

PACKAGE A: SCOPE OF WORK / SPECIFICATIONS

The Fort Mill School District (FMSD) is accepting Bids for **Single Prime** Contractor services to provide comprehensive services as described, but not limited to, the scope outlined within the Scope of Work listed below. The Contractor's scope of work shall include all surveying, demo, grading, , and paving identified below and all associated costs included within the submitted bid.

The proposed project will consist of the rehabilitation of Farm House Drive (entrance drive to Sugar Creek Elementary School) as shown on the attached sketch. FMSD is requesting bid estimates for full depth reclamation of the existing roadway as described below:

- The portion of the roadway proposed for full depth cement reclamation is approximately 1,000 feet in length, approximately 27,000 square feet or 3,000 square yards along Farm House Drive.
- Project limits will extend approximately 30Lft North of the intersection of Laurent Ave along Farm House Drive to the entrance monument to Sugar Creek Elementary School.
- The existing pavement section ranges in thickness from approximately 7 to 8.75 inches.
- The existing right-of-way is currently 66 feet in width.
- The existing roadway is currently approximately 24 feet in width and will need to be widened to 26 feet in width to meet York County Roadway Standards. This 2-foot widening will occur to the westside of Farm House Drive from Laurent Avenue along Farm House Drive to approximately 70 feet south of the intersection of Regal Manor Lane at which point the widening will shift to the eastside of Farm House Drive and continue to termination of the improved area.
- For the 2Lft widening, graded aggregate base course will need to be installed to match the existing pavement section. This will be incorporated in the overall full depth reclaimed section.
- Specified reclaimed depth is 12.5 inches.
- Proposed pavement section is 7.25 inches of reclaimed cement-treated base course, 5.25 inches of bituminous concrete surface course.
- Spread Rate:
 - York County Requirements (450 psi) 6.0 % by weight, 50 lb./square yard
 - SCDOT Requirements (600 psi) – 7.7 % by weight, 64 lb./square yard
- Full Depth Reclamation is to be performed in general accordance with the attached “Supplement Technical Specification for Cement Modified Recycled Base” SCDOT Designation: SC-M-306 (07/21)
- Contractor responsible for adhering to all York County Roadway Standards and SCDOT requirements.
- Including but not limited to YC testing procedures, required striping, traffic control, etc.
- Allowance: \$15,000 General Contingency Allowance to be included within Bid. This allowance shall be utilized for additional repairs as needed and approved by the Owner.
- Attachments:
 - “Report of Pavement Subsurface Exploration, Full Depth Reclamation, and Pavement Design Services” dated April 7, 2023 - ESP Project No. LM32.300.
 - Supplement Technical Specification for Cement Modified Recycled Base - SCDOT Designation: SC-M-306 (07/21)
 - Project Limits Sketch

FARMHOUSE ROAD - RECLAMATION Proposed Project Limits

Legend



Proposed Area
26,833.12 sf

Proposed area of Farmhouse Rd
to be Demo'd / Replaced: 26,850sf



April 7, 2023

Mr. Joe Romenick
Assistant Superintendent, Operations
Fort Mill School District
2233 Deerfield Drive
Fort Mill, SC 29715

Reference: **REPORT OF PAVEMENT SUBSURFACE EXPLORATION,
FULL DEPTH RECLAMATION, AND PAVEMENT DESIGN SERVICES
Sugar Creek Elementary – Farm House Road**
Fort Mill, South Carolina
ESP Project No. E4-LM32.300

Dear Mr. Romenick:

ESP Associates, Inc. (ESP) has completed the pavement subsurface exploration, full-depth reclamation, and pavement design services for Farm House Drive, from the school sign to the intersection of Farm House Drive and Laurent Avenue in Fort Mill, South Carolina. These services were performed in general accordance with our Proposal No. E4-23046 – Revision No. 1, dated January 18, 2023. This report summarizes the results of our pavement subsurface exploration services and provides conclusions and recommendations regarding the existing pavement section as it relates to pavement replacement, pavement section design, and construction considerations.

PROJECT INFORMATION

It is our understanding that Fort Mill School District is planning to renovate the existing pavement section along Farm House Drive from the intersection with Laurent Avenue to the school entrance sign.

We understand that the planned renovation will include full-depth reclamation and resurfacing of the existing infrastructure.

In general, we understand that the full-depth reclamation (FDR) plan will consist of blending the in-situ materials along with Portland cement and water to a depth of 8 inches. Once the cement-treated materials have been blended, they will be compacted in-place and then fine graded in accordance with the roadway alignment profiles. After the cement-treated base has cured (typically 7 days), we understand that an asphalt wearing surface will be placed.

FIELD EXPLORATION AND FINDINGS

ESP obtained full-depth reclamation bulk samples to the planned FDR mixing depth of approximately 8 inches below the top of pavement utilizing a concrete drill and hand auger at two locations (S-2 and S-6).

Sampling was performed at six test locations along Farm House Drive. Refer to the attached Test Location Plan (Figure 1) for the approximate test locations. The sample locations were located in the field utilizing existing site features and landmarks, and minimum testing criteria outlined in “AASHTO Guide for Design of Pavement Structures”. After obtaining the full-depth reclamation samples, ESP measured and documented the thickness of the pavement and, if present, stone base.

Kessler Dynamic Cone Penetrometer (DCP) testing was performed at four sample locations (S-2, S-3, S-5 and S-6) using a 17.6-pound standard hammer to a depth of approximately three feet below the planned FDR mixing depth. The Kessler DCP tests were performed in general accordance with ASTM D 6951. The Kessler DCP is used to estimate in-situ California Bearing Ratio (CBR) values within the subgrade material.

