



COASTAL SYSTEMS INTERNATIONAL, INC.

Coastal Engineering

Waterfront & Marinas

Civil Engineering

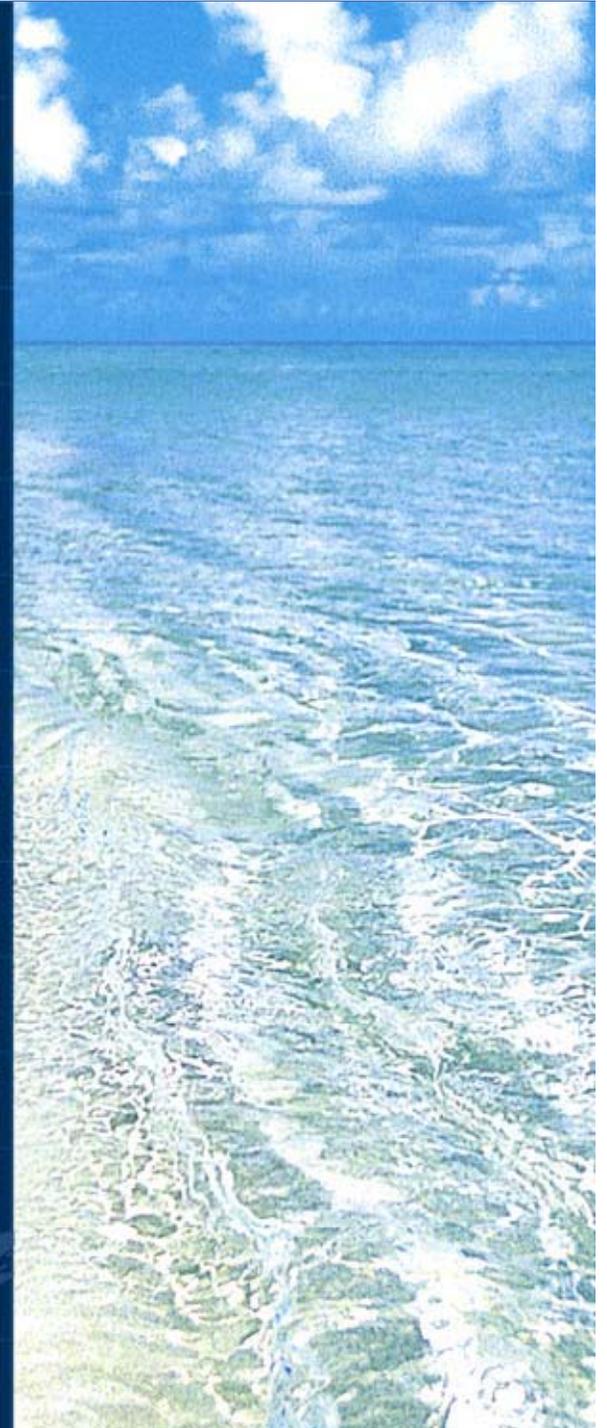
Regulatory Permitting

Site Investigations

Marine Environmental

Construction

Destination Development



Hot-Spot Management Study Town of Hillsboro Beach



Prepared for:



Town of Hillsboro Beach
1210 Hillsboro Mile
Hillsboro Beach, Florida 33062

Prepared by:



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464 South Dixie Highway
Coral Gables, FL 33146

February, 2012

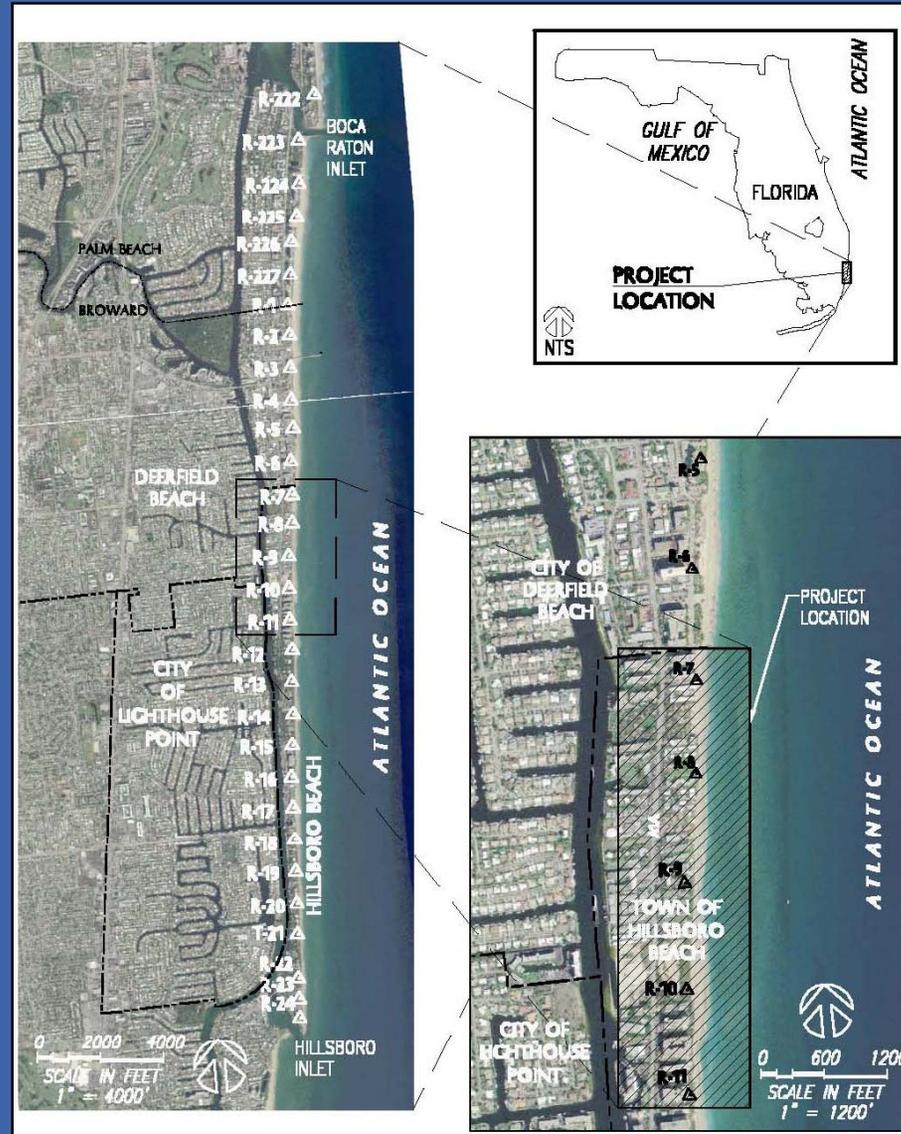


Presentation Outline

- Recap of March, 2012 Commission Meeting
- Shoreline Stabilization Alternatives Considered
- Groin Options – Additional Figures
- Continued Beach Renourishment Option
- Boca Inlet – Sand Source
- Submerged Breakwaters
- Public Comment



