

Payment for each item includes all direct and indirect costs or expenses required to complete the work.

Payment will be made under:

Item No.	Pay Item	Pay Unit
30710XX	Cement Stabilized Earth Base Course (<i>thickness</i>)" Uniform)	Square Yard
3072000	Portland Cement for Cement Stabilized Earth Base Course	Ton

SECTION 308

CEMENT STABILIZED AGGREGATE BASE COURSE

308.01 Description. This work shall consist of the construction of a base course composed of aggregates and portland cement uniformly mixed, moistened, shaped, and compacted, and application of a curing coat in accordance with these specifications. The completed base shall conform to the typical cross-section shown on the plans and to the lines and grades furnished by the Engineer.

MATERIALS

308.02 Portland Cement. Portland cement shall meet the requirements as specified in Subsection **701.02** of these specifications except that the allowable maximum alkali content ($\text{Na}_2\text{O}+0.658\text{K}_2\text{O}$) is increased to 1.0%.

308.03 Water. Water shall meet the requirements as specified in Section **701.12**.

308.04 Aggregate. The aggregate shall meet the requirements of macadam base course or marine limestone as specified in Section **305**. Samples shall be submitted to the Research and Materials Laboratory for approval of materials

and for determining the correct cement content at least thirty (30) days before beginning the operations.

308.05 Bituminous Material. The material for the bituminous curing coat shall be MC-30, RC-30, RS-2, CRS-2, or EA-P Special and shall meet the requirements as set forth for bituminous materials in Section **406**.

CONSTRUCTION REQUIREMENTS

308.06 Weather Limitations. No cement shall be applied unless the temperature is above 40°F in the shade and rising. The work shall not be performed on a frozen or excessively wet subgrade.

308.07 Preparation of Subgrade. The subgrade for the cement stabilized aggregate base course shall be constructed in accordance with the requirements set forth in Section **208**. The subgrade shall be completed at least 500 feet ahead of the placing of base course materials where practicable. The shoulders, when included on the plans, shall be constructed in accordance with the requirements of Section **209**, and accurately trimmed to the alignment and grade of the base course so as to form a trench or channeled section as prescribed on the plans.

308.08 Mixing and Placing Materials. Unless otherwise provided, the base course shall be mixed by the stationary plant method. The quantity of portland cement to be added to the aggregate will be between 2.5% and 5.0% by weight of the surface dry aggregate and shall be at the rate as directed by the Engineer with the tolerance hereinafter specified.

The aggregate, portland cement, and water shall be mixed in a pugmill, either of the batch or continuous-flow type. The plant shall be equipped with feeding and metering devices that will add aggregate, cement, and water into the mixer in the specified quantities. In all plants, the weight or rate of feed of the cement shall be within 5% of the amount desig-

nated by the Engineer. Mixing shall continue until a uniform homogeneous mixture is obtained. The mixing time may be increased by the Engineer when necessary to secure a proper blend of the materials.

The mixture shall be hauled to the roadway in trucks with protective covers. The mixture shall be placed on a moist subgrade in a uniform layer by an approved spreader. The layers shall be of such contour and thickness that the completed base course will conform to the required grade and cross-section. Dumping of the mixture in piles or windrows will not be permitted.

Not more than thirty (30) minutes shall elapse between the placement of the base course mixture in adjacent lanes except at longitudinal construction joints. Not more than sixty (60) minutes shall elapse between the start of moist mixing and the start of compaction.

308.09 Compaction. Before beginning compaction, the mixture shall be in a loose condition for its full depth and then shall be uniformly compacted to not less than 98% of the maximum laboratory density obtained according to AASHTO T 180 (Method D). The in-place density and moisture content may be determined with a nuclear moisture-density gauge. If necessary, the gauge will be calibrated for moisture content at the beginning of the work and at any time during the work.

