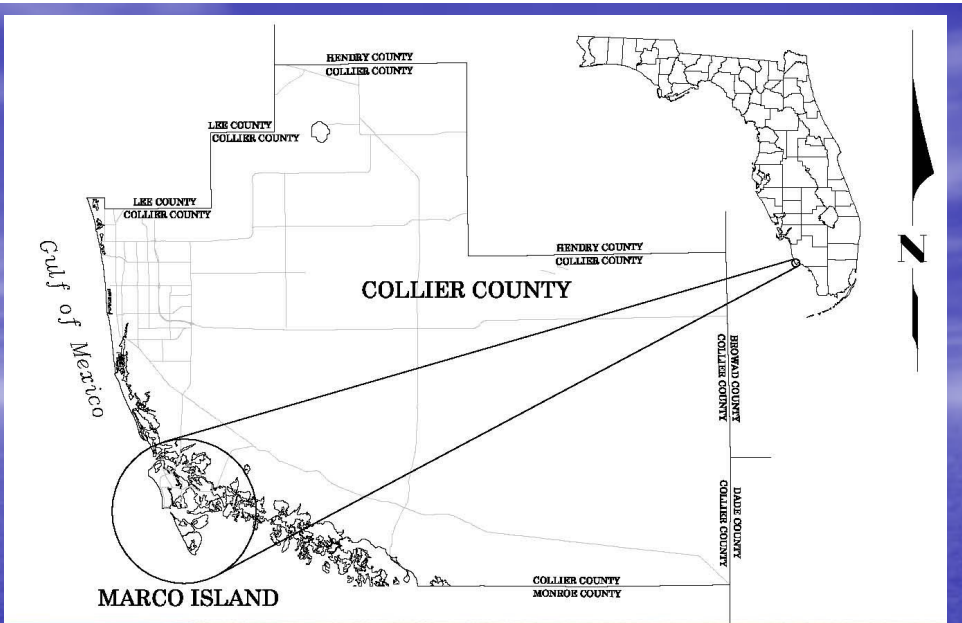
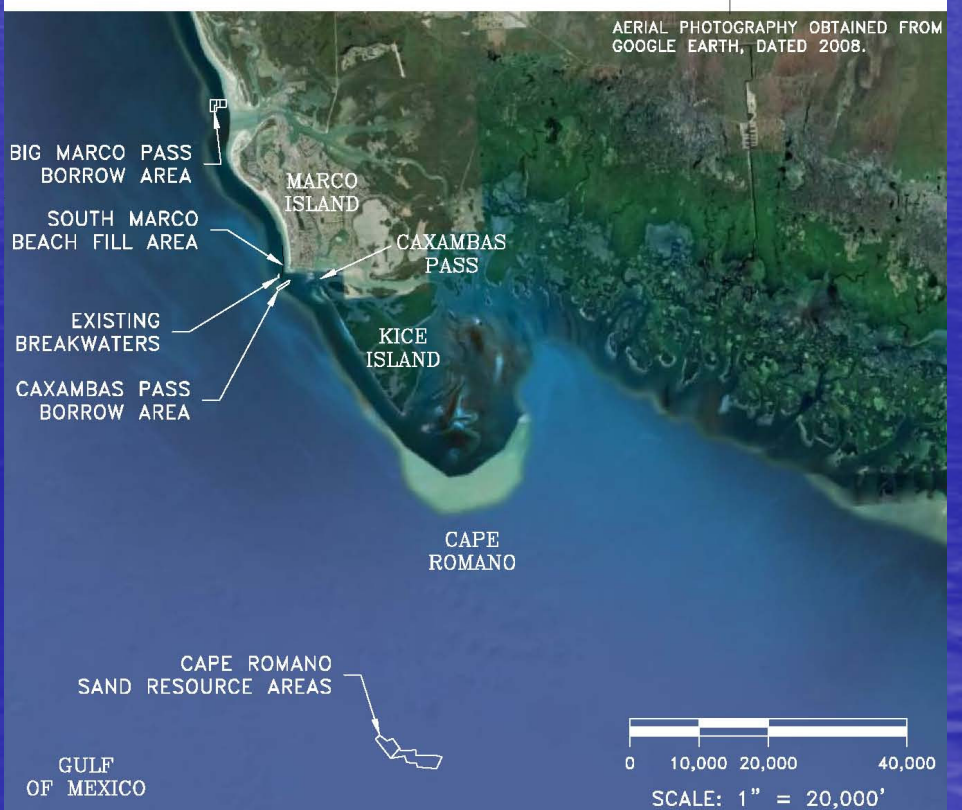
Marco Island South Beach Project Update

