

PROJECT SPECIAL PROVISIONS

ROADWAY

CLEARING AND GRUBBING – METHOD II:

(9-17-02) (Rev 3-18-08)

SP2 R01

Perform clearing on this project to the limits established by Method “II” shown on Standard No. 200.02 of the *2006 Roadway Standard Drawings*.

Revise the *2006 Standard Specifications* as follows:

Page 2-2, Article 200-3, Clearing, add the following as the 6th paragraph:

At bridge sites, clear the entire width of the right of way beginning at a station 3 feet back of the beginning extremity of the structure and ending at a station 3 feet beyond the ending extremity of the structure.

ROCK PLATING:

(SPECIAL)

Description

Construct rock plating in accordance with the contract. Rock plating is required to stabilize slopes at locations shown on the plans.

Materials

Refer to Division 10 of the *Standard Specifications*:

Item	Section
Plain Riprap, Class 2	1042
Filter Fabric for Rock Plating, Type 2	1056

Use subsurface drainage materials meeting the requirements of Section 815 of the *Standard Specifications*.

Construction Methods

Remove existing traffic barriers and waste offsite. Construct embankments in accordance with the slopes, dimensions and elevations shown on the plans and Section 235 of the *Standard Specifications*. Compact fill slopes to the satisfaction of the Engineer using tracked equipment or other approved methods. Undercut as necessary to install rock plating on cut slope faces or embed rock plating below the ground line.

Do not leave filter fabric uncovered for more than 7 days. Lay fabric smooth and free from tension, stress, folds, wrinkles or creases. Unroll filter fabric down the slope in the transverse direction, i.e., perpendicular to the roadway centerline. Bury fabric at or near the top of slope and embed fabric at the toe as shown on the plans. Filter fabric should be continuous in the transverse direction. However, if fabric length is not sufficient such as at the end of a roll, overlap fabric at least 5 ft (1.5 m) with the upper fabric over the lower. Filter fabric may be discontinuous in the transverse direction only once per roll width.

Overlap adjacent filter fabric in the longitudinal direction at least 18" (450 mm). Use wire staples as needed to hold fabric in place until it is covered. Do not displace or damage filter fabric while placing riprap.

Measurement and Payment

Rock Plating will be measured and paid for at the contract unit price per square yard (square meter). The quantity to be paid for will be the actual number of square yards (square meters) of exposed rock plating and riprap measured along the surface of the slopes that has been incorporated into the completed and accepted work. No payment will be made for portions of rock plating embedded below the ground line. This work includes but is not limited to furnishing, transporting and placing filter fabric, wire staples, riprap and removal/disposal of the traffic barriers. No separate payment will be made for undercut excavation to install rock plating on cut slope faces or embed rock plating below the ground line. Undercut excavation will be considered incidental to *Rock Plating*.

Subsurface drainage will be measured and paid for in accordance with Section 815 of the *Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Rock Plating	Square Yard (Square Meter)

EMBANKMENTS:

(5-16-06)

SP2R18

Revise the *2006 Standard Specifications* as follows:

Page 2-22, Article 235-4(B) Embankment Formation, add the following:

- (16) Do not place rock or broken pavement in embankment areas where piles or drilled shaft foundations are to be constructed. This shall include but not be limited to piles and foundations for structures, metal signal poles, overhead sign structures, and high mount lighting.

SHALLOW UNDERCUT:

(9-18-07) (Rev. 3-18-08)

SP2 R35 B

Description

Undercut to a depth of 6 to 24 inches and place fabric for soil stabilization and Class IV Subgrade Stabilization at locations shown on the plans or as directed by the Engineer.

Materials

Refer to Division 10 of the *Standard Specifications*.

Item	Section
Select Material, Class IV	1016
Fabric for Soil Stabilization, Type 4	1056

Use Class IV Select Material 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*.

Construction Methods

Perform undercut excavation in accordance with Section 226 of the *Standard Specifications*. Place fabric for soil stabilization in accordance with Article 270-3 of the *Standard Specifications* before backfilling. Backfill with Class IV Subgrade Stabilization by end dumping subgrade stabilization material on the fabric. Do not operate heavy equipment on the fabric until it is covered with Class IV Subgrade Stabilization. Compact subgrade stabilization material to 92% of AASHTO T180 as modified by the Department or to the highest density that can be reasonably obtained.