FINDINGS

The existing asphaltic concrete pavement section at our test locations was comprised of approximately 2 to 3 inches of asphalt underlain by approximately 4 to 6 inches of aggregate base course. For more information about surficial material depths at each location, reference the Table 1 below.

TABLE 1: SUMMARY OF SURFICIAL MATERIALS

Sample Location	Asphalt Depth (inches)	Aggregate Base Course Depth (inches)
S-1	2 ¼	4 ½
S-2 (Kessler)	2 ½	5 ½
S-3 (Kessler)	3	5 ¼
S-4	2 ½	5 ½
S-5 (Kessler)	2 ¾	6
S-6 (Kessler)	3	5 ¾

The correlated CBR values on materials tested at Locations S-1 through S-4 within the upper approximate three feet of the subgrade soils ranged from 5.3 to more than 10 with an average correlated CBR value of approximately 8. The results of the Kessler DCP tests are presented on the attached “Kessler DCP Test Data” sheets.

LABORATORY TESTING

ESP obtained samples of the asphalt and stone base at two locations (S-2 and S-6) for laboratory testing associated with full-depth reclamation recommendations. The limited testing program was designed to determine select engineering properties of the on-site materials relative to their use for the project.

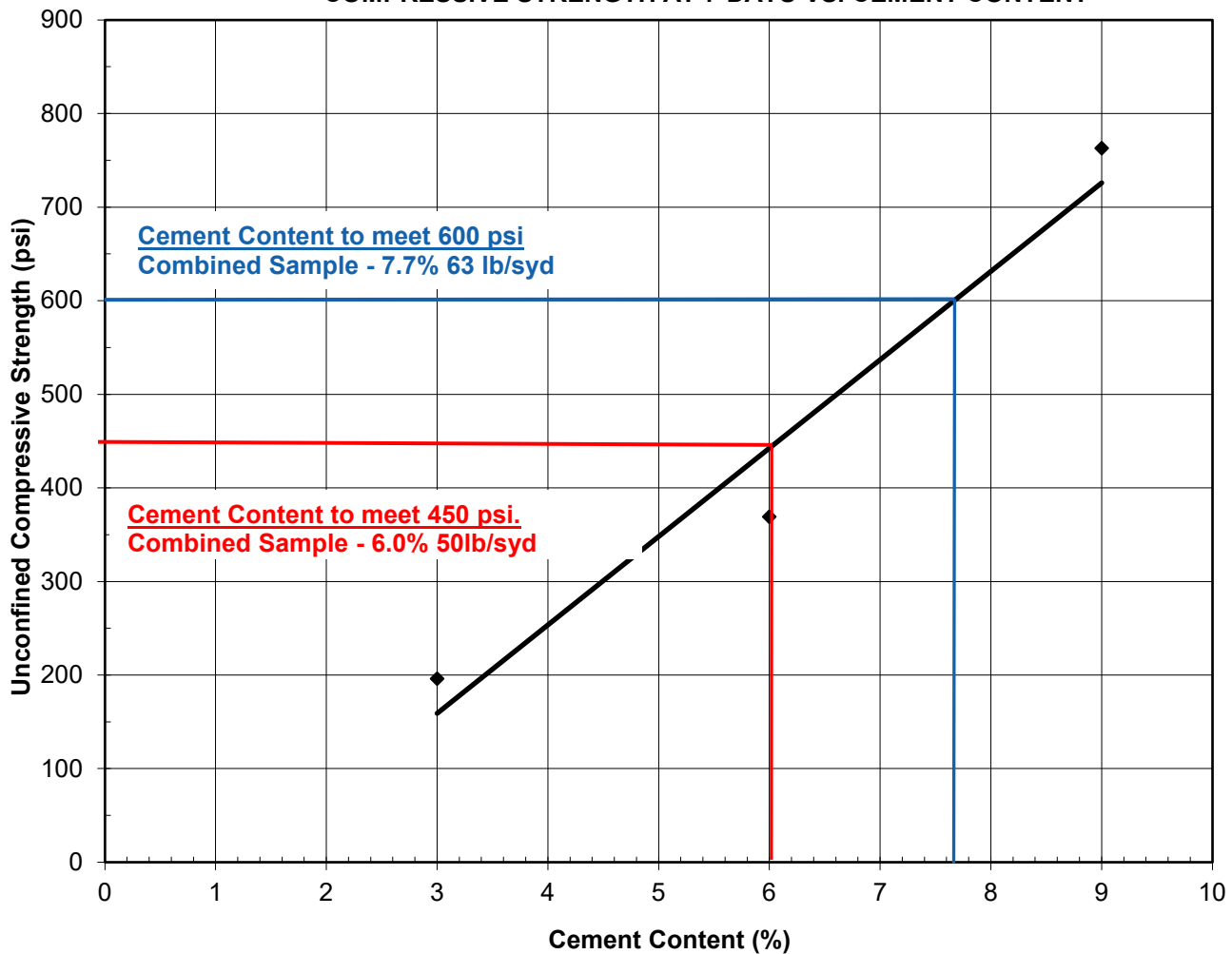
The materials obtained from each sample location were combined and then mixed with varying amounts of Type I/II Portland cement in order to estimate the percentage of cement necessary to yield the desired unconfined compressive strength of between 450 and 600 pounds per square inch (psi). South Carolina Department of Transportation (SCDOT) Standard Specifications for Highway Construction requires a minimum unconfined compressive strength of 600 psi for roadways. The Portland Cement Association (PCA) requires a minimum unconfined compressive strength of 450 psi for cement-treated base applications. The mix design procedures were performed in general accordance with SCDOT methods and the PCA Publication EB052-Soil-Cement Laboratory Handbook.

