed with the reconstruction of the Terminal Apron within the same footprint prior to the completion of the FEIR. In accordance with MEPA and NHESP, the Terminal Apron project has been included in this FEIR/EA to avoid segmentation, although this project is not required to be included in this FEIR/EA under NEPA requirements. The project was allowed to go forward by NHESP and MEPA because it was deemed to have no environmental impacts.

5.4.1.1 Transportation and Traffic

Under the No Action Alternative there would be minor adverse short-term and moderate adverse long-term impacts to Transportation and Traffic because pavement that is in poor condition would not be replaced. The project has been completed.

5.4.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction adjacent to wetlands and no potential for indirect impacts to adjacent wetlands. The project has been completed and wetland/buffer resources were not impacted under this footprint pavement project.

5.4.1.3 Floodplain

Under the No Action Alternative there would be no impacts because the construction would be within the footprint of the existing terminal apron. The project has been completed and resources were not impacted.

5.4.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction in or adjacent to coastal dune resources. The project has been completed and as a result of this, no resources were impacted.

5.4.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts because there would be no construction in or adjacent to Cultural Grassland. The project has been completed and resources were not impacted under this footprint pavement project.

5.4.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts because construction would not take place in or adjacent to habitat used by listed species. The project has been completed and rare species habitat was not impacted under this footprint pavement project.

5.4.1.7 Drainage / Stormwater Management

Under the No Action Alternative there would be no impacts to the drainage system because the pavement would not be reconstructed. The project has been completed and the existing drainage was re-established.

5.4.1.8 Visual Environment

Under the No Action Alternative there would be no impacts to the visual environment because there would not be any construction. The project has been completed and there was no change in the visual characteristic under this footprint pavement project.

5.4.2 Reconstruct within the Existing Footprint (Preferred Alternative)

The Certificate issued on the NPC/DEIR by the Secretary of Energy and Environmental Affairs allowed the Airport to proceed with the reconstruction of the Terminal Apron within the same footprint prior to the completion of the FEIR.

Coordination was carried out with staff at NHESP regarding requirements under the Massachusetts Endangered Species Act (MESA). The project qualifies as an exempt project pursuant to 321 CMR 10.14(8) "the maintenance, repair or replacement, but not widening of existing paved roads, …and paved parking areas,..." NHESP reviewed and commented on this project as part of the Notice of Intent (NOI) process under the Wetland Protection Act. The project will, however, be included in the MESA application for the Airport's CIP projects to avoid segmentation.

Coordination was also carried out with CCNS, who signed the NOI as the landowner. The project was issued an Order of Conditions (DEP File No. 058-0440) and construction was completed in the fall of 2008. Erosion controls were implemented and the project did not impact wetland, coastal dune, or rare species habitat resources.

5.4.2.1 Transportation and Traffic

Reconstruction of the Terminal Apron would have minor short-term adverse and moderate long-term beneficial impacts on Transportation and Traffic. The project would reconstruct existing pavement but would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project. Therefore, there would be no increase in vehicular traffic as a result of the project. There would be minor adverse impacts during construction and moderate long-term beneficial impacts on Transportation. This project has been completed.

5.4.2.2 Wetlands and Wetland Buffer Zones

The Preferred Alternative will remain within the existing pavement footprint and does not involve any work within wetlands. Erosion control was installed during construction of the project and the project is now completed. There were no impacts on wetlands and wetland buffer zones.

5.4.2.3 Floodplain

The Preferred Alternative will not increase the footprint of the existing pavement within the flood zone and will not affect the floodplain. Therefore, the Preferred Alternative had negligible short-term adverse impacts and will have no long-term impacts on floodplain. This project has been completed.

5.4.2.4 Coastal Dunes

The Preferred Alternative will remain within the existing pavement footprint and does not involve any work within coastal dunes. Erosion control was installed during construction of the project and this project is now completed. Accordingly, there were a no impacts on Coastal Dunes.

5.4.2.5 Cultural Grasslands

The Preferred Alternative will remain within the existing pavement footprint and does not involve any work within Cultural Grassland. Erosion control was installed prior to project construction, and this project has been completed. Consequently, there were no impacts on Cultural Grasslands.

5.4.2.6 Rare Species Habitat

The Preferred Alternative will remain within the existing pavement footprint and does not involve any work within habitat for rare species. Erosion control was installed prior to construction of the project and this project has been completed. As such, there were no impacts on rare species habitat.

5.4.2.7 Drainage / Stormwater Management

The project involves the reconstruction of existing pavement. The stormwater drainage system for the apron is unchanged. Therefore, there were no impacts to drainage and stormwater management. This project has been completed.

5.4.2.8 Visual Environment

The project is a modification to an existing facility and would not be a new visual element. Therefore, there have been no impacts to the Visual Environment since the project has been completed.

5.5 Easterly End of Parallel TW

5.5.1 No Action

5.5.1.1 Transportation and Traffic

The No Action Alternative would have moderate adverse impacts on Transportation and Traffic in terms of Airport operations. The parallel TW pavement, which is in poor condition, would not be reconstructed and loose pavement might damage aircraft.

5.5.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction in or adjacent to wetlands and no potential for indirect impacts to adjacent wetlands.

5.5.1.3 Floodplain

Under the No Action Alternative there would be no impacts because there would be no construction in or adjacent to floodplain.

5.5.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction in or adjacent to coastal dune resources.

5.5.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts because there would be no construction in or adjacent to Cultural Grasslands.

5.5.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts because construction would not take place in or adjacent to habitat used by listed species.

5.5.1.7 Drainage / Stormwater Management

The drainage system would not change under the No Action Alternative. There are no impacts to the drainage system associated with the No Action alternative.

5.5.1.8 Visual Environment

There would be no change to the visual environment under the No Action Alternative. The No Action Alternative will not impact visual resources.

5.5.2 Reconstruct within the Existing Footprint (Preferred Alternative)

5.5.2.1 Transportation and Traffic

Reconstruction of the Preferred Alternative would have moderate beneficial long-term impacts on Transportation and Traffic. The project would reconstruct existing pavement but would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project. Therefore, there would be no increase in vehicular traffic as a result of the project with only minor adverse short-term impacts during construction and moderate beneficial long-term impacts on Transportation and Traffic due to increased safety resulting from new pavement.

5.5.2.2 Wetlands and Wetland Buffer Zones

The Preferred Alternative will remain within the existing pavement footprint and does not involve any work within wetlands. Erosion controls such as haybales and silt fence will be installed prior to construction of the project to define the limit of work and prevent impacts to adjacent resources. As a result, there would be no impact on wetlands.

5.5.2.3 Floodplain

Since the Preferred Alternative does not involve filling within the coastal floodplain, it will not adversely affect the floodplain. Erosion controls such as haybales and silt fence will be installed prior to construction of the project to define the limit of work and prevent impacts to adjacent resources. Therefore, the Preferred Alternative will have no short-term or long-term impact on floodplain.

5.5.2.4 Coastal Dunes

The Preferred Alternative will remain within the existing pavement footprint and does not involve any work within coastal dunes. Erosion controls such as haybales and silt fence will be installed prior to construction of

the project to define the limit of work and prevent impacts to adjacent resources. As such, there would be no impact on coastal dunes.

5.5.2.5 Cultural Grasslands

The Preferred Alternative will remain within the existing pavement footprint and does not involve any work within Cultural Grassland. Erosion controls such as haybales and silt fence will be installed prior to construction of the project to define the limit of work and prevent impacts to adjacent resources. Accordingly, there would be no impact on Cultural Grasslands.

5.5.2.6 Rare Species Habitat

The Preferred Alternative will remain within the existing pavement footprint and does not involve any work within habitat for rare species. Erosion controls such as haybales and silt fence and other construction phase mitigation such as time of construction and monitoring, will be implemented prior to construction of the project to define the limit of work and prevent impacts to adjacent resources and the species that use them. Therefore, there would be no impact on rare species or their habitat.

5.5.2.7 Drainage / Stormwater Management

The project involves the removal of excess pavement and reconstruction of pavement. Currently stormwater runoff from the taxiway sheet flows over the grass safety areas before infiltrating into the ground. There is no sanding or deicing of the taxiway so that the stormwater flows contain minimal total suspended solids. There would be minimal potential for oil or other contaminants in the stormwater. The removal of excess pavement will improve existing conditions. There will be no impact to drainage and stormwater management.

5.5.2.8 Visual Environment

The project would reconstruct existing pavement and would not be a new element in the visual environment. Therefore there would no short-term and long-term impacts to the Visual Environment.

5.6 TW Lighting, Lighted TW Signs, and Electric Vault

5.6.1 No Action

5.6.1.1 Transportation and Traffic

The No Action Alternative would have moderate adverse impacts on Transportation and Traffic in terms of Airport operations. The TW would continue to operate with reflectors and the electric vault would not be upgraded to meet current codes and requirements. This could adversely affect the safety conditions during bad weather operations.

5.6.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction within or adjacent to wetlands and no potential for impacts to adjacent wetlands.

5.6.1.3 Floodplain

Under the No Action Alternative there would be no impacts upon the floodplain because there would be no construction in the floodplain and therefore no impacts to in the floodplain.

5.6.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction in or adjacent to coastal dune resources.

5.6.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts to Cultural Grasslands because there would be no construction within cultural grassland.

5.6.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts to rare species habitat because there would be no construction within resources used by listed species.

5.6.1.7 Drainage / Stormwater Management

There are no impacts to the drainage system associated with the No Action Alternative because there would be no construction.

5.6.1.8 Visual Environment

There would be no change to the visual environment under the No Action Alternative. The No Action Alternative will not impact visual resources because there would be no construction of the TW lights and signs.

5.6.2 Install TW Lighting and Lighted TW Signs, and Construct New Electric Vault (Preferred Alternative)

5.6.2.1 Transportation and Traffic

Construction of the Preferred Alternative would have a moderate beneficial impact on Transportation and Traffic. The project would provide safety and operational improvements but would not result in an increase in the capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project. There would be no increase in vehicular traffic as a result of the project, only negligible adverse short-term impacts during construction, and a moderate beneficial long-term impact on Transportation and Traffic.

5.6.2.2 Wetlands and Wetland Buffer Zones

The Preferred Alternative does not involve any work within wetlands. Erosion controls and a limit of work will be installed prior to construction of the project. Therefore, there would be no impact on wetlands.

5.6.2.3 Floodplain

The Preferred Alternative will not decrease the flood storage capacity at the Airport and as a result will not affect the floodplain. The Preferred Alternative will have no impact on floodplain.

5.6.2.4 Coastal Dunes

The Preferred Alternative does not involve any work within coastal dunes. Erosion controls and a limit of work will be installed prior to construction of the project. As such, there would be no impact on coastal dunes.

5.6.2.5 Cultural Grasslands

Installing new TW edge lights, lighted TW signs, and constructing an electrical vault to upgrade the electric service will occur within Cultural Grasslands adjacent to the TW.

The installation of the electrical conduit will use a construction method referred to as cable plowing. The sandy soils at the Airport make this method feasible. The cable plow machine has a chain saw attachment on the back that is referred to as the "stinger." The stinger trenches a space in the ground approximately 8" wide and approximately 24" deep and mechanically drops the cable in the trench once the stinger has created the space in the ground. The "plowing" and cable installation occurs simultaneously with minimal ground disturbance. The minimal land disturbance is quickly restored as illustrated in Photo 5-1 taken at Nantucket Airport.

Photo **5-1** Taxiway Lights. Nine months after installation using cable plowing at Nantucket Airport.

Accordingly, the Preferred Alternative will have negligible short-term adverse impacts and no adverse long-term impacts on Cultural Grassland.

5.6.2.6 Rare Species Habitat

Installation of the edge lights is not anticipated to have any short-term or long-term adverse impacts to rare species habitat. A habitat survey was conducted for the Eastern Spadefoot Toad at the Airport, and it was determined that habitat for this species is not located along the edges of the taxiway where construction associated with the installation of the taxiway edge lights will be located. Work will occur outside of the prime breeding and nesting season for the Vesper Sparrow and will not occur in areas known to support Broom Crowberry. Procedural controls (e.g., turtle sweeps) will be implemented during construction to avoid any

potential harm to Eastern Box Turtle should the work occur when this species may still be active. The lighting structures will result in a negligible loss of grasslands (i.e., the area immediately surrounding each light unit), the electrical cable will be buried, and the disturbed grasslands will be restored in kind.

The proposed location for the electrical vault is immediately adjacent to the existing Sightseeing Shack, in an area deemed not significant to Vesper Sparrow habitat due to its proximity to Airport operations and the overall isolation of this small area of Cultural Grassland. No Broom Crowberry has been documented within these areas. Therefore, there would be negligible short-term adverse short-term and no long-term impacts on rare species or their habitat as a result of this project.

5.6.2.7 Drainage / Stormwater Management

The project does not involve any changes to paved surfaces and there will be no impact to drainage and stormwater management.

5.6.2.8 Visual Environment

The project would construct an electric vault and add taxiway lights. Similar facilities are on the airfield and the project would not change the visual environment. As such, there would be no impact to the Visual Environment.

5.7 Sightseeing Shack Improvements

5.7.1 No Action

5.7.1.1 Transportation and Traffic

Under the No Action Alternative, the Shack would not be repaired after the electrical equipment was removed for the TW lighting and electric vault project. General aviation passengers and sightseeing passengers frequently sit on the porch of the Sightseeing Shack to talk airplanes with other aviation enthusiasts. Over time, the Sightseeing Shack will continue to deteriorate while communications and electrical equipment is being housed inside, causing an unsafe conditions for GA pilots and passengers. There would be a minor short-term adverse impact and moderate long-term adverse impact on passenger safety.

5.7.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction within or adjacent to wetlands and no potential for impacts to wetlands.

5.7.1.3 Floodplain

Under the No Action Alternative there would be no impacts because there would be no construction within the flood zone and, as a result, floodplain would not be impacted.

5.7.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction in or adjacent to coastal dune resources.

5.7.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts because there would be no construction in or adjacent to Cultural Grasslands.

5.7.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts because construction would not take place in or adjacent to habitat used by listed species.

5.7.1.7 Drainage / Stormwater Management

The drainage system would not change under the No Action Alternative. There are no impacts to the drainage system associated with the No Action Alternative.

5.7.1.8 Visual Environment

There would be no change to the visual environment under the No Action Alternative, except that the Shack would not be repaired and repainted. The No Action Alternative will not impact visual resources.

5.7.2 Sightseeing Shack Improvements (Within Existing Footprint)

- **Replace Building**
- **Repair Building (Preferred Alternative)**

5.7.2.1 Transportation and Traffic

Construction of the Preferred Alternative would have overall beneficial impacts on Transportation and Traffic because it would improve the facility that houses FAA equipment. The project would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project and there would be no increase in vehicular traffic as a result of the project. There would be a negligible adverse short-term impact during construction and minor beneficial long-term impacts on Transportation and Traffic.

5.7.2.2 Wetlands and Wetland Buffer Zones

The Preferred Alternative for the Sightseeing Shack does not involve any work within wetlands. Work within the buffer zone will be limited to the installation of erosion control measures at the limit of work. There would be no impact on wetlands or buffer zones as a result of implementation of the Preferred Alternative for this project element.

5.7.2.3 Floodplain

While the Preferred Alternative will occur within the coastal floodplain (at or below elevation 10 feet), improvements to the Sightseeing Shack will not involve placement of fill materials or excavation within the floodplain. As a result, it will not impact the ability of the floodplain to store floodwaters or prevent flood damage during 100-year storm events. Therefore, implementation of the Preferred Alternative will have no short-term or long-term impacts on floodplain.

5.7.2.4 Coastal Dunes

The Preferred Alternative does not involve any work within coastal dunes. Erosion control measures will be installed prior to construction of the project to prevent impacts to adjacent resources. As a result, there would be no impact on coastal dunes.

5.7.2.5 Cultural Grasslands

The Preferred Alternative does not involve any work within significant Cultural Grasslands. Erosion control measures will be installed prior to construction of the project to prevent impacts to adjacent resources and there would be no impact on Cultural Grasslands.

