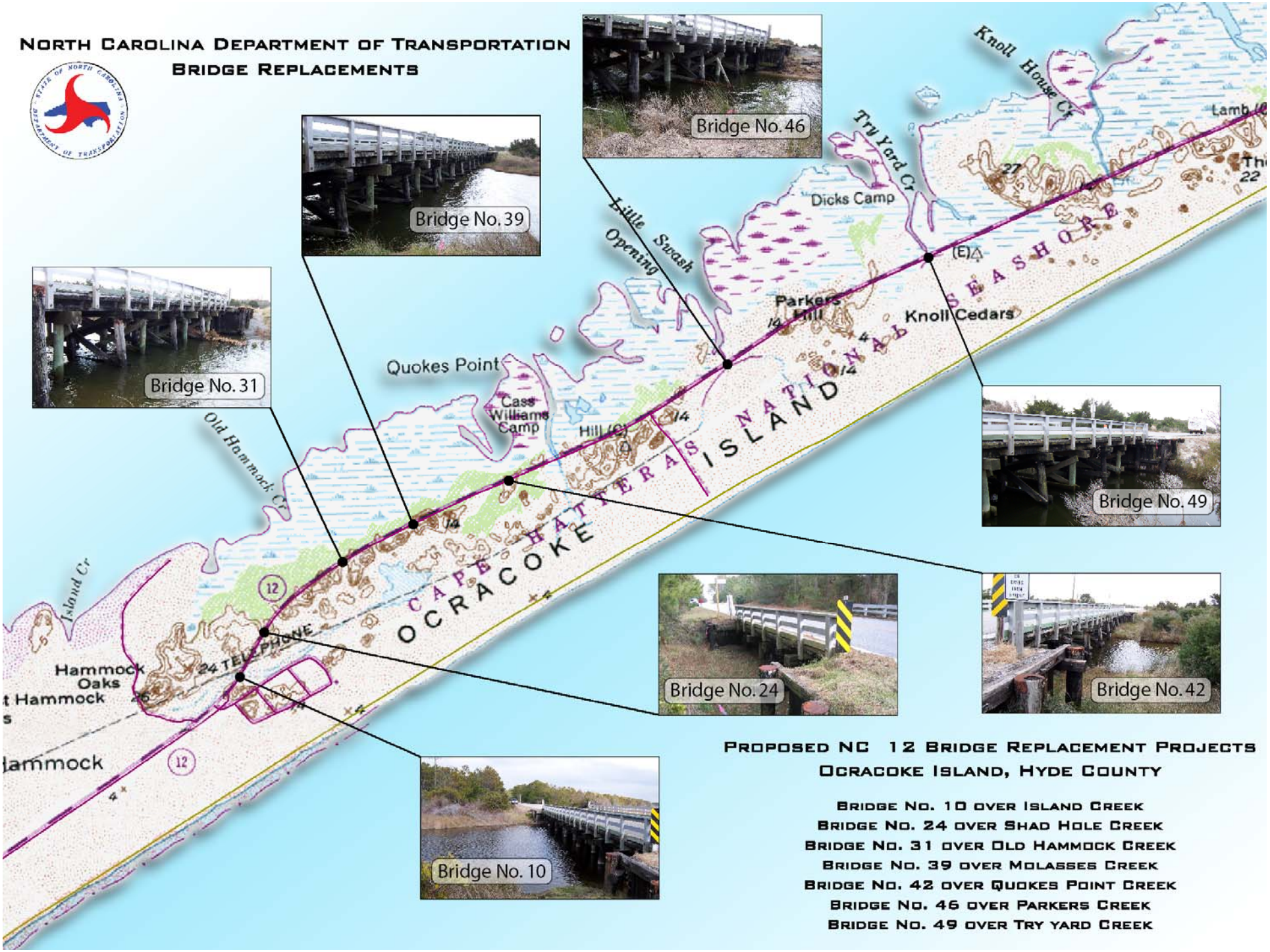

NC 12
Ocracoke Bridge Replacements
7 Bridges in 74 Days
(Or Less)
NC 12 Detour


85
Durham
Raleigh
95
h Carolina
Fayetteville
40
Wilmington
Edenton
Kitty Hawk
Roanoke Island
Oregon Inlet
Swan Qtr.
Cape Hatteras
Ocracoke
Cedar Island
Harkers Island
Cape Lookout
N
W
E
S
Image © 2008 DigitalGlobe
© 2008 Europa Technologies
Image NASA
© 2008 Tele Atlas
© 2005 Google
Pointer 35°20'10.87" N 76°29'55.40" W
Streaming ||||||||| 100%
Eye alt 265.75 mi

North Carolina Department of Transportation
Bridge Replacements



Proposed NC 12 Bridge Replacement Projects
Ocracoke Island, Hyde County

Bridge No. 10 over Island Creek
Bridge No. 24 over Shad Hole Creek
Bridge No. 31 over Old Hammock Creek
Bridge No. 39 over Molasses Creek