A summary of the soil laboratory test results are presented in Table 2 and in the Full Depth Reclamation Design chart shown below. Detailed results of the soil tests performed for this study are attached to this report.

TABLE 2 – SUMMARY OF LABORATORY TESTING

Test Location	Maximum Dry Density (pcf)	Optimum Moisture (%)	Compressive Strength (psi)		
			3% (by weight)	6% (by weight)	9% (by weight)
Combined Sample	136.9	7.7	196	369	763

**FULL DEPTH RECLAMATION DESIGN
 COMBINED SAMPLE
 COMPRESSIVE STRENGTH AT 7-DAYS VS. CEMENT CONTENT**



PAVEMENT DESIGN

General Design Basis. ESP utilized the “AASHTO Guide for Design of Pavement Structures”, dated 1993 for the analysis and design process with guidance from the “SCDOT Pavement Design Guidelines,” dated

July 2008, for selection of subgrade soil support values, structural coefficient for pavement layers, and selection of recommended pavement components. The recommendations presented herein assume that the production and placement of the bituminous and base course as well as the bituminous concrete meet the requirements of the current “SCDOT Standard Specifications for Highway Construction.”

ESP utilized the PCA Publication EB052-Soil-Cement Laboratory Handbook guidelines for the application rates of cement for the cement-treated base and the SCDOT specifications for the pavement design. As referenced above, the PCA guideline allows for a reduced compressive strength for cement-treated bases as compared to the SCDOT guidelines. If Fort Mill School District is not willing to accept the reduced compressive strength as determined by the PCA guidelines, ESP recommends that the roadway pavement design follow the SCDOT guidelines presented above.

Subgrade Soil Conditions. The pavement section subgrade will consist of cement-treated reclaimed asphalt and stone mixture underlain by existing sandy clays. A CBR value of 6 was utilized to determine the soil support value for the underlying subgrade soils. This value was determined through various Kessler DCP tests performed on the in-situ soils.

Serviceability Index and Regional Factor. A terminal serviceability index of $P_t=2.0$ and initial serviceability index of $P_o=4.2$ were used for the pavement design analysis in conjunction with a regional factor of 1.

Design Traffic Volumes. At this time, traffic volume report has not been made available to ESP. If traffic volume information becomes available, ESP requests the opportunity to review that information, and make any necessary changes to our conclusions and recommendations, if necessary. For the purposes of this report, ESP assumes that traffic conditions will consist primarily of passenger vehicles on the order of 1,000 vehicles per day. This volume was estimated by using the current enrollment of approximately 900 students, assuming approximately 60 percent of those students are car-riders, and will be both dropped off and picked up from school.

Design of Full-Depth Reclamation Pavement Sections. The full-depth reclamation pavement sections required to support the anticipated traffic were established based on the above stated design parameters and traffic loading information. The recommended section is presented below.

TABLE 3 – SUMMARY OF PAVEMENT SECTION OPTIONS

Section Type	Bituminous Concrete Surface Course – Asphalt (Inches)	Full-Depth Reclaimed Cement-Treated Base Course (Inches)	Graded Aggregate Base Course (Inches)
Full Depth Reclamation	3	8	N/A

PAVEMENT CONSTRUCTION

ESP recommends that following option be implemented for the rehabilitation of the areas that were included in our subsurface exploration of the existing pavements:

- **Full-Depth Reclamation** - this process includes the milling/pulverization of the existing pavement section in-place and then adding a specified amount of Portland cement to the reclaimed material to provide a stabilized base course for pavement support. Prior to compaction efforts, the full-depth reclaimed materials should be fine graded to the design grades. The cement-treated base materials should then be compacted to at least 95% of the standard Proctor maximum dry density and allowed to cure for a period of at least 7 days prior to placing the asphalt wearing course in general accordance with SCDOT guidelines. This process allows for the reuse of the existing materials with limited haul off of reclaimed material to be able to match existing grades. Full-depth reclamation may be difficult to implement due to equipment limitations in areas with tight turns and short runs.

CONSIDERATIONS

The owner should consider the cost of construction, the impact to traffic, the timing and cost of future maintenance, level of tolerable risk and future use of the repaired areas. In addition, testing and evaluation of the pavement construction, including the FDR process, should be performed by an ESP representative during the construction phase. As with typical pavement sections, routine maintenance is required to aid in achieving the desired pavement performance.

We recommend the following testing and inspection program be implemented during the pavement construction phase.

- Full-Depth Reclamation (FDR)
 - Measure the cement spread rate,
 - Density testing of the compacted cement-treated base,
 - Obtain a sample of the blended cement-treated base materials and mold field specimens for compressive strength testing,
 - Perform nuclear density testing of asphalt,
 - Coring of the asphalt pavement to confirm thickness and density.

LIMITATIONS OF REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice with regard to the specific conditions and requirements of this site. The conclusions and recommendations contained in this report were based on the applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made. The analysis and recommendations submitted herein are based, in part, upon the data obtained from the limited subsurface exploration. The nature and extent of variations between the borings will not be known until construction is underway. If variations appear evident, then we request the opportunity to re-evaluate the recommendations of this report.