Shoreline Stabilization Options



Study Area – Northern Hillsboro Beach

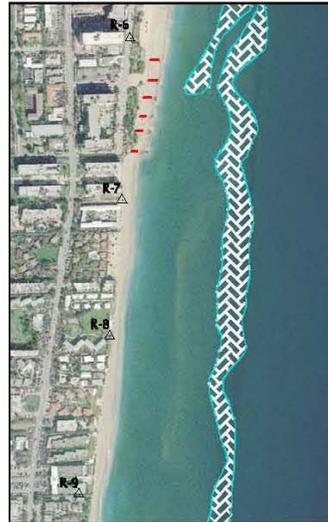
Shoreline Stabilization Alternatives



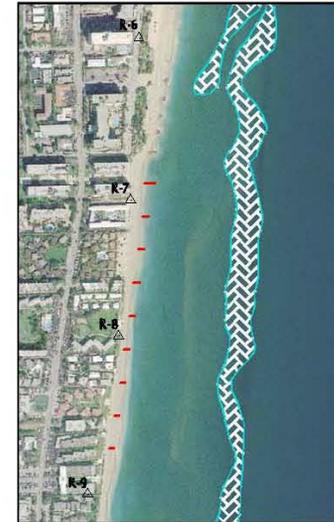
ALTERNATIVE 1



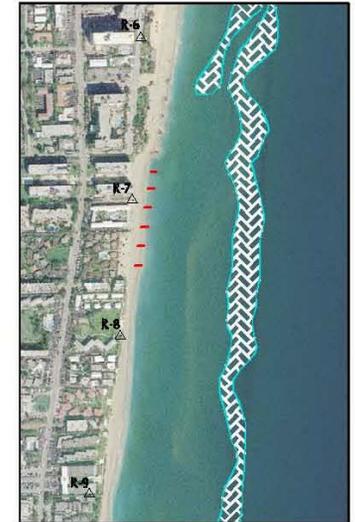
ALTERNATIVE 2



ALTERNATIVE 3

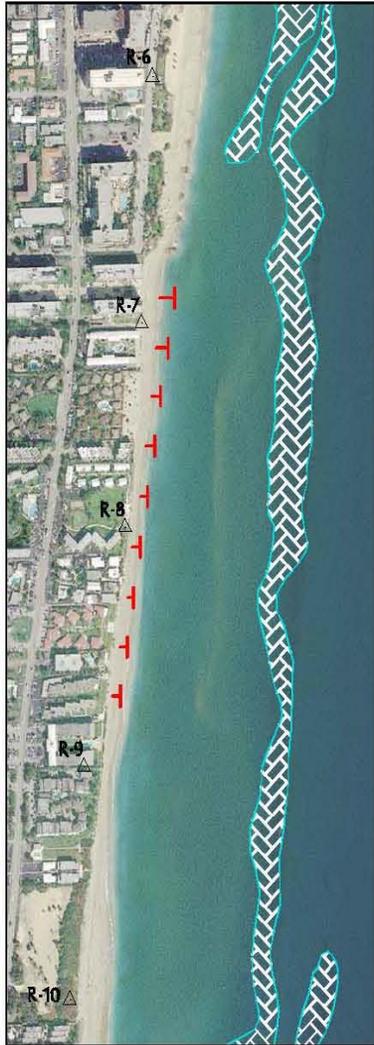


ALTERNATIVE 4A

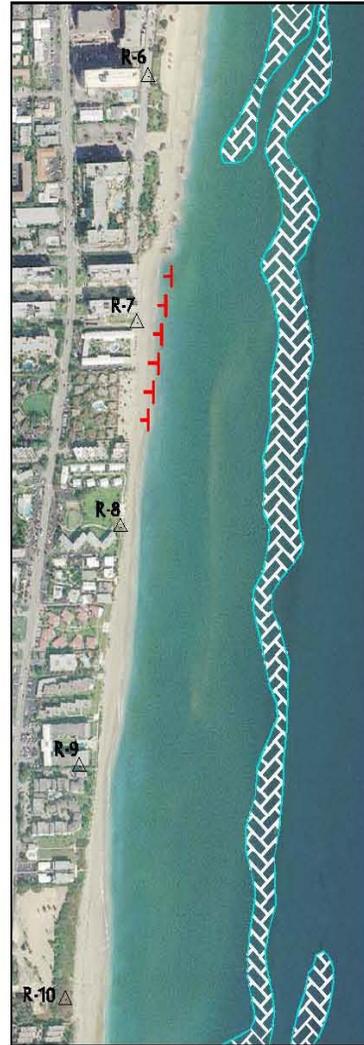


ALTERNATIVE 4B

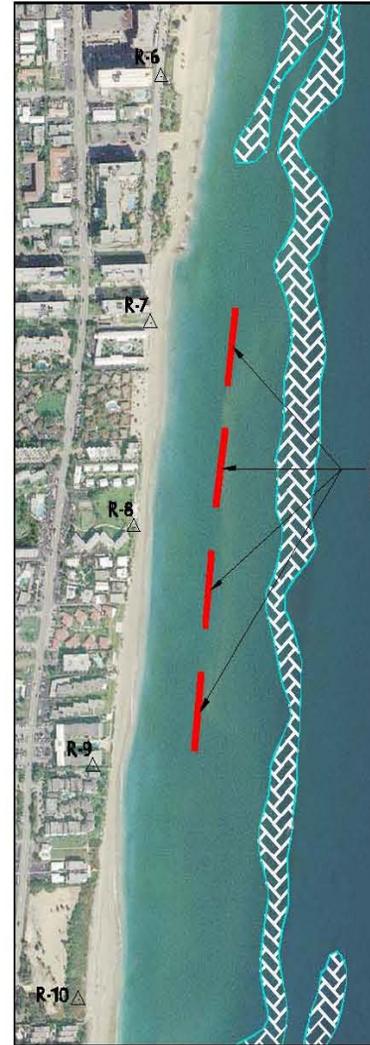
Shoreline Stabilization Alternatives



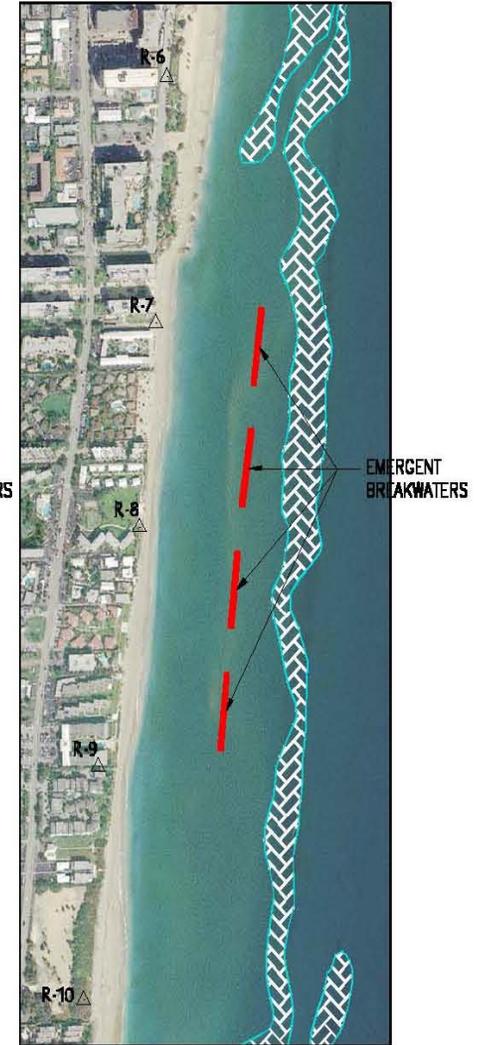
ALTERNATIVE 5A



ALTERNATIVE 5B

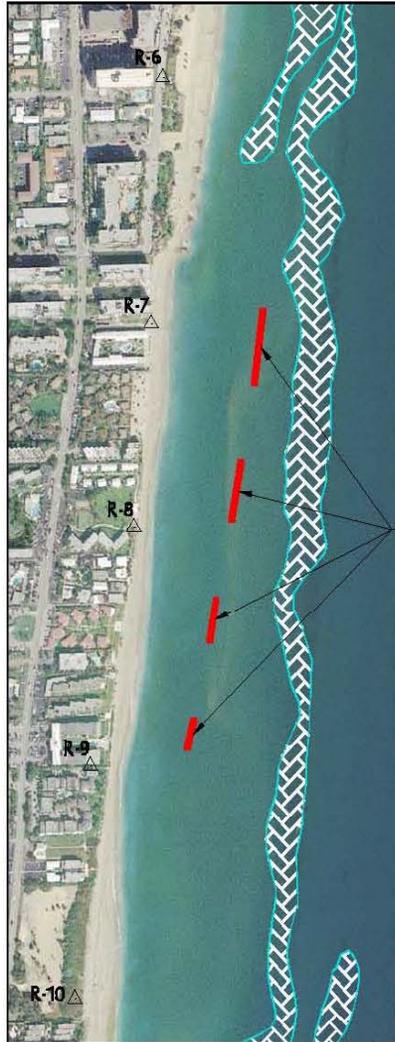


ALTERNATIVE 6A



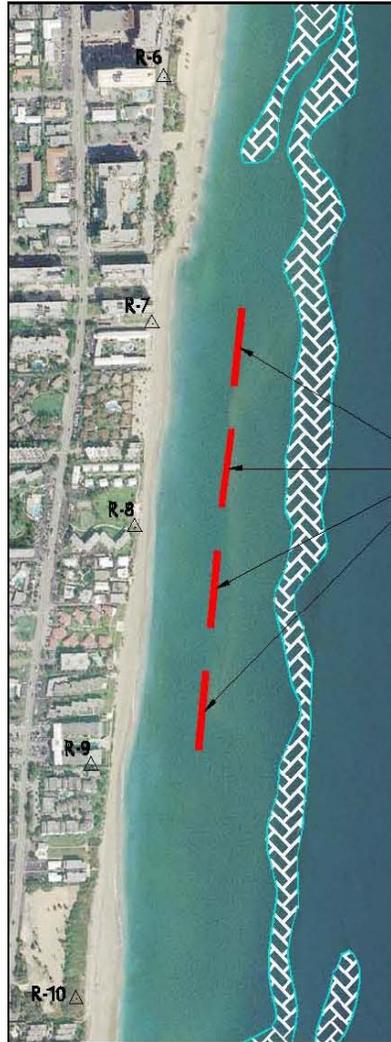
ALTERNATIVE 6B

Alternatives 5a-6b



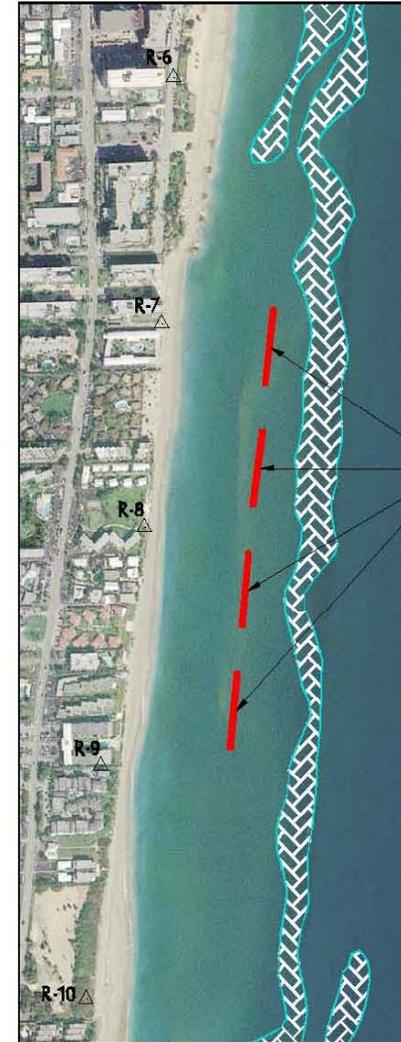
EMERGENT
BREAKWATERS

ALTERNATIVE 6C



SUBMERGED
BREAKWATERS

ALTERNATIVE 7A



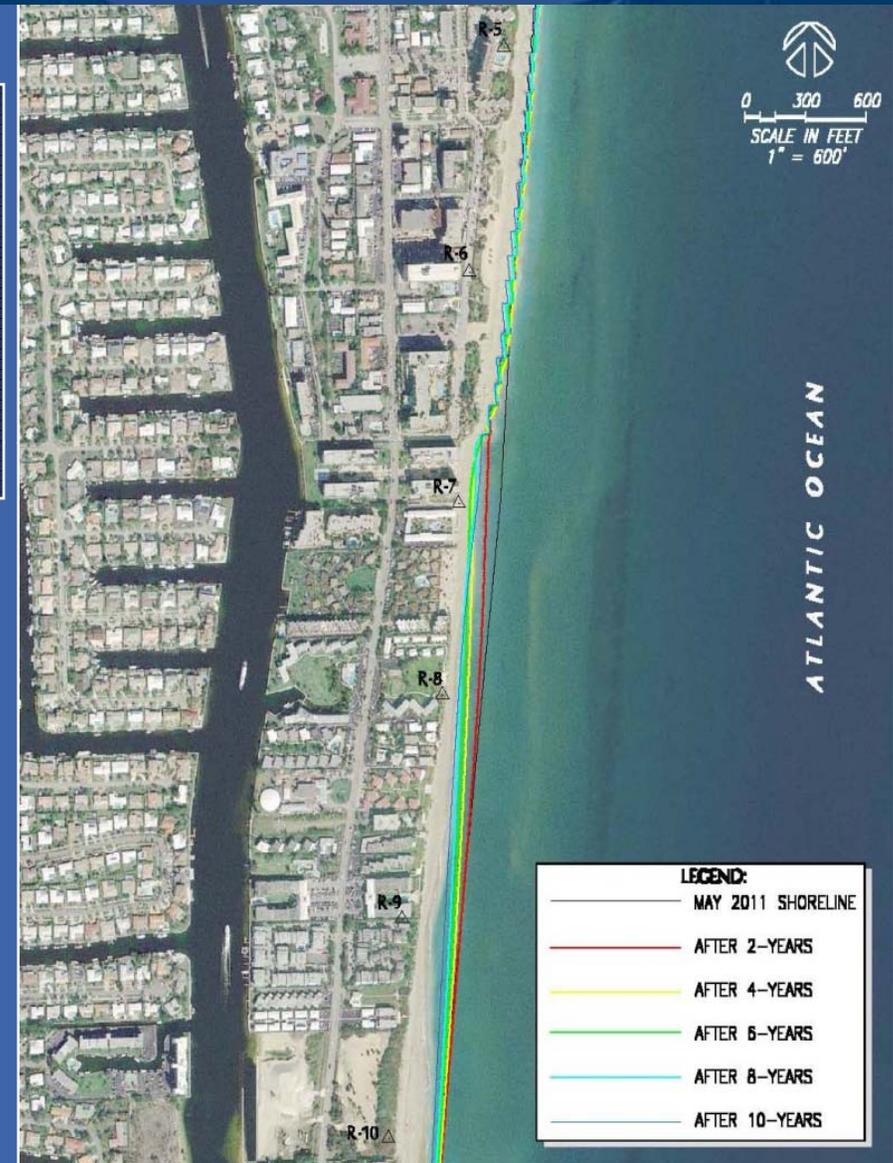
SUBMERGED
BREAKWATERS

ALTERNATIVE 7B



Modeling Results

- 10-year simulation
- Renourish every 4-6 Years
- 1997 Long Range Plan – every 8-10 years
- Viable Alternative



