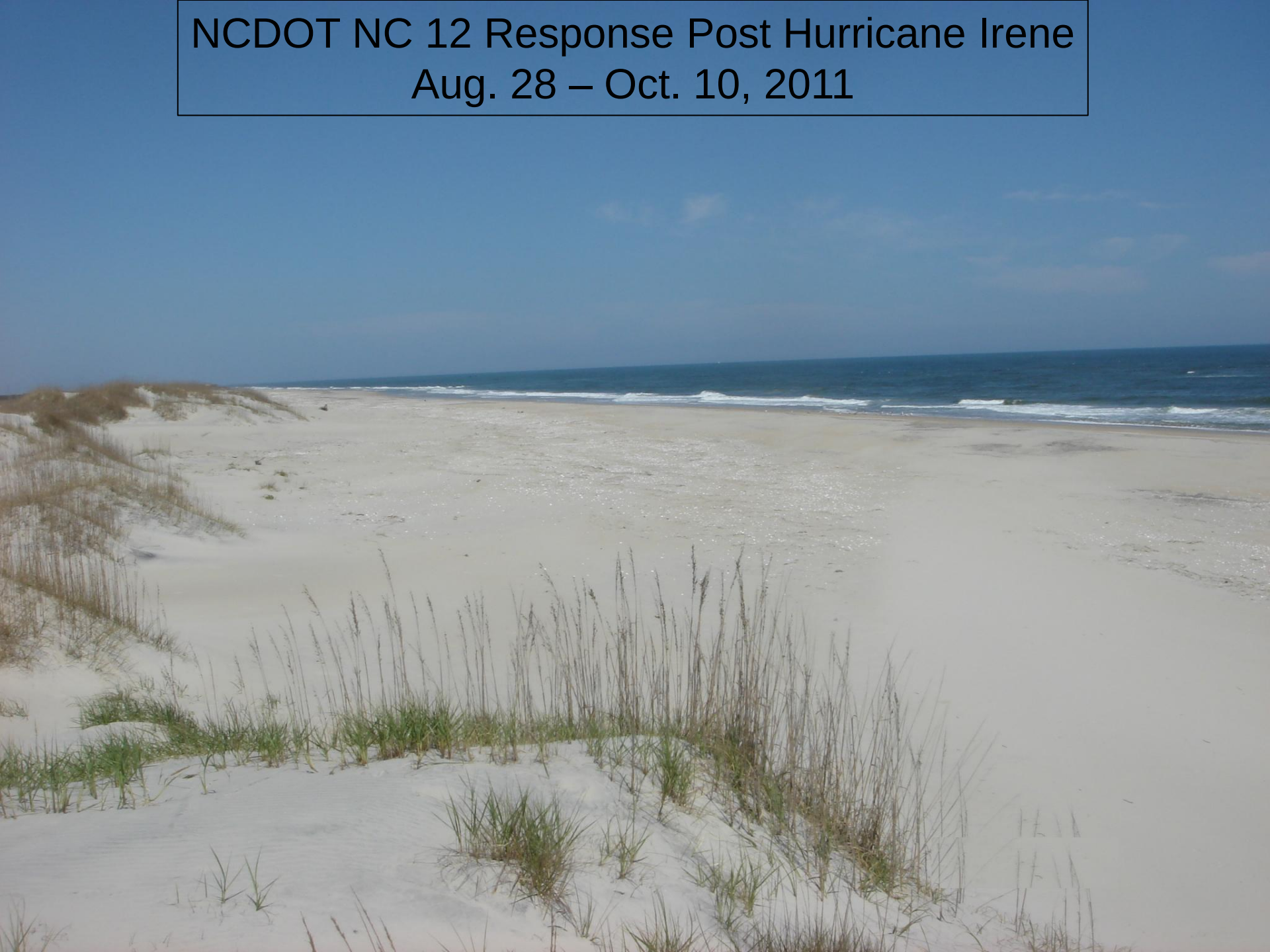
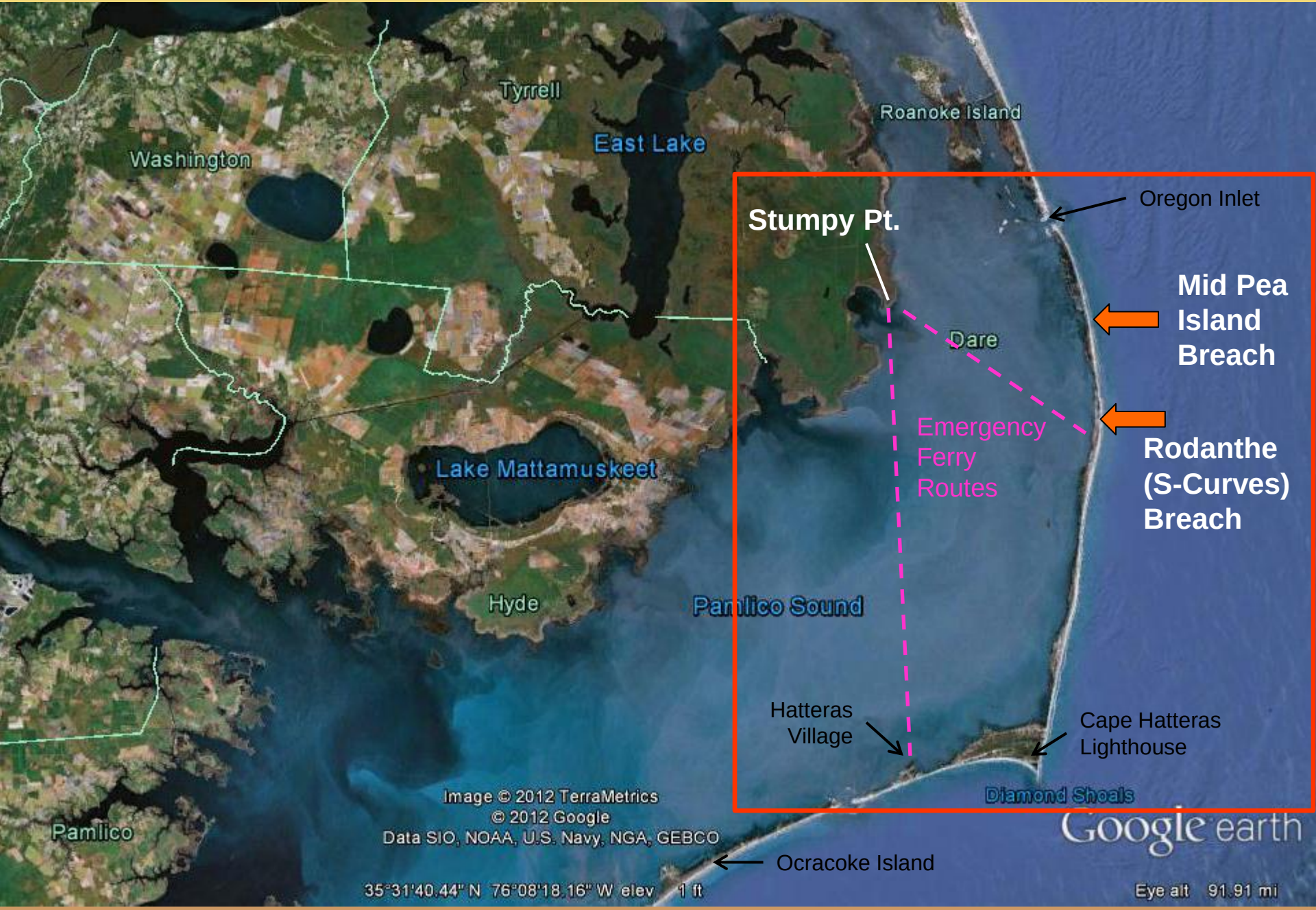
NCDOT NC 12 Response Post Hurricane Irene
Aug. 28 – Oct. 10, 2011



