

PROJECT SPECIAL PROVISIONS**ROADWAY****CLEARING AND GRUBBING – METHOD III:**

(4-6-06)

SP2 R02

Perform clearing on this project to the limits established by Method "III" shown on Standard No. 200.03 of the *Roadway Standard Drawings*.

SHOULDER AND FILL SLOPE MATERIAL (Lump Sum Grading):

(5-21-02)

SP2 R45

Description

Perform the required shoulder and slope construction for this project in accordance with the applicable requirements of Section 226 of the *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*.

CONTROL OF VIBRATION

Review and acceptance of any construction plan submittals does not relieve the Contractor of responsibility for damage or liability. Attention is directed to Articles 107-12 and 107-15 of the *Standard Specifications*.

Contact the Geotechnical Engineering Unit Contract Administration Office for an approved consultant from the list of movement, noise, and vibration monitoring work. Schedule a preconstruction conference before beginning any work, and include Contractor personnel, vibration monitoring firm, Resident Engineer, and representatives from NCDOT Construction Unit and Geotechnical Engineering Unit. Submit a vibration monitoring plan to the Engineer for approval at least 20 days before beginning any construction work.

Inspect the existing conditions of adjacent buildings on the project in the New Bern NRHD – the Harvey Mansion on S. Front Street, the Thomas Sparrow House, the Justice House on E. Front Street, and New Bern Riverfront Convention Center (NBRCC) and the Sheraton Hotel and any other structures the contractor deems necessary. Prepare and furnish three (3) copies of a preconstruction inspection report and submit along with the vibration monitoring plan. Utilize construction methods and equipment to avoid construction induced damage to the adjacent structures/properties. Use of vibratory compaction equipment is only allowed for placement and/or compaction of earth material, stone or asphalt pavement to the limit that does not cause damage to the adjacent structures.

Control of vibration is required during construction of Bridge No. 60 over Trent River and approaches. It is the responsibility of the Contractor to utilize construction methods and equipment to minimize disturbance and/or damage to the adjacent structures. Use non-impact or non-shattering methods such as saw cutting for removal of the existing bridge. Equipment such as hoe rams and wrecking balls will not be allowed.

This work shall also include furnishing and operating vibration monitoring devices (engineering seismographs) for the duration of the project in the adjacent buildings of vibration concern. These devices shall have been calibrated within twelve months from the date the calibration data are submitted to the Engineer. These devices shall be capable of recording vibrations in the three perpendicular axes: vertical, transverse, and longitudinal, and also be capable of recording the full vibration waveform. Geophones shall exhibit linear response in the frequency range of 4-100 Hertz. The monitoring devices shall also be capable of recording sound. Place devices in locations mentioned above as directed by the Engineer before beginning any construction operations that would generate detectable vibrations in the adjacent buildings.

Continuous monitoring will be required during the initial stages of each particular phase of work that could generate detectable vibrations at adjacent buildings. Continuous monitoring throughout bridge foundation construction is required for the buildings listed. Other than during bridge foundation construction activities, once safe levels have been confirmed, an instrument may be placed in the nearest structure to document ongoing safe vibrations. Construction vibration at all adjacent structures shall not exceed 0.3 inches per second peak particle velocity in any axis at any time. Inspect the conditions of adjacent structures frequently during the construction to assess any damage to the structures. If the vibrations recorded show any potential to damage adjacent structures, cease all work immediately and furnish the Engineer with an alternative method of construction.

Throughout the duration of the vibration monitoring on the project, the Department reserves the right to request that the Contractor provide information associated with this work for review without delay. At the completion of the project, submit to the Engineer three (3) copies of the final report which should include all vibration monitoring records, preconstruction, construction and post construction condition assessments of adjacent structures with both photographic and written documentation.

Payment will be made by the Lump Sum bid price for "Vibration Monitoring." Such payment will be full compensation for all work described in this provision including, but not limited to, control of vibration, inspection of the structures, vibration monitoring, and submission of reports.

LEVEL SPREADER:

03-18-03

Description:

Construct and maintain level spreaders at the locations shown on the plans and in accordance with the details in the plans. The purpose of the level spreader is to collect stormwater discharged from a drainage system and to direct the stormwater into the buffer areas in a sheet flow condition. Work includes excavation, concrete, shaping, and reinforcing steel.