5.7.2.6 Rare Species Habitat

The Preferred Alternative does not involve any work within rare species habitat. Erosion control measures will be installed prior to construction of the project and there would be no impact on rare species habitat.

5.7.2.7 Drainage / Stormwater Management

The project does not involve any changes to paved surfaces. Erosion control measures will be installed prior to construction of the project and, as a result, there would be no impact to drainage and stormwater management.

5.7.2.8 Visual Environment

The project would repair the existing building. The project would maintain the existing footprint and scale of the building. It would not be a new element in the visual environment. Therefore, there would be no impacts to the Visual Environment.

5.8 Access Road to MALSF Approach Lights

5.8.1 No Action

5.8.1.1 Transportation and Traffic

The No Action Alternative would have moderate adverse impacts on Transportation and Traffic in terms of Airport operations. FAA and airport vehicles would need to continue to back down the narrow access road. This could affect driver safety.

5.8.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction and wetlands would not be altered.

5.8.1.3 Floodplain

Under the No Action Alternative there would be no impacts to floodplain because there would no construction within flood zone elevations.

5.8.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction and coastal dune resources would not be altered.

5.8.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts because there would be no construction and cultural grassland would not be altered.

5.8.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts because construction would not take place adjacent to habitat used by listed species.

5.8.1.7 Drainage / Stormwater Management

The drainage system would not change under the No Action Alternative. There are no impacts to the drainage system associated with the No Action Alternative.

5.8.1.8 Visual Environment

There would be no change to the visual environment under the No Action Alternative. The No Action Alternative will not impact visual resources.

5.8.2 Construct Turn-Around (Preferred Alternative)

5.8.2.1 Transportation and Traffic

Construction of the Preferred Alternative would have a minor adverse short-term impact during construction and a moderate beneficial long-term impact on Transportation and Traffic in terms of Airport operations. The project would provide safety and operational improvements, such as ease of maintenance, but would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project.

5.8.2.2 Wetlands and Wetland Buffer Zones

Construction of a turn-around area for the existing access road to the MALSF approach lights will result in the unavoidable fill of 960 SF of BVW in Wetland C/J/FK. On-site restoration is proposed at a 2.4:1 ratio in Area B as shown in Section 7. Additional offsite mitigation associated with the previously approved implemented Hatches Harbor Project has allowed for restoration of similar wetland habitat within the CCNS at a greater than 10:1 ratio.

The Preferred Alternative will have a minor adverse short-term impact on wetlands. Proposed mitigation will compensate for the impacts so that there will be only negligible direct adverse long-term impacts to wetlands resources upon successful completion of all wetland mitigation with the potential for moderate long-term direct and indirect beneficial impacts to wetland resources. A Statement of Findings is provided in Section 9 to comply with NPS NEPA requirements.

5.8.2.3 Floodplain

While at least a portion of the project will occur at elevations below the 100-year floodplain (10 to 11 feet above mean sea level), the project is not anticipated to have any adverse effect on the flood storage capacity relative to the ability of the low-lying areas to temporarily retain and release coastal waters during and following a flooding event at the Airport or within the surrounding CCNS lands.

Flood storage capacity on-site will not be impaired with construction of the Preferred Alternative. The proposed projects will not displace flood waters nor will it minimize the area available for flood storage. Flood storage capacity will be compensated by the proposed wetland restoration upon successful mitigation. Mitigation associated with the Hatches Harbor Project that was previously implemented has resulted in increased flushing of the salt marsh and other tidally influenced freshwater wetlands, and has improved the attenuation of floodwaters following major storm events, while also allowing for restoration of similar floodplain habitat within the CCNS. Therefore, the Preferred Alternative will have a negligible adverse short-term impact on floodplain. Proposed mitigation will compensate for the impacts so that there will be a minor to

moderate long-term beneficial impact to floodplain. A Statement of Findings is provided in Section 9 to comply with NPS NEPA requirements.

5.8.2.4 Coastal Dunes

There are no coastal dunes within this project area and there would be no short- or long-term impacts to coastal dune resources.

5.8.2.5 Cultural Grasslands

A narrow band of Cultural Grasslands would be converted to pavement and gravel as the MASLF access road is extended from the end of Runway 25. However, there would be only negligible short-term adverse impacts with no long-term impact to this resource, as the remaining portions of the RW 25 End will be removed as part of the West End TW Improvements project and converted to Cultural Grasslands. There will be no net loss of Cultural Grasslands.

5.8.2.6 Rare Species Habitat

There will be no long-term impacts to rare species habitat with the implementation of the Preferred Alternative. Negligible short-term adverse impacts to Cultural Grasslands, which serve as potential habitat for Vesper Sparrow and Broom Crowberry, may occur during construction, and would be mitigated through construction timing, but there will be no long-term adverse impacts to rare species habitat as a result of implementing this project.

5.8.2.7 Drainage / Stormwater Management

The project involves the construction of a pervious gravel area and a minor amount of paved area. As such, there will be only negligible short-term and long-term adverse impacts to drainage and stormwater management with implementation of the Preferred Alternative.

5.8.2.8 Visual Environment

The project is a modification to an existing facility and would not be a new element in the visual environment. There would be no impact to the Visual Environment.

5.9 Service Access Roads to LES and AWOS

5.9.1 No Action

5.9.1.1 Transportation and Traffic

The No Action Alternative would have minor short term impacts and a moderate long-term adverse impact on Transportation and Traffic in terms of airport operations. FAA and airport vehicles would continue to access the LES and AWOS over coastal dunes. Vehicles may continue to become trapped in the sandy soils.

5.9.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction and wetlands would not be altered.

5.9.1.3 Floodplain

Under the No Action Alternative there would be no impacts to floodplain because there would no construction within flood zone elevations.

5.9.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dune, except for the current need to access the sites without an access road.

5.9.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts to Cultural Grasslands because there would be no construction within Cultural Grasslands.

5.9.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impact to rare species habitat because there would be no construction within resources used by listed species.

5.9.1.7 Drainage / Stormwater Management

The drainage system would not change under the No Action Alternative. There are no impacts to the drainage system associated with the No Action Alternative.

5.9.1.8 Visual Environment

There would be no change to the Visual Environment under the No Action Alternative because roads would not be constructed. The No Action Alternative will not impact visual resources.

5.9.2 Construct LES Option 2 / AWOS Option 2 (Preferred Alternative)

5.9.2.1 Transportation and Traffic

Construction of the Preferred Alternative would have a negligible adverse short-term and moderate beneficial long-term impact on Transportation and Traffic. The project would provide safety and operational improvements but would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project.

5.9.2.2 Wetlands and Wetland Buffer Zones

Construction of the Preferred Alternative for the LES road will not impact wetlands. Construction of the Preferred Alternative for the AWOS road will result in 290 SF of unavoidable impacts to Wetland H. Wetland restoration proposed in Restoration Area C will serve to mitigate for this impact.

The Preferred Alternative will have a negligible adverse short-term impact on wetlands during construction and no long-term impact with no net loss of wetland resources. Successful implementation of all proposed on-site mitigation and enhancement as well as the previously implemented off-site mitigation within Hatches Harbor will result in moderate long-term beneficial impacts to wetlands and wetland buffer zones. A Statement of Findings is provided in Section 9 to comply with NPS NEPA requirements.

5.9.2.3 Floodplain

While at least a portion of the project will occur at elevations below the 100-year floodplain (10 to 11 feet above mean sea level), the project is not anticipated to have any adverse affect on the flood storage capacity relative to the ability of the low-lying areas to temporarily retain and release coastal waters during and following a flooding event at the Airport or within the surrounding CCNS lands.

Flood storage capacity of ILSF on-site will not be impaired with construction of the Preferred Alternative. Flood storage capacity will be compensated by the proposed wetland restoration and the previously implemented Hatches Harbor Project. The proposed projects will not displace flood waters nor will they minimize the area available for flood storage because of the proposed wetland mitigation. Therefore, the Preferred Alternative will have a negligible adverse short-term impact on floodplain during construction. Proposed mitigation will compensate for the impacts so that there will be a moderate long-term beneficial impact to the coastal floodplain. A Statement of Findings is provided in Section 9 to comply with NPS NEPA requirements.

5.9.2.4 Coastal Dunes

Construction of the Preferred Alternatives for the two access roadways will result in alterations to coastal dunes. Approximately 7,610 SF of coastal dune will be impacted for construction of the access road to the LES, and approximately 10,560 SF for the AWOS access road. The existing dune in this area is relatively flat and in some cases unvegetated. Approximately 27,500 SF of dune creation is proposed adjacent to the freshwater wetland restoration areas (Restoration Areas A and C) as mitigation for this and other CIP projects with impacts to coastal dunes. The Preferred Alternative will have a minor adverse short-term impact. Long-term impacts within coastal dunes will be negligible adverse. Implementation of proposed invasive species management will have minor beneficial long-term impacts on this resource upon successful implementation of proposed wetland restoration and enhancement measures.

5.9.2.5 Cultural Grasslands

The Preferred Alternative does not involve any work within Cultural Grasslands and there would be no impact on Cultural Grasslands.

5.9.2.6 Rare Species Habitat

The Preferred Alternatives for the Service Access Road to the LES and to the AWOS will result in alterations to coastal dunes and a small portion of Wetland H.

Coastal dune alterations may have minor short-term impacts on the habitats for the Eastern Box Turtle and for non-breeding habitat of the Eastern Spadefoot Toad, particularly in the dune areas immediately south of Wetland B.

Removal of impervious pavement from the relocation of the East End TW provides an opportunity to mitigate for rare species habitat impacts through creation of additional grassland habitat, coastal dune, and wetland (See Section 7). Wetland enhancements through invasive species management may improve the ability of this area to provide suitable native habitat.

In order to avoid direct impacts to the Eastern Box Turtle, pre-construction “turtle sweeps” within the limit of work will be conducted as part of the Turtle Protection Plan discussed in Section 7. Construction will take place in accordance with NHESP agency avoidance dates in order to avoid the active period for noted rare animal species. As such, adverse impacts to rare species habitat will be minor for the short-term and negligible for the long-term because of the proposed mitigation measures.

5.9.2.7 Drainage / Stormwater Management

The project involves the construction of new paved and gravel surfaces. Following construction, stormwater runoff will continue to be managed with infiltration through sheet flow into the grass safety areas. Runoff will

have negligible contaminants because salt is not applied and engine repair does not take place in these locations.

Overall, the CIP projects will result in a net decrease in pavement at the Airport as shown in Table 5.2 at the end of this section. Accordingly, there would be negligible short term and no long-term adverse impacts to drainage and stormwater management and potentially a minor beneficial long-term impact.

5.9.2.8 Visual Environment

The project would provide service roads to existing facilities and would not be a significant new visual element. There would be no impact to the Visual Environment.

5.9.3 Construct LES Alternative 6 / AWOS Alternative 2

5.9.3.1 Transportation and Traffic

Construction of the LES-6/AWOS-2 Alternative would require an additional security gate and require the FAA vehicle to leave and enter the Airport twice to service the AWOS and the LES. The alignment would also add a new intersection with the CCNS bike path with the associated potential for safety conflicts. Therefore, there would be moderate adverse short-term and long-term impacts to Transportation and Traffic with this alternative.

5.9.3.2 Wetlands and Wetland Buffer Zones

Construction of the LES-6/AWOS-2 Alternative will result in 290 SF of unavoidable impacts to Wetland H. The LES-6/AWOS-2 Alternative will have a minor adverse short-term impact on wetlands. Wetland restoration proposed in Mitigation Areas A and C will serve to mitigate for this impact. As with the Preferred Alternative, successful implementation of all proposed on-site mitigation in conjunction with the off-site mitigation associated with the Hatches Harbor Project will result in moderate long-term beneficial impacts to wetlands and wetland buffer zones.

Proposed mitigation will compensate for the impacts so that there will be a negligible adverse long-term impact with no net loss of wetland resources, and the potential for moderate beneficial impacts to wetland resources in the long term when considering all proposed and previously implemented mitigation measures.

5.9.3.3 Floodplain

While at least a portion of the project will occur at elevations below the 100-year floodplain (10 to 11 feet above mean sea level), the project is not anticipated to have any adverse affect on the flood storage capacity relative to the ability of the low-lying areas to temporarily retain and release coastal waters during and following a major flooding event at the Airport or within the surrounding CCNS lands.

Flood storage capacity on-site will not be impaired with construction of the LES-6/AWOS-2 Alternative. Flood storage capacity will be compensated by the proposed wetland restoration. The proposed projects will not displace flood waters nor will they minimize the area available for flood storage because of the proposed wetland mitigation. As a result, the LES-6/AWOS-2 Alternative will have a negligible adverse short-term impact and no adverse long-term impact on floodplain. The previously implemented Hatches Harbor Project resulted in moderate long-term beneficial impacts to the coastal floodplain for both on-site and off-site areas of coastal floodplain within the CCNS.

5.9.3.4 Coastal Dunes

Construction of the LES-6/AWOS-2 Alternative for the two access roadways will result in alterations to coastal dunes. Approximately 7,610 SF of coastal dune will be impacted for construction of the access road to the LES, and approximately 10,560 SF for the AWOS access road. The existing dune in this area is relatively flat and in some cases unvegetated. Approximately 27,500 SF of dune creation is proposed adjacent to the proposed freshwater wetland restoration area within Mitigation Areas A and C as mitigation for this and other CIP projects with impacts to coastal dunes. The LES-6/AWOS-2 Alternative will have a minor adverse short-term impact and negligible adverse long-term impact on coastal dunes because of proposed mitigation. Implementation of the proposed invasive species management program would have minor beneficial long-term impacts on this coastal resource upon successful implementation of proposed mitigation.

5.9.3.5 Cultural Grasslands

The LES-6/AWOS-2 Alternative does not involve any work within Cultural Grasslands. There will be no impact on Cultural Grasslands.

5.9.3.6 Rare Species Habitat

The LES-6/AWOS-2 Alternative for the Service Access Road to the LES and to the AWOS will result in alterations to coastal dunes and a small portion of Wetland H.

Coastal dune alterations may have minor long-term adverse impacts on the habitats for the Eastern Box Turtle and for non-breeding habitat of the Eastern Spadefoot Toad, particularly in the dune areas immediately south of Wetland B.

Removal of impervious pavement from the relocation of the East End TW provides an opportunity to mitigate for rare species habitat impacts through creation of additional grassland habitat, coastal dune and wetland (See Section 7). Wetland enhancements through invasive species management would improve the ability of this area to provide suitable native habitat.

As with the Preferred Alternative, pre-construction “turtle sweeps” within the limit of work will be conducted in order to avoid direct impacts to the Eastern Box Turtle as discussed in Section 7. Construction will take place in accordance with NHESP agency avoidance dates in order to avoid the active period for all rare animal species identified on-site. As such, adverse impacts to rare species habitat will be minor for the short-term and negligible for the long-term because of the proposed mitigation measures.

5.9.3.7 Drainage / Stormwater Management

The LES-6/AWOS-2 Alternative involves construction of new paved surfaces. This alternative would result in less pavement area than under the Preferred Alternative, but the logistical, security, and safety issues somewhat outweigh this benefit since there will be an overall net reduction in pavement at the Airport as a result of implementing all safety and security CIP projects. Following construction, stormwater runoff will be managed by allowing for infiltration through sheet flow into the grass areas adjacent to the pavement. Runoff from the Airport’s runways, taxiways, and service roadways has negligible contaminants because salt is not applied and engine repair does not take place in these locations.

Overall, the CIP projects will result in a net decrease in pavement at the Airport, as shown in Table 5.2 and Figure 5.2 at the end of this section. There would be negligible short term and no long-term adverse impacts to drainage and stormwater management.

5.9.3.8 Visual Environment

The LES-6/AWOS-2 Alternative would provide a service road to existing facilities directly from Race Point Road across the bike path and would introduce a new visual element. This would constitute a negligible adverse impact to the Visual Environment.

5.10 Perimeter Safety and Security Fence

5.10.1 No Action

5.10.1.1 Transportation and Traffic

The No Action Alternative would have a moderate adverse long-term impact on Transportation and Traffic in terms of Airport operations. Scheduled flights might be delayed to clear the runway of wildlife. Incidents of deer strikes would not be reduced. Recreational hikers and hunters will continue to access the airfield.

