SP- 155004
(New)

SPECIAL PROVISIONS
FOR
FULL DEPTH RECLAMATION WITH CEMENT STABILIZATION

Decatur County
FM-C027(62)--55-27

Effective Date
July 19, 2016

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

155004.01 DESCRIPTION.

A. Section Includes.
Reclaim existing roadway to the width and depth specified in the contract documents. Mix the reclaimed material in-place with cement stabilizing agent and water. Compact this mixture.

B. Submittals.
- Construction sequencing
- Results of Standard Proctor moisture-density relationships, moisture content, and in-place density tests of the cement treated soil.
- Material certifications, including mill test reports on each source of cement.

155004.02 MATERIALS.

A. Cement.

1. Cement shall be Type I or Type I/II meeting the requirements of ASTM C 150. The source of the cement shall be identified and approved in advance of stabilization operations in order that Standard Proctor tests can be completed by the Contractor prior to commencing work.

2. Cement shall be stored and handled in closed weatherproof containers until immediately before distribution. Cement exposed to moisture prior to mixing with soils shall be discarded.

B. Water.
Water used for mixing or curing shall be reasonably clean and free of oil, salt acid, alkali, sugar, vegetable, or other substances injurious to the finished product. Water shall meet the requirements of AASHTO T 26. Water known to be of potable quality may be used without testing.

C. Soil / Reclaimed Mixture.
The soil / reclaimed mixture for this work consists of materials that currently make up the existing roadway surface and underlying base and subgrade. Soil shall be tested by the Contractor to determine the proper rate of application of cement and water for stabilization. The target design cement content is 5%. The reclaimed soil shall be free of roots, sod, weeds, and stones/broken pavement larger than 1.5 inches.

D. Mix Design.
The Contractor shall test the existing reclaimed mixture for the proper mix design of soil, cement, and water needed for optimum moisture and compaction. The mix design shall be reviewed and approved by the Engineer. The depth of reclamation shall be 12 inches.

155004.03 CONSTRUCTION.

A. General.

1. Perform full depth reclamation between April 1 and November 1 unless otherwise specified in the contract documents.

2. Do not perform reclaiming operations when the weather conditions are such that proper mixing, shaping, and compacting the reclaiming material cannot be accomplished. Do not perform mixing when it is foggy, rainy, or when soil or subgrade is frozen, or will be within 24 hours.

3. The cement treated subgrade shall not be mixed while the atmospheric temperature is below 40°F or when weather conditions indicate that temperatures may fall below 40°F within 24 hours.

B. Equipment.

1. Furnish a self-propelled machine capable of reclaiming the existing paving material to the width and depth shown in the contract documents. Ensure the machine meets the following:
- **a.** Equipped with automatic depth control and maintain a constant cutting depth and width.
- **b.** Capable of pulverizing material to the required gradation.
- **c.** Capable of mixing the reclaimed material and cement stabilizing agent into a homogeneous mixture.
- **d.** Provides a positive means for accurately controlling the rate of flow and total delivery of the cement stabilizing agent into the mixture in relation to the speed and quantity of material being recycled.
- **e.** A delivery system meeting the requirements of Article 2001.22, F of the Standard Specifications.

2. Use rollers meeting the requirements of Article 2001.05 of the Standard Specifications for compacting the reclaimed material. As a minimum, have the following rollers available for use:
- **a.** Sheepsfoot roller.
- **b.** Double drum steel roller (may be used in the static or vibratory mode).

C. Construction Methods.

1. General.
It is the primary requirement of this specification to secure a completed stabilized subgrade containing a uniform cement mixture, free from loose or segregated areas, of uniform density and moisture content, well bound for its full depth, and with a smooth surface suitable for placing subsequent courses. The Contractor shall regulate the sequence of work, to apply

specified rates of cement, maintain the work, and rework the courses as necessary to meet the above requirements.

2. Cement Application.

a. Cement shall be spread only on areas where the mixing and compaction operations can be completed within 2 hours. The amount of cement spread shall be the amount required to obtain the cement content by dry soil unit weight of each layer of the treated subgrade shown on the plans.

b. The cement shall be spread uniformly over the top of the subgrade by an approved screw-type spreader box or other approved spreading equipment. The cement shall be distributed in such manner that scattering by wind will be minimal. Cement shall not be applied when wind conditions, in the opinion of the Engineer, are detrimental to a proper application.