Basis of Payment:

Basis of payment for "Level Spreader" will be paid for at the contract lump sum price.

SP8R110 REV.

REINFORCED BRIDGE APPROACH FILL:

(3-18-03) (Rev.7-18-06)

SP4 R01

Description

This work consists of all work necessary to construct reinforced bridge approach fills in accordance with these provisions and the plans, and as directed by the Engineer.

Materials

Geomembrane

Provide geomembrane that is impermeable, composed of polyethylene polymers or polyvinyl chloride, and meets the following physical requirements:

Property	Requirements	Test Method
Thickness	25 mils Minimum	ASTM D1593
Tensile Strength at Break	100 lb/inch Minimum	ASTM D638
Puncture Strength	40 lbs Minimum	ASTM D 4833
Moisture Vapor Transmission Rate	0.018 ounce/yard ² per Day Maximum	ASTM E96

Fabric

Refer to Section 1056 for Type 2 Engineering Fabric and the following:

Use a woven fabric consisting of strong rot-proof synthetic fibers such as polypropylene, polyethylene, or polyester formed into a stable network such that the filaments or yarns retain their relative positions to each other.

Fabric Property	Requirements	Test Method
Minimum Flow Rate	2 gallons/min/square foot	ASTM D 4491

Lamination of fabric sheets to produce the physical requirements of a fabric layer will not be accepted. Furnish letters of certification from the manufacturer with each shipment of the fabric and geomembrane attesting that the material meets the requirements of this provision; however, the material is subject to inspection, test, or rejection by the Engineer at any time.

During all periods of shipment and storage, wrap the geomembrane and fabric in a heavy-duty protective covering to protect the material from ultraviolet rays. After the protective wrapping has been removed, do not leave the material uncovered under any circumstances for longer than 4 days.

Select Material

Provide select material meeting the requirements of Class III, Type 1 or Type 2, or Class V select material of Section 1016 of the *Standard Specifications*. When select material is required under water, use select material class V only, up to one foot above the existing water elevation.

4 inch Diameter Corrugated Drainage Pipe and Fittings

Provide pipe and fittings that meet all the applicable requirements of Section 815 or 816 of the *Standard Specifications*.

Construction Methods

Place the geomembrane and fabric as shown on the plans or as directed by the Engineer. Perform the excavation for the fabric reinforced fill to the limits shown on the plans. Provide an excavated surface free of obstructions, debris, pockets, stumps, and cleared of all vegetation. The geomembrane or fabric will be rejected if it has defects, rips, holes, flaws, deterioration or damage incurred during manufacture, transportation, handling or storage. Lay all layers smooth, and free from tension, stress, folds, wrinkles or creases. Place all the fabric layers with the machine direction (roll direction) parallel to the centerline of the roadway. A minimum roll width of 10.0 feet for the fabric is required. Overlap geomembrane or fabric splices parallel to the centerline of the roadway a minimum of 18 inches. Geomembrane or fabric splices parallel to the backwall face will not be allowed.

Deposit and spread select material in successive, uniform, approximately horizontal layers of not more than 10 inches in depth, loose measurement, for the full width of the cross section, and keep each layer approximately level. Place and compact each layer of select material fill no more than 10 inches thick with low ground pressure equipment. Use hand operated equipment to compact the fill material within three feet of the backwall and wingwalls as directed by the Engineer. Compact select material to a density equal to at least 95% of that obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. Compact the top eight inches of select material to a density to at least 100% of that

obtained by compacting a sample of the material in accordance with AASHTO T99 as modified by the Department. Density requirements are not applicable to select material, class V; however compact the fill with at least four passes of low ground pressure equipment on the entire surface as directed by the Engineer. The compaction of each layer of select material shall be inspected and approved by the Department prior to the placement of the next fill layer. No equipment will be allowed to operate on the drainage pipe or any geomembrane/fabric layer until it is covered with at least six inches of fill material. Compaction shall not damage the drainage pipe, geomembrane, or fabric under the fill. Cover the geomembrane/fabric with a layer of fill material within four days after placement of the geomembrane/fabric. Geomembrane and fabric that are damaged as a result of installation will be replaced as directed by the Department at no additional cost.

