MassDEP File No. SE 049-0635

New Bedford Regional Airport Runway Safety Improvements Project

Post Construction Monthly Wetlands Plantings Assessment – June 2014

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Subject: **Special Condition 29(f); Post Construction Monthly Wetlands Planting Assessment; New Bedford Regional Airport Runway Safety Improvement Project; Variance Order of Conditions and Water Quality Certificate DEP File No. SE 049-0635.**

This Post Construction Monthly Wetlands Planting Assessment has been prepared in accordance with Special Condition 29(f) of the aforementioned Variance Order of Conditions and Water Quality Certificate. This is Epsilon's 9th vegetation monitoring report following substantial completion of the Mitigation Phase (Phase 2) of the New Bedford Regional Airport Runway Safety Improvements Project. This report covers the month of June 2014.

Requirements of Wetland Mitigation Monitoring

Special Condition 29(f) of the Variance requires (in part) the following:

> *The WS required in Special Condition 7 shall conduct inspections of the Replacement Areas during and after construction as follows … monthly between April and November for the first two growing seasons to determine vegetation development and regulatory compliance.*

The monthly vegetation assessment reports referenced in Special Condition 29(f) are in addition to comprehensive year end monitoring reports and twice-per-year soils, hydrology, and plant data collection efforts that are required over a 5 year period as per Special Conditions 30 through 33 of the Variance. Monitoring for invasive species, while described generally herein, is required under

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Special Condition 40 and the MassDEP-approved "Invasive Species Management Plan for Mitigation Sites" ("ISMP") prepared by Epsilon Associates dated January 24, 2011. Epsilon scientists also routinely inspect the wetland mitigation areas for the presence of invasive species as part of these 30-day reports. The annual ISMP report will be submitted to MassDEP under separate cover later in the fall. The purpose of the initial monthly inspections required under Special Condition 29(f) is to primarily assess general vegetation growth and development during the early stages following construction of the mitigation areas.

Review of Wetland Mitigation Sites

Construction of the wetland mitigation sites described below was substantially complete by the site contractor (Manafort Construction) during the winter of 2012. A locus map depicting the locations of the wetland mitigation sites is provided in Attachment A. Representative site photographs depicting vegetation development in each of the mitigation sites are provided in Attachment B. Please refer to the comprehensive year end monitoring report submitted in December 2013 for as-built plans of the mitigation sites (including eastern box turtle nesting habitat areas).

Wetland Mitigation Site 5

Wetland Mitigation Site 5 is approximately 1.6 acres. It is located at the north end of the Airport between Runway 23 and New Plainville Road. Site 5 was designed and constructed as a scrub-shrub wetland with pit-and-mound micro-topography and vernal pool habitat. A section of Site 5 contained a historically buried wetland that was restored as part of the mitigation efforts. Boulders and woody debris are scattered throughout the mitigation area. Site 5 adjoins a large wetland system (Wetland G) that extends to the west and north of New Plainville Road. Approximately 960 plants were installed in Wetland Mitigation Site 5.

Wetland Mitigation Site 6

Wetland Mitigation Site 6 is approximately 3.4 acres. It is located west of Runway 5 adjacent to the West Ditch. Site 6 was constructed as a scrub-shrub wetland with pit-and-mound micro-topography. It connects with Wetlands R, S and M. Boulders and woody debris are scattered throughout the mitigation area. Similar to Site 5 a section of Site 6 contained a historically buried wetland that was restored as part of the mitigation efforts. A portion of old Shawmut Avenue and a culvert crossing was removed during construction allowing the West Ditch to be "day-lighted" and flow unencumbered through and adjacent to Site 6. Wildlife Habitat Management Area 3 (eastern box turtle nesting habitat) was created in the uplands adjacent to the western boundary of Site 6. Approximately 2,000 plants were installed in Wetland Mitigation Site 6.