5.10.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetland resources since there would be no construction within wetlands. Vegetation within wetlands would not be cut and fence posts would not be installed.

5.10.1.3 Floodplain

Under the No Action Alternative, there would be no impacts to Floodplain because there would be no alteration of flood zone elevations.

5.10.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction and coastal dunes would not be altered for the project.

5.10.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts because there would be no construction adjacent to Cultural Grassland.

5.10.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts to rare species habitat because there would be no construction within resources used by listed species.

5.10.1.7 Drainage / Stormwater Management

Under the No Action Alternative, there would be no impacts to drainage because there would be no construction.

5.10.1.8 Visual Environment

Under the No Action Alternative, there would be no additional fence, and therefore no impacts to the Visual Environment.

5.10.2 Construct Fence Concept 6 (Preferred Alternative)

5.10.2.1 Transportation and Traffic

Construction of the Preferred Alternative would have a moderate beneficial impact on Transportation and Traffic in terms of Airport operations. The fence project would provide safety and operational improvements as discussed in Section 2.2 but would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project. There would be no increase in vehicular traffic as a result of the project. The project will have a moderate beneficial long-term impact on Transportation and Traffic..

5.10.2.2 Wetlands and Wetland Buffer Zones

Installation of the perimeter safety/security fence would result in alterations to freshwater wetlands, both isolated wetlands (IVW) and bordering vegetated wetlands (BVW). For the Preferred Alternative, the type of impact has been further refined to distinguish between direct (permanent) and indirect (secondary) impacts as introduced in Section 5.1.1. The direct impacts to BVW and IVW for Concept 6 are based on one square foot of impact per fence post, with fence posts occurring every 10 feet, and also include the area of wetland vegetation community that is significantly altered for vegetation management. For example, converting an area of IVW or BVW to pavement, grassland, or a fence post location would be a direct impact. Additionally, vegetation management within BVW and IVW along the fence alignment that converts a forested BVW or IVW wetland to a low growing vegetation community would also be a direct impact. Cutting an area of *Phragmites* has not been included as an impact. To minimize impacts from constructing foundations for the posts, some posts will be driven to avoid the need for a footing as shown in a detail on Figure 6.7. To minimize impacts from vegetation management, the width of the clear area on both sides of the fence is 4 feet rather than the typically-required 10 feet on either side. Construction of the fence will result in approximately 1,152 SF of direct impacts to BVW. Approximately 25,648 SF of direct impacts to IVW would occur for the installation of fence posts and vegetation management. Mitigation Area B will mitigate for direct impacts to BVW, while providing BVW restoration for the direct fence impacts. In addition, previously implemented measures from the Hatches Harbor Project will contribute to the overall mitigation, compensating for impacts associated with this CIP projects. Mitigation Areas A and C will provide mitigation for the direct impacts to IVW. Additional mitigation for indirect impacts will be provided as on-site wetland enhancement, intended to enhance or restore some of the lost functions and values within freshwater wetlands that have deteriorated over time due to the presence of *Phragmites australis*, an invasive species in Massachusetts.

Indirect impacts would result from vegetation maintenance along the fence that would not significantly change the vegetation community within the wetland or its functions and values. For example, maintaining the vegetation within a scrub wetland with shorter shrubs would be an indirect impact. Proposed vegetation management will be similar to current practices as discussed in Section 7. The preferred fence alignment has been located strategically to eliminate the need for interior patrol roads by siting the fence immediately north of the existing parallel taxiway and within existing maintained areas where feasible to the south (i.e., along the tree line) to further reduce impacts to natural resources. Trees would be cut but the stumps and roots would not be grubbed. Smaller shrubs would be cut individually or a brush hog would be used. Groundcover would not be disturbed. A width of approximately 4 feet on either side of the fence (i.e., eight feet total width) would be managed to allow for maintenance and inspection. Indirect (secondary) impacts to IVW are currently estimated to be approximately 3,952 SF, and to BVW, 8,972 SF.

Vegetation management will be conducted once every two to three years and will only occur within an eight-foot wide corridor along the fence, where necessary. Certain areas within bordering and isolated wetlands are open with low-growing vegetation and little to no shrub or tree canopy. Vegetation management within these portions of wetland would be minimal due to existing conditions. As such, vegetation maintenance will not alter the vegetation composition and distribution or general functions of many of the wetlands within the fence footprint. In areas where the fence will traverse scrub-shrub or forested wetlands, vegetation will be maintained once every two to three years and will be cut (not removed) to the height of low-growing shrubs to allow for periodic maintenance of the fence and a clear line of sight along the fence. While vegetation management within these areas may result in a long-term transition from a forested wetland to a low-growing shrub wetland, these areas are anticipated to maintain many of their functions and values and will remain as wetlands.

The Preferred Alternative for the Safety/Security Fence will have moderate short-term and minor long-term impact on wetlands. Long-term direct impacts associated with the fence posts are anticipated to have negligible impacts on the wetland areas. The long-term presence of an chain-link fence and the long-term management of the vegetation communities within the eight-foot maintenance corridor would vary, depending upon the intensity of the management required, ranging from minor long-term impacts within open emergent marshes to moderate impacts to the scrub shrub and forested communities. Anticipated impacts to the functions and values of these managed wetlands would include changes to the species composition and the habitat provided to local wildlife populations, although given the relatively narrow footprint of the maintenance area, and considering the vast extent of these habitats in the vicinity of the Airport, these changes are anticipated to be negligible for the long-term. Impacts to the hydrologic regime are not anticipated. Proposed on-site mitigation will compensate for the proposed impacts so that there will be only minor adverse long-term impacts with no net loss of wetland resources on-site. Off-site mitigation associated with the Hatches Harbor Project has resulted in moderate long-term direct and indirect beneficial impacts to wetland resources within the Park.

5.10.2.3 Floodplain

While at least a portion of the fence project will occur at elevations below the 100-year floodplain, the project is not anticipated to have any adverse affect on the flood storage capacity relative to the ability of the low-lying areas to temporarily retain and release coastal waters during and following a flooding event at the Airport or within the surrounding CCNS lands.

Flood storage capacity on-site will not be impaired with construction of the Preferred Alternative. Flood storage capacity will be compensated by the proposed wetland restoration upon successful restoration of on-site low-lying wetland areas within the coastal floodzone with additional beneficial mitigation provided by the Hatches Harbor Project. The proposed project will not displace flood waters nor will it minimize the area available for flood storage because of the proposed wetland mitigation. The Preferred Alternative will have a negligible adverse short-term impact on floodplain within the Park. Proposed mitigation will offset the impacts so that there will be moderate long-term beneficial impacts to the coastal floodplain upon successful implementation of mitigation. A Statement of Findings is provided in Section 9 to comply with NPS NEPA requirements.

5.10.2.4 Coastal Dunes

Installation of the perimeter safety/security fence would result in direct and indirect alterations to coastal dune. Direct impacts (8,060 SF) are based on one square foot of impact per fence post to be installed at 10-foot intervals and vegetation management that significantly changes the vegetation cover. Indirect impacts to the vegetation and topography of the dune will occur within the footprint of the four-foot wide maintenance areas on either side of the fence (eight feet wide total), and would involve tree or limb removal and pruning or brush hogging of shrubs to maintain clear areas on either side of the fence. The resultant plant community within the managed areas of coastal dunes will be a grassy or low-growing shrub community, and vegetation removal is not anticipated to result in long-term impairment or destruction of these coastal dunes. Construction of the fence will result in approximately 8,060 SF of direct impacts and 24,028 SF of indirect impacts to coastal dune. Construction of patrol roads is not proposed and no changes in the existing topography within the coastal dune are proposed. The fence will consist of a vinyl coated chain-link fabric with 2-inch mesh openings. It is not anticipated to have any adverse impacts on aeolian processes, particularly since the proposed fence is not the typical design intended for dune creation/stabilization (e.g., snow fencing). In addition, the majority of the fence is proposed among stable secondary dunes where wind-borne sands are less likely to shift and alter the topographic relief over time.

The installation of a safety/security fence may have a moderate effect on the ability of the coastal dune to provide wildlife habitat for some species. Impacts to wildlife habitat and wildlife corridors have been minimized by locating the fence as close as allowable to the airfield without becoming an airspace hazard. The standard chain link fence fabric has openings that will allow for the passage of some wildlife, such as small mammals, amphibians, and some reptiles. In addition, gaps are proposed along sections of the fence in order to reduce obstructions to passage for slightly larger animals, including Eastern Box Turtles and the Eastern Spadefoot Toad. Extensive habitat analyses have been conducted for the Eastern Spadefoot Toad in conjunction with Brad Timm, Ph.D., at the direction of NHESP to identify potential and prime habitat so that the fence design would avoid these areas. Since most fence posts will be driven, land disturbance impacts to coastal dune (i.e., Eastern Spadefoot non-breeding habitat) are anticipated to be minimal, since excavation will not be involved. In addition, vegetation maintenance involves cutting and not the removal of entire plants, so the composition of sediments and root structures will not be altered and should not impair burrowing areas for the Eastern Spadefoot Toad. Therefore, adverse impacts to rare species habitat would be minor for the short-term and negligible for the long-term because of the proposed mitigation measures. While the fence will partially enclose approximately 113 acres at the Airport, it is important to note that the area within the fence consists of airport infrastructure (paved runway and taxiways, buildings, parking areas, navigational aids, and managed safety areas). The purpose of installing the fence is to restrict large animals, such as deer and coyote, as well as non-authorized personnel from the Airport operation areas. The design mitigation measures and construction timing and phasing mitigation measures will mitigate adverse impacts to resources and the species that use these resources.

5.10.2.5 Cultural Grasslands

The Preferred Alternative does not involve any work within Cultural Grasslands. There will be no impact on Cultural Grasslands.

5.10.2.6 Rare Species Habitat

Installation of a Perimeter Safety/Security Fence has been designed to minimize direct and indirect alterations to potential rare species habitat for the Eastern Box Turtle and the Eastern Spadefoot Toad. No direct impacts

will occur within the currently identified population of the Broom Crowberry. As the Preferred Alternative for the fence is not proposed to occur within managed grassland habitat, no direct impacts to Vesper Sparrow nesting habitat are anticipated.

All construction activities are proposed during the Airport's "off-season" (after Labor Day and before Memorial Day) to minimize disruptions to Airport operations as well as to avoid construction during peak wildlife activity. Rare species, such as the Eastern Box Turtle and Eastern Spadefoot Toad, are most active from mid-April to late October. As such, the installation of the fence would occur outside of these timeframes to avoid peak activity periods of these species. Incorporation of gaps in the bottom of the fence at regular intervals will minimize long-term adverse impacts due to obstruction of wildlife movement, including for Eastern Box Turtles, other reptiles or amphibians, and small mammals during more active wildlife periods, once the fence has been installed. All vegetation management will take place in the winter months (e.g., after mid-late November) when the state-listed species are not active.

As noted above, the revised fence alignment will be placed in a location that will allow for the minimization of wildlife corridor disruption, and has been located to specifically avoid direct impacts to prime Eastern Spadefoot Toad breeding habitat to the extent practicable. The installation of the safety/security fence, as currently proposed, is designed to minimize impacts to rare species habitat to the extent practicable while meeting FAA, TSA, and MassDOT safety and security mandates. Therefore, adverse impacts to rare species will be minor for the short-term and negligible for the long-term because of the proposed mitigation measures.

5.10.2.7 Drainage / Stormwater Management

The project does not involve any changes to paved surfaces. Therefore, there will be no impact to drainage and stormwater management.

5.10.2.8 Visual Environment

There are some existing segments of safety/security fencing at the Airport and one section adjacent to the bike path is shown in Photo 5-2. The new sections of fencing will be within the vicinity of the managed airfield which minimizes the effect on the various viewer groups. Additionally, the fence will be black coated vinyl to minimize the visual impact. It is expected that the fence will have a minor adverse impact on the visual experience of visitors to the CCNS and will not impair the values of the Park.

Photo 5-2 Safety Security Fence. View of existing section between bike path and Runway 25 safety area.

5.10.3 Construct Fence Concept 4

5.10.3.1 Transportation and Traffic

Construction of the Fence Concept 4 Alternative would have a moderate beneficial impact on Transportation and Traffic. The project would provide safety and operational improvements but would not result in an increase in capacity of the airport. Additional flights and additional passenger enplanements would not occur as a result of the project. There would be no increase in vehicular traffic as a result of the project and a moderate beneficial impact on Transportation and Traffic.

5.10.3.2 Wetlands and Wetland Buffer Zones

Concept 4 was developed to avoid impacts to wetland areas and was located along the dune ridge to the north of the airfield, and along the base of the dune ridge to the south.

The Concept 4 alignment would impact approximately 530 SF (direct) and 47,572 SF (indirect) of BVW. The concept would impact approximately 60 SF (direct) and 5,274 SF (indirect) of IVW on the southern side of the Airport. Wetland impacts have been minimized by locating the fence outside of wetland areas to the extent possible, and by reducing the width for vegetation clearing to 4 feet.

On the northern side, the fence would avoid Wetland C and part of Wetland C/J/FK (BVW). On the south side, the alignment avoids Wetland L, K, and the series of smaller isolated wetlands within this area. This alternative significantly reduces impacts to isolated wetlands on both the north and south sides while maintaining the minimum offset for the primary surface clear zone along the runway. There would be a moderate adverse direct impact to wetlands with this concept. Proposed mitigation, as discussed above with the Preferred Alternative would off-set some of the wetland impacts.

5.10.3.3 Floodplain

The Concept 4 fence alignment has the potential to impact tidal flow and flood storage capacity since the fence is in the vicinity of the ILS and may impede normal tidal flow and flooding during storm events. As a result, there would be a moderate adverse long-term impact to floodplain.

5.10.1.4 Coastal Dunes

Impacts to the coastal dunes would be minimized by following, as much as possible, the base of the dunes rather than maintaining a straight alignment that would go over the tops of the dunes. This Concept would impact 960 SF (direct) and 56,575 SF (indirect) of coastal dune. Therefore, there would be a minor short-term and negligible long-term adverse impact to coastal dunes.

5.10.3.5 Cultural Grasslands

Concept 4 does not involve any work within Cultural Grasslands. There will be no impact on Cultural Grasslands.

5.10.3.6 Rare Species Habitat

Concept 4 would enclose approximately 200 acres. This proposed alignment would result in habitat fragmentation on the north and south sides of the Airport, bisecting the large concentration of IVW and BVW on the northern portion of the Airport from the expansive adjacent upland areas of coastal dune seaward of the Airport. Habitat fragmentation on the south side of the Airport would be similar, although to a lesser degree, as not all of the wetland areas south of the Airport within the lease area would be isolated from the upland dune habitat. Results of the field surveys specifically intended to identify and assess breeding and non-breeding habitat for the Eastern Spadefoot Toad, indicate that the placement of the fence along the base of the dune ridge south of the Airport would likely interfere with Spadefoot migrations to the area of prime breeding habitat associated with Wetland K, as well as bisecting clusters of semi-permanent wetlands from the adjoining upland habitat, and would likely result in a “take” of this species as defined under the MESA regulations. While low wildlife tunnels would be incorporated into this fence design as well, this alternative would have a moderate short term and minor long term adverse impact on rare species habitat.

5.10.3.7 Drainage / Stormwater Management

The project does not involve any changes to paved surfaces or change in drainage patterns and there will be no impact to drainage and stormwater management.

5.10.3.8 Visual Environment

Visual impacts would be minimized because the fence would follow the lower elevations and blend in with vegetated areas, but the impacts would not be eliminated. As such, there would be a moderate adverse impact to the Visual Environment.

5.10.4 Construct Fence Concept 1

5.10.4.1 Transportation and Traffic

Construction of Fence Concept 1 would have moderate short-term and long-term beneficial impact on Transportation and Traffic. The project would provide safety and operational improvements but would not result in an increase in capacity of the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project.

5.10.4.2 Wetlands and Wetland Buffer Zones

The alignment would impact approximately 450 SF (direct) and 17,136 SF (indirect) of BVW. There would be 230 SF (direct) and 31,374 SF (indirect) impacts to isolated wetlands. Wetlands and wetland buffer zones are identified on Figures 4.4 and 4.5 in Section 4.