Option 2 – Continued Beach Nourishment



Shoreline Stabilization Alternatives



Alternative 2 – Continued Beach Nourishment



Continued Beach Renourishment



1998 Project



Continued Beach Renourishment



2011 Project



Continued Beach Renourishment



Offshore Source – Borrow Area 1

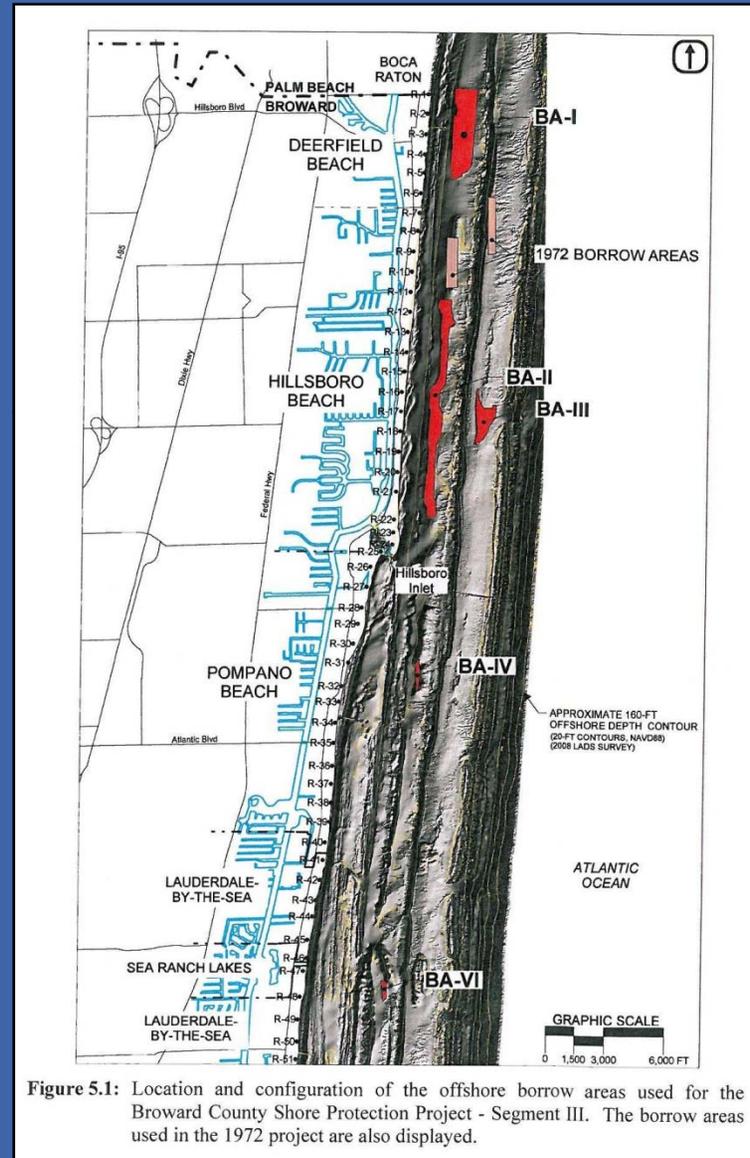


Figure 5.1: Location and configuration of the offshore borrow areas used for the Broward County Shore Protection Project - Segment III. The borrow areas used in the 1972 project are also displayed.

Offshore Borrow Areas – Broward County



Continued Beach Nourishment

Table 5.1: Estimated available sand volumes prior to construction in the five borrow areas prior to construction of the Broward County Shore Protection Project – Segment III.

Borrow Area	Area (acres)	Est. Total Material Available (cy)	Est. Fines Content (%)	Est. Rock Content (%)	Est. Total Sand Available (cy)
BA-I	86	2,209,900	2.0%	9.5%	1,960,000
BA-II	116	1,182,000	1.9%	6.0%	1,090,000
BA-III	33	411,600	4.4%	7.5%	364,000
BA-IV	6	54,800	2.6%	4.5%	51,000
BA-VI	4.5	55,600	2.1%	4.5%	52,000
Total	245.5	3,913,900			3,517,000

Note: Estimated volume quantities are based upon the March 2005 pre-construction survey and include 400-ft dredging buffers.



Continued Beach Nourishment



Truck Haul



Continued Beach Renourishment



Truck Haul – Conveyor System



Continued Beach Nourishment



Truck Haul



Continued Beach Nourishment



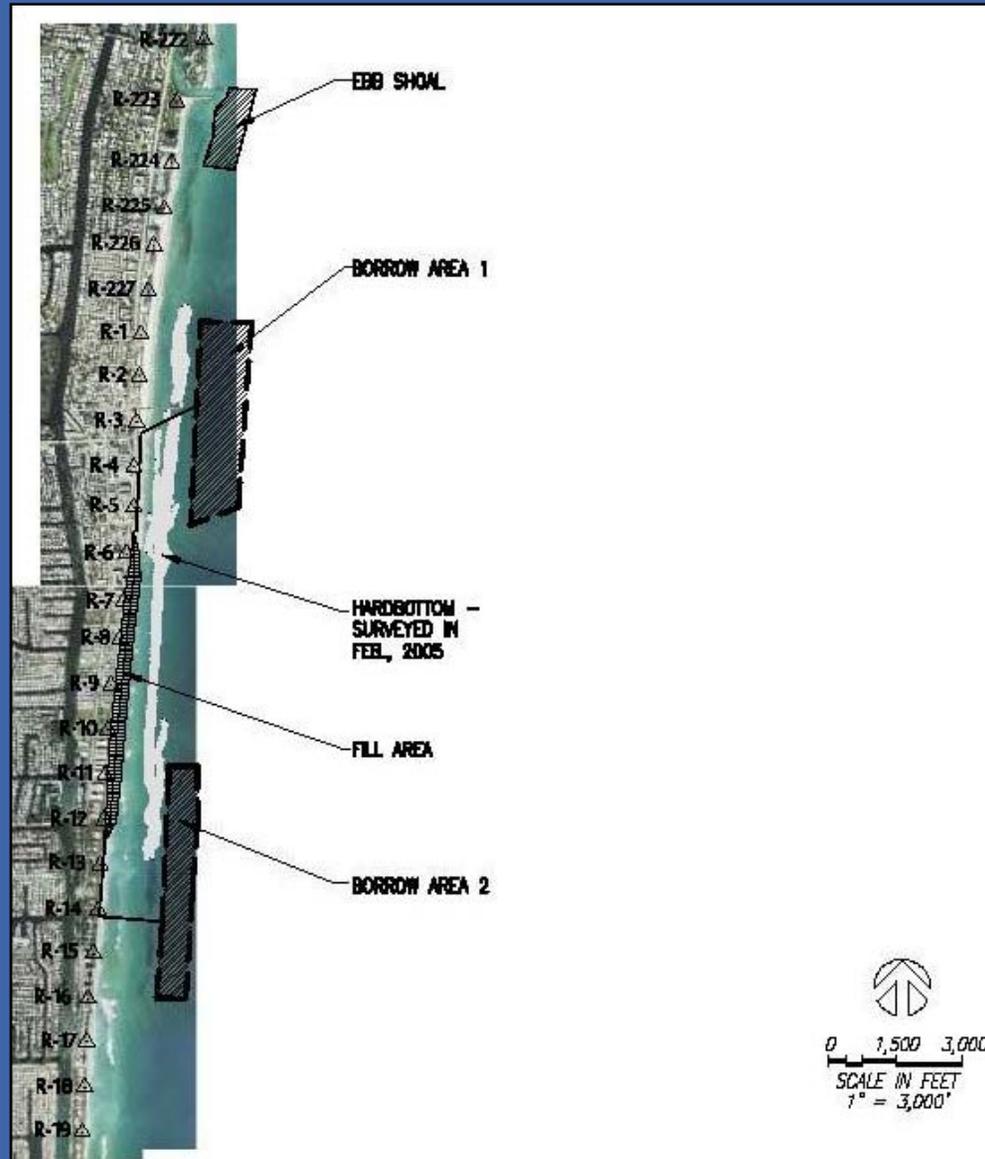
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Continued Beach Nourishment



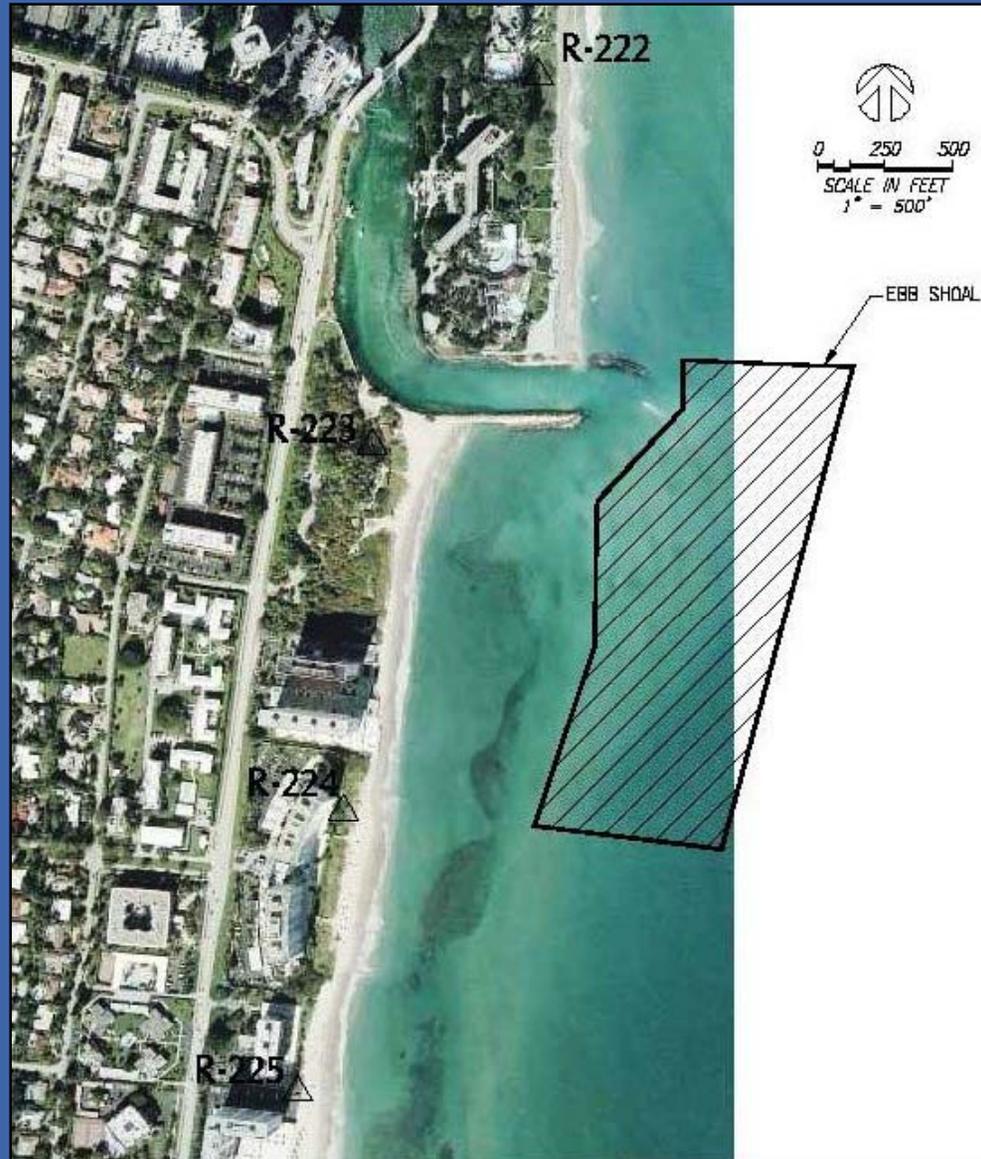
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Borrow Area – Boca Inlet Ebb Shoal



