



# Physical Monitoring Plan

## NORTH BOCA RATON BEACH PRESERVATION AND STORM DAMAGE REDUCTION PROJECT

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*City of Boca Raton*

*Prepared by Applied Technology and Management*



*FDEP Permit No.: 0261499-004-JM*

*June 2013*

### **A. Introduction**

Pursuant to Florida Rules 62B-41.005, 62B-41.002(19)(b) and 40C-4.302(1)(b), FAC, this physical monitoring plan is developed to make an assessment as to whether the constructed project results in cumulative impacts to the coastal system. Beach profile surveys and hydrographic surveys will be conducted and utilized to assess the performance of the project including changes to the coastal system adjacent to the project excavation and placement areas.

Figure 1 shows the project area and FDEP monuments. This project will place approximately 1,200,000 c.y. of sand along a total of 15,000 feet of Boca Raton's shorefront. The project will have two placement areas – Segment 1 and 2. Segment 1 extends from R-205 to R-212+181' (including tapers) and Segment 2 extends from R-216 to H-222 (including tapers). The placement templates extend approximately 7,700 feet and 7,300 feet for Segments 1 and 2. The project will utilize offshore borrow areas. The design nourishment interval for Segment 1 is approximately 10 years. The project's predicted design life for Segment 2 is 7 years.

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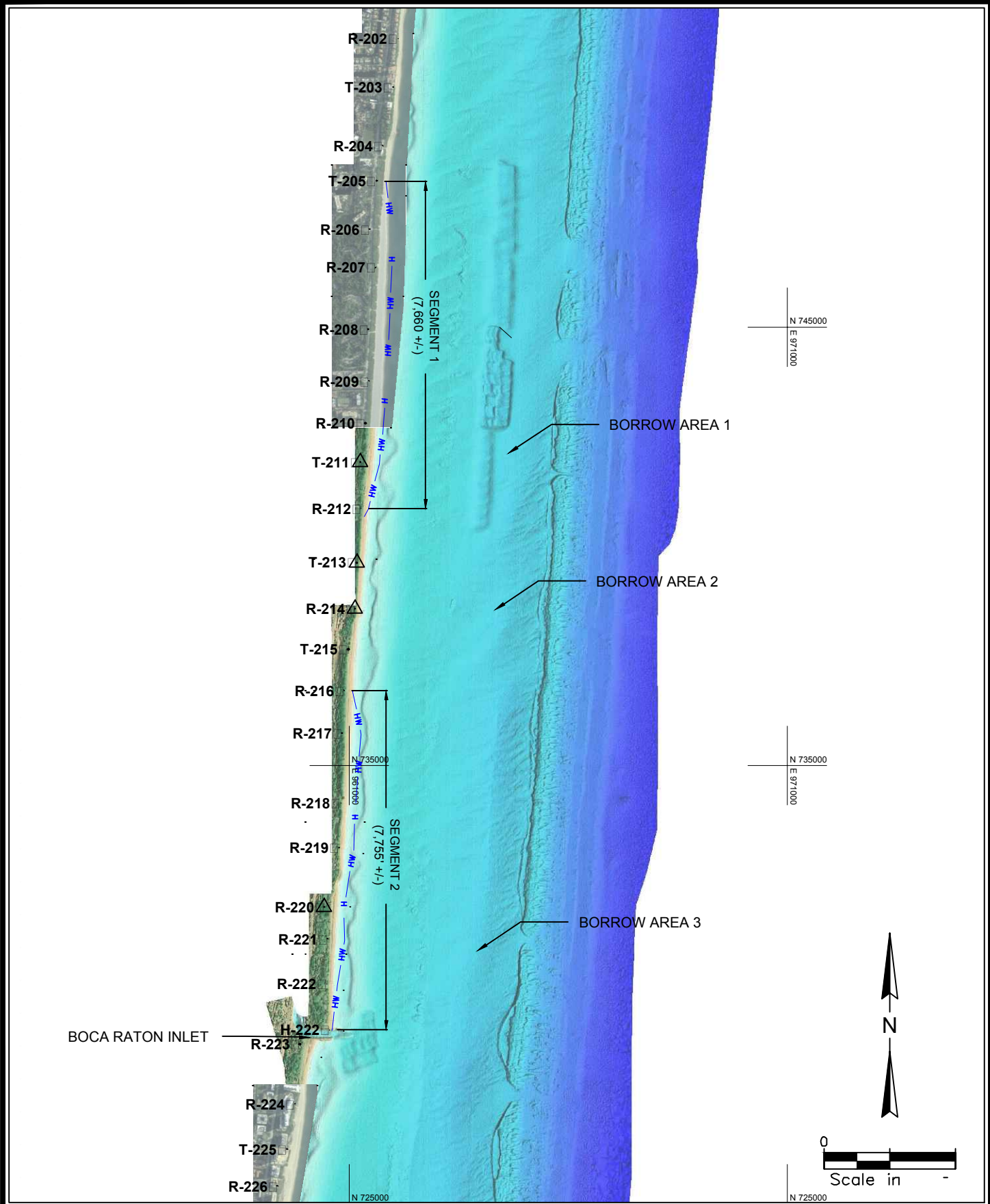