Bridge No. 42 over Quokes Point Creek
Bridge No. 46 over Parkers Creek
Bridge No. 49 over Try yard Creek

Ocracoke NC 12 Bridges

Existing

- 7 bridges built in 1950's
- Timber structures w/ ACP
- Clear width 22.5 ft.
- 36 to 152 ft. long
- Limited redirective curb/railing
- No approach guardrail
- Rehabilitation project in 1980's added additional bents, i.e. reduced span lengths

Existing Ocracoke NC 12 Bridges

- Functionally Obsolete
- Structurally Adequate
- Continual Maintenance

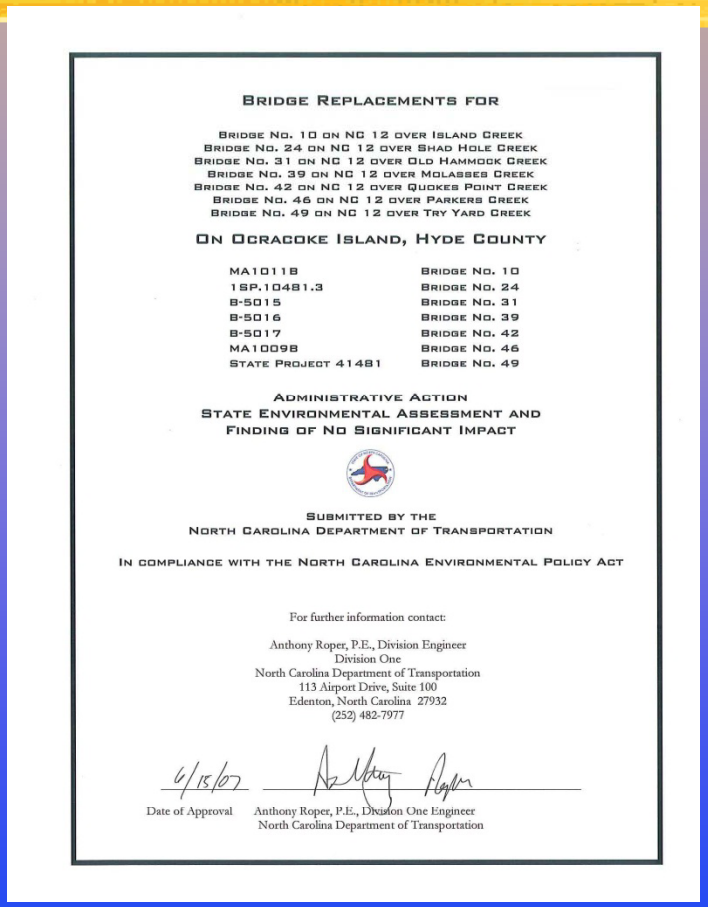
Ocracoke NC 12 Bridges

Preconstruction Highlights

- Oct. 2004 Initial planning for 4 bridge replacements, (7 total on NC 12).
- Structures Designed by Simpson Engineers & Associates.
- EA & Roadways Designed by Mulkey Engineers & Consultants.

