



THE TOWN OF OAK ISLAND, NORTH CAROLINA



LOCKWOOD FOLLY HABITAT RESTORATION PROJECT DREDGING OF EASTERN CHANNEL



Project Need – Navigation, Water Quality & Infrastructure

Navigation

- Navigation of Eastern Channel is limited to high tides
- Many areas have shoaled to -4' to -6' NAVD (-1 to -3 MLLW) and some areas are even shallower
- Eastern Channel connection at inlet is closed

Water Quality

- Water quality is also a concern along Davis Creek and other sloughs and fecal coliform counts appear to be increasing

Infrastructure Protection & Habitat Loss

- Number of homes along west end of Oak Island are very vulnerable – winter storms have exacerbated conditions – 14-15' tall escarpments – even worse now
- Significant escarpments will limit turtle nesting habitat

Need For Project

Navigation

- Clearly Defined Navigation Channel, Aligned Towards West



Lockwoods Folly Inlet



LOCKWOODS FOLLY INLET
1938

PHOTO PLATE V

April 5, 1938

Lockwoods Folly Inlet



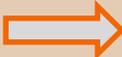
May 4, 1958

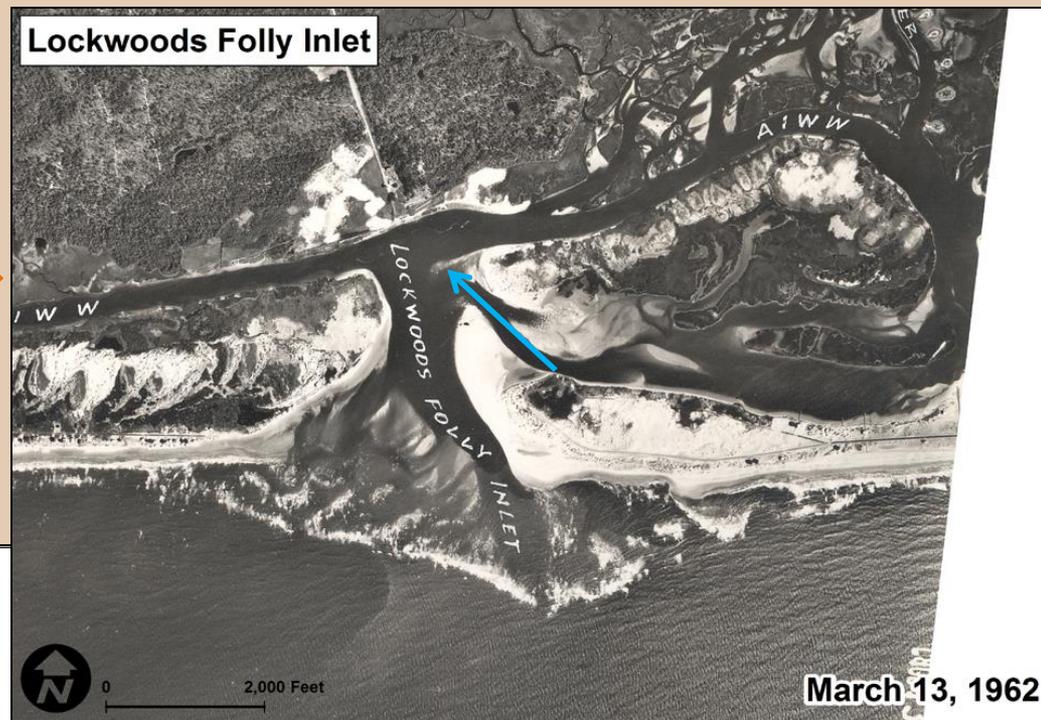


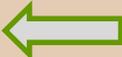
- Channel Closes Off At Entrance to LFI

Need For Project

Navigation

- Defined Channel Opens, Aligned Towards Northwest 



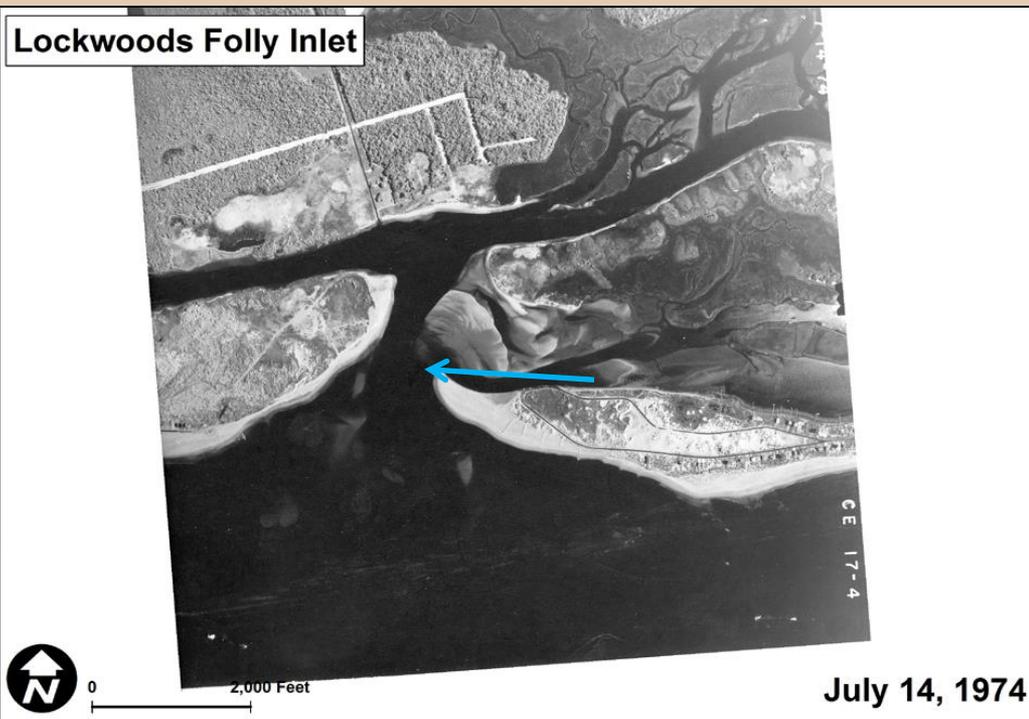
- Channel Closes Off At Entrance to LFI 



Need For Project

Navigation

- Defined Channel Opens, Aligned Towards West 



Lockwoods Folly Inlet

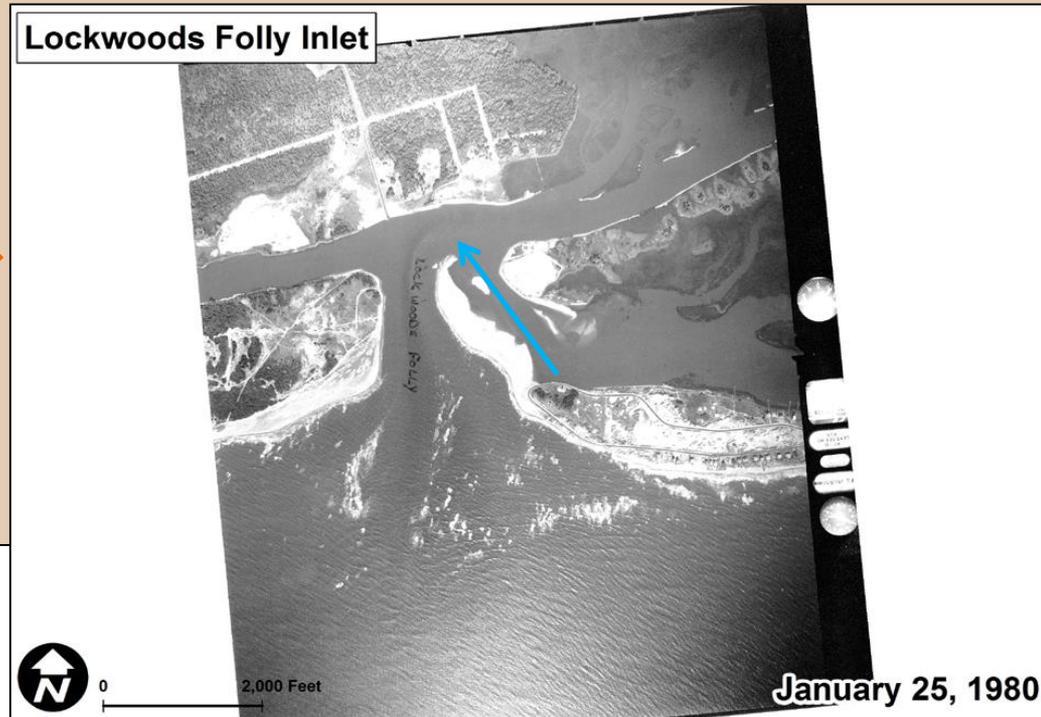


- Channel Closes Off At Entrance to LFI 

Need For Project

Navigation

- Defined Channel Opens, Angled Towards North 



- Channel Migrates To Northwest Alignment 

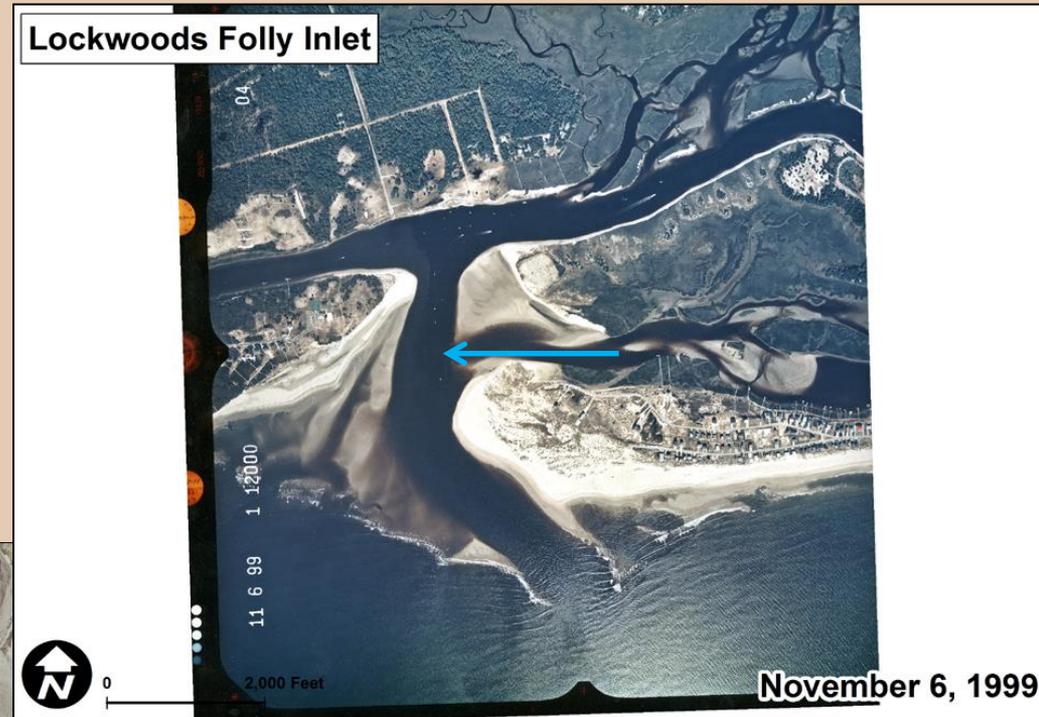
Lockwoods Folly Inlet



Need For Project

Navigation

- Channel Migrates To Western Alignment



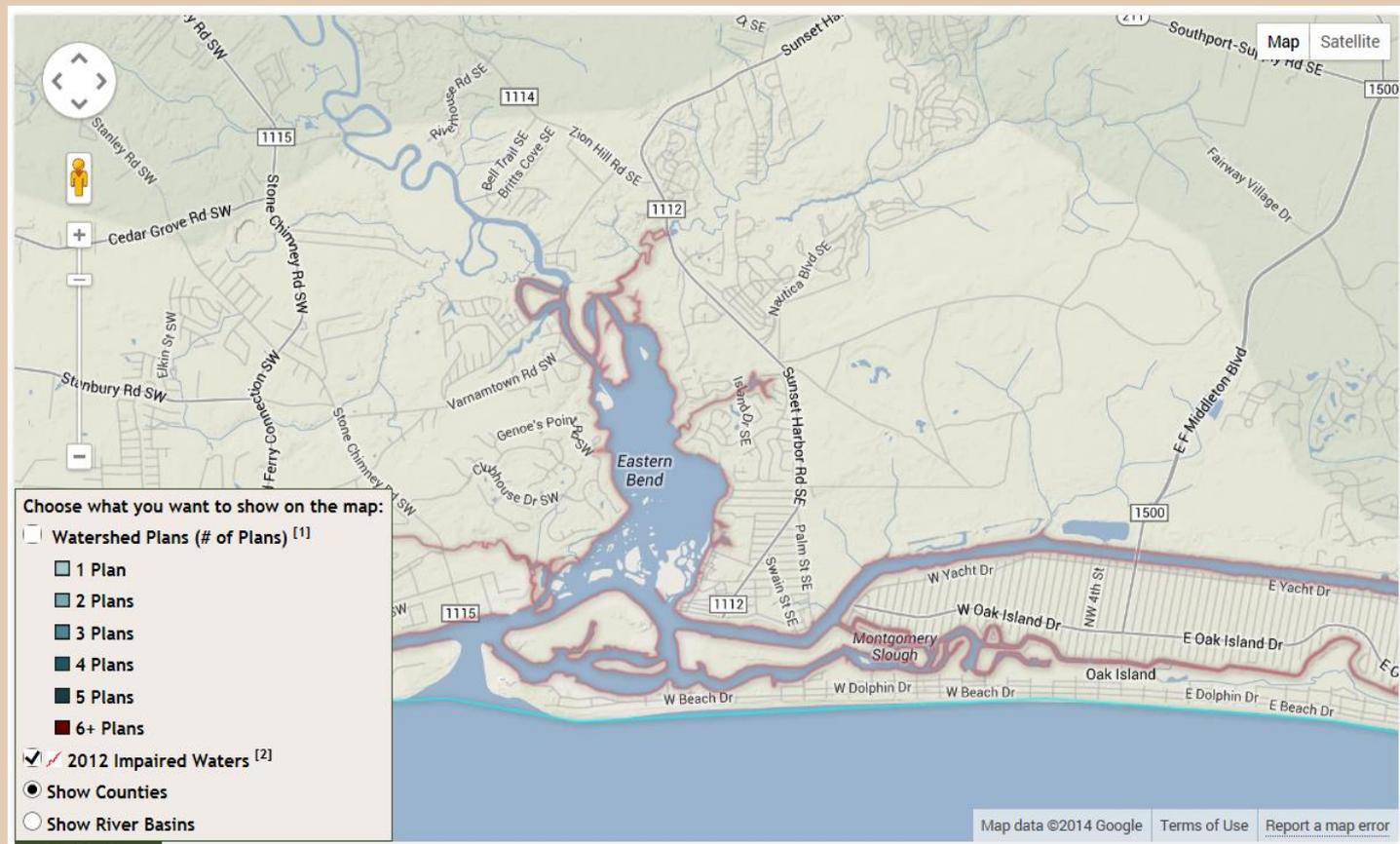
- Secondary Channel Opens Aligned Towards Northwest, Previous Channel Closes at Entrance to LFI



Need For Project – Water Quality

Water Quality

- Impaired Waters throughout the area
- Town has invested over \$177M in a sewer system to limit impacts