Rodanthe S-Curves

Roanoke
Norfolk
Greensboro
Raleigh
Charlotte
Fayetteville
Albemarle Sound
Roanoke Island
Pamlico Sound
Harkers Island
South Carolina
Lake Marion
Ridge Mountains
Irene
12
Coastal Hwy
Image © 2012 TerraMetrics
© 2012 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
35°21'52.55" N 78°59'09.82" W elev 201 ft
Google earth
Eye alt 399.01 mi

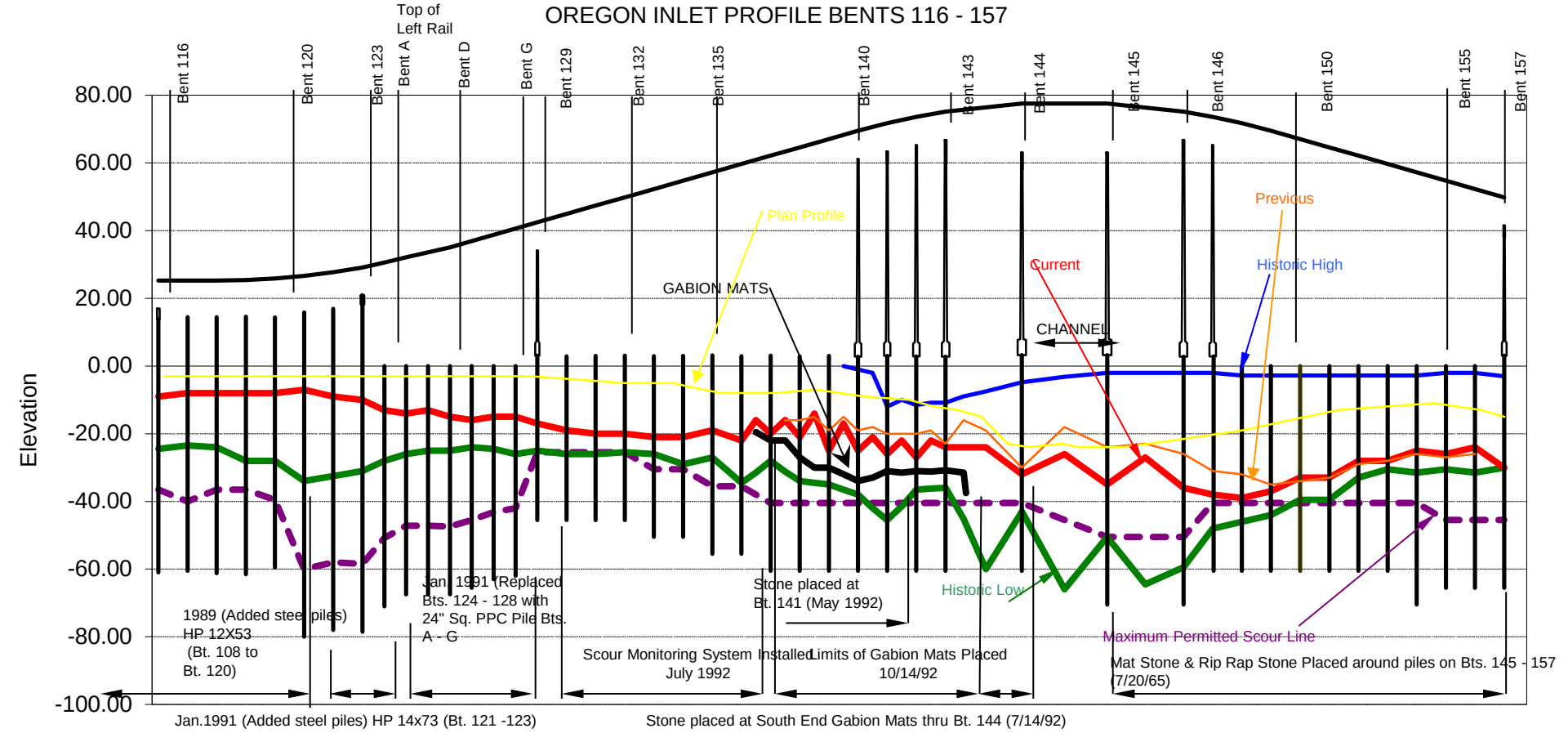

Tyrrell
Roanoke Island
East Lake
Washington
Oregon Inlet
Stumpy Pt.
Mid Pea Island Breach
Dare
Emergency Ferry Routes
Rodanthe (S-Curves) Breach
Lake Mattamuskeet
Hyde
Pamlico Sound
Hatteras Village
Cape Hatteras Lighthouse
Diamond Shoals
Image © 2012 TerraMetrics
© 2012 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Pamlico
Ocracoke Island
35°31'40.44" N 76°08'18.16" W elev 1 ft
Google earth
Eye alt 91.91 mi

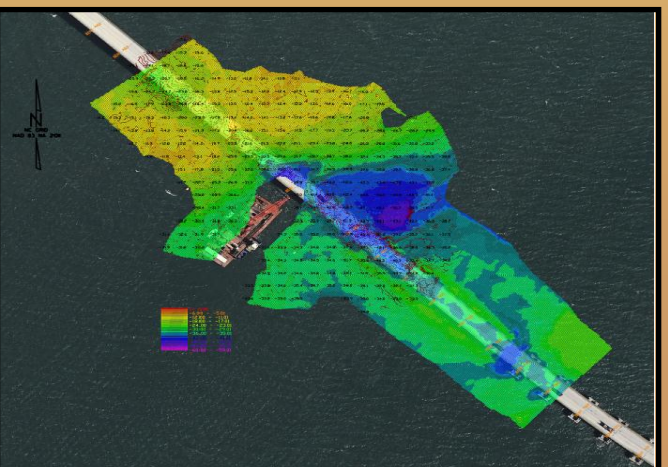
NC 12 Damage Assessment from Hurricane Irene, Aug. 27, 2011

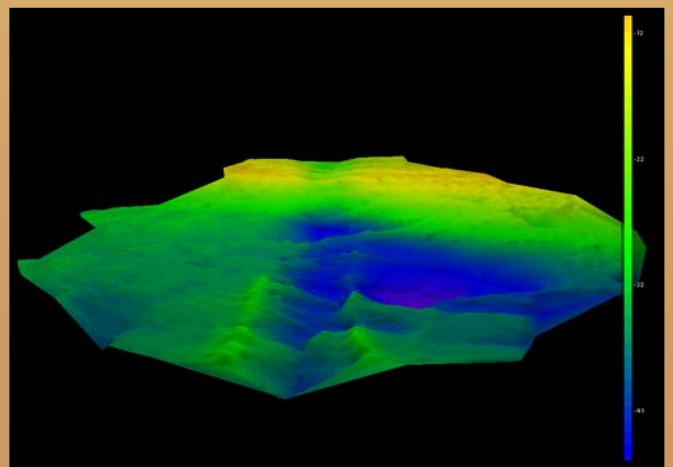
(days 1 to 2 post storm)