Maintain Class IV Subgrade Stabilization in an acceptable condition and minimize the use of heavy equipment on subgrade stabilization material in order to avoid damaging the backfill. Provide and maintain drainage ditches and drains as required to prevent entrapment of water in backfill.

Measurement and Payment

Class IV Subgrade Stabilization will be measured and paid for at the contract unit price per ton. The quantity to be paid for will be the actual number of tons of subgrade stabilization material that has been incorporated into the completed and accepted work. The material will be measured by being weighed in trucks on certified platform scales or other certified weighing devices. This work includes but is not limited to furnishing, hauling, handling, placing, compacting and maintaining the subgrade stabilization material.

Undercut Excavation will be measured and paid for in accordance with Section 226 of the *Standard Specifications*, except that where Shallow Undercut Excavation is removed and backfilled as provided in this provision, the second sentence of the sixth paragraph of Article 226-3 will not apply, as payment for the backfill will be made at the contract unit price per ton for “Class IV Subgrade Stabilization”.

Fabric for Soil Stabilization will be measured and paid for in accordance with Section 270 of the *Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Class IV Subgrade Stabilization	Ton

FALSE SUMPS:

(7-1-95)

SP2 R40

Construct false sumps in accordance with the details in the plans and at locations shown in the plans or at other locations as directed by the Engineer.

Payment for the work of construction of the false sumps will be made at the contract unit price per cubic yard for *Unclassified Excavation* or *Borrow Excavation* depending on the source of material, or included in *Grading-Lump Sum*.

SHOULDER AND FILL SLOPE MATERIAL:

(5-21-02)

SP2 R45 A

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 226 of the *2006 Standard Specifications* except as follows:

Construct the top 6 inches of shoulder and fill slopes with soils capable of supporting vegetation.

Provide soil with a P.I. greater than 6 and less than 25 and with a pH ranging from 5.5 to 6.8. Remove stones and other foreign material 2 inches or larger in diameter. All soil is subject to test and acceptance or rejection by the Engineer.

Obtain material from within the project limits or approved borrow source.

Measurement and Payment

No direct payment will be made for this work, as the cost of this work will be considered to be a part of the work being paid for at the contract lump sum price for *Grading*.

PIPE TESTING:

4-17-07

SP3 R33

Revise the *2006 Standard Specifications* as follows:

Page 3-3, Article 300-6, add the following as a new paragraph before (A):

The Department reserves the right to perform forensic testing on any installed pipe.

ASPHALT PAVEMENTS - SUPERPAVE:

(7-18-06) (Rev 12-16-08)

SP6R01

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 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 that 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 6-22, Subarticle 609-5(D)(4) Nuclear Gauge Density Procedures, third paragraph, insert the following as the second sentence:

Determine the Daily Standard Count in the presence of the QA Roadway Technician or QA Nuclear Gauge Technician on days when a control strip is being placed.

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 6-25, Article 609-6 Quality Assurance, Density Quality Assurance, insert the following items after item (E):

- (F) By retesting Quality Control core samples from control strips (either core or nuclear) at a frequency of 100% of the frequency required of the Contractor;
- (G) By observing the Contractor perform all standard counts of the Quality Control nuclear gauge prior to usage each nuclear density testing day; or
- (H) By any combination of the above

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/yd ²	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 that 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.

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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					
	Base	Inter.	Surf.	Base	Inter.	Surf.	Base	Inter.	Surf.			
Sieve (mm)												
P _b %		± 0.7%				± 0.4%				± 0.3%		
25.0	±10	-	-	±7	-	-	±5	-	-			
19.0	±10	±10	-	±7	±7	-	±5	±5	-			
12.5	-	±6	±6	-	±3	±3	-	±2	±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:

(11-21-00)

SP6 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*.

PRICE ADJUSTMENT - ASPHALT BINDER FOR PLANT MIX:

(11-21-00)

SP6 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 \$ **422.14** per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on **January 1, 2009**.

