

Supplemental Specifications to the August 2001 Standard Specifications
(Revised March 28, 2012)

Subsection 101.02 Abbreviations: (2/23/2011)

Replace AREA with the following:

AREMA	American Railway Engineering and Maintenance of Way Association
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Subsection 101.38 General Notices: (2/23/2011)

Add the following before General Notices:

101.37 (a) General Description. The General Description consists of specific Project related information, including but not limited to; Location, Description, Completion Date, Special Notices, Bidding Criteria, Construction Sequence Notes, Road User Costs, modifications to Liquidated Damages, Addenda issued, Questions and Answers published, Prebid Meeting Transcripts, Construction Items Units of Measure and Table of Contents.

Subsection 101.39 Holidays. (9/4/2009)

Delete item C and H.

Subsection 101.78 Subcontractor. (3/18/2004)

Modify the second paragraph as follows:

Exceptions to this definition are suppliers limited to delivering and depositing, but not incorporating material, suppliers of services that transport material, and the work performed which does not advance the completion of the Contract and is not considered as an item of work.

Subsection 101.79 Substantial Completion. (3/18/2004)

Modify the sentence as follows:

The point at which all Contract items are complete as deemed by the Department excluding any warranties or vegetation growth.

Subsection 102.07 Irregular Proposals. (5/15/2006)

Modify Paragraph B. as follows:

- B. There are unauthorized additions, interlineations, conditional bids, or irregularities of any kind that may tend to make the proposal incomplete, indefinite, or ambiguous.

Delete paragraph G.

Modify Paragraph I. as follows:

- I. The Contractor fails to provide a proposal guaranty.

Subsection 104.04 Accident Notification. (5/15/2006)

Modify the paragraph as follows:

Notify the Transportation Management Center (T.M.C.) at 659-2400 and Engineer concerning any accidents.

Subsection 104.05 Changes in the Character of Work. (2/23/2011)

Insert the following clause prior to the last sentence of Section 104.05 paragraph E.

If, however, the character of the work, or the unit costs, or the time required for performance of the work are changed, and if such changes cause a monetary increase or decrease to the unit cost in question of 15% or more, then an equitable adjustment may be made to any pay item (whether or not it is a major item) on such basis as may have been agreed in advance of the performance of such work. In the case no such agreement was made, then an allowance may be made, either for or against the Contractor, in such amount as the Department may determine to be fair and equitable.

Subsection 104.14 Contractor's Responsibility for Work. (4/19/2010)(2/23/2011)

Modify the following paragraph:

Change the word structure to bridge:

Before starting any work that will change the loadings on an existing or proposed bridge, the Contractor shall inform the Engineer of the proposed loadings (axle spacing, axial loads, stockpiling and equipment locations) including quantity of and type of construction equipment and vehicles it proposes to use. The loading that the Contractor's equipment will apply to the bridge shall be subject to the approval of the Engineer. The Engineer's approval does not relieve the Contractor of its responsibility for the safe performance of the work or from carrying out the work in full accordance with the Plans and the requirements of the Specifications. If at any time the Contractor's upcoming operations would result in a change to the loading and / or the location of the loading on a bridge, the Contractor shall submit the proposed loadings for approval by the Engineer prior to changing the loading. No work shall be done that

will change the loadings on any bridge within the contract limits until the Engineer's approval has been obtained.

Review time shall be in accordance with Section 105.04.

Subsection 105.04 Plans and Working Drawings. (5/15/2006)

Modify the 4th paragraph as follows:

Working drawings for concrete structures shall provide such details as are required for successful prosecution of the work. These shall include plans for items such as falsework, bracing, sheeting, shoring, cofferdams, formwork, masonry layout diagrams and bending diagrams for reinforcing steel.

Subsection 105.06 Coordination of the Plans, Standard Specifications, Supplemental Specifications, and Special Provisions. (1/3/2008) (2/23/2011) (10/10/2011)

These Specifications, Supplemental Specifications, Plans, Special Provisions, and all supplementary documents are essential parts of the Contract and a requirement occurring in one is binding as though occurring in all. They are intended to be complimentary and to describe and provide for a complete Contract. In case of a discrepancy between these Contract components the governing ranking will be:

Modify and renumber the following:

1. General Description
2. General Notices
3. Pay Units in the Bid Proposal Forms
4. Plans
5. Special Provisions
6. Supplemental Specifications
7. Standard Construction Details
8. Standard Specifications

Subsection 105.09 Utilities. (1/3/2008)(2/23/2011)

Add the following paragraph:

Overhead High-Voltage Line Safety requires notification to and mutually agreeable measures from the utility from any person intending to carry on any function, activity, work or operation within 20' of any high voltage overhead line.

Subsection 105.13 Maintenance During Construction. (3/18/2004)

Add the following:

The contractor shall mow all grass and weeds within the limits of the Contract, as directed by the Engineer, up to 4 times a year to a height in compliance with subsection 107.01.

Subsection 105.20 Project Acceptance. (3/18/2004)

Modify the first paragraph as follows:

Final acceptance will not occur until completion of the Project in accordance with Subsection 101.16. The Contract time will be stopped at substantial completion.

Section 106 – Control of Material: (10/12/2010)

Replace all “Buy American Contract Requirement” with “Buy America Contract Requirement”

Subsection 106.09 Disposal of Unacceptable Materials. (5/15/2006) (3/28/2012)

Replace with the following:

All waste materials from the Work on the Contract become the property of the Contractor. Remove all waste materials from the Project unless otherwise specified in the Contract Documents.

1. Procure disposal sites to dispose of all the waste material generated by the Work on the Contract. Use disposal sites, if any, that are provided by the Contract Documents. Disposal sites that are provided by the Contract Documents may not be large enough to handle all waste materials from the Contract. The Contractor is responsible to procure additional disposal sites if necessary to complete the Work.
2. Submit disposal sites for approval to the Engineer prior to utilization.
 - a. Provide a plan of the disposal area that includes the proposed sediment and erosion control devices, the existing contours and proposed final contours, a list of materials to be disposed of in the disposal area, and the proposed security measures.
 - b. When preparing and utilizing off-site disposal areas, comply with all stormwater and environmental rules, regulations or applicable permits promulgated by the Department of Natural Resources and Environmental Control (DNREC), the U.S. Army Corps of Engineers or any other applicable government agency. Obtain permits, if necessary, in accordance with Subsection 107.02.
 - c. Costs for preparing these plans are incidental to the Contract Item that generates the waste.

3. For disposal sites designated in the Contract Documents, payment will be made separately under applicable bid items for all necessary erosion and sediment controls, seeding, and mulching.
4. For Contractor-procured disposal sites, costs for all necessary erosion and sediment controls, seeding, and mulching are incidental to the Contract Items that generate the waste.

Subsection 107.04 Contractor's Responsibility for Utility Property and Services.
(5/15/2006) (10/12/2010)

Modify the 3rd paragraph as follows:

Fire hydrants on or adjacent to the highway shall be kept accessible to fire apparatus at all times and no material or obstruction shall be placed within 15' (4.5 m) of any such hydrant. Work shall be left entirely accessible at all points to fire apparatus at all times. Whenever any work is done in the area of a fire hydrant or whenever a fire hydrant is relocated or installed, the center of the hose outlet shall be a minimum of 18 in. (457 mm) above the final grade directly beneath the hose outlet. Breakaway flange at bottom of hydrant shall be set 0" to 4" above the ground.

Subsection 107.07 Public Convenience and Safety. (1/3/2008)

Add the following paragraph:

The Contractor shall maintain a safe work site at all times and be prepared to make repairs as needed after normal working hours in the case of an emergency. If the Department is unable to contact the Contractor to make these repairs then State Maintenance forces or a third party contractor may be used to make such repairs. The cost for this work shall be calculated according to Subsection 109.04(D) for all state personnel involved or third party contractor, including vehicles, equipment and materials needed. This cost will be deducted from money due the Contractor under the Contract.

