

PROJECT SPECIAL PROVISIONS

ROADWAY

SHOULDER RECONSTRUCTION:

The Contractor shall place ABC (M) along the completed edge of pavement and construct shoulders as shown on the sketch map and/or as directed by the Engineer. The area shall be backfilled and compacted to the satisfaction of the Engineer.

The ABC (M) shall meet the requirements of Section 1005 in the NC DOT Standard Specifications for Roads and Structures.

This work shall be defined as “Shoulder Reconstruction” and shall include all excavation, backfilling, compacting and incidentals necessary to satisfactorily complete the work and the quantity of such work to be paid for will be the actual number of shoulder miles which have been constructed. Measurement will be made along the edge of each shoulder. Measurement will be made to the nearest 0.01 of a mile.

The quantity of shoulder reconstruction measured as provided above, will be paid for at the contract unit price per shoulder mile for “Shoulder Reconstruction”.

Payment will be made under:

Shoulder Reconstruction.....Shoulder Mile

REMOVAL OF EXISTING SHOULDER:

In areas where the existing shoulder is to be converted to full depth paved shoulder, the Contractor shall remove all asphalt, earth material and aggregate necessary to place the proposed asphalt base course in accordance with the typical section and as directed by the Engineer.

No separate payment shall be made for the removal of existing shoulder as the cost of this work shall be included in the unit price bid per ton for “Asphalt Concrete Base Course, Type B25.0B”.

ASPHALT PAVEMENTS - SUPERPAVE:

(7-18-06) (Rev 12-18-07)

R6 R01

Revise the *2006 Standard Specifications* as follows:

Page 6-2, Article 600-9 Measurement and Payment, delete the second paragraph.

Page 6-12, Subarticle 609-5(C)2, Required Sampling and Testing Frequencies, first partial paragraph at the top of the page, delete last sentence and add the following:

If the Engineer allows the mix to remain in place, payment will be made in accordance with Article 105-3.

Page 6-12, Subarticle 609-5(C)2, QUALITY CONTROL MINIMUM SAMPLING AND TESTING SCHEDULE

First paragraph, delete and replace with the following.

Sample and test the completed mixture from each mix design per plant per year at the following minimum frequency during mix production:

Second paragraph, delete the fourth sentence, and replace with the following

When daily production of each mix design exceeds 100 tons and a regularly scheduled full test series random sample location for that mix design does not occur during that day's production, perform at least one partial test series consisting of Items A and B in the schedule below.

Page 6-12, Subarticle 609-5(C)2(c) Maximum Specific Gravity, add after (AASHTO T 209):

or ASTM D 2041

Page 6-13, last line and on page and Page 6-14, Subarticle 609-5(C)2(e) Retained Tensile Strength, add a heading before the first paragraph as follows:

(i) Option 1

Insert the following immediately after the first paragraph:

(ii) Option 2

Mix sampled from truck at plant with one set of specimens prepared by the Contractor and then tested jointly by QA and QC at a mutually agreed upon lab site within the first 7 calendar days after beginning production of each new mix design.

Second paragraph, delete the and replace with the following:

Test all TSR specimens required by either option noted above on either a recording test press or a test press that maintains the peak load reading after the specimen has broken.

Subarticle 609-5(C)3 Control Charts, delete the second sentence of the first paragraph and replace with the following:

For mix incorporated into the project, record full test series data from all regularly scheduled random samples or directed samples that replace regularly scheduled random samples, on control charts the same day the test results are obtained.

Page 6-15, Subarticle 609-5(C)(3) Control Charts, first paragraph on this page, delete the last sentence and substitute the following:

Denote the moving average control limits with a dash green line and the individual test limits with a dash red line.

Subarticle 609-5(C)(3)(a), (b) and (c), replace (a) (b) and (c) with the following:

- (a) A change in the binder percentage, aggregate blend, or G_{mm} is made on the JMF, or,
- (b) When the Contractor elects to stop or is required to stop production after one or two moving average values, respectively, fall outside the moving average limits as outlined in subarticle 609-5(C)6 or,
- (c) If failure to stop production after two consecutive moving averages exceed the moving average limits occurs, but production does stop at a subsequent time, re-establish a new moving average beginning at the actual production stop point.

Subarticle 609-5(C)(4) Control Limits, replace the first paragraph and the CONTROL LIMITS Table on page 6-16 with the following.

The following are established as control limits for mix production. Apply the individual limits to the individual test results. Control limits for the moving average limits are based on a moving average of the last 4 data points. Apply all control limits to the applicable target source.

CONTROL LIMITS

Mix Control Criteria	Target Source	Moving Average Limit	Individual Limit
2.36 mm Sieve	JMF	±4.0 %	±8.0 %
0.075mm Sieve	JMF	±1.5 %	±2.5 %
Binder Content	JMF	±0.3 %	±0.7 %
VTM @ N_{des}	JMF	±1.0 %	±2.0 %
VMA @ N_{des}	Min. Spec. Limit	-0.5%	-1.0%
$P_{0.075}/P_{be}$ Ratio	1.0	±0.4	±0.8
% G_{mm} @ N_{ini}	Max. Spec. Limit	N/A	+2.0%
TSR	Min. Spec. Limit	N/A	- 15%

Page 6-16, Subarticle 609-5(C)(5) Warning Bands, delete this subarticle in its entirety.

Pages 6-16 through 6-19, Subarticle 609-5(C)(6), delete the word "warning" and substitute the words "moving average".

Page 6-16, Subarticle 609-5(C)(6) Corrective Actions, first paragraph, first sentence, delete and replace with the following:

Immediately notify the Engineer when moving averages exceed the moving average limits.

Page 6-17, third full paragraph, delete and replace with the following:

Failure to stop production when required due to an individual mix test not meeting the specified requirements will subject all mix from the stop point tonnage to the point when the next individual test is back on or within the moving average limits, or to the tonnage point when production is actually stopped, whichever occurs first, to being considered unacceptable.

Sixth full paragraph, delete the first, second, and third sentence and replace with the following:

Immediately notify the Engineer when any moving average value exceeds the moving average limit. If two consecutive moving average values for any one of the mix control criteria fall outside the moving average limits, cease production of that mix, immediately notify the Engineer of the stoppage, and make adjustments. The Contractor may elect to stop production after only one moving average value falls outside the moving average limits.

Page 6-18, Subarticle 609-5(C)(6) Corrective Actions second full paragraph, delete and replace with the following:

If the process adjustment improves the property in question such that the moving average after four additional tests is on or within the moving average limits, the Contractor may continue production with no reduction in payment

Page 6-18, delete the third and fourth full paragraphs, including the Table for Payment for Mix Produced in the Warning Bands and substitute the following:

If the adjustment does not improve the property in question such that the moving average after four additional individual tests is outside the moving average limits, the mix will be evaluated for acceptance in accordance with Article 105-3. Reduced payment for or removal of the mix in question will be applied starting from the plant sample tonnage at the stop point to the sample tonnage when the moving average is on or within the moving average limits. In addition, any mix that is obviously unacceptable will be rejected for use in the work.

Page 6-19, First paragraph, delete and replace with the following:

Failure to stop production and make adjustments when required due to two consecutive moving average values falling outside the moving average limits will subject all mix produced from the stop point tonnage to the tonnage point when the moving average is back on or within the moving average limits or to the tonnage point when production is actually stopped, whichever occurs first, to being considered unacceptable. Remove this material and replaced with materials which comply with the Specifications at no additional costs to the Department, unless otherwise approved. Payment will be made for the actual quantities of materials required to replace the removed quantities, not to exceed the original amounts.

