APPENDIX H

DRAFT UMAM ANALYSIS

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SOUTHERN PALM BEACH ISLAND COMPREHENSIVE SHORELINE STABILIZATION PROJECT DRAFT UMAM ANALYSIS

TABLE OF CONTENTS

LIST OF TABLES

Table No.

LIST OF FIGURES

Figure No.

1.0 INTRODUCTION

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 these impacts. The UMAM evaluation presented herein 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. Impacts to hardbottom include two general categories:

- *Direct* = burial resulting from direct placement of sand at time of project construction (within construction toe of fill (CTOF)).
- *Indirect* = impacts resulting from the spreading of sand following project construction (outside CTOF).

While the impacts can be described generally as direct or indirect, more detailed description is necessary to accurately account for anticipated project related impacts to the nearshore intertidal and subtidal hardbottom. The hardbottom habitat adjacent to the Project Area is shown to be highly ephemeral. From 2003 to 2013, the quantity of exposed nearshore hardbottom within the Study Area of this Project (R-127 to R-141+586) has shown extreme natural variability, ranging from 3.06 acres (2009) to 51.20 acres (2006). The impact analysis conducted for this Project considered this natural variability by evaluating ten years of hardbottom delineation (2003 to 2013) to estimate the time-averaged exposed acreage, and in turn to determine the mitigation acreage for this impact area. In order to appropriately mitigate for impacts to this highly ephemeral habitat, it is important to distinguish permanent impacts from temporary impacts.

Numerical modeling estimated the movement of sand for 3 years following construction of the Project. The numerical modeling results indicate that a portion of the sand placed below mean high water (MHW) will remain within the CTOF for all 3 years following construction, while the remainder of the sand will be transported offshore and/or downdrift of the placement area as the beach equilibrates. The Town of Palm Beach and Palm Beach County projects that comprise the Southern Palm Beach Island Comprehensive Shoreline Stabilization Project, are expected to be reconstructed approximately every 3-4 years. Therefore, some direct impacts are considered permanent (i.e. buried for all 3 years post-construction), while some will be temporary (covered less than 3 years). Once sand begins equilibrating, indirect impacts will be incurred as hardbottom outside the CTOF is buried for a period of time as sand moves offshore and/or downdrift from the Project Area. Modeling has estimated the locations of sediment accumulation at 1, 2 and 3 years post construction in the form of polygons that were plotted in GIS (Figure 4-1). At 3 years post-construction, it is assumed that the project may be reconstructed, and the impacts will be repeated. Permanent and temporary impacts are defined as follows.

- *Permanent* = Permanent impacts are those that, following placement of fill, will result in hardbottom burial for at least 3 years, at which time the project may be constructed again. Based on modeling results, these are areas which were shown to have sand accumulation present at 1, 2 and 3 years post-construction and are not expected to become re-exposed for the duration of the project. These areas are considered to have lost most, but not all, of their ecological function. While these areas will be subject to increased sand cover, this habitat is already ephemeral in nature; therefore, the habitat will continue to provide ecological function to motile species such as fish, sea turtles and crabs. Impacts will be mitigated through construction of an artificial reef. Permanent impacts may be located within the CTOF and in areas beyond the CTOF.

- *Temporary* = Temporary impacts are those that, following placement of fill, are expected to be buried for less than 3 years, which allows these resources to

regain ecological function for the period of time when they are re-exposed. These temporary impacts will be repeated following construction of each project, potentially every 3-4 years. Based on previous guidance provided by Florida Department of Environmental Protection (FDEP), temporary impacts can be considered as partially self-mitigating; when conducting UMAM analyses on areas of temporary impact, minimum risk is used and once the total mitigation is initially calculated, then the temporary impact acreage is subtracted from this total in order to determine the additional mitigation required to offset the temporary impact (L. Edwards and V. Kosmynin, pers. comm., 2013).

In addition to the modeling results predicting the movement of sand following project construction, an equilibrium toe of fill (ETOF) analysis was performed. While the modeling results include both offshore and downdrift movement, the traditionally-used ETOF analysis included an area that encompassed a larger cross-shore area; therefore, it is assumed that impacts may also occur to this area. This area was used to quantify the *secondary* impact area (Figure 4-1). These secondary impacts are considered as a degradation of a community, but not a total loss of function, that could result from increased sedimentation (L. Edwards and V. Kosmynin, pers. comm., 2013).

2.0 SEVEN HARDBOTTOM IMPACT TYPES

Based on the modeling and ETOF analyses, seven (7) types of impacts to hardbottom were defined for the purpose of this UMAM evaluation. These seven impact types and the associated mitigation determined by UMAM are summarized below and in Table 1 and Figure 4-1:

1. *Permanent* = Permanent impacts include areas where the sand is expected to remain for at least 3 years. This includes areas within the CTOF following direct placement during construction and areas offshore and/or downdrift which, although outside the CTOF and not directly impacted at the time of fill placement, are expected to become buried by 1-year post-construction and remain buried through 3 years post-construction. These impacts are considered permanent

since the project may be reconstructed every 3-4 years. Permanent impacts were calculated by summing the areas shown to have overlapping sediment accumulation polygons at 1, 2 and 3 years post-construction based on the modeling results. These areas are considered to have lost most, but not all, of their ecological function. Based on the preliminary UMAM analysis, this type of impact will be mitigated at a ratio of approximately 1 ac impact:1.16 ac of mitigation (1:1.20 ac using FDEP time lag).

2. *Direct Temporary (<1 Year)* = This area will be impacted within the CTOF by direct placement of fill at the time of construction, but is expected to become re-exposed within the first year following construction. For this analysis, it is estimated that the hardbottom will be re-exposed within 1 year following project construction and will remain exposed until the project is reconstructed. This impact area was calculated by taking the total area of exposed hardbottom within the CTOF and subtracting areas shown to have sediment accumulation polygons at 1, 2 and/or 3 years post-construction based on the modeling results. This type of impact is partly self-mitigating (i.e. will become re-exposed), and based on the preliminary UMAM analysis, will likely require mitigation at a ratio of approximately 1 ac impact:0.03 ac of mitigation (1:0.07 ac using FDEP time lag).

3. *Direct Temporary (>1 Year)* = This area will be impacted within the CTOF by direct placement of fill at the time of construction, but is expected to become re-exposed within the second year following construction. For this analysis, it is estimated that the hardbottom will be buried for more than 1 year (but less than 2 years) following project construction and will become re-exposed until the project is reconstructed. This impact area was calculated by summing the area within the CTOF shown to have sediment accumulation polygons at 1, 2 or 3 years post-construction (with no overlap between years) based on the modeling results. This type of impact is partly self-mitigating, and based on the preliminary UMAM analysis, will likely require additional mitigation at a ratio of approximately 1 ac impact:0.32 ac of mitigation (1:0.38 ac using FDEP time lag).

4. *Direct Temporary (>2 Years)* = This area will be impacted within the CTOF by direct placement of fill at the time of construction, but is expected to become re-exposed within the third year following construction. For this analysis, it is estimated that the hardbottom will be buried for more than 2 years (but less than 3 years) following project construction and will become re-exposed until the project is reconstructed. This impact area was calculated by summing the area within the CTOF shown to have sediment accumulation polygons that overlap for two years based on the modeling results. This type of impact is partly self-mitigating, and based on the preliminary UMAM analysis, will likely require additional mitigation at a ratio of approximately 1 ac impact:0.85 ac mitigation (1:0.93 ac using FDEP time lag).

5. *Indirect Temporary (1 Year)* = This area, located outside the CTOF, will be temporarily impacted for 1 year by spreading of sand, but will become re-exposed prior to project reconstruction. This impact area was calculated by summing the area beyond the CTOF shown to have sediment accumulation polygons during 1, 2 or 3 years post-construction (with no overlap between years) based on the modeling results. This type of impact is partly self-mitigating, and based on the preliminary UMAM analysis, will likely require additional mitigation at a ratio of approximately 1 ac impact:0.16 ac mitigation (1:0.20 ac using FDEP time lag).