- Project Description
- Scope of Work
- Historic Shoreline & Volume Changes
- Numerical Modeling Study





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February 17, 2011

PROJECT DESCRIPTION

- South Beach Fill Renourishment
  - 104,000 CY { 76,728 CY ~ TS FAY }
  - 4,400 Ft Long
- Purpose
  - Storm Damage Reduction
  - Natural Resource Habitat Restoration
  - Enhance Recreation
  - Offset Storm Erosion Losses
- Study to Evaluate Project Improvements
  - Address Localized Erosion off South End Through Structural Enhancements (R146 - G2)

Nov 2010 Ground Photographs

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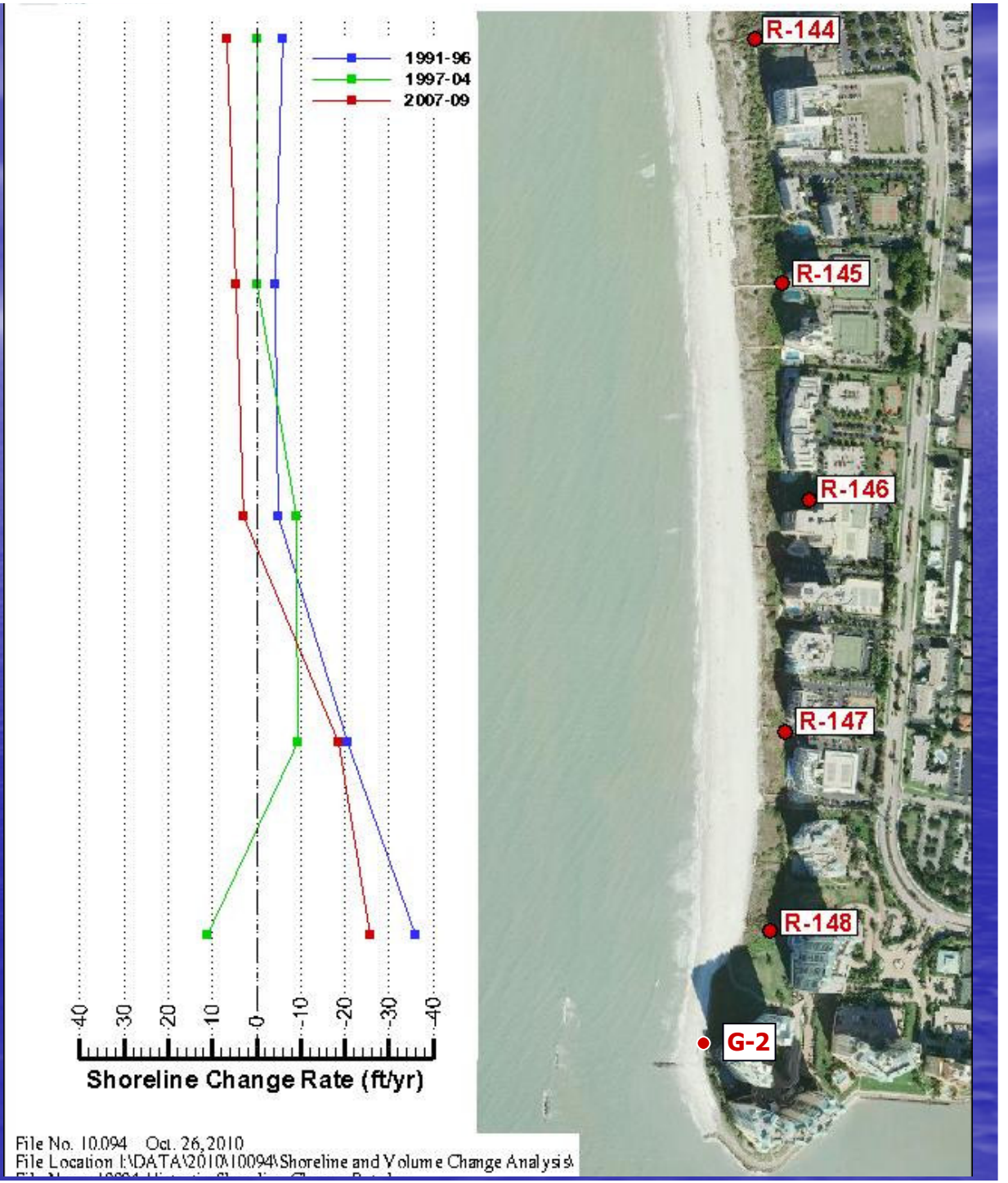
SCOPE OF WORK