Page 6-20, Subarticle 609-5(D)(1) General, delete the third full paragraph, and replace with the following:

Perform the sampling and testing at the minimum test frequencies as specified above. Should the density testing frequency fail to meet the minimum frequency as specified above, all mix without the required density test representation will be considered unsatisfactory. If the Engineer allows the mix to remain in place, payment will be made in accordance with Article 105-3.

Page 6-23, Subarticle 609-5(D)(5) Limited Production Procedure, delete the first paragraph including (a), (b), (c) and substitute the following:

Proceed on limited production when, for the same mix type and on the same contract, one of the following conditions occur (except as noted in the first paragraph below).

- (a) Two consecutive failing lots, except on resurfacing*
- (b) Three consecutive failing lots on resurfacing*
- (c) Two consecutive failing nuclear control strips.

* Resurfacing is defined as the first new uniform layer placed on an existing pavement.

Page 6-28, Subarticle 610-3(A) Mix Design-General, fourth paragraph, third sentence:

Substitute 20% for 15%

Fifth paragraph, first, second and third sentences:

Substitute 20% for 15%

Page 6-28, Subarticle 610-3(A) Mix Design-General, add the following as the fourth paragraph:

Reclaimed Asphalt Pavement (RAP) or Reclaimed Asphalt Shingles (RAS) may be incorporated into asphalt plant mixes in accordance with Article 1012-1 and the following applicable requirements.

Page 6-35, Table 610-3 delete and replace with the following:

**TABLE 610-3
ASPHALT PLACEMENT- MINIMUM TEMPERATURE REQUIREMENTS**

Asphalt Concrete Mix Type	Minimum Air Temperature	Minimum Surface Temperature
ACBC, Type B 25.0B, C, B 37.5C	35°F	35°F
ACIC, Type I 19.0B, C, D	35°F	35°F
ACSC, Type S 4.75A, SF 9.5A, S 9.5B	40°F	50°F*
ACSC, Type S 9.5C, S 12.5C	45°F	50°F
ACSC, Type S 9.5D, S 12.5D	50°F	50°F

* 35°F if surface is soil or aggregate base for secondary road construction.

Page 6-44, Article 610-8 Spreading and Finishing, third full paragraph, replace the first sentence with the following:

Use the 30 foot minimum length mobile grade reference system or the non-contacting laser or sonar type ski *with at least four referencing stations mounted on the paver at a minimum length of 24 feet* to control the longitudinal profile when placing the initial lanes and all adjacent lanes of all layers, including resurfacing and asphalt in-lays, unless otherwise specified or approved.

Page 6-50, Article 610-13 Density Acceptance, delete the second paragraph and replace with the following:

As an exception, when the first layer of mix is a surface course and is being placed directly on an unprimed aggregate or soil base, the layer will be included in the "Other" construction category.

Page 6-53, Article 620-4 Measurement and Payment, sixth paragraph, delete the last sentence.

Page 6-54, Article 620-4 Measurement and Payment, add the following pay item:

Pay Item	Pay Unit
Asphalt Binder for Plant Mix, Grade PG 70-28	Ton

Page 6-69, Table 660-1 Material Application Rates and Temperatures, add the following:

Type of Coat	Grade of Asphalt	Asphalt Rate gal/yd²	Application Temperature °F	Aggregate Size	Aggregate Rate lb./sq. yd. Total
Sand Seal	CRS-2 or CRS-2P	0.22-0.30	150-175	Blotting Sand	12-15

Page 6-75, Subarticle 660-9(B), add the following as sub-item (5)**(5) Sand Seal**

Place the fully required amount of asphalt material in one application and immediately cover with the seal coat aggregate. Uniformly spread the fully required amount of aggregate in one application and correct all non-uniform areas prior to rolling.

Immediately after the aggregate has been uniformly spread, perform rolling.

When directed, broom excess aggregate material from the surface of the seal coat.

When the sand seal is to be constructed for temporary sealing purposes only and will not be used by traffic, other grades of asphalt material meeting the requirements of Articles 1020-6 and 1020-7 may be used in lieu of the grade of asphalt required by Table 660-1 when approved.

Page 6-76, Article 661-1 Description, add the following as the 2nd paragraph:

Provide and conduct the quality control and required testing for acceptance of the UBWC in accordance with "Quality Management System for Asphalt Pavements (OGAFC, PADL, and Ultra-Thin HMA Version)", included in the contract.

Page 6-80, Subarticle 661-3(A) Equipment, add the following as the first paragraph:

Use asphalt mixing plants in accordance with Article 610-5.

Page 10-41, Table 1012-1, delete the last row of entries for OGAFC and add the following:

Mix Type	Course Aggregate Angularity ^(b) ASTM D5821	Fine Aggregate Angularity % Minimum AASHTO T304 Method A	Sand Equivalent % Minimum AASHTO T176	Flat & Elongated 5:1 Ratio % Maximum ASTM D4791 Section 8.4
S 9.5 D	100/100	45	50	10
OGAFC	100/100	N/A	N/A	10
UBWC	100/85	40	45	10

Delete Note (c) under the Table 1012-1 and replace with the following:

(c) Does not apply to Mix Types SF 9.5A and S 9.5B.

Page 10-43 through 10-45, Subarticle 1012-1(G), delete this in its entirety and replace with the following:

(G) Reclaimed Asphalt Pavement (RAP)

(1) Mix Design RAP

Incorporate RAP from stockpiles or other sources that have been tested for uniformity of gradation and binder content prior to use in an asphalt mix design. Use reclaimed asphalt pavement that meets all requirements specified for *one of* the following *two* classifications.

(a) Millings

Existing reclaimed asphalt pavement (RAP) that is removed from its original location by a milling process as specified in Section 607. Millings should be such that it has a uniform gradation and binder content and all materials will pass a 2" sieve prior to introduction into the plant mixer unit.

(b) Processed RAP

RAP that is processed in some manner (possibly by crushing and/or use of a blending method) to produce a uniform gradation and binder content in the RAP prior to use in a recycled mix. Process RAP so that all materials have a uniform gradation and binder content and will pass a 2" sieve prior to introduction into the plant mixer unit.

(2) Mix Production RAP

During mix production use RAP that meets the criteria for one of the following categories:

(a) Mix Design RAP

RAP contained in the mix design stockpiles as described above may be used in all applicable JMFs. These stockpiles have been pretested; however, they are subject to required QC/QA testing in accordance with Subarticle 609-5(C)(2).

(b) New Source RAP

New Source RAP is defined as any acceptable material which was not included in the stockpile or other source when samples were taken for mix design purposes. Process new source RAP so that all materials have a uniform gradation and binder content and will pass a 2" sieve prior to introduction into the plant mixer unit.

After a stockpile of processed RAP or millings has been sampled and mix designs made from these samples, do not add new source RAP to the original stockpile without prior field testing to insure gradation and binder uniformity. Sample and test new source RAP before blending with the existing stockpile.

Store new source RAP in a separate stockpile until the material can be sampled and tested for comparison with the original recycled mix design data. New source RAP may also be placed against the existing stockpile in a linear manner provided it is sampled for mix design conformity prior to its use in the recycled mix.

Unprocessed RAP is asphalt material that was not milled and/or has not been processed to obtain a uniform gradation and binder content and is not representative of the RAP used during the applicable mix design. Unprocessed RAP shall not be incorporated into any JMFs prior to processing. Different sources of unprocessed RAP may be stockpiled together provided it is generally free of contamination and will be processed prior to use in a recycled mix. RAP contamination in the form of excessive dirt, debris, clean stone, concrete, etc. will not be allowed. Incidental amounts of dirt, concrete, and clean stone may be acceptable. Unprocessed RAP may be processed and then classified as a new source RAP as described above.

