

APPENDIX I

DRAFT COMPENSATORY MITIGATION PLAN

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**SOUTHERN PALM BEACH ISLAND COMPREHENSIVE
SHORELINE STABILIZATION PROJECT
DRAFT COMPENSATORY MITIGATION PLAN**

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1.0 GOALS AND OBJECTIVES

The proposed Southern Palm Beach Island Comprehensive Shoreline Stabilization Project (the Project) (designated as Alternative 2 - the Applicants' Preferred Project Alternative) would use a combination of beach nourishment, dune reconstruction and coastal structures between R-129-210 and R-138+551 on Palm Beach Island, Palm Beach County, Florida (Figure 1-1). The Project includes two projects which will be constructed by two separate Applicants: the Town of Palm Beach (project area extending from R-129-210 to R-134+135) and Palm Beach County (County) (project area extending from R-134+135 to R-138+551).

The proposed Project has been designed to enhance stability to existing seawalls and to enhance the existing beach and dune system for storm protection to upland property. Approximately 150,000 cubic yards (cy) of fill will be placed along the shoreline within the Project Area from R-129-210 to R-138+551 (approximately 3.33 km (2.07 mi)). The fill volume will be split between the two Applicants' separate project areas – 75,000 cy of sand in the Town of Palm Beach and 75,000 cy in the County project area within South Palm Beach, Lantana and Manalapan. From north to south, the project would place dune nourishment only from R-129-210 to R-129+150, dune and beach nourishment from R-129+150 to R-131, dune nourishment only from R-131 to R-134+135 (Town of Palm Beach southern limit), and beach nourishment with seven low-profile groins from R-134+135 to R-138+551 (Figure 1-2).

It is anticipated that the delivery mechanism for the nourishment will be a truck-haul operation. The sand source would be a combination of stockpiled dredge material from the Reach 7 Phipps Ocean Park Beach Restoration Project (Phipps) or the Mid-Town Beach Restoration Project (Mid-Town) for placement within the Town of Palm Beach project limits (R-129-210 to R-134+135) and upland sand for placement within the County project limits in South Palm Beach, Lantana and Manalapan (R-134+135 to R-138+551) (Figure 1-2). For the initial construction of the proposed Project, the Town of Palm Beach proposes to utilize an offshore sand stockpile which will be located within the permitted Phipps template, as authorized by USACE Permit No. SAJ-2000-00380

and authorized by FDEP under the BMA (FDEP, 2013a). For subsequent maintenance of the Project, the Town of Palm Beach plans to alternate between utilizing the Phipps stockpile and an offshore sand stockpile within the permitted Mid-Town template as authorized by USACE under Permit No. SAJ-1995-03779 and authorized by FDEP under the BMA (FDEP, 2013a). If the project schedules do not coincide, the Town of Palm Beach may truck in sand from upland mines. The County only proposes upland sand for construction of its portion of the project.

This Project has been designed to avoid and minimize impacts to nearshore hardbottom to the maximum extent practicable, including reducing the volume of sand placed below mean high water (MHW) and constructing the Project using a truck haul approach instead of dredging an offshore borrow area and hydraulically pumping the sand through a pipeline to the Project Area. However, the Project is still anticipated to impact nearshore hardbottom through direct placement of sand during project construction and due to beach profile equilibration (spreading) following construction. Based on engineering and modeling results (Appendix G to the EIS), it is anticipated that the Project may result in permanent impacts to 4.03 ac of hardbottom as well as temporary and secondary impacts to 8.13 ac of hardbottom due to direct sand placement and subsequent spreading (equilibration) of sand (Figure 1-3). Impacts to hardbottom were based on a time average of exposed hardbottom delineated from aerial images between 2003 and 2013. Using the engineering and modeling results, historic exposed hardbottom acreage, and recent benthic characterization data, a preliminary Uniform Mitigation Assessment Method (UMAM) evaluation was conducted (provided as Appendix H to the EIS). This draft UMAM analysis determined that 6.39 acres of mitigation may be required to offset these impacts to intertidal and subtidal hardbottom.

This Compensatory Mitigation Plan (CMP), prepared under guidance provided in the Mitigation Rule (33 CFR 332.4(c)), outlines the Applicants' plan to provide compensatory mitigation for adverse impacts to nearshore hardbottom. This section describes the nearshore hardbottom resources that will be impacted, the proposed mitigation sites and specifications, and the manner in which the mitigation will restore

the ecological functions lost due to anticipated project impacts to the nearshore hardbottom habitat.

The specific goals of the CMP are:

1. To provide compensatory mitigation to offset 4.03 ac of permanent impacts and 8.13 ac of temporary and secondary impacts to hardbottom due to construction of the Project.
2. To create 6.39 ac of mitigation in the form of low relief artificial reefs designed to mimic the ecological function of the nearshore hardbottom habitat that will be impacted. The reef shall:
 - a. Include similar physical features as the nearshore hardbottom - low relief modules or boulders spaced at the same ratio of sand to hardbottom as the nearshore hardbottom;
 - b. Include similar substrate as the nearshore hardbottom - limestone surface that facilitates recruitment of organisms found on the natural hardbottom;
 - c. Be placed in a similar water depth as the nearshore hardbottom that will be impacted;
 - d. Include a benthic habitat with interstitial spaces that provides refuge for benthic organisms; and
 - e. Create a habitat that fully offsets the functional loss of the impacted hardbottom.