The Contractor shall have sufficient vibratory rollers, smooth wheel tandem rollers, three-wheel rollers, pneumatic tired rollers, or other means of obtaining compaction that is satisfactory to the Engineer. The equipment shall be in good working order and the rate of operation shall be sufficient to compact uniformly the specified width and depth of the base course being processed within a period of two hours. The compacting and finishing shall be done in such a manner as to produce a uniform dense mass, free from cracks, ridges or loose material. The moisture content of the surface material

shall be maintained within two percentage points of the specified optimum moisture content during finishing operations.

308.10 Construction Joints. At the end of each day's construction, a straight transverse construction joint shall be formed by cutting back into the completed work to form a true vertical face. The base course for large wide areas shall be built in a series of parallel lanes of convenient length and width meeting the approval of the Engineer. Straight longitudinal joints shall be formed at the edge of each day's construction by cutting back into the completed work to form a true vertical face free of loose or shattered materials.

308.11 Construction Limitations. The area over which the cement aggregate mixture is spread shall be limited in order that all operations specified in Subsections **308.08** and **308.09** can be continuous and all work completed within daylight hours, unless adequate artificial light is provided. All work shall be completed within three (3) hours after the application of water to the aggregate and cement mixture, unless a longer period is approved by the Engineer.

If operations are interrupted for a continuous period of greater than two (2) hours after the cement has been mixed with the aggregate, the entire section thus affected shall be reconstructed in accordance with these specifications. When the uncompacted mixture of aggregate and cement is wetted so that the moisture content exceeds that specified, it may be manipulated and aerated to reduce the moisture to the specified content, provided the base course can be completed within the time limits of these specifications.

308.12 Reconstruction. If the construction of the base course is proceeding with the approval of the Engineer and the uncompacted aggregate and cement mixture is wetted by rain so that the moisture exceeds the allowable, the Contractor will be paid for the additional cement used in reconstructing the section and no additional payment will be made

for aggregate, mixing, shaping, and compacting. If the reconstruction of any section is made necessary by the negligence or omission of the Contractor or unsatisfactory performance of his equipment, or, if any section does not comply with the allowable variation in thickness, the Contractor will be required to reconstruct the section without additional compensation.

308.13 Surface Smoothness. The finished surface of the base course shall not vary more than 3/8 inch from a straight edge 10 feet long when applied parallel to the centerline of the road, nor more than 1/2 inch from the typical cross-section shown on the plans.

The finished surface of the base course shall not be disturbed after the final finishing and compaction. The removal of random knots will not be permitted after the base course has hardened. Where low areas or depressions result in the finished surface of the base course, the same material which the base course is to receive as the next component of the pavement structure shall be used in truing up the finished surface. The Contractor shall furnish the materials and perform this corrective work without additional compensation.

308.14 Tolerance in Base Course Thickness. The thickness of the completed base course shall be measured at staggered intervals not to exceed 250 feet in length for two-lane roads. The depth measurements shall be made by test holes through the base course. Where the base course is deficient by more than 1/2 inch, the Contractor shall correct such areas. Where the measured thickness is more than 1/2 inch thicker than shown on the plans, it shall be considered as the specified thickness, plus 1/2 inch. The average job thickness shall be the average of the depth measurements determined as specified above. Should this average thickness be more than 1/4 inch below the specified thickness, an adjusted unit price shall be used in payment. This adjusted unit price shall bear the same ratio to the contract unit price as the average thickness bears to the specified thickness.

When the contract includes more than one road, each road shall be considered separately.

308.15 Curing Coat. After the base course has hardened, but not later than twelve (12) hours after the completion of finishing operations, a bituminous curing coat of 0.20 to 0.25 gallons per square yard of residual asphalt shall be applied as specified in Section 406. The finished base course shall be kept continuously moist until the curing coat is applied. At the time the bituminous material is applied, the base course surface shall be dense, free of all loose and extraneous material and shall contain sufficient moisture to prevent penetration of the bituminous material.

Depending upon temperature and weather conditions and at his discretion, the Engineer may permit the application of the curing coat for a base course placed and completed during the latter portion of a day to be deferred until the early part of the following day.