Field approval of new source RAP will be based on Table 1012-2 below and volumetric mix properties on the mix with the new source RAP included. Provided the Table 1012-2 tolerances are met, volumetric properties of the new mix will then be performed. If all volumetric mix properties meet the mix design criteria for that mix type, the new source RAP may continue to be used.

If the gradation, binder content, or any of the volumetric mix properties are not within the allowable tolerances of Table 1012-2, do not use the new source RAP unless approved by the Engineer. The Contractor may elect to either not use the stockpile, to request an adjustment to the JMF, or to redesign the mix.

TABLE 1012-2
NEW SOURCE RAP GRADATION and BINDER TOLERANCES
 (Apply Tolerances to Mix Design Data)

Mix Type	0-20% RAP			20 ⁺ -25 % RAP			25 ⁺ % RAP			
	Sieve (mm)	Base	Inter.	Surf.	Base	Inter.	Surf.	Base	Inter.	Surf.
P _b %		± 0.7%			± 0.4%			± 0.3%		
25.0	±10	-	-	-	±7	-	-	±5	-	-
19.0	±10	±10	-	-	±7	±7	-	±5	±5	-
12.5	-	±10	±6	-	±7	±3	-	±5	±5	±2
9.5	-	-	±8	-	-	±5	-	-	-	±4
4.75	±10	-	±10	-	±7	-	±7	±5	-	±5
2.36	±8	±8	±8	-	±5	±5	±5	±4	±4	±4
1.18	±8	±8	±8	-	±5	±5	±5	±4	±4	±4
0.300	±8	±8	±8	-	±5	±5	±5	±4	±4	±4
0.150	-	-	±8	-	-	±5	-	-	-	±4
0.075	±4	±4	±4	-	±2	±2	±2	±1.5	±1.5	±1.5

ASPHALT BINDER CONTENT OF ASPHALT PLANT MIXES:

(1-1-02)

R6 R15

The approximate asphalt binder content of the asphalt concrete plant mixtures used on this project will be as follows:

Asphalt Concrete Base Course	Type B 25.0	4.3 %
Asphalt Concrete Intermediate Course	Type I 19.0	4.7 %
Asphalt Concrete Surface Course	Type S 4.75A	7.0 %
Asphalt Concrete Surface Course	Type SF 9.5A	6.5 %
Asphalt Concrete Surface Course	Type S 9.5	6.0 %
Asphalt Concrete Surface Course	Type S 12.5	5.5 %

The actual asphalt binder content will be established during construction by the Engineer within the limits established in the *2006 Standard Specifications*.

ASPHALT PLANT MIXTURES:

(7-1-95)

R6 R20

Place asphalt concrete base course material in trench sections with asphalt pavement spreaders made for the purpose or with other equipment approved by the Engineer.

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:

(11-21-00)

R6 R25

Price adjustments for asphalt binder for plant mix will be made in accordance with Section 620 of the *2006 Standard Specifications*.

The base price index for asphalt binder for plant mix is \$ **361.54** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **March 1, 2008**.

ASPHALT CONCRETE SURFACE COURSE COMPACTION:

(7-1-95)

R6 R49

Compact the asphalt surface course on this project in accordance with Subarticle 610-9 of the *2006 Standard Specifications* and the following provision:

Perform the first rolling with a steel wheel roller followed by rolling with a self-propelled pneumatic tired roller with the final rolling by a steel wheel roller.

MILLING ASPHALT PAVEMENT:

The quantity of milled asphalt pavement to be paid for will be the actual number of square yards of pavement surface, which has been milled in accordance with the requirements of the contract. This quantity will also include the milling of irregular areas, intersections, and remilled areas. Where the Project Engineer directs remilling to achieve the final depth, measurement will be made for each cut. The quantity of milled asphalt pavement, measured as provided in Article 607-5, will be paid for at the contract unit price per square yard for the depth milled.

REPAIR OF JOINTED CONCRETE PAVEMENT SLABS:**DESCRIPTION:**

The work covered by this provision consists of the removal and satisfactory disposal of the existing damaged jointed concrete pavement slabs, furnishing and placing new jointed concrete pavement slabs as shown in the plans or as directed by the Engineer.

MATERIALS:

Refer to Divisions 6, 7, and 10 of the Standard Specifications.

Item	Section
Portland Cement Concrete	1000
Curing Agents	1026
Water	1024-4
Select Material, Class IV	1016
Dowels and Tie Bars	1070-6
Fabric for Soil Stabilization	270

Use Select Material, Class IV for Class IV Subgrade Stabilization. If Class IV Subgrade Stabilization does not meet the requirements of Article 1010-2 of the *Standard Specifications*, the Engineer, at his discretion, may consider the material reasonably acceptable in accordance with Article 105-3 of the *Standard Specifications*.

METHODS OF PRODUCTION

The repair of jointed concrete pavement slabs shall meet the applicable requirements of Section 700 of the Standard Specifications and the following provisions:

The concrete shall meet the requirements given in the Special Provision Titled "Very High Early Strength Concrete for Concrete Pavement Repair".

The repair of jointed concrete pavement slabs shall be conducted in one lane at a time. The work shall be accomplished with other operations in progress in the same area.

In all cases of slab removal, the Contractor shall remove the entire 12 ft width and a minimum of 6 ft in the travel direction. Any remaining portion of a slab that is removed shall not be less than 6 ft in the travel direction.

As a result of the full depth sawing of the existing pavement to remove the distressed area, saw cuts that extend into the adjacent pavement shall be filled with epoxy prior to placing traffic on the new area. The epoxy shall meet the requirements of Section 1081 Type 3 of the Standard Specifications.

The Contractor shall take necessary measures to protect the exposed subgrade and base from damage resulting from surface water and/or rain during the period between the pavement removal and replacement. The Contractor shall submit his plan for removing the pavement areas to the Engineer for approval. The removal method shall minimize damage to the subgrade and to adjacent pavement and shoulders.

At locations as directed by the Engineer, the Contractor shall:

- 1) Remove unsuitable aggregate base material and backfill with Class IV Subgrade Stabilization as directed by the Engineer; or
- 2) Remove unsuitable aggregate base material, undercut the subgrade, place Fabric for Soil Stabilization, and backfill with Class IV Subgrade Stabilization as directed by the Engineer.

The Fabric for Soil Stabilization shall conform to the requirements of Section 270 of the Standard Specifications.

The Engineer will direct which method of repair is to be used at each location.

The Contractor shall thoroughly tamp any loosened subgrade or base material to the satisfaction of the Engineer before the pavement is replaced. New pavement shall be cast to match the thickness of the adjacent slabs.

Pneumatic or hydraulic drills and bits that will drill a hole in the existing concrete faces for placement of the dowels at location specified on the Plans shall be used. The equipment shall be operated so as to prevent damage to the pavement being drilled. The drilling procedure shall be approved by the Engineer. The drilled holes shall be thoroughly cleaned of all contaminants and the dowels of specified type and size shall then be set into the hardened concrete face of the existing pavement with an epoxy bonding compound meeting the requirements of a Type 3A epoxy detailed in Section 1081 of the Standard Specifications. The specified dowels shall be placed at locations noted on Plan details with one-half of dowel protruding beyond the hardened face of existing pavement and placed at correct horizontal and vertical alignment with misalignment not to exceed 0.4 inches in the vertical or oblique plane. The epoxy shall be allowed to harden sufficiently prior to placing concrete to prevent any movement of the dowels during the placement of the concrete. A sufficient amount of epoxy must be placed in the back of the hole so that the entire cavity around the dowel is completely filled upon insertion of the dowel bars. Any excess epoxy shall be removed. The epoxy adhesive must be packaged in a cartridge with a mixing nozzle that thoroughly mixes the two components as they are dispensed (the mixing nozzle must be a minimum of 8 inches long) or may be placed with a machine which mixes the two components thoroughly and to the proper ratio as the material is being placed.