MASONRY DRAINAGE STRUCTURES:

(10-16-07)

SP8 R01

Revise the *2006 Standard Specifications* as follows:

Page 8-31, Article 840-4 Measurement and Payment, add the following at the end of the second paragraph:

For that portion of *Masonry Drainage Structure* measured above a height of 10.0 feet, payment will be made at 1.3 times the contract unit price per linear foot for *Masonry Drainage Structure*.

BORROW EXCAVATION AND SHPO DOCUMENTATION FOR BORROW/WASTE**SITES:**

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

SP8 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.

GUARDRAIL ANCHOR UNITS, TYPE 350 TL-2

(10-21-08)

SP8 R64

Description

Furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the *2006 Standard Specifications*, and at locations shown in the plans.

Materials

The Contractor may at his option, furnish any one of the guardrail anchor units.

Guardrail anchor unit (ET-Plus) manufactured by:

Trinity Industries, Inc.
2525 N. Stemmons Freeway
Dallas, Texas 75207
Telephone: 800-644-7976

The guardrail anchor unit (SKT 350) as manufactured by:

Road Systems, Inc.
3616 Old Howard County Airport
Big Spring, Texas 79720
Telephone: 915-263-2435

Prior to installation the Contractor shall submit to the Engineer:

(A) FHWA acceptance letter for each guardrail anchor unit certifying it meets the requirements of NCHRP Report 350, Test Level 2 in accordance with Section 106-2 of the *2006 Standard Specifications*.

(B) Certified working drawings and assembling instructions from the manufacturer for each guardrail anchor unit in accordance with Section 105-2 of the *2006 Standard Specifications*.

No modifications shall be made to the guardrail anchor unit without the express written permission from the manufacturer. Perform installation in accordance with the details in the plans, and details and assembling instructions furnished by the manufacturer.

Construction Methods

Guardrail end delineation is required on all approach and trailing end sections for both temporary and permanent installations. Guardrail end delineation consists of yellow reflective sheeting applied to the entire end section of the guardrail in accordance with Section 1088-3 of the *2006 Standard Specifications* and is incidental to the cost of the guardrail anchor unit.

Measurement and Payment

Measurement and payment will be made in accordance with Articles 862-6 of the *2006 Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail Anchor Units, Type 350 TL-2	Each

AGGREGATE PRODUCTION:

(11-20-01)

SP10 R05

Provide aggregate from a producer who uses the current Aggregate Quality Control/Quality Assurance Program that 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)

SP10 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)

SP10 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>

Table 1024-1	
Pozzolans for Use in Portland Cement Concrete	
<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)

SP10 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)

SP10 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

PRECAST DRAINAGE STRUCTURES - MACRO-SYNTHETIC FIBERS

(7-15-08)(Rev 11-18-08)

SP 10 R42

Description

Substitute as an option, macro-synthetic fibers in lieu of 4" x 4" W1.4 x W1.4 welded wire fabric reinforcement for selected precast concrete products in accordance with the following requirements.

Materials

Item	Section
Portland Cement Concrete	1077-5

(A) Substitute macro-synthetic fibers only for steel reinforcement with an area of steel of 0.12 in²/ft or less in the following items:

- (1) **Precast Drainage Structure** units in accordance with the requirements of *Standard Drawing 840.45*.
- (2) **Precast Manhole 4.0' Riser Sections** in accordance with the requirements of *Standard Drawing 840.52*.

All other requirements, including reinforcement for these precast concrete items will remain the same.

(B) **Submittal** Submit to the Department for approval by the precast producer and fiber manufacturer, independently performed test results certifying the macro-synthetic fibers and the precast concrete products meet the requirements listed herein:

(C) Macro-Synthetic Fibers

- (1) Manufacture from virgin polyolefins (polypropylene and polyethylene) and comply with ASTM C 1116.4.1.3.

Fibers manufactured from materials other than polyolefins Submit test results certifying resistance to long-term deterioration when in contact with the moisture and alkalis present in cement paste and/or the substances present in air-entraining and chemical admixtures.

