STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

J.R. "JOEY" HOPKINS
SECRETARY

November 3, 2023

CONTRACT:	DB00569
WBS ELEMENT:	2023CPT.02.22.20742 & 2023CPT.02.18.20741
COUNTY:	PITT
ROUTE:	VARIOUS
DESCRIPTION:	FULL DEPTH RECLAMATION, RESURFACING, AND SHOULDER RECONSTRUCTION OF VARIOUS SECONDARY ROUTES IN PITT COUNTY

ADDENDUM 1

TO: PROSPECTIVE BIDDERS

Please note the following revisions to the proposal.

- Geotech reports for the 3 Secondary Routes.

Sincerely,

DocuSigned by:
Mary Voelker Moore
714C11DCCEBC4C6...

Mary Voelker Moore, PE
Division Contract Engineer

cc: Ms. Mary Beth Houston, PE
Mr. Jordan Davenport, PE
Ms. Heather Lane, PE
Mr. Sarah F. Lentine, PE
Mr. Cadmus Capehart, PE
Mr. Jordan Scott, PE

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
DIVISION 2
PROJECT DEVELOPMENT GROUP
GREENVILLE, NC 27834

Telephone: (252) 439-2828
Customer Service: 1-877-368-4968

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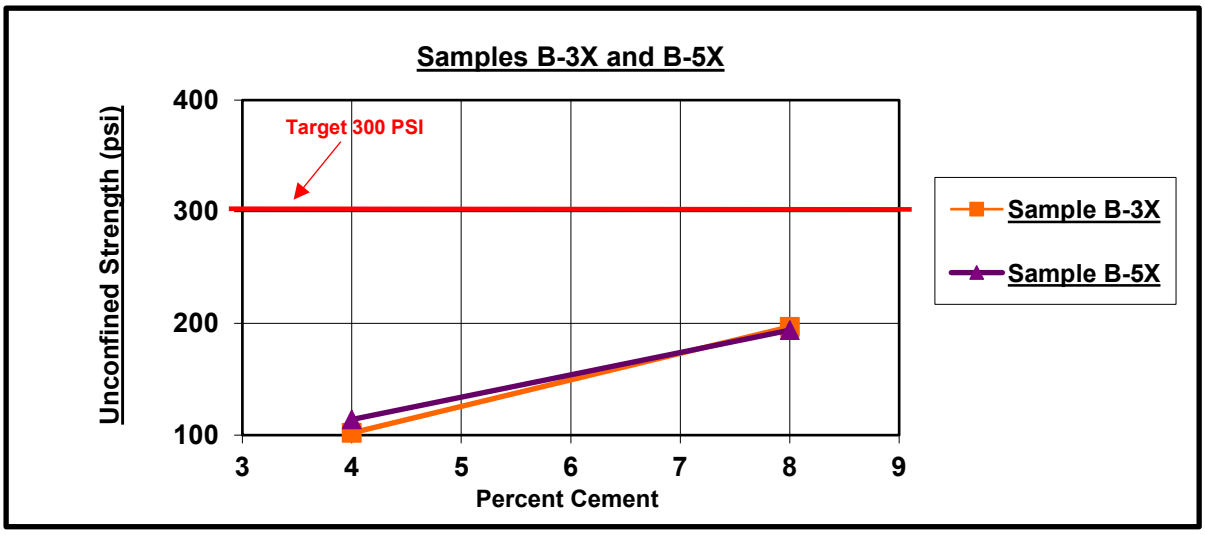
Location:
1037 W.H. SMITH BLVD.
GREENVILLE, NC 27834

FDR # 246, SR 1537, Rams Horn Road, Pitt County
GEOTECHNICAL ENGINEERING UNIT
GEOPAVEMENT SECTION
FULL DEPTH RECLAMATION INVESTIGATION REPORT

