



Date: April 8, 2022

Memorandum to: Brian Wiles, PE
Project Manager
CH Engineering

From: Kelly R. Plummer, PG
Project Geologist
Terracon Consultants

State Project: BP8.R013
County: Richmond
Description: Replace Bridge 760140 on SR 1971 (Sandhill Road) over Solomons Creek

Subject: Geotechnical Roadway Recommendations

Terracon Consultants has completed a subsurface investigation for this project and presents the following recommendations:

I. Slope and Embankment Stability

A. Slope Design

All permanent slopes should be constructed at a ratio of 3:1 (H:V) or flatter. The slope recommendation does not apply to transitions to end slopes and sliver fills.

B. Undercut for Embankment Stability

The following areas contain very soft wet alluvial soils and should be Undercut for Embankment Stability. The depth of undercut should be to suitable soils. The estimated total volume of soils to be undercut is 1,480 cubic yards. Recommend that these undercut soils be wasted.

<u>Line</u>	<u>Stations (±)</u>
-L-	17+15 to 19+37
-L-	20+08 to 21+65

We recommend a quantity of 200 cubic yards of Undercut Excavation for Embankment Stability be included in the contract as a contingency to be used at the discretion of the Engineer.



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C. Geotextile for Soil Stabilization

A quantity of 1,490 square yards of Geotextile for Soil Stabilization should be included in the project contract to be used in conjunction with the undercut described in section I.B. An additional quantity of 200 square yards of Geotextile for Soil Stabilization is recommended for inclusion in the contract as a contingency to be used at the discretion of the Engineer.

II. Subgrade Stability

A. Undercut for Subgrade Stability

We recommend a quantity of 200 cubic yards of Undercut for Subgrade Stability be included in the contract as a contingency item, to be used in areas for Undercut at the discretion of the Engineer.

B. Aggregate Subgrade

We recommend a quantity of 100 cubic yards of Undercut for Subgrade Stability be included in the contract as a contingency item, to be used in areas for Undercut at the discretion of the Engineer. Shallow Undercut should be to a depth of 1.0 foot below subgrade. Backfill should extend to a depth of 1.0 foot below subgrade from the edge of existing pavement to 1.0 foot beyond edge of pavement structure.

C. Geotextile for Soil Stabilization

A quantity of 300 square yards of Geotextile for Soil Stabilization should be included in the project contract to be used in conjunction with the Shallow Undercut for Aggregate Subgrade described in Section II.B as a contingency item to be used at the discretion of the Engineer.

III. Borrow Specifications

A. Borrow Criteria

Common borrow for embankment construction to subgrade shall meet Coastal Plain criteria as described in Section 1018-2(B) of the Standard Specifications.

B. Select Granular Material

We recommend a quantity of 1,480 cubic yards of Select Granular Material (Class III) be included in the project contract as a contingency item, for backfilling the Undercut described in Section I.B and 200 cubic yards of Select Granular Material be included in the project as a contingency item, to be used at the discretion of the Engineer. Follow Standard Specifications, Section 265, "Select Granular Material".

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C. Class IV Material

We recommend a quantity of 200 tons of Class IV Subgrade Stabilization be included in the contract for backfilling the Shallow Undercut described in Section II.B, as a contingency item, to be used at the discretion of the Engineer.

D. Shrinkage Factor

A shrinkage factor of 20 percent is recommended for calculation of earthwork on this project.

IV. Miscellaneous

A. Reduction of Unclassified Excavation – Loss Due to Clearing and Grubbing

No significant Reduction of Unclassified Excavation is anticipated on the project due to clearing and grubbing.

B. Reduction of Unclassified Exavaction – Unsuitable

The soils derived primarily from cuts along the alignments are unsuitable for use as coastal plain borrow. The following areas of excavation contains clayey soils with plastic indices (PI) greater than 20 and should be considered Unsuitable Unclassified Excavation.

<u>Line</u>	<u>Stations (±)</u>
-L-	21+50 to 24+50

We estimate a quantity of 180 cubic yards of excavated moderately to highly plastic unsuitable soils.

C. Springs and Seeps

Possible springs are within the NCDOT right-of-way at the following location:

<u>Line</u>	<u>Station (±)</u>	<u>Offset (ft)</u>
-L-	15+40	19 RT

The location of possible springs are also shown on the plan sheets of the inventory report.

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Sincerely,
Terracon Consultants, Inc.



DocuSigned by:

Kelly R. Plummer

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Project Geologist
N.C. Registration No. 2559



DocuSigned by:

Abner F. Riggs, Jr.

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Abner F. Riggs, Jr., PE
Senior Geotechnical Engineer
N.C Registration No. 14155

Attachments: Summary of Quantities

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED.



NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

GEOTECHNICAL ENGINEERING UNIT

Summary of Quantities

WBS Number: BP8.R013County: RICHMONDProject Engineer: RIGGS, A.TIP Number: SF-760140Field Office / PEF: TERRACONProject Geologist: PLUMMER, K.Description: BRIDGE 760140 ON SR 1971 (SANDHILL ROAD) OVER SOLOMONS CREEK

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-	17+15.00	19+37.00	1,240	CY
0036000000-E	Undercut Excavation	225 - Roadway Excavation	I. B	-L-	20+08.00	21+65.00	240	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. A	Contingency	N/A	N/A	200	CY
Total Quantity of Undercut Excavation =							1,880	CY
0194000000-E	Select Granular Material, Class III	265 - Select Granular Material	III. B	-L-	17+15.00	19+37.00	1,240	CY
0194000000-E	Select Granular Material, Class III	265 - Select Granular Material	III. B	-L-	20+08.00	21+65.00	240	CY
0194000000-E	Select Granular Material, Class III	265 - Select Granular Material	III. B	Contingency	N/A	N/A	200	CY
Total Quantity of Select Granular Material, Class III =							1,680	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-	17+15.00	19+37.00	1,100	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	I. C	-L-	20+08.00	21+65.00	390	SY
0196000000-E	Geotextile for Soil Stabilization	270 - Geotextile for Soil Stabilization	II. C	Contingency	N/A	N/A	300	SY
Total Quantity of Geotextile for Soil Stabilization =							1,990	SY
1099500000-E	Shallow Undercut	505 - Aggregate Subgrade	II. B	Contingency	N/A	N/A	100	CY
Total Quantity of Shallow Undercut =							100	CY
1099700000-E	Class IV Subgrade Stabilization	505 - Aggregate Subgrade	III. C	Contingency	N/A	N/A	200	TON
Total Quantity of Class IV Subgrade Stabilization =							200	TON

These Items Only Impact Earthwork Totals								
N/A	Shrinkage Factor	235 - Embankments	III. D	N/A	N/A	N/A	20	%
N/A	Unclassified Excavation - Unsuitable Waste	225 - Roadway Excavation	IV. B	N/A	N/A	N/A	180	CY