6. *Indirect Temporary (2 Years)* = This area, located outside the CTOF, will be temporarily impacted for 2 years by spreading of sand, but will become re-exposed prior to project reconstruction. This impact area was calculated by summing the area beyond the CTOF shown to have sediment accumulation polygons that overlap for two years (e.g. overlap of 1- and 2-year, 2- and 3-year, or 1- and 3-year post-construction) based on the modeling results (with overlap between two years). This type of impact is partly self-mitigating, and based on the preliminary UMAM analysis, will likely require additional mitigation at a ratio of approximately 1 ac impact: 0.55 ac mitigation (1:0.61 ac using FDEP time lag).

7. *Secondary* = This area represents an impact area associated with the traditional equilibrium toe of fill (ETOF) and was not entirely predicted to be impacted based on modeling results. Although the project was modeled to account for direct and indirect impacts as discussed above, the ETOF was used to quantify the area where secondary impacts may occur due to increased sedimentation. This provides a conservative estimate of total impacts by including both cross-shore and downdrift estimates. The areas that were already accounted for from the modeling polygons were subtracted from the area of the ETOF so as not to "double dip". Areas that may experience secondary impacts are not expected to become buried, but effects may include slightly impaired ecological function. Based on the preliminary UMAM analysis, secondary impacts will likely require mitigation (artificial reef) at a ratio of approximately 1 ac impact:0.13 ac mitigation (also 1:0.13 ac using FDEP time lag).

3.0 DETAILS OF INPUT FOR UMAM EVALUATION AND ASSOCIATED MITIGATION REQUIRED FOR EACH IMPACT TYPE

Each of the seven types of impact received a separate UMAM evaluation which accounted for the nature of the impact (direct, indirect and secondary) and the duration of the impact (permanent and temporary). It is assumed that mitigation will be in the form of an artificial reef. Based on the ephemeral nature of the nearshore hardbottom in the impact area (low complexity, dominated by turf and macroalgae), it is expected that the artificial reef will completely resemble the hardbottom habitat within 3 years. Therefore, the time lag (t-factor) was set to 1.03 for all evaluations based on USACE time lag guidelines (the FDEP uses a t-factor of 1.07 for 3 years). The UMAM forms for each impact type associated with the Applicants' Preferred Alternative are attached. Sub-Appendix H-1 provides the UMAM evaluation for the Southern Palm Beach Island Comprehensive Shoreline Stabilization Project using modeling and engineering results for both the Town of Palm Beach and County projects considered together. In order to assist with the permitting of the projects, which must be permitted separately for the Town of Palm Beach and the County, the projects were also modeled as standalone projects. Based on these results, separate UMAM evaluations were conducted and are

provided as Sub-Appendices H-2 (for Town of Palm Beach project) and H-3 (for County project). For each of the three attached UMAM evaluations, Part I – Qualitative Descriptions are provided for the impact and mitigation areas, followed by Part II – Qualification of Assessment Areas for the impact and mitigation areas associated with each of the seven impact types. The final page of each evaluation shows the formulas used to calculate the mitigation acreage required for each impact type and the total mitigation required for each project. The parameters used for each UMAM evaluation are summarized below and in Table 1. Figure 4-1 illustrates the seven impact types determined for the Southern Palm Beach Island Comprehensive Shoreline Stabilization Project.

It is important to note that although permanent and temporary impacts to the nearshore hardbottom resources are anticipated, not all functional value will be lost. The expected remaining functional value is represented by the assigned value of one (1) for the "with project" natural hardbottom resources in the (a) Location and Landscape Support and the (c) Benthic Community for impact types 1 through 6. The softbottom habitat and marine water column above this substrate could still provide functions and services to the nearshore environment. The marine water column will continue to serve as a medium of transport for nutrients, migrating organisms and larvae of crustacean and fish species (SAFMC, 1998) and the sand substrate provides habitat for several fish, benthic and infaunal species; therefore, it is not a complete loss.

1. *Permanent:*

Impact Area: The "without project" natural hardbottom resources were assigned a value of 10 and the "with project" value was reduced to one in the (a) Location and Landscape Support and the (c) Benthic Community to account for the loss of most, but not all, function ((b) Water Environment was unchanged).

Mitigation: To determine the required mitigation, a "without mitigation" value of 0 and "with mitigation" value of 10 were assigned to (a) Location and Landscape Support and (c) Benthic Community ((b) Water Environment was unchanged). The risk factor

was set at 1.25, accounting for the slight uncertainty that the artificial reef will successfully mimic the impact area.

Mitigation Required: 1 acre of permanent impact will require 1.16 ac of mitigation (1.20 ac using FDEP time lag).

2. *Direct Temporary (< 1 Year):*

Impact Area: The "without project" natural hardbottom resources were assigned a value of 10 and the "with project" was reduced to one in the (a) Location and Landscape Support and the (c) Benthic Community to account for the loss of most, but not all, function ((b) Water Environment was unchanged).

Mitigation: This area of hardbottom will be directly impacted due to sand placement but will remain buried for less than 1 year, therefore it is designated as a temporary impact and considered partially self-mitigating. The impacted ephemeral hardbottom community will be re-exposed, but may not return to the exact same condition; therefore, the "with mitigation" value was set at 9, indicating that less than 1 year of burial may leave the re-exposed habitat functioning slightly (1 unit) below its pre-impact state. Because this area is considered partially self-mitigating, the UMAM output is subtracted from the original impact area and the remaining area represents the acreage of artificial reef required to offset the temporary impact. Unlike the "direct permanent" impact parameters, the risk factor for less than 1 year of temporary impacts is set to 1.00 to account for the re-exposure that will occur in this area.

Mitigation Required: 1 acre of less than 1 year of direct temporary impact will require 0.03 ac of mitigation (0.07 ac using FDEP time lag).

3. *Direct Temporary (>1 Year):*

Impact Area: The "without project" natural hardbottom resources were assigned a value of 10 and the "with project" was reduced to one in the (a) Location and

Landscape Support and the (c) Benthic Community to account for the loss of most, but not all, function ((b) Water Environment was unchanged).

Mitigation: This area of hardbottom will be directly impacted due to sand placement but will remain buried for more than 1 year (but less than 2 years), thus it is designated as a temporary impact and considered partially self-mitigating. The impacted ephemeral hardbottom community will be re-exposed, but may not return to the exact same condition; therefore, the "with mitigation" value was set at 7 to account for more than 1 year of burial. Because this area is considered self-mitigating, the UMAM output is subtracted from the original impact area and the remaining area represents the acreage of artificial reef required to offset the temporary impact. The risk factor for temporary impacts is set to 1.00 to account for the re-exposure that will occur in this area.

Mitigation Required: 1 acre of more than 1 year of direct temporary impact will require 0.32 ac of mitigation (0.38 ac using FDEP time lag).

4. *Direct Temporary (>2 Years):*

Impact Area: The "without project" natural hardbottom resources were assigned a value of 10 and the "with project" was reduced to one in the (a) Location and Landscape Support and the (c) Benthic Community to account for the loss of most, but not all, function ((b) Water Environment was unchanged).

Mitigation: This area of hardbottom will be directly impacted due to sand placement but will remain buried for more than 2 years (but less than 3 years), thus it is designated as a temporary impact and considered partially self-mitigating. The impacted ephemeral hardbottom community will be re-exposed, but may not return to the exact same condition; therefore, the "with mitigation" value was set at 5 to account for more than 2 years of burial. Because this area is considered self-mitigating, the UMAM output is subtracted from the original impact area and the remaining area represents the acreage of artificial reef required to offset the

temporary impact. The risk factor for temporary impacts is set to 1.00 to account for the re-exposure that will occur in this area.