Use dowels of the type, size, spacing, and at the location specified in Detail Drawing 700D01 Sheet 1 of 2. At no time shall dowels be driven into a dowel hole with sledge hammers or other devices. In all cases, any dowel which cannot be freely inserted into a dowel hole will be rejected for use.

Prior to placing concrete, the vertical exposed faces of the existing slabs shall be thoroughly cleaned of contaminants using wire brushing or other methods approved by the Engineer. Extra care must be taken to remove all existing silicone or other joint sealant from the exposed concrete faces.

The concrete shall be deposited within the slab replacement area in such manner as to require as little re-handing as possible, to prevent segregation of the mix. Hand spreading shall be minimized as much as possible, but where necessary, shall be done with shovels, not rakes. Workers will not be allowed to walk in the fresh concrete with shoes coated with earth or other foreign substances. The replaced slab area shall be filled with concrete and thoroughly consolidated by rodding, spading, and sufficient vibration to form a dense homogeneous mass throughout the area. The final surface area shall be uniform in appearance and free of irregularities and porous areas.

The finished surface, including joints, shall meet a surface tolerance of 1/8 inch in 10 feet in any direction. Any necessary corrections shall be done by grinding. Any replaced slab which is low in relation to adjacent slabs may be ordered replaced by the Engineer. Replacement of such a slab would generally be required if, in the opinion of the Engineer, excessive grinding of the adjacent pavement is necessary to match the profile of the full depth slab replacement or if a drainage problem would be created by grinding the adjacent pavement.

The surface finish of the proposed concrete pavement shall be a burlap drag finish and conform to the cross-section of adjacent pavement. The method of finishing shall be approved by the Engineer. Immediately after finishing operations have been completed and surface water has disappeared, all exposed surfaces of the pavement shall be cured in accordance with the applicable provisions of Section 700-9 "Curing" and Section 1026 "Curing Agents for Concrete" of the Standard Specifications.

MEASUREMENT AND PAYMENT

The quantity of Jointed Concrete Pavement Slab repair to be paid for at the unit price established herein will be the actual number of square yards of jointed concrete pavement with dowels which has been completed and accepted. In measuring this quantity, the width of the repair will be measured perpendicular to the centerline of the lane. The length will be the actual length constructed, measured along the centerline of the pavement

The unit price for Repair of Jointed Concrete Pavement Slabs will be full compensation for all work covered by this provision, and applicable sections of the Standard Specifications for furnishing all labor, materials, tools, equipment, and incidentals for doing all work involved in placement of the concrete including but not limited to furnishing placing, and curing concrete; dowel bars; sawing and removing concrete; and filling saw cuts around the pavement repair.

The quantity of Class IV Subgrade Stabilization to be paid for at the unit price established herein will be the actual number of tons of aggregate which has been incorporated into the completed and accepted work. The aggregate will be measured by being weighed in trucks on certified platform scales or other certified weighing devices. No deductions will be made for any moisture contained in the aggregate at the time of weighing.

The unit price for Class IV Subgrade Stabilization will be full compensation for all work covered by this provision and the Standard Specifications including but not limited to removing of existing aggregate base course and backfilling with Class IV Subgrade Stabilization.

The quantity of material removed from beneath the base course will be measured and paid for in accordance with Section 225 of the Standard Specifications for "*Undercut Excavation*"

The quantity of Fabric for Soil Stabilization furnished and placed as directed will be measured and paid for in accordance with Section 270 of the Standard Specifications for "*Fabric for Soil Stabilization*"

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Repair of Jointed Concrete Pavement Slabs	Square Yard
Class IV Subgrade Stabilization	Ton
Undercut Excavation	Cubic Yard
Fabric for Soil Stabilization	Square Yard

PATCHING CONCRETE PAVEMENT SPALLS:

7-1-95

SPI

Description:

The work covered by this provision consists of the partial depth patching of edge spalls in existing Portland cement concrete pavement by sawing and removing the broken, damaged or disintegrated concrete pavement from the spalled areas of the pavement surface and patching the areas with approved patching materials at locations as directed by the Engineer in accordance with this provision.

Alternate methods and materials for patching concrete spalls may be submitted by the Contractor for approval by the Engineer.

Proportioning and Mixing Equipment:

Concrete proportioning and mixing equipment shall meet the applicable provision of Section 1000 of the Standard Specifications with the following addition:

A truck-mounted mobile cement concrete plant designed for automatic volume proportioning of the concrete materials and for mixing concrete for immediate use at the site may be used provided a satisfactory rate of production is maintained. Each mobile unit shall have attached thereto, in a prominent place by the manufacturer, a metal plate or plates on which it is plainly marked the gross volume of the transportation unit in terms of mixed concrete discharge speed and the weight-calibrated constant of the machine in terms of an indicator revolution counter. The mobile units shall also be equipped with water flow meters. The mixer shall produce a thoroughly mixed and uniform concrete, continuously discharged with a satisfactory degree of uniformity. The operator of the unit shall be trained and certified by the manufacturer. The unit shall be calibrated and yield test performed by the Contractor in accordance with manufacturer instructions prior to furnishing concrete and when requested by the Engineer. The Contractor shall furnish all equipment and materials necessary for calibrations and yield tests. The cement and aggregate bins shall be emptied and cleaned at least once each week and as often as necessary to prevent build-up in bins and on gates which may affect the flow of materials. The admixture tanks shall be flushed and drained at least once each week and when brand of admixture is changed. The unit shall be operated as recommended by the manufacturer.

Materials:

The concrete used in patching spalled areas shall produce a minimum compression strength of 3000 psi. The pavement shall not be opened to traffic until the minimum strength is obtained.

The Contractor may at his option use either of the following two mixes:

Type III Portland Cement:

Concrete which will achieve the minimum specified strength at approximately 24 hours may be produced by the use of 800 pounds of Type III Portland Cement per cubic yard of concrete. The concrete is to have an air content of 5% plus or minus 1.5% and a slump not to exceed 3 inches. The concrete will be accepted based on suitable cylinders tested at 24 hours.

Fondu Calcium Aluminate Cement:

Concrete which will achieve the minimum specified strength at approximately 6 hours may be produced by using calcium aluminate cement with an aluminum oxide content of 40 to 45 percent and using a 9 bag per cubic yard mix.

The cement must be Fondu Calcium Aluminate Cement or equal. The concrete is to have an air content of 5% plus or minus 1.5% and a slump not to exceed 3 inches. The concrete will be accepted based on suitable cylinders testing at 6 hours.

Both of the above mixes will be designed by the Engineer using approved aggregates designated by the Contractor.

EPOXY RESIN:

Type: General purpose bonding agents, moisture insensitive.

General Requirements:

Epoxy resin shall be furnished in two components for combining immediately prior to use in accordance with the written instructions of the manufacturer. Component A shall contain a condensation product of epichlorohydrin and bisphenol "A" and shall contain one or more hardening agents which on mixing with Component A will cause the system to harden and shall conform to the requirements of the specifications.

The physical properties of a mixture of Components A and B in the proportions recommended by the manufacturer shall conform to the requirements described in the specifications.