Subsection 107.09 Protection and Restoration of Property. (5/15/2006)

Modify the 4th sentence in the first paragraph as follows:

The Contractor shall not injure or destroy trees or shrubs outside the limits of construction, nor remove or cut them without proper authority.

Subsection 108.01 Subletting of Contract. (3/18/2004)

Modify the second paragraph as follows:

If the Contractor to whom a contract is awarded proposes to subcontract any part of the work, the scope and value of the work to be done by the subcontractor shall be outlined. The cost of materials to be used by the subcontractor shall be outlined. The

cost of materials to be used by the subcontractor shall be included in the value of the subcontracted work. A subcontractor shall not subcontract further a portion of the work intended to be done by the original subcontractor without the express written permission of the Engineer. In granting such permission, the Engineer shall ensure that the subcontractor seeking to subcontract the work to be performed by another shall nonetheless perform with its own organization work amounting to not less than 50% of the total subcontracted bid price.

Subsection 108.04 Progress Schedules: (2/23/2011)

Add the following after paragraph C:

D. *Monthly Payment Chart.* Unless otherwise noted on the plans, the Contractor shall, as part of his Project Schedule, submit to the Engineer an estimate of the monthly payments expected to be received on the contract. This will be referenced as the “Monthly Payment Chart”.

A chart in Microsoft Excel, Microsoft Word, or hand written format will be acceptable for this purpose. The chart should include, as a minimum, columns for the month, year, and estimated monthly payments. The total of all estimated monthly payments should equal the awarded contract total bid price.

The Engineer may request an updated “Monthly Payment Chart” at his discretion, depending on the accuracy of the initial estimates and according to the overall needs of the Department.

The “Monthly Payment Chart” will not be considered a binding document by either the Contractor or the Department and is considered solely informational.

On projects requiring CPM Schedules, the Contractor may, but is not required to, “Cost Load” the CPM Schedule in order to generate the “Monthly Payment Chart”.

Costs to prepare and/or update the “Monthly Payment Chart” are addressed as follows:

- a. On Contracts requiring CPM Schedules and Updates, preparation of the initial chart shall be incidental to Item 763508. Updates shall be incidental to Item 763509
- b. On contracts not requiring CPM Schedules, the cost to prepare and update the “Monthly Payment Chart” shall be included in Item 763000, Initial Expense

Subsection 108.09 Schedule of Liquidated Damages. (9/4/2009) (3/28/2012)

Update table with these new numbers.

Schedule of Liquidated Damages

Awarded Contract Value		Daily Charge	
For More Than –	To and Including –	Work Day	Calendar Day
\$ 0	\$ 25,000	\$ 470.00	\$ 340.00
25,000	50,000	490.00	350.00
50,000	100,000	660.00	470.00
100,000	500,000	1,030.00	730.00
500,000	1,000,000	1,340.00	950.00
1,000,000	2,000,000	1,640.00	1,170.00
2,000,000	5,000,000	1,720.00	1,230.00
5,000,000	10,000,000	1,920.00	1,370.00
10,000,000	15,000,000	3,060.00	2,180.00
15,000,000	20,000,000	5,090.00	3,640.00
20,000,000	25,000,000	7,120.00	5,080.00
25,000,000	30,000,000	9,140.00	6,530.00
30,000,000	35,000,000	11,190.00	7,990.00
35,000,000	Over	13,200.00	9,430.00

Subsection 108.12 – Termination of Contractor’s Responsibility (10/10/2011)

Remove the current sentence and replace with the following:

The termination of the Contractor’s responsibility occurs upon final acceptance in accordance to subsection 105.20.

Subsection 109.01 – Measurement of Quantities. (1/3/2008)

Add the following sentence to Paragraph A:

- A. Weight tickets shall be computer generated.

Subsection 109.04 Payment for Differing Site Conditions, Major Changes, Extra Work, and Force Account

- B. Unit prices agreed upon in the change order authorizing the work.
(4/19/2010)**

Add the following:

Should an agreed price involve work to be performed by a Subcontractor, then the Prime Contractor's total allowable mark-up on the Subcontracted portion of work shall not exceed 10% of the Subcontractor's proposed price. The Prime Contractor

shall, upon request by the Department, submit documentation substantiating the Subcontractor's proposed price.

Subsection 109.05 Basis of Payment for Fixed Quantity Items (10/10/2011)

Delete Subsection 109.05 in its entirety and replace with the following:

109.05 Basis of Payment for Fixed Quantity Items. When indicated on the Plans or in the Special Provisions, certain items will be paid for on an estimated fixed quantity item basis. Where this occurs the method of measurement and basis of payment indicated in these Specifications for such items are deleted.

When estimated fixed quantities are indicated, the only quantities for which payment will be made are the estimated quantities as shown in the proposal at the unit prices bid.

The bidder should check the estimates and make its own appraisal of the amount of labor, equipment, or material required to complete the work in accordance with the Plans and Specifications. No allowance will be made or claims considered for any quantities used in completing the work in excess of those given in the proposal unless changes due to conditions encountered during construction become necessary and are authorized in writing by the Engineer. In such cases additions or deductions will be made to or from the proposal quantities for the actual volume or amounts charged, with payment adjusted in accordance with the bid price of the item.

If estimated fixed quantity items are deleted completely, no payment will be made.

In cases where a fixed quantity is contested by the Contractor, it shall be the responsibility of the Contractor to provide necessary measurements and computations to support a change in the quantity. If the change is verified and approved by the Engineer, payment will be adjusted in accordance with this Subsection.

In cases where it can be shown, by either the Department or the Contractor, that an error in the proposal quantity is more than 25%, the contractor will be compensated at the unit bid price for only the actual quantities of work performed.

Subsection 109.08 Payment for Material. (10/12/2010)

Delete paragraph A & F in their entirety and replace with the following:

- A. Request. The request for payment allowance for properly stored materials must be in writing, accompanied by an itemized inventory statement, written consent of

the surety, and an invoice or purchase order on the supplier's letterhead documenting the cost of the materials. No payment allowance will be permitted for amounts less than \$25,000.00 for each material of a qualifying Contract item.

- F. **Materials Measurement and Payment.** The method of measurement for materials shall be in units which are easily inventoried and acceptable to the Engineer. Payment allowance for materials shall be included in the progress estimate as a new and separate item and shall be subject to retainage provisions. Submit proof of payment to the Engineer prior to processing the next progress estimate in the form of a paid invoice from the Material supplier. Failure to submit proof of payment prior to the processing of the progress payment will result the deduction of the applicable material payment, in its entirety, from progress payments until such time as the proof of payment is received by the Engineer. As the materials are incorporated in the Project and paid for in place, an equal percentage shall be deducted from progress estimates until 100% of the allowance has been deducted. At the conclusion of the work for which the materials are required, the cost of materials remaining in storage for which payment allowance has been made will be deducted from the progress estimate.

Section 110 - Erosion, Sediment Control and Water Pollution. (1/3/2008)

Delete Section 110 in its entirety modify as follows:

- 110.01** Definitions
- 110.02** Legal Authority
- 110.03** Sediment and Stormwater Permit Approval
- 110.04** Description of Work
- 110.05** Completion of the Work
- 110.06** Plan Changes
- 110.07** Limits of Construction
- 110.08** Division of Responsibilities
- 110.09** Vegetative Stabilization
- 110.10** Temporarily Stockpiled Material
- 110.11** Channel and Ditch Scour Protection
- 110.12** Sediment-Laden Runoff
- 110.13** Dewatering Operations
- 110.14** Clean Water Diversions
- 110.15** Stream Diversions
- 110.16** Temporary Stream Crossings
- 110.17** Wash Water
- 110.18** Waste Water
- 110.19** Water Pollution Violations Enforced
- 110.20** Maintenance
- 110.21** Erosion and Sediment Control Reports
- 110.22** Failure to Implement and Maintain Erosion and Sediment Control Measures

110.23 Contractor Payment

110.24 Fines Resulting from Non-Compliance

110.01 Definitions.

Clearing. The clearing of trees, brush, shrubs, downed timber, rotten wood, rubbish, and any other vegetation, except where excluded by the definition for grubbing, as well as the removal of fences and structures. See Subsection 201.01.

