

MassDEP File No. SE 049-0635

New Bedford Regional Airport Runway Safety Improvements Project

Post Construction Monthly Wetlands Plantings Assessment – March/April 2014

To: Lisa Rhodes, MassDEP  
Tom Maguire, MassDEP  
Tena Davies, MassDEP  
Sarah Porter, New Bedford Conservation Commission

From: Michael D. Howard, PWS, CWS, Epsilon Associates, Inc (EM)  
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CC: Robert Mallard, P.E., ASG  
Erick D'Leon, New Bedford Regional Airport Manager

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.**

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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 7<sup>th</sup> vegetation monitoring report following substantial completion of the Mitigation Phase (Phase 2) of the New Bedford Regional Airport Runway Safety Improvements Project. This report includes observation made by Epsilon during the month of March and April 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 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 as part of the annual wetlands monitoring report. 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 to MassDEP, Corps and Conservation Commission 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.

NOTE: Epsilon simultaneously completed vernal pool assessments in the vernal pool in Site 5 and the three created vernal pools within Site 10. Vernal pool indicator species were observed within the Site 5 vernal pool including multiple American toads (*Anaxyrus americanus*) observed within Site 5 and 10 wetlands, calling on the edges of the vernal pools, mating and many egg strings were observed. Within the small vernal pool, located in the northeast corner of Site 10, Epsilon observed wood frog (*Lithobates sylvatica*) and spotted salamander (*Ambystoma maculatum*) egg masses in addition to American toad egg strings. Spotted salamander egg masses were also observed within the westernmost vernal pool in Site 10. There was no evidence of fish in any of the pools. It is interesting to note that the breeding amphibians and egg masses were found within and attached to the native cattail (*Typha latifolia*) located along the edges of all the pools. By the end of April, the cattails, which are generally interspersed in the lower elevations of the three mitigation sites were starting to green-up.

## Findings

### *Vegetation Development*

Considering cold temperatures through March and into late April, the wetland mitigation sites and the overall vegetated community observed within the New Bedford Regional Airport were still in relative winter senescence at the time of inspection. Many of the planted shrubs were just starting bud break and the herbaceous layer was largely unidentifiable at this stage of the early growing season. Ultimately, Epsilon based its herbaceous vegetation assessments on plants that were just emerging and only identifiable as monocots or dicots.

### *Woody Plantings and Other Site Features*

#### *Wetland Mitigation Site 5*

Many of the plantings observed during prior inspections [e.g., 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*)] were just beginning to bud break and appeared healthy. Groundcover at the time of inspection mostly included herbaceous die back from the previous growing season. Some trace monocots, dicots were also noted. The vernal pool was at its maximum water elevation which is a typical spring-time condition at the Airport.

#### *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, silky dogwood, buttonbush and

northern arrowwood. Generally shrubs were undergoing bud break and appeared to be in good condition. Some shrubs are suffering from deer browse. Groundcover at the time of inspection mostly included herbaceous die back from the previous growing season. Some trace monocots, dicots were also noted. There was standing water at lower elevations and some channels forming within the wetland. Deer browse on the planted shrubs continues to be a challenge and there were numerous fresh deer tracks in the adjacent box turtle mitigation site.

#### *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. There was again evidence of deer browse throughout the mitigation area. As noted in last year's reports some of the planted shrubs were not able to be located in the field even after extensive inspections by Epsilon because of the dense herbaceous wetland vegetation, while the herbaceous vegetation was matted and underwent some significant die back over the winter, it was still challenging to find shrubs within Site 10. Groundcover at the time of inspection mostly included herbaceous die back from the previous growing season. Some trace monocots, dicots were also noted. All three vernal pools were at their highest level (approximately 3-4 feet) based on water marks at the time of inspection. There was standing water at lower elevations and there are some channels forming within the wetland.

#### *West Ditch*

Shrubs within the west ditch are experiencing bud break and many 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 WS has provided DEP with a restoration and monitoring plan to remediate the disturbance. 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.

#### *Paskamansett River*

The banks of the Paskamansett River remain thickly vegetated which was the goal following completion of obstruction removal activities. The River and adjacent floodplain and wetlands were inundated at the time of inspection.

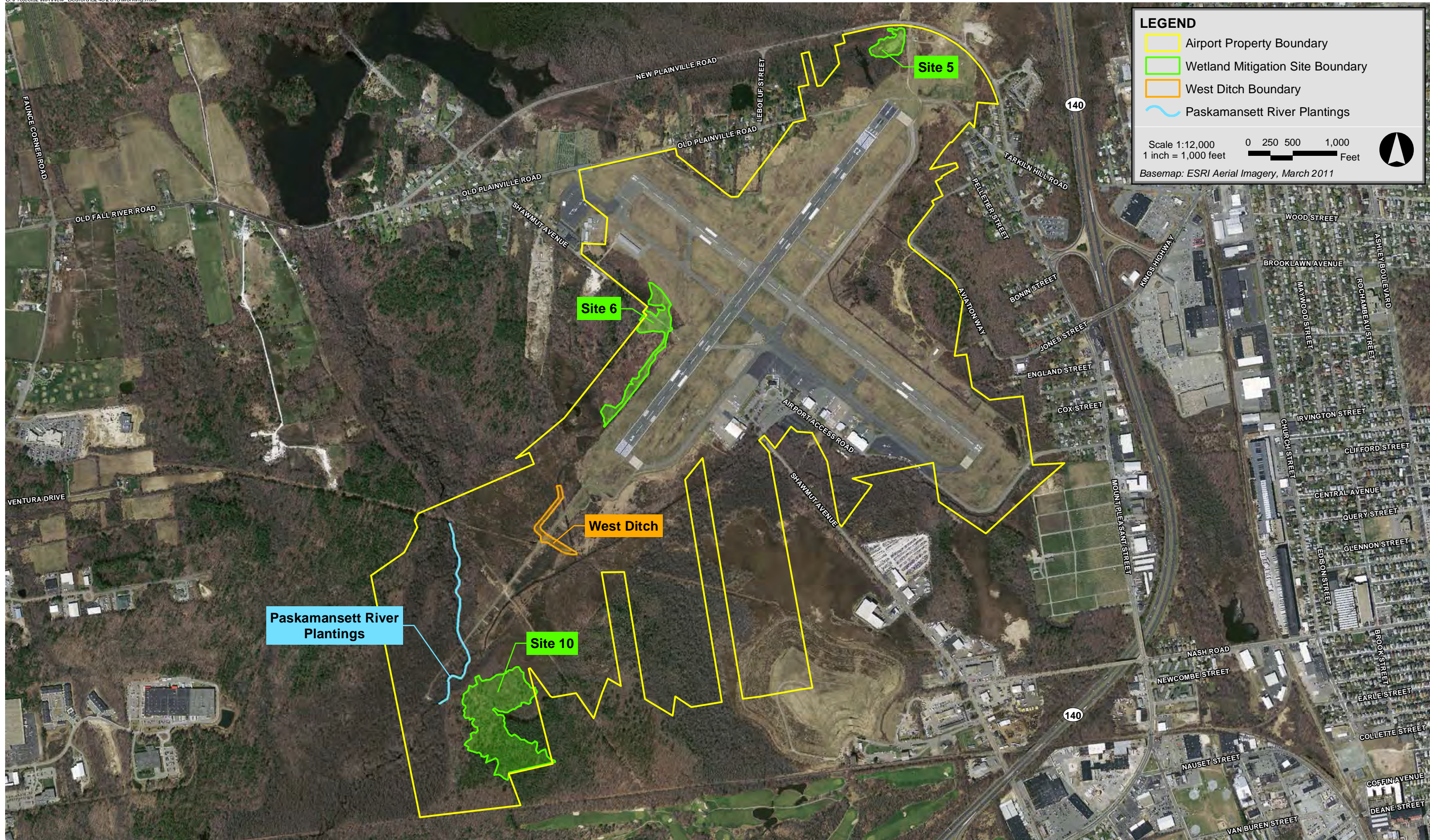
MH/AA

## Attachment A

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### Wetland Mitigation Sites Locus Map





New Bedford Airport New Bedford, MA



**Attachment B**

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**Representative Site Photographs of Wetland Mitigation Plantings**





View of Site 5 vernal pool. Consistent with other spring-time observations made in 2012 and 2013 at the project site this water feature appears to be at bankfull, the maximum volume of water during the year. Note that some of the herbaceous vegetation adjacent to the vernal pool is starting to grow (green-up). At the time of inspection numerous American toad (*Bufo americanus*) egg masses (strings) and breeding adults were observed along the edges of the pool within the stands of cattail and herbaceous vegetation.





View looking generally north within Site 5. Some shrubs are starting to bud, but generally the site is still in senescence.





View of vernal pool in northeastern corner of Site 10. This vernal pool had multiple obligate vernal pool species egg masses (spotted salamander, wood frog) and breeding adult American toads (and related egg masses/strings) at the time of inspection. Egg masses and breeding adults were primarily identified within the fringe of cattails bordering the perimeter of the pool.





View of two mating pairs of American toads within the planted buttonbush and cattails that migrated in following construction of the mitigation site. Note that egg strings are visible adjacent to the toads on the right.





View of chorusing male American toad within the cattails.





View of westernmost vernal pool at Site 10 during high water conditions in March/April 2014. Numerous breeding American toads and related egg strings were found within the cattails.





View of easternmost vernal pool in Site 10 from rock outcropping during high water conditions in March/April 2014. In addition to numerous breeding American toads we identified a spotted salamander egg mass within the cattail fringe during the inspection period .



View of Site 10, the site is still largely in senescence.





View of Site 6, the site is still largely in senescence.





View of west ditch in early April prior to start of Phase 4 work.



View of west ditch after disturbance (April 24, 2014). Some of the shrubs were undergoing bud break.





View of swollen banks of the Paskamansett River and adjacent floodplain and wetlands during significant rain event, many of the plantings were well under water.

## Attachment C

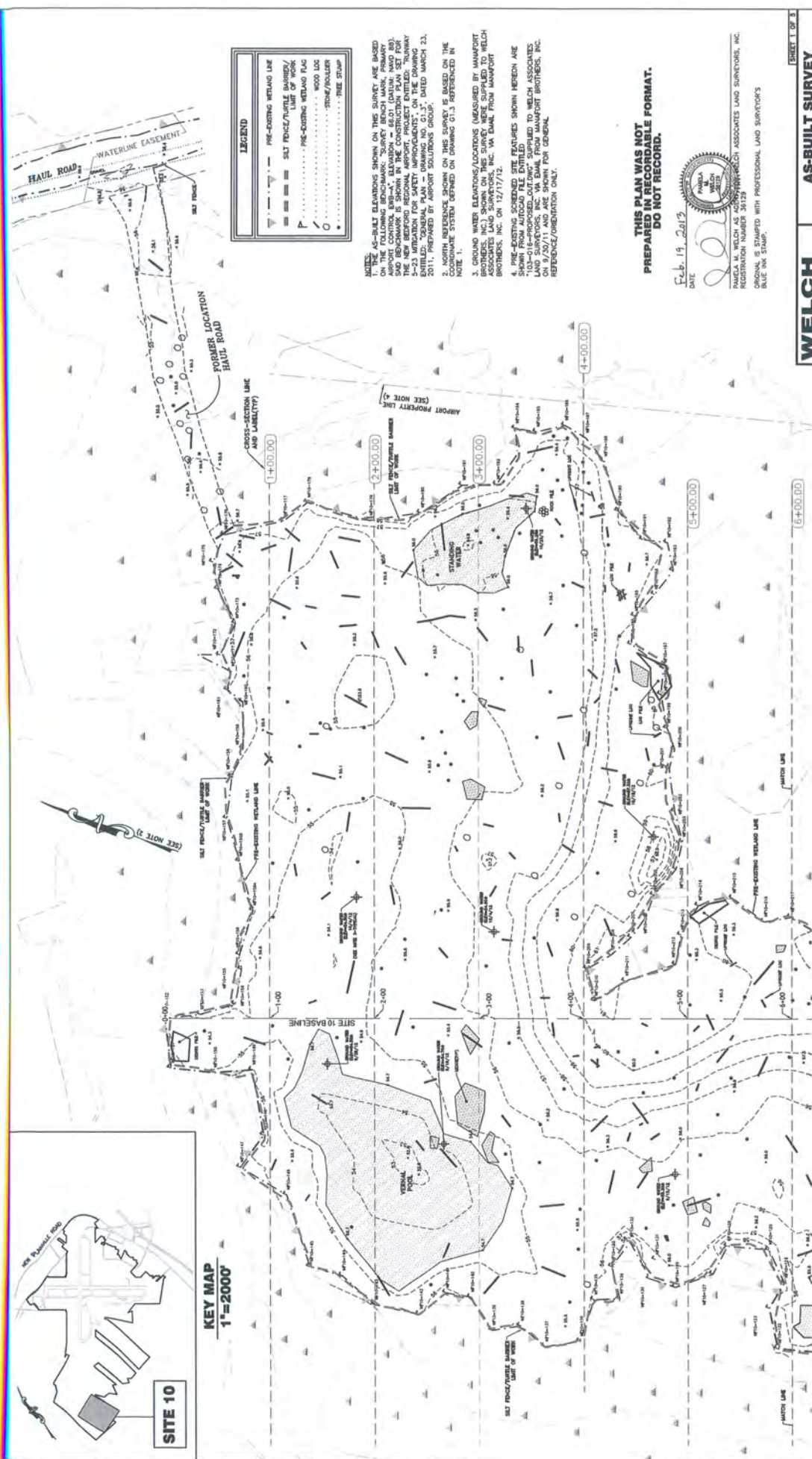
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As-Built Drawings of Mitigation Areas  
(wetlands and box turtle nesting habitat areas)