There would be moderate adverse short-term and minor long-term impacts to Wetlands and Wetland Buffer Zones, which would be off-set somewhat by the proposed mitigation, although to a lesser degree than with the Preferred Alternative for the fence project.

5.10.4.3 Floodplain

The Lease line Concept 1 fence alignment has the potential to impact tidal flow and flood storage capacity since the presence of a fence in the vicinity of the ILS may impede normal tidal flow and flooding during storm events. Therefore, this alternative would have a moderate short-term and moderate long-term adverse impact on the coastal floodplain.

5.10.4.4 Coastal Dunes

This concept would impact 1,440 SF (direct) and 200,872 SF (indirect) of coastal dune. The fence would maintain the alignment over the coastal dunes, regardless of topography. As discussed in Section 4, the northern dunes are less stable and more dynamic than the southern dunes, which have been stabilized by the established vegetation that includes trees and shrubs in addition to herbaceous species. Therefore, there would potentially be moderate short-term and minor long-term adverse impacts, particularly to coastal dunes to the north of the Airport, while long-term maintenance may adversely impact some of the more stable dunes to the south once larger trees or established shrubs are cut.

5.10.4.5 Cultural Grasslands

Concept 1 does not involve any work within Cultural Grasslands. There will be no impact on Cultural Grasslands.

5.10.4.6 Rare Species Habitat

Concept 1 would impact potential habitat for rare species. The location of known and potential rare species habitat is discussed in Section 4. Concept 1 would enclose nearly the entire 322 acres of the lease area and impact potential habitat for rare species. This proposed alignment would result in habitat fragmentation on the north and south sides of the Airport, bisecting the large concentration of IVW and BVW on the northern portion of the Airport from the seaward expanse of adjacent upland areas of coastal dune. Habitat fragmentation on the south side of the Airport would be similar, although to a lesser degree, as not all of the wetland areas south of the Airport within the lease area would be isolated from the upland dune habitat. Concept 1 fence alignment would directly impact the significant wetlands identified as prime Spadefoot Toad breeding habitat (Wetlands K and L), it is likely that this alignment would result in a “take” of rare species habitat, similar to Concept 4. Small wildlife gaps will be incorporated into the bottom of the fence in order to lessen the potential impacts to Eastern Box Turtle movements between habitat areas. Therefore, this alternative would have a moderate short-term and minor long-term adverse impact on rare species habitat.

5.10.4.7 Drainage / Stormwater Management

The project does not involve any changes to paved surfaces or changes in the drainage patterns. There will be no impact to drainage and stormwater management.

5.10.4.8 Visual Environment

The Concept 1 fence alignment constitutes a new visual element. Along the northern side, the fence would likely be viewed as an incompatible element in the natural environment because of the open unvegetated areas and the expectations of the viewer groups. On the southern side of the site, the fence would be within a vegetated area without long open views. This alternative would have a moderate short-term and long-term adverse impact on the Visual Environment.

5.11 Auto Parking

5.11.1 No Action

5.11.1.1 Transportation and Traffic

The No Action Alternative would have a moderate adverse impact on Transportation and Traffic because additional parking would not be constructed. During occasional peak periods, cars would continue to park along Airport Drive and idle waiting for a parking space.

5.11.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative, the project would not be built and there would be no impacts to adjacent wetlands.

5.11.1.3 Floodplain

Under the No Action Alternative, the project would not be built and there would be no impacts to Floodplain.

5.11.1.4 Coastal Dunes

Under the No Action Alternative, the project would not be built and there would be no impacts to coastal dunes.

5.11.1.5 Cultural Grasslands

Under the No Action Alternative, the project would not be built and there would be no impacts to adjacent Cultural Grasslands.

5.11.1.6 Rare Species Habitat

Under the No Action Alternative, the project would not be built and there would be no impacts to rare species habitat.

5.11.1.7 Drainage / Stormwater Management

Under the No Action Alternative, the project would not be built and there would be no improvements to the drainage. Therefore, there would be a negligible adverse impact on drainage.

5.11.1.8 Visual Environment

Under the No Action Alternative, the additional parking area would not be built and there would be no impacts to the Visual Environment.

5.11.2 Construct Concept 4 Auto Parking (Preferred Alternative)

5.11.2.1 Transportation and Traffic

Concept 4 would construct 28 additional spaces for Phase 1 (for a total of 90 spaces). Only after additional parking studies have been carried out and reviewed and approved by NPS and CCC, would Phase 2 be constructed with 29 additional spaces, for a Phase 1 and 2 total of 119 spaces.

No impacts to pedestrian or bicycle movement are anticipated with this project. During construction, signage and fencing will separate the work area.

The project would address existing demand for parking and is not intended to attract more passengers. TDM measures such as taxicab sharing and on-call shuttle bus service are in place and would be improved upon if feasible. Therefore, there would be no increase in vehicular traffic as a result of the project and there would be a moderate beneficial long-term impact on Transportation and Traffic.

5.11.2.2 Wetlands and Wetland Buffer Zones

The Preferred Alternative for the parking lot expansion will not directly impact wetlands but would have unavoidable impacts to Buffer Zone of approximately 3,900 SF for Phase 1, and 1,900 SF for Phase 2 (for a total of 5,800 SF of Buffer Zone impacts) following the completion of both parking lot phases. Given that the existing parking lot is situated between two wetland areas (Wetland A and Wetland C), there is no location that would avoid alterations within the Buffer Zone while still addressing the project purpose. Installation of erosion and sedimentation controls prior to construction is designed to protect the adjacent wetland resources during earth moving activities and until all sediments are stabilized. Therefore, there would be negligible adverse short-term and no long-term impacts to wetland buffer resources associated with the proposed parking lot expansion.

5.11.2.3 Floodplain

The Preferred Alternative will not alter the ability of the flood zone to attenuate stormwater and to provide flood damage protection. As such, there will be negligible short-term and no long-term impacts on floodplain.

5.11.2.4 Coastal Dunes

Construction of the Preferred Alternative for the expansion of the Auto Parking lot would directly impact approximately 7,315 SF of coastal dune for Phase 1. Upon approval to construct Phase 2, an additional 5,707 SF of coastal dune would be altered. The total impact from the two phases would be approximately 13,022 SF of coastal dune. Coastal dune creation will occur within the pavement removal area within Mitigation Areas A and C as described in Section 7. Management of invasive species within other existing coastal dune habitat is also proposed. The Preferred Alternative for the parking lot expansion would have a minor adverse short-term and negligible long-term impact on coastal dunes upon successful implementation of the proposed mitigation measures.

5.11.2.5 Cultural Grasslands

The Preferred Alternative does not involve any work within Cultural Grasslands. There would be a no impact on Cultural Grasslands.

5.11.2.6 Rare Species Habitat

The Preferred Alternative for the improvements to the auto parking lot will result in impacts to coastal dune in an area adjacent to the existing lot. This may impact Eastern Box Turtle habitat. Based upon recently conducted habitat assessments for the Eastern Spadefoot Toad, this area may provide some non-breeding habitat for this species, although more ideal upland habitat for burrowing and foraging activities is located to the southeast near Wetland B and the bike path, as well as to the west along the north and south sides of the airfield.

This area of coastal dune is adjacent to Race Point Road and the intersection with the Airport entrance. Impacts to this area of coastal dune may have minimal impacts to wildlife and rare species habitat given the location. In order to avoid direct impacts to Eastern Box Turtle, pre-construction "turtle sweeps" within the limit of work will be conducted as part of the Turtle Protection Plan discussed in Section 7. Adverse impacts to rare species will be minor for the short-term and negligible for the long-term because of the proposed mitigation measures, including construction timing.

5.11.2.7 Drainage / Stormwater Management

Construction of Phase 1 will result in 2,835 SF of additional pavement for the aisle. The parking spaces will be gravel. Currently, runoff from the paved aisles flows to the unpaved median and gravel parking spaces and infiltrates into the soil. Additional areas of infiltration swales would be constructed for Phase 1.

Phase 2 would result in an approximate 2,803 SF net increase in impervious area. The additional parking spaces will be gravel and only the driveway and aisles will be paved. The net increase in impervious surface from the 2 phases is 5,638 SF. Stormwater BMPs are proposed, as discussed below.

Bioretention was selected as the treatment system for Phase 2 of the auto parking area because it has been shown to effectively remove high levels of the typical pollutants associated with parking areas runoff, and because it also promotes infiltration after treatment to support groundwater recharge objectives.

Grass filter strips will be located between paved areas and the bioretention systems to provide pre-treatment prior to the bioretention system. These grass filter strips provide some removal of sediment and other pollutants prior to treatment and help extend the design life of the bioretention system and reduce overall maintenance requirements.

The bioretention area and infiltration swales proposed for Phase 2 of the auto parking area will provide recharge to groundwater and water quality treatment The bioretention system is a soil filter that incorporates a shallow landscaped depression to filter stormwater runoff before either infiltrating to groundwater or sheet flowing to an adjacent wetland. The bioretention area will be sized to treat, store, and partially infiltrate the 1-inch storm event. A schematic of a bioretention system is provided on Figure 5.1.

Overall, the CIP projects will result in a net decrease in pavement at the Airport as shown in Table 5.2 at the end of this section. There will be moderate beneficial long-term impact to drainage and stormwater management.

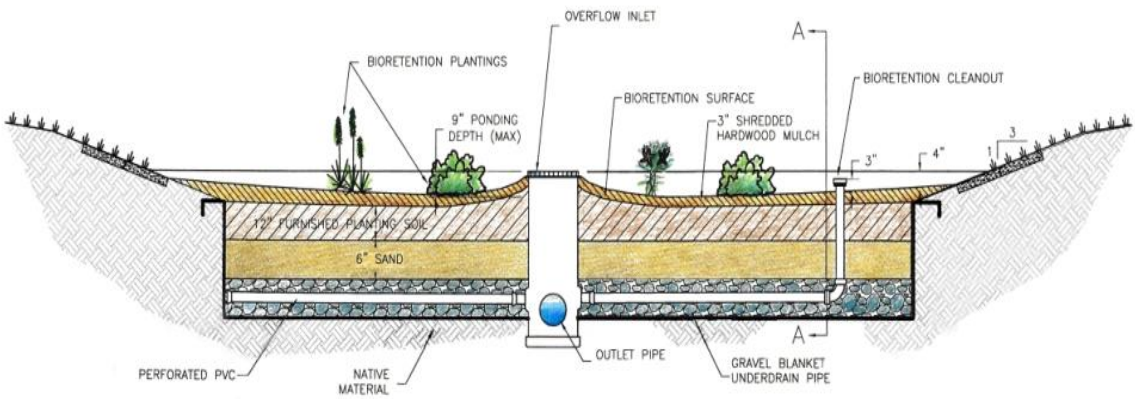


Figure 5.1 Schematic of a Bioretention System for Phase 2**.**	(Horsley Witten Group with permission)

5.11.2.8 Visual Environment

The existing parking area at the Airport is visible from the Race Point Beach parking lot and the bike path as shown in photos in Section 4. The new area of parking will be adjacent to the existing parking area and Airport Drive. There are two NPS parking areas visible from Race Point Road, the Visitors Center parking lot and the Race Point Beach parking lot. A landscaping buffer is proposed, which will screen the effect on the various viewer groups. Figure 5.3 shows a photo of the existing Airport parking lot, looking from the bike path between the Airport access road and the Race Point Beach parking lot. Figure 5.4 shows an example of a photo simulation of the Phase I and Phase 2 parking areas (along with the proposed Terminal building discussed in Section 5.12.2), showing how visual impacts can be evaluated with various landscape layouts and designs. Therefore, it is expected that both Phase 1 and Phase 2 parking area will have a minor short-term adverse and negligible adverse long-term impact on the visual experience of visitors to the CCNS or users of the Airport.

Photo 5-3 Existing view of Airport parking lot from bike path.

Photo 5-4 Photo Simulation Example Showing Visual Impact Assessment (Proposed auto parking lot and proposed terminal building discussed in Section 5.12 with a vegetation barrier)

5.11.3 Construct Concept 1 Auto Parking

5.11.3.1 Transportation

Concept 1 would construct 57 additional spaces. A parking control gate had been included in this option for the NPC/Draft EA/EIR, but additional evaluation of the cost for staffing and equipment has indicated that it would be cost prohibitive.

No impacts to pedestrian or bicycle movement are anticipated with this project. During construction, signage and fencing will separate the work area.

The project would address existing demand for parking and projected future long-term parking needs. TDM measures such as taxicab sharing and on-call shuttle bus service are in place and would be improved upon if feasible. Therefore there would be a moderate beneficial impact on Transportation.

5.11.3.2 Wetlands and Wetland Buffer Zones

This concept was identified as the preferred alternative in the NPC/Draft EA/EIR. Concept 1 would impact 4,650 SF of IVW. Therefore, this alternative would be deemed to have a moderate short-term and minor long-term adverse impact to wetlands. Impacts to wetlands would be offset by proposed mitigation measures. However, in the comment letter on the NPC/Draft EIR/EA, DEP SERO indicated that this project would require a Variance from the Water Quality Certification (WQC) because the wetland areas at the Airport are all Outstanding Resource Waters (ORWs), and this project would not qualify for a Variance from the WQC regulations since it is not a safety or security project.

5.11.3.3 Floodplain

Concept 1 would impact floodplain, as construction would impact wetlands. As such, there would be a negligible adverse short-term and no long-term impact with proposed mitigation.

5.11.3.4 Coastal Dunes

Concept 1 would impact at least 11,500 SF of coastal dunes. This would have a minor long-term and short-term adverse impact on coastal dune resources.

5.11.3.5 Cultural Grasslands

Concept 1 does not involve any work within Cultural Grasslands. Therefore, there would be no impact on Cultural Grasslands.

5.11.3.6 Rare Species Habitat

Concept 1 for the improvements to the auto parking lot will result in impacts to coastal dune in an area adjacent to the existing lot. This may impact Eastern Box Turtle habitat. Based upon habitat assessments for the Eastern Spadefoot Toad, this area may provide some non-breeding habitat for this species, although more ideal upland habitat for burrowing and foraging activities is located to the southeast near Wetland B and the bike path, as well as to the west along the north and south sides of the airfield.

This area of coastal dune is adjacent to Race Point Road and the intersection with the Airport entrance. Impacts to this area of coastal dune may have minimal impacts to wildlife and rare species habitat given the location. In

order to avoid direct impacts to the Eastern Box Turtle, pre-construction "turtle sweeps" within the limit of work will be conducted as part of the Turtle Protection Plan discussed in Section 7. Therefore, adverse impacts to rare species would be minor for the short-term and negligible for the long-term because of the proposed mitigation measures.

5.11.3.7 Drainage / Stormwater Management

Construction of Concept 1 would result in additional pavement for the aisle. The parking spaces will be gravel. Currently, runoff from the paved aisles flows to the unpaved median and gravel parking spaces and infiltrates into the soil. Additional areas of infiltration swales would be constructed.

Overall, the CIP projects will result in a net decrease in pavement at the Airport as shown in Table 5-2 and Figure 5.2 at the end of this section. There would be a negligible adverse short-term and negligible beneficial long-term impact to drainage.

5.11.3.8 Visual Environment

There is an existing parking area at the Airport which is visible from the Race Point Beach parking lot and the bike path as shown in photos in Section 4. The new area of parking will be adjacent to the existing parking area and closer to Airport Drive. Landscaping is proposed, which will screen the effect on the various viewer groups. Therefore, there would be a negligible long-term adverse impact to the visual environment.

5.12 Terminal Building Expansion

5.12.1 No Acton

5.12.1.1 Transportation and Traffic

The No Action Alternative would have moderate adverse impacts on Transportation and Traffic because there would be no replacement of passenger space. The No Action Alternative would not address the inefficient and cramped conditions for the commercial airline passengers and general aviation pilots.

5.12.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction in or adjacent to wetlands and no potential for indirect impacts to adjacent wetlands.

5.12.1.3 Floodplain

Under the No Action Alternative there would be no impacts because there would be no construction in flood zone elevations and therefore no impacts to floodplain.