Disturbed Area. An area where any activity has been initiated which may result in soil erosion from water or wind or movement of sediments or pollutants into state waters or onto lands in the state, or which may result in accelerated stormwater runoff, including, but not limited to, clearing, grubbing, grading, excavating, transporting, filling, and backfilling of land.

Grubbing. Shall mean the removal of trees, stumps, roots, brush, root mat, and debris from the ground.

Limited Suspension of Activity. Suspension of specific land disturbing work activities when the Contractor fails to implement and maintain the erosion and sediment controls after verbal or written direction to do so by the Engineer. This suspension would be specific to the land disturbing activities that are not compliant. During a Limited Suspension of Activity, progress payments for these specific activities will be withheld until the Contractor has corrected the problems. Time charges will continue and no claim for delay will be considered during a Limited Suspension of Activity.

Phasing. Staged construction sequencing as shown in the Plans.

Significant Rain Event. A rain event that generates erosion.

Site Reviewer. A person on the Contractor's staff assigned to erosion and sediment control review, implementation and maintenance. The level of training (Contractor's Certification or Certified Construction Reviewer) required for the Site Reviewer will be noted in the project plans.

- A. *Contractor's Certification (Blue Card).* Introductory training for erosion and sediment control provided by the Department of Natural Resources (DNREC). For projects designated as having Minor erosion potential, the Contractor must submit as part of his bid, the name and certification number for someone other than the Superintendent who has a Blue Card certification.
- B. *Certified Construction Reviewer (CCR, Gold Card).* Advanced training for erosion and sediment control provided by the Department of Natural Resources (DNREC). For projects designated as having Medium or Major erosion potential, the Contractor must submit as part of his bid the name(s) and certification number(s) for the individuals on his staff who have a CCR (Gold Card) certification as noted on the plans.

110.02 Legal Authority. The Department is a delegated agency of DNREC as defined in Chapter 40, Title 7 of the Delaware Code and the Delaware Sediment and Stormwater Regulations. Any project built by Contract with the Department shall maintain compliance with the aforementioned law and regulations at all times throughout the life of that project. As a delegated agency, the Department shall enforce

compliance with the law and regulations through the Contract documents or may refer a violation to DNREC for enforcement action.

110.03 Sediment and Stormwater Permit Approval. A signature, date, and seal in the Stormwater Engineer's block on the title sheet of the Plans indicates that the Plans were designed in conformance with the applicable State and Federal stormwater regulations and that the Sediment and Stormwater Permit is approved. All work shall be completed pursuant to the Plans and as directed by the site reviewer and the Stormwater Engineer.

Neither review and approval of the erosion, sediment control, and water pollution control plans nor errors and omissions in the plans shall relieve the Contractor from its responsibilities for compliance with the Delaware Sediment and Stormwater Regulations or other applicable laws or regulations and the more stringent water pollution control requirements shall apply.

110.04 Description of Work. Erosion and sediment control measures shall be applied to erodible earth material exposed by any of the Contractor's land disturbing activities on the Project. The work shall consist of the application of temporary and permanent erosion and sediment control items as provided in the Contract or ordered by the Site Reviewer or the Engineer. The temporary erosion control items shall be coordinated with the permanent erosion control items specified. The items shall include, but are not limited to, the use of berms, dikes, dams, sediment basins, traps, geotextiles, stone check dams, silt fences, phased construction, special land grading methods, mats and nets, aggregates, mulches, grasses, slope drains, chemical binders, tackifiers, and other erosion and sediment control items or approved methods as designated in the Contract documents or as directed by the Site Reviewer or the Engineer.

110.05 Completion of the Work. The Contractor shall implement the temporary and permanent erosion control items for each phase of construction as detailed in the Contract documents. Additional erosion and sediment control items may be required during the Project as deemed necessary by the Site Reviewer and the Engineer in order to provide continuous erosion and sediment control protection.

Before starting each phase of any land-disturbing activity, the Site Reviewer shall make certain that all erosion and sediment control items required in that phase are properly installed and functional.

A. Construction Phasing. For Project sites in excess of 20 ac (8 ha), the construction must be phased in 20 ac (8 ha) increments. Once grading is initiated in one 20 ac (8 ha) increment, a second 20 ac (8 ha) increment may be cleared and grubbed provided the Contractor installs and maintains effective erosion and sediment control measures on both sections in such quantities and locations as deemed acceptable by the Site Reviewer and the Engineer.

When balancing earthwork, such as when borrow from a cut is used as fill at a noncontiguous location distant from the cut, more than a total of 20 ac (8 ha) may be allowed to be grubbed and graded within the overall limits of the Project at any one time with prior written approval from the Engineer. In such cases, one

20 ac (8 ha) increment in cut and one 20 ac (8 ha) increment in fill may be grubbed and graded at each separate location concurrently. Examples of when this would likely occur would be on interchange construction or on a new alignment.

The Site Reviewer or the Engineer may further limit the area of clearing, grubbing, stripping, and grading operations to the Contractor's capability and actual progress of keeping the finish grading, mulching, seeding, and other temporary or permanent erosion control measures current according to the approved progress schedule and construction sequence.

B. Construction Sequence. The Contractor shall sequence the construction to comply with the following constraints unless indicated otherwise on the Plans:

1. Implement temporary erosion and sediment control items prior to any operation, which exposes soil to erosion, such as during the clearing portion, and prior to the grubbing portion of each phase of construction.
2. Schedule and perform the clearing and grubbing operations so that grading operations and permanent stabilization can follow immediately thereafter. Once earthwork has begun, the operation shall be continuous from clearing and grubbing through to completion of grading and final stabilization in accordance with Subsection 110.09 A.2. Any interruption in these operations in excess of 14 calendar days must be approved by the Engineer and shall require interim stabilization in accordance with Subsection 110.09 A.1.
3. Vegetatively stabilize bare soil areas in each phase of construction in accordance with Subsection 110.09 A.1 prior to advancing the work into the next phase of construction.
4. Vegetatively stabilize all cut and fill slopes of the highway excavation and embankment as the work progresses in height increments not to exceed 4' (1.2 m) of embankment. This will minimize exposed soil on the slopes to bands of 9-12 feet as measured along the slope face. Excavate roadside ditches as early in the Project as possible to establish good drainage.
5. Vegetatively stabilize all grass ditches, swales, and medians within seven calendar days after their initial excavation.
6. Remove temporary erosion and sediment controls after final stabilization is complete in accordance with Subsection 110.09 A.2. Return land contours to original grade or as indicated on the Plans, and vegetatively stabilize any remaining bare soil areas.

110.06 Plan Changes. The Contractor shall not deviate from the erosion, sediment control, and stormwater management aspects of the Contract shown in the Plans and contract documents, other than as specified in 110.08.A.2.b without prior review and approval by the Engineer, the Stormwater Engineer, the Department's Environmental Section and appropriate regulatory authorities.

