Adaptability During Design and Construction of Large Scale Coastal Restoration Projects in Louisiana

FLORIDA SHORE & BEACH PRESERVATION ASSOCIATION
A League of Cities and Counties on Beach and Coastal Issues

27th Annual National Conference on Beach Preservation Technology
February 13, 2014

Presented by:
Michael Poff, P.E.

COASTAL ENGINEERING CONSULTANTS INC.

A.K.A "A TALE OF TWO FIRSTS"

FLORIDA SHORE & BEACH PRESERVATION ASSOCIATION
A League of Cities and Counties on Beach and Coastal Issues

27th Annual National Conference on Beach Preservation Technology
February 13, 2014

Presented by:
Michael Poff, P.E.

COASTAL ENGINEERING CONSULTANTS INC.

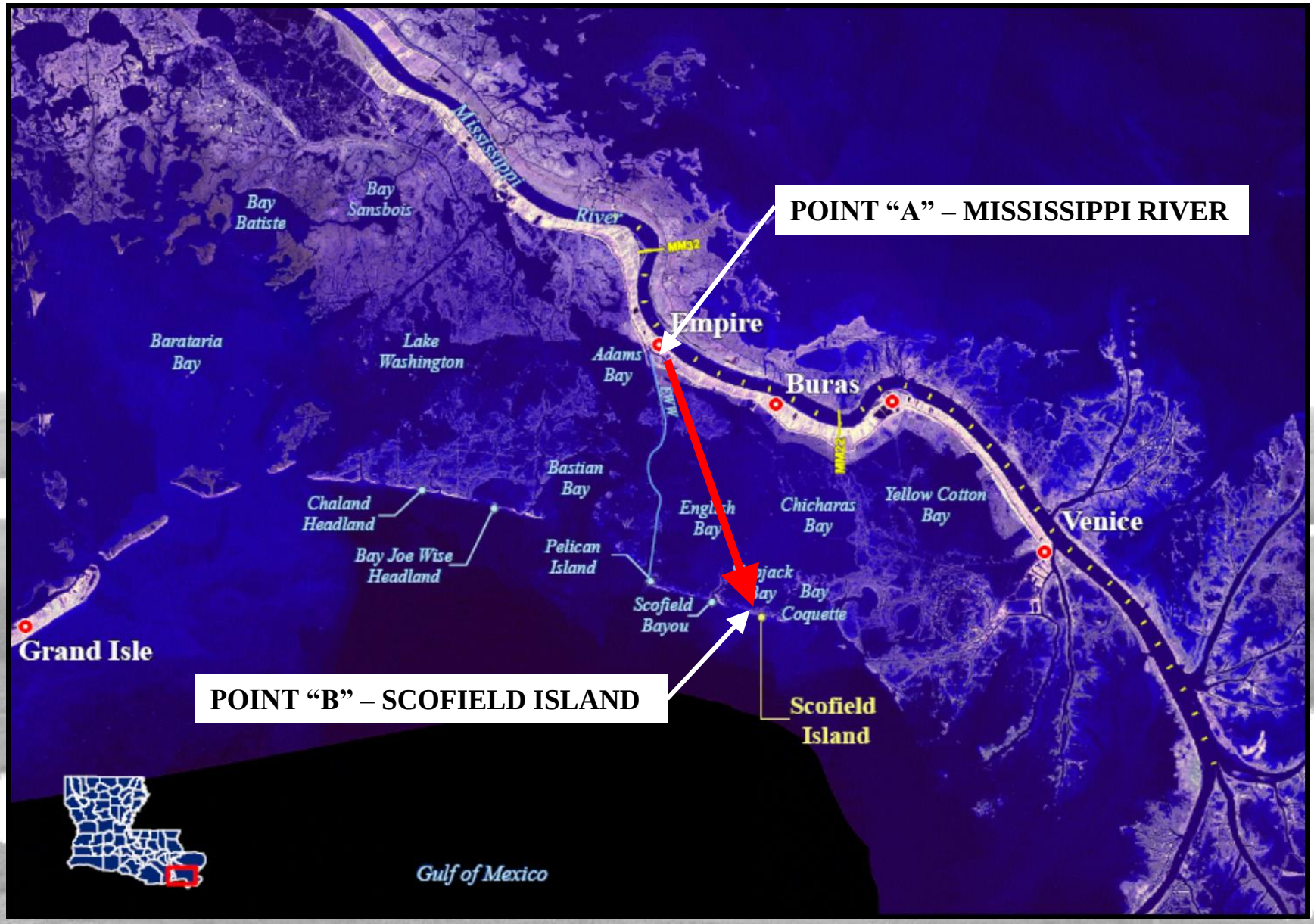
Outline

- Design / Permitting
  - Anthropogenic Effects
  - Hurricanes
  - Fill Template Tolerances
  - Means & Methods Options

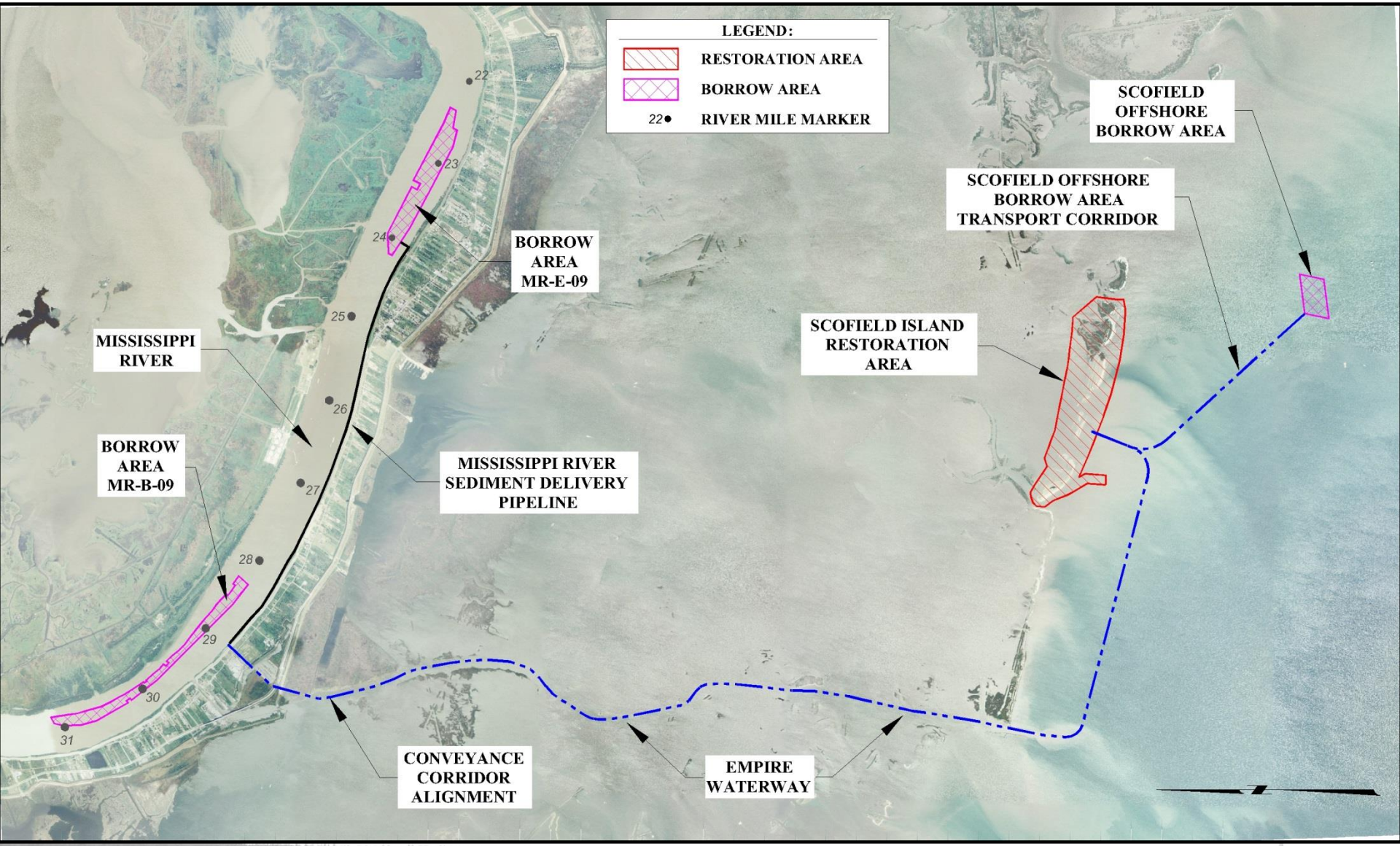
Outline

- Construction
  - Anthropogenic Effects
  - Hurricanes
  - Fill Template Tolerances
  - Means & Methods Options