Mitigation Required: 1 acre of more than 2 years of direct temporary impact will require 0.85 ac of mitigation (0.93 ac using FDEP time lag).

5. *Indirect Temporary (1 Year):*

Impact Area: The "without project" natural hardbottom resources were assigned a value of 10 and the "with project" was reduced to one in the (a) Location and Landscape Support and the (c) Benthic Community to account for the loss of most, but not all, function ((b) Water Environment was unchanged).

Mitigation: This area of hardbottom will be impacted due to sand spreading after initial placement and it is assumed that this area will remain buried for 1 year, thus it is designated as a temporary impact and considered self-mitigating. The impacted ephemeral hardbottom community will be re-exposed, but may not return to the exact same condition; therefore, the "with mitigation" value was set at 8, indicating that 1 year of burial may leave the habitat functioning two units below its pre-impact state. Because this area is considered partially self-mitigating, the UMAM output is subtracted from the original impact area and the remaining area represents the acreage of artificial reef required to offset the temporary impact. The risk factor for temporary impacts is set to 1.00 to account for the re-exposure that will occur in this area.

Mitigation Required: 1 acre of 1 year of indirect temporary impact will require 0.16 ac of mitigation (0.20 ac using FDEP time lag).

6. *Indirect Temporary (2 Years):*

Impact Area: The "without project" natural hardbottom resources were assigned a value of 10 and the "with project" was reduced to one in the (a) Location and

Landscape Support and the (c) Benthic Community to account for the loss of most, but not all, function ((b) Water Environment was unchanged).

Mitigation: This area of hardbottom will be impacted due to sand spreading after initial placement and it is assumed that this area will remain buried for 2 years, thus it is designated as a temporary impact and considered self-mitigating. The impacted ephemeral hardbottom community will be re-exposed, but may not return to the exact same condition; therefore, the "with mitigation" value was set at 6 to account for 2 years of burial. Because this area is considered partially self-mitigating, the UMAM output is subtracted from the original impact area and the remaining area represents the acreage of artificial reef required to offset the temporary impact. The risk factor for temporary impacts is set to 1.00 to account for the re-exposure that will occur in this area.

Mitigation Required: 1 acre of 2 years of indirect temporary impact will require 0.55 ac of mitigation (0.61 ac using FDEP time lag).

7. *Secondary:*

Impact Area: In UMAM, the "without project" natural hardbottom resources were assigned a value of 10 and the "with project" value was reduced to 9 in the (a) Location and Landscape Support and the (c) Benthic Community to account for the potential reduction in ecological function of the hardbottom which may occur as a result of increased sedimentation over the ephemeral hardbottom ((b) Water Environment was unchanged).

Mitigation: It is anticipated that secondary impacts will result in a minimal reduction in function to the ephemeral hardbottom; therefore, the "with mitigation" value was set at 10 for (a) Location and Landscape Support and (c) Benthic Community ((b) Water Environment was unchanged). The risk factor was set at 1.25, accounting for the slight uncertainty that the artificial reef will successfully mimic the impact area.

Mitigation Required: 1 acre of secondary impact will require 0.13 ac of mitigation (also 0.13 ac using FDEP time lag).

4.0 SUMMARY

The UMAM methodology described herein was applied to Alternatives 2 through 6 for evaluation within the Southern Palm Beach Island Comprehensive Shoreline Stabilization Project Draft EIS. Impact acreages and associated mitigation required for each impact type for each alternative are presented in Chapter 4, Table 4-1.

Table 4-1. Summary of seven hardbottom impact types, before and after mitigation UMAM scores, and mitigation required per 1 acre of impact using the USACE and FDEP time lag values.

Impact Type	Before and after mitigation			Mitigation required for 1 acre impact (assuming 3 years for artificial reef to function as impact area)		
	Without Impact	With Impact	With Mitigation (artificial reef and/or re-exposure)	Risk Factor	USACE Time Lag = 1.03	FDEP Time Lag = 1.07
1. Permanent	10	1	10	1.25	1.16	1.20
2. Direct Temporary (< 1 year)	10	1	9	1.00	0.03	0.07
3. Direct Temporary (> 1 years)	10	1	7	1.00	0.32	0.38
4. Direct Temporary (> 2 years)	10	1	5	1.00	0.85	0.93
5. Indirect Temporary (1 year)	10	1	8	1.00	0.16	0.20
6. Indirect Temporary (2 years)	10	1	6	1.00	0.55	0.61
7. Secondary (ETOF)	10	9	10	1.25	0.13	0.13

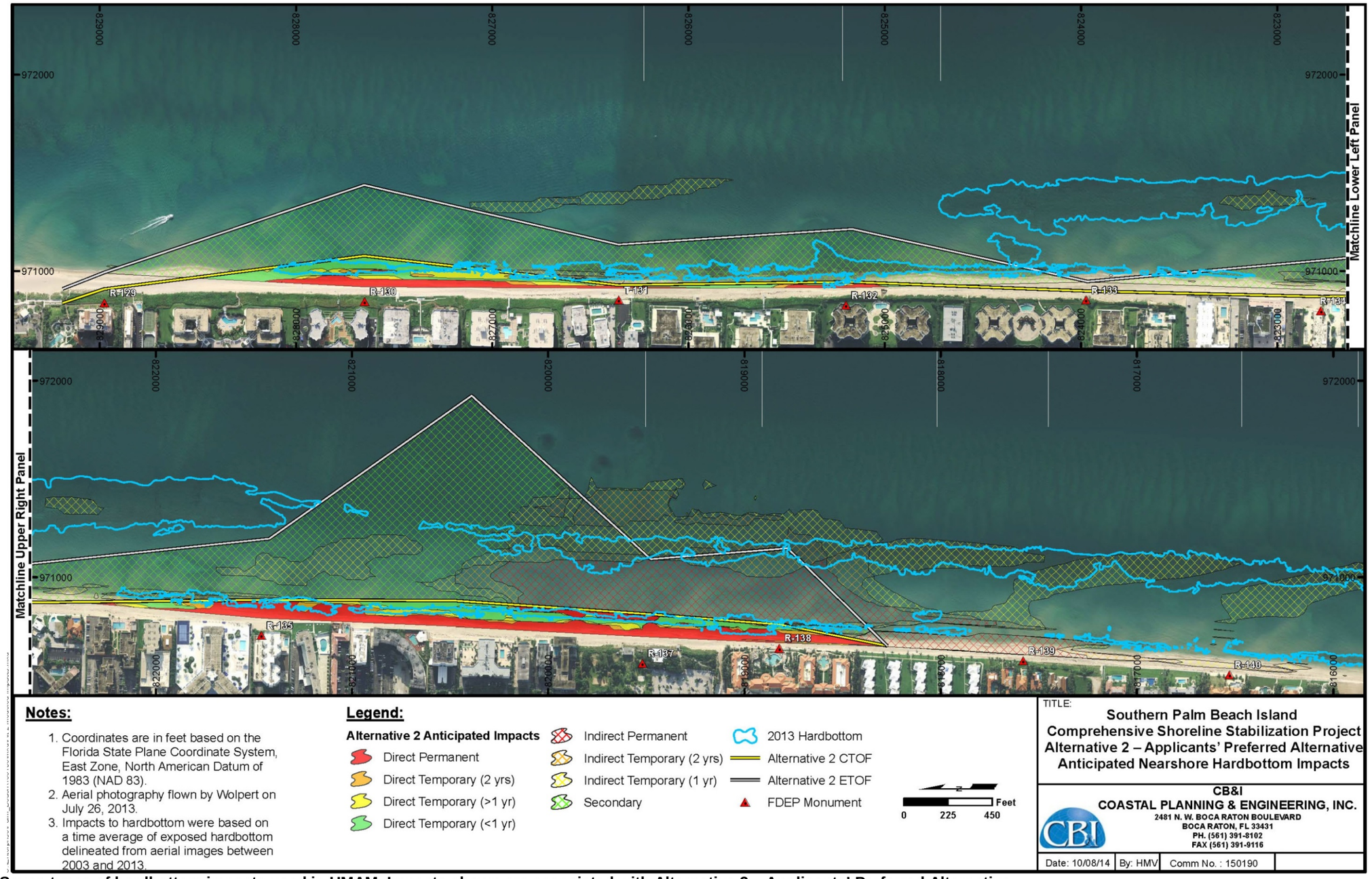

Figure 4-1. Seven types of hardbottom impacts used in UMAM. Impacts shown are associated with Alternative 2 – Applicants' Preferred Alternative.