Wetland Mitigation Site 10

Wetland Mitigation Site 10 is the largest of the three wetland mitigation sites and is nearly 14 acres in size. Site 10 is located at the extreme southern end of the Airport property. Site 10 is surrounded on all sides by a large scrub-shrub wetland system and large floodplain area associated with the Paskamansett River. Site 10 was primarily created for the purpose of providing compensatory flood storage to offset fill that was placed in the floodplain during construction. Site 10 contains three vernal pool habitat areas located along the southern and eastern boundaries. Fairly substantial boulders, ledge outcrops and woody debris are scattered throughout the mitigation area. The temporary access road that was used during construction of Site 10 also contains a restored wetland complete with native plantings, microtopographic features, small stream channels and woody debris. Approximately 8,100 plants were proposed to be installed in Wetland Site 10.

Paskamansett River Plantings

Approximately 1,020 native shrubs were planted on either side of the Paskamansett River as mitigation for obstruction removal work. The shrubs were installed in a "zig zag" fashion within roughly 10 feet of the river banks over a distance of approximately 2,500 feet.

West Ditch

Approximately 1,100 linear feet of the West Ditch was relocated to facilitate construction of the Runway 5 Safety Area. The West Ditch was historically a relatively straight, man-made channel designed to collect and convey stormwater runoff from the west side of the Airport to the southeast side of the Airport across the existing Runway 5 Safety Area. The relocated West Ditch has greater sinuosity when compared to the original ditch and incorporates a network of pool complexes, low flow channels, channel constrictions, cross vane structures and submerged shelters to create enhanced habitat opportunities. Approximately 600 native shrubs and a seed mix were planted / sown on the banks of the reconstructed West Ditch.

Vegetation Assessment

In order to assess the relative health and vigor of the plantings installed in the aforementioned mitigation sites Epsilon conducted a series of meander surveys and an overall qualitative visual assessment of each site. General observations regarding plant species composition and health were made, along with representative photographs, and other relevant observations including but not limited to evidence of deer browse, bud/stem/leaf development, insect damage, readily observable plant disease, hydrologic conditions and other similar factors that could contribute to the success or decline of the plantings.

Findings

Vegetation Development

Plants located within the Wetland Mitigation areas are growing rigorously and many are flowering. The overall result is a dense herbaceous cover in all three mitigation areas. Shrubs were generally healthy and many were flowering or flower buds were starting to emerge.

Early volunteer species such as barnyard grass *(Echinochloa crus-galli) (FAC)* and smart weed *(Polygonum pensylvanicum) (FACW)* were observed in lower numbers. Additionally, other annuals that are generally found more in uplands such as clovers, mullin, and ragweed were less dominant then the previous year. Many planted species, part of the New England Wetland Mix, are in vegetative stages of various degrees of identification. Some of the grasses and sedges were in flowering phase, while other plants were generally unidentified or identified in early vegetative stage. Dominant plants observed in all three mitigation areas include green bulrush *(Scirpus atrovirens) (OBL),* soft rush *(Juncus effusus) (OBL),* blue vervain *(Verbena hastata) (FACW),* broom sedge *(Carex scoparia) (FACW),* fox sedge *(Carex vulpinoidea) (OBL),* shallow sedge *(Carex lurida) (OBL),* blunt broom sedge *(Carex tribuloides) (FACW),* soft-stem bulrush *(Schoenoplectus tabernaemontani) (OBL),* fowl bluegrass *(Poa palustris) (FACW),* fowl manna grass *(Glyceria striata) (OBL),* rattlesnake grass *(Glyceria canadensis) (OBL),* grass *(Poacea),* common boneset *(Eupatorium perfoliatum) (FACW),* Joe-pye weed *(Eutrochium purpureum) (FAC),* beggarticks *(Bidens spp.) (FACW/OBL),* and woolgrass *(Scirpus cyperinus) (OBL).* Other species identified throughout the year-one survey that were observed reemerging include native cattail *(Typha latifolia) (OBL),* smart weed, lady's-thumb *(FAC),* willow-herb *(Epilobium coloratum) (OBL),* large barnyard grass *(Echinochloa crus-galli) (FAC),* foxtail *(Alopecurus pratensis) (FAC),* marsh horsetail *(Equisetum palustre) (FACW), Cyperus spp. (FACW/OBL), A*sters, annual sowthistle *(Sonchus oleraceus) (FACU),* spike rush (*Eleocharis spp.),* jewelweed *(Impatiens capensis) (FACW)* and rye grass *(Lolium spp.).* Some common upland weeds were observed in small quantities on the higher elevations of some of the hummocks, these species included potentilla (*Potentilla spp.*), clover (*Trifolium spp.*), pennycress (*Thlaspi arverense*), bittercress (*Cardamine hirsute*), geranium (*Geranium spp.*), bindweed (*Convolvulus arvensis*), mullein (*Verbascum thapsus*), blue-eyed grass (*Sisyrinchium spp.*), and curly dock (*Rumex crispus*).