- Plan Formulation & Project Update
  - Update Project Description, Volumes, Borrow Area Analysis, Structural Enhancement Screening
- Modeling
  - Calibrate and Validate Coupled Hydrodynamic and Sediment Transport Model Suite
  - Alternatives Analysis
- Preliminary Design
  - Pre-Application Agency Conferences
  - Preliminary Plans and Opinion of Probable Cost
  - Environmental Assessment

HISTORIC SHORELINE CHANGES

Monument	1991-1996 (ft/yr)	1997-2004 (ft/yr)	2007-2009 (ft/yr)
R144	-6.1	0.0	6.7
R145	-4.2	-0.3	4.5
R146	-4.8	-9.0	2.9
R147	-20.6	-9.5	-18.5
R148	-36.0	11.0	-25.8

HISTORIC SHORELINE CHANGES



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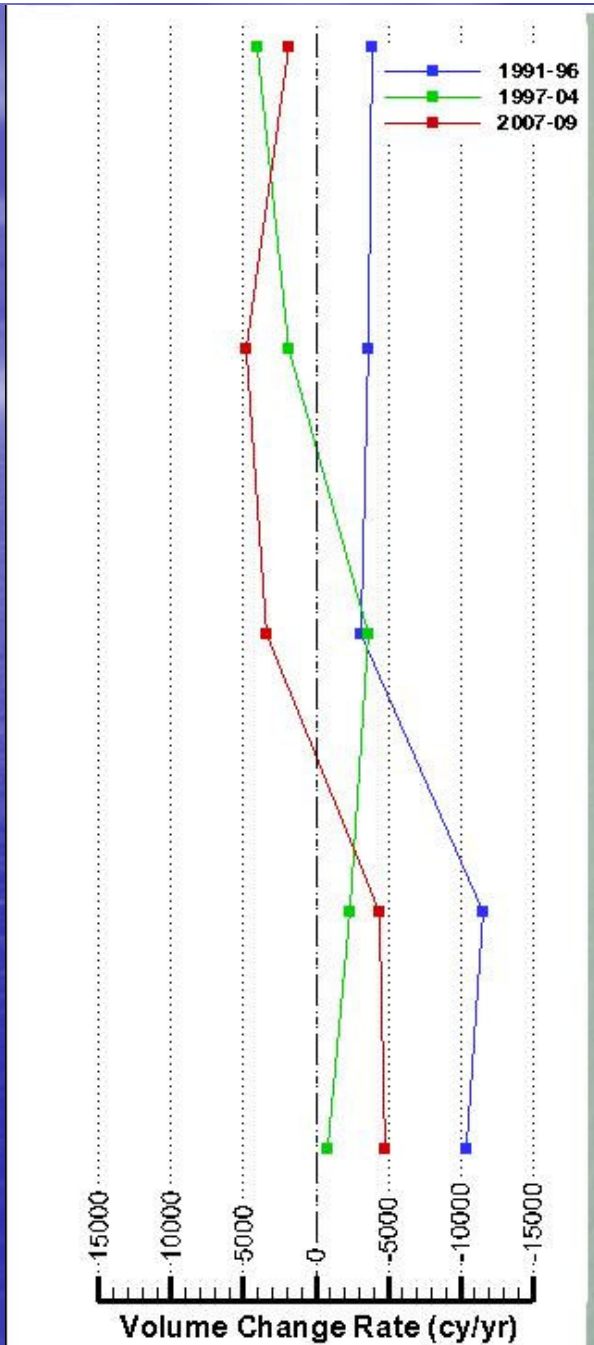
HISTORIC VOLUME CHANGES