- (2) Fiber length - no less than 1-1/2 inch.
- (3) Macro-synthetic fibers - aspect ratio (length divided by the equivalent diameter of the fiber) between 45 and 150.
- (4) Macro-synthetic fibers - Minimum tensile strength of 40 ksi when tested in accordance with ASTM D 3822.
- (5) Macro-synthetic fibers - minimum modulus of elasticity of 400 ksi when tested in accordance with ASTM D 3822.

(D) Fiber Reinforced Concrete

- (1) Approved structural fibers may be used as a replacement of steel reinforcement in allowable structures of NCDOT Standards 840.45 and 840.52. The dosage rate, in pounds of fibers per cubic yard, shall be as per recommended by the fiber manufacturer to provide a minimum average residual strength (in accordance with ASTM C 1399) of concrete of no less than that of the concrete with the steel reinforcement that is being replaced, but no less than 5 lbs. per cubic yard. Submit the recommendations of the manufacturer that correlate the toughness of steel-reinforced concrete with that of the recommended dosage rate for the fiber-reinforced concrete.
- (2) Fiber reinforced concrete - 4.5% air content, $\pm 1.5\%$ tolerance.
- (3) Fiber reinforced concrete - develop a minimum compressive strength 4000 psi in 28 days.
- (4) Workability of the concrete mix - determine in accordance with ASTM C995. The flow time - not be less than 7 seconds or greater than 25 seconds.
- (5) Assure the fibers are well dispersed and prevent fiber balling during production. After introduction of all other ingredients, add the plastic concrete and mix the plastic concrete for at least 4 minutes or for 50 revolutions at standard mixing speed.

Measurement and Payment

No separate payment will be made for substitution of macro-fiber synthetic reinforcement for the steel reinforcing. The price bid for the precast units will be full compensation for furnishing and incorporating the macro-fiber synthetic reinforcement.

TEMPORARY SOIL NAIL WALLS:**(SPECIAL)****Description**

A soil nail is defined as a steel bar grouted in a drilled hole inclined at an angle below horizontal. A temporary soil nail wall consists of soil nails spaced at a regular pattern and connected to a reinforced shotcrete face supporting the excavation. Design and construct temporary soil nail walls based on actual elevations and dimensions in accordance with the contract and accepted submittals. For this provision, "soil nail wall" refers to a temporary soil nail wall and "Soil Nail Wall Contractor" refers to the contractor installing soil nails and applying shotcrete. Use a Soil Nail Wall Contractor prequalified by the NCDOT Construction Unit for anchored retaining walls work (work code 3020).

Materials

Provide Type 3 Manufacturer's Certifications in accordance with Article 106-3 of the *Standard Specifications* for soil nails. Provide Type 7 Contractor's Certifications for all other soil nail wall materials and geocomposite drain strips.

(A) Soil Nails

Store steel materials on blocking a minimum of 12" (300 mm) above the ground and protect it at all times from damage; and when placing in the work make sure it is free from dirt, dust, loose mill scale, loose rust, paint, oil or other foreign materials. Damaged or bent materials will be rejected. Do not crack, fracture or otherwise damage grout inside sheathing of shop grouted encapsulated soil nails.

Use epoxy coated or encapsulated deformed steel bars meeting the requirements of AASHTO M275 or M31, Grade 60 or 75 (420 or 520). Splice bars in accordance with Article 1070-10 of the *Standard Specifications*.

For epoxy coated bars, provide epoxy coated reinforcing steel meeting the requirements of Article 1070-8 of the *Standard Specifications*.

For encapsulated bars, use an unperforated corrugated high-density polyethylene (HDPE) sheathing a minimum of 0.04" (1 mm) thick meeting the requirements of AASHTO M252. Provide at least 0.4" (10 mm) of grout cover between the bar and sheathing and at least 0.8" (20 mm) of grout cover between the sheathing and drill hole wall.

Fabricate bar centralizers from schedule 40 polyvinyl chloride (PVC) plastic pipe or tube, steel or other material not detrimental to steel bars (no wood). Size centralizers to position the bar within 1 inch (25 mm) of the drill hole center and allow a tremie to be inserted to the bottom of the hole. Use centralizers that do not interfere with grout placement or flow around bars. For encapsulated bars, centralizers are required both inside and outside of encapsulation.

Use grout in accordance with the contract.