CLOSING

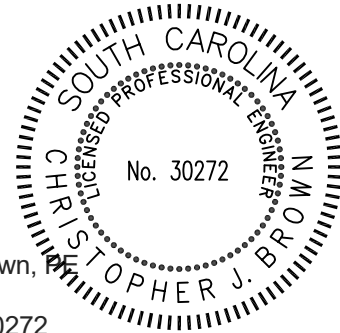
ESP appreciates the opportunity to assist you during this phase of the project by performing subsurface exploration, full-depth reclamation laboratory testing, and pavement design services for the referenced project. If you should have questions concerning this proposal, or if additional information is required, please contact us.

Sincerely,

ESP Associates, Inc.



Nathan McLaren, PG
Project Manager



Christopher J. Brown,
Senior Engineer
SC License No. 30272

NDM/

Enclosures: Test Location Plan
Standard Moisture-Density Relationship (1 sheet)
Kessler DCP Test Data (4 sheets)





Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri

SITE VICINITY MAP
(Not to Scale)



This drawing is intended to show approximate boring locations only. No other information is expressed or implied.

Esri, HERE, Garmin, (c) OpenStreetMap contributors, and the GIS user community, Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Legend

Approximate Test Location

Boring Labels

Boring Name Designation
Depth of Stone Base Material (inches)
Asphalt Thickness (inches)
Kessler Location

SHEET TITLE:

Test Location Plan with Site Vicinity Map
Figure 1

Sugar Creek Elementary - Farm House Drive
Fort Mill, South Carolina

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DATE: April 03, 2023

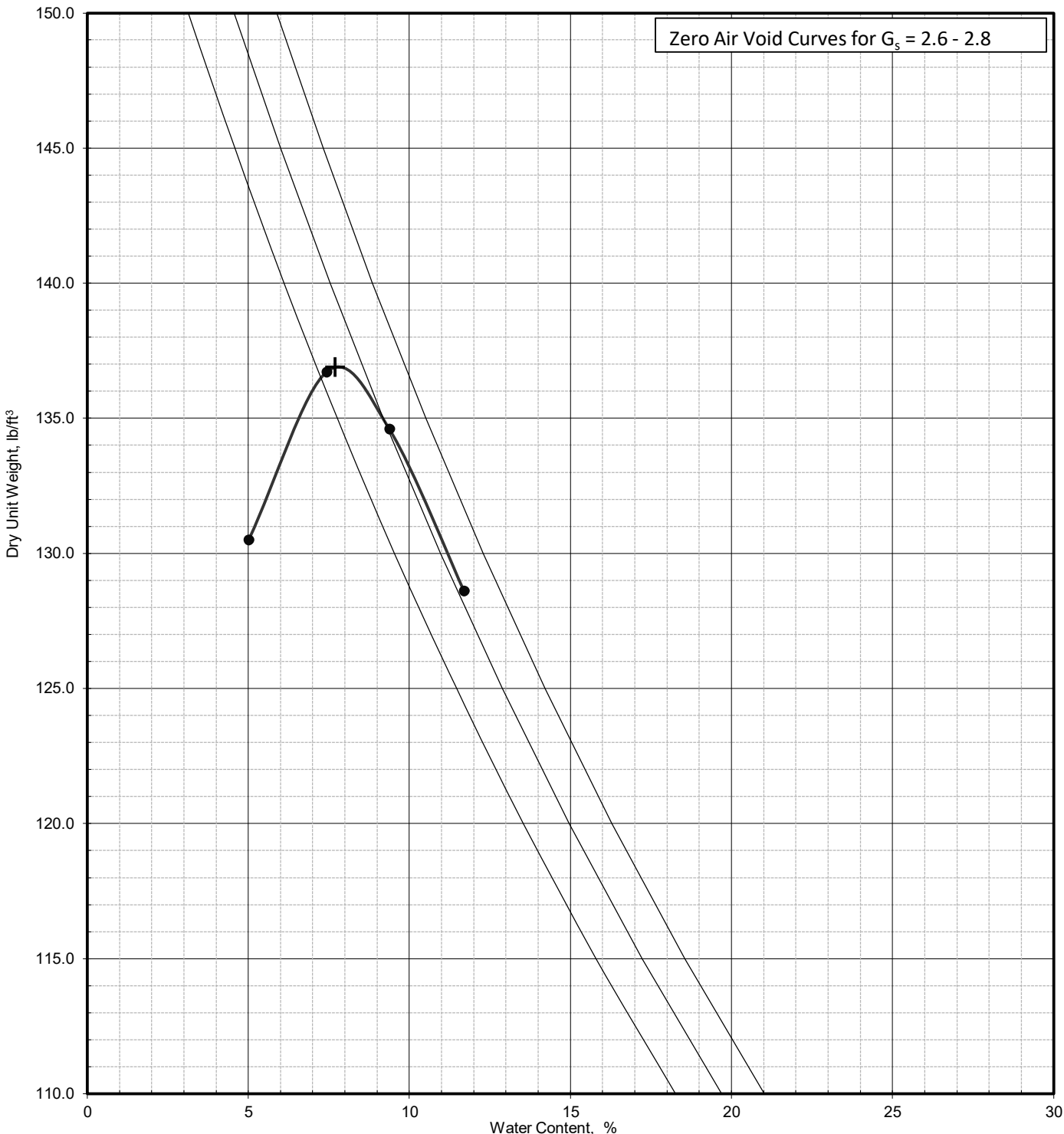



PROJECT NO.:	E4-LM32.300
SCALE:	NTS
DRAWN BY:	NDM
CHECKED BY:	CJB

3475 Lakemont Blvd.
Fort Mill, SC 29708

www.espassociates.com
Phone: 803-802-2440

Zero Air Void Curves for $G_s = 2.6 - 2.8$



Soil Description: FDR Pill Mix (soil/asphalt/base course)		Sample No. S-1	
Sample Type: BLK	Preparation: Moist	Rammer: Manual - 5.5lbf (24.5N)	Location: Farm House Road
Depth: 0 - 2 ft	Maximum Dry Unit Weight: 136.9 lb/ft³	PL: 17	PI: 3
Received water content: %	Optimum Water Content: 7.7 %	Fines: 17.2 %	LL: 20
Remarks:		STANDARD MOISTURE-DENSITY RELATIONSHIP	
		TEST METHOD: ASTM D698 method C	
	Address: 3475 Lakemont Boulevard Fort Mill, SC 29708	Project: Sugar Creek Elementary - Farm House Road	
	Telephone: 803-802-2440	Number: LM32.300.000	
Lab Technician:		Project Manager: nmclaren	

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 The test results shown are specific to the specimen/sample numbers tested, as noted above.

**Supplemental Technical Specification for
Cement Modified Recycled Base**

SCDOT Designation: SC-M-306 (07/21)

**APPROVED:
Division Administrator**

By: _____
FEDERAL HIGHWAY ADMINISTRATION

1.0 DESCRIPTION

- 1.1 This section contains specifications for the materials, equipment, construction, measurement, and payment for the modification of an existing paved roadway or shoulder by scarifying the existing pavement structure, mixing it with Portland cement, and constructing the base course in conformance with the lines, grades, dimensions, and cross-sections shown on the Plans or as directed by the **RCE**.

2.0 MATERIALS

- 2.1 Portland Cement - Use Portland cement that conforms to the requirements of **Subsection 301.2.1**.
- 2.2 Water - Use water conforming to the requirements of **Subsection 701.2.11**.
- 2.3 Asphalt Material – Use asphalt material conforming to the requirements of **Subsection 301.2.4**.

3.0 EQUIPMENT

- 3.1 Ensure that the equipment necessary for the proper construction of the work is on site and in acceptable working condition. Provide sufficient equipment to enable prosecution of the work in accordance with the project schedule and completion of the work in the specified time.
- 3.2 Construct the base with self-propelled rotary mixer(s)/reclaimer(s) capable of mixing in place to the required depth. The mixer(s)/reclaimer(s) shall have a mechanism for controlling the reclaimed material gradation via breaker bar and/or a door opening on the mixer(s)/reclaimer(s). Mixer(s)/reclaimer(s) shall be fitted with an integrated liquid injection system capable of introducing liquid into the cutting drum during the mixing process.
- 3.3 Provide a sufficient number of water trucks on the jobsite at all times of operation to maintain the moisture requirements listed in **Subsection 9**. Ensure that the water truck used in conjunction with the reclaimer uses a direct injection system, and additional trucks maintain surface moisture during grading and compaction work and until the curing treatment is applied in accordance with **Subsection 13**. Accomplish this using a controlled and uniform application of water without eroding or otherwise damaging the CMRB surface.
- 3.4 Provide a spreader/distributor capable of achieving consistent, accurate and uniform distribution across the entire length and width of the roadway while minimizing dust. Ensure that the spreader has adjustable openings or gate headers and is not solely dependent on vehicle speed to obtain the required spread rate.
- 3.5 Provide a combination of sheepsfoot rollers, smooth wheel tandem rollers, and/or pneumatic-tired rollers that have the ability to adequately compact reclaimed material throughout the entire specified CMRB thickness. Ensure the necessary weight, size and number of rollers to achieve the requirements of **Subsection 10**.

4.0 CONSTRUCTION

- 4.1 Regulate the sequence of work to process the necessary quantity of material to provide the full depth of modification as shown on the Plans:
 - 4.1.1 Ensure structural integrity of reclaimed material is consistent throughout the depth of the modification.
 - 4.1.2 Ensure surface quality is sufficient to provide durable temporary pavement structure surface and supports permanent pavement structure performance.
 - 4.1.3 Incorporate appropriate material as specified in the plans for drainage correction, cross slope correction or roadway strengthening.

5.0 QUALITY CONTROL PLAN, TEST STRIP & CORRECTIVE ACTION REQUIREMENTS

- 5.1 Prepare an annual Quality Control Plan that ensures that operational techniques and activities provide integral and finished material of acceptable quality for each Cement Modified Recycled Base project. Submit a Quality Control Plan for acceptance to the Chemical Stabilization Engineer (**CSE**) in writing a minimum of two weeks before work begins for the year.
- 5.2 The Quality Control Plan should include, but not be limited to addressing the following items;
 - 5.2.1 Contingency plans for pulverization, mixing and compaction when specifications criteria are not met. Consider the specific roadway conditions of various project sites.
 - 5.2.2 Plan for identifying in-situ moisture conditions, adjusting the moisture content to meet specifications, and maintaining moisture content through the time of curing. Include a description of the methods and minimum contractor testing for moisture. Consider specific environmental conditions of various project sites and schedules.
- 5.3 Test Strips
 - 5.3.1 The first load of cement on the roadway will be used as a test strip to determine if the contractor is capable of producing a mixture according to specifications. Particular attention will be paid to the moisture and compaction requirements set in **Subsection 10**, mixing and processing requirements set in **Subsection 9**, pulverization requirements set in **Subsection 7**, depth requirements in **Subsection 17**, and cement tolerances in **Subsection 8**. Cease production after the first load if any of the requirements of the specification are outside of the tolerances and change procedures to contingency plans approved in the QC Plan to continue work. Continue production as normal on the same day when the test strip meets the specification requirements.
 - 5.3.2 The first load applied with the contingency plans will be used as a test strip to evaluate the corrective action plan. Cease production after this initial load of cement if the requirements of this specification are still not being met and submit a revised corrective action plan to the **RCE** for acceptance prior to continuing work.
 - 5.3.3 If the requirements of this specification are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the **RCE** for acceptance prior to continuing work.