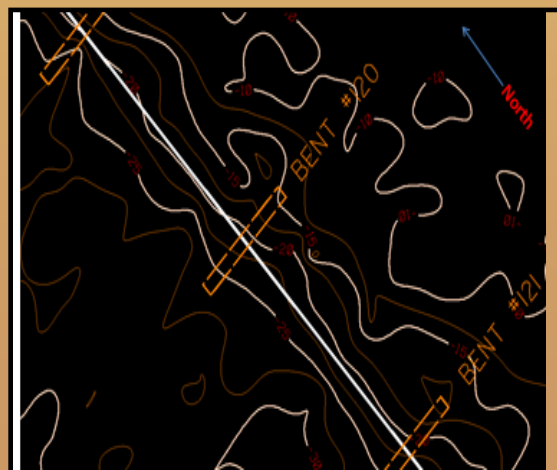
- NC 12 Bonner Bridge over Oregon Inlet
- NCDOT forces on Hatteras & Ocracoke Islands.
- Confirm reports from “others” & ground truth.
- Photogrammetry – Aerial Photos

NC 12 Bonner Bridge over Oregon Inlet


OREGON INLET PROFILE BENTS 116 - 157
Top of Left Rail
Bent 116
Bent 120
Bent 123
Bent A
Bent D
Bent G
Bent 129
Bent 132
Bent 135
Bent 140
Bent 143
Bent 144
Bent 145
Bent 146
Bent 150
Bent 155
Bent 157
80.00
60.00
40.00
20.00
0.00
-20.00
-40.00
-60.00
-80.00
-100.00
Elevation
Plan Profile
GABION MATS
Current
Previous
Historic High
CHANNEL
Historic Low
Maximum Permitted Scour Line
1989 (Added steel piles) HP 12X53 (Bt. 108 to Bt. 120)
Jan. 1991 (Replaced Bts. 124 - 128 with 24" Sq. PPC Pile Bts. A - G
Stone placed at Bt. 141 (May 1992)
Scour Monitoring System Installed July 1992
Limits of Gabion Mats Placed 10/14/92
Mat Stone & Rip Rap Stone Placed around piles on Bts. 145 - 157 (7/20/65)
Jan.1991 (Added steel piles) HP 14x73 (Bt. 121 -123)
Stone placed at South End Gabion Mats thru Bt. 144 (7/14/92)