Provide bearing plates meeting the requirements of ASTM A36 and hex nuts and washers in accordance with the bar manufacturer's recommendations.

(B) Geocomposite Drain Strips

Provide minimum average roll values (MARV) in accordance with ASTM D4759 for test reports. Load, transport, unload and store geocomposite drain strips such that they are kept clean and free of damage. Identify, store and handle drain strips in accordance with ASTM D4873. Drain strips with defects, flaws, deterioration or damage will be rejected. Do not leave drain strips uncovered for more than 7 days.

Use at least 12 inch (300 mm) wide prefabricated geocomposite drain strips consisting of a non-woven polypropylene geotextile bonded to one side of an HDPE or polystyrene drainage core, e.g., sheet drain. Provide drain strips with cores meeting the following requirements.

Core Property	Test Method	Requirement (MARV)
Thickness	ASTM D5199	¼ - ½ inch (6 – 13 mm)
Compressive Strength	ASTM D1621	40 psi (276 kPa) min
Flow Rate (with a gradient of 1.0)	ASTM D4716	5 gpm (1 l/s) min*

* per ft (m) of width tested

(C) Shotcrete

Use shotcrete in accordance with the contract.

(D) Reinforcing Steel

Use deformed steel bar reinforcement and welded wire fabric meeting the requirements of reinforcing steel in accordance with Section 1070 of the *Standard Specifications*.

Design

Before beginning design, survey Contractor designed shoring locations to determine existing elevations and actual design heights. Design soil nail walls in accordance with the plans and the allowable stress design method in the *FHWA Geotechnical Engineering Circular No. 7 "Soil Nail Walls"* (Publication No. FHWA-IF-03-017) unless otherwise required.

For pavements above and behind soil nail walls, maintain a minimum clearance of 36" (900 mm) between the wall face and edge of pavement. For slopes above and behind soil nail walls, maintain a minimum clearance of 12" (300 mm) between the wall face and toe of slope.

Design nails for soil nail walls for a 100-year design service life. Design all other soil nail wall elements for a 3-year design service life. Design soil nail walls for a traffic surcharge equal to 240 psf (11.5 kPa) This surcharge is not applicable for construction traffic. If a construction surcharge will be present within a horizontal distance equal to the height of the wall, design the soil nail wall for the required construction surcharge.

Do not extend soil nails beyond right-of-way or easement lines. If existing or future obstructions such as foundations, guardrail posts, pavements, pipes, inlets or utilities will interfere with soil nails, maintain a minimum clearance of 6" (150 mm) between the obstruction and the nails. Use soil nails meeting the following minimum requirements.

- (A) Vertical and horizontal spacing of 3 ft (1 m)
- (B) Inclination of 10 degrees below horizontal
- (C) Diameter of 4" (100 mm)

Geocomposite drain strips are required at minimum 10 ft (3 m) centers between the shotcrete and excavation face. Use a minimum shotcrete thickness of 4" (100 mm) and reinforce shotcrete with #4 (#13) whaler bars around each nail head. Two reinforcing bars (one on each side of the nail head) in both the vertical and horizontal directions for a total of 4 whaler bars per soil nail are required. Do not embed shotcrete facing below bottom of excavation or the grade in front of soil nail walls.

Submit soil nail wall designs including unit grout/ground bond strengths for review and acceptance in accordance with Article 105-2 of the *Standard Specifications*. Submit working drawings showing plan views, wall profiles with soil nail locations and typical sections with soil nail, drainage, shotcrete and reinforcing details. If necessary, include details on working drawings for obstructions interfering with soil nails or extending through walls. Submit design calculations for each soil nail wall section with different surcharge loads, wall geometry or material parameters. A minimum of one analysis is required for each wall section with different soil nail lengths. Submit 3 hard copies of design calculations and 10 hard copies of drawings and an electronic copy (pdf format on CD or DVD) of both the calculations and drawings. Have soil nail walls designed, detailed and sealed by a Professional Engineer registered in North Carolina.

Construction Methods

When using an anchored NCDOT portable concrete barrier (PCB), anchor the barrier in accordance with Roadway Standard Drawing 1170.01 and Section 1170 of the *Standard Specifications*. Control drainage during construction in the vicinity of soil nail walls. Collect and direct run off away from soil nail walls and areas above and behind walls.