PROJECT: FDR #246 SR 1537 Rams Horn Rd.
COUNTY: Pitt
RT: SR 1537 (Rams Horn Rd.) from US 264 to SR 1523 (Whichard Rd.)
INVESTIGATION DATE: 1/26/2022
MAX DENSITY: 117.0 PCF
SAMPLING DEPTH: 12"

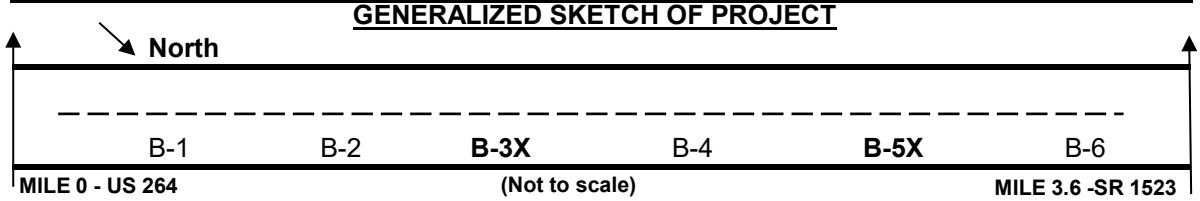
LAB RESULTS		
SAMPLE	CEMENT PERCENT	PSI
B-3X	4	102
B-3X	8	197
3.0" Asphalt, 4.0" Sand Asphalt		

LAB RESULTS		
SAMPLE	CEMENT PERCENT	PSI
B-5X	4	114
B-5X	8	194
5.0" Asphalt, 3.0" Sand Asphalt		



RECOMMENDATIONS		
DEPTH IN INCHES	CEMENT PERCENT	CEMENT RATE: LBS/SY
12	7.5	79
Design overlay to meet or exceed 2.0" S9.5C		

GENERALIZED SKETCH OF PROJECT



B-1: 3.0" asphalt, NO ABC, tn brn si sd to 4.0'
B-2: 3.0" asphalt, 4.0" sand asphalt, NO ABC, tn brn si sd to 1.5', tn sd cl to 4.0'
B-3X: 3.0" asphalt, 4.0" sand asphalt, NO ABC, tn brn si sd to 4.0'
B-4: 5.0" Asphalt, 3.0" Sand Asphalt, NO ABC, tn si sd to 1.5', tn sd cl to 4.0'
B-5X: 5.0" Asphalt, 3.0" Sand Asphalt, NO ABC, tn si sd to 1.5', tn sd cl to 4.0'
B-6: 4.0" Asphalt, 3.0" Sand Asphalt, NO ABC, tn si sd to 4.0'

FDR # 246, SR 1219, Rams Horn Road, Pitt County

SUMMARY OF INVESTIGATION:

Six (6) areas were investigated at the approximate locations shown on the sketch of SR 1537 (Rams Horn Rd.) from US 264 to SR 1523 (Whichard Rd.). Asphalt thickness ranged from 3.0 inches to 5.0 inches. Auger borings were also conducted at each location to identify soil types and moisture contents. Additional asphalt in the form of "sand asphalt", a mix design used in older roadways, was present in all borings except B-1. Sand asphalt depth ranged from 3.0 inches to 4.0 inches. No groundwater was observed in any of the borings to a depth 4.0 feet. Samples of roadway asphalt, base, and subgrade soils were collected at B-3X and B-5X for laboratory analysis. Laboratory tests indicate that a cement application rate of approximately **7.5%** is required to ensure that strengths fall within the desired 7-day unconfined compressive strength target range of 200-400 psi. On-site traffic counts were collected, but the overlay design is left up to Division 2.

RECOMMENDATIONS: The Geotechnical Engineering Unit recommends the following:

1.) We recommend a cement application rate of **79 LBS PER SQUARE YARD** and a mixing depth of **12 INCHES**. We do not recommend that a greater depth of reclamation be used unless the cement rate is increased.

2.) We recommend that the reclamation width be a minimum of two feet (1 foot on each side of the roadway) more than the final pavement width, inclufding all widened areas.