KEY MAP  
1"=2000'



LEGEND	
	PRE-EXISTING WETLAND LINE
	SILT FENCE/TURBULE BARRIER LIMIT OF WORK
	PRE-EXISTING WETLAND FLAG
	WOOD LOG
	STAKE/ROUTER
	TREE STUMP

NOTES:  
1. THE AS-BUILT ELEVATIONS SHOWN ON THIS SURVEY ARE BASED ON THE DATUM OF 1985. THE DATUM IS BASED ON THE DATUM OF 1985. THE DATUM IS BASED ON THE DATUM OF 1985.  
2. THE DATUM IS BASED ON THE DATUM OF 1985. THE DATUM IS BASED ON THE DATUM OF 1985. THE DATUM IS BASED ON THE DATUM OF 1985.  
3. GROUND WATER ELEVATIONS/LOCATIONS (MEASURED BY MANAFORT BROTHERS, INC.) SHOWN ON THIS SURVEY WERE SUPPLIED TO WELCH BROTHERS, INC. BY MANAFORT BROTHERS, INC. ON 12/17/12.  
4. PRE-EXISTING ELEVATED SITE FEATURES SHOWN HEREIN ARE SHOWN FROM AUTOCAD FILE ENTITLED "103-016-PROPOSED OUTLINE" SUPPLIED TO WELCH ASSOCIATES BY MANAFORT BROTHERS, INC. ON 8/20/11 AND ARE SHOWN FOR GENERAL REFERENCE/ORIENTATION ONLY.  
5. THE DATUM IS BASED ON THE DATUM OF 1985. THE DATUM IS BASED ON THE DATUM OF 1985. THE DATUM IS BASED ON THE DATUM OF 1985.

THIS PLAN WAS NOT  
PREPARED IN RECORDABLE FORMAT.  
DO NOT RECORD.



DATE: Feb. 19, 2013  
PAMELA M. WELCH AS ASSOCIATE WELCH ASSOCIATES LAND SURVEYORS, INC.  
REGISTRATION NUMBER 35129  
ORIGINAL IS STAMPED WITH PROFESSIONAL LAND SURVEYOR'S  
BLUE INK STAMP.

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AS-BUILT SURVEY  
WETLAND AND FLOODPLAIN  
MITIGATION SITE 10  
AIP NO. 3-25-0034-41  
NEW BEDFORD REGIONAL AIRPORT  
NEW BEDFORD, MASSACHUSETTS  
Prepared for:  
MANAFORT BROTHERS, INC.

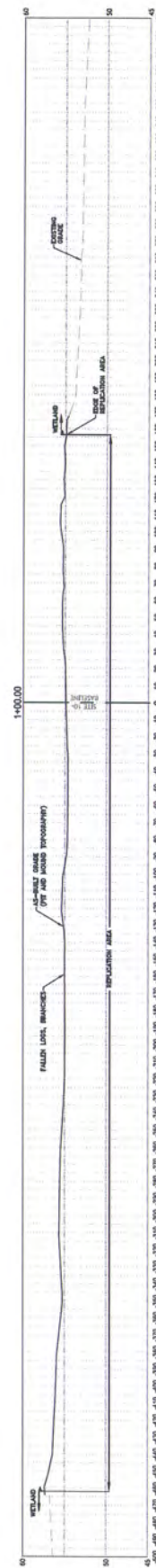
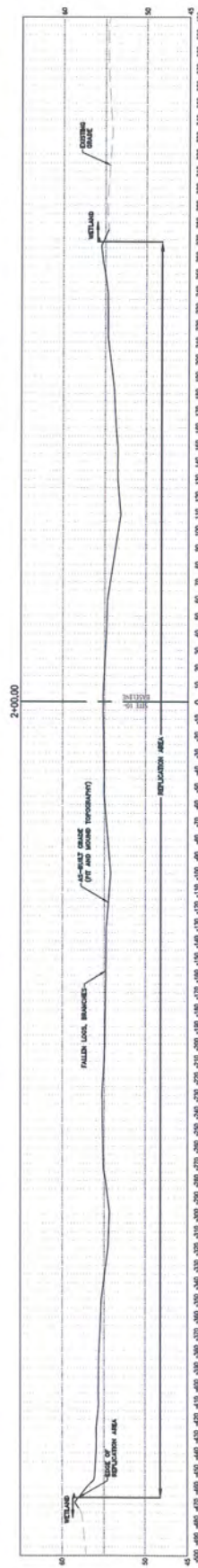
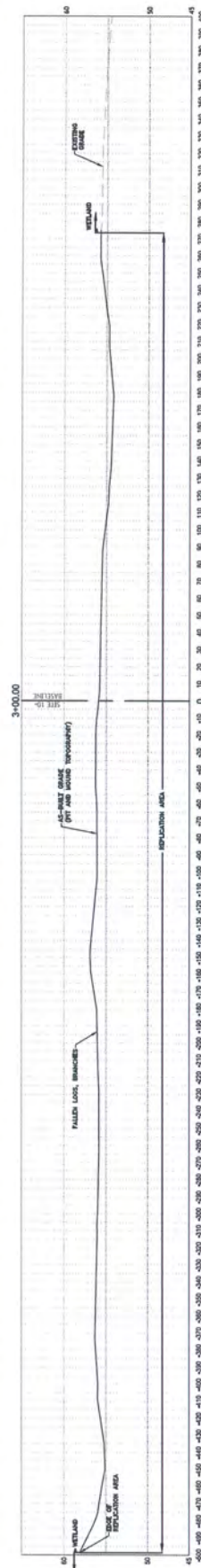
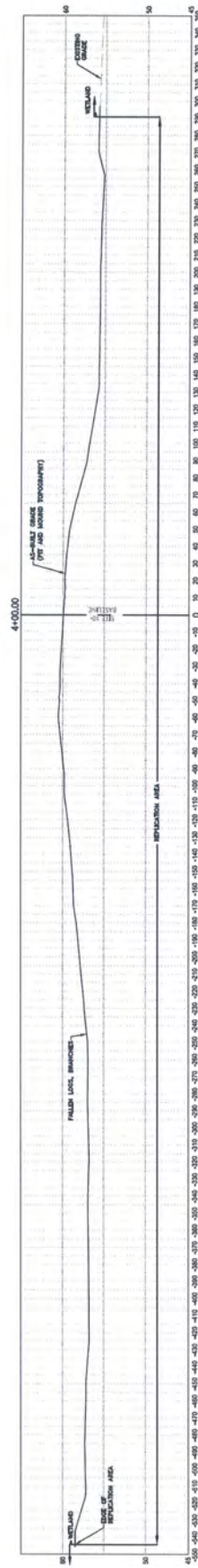
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SHEET 3 OF 3


FILE: N1109048-SITE\_10 DATE: FEBRUARY 19, 2013

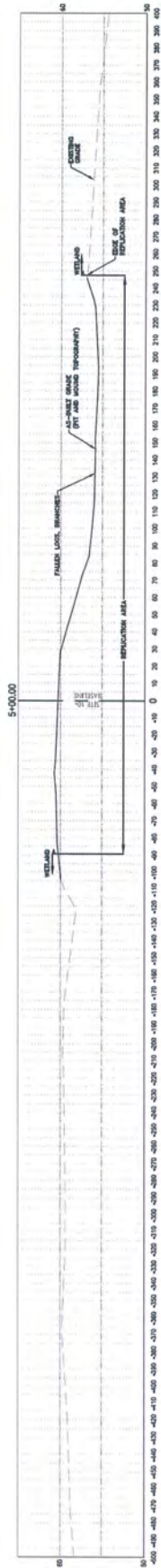
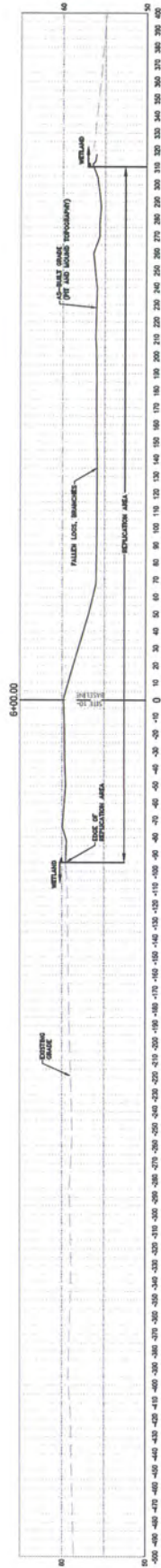
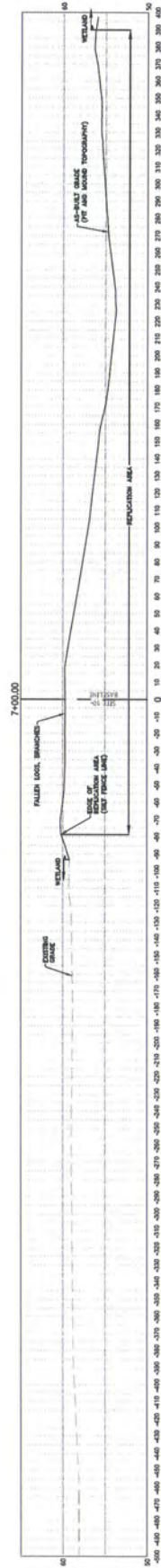
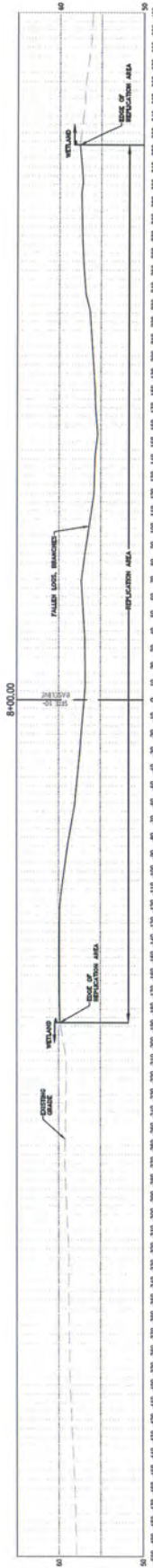




**CROSS-SECTIONS  
WETLAND AND FLOODPLAIN MITIGATION  
SITE 10**

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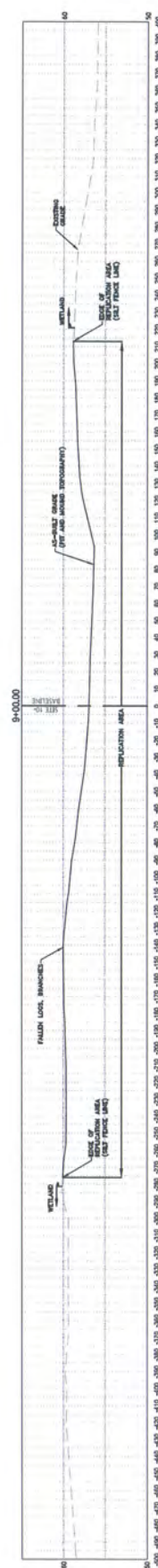
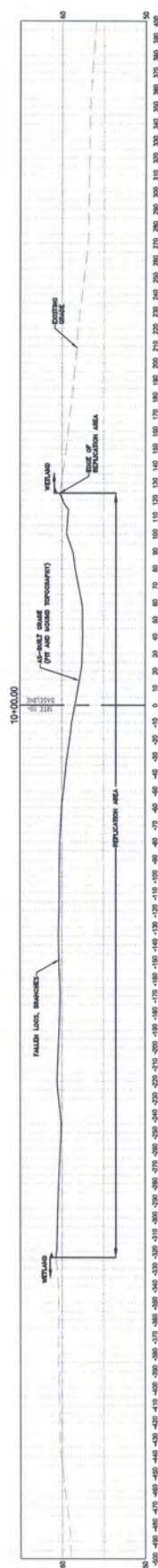
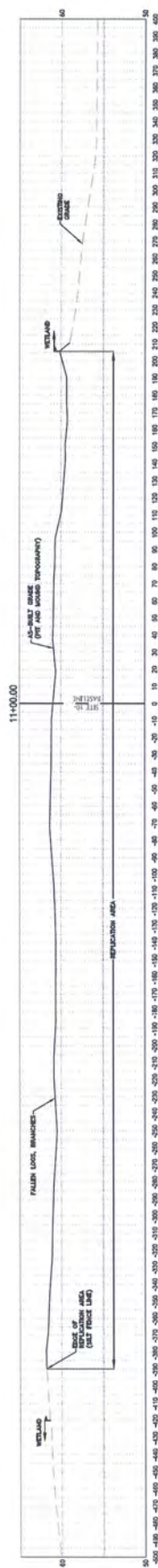
 <p><b>WELCH</b> Associates Land Surveyors, Inc. 10000 Highway 104, #200 Shreveport, LA 71209 Phone: (504) 835-4422 www.welchland.com</p>	<p><b>AS-BUILT SURVEY</b> WETLAND AND FLOODPLAIN MITIGATION SITE 10 AIP NO. 3-25-0034-41 NEW BEDFORD REGIONAL AIRPORT NEW BEDFORD, MASSACHUSETTS</p>	<p>Prepared for: <b>MANAFORT BROTHERS, INC.</b></p>
	<p>FILE: N1109040-STM-10 DATE: FEBRUARY 19, 2013</p>	



**CROSS-SECTIONS  
WETLAND AND FLOODPLAIN MITIGATION  
SITE 10**  
SCALE: 1"=30' HORIZ./1"=6' VERT.

<b>WELCH</b> Associates Land Surveyors, Inc. 1000 Main Street, Suite 100 Westborough, MA 01581 Tel: 508/865-1100 Fax: 508/865-1101 www.welchinc.com	<b>AS-BUILT SURVEY</b> WETLAND AND FLOODPLAIN MITIGATION SITE 10 AIP NO. 3-25-0034-41 NEW BEDFORD REGIONAL AIRPORT NEW BEDFORD, MASSACHUSETTS Prepared for: MANAFORT BROTHERS, INC.
	SHEET 4 OF 5
	FILE: N1100048-SITE_10 DATE: FEBRUARY 19, 2013
	AS-NOTED





**CROSS-SECTIONS  
WETLAND AND FLOODPLAIN MITIGATION  
SITE 10**

SCALE: 1"=30' HORIZ./1"=6' VERT.