- Multiple changes to funding & project approach.
- Jan. 2007 Plans prepared for staged bridge construction then changed to all precast with NC 12 closure for 6 bridges & 1 culvert.
- 2.5 months to revise plans, due Apr. 2007

- June 2007 NCDOT Div. 1 self-performed 4 test piles: $142,000 vs. $460,000.
- PDA data supplied to Bidders at prebid meeting.



BRIDGE REPLACEMENTS FOR

BRIDGE NO. 10 ON NC 12 OVER ISLAND CREEK
BRIDGE NO. 24 ON NC 12 OVER SHAD HOLE CREEK
BRIDGE NO. 31 ON NC 12 OVER OLD HAMMOCK CREEK
BRIDGE NO. 39 ON NC 12 OVER MOLASSES CREEK
BRIDGE NO. 42 ON NC 12 OVER QUOKES POINT CREEK
BRIDGE NO. 46 ON NC 12 OVER PARKERS CREEK
BRIDGE NO. 49 ON NC 12 OVER TRY YARD CREEK

ON OCRACOKE ISLAND, HYDE COUNTY

MA10118	BRIDGE NO. 10
1SP.10481.3	BRIDGE NO. 24
B-5015	BRIDGE NO. 31
B-5016	BRIDGE NO. 39
B-5017	BRIDGE NO. 42
MA10098	BRIDGE NO. 46
STATE PROJECT 41481	BRIDGE NO. 49

ADMINISTRATIVE ACTION
STATE ENVIRONMENTAL ASSESSMENT AND
FINDING OF NO SIGNIFICANT IMPACT

SUBMITTED BY THE
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

IN COMPLIANCE WITH THE NORTH CAROLINA ENVIRONMENTAL POLICY ACT

For further information contact:

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Edenton, North Carolina 27932
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4/15/07
Date of Approval

Anthony Roper, P.E., Division One Engineer
North Carolina Department of Transportation

Ocracoke NC 12 Bridges

Proposed

- Concrete structures w/ silica fume & corrosion inhibitor
- Clear width 33.0 ft; i.e. 12.0 ft lane & 4.5 ft. shoulder
- 122 to 252 ft long
- Concrete parapet w/ guradrail
- Limit impact to the Village, no phased construction
- Replace 7 bridges in 1 construction season.

Ocracoke NC 12 Bridges

Least impact to Village

- Opted for Closure of NC 12 & Beach Detour
  - January 2 to March 15, 2008 non peak visitor season.
  - 74 days. Must open for Easter 2008.
  - All bridge members precast for speedy construction and not as weather dependent as cast in place.
  - Due to limited private property on the island, NPS permitted use of 3 locations for staging.

Beach Detour Route
NPS Campground (Ramp #68) to Pony Pen (Proposed Ramp)
(Ramp #67 for use by contractor only)

Ocracoke NC 12 Bridges

Construction Highlights

- 8 week bid advertisement for July 2007 let.
- Mandatory prebid meeting; PDA data provided to bidders & pile type addendum.
- Awarded to Carolina Bridge Company; Orangeburg, SC for $8,024,399.81.

- Site Available Nov. 2007: MOT permitted.
- NC 12 Closure & Beach Detour Jan. 2, 2008.
- Open NC 12 to all traffic March. 15, 2008.
- Project Completion May 15, 2008.

- Incentive/Disincentive $10,000/day.
- Bonus $250,000: open NC 12 on or before March 15th .