5.12.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction.

5.12.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts because there would be no construction in or adjacent to Cultural Grasslands.

5.12.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts because construction would not take place in or adjacent to habitat used by listed species.

5.12.1.7 Drainage / Stormwater Management

Under the No Action Alternative, the drainage system would not change and there would be no impacts to stormwater management.

5.12.1.8 Visual Environment

Under the No Action Alternative there would be no impacts to the visual environment because there would be no construction and the appearance of the building would not change.

5.12.2 Construct Vertical (Within Existing Footprint)

5.12.2.1 Transportation and Traffic

Construction of the Preferred Alternative would have a moderate short-term and long-term beneficial impact on Transportation. The project would replace non-secure passenger area lost to TSA security operations but would not result in an increase in operations at the Airport and would not require the relocation of other operations at the airfield. Additional flights and additional passenger enplanements would not occur as a result of the project.

Consequently there would be a moderate short-term and long-term beneficial impact on Transportation and Traffic.

5.12.2.2 Wetlands and Wetland Buffer Zones

The Preferred Alternative does not involve any work within wetlands. There would be no impact on wetlands.

5.12.2.3 Floodplain

The Preferred Alternative ~~will~~ would result in additional terminal space without a change in the existing building footprint within the floodplain, and therefore no impact on floodplain.

5.12.2.4 Coastal Dunes

The Preferred Alternative does not involve any work within coastal dunes. There would be no impact on coastal dunes.

5.12.2.5 Cultural Grasslands

The Preferred Alternative does not involve any work within or near Cultural Grasslands. There will be no impacts to Cultural Grasslands.

5.12.2.6 Rare Species Habitat

The Preferred Alternative does not involve any work within rare species habitat. Therefore, there would be no impact on rare species habitat.

5.12.2.7 Drainage / Stormwater Management

The Preferred Alternative does not involve any change to the drainage system. Therefore, there would be no impact on drainage or stormwater management.

5.12.2.8 Visual Environment

The preferred alternative would add a second floor to the building which would be visible from the Race Pont Beach parking lot, the Visitor Center's observation deck, and portions of the bike path. The Federal Highway Administration (FHWA) guidance on visual design principals was used to evaluate visual impacts. They have found that "objects that are above the observer tend to be more dominant, more detail can be seen at a position near eye level, and objects below the observer tend to blend in." The three most observable positions from visitor areas of the CCNS would be the three selected views, i.e. the Race Point Beach parking lot, the Visitor's Center observation deck, and the bike path. These views are elevated from the terminal and look down on the building, as shown in Photo 5-5.

Race Point Ranger Station

Old Harbor Life-Saving Station Museum

Pilgrim Monument and Provincetown Museum

Airport Terminal, Hangar, and TSA Trailer

Photo 5-5 Telescopic views of area buildings from NPS Visitors Center.

The viewscape from the Visitors Center, a NPS viewing area of the surrounding dunes and vegetation, consists of many multiple story buildings. Included in these are the Race Point Ranger Station, the old Harbor Life-Saving Station Museum, the Pilgrim Monument and Provincetown Museum, and the Race Point Light lighthouse. The Race Point Ranger Station, the old Harbor Life-Saving Station Museum, the Pilgrim

Monument and Provincetown Museum, and the Airport Terminal, Hangar, and TSA Trailer are shown from the NPS Visitors Center (telescopic views) in the following viewshed photo compilation, Photo 5-5.

The visual impact would relate to the mass, height, volume, and scale of the building. There are several measures that will be evaluated during the design process to reduce the visual impact of the building. The appearance of building height and mass could be minimized by use of building insets or projections, stepping back the upper floor, varying the height of the roofline, and adding trees and other vegetation. A combination of roof lines with varying roof heights and pitches could be used to add interest to the building and break up the mass of the building. Windows and other architectural features can be used to break up large wall masses. Sample buildings with varying roof heights and building insets and projections are shown in Figure 5.2.

Example of building with varying roof line looking from the southeast (a telescopic view from the NPS Visitor Center)

Example of terminal with building insets and projections looking from the Northwest

Figure 5.2 Examples of varying roof designs and building insets and projections

Roof color can also minimize the negligible adverse visual impact, as shown in the following examples. As taken from the FHWA guidance: “colors that occur most frequently in nature are greens, blues, and browns, and less bright colors tend to produce quiet and restful moods.” The design process will also evaluate the most appropriate colors for the building and roof to blend in with the existing landscape as approved by NPS. Two examples of the same style building with different roof colors have been illustrated in Figure 5.3 to note the impact that color could make on the perception of visibility. During the design process, background colors will be refined to aid in visual comparisons.

Example of a building with a green roof

Example of a building with a brown roof

Figure 5.3 Examples of varying roof colors**.**

Landscaping specific to the terminal will be incorporated into the landscaping plan for the parking lot. Landscaping for the parking lot has been proposed that will buffer the visual plane to the terminal building and parking lot from both the bike path and the Race Point Beach parking lot to the extent feasible. Native trees

and bushes will be proposed. If determined to be more effective and desired by NPS, landscaping could be implemented outside of the Airport lease area to screen the terminal.

Conceptual building design concepts have been developed to illustrate general issues. Existing and simulated views are provided in the following photos. The existing building is shown in Photos 5-6, 5-8, and 5-10 from three different views. Photos 5-7, 5-9, and 5-11 illustrate the type of visual simulation that will be utilized during the design process. Building height has been considered and efforts to minimize the height have been done at this conceptual level of design. It is anticipated that a 6 to 12 foot increased in the height of the terminal building will be necessary. The formal design process has not been initiated since the terminal project is programmed for FY 2015 and as such a preferred specific vertical design has not been selected. The design process will be carried out in collaboration with Airport staff, the Airport Commission, and NPS staff. Specific design detail will be incorporated into the design process, including details to reduce the perception of scale, mass, and volume of the building. The design process will also evaluate the most appropriate colors for the building and roof, to blend in with the existing landscape. All of the design phases will be reviewed and approved by NPS.

By using the design principals to reduce the scale, volume, and mass perception and by proposing vegetated buffers between the building and visual points of interest, the vertical terminal option would have a minor adverse short-term and negligible adverse long-term impact on the visual environment with mitigation.

Photo 5-6 Existing view from beach parking lot.

Photo 5-7 An example of how photo simulation can be used to show the visual impact of the vertical design.

Photo 5-8 Existing view from bike path.

Photo 5-9 Example of use of photo simulation to assess visual impact.	Roof color and roof lines could be changed.

Photo 5-10 Existing view from Visitors' Center Observation Deck.

Photo 5-11 Example of use of photo simulation with a proposed second floor added to the Terminal.

5.12.3 Horizontal Alternative (Expand Footprint)

5.12.3.1 Transportation and Traffic

The Horizontal Alternative would require that the TSA trailer be relocated to accommodate the access road to the airfield. It would also impact the auto parking lot by decreasing available spaces. This alternative would have a short and long-term moderate adverse impact on Transportation and Traffic.

5.12.3.2 Wetlands and Wetland Buffer Zones

Approximately 560 SF of the edge of Wetland C would be impacted to accommodate the spacing requirements of the entrance road, and will have a minor adverse short-term and no long-term impact on wetlands. MA DEP has indicated that an alternative for a capacity project that avoids wetland impacts would be necessary in order to qualify for a permit under WQC, given the ORW status of the wetlands and the need for a Variance under the WQC regulations. Therefore, this alternative may not meet the DEP performance standards for a WQC.

5.12.3.3 Floodplain

The Horizontal Concept would impact floodplain to the extent that it would impact~~s~~ wetlands that occur within the floodplain (approximately 560 SF). Wetland mitigation would be provided and would compensate for direct adverse impacts to wetland and floodplain resources. Therefore, this alternative would have a minor adverse short-term and a negligible long-term adverse impact on floodplain upon successful completion of proposed wetland mitigation.

5.12.3.4 Coastal Dunes

The building and road would be on existing developed land. There will be no impacts to coastal dune resources.

5.12.3.5 Cultural Grasslands

Cultural Grasslands would not be impacted. Therefore, there would be no impact on Cultural Grasslands.

5.12.3.6 Rare Species Habitat

The Horizontal Alternative does not involve any work within rare species habitat. Therefore, there would be no impact on rare species habitat.

5.12.3.7 Drainage / Stormwater Management

The Horizontal Alternative would change the drainage system and increase runoff. There would be minor adverse short-term and long-term impacts on drainage and stormwater management once stormwater BMPs were constructed.

5.12.3.8 Visual Environment

The horizontal expansion of the Terminal would be visible from the Race Pont Beach parking lot, the Visitor Center's observation deck, and portions of the bike path. Existing and simulated views are provided in the following photos. There would be a change in the appearance of the existing building. As shown in Photos 5-13, 5-15, and 5-17, the roof extends off the existing roof elevation.

Photo 5-12 Existing view from beach parking lot.

Photo 5-13 Photo simulation of Horizontal Option viewed from beach parking lot.

Photo 5-14 Existing view from bike path.

Photo 5-15 Photo simulation of Horizontal Option viewed from bike path.

Photo 5-16 Existing view from Visitors' Center Observation Deck.

Photo 5-17 Photo simulation of Terminal Horizontal Option viewed from Observation Deck

The horizontal terminal option would maintain the existing building height. However, maintaining the same height might make the Airport facilities appear to be industrial buildings with matching roof lines. Incorporating design principals to reduce the appearance of the building wall lengths and roof line, along with vegetated buffers between the building and visual points of interest, the horizontal terminal option would have a minor adverse short-term and negligible adverse long-term impact on the visual environment.

5.13 Turf Apron

5.13.1 No Action

5.13.1.1 Transportation and Traffic

The No Action Alternative would have a moderate adverse impact on Transportation and Traffic in terms of Airport operations. During peak times, airplanes would be parked on the mid connector TW and this TW would not be available. There would be a moderate long-term adverse impact to Transportation and Traffic.

5.13.1.2 Wetlands and Wetland Buffer Zones

Under the No Action Alternative there would be no impacts to wetlands because there would be no construction adjacent to or within wetlands.

5.13.1.3 Floodplain

Under the No Action Alternative there would be no impacts because there would be no construction within flood zone elevations and therefore no impacts to floodplain.

5.13.1.4 Coastal Dunes

Under the No Action Alternative there would be no impacts to coastal dunes because there would be no construction adjacent to or within coastal dune resources.

5.13.1.5 Cultural Grasslands

Under the No Action Alternative there would be no impacts to Cultural Grasslands because there would be no construction.

5.13.1.6 Rare Species Habitat

Under the No Action Alternative there would be no impacts to rare species habitat because there would be no construction within resources used by listed species.

5.13.1.7 Drainage / Stormwater Management

Under the No Action Alternative, the drainage system would not change and, therefore, there would be no impact to drainage.

5.13.1.8 Visual Environment

Under the No Action Alternative, there would be no change to the Visual Environment because the project would not be built.

5.13.2 Full Dimension

5.13.2.1 Transportation and Traffic

Construction of the Full Dimension alternative would have a moderate beneficial impact on Transportation and Traffic. The project would provide turf parking for an existing demand but would not result in an increase in operations at the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project. There would be a moderate long-term beneficial impact on Transportation and Traffic.

5.13.2.2 Wetlands and Wetland Buffer Zones

The Full Dimension alternative minimizes wetland impacts with steepened slopes, but there would be an impact of approximately 1,250 SF in Wetland C. The comment letter on the NPC/Draft EIR/EA submitted by DEP indicated that this project, like the other capacity projects would require a Variance from the WQC regulations, but would be unlikely to qualify for a Variance. This alternative could be deemed to have moderate short-term and minor long-term adverse impacts to wetlands.

5.13.2.3 Floodplain

The full dimension alternative involves impacts to wetlands, and will therefore also affect the floodplain associated with the wetland. There would be a negligible adverse short-term and no long-term impact on floodplain, with proposed on-site wetland mitigation combined with the previously implemented mitigation through the Hatches Harbor Project.

5.13.2.4 Coastal Dunes

There are no coastal dunes within the project impact area and there would be no impacts to coastal dune resources with this alternative.

5.13.2.5 Cultural Grasslands

Additional Turf Apron area would be constructed within an area of existing Cultural Grasslands. The project would modify the structure of the underlying soils within the area of managed grassland. The grassland vegetation will be restored. The new turf apron would be maintained as Cultural Grasslands.

Therefore, there would be a minor adverse short-term and negligible adverse long-term impact to Cultural Grasslands.

5.13.2.6 Rare Species Habitat

Expansion of the turf apron will impact a portion of Cultural Grassland. Construction activities within Cultural Grasslands will be scheduled according to NHESP agency avoidance dates (i.e., outside of the active breeding and nesting period for this species) which will avoid impacts to Vesper Sparrow.

In order to avoid direct impacts to the Eastern Box Turtle, pre-construction “turtle sweeps” within the limit of work will be conducted as part of the Turtle Protection Plan discussed in Section 7. Work will be conducted in the fall.

The newly created turf apron will be managed similarly to other areas of managed Cultural Grasslands throughout the Airport operational area.

Adverse impacts to rare species will be minor for the short-term and negligible for the long-term because of the proposed mitigation measures.

5.13.2.7 Drainage / Stormwater Management

The project does not involve any changes to paved surfaces and there will be no impact to drainage and stormwater management.

5.13.2.8 Visual Environment

The project would modify the structure of the underlying soils within the area of managed grassland and would not be a new element in the visual environment. The visual appearance of the turf apron will be the same as the existing managed grassland. As a result, there would be no impacts to the Visual Environment.

5.13.3 Reduced Dimension (Preferred Alternative)

5.13.3.1 Transportation and Traffic

Construction of the Preferred Alternative would have a negligible short-term adverse impact and a moderate beneficial long-term impact on Transportation and Traffic. The project would provide turf parking for an existing demand during peak periods but would not result in an increase in operations at the Airport. Additional flights and additional passenger enplanements would not occur as a result of the project. There would be no increase in vehicular traffic as a result of the project.

5.13.3.2 Wetlands and Wetland Buffer Zones

The project will not impact wetlands. There would be no impacts to wetlands.

5.13.3.3 Floodplain

The Preferred Alternative would not alter the flood storage capacity of the floodplain, and would have only negligible adverse impacts during construction, with no long-term adverse impacts to this resource.

5.13.3.4 Coastal Dunes

There are no coastal dunes within the project impact area. Therefore, there would be no impacts to coastal dune resources.

5.13.3.5 Cultural Grasslands

Additional Turf Apron area will be constructed within an area of existing Cultural Grassland. The project would modify the structure of the underlying soils within the area of managed grassland. The grassland vegetation would be restored. The new Turf Apron would be maintained as Cultural Grassland.

As such, there would be negligible adverse short-term impacts and no long-term impacts to Cultural Grasslands.

5.13.3.6 Rare Species Habitat

Expansion of the turf apron would impact a portion of Cultural Grassland that serves as potential Vesper Sparrow habitat. Construction activities within Cultural Grasslands will be scheduled consistent with NHESP agency avoidance dates which will avoid impacts to Vesper Sparrow.

In order to avoid direct impacts to the Eastern Box Turtle, pre-construction "turtle sweeps" within the limit of work will be conducted as part of the Turtle Protection Plan discussed in Section 7. Work will be conducted consistent with specific NHESP agency avoidance dates.

The newly created Turf Apron will be managed similarly to other areas of managed Cultural Grasslands throughout the airport operational area. Adverse impacts to rare species will be negligible for the short-term and no impacts for the long-term because of the proposed mitigation measures.

5.13.3.7 Drainage / Stormwater Management

The project does not involve any changes to paved surfaces and will not impact drainage and stormwater management.

5.13.3.8 Visual Environment

The project would modify the structure of the underlying soils within the area of managed grassland and would not be a new element in the visual environment. The visual appearance of the turf apron will be the same as the existing managed grassland and would not impact the Visual Environment.