**WELCH**  
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**AS-BUILT SURVEY**  
WETLAND AND FLOODPLAIN  
MITIGATION SITE 10  
AIP NO. 3-25-0034-41

AIR NO. 3-29-0034-41  
NEW BEDFORD REGIONAL AIRPORT  
NEW BEDFORD, MASSACHUSETTS

Prepared for:  
MANAFORT BROTHERS, INC.

FILE: N110206AB-SFTE_10	JUTC DATE: FEBRUARY 19, 2013
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### ALSO-NOTED



**NOTES:**

1. THE AS-BUILT ELEVATIONS SHOWN ON THIS SURVEY ARE BASED ON THE "EUM-88" DATUM.

2. ELEVATION = 60.0' (NORMAL NAVD 83). BEST BENCHMARK IS SHOWN IN THE DRAWING.

3. UNITS: HORIZONTAL = 25.4' DIMENSION FOR SAFETY IMPROVEMENTS ON THE DRAINAGE ENTRENCH; VERTICAL NAVD - DRAWING NO. 01.37, DATED MARCH 23, 2011.

4. PREPARED BY RAYPORT SOLUTIONS GROUP.

5. THIS SURVEY REPORT AND ALL ATTACHED FILES ARE BASED ON THE COORDINATE SYSTEM DEFINED ON DRAWING OF THE FEATURES IN NOTE 1.

6. PRE-EXISTING SCHEDULED SITE FEATURES SHOWN HEREON ARE SHOWN FROM AIRCOM FILE DENTED "103-018-PROPOSED OUTFALL" SUPPLIED TO WELCH ENGINEERING INC. BY THE STATE OF CALIFORNIA DEPARTMENT OF WATER RESOURCES, INC. 9/20/01 AND ARE SHOWN FOR GENERAL REFERENCE/Orientation ONLY.

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PREPARED IN RECORDABLE FORMAT.  
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DATE Feb. 19, 2013



PAULA M. WELCH AS AGENT FOR WELCH ASSOCIATES LAND SURVEYORS, INC.  
REGISTRATION NUMBER 36129

ORIGINAL IS STAMPED WITH PROFESSIONAL LAND SURVEYOR'S  
BLUE INK STAMP.

### LEGEND

-  PRE-EXISTING WETLAND LINE  
 SAT FENCE/TURTLE BARRIER/  
 LIMIT OF WORK  
 PRE-EXISTING WETLAND FLAG  
 WOOD LOG  
 STONE/BOULDER  
 "BE" STUMP

SHEET 1 OF 2

## AS-BUILT SURVEY

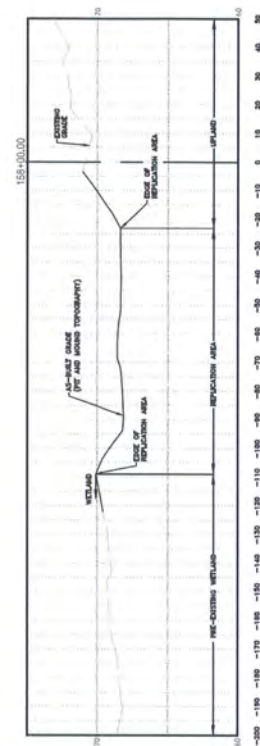
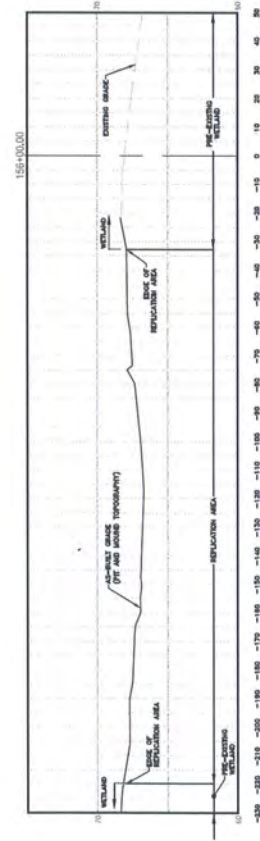
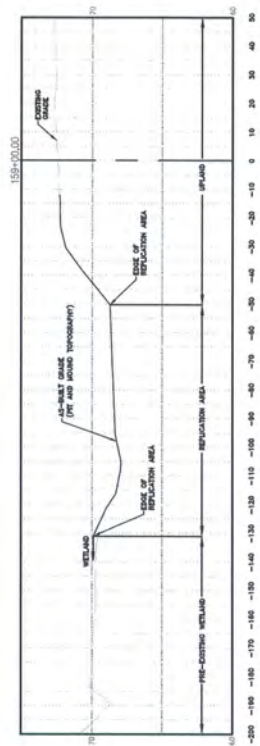
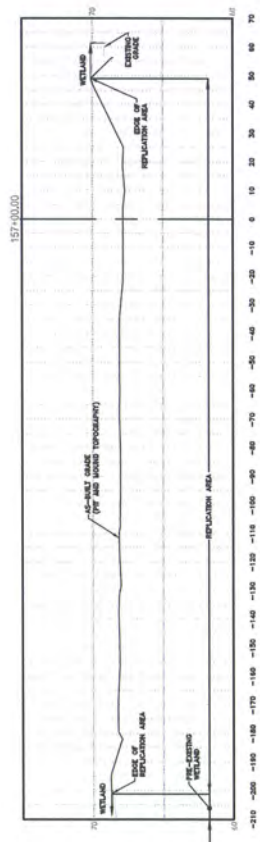
WETLAND MITIGATION SITE 5  
AIP NO. 3-25-0034-41  
NEW BEDFORD REGIONAL AIRPORT  
NEW BEDFORD, MASSACHUSETTS

Prepared for:  
**MANAFORT BROTHERS, INC.**

FILE: N110906AB-SITE_5	ETC DATE: FEBRUARY 19, 2013
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SCALE: 1"=40'





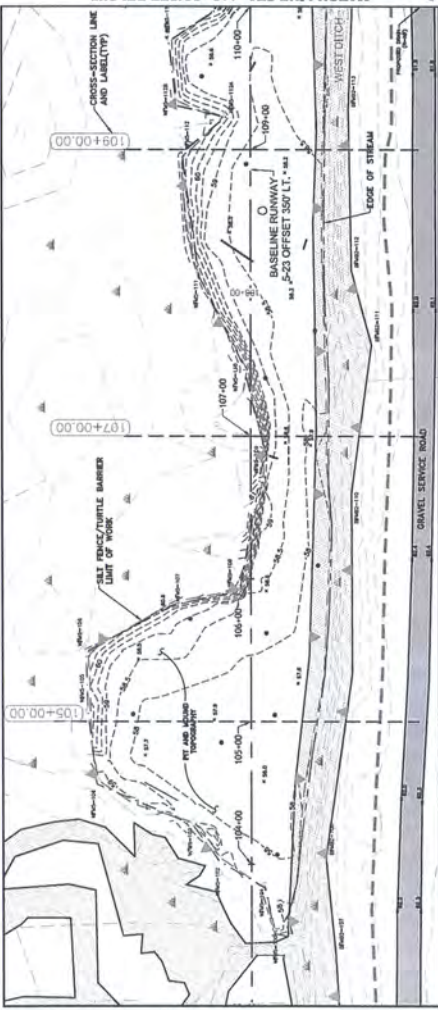
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SCALE: 1"=20' HORIZ./1"=4' VERT.

**WELCH**  
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NEW BEDFORD, MASSACHUSETTS  
Prepared for:  
MANAFORT BROTHERS, INC.