5.0 LITERATURE CITED

Edwards, L. and V. Kosmynin. 2013. Personal communication between Lainie Edwards and Vladimir Kosmynin (FDEP) and Stacy Buck (CB&I) regarding temporary and secondary impacts in the UMAM analyses.

South Atlantic Fishery Management Council (SAFMC). 1998. Final habitat plan for the South Atlantic region: Essential Fish Habitat requirements for fishery management plans of the South Atlantic Fishery Management Council. 457 p.

SUB-APPENDIX H-1

DRAFT UMAM ANALYSIS

TOWN OF PALM BEACH AND PALM BEACH COUNTY

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PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Numbers	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach and Palm Beach County combined)	Town of Palm Beach SAJ-2005-07908; Palm Beach County SAJ-2008-04086	Intertidal and Nearshore Subtidal Hardbottom Resources

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
571	N/A	Impact Site	12.16 acres (includes 7 impact types, see Part II forms for each)

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Atlantic Ocean	Class III	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Open waters of the Atlantic Ocean. The project area is located approximately 11 miles south of Lake Worth Inlet and approximately 2.5 miles north of South Lake Worth Inlet.

Assessment area description

The hardbottom environment adjacent to the project 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 utitilize this habitat. Species are accustomed to the ephemeral nature of the habitat which is subject to frequent burial and re-exposure.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The outer reef (beyond the impact area) is located east of the nearshore natural hardbottom habitat in 40-70 ft water depth.	Somewhat unique; the intertidal portion of the hardbottom ridge terminates to the north of the project area.

Functions	Mitigation for previous permit/other historic use
Provides cover, substrate, refuge and food resources for benthic and motile marine species.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae. Wormrock, sponges, tunicates, octocorals, bryozoans, and zoanthids were also present. Common macroalgal taxa are *Dictyota* , P*adina, Hypnea, Dasycladus, Halimeda,* and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom and include *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia* , *Muricea* , and *Eunicea* . Motile species such as fish, sea turtles and crabs also utitilize this habitat. Species are accustomed to the ephemeral nature of the habitat .	Loggerhead (*Caretta caretta)* (T), Green *(Chelonia mydas)* (E), and leatherback (*Dermochelys coriacea)* (E) sea turtles regularly nest in the project area. The project area is also loggerhead critical habitat (terrestrial and marine) . The Florida manatee (*Trichechus manatus latirostris*) (E) is common in Palm Beach County. Smalltooth sawfish (*Pristis pectinata*) (E) has the potential to occur in the project area. Threatened coral species which have the potential to occur in the project area but which have not been observed during recent benthic survyes include: staghorn coral (*Acropora cervicornis),* elkhorn coral *(A. palmata),* boulder star coral *(Orbicella annularis),* mountainous star coral *(O. faveolata),* star coral complex (*O. franski),* pillar coral *(Dendrogyra cylindrus),* and rough cactus coral *(Mycetophyllia ferox).*

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Characterization surveys documented the biota listed above.

Additional relevant factors:

The hardbottom in highly ephemeral. Based on delineation of aerials, there has been a time-averaged 23.85 ac of exposed hardbottom between R-127 and R-141 from January 2003 to July 2013, including a minimum of 2.71 ac in January 2009 and a maximum of 48.78 ac in January 2006. Line intercept data collected on transects immediately offshore of the project area on the nearshore hardbottom adjacent to R-130 to R-141 revealed this area to have a hardbottom to sand ratio of 24:76 (24% of the area east of the hardbottom edge is hardbottom and 76% is sand) (CBI, 2014). HB edge and benthic characterization surveys were conducted in 2005, 2006, 2007, 2011, and 2014.

Assessment conducted by:	Assessment date(s):
CB&I Coastal Planning & Engineering, Inc.	October 2014

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach and Palm Beach County combined)	Town of Palm Beach SAJ-2005-07908; Palm Beach County SAJ-2008-04086	Mitigation Reef

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
571	N/A	Mitigation Site	6.39 acres (mitigation for 7 impact types, see Part II forms for each)

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Atlantic Ocean	Class III	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Open waters of the Atlantic Ocean. The project area is located approximately 11 miles south of Lake Worth Inlet and approximately 2.5 miles north of South Lake Worth Inlet.

Assessment area description

Subtidal limestone boulder artificial reefs are proposed to be deployed in the same general vicinity and water depth as the impact area in a location devoid of hardbottom habitat in water depths similar to the natural nearshore hardbottom. Additional surveys will be conducted to determine the location of the mitigative reefs.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The outer reef is located east of the nearshore natural hardbottom habitat in 40-70 ft water depth.	The artificial reefs will be placed in similar water depths as the impacted hardbottom in order to mimic the lost function of the habitat.

Functions	Mitigation for previous permit/other historic use
The artificial reef habitat is intended to closely mimic the characteristics of adjacent nearshore habitat, which is typically low relief limestone pavement. It will provide cover, substrate, refuge and food resources for marine species.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The artificial reef is intented to replicate the physical appearance, texture, relief and ecological function of the habitat it is meant to replace.	Loggerhead (*Caretta caretta)* (T), Green *(Chelonia mydas)* (E), and leatherback (*Dermochelys coriacea)* (E) sea turtles regularly nest in the project area. The project area is also loggerhead critical habitat (terrestrial and marine). The Florida manatee (*Trichechus manatus latirostris*) (E) is common in Palm Beach County. Smalltooth sawfish (*Pristis pectinata*) (E) has the potential to occur in the project area. Threatened coral species which have the potential to occur in the project area but which have not been observed during recent benthic surveyes include: staghorn coral (*Acropora cervicornis),* elkhorn coral *(A. palmata),* boulder star coral *(Orbicella annularis),* mountainous star coral *(O. faveolata),* star coral complex (*O. franski),* pillar coral *(Dendrogyra cylindrus),* and rough cactus coral *(Mycetophyllia ferox).*

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Characterization surveys documented the biota listed above for natural nearshore hardbottom. Utilization of artificial reef is expected to be similar to that of natural hardbottom.

Additional relevant factors:

Limestone is a natural material and will provide a suitable replacement for the impacted nearshore reef substrate. Limestone boulder artificial reefs have been documented to offset impacts associated with beach nourishment projects in southeast Florida.

