

# 4<sup>TH</sup> ANNUAL CAPE COASTAL CONFERENCE




Efforts to Analyze and Permit a Nearshore Sediment Borrow  
Source for Sandwich Beaches

Stephen McKenna  
Massachusetts Coastal Zone Management

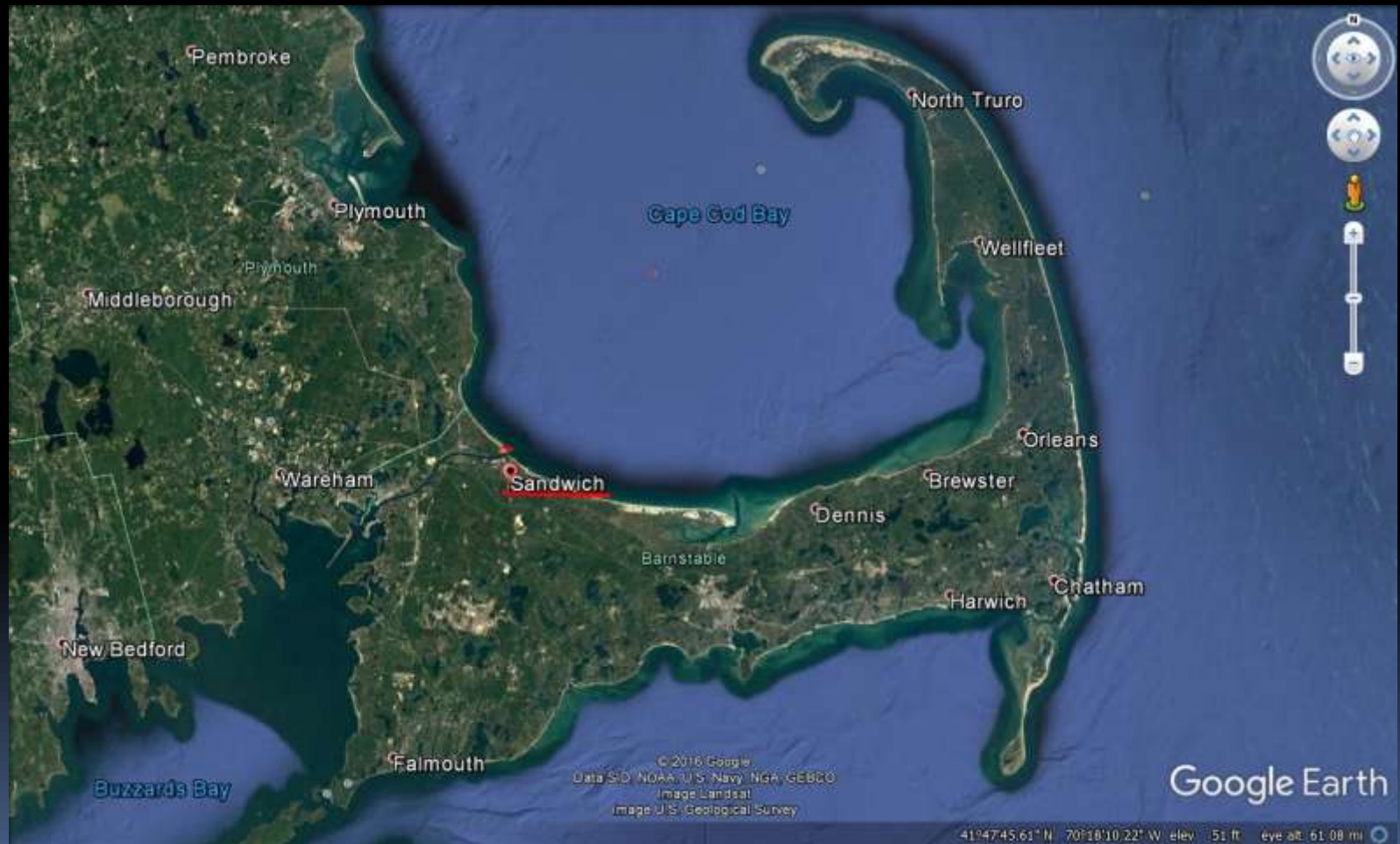




# Project Partners

- Town of Sandwich
    - Mark Galkowski, Director of Natural Resources
  - Woods Hole Group
    - Dave Walsh, Project Manager
  - Massachusetts Coastal Zone Management
    - Stephen McKenna, Project Manager
- 

# Locus




# Site Locus






# Presentation Outline

- Project background
  - Field investigations/Data Analysis
  - Alternatives
  - Preferred alternative
  - Regulatory history
  - Regulatory path forward
  - Q & A
- 






# Project Background

- Sandwich has been working to address coastal erosion at Town Neck for many years
  - Accelerated erosion rates began in 1906 with the construction of the Canal jetties
    - Long-term erosion rate ~ 2ft/yr
    - Short-term erosion rate ~ 10ft/yr
  - Town Neck is an actively managed beach system, with 3 major beach & dune nourishment projects since 1990
- 



# Project Background

- 110,000 cys nourishment project in 2016
  - TN barrier beach protects an extensive saltmarsh system and estuary behind it
  - TB barrier beach protects infrastructure on the beach, and infrastructure located in adjacent flood-zones, including the Sandwich police station
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# Sandwich Town Neck

■ 2011



■ 2015






# Town Neck Beach & Dune Reconstruction – Phase I

- Involved the design and permitting of beach nourishment template
- Design totaled approximately 400K cubic yards of material
- Final sediment source was not identified, but included future canal maintenance dredging





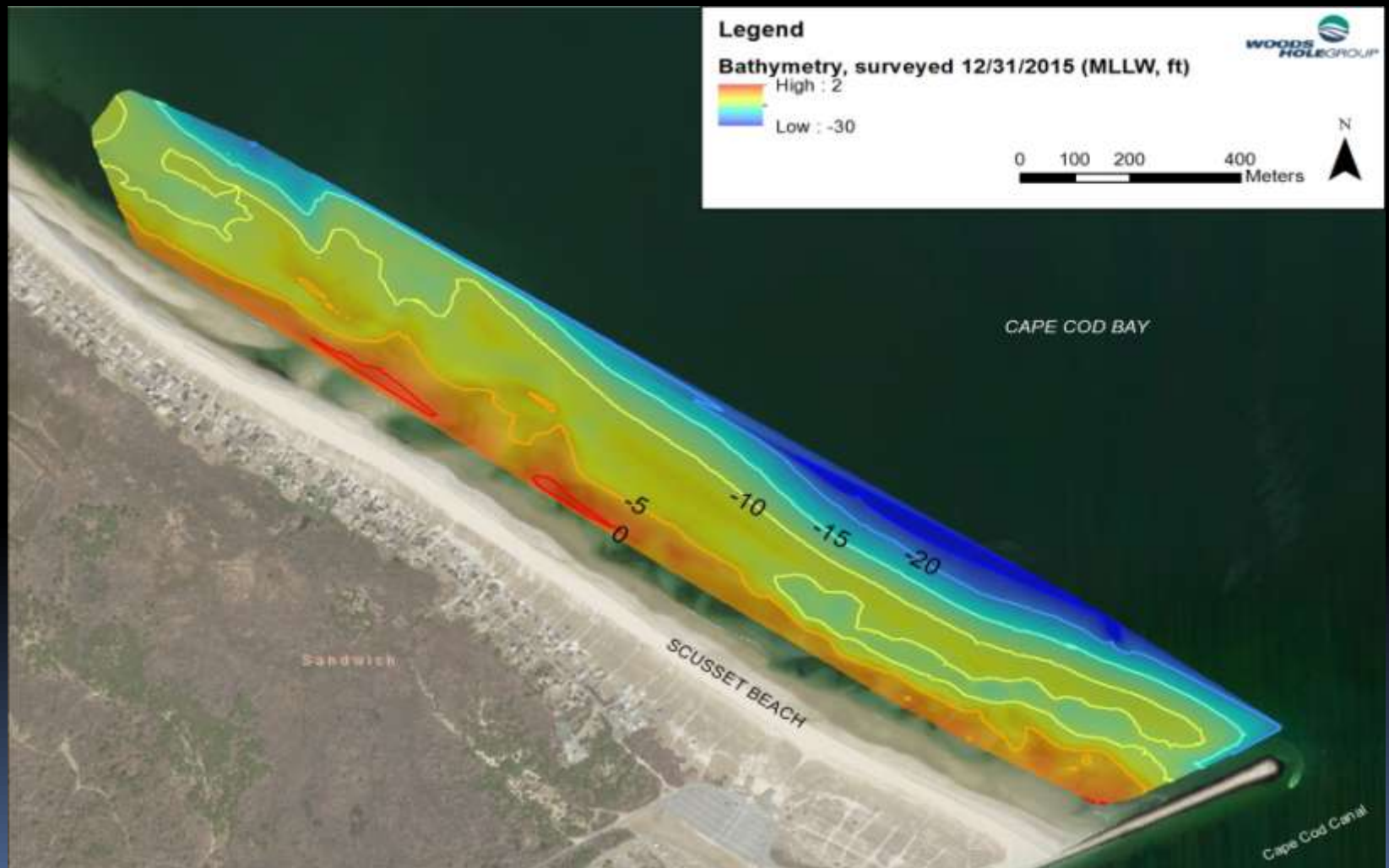
## Phase II – Identify & Permit Borrow Source