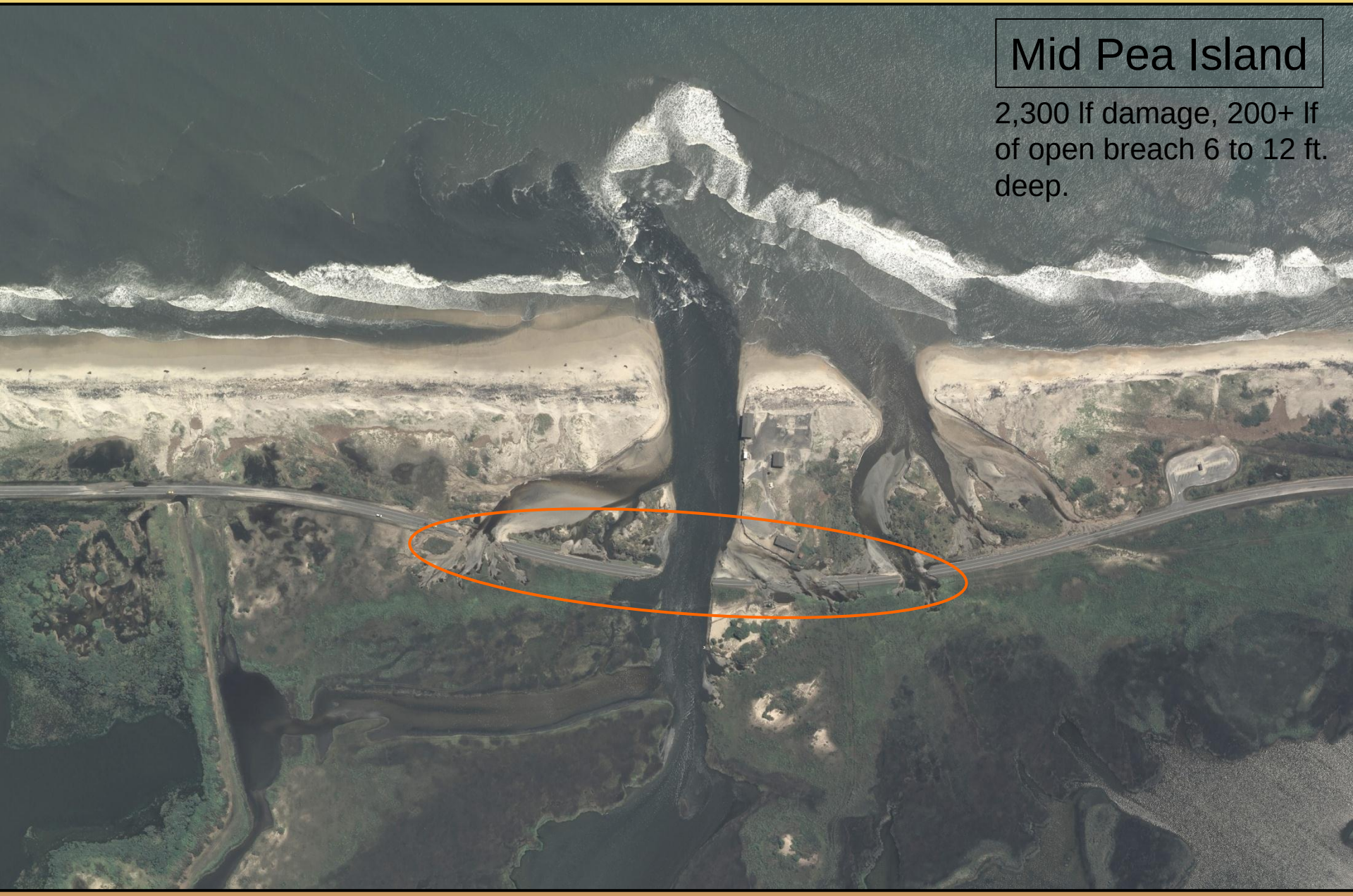





BENT #120
BENT #121
North

Rodanthe S-Curves

2,000 lf damage, 300 lf of open breach 2 to 4 ft. deep.


Mid Pea Island
2,300 lf damage, 200+ lf of open breach 6 to 12 ft. deep.

Ground Truth at Rodanthe

Ground Truth at Pea Island

Next Steps After Assessments, Aug. 29 to Sept. 2

(days 2 to 6 post storm)

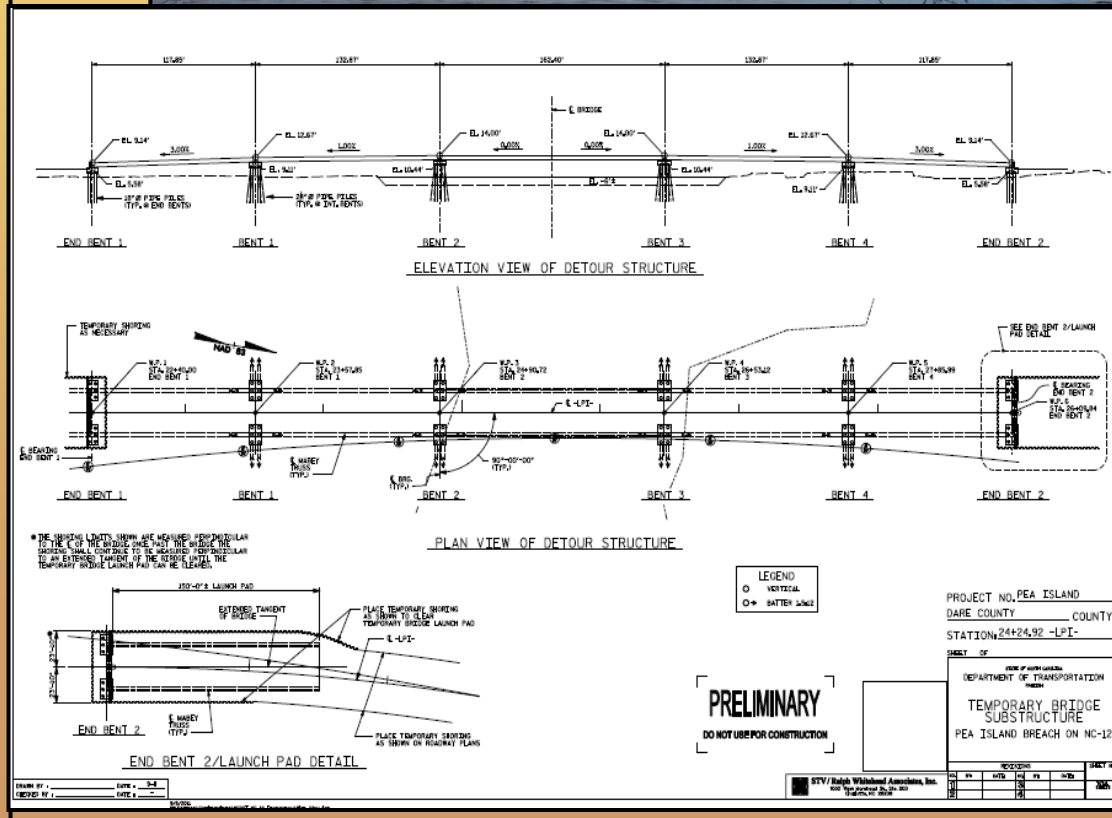
- Control Points for Detailed Survey, i.e. More Photogrammetry.
- NCDOT Internal & External Meetings.
  - reach out: who, what, where.
- Pea Isl. Inlet Comments from Experts.
- Environmental Merger Team Meeting.
- Environmental Permits By Sept 2.

- Aug. 31, Environmental Merger Team Meeting: 70+ Attendees
- Sept. 1, Rodanthe Contract/Plan Meeting.
  - Develop plans & items of work, method of payment, timeframe, etc.
  - Conference call with Barnhill Contracting = available resources.