Assessment conducted by:	Assessment date(s):
CB&I Coastal Planning & Engineering, Inc.	October 2014

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Permanent Impacts
Impact or Mitigation: Impact (Permanent)	Assessment conducted by: CB&I	Area (acres) 4.03

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 2.415338302

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Mitigation for Permanent Impacts
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	10	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	10	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.867

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.667

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.25

For mitigation assessment areas	
RFG=delta/(t-factor x risk)=	0.52

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	2.415338		0.52		4.66
a.a.2					
total					

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Direct Temporary Impacts (<1 year)
Impact or Mitigation Impact (Direct Temporary <1 year)	Assessment conducted by: CB&I	Area (acres) 0.76

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.457063061

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Mitigation for Direct Temp Impacts (<1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	9	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	9	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.800

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.600

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas	
RFG=delta/(t-factor x risk)=	0.58

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.457063		0.58		0.78
a.a.2					
total					

Ac of mitigation - impact acres
0.02

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Direct Temporary Impacts (>1 year)
Impact or Mitigation Impact (Direct Temporary > 1 yr)	Assessment conducted by: CB&I	Area (acres) 0.30

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 10 with: 1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.	
.500(6)(b) Water Environment (n/a for uplands) w/o pres or current: 6 with: 6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.	
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 10 with: 1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.	

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.867	with: 0.267	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.179186385

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Mitigation for Direct Temp Impacts (>1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	7	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	7	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.667

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.467

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.45

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.179186		0.45		0.40
a.a.2					
total					

Ac of mitigation - impact acres
0.10

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Direct Temporary Impacts (> 2 years)
Impact or Mitigation Impact (Direct Temporary > 2 years)	Assessment conducted by: CB&I	Area (acres) 0.16

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 10 with: 1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.	
.500(6)(b) Water Environment (n/a for uplands) w/o pres or current: 6 with: 6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.	
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 10 with: 1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.	

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.867	with: 0.267	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.096006073

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Mitigation for Direct Temp Impacts (>2 yr)
Impact or Mitigation	Assessment conducted by:	Assessment date:
Mitigation	CB&I	Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	5	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	5	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.533

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.333

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas	
RFG=delta/(t-factor x risk)=	0.32

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.096006		0.32		0.30
a.a.2					
total					

Ac of mitigation - impact acres
0.14

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Indirect Impacts (1 year)
Impact or Mitigation: Impact (Indirect Temporary 1 year)	Assessment conducted by: CPE	Area (acres) 2.51

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 1.504956543

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Mitigation for Indirect Temp Impacts (1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	8	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	8	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.733

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.533

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.52

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	1.504957		0.52		2.91
a.a.2					
total					

Ac of mitigation - impact acres
0.40

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Indirect Temporary Impacts (2 years)
Impact or Mitigation: Impact (Indirect Temporary 2 years)	Assessment conducted by: CB&I	Area (acres) 1.21

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas	
FL=delta x acres=	0.72486937

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Mitigation for Indirect Temp Impacts (2 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	6	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	6	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.600

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.400

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.39

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.724869		0.39		1.87
a.a.2					
total					

Ac of mitigation - impact acres
0.66

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Secondary Impacts
Impact or Mitigation: Impact (secondary)	Assessment conducted by: CB&I	Area (acres) 3.20

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	9	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	9	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.800

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.213128774

Delta = [with - current]
0.067

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
SPBICSSP - Town of Palm Beach and County	Town SAJ-2005-07908; County SAJ-2008-04086	Mitigation for Secondary Impacts
Impact or Mitigation	Assessment conducted by:	Assessment date:
Mitigation	CB&I	Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	10	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	10	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.867

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.667

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.25

For mitigation assessment areas	
RFG=delta/(t-factor x risk)=	0.52

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.213129		0.52		0.41
a.a.2					
total					

Form 62-345.900(3), F.A.C. [effective date]

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

(b) Mitigation needed to offset impacts, when using a mitigation bank

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	Impact Types	FL	/	RFG	=	Acres of Mitigation
1	Permanent	2.415338		0.52		4.66
2	Direct Temporary (< 1 Year)	0.457063		0.58		0.02
3	Direct Temporary (>1 year)	0.179186		0.45		0.10
4	Direct Temporary (>2 year)	0.096006		0.32		0.14
5	Indirect Temp. (1 year)	1.504957		0.52		0.40
6	Indirect Temp. (2 years)	0.724869		0.39		0.66
7	Secondary (ETOF)	0.213129		0.52		0.41
	total					6.39

*Note: for temporary impacts, *Mitigation = (FL/RFG) - Impact Area*

Form 62-345.900(3), F.A.C. [effective date]

SUB-APPENDIX H-2

DRAFT UMAM ANALYSIS

TOWN OF PALM BEACH

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PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Numbers	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Intertidal and Nearshore Subtidal Hardbottom Resources

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
571	N/A	Impact Site	2.99 acres (includes 7 impact types, see Part II forms for each)

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Atlantic Ocean	Class III	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Open waters of the Atlantic Ocean. The project area is located approximately 11 miles south of Lake Worth Inlet and approximately 2.5 miles north of South Lake Worth Inlet.

Assessment area description

The hardbottom environment adjacent to the project 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 utitilize this habitat. Species are accustomed to the ephemeral nature of the habitat which is subject to frequent burial and re-exposure.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The outer reef (beyond the impact area) is located east of the nearshore natural hardbottom habitat in 40-70 ft water depth.	Somewhat unique; the intertidal portion of the hardbottom ridge terminates to the north of the project area.

Functions	Mitigation for previous permit/other historic use
Provides cover, substrate, refuge and food resources for benthic and motile marine species.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae. Wormrock, sponges, tunicates, octocorals, bryozoans, and zoanthids were also present. Common macroalgal taxa are *Dictyota* , P*adina, Hypnea, Dasycladus, Halimeda,* and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom and include *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia* , *Muricea* , and *Eunicea* . Motile species such as fish, sea turtles and crabs also utitilize this habitat. Species are accustomed to the ephemeral nature of the habitat .	Loggerhead (*Caretta caretta)* (T), Green *(Chelonia mydas)* (E), and leatherback (*Dermochelys coriacea)* (E) sea turtles regularly nest in the project area. The project area is also loggerhead critical habitat (terrestrial and marine) . The Florida manatee (*Trichechus manatus latirostris*) (E) is common in Palm Beach County. Smalltooth sawfish (*Pristis pectinata*) (E) has the potential to occur in the project area. Threatened coral species which have the potential to occur in the project area but which have not been observed during recent benthic survyes include: staghorn coral (*Acropora cervicornis),* elkhorn coral *(A. palmata),* boulder star coral *(Orbicella annularis),* mountainous star coral *(O. faveolata),* star coral complex (*O. franski),* pillar coral *(Dendrogyra cylindrus),* and rough cactus coral *(Mycetophyllia ferox).*

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Characterization surveys documented the biota listed above.

Additional relevant factors:

The hardbottom in highly ephemeral. Based on delineation of aerials, there has been a time-averaged 23.85 ac of exposed hardbottom between R-127 and R-141 from January 2003 to July 2013, including a minimum of 2.71 ac in January 2009 and a maximum of 48.78 ac in January 2006. Line intercept data collected on transects immediately offshore of the project area on the nearshore hardbottom adjacent to R-130 to R-141 revealed this area to have a hardbottom to sand ratio of 24:76 (24% of the area east of the hardbottom edge is hardbottom and 76% is sand) (CBI, 2014). HB edge and benthic characterization surveys were conducted in 2005, 2006, 2007, 2011, and 2014.

Assessment conducted by:	Assessment date(s):
CB&I Coastal Planning & Engineering, Inc.	October 2014

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Mitigation Reef

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
571	N/A	Mitigation Site	0.42 acres (mitigation for 7 impact types, see Part II forms for each)

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Atlantic Ocean	Class III	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Open waters of the Atlantic Ocean. The project area is located approximately 11 miles south of Lake Worth Inlet and approximately 2.5 miles north of South Lake Worth Inlet.

Assessment area description

Subtidal limestone boulder artificial reefs are proposed to be deployed in the same general vicinity and water depth as the impact area in a location devoid of hardbottom habitat in water depths similar to the natural nearshore hardbottom. Additional surveys will be conducted to determine the location of the mitigative reefs.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The outer reef is located east of the nearshore natural hardbottom habitat in 40-70 ft water depth.	The artificial reefs will be placed in similar water depths as the impacted hardbottom in order to mimic the lost function of the habitat.