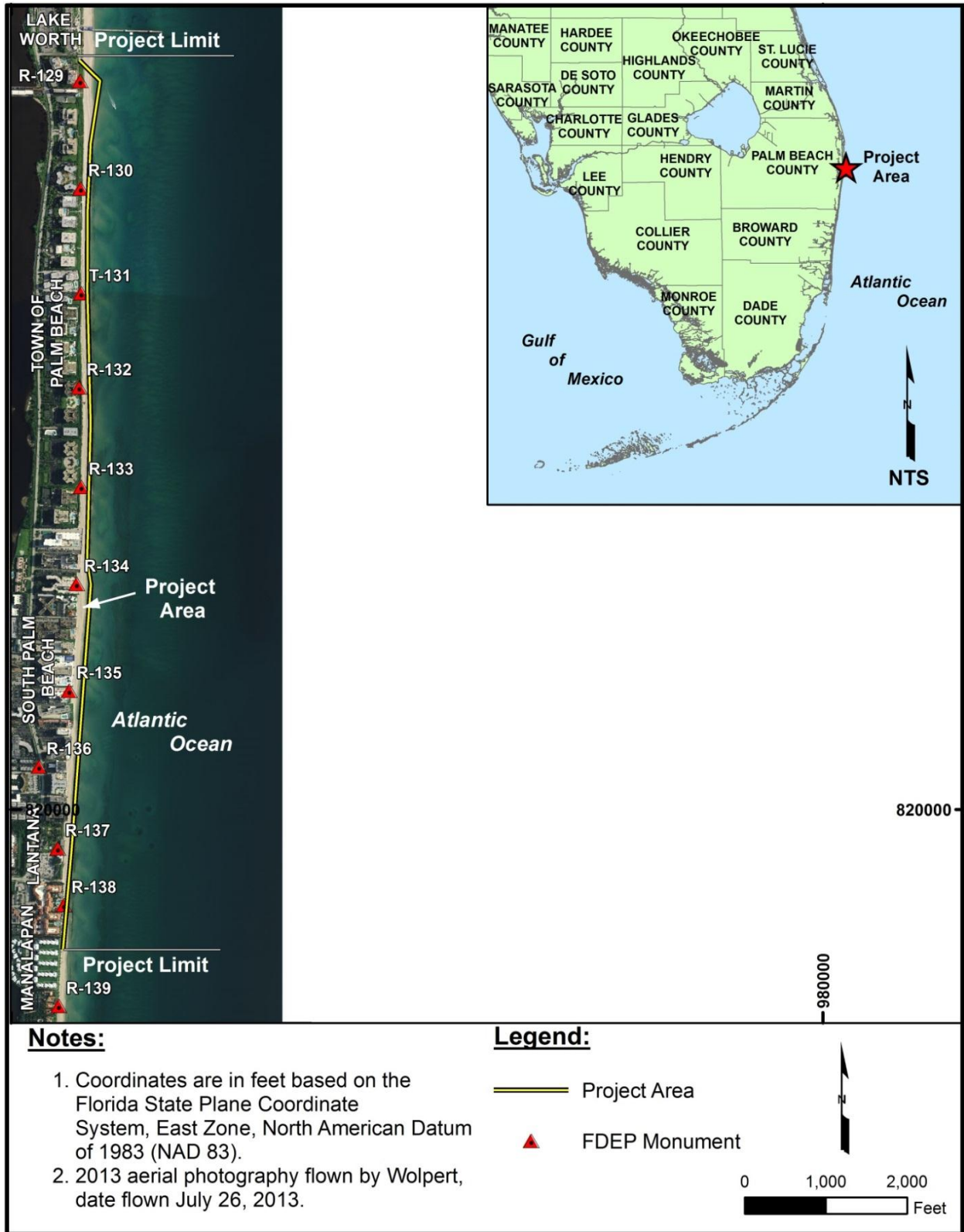


Figure 1-1. Southern Palm Beach Island Comprehensive Shoreline Stabilization Project location map.

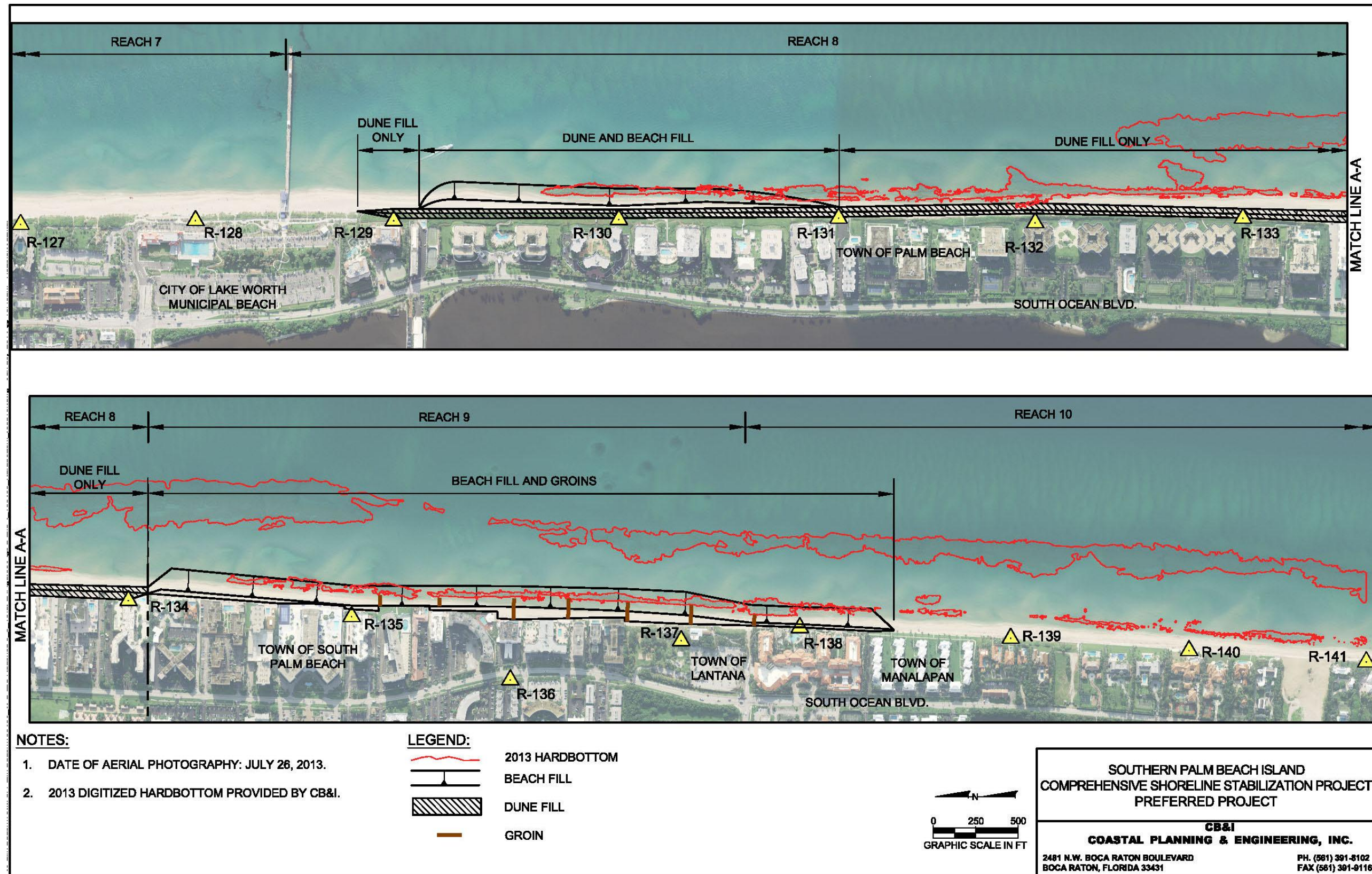


Figure 1-2. Proposed Southern Palm Beach Island Comprehensive Shoreline Stabilization Project (Alternative 2 – Applicants’ Preferred Alternative).