For plan changes initiated by the Contractor, revised construction Plans shall be submitted for review and approval by the Engineer, the Stormwater Engineer, the

Department's Environmental Section and appropriate regulatory authorities. The revised Plans shall be prepared in accordance with current Department standards for roadway design, traffic control, erosion and sediment control, and stormwater management. Revised Plans shall also conform to all applicable Federal, State, or municipal pollution control laws, rules, or regulations. All supporting design calculations and cost analyses required by the Engineer shall accompany the submission. The number of copies required to be submitted for review shall be determined by the Engineer depending on the nature of the proposed revision.

Contractor proposed revisions to the Plans, as well as review time by the Department, will not justify a delay in the progress schedule. All costs involved in preparing plan revision documents for changes proposed by the Contractor shall be the responsibility of the Contractor.

110.07 Limits of Construction. The Contractor shall not perform any work including, but not limited to, clearing, grubbing, construction phasing, equipment storage, and material stockpiling outside the limits of construction shown on the Plans without prior approval of the Engineer.

If the Contractor should require additional lands that are not within Department rights-of-way or easements, it shall be the Contractor's responsibility to make all arrangements with the property owners and to acquire all permits from the appropriate regulatory authorities for the use of these lands.

The Contractor shall acquire a statement signed by the property owners, which releases the Department from all claims arising from the use of the property being considered. The signed statement from the property owner and copies of all permits acquired by the Contractor shall be transmitted by the Contractor to the Engineer for the Engineer's records prior to initiating any operation on the property being considered for use.

110.08 Division of Responsibilities.

A. *Site Reviewer.* The Site Reviewer is responsible for the following:

1. On Projects with Erosion Potential identified as Minor, Medium, or Major:
 - a. The Site Reviewer shall review and become familiar with all elements of the approved sediment and stormwater management plan. Any questions or issues raised during this review should be discussed with the Contractor, Designer and the Department at the pre-construction meeting. The Site Reviewer should bring up any questions about the plans at this meeting.
 - b. The Site Reviewer shall inspect all perimeter controls in accordance with the approved plan and the Department's Standard Construction Details for Erosion and Sediment Control prior to the Contractor beginning any earth disturbing activities and shall submit an Erosion and Sediment Control Report (E & S Report) to the Department stating that all perimeter controls are in place and functioning.
 - c. The Site Reviewer shall perform sediment and stormwater reviews of the site jointly with a member of DeIDOT's construction inspection

staff. These inspections shall be completed at least weekly and immediately after any significant rain event. The Site Reviewer shall prepare an E & S Report, which details any corrective actions that need to be implemented and a completion date for each. If no deficiencies exist, the report shall document that all erosion and sediment control measures are in place and functioning. The Site Reviewer and the Inspector shall sign and date the E & S Report at the conclusion of the field inspection. By close of business that day, the report shall be forwarded, via email or FAX, to the Contractor's Superintendent for Implementation with copies sent to the Department's Construction Engineer, the Project Resident, the Stormwater Engineer, and the Contractor's engineer.

- d. With concurrence of the Engineer, once all land disturbing activities are completed and all permanent erosion and sediment controls and stormwater management elements are in place and vegetatively stabilized, the Site Reviewer shall contact the Stormwater Engineer and schedule an as-built inspection of these features.
2. On Projects with Erosion Potential identified as Medium and Major the Site Reviewer shall be responsible for all of the requirements under 110.08A.1. plus the following (Site Reviewer must be a CCR):
 - a. The Site Reviewer shall accurately fill out a Stormwater Management Facility Construction Checklist(s) for permanent stormwater management ponds. The Site Reviewer shall be present during the construction of these facilities to observe all checklist items for compliance with approved plans and applicable pond construction codes.
 - b. The Site Reviewer with concurrence of the DeIDOT Project Resident may approve minor changes or deviations to the approved erosion and sediment control/ stormwater management plan. Changes, so approved, shall be documented in the Site Reviewer's weekly report.

B. *Contractor's Professional Engineer.* The Contractor's Professional Engineer is responsible for the following:

1. The Contractor's PE shall supervise the Site Reviewer and assure that he or she is performing all of his or her duties and completing all reporting requirements within the timeframes identified in this specification.
2. The Contractor's Professional Engineer shall review, sign and date all E & S Reports that proposed corrective actions that will require plan revisions.
3. The Contractor's Professional Engineer shall sign and seal any Plan Revisions the Contractor proposes to the stormwater management plan, the construction phasing, or the erosion and sediment control plans.
4. The Contractor's Professional Engineer shall review, sign and seal the Stormwater Management Facility Construction Checklist after the Site Reviewer has filled it out

C. *Engineer.* The Engineer is responsible for the following:

1. The Engineer is responsible for ensuring that all work is completed in accordance with the approved erosion and sediment control/ stormwater

- management plan. The Engineer shall designate an E&S inspector on each project who shall accompany the Site Reviewer on site inspections.
2. The Engineer is responsible for assuring the contractor is providing a Site Reviewer if required by the General Notes of the construction plans. The Engineer is also responsible for referring to the Stormwater Engineer any Site Reviewer who fails to perform the duties assigned by this Contract.
- D. *Stormwater Engineer.* The Department's Stormwater Engineer is responsible for the following:
1. The Stormwater Engineer or his designee shall be represented at the pre-construction meeting and at any erosion and sediment control specific meetings. Any concerns about plan implementation or general procedures shall be discussed and resolved at these meetings.
 2. In accordance with subsection 110.22, when the Site Reviewer refers a site or if the condition of the site is consistently not improved by the dates noted in the weekly reports the Stormwater Engineer shall recommend that the Engineer pursue enforcement actions to gain compliance. A Site Reviewer may refer a site for failure to implement the approved erosion and sediment control/ stormwater management plan, or for failure to comply with the recommendations in the E & S Reports.
 3. The Stormwater Engineer or his designee shall perform annual performance evaluations of the Site Reviewers using the Department's evaluation form. If it is determined that a Site Reviewer is not providing adequate site control or is not referring problem situations, the representative shall require the Contractor to replace the Site Reviewer for the Project and request that DNREC suspend or revoke his/her certification.
 4. The Stormwater Engineer or his designee shall perform an as-built inspection of the permanent erosion and sediment controls and Stormwater management features to determine compliance with the approved Sediment and Stormwater Management Plan. If the Stormwater Engineer or his designee identifies deficiencies during the inspection, a letter will be issued to the Project Resident who will notify the Contractor. These deficiencies must be satisfactorily corrected prior to project closeout.
 5. The Stormwater Engineer shall complete the Notice of Intent (NOI) at the start of the project and the Notice of Termination (NOT) at the end of the project to meet the requirements of the NPDES Permit.

110.09 Vegetative Stabilization.

- A. *Interim and Final Stabilization.* An area of the work shall be considered vegetatively stabilized for erosion control if it meets the criteria in one of the following two cases:
1. *Interim Stabilization.* The seeding and mulching items, sod, or erosion and sediment control items as noted on the Plans are in place and accepted by the Engineer.
 2. *Final Stabilization.* Meets the requirement for the removal of the temporary erosion controls placed during interim stabilization, and has complete vegetation growth in accordance with section 734 as determined by the

Engineer. Complete growth of vegetation includes permanent grass reaching a height of 3" (75 mm) over all seeded areas.

- B. *Incremental Stabilization.* Side slopes, and other slopes 1:3 (vertical to horizontal) or steeper require placement of either temporary or permanent seeding and mulching as the work progresses in height increments not to exceed 4' (1.2 m) of embankment. This will minimize exposed soil on the slopes to bands of 9-12 feet as measured along the slope face.
- C. *Tracking of Slopes.* During grading operations the Contractor shall track all slopes 1:3 (vertical to horizontal) or steeper to prevent gully and sheet erosion. The tracking shall be accomplished by driving cleated equipment such as a bulldozer up and down the slopes so the cleats make horizontally oriented indentations in the soil. All costs associated with tracking of slopes at regular increments shall be incidental to Section 202.