The contents of the separate packages containing Components A and B shall be thoroughly stirred before use. The same paddle shall not be used to stir Component A as is used to stir Component B.

Any heating of epoxy adhesive shall be performed by application of indirect heat.

Epoxy resin shall not be mixed or applied when either the equipment, material, or air temperature is below 50 degrees F or above 100 degrees F unless approved in writing by the Engineer.

The temperature of the concrete shall be at least 50 degrees F before applying epoxy, unless approved in writing by the Engineer. Any heating of the concrete shall be performed by application of indirect heat.

Handling and Storing Materials:

The two components of the epoxy resin system furnished under these specifications shall be supplied in separate containers which are non-reactive with the materials contained therein. The size of the containers shall be such that the recommended proportions of the final mixture can be obtained by combining one containers of one component with one or more whole containers of the other component.

Containers shall be identified as "Component A - Contains Epoxy Resin" and "Component B - Contains Hardener", and shall show the type, mixing directions and usable temperature range. Each container shall be marked with the name of the manufacturer, the lot or batch number, the date of packaging, the date of shelf life expiration, pigmentation, if any, and the quantity contained therein in pounds and gallons. Potential hazards shall be so stated on the package in accordance with the Federal Hazardous Products Labeling Act.

The two components shall be stored at 70 degrees F or above for at least 24 hours prior to mixing.

Requirements for Acceptance:

The material will be sampled and inspected at the place of manufacture (or warehouse) by a representative of the Department of Transportation and all containers so designated for delivery will be sealed as "sampled" by the inspector. Any unauthorized tampering or breaking of the seal between time of sampling and delivery will be cause for rejection of the material.

A copy of the manufacturer's tests results on each batch shall be furnished the Department of Transportation showing that the epoxy resin meets the appropriate specifications.

Required Properties:

<u>TEST METHOD</u>	<u>PROPERTY</u>	<u>MIXED A & B</u>	
ASTM D-445	Viscosity	25	75
Brookfield Model RVT *(2) Modified	Poises @ 77°F + 2°F Spindle No. 4 Speed, RPM-20		
AASHTO T-237 Modified *(1)	Pot Life, Mins.	20	50
ASTM D-638	Tensile Strength		
77°F ± 2°F Speed B (C Die)	PSI 7 Days	4000	-
	Tensile Elongation % 7 Days	1	5
ASTM C-109-77 * (3) (4)	Compressive Strength PSI 2"x2" Mortar		
	24 Hours	3500	-
	7 Days	6000	-
ASTM D-2240 *(5)	Shore D Hardness		
	24 Hours	70	-
		80	-
	7 Days		
		-	0.8
ASTM D-570 *(6)	Absorption in Water %		
AASHTO T-237 & ASTM C-78	Bond Strength Fresh & Hardened Concrete to Hardened Concrete PSI		
	(A) Direct Tensile, 7 Days	250	-
	(B) Beam Break, 7 Days	600	-
ASTM D-482 By Ignition	Ash Content % By Weight of Component A and Component B	20	40

* SEE GENERAL NOTES

TEST
METHOD PROPERTYMIN. MAX.

COMPONENT A

ASTM *(2)	Viscosity		
D-445	Poises @ 77°F = 2°F	-	70
Brookfield	Spindle No. 4	-	
Model RVT	Speed, RPM-20	-	
Modified			
ASTM D-1652	Epoxide Equiv.	180	275
ASTM D-1078	Volatile, % by Weight		
	Distilled Below 350°F	-	3
	Shelf Life, Year	1	-

COMPONENT B

ASTM D-445	Viscosity		
	Poises @ 77°F ° 2°F	-	120
Modified Brookfield	Spindle No. 4	-	
Model RVT *(2)	Speed, RPM-10	-	
ASTM D-1078	Volatile, % by Weight		
	Distilled Below 350°F	-	3
	Shelf Life, Year	1	-

GENERAL NOTES

1. POT LIFE

Samples of each component of the epoxy resin are conditioned at 77°F ° 2°F. When the samples have reached this temperature, 60 ° 0.4g total weight of components A and B, in the proportions recommended by the manufacturer, are weighted into an unwaxed paper cup. The time is recorded, and mixing of the components is started immediately by stirring with a wooden tongue depressor. Mixing is continued for three (3) minutes making sure you scrape the wall and bottom of the cup and the depressor periodically. The sample is then poured into an 8 ounce unwaxed paper cup, set on a wooden bench top and probed every one (1) minute with a small stick starting five (5) minutes prior to the minimum specified pot life. The time at which a stringy mass forms in the center of the containers is recorded as the get time or pot life.

2. VISCOSITY

Using the Brookfield Viscometer (Model RVT Brookfield Syncro-Electric Viscometer), 400 ml. of material will be tested while contained in a 1 pint paint can. The sample shall be conditioned to insure that the temperature is $77^{\circ}\text{F} \pm 2^{\circ}\text{F}$. Attach the proper spindle as specified to the machine, being careful to avoid undue side pressure as it might affect the alignment. Only the spindle should be turned in making this connection. Insert guard and spindle into the material to be tested until immersed to the depth indicated by the groove cut into the shaft. This mark indicates minimum immersion and should be observed. After the instrument has been clamped in place, press down the clutch lever and start the motor. Release the lever and allow rotation of the spindle for 8 to 10 revolutions until a stable reading has been reached. Press down the clutch lever and snap off the switch. Be sure to keep the clutch lever depressed so that the reading will be held. Apply the proper factor (from Brookfield Factor Finder) to obtain the viscosity of the material under test.

3. MIXING INSTRUCTIONS

Mix components A and B at the recommended ratio for a minimum of two (2) minutes. Add three parts by volume of Ottawa silica sand (conforming to ASTM-C-109) to one volume of the mixed A-B and thoroughly blend for a minimum of three minutes. The mixed mortar shall be poured into the appropriate molds in two layers for 2"x2" cubes, and 3 layers for 2"x4" cylinders, with each layer tamped 25 times with a hammer handle. As much mortar shall be packed into the molds as possible. A minimum of six specimens shall be tested for the compression and tensile splitting test at $77^{\circ}\text{F} \pm 2^{\circ}\text{F}$ after 24 hours cure. In the tensile splitting strength test the specimen shall be loaded at a rate of 2,000 pounds per minute. In the compressive strength test the specimen shall be loaded at a rate of 3,000 pounds per minute.

4. TESTING

Six Moisture Insensitive Specimens (prepared in accordance with Note 3 above) shall be cured at $77^{\circ}\text{F} \pm 2^{\circ}\text{F}$ for 24 hours and three specimens shall be tested dry at 24 hours. The remaining three specimens shall be immersed in water for 6 days at $77^{\circ}\text{F} \pm 2^{\circ}\text{F}$ and tested immediately while still wet.

5. HARDNESS

Hardness shall be determined on the cured unfilled material cured at $77^{\circ}\text{F} \pm 2^{\circ}\text{F}$ for 24 hours as per ASTM Method D-2240. Hardness shall be determined by using a Shore D scale hardness tester.

6. ABSORPTION

Absorption Specimens 1/8" x 1" x 3" shall be immersed in water for 24 hours, and tested as per ASTM D-570.

Curing of Concrete:

Immediately after finishing operations have been completed and surface water has disappeared, all exposed surfaces of the pavement shall be cured with a liquid membrane curing compound in accordance with Section 700 of the Standard Specifications. A second application of liquid membrane shall be applied to all exposed surfaces of the pavement between 1½ and 4 hours after the initial application. The second application of curing compound shall also cover the vertical edges of all sawn joints. If joints are sawn after the second application of liquid membrane curing compound, the vertical edges of the joint and other surface areas disturbed during the sawing operations shall receive another application of curing compound.