Continued Beach Nourishment



Borrow Area - Boca Inlet Ebb Shoal

- 10-year simulation
- Taper southern 5 Groin Structures
- Modify approximately 25% of the groin field
- Still have to nourish beach every 4-6 years
- Not a viable Alternative



Alternative 3 – Modify Deerfield Groin Field



Groin Modifications

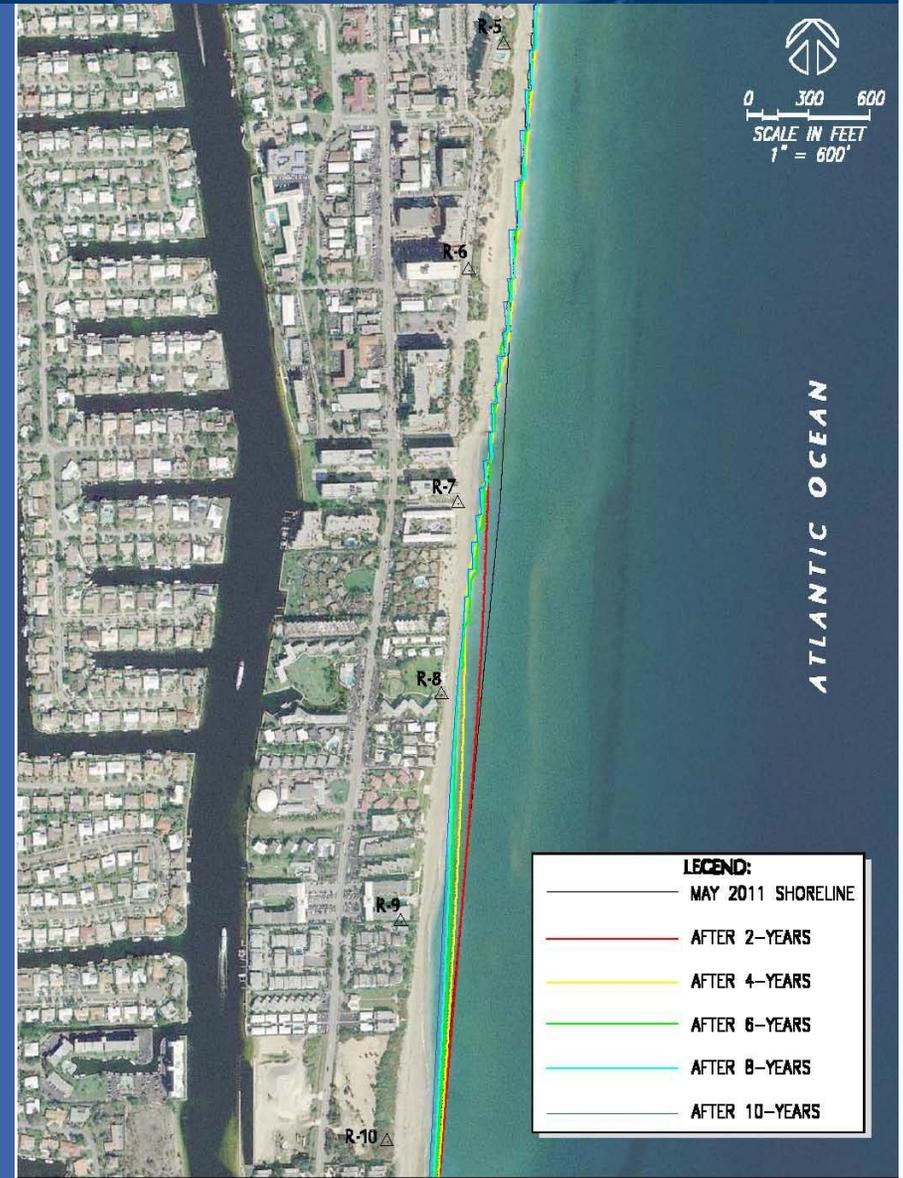
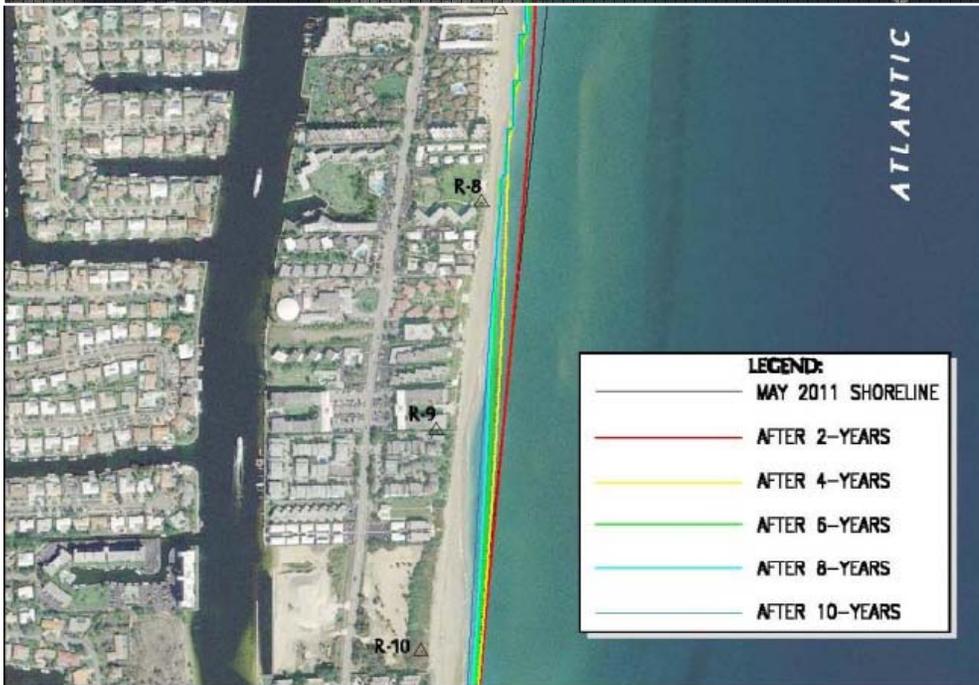


Option 3 & 4 Groin Modification Approach



Groin Modification

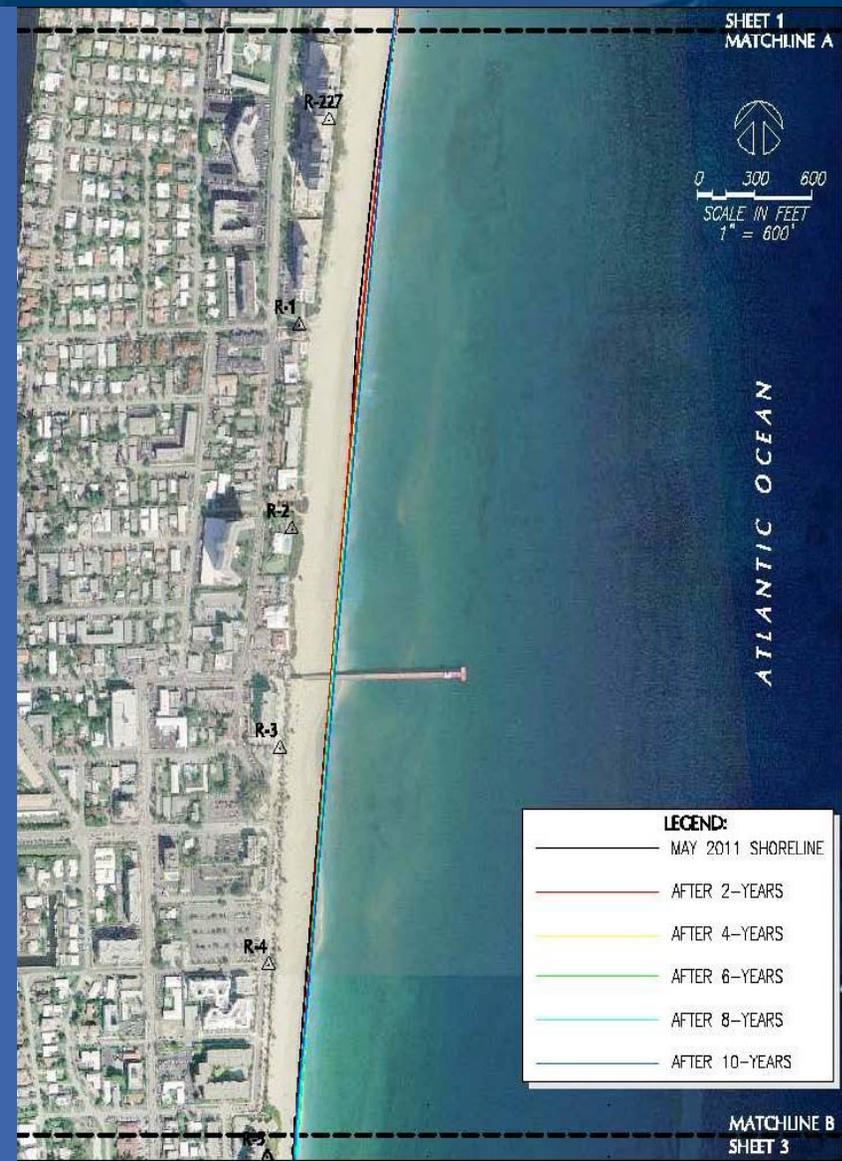
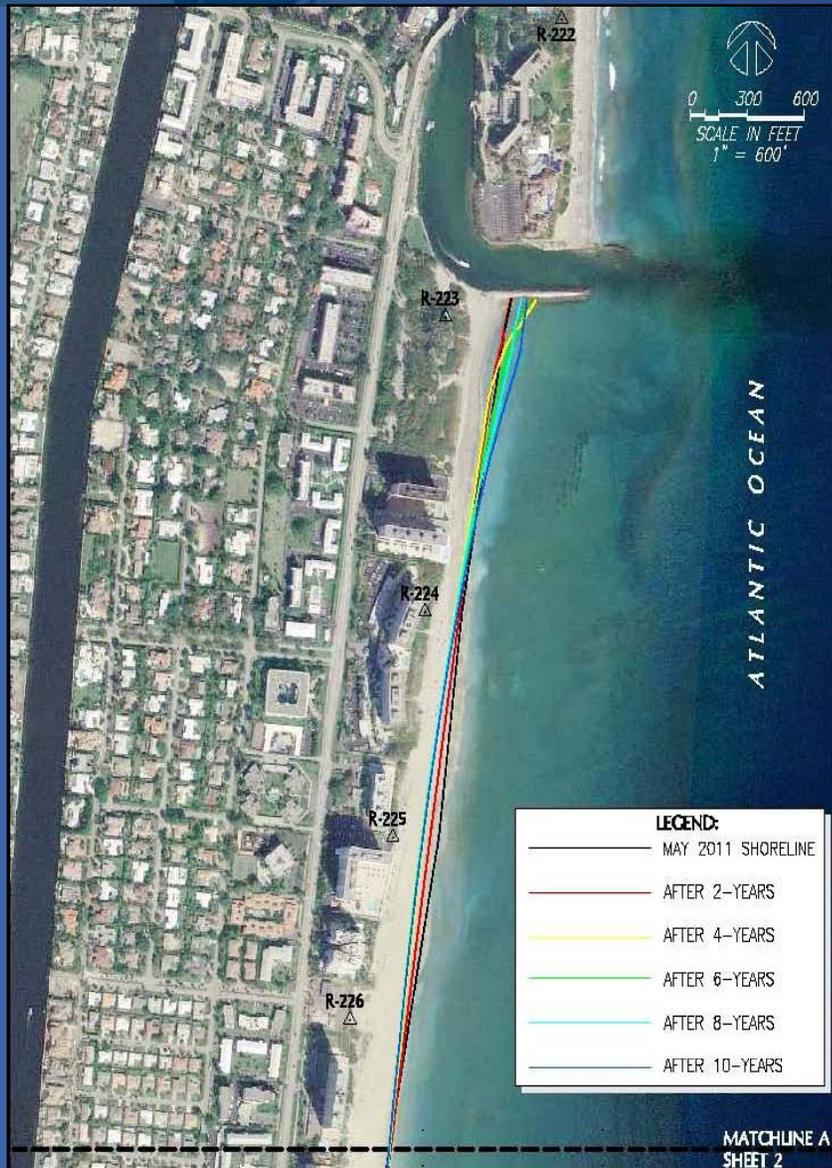
- 10-year simulation
- Construct 9 groins – tapered (Alternative 4a)
- Construct 5 groins – tapered (Alternative 4b)
- Transfer of "Hot Spot" further downdrift (south)
- Still have to nourish beach every 4-6 years
- Not a viable Alternative