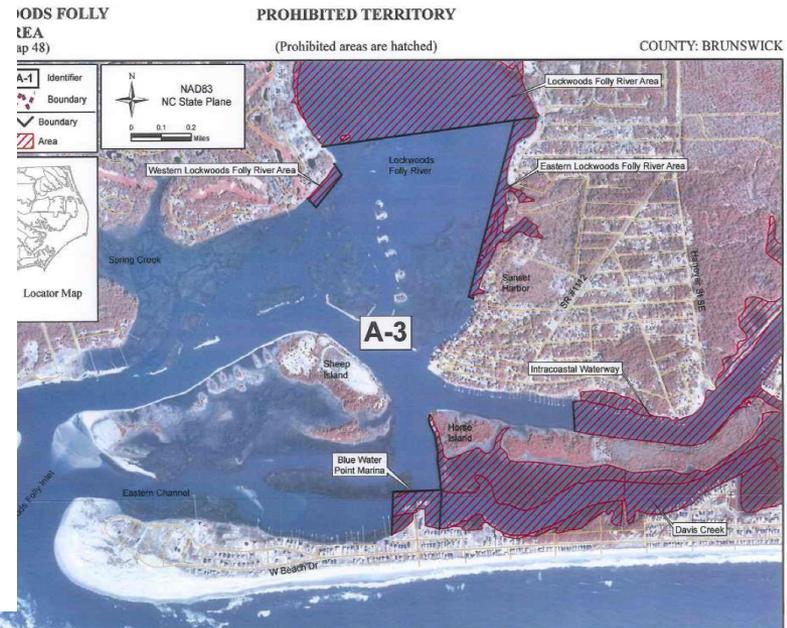
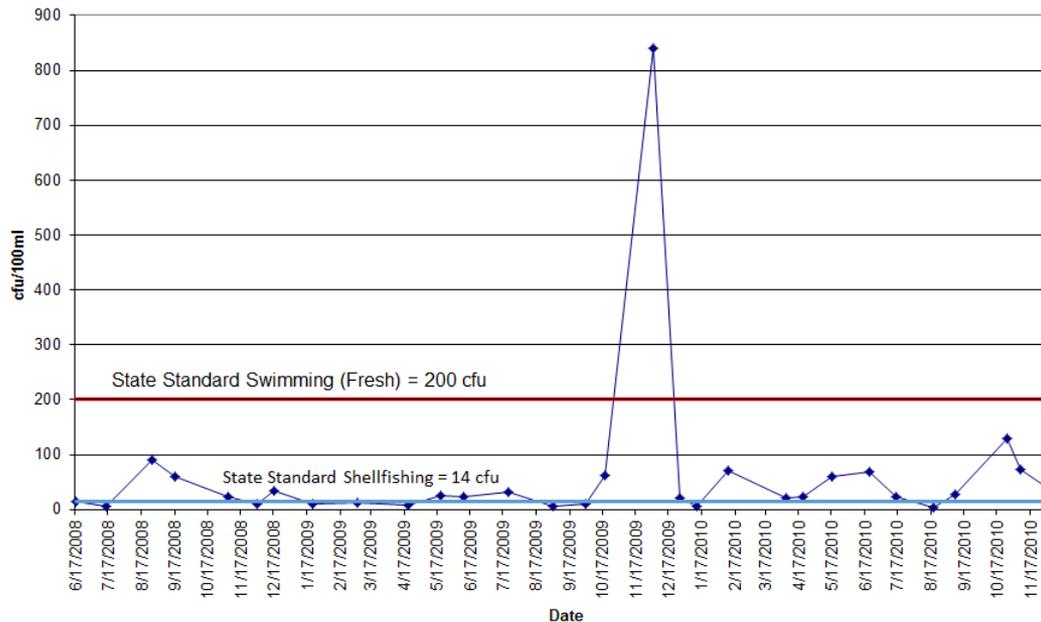


Need For Project – Water Quality

Water Quality

- Davis Canal and other sloughs have concerns
- Additional tidal flushing can improve water quality conditions

NC DWQ Davis Canal Monitoring Station
Fecal Coliform



(SEE BACK OF MAP FOR AREA DESCRIPTIONS.)

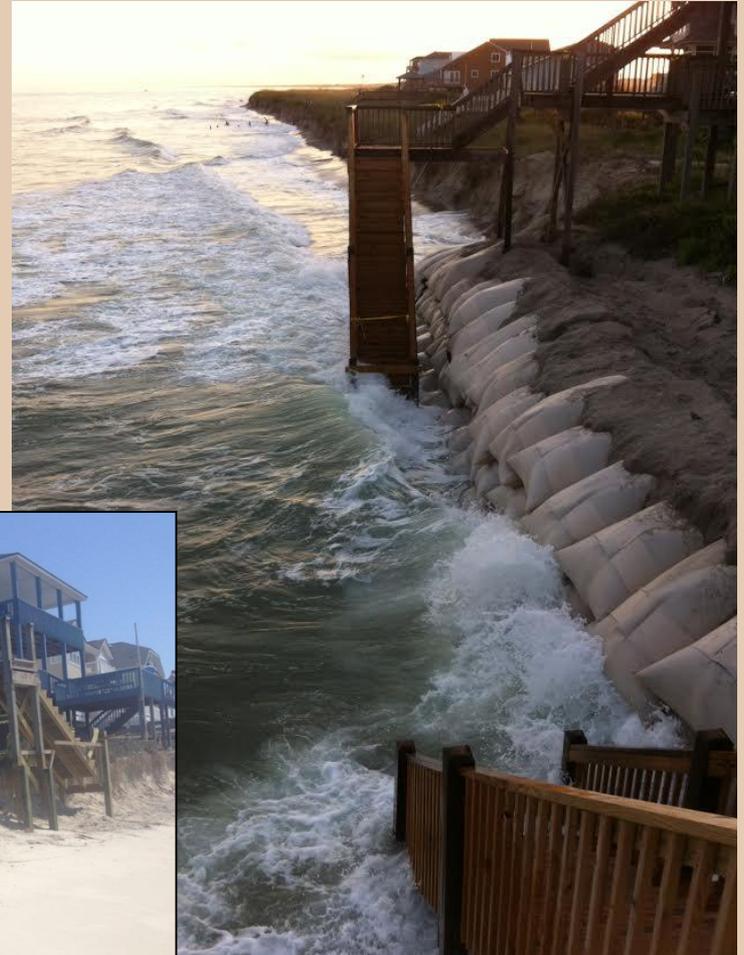
Need For Project

Infrastructure Vulnerability & Habitat Loss



Need For Project

Infrastructure Vulnerability & Habitat Loss



Need For Project

Infrastructure Vulnerability & Habitat Loss



Project Need – Navigation, Water Quality & Infrastructure

Dredging of Eastern Channel Will Help All Three Situations

- Dredging to an adequate depth should help maintain channel navigability
- Deeper in areas near the inlet – shallower in stable areas
- Improved hydraulics will allow more tidal flushing and should benefit water quality
- Beneficial use of beach compatible dredged material can be used to protect infrastructure that has reached a critical erosion point and also provide turtle nesting habitat
- Non-beach compatible material will be placed on Sheep Island CDF

Past Work/Existing Data



Preliminary Drawing
Not for Construction

| NO. | REVISION | BY | DATE |
|-----|----------|----|------|
| | | | |
| | | | |
| | | | |
| | | | |

Company: **CSE**
 Coastal Science & Engineering
 PO BOX 1168
 WYOMING BEACH CITY, NORTH CAROLINA 28587
 PHONE: (252) 922-2071
 FAX: (252) 922-2077