Monument	1991-1996 (cy/yr)	1997-2004 (cy/yr)	2007-2009 (cy/yr)
R144	-3,935	3,995	1,891
R145	-3,593	1,831	4,814
R146	-3,097	-3,696	3,382
R147	-11,522	-2,304	-4,425
R148	-10,391	-814	-4,775

HISTORIC VOLUME CHANGES



File No. 10.094 Oct. 26, 2010
File Location I:\DATA\2010\10094\Shoreline and Volume Change Analysis\

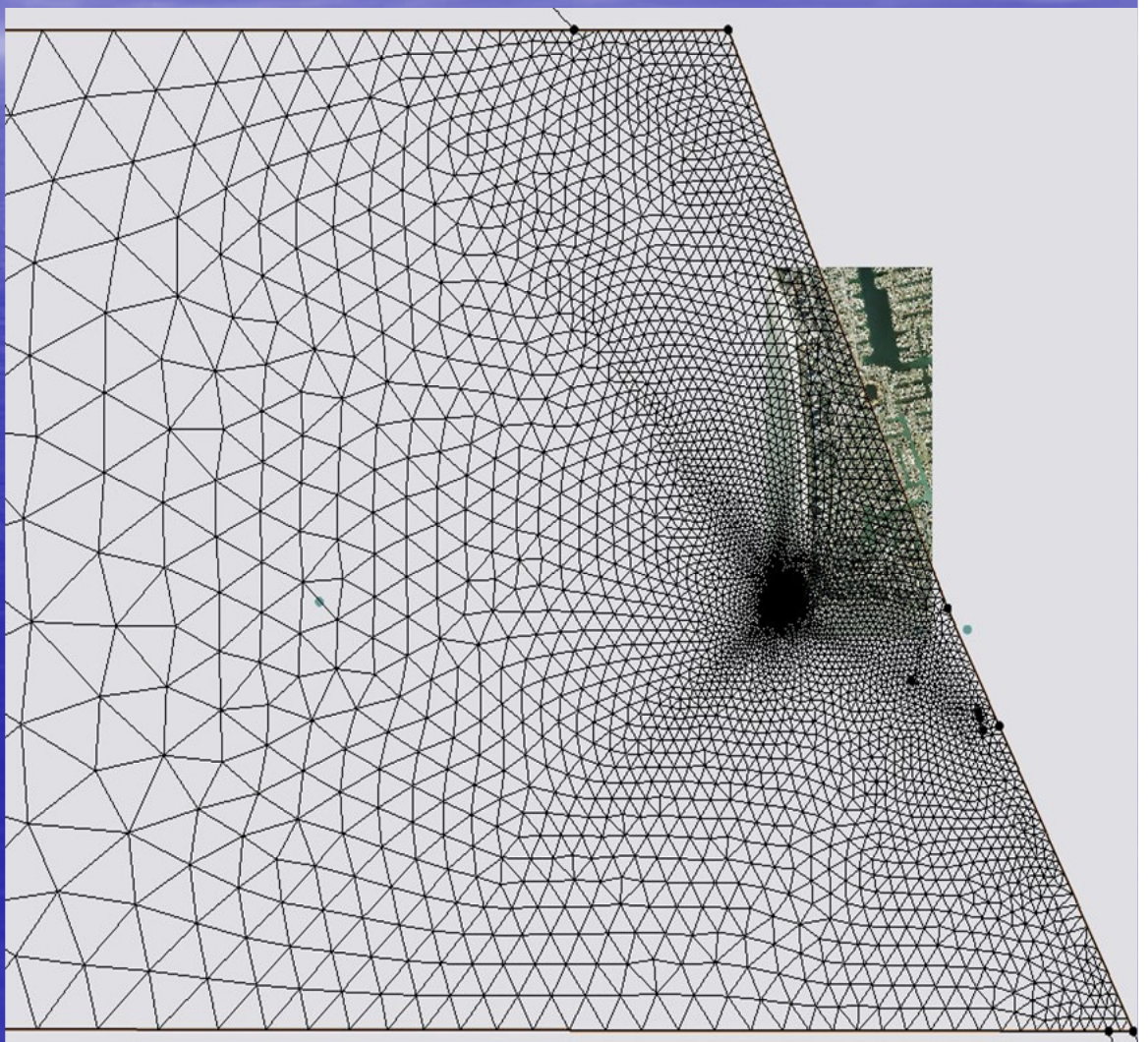
CEC File No. 10.094
February 17, 2011

NUMERICAL MODEL STUDY

- Calibration Data
  - 1999-2001 Measured Wave Data and Surveys
- Validation Data
  - Deployed Wave & Tide Gauges & Current Meters; Measuring Surveys