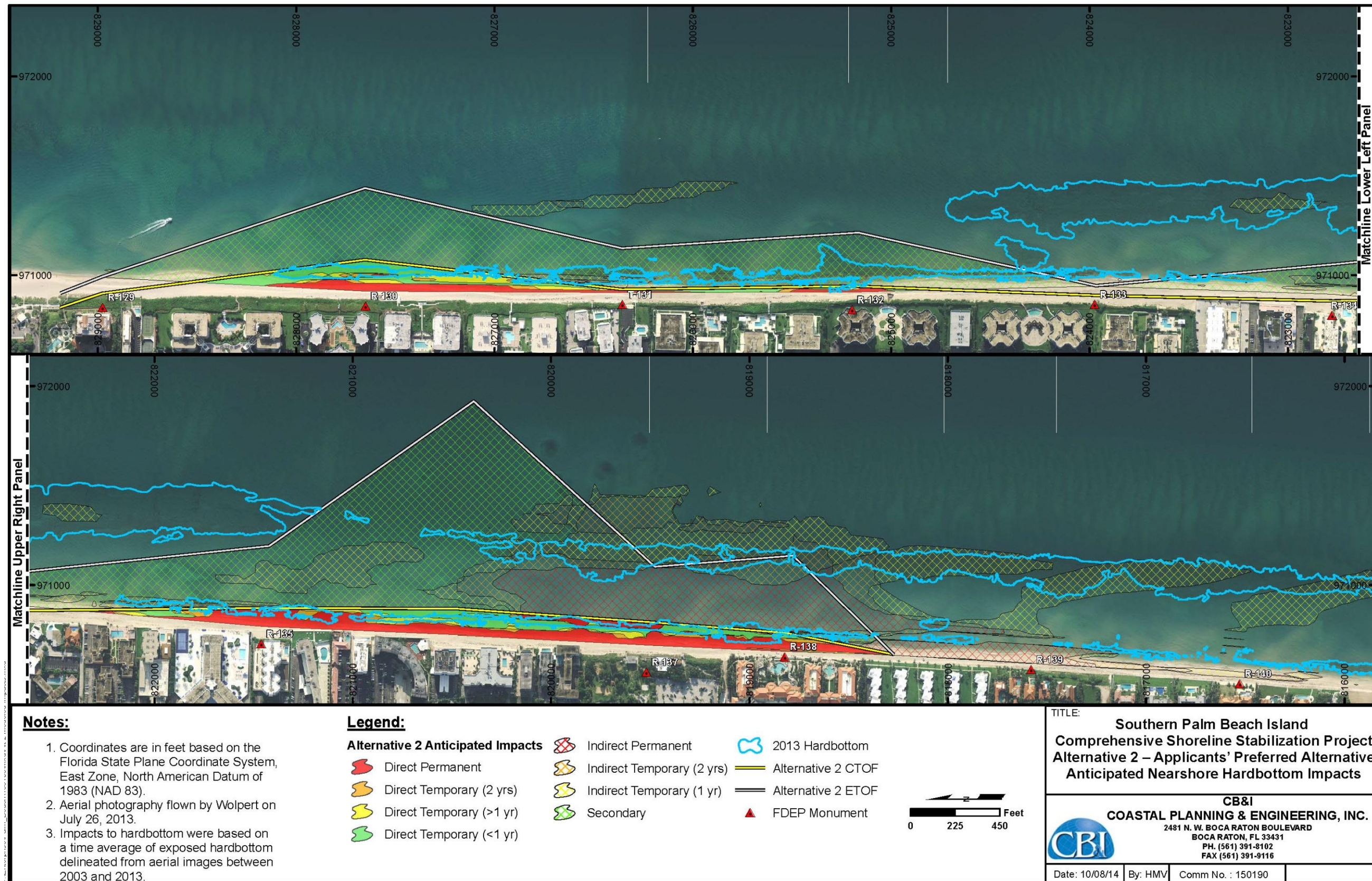


Figure 1-3. Anticipated nearshore hardbottom impacts from Alternative 2 – Applicants' Preferred Alternative.

1.1. IMPACT SITE

Due to direct sand placement and subsequent spreading (equilibration) of sand, it is anticipated that the Project may result in permanent impacts to 4.03 ac of hardbottom as well as temporary and secondary impacts to 8.13 ac of hardbottom (Figure 1-3). A benthic characterization survey was conducted in the fall of 2013 to assess the habitat adjacent to the Project Area (R-127 to R-141), including intertidal and subtidal hardbottom (CB&I, 2014, provided as Appendix D to the EIS). This included a quadrat-based assessment to quantify the benthos as well as shore-perpendicular transects to determine sediment conditions. During this survey, maximum relief measurements were taken within each quadrat: the mean maximum vertical relief of the intertidal area was 7.0 cm (SD 10.5) and the mean maximum vertical relief for the subtidal area was 9.3 cm (SD 8.8). Based on these results, the impact site is characterized as low relief (≤ 30 cm).

The benthic community located in the impact area is dominated by turf algae, sediment and macroalgae (CB&I, 2014). A total of 14 macroalgae genera were identified during the 2013 characterization survey, five of which are known to be preferred food items of *C. mydas*. These included *Dictyota*, *Dictyopteris*, *Bryothamnion*, *Dasycladus*, and *Jania*. Of all macroalgae genera recorded, *Dictyota*, *Gelidiella* and *Dasycladus* dominated the macroalgae cover in the Study Area and were also the most frequently occurring genera. In 2013, 20 scleractinian colonies (0.5 colonies m^{-2}) and 225 octocoral colonies (6.1 colonies m^{-2}) were documented on the same 12 transects. *Oculina diffusa* added to the scleractinian species diversity in 2013; however, only one 1-cm colony of this species was observed on R-139. The octocoral community was made up of four genera (*Eunicea*, *Muricea*, *Pseudopterogorgia* and *Pterogorgia*), all of which occurred in the subtidal portion of the sampling area. Average size was 2.6 cm for all observed scleractinian corals and 5.3 cm for all observed octocorals. No *Acropora* coral species and none of the five coral species listed as threatened in August 2014 were observed during the survey, or during an *Acropora* survey conducted by Palm Beach County's Department of Environmental Resources Management (PBC-ERM) in October 2013 (provided as Appendix C to the EIS).

A total of 56 fish taxa from 29 families were recorded along the natural hardbottom during this survey, including 18 predatory species and 11 species of the snapper/grouper management complex.

2.0 MITIGATION SITE SELECTION CRITERIA

In order to offset lost ecological functions from the burial of hardbottom from the Southern Palm Beach Island Comprehensive Shoreline Stabilization Project, the Town of Palm Beach and Palm Beach County propose to provide in-kind mitigation through construction of artificial reef substrate within the vicinity of and similar depths to the impact area. The mitigation will be located in Palm Beach County and extend into the Atlantic Ocean, Class III Waters. The Applicants determined that suitable mitigation sites should be located near the proposed impact site in similar water depths as the impacted hardbottom (less than 20 ft). Further, to avoid impacts from the mitigation structures themselves, the mitigation sites must be located on sandy seafloor where there are no hardbottom resources. These areas must also have a relatively thin sand layer, covering subsurface rock and or consolidated rubble that will prevent and or minimize settlement of the mitigation units. The general artificial reef citing criteria being used by the Town of Palm Beach and the County are as follows:

1. Offshore of the predicted ETOF, beyond the anticipated impact area;
2. Similar water depth to impacted hardbottom resources;
3. Maintain a protective buffer of at least 25ft from all nearshore hardbottom;
4. Underlying sediment thickness between 1 and 4 ft.

The criteria listed above place the artificial reef outside the anticipated project impact area and protect the existing natural hardbottom during construction of the mitigative reef while placing the reef within the vicinity of these resources. These locations maintain proximity and connectivity to aquatic resources, which will allow recruitment of organisms from adjacent hardbottom onto the artificial reef, thereby increasing the likelihood that the artificial reef will succeed at developing a natural community similar to that found on the impacted nearshore hardbottom.

2.1. SITE SELECTION PROCESS

The Town of Palm Beach has conducted field surveys in August 2014 to support mitigation reef siting for the Mid-Town Project. These surveys were based on the most recent site information including probe measurements of nominal sand depth. A minimum of 0.5 acres is available and identified. Additional viable acreage is potentially available within the vicinity, though site specific investigations of additional areas have not been conducted. No additional surveys are planned at this time; however, additional surveys will be required to support the full mitigation acreage that will be required and to finalize design and construction.

In order to determine potential sites for Palm Beach County's mitigative artificial reef, a time series of aerials was analyzed in August 2014 to identify areas where hardbottom has not historically been exposed. A seismic survey is scheduled to be conducted in Fall 2014 to verify the feasibility of the proposed area (described in Section 2.2) to support an artificial reef based on the depth of sand over bedrock.