6.0 SHOULDERS & ROADWAY PREPARATION

- 6.1 Remove all excess vegetation generated from the clipping and cleaning of shoulders from the roadway and any other debris, including Reflective Pavement Markers, prior to performing the mixing operations. Remove material from the shoulders as necessary to ensure proper drainage at all times.

7.0 PULVERIZATION

- 7.1 Provide means, methods, and equipment necessary to obtain satisfactory pulverization of the pavement so that at the completion of pulverization and mixing (prior to compactive efforts), a uniform mixture is created in which 100% of the reclaimed material mixture (by weight) passes a 3 inch sieve and 95% of the reclaimed material mixture (by weight) passes a 2 inch sieve. When necessary, SC-T-1 Section 6.6 will be used for sampling to run gradation tests. Rework areas not meeting this gradation control measure as necessary, adhering to the time limitations in **Subsection 11**. The pulverization pass is defined as at least one pass of the mixer prior to the application of cement. Additional passes are allowed. Lightly compact following each pass of the mixer to produce a uniform layer. Carefully control the depth of pulverization and conduct operations in a manner to ensure that the surface of the roadbed below the pulverized material remains undisturbed and conforms to the required cross-section. Means, methods and equipment including but not limited to additional passes of the reclaimer, milling in place or the use of supplementary equipment to achieve pulverization is the responsibility of the contractor and incidental to the process.
- 7.2 If the requirements of pulverization are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the **RCE** for acceptance prior to continuing work.

8.0 APPLICATION OF CEMENT

- 8.1 The **CSE** will determine the rate of cement based on test results supplied in writing by the Contractor. Do not commence construction until an approved rate has been determined by the **CSE**. Allow two weeks from the date of submittal for the results and selection of appropriate cement rate. The test results will be conducted according to SC-T-26 by an AASHTO-accredited laboratory with material obtained from the roadway in which construction is to occur. Ensure that the roadway sampling and mix design testing is representative of the entire area and depth to be treated, several samples and/or designs may be necessary.
- 8.2 Spread Portland Cement uniformly on the pulverized material at the rate established by the **CSE**, taking care to minimize fugitive dust and minimize overlapping of the passes (maximum 6 inches). Apply cement only when the temperature is 40°F in the shade and rising, and no freezing temperatures are predicted for at least 48 hours. Do not perform work on frozen or excessively wet subgrade. A tolerance of 5% (of the rate) is allowed in the spread rate for individual sections (load of cement) of roadway; however, adjustments should be made in order to keep the actual spread rate as close to that established by the **CSE**. Only apply cement to such an area that all the operations (including final compaction) can be continuous and completed in daylight, unless adequate artificial light is provided. Ensure that all operations (including final compaction) can be completed within 3 hours of application of cement.

- 8.3 Do not allow the percentage of moisture in the reclaimed material mixture at the time of cement application to exceed the quantity that permits uniform and thorough mixture of reclaimed material or that creates instability of the roadway. Do not allow equipment, except that used in spreading and mixing, to pass over the freshly spread cement until it is mixed with the reclaimed material mixture.
- 8.4 If the requirements of cement application are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the **RCE** for acceptance prior to continuing work.

9.0 MIXING & PROCESSING

- 9.1 Pulverize material as necessary to meet the requirements given in **Subsection 7**. The pulverization pass is defined as at least one pass of the mixer prior to the application of cement. Lightly compact following each pass of the mixer to produce a uniform layer.
- 9.2 After the cement has been applied per **Subsection 8**, mix and uniformly add necessary moisture to the reclaimed material to ensure that the moisture content is above the optimum value as set in the approved mix design and within +/- 2% of the optimum moisture content when tested within 30 minutes of final compaction. Mix with at least one pass of the reclaimer after cement application at minimum. Additional passes are allowed, adhering to time limitations set forth within this specification. Ensure full width pulverizing and mixing by overlapping a minimum of 6 inches with each longitudinal pass, including at the longitudinal joint of each lane, and a minimum of 2 feet with each transverse joint. Additional mixing passes may be required in the contract documents. Lightly compact following each pass of the mixer to produce a uniform layer.
- 9.3 Immediately begin final compaction after the mixing process has been completed so that the requirements of **Subsection 10** are met.
- 9.4 Remove excess material generated from the mixing process after final grading operations have been completed.
- 9.5 If the requirements of mixing and processing are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the **RCE** for acceptance prior to continuing work.

10.0 COMPACTION

- 10.1 Before beginning compaction, ensure that the mixture is free from excessive fluff and overly compacted areas to allow for uniform compaction of the layer. Continue compaction until the entire depth of the base course mixture is uniformly compacted to not less than 95% of the maximum density. SC-T-23, SC-T-26, SC-T-27, or SC-T-29 will be used at the discretion of the **RCE** to determine the maximum density of the composite mix. If tests show that 95.0% requirement is not being met, adjust construction operations to obtain the required density. Complete the compaction work within 1 hour of the final mixing pass.
- 10.2 After the mixture is compacted, reshape the surface of the base course as necessary to conform to the required lines, grades, and cross-section. Perform light scarifying to a depth which removes the sheepsfoot imprints at minimum. Continue as required to obtain a uniform surface and to prevent scaling and delamination.