- In 2015 – Sandwich was awarded a CZM Coastal Resilience Grant award of \$200k for design and permitting sediment borrow source – Phase II
  - Project began in the fall of 2015
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# Field Investigation – Area of Study

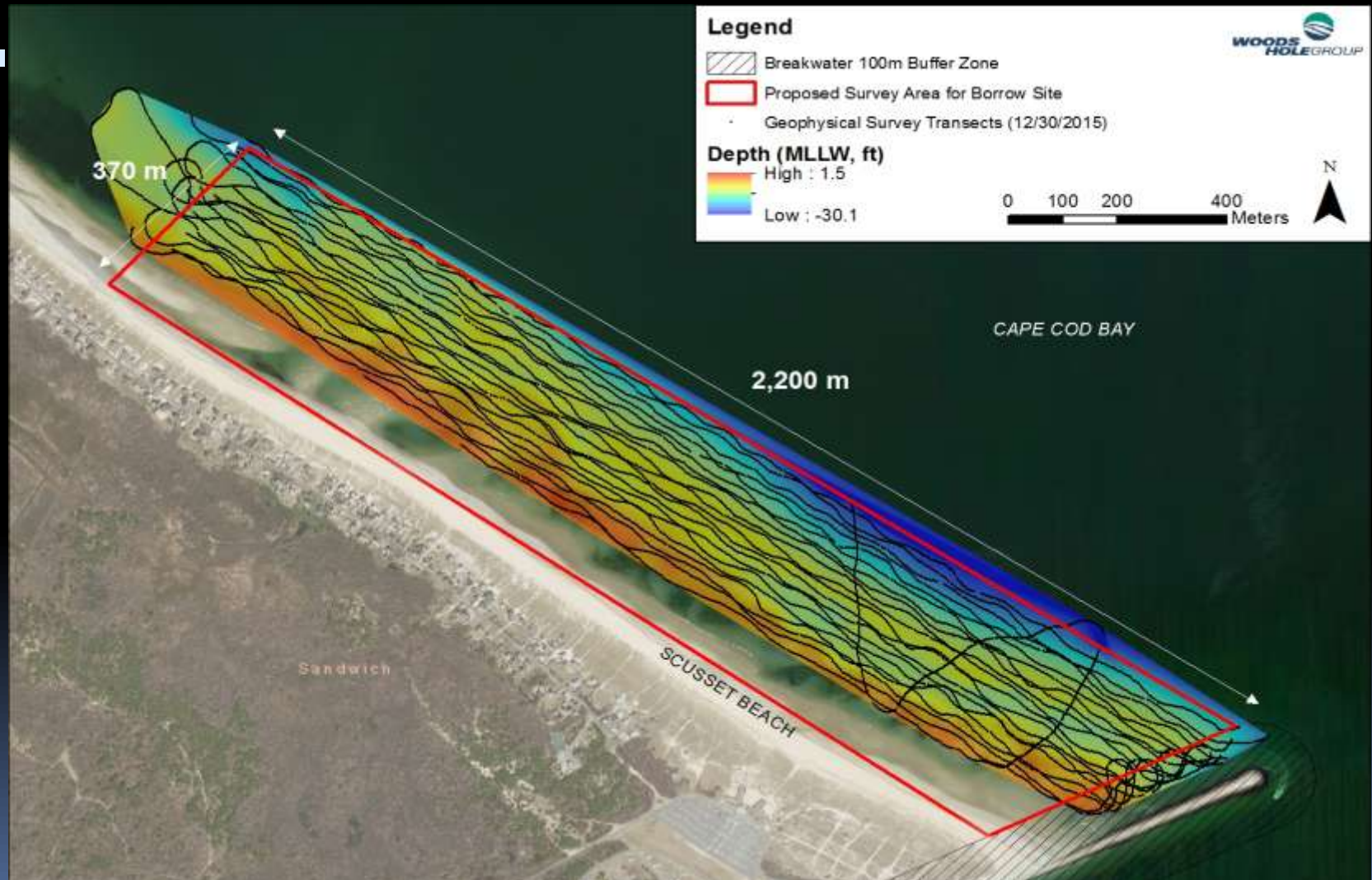


# Bathymetry – 12/31/2015



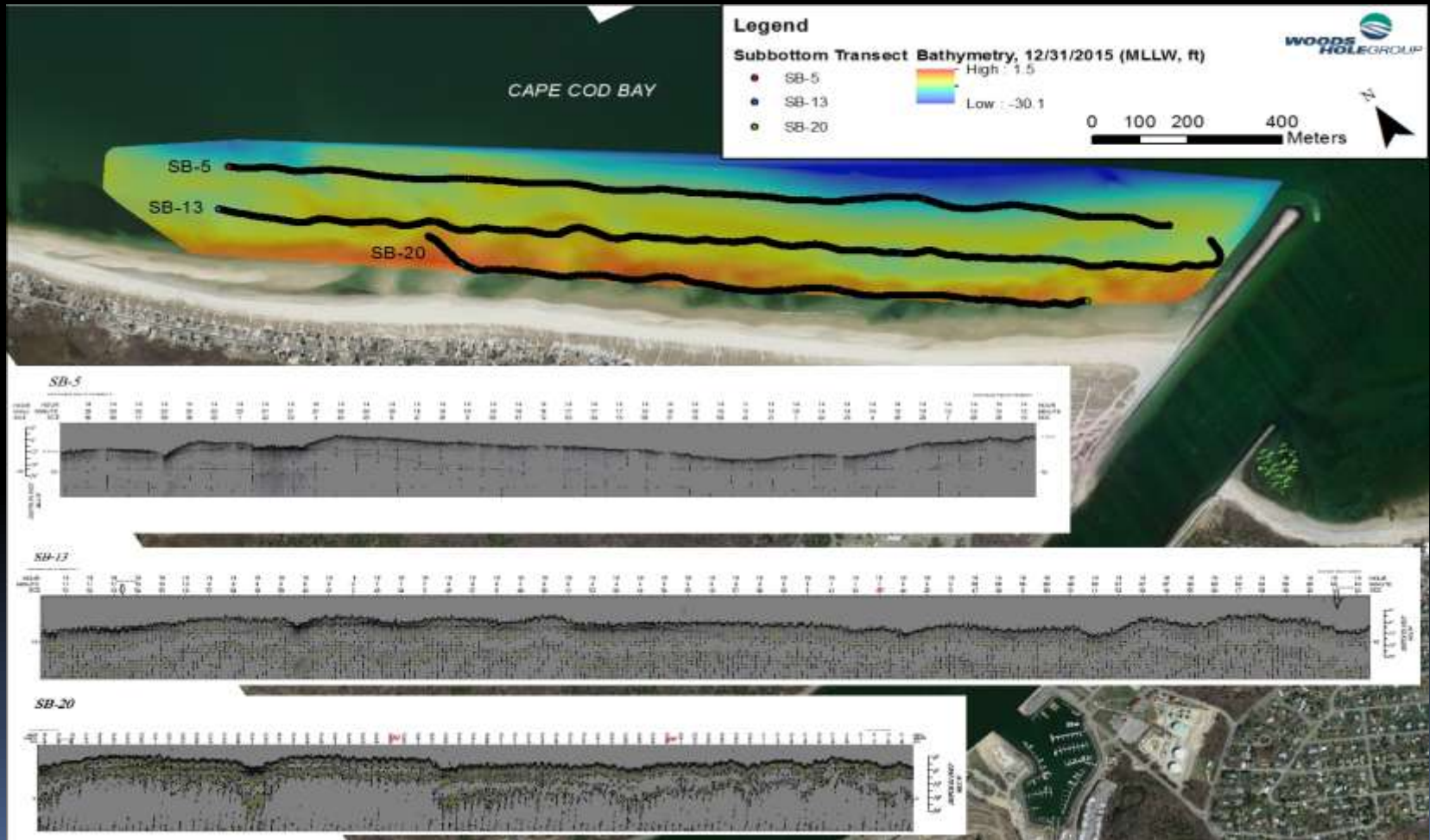