2.2 Proposed Mitigation Sites

Based on the selection criteria and surveys conducted to date, the Town of Palm Beach and Palm Beach County have identified potential locations for their respective mitigative artificial reefs (Figure 2-1). However, the final site determinations will be based on additional surveys and on final mitigation conditions which will be required by project permits.

The preferred location for the Town of Palm Beach County's mitigation reef is in the nearshore zone in the vicinity of R-104.5, approximately 800 feet seaward of the MHWL in approximately 15 ft water depth (Figure 2-1), located about 4.8 miles north of the Project Area. Field surveys of the area have been conducted to support mitigation reef siting for the Mid-Town Project. These were completed in August 2014 and are based on the most recent site information including probe measurements of nominal sand depth. The proposed mitigation reef will consist of one layer of limestone boulders measuring 4 ft. in maximum diameter.

The preferred location for Palm Beach County's mitigation reef is in the nearshore zone between R-137-330 and R-137+400 (Lantana Public Beach) (Figure 2-1). The mitigation reef will consist of a single layer of limestone boulders clusters in approximately -10 ft to -20 ft NGVD. To minimize potential impacts to sediment transport, the spacing between the clusters will be similar to those of the mitigation built for the Juno Beach Renourishment Project. The clusters will likely have a dimension of 20 ft x 40 ft and space between each cluster will likely be 35 ft laterally and 30 ft longitudinally. The limestone boulders will likely have a minimum weight of 2,200 lbs. and shall not exceed 6,000 lbs. with at least 95% of the boulders between 2,200 lbs. and 5,800 lbs. Construction will be similar to the FDEP approved mitigation for the Juno Beach re-nourishment.

Based on the observed performance of other mitigative artificial reefs constructed in southeast Florida, the proposed mitigation structures are expected to provide the intended mitigating effect. Given the nature of the rock and consolidated rubble beneath the proposed mitigation area, the likelihood of unanticipated settlement is minimal. The mitigation units themselves will be sized such that they will be individually stable under the influence of tide, current, and wave conditions that area reasonable likely to occur for storm events with a return period of at least 25 years. Thus, movement due to such conditions is unlikely.

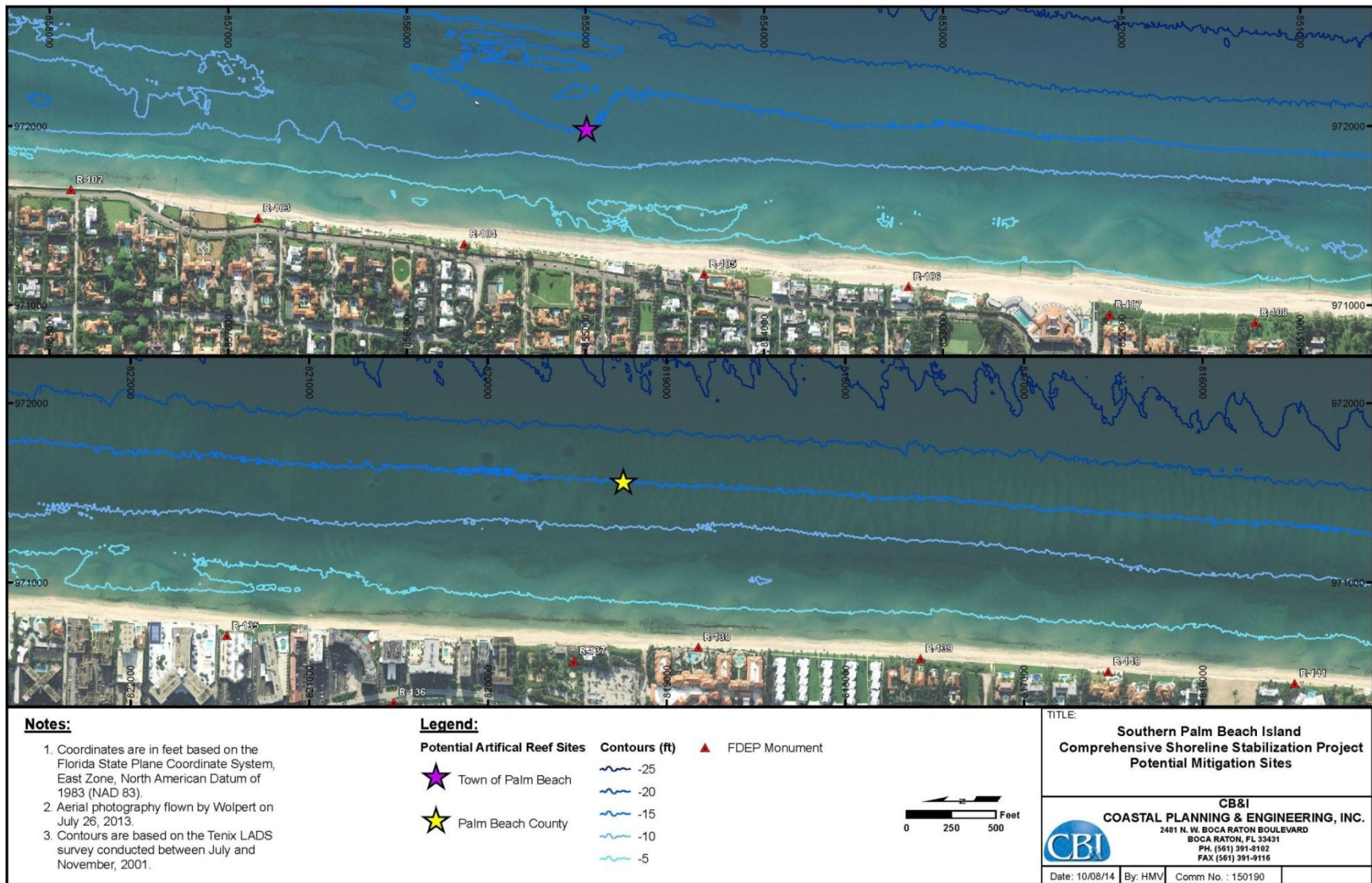


Figure 2-1. Potential mitigation sites.

3.0 SITE PROTECTION INSTRUMENT

The mitigation will be constructed on sovereign submerged lands of the State of Florida. This mitigation will be authorized by the State of Florida under FDEP permits for the Town of Palm Beach and Palm Beach County projects. The Town of Palm Beach and the County will be responsible for the construction and management of their respective artificial reefs. The USACE will have access to the mitigation site subsequent to the issuance of a Department of the Army permit.

4.0 BASELINE INFORMATION

This section describes the baseline conditions found at the impact site and the proposed mitigation sites.

4.1 IMPACT SITE

Based on engineering and modeling results, it is anticipated that the Project may result in permanent impacts to 4.03 ac of hardbottom as well as temporary and secondary impacts to 8.13 ac of hardbottom due to direct sand placement and subsequent spreading (equilibration) of sand (Figure 1-3). Impacts to hardbottom were based on a time average of exposed hardbottom delineated from aerial images between 2003 and 2013. The hardbottom environment within the project impact area is highly ephemeral, consisting primarily of low-relief intertidal and subtidal hardbottom habitat, located in less than 15 ft water depth. Surveys have shown a benthic community dominated by turf algae and macroalgae, but also supporting wormrock, tunicates, sponges, bryozoans and small coral colonies. Motile species such as fish, sea turtles and crabs also utilize this habitat. Species are accustomed to the ephemeral nature of the habitat which is subject to frequent burial and re-exposure.