3.) For all widening areas, it is recommended that a **minimum 5 inches depth** of the shoulder material be removed and replaced with no more than 5 inches depth ABC, asphalt millings, or other suitable material prior to FDR base construction. The objective is to eliminate organics like grass and closely match the widening material with the mainline pavement structure.

4.) The Pavement Design and Collection Section has a minimum requirement of **overlaying the 12 inches of finished FDR with 2.0 inches of S9.5B**. The Division will meet or exceed this requirement. A fresh tack coat between the FDR layer and the surface layer is required.

NOTABLE AREAS OF CONCERN:

1.) Special attention is needed prior to construction for utilities. Since the FDR procedure usually includes widening, utility conflicts can occur. Please ensure any widening areas minimize utility damages.

2.) Special attention is needed in any widening areas, to ensure the base closely matches the composition of the mainline pavement and ensure proper compaction. Unless there is a uniformity of support across the full pavement width, longitudinal cracking may result. Longitudinal cracking has occurred on some previous FDR projects.

3.) Any changes in FDR width and depth, asphalt thickness, or cement application rate should be carefully considered, since any changes in these areas are likely to have long term consequences.

We request that your office notify the Geotechnical Engineering Unit and the Soils Laboratory of the Materials and Tests Unit at least two weeks prior to start up so that they can schedule their personnel to be on site and assist your inspectors. They will prepare unconfined compressive strength (quality assurance) samples and also help your inspectors in this evolving form of roadway construction.

Please contact the Geotechnical Engineering Unit with any questions.

Cynthea Jaskolka
Geopavement Engineer

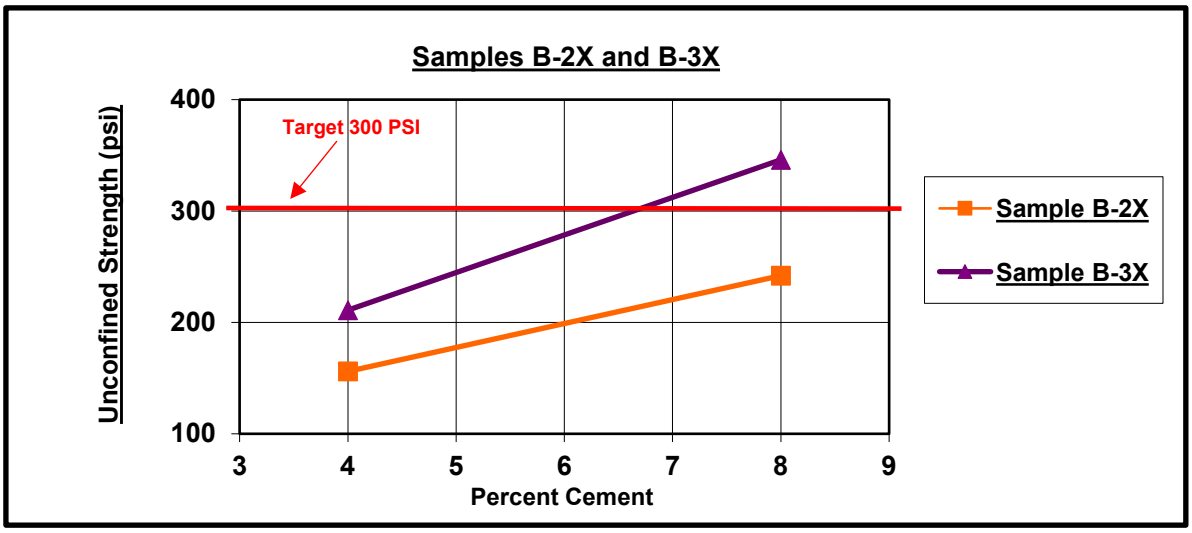
Matthew Alexander
Assistant State Geotechnical Engineer