- Sept. 2, Pea Island Bridge Contract/Plan Meeting.
  - Develop bridge design, items of work, method of payment, timeframe, etc.
  - Carolina Bridge Co., STV/Ralph Whitehead Assoc. , Mabey Bridge Inc.
  - 4 hours later: 5 span bridge w/ main span 162 ft., H-Pile foundation, Cost Plus Contract.

Pea Island Bridge
Sat Sept. 3 to Mon Sept. 5
(days 7 to 9 post storm)

- Develop Substructure Plans.
- Foundation changed from 14” H-Pile to 24” diameter Pipe Pile – 70’ long. (scour & stability)
- Construction Unit located pipe pile from other projects. (Sanford & Smith-Rowe Contractors)
- Piling to be spliced & coated off site. (The Hales Group.)
- Contract with Carolina Bridge Co., Orangeburg, SC - $3.0 million.
- Carolina Bridge moved crane to bridge site.
- Mabey Bridge 660 ft., $2.5 million.
- NCDOT begins hauling sand to small Pea Isl. washouts.



Rodanthe
Sat Sept. 3 to Mon Sept. 5
(days 7 to 9 post storm)

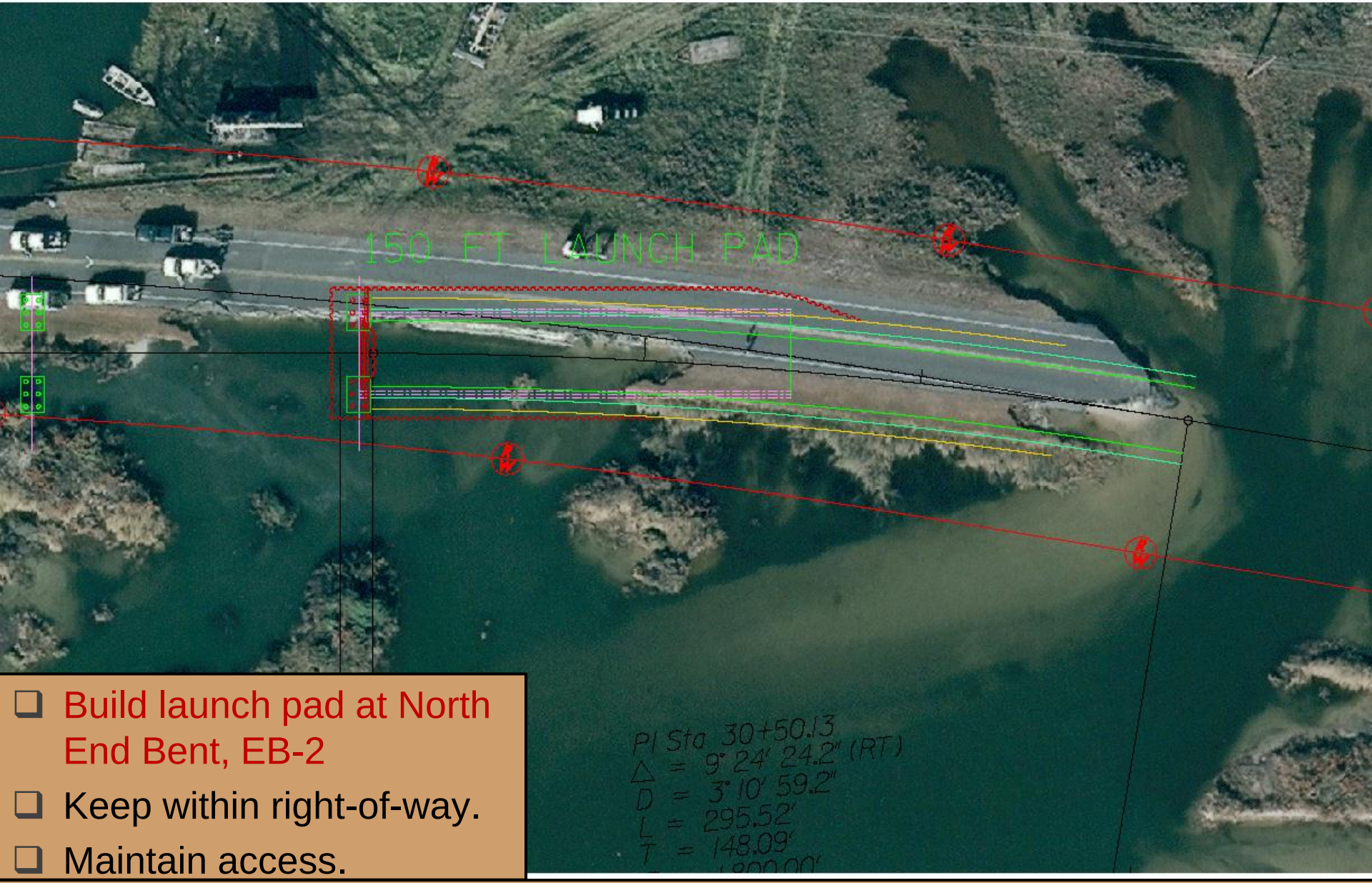
- Contract with Barnhill Contracting Co - $ 4.3 million.
- Barnhill mobilizes equipment by emergency ferry to Rodanthe.
  - 35+ for hire dump trucks.
  - 3 dozers & 2 excavators.
  - 2 front end loaders.
  - 1 roller.
  - 2 fuel trucks.
  - 3 loads of logging mats.
  - 6 light plants.
- Begin hauling sand Monday Sept 5.
- Logging Mat Road.