Alternatives 4a & 4b – Groin Field Extension into Hillsboro Beach



Groin Modification



LITLINE Modeling Results



LITLINE Modeling Results



LITLINE Modeling Results

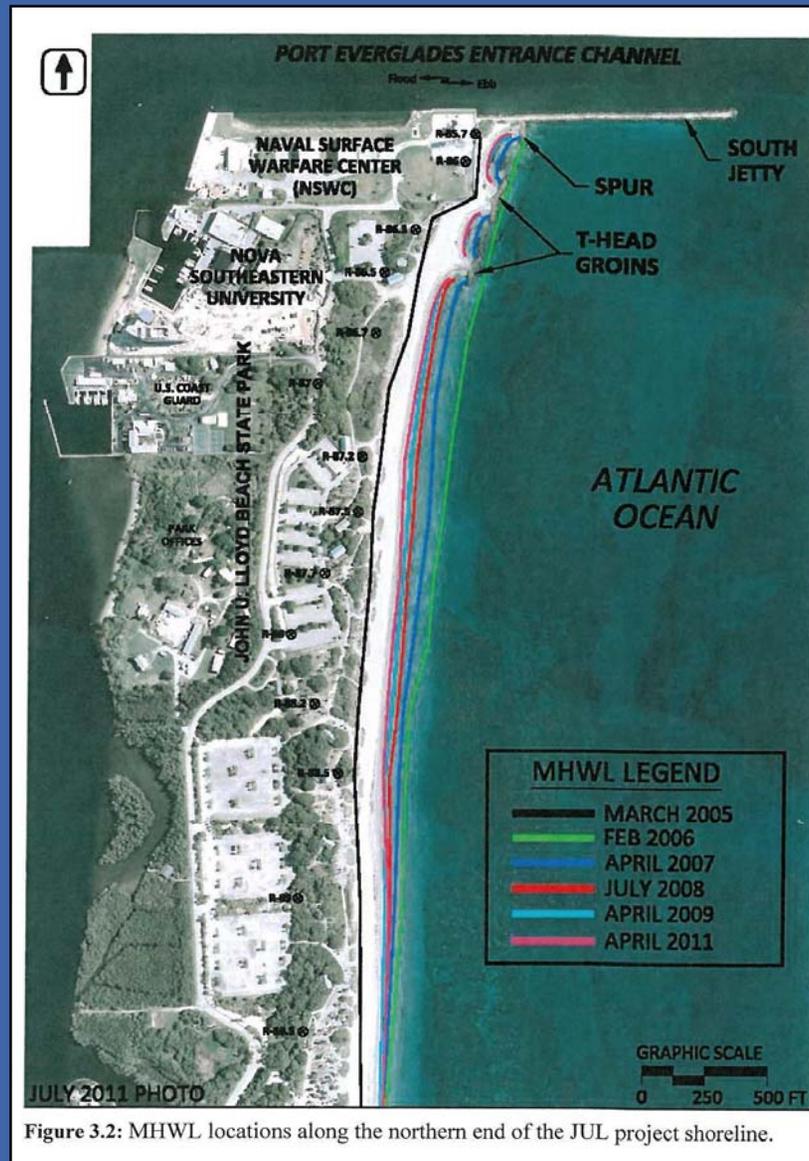


Figure 3.2: MHWL locations along the northern end of the JUL project shoreline.

Port Everglades – T-Head Groins

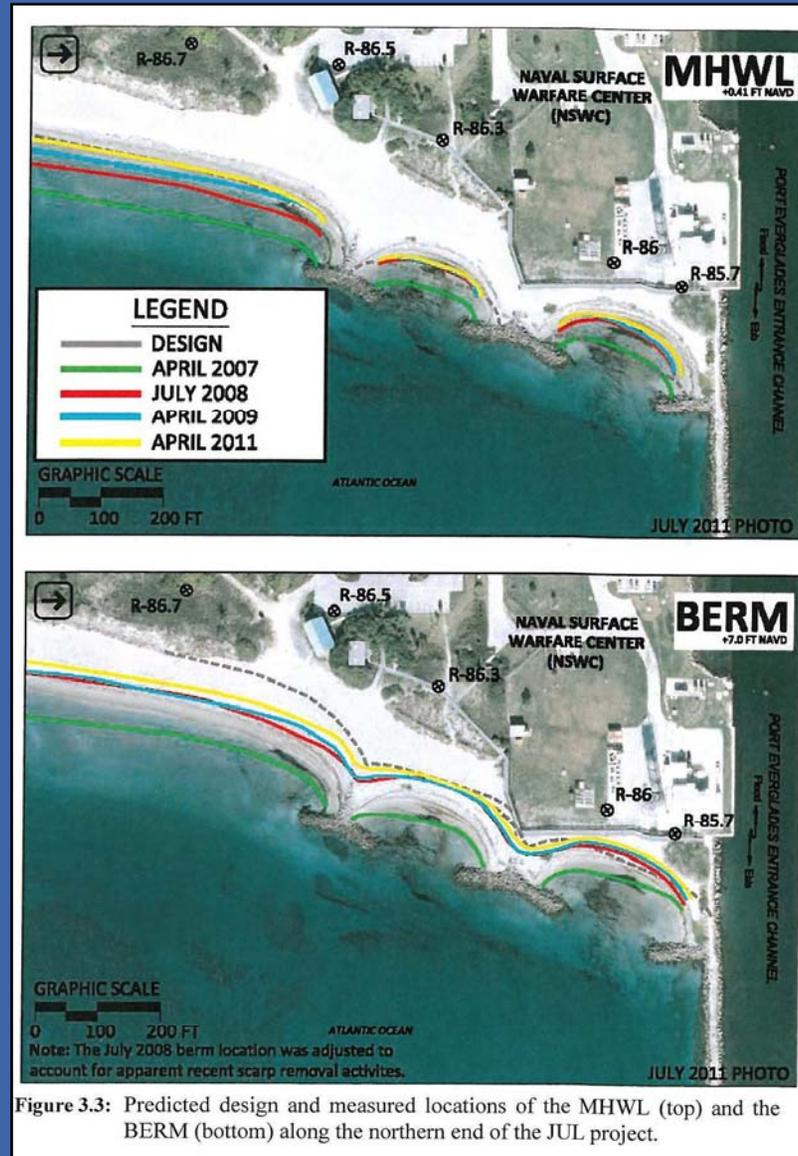
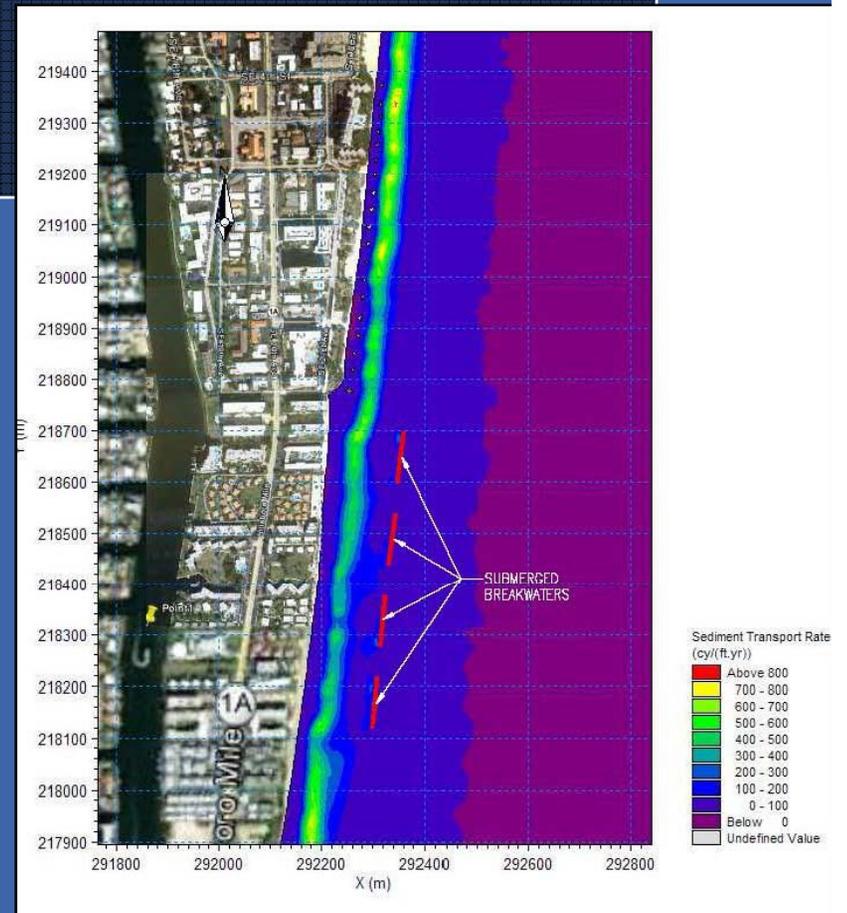
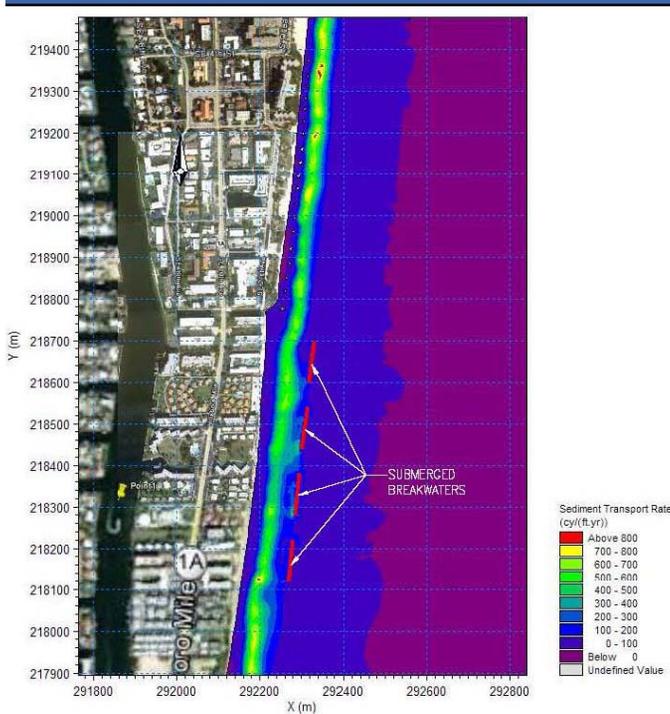