# Field Investigations: Geophysical Survey





# Sub-bottom Transect Bathymetry



# Sediment Core Samples







# Shellfish Survey





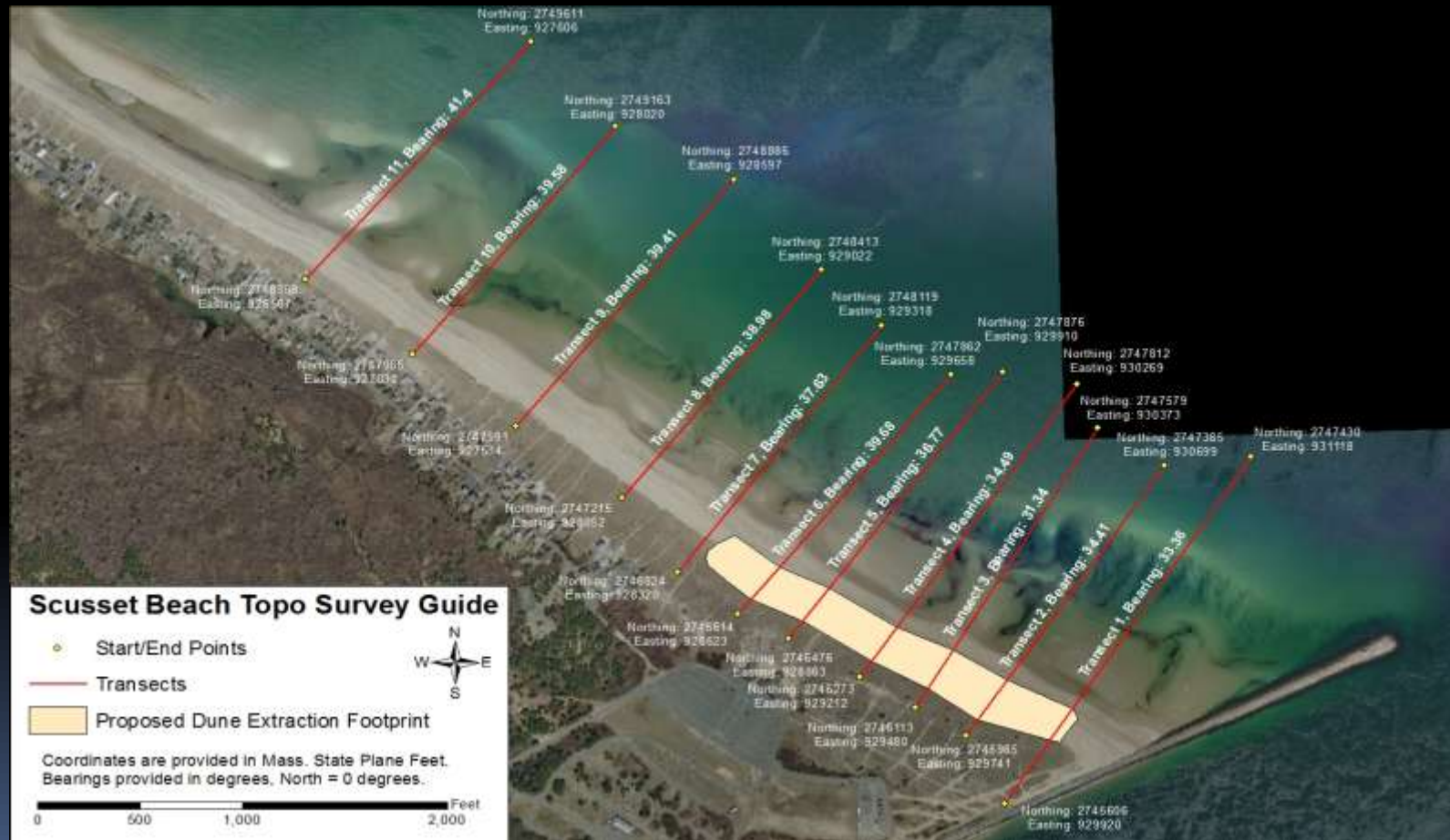




# Eel Grass Survey




# Upland Topography







# Coastal Processes Analysis

- Numeric Modeling
    - Wave Data Analysis
    - Nearshore Wave Transformation Modeling
    - Storm Surge Analysis
    - Sediment Transport Analysis
    - Sediment Budget Analysis
    - Shoreline Change & Site Recovery Analysis
- 