Figure 1  
Project Map



The physical monitoring of this project will accomplish the following:

- 1) Assess the performance of the renourishment project;
- 2) Identify erosion and accretion patterns (shoreline and volumetric changes) along the beach placement area;
- 3) Assess changes to the shorelines immediately adjacent to the project area; and,
- 4) Assess the post-project conditions of the borrow areas.

This physical monitoring plan specifies the following:

- 1) Beach profile survey protocol;
- 2) Hydrographic surveys of the borrow areas
- 3) Survey frequency; and,
- 4) Reporting requirements.

## **B. Beach Profile Survey Protocol**

Beach profile surveys will be conducted along the established FDEP reference monuments R-200 through R-227 (Table 1). The beach profile surveys will extend from the FDEP monument location or approximately 150 feet landward of the vegetation line (whichever is more seaward) to either a minimum of 3,000 feet offshore (from the MHW) or a depth of 30 feet NAVD, whichever is most landward. The survey data will be collected such that there is sufficient overlap between the seaward terminus of the beach profiles and the landward origination of the hydrographic profiles. Profile alignment will be conducted on appropriate azimuths at all profiles in order to replicate the azimuths previously established by FDEP for each monument (Table 1). Elevations of the beach profiles will be obtained at 10-foot intervals and at all noticeable breaks in grade (greater than 1 foot vertically). Soundings from offshore portions of beach profiles will be obtained at 10-foot intervals.

The survey data will be tide-corrected and referenced to the NAVD vertical datum and the horizontal datum in NAD83 State Plane Coordinate System, Florida East Zone. All work activities and deliverables shall be conducted in accordance with the latest update of the Department's *Monitoring Standards for Beach Erosion Control Projects*, Sections 01000 and 01100.

## **C. Hydrographic Survey Protocol**

The hydrographic surveys of the borrow areas will be conducted. The survey transect lines will be spaced approximately 200 feet apart, and will extend 100 feet beyond the limits of the each borrow area. The survey data will be tide-corrected and referenced to the NAVD vertical datum and the horizontal datum in NAD83 State Plane Coordinate System, Florida East Zone. Work activities and deliverables shall be consistent with the latest update of the Department's *Monitoring Standards for Beach Erosion Control Projects*, Section 01200.