CLIENT:
BRUNSWICK COUNTY
 P.O. BOX 249
 BOLIVIA, NC 28422

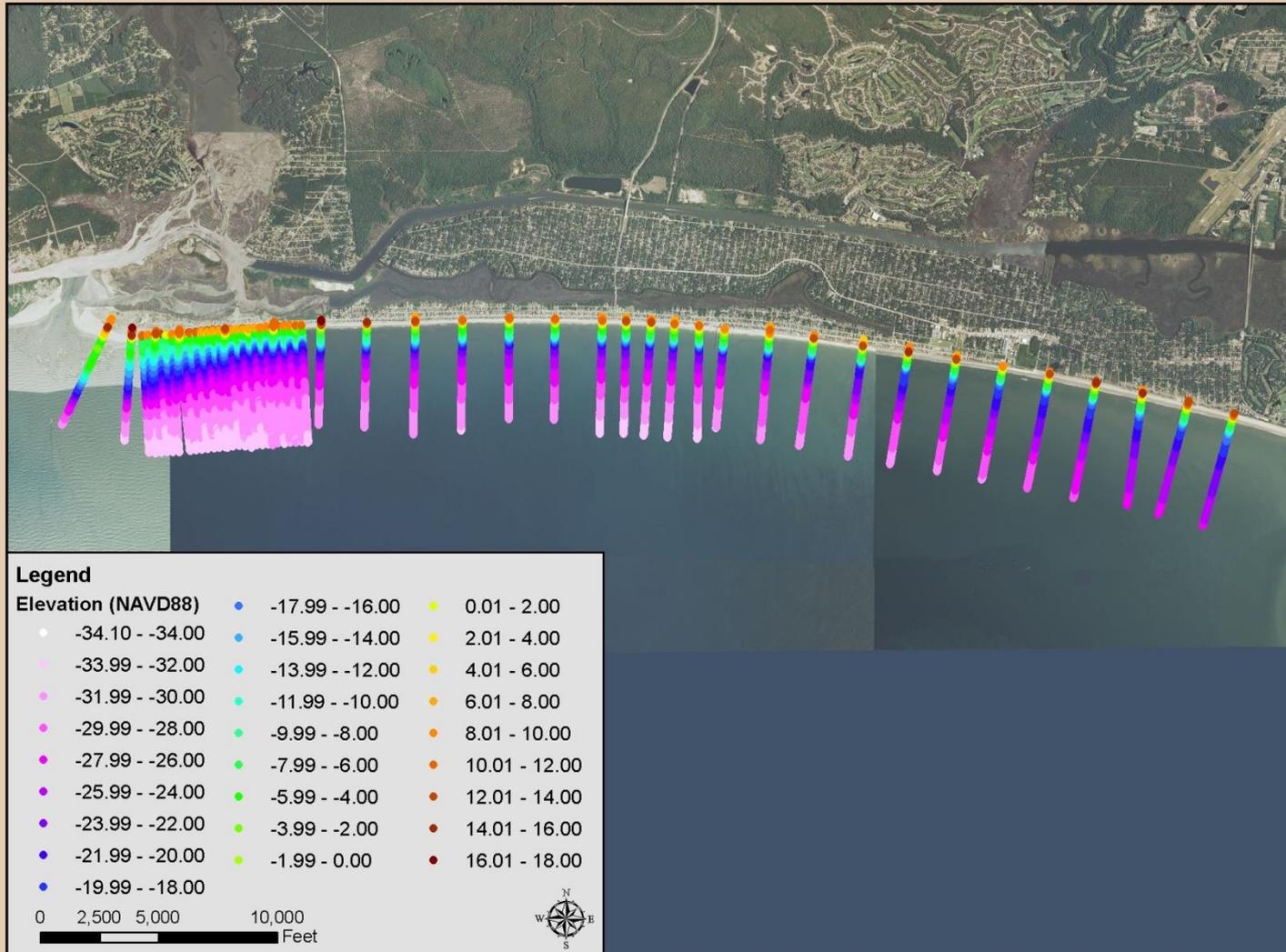
PROJECT:
**LOWER LOCKWOODS FOLLY RIVER
 AQUATIC RESTORATION PROJECT**

DRAWING TITLE:
**EASTERN CHANNEL
 DREDGING PROJECT PLAN**

| | | |
|--------------|-----------|-----------|
| SCALE: | AS SHOWN | 02 |
| DATE: | 27 MAY 08 | |
| DESIGNED BY: | RSB | |
| APPROVED BY: | JMF | |
| PROJECT NO.: | 288 | |