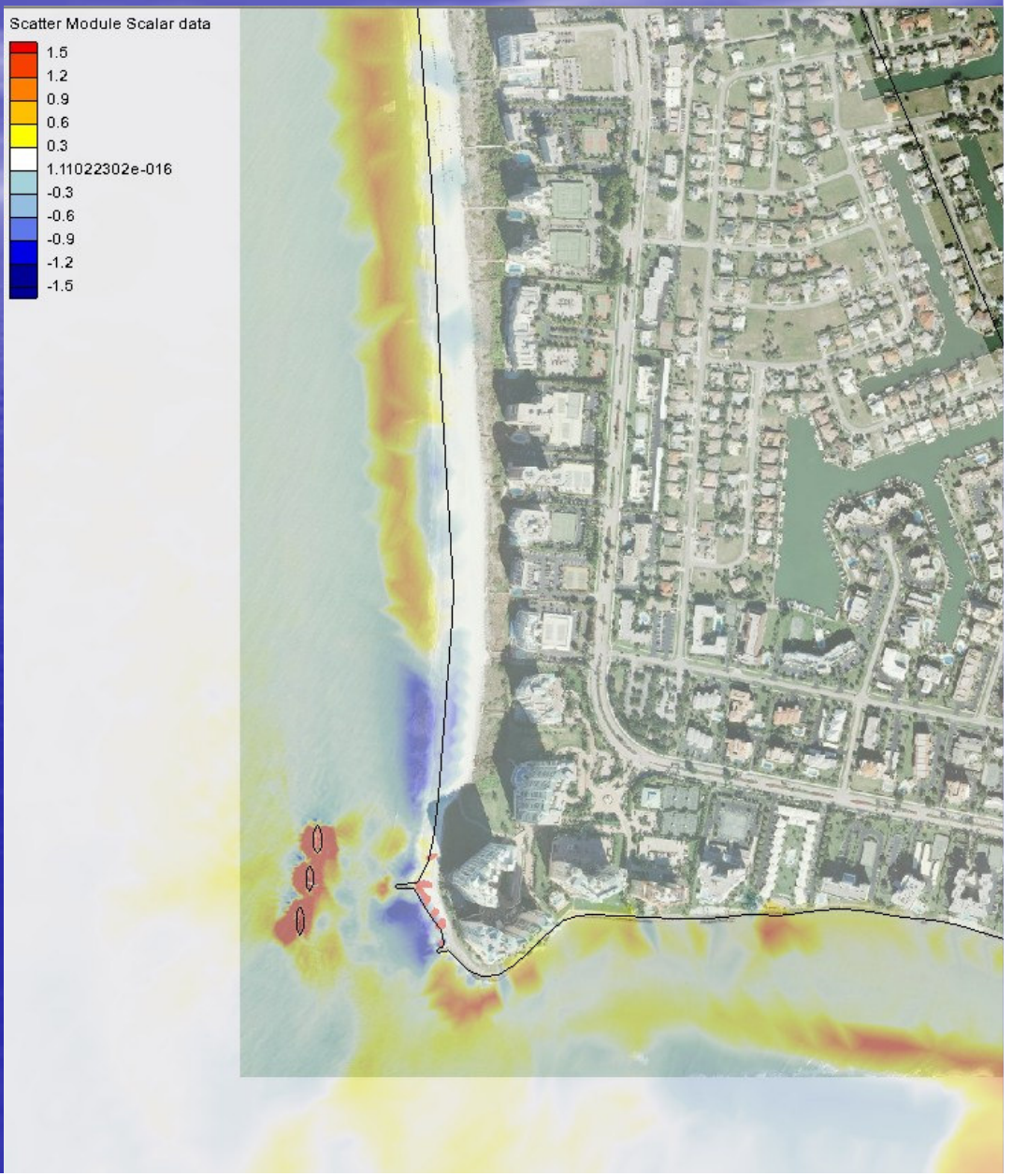
Numerical Model Grid

- Boundary Fitted MIKE21 Grid
- Includes Detached Breakwaters, Groins and Seawall
- High Resolution for Project Area