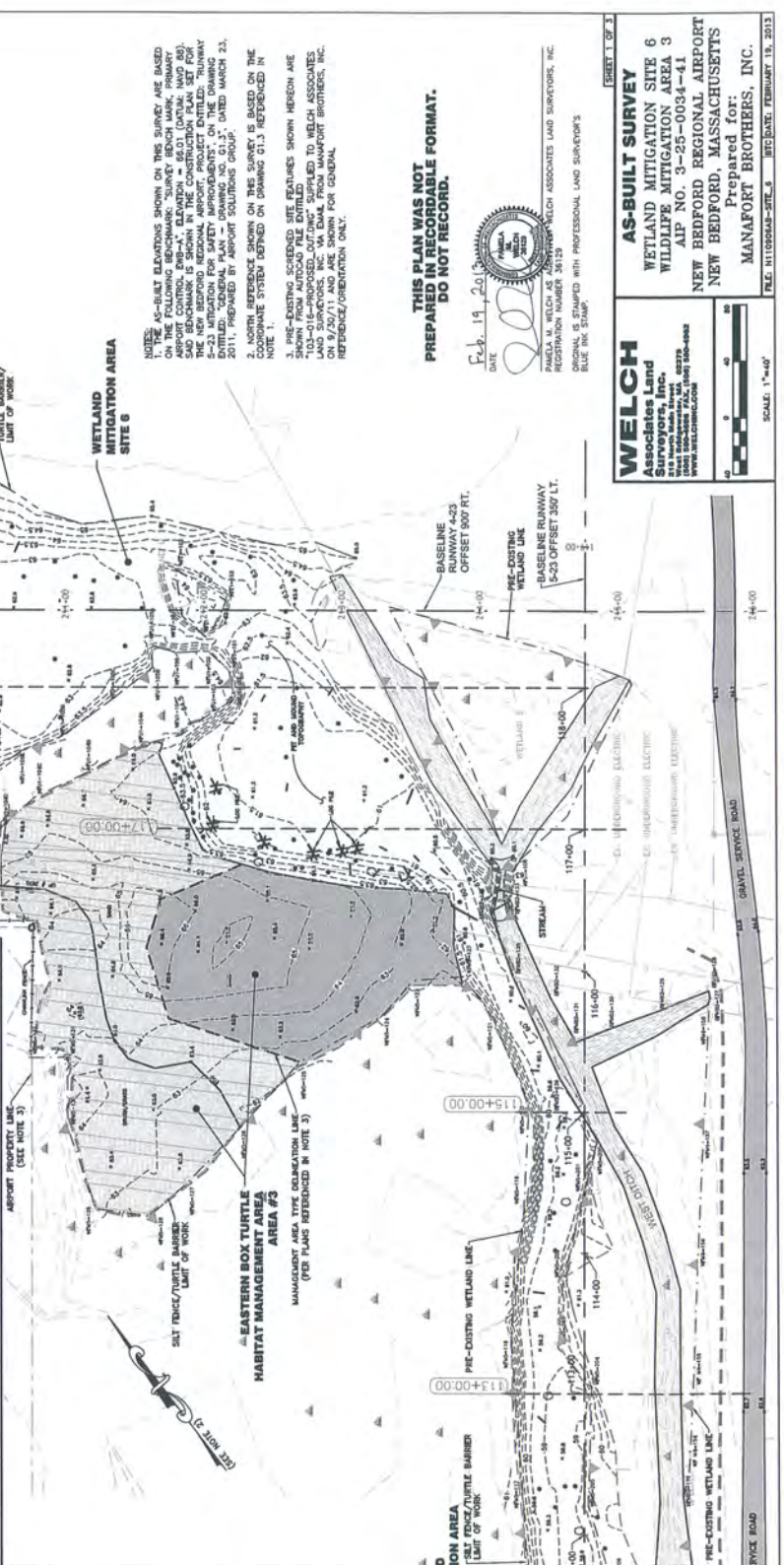
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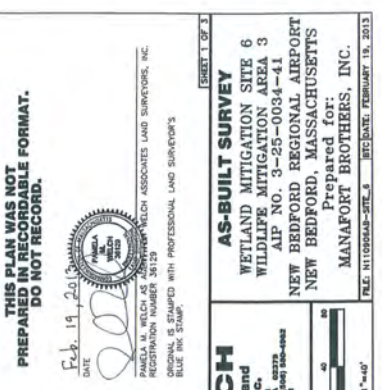
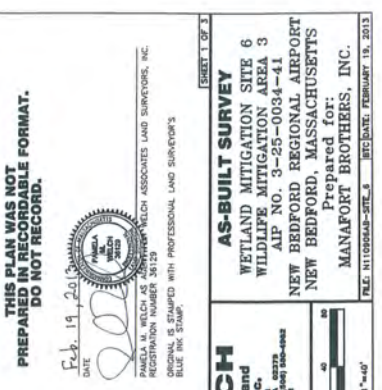
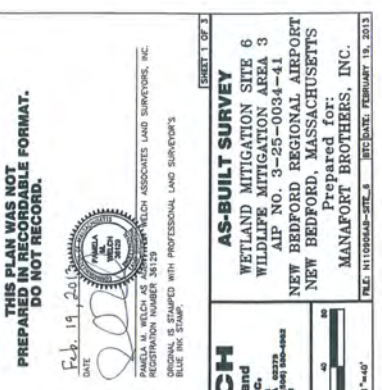
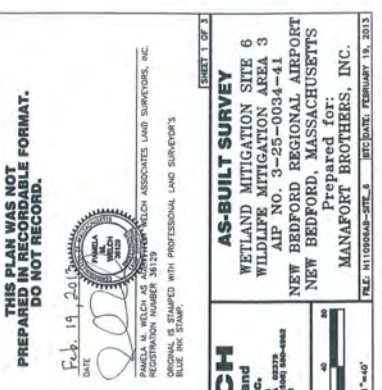
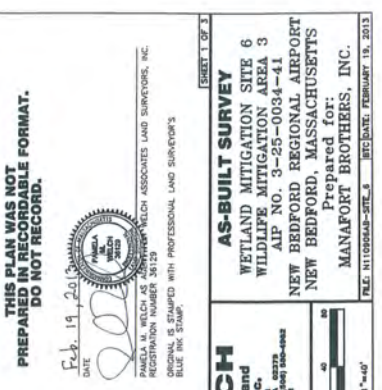
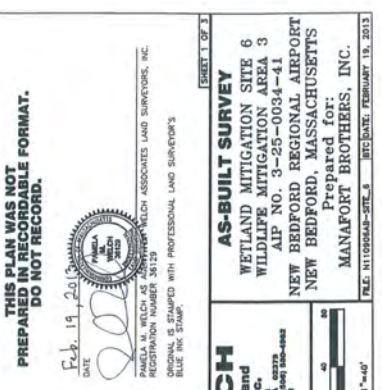
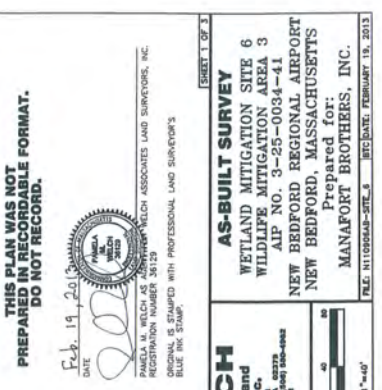
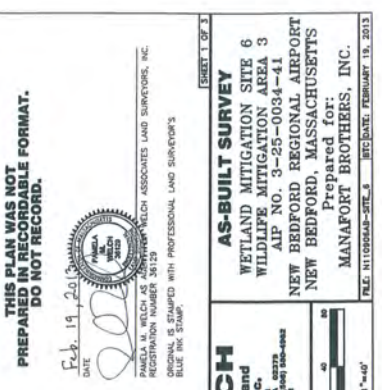
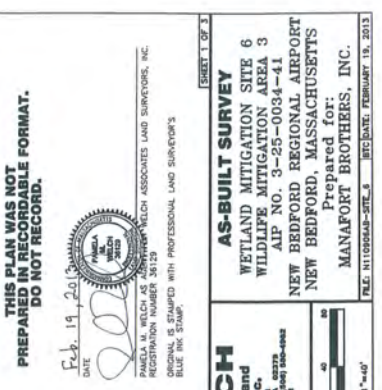
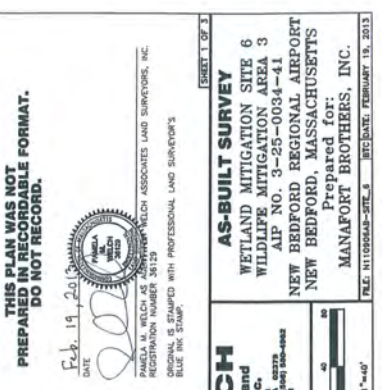
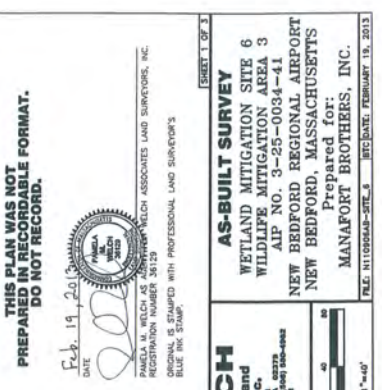
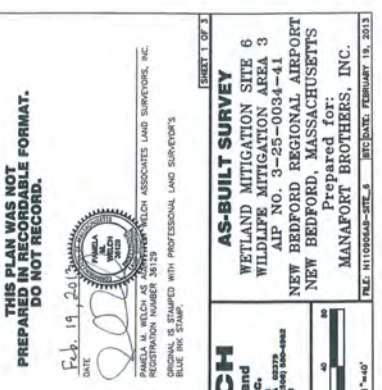
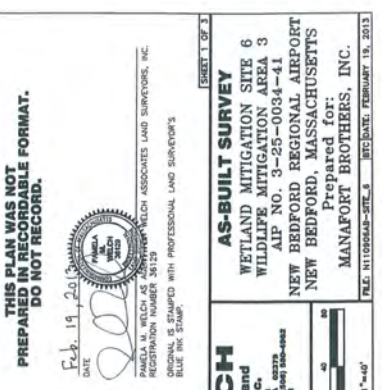
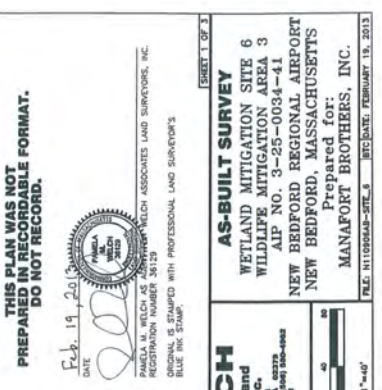
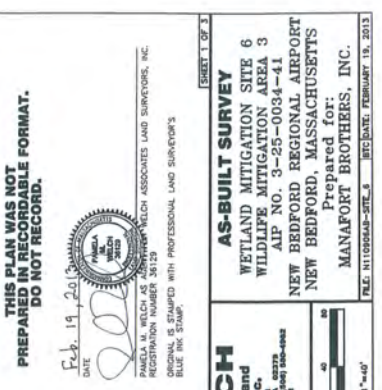
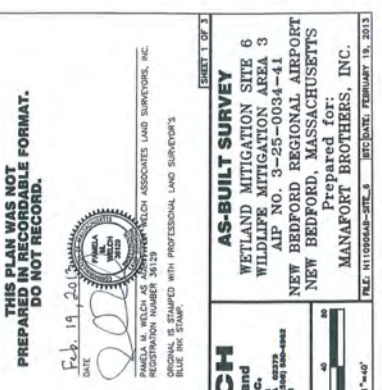
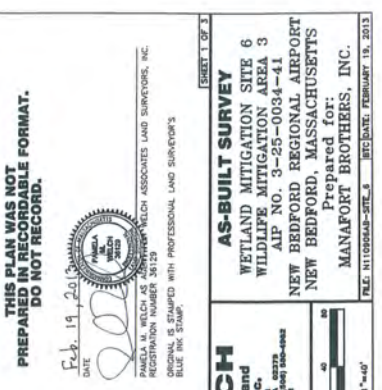
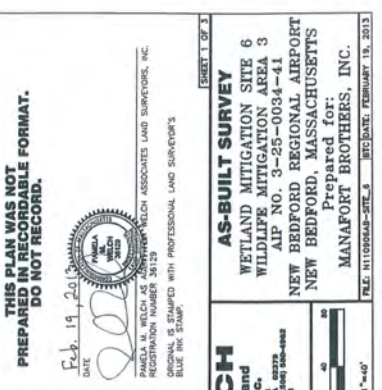
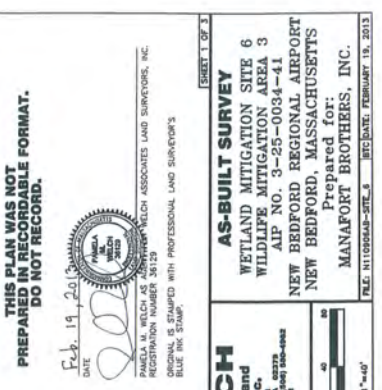
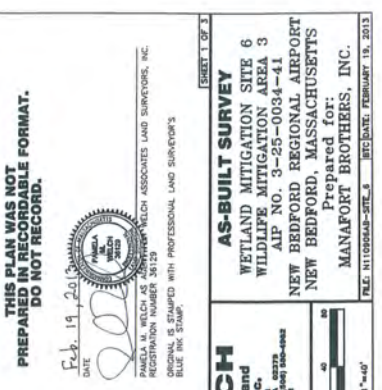
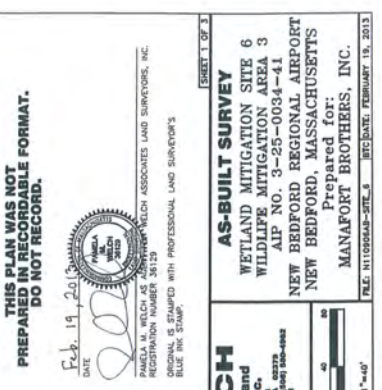
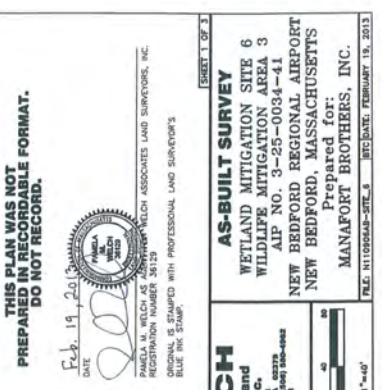
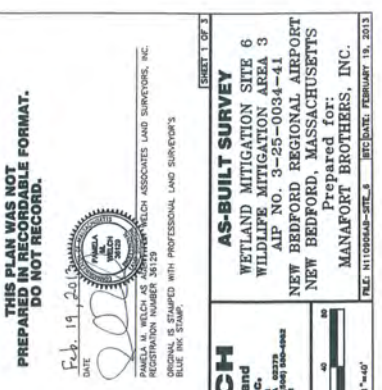
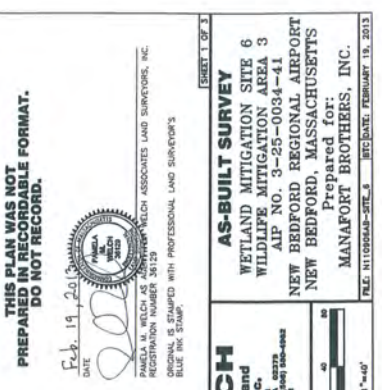
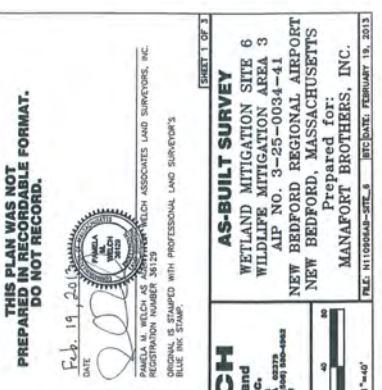
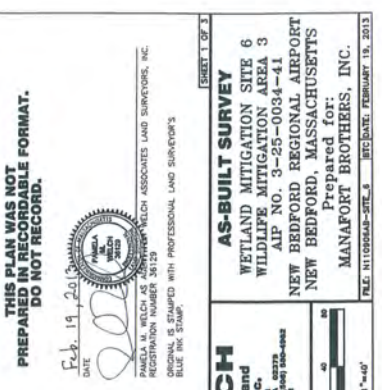
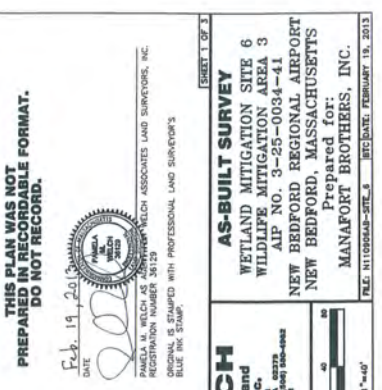
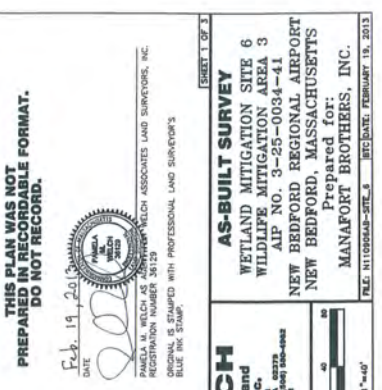