Campground Staging Area


Campground Staging Area


Campground Staging Area

Additional Staging Areas

North End of Project

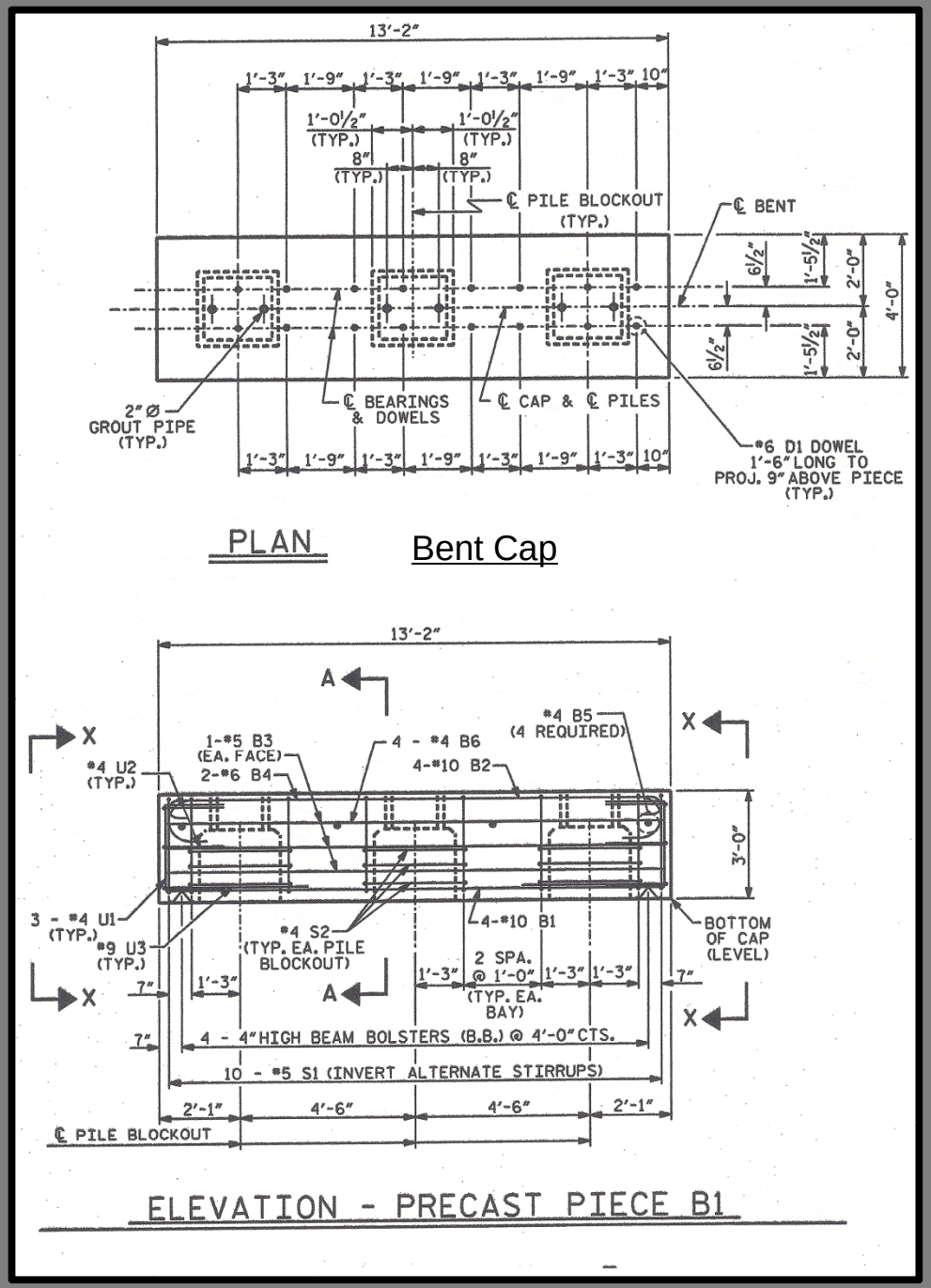
Pony Pen Parking

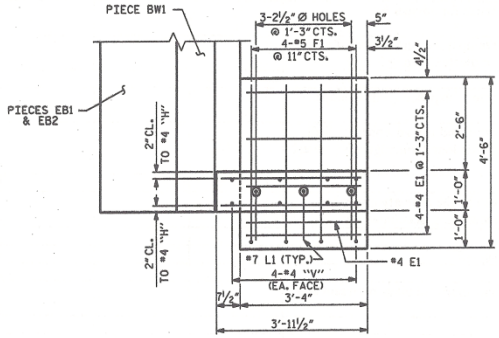
North Ferry Dock

Pony Pen Parking

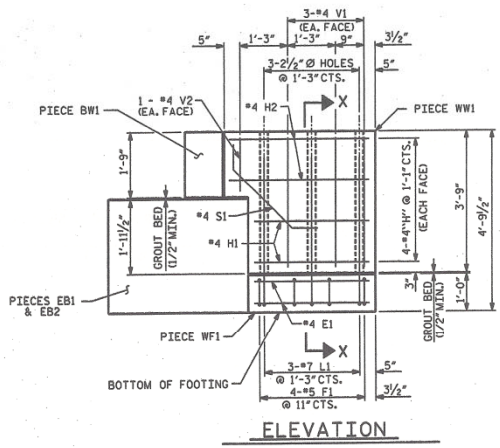
- Water Storage for Grouting
- NCDOT Fuel & Lab
- Demolition Debris Storage

Precast Substructure Members/Pieces Utilize Uniform Design Across All Structures





Wing Wall




Precast Bent Caps - 10 tons

Precast End Bent Cap - 15.5 tons

Precast Cap Backwalls - 1 ton

Precast Wing Wall

Precast Wing Wall Footing

Wingwall & Footing Assembly - 2 tons

Work Prior to January NC 12 Closure

Lane Closure for Pile Driving

Driving End Bent Piles Through Existing Road

74 12” P/S Concrete Piles with 2 ft. HP Pile Tip

Pile Driving Crane Walks to Next Bridge End Bent

Load Distribution on Existing Structure

January 2, 2008 Begin Beach Detour

First 2 days of NC 12 Closure...Begin Beach Detour

Equipment & Material Prepositioning and Bridge Preparation

Bridge Replacement Day 1

Select Demolition of Existing Structure

- **Chain Saws & Concrete Walk Behind Saws**
- **Install Temporary Steel Decking at Wheel Paths for Continual Access to Project Limits**

Bridge Replacement Day 1

Select Demolition of Existing Structure

- Temporary Steel Decking Supported on Timber Cap
- Adjust to Accommodate Crane or Vehicles
- Remove to Allow Pile Driving
- Replace After Pile Driving, Move Ahead

Temporary Steel Mats - Project Access

Bridge Replacement Days 2 & 3

Pile Driving Through Existing Structure

16” Prestressed Concrete Composite Pile

20 ft HP 10 X 57 bolted to 26.5 ft P/S Concrete

- Dense sand – no pile jetting.
- Eliminate early refusal before minimum tip elevation.
- First use in NCDOT.
- 2 Point Pick Up.