Preliminary Model Results

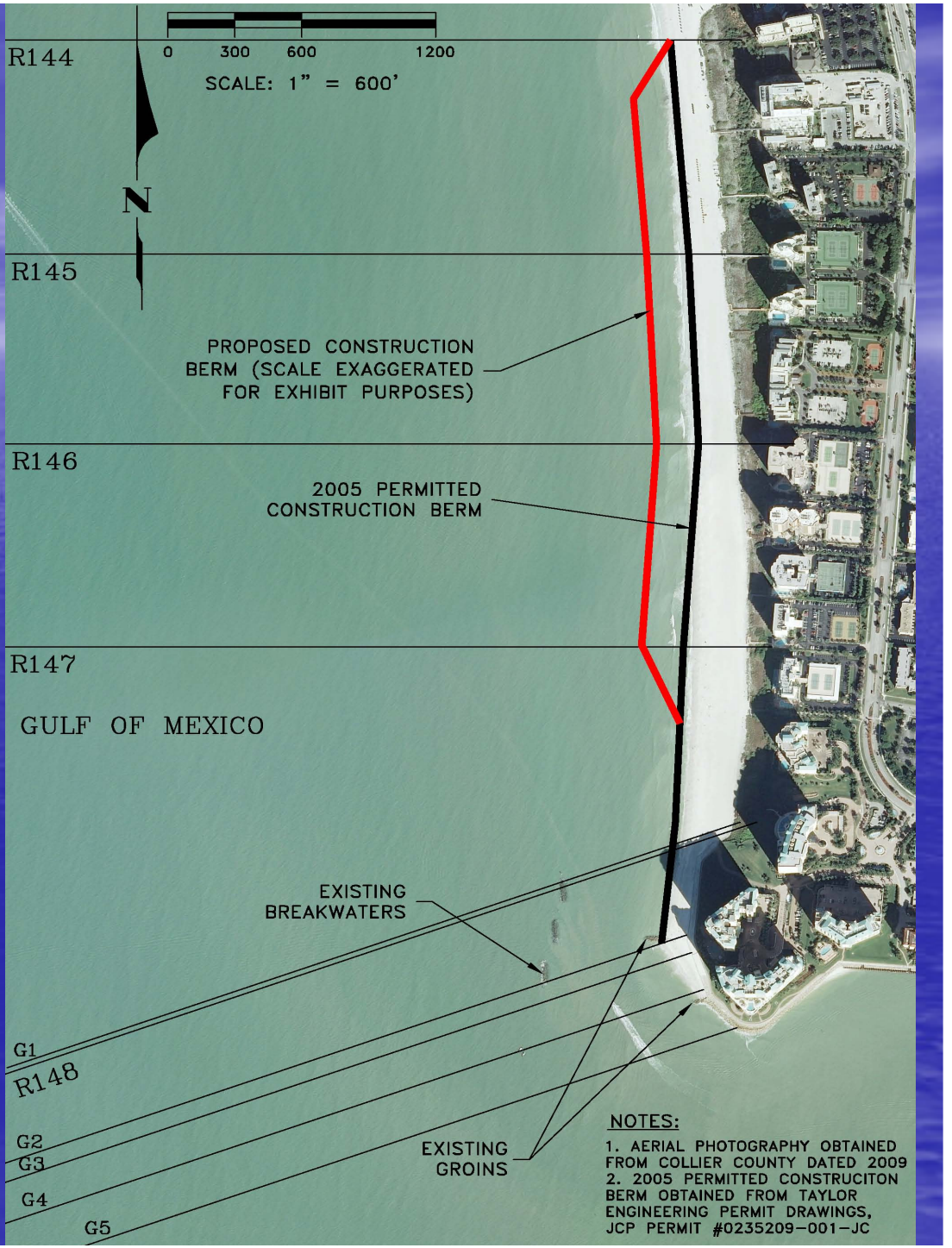
- Accretion Trends in Northern Segment
- Erosion Trends in Extreme Southern End
- Deposition into Caxambas Pass
- Improvements:
  - Accretion at Breakwaters
  - Accretion in Southern End (~ R146 to R147)