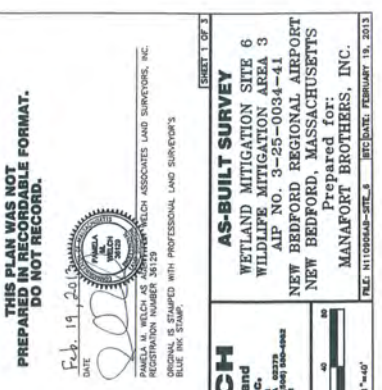
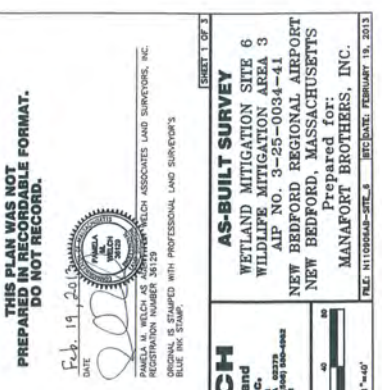
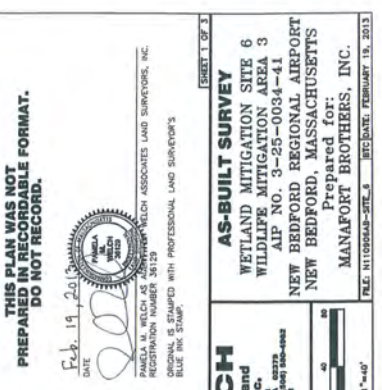
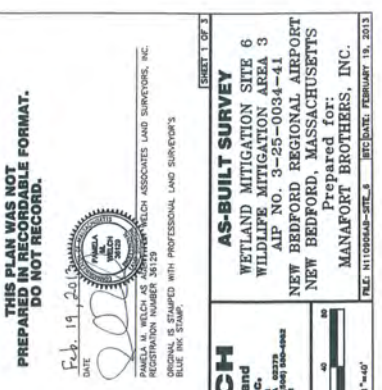
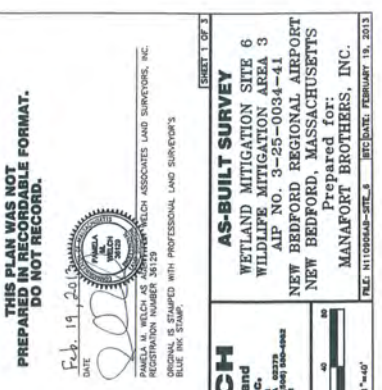
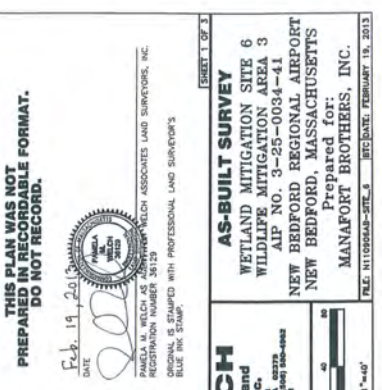
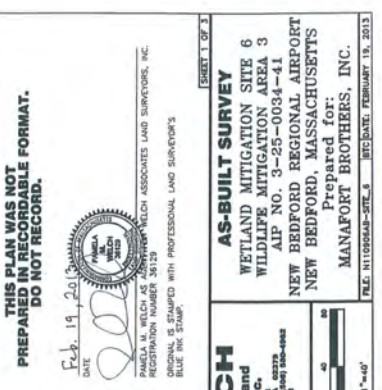
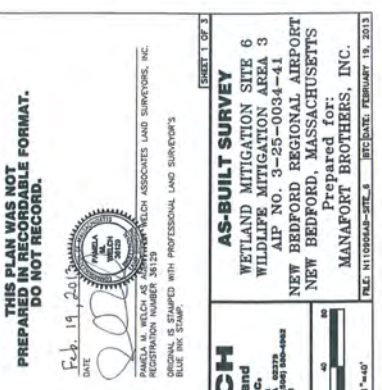
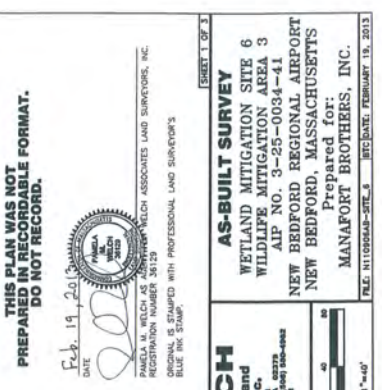
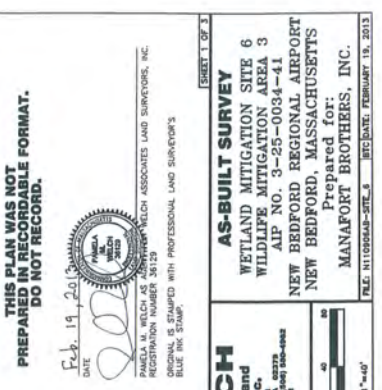
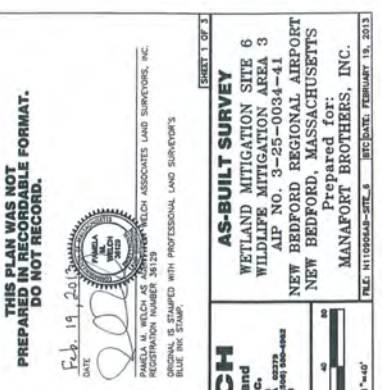
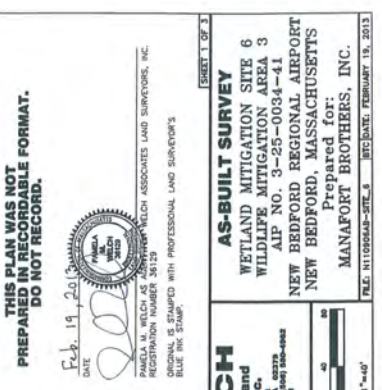
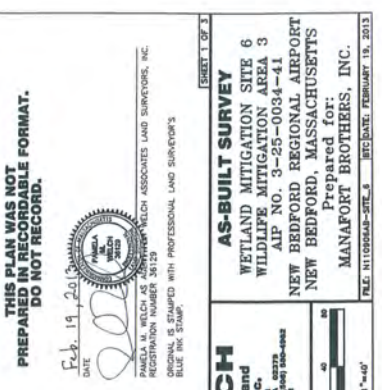
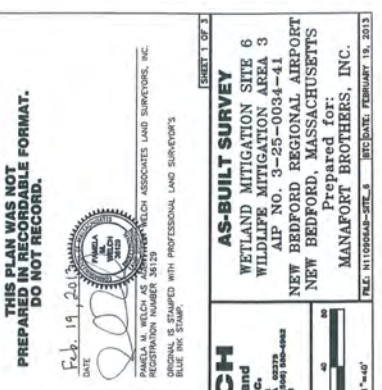
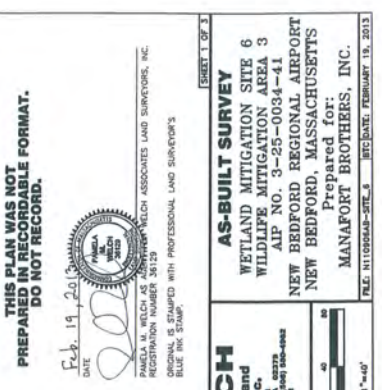
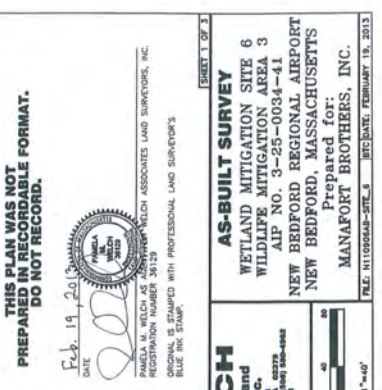
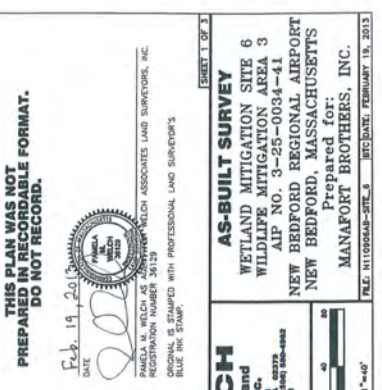
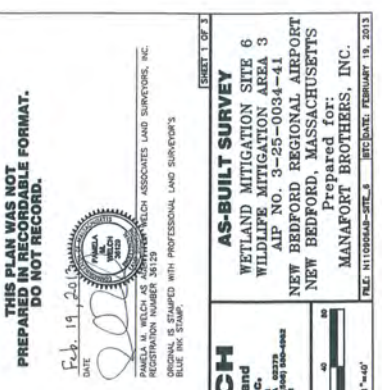
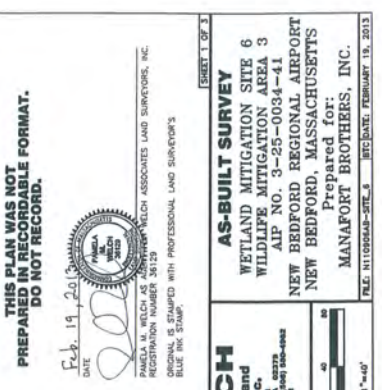
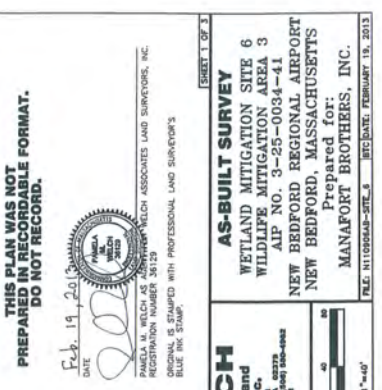
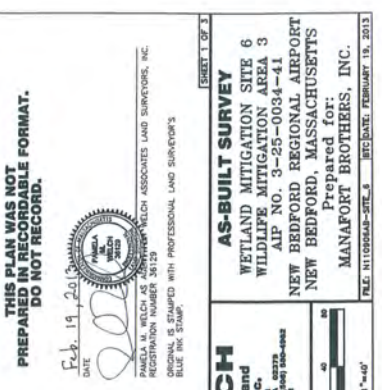
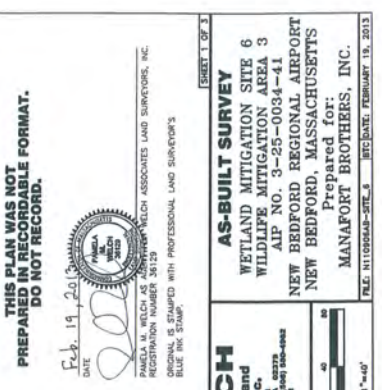
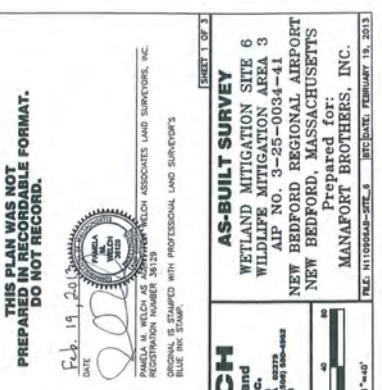
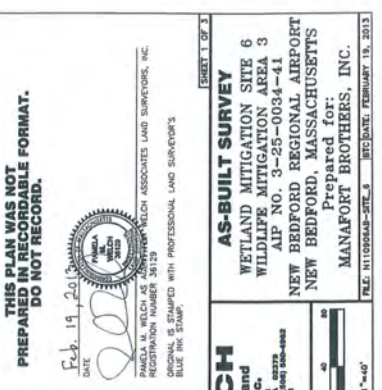
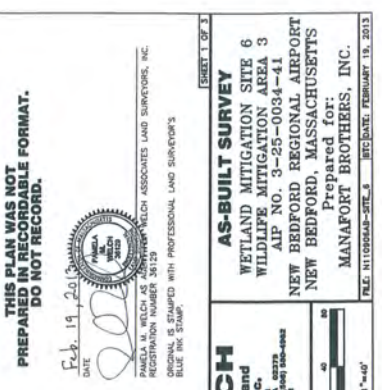
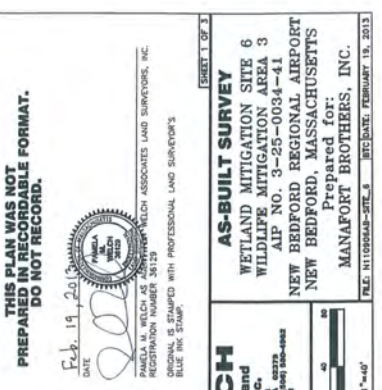
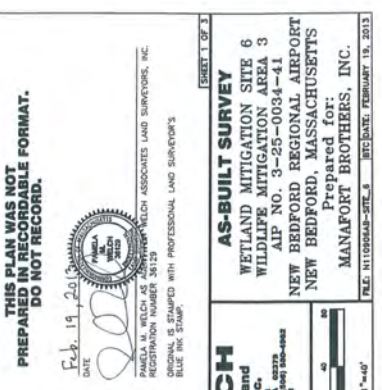
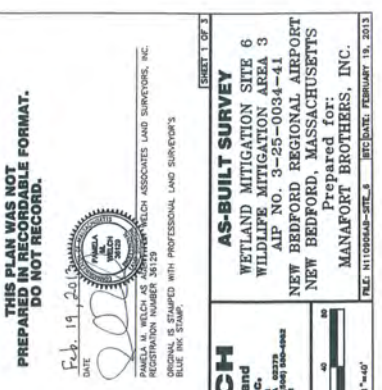
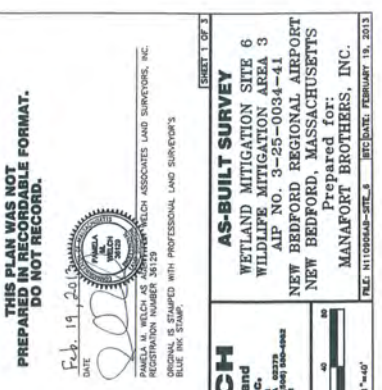
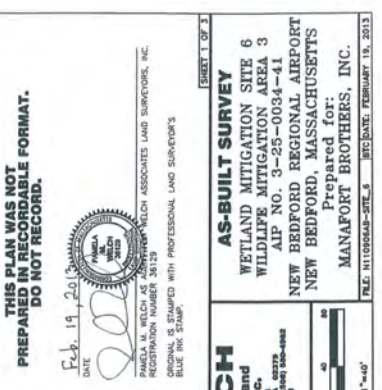
KEY MAP  
1"=2000'