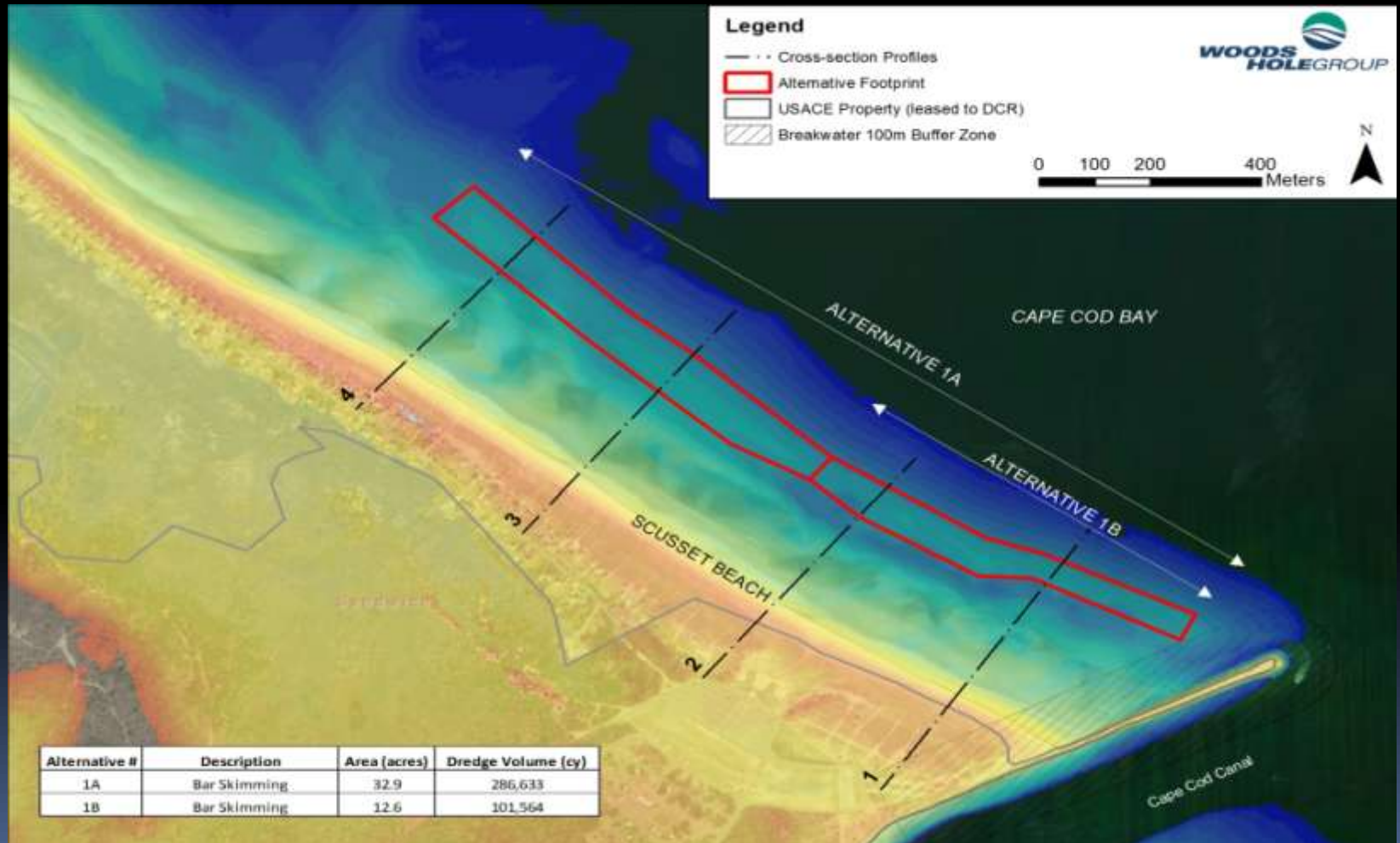


# Borrow Site Alternatives

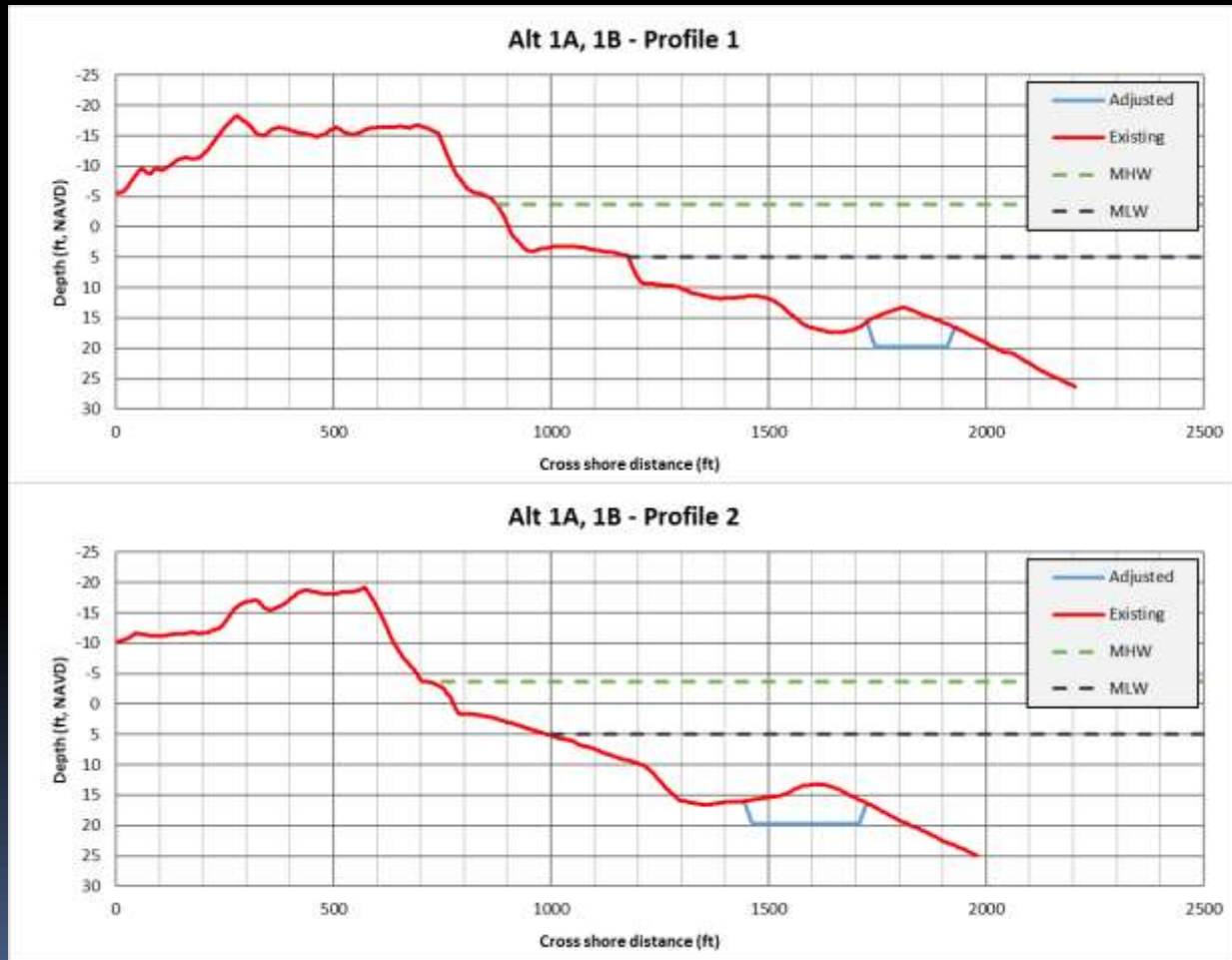




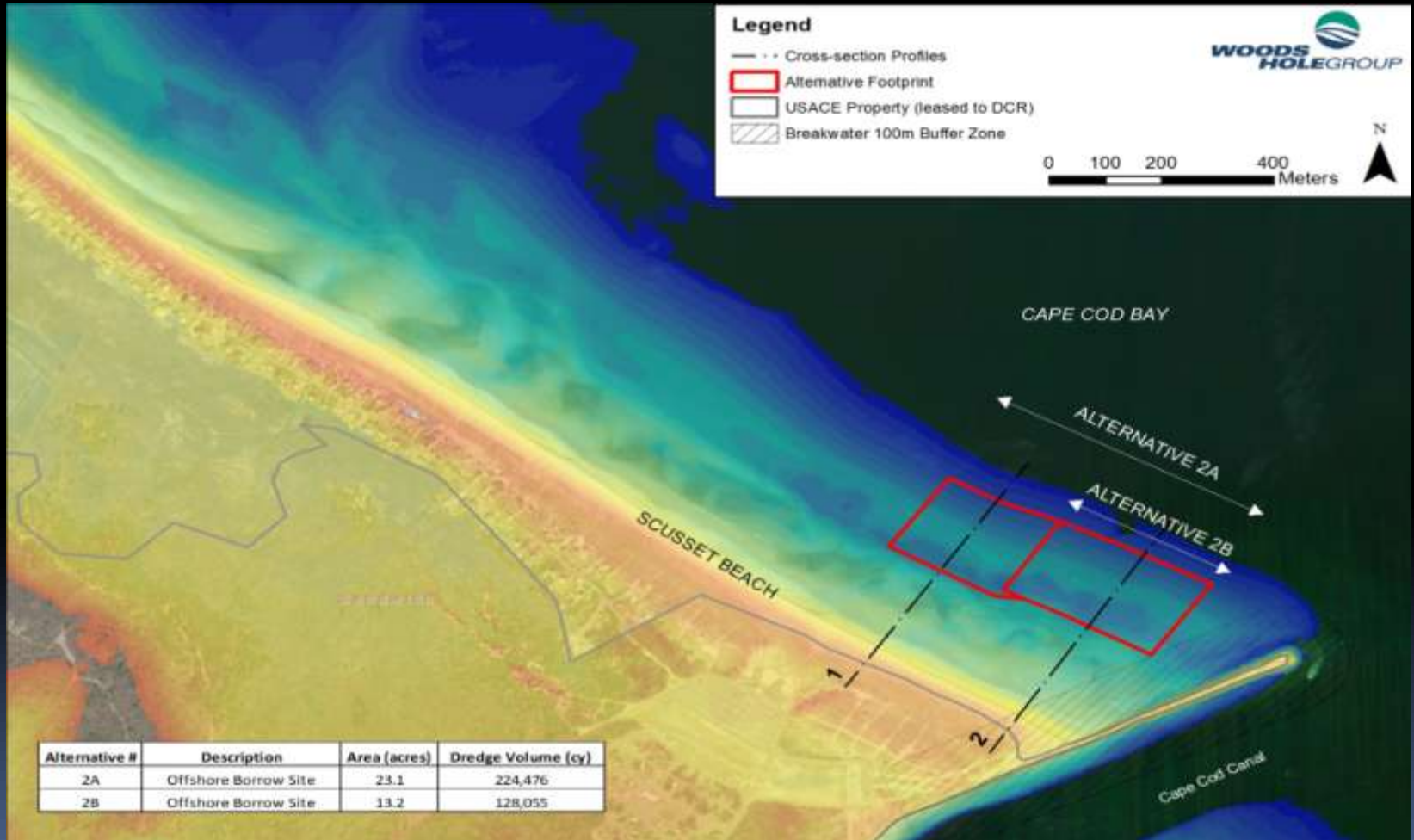
# Alt.1 Bar Skimming



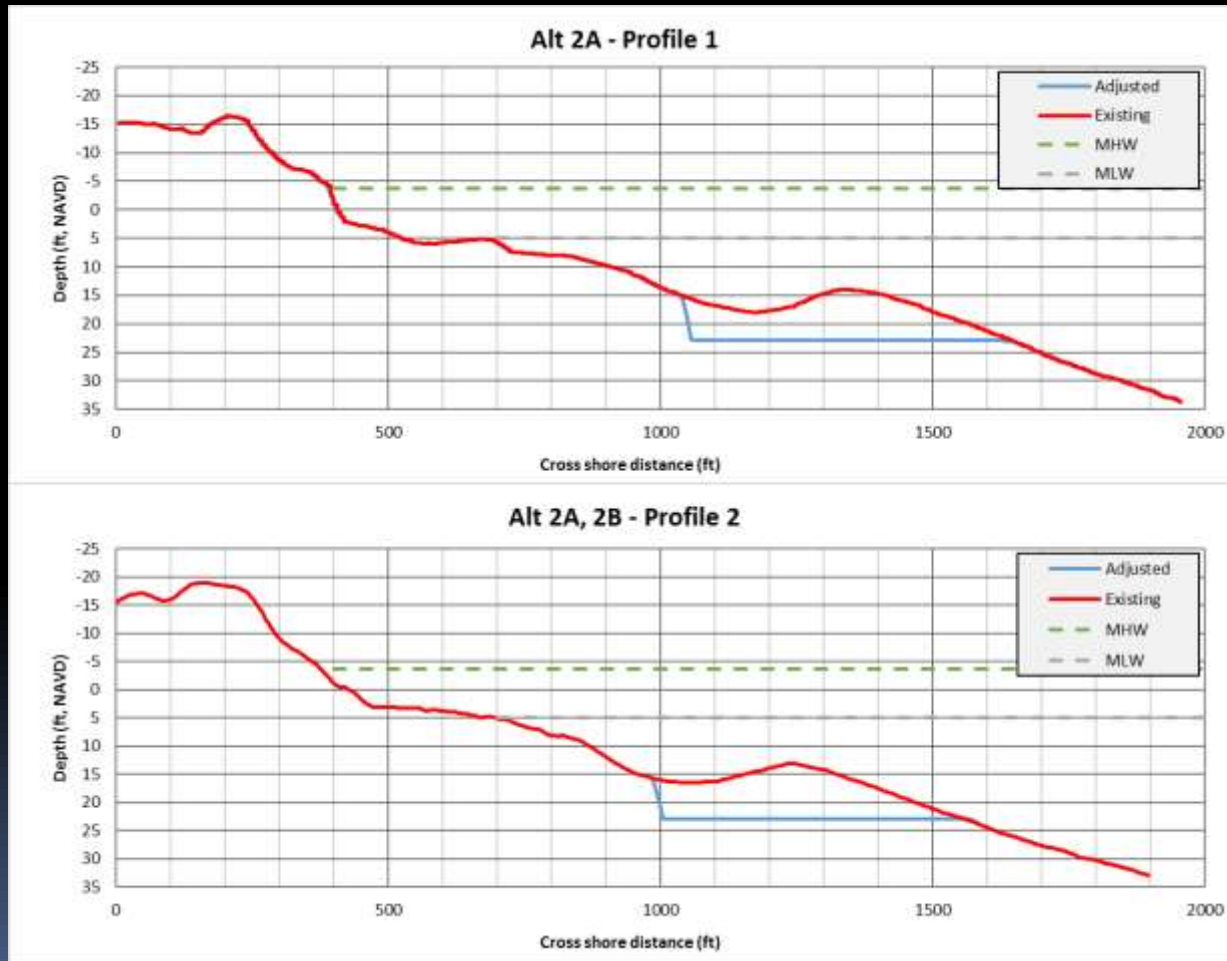
# Bar Skimming – Cross Section



# Alt.2 Offshore Borrow Site

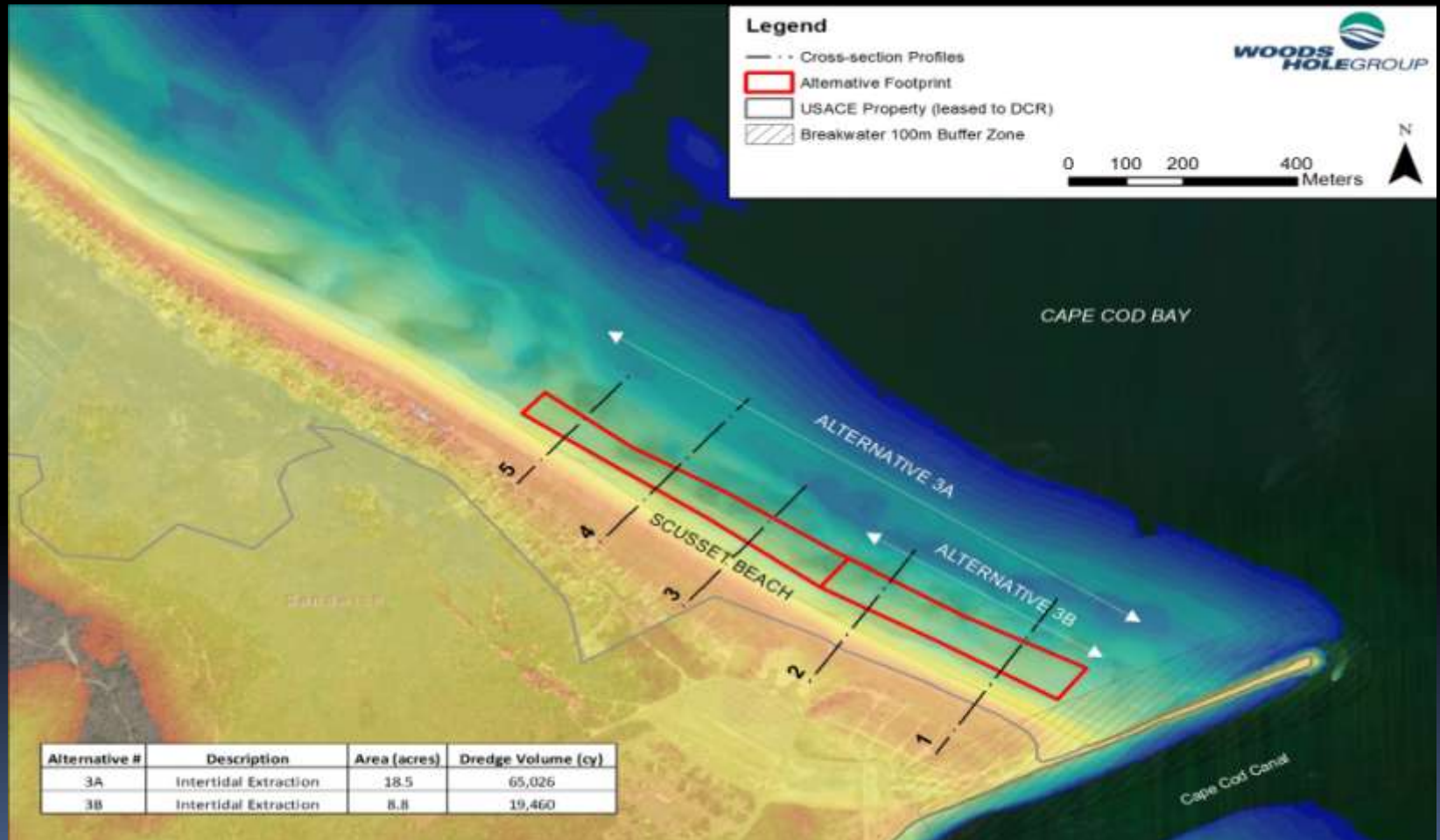


# Off-Shore Borrow Site





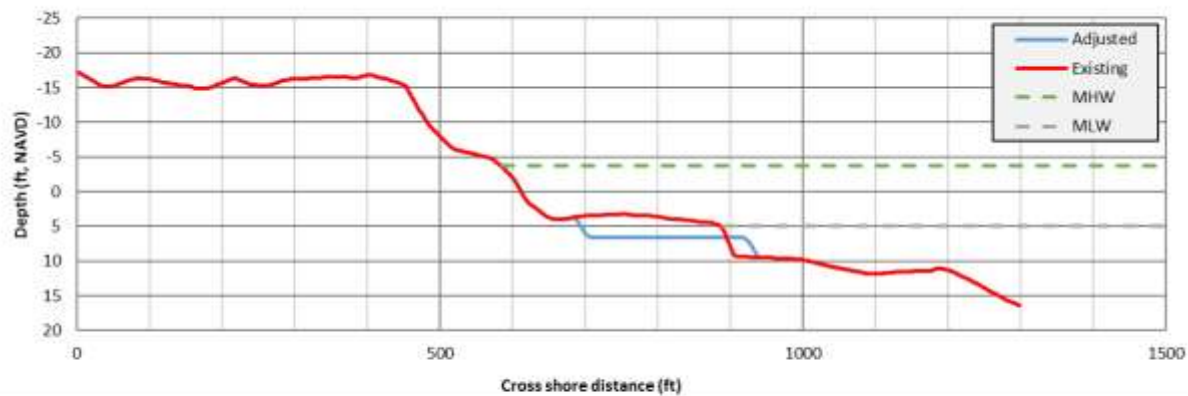
# Alt.3 Intertidal Extraction



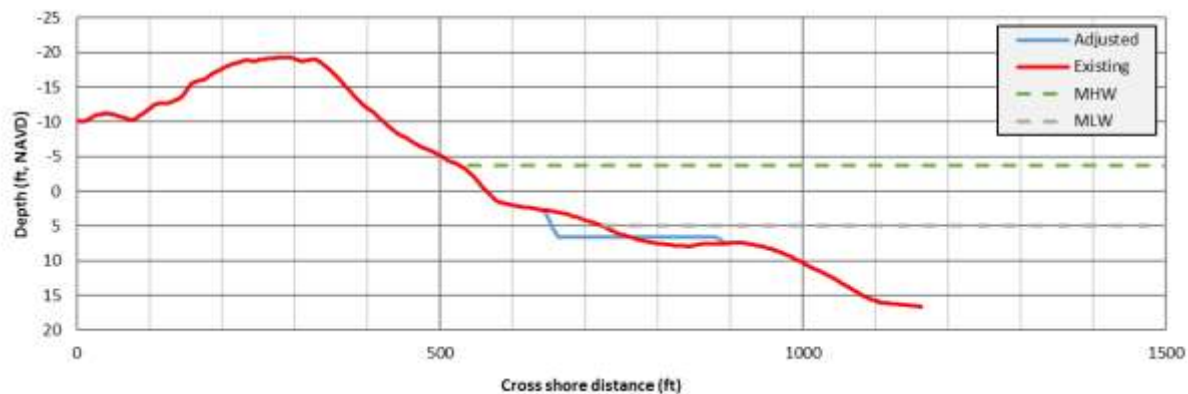


# Inter-tidal Extraction

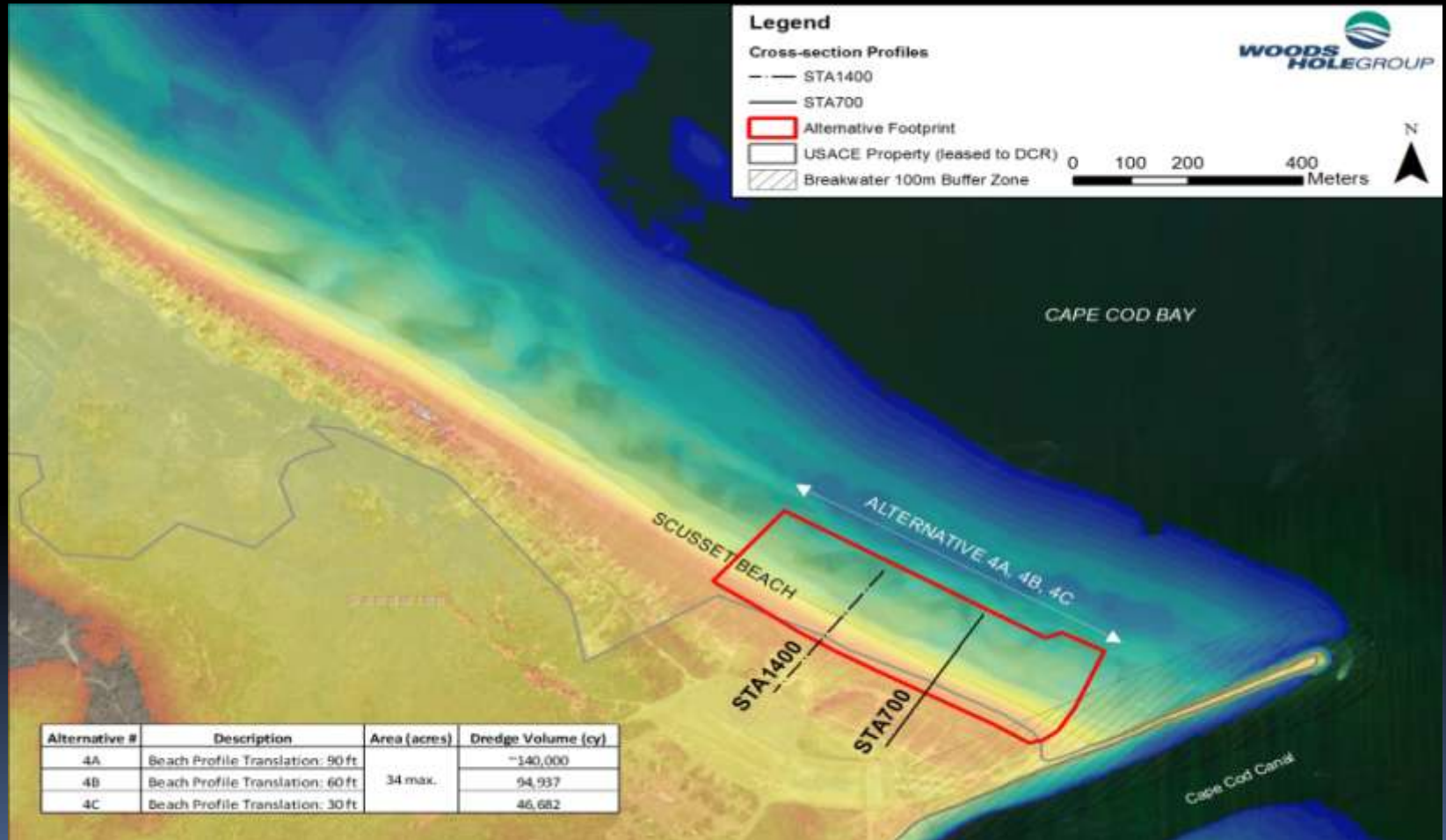
Alt 3A, 3B - Profile 1



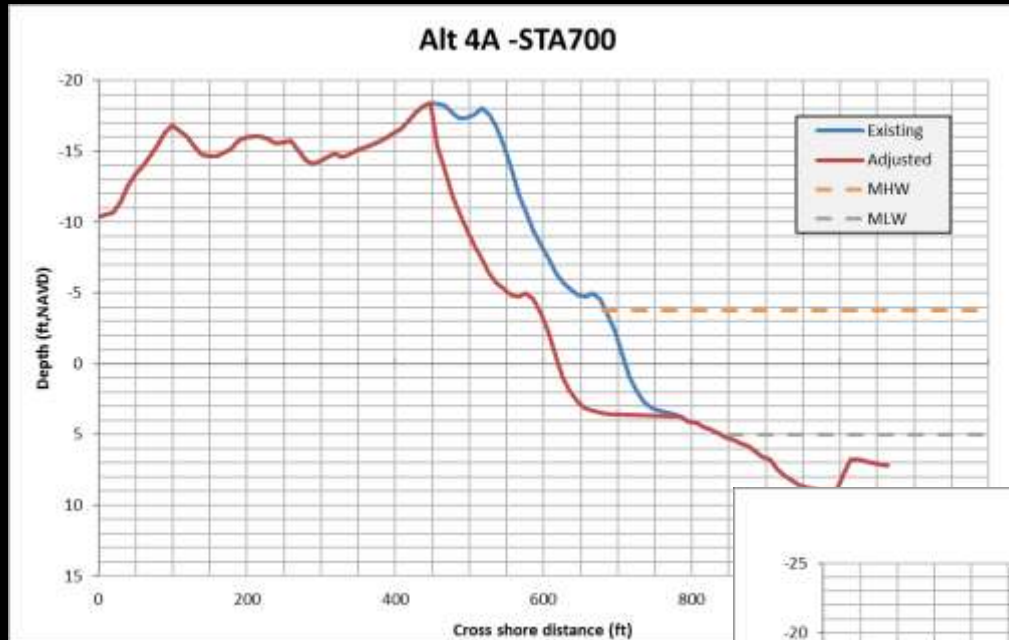
Alt 3A, 3B - Profile 2



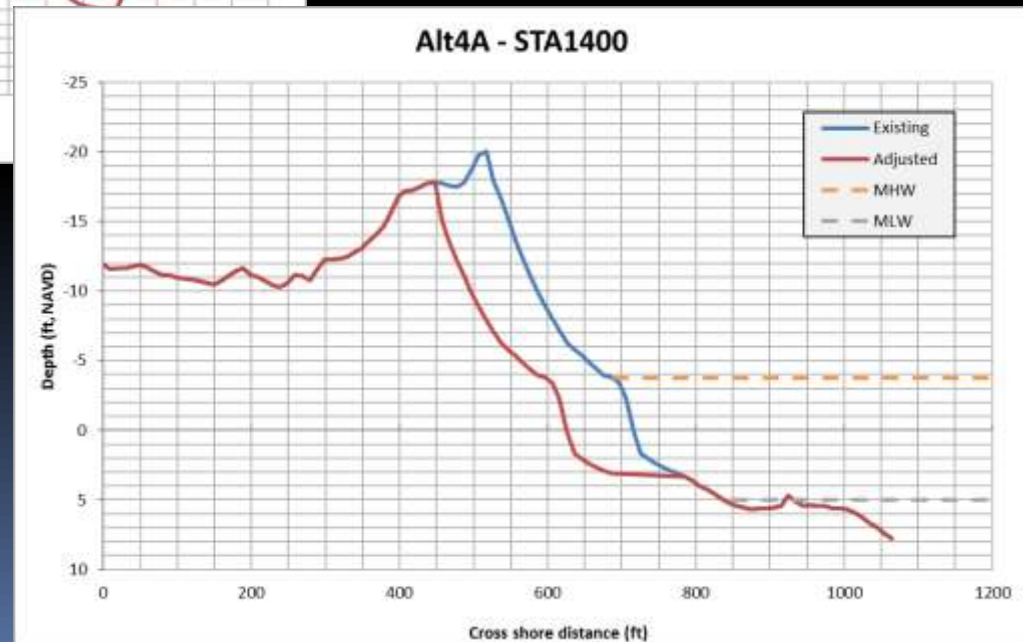
# Alt.4 Beach Profile Translation



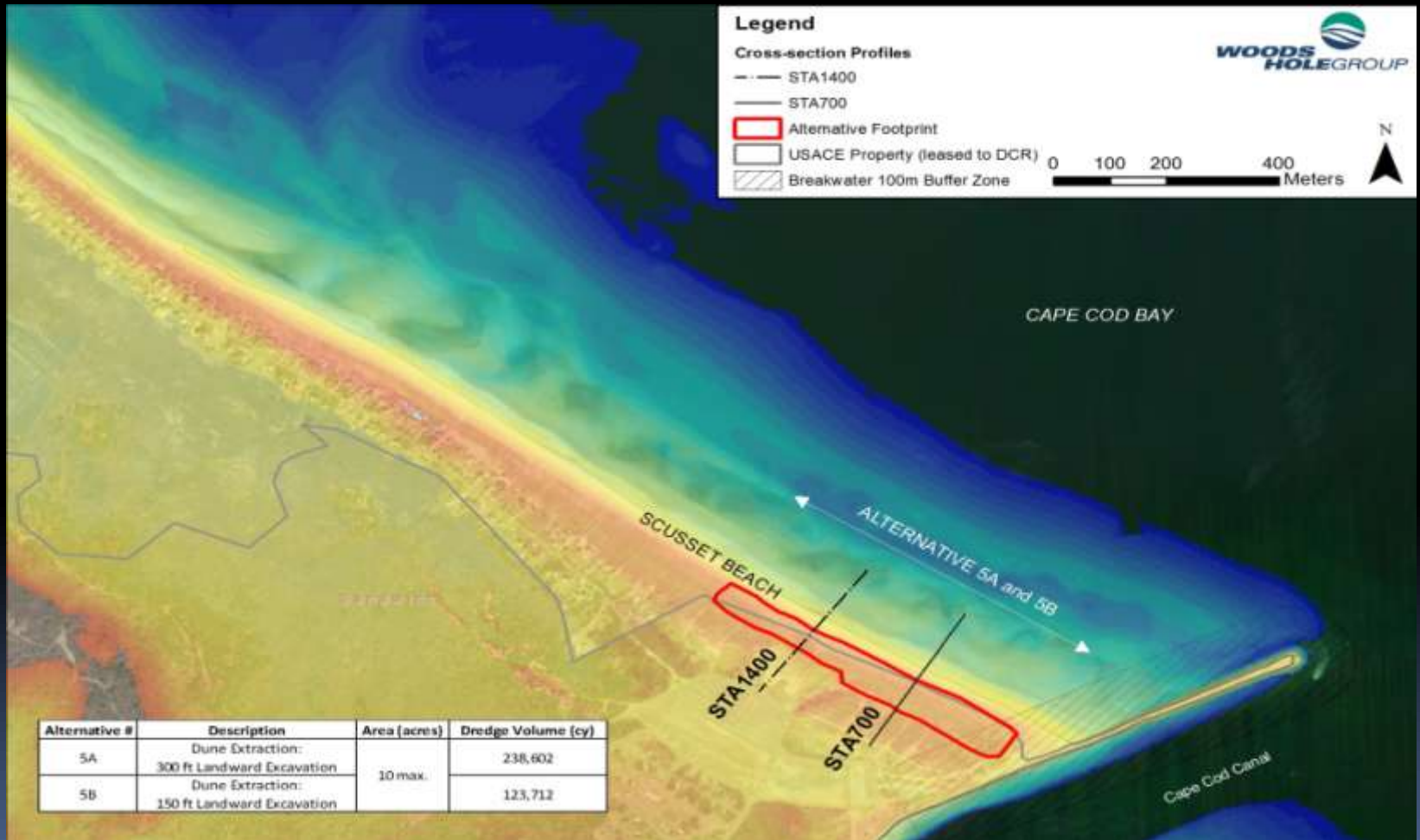