ALTERNATIVES ANALYSIS

- Repair Existing Breakwaters
  - Return to Design Form and Function
- Feeder Beach {No Structural Enhancements}
  - Overfill Northern Segment to "Feed" Southern Segment
- Add One Groin
  - Enhance Project Life Through Addition of One Rock Groin North of Existing Groins
- Add One Breakwater
  - Enhance Project Life Through Addition of One Breakwater North of Existing Breakwaters

Feeder Beach Concept



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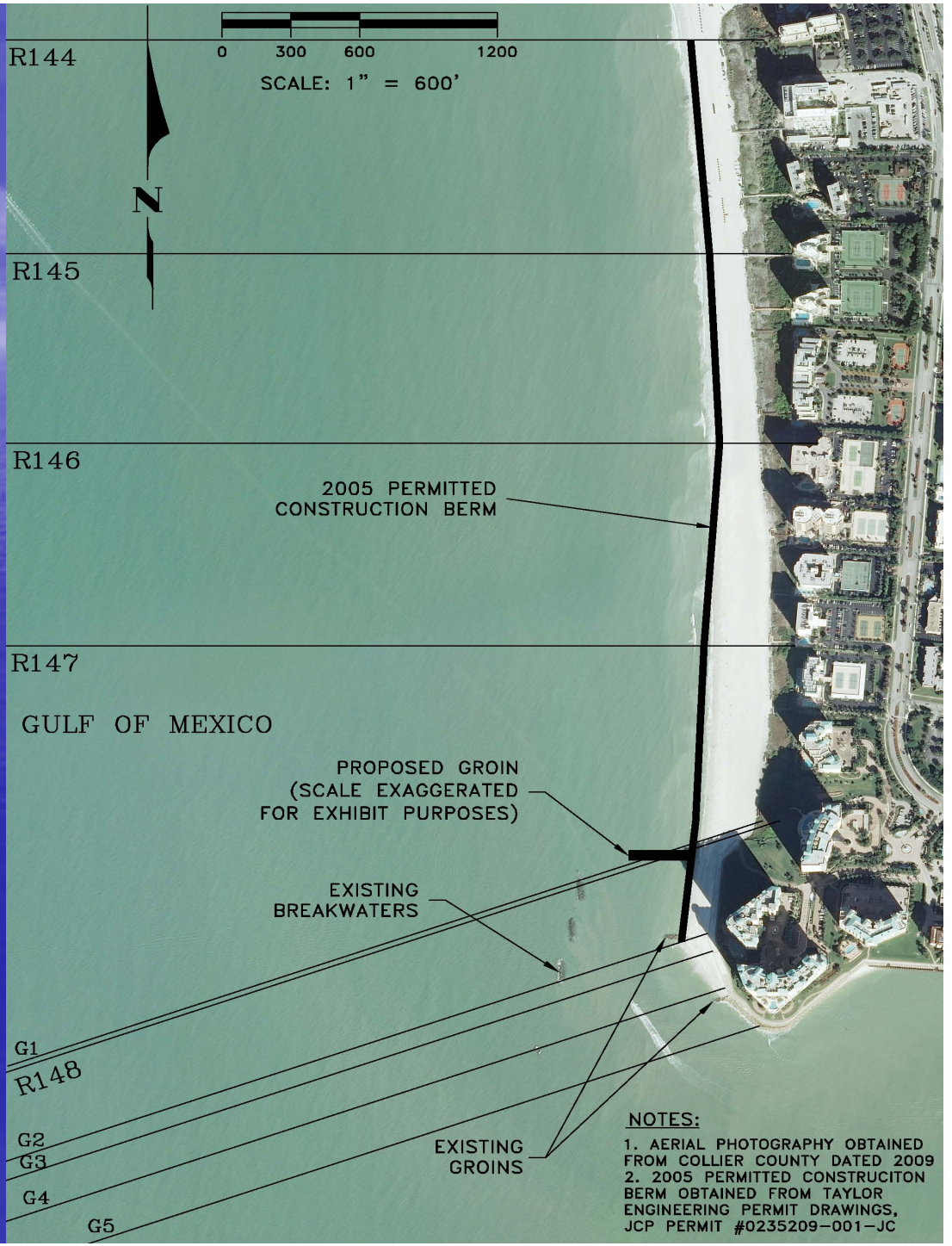
Additional Groin Concept