5 12:04PM

Logging Mat Road Building South To North

Pea Island
Tues Sept. 6 to Fri Sept. 9
(days 10 to 13 post storm)

- Continue to mobilize equip.
  - 2 crawler cranes & 2 rubber tire cranes.
  - Excavator, fork lifts, pile hammers
  - Work barges & tug boat.
  - Tools & Supplies.
- Begin construction stake out.
- NCDOT begins hauling H-Pile from inventory.
- Unload 3 to 5 truckloads of temporary bridge per day.
- Final Substructure Plans Sept. 9.
  - 7 days from bridge meeting Sept. 2.
- Begin driving sheet pile for launch pad/bridge build area at north end. (End Bent 2).



- Build launch pad at North End Bent, EB-2
- Keep within right-of-way.
- Maintain access.

8 4:18PM

8 4:49PM

9 1:27PM

9 1:58PM

9 1:26PM

Rodanthe
Tues Sept. 6 to Fri. Sept. 9
(days 10 to 13 post storm)

- Push sand across breaches at low tide.
- 25,000 CY hauled since Sept. 5.
- Pioneer logging mat road to south end of Pea Island Inlet.
- Prepare for swells from offshore Hurricane Katia.
- Mobilize for sand bag work.
- NCDOT Staff Biologists On Site.

9 2:26PM

9 3:09PM

Road Access To South End Of Pea Isl. Inlet

12 1:27PM

13 5:54PM

Move Equipment & Materials To South Pea Isl. Inlet

Sept. 10 to Oct. 10
(days 14 to 44 post storm)

Rodanthe – Sept. 10

- Continue hauling sand = 65,000 CY.
- Build dune & install sand bags.