FDR #273, SR 1524, Lewis Dudley Road, Pitt County
GEOTECHNICAL ENGINEERING UNIT
GEOPAVEMENT SECTION
FULL DEPTH RECLAMATION INVESTIGATION REPORT

PROJECT: FDR #273, SR 1524, Lewis Dudley Rd.
COUNTY: Pitt
RT: SR 1524 (Lewis Dudley Rd.) from SR 1529 (Old Creek Rd.) to SR 1523 (Whichard Rd.)
INVESTIGATION DATE: 2/16/2023
MAX DENSITY: 129.1 PCF
SAMPLING DEPTH: 12"

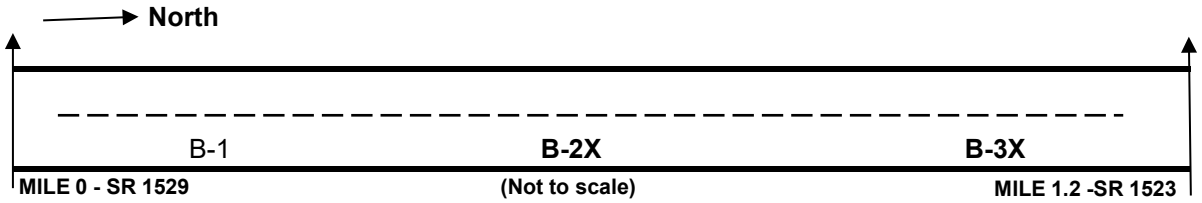
LAB RESULTS		
SAMPLE	CEMENT PERCENT	PSI
B-2X	4	156
B-2X	8	242
3.5" Asphalt, 4.0" ABC		

LAB RESULTS		
SAMPLE	CEMENT PERCENT	PSI
B-3X	4	211
B-3X	8	346
2.0" Asphalt, 4.0" ABC		



RECOMMENDATIONS		
DEPTH IN INCHES	CEMENT PERCENT	CEMENT RATE: LBS/SY
12	6.0	70
Design overlay to meet or exceed 2.0" S9.5C		

GENERALIZED SKETCH OF PROJECT - SR 1524



B-1: 4.0" Asphalt, 4.0" ABC, Tn-brn si sd to 1.7', Tn-orng si cl to 4.0'
B-2X: 3.5" Asphalt, 4.0" ABC, Tn-brn si sd to 1.5', Tn cs sd and gravel to 2.4', Tn-orng si cl to 4.0'
B-3X: 2.0" Asphalt, 4.0" ABC, Tn-brn si sd to 1.1', Tn-orng si cl to 4.0'

FDR #273, SR 1524, Lewis Dudley Road, Pitt County

SUMMARY OF INVESTIGATION:

Three (3) areas were investigated at the approximate locations shown on the sketch of SR 1524 (Lewis Dudley Rd.) from SR 1529 (Old Creek Rd.) to SR 1523 (Whichard Rd.). Asphalt thickness ranged from 2.0 inches to 4.0 inches. Auger borings were also conducted at each location to identify soil types and moisture contents. Aggregate base course (ABC) was present in all borings and was 4 inches in thickness. No groundwater was observed in any of the borings. Samples of roadway asphalt, base, and subgrade soils were collected at B-2X and B-3X for laboratory analysis. Laboratory tests indicate that a cement application rate of approximately **6%** is required to ensure that strengths fall within the desired 7-day unconfined compressive strength target range of 200-400 psi. On-site traffic counts were collected, but the overlay design is left up to Division 2.

RECOMMENDATIONS: The Geotechnical Engineering Unit recommends the following:

1.) We recommend a cement application rate of 70 LBS PER SQUARE YARD and a mixing depth of 12 INCHES. We do not recommend that a greater depth of reclamation be used unless the cement rate is increased.

2.) We also recommend that the reclamation width be a minimum of two feet (1 foot on each side of the roadway) more than the final pavement width, including all widened areas.