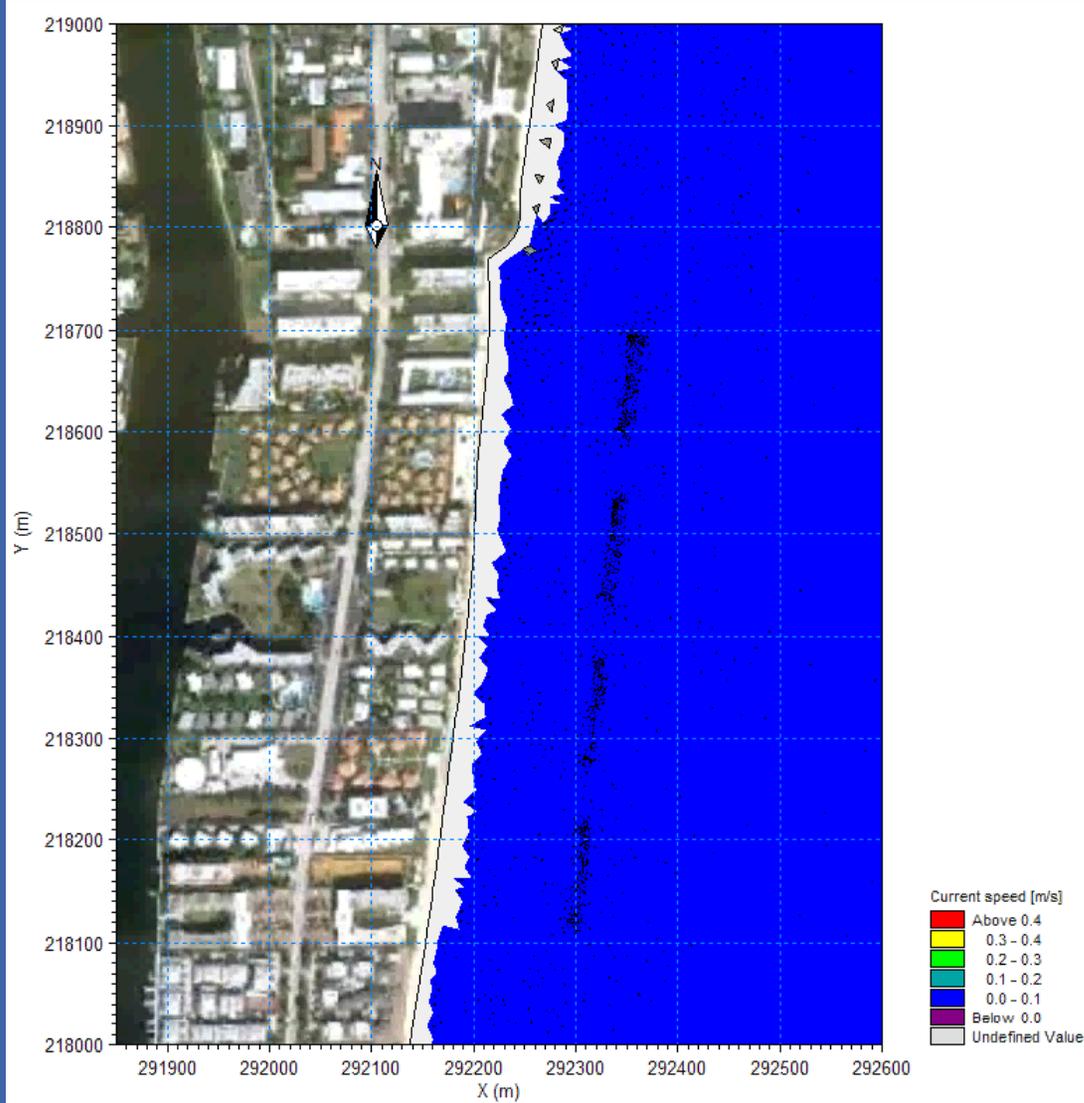
Figure 3.3: Predicted design and measured locations of the MHWL (top) and the BERM (bottom) along the northern end of the JUL project.

Port Everglades – T-Head Groins

- Construction of 4 submerged breakwaters
- Simulated with coupled MIKE-21 SW and HD Models
- Reduce sediment transport 20% for Alternative 7b
- Minimal downdrift impacts
- Viable Alternative