Before starting soil nail wall construction, conduct a preconstruction meeting to discuss the construction, inspection and testing of the soil nail walls. Schedule this meeting after all soil nail wall submittals have been accepted. The Resident or Bridge Maintenance Engineer, Bridge Construction Engineer, Geotechnical Operations Engineer, Contractor and Soil Nail Wall Contractor Superintendent and Project Manager will attend this preconstruction meeting.

Notify the Engineer before blasting in the vicinity of soil nail walls. Perform blasting in accordance with the contract. Install foundations located behind soil nail walls and within a horizontal distance equal to the longest soil nail length before beginning soil nail wall construction.

Do not excavate behind soil nail walls. If overexcavation occurs, repair walls at no additional cost to the Department with a method proposed by the Contractor and accepted by the Engineer.

(A) Excavation

Construct soil nail walls from the top down by removing material in front of walls. Excavate in accordance with the accepted submittals and in staged horizontal lifts with heights not to exceed the vertical soil nail spacing. Do not excavate more than 3 ft (1 m) below where soil nails will be installed. Remove any cobbles, boulders, rubble or debris that will protrude more than 2" (50 mm) into the required shotcrete thickness. Rocky ground such as colluvium, boulder fills and weathered rock may be difficult to excavate without leaving voids.

Install geocomposite drain strips as shown in the accepted submittals. Before shotcreting, place and secure drain strips with the geotextile side against the excavation face. Ensure that drain strips continuously contact the excavation face and allow for full flow the entire height of the wall. Discontinuous drain strips are not allowed. If splices are needed, overlap drain strips a minimum of 12" (300 mm) such that flow is not impeded.

Apply shotcrete to the excavation face within 24 hours of excavating the lift unless approved otherwise by the Engineer. The application of shotcrete may be delayed if it can be demonstrated that the delay will not adversely affect the excavation face stability. If the excavation face will be exposed for more than 24 hours, use polyethylene sheets anchored at the top and bottom of the lift to protect the face from changes in moisture content.

If the excavation face becomes unstable at any time, suspend soil nail wall construction and temporarily stabilize the face by immediately placing an earth berm against the unstable face. Soil nail wall construction may not proceed until remedial measures are proposed by the Contractor and accepted by the Engineer.

Do not excavate subsequent lifts until soil nail installation, shotcrete application, nail head assembly and soil nail testing are complete and accepted for the preceding lift. Also, do not excavate subsequent lifts until grout and shotcrete have cured at least 3 days and 1 day, respectively, for the preceding lift.

Cut off excess drain strips and expose strip ends below shotcrete facing when excavation and shotcreting is complete.

(B) Soil Nail Installation

Drill and grout soil nails the same day and do not leave drill holes open overnight. Control drilling and grouting to prevent excessive ground movements, damaging structures and pavements and fracturing rock and soil formations. If ground heave or subsidence occurs, suspend soil nail wall construction and take action to minimize movement. If structures or pavements are damaged, suspend wall construction and repair structures and pavements at no additional cost to the Department with a method proposed by the Contractor and accepted by the Engineer.

(1) Drilling

Use drilling rigs capable of drilling through whatever materials are encountered to the dimensions and orientations required for the soil nail wall design. Drill straight and clean holes at locations shown in the accepted submittals. Stabilize drill holes with temporary casings if unstable, caving or sloughing material is anticipated or encountered. Do not use drilling fluids to stabilize drill holes or remove cuttings.

(2) Soil Nail Bars

Use centralizers to center steel bars in drill holes. Securely attach centralizers at maximum 8 ft (2.4 m) intervals along bars. Attach upper and lowermost centralizers 18" (450 mm) from the top and bottom of drill holes.

Before placing soil nail bars, allow the Engineer to check location, orientation and cleanliness of drill holes. Provide steel bars as shown in the accepted submittals and insert bars without difficulty or forcing insertion. Do not vibrate or drive soil nail bars. If a bar can not be completely inserted easily, remove the bar and clean or redrill the hole.

(3) Grouting

Remove oil, rust inhibitors, residual drilling fluids and similar foreign materials from holding tanks/hoppers, stirring devices, pumps, lines, tremie pipes and all other equipment in contact with grout before use.