**LEGEND**

	EASTERN BOX TURTLE SPARSE OPEN FIELD MANAGEMENT AREA
	EASTERN BOX TURTLE MANAGEMENT AREA
	WETLAND MITIGATION AREA
	OPEN WATER
	PRE-EXISTING WETLAND LINE
	SALT FENCE/TURTLE BARRIER LIMIT OF WORK
	PRE-EXISTING WETLAND FLAG
	STONE/ROLLER
	TREE STAMP
	EDGE OF GRASS



MATCH LINE STA. 110+00.00 (SEE ABOVE)





SCALE: 1"=20' HORIZ./1"=4' VERT.

# WELCH

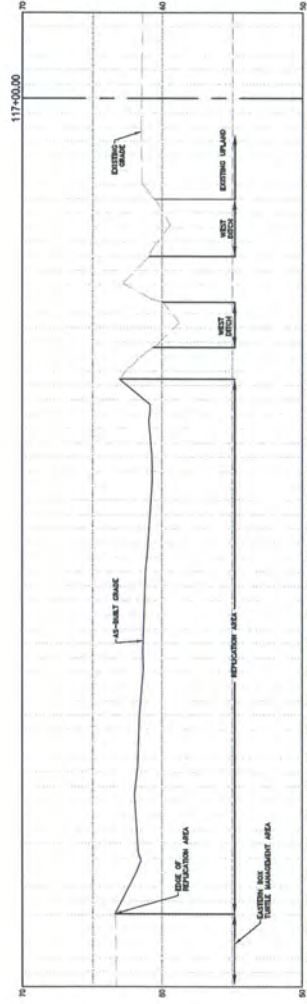
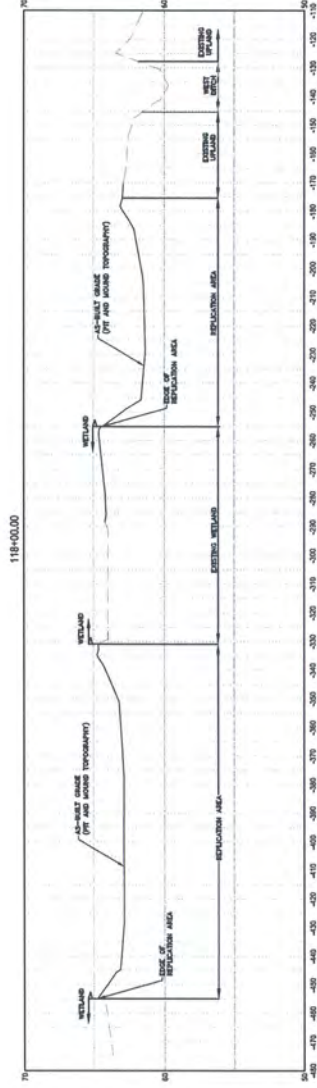
Associates Land  
Surveyors, Inc.  
210 North Main Street  
Bedford, MA 01730  
(508) 863-0000 FAX (508) 863-0002  
WWW.WELCHINC.COM

**AS-BUILT SURVEY**  
WETLAND MITIGATION SITE 6  
WILDLIFE MITIGATION AREA 3  
AIP NO. 3-25-0034-41  
NEW BEDFORD REGIONAL AIRPORT  
NEW BEDFORD, MASSACHUSETTS  
Prepared for:  
MANAFORT BROTHERS, INC.

FILE: W11090AB-SITE 6 BIG DATE: FEBRUARY 19, 2013

AS-NOTED

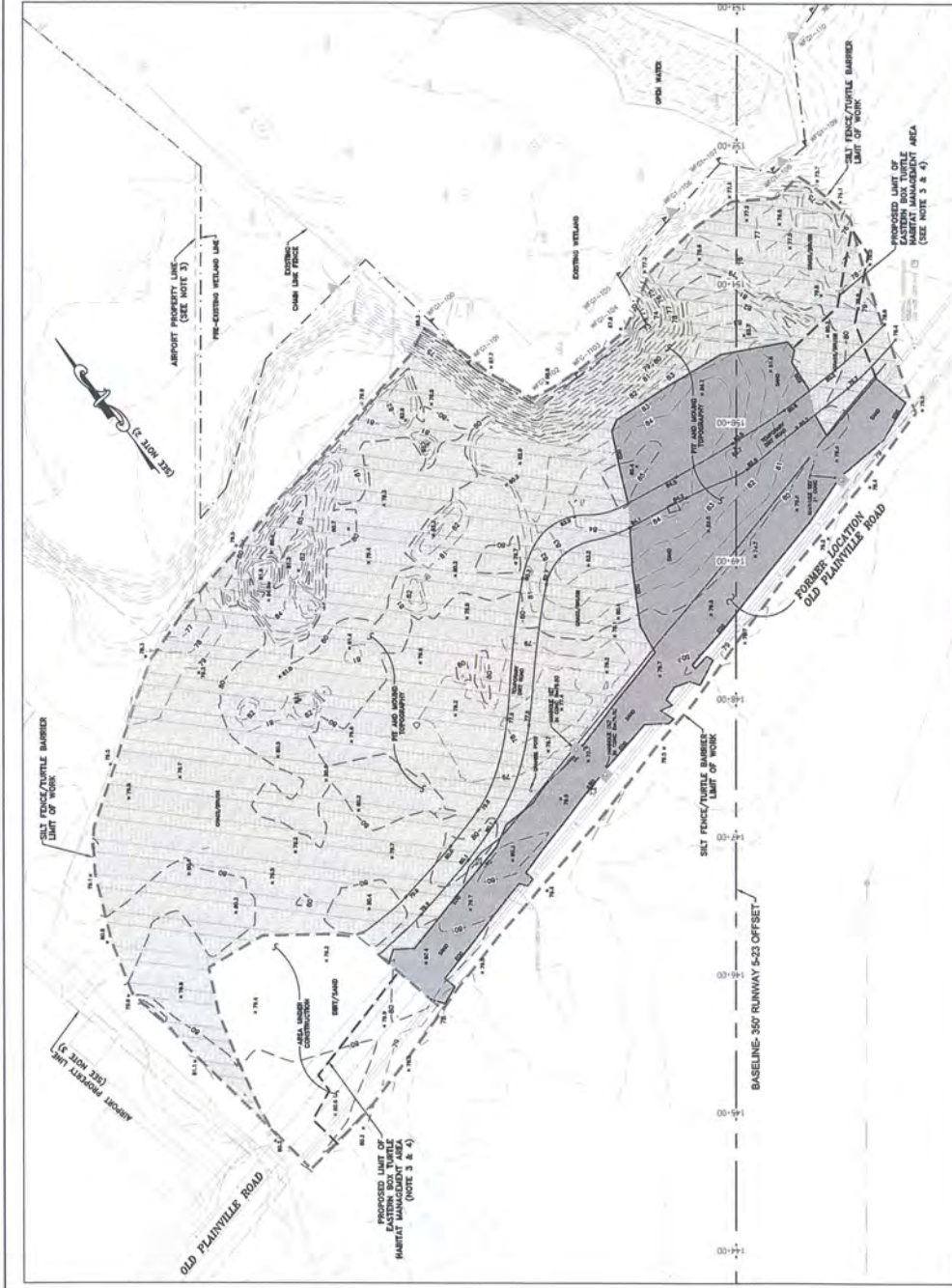
SHEET 3 OF 3



## CROSS-SECTIONS WETLAND MITIGATION SITE 6

SCALE: 1"=20' HORIZ./1"=4' VERT.





**EASTERN BOX TURTLE HABITAT  
MANAGEMENT AREA 1**

- NOTES:
1. THE AS-BUILT ELEVATIONS SHOWN ON THIS SURVEY ARE BASED ON THE EXISTING TERRAIN. ELEVATIONS ARE NOT TO BE USED FOR ANY OTHER PURPOSES. ELEVATION = 86.01 (DRAIN WAD 86) AND 86.00 (WAD 86) ARE SHOWN IN THE CONSTRUCTION PLAN SET FOR THE NEW BEDFORD REGIONAL AIRPORT, PROJECT ENTITLED: "NEW 5-23 MITIGATION FOR SAFETY IMPROVEMENTS ON THE DRAWING PREPARED BY AIRPORT SOLUTIONS GROUP, DATED MARCH 23, 2011."
  2. NORTH REFERENCE SHOWN ON THIS SURVEY IS BASED ON THE COORDINATE SYSTEM DEFINED ON DRAWING C1.3 REFERENCED IN NOTE 1.
  3. PRE-EXISTING SCHEDULED SITE FEATURES SHOWN HEREON ARE SHOWN FROM THE 2008 AERIAL PHOTOGRAPH. THE 2008 AERIAL PHOTOGRAPH IS AVAILABLE ON THE WEBSITE: [WWW.AIRPORTSOLUTIONS.COM](http://WWW.AIRPORTSOLUTIONS.COM). THE 2008 AERIAL PHOTOGRAPH IS DATED 9/20/11 AND ARE SHOWN FOR GENERAL REFERENCE/ORIENTATION ONLY.
  4. HATCHED LIMITS OF EASTERN BOX TURTLE MANAGEMENT AREA AS SHOWN ON THIS PLAN IS DERIVED BY THE AS-BUILT LOCATION OF EDGE OF SAND.



**KEY MAP  
1"=2000'**

LEGEND	
	EASTERN BOX TURTLE SPARSE OPEN FIELD MANAGEMENT AREA
	EASTERN BOX TURTLE SPARSE OPEN FIELD MANAGEMENT AREA
	PRE-EXISTING WETLAND LINE
	SILT FENCE/TURTLE BARRIER LIMIT OF WORK
	PRE-EXISTING WETLAND TAG
	NEW FENCE
	CHINA LAKE FENCE
	EDGE OF SAND

**THIS PLAN WAS NOT  
PREPARED IN RECORDABLE FORMAT.  
DO NOT RECORD.**

DATE: Feb 19, 2013



WELCH ASSOCIATES LAND SURVEYORS, INC.  
REGISTRATION NUMBER: 15179  
ORIGINAL IS STAMPED WITH PROFESSIONAL LAND SURVEYOR'S  
BLUE INK STAMP