Construction:

Concrete patching operations shall be conducted in one lane at a time. The work shall be accomplished with other operations in progress within the same area.

The surface within the repair areas shall be cleaned so as to be free of oil, dust, dirt, deteriorated concrete and other contaminants immediately before placement of the epoxy and patching material.

Epoxy shall be applied to the vertical and flat surface of the cleaned spall areas prior to placing concrete.

Measurement and Payment:

The quantity of patching concrete pavement spalls to be paid for will be the actual number of square feet of existing concrete which has been patched and accepted. The actual length and width of a completed patching will be measured along the surface of the pavement.

The quantity of patching concrete pavement spalls, measured as provided above, will be paid for at the contract unit price per square foot "Patching Concrete Pavement Spalls".

The above prices and payments will be full compensation for all work covered by this provision for furnishing all labor, materials, tools, equipment and incidentals for doing all work involved in sawing concrete pavement, removing deteriorated concrete, cleaning surfaces, epoxying, furnishing, placing, finishing, and curing concrete patch.

Payment will be made under:

Pay Item	Pay Unit
Patching Concrete Pavement Spalls	Square Foot

VERY HIGH EARLY STRENGTH CONCRETE FOR CONCRETE PAVEMENT**REPAIR**

March 21, 2007

SPI

Submit mix designs for Very High Early Strength Concrete for Concrete Pavement Repair in terms of saturated surface dry weights on M & T Form 312U for acceptance at least 30 days before proposed use.

Use a mix sufficient to obtain at least a flexural strength of 400 psi at 4 hours. Entrain 5 % ± 1.5% air in the freshly mixed concrete. Produce the mix with a maximum slump of 1.5" for placement by a fully mechanized paving train and a maximum slump of 3" for hand placement.

Use cement, fine aggregate, coarse aggregate, admixtures and, optionally, pozzolan as shown on the Department's approved list.

Submit 4 hour flexural strength results of at least 6 beams made and tested in accordance with AASHTO T126 and T97 with M & T Form 312U. In addition, submit 4 hour compressive strength results of at least six 4" by 8" or 6" by 12" cylinders and maturity test results of the mix. With permission of the Engineer, compressive strength testing and maturity testing may be used in lieu of or concurrent with flexural strength testing to determine the acceptability of the concrete in the field.

Design and produce the mix in accordance with BASF Chemical Company's 4 X 4 Concrete system or a comparable proprietary system. The timing of the addition of hydration control admixtures is critical to the performance of this concrete; therefore, an admixture representative shall be present on the job when Very High Early Strength Concrete is batched.

DIAMOND GRINDING CONCRETE PAVEMENT:**Description**

Perform the work covered by this provision including but not limited to diamond grinding and regrinding concrete pavement to meet final surface testing requirements detailed in Article 710-7, evaluating existing concrete pavement and aggregate properties, selecting diamond tipped saw blades and configuration of cutting head; continual removal of residual slurry from pavement and disposal off-site; furnishing all labor, materials, supplies, tools, equipment and incidentals as necessary. Perform this work at locations indicated in the plans or as directed by the engineer.

Equipment

Use equipment with diamond tipped saw blades gang mounted on a power driven self propelled machine with a minimum wheel base length of 15 feet (4.6 meter) that is specifically designed to smooth and texture Portland Cement Concrete pavement. Utilize equipment that does not cause ravels; aggregate fracture; spalls or disturbance to the longitudinal or transverse joints; or damage and/or strain to the underlying surface of the pavement. Should any of the above problems occur immediately suspend operations.

Provide a minimum 3 feet (1 meter) wide grinding head with 50 (164) to 60 (200) evenly spaced grooves per foot (meter). Prior to designing the grinding head, evaluate the aggregate hardness of the concrete pavement and select the appropriate diamond size, diamond concentration and bond hardness for the individual saw blades.

Provide vacuuming equipment to continuously remove slurry residue and excess water from the pavement as part of the grinding operation. Transport slurry material off-site and dispose of this material appropriately. Do not allow the slurry material to flow into a travel lane occupied by traffic or into any drainage facility.

Construction

Grind the pavement surface to a uniform appearance with a high skid resistant longitudinal corduroy type texture. Provide grooves between 0.09 (2.28mm) and 0.15 (3.81mm) inches wide with the land area between the grooves between 0.06 (1.52mm) and 0.13 (3.30mm) inches wide. Ensure a ridge peak of approximately 0.0625 inches (1.59mm) higher than the bottom of the grooves.

Begin and end diamond grinding at lines normal to the pavement centerline. Grind only in the longitudinal direction. All grooves and adjacent passes shall be parallel to each other with no variation. Completely lap adjacent passes with no unground surface remaining between passes and no overlap of more than 1½ inches (35 mm). Adjacent passes shall be within 1/8 inch (10 mm) of the same height as measured with a 3 foot (0.914 meter) straightedge. Maintain positive cross-slope drainage for the duration of the grinding operation.

Grind all travel lanes to include auxiliary lanes, ramps and loops with not less than 98 percent of the specified surface being textured by grinding. Grinding of the bridge decks and concrete shoulders will not be required. Remove a minimum 0.0625 inches at all locations except dips. Extra grinding to eliminate minor depressions is not required. It is anticipated that extra grinding will be required on the high side of existing faults in the pavement. There shall be no ridge between lanes. In a separate operation, transition the grinding of any remaining ridges greater than 1/8 inch (10mm) in height on the outside edge next to the shoulder or at a tie to an existing facility to the satisfaction of the Engineer.

Measurement and Payment

The quantity of Diamond Grinding PCC Pavement to be paid for at the contract unit price will be the actual number of square yards of pavement diamond ground in accordance with the requirements of this provision. In measuring this quantity, the length will be the actual length diamond ground measured along the pavement surface. The width will be the width required by the plans or directed, measured along the pavement surface. No separate payment will be made for any overlapping.

Payment is full compensation for the work and includes but is not limited to grinding, disposal of slurry off-site, furnishing all materials, equipment, labor and all incidentals necessary to complete the work satisfactorily.

Payment will be made under:

Pay Item

Pay Unit

Diamond Grinding PCC Pavement

Square Yard

RESURFACING EXISTING BRIDGES:

(7-1-95)

R6 R61

The Contractor's attention is directed to the fact that he will be required to resurface the bridges on this project if directed by the Engineer.

Place the surface so as to follow a grade line set by the Engineer with the minimum thickness as shown on the sketch herein or as directed by the Engineer. State Forces will make all necessary repairs to the bridge floors prior to the time that the Contractor places the proposed surfacing. Give the Engineer at least 15 days notice prior to the expected time to begin operations so that State Forces will have sufficient time to complete their work.

At all bridges that are not to be resurfaced, taper out the proposed resurfacing layer adjacent to the bridges to insure a proper tie-in with the bridge surface.

MILLING FOR SHOULDER DRAIN

In areas where shoulder drain is to be placed underneath the existing full depth paved shoulder, the Contractor shall remove 1 1/2" of the existing shoulder by milling. The Contractor shall mill a trench to the required depth in order to install shoulder drain. Install Shoulder Drains in accordance with Section 816 of the Standard Specifications. The top of the shoulder drain aggregate, as shown in the Standard Drawings, shall not extend to an elevation greater than the bottom of the existing concrete pavement. After proper installation of the shoulder drain, the remainder of the trench shall be filled with Asphalt Concrete Intermediate Course, Type I19.0B at an average rate of 855 lbs. per square yard (7 1/2") in two equal layers of 427.5 lbs. per square yard (3 3/4") each.