Section 1.1 of this mitigation plan describes the benthic community found in this habitat and summarizes the results of the 2013 benthic characterization survey (CB&I, 2014). The nearshore marine habitat may be utilized by listed species, including sea turtles, manatees, smalltooth sawfish, *Acropora* spp. corals, as well as five coral species recently listed as threatened under the ESA. The Project Area is also designated as

loggerhead critical habitat (terrestrial and marine). The USACE will coordinate with NMFS for potential project impacts to federally listed species, loggerhead critical habitat and Essential Fish Habitat (EFH).

4.2 MITIGATION SITES

Based on the results the UMAM evaluation (Appendix H of the EIS), 6.39 ac of mitigation will be required to offset impacts to 4.03 ac of hardbottom as well as temporary and secondary impacts to 8.13 ac of hardbottom due to direct sand placement and subsequent spreading (equilibration) of sand (Figure 1-3). The Applicants will construct artificial reefs to offset these impacts, and will place these reefs in similar depths as the impacted resources. The artificial reefs will be spaced so as to replicate the spacing of the natural nearshore hardbottom habitat.

The preferred location for the Town of Palm Beach County's mitigation reef is in the nearshore zone in the vicinity of R-104.5, approximately 800 feet seaward of the MHWL in approximately 15 ft water depth (Figure 2-1). The proposed mitigation reef will consist of one layer of limestone boulders measuring 4 ft. in maximum diameter. The preferred location for Palm Beach County's mitigation reef is in the nearshore zone between R-137-330 and R-137+400 (Lantana Public Beach) (Figure 2-1). The mitigation reef will consist of a single layer of limestone boulders clusters in approximately -10 ft to -20 ft NGVD. Both areas are currently sandy bottom areas of the nearshore region which contain thin layers of sand over rock or rubble. The nearshore areas are located within designated loggerhead critical habitat.

5.0 DETERMINATION OF CREDITS

The area of impact determined from the Engineering Analysis and Numerical Modeling Study (provided as Appendix G to the EIS) was used to complete a Uniform Mitigation Assessment Method (UMAM) evaluation (Chapter 62-345, F.A.C.) for the Southern Palm Beach Island Comprehensive Shoreline Stabilization Project. UMAM assesses the functions and services of the hardbottom resources predicted to be impacted, and determines the amount of appropriate mitigation to compensate for impacts to these resources. Time lag and risk are incorporated into the calculations to ensure the

appropriate amount of compensatory mitigation is identified that will effectively offset the loss of ecological functions and services due to hardbottom impacts. Time lag refers to the period of time between when the functions are lost at an impact site and when those functions are replaced by the mitigation. Mitigation risk accounts for the degree of uncertainty that the proposed mitigation will succeed at offsetting project impacts.

In UMAM, the input factors that determine mitigation requirements are:

1. The area (ac) of impact;
2. The parameters of the impact area without and with the project;
3. The parameters of the mitigation area without and with the project;
4. The risk factor; and
5. The time lag (t-factor).

The Draft UMAM Analysis provided as Appendix H to the EIS details the input factors used to determine mitigation for the Project. The UMAM evaluation was developed to specifically assess the anticipated loss of nearshore hardbottom function attributed to the construction of the Applicants' Preferred Alternative, as well as to all proposed alternatives evaluated in the EIS. Based on the modeling and ETOF analyses, seven types of impacts to hardbottom were defined for the purpose of this UMAM evaluation. These impact types are described in the Draft UMAM Analysis, provided as Appendix H. Table 4-1 in Chapter 4 of the EIS summarizes the estimated impact acreage for each impact type and the associated mitigation which may be required for each alternative. These UMAM results have not yet been reviewed by the Applicants or the coordinating agencies, but will be finalized after public review and provided in the Final EIS. For the Applicants' Preferred Alternative (Alternative 2), the draft UMAM assessment determined that 6.39 acres of mitigative artificial reef would be required to offset 4.03 ac of permanent hardbottom and 8.13 ac of temporary and secondary hardbottom impacts due to direct sand placement and subsequent spreading (equilibration) of sand.

6.0 MITIGATION WORK PLAN

Based on the UMAM analysis for the Applicants' Preferred Project (Alternative 2), 6.39 acres of mitigative artificial reef will be required to offset 4.03 ac of permanent hardbottom and 8.13 ac of temporary and secondary hardbottom impacts due to direct sand placement and subsequent spreading (equilibration) of sand (see Section 2.0 and Figure 1-3). The UMAM approach is provided in Appendix H to the EIS and the UMAM evaluation for Alternative 2 is provided as Sub-Appendix H-1. The Southern Palm Beach Island Comprehensive Shoreline Stabilization Project is comprised of a Town of Palm Beach project and a Palm Beach County project. The EIS is intended to evaluate the impacts of the two similar actions; therefore, the alternatives evaluated in the EIS consist of various combinations of two potential Town of Palm Beach projects with three potential County projects. However, since the Applicants must obtain separate permits, the Town of Palm Beach and County projects were also modeled as standalone projects. Additional UMAM evaluations were conducted based on the results for the separated Town of Palm Beach and County projects. UMAM forms for the Preferred Alternative (Alternative 2) for the Town of Palm Beach and County are provided as Sub-Appendices H-1 and H-2, respectively.

6.1 TIMING OF MITIGATION

The artificial reefs are expected to be constructed within the same year as the Town of Palm Beach and Palm Beach County projects; the construction of the nourishment projects and mitigative reefs will be constructed as separate projects.

6.2 CONSTRUCTION SCHEDULE

The amount of mitigation required for the Town of Palm Beach and County projects will be finalized during the permitting process for the Project. Mitigation unit deployment of the mitigation modules and/or limestone boulders will likely occur during late-spring, summer, and early fall months when sea conditions are most favorable for working offshore of Palm Beach County. The total time to complete the mitigation project is not known at this time given uncertainties with fabrication and deployment rates, as well as the unknown final amount of mitigation that will be required. Time required to deploy the

mitigation units will be highly dependent upon the amount of suitable working conditions during the summer months.

6.3 MITIGATIVE REEF DESIGN AND CONSTRUCTION METHODS

The Town of Palm Beach's proposed mitigation reef will consist of one layer of limestone boulders measuring 4 ft. in maximum diameter. The Town of Palm Beach's proposed mitigation reef layout and reef specifications are provided as Sub-Appendix I-1. Palm Beach County's mitigation reef will consist of a single layer of limestone boulders clusters in approximately -10 ft to -20 ft NGVD. To minimize potential impacts to sediment transport, the spacing between the clusters will be similar with those of the mitigation built for the Juno Beach Renourishment Project. The clusters will likely have a dimension of 20 ft x 40 ft and space between each cluster shall be 35 ft laterally and 30 ft longitudinally. The limestone boulders will likely have a minimum weight of 2,200 lbs. and shall not exceed 6,000 lbs. with at least 95% of the boulders between 2,200 lbs. and 5,800 lbs. Construction will likely be consistent with the FDEP approved mitigation for the Juno Beach re-nourishment. Details of Palm Beach County's proposed mitigation are provided in Sub-Appendix I-2

7.0 MAINTENANCE PLAN

The Town of Palm Beach and Palm Beach County will conduct mid-construction surveys and an immediate post-construction as-built survey to ensure their respective mitigative reefs are constructed properly. A line-intercept survey will be conducted on the artificial reefs as part of the as-built in order to estimate percent of net reef cover. The goal of this is to ensure that the artificial reef site reflects a similar hardbottom to sand ratio as the pre-construction natural hardbottom. Annual surveys will also be conducted for three years post-construction to document that the reef is providing appropriate mitigation for hardbottom impacts. During the third (and final) annual mitigation monitoring, the edge of the artificial reef will be delineated to quantify the total acreage of functional artificial reef.

