



What's New with the NCDOT Geotechnical Engineering Unit?

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What's New with the NCDOT GEU?

- Geosynthetic Reinforced Soil (GRS)– Integrated Bridge System (IBS)
 - FHWA EDC-3 Innovation
- Geocells for Slope Erosion Control
 - Issues with establishing vegetation on steep RSS
- Compaction Grouting for Bridge Approach Slabs
 - Issues with repeatedly slab jacking settling bridge approach slabs

The NCDOT GRS–IBS

- Segmental Retaining Wall (SRW Units) instead of Concrete Masonry Units (CMU)
- Geogrids instead of geotextiles
- Cast-in-Place (CIP) footing instead of precast or no footing
- Bridge approach slab instead of paved asphalt approach
- Expecting significantly accelerated construction but maybe not substantially reduced construction costs

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NCDOT GRS–IBS Pilot Project

- Anson County Bridge No. 201 on Rocky Mountain Church Road over Big Branch Creek
- Little Scour – shallow rock approx. 2 ft below stream bed
- Very Low Risk – 90° skew, April letting, 100 yr storm 2 ft below low chord, single span cored slab, no MOA required, minimal design rework, etc.
- Received a \$400,000 grant from FHWA

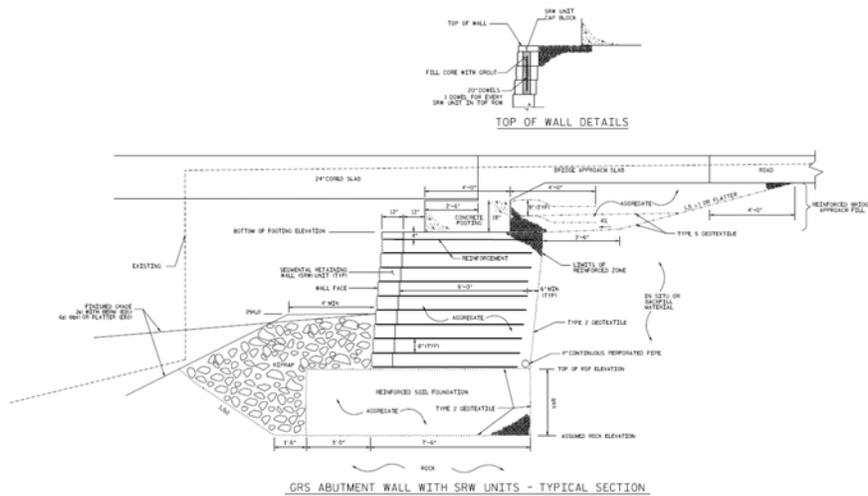
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Anson County Bridge No. 201



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GRS Details



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Future Plans

- GRS abutment fails in connection per AASHTO MSE wall design
- GRS wall can be designed as an MSE wall per AASHTO without the bridge surcharge loads
 - Minimal connection needed with geogrid reinforcement at every layer
- Allows for standard MSE wall design with different combinations of SRW units, geogrids and backfills
- Revise MSE wall policy to be in line with standard GRS wall – ✓ Done, effective 1/5/15

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Permanent Soil Reinforcement Mat, i.e., Turf Reinforcement Mat (TRM)



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Cellular Confinement Systems, i.e., “Geocells”



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NC 33 over Norfolk Southern RR in Chocowinity, NC



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NC 33 over Norfolk Southern RR in Chocowinity, NC



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NC 33 over Norfolk Southern RR in Chocowinity, NC



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NC 33 over Norfolk Southern RR in Chocowinity, NC



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Future Plans

EROSION CONTROL PRODUCTS			
Type	Geocell	ECB	TRM
Typical Application	Slope Erosion Control (Slopes steeper than 1.5:1 and Slopes in Coastal Plain steeper than 2:1)	Slope Erosion Control (Slopes 1.5:1 or flatter and Slopes in Coastal Plain 2:1 or flatter)	Channel Erosion Control
Typical Material	HDPE, Polyester or Polypropylene Polymer	Double Net Coconut Blanket	Double Net Polyfiber Matting
Typical Longevity	Permanent	Long-Term (> 24 months)	Permanent

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Approach Slab Settlement



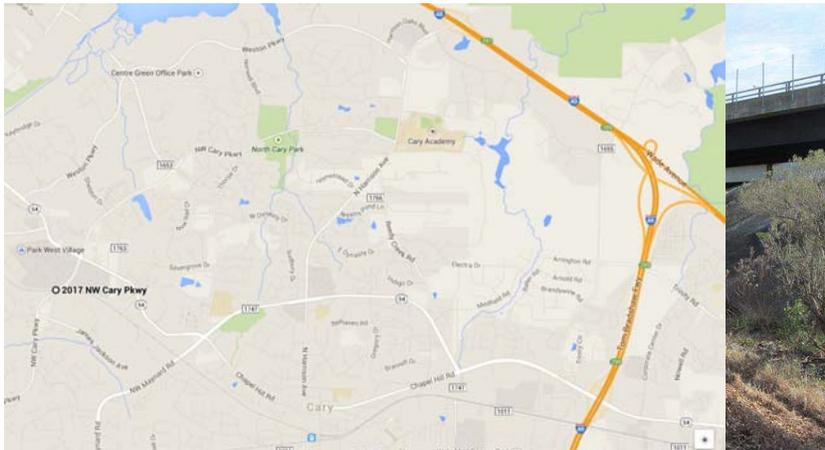
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Slab Jacking