Prior to applying seeding items on slopes 1:3 (vertical to horizontal) or steeper, the Contractor shall track the slopes as described above in order to prepare a stable seedbed. All costs associated with tracking of slopes to prepare a seedbed shall be incidental to the topsoil item being applied to the slope surface.

- D. *Maximum Soil Exposure Times.* All erodible earth material exposed by the Contractor's activities shall be vegetatively stabilized within the time frames specified below:

<u>Location</u>	<u>Maximum Time to Vegetatively Stabilize</u>
Sediment controls	Seven calendar days from initial construction (berms, ditches, traps, basins, etc.)
Areas meeting final grades	Seven calendar days from completion of grading
Areas not meeting final grades	Fourteen calendar days from ceasing work in that location

110.10 Temporarily Stockpiled Material. Erodeable earth material designated on the Plans or required by the Engineer to be excavated and temporarily stockpiled for later use in the Project shall be located away from live streams and wetlands and placed only in areas deemed appropriate by the Engineer.

The Contractor shall install the erosion and sediment control items designated on the Plans or as directed by the Site Reviewer and the Engineer about the base of the pile in advance of the actual stockpiling operation. Erodeable earth material shall be placed in piles of neat conformations. Side slopes shall be seeded and mulched as the pile is placed. All remaining unstabilized surfaces shall be seeded and mulched immediately following completion of the stockpiling operation.

If the Contractor proposes to stockpile erodeable earth material in areas not designated on the Plans, it shall be the Contractor's responsibility to prepare and submit erosion and sediment control plans for those proposed areas, which are located within Department rights-of-way and easements for approval by the Site Reviewer and the Engineer. Materials shall not be stockpiled until an erosion and sediment control plan for the proposed stockpile has been approved by the Site Reviewer and the Engineer. The Contractor is also responsible for getting any permits that are necessary.

If the Contractor proposes to stockpile erodible earth material in areas outside of Department rights-of-way and easements, it shall be the Contractor's responsibility to prepare and submit for approval a plan for the use of the proposed site to the appropriate agencies having jurisdiction. No stockpiling operation shall commence in areas outside the Department rights-of-way and easements until the Engineer has received copies of all plans and permits approved by the appropriate regulatory agencies and received copies of statements signed by the property owners, as required under Subsection 110.07, which release the Department from any claims arising from the use of the property. The Contractor shall be responsible for all costs associated with the installation of erosion and sediment controls required by other agencies having jurisdiction on stockpiles located outside the Department's rights-of-way.

110.11 Channel and Ditch Scour Protection. Riprap or other proposed channel lining items designated on the Plans at pipe, culvert, and bridge inlets and outlets and along channel lengths shall be placed before the pipes, culverts, bridges, and channels become operational.

110.12 Sediment-Laden Runoff. Stormwater runoff from disturbed areas shall be directed to an approved sediment control measure, such as a trap or basin, prior to release to ditches, storm drain systems, streams, or surface water bodies of any type. All storm drain pipes, which convey sediment-laden runoff, shall discharge to a sediment trap or sediment basin prior to release from the Project limits of construction as shown on the Plans, or as directed by the Site Reviewer and the Engineer.

~~110.13 Dewatering Operations.~~ **MOVED TO SECTION 111.**

110.14 Clean Water Diversions. Stormwater runoff from non-disturbed areas shall be directed away from work areas using any combination of berms, pipes, dikes, swales, pumps and slope drains or as shown on the Plans, or as directed by the Site reviewer and the Engineer.

110.15 Stream Diversions. The Contractor shall not conduct work in a stream without having first obtained the appropriate wetland and subaqueous lands permit(s).

When work is to be conducted in the flow line of a stream, whether the stream is perennial or intermittent, the Contractor shall use any combination of dikes, swales, ditches, cofferdams, pipes, pumps, and other devices as shown on the Plans, or as directed by the Engineer to direct the stream flow around the work area.

110.16 Temporary Stream Crossings. Equipment shall not be operated in live streams without a stream diversion being installed to the satisfaction of the Engineer. Temporary bridges or other structures shall be installed if the work requires the crossing of a stream by construction equipment.

110.17 Wash Water. Water containing sediment from any construction activity on the Project such as truck washing, saw cutting, milling, aggregate washing, and equipment washing and which is not regulated as a waste water under State or Federal statutes

shall be discharged to a sediment trapping device and treated by filtration or settling. Sediment-laden wash water shall not be discharged directly to any ditches, storm drain systems, streams, or surface water bodies of any type. Water mixed with Bentonite (a natural material formed from clay particles) used for drilling or augering shall be collected and removed appropriately. An appropriate use may be disposal in approved fill areas of the project.

110.18 Waste Water. Water containing pollutants such as raw sewage, bitumens, fuels, lubricants, paint, or other harmful materials, is strictly regulated under State and Federal statutes and as such shall not be discharged into waters of the State as defined in Chapter 60, Title 7 of the Delaware Code or into natural or manmade channels or storm drain systems leading to waters of the State.

The Contractor is responsible for obtaining all permits required from the appropriate issuing authority for the discharge of waste waters from the Project site. The Contractor shall pay costs associated with waste water permit acquisition. The Contractor shall submit copies of all permit approvals to the Engineer for the Engineer's records.

110.19 Water Pollution Violations. If a water pollution control violation exists on the Project which in the Engineer's judgment poses a public health or safety risk, such as a fuel or chemical spill or release of raw sewage, the Engineer shall refer the violation to the DNREC for immediate action. The cost of clean up shall be the sole responsibility of the Contractor if the DNREC investigation reveals the Contractor's actions caused the violation.

110.20 Maintenance. Erosion and sediment control items shall be maintained continuously throughout the duration of the project, including periods when the project is inactive or suspended. The Contractor shall repair, replace, or maintain any erosion and sediment control item promptly as noted on the E&S Report or as directed by the Site Reviewer or the Engineer. Any eroded surface shall be stabilized, and any accumulated sediment not trapped by a control measure shall be removed and disposed of in an approved stockpile area or hauled off-site. Access shall be maintained to all sediment control devices until construction phasing and stabilization allow the removal of those controls that are no longer required.

Costs associated with repairing, replacing, and maintaining the erosion and sediment control items are incidental to the initial construction of each item. Sediment removal will be paid for separately under Section 250.

110.21 Erosion and Sediment Control Reports. DelDOT will provide standard Erosion and Sediment Control Report forms and Stormwater Management Facility Construction Checklists to the Contractor to be used for all E&S Reports. The reports will itemize work required to maintain compliance with the Contract. The Contractor shall complete the items of work listed on or before the completion dates indicated on the reports.

110.22 Failure to Implement and Maintain Erosion and Sediment Control

Measures. Controlling erosion and sedimentation is the Contractor's responsibility under the Contract. If the Contractor fails at any time to implement and maintain the required erosion and sediment control provisions of the Contract, fails to supply a Site Reviewer, or fails to routinely perform E&S inspections, complete the E & S Reports and correct deficiencies identified in the E & S Reports, the Engineer will notify the Contractor, orally or in writing, to comply with the required erosion and sediment control provisions. If the Contractor fails to perform the work as directed orally or in writing from the Engineer, the Engineer shall take any or all of the following actions listed below to gain compliance.

- A. *Limited Suspension of Activity.* The Engineer will order a "Limited Suspension of Activity" for the specific land disturbing activities that are not in compliance. Activities necessary to bring the site into compliance will be permitted. The Engineer will establish completion dates for the erosion and sediment control work. Time charges will continue during a Limited Suspension of Activity.
- B. *Withhold Progress Payment.* The Engineer may withhold monthly estimate and payment for all contract items.
- C. *Stop Work Order.* The Engineer may suspend the performance of all construction, as noted in Subsection 105.02, until all items of work on the E & S Reports are complete and accepted.