8.0 PERFORMANCE STANDARDS

Success of the compensatory mitigation project will be achieved when the benthic community and colonization of the mitigation reef have been documented to be comparable to the benthic community and species composition which were observed in the impact area during pre-construction. The monitoring and reporting requirements are described in Section 9.0. Based on permit requirements for similar projects, the mitigation success criteria may include:

1. An obvious trend toward similarity in the benthic community between the artificial reef and the natural hardbottom by the completion of the monitoring period;
2. Percent cover by each of the major groups of organisms (functional groups) in the mitigation site shall be no less than it was in the impact site (difference shall be statistically insignificant);
3. 90% of the functional groups, octocoral genera and scleractinian coral species shall be present on the artificial reef compared to the natural hardbottom; and
4. A line-intercept survey shall demonstrate that net amount of reef versus sand did not change from the time of construction due to subsidence (not more than 5% buried from results of initial survey).

9.0 MONITORING REQUIREMENTS

The mitigative artificial reef monitoring is described below. Nearshore hardbottom biological monitoring will also be required, and will be designed to supplement the protocol detailed in the Beach Management Agreement (BMA) (see EIS Section 5.2.3. for details on natural hardbottom monitoring).

9.1 MITIGATIVE ARTIFICIAL REEF MONITORING

The Town of Palm Beach and Palm Beach County will monitor the artificial reefs for benthic colonization and succession in order to detect whether the success criteria (defined in Section 8.0) have been met. Monitoring of the mitigation reefs will be conducted in the summer, likely beginning approximately one year after construction

and repeated annually for three years post-construction (three events), or until data from biological monitoring show the reefs are trending towards success at offsetting project impacts to natural hardbottom.

The functional success of the artificial reefs will be tracked through a biological monitoring program coordinated with state and federal agencies. Depending on the layout of the reefs, transects will be likely be spaced throughout the reef and quadrats will be sampled along these transects to quantify the benthic habitat. Additionally, video and photo-documentation will be collected. Line-intercept may also be conducted to ensure the correct rock to sand ratio is installed within the mitigation reef footprint. This monitoring will determine trends toward success or failure. If the benthic communities on the artificial reefs are not similar to the impacted hardbottom resources after three years of monitoring, the Applicants will conduct additional monitoring, if required. The Applicants will coordinate with state and federal agencies to determine a path forward if the mitigation does not succeed at offsetting hardbottom impacts.

The boundaries of the artificial reefs shall be mapped one time during the third annual survey. The mapping survey is conducted *in situ* by biologists following outer boundary of the artificial reef. A buoy with a Differential Global Positioning System (DGPS) antenna linked to a topside laptop computer running HYPACK navigational software is towed along reef edge to record the position of the reef boundary. The reef edge will be presented on a map within the 3-year post-mitigation annual monitoring report and a shapefile will be provided as well.

Monitoring reports shall be completed after the 1-year, 2-year and 3-year post-deployment surveys of the artificial reef and shall be provided within 90 days after completion of each annual monitoring event. The JCP Compliance Officer and the USACE shall be notified at the commencement and completion of each monitoring event, along with weekly progress updates throughout monitoring. Each annual report shall document the colonization of the artificial reef and compare the species composition on this reef to that documented in the impact area during the pre-construction survey.

10.0 LONG-TERM MANAGEMENT PLAN

Based on previous performance of artificial reefs in southeast Florida, including Palm Beach County, it is anticipated that the proposed mitigative artificial reef substrate will succeed at offsetting project impacts to the nearshore natural hardbottom. The Applicants will implement Biological Monitoring Plans (see Section 9.0) that include monitoring the mitigative artificial reef to ensure the colonization and development of the reef proceeds as anticipated. However, if the benthic communities on the artificial reefs are not similar to the impacted hardbottom resources after three years of monitoring, the Applicants will conduct additional monitoring, if required. The Applicants will coordinate with state and federal agencies to determine a path forward if the mitigation does not succeed at offsetting hardbottom impacts.

11.0 ADAPTIVE MANAGEMENT PLAN

As stated above in Section 10.0, if the benthic communities on the artificial reefs are not similar to the impacted hardbottom resources after three years of monitoring, the Applicants will conduct additional monitoring, if required. The Applicants will coordinate with state and federal agencies to determine a path forward if the mitigation does not succeed at offsetting hardbottom impacts. Impacts to the artificial reefs as a result of a hurricane (or other storm events) or sea level rise are considered acts of nature. The Applicants will not be responsible for reparations due to acts of nature.

12.0 FINANCIAL ASSURANCES

The Town of Palm Beach and Palm Beach County will be responsible for their share of the costs associated with construction and monitoring of their respective artificial reefs.

13.0 LITERATURE CITED

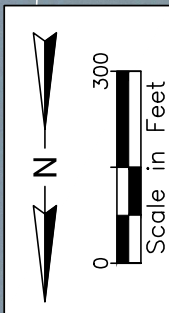
CB&I (Coastal Planning & Engineering, Inc., a CB&I Company). 2014. Southern Palm Beach Island Comprehensive Shoreline Stabilization Project, 2013 characterization report. Prepared for The Town of Palm Beach. January 2014.

Florida Department of Environmental Protection (FDEP). 2013. Palm Beach Island Beach Management Agreement (BMA). <http://www.dep.state.fl.us/beaches/pb-bma/docs/BMA-MainAgreement.pdf>. Prepared by Florida Department of Protection.