Pile Driving Through Existing Bridge


Piles Driven Through Existing Bridge


Piles Driven Through Existing Bridge

Bridge Replacement Days 3 & 4

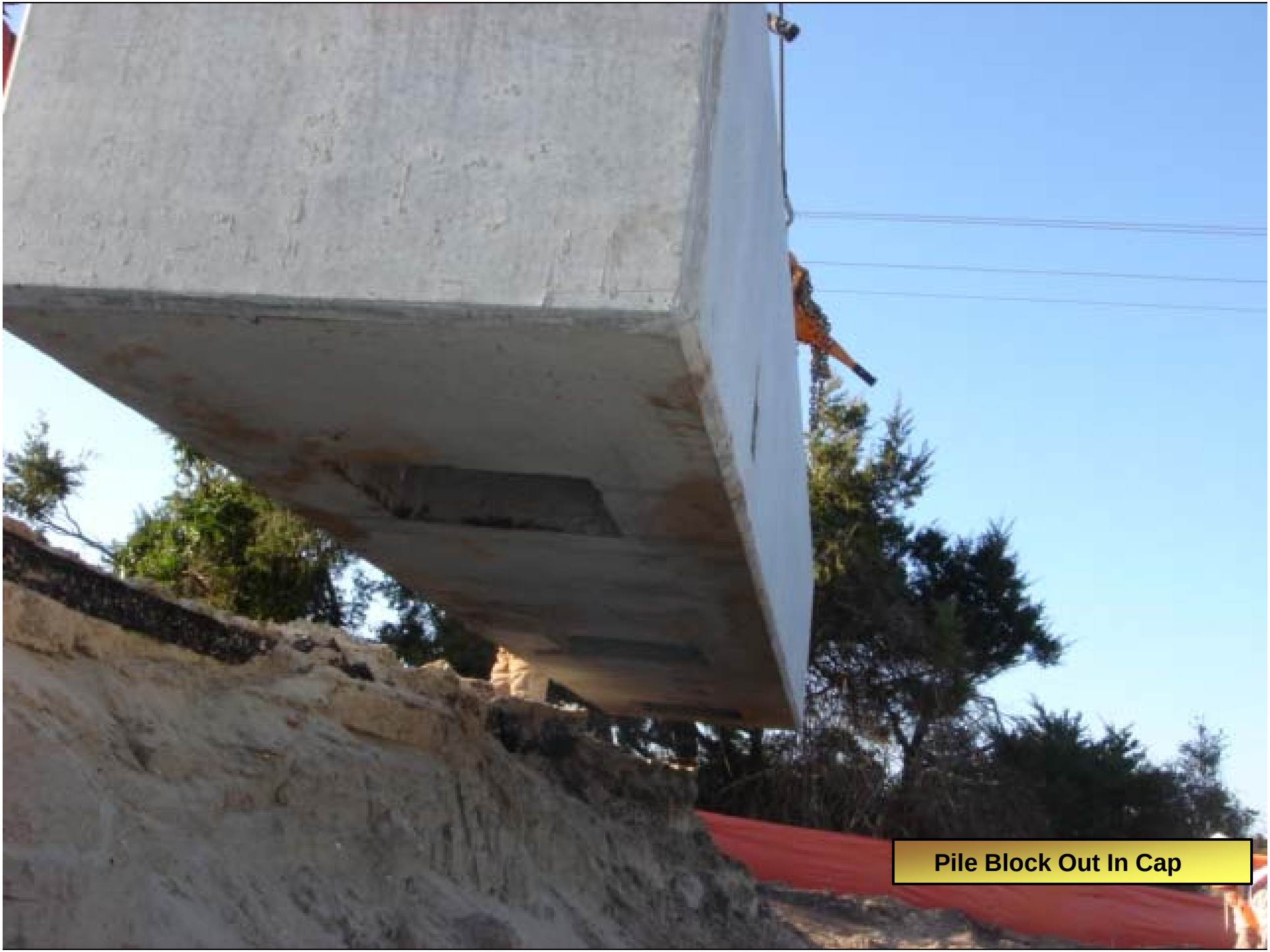
Bridge Demolition

Bridge Replacement Days 3 & 4

Setting Precast Substructure

- Pile Blockout Bottom Prepared
- Equipment Dedicated to Certain Tasks
- Availability of Work Items Dictated Time of Operation (4 crews & 3 cranes)
- Do Not Put Off Available Work