The 1 1/2" milling of the existing shoulder shall be paid for as provided elsewhere in this contract.

No separate payment shall be made for milling of the trench for the shoulder drain, as the cost of this work shall be included in the unit price bid per linear foot for "Shoulder Drain".

Asphalt Concrete Intermediate Course, Type I19.0B, shall be measured and paid for as provided elsewhere in this contract.

PAVEMENT WIDTH VARIES:

(7-1-95)

R6 R76

The Contractor's attention is directed to the fact that the existing pavement varies in width and the Contractor will be required to widen the pavement as directed by the Engineer in order to obtain a uniform edge of pavement.

TRENCHING FOR BASE COURSE:

(7-1-95)

R6 R79

Perform all trenching necessary to place the asphalt concrete base course widening in accordance with the typical sections, at locations shown on the sketch maps, and as directed by the Engineer.

Perform the trenching for the base course on the same day that the base course is to be placed. If the base course cannot be placed on the same day the trench section is excavated, backfill the trench with earth material and compact it to the satisfaction of the Engineer. Once the trench is open, perform backfilling and re-opening of the trench at no cost to the Department.

The Contractor will be restricted to widening one side of the project at a time unless otherwise permitted by the Engineer. In widening, operate equipment and conduct operations in the same direction as the flow of traffic.

Density tests may be taken every 2000 feet in the widened areas as directed by the Engineer. Shape and compact the subgrade in the widened areas to the satisfaction of the Engineer. Compact the asphalt concrete base course in the widened areas in accordance with the provisions of Article 610-9 of the *2006 Standard Specifications*.

Place the excavated material from trenching operation on the adjacent shoulder area as directed by the Engineer. Cut adequate weep holes in the excavated material to provide for adequate drainage as directed by the Engineer. Remove all excavated material from all drives to provide ingress and egress to abutting properties and from in front of mailboxes and paper boxes. Saw a neat edge and remove all asphalt and/or concrete driveways, and existing asphalt widening, as directed by the Engineer, to the width of the widening and dispose of any excavated concrete or asphalt materials. Properly reconnect driveways.

Upon completion of the paving operation, backfill the trench to the satisfaction of the Engineer. Properly dispose of any excess material remaining after this operation.

No direct payment will be made for trenching, sawing, and removal of driveways, depositing material on shoulder area, backfilling trench, or removal of spoil material, as the cost of this work shall be included in the contract unit price per ton for *Asphalt Concrete Base Course, Type ____*.

SAWING AND SEALING CONCRETE PAVEMENT JOINTS:

4-15-08

SPI

Description

Saw existing unitube joints, saw existing sawed joints, remove existing deteriorated unitubes and clean and seal joints with Low Modulus Silicone in accordance with the detail in the plans. Also, repair and reseal existing joints with Low Modulus Silicone, form joints in slab replacements and seal with Low Modulus Silicone in accordance with the detail in the plans.

Materials

Meet the requirements of Section 1028-4(A) of the *Standard Specifications* for Low Modulus Silicone Sealant.

Construction

Saw and seal pavement joints, and form control joints in one lane at a time.

Saw and seal joints at locations shown on the plans or as directed by the Engineer.

Saw and seal the centerline longitudinal joint according to the detail in the plans.

Form control joints in the proposed replacement slabs according to the spacing and dimensions as shown on the plans. Form the control joints by sawing with an approved concrete saw. Saw as soon as the concrete has hardened sufficiently without spalling or raveling, but before the lane is reopened to traffic, and not more than 6 hours after the concrete is placed.

Equip air compressors for cleaning joints with suitable traps capable of removing all surplus water and oil in the compressed air. The Engineer will check the compressed air daily for contamination. Do not use contaminated air.

Cleaning and sealing shall be as follows:

(A) Cleaning Freshly Cut Sawed Joints

Immediately after sawing the joint, completely remove the resulting slurry from the joint and the immediate area by flushing with a jet of water under pressure, and other tools as necessary. After flushing, blow out the joint with compressed air. After the surfaces are thoroughly clean and dry and just before the joint sealer is placed, blow out the joint with compressed air having a pressure of at least 90 psi and remove all traces of dust. If freshly cut sawed joints become contaminated before they are sealed, clean as many times as necessary by one of the optional methods below or other methods of cleaning as approved by the Engineer.

(B) Installing Backup Material

When required, install closed cell, expanded polyethylene foam rod type backup material in a manner that will produce the shape factor specified. If the sealant bonds to the backup material, a bond-breaking type may be required.

(C) Taping Expansion Joints

When the joints have been cleaned and are thoroughly dry, place bond-breaking adhesive tape on top of the joint material or backup material to prevent any bonding action between the bottom of the joint sealer and the top of underlying material. The tape shall completely cover the top of the underlying material, but at no place shall the tape be allowed to adhere to the sides of the joint.

(D) Sealing Joints Requirements

- (1) Do not place silicone joint sealer when the air temperature near the joint is less than 50°F or is 50°F and falling or between October 15 and May 1, unless otherwise directed by the Engineer.
- (2) Filling the Joint: Do not seal a joint until the seal is thoroughly clean and dry, and properly taped, if taping is required. Place the sealer in reasonably close conformity with dimensions shown on the plans. The joints will be rejected for any unreasonable deviation until satisfactory corrective measures are taken.

Apply the joint sealer by an approved mechanical device or by manual pouring or troweling, depending upon the consistency used. When applied mechanically or by pouring, a nozzle or pouring spout shall be shaped to fit inside the joint to introduce the sealer from inside the joint. Pouring consistency shall be used in horizontal joints, and troweling consistency shall be used in vertical joints, unless the pouring consistency is such that it can be satisfactorily placed in vertical joints.

Recess the joint sealer below the adjacent surface as shown in the plans.

If the joint material fails in either adhesion or cohesion, the joint shall be repaired to the Engineer's satisfaction at the Contractor's expense.

- (3) Special Requirements for Installation of Low Modulus Silicone Sealant: The sealant shall be tooled to provide the required recess. The sealant shall be tooled or applied in a manner which causes it to wet the joint faces.
- (4) Cleaning Pavement: Promptly remove surplus joint sealer on the pavement after a joint has been sealed so that the joint sealer is not exposed to direct contact with traffic.

(E) Opening to Traffic

Do not permit traffic over sealed joints without the approval of the Engineer.

Measurement and Payment

Centerline Longitudinal Joints will be measured along the completed joint of the actual linear feet of joints that have been formed or sawed, and sealed and accepted and paid for at the contract unit price per linear foot. This price shall include forming and sealing control joints in new slabs and sawing and sealing transverse construction joint with slab replacements, sawing and sealing existing transverse joints and new transverse joints created with partial slab replacements.

Concrete Pavement Joints will be measured along the completed joint of the actual linear feet of joints that have been formed or sawed, and sealed and accepted and paid for at the contract unit price per linear foot. This price shall include forming and sealing control joints in new slabs and sawing and sealing transverse construction joint with slab replacements, sawing and sealing existing transverse joints and new transverse joints created with partial slab replacements.

The above prices and payment will be full compensation for all work covered by this provision for furnishing all labor, materials, tools, equipment, backer rods, and incidentals for doing all work involved in sawing, forming, cleaning and sealing joints.