# Beach Profile Translation



Translate profile  
from dune peak  
to MLW; adjust  
by 90 ft



# Alt.5 Dune Extraction



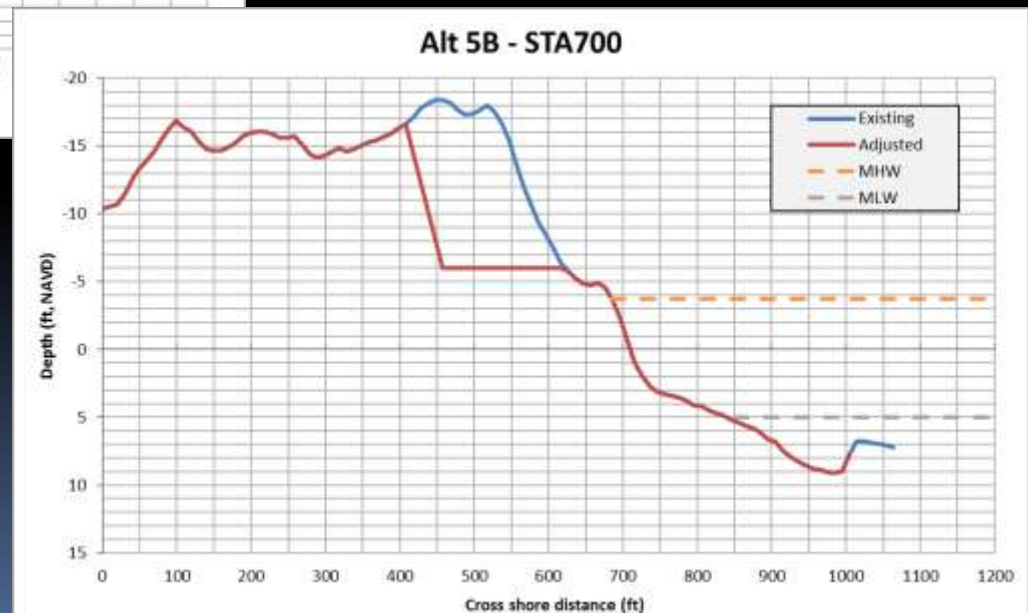


# Dune Extraction

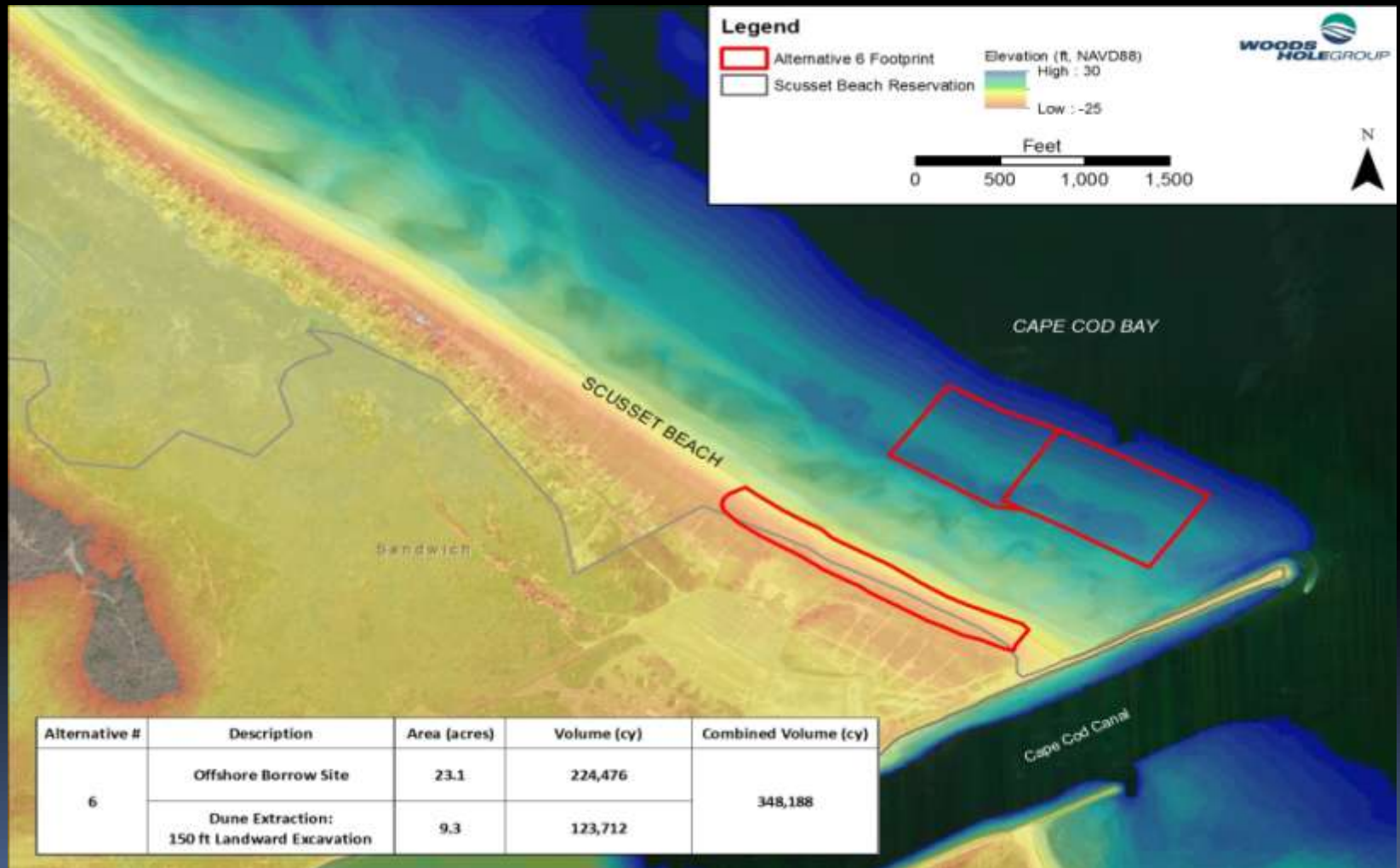


Extraction from  
primary dune feature  
Approximately 300 ft  
landward;  
cut @ Elev. 6 ft NAVD

Extraction from  
primary dune feature  
Approximately 150 ft  
landward;  
cut @ Elev. 6 ft NAVD



# Preferred Alternative (Alt.6)




# Preferred Alternative Alt.6

- Total - 348k cys of sand
  - Offshore borrow site - 224K cys
  - 150' Dune extraction – 124K cys
- Offshore borrow site
  - 23 acres, 1700' x 600'
  - Located 300' – 500' from the shoreline
  - Excavated to depth of -18 MLLW, 3:1 side slope