Functions	Mitigation for previous permit/other historic use
The artificial reef habitat is intended to closely mimic the characteristics of adjacent nearshore habitat, which is typically low relief limestone pavement. It will provide cover, substrate, refuge and food resources for marine species.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The artificial reef is intented to replicate the physical appearance, texture, relief and ecological function of the habitat it is meant to replace.	Loggerhead (*Caretta caretta)* (T), Green *(Chelonia mydas)* (E), and leatherback (*Dermochelys coriacea)* (E) sea turtles regularly nest in the project area. The project area is also loggerhead critical habitat (terrestrial and marine). The Florida manatee (*Trichechus manatus latirostris*) (E) is common in Palm Beach County. Smalltooth sawfish (*Pristis pectinata*) (E) has the potential to occur in the project area. Threatened coral species which have the potential to occur in the project area but which have not been observed during recent benthic surveyes include: staghorn coral (*Acropora cervicornis),* elkhorn coral *(A. palmata),* boulder star coral *(Orbicella annularis),* mountainous star coral *(O. faveolata),* star coral complex (*O. franski),* pillar coral *(Dendrogyra cylindrus),* and rough cactus coral *(Mycetophyllia ferox).*

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Characterization surveys documented the biota listed above for natural nearshore hardbottom. Utilization of artificial reef is expected to be similar to that of natural hardbottom.

Additional relevant factors:

Limestone is a natural material and will provide a suitable replacement for the impacted nearshore reef substrate. Limestone boulder artificial reefs have been documented to offset impacts associated with beach nourishment projects in southeast Florida.

Assessment conducted by:	Assessment date(s):
CB&I Coastal Planning & Engineering, Inc.	October 2014

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Permanent Impacts
Impact or Mitigation Impact (Permanent)	Assessment conducted by: CB&I	Area (acres) 0.02

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 10 with: 1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.	
.500(6)(b) Water Environment (n/a for uplands) w/o pres or current: 6 with: 6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.	
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 10 with: 1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.	

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: 0.867 with: 0.267	Preservation adjustment factor = Adjusted mitigation delta =	FL=delta x acres= 0.014125201

Delta = [with - current]	If mitigation	For mitigation assessment areas
0.600	Time lag (t-factor) = Risk factor =	RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Mitigation for Permanent Impacts
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	10	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	10	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.867

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.667

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.25

For mitigation assessment areas	
RFG=delta/(t-factor x risk)=	0.52

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:

(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:

(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.014125		0.52		0.03
a.a.2					
total					

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Direct Temporary Impacts (<1 year)
Impact or Mitigation Impact (Direct Temporary <1 year)	Assessment conducted by: CB&I	Area (acres) 0.24

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.14552021

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Mitigation for Direct Temp Impacts (<1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	9	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	9	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.800

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.600

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.58

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.14552		0.58		0.25
a.a.2					
total					

Ac of mitigation - impact acres
0.01

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Direct Temporary Impacts (>1 year)
Impact or Mitigation Impact (Direct Temporary > 1 yr)	Assessment conducted by: CB&I	Area (acres) 0.05

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.032268815

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Mitigation for Direct Temp Impacts (>1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	7	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	7	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.667

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.467

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.45

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.032269		0.45		0.07
a.a.2					
total					

Ac of mitigation - impact acres
0.02

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Direct Temporary Impacts (> 2 years)
Impact or Mitigation Impact (Direct Temporary > 2 years)	Assessment conducted by: CB&I	Area (acres) 0.03

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 10 with: 1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands) w/o pres or current: 6 with: 6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 10 with: 1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: 0.867 with: 0.267	Preservation adjustment factor = Adjusted mitigation delta =	FL=delta x acres= 0.015052467

Delta = [with - current]	If mitigation	For mitigation assessment areas
0.600	Time lag (t-factor) = Risk factor =	RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Mitigation for Direct Temp Impacts (>2 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	5	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	5	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.533

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.333

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.32

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.015052		0.32		0.05
a.a.2					
total					

Ac of mitigation - impact acres
0.02

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Indirect Impacts (1 year)
Impact or Mitigation Impact (Indirect Temporary 1 year)	Assessment conducted by: CPE	Area (acres) 0.05

Scoring Guidance
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed

Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.032233286

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Mitigation for Indirect Temp Impacts (1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	8	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	8	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.733

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.533

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.52

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.032233		0.52		0.06
a.a.2					
total					

Ac of mitigation - impact acres
0.01

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Indirect Temporary Impacts (2 years)
Impact or Mitigation Impact (Indirect Temporary 2 years)	Assessment conducted by: CB&I	Area (acres) 0.02

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 10 with: 1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands) w/o pres or current: 6 with: 6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 10 with: 1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.867	with: 0.267	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.010431456

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Mitigation for Indirect Temp Impacts (2 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	6	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	6	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.600

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.400

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.39

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.010431		0.39		0.03
a.a.2					
total					

Ac of mitigation - impact acres
0.01

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Secondary Impacts
Impact or Mitigation: Impact (secondary)	Assessment conducted by: CB&I	Area (acres) 2.57

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support	w/o pres or current: 10	with: 9
The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.		
.500(6)(b) Water Environment (n/a for uplands)	w/o pres or current: 6	with: 6
The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.		
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	w/o pres or current: 10	with: 9
The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.		

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.800

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.171414068

Delta = [with - current]
0.067

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Town of Palm Beach portion)	SAJ-2005-07908	Mitigation for Secondary Impacts
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	10	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	10	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.867

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.667

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.25

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.52

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.171414		0.52		0.33
a.a.2					
total					

Form 62-345.900(3), F.A.C. [effective date]

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

(b) Mitigation needed to offset impacts, when using a mitigation bank

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	Impact Types	FL	/	RFG	=	Acres of Mitigation
1	Permanent	0.014125		0.52		0.03
2	Direct Temporary (< 1 Year)	0.14552		0.58		0.01
3	Direct Temporary (>1 year)	0.032269		0.45		0.02
4	Direct Temporary (>2 year)	0.015052		0.32		0.02
5	Indirect Temp. (1 year)	0.032233		0.52		0.01
6	Indirect Temp. (2 years)	0.010431		0.39		0.01
7	Secondary (ETOF)	0.171414		0.52		0.33
	total					0.42

*Note: for temporary impacts, *Mitigation = (FL/RFG) - Impact Area*

Form 62-345.900(3), F.A.C. [effective date]

SUB-APPENDIX H-3

DRAFT UMAM ANALYSIS

PALM BEACH COUNTY

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PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Numbers	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Intertidal and Nearshore Subtidal Hardbottom Resources

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
571	N/A	Impact Site	7.14 acres (includes 7 impact types, see Part II forms for

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Atlantic Ocean	Class III	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Open waters of the Atlantic Ocean. The project area is located approximately 11 miles south of Lake Worth Inlet and approximately 2.5 miles north of South Lake Worth Inlet.

Assessment area description

The hardbottom environment adjacent to the project 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 utitilize this habitat. Species are accustomed to the ephemeral nature of the habitat which is subject to frequent burial and re-exposure.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The outer reef (beyond the impact area) is located east of the nearshore natural hardbottom habitat in 40-70 ft water depth.	Somewhat unique; the intertidal portion of the hardbottom ridge terminates to the north of the project area.