5.14 Evaluation of Impairment of Park (CCNS) Resources or Values

Introduction

As suggested by NPS CCNS staff, Impairment of Park Resources is discussed for all the CIP project elements in aggregate rather than by individual project element. For the purposes of evaluating the potential for Impairment of Park Resources and values, impact topics include:

- Natural Resources (wetlands, wetland buffers, floodplains, coastal dunes, wildlife habitat),
- Massachusetts state-listed Rare Species and their sustaining habitat, and
- Visual Impacts.

In addition to natural resources, the NPS is the steward of many of America's most important cultural resources. These resources are categorized as archaeological resources, cultural landscapes, ethnographic resources, historic and prehistoric structures, and museum collections. Cultural resources may also include historic designed landscapes, historic vernacular landscapes, ethnographic landscapes, and historic sites, natural resources with traditional cultural meaning and value to associated peoples and other resource users.

The Park's Cultural Resources were not included as an impact topic for this discussion because it has been established that there are no historical or archaeological structures within the lands occupied by the Airport (See MHC letter dated April 2, 2007, and commentary from NPS staff December 15, 2008, provided in Section 10.1). Additionally, as discussed in Section 1.4, there are no Museum Objects, Ethnographic, or Cultural Resources.

Background

In 1961, the U.S. Congress established the Cape Cod National Seashore (CCNS) as a unit of the National Park Service (NPS), recognizing that the outer portion of Cape Cod, or Outer Cape, was "nationally significant for ecological, historical, and cultural reasons. Given the unique circumstances under which the CCNS also encompasses the Provincetown Municipal Airport, which operates within the Park under a Special Use Permit, the CCNS General Management Plan (NPS 1998; Access and Transportation section), identifies the Airport as "an important transportation facility for the Outer Cape [that] … is part of the national aviation system." One

of the Goals stated in the CCNS General Management Plan is to "Provide access to public use areas that is environmentally sensitive, safe, and consistent with the desired experience and the intermodal planning initiatives; [and] ensure that the transportation system does not detract from the Cape Cod character." Although the proposed CIP projects are primarily designed to address safety and security deficiencies at the Airport, while meeting current demands for Airport use, and will be confined to the lands specifically set aside for Airport operations, the CCNS General Management Plan recognizes that through the Airport Commission's long-term master planning and environmental analysis, public safety upgrades could potentially affect the resources and values provided by the CCNS.

The CCNS General Management Plan requires that park resources and values to be considered when reviewing proposed projects at the Airport include "opportunities for quiet contemplation, reasonable access to NPS facilities, and the preservation of vegetation, wildlife, wetlands, dunes, views, and cultural resources." The following provides a discussion of the proposed CIP Projects in the context of the potential for Impairment of these Park Resources and values with regard to direct and indirect impacts associated with each alternative of the proposed (preferred) action.

NPS Management Policies define Impairment of Park Resources as an impact that: "…in the professional judgment of the responsible NPS manager, would harm the integrity of the park resources or values, including those that would otherwise be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources that would be affected, the severity, duration, and timing of the impact, the direct and indirect effects of the impact, and the cumulative effects of the impact in question with other impacts."

The laws establishing the NPS and its authority give NPS management the discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute an impairment of the affected resources and values. Not all impacts would constitute impairment. As described in the NPS Management Policies, an impact would more likely constitute impairment to the extent that it would impact a resource or value whose conservation is:

- Necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- Key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; [and, or]
- Identified as a goal in the Seashore's General Management Plan or other park planning documents.

Conversely, an impact would be less likely to result in impairment if it is an unavoidable result of an action that is necessary to preserve or restore the integrity of vital park resources, which cannot be reasonably mitigated.

Natural Resources

Wetland Resources

Impacts to the Park's wetland resources resulting from the combined Preferred Alternatives for the CIP projects affecting wetland resources at the Airport include moderate, direct, short-term impacts to wetland ecosystems in the immediate vicinity of the Airport facilities to allow for the taxiway and access road safety improvements to occur. Specifically, this would involve reconstruction and/or realignment of the taxiways, installation or modification of access roadways to Airport navigational aids, and installation of the proposed

safety/security fence. With the exception of the safety/security fence, these projects would not be new elements at the Airport or within the CCNS. Even the safety/security fence is not a new concept to the CCNS, where the Airport, for safety reasons, has worked with the CCNS to install multiple Navigational devices that require obstacle clearing, including the airspace surrounding the airport.

Wetland impacts associated with the CIP projects would not adversely affect the natural integrity of the CCNS wetland resources or detract from the enjoyment of those resources or values. Further, these impacts will be minimized (offset) and subsequently mitigated upon successful wetland restoration, along with the previous mitigation under the Hatches Harbor Project as discussed in Section 7.0. Construction timing and implementation of applicable BMPs and other measures will further minimize impacts to the values of the wetland resources at the Airport and within the CCNS. Minor indirect, long-term impacts will occur within wetlands for the installation and maintenance of the safety/security fence as eight-foot wide swaths along the proposed fence would be managed in a low-growing plant community rather than a forested or taller scrub-shrub community. Consequently, there would be no impairment of wetland resources or values as a result of the implementation of the Preferred Alternatives when mitigation is also implemented.

Coastal Floodplains

The entire Airport and its immediate environs fall within the coastal floodplain (ranging from elevation 10 to 11 feet above mean sea level). CIP projects with the potential to directly affect the coastal floodplain include the reconstruction and/or realignment of the taxiways, installation of the service access roadways, and improvements to the MALSF access roadway where fill is proposed; other CIP projects would have negligible impacts to the coastal floodplain. Negligible short-term, direct, adverse impacts will occur to the coastal flood zone at the Airport and within the CCNS as a result of implementing the Airport CIP projects during construction. These impacts would not harm the integrity of the Park's resources by increasing the extent of flood prone areas or otherwise diminishing the ability of this natural resource to function to provide flood storage by temporarily retaining and slowly releasing coastal waters during and following a flooding event at the Airport or within the surrounding CCNS lands, or prevent storm damage to inland areas upon successful mitigation within the floodplain. Further, short-term impacts to the coastal floodplain will be restored upon successful wetland mitigation as described above and in Section 7.0. Therefore, implementation of the Preferred Alternatives would not impair floodplain resources within the CCNS.

Coastal Dune Ecosystems, Buffers, and Wildlife Habitat

The Province Lands within the CCNS, where the Airport is located, are comprised of a vast ecosystem of primary and secondary dunes. Coastal dunes within the Airport lease area range from barely elevated sandy patches situated among freshwater wetlands (e.g., interdunal swales) to tall, sparsely vegetated shifting dune ridges to the north, and to extensively vegetated dune ridges to the south. Given the proximity of the natural resources at the Airport, coastal dunes also frequently serve as natural buffers to the system of freshwater wetlands found there, and along with the wetland system, provides a unique wildlife habitat.

Minor long-term direct and indirect impacts to coastal dune ecosystems and the associated wildlife habitat would occur with the implementation of the Preferred Alternatives for the combined CIP projects (taxiway realignments, construction of service access roadways (AWOS and LES), expansion of auto parking (Phases 1 and 2), and installation of the safety/security fence). However, these impacts would not detract from the vast extent of dunes within the Province Lands at the CCNS, nor would they harm the integrity of the Park's resources or values.

The Preferred Alternative for the proposed safety/security fence would partially enclose 113 acres of the Airport lease area. The majority of the area consists of airport infrastructure (paved runway and taxiways, buildings, parking areas, navigational aids, and managed safety areas). Implementation of the combined CIP projects would result in negligible to minor, direct and indirect short-term and long-term adverse impacts to local populations of certain wildlife species whose habitat would be interrupted by the existence of a fence.

Impacts to coastal dune ecosystems at the Airport will be mitigated in part through the conversion of existing impervious surfaces and mowed grasslands to coastal dune habitat, and implementation of habitat management to control invasive species currently documented within the coastal dune ecosystem at the Airport. Mitigation efforts, including design specifications, construction timing, and implementation of applicable BMPs, will further minimize impacts to the coastal dune ecosystem at the Airport and within the CCNS. As with the wetland resources, minor indirect, long-term impacts will occur within the coastal dunes for the installation and maintenance of the safety/security fence as an eight-foot wide swath along the proposed fence would be managed in a low-growing plant community rather than a forested or taller shrub community. However, installation of the fence is an unavoidable result of a necessary action to maintain a safe and secure Airport within the CCNS, and for visitors to the CCNS that would utilize the Airport. Considered in relation to the total dune ecosystem in the Province Lands, combined with the proposed dune restoration and mitigation measures, there would be no impairment of the coastal dune ecosystem or its habitat functions and values as a result of the implementation of the Preferred Alternatives.

State-listed Rare Species and Their Sustaining Habitat

Implementation of the combined CIP projects at the Airport has the potential to affect the habitats of three of the four Massachusetts state-listed rare species documented at the Airport: Eastern Spadefoot Toad, Eastern Box Turtle, and Vesper Sparrow, with no adverse impacts anticipated to the fourth documented species, Broom Crowberry). The mosaic habitat of the coastal dune ecosystem interspersed with freshwater interdunal swales within the Province Lands constitutes a unique habitat that supports these species. Potential impacts to the habitat for the Eastern Spadefoot Toad have been the focus of the Massachusetts Natural Heritage and Endangered Species Program (NHESP), and prime and potential breeding habitat for this state-Threatened species has been further assessed at the Airport in the context of the Preferred Alternatives.

Minor short-term, direct, adverse impacts of potential breeding habitat for the Eastern Spadefoot Toad will occur with the taxiway improvement projects. Negligible short-term, direct adverse impacts and negligible long-term indirect adverse impacts would occur within prime breeding habitat for Eastern Spadefoot Toad for the installation and maintenance of portions of the proposed safety/security fence (see Figure 4.7). In addition, implementation of the Preferred Alternatives for the combined CIP projects would have the potential for minor, short-term and long-term, direct adverse impacts to the non-breeding habitat for this species.

Implementation of the Preferred Alternatives for the combined CIP projects would result in minor short-term, direct adverse impacts within wetlands, grasslands, and coastal dune ecosystems which serve as potential breeding and non-breeding habitat for the Eastern Box Turtle.

Negligible, short-term, direct adverse impacts will occur within managed grasslands (Cultural Grasslands) which serve as potential habitat for Vesper Sparrow (and Broom Crowberry, although none of the Preferred Alternatives would have a direct impact on the known population of this species at the Airport) with the

implementation of the taxiway realignment and relocation projects as well as the installation of the taxiway lighting and expansion of the turf apron. Moderate long-term direct beneficial impacts to this species may occur through habitat maintenance of the grasslands and a species-sensitive mowing schedule.

With the implementation of mitigation measures, the resulting impacts to these species would be considered short-term and negligible, off-set by habitat restoration (including wetland restoration), location-specific fence alignment siting, design measures for the fence (wildlife tunnels), and construction timing measures designed to protect this unique habitat.

Considered in relation to the total wetland and dune ecosystem in the Province Lands, combined with the mitigation measures proposed, impacts to state-listed rare species habitat would be considered near negligible, long-term, adverse impacts. Consequently, implementation of the CIP projects would not result in an impairment of rare species habitat resources or values.

Visual Impacts

The proposed CIP projects designed to improve safety standards at the Airport has the potential to impact the visual environment at the Airport. Specifically, installation of the proposed safety/security fencing and taxiway edge lighting, and expansion of the auto parking lot and the Terminal building could result in visual impacts for Park visitors. The remaining CIP projects would not be new elements or expansion of existing elements at the Airport and would not diminish the natural or cultural integrity of the CCNS, and in fact, would result in minor to moderate, long-term, direct, and beneficial impacts to visitor use, safety, and experience for those visitors patronizing the Airport as a means of accessing the Park.

The Airport may be seen by Park visitors (or viewer groups) utilizing the bike trail system near the Airport, those driving past the Airport toward Race Point Beach, or those visiting the lookout tower at the Province Lands Visitor Center (“birds eye views”), where minor, long-term, direct adverse impacts to visual aspects of the Park may be experienced by those visitors upon the implementation of the Preferred Alternatives for these CIP projects.

Visual impacts will be off-set by native landscape screening plantings proposed around the parking lot, as well as design modifications to the Terminal to ensure that it meets the local design and character of other buildings at the Park and minimizes impacts to the visual environment at the CCNS. Lighting along the taxiway does not constitute a new element at the Airport, but rather an improvement of the existing runway lighting. The taxiway lighting is an unavoidable consequence of meeting airport safety requirements.

The proposed fence will match the design of the existing segments of safety/security fencing currently visible along the bike path along Race Point Road. The new sections of fencing will be installed within the vicinity of the managed airfield, and will be black coated vinyl, which minimizes the effect on the various viewer groups. The aspects that contribute to the significance of the CCNS would not be diminished because there would be no significant change in the visual environment and no change in recreational activity for the CCNS visitors since the fence will secure the operational area of the Airport that is closed to unauthorized persons.

5.15 Cumulative Impacts

Cumulative Impacts are defined as “the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonable foreseeable future actions regardless of what

agency (federal or non-federal) or person undertakes such actions" (40 CFR 1508.7). An assessment of cumulative impacts is a requirement of NEPA. Cumulative impacts are typically considered for all alternatives (preferred or other alternatives that were considered but not dismissed), including the no action alternative.

This discussion takes into account the combined CIP projects discussed above relative to their potential impacts on the following resources: Wetland Resources (wetlands, floodplains, and associated habitats), Coastal Dune Ecosystems (including buffers and associated habitats), State-listed Rare Species and associated Priority Habitats, and Public Use and Access and Safety for Park Users. The action alternatives focus primarily on the impacts of the Preferred Alternatives for the combined CIP projects in conjunction with the preferred and/or already implemented projects in the nearby vicinity of the Province Lands. A discussion of the differences in combined impacts follows, should one of the other alternatives (i.e., not selected as the preferred) be implemented. The effects of the No Action alternatives are also discussed.

Projects Evaluated for Cumulative Impacts

At the recommendation of NPS staff, in this FEIR/EA the discussion of cumulative impacts is presented in the context of the combined effects of the various CIP projects, as well as the impacts resulting from other projects in the vicinity of the Province Lands within the CCNS. Other projects and programs considered for this analysis were identified through consultation with the CCNS staff and published reports. Projects with similar impacts were identified and include three transportation projects and the installation of an electrical supply in the Province Lands. Projects occurring outside the geographical vicinity of the Airport CIP projects are not considered. Likewise, the proposal for the development of a multi-use trail in conjunction with the rehabilitation of a 2-mile stretch of Moors Road in Provincetown, which is planned for the area, has not yet been fully developed, and therefore has not been considered in this analysis. Four other projects in the general vicinity of the Airport include:

1. Electrical Supply for Herring Cove Beach Facilities;
2. Province Lands Bike Trail Renovations;
3. Herring Cove Intersection Project; and
4. Certain project elements from Repair and Rehabilitate Four Roads and Parking Lots (Herring Cove).

A brief description of these four projects and their identified impacts for their Preferred Alternatives is presented upfront by way of background information. The cumulative impacts of these projects on the specific impact topics are discussed below in conjunction with the combined proposed CIP projects at the Airport. The effects on the resources are first considered for the No Action alternatives, followed by the effects of the combined Preferred Alternatives. Where more than one Build alternative has been identified for a CIP project (and not previously dismissed), a discussion of cumulative impacts follows, providing a range of impacts these non-preferred alternatives would have on the resources if implemented.

1. Electrical Supply for Herring Cove Beach Facilities

Preferred Alternative: According to the Electrical Supply for Herring Cove Beach Facilities EA (NPS 2008), the Preferred Alternative would entail the installation of a combined solar- and wind-powered electrical supply sited on the roof of the Herring Cove bathhouse with a separate land-based wind-turbine located nearby. Under the preferred alternative, there would be potential minor adverse impacts to birds and bats, including state- and federally-listed rare species. Impacts to wildlife derived from the operations of the wind turbine will be minimized through a two-phased adaptive management plan. Installation during the off-season would have

negligible impacts on public use and access, and impacts to visitor safety would be temporary (short-term) and minor. Long-term minor visual impacts from the presence of the land-based wind turbine were recognized as either adverse (interruption of the existing views) or beneficial (educational); adverse impacts would be minimized by building the turbine in scale with the existing environment.