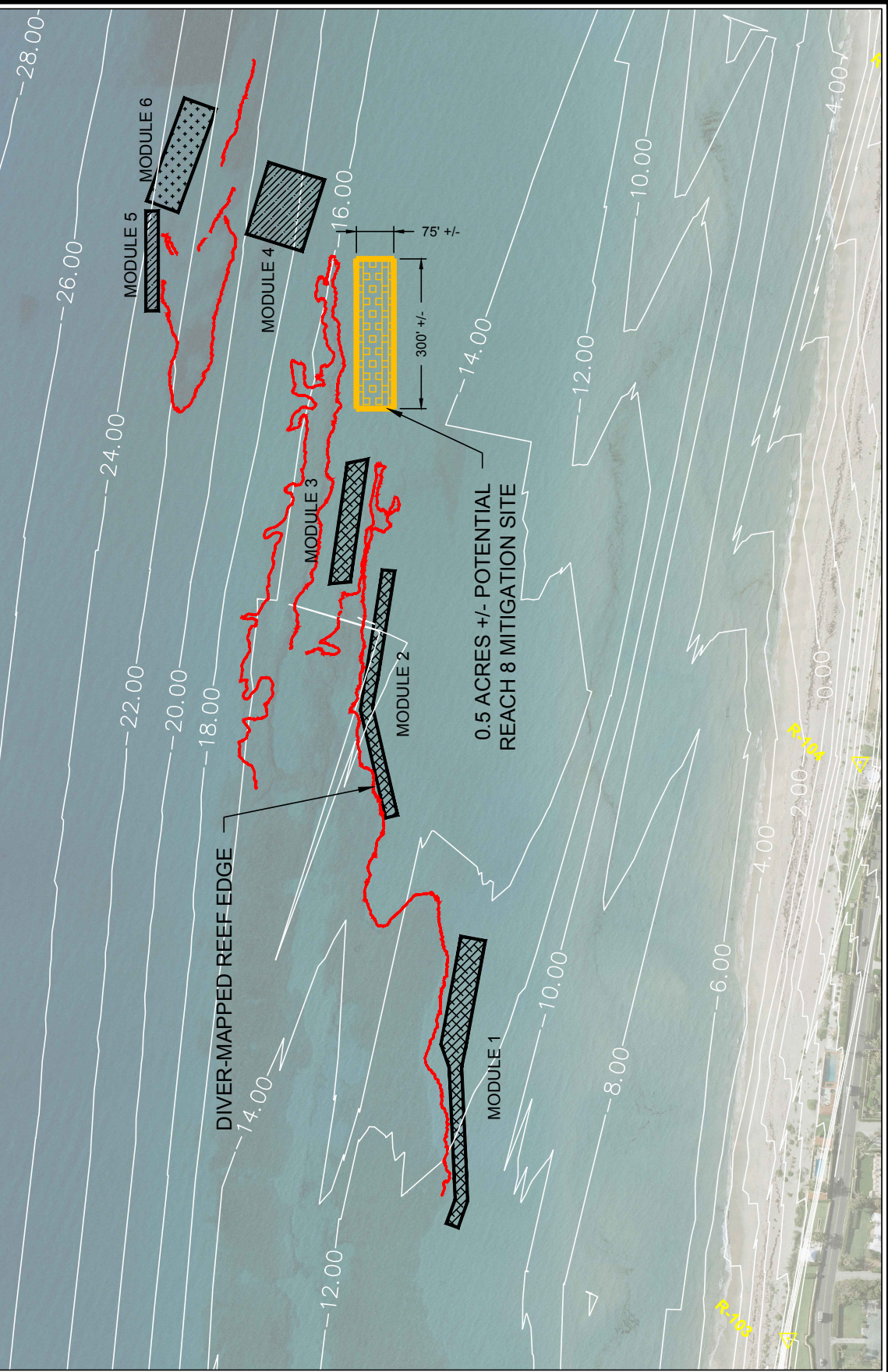
SUB-APPENDIX I-1

TOWN OF PALM BEACH PROPOSED MITIGATION

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- NOTES: 1.) AERIAL PHOTOGRAPHY DATED 2012.
 2.) HORIZONTAL DATUM RELATIVE TO NAD83 FLORIDA STATE PLANE, EAST ZONE, US FEET.
 3.) DIVER-MAPPED REEF EDGE MAPPED ON APRIL 23, 2014.
 4.) MODULES 1-6 ARE PROPOSED MITIGATION REEFS FOR THE MID-TOWN PROJECT.



ATMSM
 APPLIED TECHNOLOGY & MANAGEMENT
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 West Palm Beach, FL 33411
 (561) 659-0041
 Certificate of Authorization #4669

Potential Reach 8 Mitigation Site

Town of Palm Beach

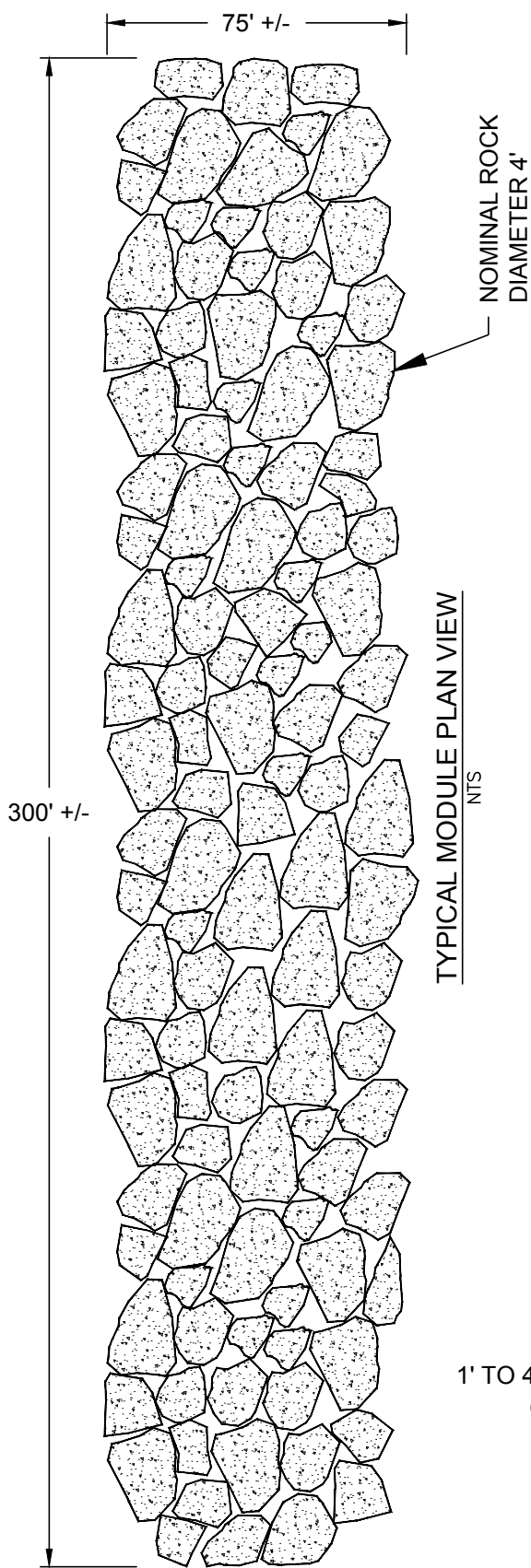
FIGURE 1

JOB NUMBER: 13-2534

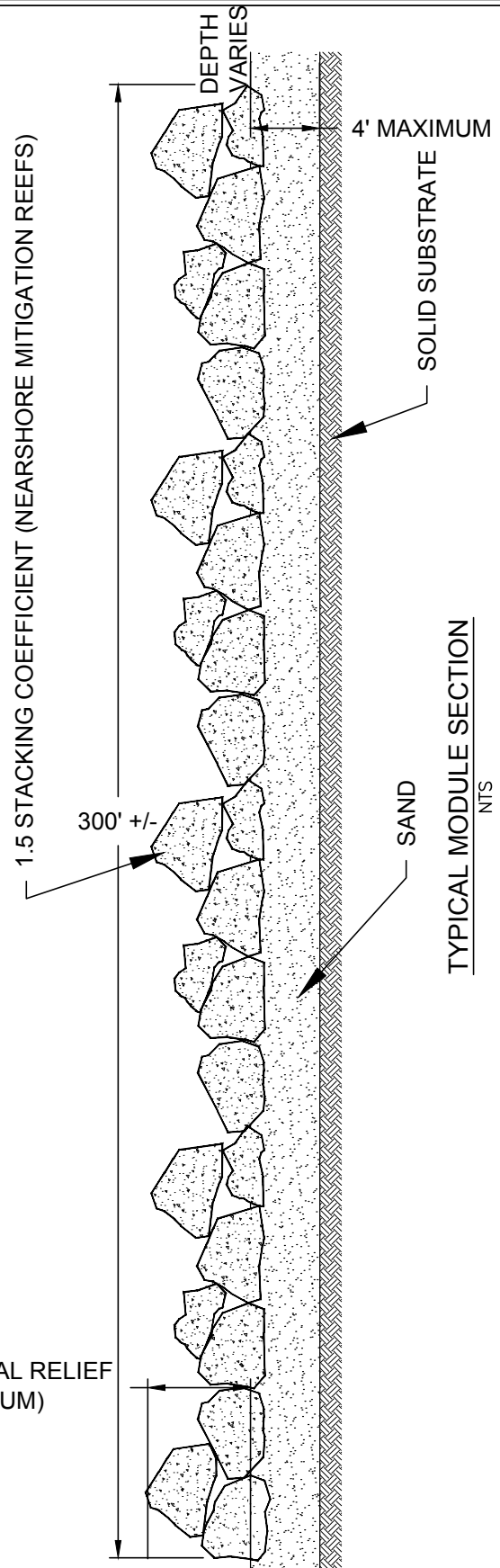
ISSUE DATE: 10-09-2014

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 Professional Engineer
 Florida License Number xxxxx