Alternatives 7a & 7b - Submerged Breakwaters

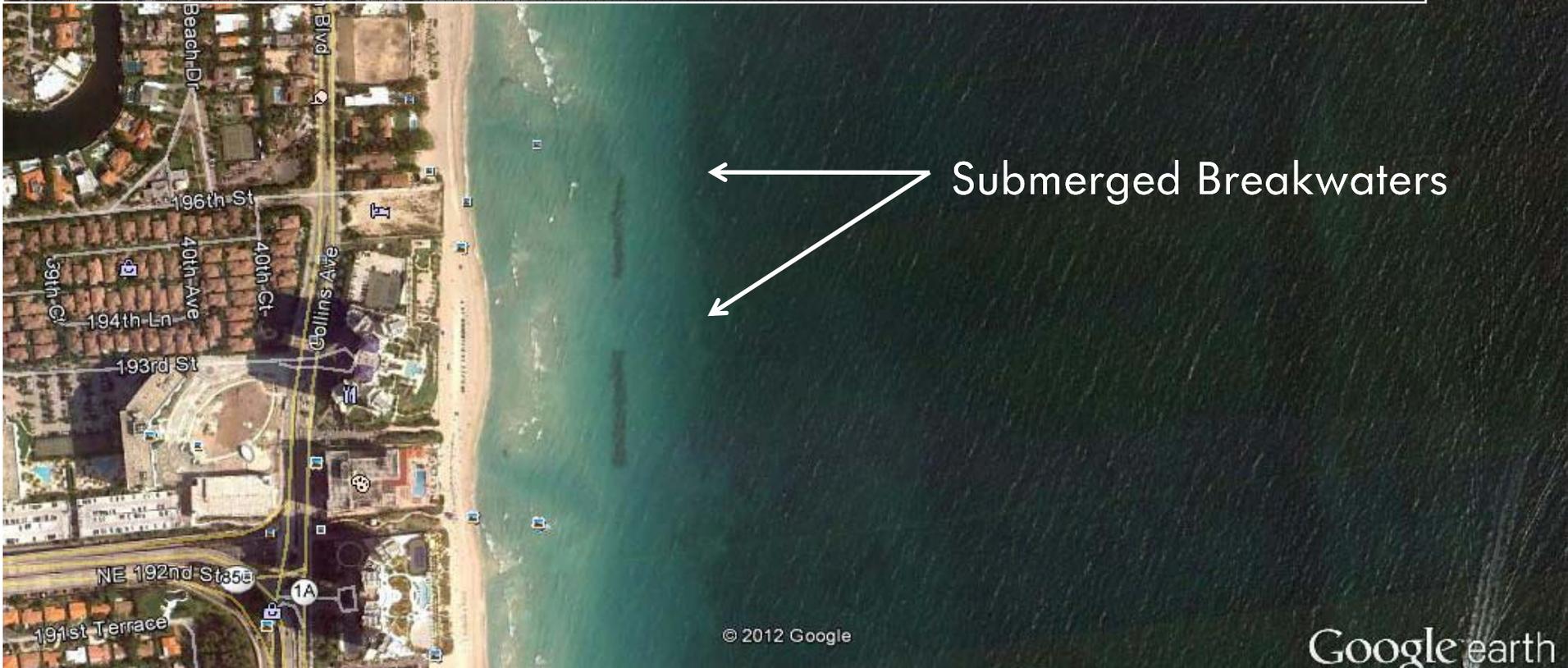


Alternative 7b – Current Simulation

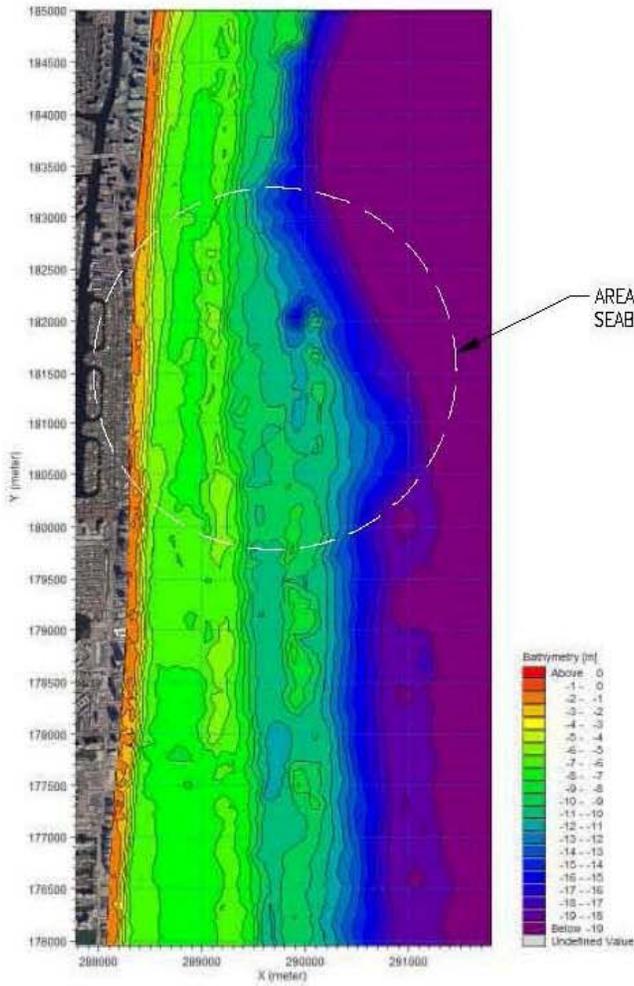


Submerged Breakwaters

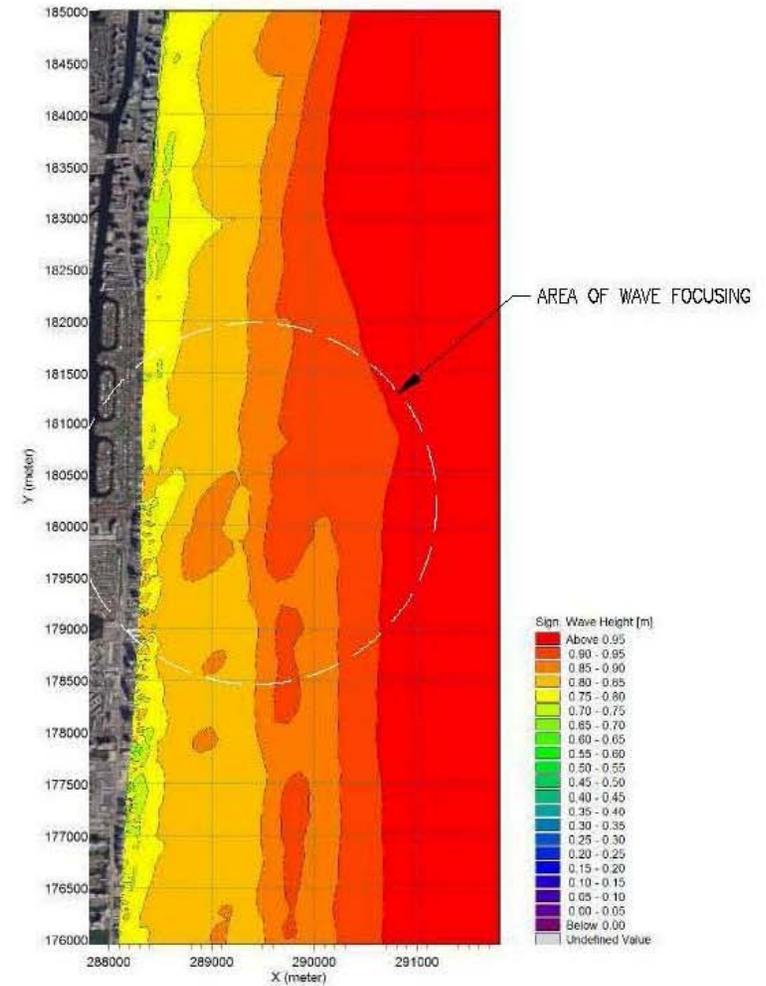
- Submerged Breakwaters - Sunny Isles – Miami-Dade County
- Aerial Photo – 2011
- Designed by the Corps of Engineers and constructed in 2001



Alternative 7 – Submerged Breakwaters



AREA OF PROTRUSION IN SEABED CONTOURS



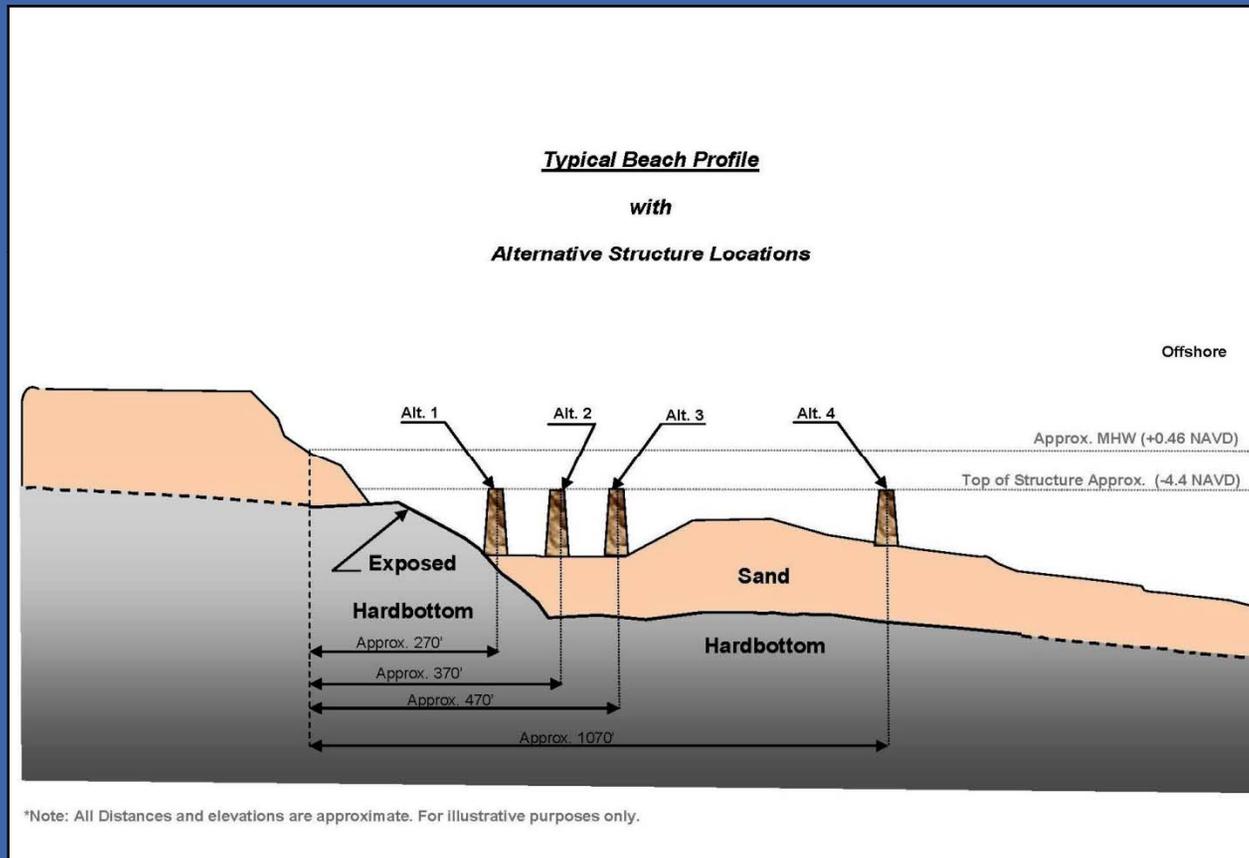
AREA OF WAVE FOCUSING

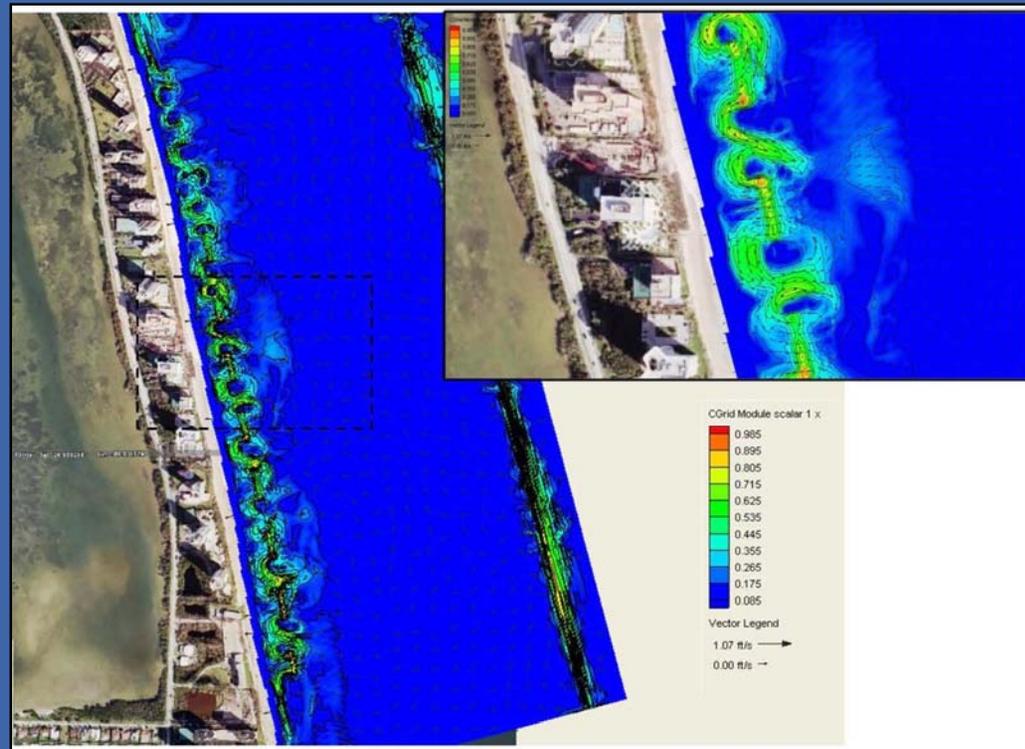


Sunny Isles Shoreline Results (ref. Palm Beach County)