Epsilon positively identified common reed *(Phragmites australis)* at all three Wetland Mitigation Sites and within the West Ditch. Based on visual estimates there is between 90% and 95% cover with primarily native herbaceous wetland plant species throughout the vast majority of all Site 6 and Site 10 mitigation sites. The encroachment of common reed at these in Site 10 appears to be no different at this point as compared to observations made in November of last year and May 2014 (trace amounts to 5% throughout). Common reed in the southern 1/3 of Site 6 appears to have increased by ~2-5% since last month. Some areas within this southern lobe are up to 10%

common reed. The common reed was interspersed amongst cattails and other native wetland plant species. The Airport has scheduled an herbicide treatment in Sites 6 and 10 in late summer. We will continue to keep an eye on these areas in the interim. Epsilon observed and harvested individual common reed plants at Site 5 in May; no additional common reed individuals were found in June. We will continue to keep an eye on Site 5 and advise the Airport in the event treatment measures are determined to be necessary as per the approved ISMP. No new individual multiflora rose plants (*Rosa multiflora*) sprouts were found in Site 5 or 10. Site 6 had a few new rose sprouts, predominately on the edges of the mitigation area and immediately adjacent to established rose plants along the West Ditch. We will continue to keep an eye on these areas and advise the Airport in the event treatment measures are determined to be necessary as per the approved ISMP.

The areas of native cattail *(Typha latifolia)* seem to be stabilized and appeared to remain essentially in the same locations as described and the area quantified in the 2013 end of year report. The cattails are generally interspersed in the lower elevations of the three mitigation sites among other herbaceous cover types, woody plantings, micro-habitat features (boulders, pits-and-mounds, large woody debris) and areas of open water / vernal pools resulting in good horizontal habitat diversity.

Woody Plantings and Other Site Features

Wetland Mitigation Site 5

The following woody plantings were observed in Site 5 at the time of inspection: silky dogwood *(Cornus amomum),* buttonbush *(Cephalanthus occidentalis),* swamp rose *(Rosa palustris),* winterberry holly *(Ilex verticillata),* maleberry *(Lyonia ligustrina),* red chokecherry (*Aronia arbutifolia*), black chokecherry (*Aronia melanocarpa*), grey dogwood *(Cornus racemosa*), and northern arrow-wood *(Viburnum recognitum)*. These shrubs appeared healthy and were vigorously growing. In Site 5, two buttonbush shrubs were suffering from insect damage. Groundcover at the time of inspection included the mix of mostly wetland plants noted above; the density of ground cover was quite high (95 to 110%). Herbaceous vegetation was generally around two feet tall. The vernal pool was super-saturated, with no soil strength. There was no standing water at the time of inspection.

Wetland Mitigation Site 6

The following woody shrub species were observed in Site 6 at the time of inspection: winterberry holly, sweet pepperbush *(Clethra alnifolia),* red chokeberry, American elderberry *(Sambucus canadensis),* silky dogwood, buttonbush and northern arrowwood. These shrubs appeared healthy and were vigorously growing. A few dogwoods are suffering from deer browse. Groundcover at the time of inspection included the mix of mostly wetland plants noted above; the density of

ground cover was quite high (95 to 115%). There was no standing water at lower elevations within the wetland.