Functions	Mitigation for previous permit/other historic use
Provides cover, substrate, refuge and food resources for benthic and motile marine species.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae. Wormrock, sponges, tunicates, octocorals, bryozoans, and zoanthids were also present. Common macroalgal taxa are *Dictyota* , P*adina, Hypnea, Dasycladus, Halimeda,* and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom and include *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia* , *Muricea* , and *Eunicea* . Motile species such as fish, sea turtles and crabs also utitilize this habitat. Species are accustomed to the ephemeral nature of the habitat .	Loggerhead (*Caretta caretta)* (T), Green *(Chelonia mydas)* (E), and leatherback (*Dermochelys coriacea)* (E) sea turtles regularly nest in the project area. The project area is also loggerhead critical habitat (terrestrial and marine) . The Florida manatee (*Trichechus manatus latirostris*) (E) is common in Palm Beach County. Smalltooth sawfish (*Pristis pectinata*) (E) has the potential to occur in the project area. Threatened coral species which have the potential to occur in the project area but which have not been observed during recent benthic survyes include: staghorn coral (*Acropora cervicornis),* elkhorn coral *(A. palmata),* boulder star coral *(Orbicella annularis),* mountainous star coral *(O. faveolata),* star coral complex (*O. franski),* pillar coral *(Dendrogyra cylindrus),* and rough cactus coral *(Mycetophyllia ferox).*

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Characterization surveys documented the biota listed above.

Additional relevant factors:

The hardbottom in highly ephemeral. Based on delineation of aerials, there has been a time-averaged 23.85 ac of exposed hardbottom between R-127 and R-141 from January 2003 to July 2013, including a minimum of 2.71 ac in January 2009 and a maximum of 48.78 ac in January 2006. Line intercept data collected on transects immediately offshore of the project area on the nearshore hardbottom adjacent to R-130 to R-141 revealed this area to have a hardbottom to sand ratio of 24:76 (24% of the area east of the hardbottom edge is hardbottom and 76% is sand) (CBI, 2014). HB edge and benthic characterization surveys were conducted in 2005, 2006, 2007, 2011, and 2014.

Assessment conducted by:	Assessment date(s):
CB&I Coastal Planning & Engineering, Inc.	October 2014

PART I – Qualitative Description
(See Section 62-345.400, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Mitigation Reef

FLUCCs code	Further classification (optional)	Impact or Mitigation Site?	Assessment Area Size
571	N/A	Mitigation Site	5.44 acres (mitigation for 7 impact types, see Part II forms for each)

Basin/Watershed Name/Number	Affected Waterbody (Class)	Special Classification (i.e. OFW, AP, other local/state/federal designation of importance)
Atlantic Ocean	Class III	N/A

Geographic relationship to and hydrologic connection with wetlands, other surface water, uplands

Open waters of the Atlantic Ocean. The project area is located approximately 11 miles south of Lake Worth Inlet and approximately 2.5 miles north of South Lake Worth Inlet.

Assessment area description

Subtidal limestone boulder artificial reefs are proposed to be deployed in the same general vicinity and water depth as the impact area in a location devoid of hardbottom habitat in water depths similar to the natural nearshore hardbottom. Additional surveys will be conducted to determine the location of the mitigative reefs.

Significant nearby features	Uniqueness (considering the relative rarity in relation to the regional landscape.)
The outer reef is located east of the nearshore natural hardbottom habitat in 40-70 ft water depth.	The artificial reefs will be placed in similar water depths as the impacted hardbottom in order to mimic the lost function of the habitat.

Functions	Mitigation for previous permit/other historic use
The artificial reef habitat is intended to closely mimic the characteristics of adjacent nearshore habitat, which is typically low relief limestone pavement. It will provide cover, substrate, refuge and food resources for marine species.	N/A

Anticipated Wildlife Utilization Based on Literature Review (List of species that are representative of the assessment area and reasonably expected to be found)	Anticipated Utilization by Listed Species (List species, their legal classification (E, T, SSC), type of use, and intensity of use of the assessment area)
The artificial reef is intented to replicate the physical appearance, texture, relief and ecological function of the habitat it is meant to replace.	Loggerhead (*Caretta caretta)* (T), Green *(Chelonia mydas)* (E), and leatherback (*Dermochelys coriacea)* (E) sea turtles regularly nest in the project area. The project area is also loggerhead critical habitat (terrestrial and marine). The Florida manatee (*Trichechus manatus latirostris*) (E) is common in Palm Beach County. Smalltooth sawfish (*Pristis pectinata*) (E) has the potential to occur in the project area. Threatened coral species which have the potential to occur in the project area but which have not been observed during recent benthic surveyes include: staghorn coral (*Acropora cervicornis),* elkhorn coral *(A. palmata),* boulder star coral *(Orbicella annularis),* mountainous star coral *(O. faveolata),* star coral complex (*O. franski),* pillar coral *(Dendrogyra cylindrus),* and rough cactus coral *(Mycetophyllia ferox).*

Observed Evidence of Wildlife Utilization (List species directly observed, or other signs such as tracks, droppings, casings, nests, etc.):

Characterization surveys documented the biota listed above for natural nearshore hardbottom. Utilization of artificial reef is expected to be similar to that of natural hardbottom.

Additional relevant factors:

Limestone is a natural material and will provide a suitable replacement for the impacted nearshore reef substrate. Limestone boulder artificial reefs have been documented to offset impacts associated with beach nourishment projects in southeast Florida.

Assessment conducted by:	Assessment date(s):
CB&I Coastal Planning & Engineering, Inc.	October 2014

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Permanent Impacts
Impact or Mitigation Impact (Permanent)	Assessment conducted by: CB&I	Area (acres) 4.00

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 10 with: 1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.	
.500(6)(b) Water Environment (n/a for uplands) w/o pres or current: 6 with: 6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.	
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 10 with: 1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.	

Score = sum of above scores/30 (if uplands, divide by 20)	If preservation as mitigation,	For impact assessment areas
current or w/o pres: 0.867 with: 0.267	Preservation adjustment factor =	FL=delta x acres= 2.398645262
	Adjusted mitigation delta =	

Delta = [with - current]	If mitigation	For mitigation assessment areas
0.600	Time lag (t-factor) =	RFG=delta/(t-factor x risk)=
	Risk factor =	

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Mitigation for Permanent Impacts
Impact or Mitigation	Assessment conducted by:	Assessment date:
Mitigation	CB&I	Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 0 with: 10	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.	
.500(6)(b) Water Environment (n/a for uplands) w/o pres or current: 6 with: 6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.	
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 0 with: 10	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.	

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.200	with: 0.867	

If preservation as mitigation,	For impact assessment areas
Preservation adjustment factor =	FL=delta x acres=
Adjusted mitigation delta =	

Delta = [with - current]
0.667

If mitigation		For mitigation assessment areas
Time lag (t-factor) =	1.03	0.52
Risk factor =	1.25	RFG=delta/(t-factor x risk)=

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	2.398645		0.52		4.63
a.a.2					
total					

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Direct Temporary Impacts (<1 year)
Impact or Mitigation: Impact (Direct Temporary <1 year)	Assessment conducted by: CB&I	Area (acres) 0.53

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.319012378

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Mitigation for Direct Temp Impacts (<1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	9	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	9	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.800

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.600

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas	
RFG=delta/(t-factor x risk)=	0.58

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.319012		0.58		0.55
a.a.2					
total					

Acres of mitigation - impact acres
0.02

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Direct Temporary Impacts (>1 year)
Impact or Mitigation: Impact (Direct Temporary > 1 yr)	Assessment conducted by: CB&I	Area (acres): 0.24

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.14134411

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Mitigation for Direct Temp Impacts (>1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	7	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	7	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.667

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.467

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.45

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.141344		0.45		0.31
a.a.2					
total					

Ac of mitigation - impact acres
0.08

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Direct Temporary Impacts (> 2 years)
Impact or Mitigation: Impact (Direct Temporary > 2 years)	Assessment conducted by: CB&I	Area (acres) 0.14

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.085346277

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Mitigation for Direct Temp Impacts (>2 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	5	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	5	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.533