3.) For all widening areas, it is recommended that a minimum **6 inches** depth of the shoulder material be removed and replaced with no more than **6 inches** depth ABC, asphalt millings, or other suitable material. The objective is to closely match the widening material with the mainline pavement structure.

4.) The Pavement Design and Collection Section has a minimum requirement of overlaying the 12 inches of finished FDR with 2.0 inches of **S9.5C**. The Division will meet or exceed this requirement. A fresh tack coat between the FDR layer and the surface layer is required.

NOTABLE AREAS OF CONCERN:

1.) Special attention is needed prior to construction for utilities. Since the FDR procedure usually includes widening, utility conflicts can occur. Ensure any widening areas minimize utility damages.

2.) Special attention is needed in any widening areas, to ensure the base closely matches the composition of the mainline pavement and ensure proper compaction. Unless there is a uniformity of support across the full pavement width, longitudinal cracking may result. Longitudinal cracking has occurred on some previous FDR projects.

3.) Any changes in FDR width and depth, asphalt thickness, or cement application rate should be carefully considered, since any changes in these areas are likely to have long term consequences.

We request that your office notify the Geotechnical Engineering Unit and the Soils Laboratory of the Materials and Tests Unit at least two weeks prior to start up so that they can schedule their personnel to be on site. Geotechnical will prepare unconfined compressive strength (quality assurance) samples and if needed, assist your inspectors in this evolving form of roadway construction.

Please contact the Geotechnical Engineering Unit with any questions.

Cynthea Jaskolka
Geopavement Engineer

Matthew Alexander
Assistant State Geotechnical Engineer

FDR # 274, SR 1538, Whichard Cherry Lane Road, Pitt County

GEOTECHNICAL ENGINEERING UNIT
GEOPAVEMENT SECTION
FULL DEPTH RECLAMATION INVESTIGATION REPORT

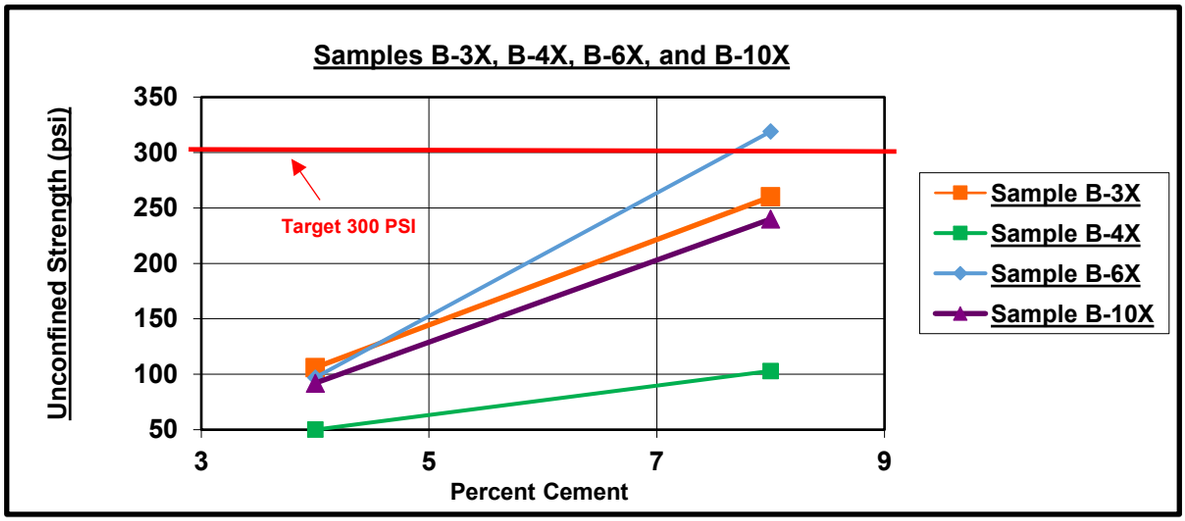
PROJECT: FDR #274
COUNTY: Pitt
RT: SR 1538 (Whichard Cherry Lane Rd.) from SR 1537 (Rams Horn Rd.) to SR 1543 (Worthington-Warren Rd.)
INVESTIGATION DATE: 2/16/2023 - 2/23/2023
MAX DENSITY: 126.2 PCF
SAMPLING DEPTH: 12"