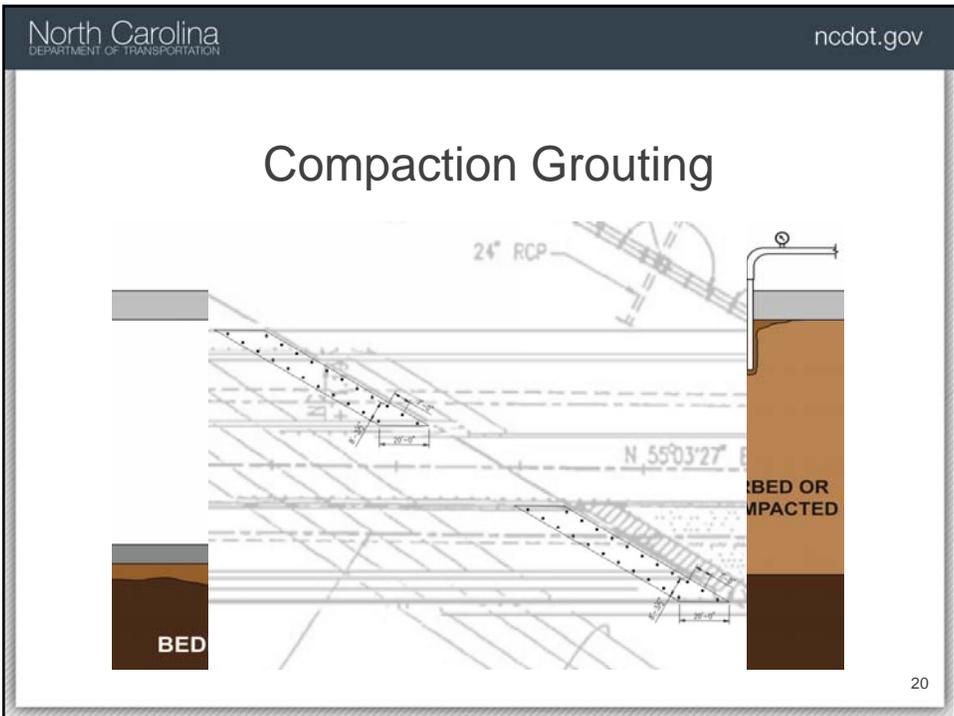
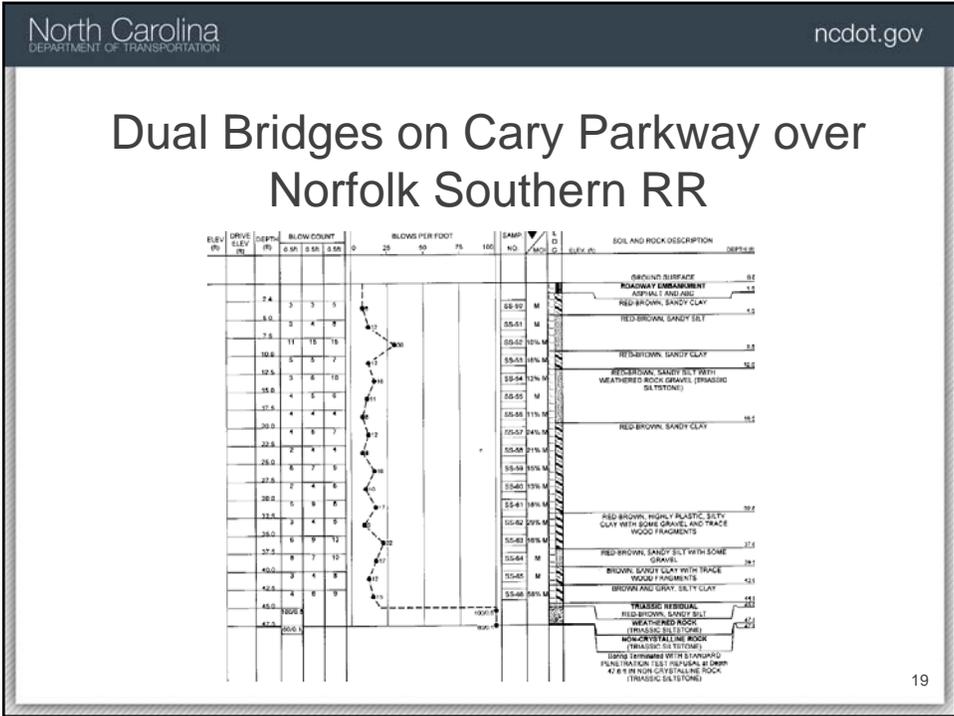


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Dual Bridges on Cary Parkway over Norfolk Southern RR



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Future Plans

- Division 5 is looking at using Bridge Maintenance funds for permanent fix
- Applying for \$100,000 grant from FHWA for an Accelerating Innovation Development (AID) Demonstration Project to partially cover costs
- Implement new grout types with approved product list (APL) for prepackaged grout –
 ✓ Done, effective March 2015 Letting

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Update Section 1003 Grout Production and Delivery

Type of Grout	Minimum Durability Factor
1	-
2	-
3	80
4 ^D	-
5	-



Minimum Durability Factor
-
-
80
-
-

A. Applicable to Type 3 grout
 B. Applicable to Type 4 grout
 C. ASTM C1107.
 D. Use Type 4 grout

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