Payment will be made under:

Pay Item	Pay Unit
Sawing and Sealing Existing Centerline Concrete Pavement Joints	Linear Foot
Sawing and Sealing Existing Concrete Pavement Joints	Linear Foot

BORROW EXCAVATION AND SHPO DOCUMENTATION FOR BORROW/WASTE

SITES:

(12-18-07) (4-15-08)

RR8 R02

Revise the 2006 Standard Specifications as follows:

Division 2 Earthwork

Page 2-16, Subarticle 230-1(D), add the words: *The Contractor specifically waives* as the first words of the sentence.

Page 2-17, Article 230-4(B) Contractor Furnished Sources, first paragraph, first sentence replace with the following:

Prior to the approval of any borrow sources developed for use on any project, obtain certification from the State Historic Preservation Officer of the State Department of Cultural Resources certifying that the removal of the borrow material from the borrow sources(s) will have no effect on any known district, site building, structure, or object, architectural and/or archaeological that is included or eligible for inclusion in the National Register of Historic Places.

Division 8 Incidentals

Page 8-9, Article 802-2 General Requirements, add the following as the 1st paragraph:

Prior to the removal of any waste from any project, obtain certification from the State Historic Preservation Officer of the State Department of Cultural Resources certifying that the deposition of the waste material to the proposed waste area will have no effect on any known district, site building, structure, or object, architectural and/or archaeological that is included or eligible for inclusion in the National Register of Historic Places. Furnish a copy of this certification to the Engineer prior to performing any work in the proposed waste site.

Page 8-10, Article 802-2, General Requirements, 4th paragraph, add the following as the 2nd sentence:

The Department’s borrow and waste site reclamation procedures for contracted projects is available on the NCDOT website and shall be used for all borrow and waste sites on this project.

CONVERT EXISTING OPEN THROAT CATCH BASIN TO DROP INLET:

(1-1-02) (Rev. 7-18-06)

SP8 R50

At the proper phase of construction, convert the existing open throat catch basin at locations indicated in the plans or where directed, to drop inlet in accordance with the details in the plans and the applicable requirements of Sections 840 and 859 of the *2006 Standard Specifications*.

Convert Existing Open Throat Catch Basin to Drop Inlet will be measured and paid for as each, completed and accepted. Such price and payment is considered full compensation for all equipment, materials, labor, tools, and incidentals necessary to complete each conversion satisfactorily.

Payment will be made under:

Pay Item	Pay Unit
Convert Existing Open Throat Catch Basin to Drop Inlet	Each

REPLACEMENT OF FRAMES & GRATES:

Existing cast iron grates and frames shall remain the property of the NC DOT and shall be delivered to the NC DOT’s Henderson County Maintenance Facility. No separate payment will be made for such delivery as the cost of this work shall be incidental to the unit price bid for “Frame with Two Grates, Std. 840.22”.

STEEL U-CHANNEL POSTS:

(7-18-06)

R9 R02

Revise the *2006 Standard Specifications* as follows:

Page 9-15 Subarticle 903-3(D) first paragraph, last sentence, delete the last sentence and add the following:

Use posts of sufficient length to permit the appropriate sign mounting height. Spliced posts are not permitted on new construction.

SHIPPING SIGNS:

5-15-07

R9 R03

Revise the *2006 Standard Specifications* as follows:

Page 9-2, Section 901-3(A), General, add the following as the 7th paragraph:

Ship all multi-panel signs to the project intact, completely assembled and ready to be hung. Fabricate signs taller than 12 ft as 2 separate signs with a horizontal splice, ready to be spliced and hung. No assembly other than a horizontal splice will be permitted.

AGGREGATE PRODUCTION:

(11-20-01) (Rev. 11-21-06)

R10 R05

Provide aggregate from a producer who uses the current Aggregate Quality Control/Quality Assurance Program which is in effect at the time of shipment.

No price adjustment is allowed to contractors or producers who use the program. Participation in the program does not relieve the producer of the responsibility of complying with all requirements of the *2006 Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

CONCRETE BRICK AND BLOCK PRODUCTION:

(11-20-01) (Rev. 11-21-06)

R10 R10

Provide concrete brick and block from a producer who uses the current Solid Concrete Masonry Brick/Unit Quality Control/Quality Assurance Program that is in effect on the date that material is received on the project.

No price adjustment is allowed to contractors or producers who use the program. Participation in the program does not relieve the producer of the responsibility of complying with all requirements of the *2006 Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

PORTLAND CEMENT CONCRETE (Alkali-Silica Reaction):

2-20-07

R10 R16

Revise the *2006 Standard Specifications* as follows:

Article 1024-1(A), replace the 2nd paragraph with the following:

Certain combinations of cement and aggregate exhibit an adverse alkali-silica reaction. The alkalinity of any cement, expressed as sodium-oxide equivalent, shall not exceed 1.0 percent. For mix designs that contain non-reactive aggregates and cement with an alkali content less than 0.6%, straight cement or a combination of cement and fly ash, cement and ground granulated blast furnace slag or cement and microsilica may be used. The pozzolan quantity shall not exceed the amount shown in Table 1024-1. For mixes that contain cement with an alkali content between 0.6% and 1.0%, and for mixes that contain a reactive aggregate documented by the Department, regardless of the alkali content of the cement, use a pozzolan in the amount shown in Table 1024-1.

Obtain the list of reactive aggregates documented by the Department at: <http://www.ncdot.org/doh/operations/materials/pdf/quarryasrprob.pdf>

<i>Pozzolan</i>	<i>Rate</i>
Class F Fly Ash	20% by weight of required cement content, with 1.2 lbs Class F fly ash per lb of cement replaced
Ground Granulated Blast Furnace Slag	35%-50% by weight of required cement content with 1 lb slag per lb of cement replaced
Microsilica	4%-8% by weight of required cement content, with 1 lb microsilica per lb of cement replaced

GLASS BEADS:

(7-18-06)

R10 R35

Revise the *2006 Standard Specifications* as follows:

Page 10-223, 1087-4(C) Gradation & Roundness

Replace the second sentence of the first paragraph with the following:

All Drop-On and Intermixed Glass Beads shall be tested in accordance with ASTM D1155.

Delete the last paragraph.

ENGINEERING FABRICS TABLE 1056-1:

(7-18-06)

R10 R40

Revise the *2006 Standard Specifications* as follows:

Page 10-100, Table 1056-1, replace the values for Trapezoidal Tear Strength with the following:

Physical Property	ASTM Test Method	Type 1	Type 2	Type 3		Type 4
				Class A	Class B	
Typical Applications		Shoulder Drain	Under Riprap	Temporary Silt Fence		Soil Stabilization
Trapezoidal Tear Strength	D4533	45 lb	75 lb	--	--	75 lb

CHANGEABLE MESSAGE SIGNS

(11-21-06)

R11 R11

Revise the *2006 Standard Specifications* as follows:

Page 11-9, Article 1120-3, Replace the 3rd sentence with the following:

Sign operator will adjust flash rate so that no more than two messages will be displayed and be legible to a driver when approaching the sign at the posted speed.

PAVEMENT MARKING LINES:

(11-21-06) (Rev. 9-18-07)

R12 R01

Revise the *2006 Standard Specifications* as follows:

Page 12-2, 1205-3(D) Time Limitations for Replacement, add the following at the beginning of the chart:

Facility Type	Marking Type	Replacement Deadline
Full-control-of-access multi-lane roadway (4 or more total lanes) and ramps, including Interstates	All markings including symbols	By the end of each workday's operation if the lane is opened to traffic

Page 12-14, Subarticle 1205-10, Measurement and Payment, delete the first sentence of the first paragraph and replace with the following:

Pavement Marking Lines will be measured and paid for as the actual number of linear feet of pavement marking lines per application that has been satisfactorily placed and accepted by the Engineer.