Setting End Bent Cap 9:30pm


Pile Block Out In Cap


Setting End Bent Cap


Setting Interior Bent Cap

Setting Interior Bent Cap

Precast Cap Blockout & Cap Support

Limited Falsework & Quick Set Up

Bottom of Cap with Block Out & Pile

Bottom of Cap, Top of Pile, & Internal Skew Adj. Bolt

Bearing Plate for Internal Support Bolt

Top of Cap, Internal Support Bolt & Grout Vents


Caps Completed Within Hours

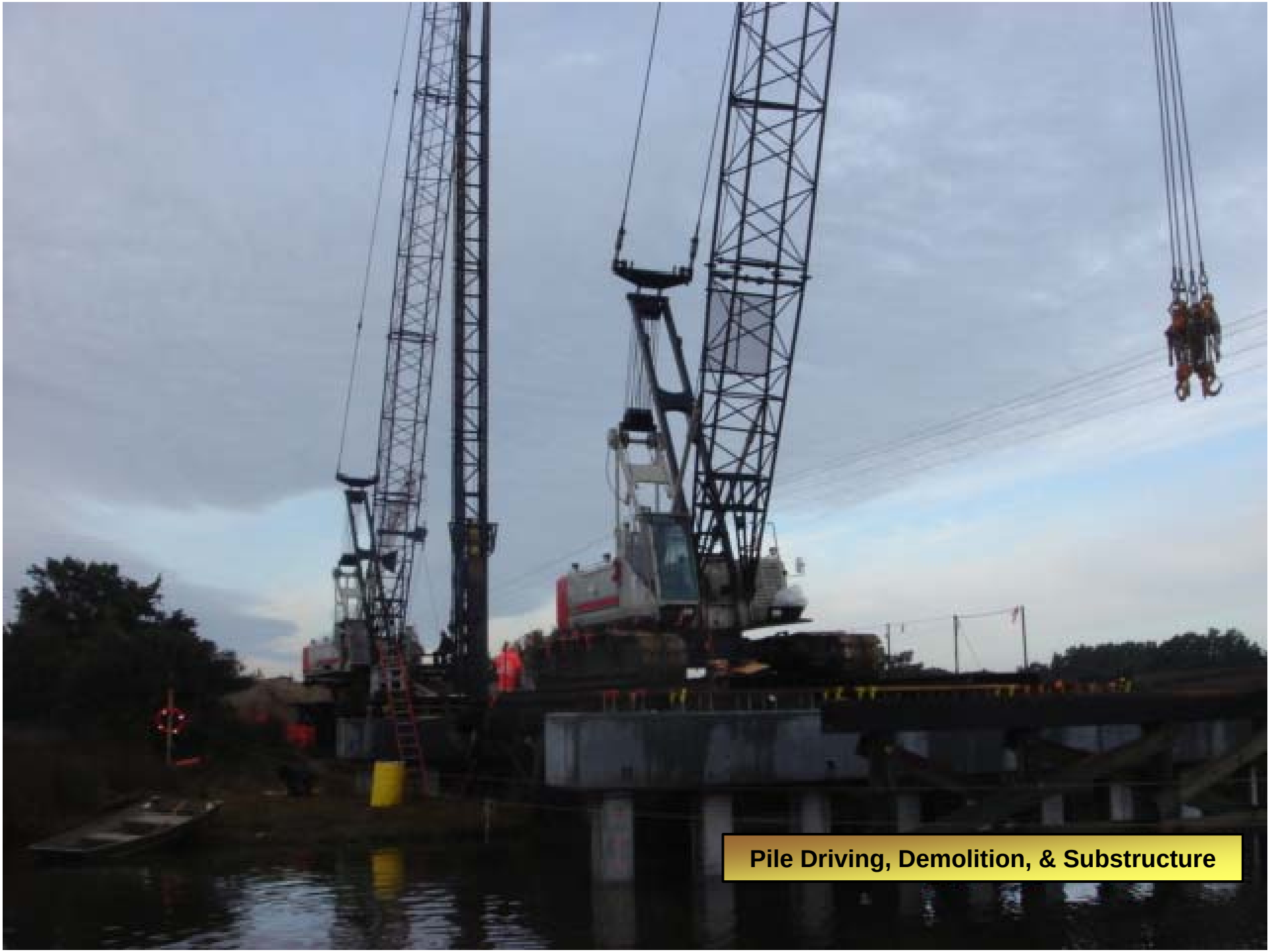

Skewed & Superelevated Cap

End Bent Cap With Rip Rap

Precast Wing Walls

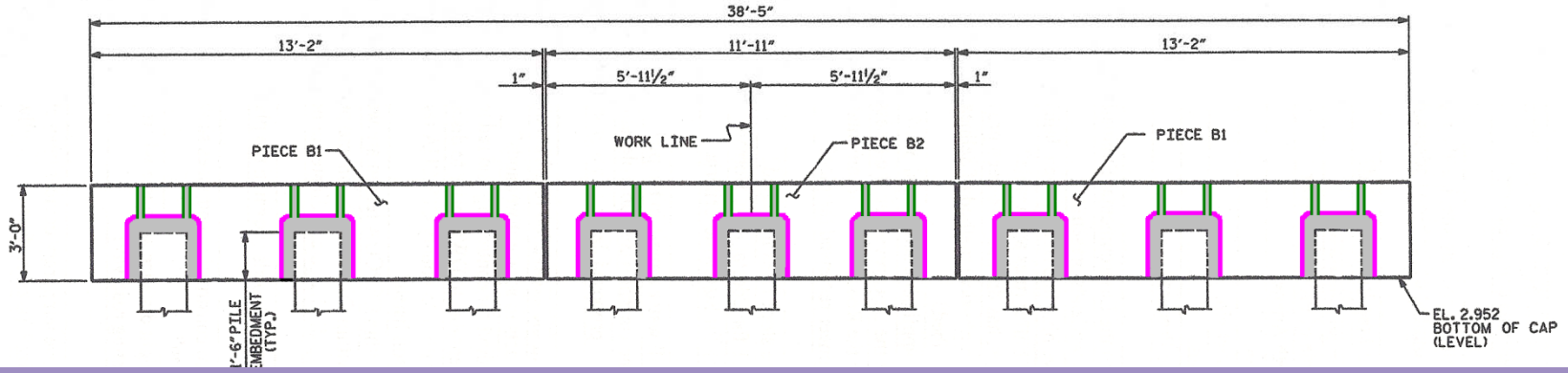
Spread Footings Set on Consistent Material

- Level Footing for Uniform Gap
- Wingwall Grouted to Footing
- Take Care with Backfilling


Pile Driving, Demolition, & Substructure

Bridge Replacement Day 5

Grouting Substructure



Grout Plant

Bridge Replacement Day 5

Grouting Substructure

Bridge Replacement Days 6 & 7

Erecting Cored Slabs & Barrier Rail


Setting Cored Slabs - 14 tons

Alternate Concrete Barrier Rail

Light Weight Concrete Barrier Cast on Cored Slab

- Proposed by Carolina Bridge Co. and Alpha & Omega Engineers.
- Barrier Cast on the Slab at Casting Yard.
- Eliminates Extra Steps of Setting & Grouting Precast Barrier Pieces.
- One Less Operation On Site.

Setting Exterior Cored Slab & Barrier Rail – 24 tons
Crane with counterweights 193k; behind end bent.

Crane on Work Bridge Supported on Bridge Bents - 40k less counterweight.


Setting BackWalls

Cored Slabs & Barrier Rail ready for Grouting & 2-Bar Metal Rail

Open Early To Traffic March 5, 2008

Contract did not Require Paving & Guardrail for Opening

- All Structures Complete on February 16, 2008.
- Elected to Pave for “BUMP” Free Corridor.
- Carolina Bridge Awarded Incentive & Bonus: $350,000

One More Thing....Remove a Bridge & Install Twin Culvert


Carolina Bridge Company-
Scott Nickel, President
Richard Nickel, Vice President
National Park Service
Hyde County
NCDOT Ferry Division
NCDOT Division 1 & Resident Offices
Village of Ocracoke


DETOUR
DETOUR
Closed To
Vehicles
Cape Point
EXXON
Towing
475-4285


FEB 13 2008