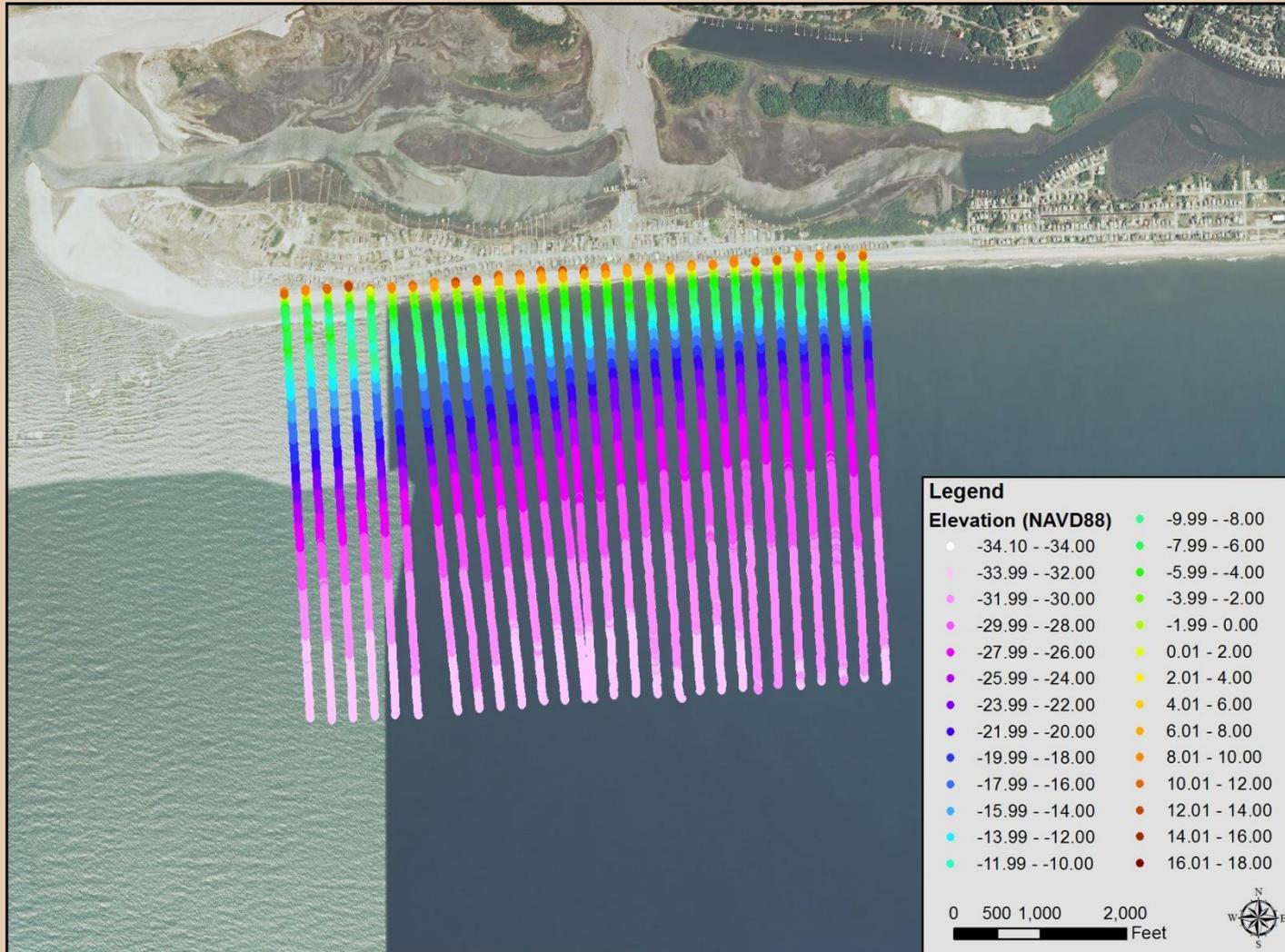
New Work Completed

Profile Data – Oak Island



New Work Completed

Profile Data – Oak Island



New Work Completed

Bathymetry Data – Eastern Channel



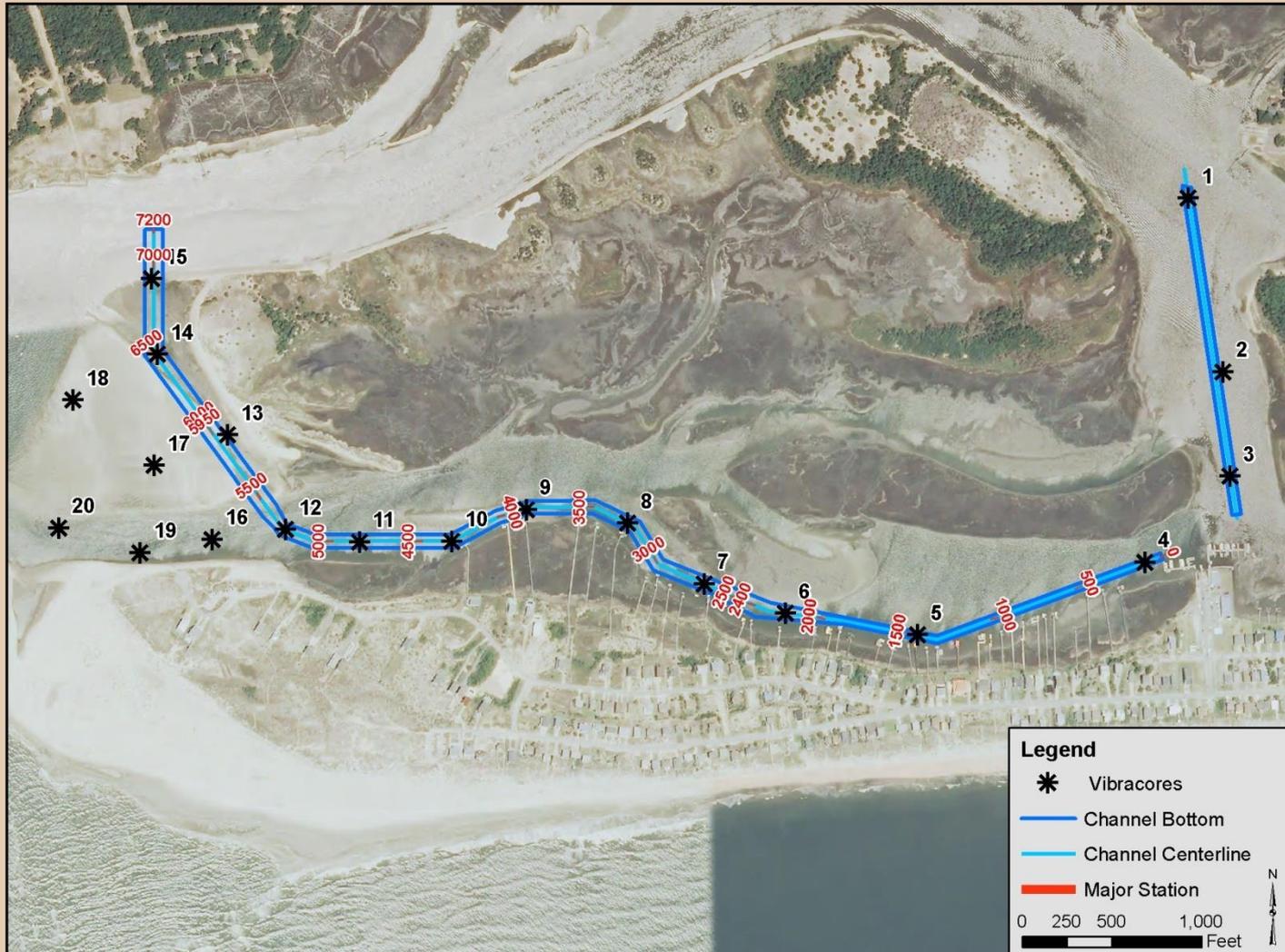
New Work Completed

Native Beach Data – Oak Island

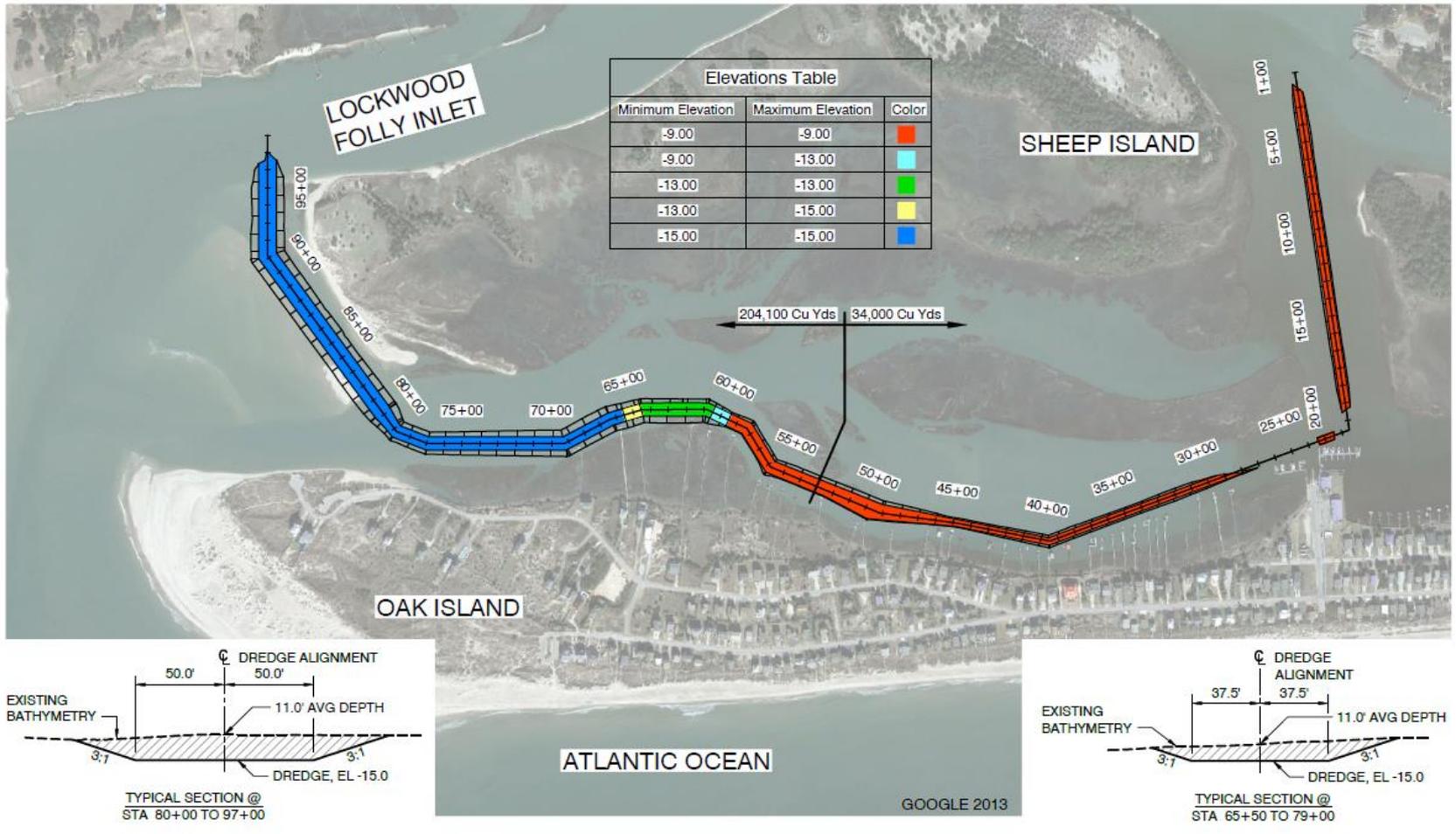
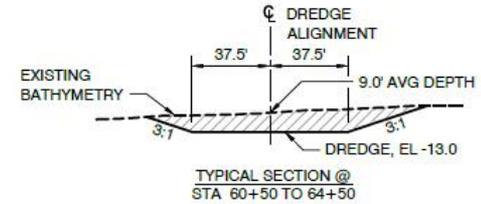
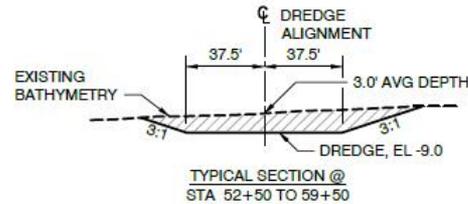
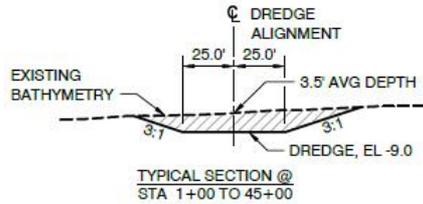


New Work Completed

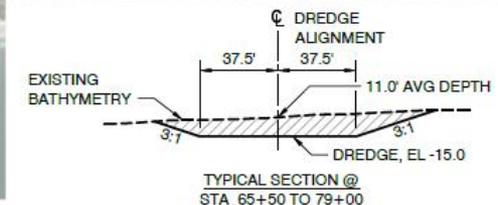
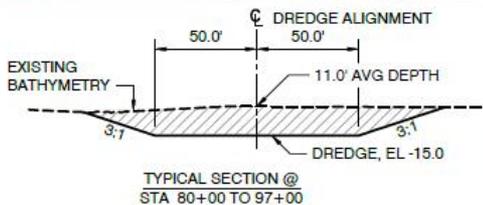
Vibracore Data – Eastern Channel