Place grout with a tremie in accordance with the contract and accepted submittals. Inject grout at the lowest point of drill holes through a tremie pipe, e.g., grout tube, casing, hollow-stem auger or drill rod, in one continuous operation. Fill drill holes progressively from the bottom to top and withdraw tremie at a slow even rate as the hole is filled to prevent voids in the grout. Extend tremie pipe into grout a minimum of 5 ft (1.5 m) at all times except when grout is initially placed in a drill hole.

Provide grout free of segregation, intrusions, contamination, structural damage or inadequate consolidation (honeycombing). Cold joints in grout are not allowed except for soil nails that are tested. Extract temporary casings as grout is placed. Monitor and record grout volumes during placement.

(4) Nail Heads

After shotcreting, attach nail head assemblies consisting of bearing plates and nuts as shown in the accepted submittals. Before shotcrete reaches initial set, seat plates and tighten nuts so plates contact shotcrete uniformly. If uniform contact is not possible, install nail head assemblies on a mortar pad to provide even bearing against shotcrete.

(C) Shotcreting

Perform shotcreting in accordance with the contract and accepted submittals. Use nozzlemen who made satisfactory preconstruction test panels.

Clean the excavation face and ungrouted zones of drill holes near the face of loose materials, mud, rebound and other foreign material. Moisten surfaces to receive shotcrete. Secure reinforcement to prevent movement and vibration while shotcreting.

Direct shotcrete at right angles to the excavation face except when placing shotcrete around reinforcing bars. Rotate nozzle steadily in a small circular pattern. Apply shotcrete from the bottom up. Make shotcrete surface uniform and free of sloughing or sagging.

Completely fill ungrouted zones of drill holes near the excavation face and any other voids with shotcrete. Consider subsurface conditions and resulting potential for voids when estimating shotcrete quantities. No additional payment will be made for unanticipated shotcrete quantities.

Taper construction joints to a thin edge over a minimum distance equal to the shotcrete thickness. Wet the joint surface before applying shotcrete on adjacent sections.

Repair surface defects as soon as possible after placement. Remove any shotcrete which lacks uniformity, exhibits segregation, honeycombing or lamination or contains any voids or sand pockets and replace with fresh shotcrete to the satisfaction of the Engineer.

(D) Soil Nail Testing

For this provision, “proof tests” are performed on test nails incorporated into the wall, i.e., production soil nails assuming test nails are acceptable in accordance with this provision. “Proof test nails” refer to soil nails on which proof tests are performed.

In general, proof tests on 5 percent of production soil nails with a minimum of 1 test per nail row is required. More or less soil nail testing may be required depending on the subsurface conditions encountered. The Engineer will decide the actual number and locations of proof tests.

Do not test soil nails until grout and shotcrete achieve the required 3 day compressive strength.

(1) Testing Equipment

Use testing equipment that includes the following.

- (a) 2 dial gauges with rigid supports
- (b) Hydraulic jack and pressure gauge
- (c) Electronic load cell
- (d) Jacking block or reaction frame

Provide pressure gauges graduated in 100 psi (690 kPa) increments or less. Use dial gauges capable of measuring to 0.001” (0.025 mm) and accommodating the maximum anticipated movement.

Align testing equipment to ensure uniform loading. Use a jacking block or reaction frame that does not damage the shotcrete or contact the shotcrete face within 3 ft (1 m) of test nails. Align dial gauges within 5 degrees of the test nail axis. Place dial gauges opposite each other on either side of the test nail. Set up testing equipment and measuring devices such that resetting or repositioning the components before completing testing is not required. A load cell is not required for subsequent proof tests after the initial proof test if the same jack and pressure gauge are used for all proof tests.

(2) Proof Tests

Proof test nails have both bonded and unbonded lengths. Grout only the bonded length before testing. Minimum bonded and unbonded lengths of 10 ft (3 m) and 3 ft (1 m), respectively, are required.

Soil nail bars for production soil nails may be overstressed under higher test nail loads. Use larger or higher grade steel bars to allow for higher loads instead of shortening bond lengths to less than the minimum.