Project #1 - Scofield Island

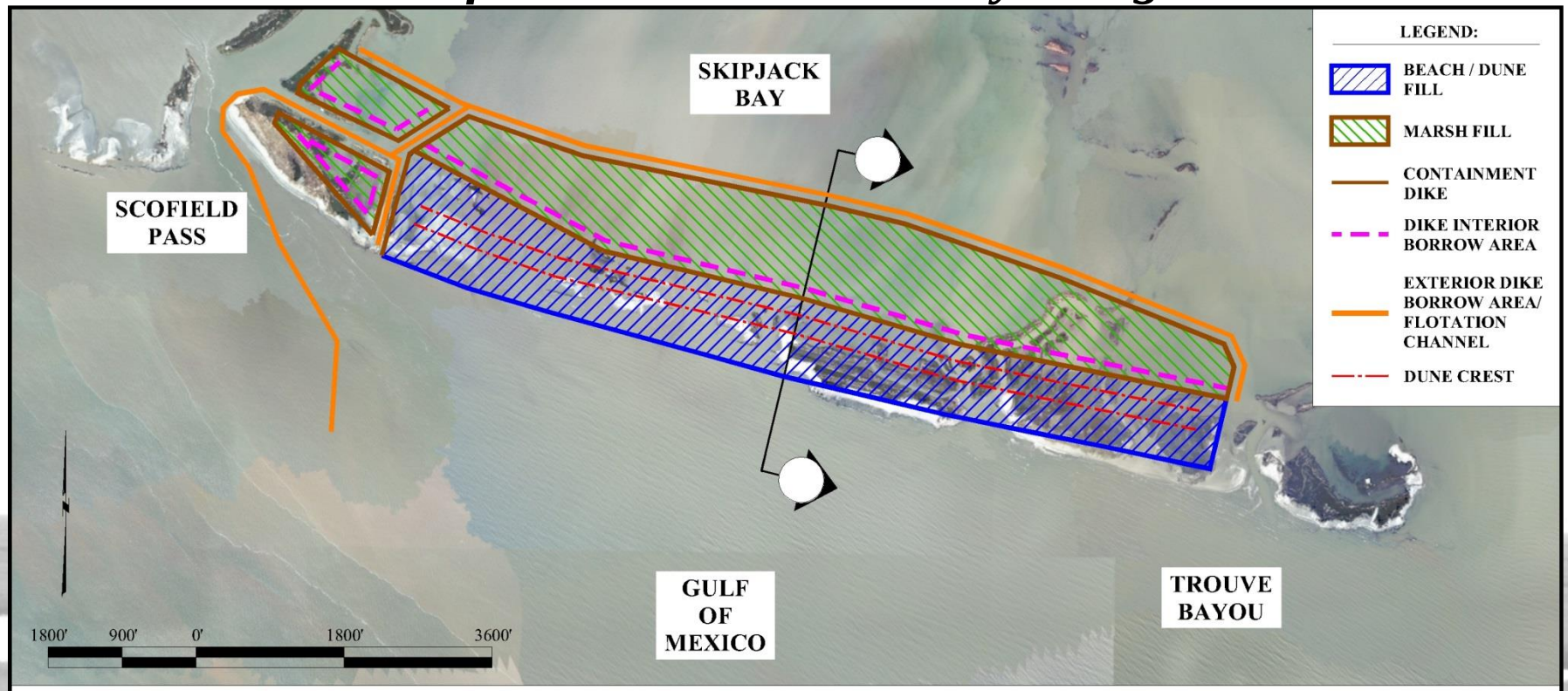


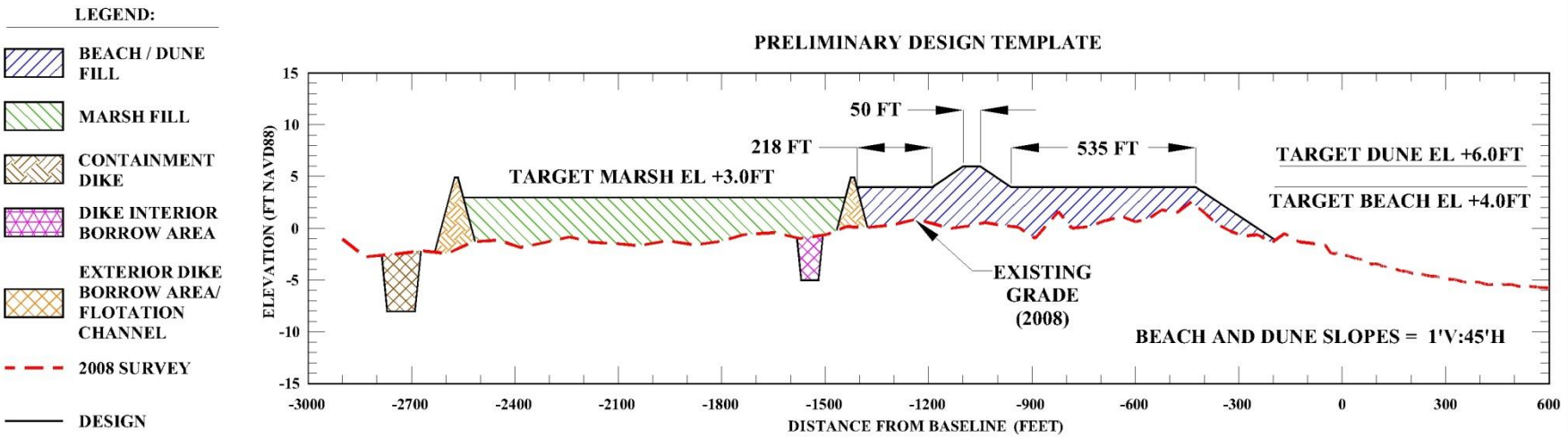
Project #1 Elements



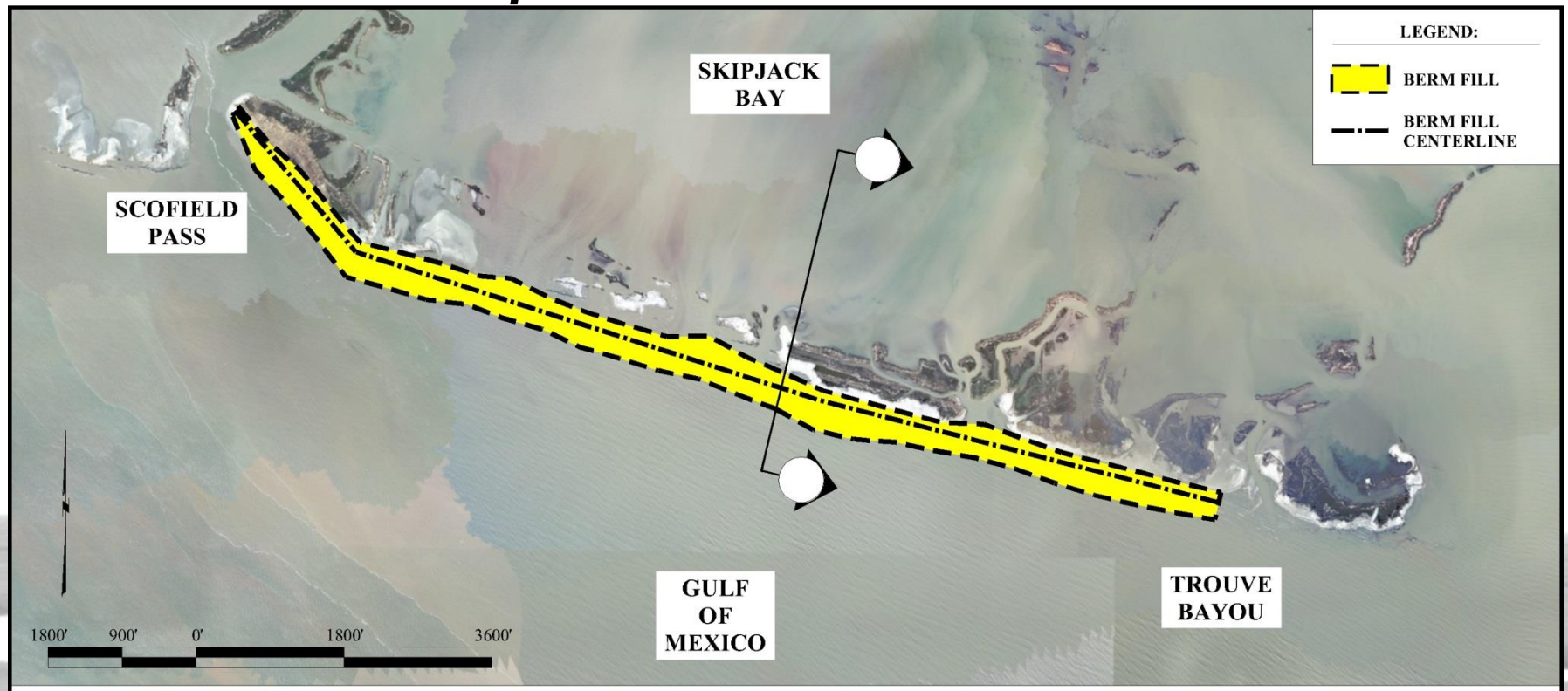
Berm to Barrier Island

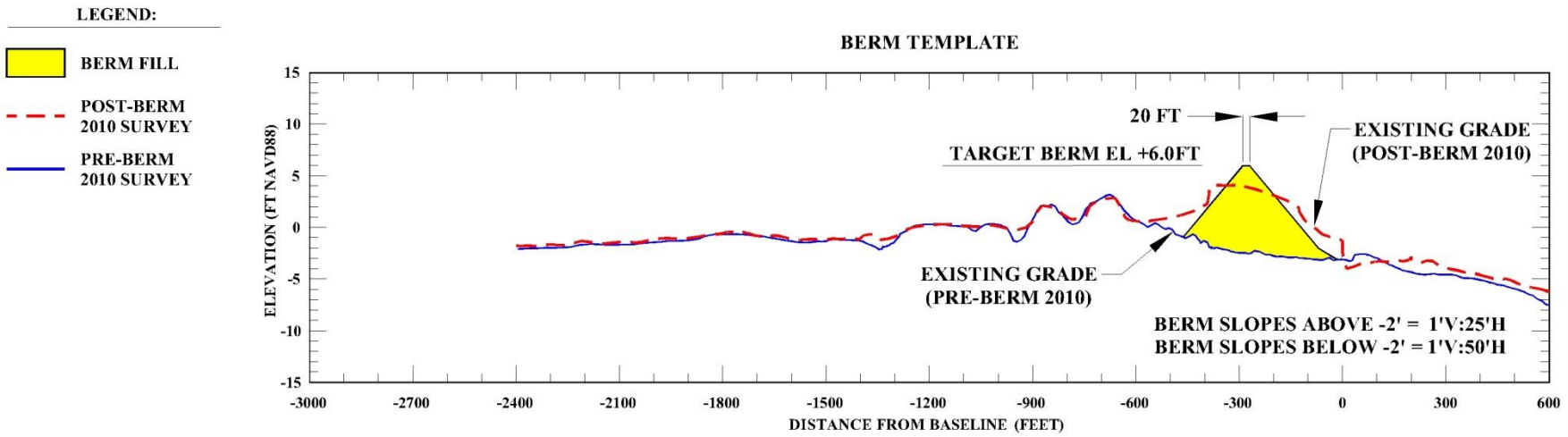
Scofield Island Preliminary Design



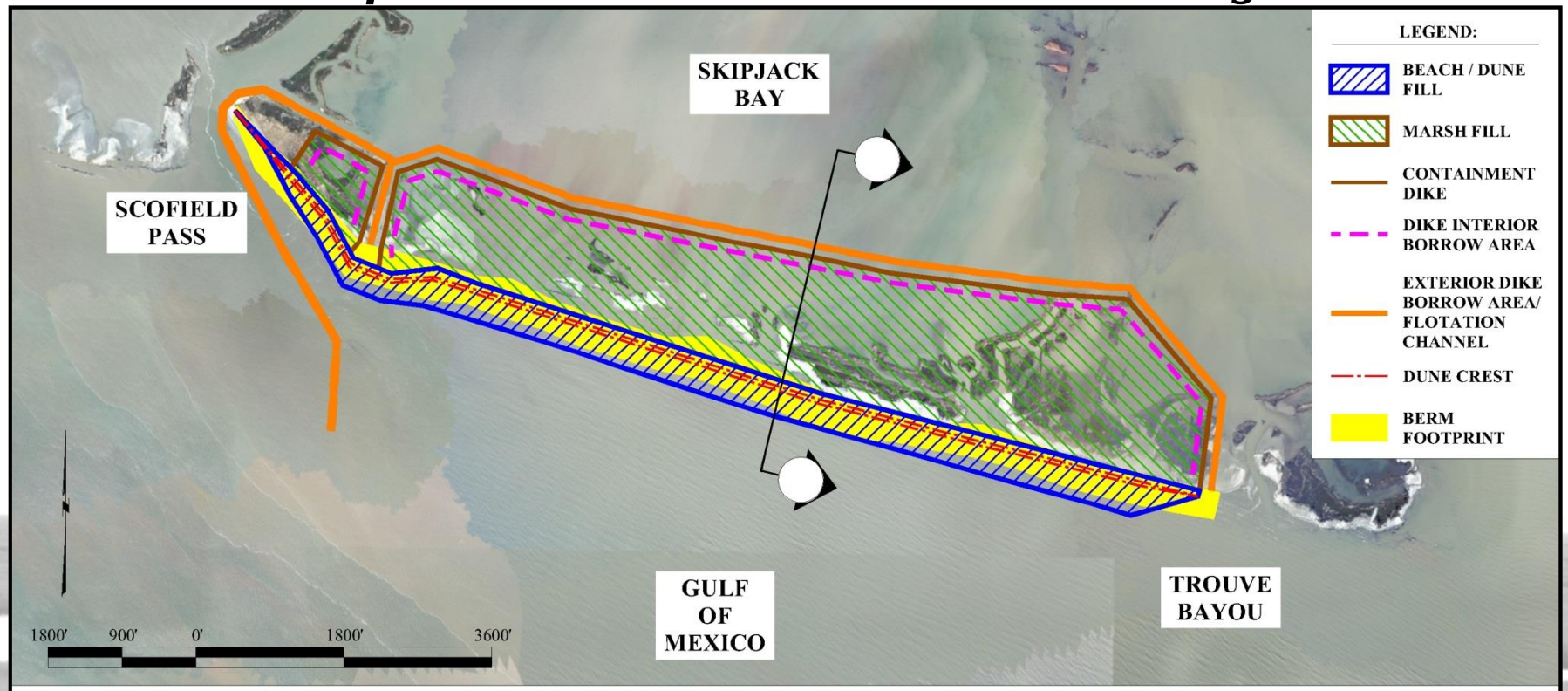