**Table 1.** Beach Profile Survey Control

Profile Monument	Control Data		
	Northing <sup>1</sup>	Easting <sup>1</sup>	Azimuth
R-200	753833.73	962316.40	95°
R-201	752735.81	962195.77	95°
R-202	751582.86	962095.05	95°
T-203	750475.45	962000.85	95°
R-204	749140.39	961751.82	95°
T-205	748339.70	961617.77	95°
R-206	747235.01	961464.99	90°
R-207	746363.04	961598.30	90°
R-208	744952.06	961431.27	90°
R-209	743771.85	961437.41	90°
R-210	742807.47	961361.16	95°
T-211	741916.81	961251.69	95°
R-212	740866.40	961259.96	95°
T-213	739622.35	961175.13	95°
R-214	738575.47	961132.95	95°
T-215	737650.07	960971.56	95°
R-216	736710.50	960866.70	95°
R-217	735732.62	960897.35	95°
R-218	734147.31	960800.60	95°
R-219	733120.03	960788.91	95°
R-220	731768.80	960425.89	90°
R-221	731043.68	960502.12	95°
R-222	730012.60	960475.96	95°
H-222 <sup>2</sup>	728962.25	960540.15	95°
R-223	728638.75	959862.48	110°
R-224	727281.71	959754.21	100°
T-225	726244.84	959583.83	100°
R-226	725405.54	959357.56	100°
R-227	724383.64	959225.53	100°

Notes

- 1) Florida State Plane Coordinate System, East Zone, North American Datum (NAD) 83.
- 2) H-222 is on top of Boca Raton Inlet's northern jetty. Beach profile survey data are acquired along the same azimuth offset 50 feet to the north.

### D. Survey Frequency

The issued FDEP permit allows for up to two construction events. For each event, the schedule of surveys is described in the following listing.

Pre-Construction – Beach profile and hydrographic surveys will be conducted within 90 days prior to commencement of construction.

Immediate Post-Construction – Beach profile and hydrographic surveys will be conducted within 60 days of completion of construction.

1<sup>st</sup> Year Post-Construction – A Beach profile survey will be conducted in the first spring/summer following construction. If the time period between the immediate post-construction survey and the first annual monitoring survey is less than six months, then the City may request a postponement of the first monitoring survey until the following spring/summer.

2<sup>nd</sup> Year Post-Construction – A Beach profile survey will be conducted in the second spring/summer following construction.

3<sup>rd</sup> Year Post-Construction – A Beach profile survey will be conducted in the third spring/summer following construction.

5<sup>th</sup> Year Post-Construction – A Beach profile survey will be conducted in the fifth spring/summer following construction.

7<sup>th</sup> Year Post-Construction – A Beach profile survey will be conducted in the seventh spring/summer following construction. If the project has no placed sand remaining in the template or if the design life of the constructed project is less than 7 years, the applicant will request a waiver from this and subsequent surveys.

9<sup>th</sup> Year Post-Construction – A Beach profile survey will be conducted in the ninth spring/summer following construction. If the project has no placed sand remaining in the template or if the design life of the constructed project is less than 9 years, the applicant will request a waiver from this and subsequent surveys.

## **E. Reporting Requirements**

A detailed monitoring report will be submitted to the Department and federal agencies (as required by the USACE permit) within 90 days of completion of the survey data collection of the post-construction survey events. The report will summarize and discuss the data, the performance of the beach fill project, and identify erosion and accretion patterns within the monitored area. In addition, the report will include a comparative review of project performance to performance expectations and identification of adverse impacts attributable to the project. The report will document patterns, trends, or changes between annual surveys and cumulatively since project construction, and will specifically state the percentage of volume remaining (above the MHW and DOC) and the project berm width or shoreline width remaining.

The report will include graphical representations of volumetric and shoreline position changes for the monitoring area. Report appendices shall include plots of survey profiles and borrow area survey data (as necessary). The report will be provided to the FDEP JCP Compliance Officer (electronically) and Federal regulatory staff (as required by the USACE permit in electronic and hardcopy format). A letter of transmittal will be provided with each report clearly stating: "This monitoring information is submitted in accordance with Item No. xx of the approved Monitoring Plan for Permit No. xx for the xx monitoring period."