Wetland Mitigation Site 10

The following woody shrub species were observed in Site 10 at the time of inspection: winterberry holly, northern arrowwood, swamp rose, highbush blueberry *(Vaccinium corymbosum),* buttonbush and maleberry, steeplebush (*Spirea tomentosa*), meadowsweet (*Spirea latifolia*). There was evidence of some deer browse throughout the mitigation area, especially on the dogwoods. Generally shrubs appeared healthy and were vigorously growing. Groundcover at the time of inspection included the mix of mostly wetland plants noted above; the density of ground cover was quite high (95 to 115%). The northernmost vernal pool was super-saturated, yet had no standing water. The southernmost vernal pool appeared approximately ½ full, based on the watermark on the rock within the pool. The western vernal pool had approximately 0.5 feet standing water and was the pool was reduced. There was little standing water at lower elevations. Significant bird activity was noted during the inspection.

West Ditch

Shrubs within the West Ditch are vigorously growing and appear healthy. As reported in the first EM report for Phase 4, a portion of the West Ditch restoration area (approximately 450 linear feet) was disturbed during erosion control installation. The contractor has implemented the restoration and monitoring is ongoing. Many of the affected shrubs are also undergoing bud break and look relatively good, especially in light of the impact they withstood. The side slopes that were seeded are now exhibiting growth including some species identifiable from the erosion seed mix. Except where noted, the side slopes were well vegetated with a robust and established mixed layer of herbaceous vegetation. Rooted aquatic vegetation remained persistent on the bottom of the West Ditch.

The following species were identified along the West Ditch at the time of inspection: silky dogwood, winterberry holly, buttonbush, maleberry, pussy willow *(Salix discolor),* highbush blueberry, red chokeberry, and northern arrowwood. There are some common reed popping up through the bank and bed of the West Ditch; there is a fair amount to common reed located at either end of the West Ditch, where the ditch ties into common reed monocultures (approximately 40 feet on south end and 20 feet on north end). The erosion seed mix is robust and established at the time of inspection.

Paskamansett River

The banks of the Paskamansett River remain thickly vegetated with native wetland plants which was the goal following completion of obstruction removal activities.

Attachment A

Wetland Mitigation Sites Locus Map

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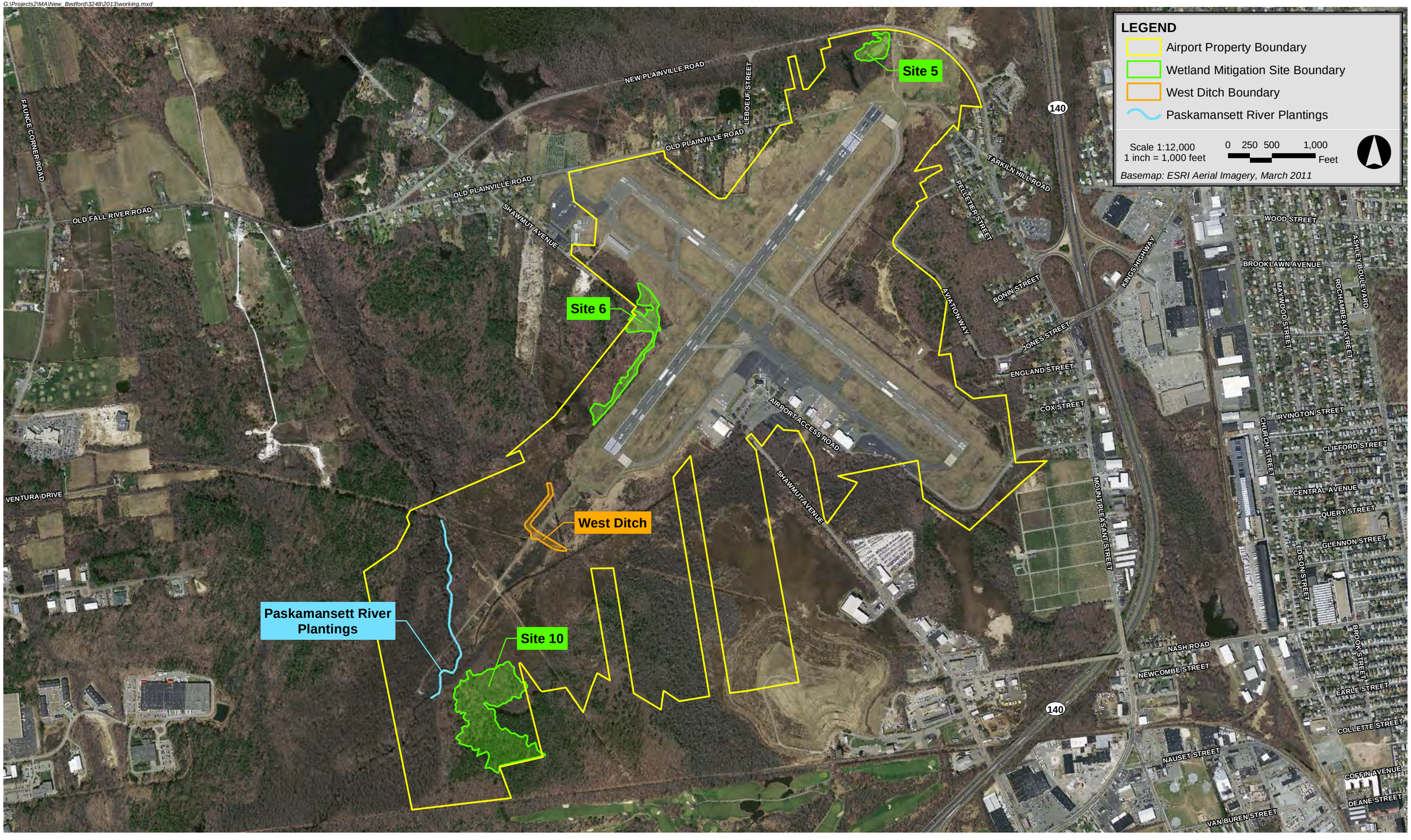