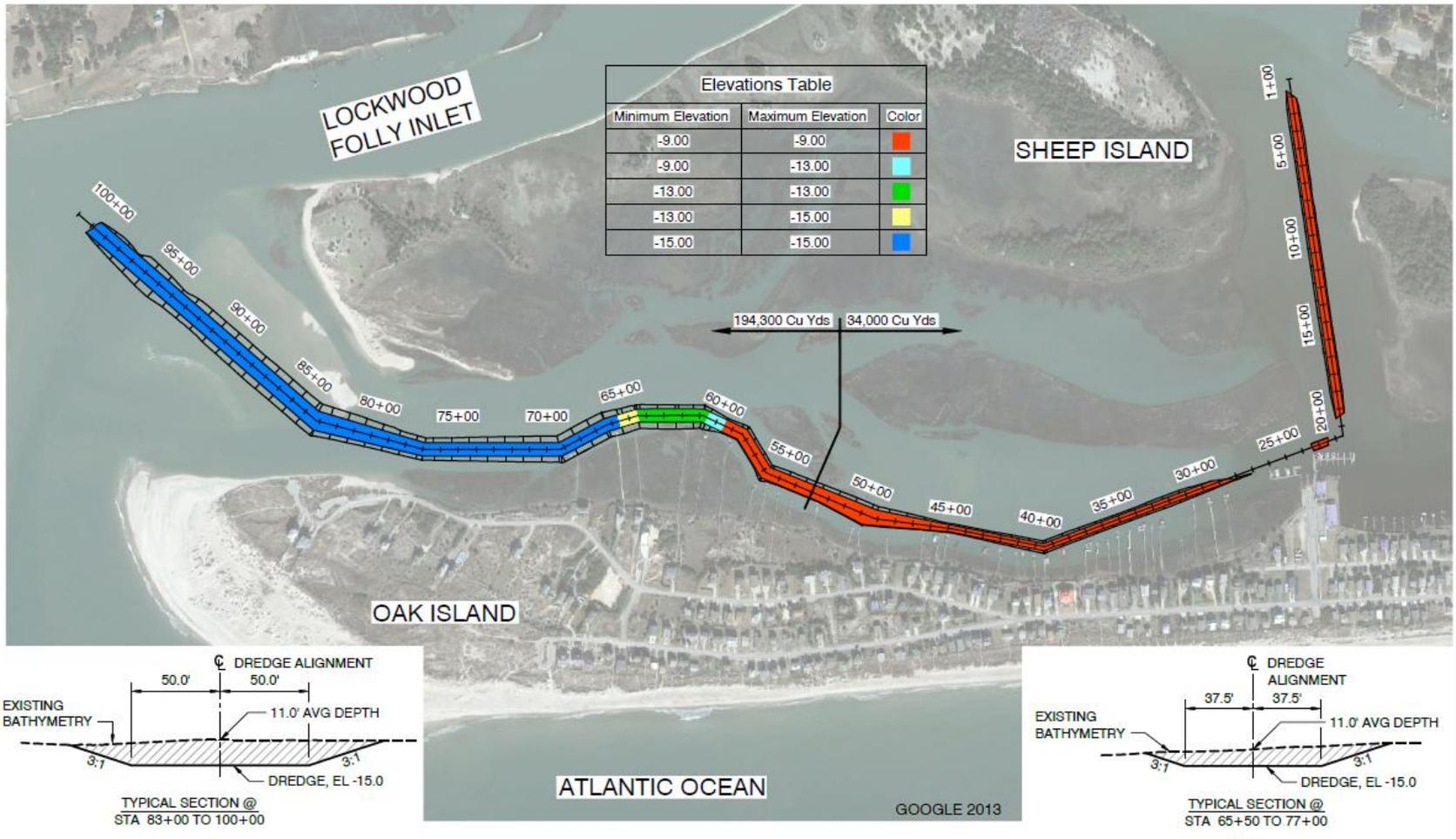
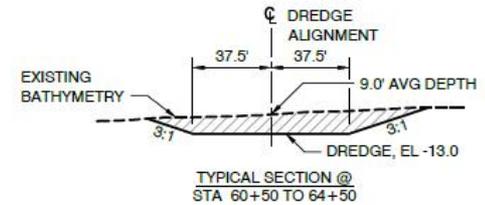
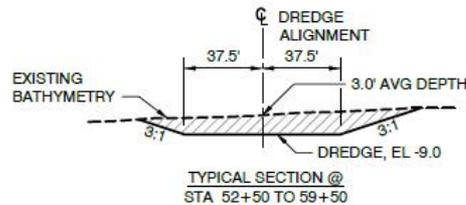
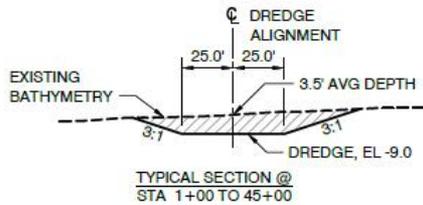
Options Under Consideration – Dredging Option 1



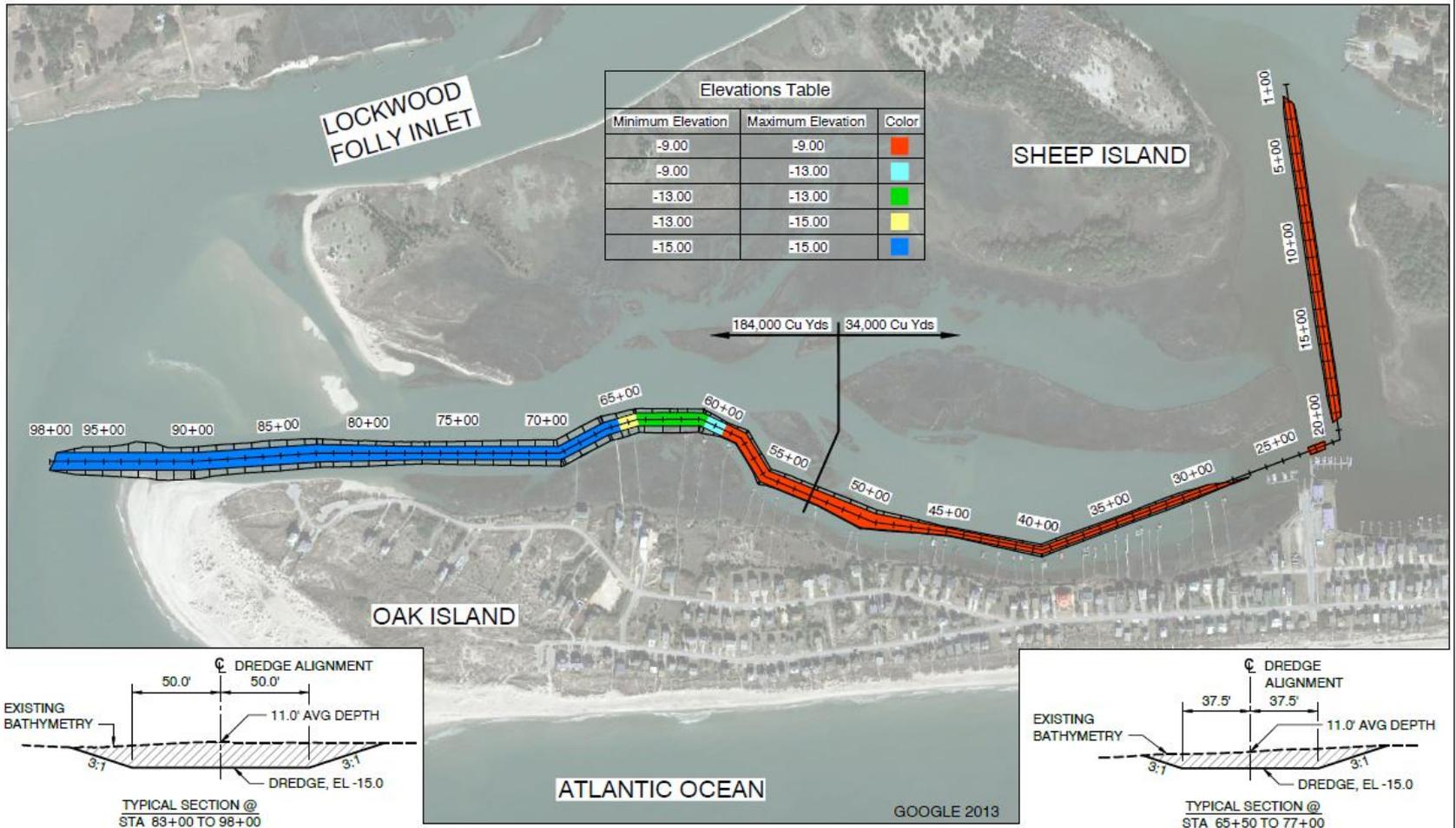
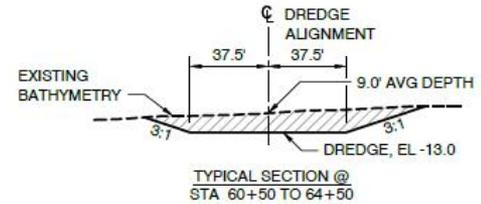
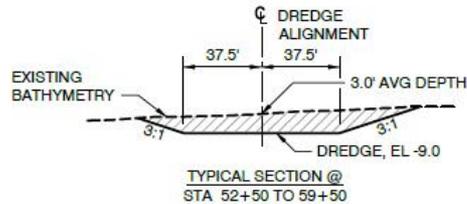
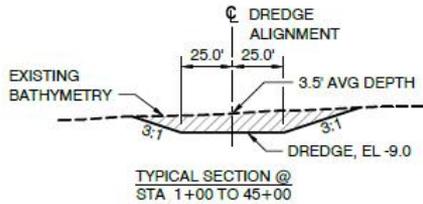
| Elevations Table | | |
|-------------------|-------------------|--------|
| Minimum Elevation | Maximum Elevation | Color |
| -9.00 | -9.00 | Red |
| -9.00 | -13.00 | Cyan |
| -13.00 | -13.00 | Green |
| -13.00 | -15.00 | Yellow |
| -15.00 | -15.00 | Blue |