Time charges will continue during this "Shut-Down" period and no claims for additional time or money shall be considered due to "Shut-Downs" resulting from the Contractor's failure to implement and maintain the required erosion and sediment control items.

- D. *Deduct Cost of Work Completed By Others.* The Engineer may proceed with adequate forces and equipment of its own or a third party contractor to implement or maintain the erosion and sediment control items necessary to bring the Project into compliance with the Contract documents.

The entire cost to engage either a third party contractor or the Department's Maintenance personnel, including administration costs, will be deducted from monies due the Contractor.

- E. *Default of Contract.* More than one "Shut-Down" for erosion and sediment control noncompliance may be considered as a failure to perform the terms of the Contract and will be grounds for finding the Contractor in default of the Contract in accordance with Subsection 108.10. If the Contractor defaults on the erosion and sediment control provisions of the Contract, the Project will be referred to the DNREC for enforcement action.

110.23 Contractor Payment. Payment will be made at the unit prices bid for the quantities of the various erosion and sediment control items provided in the Contract that are installed by the Contractor and accepted by the Engineer. Approved changes to the Erosion and Sediment Control Plans shall be paid at the applicable unit bid prices. Any additional work or corrections brought about as a result of errors by the Contractor,

such as nonconformance with the Contract documents and the construction phasing, staging, or sequencing will be made at the Contractor's expense.

110.24 Fines Resulting from Non-Compliance. If the Department receives any fines from DNREC, the Army Corps of Engineers or the EPA as a direct result of the Contractor's refusal to implement and maintain the required erosion and sediment control, fails to supply a Site Reviewer, or fails to routinely perform E&S inspections, complete the E & S Reports and correct deficiencies identified in the E & S Reports, the Contractor will be responsible to pay the fines or the money will be deducted from monies due the contractor

SECTION 111 – DEWATERING OPERATIONS (6/23/2008)

Delete Section 110.13 in its entirety and add Section 111 as follows:

111.01 Permit Required. The State of Delaware, through the Department of Natural Resources and Environmental Control, Division of Water Resources, Water Supply Section regulates the pumping of ground water at depths, rates, and durations that have the potential to affect water supplies, and the pumping of surface water at rates and durations that have the potential to affect water supplies and aquatic environments.

A permit is required when the work described in the Plans requires the deliberate drawdown of the water table using well points, sump pits, or other similar dewatering devices to lower the water table below the work area.

A permit is required when the work described in the Plans requires pumping of water from an excavation and pumping at a rate exceeding 50,000 gallons per day.

111.02 Statewide Permitted Activities. A Statewide General Permit for Dewatering Activities on DeIDOT projects has been approved via a memorandum of understanding between DNREC and DeIDOT. The effective date of this general permit is June 1, 2008.

No individual dewatering permit shall be required when there is no withdrawal of ground water and pumping rates are less than 50,000 gallons per day.

For individual dewatering permits and Statewide General Permits pumping shall be metered using an instantaneous and totalizing flow meter accurate to within +/- 5%

For Statewide General Permits, DeIDOT shall notify the Water Supply Section at (302) 739-9945 at the commencement of dewatering operations. For individual dewatering permits, the Contractor shall notify the Water Supply Section at (302) 739-9945, 48 hours in advance of starting dewatering operations.

The Contractor shall be aware that other State and Federal permits will be required for any entry into streams or wetlands. This Statewide General Permit for Dewatering

Activities does not constitute approval, exemption or waiver from any other law, rule or regulation that may apply to the work shown in the Plans or the activities necessary to complete the work because of the Contractor's chosen means and methods of construction. The Contractor shall at all times employ sound sediment control methods to any water pumped from the project site ensuring all discharges are directed to sediment trapping or filtering devices prior to release to surface water bodies or the storm drain system. The Contractor shall not discharge saline water into a fresh water system nor discharge fresh water into a saline water system. The Contractor shall not cause dewatering of wetlands or other surface water bodies.

The Contractor shall notify the DNREC Wetlands and Subaqueous Lands Section prior to any dewatering adjacent to wetlands or if discharge water is proposed to be directed to any wetlands.

Examples of work that may be accomplished under the Statewide General Permit include but are not limited to: dewatering shallow localized depressions, such as mud puddles in the work area, pumping out the roadway pavement box, dewatering for the conversion of temporary sediment basins to permanent stormwater management ponds, dewatering for the maintenance clean out of permanent stormwater management ponds, dewatering of ponded rain water from excavations, dewatering of pipe trenches, dewatering of temporary cofferdams facilitating the excavation of shallow bridge and culvert foundations using sump pits and in-stream bypasses for work areas such as in bridge and culvert replacements.

111.03 Licensing Requirement. When a permit is required, the Contractor shall be responsible for acquiring any and all licenses needed to install or operate the dewatering equipment or shall employ the services of properly licensed subcontractors, such as a licensed well driller.

111.04 Permit Acquisition. Unless covered in the Statewide General Permit for Dewatering Activities, the Contractor shall obtain all necessary permits for dewatering and disposal of pumped water as required to construct and complete the Work. The Contractor shall not commence any dewatering operation without having first obtained the necessary dewatering permit from the Delaware Department of Natural Resources and Environmental Control (DNREC), Water Resources Division, Water Supply Section.

111.05 Permit Acquisition Time. Withdrawal of water at a rate exceeding 50,000 gallons per day will require public notice and possibly a public hearing prior to the issuance of a permit by DNREC. The Contractor shall account for this permit acquisition time in the project schedule. No time extensions will be considered by the Department for the Contractor's failure to account for this time in the project schedule.

111.06 Permit Costs. The Contractor shall pay all costs associated with a dewatering permit acquisition.

111.07 Submission of Approved Permits. The Contractor shall submit copies of all permit approvals to the Engineer for the Engineer's records.

111.08 Submittals. When a permit is required, the Contractor shall submit working drawings of the proposed dewatering system for review and acceptance in accordance with Section 105 of the Standard Specifications.

111.09 Dewatering. The Contractor shall provide for dewatering of the work area using any combination of pumps, sumps, suction and discharge lines and other dewatering system components necessary to remove surface water and, if necessary, ground water in order to facilitate the work described in the Plans or as ordered by the Engineer. The Contractor shall provide back-up equipment and replacement as necessary in order to ensure the continuous dewatering of the work area. Surface and ground water shall not be allowed to rise around the proposed work. Dewatering shall be continued until such time as the work has been brought to finished lines and grades, and accepted by the Engineer. None of the proposed work shown on the Plans shall be laid in water, unless otherwise indicated on the Plans or directed by the Engineer.

111.10 Dewatering Discharge. The Contractor shall assure that no soil particles are present in the discharge from the dewatering system. All pumped water from open excavations shall be directed to an approved sediment trapping device such as a dewatering bag, dewatering basin, portable sediment tank, sediment trap or sediment basin, prior to release to ditches, storm drain systems, streams or surface water bodies of any type.

111.11 Dewatering of Temporary Cofferdams for Bridge Construction. Upon completion of driving of temporary sheet pile in streams, or erection of a temporary dike to create a temporary cofferdam, the sediment-laden water impounded within the cofferdam shall be allowed to rest undisturbed for a 12-hour period in order to induce physical settling of suspended soil particles. Prior to pumping to remove water from temporary cofferdams, the Contractor shall attach the suction line of the pumping equipment to a flotation device, immersing the intake end no more than 6" (150 mm) below the water surface. In this manner, water shall be "skimmed" off the surface. Once the water level has been pumped down, further dewatering shall be accomplished in conjunction with a sump pit constructed in conformance with Department standards.