New Bedford Airport **New Bedford, MA**

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Figure 1
Mitigation Monitoring Locations

Attachment B

Representative Site Photographs of Wetland Mitigation Plantings

Typical view of hearty buttonbush in Site 5.

View of cattail fringe around Site 5 vernal pool from photo station, looking north.

View of vernal pool edge in Site 5. This pool is saturated and soil lacks structure (due to saturation), yet standing water has evaporated. Note the herbaceous vegetation growing in the bottom of the pool (a new observation as pool historically had a mucky exposed substrate); not clear if it is Typha or another plant species. Vegetation will need to be keyed out during flowering period as the plants mature.

This buttonbush has some insect damage; one of only two shrubs observed with insect damage in Site 5.

View looking southwest within Site 5. Very dense herbaceous plant growth and predominantly healthy woody shrubs throughout.

View of healthy winterberry in Site 5.

View of flowering swamp rose in Site 5.

View of healthy sweet pepperbush in Site 6.

Typical view of representative vegetated growth in Site 6 (very dense and robust).

View of representative vegetated growth in southern 1/3 of Site 6, note presence of phragmites (scheduled to be treated late summer 2014).

View of healthy dogwood growing within dense herbaceous vegetation in Site 6.

Typical view of plant growth in first 1/3 of Site 6 from Turtle Area 3 vantage point.

View of healthy flowering American elderberry in Site 6.

Typical view of Site 10, looking south.

View of northernmost vernal pool and cattail fringe in Site 10, looking northeast.

View of southernmost vernal pool in Site 10. Water levels have dissipated since May visit. Note watermark on center rock.

View of southeasternmost portion of Site 10, looking east. The wetland seed mix is extremely hearty and diverse throughout this stretch.

View of robust herbaceous vegetation and healthy alder planted in Site 10.

View of western vernal pool in Site 10. Water levels have dissipated, shrubs planted along the fringe are starting to leaf out. Evidence of wildlife utilization observed in the soil.

View of western vernal pool in Site 10 and cattail fringe, looking west.

View of robust and healthy plant growth as you enter Site 10.

Typical view of overall plant growth in Site 10.

Typical view of healthy joe-pye weed in Site 10.

Typical view of sporadic phragmites pockets encroaching into Site 10 (scheduled to be treated late summer 2014).

Typical view of herbaceous plant growth in Site 10; common vervain (purple flower) in foreground.