LAB RESULTS		
SAMPLE	CEMENT PERCENT	PSI
B-3X	4	106
B-3X	8	260
2.5" Asphalt, 3.0" SD Asphalt, 4.0" ABC		

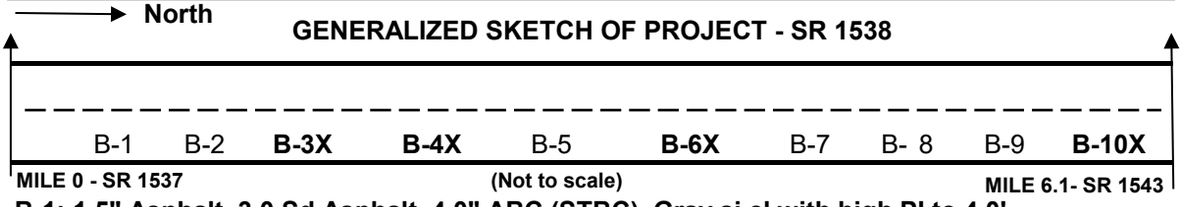
LAB RESULTS		
SAMPLE	CEMENT PERCENT	PSI
B-4X	4	50
B-4X	8	103
3.0" Asphalt, 4.0" ABC		

LAB RESULTS		
SAMPLE	CEMENT PERCENT	PSI
B-6X	4	97
B-6X	8	319
4.0" Asphalt, NO ABC		

LAB RESULTS		
SAMPLE	CEMENT PERCENT	PSI
B-10X	4	92
B-10X	8	240
1.0" Asphalt, 3.0" SD Asphalt, 4.0" ABC		



RECOMMENDATIONS		
DEPTH IN INCHES	CEMENT PERCENT	CEMENT RATE: LBS/SY
12	6.5	74
Overlay with a minimum of 2.0" of S9.5C		



B-1: 1.5" Asphalt, 3.0 Sd Asphalt, 4.0" ABC (STBC), Gray si cl with high PI to 4.0'
B-2: 1.0" Asphalt (AST), 3.0" Sd Asphalt, 4.0" ABC(STBC),Gry si cl w/ hi PI to 3.2', Gry-tn si sd to 4.0'
B-3X: 2.5" Asphalt, 3.0" SD Asphalt, 4.0" ABC (STBC), Gry si cl with high PI to 4.0'
B-4X: 3.0" Asphalt, 4.0" ABC (STBC), Tn-brn si sd to 4.0'
B-5: 10.0" Asphalt, NO ABC, Tn-brn si sd to 4.0' Near Grindle Creek Bridge
B-6X: 4.0" Asphalt, NO ABC, Tn-brn si sd to 2.0', Gry si cl with high PI to 4.0' Patched area
B-7: 3.0" Asphalt, 2.0" SD Asphalt, 4.0" ABC (STBC), Dark Gry sd with si cl lenses to 4.0'
B-8: 3.0" Asphalt, 3.0" SD Asphalt, 4.0" ABC (STBC), Dark Gry sd with si cl lenses to 4.0'
B-9: 3.0" Asphalt, 4.0" SD Asphalt, 4.0" ABC (STBC), Tn-brn si sd to 1.5', Gry si cl with high PI to 4.0'
B-10X: 1.0" Asphalt (AST), 3.0" SD Asphalt, 4.0" ABC (STBC), Tn-brn si cl to 4.0'

SUMMARY OF INVESTIGATION:

Ten (10) areas were investigated at the approximate locations shown on the sketch of SR 1538 (Whichard Cherry Lane Rd.) from SR 1537 (Rams Horn Rd.) to SR 1543 (Worthington-Warren Rd.). Asphalt thickness ranged from 1.0 inches to 10.0 inches. Sand asphalt thickness ranged from 2.0 inches to 4.0 inches and was observed in all borings except B-4X, B-5, and B-6X. Auger borings were also conducted at each location to identify soil types and moisture contents. Aggregate base course (ABC) in the form of a soil-type base course (STBC) or coarse drainage sand was present in all borings except B-5 and B-6X and was 4 inches in thickness. No groundwater was observed in any of the borings, however, saturated soil was encountered at the bottom of B-1, B-6X, B-8, and B-9. Samples of roadway asphalt, base, and subgrade soils were collected at B-3X, B-4X, B-6X and B-10X for laboratory analysis. Laboratory tests indicate that a cement application rate of approximately **6.5%** is required to ensure that strengths fall within the desired 7-day unconfined compressive strength target range of 200-400 psi. On-site traffic counts were collected, but the overlay design is left up to Division.

RECOMMENDATIONS: The Geotechnical Engineering Unit recommends the following:

1.) We recommend a cement application rate of 74 LBS PER SQUARE YARD and a mixing depth of 12 INCHES. We do not recommend that a greater depth of reclamation be used unless the cement rate is increased.

2.) We also recommend that the reclamation width be a minimum of two feet (1 foot on each side of the roadway) more than the final pavement width, including all widened areas.

3.) For all widening areas, it is recommended that a minimum **6 inches** depth of the shoulder material be removed and replaced with no more than **6 inches** depth ABC, Class IV, asphalt millings, or other suitable material. The objective is to closely match the widening material with the mainline pavement structure.

4.) The Pavement Design and Collection Section has a minimum requirement of overlaying the 12 inches of finished FDR with 2.0 inches of **S9.5C**. The Division will meet or exceed this requirement. A fresh tack or prime coat between the FDR layer and the surface layer is required.

5.) At B-5, an area of asphalt 10 inches in thickness was observed near the bridge over Grindle Creek. The amount of asphalt exceeds the acceptable limit for FDR. The area begins at the intersection with SR 1529 (Old Creek Rd.) and ends at the pavement joint near address 1582 Whichard Cherry Lane Rd. We recommend one of the following options:

A. Avoid and skip the area during construction, then resume FDR operations on the other side of the area.

B. Mill the asphalt in this area 5 inches in thickness prior to FDR construction. Then, include the area in FDR operations. The millings can be placed into any widening areas.

NOTABLE AREAS OF CONCERN:

1.) Special attention is needed prior to construction for utilities. Since the FDR procedure usually includes widening, utility conflicts can occur. Ensure any widening areas minimize utility damages.

2.) Special attention is needed in any widening areas, to ensure the base closely matches the composition of the mainline pavement and ensure proper compaction. Unless there is a uniformity of support across the full pavement width, longitudinal cracking may result. Longitudinal cracking has occurred on some previous FDR projects.

3.) Any changes in FDR width and depth, asphalt thickness, or cement application rate should be carefully considered, since any changes in these areas are likely to have long term consequences.

4.) Special attention is needed during construction to avoid possible FDR damage or delay. An area of asphalt 10 inches in thickness was encountered near the bridge over Grindle Creek. This area is present from the intersection of SR 1529 (Old Creek Rd.) to the pavement joint at the address of 1582 Whichard Cherry Lane Rd. Please ensure one of the two recommended options is implemented. (See Recommendation number 5, above.)

We request that your office notify the Geotechnical Engineering Unit and the Soils Laboratory of the Materials and Tests Unit at least two weeks prior to start up so that they can schedule their personnel to be on site. Geotechnical will prepare unconfined compressive strength (quality assurance) samples and if needed, assist your inspectors in this evolving form of roadway construction.

Please contact the Geotechnical Engineering Unit with any questions.

Cynthea Jaskolka
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