111.12 Protection of Work Area. The Contractor shall install clean water diversions outside excavation limits to prevent the flow of surface water from undisturbed areas into open excavations using any combination of berms, pipes, dikes, pumps, etc. in order to establish a clean water diversion. The Contractor shall comply with applicable sediment control measures.

111.13 Protection of Adjacent Property. The Contractor shall dispose of pumped water into a suitable conveyance system without flooding or damage to adjacent property, buildings, structures, utilities, and other work. The Contractor shall protect adjacent structures and property from any damage that may occur as a result of settlement or other effects related to the removal of ground water and lowering of the water table. No dewatering discharge shall be drained into work completed or under construction without prior consent of the Engineer. Water shall be disposed of in such a

manner as not to be a menace to the Public Health. No discharge to the sanitary sewer system shall be allowed.

111.14 Well Impacts. In the event the Contractor's dewatering operations affect any public or private potable water supplies or wells within the project area, the Contractor shall take whatever steps are necessary to provide uninterrupted water service to those so affected.

Subsection 201.03 Trees and Roadside Amenities Designated to Remain.
(5/15/2006)

Modify the subsection title as shown above and modify the paragraph as follows:

The Engineer shall designate such trees, shrubbery, plants and roadside amenities, such as signs, light posts, or other improvements, which are not to be removed, and the Contractor shall protect them from any damage. If any such shrubbery, plants or roadside amenities are damaged, they shall be replaced or repaired. Any trees that are designated to remain that are damaged shall be evaluated by a certified tree surgeon and the contractor shall follow their recommendations to repair or for replacement of the trees. Branches of trees overhanging the roadbed shall be properly trimmed to maintain a clearance height of 20' (6 m), unless otherwise directed. All pruning shall be performed in accordance with the International Society of Arboriculture's Current Tree Pruning Guidelines, Publication ISBN 1-881956-07-5, and as illustrated on the Standard Construction Details.

Subsection 201.05 Preparation of Ground Surface. (10/10/2011)

Remove the last sentence of the First Paragraph and replace with:

Following root mat and stump removal in fill areas, the existing material shall be leveled and compacted prior to cross sectioning (if required) and placement of initial embankment lifts.

Subsection 201.10 Basis of Payment. (5/15/2006) (10/10/2011)

Modify the 1st paragraph as follows:

The quantity of clearing and grubbing will be paid for at the Contract lump sum. Price and payment will constitute full compensation for leveling and compacting existing material ; for protecting trees, shrubbery, plants and other roadside amenities that are designated to remain, for replacement or repair of damaged trees, shrubbery, plants or other roadside amenities that are designated to remain; for disposal; and for all labor, equipment, tools, and incidentals required to complete the work.

Subsection 202.04 Removal of Existing Pipe. (10/10/2011)

Delete 202.04 and any updates in their entirety and replace with:

202.04 Removal of Existing Pipe: All obstructions, within the limits of construction, not covered under Section 201, shall be removed as shown on the Plans, or as directed by the Engineer. The removal of pipe is included in this section. All existing pipe designated for removal regardless of depth, shall be removed with reasonable care. If the removed pipe is reusable, it will remain the property of the Department and shall be stored at a suitable location on or adjacent to the Project for transport by the Department.

All pipes not being used in the drainage system shall be removed entirely or plugged at both ends with concrete block, brick or masonry, as shown in the Plans and in the Standard Construction Details and filled with flowable fill. Payment for pipe removal below or outside the limits of excavation and for plugging is incidental to 202000 - Excavation and Embankment. Flowable Fill will be paid under 208001 – Flowable Fill. Payment for pipe removed within the limits of excavation will be included in the measurement for item 202000.

Subsection 202.05 Embankment. (10/12/2010)

Next to last sentence, change “mixture” to “moisture”

Subsection 202.05 – Embankment. (10/12/2010)

202.05 (a) Preparation: Delete in its entirety and replace with the following:

- a. *Preparation.* Unless shown otherwise on the Plans or in the Special Provisions, where the embankment height to be constructed is less than 5' (1.5 m), all sod, vegetation, and topsoil shall be removed from the surface upon which the embankment is to be placed, and the cleared surface shall be completely broken-up to a minimum depth of 6" (150 mm). This area shall then be re-compacted. Sod not required to be removed shall be thoroughly disced before construction of embankment.

Existing roadway surfaces lying less than 5' (1.5 m) below the final grade shall be treated as follows:

1. Existing compacted unpaved road surfaces lying within 3' (900mm) of the final grade, or within the pavement structure if the subgrade is more than 3' (900mm) from the final grade shall be scarified to a depth of at least 6"(150mm) unless otherwise designated on the Plans. Scarified material shall be recompacted.
2. Existing bituminous surface treated and paved road surfaces lying within 5' (1.5 m) of the final grade, or within the pavement structure if the subgrade is more than 5' (1.5 m) from the final grade, shall be removed,

and the underlying base materials scarified to a depth of 6" (150 mm). Scarified material shall be recompact.

Existing roadway surfaces lying more than 5' (900 mm) below the final grade, or bottom of pavement structure, may remain in place, provided that no bituminous material is left in place below the water table as determined by the Engineer or as shown in the Contract Documents. Roadway surfaces remaining in place shall be treated as follows:

1. Bituminous concrete shall be broken up to a maximum surface area of 1 ft² (0.1 m²) and recompact.
2. Portland cement concrete shall be broken up to a maximum surface area of 1 yd² (0.8 m²) with a pavement breaker or other approved equipment.
3. Bituminous surface treated roadways lying beneath an embankment shall be scarified to a depth of 6" (150 mm) and re-compact.

Subsection 202.10 – Method of Measurement. (10/10/2011)

Modify the paragraph as follows:

202.10 Method of Measurement. The quantity of excavation will be measured by the cubic yard (cubic meter). The volume will be computed by the method of average end areas and will be measured by cross-sections taken at regular intervals and at breaks in grade. All excavation, except topsoil, will be measured in its original position. Topsoil will be measured in its original position or in a stockpile after excavation, at the discretion of the Engineer. Topsoil removed from fill areas may be stockpiled separately for the cross-sectioning or may be measured by cross-sectioning the area of removal before and after topsoil stripping is performed. Excess excavation generated by the Contractor that the Engineer has directed to be stockpiled for use at a later date will not be measured. Excess excavation generated by others will be measured by the cubic yard (cubic meter) in the stockpile.

Embankment will not be measured.

When 202000 is indicated on the Plans or in the Special Provisions as a fixed quantity, measurement and payment shall be in accordance with Subsection 109.05.

Subsection 206.04 Method of Measurement: (2/23/2011)

Replace (a) with the following:

- (a) The pipe trenches will be measured to a width not to exceed 18" (450 mm) on each side of the pipe and to a depth limit not to exceed 12" (300 mm) lower than

the bottom of the earth cushion for bedding in rock, as shown on the Plans, or as established by the Engineer.

Subsection 207.03 Excavation. (1/3/2008)

Add the following paragraph:

Shoring shall be provided for any excavation exceeding 5'-0" in height. The cost of shoring shall be incidental to item 207000 - Excavation and Backfill for Structures. In lieu of shoring, the contractor may cut slope back as allowed by soil conditions or other obstructions. No payment shall be made for additional excavation or fill outside of limits.

Section 208 – Excavation and Backfilling for Pipe Trenches: (2/23/2011)

Add the following to Section 208 (In accordance with Section 101.01 of the 2001 Standard Specifications)

208001- FLOWABLE FILL

Description:

Furnish and place flowable fill material at locations as specified in the Plans and as directed by the Engineer.