LOCATION: \\PB\BOP\5001\GROUPS\WESTPALMBEACH_SHARES\DRAWINGS\PROJECTS\13-2534_TOPB_2013_MITIGATION_REEF_DES_PERMITTING & CONST\FIGURES\REACH_8_MIT_SITE_DETAIL.DWG



1' TO 4' VERTICAL RELIEF
(6' MAXIMUM)



2047 Vista Parkway, Suite 201
West Palm Beach, FL 33411
(561) 659-0041
Certificate of Authorization #4669

Potential Reach 8 Mitigation Site - Details

Town of Palm Beach

FIGURE 2

JOB NUMBER: 13-2534

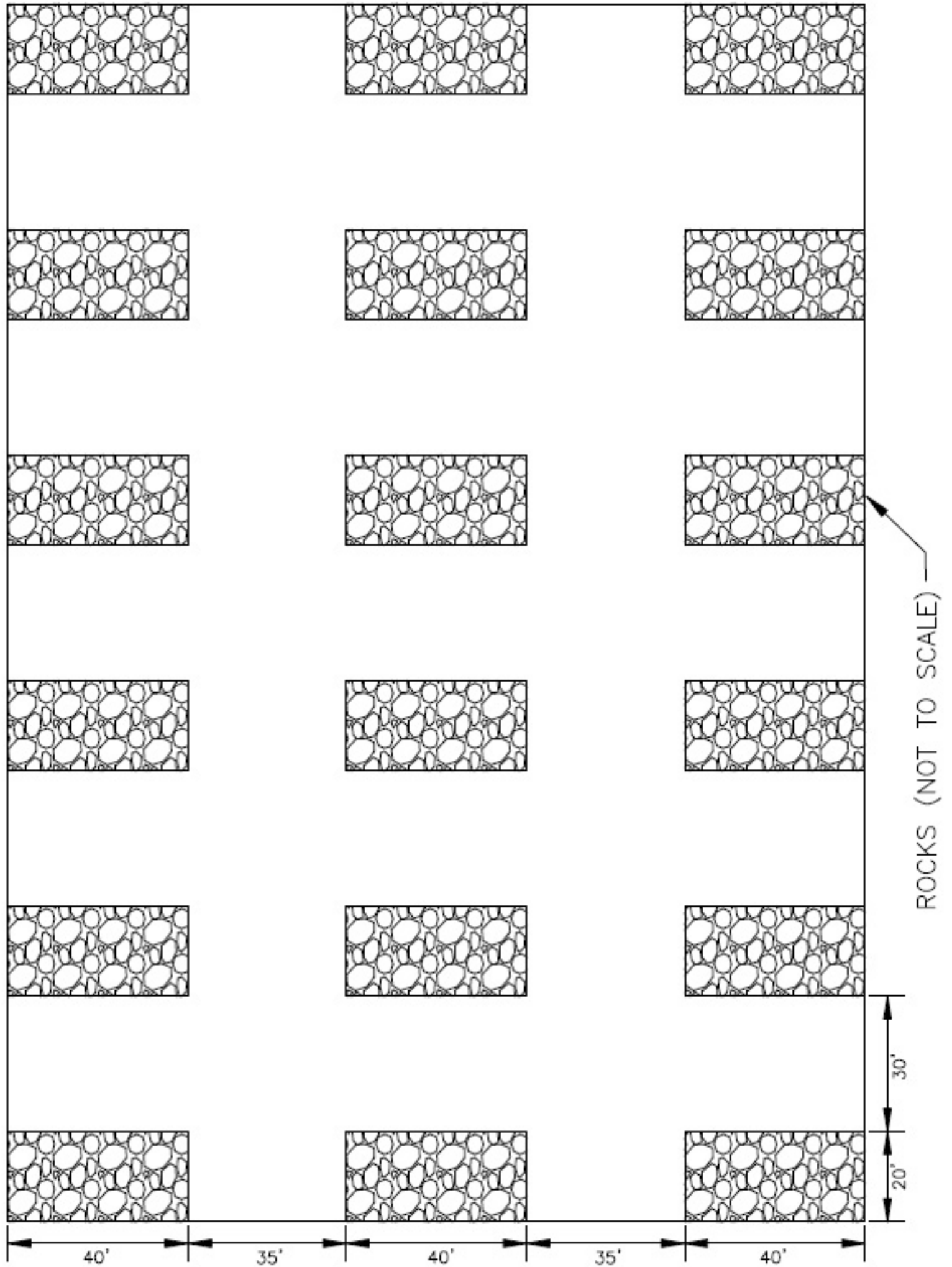
ISSUE DATE: 10-09-2014

xxxxx x xxxxx
Professional Engineer
Florida License Number xxxxx

SUB-APPENDIX I-2
PALM BEACH COUNTY PROPOSED MITIGATION

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-6' MLW MINIMUM
DEPTH OF WATER



PALM BEACH COUNTY
DEPARTMENT OF
ENVIRONMENTAL
RESOURCES
MANAGEMENT

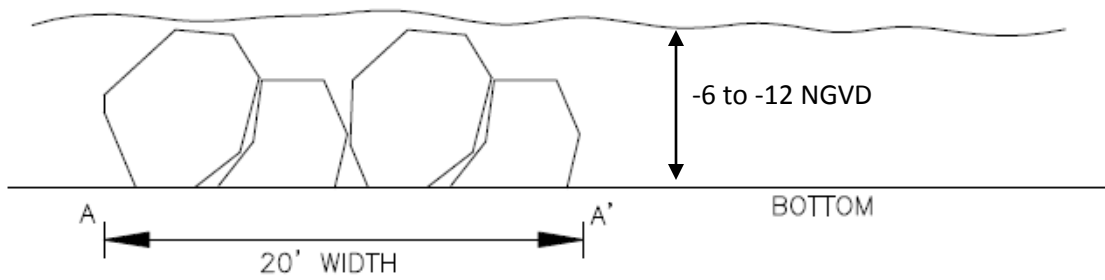
TYPICAL
ARTIFICIAL REEF LAYOUT
FOR
MITIGATION REEFS

NTS

SEPARATION DISTANCES MAY VARY WHEN FIELD
ADJUSTED

02/08

Figure 5



CONSTRUCTION NOTES:

BOULDERS SHALL HAVE A MINIMUM WEIGHT OF 2200 LB.
 UP TO 6000 LB. WITH AT LEAST 95% OF THE BOULDERS
 2200 TO 5800 LB.



PALM BEACH COUNTY
 DEPARTMENT OF
 ENVIRONMENTAL
 RESOURCES
 MANAGEMENT

CROSS-SECTION
 MITIGATION REEFS CONSTRUCTION

NTS

Figure 4

07/07/MODIFIED 10/08