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.333

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas	
RFG=delta/(t-factor x risk)=	0.32

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.085346		0.32		0.26
a.a.2					
total					

Ac of mitigation - impact acres
0.12

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Indirect Impacts (1 year)
Impact or Mitigation: Impact (Indirect Temporary 1 year)	Assessment conducted by: CPE	Area (acres) 0.81

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.486313627

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Mitigation for Indirect Temp Impacts (1 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	8	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	8	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.733

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.533

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.52

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.486314		0.52		0.94
a.a.2					
total					

Ac of mitigation - impact acres
0.13

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Indirect Temporary Impacts (2 years)
Impact or Mitigation Impact (Indirect Temporary 2 years)	Assessment conducted by: CB&I	Area (acres) 0.67

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	10	1	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	10	1	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.867	0.267

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.403546797

Delta = [with - current]
0.600

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Mitigation for Indirect Temp Impacts (2 yr)
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	6	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	6	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)	current or w/o pres	with
	0.200	0.600

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.400

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.00

For mitigation assessment areas
RFG=delta/(t-factor x risk)= 0.39

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.403547		0.39		1.04
a.a.2					
total					

Ac of mitigation - impact acres
0.37

Form 62-345.900(3), F.A.C. [effective date]

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Secondary Impacts
Impact or Mitigation Impact (secondary)	Assessment conducted by: CB&I	Area (acres) 0.75

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

.500(6)(a) Location and Landscape Support w/o pres or current: 10 with: 9	The assessment area is a wide exposure of nearshore hardbottom carbonate rock with primarily low relief areas and colonized pavement. Benthic characterization surveys within the project area revealed the dominant components of the epibenthic communities to be turf and macroalgae, and also supporting wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. Common macroalgal taxa are *Dictyota, Padina, Hypnea, Dasycladus, Halimeda* , and *Laurencia* . Small (<3 cm) colonies of scleractinian corals have been documented on the nearshore hardbottom, including *Siderastrea* spp. and *Solenastrea bournoni* . Common octocorals are *Pterogorigia, Muricea* , and *Eunicea* . The nearshore hardbottom provides an important settlement and nursery habitat for immigrating larvae of many important fisheries species. It is also provides foraging habitat for juvenile green sea turtles and the beach provides nesting habitat for loggerhead, green and leatherback sea turtles.	
.500(6)(b) Water Environment (n/a for uplands) w/o pres or current: 6 with: 6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be altered.	
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community w/o pres or current: 10 with: 9	The community structure is a high stress (low relief) to sub-climax (moderate relief) community, with some benthic organisms thriving in this habitat for many years (scleractinians, large sponges). It supports a multi-species macroalgae assemblage and a diverse invertebrate community in the form of wormrock, sponges, tunicates, scleractinian corals, octocorals, bryozoans, and zoanthids. The most abundant scleractinian species are *Siderastrea* spp. and *Solenastrea bournoni* . Size distribution indicates recruitment, but repeated burial of habitat limits succession and colony growth.	

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres: 0.867	with: 0.800	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres= 0.049674873

Delta = [with - current]
0.067

If mitigation
Time lag (t-factor) =
Risk factor =

For mitigation assessment areas
RFG=delta/(t-factor x risk)=

PART II – Qualification of Assessment Area (impact or mitigation)
(See Sections 62-345.500 and .600, F.A.C.)

Site/Project Name	Application Number	Assessment Area Name or Number
Southern Palm Beach Island Comprehensive Shore Stabilization Project (Palm Beach County portion)	SAJ-2008-04086	Mitigation for Secondary Impacts
Impact or Mitigation: Mitigation	Assessment conducted by: CB&I	Assessment date: Oct. 2014

Scoring Guidance	Optimal (10)	Moderate (7)	Minimal (4)	Not Present (0)
The scoring of each indicator is based on what would be suitable for the type of wetland or surface water assessed	Condition is optimal and fully supports wetlands/surface water functions	Condition is less than optimal, but sufficient to maintain most wetland/surface water functions	Minimal level of support of wetland /surface water functions	Condition is insufficient to provide wetland/surface water functions

	w/o pres or current	with	
.500(6)(a) Location and Landscape Support	0	10	The mitigation area is shallow water nearshore habitat of unconsolidated sandy substrate in similar water depth as the impact area. Nearshore hardbottom resources exist in the adjacent area to facilitate recruitment to the proposed mitigative artificial reef.
.500(6)(b) Water Environment (n/a for uplands)	6	6	The assessment area is in the nearshore habitat of the Atlantic Ocean with open circulation. It is often exposed to high wave energy with generally clear water. Water quality will not be not altered.
.500(6)(c) Community structure 1. Vegetation and/or 2. Benthic Community	0	10	An artificial reef will provide substrate for benthic recruitment of macroalgae and sessile invertebrates and will create a refuge for fish and other motile marine organisms. It will create a foraging resource for sea turtles since preferred macroalgae have been documented to grow on artificial reefs in the nearshore habitat of Southeast Florida.

Score = sum of above scores/30 (if uplands, divide by 20)		
current or w/o pres	with	
0.200	0.867	

If preservation as mitigation,
Preservation adjustment factor =
Adjusted mitigation delta =

For impact assessment areas
FL=delta x acres=

Delta = [with - current]
0.667

If mitigation	
Time lag (t-factor) =	1.03
Risk factor =	1.25

For mitigation assessment areas	
RFG=delta/(t-factor x risk)=	0.52

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

The total potential credits for a mitigation bank is the sum of the credits for each assessment area where assessment area credits equal the RFG times the acres of the assessment area scored

Bank Assessment Area	RFG	X	Acres	=	Credits
example					
a.a.1					
a.a.2					
total					

(b) Mitigation needed to offset impacts, when using a mitigation bank

The number of mitigation bank credits needed, when the bank or regional offsite mitigation area is assesses in accordance with this rule, is equal to the summation of the calculated functional loss for each impact assessment area.

Impact Assessment Area	FL	=	Credits needed
example			
a.a.1			
a.a.2			
total			

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	FL	/	RFG	=	Acres of Mitigation
example					
a.a.1	0.049675		0.52		0.10
a.a.2					
total					

Form 62-345.900(3), F.A.C. [effective date]

Mitigation Determination Formulas
(See Section 62-345.600(3), F.A.C.)

For each impact assessment area:
(FL) Functional Loss = Impact Delta X Impact acres

For each mitigation assessment area:
(RFG) Relative Functional Gain = Mitigation Delta (adjusted for preservation, if applicable/((t-factor)(risk))

(a) Mitigation Bank Credit Determination

(b) Mitigation needed to offset impacts, when using a mitigation bank

(c) Mitigation needed to offset impacts, when not using a bank

To determine the acres of mitigation needed to offset impacts when not using a bank or a regional offsite mitigation area as mitigation, divide functional loss (FL) by relative functional gain (RFG). If there are more than one impact assessment area or more than one mitigation assessment area, the total functional loss and the total relative functional gain is determined by summation of the functional loss (FL) and relative functional gain (RFG) for each assessment area.

	Impact Types	FL	/	RFG	=	Acres of Mitigation
1	Permanent	2.40		0.52		4.63
2	Direct Temporary (< 1 Year)	0.32		0.58		0.02
3	Direct Temporary (>1 year)	0.14		0.45		0.08
4	Direct Temporary (>2 year)	0.09		0.32		0.12
5	Indirect Temp. (1 year)	0.49		0.52		0.13
6	Indirect Temp. (2 years)	0.40		0.39		0.37
7	Secondary (ETOF)	0.05		0.52		0.10
	total					5.44

*Note: for temporary impacts, *Mitigation = (FL/RFG) - Impact Area*

Form 62-345.900(3), F.A.C. [effective date]