- 10.3** Perform compacting and finishing in a manner that produces a smooth, closely knit surface, free from equipment imprints, cracks, ridges, or loose material. Maintain the moisture content of the mixture within +/- 2% of the optimum moisture as determined by the pre-approved mix design and keep the surface continuously moist to the time of final curing coat being applied. The moisture content and density requirements for compaction will be tested for acceptance within 30 minutes of final compaction. Additional moisture contents tests will be randomly performed for acceptance through the curing application to ensure that the surface moisture is maintained above optimum moisture.
- 10.4** If the requirements of compaction are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the **RCE** for acceptance prior to continuing work.

11.0 CONSTRUCTION LIMITATIONS

- 11.1** Perform work in daylight hours unless adequate artificial light is provided. Limit the area over which the cement-pavement mixture is spread so that all operations specified in **Subsections 7, 8, 9, 10 and 13** are performed continuously until completion of a section (load of cement). Complete all grading and compaction work on a section (load of cement) within 2 hours after the initial mixing pass of the reclaimer unless the **RCE** approves a longer period.
- 11.2** If operations are interrupted for a continuous period of greater than 1 hour after the cement has been mixed with the reclaimed material, reconstruct the entire affected section (area of interruption) in accordance with these specifications. When the un-compacted reclaimed material mixture and cement is wetted so that the moisture content exceeds that specified, manipulate and aerate the mixture to reduce the moisture to the specified content provided the base course is completed within the time limits of these specifications.
- 11.3** Begin subsequent lifts of asphalt or chip seals which cover the Cement Modified Recycled Base curing methods and act as a final riding surface within 7 calendar days of completion of the CMRB section unless the **RCE** approves a longer period. Begin these subsequent lifts so that no more than 4 miles have temporary surface treatment on them at any time. A section is defined as the contract section of roadway receiving CMRB treatment. When using Curing Methods B or C, ensure that a milled surface is not left open to the public for more than 72 hours.

12.0 WEATHER LIMITATIONS

- 12.1** Apply cement only when the temperature is 40°F in the shade and rising, and no freezing temperatures are predicted for at least 48 hours. Do not perform work on frozen or excessively wet subgrade. The temperature restrictions for single treatment, when used as a curing option, shall meet the requirements of this reclamation specification. If the successive course is a final riding course, the seasonal restrictions of December, January and February apply unless otherwise approved by the DOC.

13.0 CURING

- 13.1** After the Cement Modified Recycled Base has been finished as specified, cure the surface using the specified method in the plans or contract. Dampen and sweep the CMRB immediately prior to the application of the surface treatment.

Curing Method A: Surface (Single) Treatment

Curing Method B: Surface (Single) Treatment with Milling

Curing Method C: Surface (Double) Treatment with Milling

- 13.2** After the Cement Modified Recycled Base has been finished as specified, protect the base from rapid drying and traffic by placing Asphalt Surface Treatment as specified in **Section 406 or 407**, with the exception that lightweight aggregate is not required and CRS-2 may be used in place of CRS-2P. Perform this operation daily to protect the newly constructed Cement Modified Recycled Base, unless otherwise directed by the **RCE**.
- 13.3** Prior to placement of the HMA course in Methods B & C, mill the Cement Modified Recycled Base course surface to obtain a true and level finish for the asphalt placement. Ensure that a diamond milling pattern with a double or triple strike is clearly visible in the finished surface. Consider the final thickness during construction, leaving the specified depth of treatment after the milling has occurred. Ensure that the surface is left in a condition ready for paving, free from scabbing, scaling and other defects. Ensure that any structure lost to additional, deeper milling to remove these defects is replaced with asphalt. Include this cost in the Cement Modified Recycled Base price.

14.0 CONSTRUCTION JOINTS

- 14.1** At the end of each day's construction, form a straight construction joint as specified in **Subsection 301.4.9**.

15.0 SURFACE SMOOTHNESS

- 15.1** Ensure that the finished surface of the recycled base meets the requirements of **Subsection 301.4.10**. The grade of the road will be based on existing conditions of the roadway. Grade the cross slope to obtain positive drainage as well as smooth transitions from crown to superelevated sections of the roadway, re-grade roads with a pre-existing cross slope of 2% or greater to the same cross slope. On roads with a pre-existing cross slope of less than 2%, the Contractor and **RCE** will determine the measures required to obtain positive drainage and the final cross slope.

16.0 RIDEABILITY

- 16.1** Ensure that the final asphalt surface placed on Cement Modified Recycled Base course meets the Rideability requirements of SC-M-403 for either New Construction or Resurfacing, whichever is applicable based on the specified pavement structure.

17.0 THICKNESS TOLERANCE

- 17.1** The thickness of the completed Cement Modified Recycled Base will be measured at random intervals not to exceed 1,000 feet in length. The average job thickness will be measured daily using the average value of all measurements taken by the inspector each day. Where the measured thickness is more than 1 inch greater than the specified thickness, the thickness of that location will be considered the specified thickness plus 1 inch. If the average job thickness varies from the specified job thickness by more than ½ inch, an adjusted unit price is used for calculating payment. The pay factor will be calculated as below and applied;

$$\text{Pay Factor} = 1 - \frac{|\text{Average Job Thickness} - \text{Specified Job Thickness}|}{\text{Specified Job Thickness}}$$

$$\text{Adjusted Contract Unit Price} = \text{Pay Factor} * \text{Contract Unit Price}$$

17.2 If the requirements of thickness (any single test value greater than 1 inch different from the specified depth) are not being met in a section not defined as a test strip (a section is defined as one load of cement) then one additional load of cement will be allowed. Cease production after this additional load of cement if the requirements are still not being met and submit a corrective action plan to the **RCE** for acceptance prior to continuing work.