Place the geomembrane on the ground, and attach and secure it tightly to the vertical face of the backwall and wingwalls with adhesives, duct-tape, nails or any other method approved by the Engineer. Place the first fabric layer on the surface of the geomembrane with the same dimensions of the geomembrane. No material or void is allowed between the geomembrane and the first fabric layer. Place and fold the remaining fabric layers on the edges as shown on the plans or as directed by the Engineer. Provide vertical separation between fabric layers as specified on the plans. The number of fabric layers will be shown in the plans.

Place four inch diameter perforated drainage pipe along the base of the backwall and sloped to drain as shown on the plans. Completely wrap perforated drainage pipe and #78M stone with Type 2 Engineering Fabric as shown on the plan detail. Install a pipe sleeve through the bottom of or under the wing wall prior to placing concrete for the wing wall. The pipe sleeve shall be of adequate strength to withstand the wingwall load. Place the pipe sleeve in position to allow the drainage pipe to go through the wing wall with a proper slope. Connect four-inch diameter nonperforated (plain) drainage pipe with a coupling to the perforated pipe near the inside face of the wingwall. Place the nonperforated drainage pipe through the pipe sleeve, extend down to the toe of the slope and connect, to a ditch or other drainage systems as directed by the Engineer. For bridge approaches in cut sections where no side slope is available, direct the drainage pipe outlet to the end slope down to the toe using elbows as directed by the Engineer.

Measurement and Payment

Reinforced Bridge Approach Fill, Station _____ will be paid for at the contract lump sum price. Such price and payment will be full compensation for both approach fills at each bridge installation, including but not limited to furnishing, placing and compacting select material, furnishing and placing geomembrane and woven fabric, furnishing and placing pipe sleeve, drainage pipe, and stone, furnishing and installing concrete pads at the end of outlet pipes, excavation and any other items necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Reinforced Bridge Approach Fill, Station _____	Lump Sum

CATCH BASIN CLEAN OUT:

Description:

Clean out silt accumulations and other debris from existing catch basin at Station 38+20 LT And as directed.

Construction Methods

Use a catch basin clean out method that does not damage the existing catch basin.

Measurement and Payment

Catch Basin Clean Out will be paid for at the contract lump sum price. No payment will be made where the work of clearing out the catch basin was made necessary by the Contractor's negligence in taking appropriate erosion control measures. Such price and payment will be full compensation for cleaning out existing catch basin and disposing of all silt and debris.

Payment will be made under:

Pay Item	Pay Unit
Catch Basin Clean Out (Station 38+20 LT)	Lump Sum

ASPHALT PAVEMENTS - SUPERPAVE:

(7-18-06) (Rev 9-19-06)

SP6 R01

Revise the *2006 Standard Specifications* as follows:

Page 6-2, Article 600-9 Measurement and Payment

Delete the second paragraph.

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

or ASTM D 2041

Page 6-13, last line on page & Page 6-14, Subarticle 609-5(C)(2)(e), delete and substitute the following:

(e) Retained Tensile Strength (TSR) - (AASHTO T 283 Modified), add subarticle (1) Option 1 before the first paragraph.

(1) Option 1

Add subarticle (2) Option 2 and the following sentence as the first sentence of the second paragraph:

(2) 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.

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

Substitute 20% for 15%

First, second and third sentences of the fifth paragraph:

Substitute 20% for 15%

Page 6-44, 610-8, 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 6-54, Article 620-4, 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, 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 10-41, Table 1012-1, 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

Page 10-45, Replace Table 1012-2 with the following:

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

Mix Type	0-20% RAP			21-25% RAP			26%+ RAP		
	Base	Inter.	Surf.	Base	Inter.	Surf.	Base	Inter.	Surf.
P _b , %		± 0.7%			± 0.4%			± 0.3%	
1 1/2" (37.5)	±10	-	-	±7	-	-	±5	-	-
3/4" (19.0)	±10	±10	-	±7	±7	-	±5	±5	-
1/2" (12.5)	-	±10	±6	-	±7	±3	-	±5	±2
3/8" (9.5)	-	-	±8	-	-	±5	-	-	±4
No. 4 (4.75)	±10	-	±10	±7	-	±7	±5	-	±5
No. 8 (2.36)	±8	±8	±8	±5	±5	±5	±4	±4	±4
No.16 (1.18)	±8	±8	±8	±5	±5	±5	±4	±4	±4
No. 30 (0.600)	±8	±8	±8	±5	±5	±5	±4	±4	±4
No. 50 (0.300)	-	-	±8	-	-	±5	-	-	±4
No. 200 (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 *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 *Standard Specifications*.