308.16 Opening to Traffic. Unless otherwise directed by the Engineer, the Contractor shall furnish such guards, flagmen, barricades along with other devices necessary to prevent construction equipment or other traffic, regardless of the type vehicle or its reason for being on the project, from using the finished base course. The subgrade shoulders, or completed pavement when available, shall be used in transporting materials, men and equipment throughout the length of the project. The finished base course may be crossed at locations designated by the Engineer after the seven (7) day curing period. Such designated crossing shall be covered with at least 3 inches of screenings or sand as protection of the completed base course. When the paving operation is commenced, the completed section of the base course may be opened to light construction equipment for a distance not to exceed 1000 feet in advance of the paving work after the seven (7) day curing period has elapsed. When necessary to

provide for normal traffic, the Engineer may permit use of the base course for such purposes. If the bituminous curing coat has not sufficiently dried to prevent pickup when the base course is opened to traffic as outlined above, a granular cover shall be applied before opening.

308.17 Maintenance. The Contractor shall be required within the limits of his contract to maintain the cement stabilized aggregate base course in good condition until all work has been completed and accepted. Maintenance shall include the immediate repairs of any defects that may develop. Should any repairs or patching be necessary, they shall extend to the full depth of the base course and shall be made in a manner that will insure the restoration to a uniform and durable base course.

308.18 Method of Measurement.

A. Cement Stabilized Aggregate Base Course. Cement Stabilized Aggregate Base Course, complete in place with curing coat and accepted, will be measured by the square yard along the surface of the road. Materials placed outside the designated area will not be measured for payment.

When the contract does not contain a unit price for a thickness of base course, the base course for which there is no contract unit price shall be converted to equivalent square yards of base course for which there is a contract unit price. The conversion shall be based on the base course that has a thickness nearest to that of the base course thickness in question.

B. Portland Cement for Cement Stabilized Aggregate Base Course. The quantity for Portland Cement for Cement Stabilized Aggregate Base Course shall be the number of tons of portland cement accepted and used in the work. Portland cement used in excess of 5% of the amount specified will not be measured for payment.

The measurement of portland cement will be by scale weights or by delivered weights. The Contractor shall furnish the Engineer invoices of all cement received.

C. Aggregate. The Contractor shall furnish all aggregate and no payment for the aggregate or haul will be made.

308.19 Basis of Payment.

A. Cement Stabilized Aggregate Base Course. The base course measured as provided in Subsection **308.18A** above will be paid for at the contract unit price for Cement Stabilized Aggregate Base Course with curing coat, which price and payment shall be full compensation for furnishing all materials (except portland cement), tools, equipment, labor, maintenance, and incidentals necessary to complete the work.

Base course that is deficient in thickness will be paid for at the reduced unit price as provided in Subsection **308.14**.

B. Portland Cement for Cement Stabilized Aggregate Base Course. Portland cement, measured as provided in Subsection **308.18B**, will be paid for at the contract unit price for Portland Cement for Cement Stabilized Aggregate Base Course, which price and payment shall be full compensation for the material accepted and used in the work as described in this Section.

Payment for each item includes all direct and indirect costs or expenses required to complete the work.

Payment will be made under:

Item No.	Pay Item	Pay Unit
30810XX	Cement Stabilized Aggregate Base Course (<i>thickness</i> " Uniform)	Square Yard
3082000	Portland Cement for Cement Stabilized Aggregate Base Course	Ton

SECTION 309

HOT MIX SAND ASPHALT BASE COURSE

309.01 Description. This work shall consist of the construction of a Hot Mix Sand Asphalt Base Course composed of fine aggregate and asphalt binder, properly mixed in a hot mix asphalt approved plant and constructed on a prepared sub-grade, base course or other surface, and applying a tack coat when specified, all in accordance with these specifications and conforming to the lines, grades, dimensions, compacted thickness and typical cross-sections shown on the plans or as otherwise specified.

MATERIALS

309.02 Asphalt Binder. The asphalt binder shall meet the requirements of Subsection **401.02**. The performance grade shall be PG64-22 unless otherwise specified.

309.03 Aggregate. The aggregate material shall be composed of local sand or local sand containing crushed shell, blends of sand and stone, slag or limestone screenings or other approved materials.