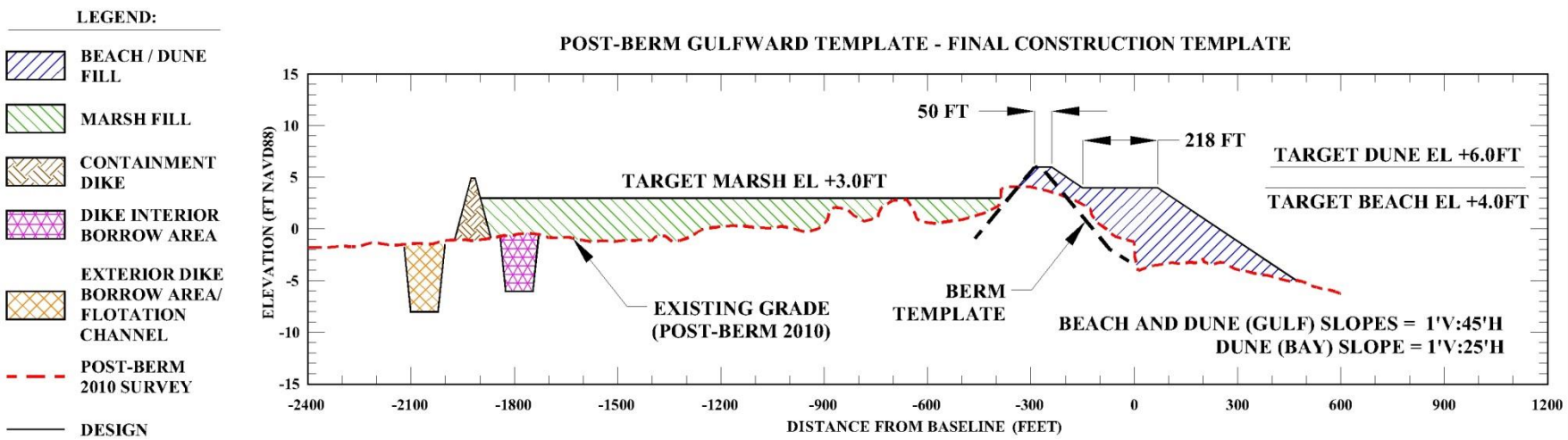
Scofield Island Protective Berm





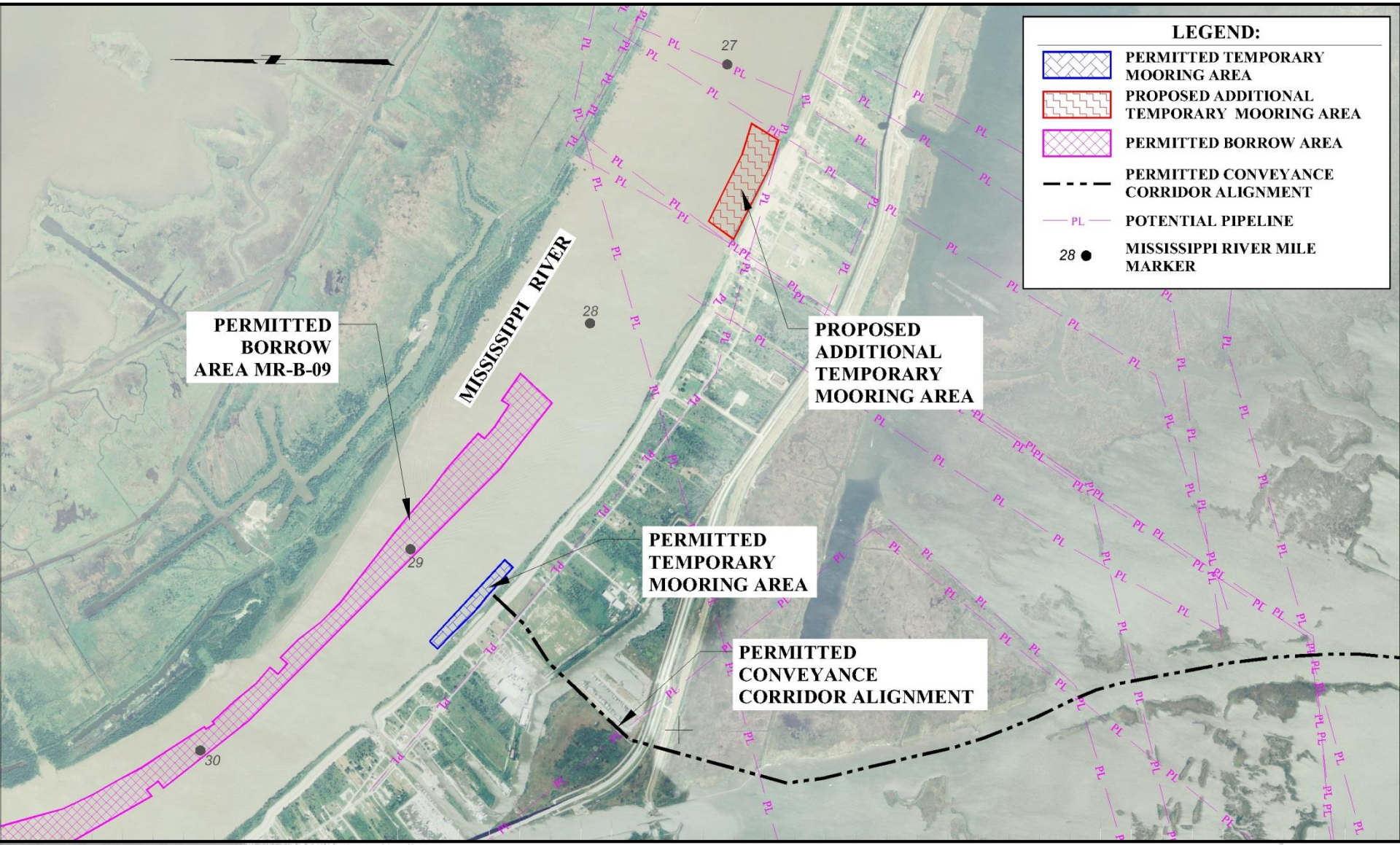
Scofield Island - Final Construction Design



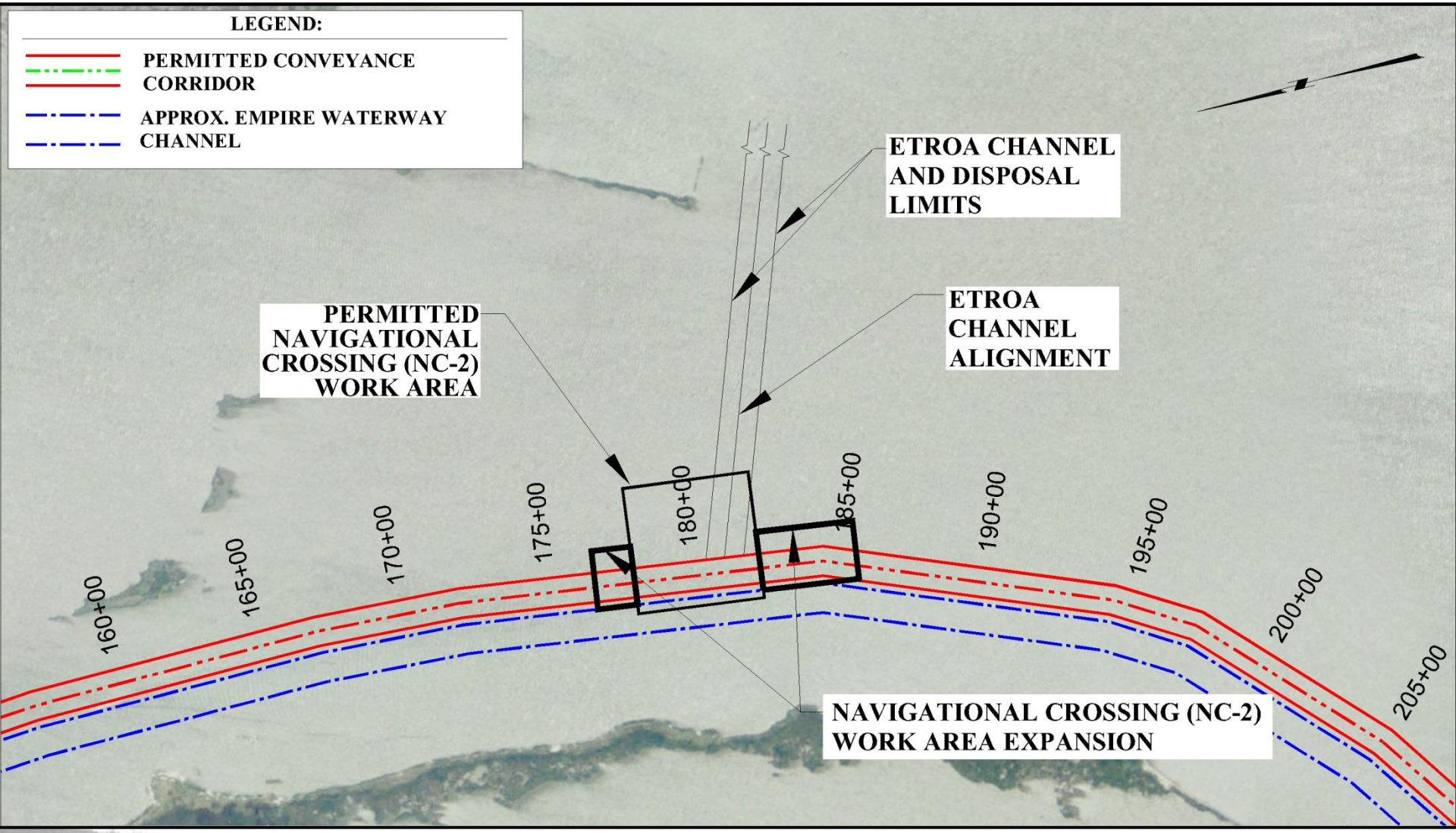


Permit Modifications

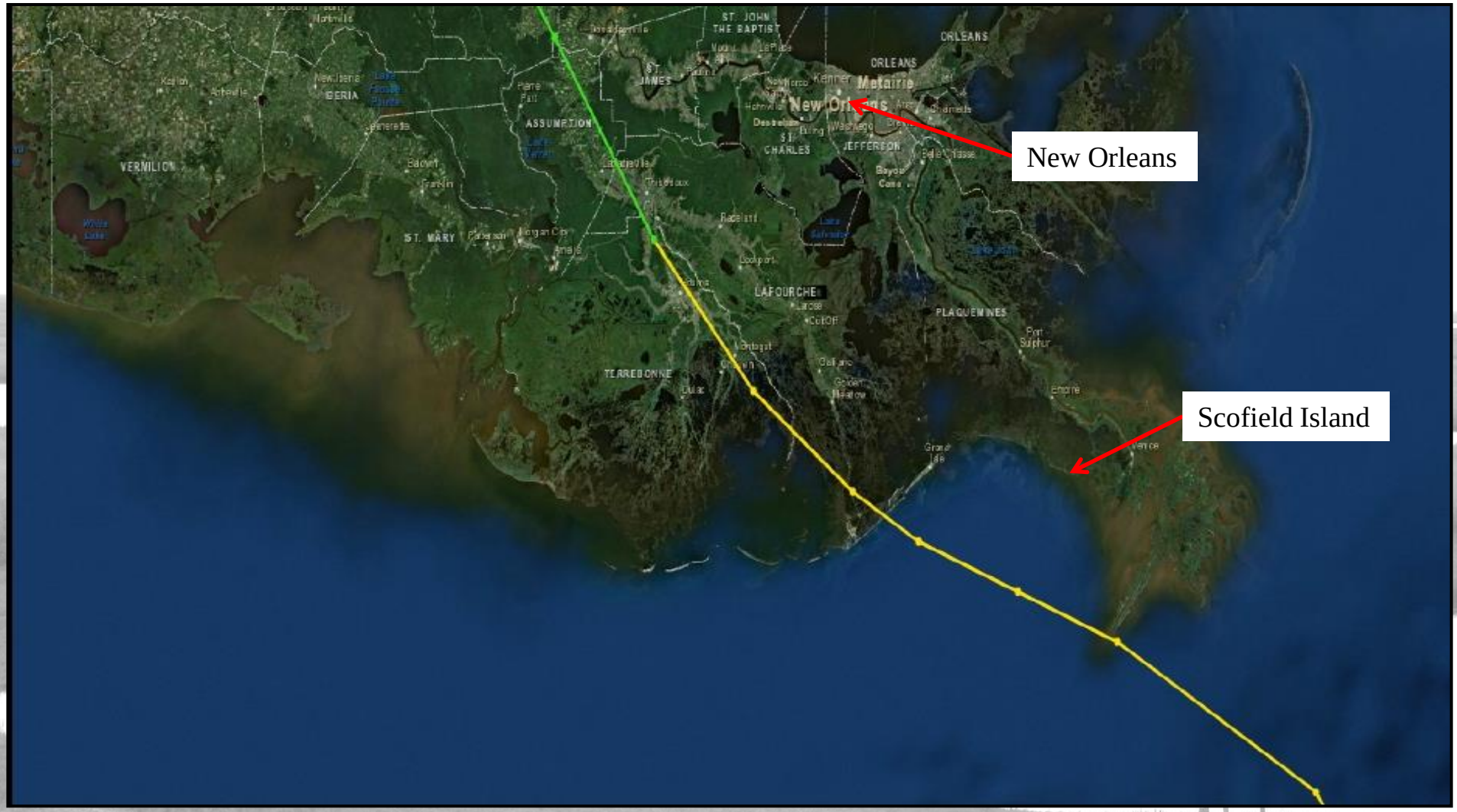
Permit Modifications - Additional Temporary Mooring Area