**WELCH**  
Associates Land  
Surveyors, Inc.

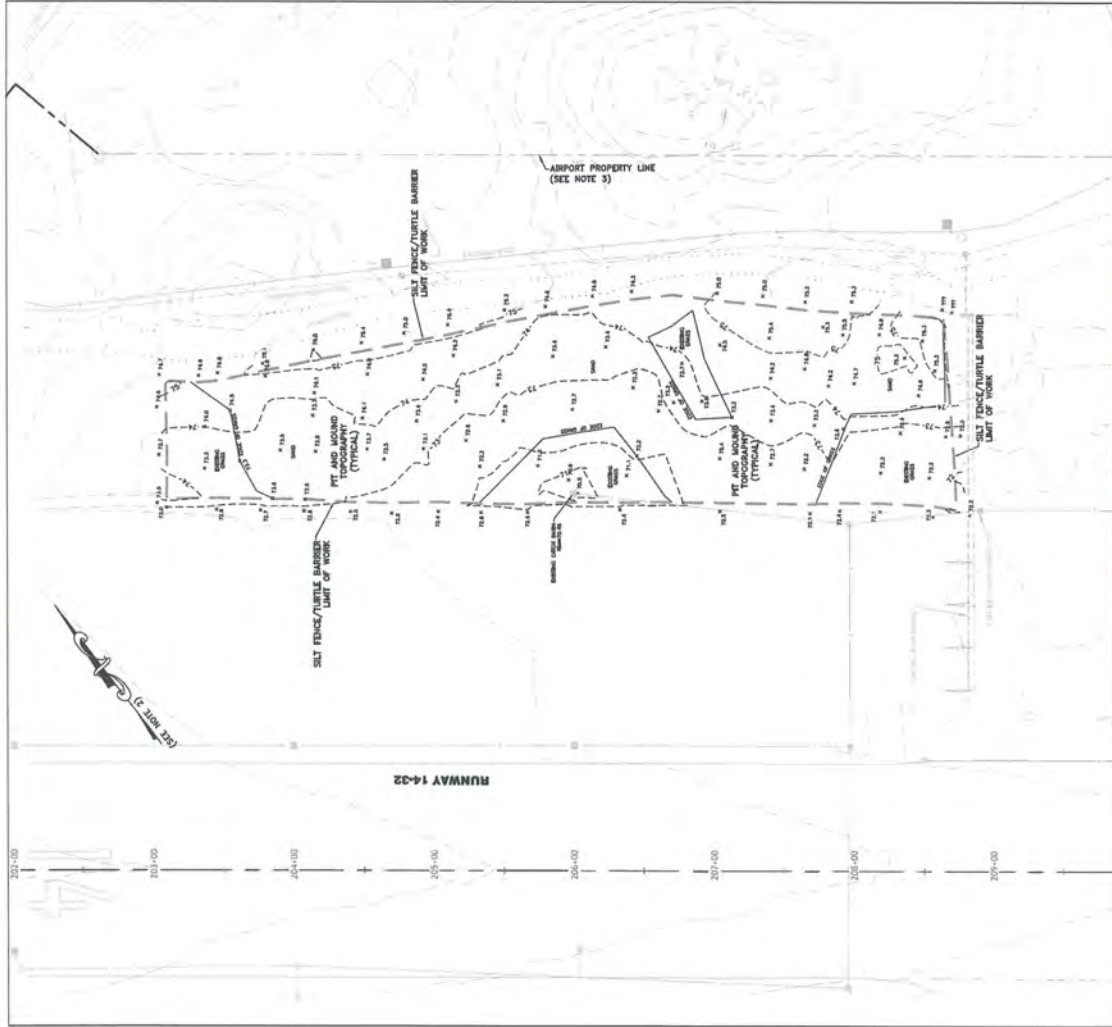
211 New Bedford Road  
New Bedford, MA 01905  
Tel: 508-538-1111  
Fax: 508-538-1112  
www.welchland.com

SHEET 1 OF 1

**AS-BUILT SURVEY**  
WILDLIFE MITIGATION AREA 1  
AIP NO. 3-25-0034-41  
NEW BEDFORD REGIONAL AIRPORT  
NEW BEDFORD, MASSACHUSETTS  
Prepared for:  
MANAFORT BROTHERS, INC.

FILED: H1100048-SITE\_1 ITC DATE: FEBRUARY 19, 2013

SCALE: 1"=400'



**KEY MAP**  
**1"=2000'**

NOTES: 1. AS-BUILT ELEVATIONS SHOWN ON THIS SURVEY ARE BASED ON THE FOLLOWING BENCHMARK: "SURVEY BENCH MARK, PRIMARY AIRPORT CONTROL EMB-A", ELEVATION = 66.01 (DATING: MAY 89). SAID BENCHMARK IS SHOWN IN THE ATTACHED PHOTOGRAPH. 2. THIS SURVEY WAS CONDUCTED IN ACCORDANCE WITH THE ENTITLED: "GENERAL PLAN - DRAWING NO. 01.3", DATED MARCH 23, 2011, PREPARED BY AIRPORT SOLUTIONS GROUP. 3. THE SURVEY IS BASED ON THE COORDINATE SYSTEM DERIVED ON DRAWING 01.3, REVISIONS IN NOTE 1. 4. PRE-EXISTING EXISTING SITE FEATURES SHOWN ARE SHOWN FROM AUTOCAD FILE ENTITLED: "103-016-PROPOSED OUTLINE" SUPPLIED TO WELCH ASSOCIATES LAND SURVEYORS, INC. VIA EMAIL FROM MANAFORT BROTHERS, INC. ON 1/27/11 AND ARE SHOWN FOR GENERAL REFERENCE/ORIENTATION ONLY.

**THIS PLAN WAS NOT  
PREPARED IN RECORDABLE FORMAT.  
DO NOT RECORD.**

DATE: Feb. 19, 2013  
  
 PAMELA M. WELCH AS ASSOCIATE WELCH ASSOCIATES LAND SURVEYORS, INC.  
 REGISTRATION NUMBER 28129  
 ORIGINAL IS STAMPED WITH PROFESSIONAL LAND SURVEYOR'S  
 BLUE INK STAMP.

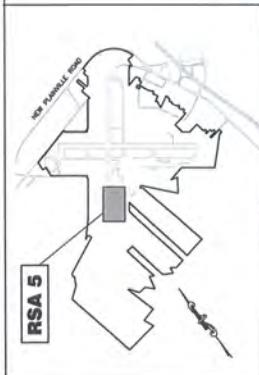
**WELCH**  
 Associates Land  
 Surveyors  
 214 North Main Street  
 Boston, MA 02110  
 (617) 552-0000 FAX (617) 552-0002  
 WWW.WELCHCOMP.COM

**AS-BUILT SURVEY**  
 WILDLIFE MITIGATION AREA 2  
 AIP NO. 3-25-0034-41  
 NEW BEDFORD REGIONAL AIRPORT  
 NEW BEDFORD, MASSACHUSETTS  
 Prepared for:  
 MANAFORT BROTHERS, INC.

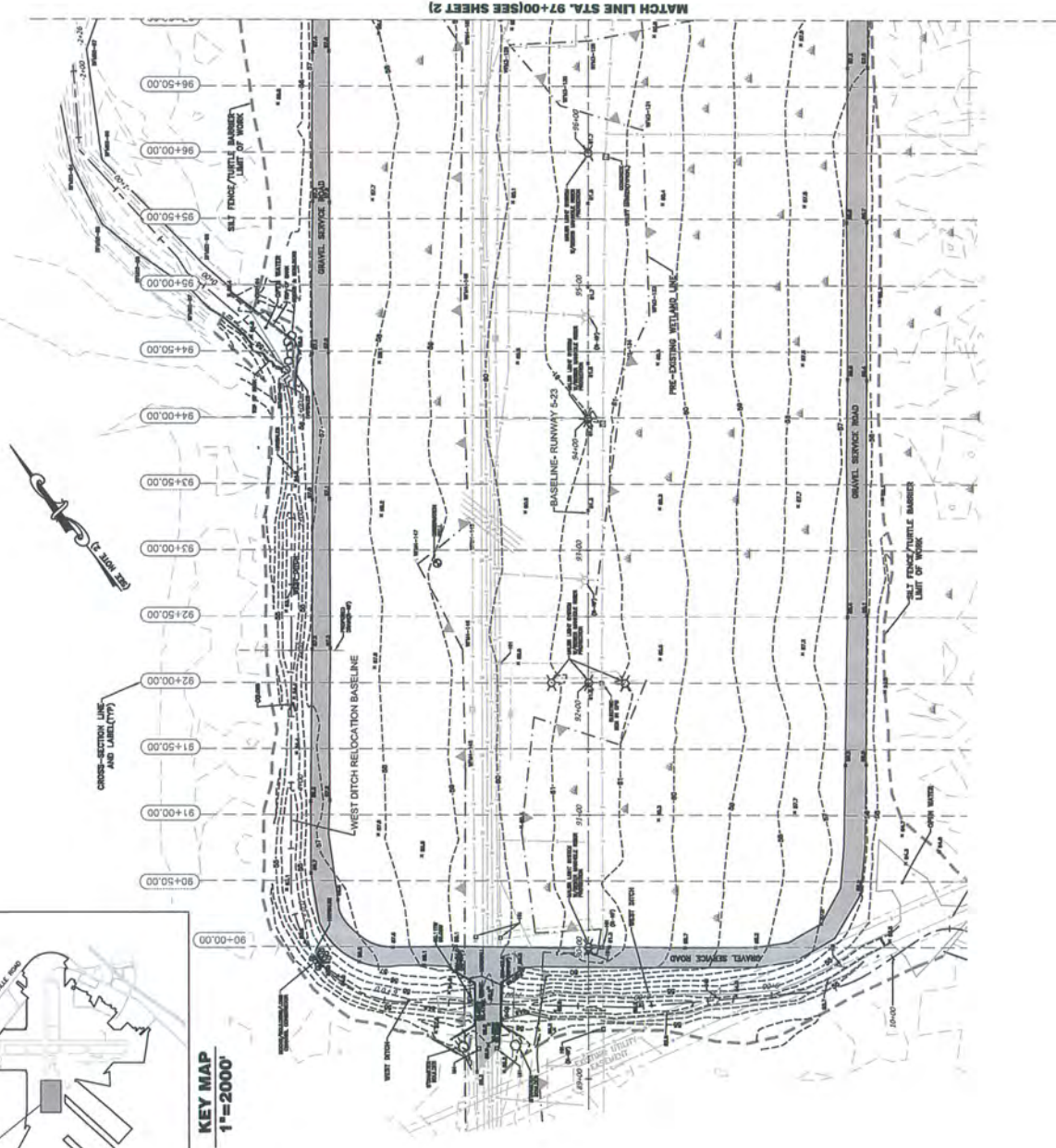
SCALE: 1"=400'

**EASTERN BOX TURTLE HABITAT  
SPARSE OPEN FIELD MANAGEMENT AREA 2**





**RSA 5**



MATCH LINE STA. 97+00 (SEE SHEET 2)

LEGEND	
	GRAVEL SERVICE ROAD
	OPEN WATER
	PRE-EXISTING WETLAND LINE
	SALT FENCE/TURF BARRIER
	LIMIT OF WORK
	UTILITY DUCT MARKER
	PRE-EXISTING WETLAND LINE
	WOOD LOG
	STONE/ROCK
	TREE STUMP
	WATER CATCH
	HYDRANT
	BOTTOM OF WALL
	TOP OF WALL
	EDGE OF SHOULDER
	HYDRANT
	RECORDING POINT
	TOP OF WALL
	UNDERGROUND CONDUIT

NOTES:  
1. THE AS-BUILT ELEVATIONS SHOWN ON THIS SURVEY ARE BASED ON THE BENCHMARK ELEVATION SHOWN IN THE CONSTRUCTION PLAN SET FOR THE NEW RUNWAY 5. THE BENCHMARK IS SHOWN IN THE CONSTRUCTION PLAN SET FOR THE NEW RUNWAY 5. THE BENCHMARK IS SHOWN IN THE CONSTRUCTION PLAN SET FOR THE NEW RUNWAY 5. THE BENCHMARK IS SHOWN IN THE CONSTRUCTION PLAN SET FOR THE NEW RUNWAY 5.

2. NORTH REFERENCE SHOWN ON THIS SURVEY IS BASED ON THE COORDINATE SYSTEM SHOWN ON DRAWING 01.3 REFERENCED IN NOTE 1.

3. PRE-EXISTING WETLAND LINE FEATURES SHOWN HEREON ARE SHOWN FOR INFORMATION ONLY. THEY DO NOT REPRESENT A GUARANTEE BY WELCH ASSOCIATES LAND SURVEYORS, INC. VIA DEAL FROM MANHATTAN TO BROTHERS, INC. ON 8/20/11 AND ARE SHOWN FOR GENERAL REFERENCE/IDENTIFICATION ONLY.

THIS PLAN WAS NOT  
PREPARED IN ACCORDANCE WITH  
DO NOT RECORD.