- Dune extraction site
  - 9.3 acres, 2000' x 150'
  - Excavated to elevation 11' MLLW, 5:1 dune slope
  - Dune extraction is anticipated as a secondary source of material for the project



# Preferred Alternative

- Annual sediment budget for Study Area calculated at 90K cys/yr
  - Estimated borrow site recovery estimated at 2.5 – 3 yrs, based on extraction of 224K cys
  - Propose post dune extraction grading to create new shorebird nesting habitat
- 




# Construction Methodology

- Offshore Borrow Site
  - Hydraulic pump-out hopper dredge
- Dune Extraction
  - Land based equipment and trucked to site/ or
  - Hydraulic eductor method, and barged to site





# Regulatory Process


- Phase I - Expanded Environmental Notification Form (EENF) was reviewed and approved for the Town of Sandwich Dune and Beach Reconstruction Project in 2014.
  - EIR Waiver was granted, and required a Notice of Project Change to be filed once the sand source for the project was identified.
  - Sandwich has completed a draft NPC and has sought feedback from Federal & State agencies.
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# Regulatory Review Path

- Sandwich Conservation Commission
  - Order of Conditions Phase I
  - Amended Order of Conditions/NOI
- MEPA
  - Expanded Environmental Notification Form (EENF)
  - Notice of Project Change
  - Waiver from Mandatory Environmental Impact Report (EIR)
- DEP
  - Combined Ch91/401 Water Quality Permit
- CZM
  - Federal Consistency
- Army Corps of Engineers
  - Corp Permit for Phase I
    - Revise/Re-open permit



# Conclusions

- Extensive site investigation/analysis is required
  - Highlights the need for regional and system based sediment transport analysis
  - Highlights existing challenges, conflicts and limitations of many coastal regulations
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# Conclusions

- Regulatory agencies need to recognize a new, emerging class of “resilience” projects
    - Define “resilience” projects
    - “Resilience” projects should demonstrate public benefit
    - Consider different performance standards for this class of projects
    - Create more flexibility in regulations and policies
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