No Action: Under the No Action alternative for this project, there would be no impacts to the natural resources (soils, vegetation, and wildlife or air quality) or to the Park's cultural resources. As the project is intended to address a recurring issue with faulty electricity that is an inconvenience to visitors using the bathhouse and restroom facilities and limiting visitor access, there is a potential for moderate to major impacts on public use of the Herring Cove facilities, which is a potential long-term adverse indirect consequence of the No Action alternative for this project.

2. Province Lands Bike Trail Renovations

Preferred Alternative: The Preferred Alternative for the Province Lands Bike Trail Renovations project (realignment, repair, and 10-foot widening of the existing bike trail system) would impact wetlands, coastal upland ecosystems, and coastal dune ecosystems in the project area. Minor short-term direct adverse impacts to wetland resources within a foot of the renovated trails during construction of the preferred alternative is 0.14 acres, with no long-term direct adverse impacts to wetlands occurring. Minor long-term, direct adverse impacts of up to 4.33 acres of upland and coastal dune ecosystems, which provide potential non-breeding habitat for a state-threatened rare species, Eastern Spadefoot Toad, distributed along the 7.3 miles of bike trail were identified. Adverse impacts would be partially off-set by restoration of portions of the existing trail which would be abandoned, and construction and timing measures designed to protect this habitat. With the implementation of mitigation measures, the resulting impacts were considered short-term and negligible or minor. Moderate, long-term direct and beneficial impacts to visitor (and staff) use, safety, and experience are anticipated from the resultant safer bike trail system. Minor, short-term and long-term, direct adverse impacts to the habitat for the Eastern Spadefoot Toad would result from the preferred alternative, with the potential for additional minor, short-term direct adverse impacts to breeding habitat for this species. Potential minor, short-term and long-term, direct adverse impacts would also occur if other protected species are discovered within the project areas of the realignments.

No Action: The No Action alternative would not result in impacts to the Park's natural resources (wetlands or coastal dune and upland ecosystems). However, minor long-term direct adverse impacts to visitor and staff safety, use and experience would result from the continued existence of unsafe conditions and deteriorated segments of the bike trail.

3. Herring Cove Intersection

Preferred alternative: The work associated with this project primarily includes reconstruction at the intersection of Route 6 and Province Lands Road, including the addition of an exit from South Herring Cove Beach onto Route 6. In addition, the sealing of the pavement on Race Point Road was included. Although within the buffer zone to Shank Painter Pond, all work occurred within the roadway and resulted in a net reduction in impervious surface and moderate, long-term, direct, and beneficial impacts to visitor safety, use and experience resulting from the improvements to the park resources for visitor enjoyment.

No Action: The No Action alternative would result in no adverse impacts to natural resources. However, minor long-term direct adverse impacts to visitor and staff safety, use and experience would result from the continued existence of the inadequate and unsafe conditions at this intersection.

4. Repair and Rehabilitate Four Roads and Parking Lots (Herring Cove)

Preferred Alternative: Portions of this project, which involved the repair and rehabilitation of four roads (Marconi Beach Road, Marconi Site Road, Old Dewline Road, and Moors Road) and modifications to the Herring Cove Parking Lot access, would result in impact to Park Resources. The Preferred Alternative identified in the Value Analysis Study for this project (NPS 2006) would result in minor, long-term direct adverse impacts to coastal dune ecosystems. These project elements would also result in moderate, long-term, direct, and beneficial impacts to visitor safety, use and experience resulting from the modifications to the Herring Cover Parking Lot Access. No impacts occurred within sensitive or state-listed rare plant or animal habitat, and no work was proposed within wetlands or within 100 feet of wetlands (buffer zone).

No Action: The No Action alternative would result in no impacts to natural resources. However, minor long-term direct adverse impacts to visitor and staff safety, use and experience would result from the continued existence of the existing inadequate and unsafe entrance and exists to the Herring Cove parking lot.

Cumulative Impact to Wetland Resources

No Action

No impacts would occur to wetland resources if the No Action alternatives for the CIP projects were implemented. However, there is potential for minor, long-term, direct and indirect, adverse impacts to occur within wetlands and surrounding habitats if safety measures such as surfacing of deteriorating and crumbling surfaces are not completed and the water quality of adjacent wetlands were to become impacted through stormwater runoff carrying debris and contaminants from the deteriorated surfaces. When considered with the No Action alternatives for other projects in the Province Lands, the No Action alternatives would result in no additional adverse impacts to the natural resources (soils, vegetation, and wildlife, or air quality) beyond those impacts that may occur under existing conditions.

Preferred Alternatives

Impacts to the Park's natural resources resulting from the combined preferred alternatives for the CIP projects at the Airport include moderate, direct, short-term impacts to wetland ecosystems in the immediate vicinity of the Airport facilities to allow for the taxiway and access road safety improvements to occur. These impacts (1.35 acres) will be minimized (offset) through a reduction in impervious surfaces and subsequent wetland restoration, which overall would result in an increase in the amount of freshwater wetlands occurring at the Airport, when combined with the implementation of the Hatches Harbor Project over the long-term (1.70 acres) upon successful restoration of previously disturbed wetlands. In addition to the Hatches Harbor Project, additional protective measures to be implemented include construction sequencing and timing, implementation of applicable BMPs, and enhancement measures as outlined in Section 7.0. Moderate temporary wetland impacts will also occur due to temporal loss during construction and prior to full grow-in of the restored wetland areas. Additional minor to moderate indirect, long-term impacts will occur within wetlands (0.59 acres) for the installation of the safety/security fence as 8-foot wide swaths along the proposed fence would be managed in a low-growing plant community rather than a forested or taller scrub-shrub community, as well as minor to moderate temporary impacts to wetlands during construction.

Reconstruction and/or realignment of the taxiways, installation of the access roadways, and installation of the proposed safety/security fence combined with the impacts to wetland resources associated with the bike trail renovations would result in direct and indirect, moderate, short-term cumulative impacts on wetland resources. Total short-term direct adverse impacts to the wetland ecosystems are approximately 1.49 acres.

Implementation of the preferred alternatives associated with the Airport CIP projects would have only minor short-term, direct adverse impacts to the to the wetland resources analyzed in this document even when considered cumulatively with other projects in the vicinity. Proposed wetland mitigation, including the previously implemented restoration project in Hatches Harbor, would off-set the direct and indirect impacts to wetlands in less impervious surfaces and subsequently greater wetland areas within the Park upon successful wetland restoration. Consequently, there would be no cumulative adverse impact to wetland resources or values as a result of the implementation of the preferred alternatives when mitigation is also implemented.

Considerations of Non-Preferred Alternatives for CIP Projects – Wetland Resources
Impacts to the Park's natural resources resulting from the combined other alternatives (some of which would include the preferred alternatives) for the CIP projects at the Airport include moderate, direct, short-term adverse impacts to wetland ecosystems in the immediate vicinity of the Airport facilities to allow for the taxiway and access road safety improvements to occur. These impacts (approximately 1.35 acres, 1.33 acres of which are accounted for by the Preferred Alternatives where no other alternatives were considered) are comparable to the wetland impacts under the preferred alternative. However, there would be greater impacts associated with implementation of the horizontal alternative to the Terminal Expansion project (an additional ~560 SF) and the two fence alternatives (Concept 1 at the lease line and Concept 4) with moderate, indirect and direct adverse wetland impacts totaling an additional 3.4 acres and 1.13 acres, respectively, with additional undetermined alterations occurring within tidally influenced areas of the BVW associated with the enclosure of the MALSF system, which would occur with both non-preferred fence alternatives. Thus, cumulative impacts to the Park's natural resources would range from approximately 2.71 to 4.88 acres (not including indirect impacts resulting from enclosure of tidally-influenced wetlands). These additional wetland impacts would be partially off-set through a reduction in impervious surfaces and on-site wetland restoration and including the previously implemented restoration off-site project in Hatches Harbor, although at a slightly lower ratio than with the Preferred Alternatives. Construction timing and implementation of applicable BMPs and measures outlined in Section 7.0 would further reduce impacts. Moderate temporary adverse wetland impacts will also occur due to temporal loss during construction and prior to full grow-in of the restored wetland areas.

Cumulative Impact to Floodplains

No Action
No impacts would occur within floodplains if the No Action alternatives for the CIP projects were implemented. Other projects in the vicinity of the Province Lands have not reported impacts to floodplains.

Preferred Alternatives
Implementation of the combined CIP projects would cumulatively result in negligible to minor, short-term, direct, adverse impacts within the coastal flood zone as a result of implementing the Airport CIP projects during construction, specifically for the reconstruction and/or realignment of the taxiways, installation of the access roadways, and installation of the proposed safety/security fence (i.e., projects that would result in introduced fill material). The temporary loss of flood storage capacity will be compensated by the proposed wetland restoration and through the mitigation derived from the implementation of the Hatches Harbor Project. No long-term adverse impacts on the flood storage capacity relative to the ability of these low-lying areas to temporarily retain and release coastal waters during and following a flooding event at the Airport or within the surrounding CCNS lands are anticipated. Therefore, implementation of the Preferred Alternatives will have a negligible short-term direct adverse impact on floodplains. Proposed restoration activities will mitigate for impacts to floodplains, such that there will be negligible long-term impacts upon successful implementation of

wetland restoration activities. Other projects in the vicinity of the Province Lands have not reported impacts to floodplains. Consequently, there would be no cumulative adverse impact to floodplain resources as a result of the implementation of the combined preferred alternatives for the projects.

Considerations of Non-Preferred Alternatives for CIP Projects – Floodplains
Other projects in the vicinity of the Province Lands have not reported impacts to floodplains, and therefore implementation of non-preferred alternatives for the combined CIP projects would be limited to impacts associated with the Airport. Negligible, short-term, direct, adverse impacts will occur within coastal floodplains as a result of implementing the Airport CIP projects during construction, specifically for the reconstruction and/or realignment of the of the taxiways, installation of the access roadways, and installation of the proposed safety/security fence. The only projects with identified non-preferred alternatives that could impact floodplains are the terminal expansion project, the service access roads, the fence and the auto parking project. Implementation of the auto parking Concept 1, the horizontal option for the Terminal, and the full dimension of the turf apron would result in additional wetland (and therefore floodplain) fill ranging from 0.1 to 0.15 acres. Presumably, these impacts would also result in minor, short- and long-term adverse impacts to the flood storage capacity of the coastal floodplains. These additional impacts to the flood storage capacity would be compensated by the proposed wetland restoration (upon successful implementation) and further enhanced through the Hatches Harbor restoration project, resulting in negligible long-term adverse impacts on the flood storage capacity relative to the ability of these low-lying areas to temporarily retain and release coastal waters during and following a flooding event at the Airport or within the surrounding CCNS lands. However, implementation of either non-preferred alternative for the fence (Concept 1 or Concept 4) would result in undetermined short-and long-term, direct and indirect adverse impacts within tidally-influenced areas of the wetland system due to the complete enclosure of the MASLF system.

Cumulative Impact to Coastal Dune Ecosystems, Buffers, and Wildlife Habitat

No Action
No impacts would occur to coastal dune ecosystems, buffers, or general wildlife habitat if the No Action alternatives for the CIP projects were implemented. When considered with the No Action alternatives for other projects in the Province Lands, the No Action alternatives would result in no adverse impacts to these resources.

Preferred Alternatives
Minor, long-term direct, adverse impacts to coastal dune ecosystems and the associated wildlife habitat would occur to a total of 1.05 acres through the implementation of the Preferred Alternatives for the combined CIP projects. Combined with the minor, long-term direct adverse impacts of up to 2.63 acres and minor short-term direct adverse impacts of up to 3.68 acres of dune ecosystem habitat associated with the preferred alternatives for the bike trail renovations, and the minor impacts to coastal dune and upland ecosystem habitats associated with the installation of the wind turbine at the Herring Cove facilities, cumulative long-term, direct, adverse impacts to dune ecosystem impacts resulting from these projects would be approximately 3.96 acres (including mitigation efforts to restore dune and upland ecosystems). Impacts to coastal dune ecosystems at the Airport will be mitigated in part (0.69 acres) through the conversion of existing impervious surfaces and mowed grasslands to coastal dune habitat, and implementation of habitat management to control invasive species.

The fence would partially enclose 113 acres of the Airport lease area. This may result in negligible to minor, direct and indirect short-term and long-term adverse impacts to local populations of certain wildlife species

whose habitat would be interrupted by the existence of a fence. While the preferred alternative for the fence will partially enclose approximately 113 acres at the Airport, it is important to note that the area within the fence consists of airport infrastructure (paved runway and taxiways, buildings, parking areas, navigational aids, and managed safety areas). The purpose of installing the fence is to restrict movement of large animals, such as deer and coyote, as well as non-authorized personnel from the Airport operation areas. However, the design mitigation measures and construction timing and phasing mitigation measures will reduce the impacts to resources and the species that use these resources. Mitigation efforts, including design specifications and construction timing will minimize these impacts. When considered in relation to the total dune ecosystem in the Province Lands, combined with the dune restoration and mitigation measures proposed, these would be considered only minor, long-term, adverse impacts to the dune ecosystem even when considered cumulatively with other projects.

Consequently, there would be no cumulative adverse impact to dune ecosystem resources or values as a result of the implementation of the combined preferred alternatives for the projects.

Considerations of Non-Preferred Alternatives for CIP Projects – Coastal Dune Ecosystems
Implementation of Non-Preferred alternatives for the following CIP projects have the potential for minor, long-term direct, adverse impacts to coastal dune ecosystems, their habitats, and their buffers. These include the service access roads to the AWOS and LES facilities, the auto parking area, and installation of a safety/security fence. In addition, potential additional long-term adverse impacts to these resources could also occur indirectly from the implementation of the horizontal expansion alternative for the terminal project, as the horizontal concept would result in a loss of existing parking, where the parking expansion would have adverse impacts to coastal dunes. A minor reduction of 0.06 acres of coastal dune ecosystem impacts would occur with the implementation of the alternative access path to the LES (LES Concept 6), as the alternative to bring the roadway off of the existing CCNS bike trail would not require paving. However, implementation of auto parking Concept 1 would result in 0.23 acres of additional impacts to this resource.

Direct and indirect impacts to coastal dune ecosystems at the Airport would increase substantially with the increased length of fencing (24,200 LF for Concept 1 and 15,400 LF for Concept 4). In addition, the proposed alternative fence Concepts 1 and 4 would fully enclose a greater amount of habitat (317 acres and 200 acres, respectively), resulting in minor to moderate, direct, and indirect long-term adverse impacts to local wildlife populations. Coastal dune impacts associated with these non-preferred CIP projects would be mitigated in part through the conversion of existing impervious surfaces to coastal dune habitat, and implementation of habitat management to control invasive species, but would result in far greater net loss of coastal dune habitat as compared to the Preferred Alternatives. These impacts, combined with the minor, long-term direct adverse impacts of up to 2.63 acres and minor short-term direct adverse impacts of up to 3.68 acres of dune ecosystem habitat associated with the preferred alternatives for the bike trail renovations, and the minor impacts to coastal dune and upland ecosystem habitats associated with the installation of the wind turbine at the Herring Cove facilities (3.96 acres combined), would result in additional cumulative long-term, direct and indirect adverse impacts to dune ecosystem impacts, considering and including mitigation efforts to restore dune and upland ecosystems. Considered in relation to the total dune ecosystem in the Province Lands, combined with the dune restoration and mitigation measures proposed, these would be considered only minor, long-term, adverse impacts to the dune ecosystem even when considered cumulatively with other projects.

Cumulative Impact to State-Listed Rare Species (including habitat Coastal Dunes and Wildlife Habitat)

No Action

No impacts would occur to state-listed rare species or their habitat if the No Action alternatives for the CIP projects were implemented. Other projects in the Province Lands have not identified impacts to state-listed rare species, therefore the No Action alternatives would result in no cumulative adverse impacts to rare species.