Permit Modifications - Navigational Crossing



Hurricane Isaac Track



Pre – Hurricane Isaac

Aero Photo

727.520.8181
www.aerophoto.com

Scofield Island

Image # 120802 6013
Date 08.02.12

Post – Hurricane Isaac

Aero Photo
727.520.8181
www.aerophoto.com

Scofield Island

Image # 121002 6049
Date 10.02.12

Pre – Hurricane Isaac Breach

Aero Photo

727.520.8181
www.aerophoto.com

Scofield Island

Image # 120802 6026
Date 08.02.12

Post – Hurricane Isaac Breach

Aero Photo

727.520.8181
www.aerophoto.com

Scofield Island

Image # 121002 6038
Date 10.02.12

Hurricane Isaac Impacts

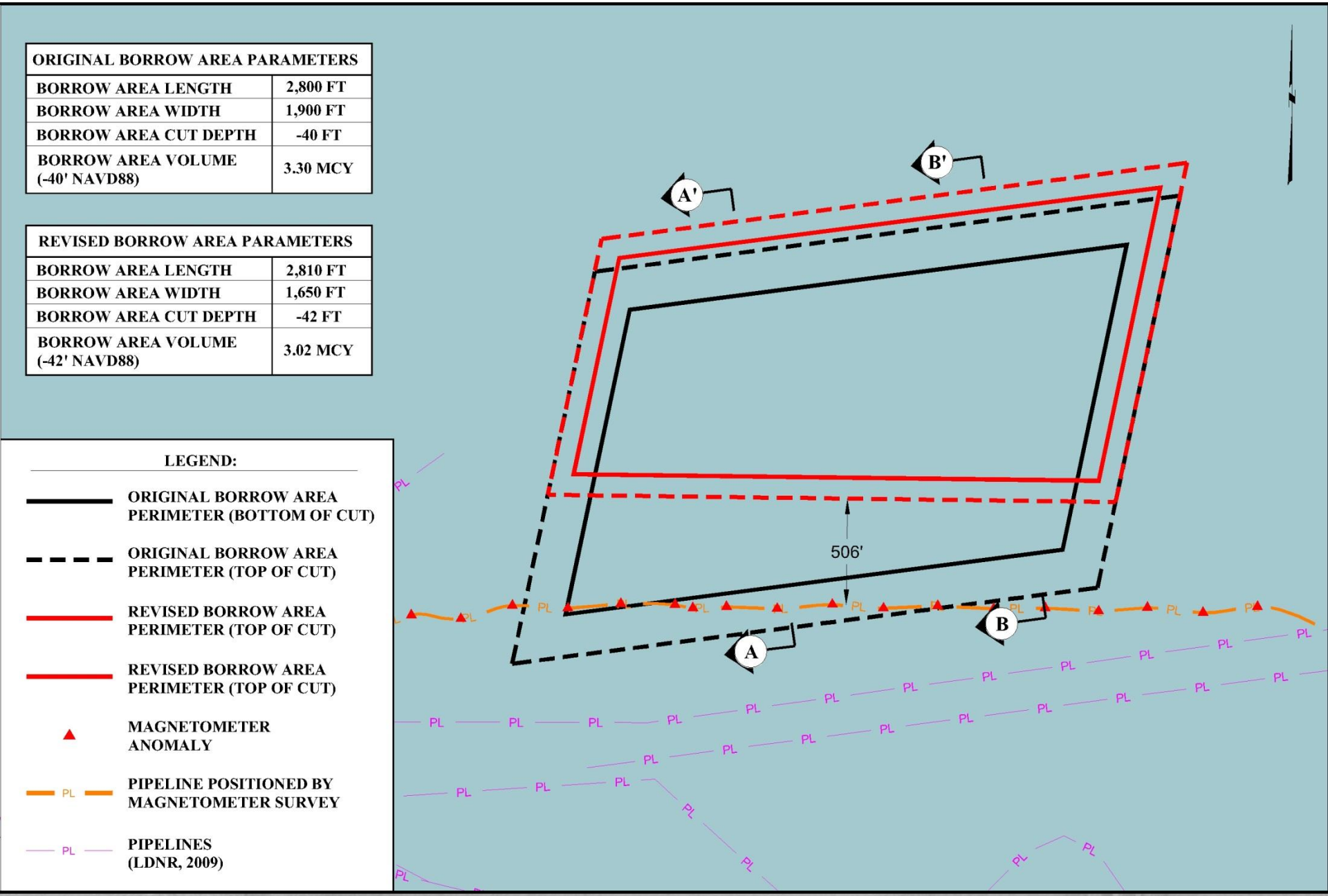
Original Construction Volumes	
Beach and Dune	1,632,000 cy
Marsh	1,761,500 cy
Hurricane Impacts	
Beach and Dune	- 257,310 cy (-15.8%)
Marsh	+133,260 cy (+7.6%)
Final Construction Volumes	
Beach and Dune	1,889,310 cy
Marsh	1,628,240 cy

Offshore Borrow Area Redesign

Scofield Offshore Borrow Area Redesign

ORIGINAL BORROW AREA PARAMETERS	
BORROW AREA LENGTH	2,800 FT
BORROW AREA WIDTH	1,900 FT
BORROW AREA CUT DEPTH	-40 FT
BORROW AREA VOLUME (-40' NAVD88)	3.30 MCY

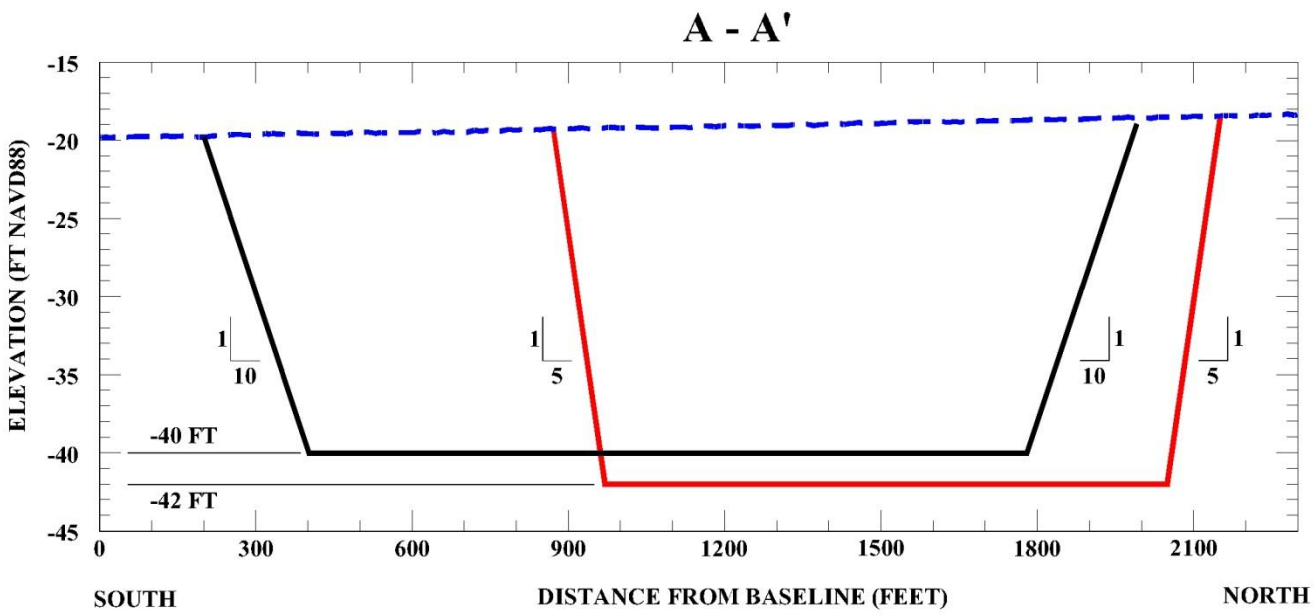
REVISED BORROW AREA PARAMETERS	
BORROW AREA LENGTH	2,810 FT
BORROW AREA WIDTH	1,650 FT
BORROW AREA CUT DEPTH	-42 FT
BORROW AREA VOLUME (-42' NAVD88)	3.02 MCY

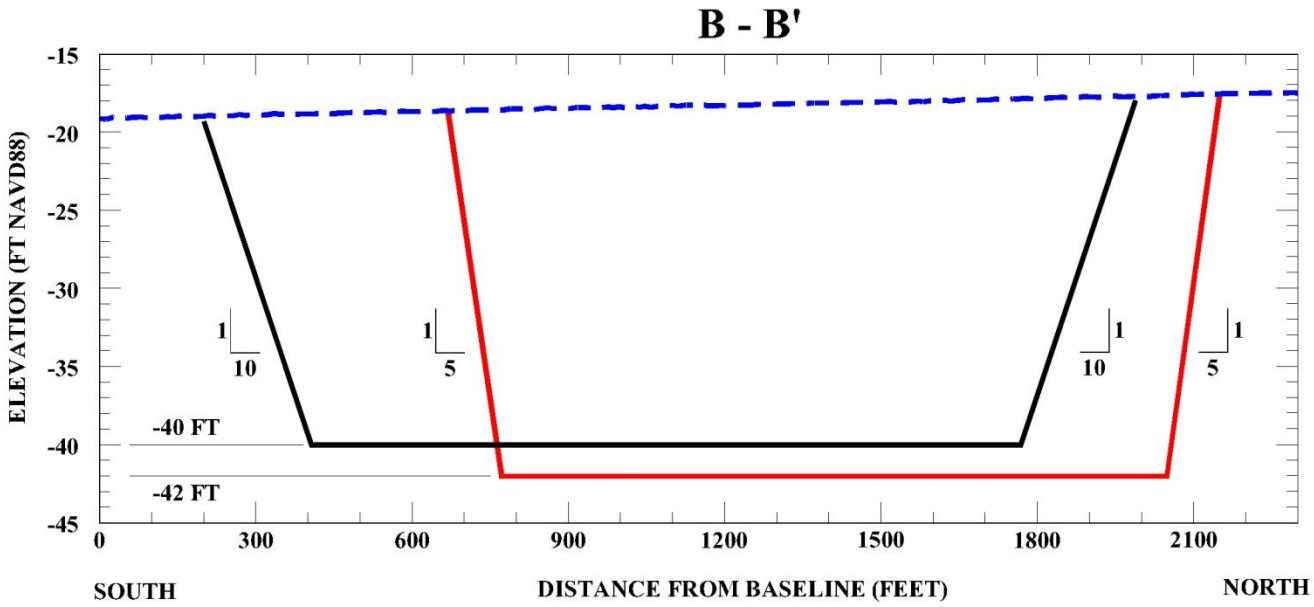


Scofield Offshore Borrow Area Redesign

LEGEND:

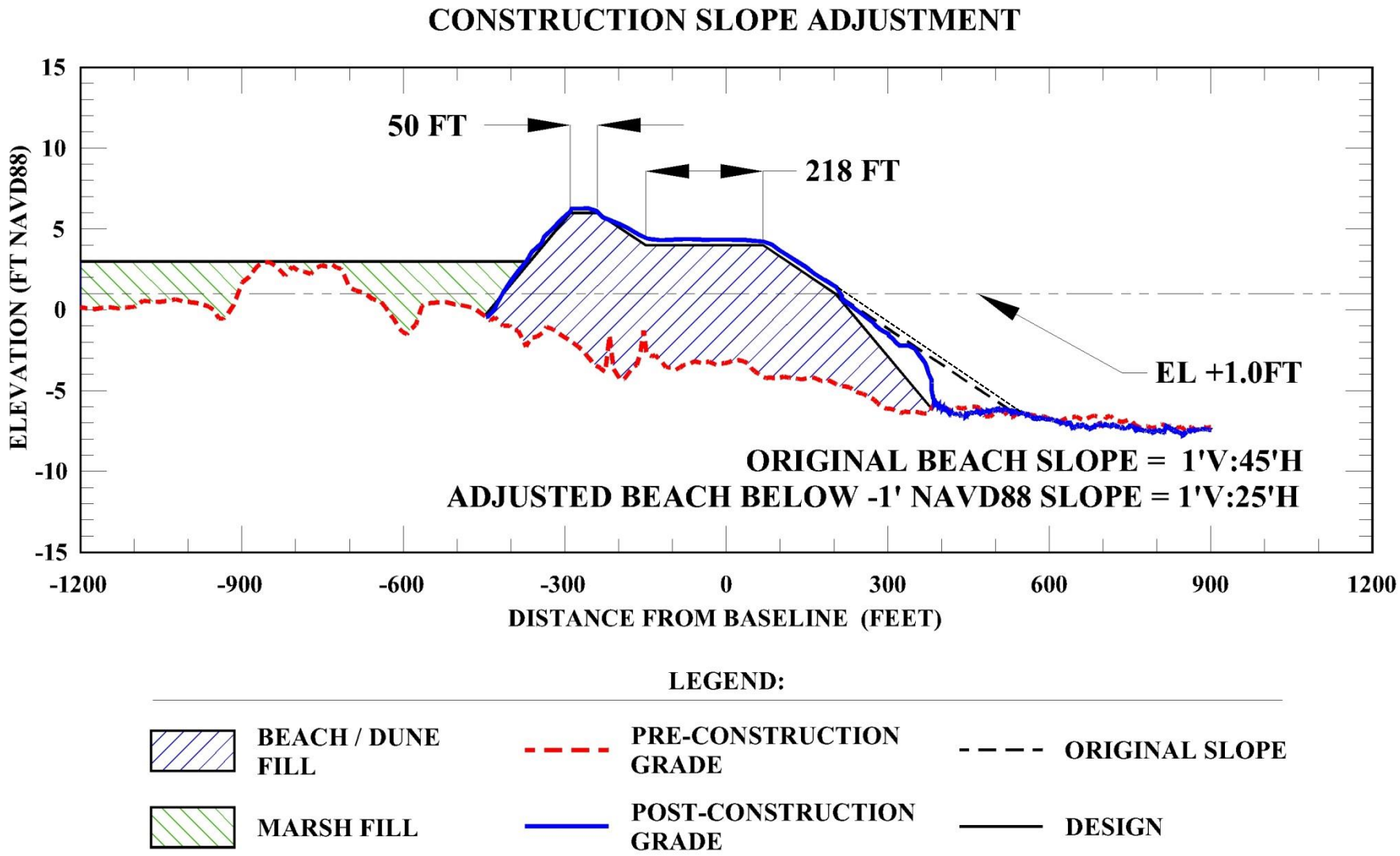
- EXISTING GRADE
- ORIGINAL BORROW AREA DESIGN
- REVISED BORROW AREA DESIGN





Beach Fill Design Slope Adjustment

Design Slope Adjustment



Lessons Learned

- Stakeholder coordination early and continuously through the project to completion.
- Sand quality of the Mississippi River performance versus offshore sand source performance
- Flexibility of construction tolerances to benefit the Project, Owner, and Contractor.