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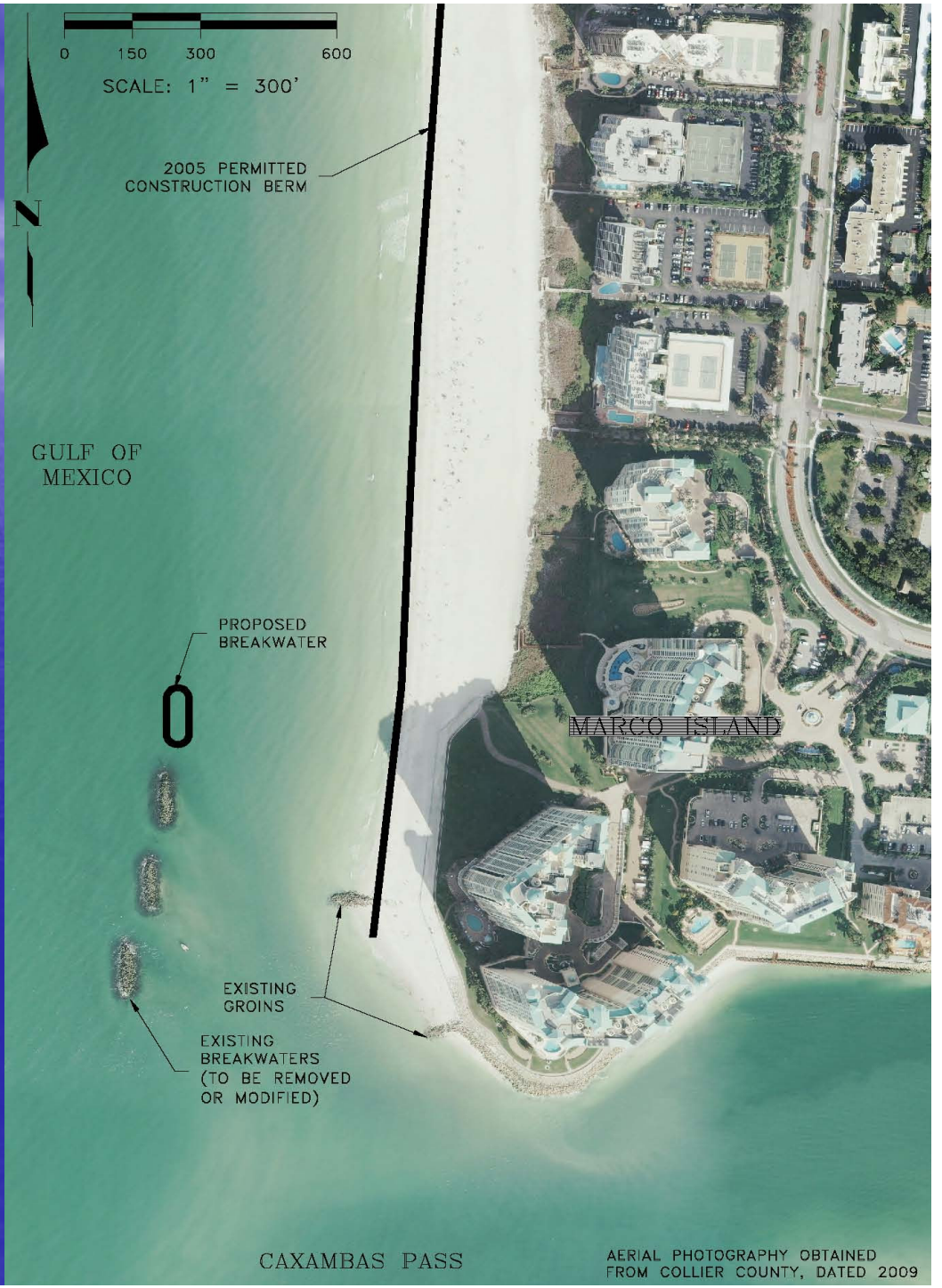
Additional Breakwater Concept



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