



March 27, 2020

MEMORANDUM TO: Pat Ivey, P.E.
 Division Engineer

FROM: Kenneth Bussey, P.E.
 Senior Geotechnical Engineer
 HDR Engineering, Inc., of the Carolinas

STATE PROJECT: 50163.1.1
 TIP NO: U-5738
 COUNTY: Rowan
 DESCRIPTION: SR 2528 (Julian Road) from SR 2667 (Summit Park Drive) to US 601 (Jake Alexander Blvd) in Salisbury

SUBJECT: Geotechnical Roadway Recommendation Report

HDR Engineering, Inc., of the Carolinas (HDR) has completed the subsurface investigation and provides the following recommendations for design and construction of the proposed roadway for the above referenced project.

I. Slope/Embankment Stability

A. Slope Designs

We recommend that all cut slopes be constructed at a ratio of 2:1 (H:V) or flatter and that all fill slopes be constructed at 2:1 (H:V) or flatter.

B. Undercut for Embankment Stability

We recommend 675 cubic yards of undercut for embankment stability be included in the contract for the areas listed below.

<u>Line</u>	<u>Station (±)</u>
-L-	39+75 to 40+75

We recommend a contingency item of 200 cubic yards of undercut for embankment stability be included in the contract.

C. Geotextile for Soil Stabilization

To provide an initial working platform for embankment construction in soft, wet areas, we recommend that 675 square yards of Geotextile for Soil Stabilization as described in Section 270 of the Standard Specifications be used in the areas described in Section I. B. We recommend a contingency item of 200 square yards of Geotextile for Soil Stabilization be included in the contract to be used at the discretion of the Engineer.

II. Subgrade Stability

A. Subsurface Drainage – Subsurface Drain

We recommend 830 linear feet of subsurface drainage be included in the contract for the area listed below.

<u>Line</u>	<u>Station (±)</u>
-L-	66+00 to 70+15

We recommend 200 linear feet of subsurface drain (Roadway Standard Drawing 815.02) be included in the contract as a contingency to be used at the discretion of the Engineer.



- B. Aggregate Subgrade
Shallow undercut should extend to a point one foot beyond the edge of proposed pavement or curb and gutter to a depth of approximately 1.0 foot below subgrade. We recommend 250 cubic yards of shallow undercut for subgrade stability be included in the contract as a contingency to be used at the discretion of the Engineer.
- C. Geotextile for Soil Stabilization
We recommend 750 square yards of geotextile for soil stabilization be included in the contract as a contingency to be used at the discretion of the Engineer.
- D. Grade Point Undercut
We recommend a contingency item of 100 cubic yards of grade point undercut be included in the contract as a contingency to be used at the discretion of the Engineer.

III. Borrow Specifications

- A. Borrow Criteria
Common Borrow for embankment construction should meet Piedmont and Western Area Criteria outlined in the Standard Specifications, Article 1018-1.
- B. Shrinkage Factor
We recommend a shrinkage factor of 20% be used for earthwork calculations.
- C. Select Granular Material
Utilize 675 cubic yards of Select Granular Material, Class III, backfill over Geotextile for Soil Stabilization per Section 265 of the Standard Specifications for use in areas recommended for Undercut for Embankment Stability Section I B. Include a contingency quantity of 200 cubic yards to be used in Section I B.
- D. Class IV Subgrade Stabilization Material
We recommend a contingency of 500 tons of Class IV Subgrade Stabilization Material as backfill for the Aggregate Subgrade. The material should meet the requirement of Standard Specifications, Article 1016-3 Class IV.

Please contact either Kenny Bussey at 919-985-8942 or Mike Batten at 919.232.6675 if there are any questions concerning this memorandum.

Prepared By,



Kenneth R. Bussey, Jr., P.E.
Senior Geotechnical Engineer
HDR



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

Summary of Quantities

WBS Number: 50163.1.1County: RowanProject Engineer: M. BattenTIP Number: U-5738Field Office / PEF: HDRProject Geologist: J. CrenshawDescription: SR 2528 (Julian Road) from SR 2667 (Summit Park Drive) to US 601 (Jake Alexander Blvd) in Salisbury

Pay Item No.	Pay Item/ Quantity Adjustment	Spec Book Section No. or Special Provision (SP) Reference	Report Section	Alignment	Begin Station	End Station	Quantity	Units / %
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	-L-	39+75.00	40+75.00	675	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	Contingency	N/A	N/A	200	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	II. D	Contingency	N/A	N/A	100	CY
Total Quantity of Undercut Excavation =							975	CY
0195000000-E	Select Granular Material	265 - Select Granular Material	III. C	-L-	39+75.00	40+75.00	675	CY
0195000000-E	Select Granular Material	265 - Select Granular Material	III. C	Contingency	N/A	N/A	200	CY
Total Quantity of Select Granular Material =							875	CY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	Contingency	N/A	N/A	200	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	-L-	39+75.00	40+75.00	675	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. C	Contingency	N/A	N/A	750	SY
Total Quantity of Geotextile for Soil Stabilization =							1,625	SY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. B	Contingency	N/A	N/A	250	CY
Total Quantity of Shallow Undercut =							250	CY
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	III. C	Contingency	N/A	N/A	500	TON
Total Quantity of Class IV Subgrade Stabilization =							500	TON
2044000000-E	6" Perforated Subdrain Pipe	815 - Subsurface Drainage	II. A	-L-	66+00.00	70+15.00	830	LF
2044000000-E	6" Perforated Subdrain Pipe	815 - Subsurface Drainage	II. A	Contingency	N/A	N/A	200	LF
Total Quantity of 6" Perforated Subdrain Pipe =							1,030	LF

These Items Only Impact Earthwork Totals

N/A	Shrinkage Factor	235 - Embankments	III. B	N/A	N/A	N/A	20	%
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