18.0 OPENING TO TRAFFIC

18.1 Local traffic may use completed portions of the Cement Modified Recycled Base provided the base has hardened sufficiently to prevent marring, damaging or visible rutting of the surface by such usage. Ensure that no damage occurs to the curing coat. With approval of the District Office, temporary detours may be utilized during the reclamation process to reduce the traffic on the reclaimed roadway. Use the subgrade shoulders or completed pavement, when available, for transporting materials, workers, and equipment throughout the project. Do not place construction equipment on the base without the approval of the **RCE** unless it is being used in the subsequent construction operation.

19.0 MAINTENANCE

19.1 Maintain the Cement Modified Recycled Base in accordance with **Subsection 301.4.13**.

20.0 MEASUREMENT

20.1 The quantity for the pay item Cement Modified Recycled Base (of the uniform thickness required) is the surface area of a uniform base constructed by applying and mixing cement with the subgrade as specified and is measured by the square yard (SY) of the modified base in-place, complete and accepted. Cement Modified Recycled Base constructed outside the designated area is not measured for payment.

20.2 The quantity for the pay item Portland Cement for Cement Modified Recycled Base is the weight of cement incorporated into the base at the rate established by the **CSE** and is measured by the ton (TON), complete and accepted. Portland cement incorporated in excess of 5% of the amount established by the **CSE** is not included in the measurement. Furnish the **RCE** with invoices of all cement received to verify weight.

21.0 PAYMENT

21.1 Payment for the accepted quantity of Cement Modified Recycled Base (of the uniform required thickness) or Portland Cement for Cement Modified Recycled Base, measured in accordance with **Subsection 20** is determined using the contract unit bid price for the applicable item.

21.2 Payment for Cement Modified Recycled Base (of the uniform required thickness) is full compensation for constructing the Cement Modified Recycled Base course as specified or directed and includes pulverizing and scarifying the existing pavement, applying and spreading cement, processing and mixing base course material, watering

and maintaining proper moisture content, compacting, finishing, curing, hauling and disposing of excess shoulder material and curing base course, forming construction joints, and all other materials, labor, equipment, tools, transportation, and incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.

- 21.3** Base course that is deficient in thickness is paid for at the adjusted unit price specified in **Subsection 20**.
- 21.4** Payment for Portland Cement for Cement Modified Recycled Base is full compensation for furnishing and weighing the cement as specified or directed and includes all other materials, labor, equipment, tools, supplies, transportation, and incidentals necessary to complete the work in accordance with the Plans, the Specifications, and other terms of the Contract.
- 21.5** Payment for excess reclaimed material generated from the roadway (excluding shoulder material) is paid for as unclassified excavation.
- 21.6** Payment for each item includes all direct and indirect costs or expenses required to complete the work.
- 21.7** Pay items under this section include the following:

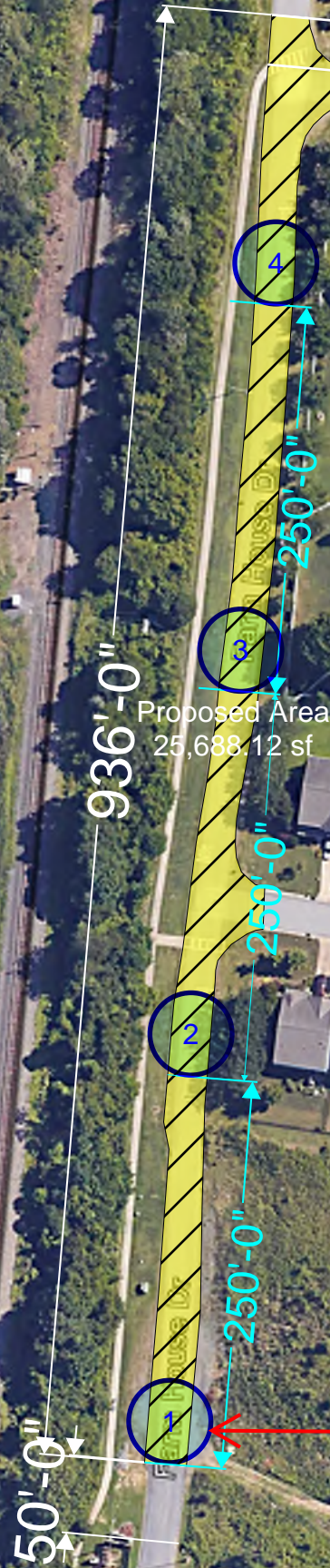
Item No.	Pay Item	Unit
3063306	Cement Modified Recycled Base (6" Uniform)	SY
3063308	Cement Modified Recycled Base (8" Uniform)	SY
3063310	Cement Modified Recycled Base (10" Uniform)	SY
3063312	Cement Modified Recycled Base (12" Uniform)	SY
3064000	Portland Cement for Cement Modified Recycled Base	TON

Farmhouse Rd Testing Limits

Proposed locations of Cores / Samples / Testing / etc.

Legend

Proposed area of Farmhouse Rd to be Demo'd / Replaced: 25,690sf OR 2,855syd



These are the locations where the (4) cores shall be performed. Per YC they requested a max of 250-300Lft between locations.