Options Under Consideration – Dredging Option 2



Options Under Consideration – Dredging Option 3



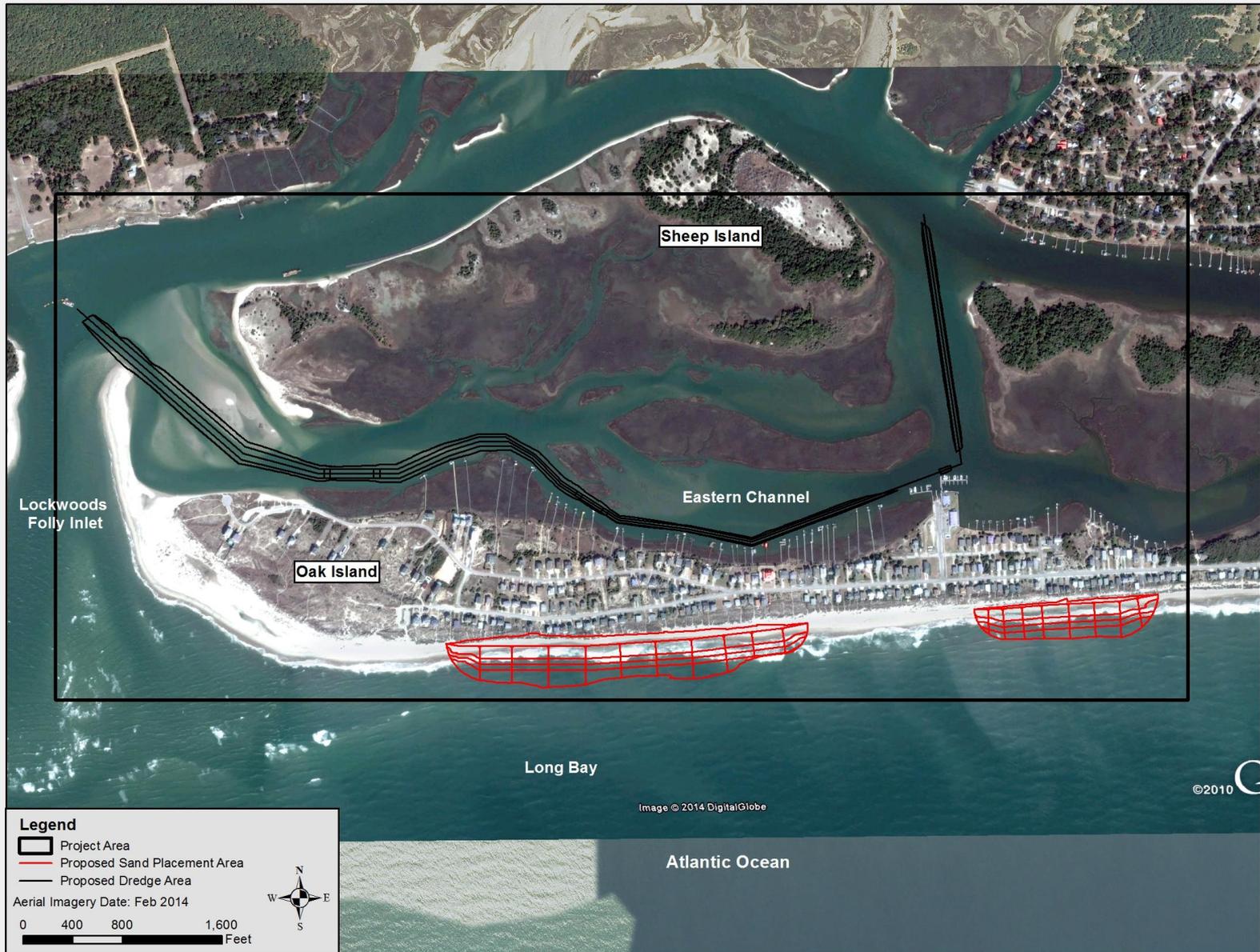
Vibracore Results

Major Findings

- Review of logs/photos confirms previous work
- Transition zone around Vibracore 7
- Extreme northwest channel Option 1 has more fines and shells – Option 2 - preferred



Current Plan



Permitting

CAMA Major Permit – Submitted on November 26

- Anticipate Major CAMA permit and Water Quality by Late January

General Permit 291 & Section 408 Review – Submitted on November 26

- USACE Has 60 Days to Review and Develop Internal EA
- USACE Will Consult with Other Agencies About Concerns (USFWS – up to 135 Days & NMFS – up to 90 Days)

USFWS – Biological Assessment

- Formal Consultation for Piping Plover (up to 135 Days)
- Biological Opinion – mid-January – May Contain Conservation Measures

NMFS – Essential Fish Habitat Assessment

- Consultation initiated December 5th – 30 Days from Receipt From USACE

NC State Property Office

- Provided Letter of Consent to Use Sheep Island as Disposal Area

Project Schedule

- **Under Contract and Started Field Work – Mid-July**
- **Received Surveys and Began Concept Design – Mid-August**
- **Pre-Application Permit Meeting – Late August**
- **Received Vibracore Data – Late October**
- **Preliminary Design/Submit Permits – Mid-Late November**
- **Final Design/Advertise Project – Mid December**
- **Receive Permits – Mid January to Mid February**
- **Bid Opening – Mid-Late January**
- **Construct Project – Mid Feb – End of March/April**

Project Funding

Total Project Budget = \$3.545 M

| | | | | |
|---|---------|------|-------------|--------------------|
| <u>Design, Permitting and Construction Observation Services</u> | | | | |
| Engineering (Design and Construction Observations) | | | | \$145,610 |
| Surveys (Channel and Placement Area) | | | | \$29,992 |
| Environmental and Permitting | | | | \$35,588 |
| Geotechnical Investigations (Assumes 20 - 15' Vibracores with 4 Samples each) | | | | \$63,735 |
| Total Design and Construction Observation Costs | | | | \$274,925 |
| <u>Construction Costs</u> | | | | |
| Mob/Demob | | 1 LS | \$750,000 | \$750,000 |
| Beach Compatible Dredging and Placement | 180,000 | cy | \$10.00 | \$1,800,000 |
| Non-Beach Compatible Dredging and Placement | 20,300 | cy | \$7.50 | \$152,250 |
| Non-Beach Compatible Placement CDA Fees | 20,300 | cy | \$2.50 | \$50,750 |
| Improvements to CDA | | 1 LS | \$55,000 | \$55,000 |
| Total Construction Costs | | | | \$2,808,000 |
| | | | | \$3,082,925 |
| | | | Contingency | 15% |
| | | | | \$462,439 |
| Total Project Budget | | | | \$3,545,364 |