3. Mixing.

a. The full depth of the treated subgrade shall be mixed with the pulvamixer. Cement shall not be left exposed for more than 30 minutes after application. The pulvamixer shall make two passes to incorporate the cement into the soil. Water shall be added through use of a pulvamixer equipped with a spray bar in the mixing drum capable of applying sufficient quantities of water to achieve the required moisture content of the soil-cement mixture. The system shall be capable of being regulated to the degree as to maintain moisture contents within the specified range.

b. Specified moisture contents shall be established by the Contractor based on Standard Proctor tests with the site soils and the specific cement to be used for the treatment. Final moisture content of the mix, immediately prior to compaction, shall not be below nor more than 2% above the optimum moisture content for maximum density of the mix as determined in accordance with Materials I.M. 309. If moisture contents exceed the specified limits, additional cement may be added to lower the moisture content to the required limits. Lowering moisture contents by aeration following addition of the cement will not be permitted.

4. Compaction.

a. Compaction of the soil-cement mixture shall begin immediately after mixing of the cement and be completed within two hours following incorporation of the cement. The field density of the compacted mixture shall be at least 95% of the maximum density of laboratory specimens prepared from samples taken from the material in place. The specimens shall be compacted and tested in accordance with Materials I.M. 309. Quality control testing by the Contractor shall be performed by a certified Soils Technician.

b. The in-place density of the cement treated subgrade layer shall be determined at intervals so that each test shall represent no more than 300 square yards. Acceptable test methods for in-place density are provided in Materials I.M. 204, Appendix A.

c. Irregularities, depressions, or weak spots, which develop, shall be corrected immediately by scarifying the area affected, adding or removing material as required, and reshaping and re-compacting. The surface of the course shall be maintained in a smooth condition, free from undulations and ruts, until other work is placed thereon or the work is accepted.

d. In addition to the requirements specified for density, the full depth of the material shown on the plans shall be compacted to the extent necessary to remain firm and stable under construction equipment. After each section is completed, tests will be made by the Engineer. If the material fails to meet the density requirements, it shall be reworked to meet these requirements. Throughout this operation, the shape of the course shall be maintained by blading, and the surface upon completion shall be smooth and shall conform with the typical section shown on the plans and to the established lines and grades. Should the material lose the required stability, density, and finish before the next course is placed or the work is accepted; it shall be recompacted and refinished at no additional cost to the Contracting Authority.

5. **Finishing and Curing.**
   - **a.** After the final layer or course of the cement treated subgrade has been compacted, it shall be brought to the required lines and grades in accordance with the typical sections. The finished surfaces shall not vary more than 3/8 inch when tested with a 16 foot straightedge applied parallel with and at right angles to the subgrade centerline. Any variations in excess of this tolerance shall be corrected by the Contractor, at no additional cost to the Contracting Authority, and in a manner satisfactory to the Engineer.
   - **b.** After the cement treated course has been finished as specified herein, the surface shall be protected against rapid drying and maintained in a thorough and continuously moist condition by sprinkling for a period of not less than 3 days or until the pavement section is placed.

6. **Thickness.**
   The thickness of the cement treated subgrade shall be determined by depth checks or cores taken at intervals so that each test will represent no more than 300 square yards. When the base thickness is deficient by more than 0.5 inch, the Contractor shall correct such areas in a manner satisfactory to the Engineer. The Contractor shall replace, at no additional cost to the Contracting Authority, the base material where borings are taken for test purposes.

7. **Maintenance.**
   The Contractor shall maintain the cement treated subgrade in good condition from the start of work until all the work has been completed, cured, and accepted by the Engineer.

155004.04 METHOD OF MEASUREMENT.

The quantity of Full Depth Reclamation satisfactorily completed, in square yards, will be computed from the measured longitudinal length of pavement reclaimed to the nearest 0.1 foot and the width of pavement specified in the contract documents.

155004.05 BASIS OF PAYMENT.

Payment for Full Depth Reclamation, in square yards, is full compensation for all labor, equipment, and materials necessary for preparation, reclaiming, stabilizing, shaping, and compaction of the reclaimed material.