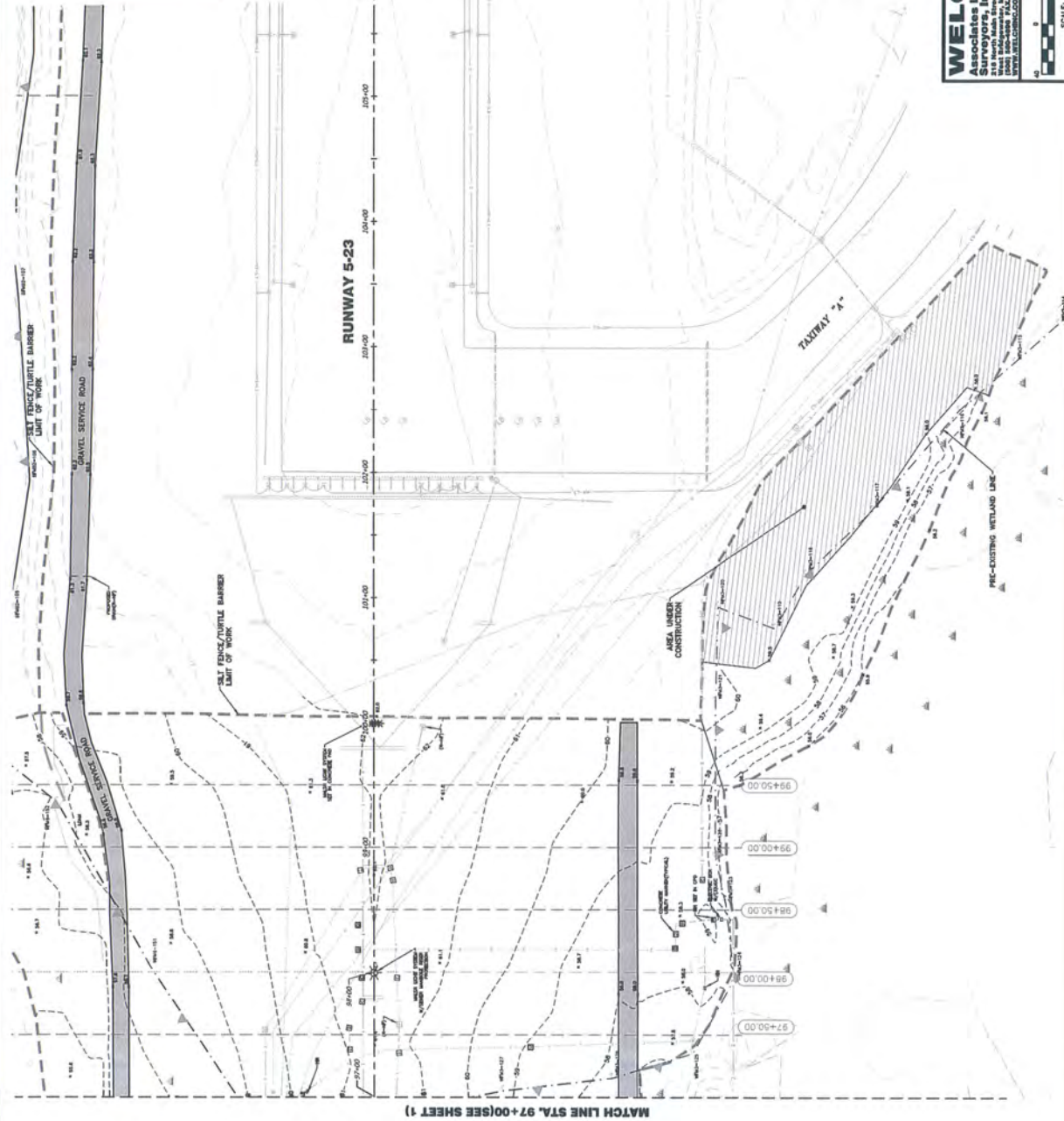
DATE  
Feb. 19, 2013

MANHATTAN TO BROTHERS, INC. VIA DEAL FROM MANHATTAN TO BROTHERS, INC. ON 8/20/11 AND ARE SHOWN FOR GENERAL REFERENCE/IDENTIFICATION ONLY.

**WELCH**  
Associates Land  
Surveyors, Inc.  
111 West Main Street  
West Main Street, MA 02779  
WWW.WELCH-ASSOCIATES.COM

**AS-BUILT SURVEY**  
RUNWAY 5 - RSA  
AIP NO. 3-25-0034-41  
NEW BEDFORD REGIONAL AIRPORT  
NEW BEDFORD, MASSACHUSETTS  
Prepared for:  
MANAFORT BROTHERS, INC.

FILE: N1109048-SITE-STA\_5-SEC DATE: FEBRUARY 19, 2013



**KEY MAP**  
1"=2000'

**WELCH**  
Associates Land  
Surveyors, Inc.  
100 West Main Street, Suite 200  
Bedford, Massachusetts 01730  
TEL: 781.235.1234  
WWW.WELCHLANDSURV.COM

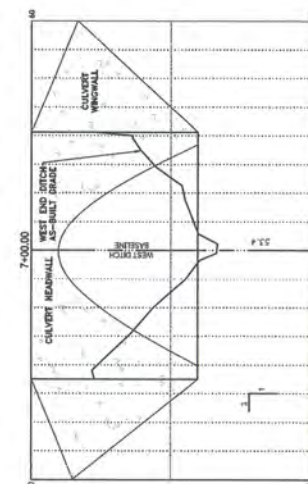
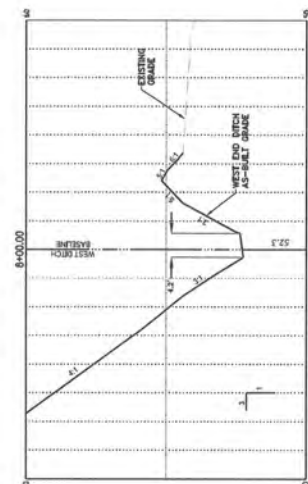
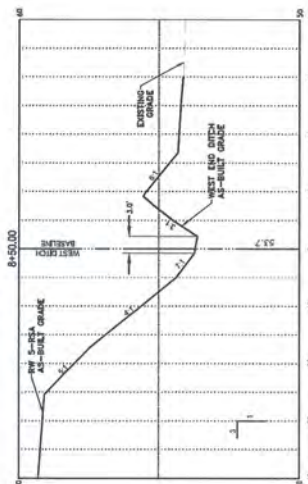
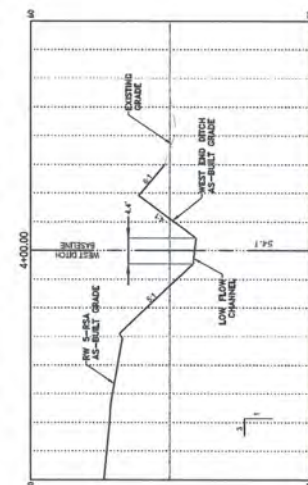
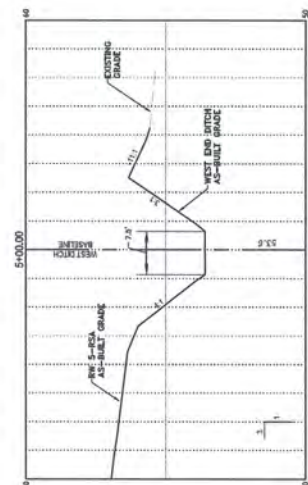
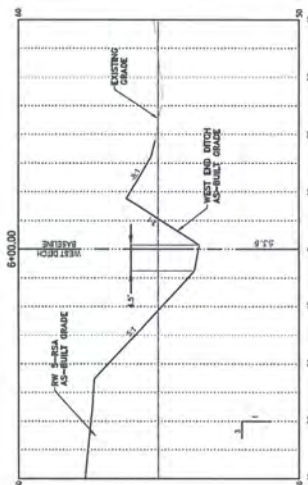
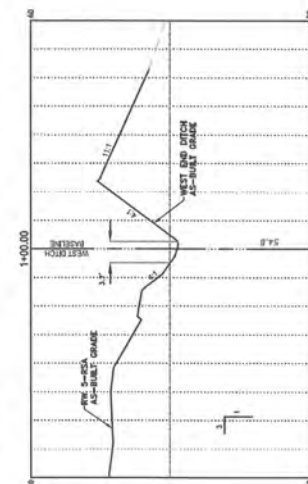
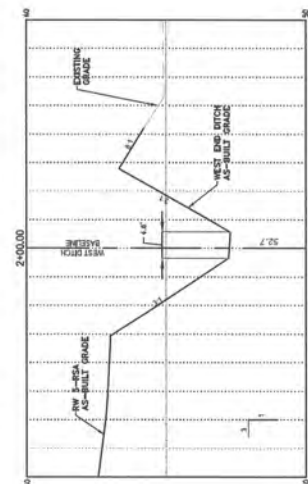
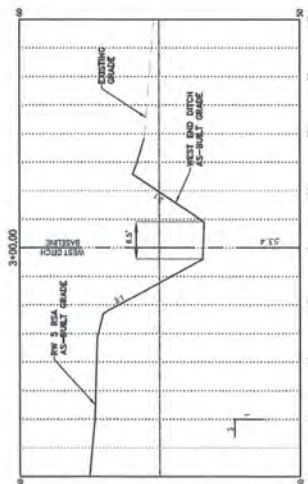


**AS-BUILT SURVEY**  
RUNWAY 5 - RSA  
AIP NO. 3-25-0034-41  
NEW BEDFORD REGIONAL AIRPORT  
NEW BEDFORD, MASSACHUSETTS  
Prepared for:  
MANAFORT BROTHERS, INC.  
FILE: N1109048-SITE\_RSA\_01.DWG DATE: FEBRUARY 19, 2013



MATCH LINE STA. 97+00(SEE SHEET 1)



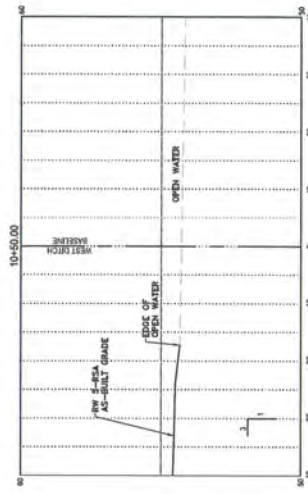
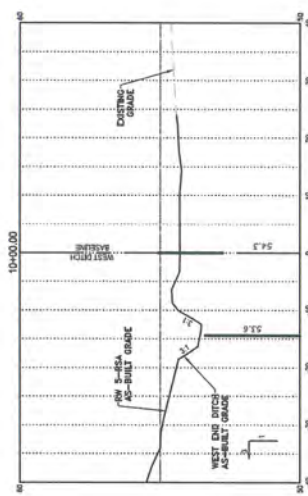
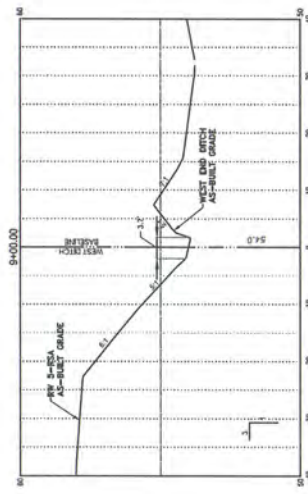


# **CROSS-SECTIONS** **WEST DITCH RELOCATION** **RUNWAY 5 - RUNWAY SAFETY AREA**

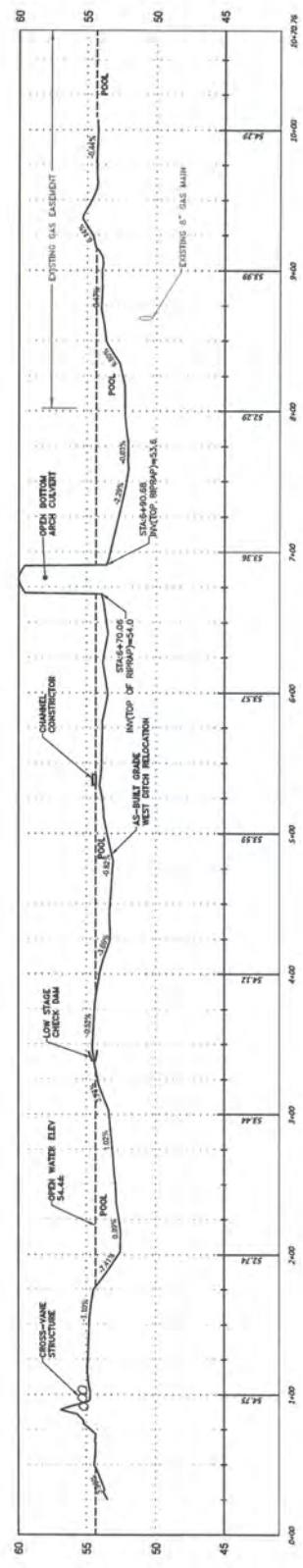
SCALE: 1"=10 HORIZ, 1"=2' VERT.

**WELCH**  
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Surveyors, Inc.  
1000 Main Street, Suite 200  
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(508) 865-1100  
WWW.WELCH-MA.COM

**AS-BUILT SURVEY**  
RUNWAY 5 - SSA  
AIP NO. 3-25-0034-41  
NEW BEDFORD REGIONAL AIRPORT  
NEW BEDFORD, MASSACHUSETTS  
Prepared for:  
MANAFORT BROTHERS, INC.



**CROSS-SECTIONS**  
**WEST DITCH RELOCATION**  
**RUNWAY 5 - RUNWAY SAFETY AREA**  
 SCALE: 1"=10' HORIZ./1"=2' VERT.



**PROFILE**  
**WEST DITCH RELOCATION**  
**RUNWAY 5 - RUNWAY SAFETY AREA**  
 SCALE: 1"=40' HORIZ./1"=4' VERT.

**WELCH**  
 Associates Land  
 Surveyors, Inc.  
 215 North Main Street  
 New Bedford, MA 01905  
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 RUNWAY 5 - RSA  
 AIP NO. 3-25-0034-41  
 NEW BEDFORD REGIONAL AIRPORT  
 NEW BEDFORD, MASSACHUSETTS  
 Prepared for:  
 MANAFORT BROTHERS, INC.

FILE: N1100048-RTL\_P01\_3.DWG DATE: FEBRUARY 15, 2013

AS NOTED