The base price index for asphalt binder for plant mix is \$315.36 per ton.

This base price index represents an average of F.O.B. selling prices of asphalt binder at supplier's terminals on December 1, 2006.

GUARDRAIL ANCHOR UNITS, TYPE 350:

(4-20-04)

SP8 R65

Description

Furnish and install guardrail anchor units in accordance with the details in the plans, the applicable requirements of Section 862 of the *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-2000) as 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 3, in accordance with Section 106-2 of the 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 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 *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 *Standard Specifications*.

Payment will be made under:

Pay Item	Pay Unit
Guardrail Anchor Units, Type 350	Each

IMPACT ATTENUATOR UNITS, TYPE 350:

(4-20-04) (Rev 7-18-06)

SP8 R75

Description

Furnish and install impact attenuator units and any components necessary to connect the impact attenuator units in accordance with the manufacturer's requirement, the details in the plans and at locations shown in the plans.

Materials

NON-GATING IMPACT ATTENUATOR UNITS:

The impact attenuator unit (QUADGUARD) as manufactured by:

Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601-2076
Telephone: 312-467-6750

The impact attenuator unit (TRACC) as manufactured by:

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

GATING IMPACT ATTENUATOR UNITS:

The impact attenuator unit (BRAKEMASTER) as manufactured by:

Energy Absorption Systems, Inc.
One East Wacker Drive
Chicago, Illinois 60601-2076
Telephone: 312-467-6750

The impact attenuator unit (CAT) as manufactured by:

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

Prior to installation the Contractor shall submit to the Engineer:

- (A) FHWA acceptance letter for each impact attenuator unit certifying it meets the requirements of NCHRP Report 350, Test Level 3, in accordance with Article 106-2 of the *Standard Specifications*.
- (B) Certified working drawings and assembling instructions from the manufacturer for each impact attenuator unit in accordance with Article 105-2 of the *Standard Specifications*.

No modifications shall be made to the impact attenuator 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

If the median width is 40 feet or less, the Contractor shall supply one of the NON-GATING Impact Attenuator Units listed in the Materials Section herein.

If the median width is greater than 40 feet, the Contractor may use any of the GATING or NON-GATING Impact Attenuator Units listed in the Materials Section herein.

Measurement and Payment

Impact Attenuator Unit, Type 350 will be measured and paid for at the contract unit price per each. Such prices and payment will be full compensation for all work covered by this provision including but not limited to furnishing, installing and all incidentals necessary to complete the work.

Payment will be made under:

Pay Item	Pay Unit
Impact Attenuator Unit, Type 350	Each

STREET SIGNS AND MARKERS AND ROUTE MARKERS:

(7-1-95)

SP9 R01

Move any existing street signs, markers, and route markers out of the construction limits of the project and install the street signs and markers and route markers so that they will be visible to the traveling public if there is sufficient right of way for these signs and markers outside of the construction limits.

Near the completion of the project and when so directed by the Engineer, move the signs and markers and install them in their proper location in regard to the finished pavement of the project.

Stockpile any signs or markers that cannot be relocated due to lack of right of way, or any signs and markers that will no longer be applicable after the construction of the project, at locations directed by the Engineer for removal by others.

The Contractor will be responsible to the owners for any damage to any street signs and markers or route markers during the above described operations.

No direct payment will be made for relocating, reinstalling, and/or stockpiling the street signs and markers and route markers as such work will be considered incidental to other work being paid for by the various items in the contract.

STEEL U-CHANNEL POSTS:

(7-18-06)

SP9 R02

Amend 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.

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 *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 *Standard Specifications*. Copies of this procedure are available upon request from the Materials and Test Unit.

GLASS BEADS:

(7-18-06)

SP10 R35

Revise the *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.

CHANGEABLE MESSAGE SIGNS

(11-21-06)

SP11 R 11

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 MEASUREMENT AND PAYMENT:

(11-21-06)

SP 12 R01

Revise the 2006 Standard Specifications as follows:

Page 12-14, Subarticle 1205-10, 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.

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