Use the following equation to determine maximum bond lengths, L_B (ft or m).

$$L_B \leq \frac{C_{RT} \times A_t \times f_y}{Q_{ALL} \times 1.5},$$

where,

- C_{RT} = reduction coefficient, 0.9 for Grade 60 and 75 (420 and 520) bars or 0.8 for Grade 150 (1035) bars,
- A_t = bar area (in² or m²),
- f_y = bar yield stress (ksi or kPa) and
- Q_{ALL} = allowable unit grout/ground bond strength (kips/ft or kN/m).

Use the following equation to determine design test loads, DTL (kips or kN).

$$DTL = L_B \times Q_{ALL}$$

Calculate DTL based on as-built bond lengths. Perform proof tests by incrementally loading test nails to failure or a maximum test load of 150 percent of DTL according to the following schedule.

Load	Hold Time
AL*	Until movement stabilizes
0.25 DTL	Until movement stabilizes
0.50 DTL	Until movement stabilizes
0.75 DTL	Until movement stabilizes
1.00 DTL	Until movement stabilizes
1.25 DTL	Until movement stabilizes
1.50 DTL	10 or 60 minutes (creep test)
AL*	1 minute

*Alignment load (AL) is the minimum load required to align testing equipment and should not exceed 0.05 DTL.

Reset dial gauges to zero after applying alignment load. Record test nail movement at each load increment and monitor test nails for creep at the 1.50 DTL load increment. Measure and record test nail movement at 1, 2, 3, 5, 6 and 10 minutes. When the test nail movement between 1 minute and 10 minutes exceeds 0.04” (1 mm), maintain the maximum test load for an additional 50 minutes and record movements at 20, 30, 50 and 60 minutes. Repump jack as needed to maintain the intended load during hold times.

(3) Test Nail Acceptance

Test nail acceptance is based on the following criteria.

- (a) Total creep movement is less than 0.04" (1 mm) between the 1 and 10 minute readings or less than 0.08" (2 mm) between the 6 and 60 minute readings and creep rate is linear or decreasing throughout the creep test load hold time.
- (b) Total test nail movement at maximum test load exceeds 80 percent of the theoretical elastic elongation of the test nail unbonded length.
- (c) Pullout failure does not occur at or before the 1.5 DTL load increment. Pullout failure is defined as the inability to increase the load while test nail movement continues. Record the pullout failure load as part of the test data.

Maintain stability of test nail unbonded lengths for subsequent grouting. If the test nail unbonded length of a proof test nail can not be satisfactorily grouted after testing, do not incorporate the test nail into the wall and replace the nail with another production soil nail at no additional cost to the Department.

(4) Test Nail Results

Submit 2 original hard copies of test nail records including load versus movement curves within 24 hours of completing each test. The Engineer will review the test records to determine if the test nail is acceptable.

If the Engineer determines a test nail is unacceptable, either perform additional proof tests on adjacent production soil nails or revise the soil nail wall design for the production soil nails represented by the unacceptable proof test nail as determined by the Engineer. Submit a revised soil nail wall design for review and acceptance and provide an acceptable proof test nail with the revised design and/or installation methods at no additional cost to the Department. If required, remove representative production soil nails and/or provide new production soil nails with the revised design and/or installation methods at no additional cost to the Department.

After completing soil nail testing for each wall, submit electronic copies (pdf or jpg format on CD or DVD) of all corresponding test records.

Measurement and Payment

Temporary Soil Nail Walls will be measured and paid for at the contract unit price per square foot (square meter) of exposed face area incorporated into the completed and accepted wall. The wall height will be measured as the difference between the top and bottom of wall elevation. The top of wall elevation is defined as the top of shotcrete facing. The bottom of wall elevation is defined as where the grade intersects the front face of the temporary soil nail wall.

Include in the unit bid price for *Temporary Soil Nail Walls* all costs for design, submittals, furnishing labor, tools, equipment and materials, excavating lifts, installing and proof testing soil nails, grouting, providing geocomposite drain strips, reinforcement, shotcrete including test panels, and any incidentals necessary to design and construct temporary soil nail walls in accordance with this provision.

PAVEMENT MARKING LINES:

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

SP12 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.