Project Funding

Total Project Budget = \$3.545 M

NC Division of Water Resources (DWR) – 50%

- **Awarded the Town of Oak Island \$1,772,682 for construction of project**

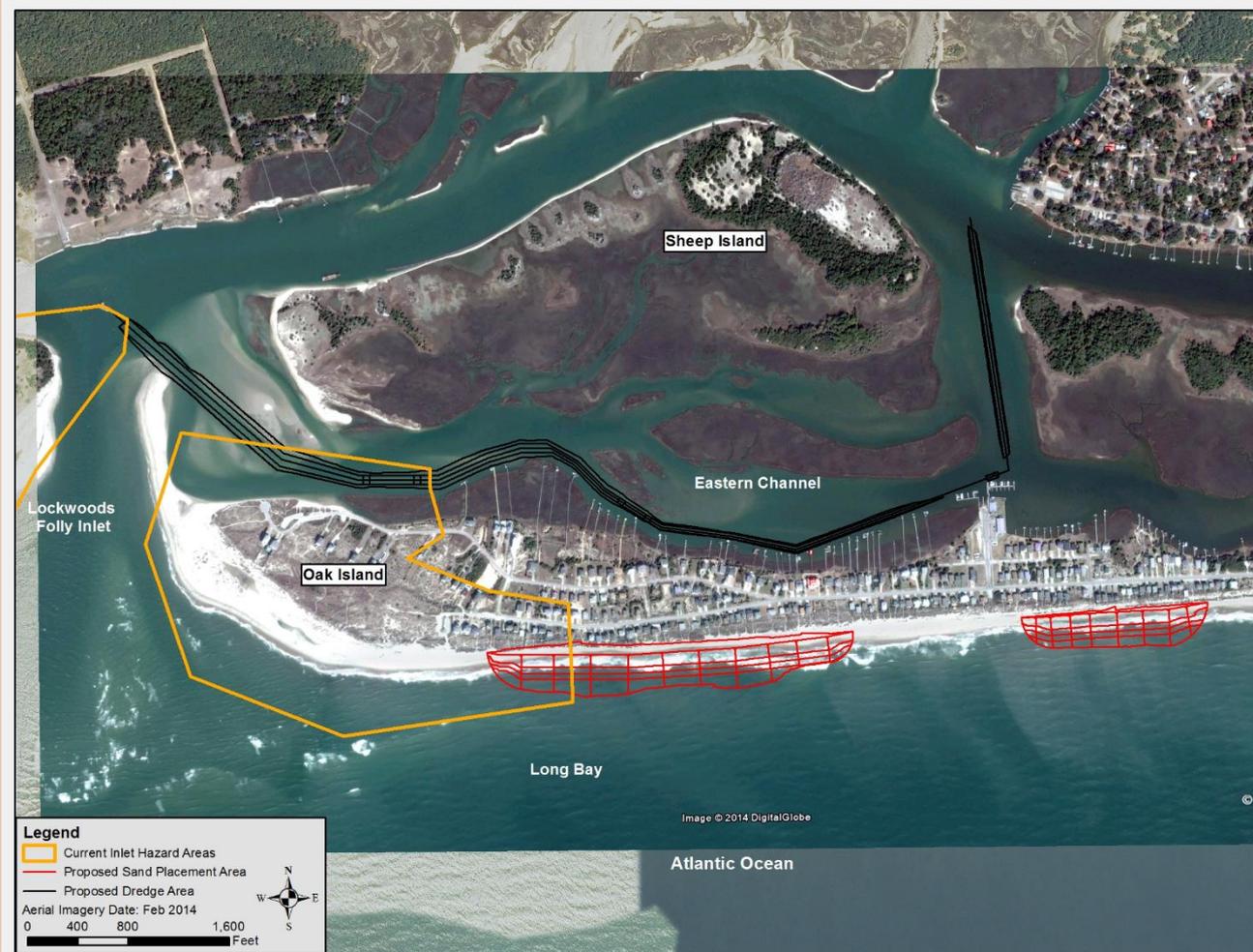
Brunswick County

- **Board of Commissioners have funding request for \$500k**

Additional Items

Placement of Sand Near Inlets

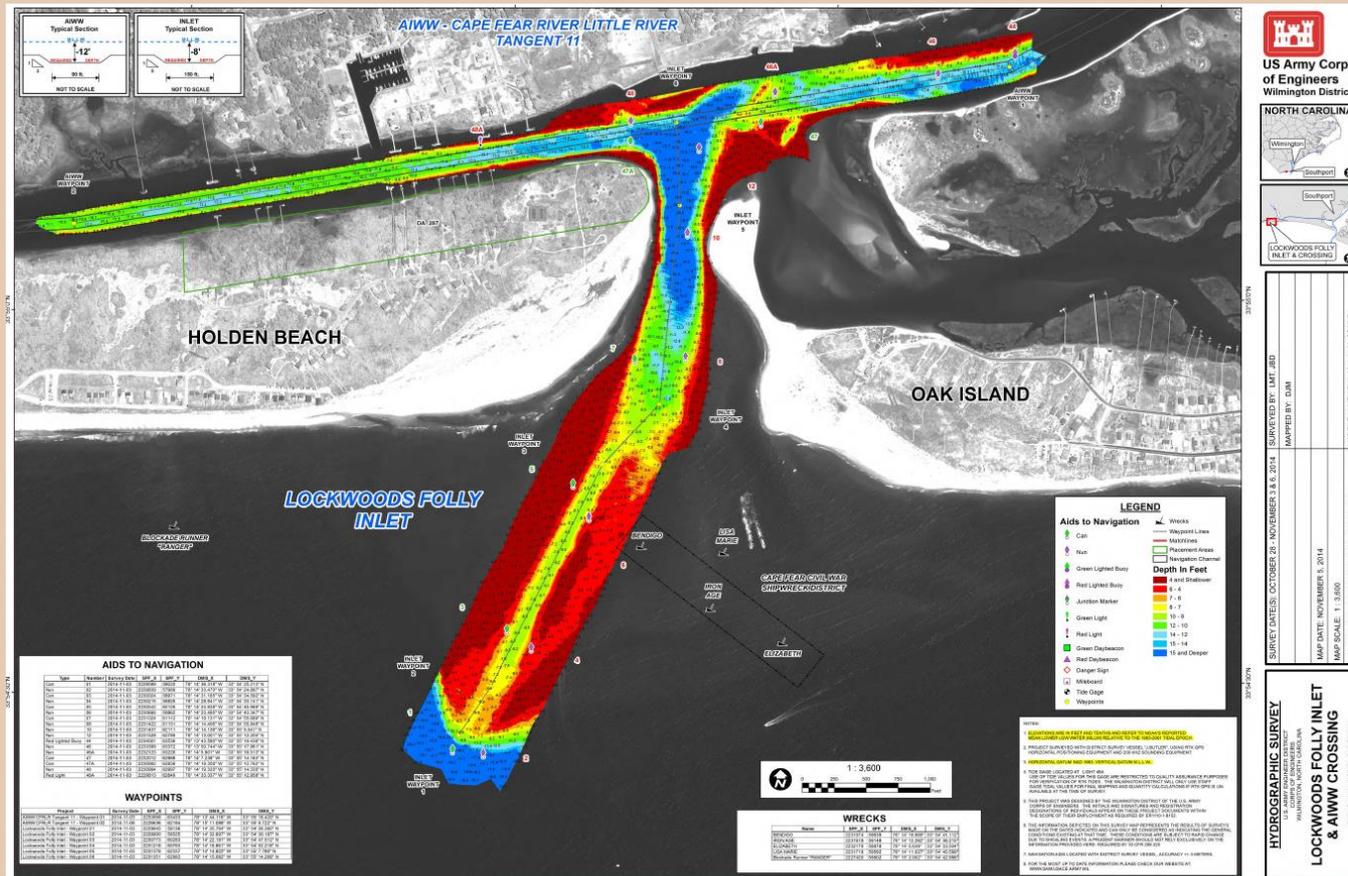
- Inlet Hazard Areas Are Used to Determine Setbacks for Development – Development/Improvements Are Allowed



Additional Items

Expected Project Performance

- Mouth of Channel May Shoal in 2 – 6 Years, Rest of Channel – 6-10 Years
- Nourishment Life Span is Highly Dependent on Storms and Offshore Shoal Channel Patterns



Additional Items

Potential Town Commitment

- Navigation Funding from NCDWR – At Most Maintain the Channel
- Piggyback onto AIWW Dredging Contracts with USACE to Maintain Mouth To Save Mobilization Costs Should Be Investigated

FEMA Engineered Beach

- FEMA Requirements
 - Beach Constructed by Placement of Imported Sand to Designed Elevation, Width, and Slope
 - Maintenance Program Involving Periodic Renourishment Has Been Established and Adhered to by Applicant
 - Maintenance Program Preserves the Original Design
 - Submit Studies, Construction Documents and Funding Plan
- Emergency, “One-Time” or “As-Needed” Nourishments Do Not Qualify – Program Is Needed – Channel Maintenance Alone Does Not Qualify – Must Be Designed and Beach Placement Controlled By Need on Beach – Not Dredging Need

Additional Items

FEMA Engineered Beach

- If Town Wishes to Consider,
 - Analysis Must Be Completed to Determine Level of Protection To Be Provided and Maintained
 - Town Must Then Monitor the Beach Annually (Surveys) and
 - Maintain the Proposed Level of Protection
 - Submit Design Studies, Plans, Construction Documents, As-Builts for Original Nourishment
 - Submit Design Studies, Plans, Construction Documents, As-Builts for Every Renourishment Action
 - Documentation and Details of the Maintenance Plan, How Need for Renourishment Is Determined and Funded
 - Pre- and Post Storm Profiles That Extend Offshore to Closure Depth
 - Submission of This Will Allow the Applicant to Get FEMA Federal Funding After a Declared Disaster Event For the Amount of Material Lost During Event

Discussion

Thank You!