The First "First"

GLDD's California in MR

Mississippi River Levee Crossing

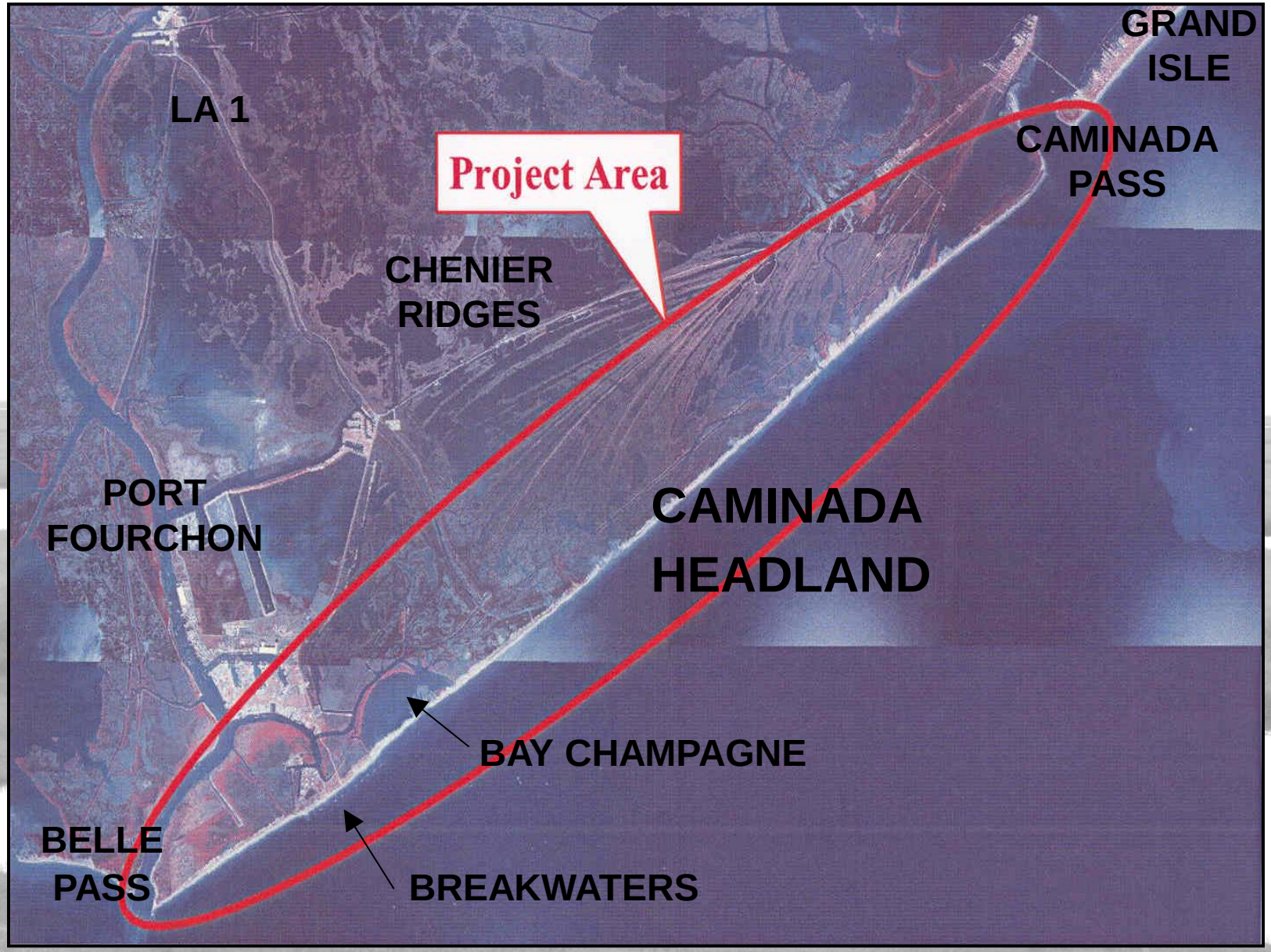
Hurricane Protection Levee Crossing

The First "First"

