I-40 SLOPE REPAIRS

INTERSTATE HIGHWAY 1-40 SLOPE REPAIRS IN WESTERN NORTH CAROLINA

Joseph Bigger
Geobrugg North America, LLC.
New London, Connecticut

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I-40 SLOPE REPAIRS

THE PROBLEM – RAIN

“THE HURRICANES OF 2004 TRIGGERED AT LEAST 85 LANDSLIDES, MOSTLY IN WESTERN NORTH CAROLINA“  *Journal Raleigh Bureau, February 6, 2005*

“NORTH CAROLINA HAS OBTAINED $72 MILLION IN FEDERAL FUNDS TO RESTORE WESTERN NORTH CAROLINA WATERSHEDS DAMAGED BY LAST YEAR’S TROPICAL STORMS“  *NBC17, February 8, 2005*
The 2004 Hurricane Season

August 9th through September 29th
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September 17, 2004

Pigeon River
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September 17, 2004

Pigeon River
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Pigeon River

November 24, 2004
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Aerial Photographs

2004 Aerial

1992 Aerial
Further downstream in Tennessee
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AFTER THE RAIN HAD STOPPED

- I-40 EASTBOUND LANES CLOSED AND ALL TRAFFIC ON THE WESTBOUND LANES
- EMERGENCY REPAIR PROJECT WITH THE GOAL OF REOPENING I-40 EASTBOUND LANES ASAP
- NEXT STEP – WHO WILL DO THE DESIGN?
  - IN HOUSE OR OUTSIDE CONSULTANT
- NORTH CAROLINA DOT DECIDED THE HIGHWAY DESIGN BRANCH WOULD DO THE DESIGN
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DESIGN AND CONSTRUCTION OBJECTIVES/CRITERIA

1. STABILIZE THE SLOPE
2. NO MAINTENANCE
3. NON-RIGID SYSTEM AT TOE
4. PREVENT FUTURE TOE SCOUR
5. ENVIRONMENTAL CONCERNS
6. REOPEN I-40 EASTBOUND LANES ASAP
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- Two design teams established
  - One team focused on the roadway
  - One team focused on the toe
- Design was completed in 3 weeks from flyover to final plans
- At the roadway, the proposed design was a tie back wall
- At the toe, the final design was a rip rap abutment reinforced with ring nets
Contractor Selection Method

- Utilized a TWO-step contracting process

1) **Select Geotechnical SubContractor**
   - 4 Geotechnical Contractors Invited To Bid

2) **Select General Contractor**
   - 4 General Contractors Invited to Bid
   - Required to use selected geotechnical subcontractor
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Geotechnical Contractor Selection Process

- **Proposal Grading Criteria**
  - 60% Technical
    - Safety Plan: 30 points
    - Schedules and Milestones: 25 points
    - Long Term Maintenance: 20 points
    - Innovation: 10 points
    - Environmental Stewardship: 10 points
    - Oral Interview: 5 points

- **Cost**
  - 40% Cost
  - Grading Criteria used to determine Quality Credit
  - Quality Credit applied to proposal price to determine adjusted price
  - Selected Contractor: Schnabel Foundation
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CONSTRUCTION SCHEDULE

- Slides 1 & 2 were awarded on ~October 28, 2004
- Contractors started in early November
- Slide 3 added to contract on ~January 24, 2005
- Contractor not allowed to start toe scour protection until all pipe piles and 1st row of tie backs installed
- All 4 lanes of I-40 opened on February 25, 2005
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Tie-Back Wall Design
- Pipe Piles - Numa Super Jaws®
- Concrete Walers
- Shotcrete Facing Below 1st Waler
- Cast In Place Concrete Wall Above 1st Waler
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Winter Weather
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Difficult Drilling
Drilling Tie Back Anchors
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Preparing for lower shotcrete wall
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Applying Shotcrete
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Partially Completed Toe Scour At Slide 2
Placing Final RipRap Layer At Slide 3-
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Completed Toe Scour At Slide 1
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Completed Slide 2
I-40 SLIDE REPAIRS

Further Downstream in Tennessee
I-40 SLOPE REPAIRS

SUMMARY / CONCLUSION
NEW APPLICATION FOR NCDOT
EVERY ONE CONFIDENT SYSTEM WORKS
HOPEFUL SYSTEM IS NEVER REALLY TESTED