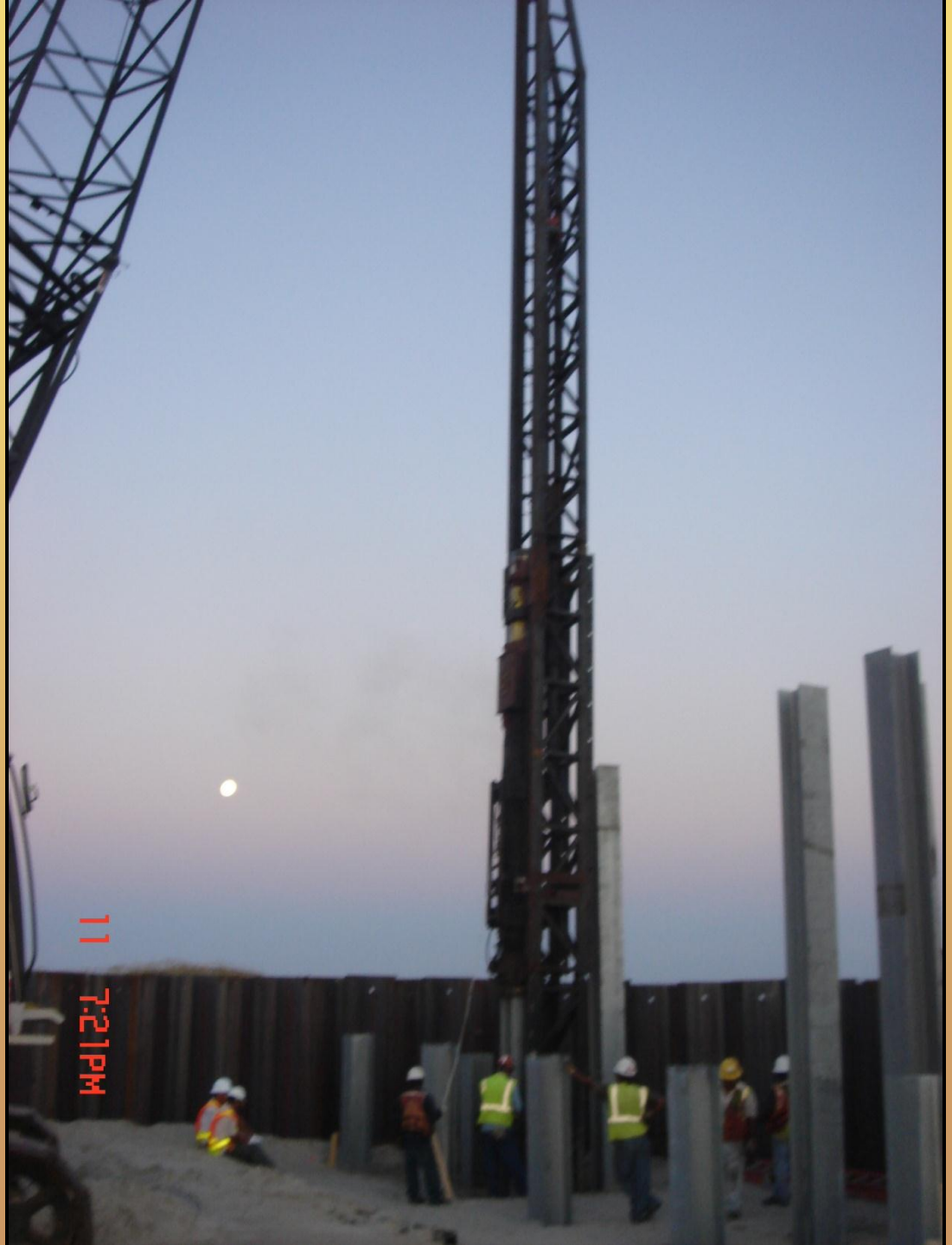
Pea Isl. Bridge – Sept. 10

- Begin driving H-Pile at the north end bent & 24” pipe piles at interior bents.
- Mobilize materials & equipment by ferry & mat road to south side of Pea Island Inlet.
- Begin bridge foundations south side of inlet.
- Assembly of temp. bridge & launch.
- 5 Inspectors and 1 to 3 Biologists.
- Approx. 75 workers, 12 to 24 hrs/day.

10 2:57PM

10 2:58PM

11 3:29PM


11
7:21PM

12 11:12AM

13 2:59PM

13 2:59PM

Launch Pad Sheet Pile Complete

Fill Sheet Pile With 2,500 CY To Elevation +10.0

End Bent 2

- Set 400 pound temporary roller bearings on caps & launch pad.
- Alignment very critical due to launching method.

Launch Pad/Build Area 150 ft.. Long

Launching Nose

Truss Superstructure

- 14.76 ft. truss panels.
- 2.5” diameter, 10 lb. pins with retaining rings.
- Transverse floor beams & wind bracing.
- Ideal for 24 hour work.
  (Blythe Construction Co.)

- Follow erection plan for counterbalance of launch.
- Push with excavator and/or front end loader.
- 825 tons total weight.

Truss Superstructure

Driven Pipe Piles For 1st Interior Bent From Launch Pad – Bent 4

16 4:16PM

Substructure Built North To South

Pile Bent At North Side of Inlet – Bent 3

19 11:04AM

19 6:09PM

218
20 2:12PM

Bridge Launched To 1st Interior Bent From Launch Pad – Bent 4

Pile Bent At North & South Sides Of Inlet, Bents 2 & 3 , 162 ft. Span

23 3:44PM

Bridge Launched Near To Pile Cap At North End Of Inlet – Bent 3

24 2:26PM

Bridge Launched Across Inlet Near To Bent At South End Of Inlet – Bent 2