Singer Island – Palm Beach County

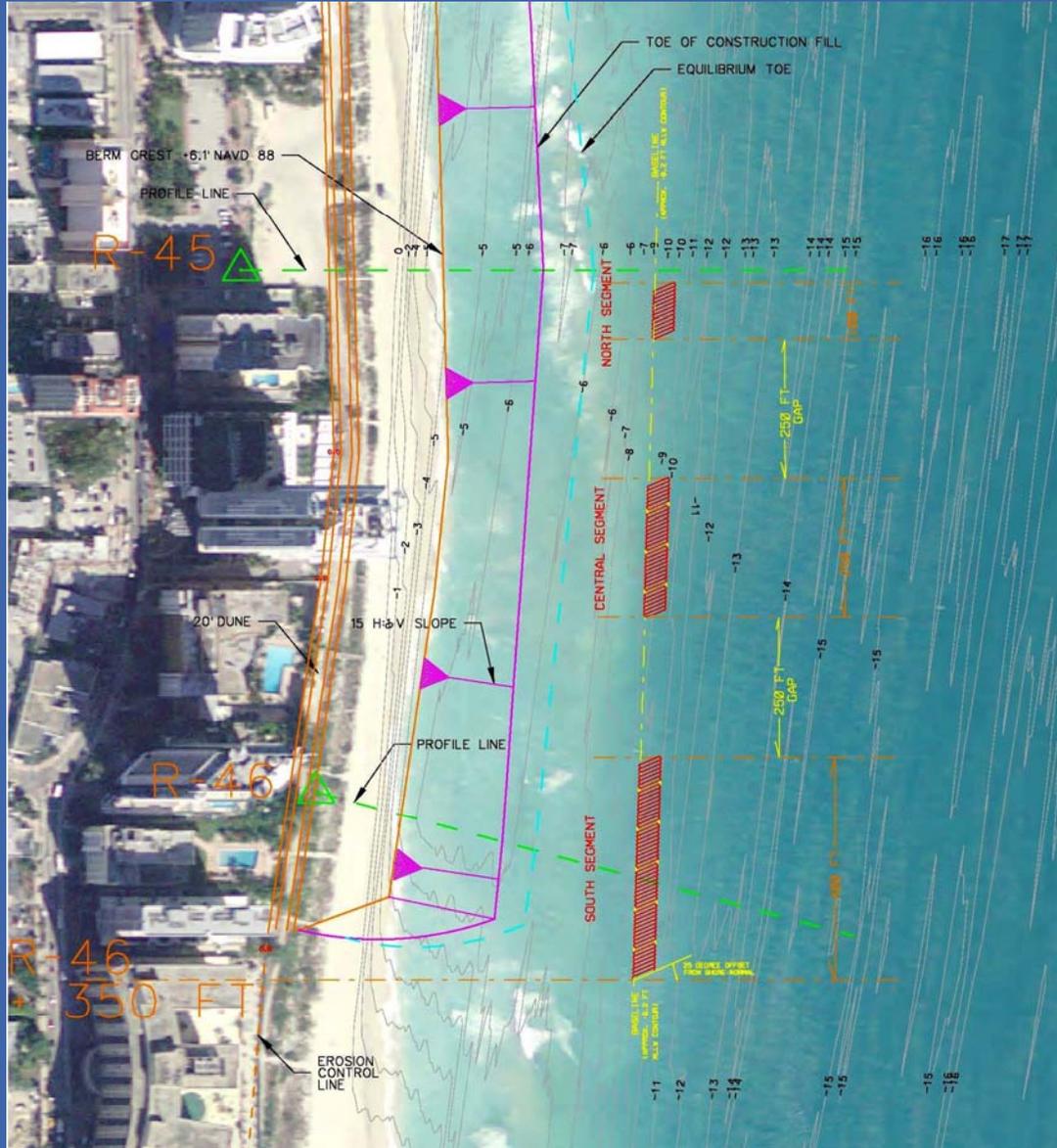




Singer Island Modeling Results – Palm Beach County

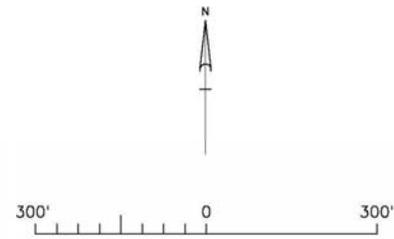


Submerged Breakwaters

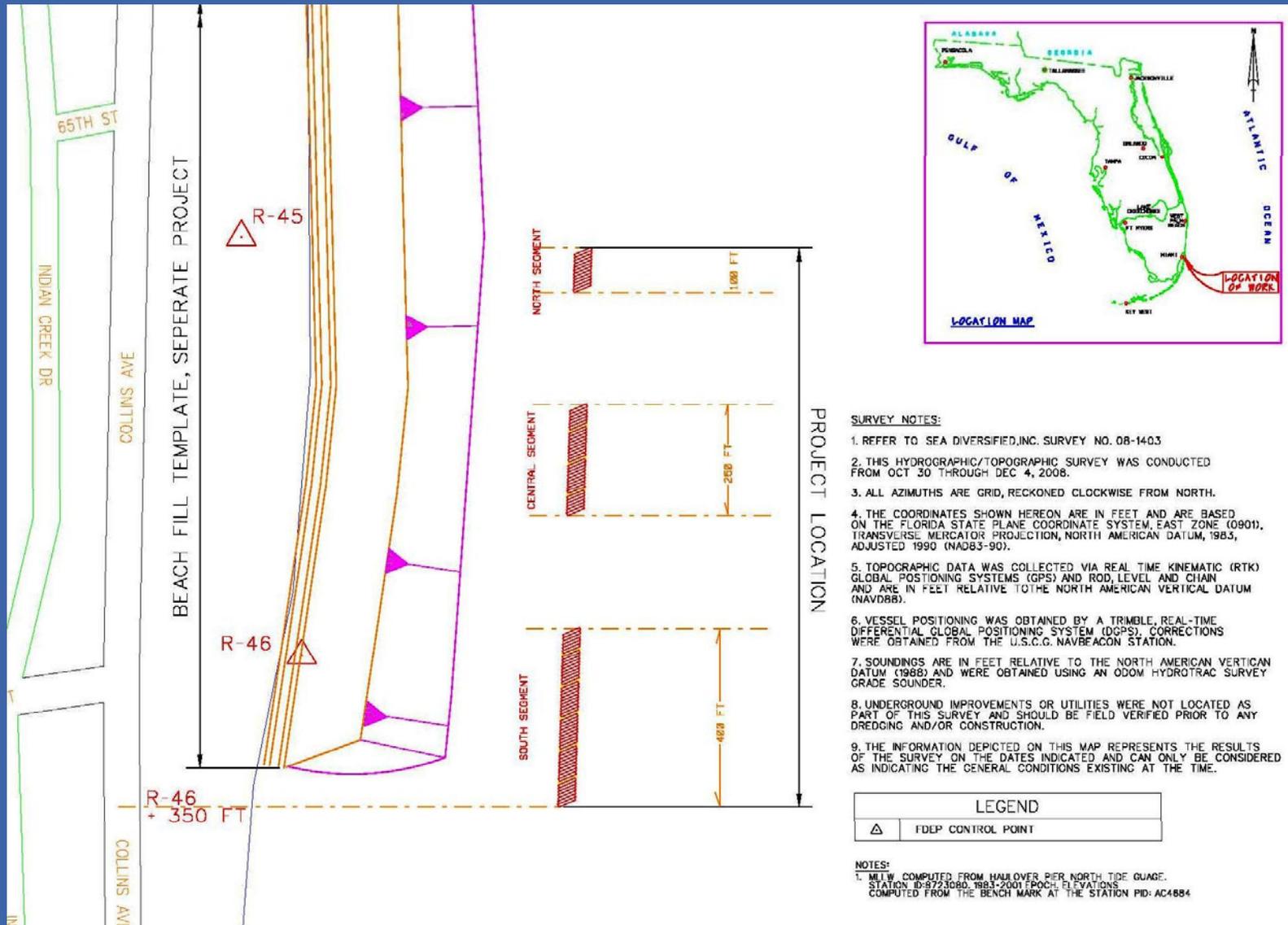


- NOTES:**
1. 99 TOTAL SMART MATS (THIS NUMBER MAY VARY SLIGHTLY, BASED ON FIELD CONDITIONS AND THE ABILITY TO PLACE THE MATS IN CLOSE PROXIMITY TO ONE ANOTHER)
 2. CONTOUR LINES FROM SURVEY 08-1403. ELEVATIONS ARE IN NAVD 88.

- LEGEND:**
- SMART MAT
 - TURTLE PASSAGE MAT
 - SLOPE ARROW FROM BEACH FILL TEMPLATE



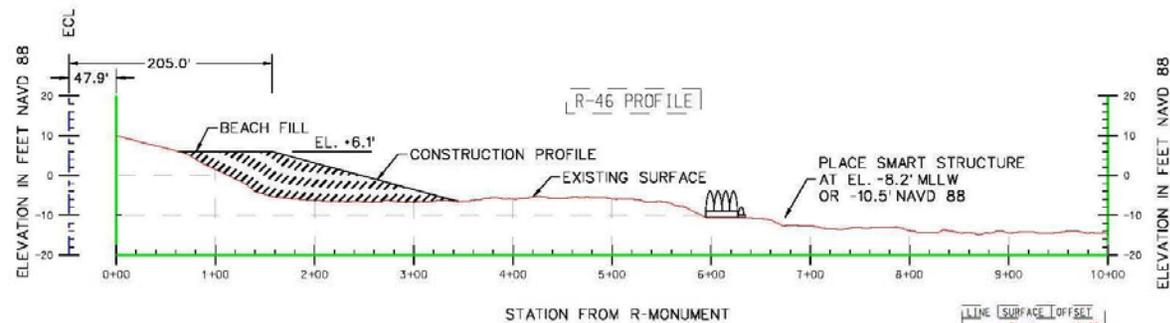
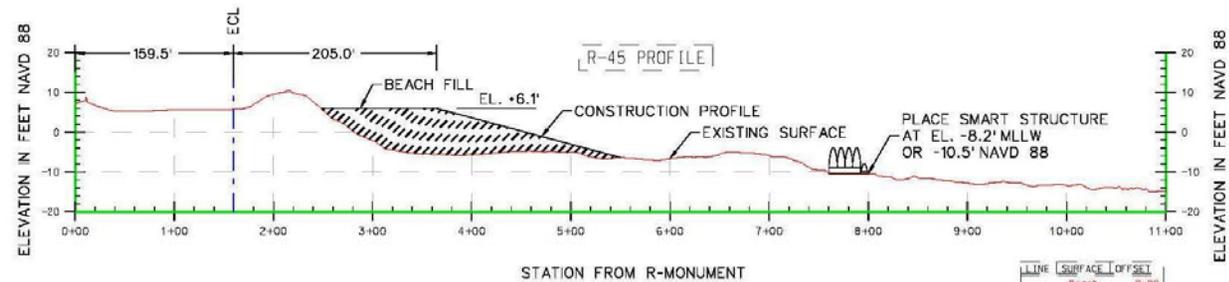
63rd Street Miami Beach



63rd Street Miami Beach

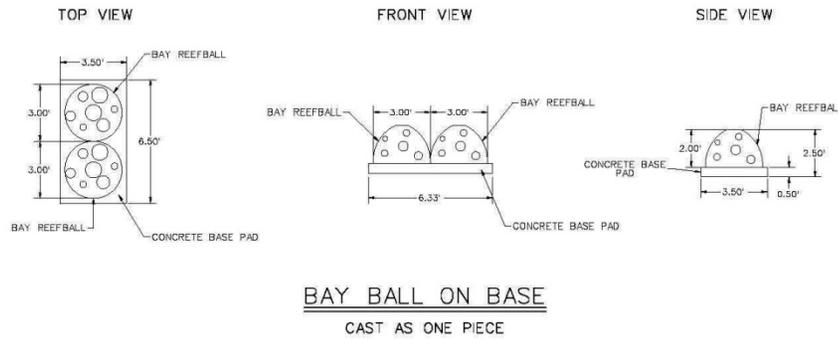
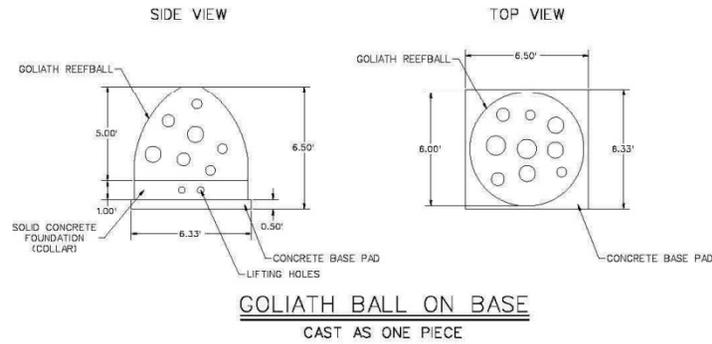


Submerged Breakwaters



- NOTE:
1. PENDING FUTURE SURVEY, MAT PLACEMENT WILL EITHER CONFORM TO BOTTOM OR SOME LEVELING WILL BE PERFORMED.
 2. +6.1' NAVD 88 IS EQUAL TO +9.0' MLLW, WHICH IS THE PERMITTED BERM HEIGHT FOR BEACH PLACEMENT

63rd Street Miami Beach





- Alternative 2 Continued Beach Renourishment
 - Evaluate Sand Sources – upland and offshore
 - Economic Analysis on nourishment Frequency, sources of funding
- Alternative 7b Coastal Structures
 - Conduct Pre-Application Meetings with Agencies
 - Outline a strategy for funding, design/permitting
 - Support needed – lobbying and legal
 - Cost/Benefit analysis for coastal structures
 - Detailed Numerical Modeling and Coastal Engineering



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