Preferred Alternatives

Total short-term and long-term direct adverse impacts to the non-breeding habitat (coastal dune ecosystems) for the CIP projects and other projects in the vicinity of the Airport are approximately 5.38 acres. Implementation of the combined CIP projects at the Airport has the potential to affect the habitats of three of the four state-listed rare species documented at the Airport: Eastern Spadefoot Toad, Eastern Box Turtle, and Vesper Sparrow (with no adverse impacts anticipated to the fourth species, Broom Crowberry). Minor short-term, direct, adverse impacts of up to 1.3 acres of potential breeding habitat for the Eastern Spadefoot Toad will occur with the taxiway improvement projects and the AWOS access road (direct fill). Negligible, short-term, direct adverse impacts and negligible, long-term indirect adverse impacts would occur within prime breeding habitat for Eastern Spadefoot Toad for the installation and maintenance of portions of the proposed safety/security fence (see Figure 4.7), and further minimized by field adjustments prior to construction. Minor, short-term and long-term, direct adverse impacts to the non-breeding habitat for the Eastern Spadefoot Toad would result from the preferred alternatives. Adverse impacts will be partially off-set by habitat restoration (including wetland restoration), location-specific fence alignment siting, design measures (wildlife tunnels), and construction and timing measures designed to protect this habitat.

Implementation of the preferred alternatives for the combined CIP projects will result in minor short-term, direct adverse impacts of up to 3.04 acres within wetlands, grasslands, and coastal dune ecosystems which serve as potential breeding and non-breeding habitat for the Eastern Box Turtle. With the implementation of mitigation measures, the resulting impacts would be considered short-term and negligible, off-set by habitat restoration, design measures for the fence (wildlife tunnels), and construction and timing measures designed to protect this habitat.

Moderate, short-term, direct adverse impacts will occur within managed grasslands (Cultural Grasslands) which serve as habitat for Vesper Sparrow with the implementation of the taxiway realignment and relocation projects, as well as the installation of the taxiway lighting and expansion of the turf apron. A net loss of approximately 0.54 acres of grassland will result in moderate, long-term, direct, adverse impacts to this species' habitat. Moderate, long-term, direct, and beneficial impacts to this species will occur through habitat maintenance of the grasslands and a species-sensitive mowing schedule.

When considered in relation to the total wetland and dune ecosystem in the Province Lands, combined with the wetland, dune, and grassland mitigation measures proposed, impacts to State-listed rare species habitat would be considered negligible, long-term, adverse impacts even when considered cumulatively with other projects.

Other projects in the Province Lands have not identified impacts to state-listed rare species. Consequently, there would be no cumulative adverse impact to rare species habitat resources or values as a result of the implementation of the combined preferred alternatives for the projects.

Considerations of Non-Preferred Alternatives for CIP Projects – State Listed Rare Species
Implementation of Non-Preferred alternatives for the following CIP projects have the potential for minor, long-term direct, adverse impacts to state-listed rare species and their habitats. These include the service access roads to the LES facility (Eastern Box Turtle habitat and non-breeding habitat for Eastern Spadefoot Toad), the auto parking area (Eastern Box Turtle habitat and both breeding and non-breeding Eastern Spadefoot Toad habitats), the horizontal concept for the Terminal building (breeding habitat for Eastern Spadefoot Toad), the full dimension of the terminal apron, and alternative Concepts 1 and 4 for the installation of a safety/security fence (Eastern Box Turtle habitat and both breeding and non-breeding Eastern Spadefoot Toad habitats). A minor reduction of 0.06 acres of coastal dune ecosystem impacts that would occur with the implementation of the alternative access path to the LES (LES Concept 6) is the only impact that would be reduced with the implementation of the non-preferred CIP alternatives. Implementation of auto parking Concept 1 would result in 0.23 acres of additional impacts to Eastern Box Turtle habitat and non-breeding Eastern Spadefoot habitat, with an additional 0.11 acres of potential breeding habitat for the Eastern Spadefoot.

Direct and indirect impacts to rare species habitat at the Airport would increase substantially with the increased length of fencing, the subsequent impacts associated with creating and maintaining a perimeter roadway (Concept 1), and long-term maintenance (adverse impacts) by potentially up to an additional 1.13 to 1.56 acres of freshwater wetlands (Concept 4 and Concept 1, respectively), and up to an additional 4.8 acres of long-term adverse coastal dune habitat along the fence. If implemented, these non-preferred CIP projects have the potential to substantially increase adverse impacts to state-listed rare species within the Province Lands. These impacts would be only partially mitigated through the conversion of existing impervious surfaces to wetland and coastal dune habitat (upon successful implementation), as well as implementation of habitat management to control invasive species.

Cumulative Impact to Public Use and Access and Safety (transportation and Section 4(f) properties and visual impacts)

No Action
The No Action alternative would result in continued minor to moderate short-term and long-term, adverse impacts to the safety and welfare of visitor use, safety, and experience for those visitors patronizing the Airport as a means of accessing the Park. Visitors will also continue to experience minor, long-term, direct, and indirect adverse impacts associated with the inconveniences of the crowded parking lot and terminal space for Park visitors who are Airport patrons. However, there would be no impacts to the visual experience of Park visitors.

When considered in combination with other projects in the Province Lands, existing impacts, due to unsafe and inconvenient conditions at the Airport, would continue to contribute to the minor to moderate short-term direct and indirect adverse impacts on Park visitors and Park staff with respect to their safety and park experience. In addition, the No Action alternative would continue to contribute to the potential moderate to major long-term adverse direct and indirect adverse impacts with respect to the public use of facilities (both safety and Park experience) within the Province Lands.

Preferred Alternatives
Proposed CIP projects designed to improve safety standards at the Provincetown Municipal Airport will result in minor to moderate, long-term, direct, and beneficial impacts to visitor use, safety, and experience for those visitors patronizing the Airport as a means of accessing the Park. Visitors may also experience minor, long-

term, direct, and beneficial impacts from the capacity-related CIP projects, which may alleviate certain inconveniences of crowded parking lot and terminal space for Park visitors who are Airport patrons. Minor, long-term, direct adverse impacts to visual aspects of the Park may be experienced by visitors utilizing the bike trail system near the Airport or those visiting the lookout tower at the Province Lands Visitor Center, where implementation of the preferred alternatives for the proposed parking lot and terminal expansion projects will result in minor changes to the views. Visual impacts will be off-set by native landscape screening plantings proposed around the parking lot and design modifications to the terminal to ensure that it meets the local design and character of other buildings at the Park and minimizes impacts to the visual environment at the Park.

Consequently, there would be no cumulative adverse impact to Public Use and Access and Safety as a result of the implementation of the combined preferred alternatives for the projects.

Considerations of Non-Preferred Alternatives for CIP Projects – Public Use and Access and Safety
Implementation of non-preferred alternatives considered for the proposed CIP projects, specifically the service access roads for the AWOS and the LES facilities and installation of the perimeter safety/security fence, and expansion to the terminal, auto parking area, and the turf apron, would also improve safety standards, and contribute to the minor to moderate, long-term, direct, and beneficial impacts to visitor use and experience for those visitors to the Province Lands, although the non-preferred alternative to the proposed LES would not be considered as safe for Airport operations. The horizontal expansion of the Airport terminal would result in negligible, long-term, direct, adverse impacts to the visual environment at the Airport.

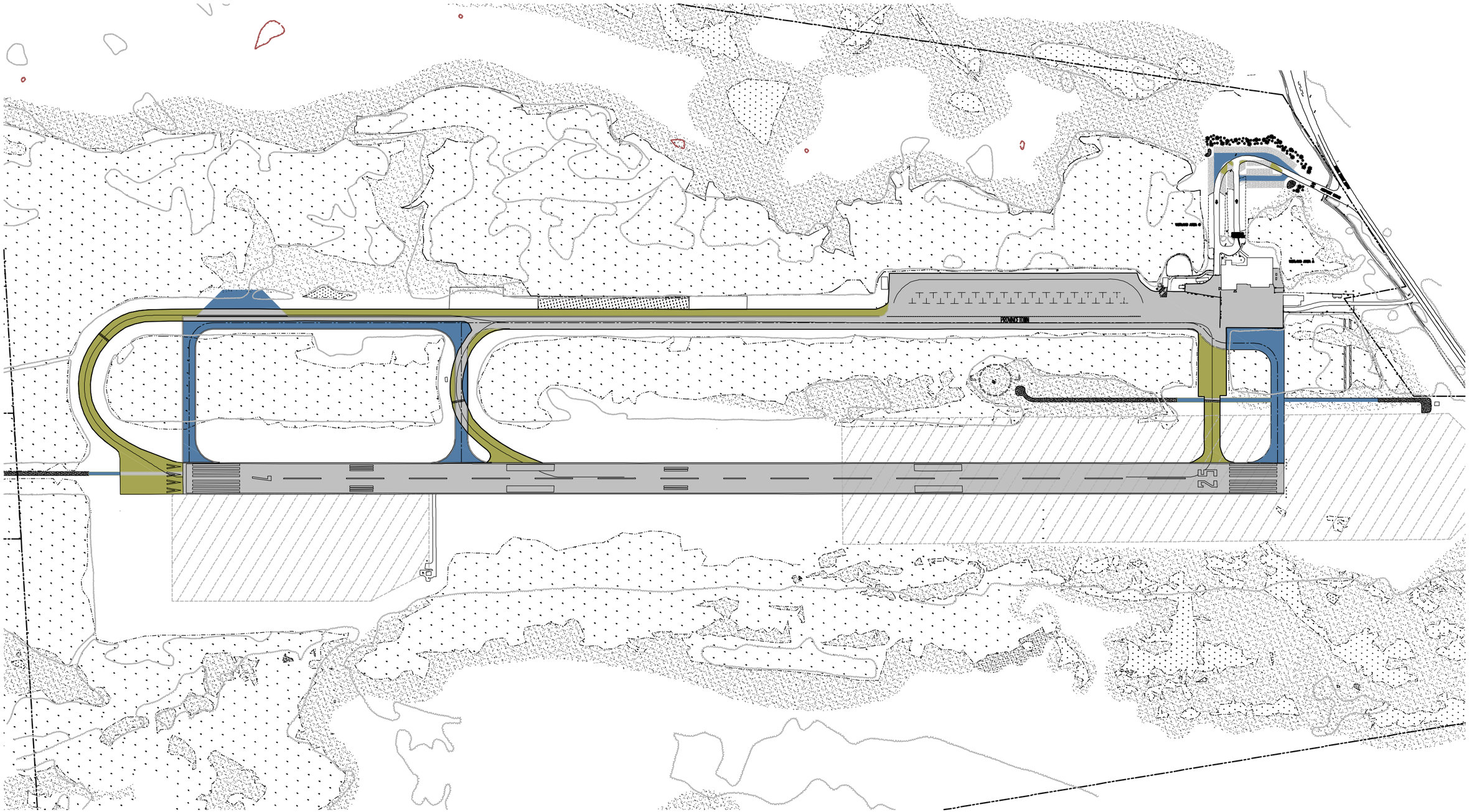
Table 5-2 Changes in Impervious Surface		
Projects with Pavement Elements	**Net Change**	**Stormwater Management**
1. Westerly TW System Improvements	-1,294	Infiltration Grass filter
2. Relocate East End TW	+2,814	Infiltration Grass filter
3. Reconstruct Terminal Apron	0	Closed system with filters; Sediment outlet trap
4. Reconstruct Easterly End of Parallel TW	-44,226	Infiltration Grass filter
5. Construct Electric Vault	+381	Infiltration Grass filter
6. Improve Access Road to MALSF	+1,000	Infiltration Grass filter
7. Construct AWOS and LES Service Access Roads	+5,500	Infiltration Grass filter
8a. Expand Auto Parking (Phase 1)	+2,830	Infiltration Grass filter
8b. Expand Auto Parking (Phase 2)	+5,070	Bioretention
Total Net Change in Pavement	**-27,925 SF**	
Source: consultant calculations		

Table 5-3 Summary Of Impacts And Proposed Mitigation Measures For Preferred Alternatives For CIP Projects

PROPOSED ALTERATION					PROPOSED MITIGATION		
Project	**Type of Resource Area**	**Area of Proposed Alteration (SF)**	**Species Habitat**	**Description of Proposed Alteration**	**Description of Proposed Mitigation**	**Area of Proposed Mitigation (SF)**	
(1) Westerly TW System Improvements	IVW	28,655 (Wetland I)	EBT, ES(B)	Fill	On-site wetland restoration	Areas A & C	
	Coastal Dune	6,460	EBT, ES(N)		On-site dune creation	Areas A & C	
	Cultural Grassland	No Net Loss	EBT, VS		On-site cultural grassland creation/restoration	No Net Loss	
(2) Relocate East End TW	IVW	28,300 (Wetland B)	EBT, ES(B)	Fill	On-site wetland restoration	Areas A & C	
	Coastal Dune	5,000	EBT, ES(N)		On-site dune creation	Areas A & C	
	Cultural Grassland	No Net Loss	EBT, VS		On-site cultural grassland creation/restoration	No Net Loss	
(3) Reconstruct Terminal Apron	--	--		--	--	--	
(4) Reconstruct Easterly End of Partial Parallel TW	--	--		--	--	--	
(5) Install TW Lighting and Construct Electric Vault	Cultural Grassland	No Net Loss	EBT, VS	--	On-site cultural grassland restoration	--	
(6) Repair Sightseeing Shack	--	--		--	--	--	
(7) Improve Access Road to Approach Lights (MALSF)	BVW	960 (Wetland C/J/FK)		Fill	On-site wetland restoration	Area B	
(8) Construct Service Access Roads LES Road	Coastal Dune	7,610	EBT, ES(N)	Fill	On-site dune creation	Areas A & C	
(8) Construct Service Access Roads AWOS Road	IVW	290 (Wetland H)	EBT	Fill	On-site wetland restoration	Areas A & C	
	Coastal Dune	10,560	EBT, ES(N)	Fill	On-site dune creation	Areas A & C	
(9) Install Perimeter Fence (REVISED alternative) **"Concept 6"**	BVW	1,152 (direct)[1] 8,972 (indirect/secondary) (Wetland C/J/FK)	(EBT)	Direct Impact consists of Fill for Fence Post Installation and maintenance. Indirect/Secondary Impact consists of Vegetation Maintenance[1].	On-site wetland restoration	Area B	
	IVW	25,648 (direct) 3,952 (indirect/secondary)	EBT, ES(B)		On-site wetland restoration	Areas A & C	
					On-site wetland enhancement	Wetland H & I	
	Coastal Dune	8,060 (direct) 24,028 (indirect/secondary)	EBT, ES(N)	Fill	On-site dune creation	Areas A & C	
(10a) Expand Auto Parking (Phase 1) **(10b) Auto Parking** (Phase 2) **"Concept 4"**	Coastal Dune	7,315	EBT, ES(N)	Fill	On-site dune creation	Areas A & C	
	Coastal Dune	5,707	EBT, ES(N)	Fill			
(11) Expand Terminal Building (Vertical Expansion)	--	--		--	--	--	
(12) Expand Turf Apron	Cultural Grassland	No Net Loss	EBT, VS	--	On-site cultural grassland restoration		
TOTAL DIRECT ALTERATION: (SF)	IVW	82,893		**TOTAL ON-SITE MITIGATION: (SF)**	On-site IVW restoration	**Net Change in Area (SF)**	
						78,000	**-4,893 (~1:1)**
					On-site wetland enhancement	616,350	**(~7.4:1)**
	BVW	2,112			On-site BVW restoration	5,000	**+2,888 (~2.4:1)**
	Coastal Dune	50,712 (includes Parking Phases 1 & 2)			On-site Dune creation	27,500	**-23,212 (~0.5:1)**
							-7,212 (~0.9:1)
	Cultural Grassland	No Net Loss			On-site Cultural Grassland restoration No Net Loss	On-site cultural grassland creation/restoration	**No Net Loss**

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

EBT = Eastern Box Turtle Habitat
ES(B) = Eastern Spadefoot Toad Breeding Habitat
ES(N) = Eastern Spadefoot Toad Non-Breeding Habitat
VS = Vesper Sparrow Habitat



Prepared By:

JACOBS

NEW IMPERVIOUS PAVEMENT AREA

EXISTING IMPERVIOUS REMAINING

IMPERVIOUS AREA TO BE REMOVED

Approx. Scale: 1"=300'

0 150 300

Provincetown Municipal Airport
Capital Improvements Plan

AIRPORT PAVEMENT PLAN

Figure 5.4