60
65
28 9:53AM

YAMAHA
60
65
28 10:06AM

Drive Pile For South End Bent And Sheet Pile Retained Approach

Bridge Launched Onto Pile Cap At South End Of Inlet – Bent 2

Bridge Launched Near To Last Interior Pile Bent - Bent 1

Bridge Launched Near To Last Interior Pile Bent - Bent 1

Bridge Launched To South End Bent – EB 1

2 5:57PM
2 6:13PM

JLG
2 6:24PM

4 7:28PM

5 6:33PM
5 12:22PM
YAMAHA

DEERE
7 11:59AM

7 10:50AM

1 9:19AM

...Meanwhile in Rodanthe

9 2:19PM

14 3:07PM

KOBELCO
14 3:07PM

MIRLO
BEACH
DARE TO DREAM THE IMPOSSIBLE DREAM
HITACHI
25 10:53AM

30 3:18PM

- Contract with RPC Contracting - $1.4 million.
- Ferry 2,835 tons of asphalt :135 Trucks

9 5:22PM

10 3:12PM

MIRLO
BEACH
11 12:46PM

11 1:32PM

PERMANENT SOLUTION

- Design – Bid – Build
- STV/Ralph Whitehead Associates – Designer
- 2.1 Mile Long Structure
  - 98 Spans (8 @ 60’, 90 @ 120’)
  - Two Lanes – 42.6ft out-to-out.
  - 30” Sq. P/S Conc. Piling
- Deck Elevation: +25 to +33
- Wave Impact & Scour
- All with-in 100’ easement.
- Letting: Nov. 2013
- A+B Contract
- Awarded: Parsons
  - $79.6 Million
  - 800 Days
- CEI: Sepi Engineering

Rodanthe S-Curves

PERMANENT SOLUTION

- Design Build
  - Advertised Nov. 1, 2013
- SOQ Due Dec. 19, 2013
  - 39 Firms Submitted
- Two Alternates
  - All with-in easement.
  - Leave easement ASAP/Pamlico Sound.
- NCDOT/FHWA working on Record Of Decision for preferred alternate.
- 2+ Mile Long Structure
  - Two Lanes – 42.6ft out-to-out.
- Wave Impact & Scour
- Short List, Final RFP, Tech Proposals & Open: TBD
- CEI: TBD