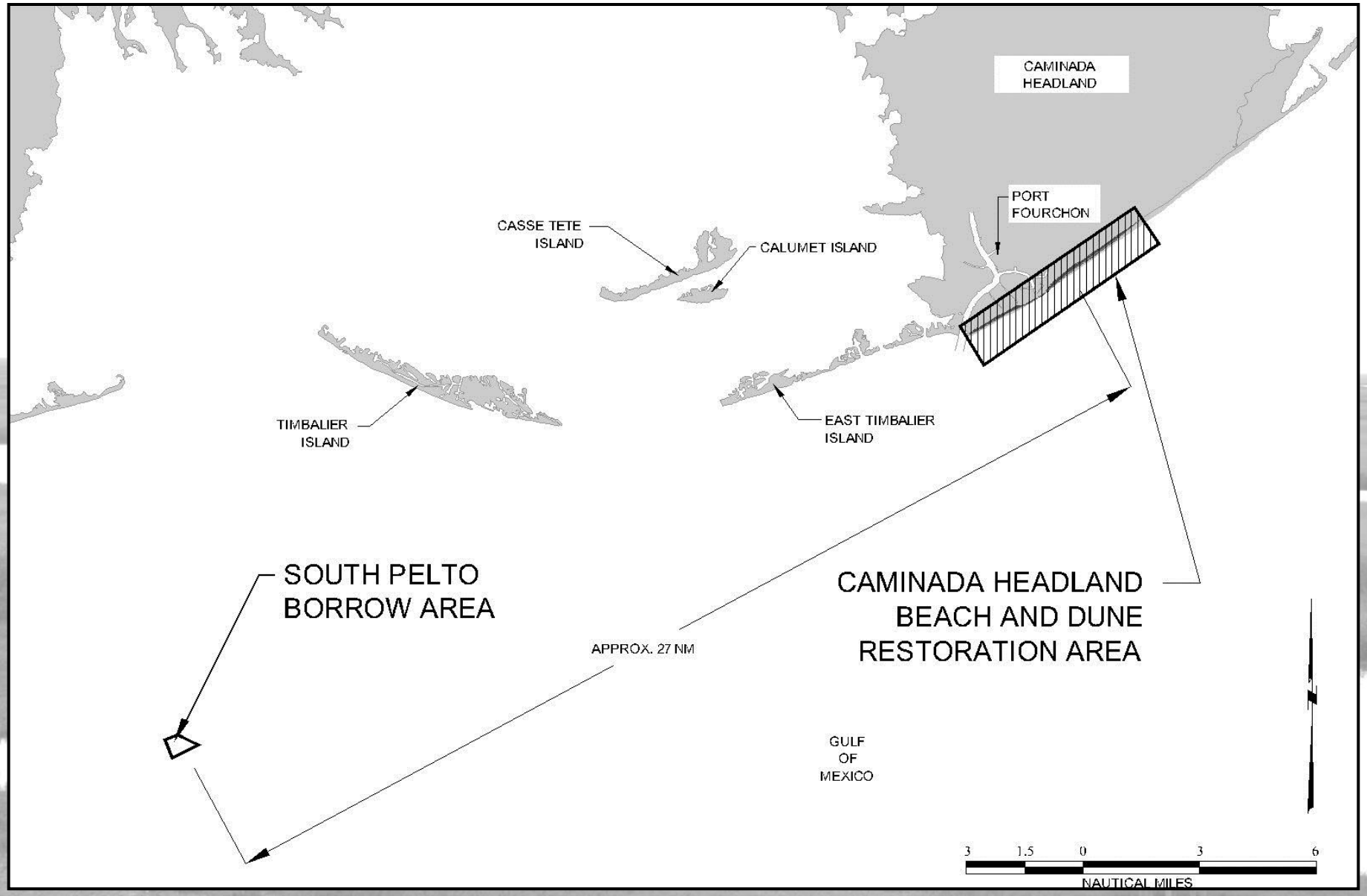
Scofield Pass Crossing

12-18-12 **First grains of MR sand arrive at Scofield Island**

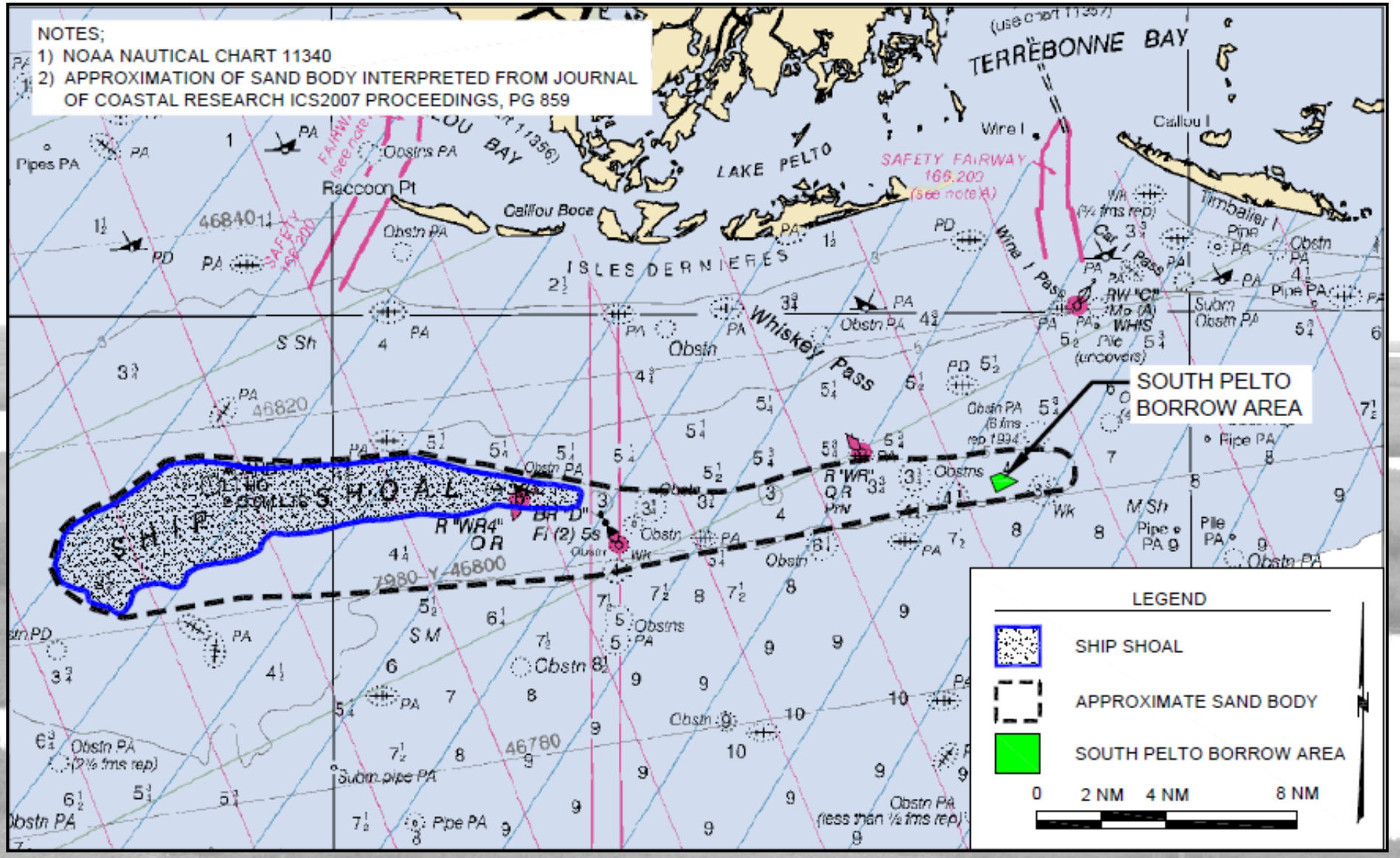
Project #2 Caminada Headland



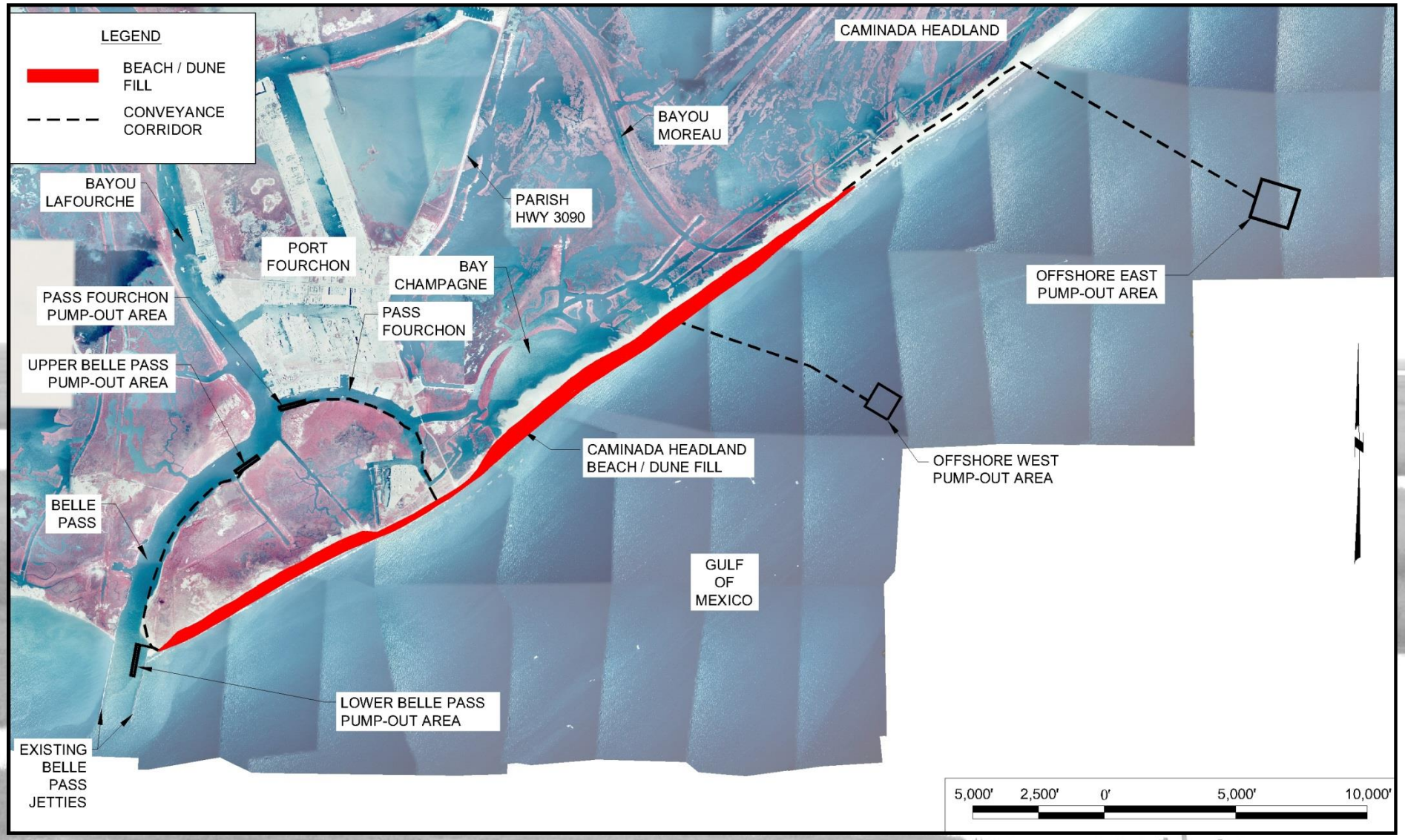
Project #2 Elements



Ship Shoal Overview Map



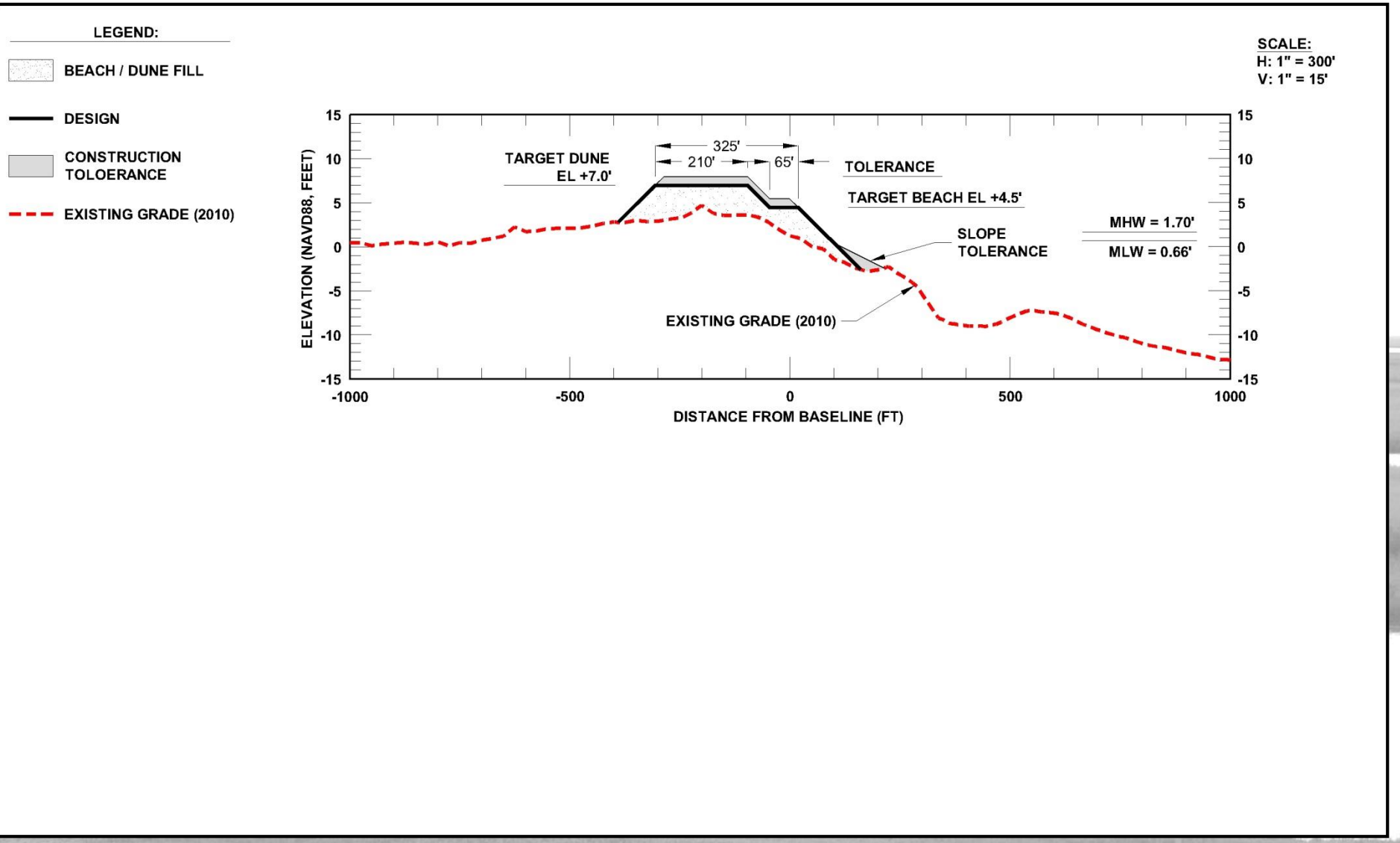
Headland Overview Map



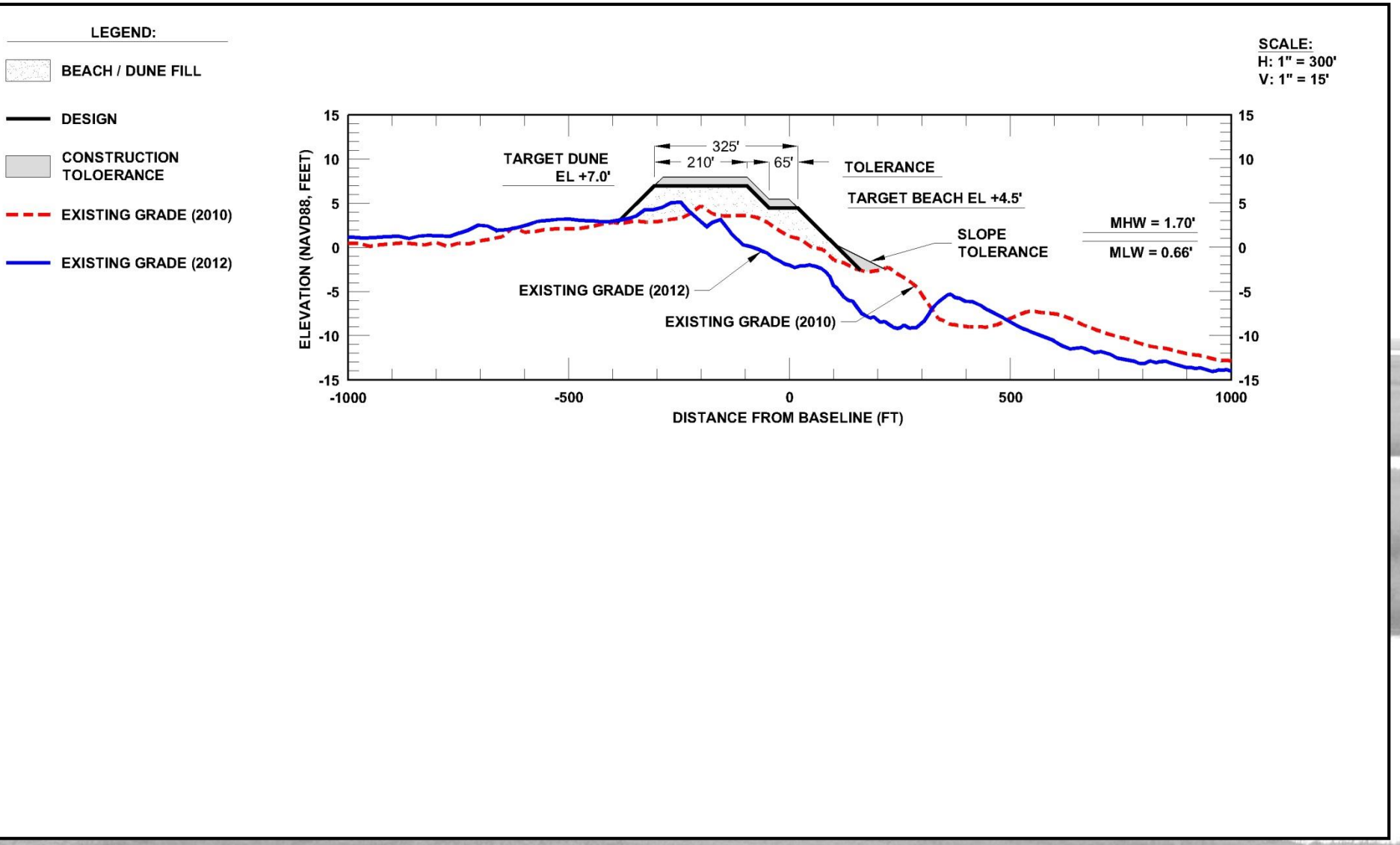
Critical Infrastructure

Native Beach Sediment Sampling

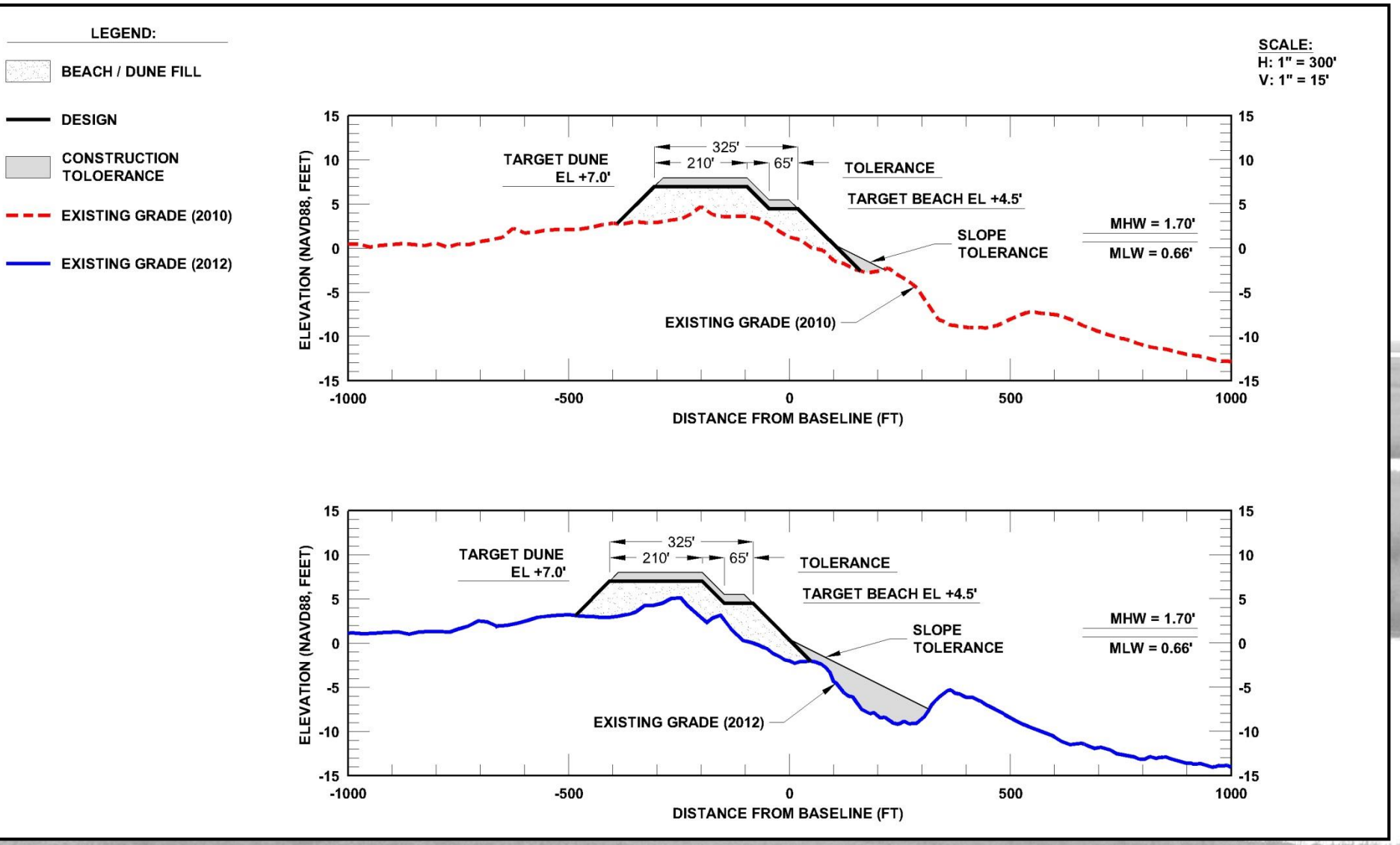
Typical Design Template



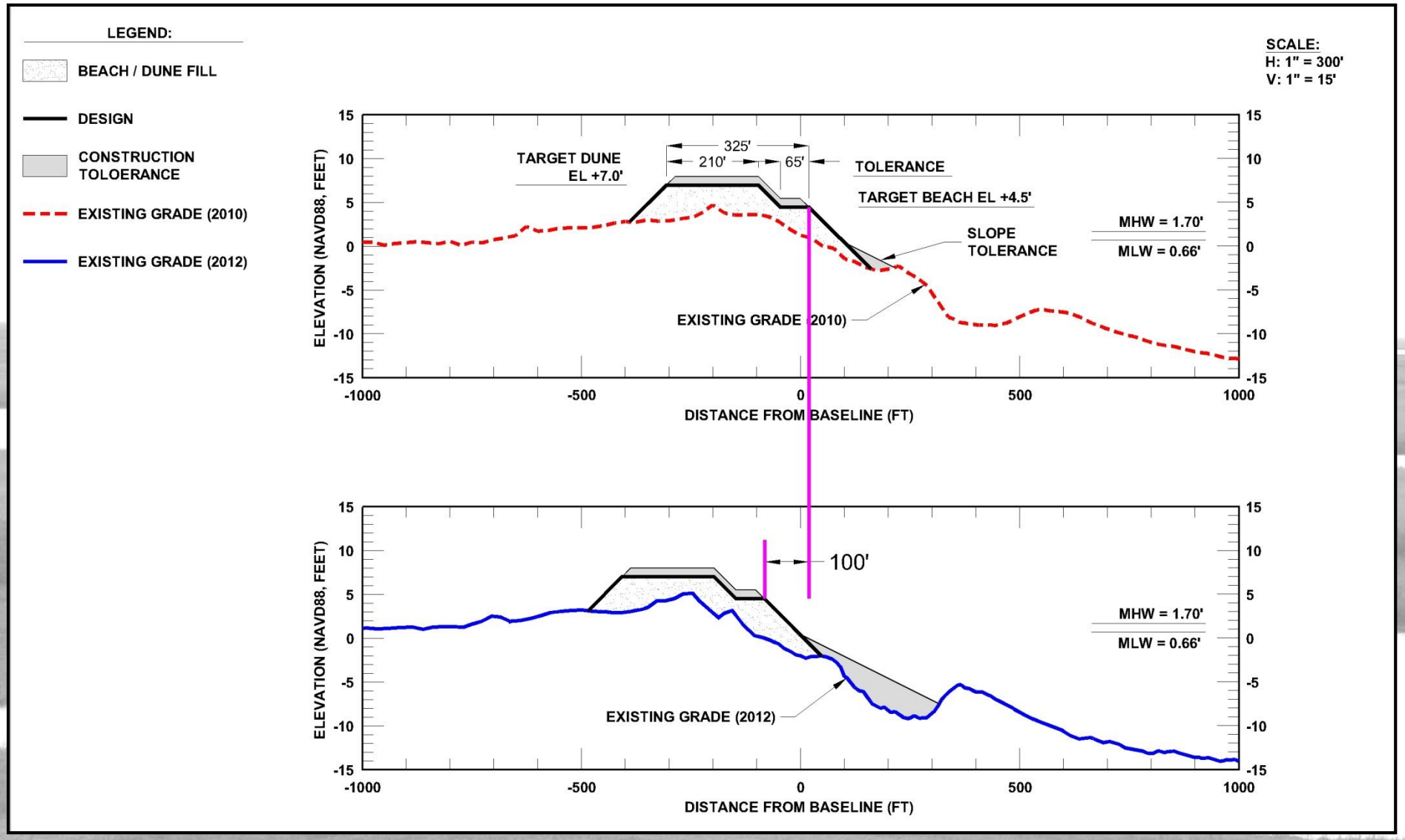
Post – Hurricane Profile Adjustment



Post- Hurricane Typical Design Template Adjustment



Post- Hurricane Typical Design Template Offset



Project Timeline

- Final Design Review in May 2012
- Hurricane Isaac Landfall on August 29, 2012
- Advertised for Construction on October 12, 2012
- Post-Isaac Re-survey of Headland Oct. – Nov. 2012
- Pre-Bid Meeting on November 8, 2012
- Bid Addendum Issued on December 10, 2012
- Construction Bids Opened on December 18, 2012
- Dredging Started on July 31, 2013

Jetty Maintenance

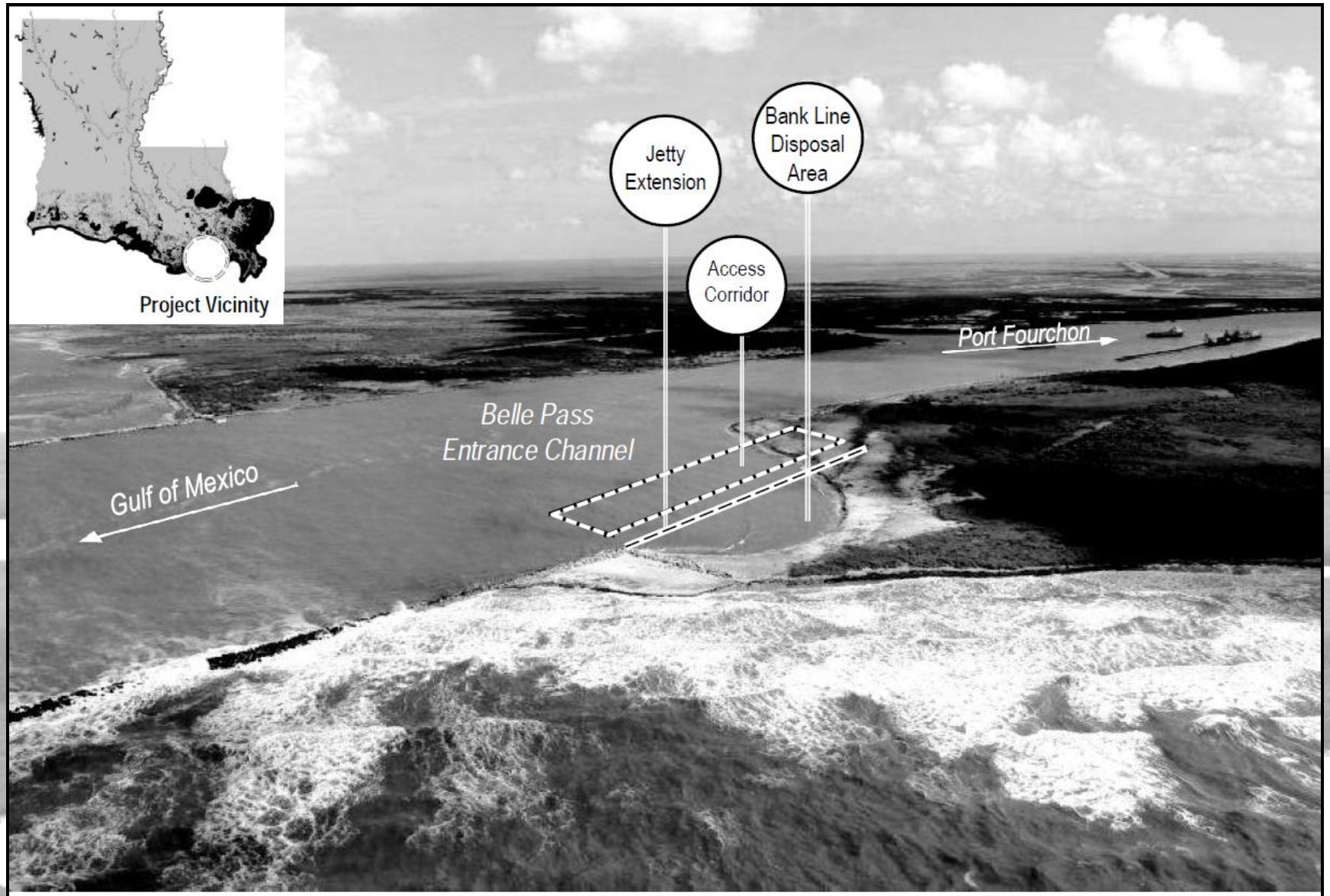
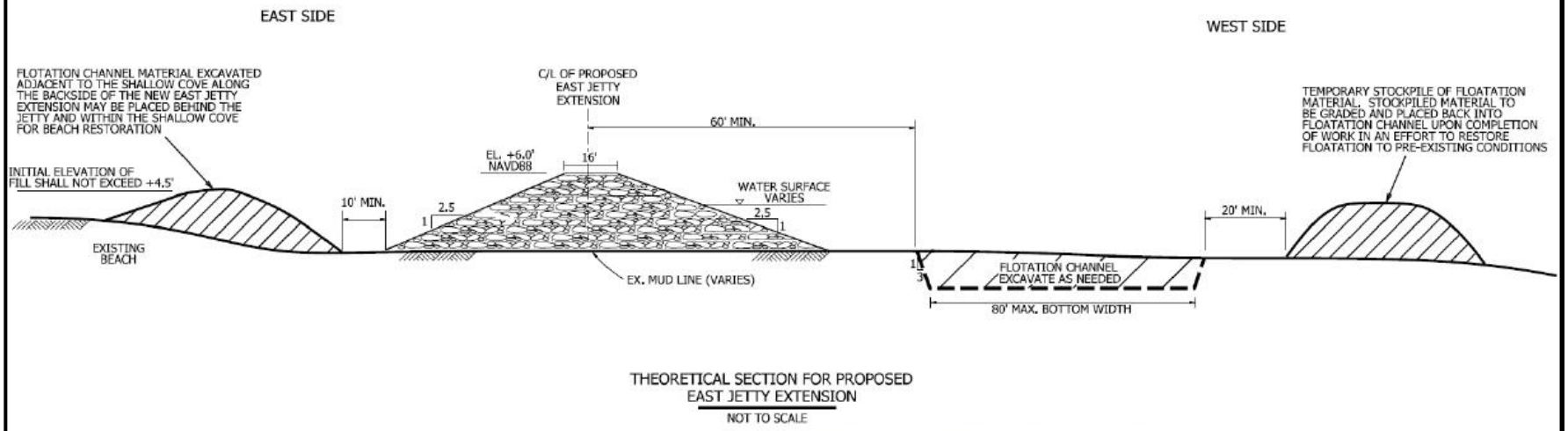


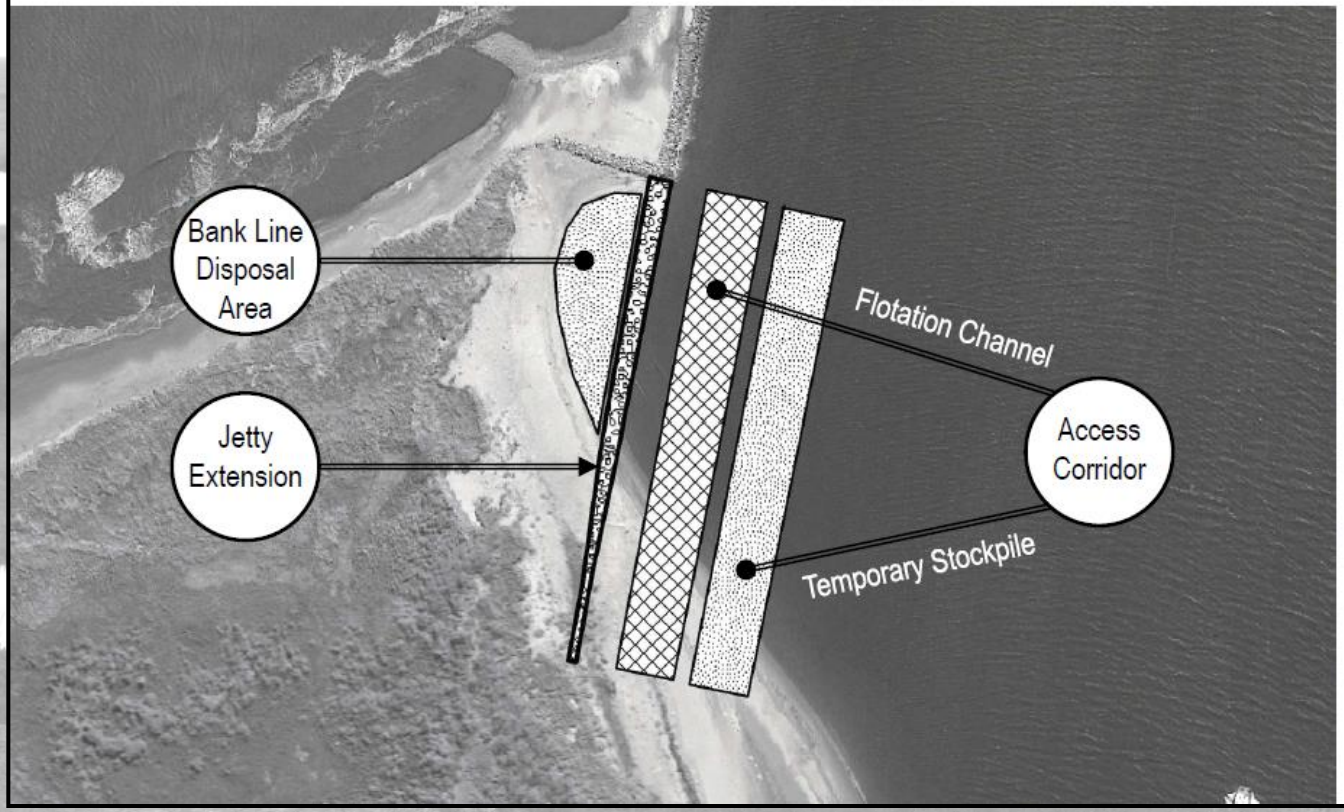
Figure 1. Project vicinity & overview. The jetty extension would tie the existing jetty to a natural high ridge along the bank line, crossing an area of shallow open water and beach. Equipment would access the construction site from Belle Pass. Dredged material excavated to provide equipment access would be temporarily stockpiled within the access corridor for later use as construction backfill, and/or placed beneficially in a shallow cove to rebuild a portion of the eroded bank line.

Jetty Maintenance



THEORETICAL SECTION FOR PROPOSED EAST JETTY EXTENSION

NOT TO SCALE

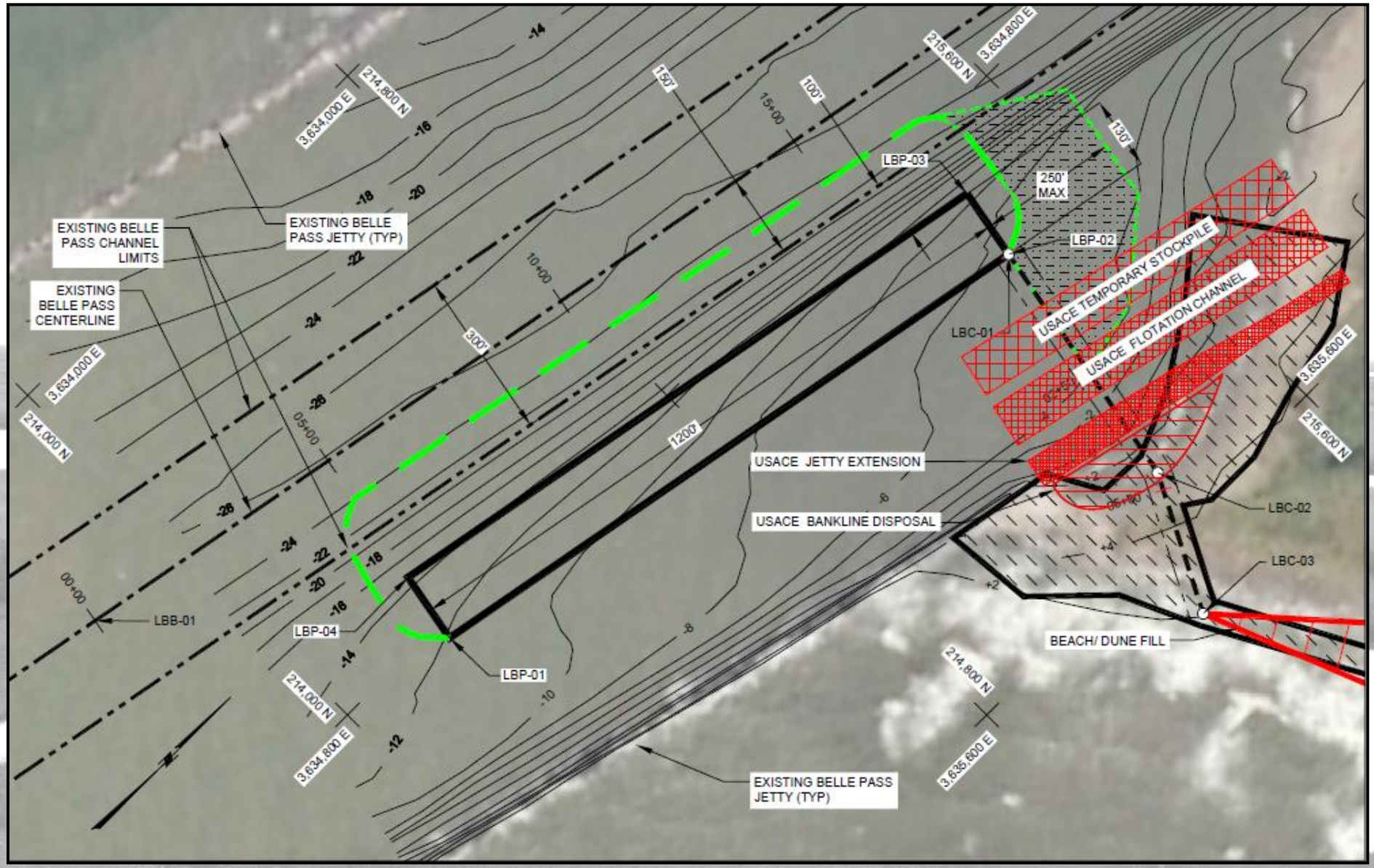


Figures 2 and 3. Theoretical cross-section (above) and plan view (left) of the jetty extension, flotation channel, temporary stockpile area, and bank line disposal area.

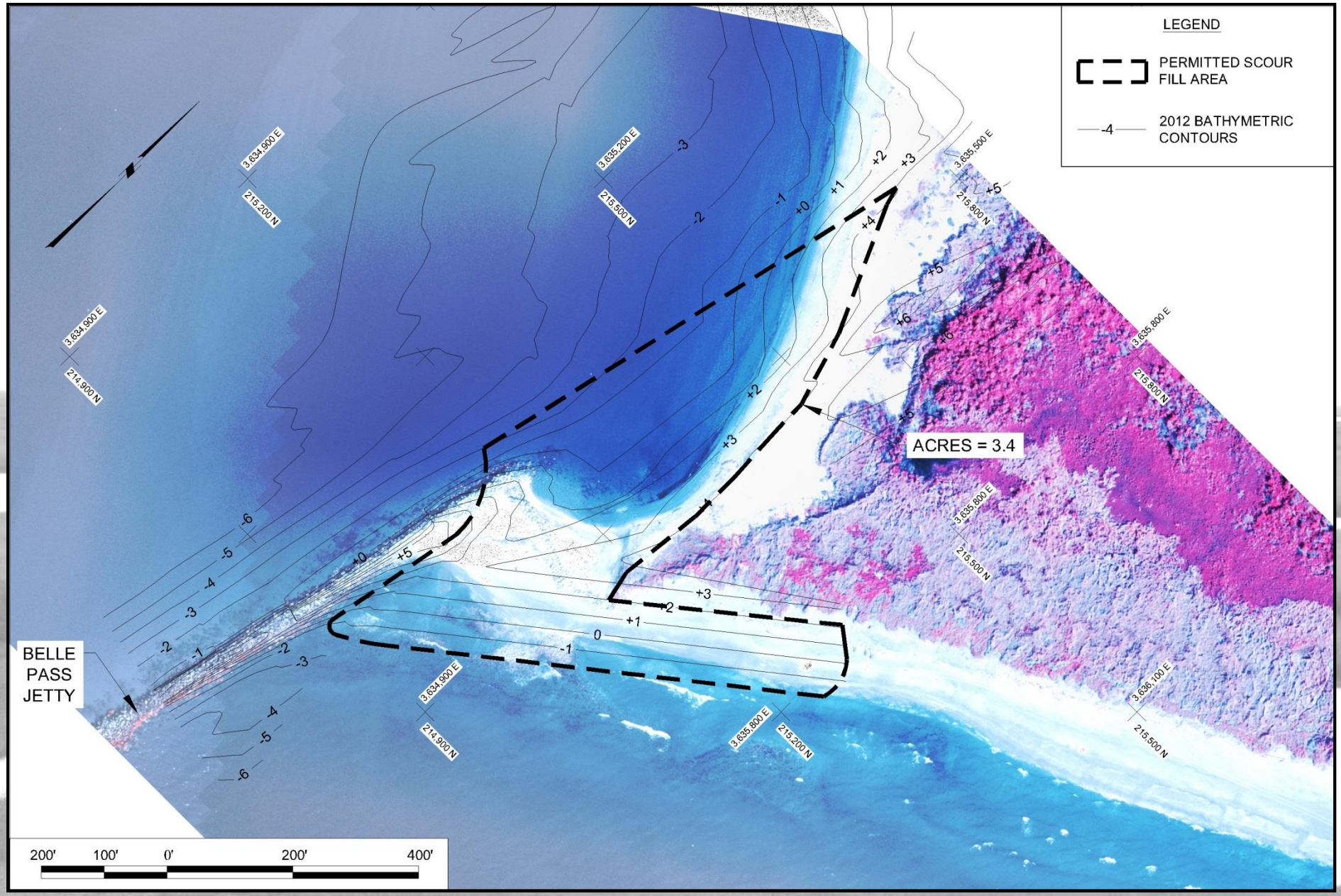
The jetty extension would tie the existing jetty to a natural high ridge along the bank line.

A flotation channel would be excavated to provide equipment access for construction of the jetty extension. Dredged material would be temporarily stockpiled adjacent to the channel for later use as backfill, and placed beneficially in the bank line disposal area to restore an eroded section of the bank line.

Jetty Maintenance and Caminada Headland Project Areas



Scour Fill Area Solution



The Second "First"

The Second "First"

Weeks' Unloader, Booster {Borinquen} and Hopper Barge

Discharge Into Project Template

Lessons Learned

- Reduce contractors risk by providing the most updated site information possible.
- If possible, permit multiple points of access such that contractor’s can bid projects utilizing their available dredging equipment.
- Reach out to project stakeholders and have an open dialogue with regulatory officials.
- Expect the unexpected.