Materials:

A. Provide materials as specified in:

Portland Cement	Section 822, free of lumps, dirt,
Fine Aggregate	debris, and other contamination.
Air-Entraining Admixtures	AASHTO M 302, Grade 100 or
Chemical Admixtures	Grade 120
Fly Ash	

Section 803

Ground Granulated Blast Furnace
Slag (GGBFS)
Water

Subsection 801
Subsection 804
AASHTO M 154
AASHTO M 194

- B. Flowable fill consists of a combination of portland cement, fine aggregate, water, and chemical admixtures and/or ground granulated blast furnace slag, fly ash.
- C. Submit sources of all materials to the Engineer a minimum of 30 days prior to use.
- D. Submit material test data of fly ash representative of the source to the Engineer a minimum of 30 days prior to use. Include test data characteristics of the ash leachate as determined by the Toxicity Characteristics Leaching Procedure (TCLP) in accordance with EPA SW-846, with respect to leachate metals.

Construction Methods:

- A. *Mix Design.* Prepare and submit a mix design a minimum of 30 days in advance of use.
 - 1. Design the material to produce a 28-day compressive strength of 50 to 200 psi. While not required, the addition of an accelerator may be allowed if early gain in strength is desirable.
 - 2. Test compressive strength in accordance with the following AASHTO test methods:
 - T 106M/T 106 Compressive Strength of Hydraulic Cement
 - T 23, Making and Curing Concrete Test Specimens in the Field.*Plant and Equipment Requirements.* Provide flowable fill produced only in batching plants meeting the requirements of 812.07.
- B. *Transportation.* Transport flowable fill to the project in ready-mix trucks or as approved by the Engineer. Place the material within three hours of the introduction of water to the mixture.
- C. *Placement.* Place flowable fill only when:
 - 1. The ambient temperature is a minimum of 40° F (4°C) and rising;
 - 2. The temperature of the flowable fill is a minimum of 50° F (10° C);
 - 3. Do not place flowable fill against frozen surfaces;
 - 4. Protect flowable fill from freezing for at least 36 hours in accordance with 501.04;
 - 5. Provide positive containment of the fill material to prevent flow beyond the desired placement location;
 - 6. Discharge fill at a rate that allows the material to:
 - i. flow into the placement location;
 - ii. fill all voids; and
 - iii. not dislodge the existing containment or interior items.
 - 7. Make relief holes wherever necessary to ensure that all voids are filled.
- D. Ensure that all interior items are capable of withstanding lateral hydraulic pressures of the flowable fill.
- E. Do not exceed 5 feet in lift thickness unless otherwise directed by the Engineer
- F. Allow each lift to cure until it is self-supporting before placing additional lifts or other loads.
- G. Take care to prevent pipes from floating.
 - 1. Straps, soil anchors, or other approved means of restraint may be required to ensure proper alignment when flowable fill is used as backfill

for pipes. Ensuring proper alignment is the sole responsibility of the Contractor.

- H. Place flowable fill to the final lines and grades shown on the Plans.
- I. Maintain all confining and supporting structures, protective covers, and barriers until the flowable fill is self-supporting.
- J. Shrinkage of the flowable fill as it cures may require additional backfill with other material.
- K. Protect flowable fill from direct contact with vehicular traffic and from prolonged exposure to rain and or running water.

Method of Measurement:

The quantity of flowable fill will be the measured number of cubic yards of material accepted and placed within the approved limits of the fill location. Pipe trenches will be measured in accordance with Section 208.05.

Basis of Payment:

The quantity of flowable fill will be paid for at the Contract unit price per cubic yard. Price and payment will constitute full compensation for furnishing component materials, designing, mixing, and hauling the fill material; preparing the fill location for containment of the fill material; anchoring of items within the fill location; protecting and curing the material after placement; and all labor, tools, equipment and incidentals necessary to complete this work.

Subsection 208.03 Excavation. (1/3/2008)

Add the following paragraph:

Shoring shall be provided for any excavation exceeding 5'-0" in height. In lieu of shoring, the contractor may cut slope back as allowed by soil conditions or other obstructions. No payment shall be made for additional excavation or fill outside of limits.

Subsection 208.05 Method of Measurement: (2/23/2011)

Replace subsection with the following:

208.05 Method of Measurement. The quantity of excavation and backfilling for pipe trenches will be measured as the volume of excavation included between a line from the bottom of plan excavation to the bottom of the pipe at the time of pipe placement, and a normal horizontal measurement of outside pipe dimension plus 18" (450mm) each side, unless otherwise designated on the Plans, but exclusive of rock excavation, which will be paid for under Section 206. No allowance will be made for excavation or backfill outside the limits established above. The limits of trench excavation shall extend to the exterior wall of drainage inlets and manholes. When the trench intercepts a "normal" structure, such as a headwall, culvert, etc. (where payment for structure excavation is

applicable), the trench payment limit will terminate at the point where structure excavation begins [normally 18" (450 mm) outside the structure]. For pipe placement in a fill area, the trench payment limit will extend to only 12" (300 mm) above the pipe.

Subsection 209.02 General Requirements. (1/3/2008)

Modify the 1st paragraph as follows:

The uses, classifications, characteristics, and definitions of terms for borrow materials shall be in accordance with the requirements of AASHTO M 57, Modified; M 145, Modified; and M 146 and M 147, Modified.

Unless otherwise directed, all materials having the following properties shall be excluded from use:

- (a) Material with a maximum dry weight less than 90lb/ft³ (1440 kg/m³)
- (b) Material with a liquid limit greater than 40 or a plasticity index greater than 10.
- (c) Material containing any percentage of frozen material, rubbish, boulders in excess of 6" (150mm) in any direction, or an organic matter percentage greater than 2% (including leaves, roots, grass or sewage).

Subsection 209.04 Borrow Types. (10/12/2010)

209.04 (g) Delete in its entirety

Table 209-A – Type G* (Select Borrow)

Delete in its entirety

Subsection 209.09 Method of Measurement. (1/3/2008)

Modify the 3rd paragraph as follows:

Where the Engineer determines it to be impracticable to obtain weight-volume conversion factors for the borrow types specified, 3050 lbs of borrow will be considered equivalent to 1 yd³.

Section 251-SILT FENCE (01/15/2010)

Section 251 of the Standard Specifications is replaced with the following (In accordance with Section 101.01 of the 2001 Standard Specifications)

251000 – SILT FENCE

Description:

Furnish, construct, install, and maintain silt fence to control sedimentation as shown on the details in the Plans, at the locations shown on the Plans, and as directed by the Engineer. Remove silt fence at the appropriate time.

Materials:

A. Provide materials as specified in:

Seed	Section 734
Mulch	Section 735
Geotextile	Section 827

B. *General.* Submit all materials to Materials and Research for approval prior to use.

C. *Posts.* Oak timber or steel a minimum of 36" long.

1. *Oak Timber Posts.* Straight with a minimum nominal cross-section of 2" x 2" (50 mm x 50 mm).
2. *Steel Posts.* 2 1/2" (63 mm) diameter Schedule 40 pipe or be standard steel "T" or "U" section of 1.3-lb/ft (.6 kg/300 mm) minimum.

D. *Reinforcing Strip.* Wooden lath, plastic strip or other approved equivalent.

E. *Fasteners and Attachment.* Either 5/8" (16 mm) long brass or copper staples, or 17 gage galvanized or aluminized steel tie wires long enough to securely attach the fabric to the posts.

F. *Prefabricated Silt Fence.* Prefabricated silt fence may be used if constructed with the materials specified in this Section and approved by the Engineer.

Construction Methods:

A. *Construction of Silt Fence*

1. Excavate the trench along the upstream side of the post line as shown on the Standard Construction Details.
2. Install posts along the established fence line on the downstream edge of the trench.
3. Securely attach the geotextile material to the upstream side of the posts with staples, nails, ties or other appropriate means.
4. Install a reinforcement strip or other means of reinforcing the attachment of the geotextile material to the post to prevent wind damage.
5. Overlap the geotextile roll ends a minimum of 6" at post locations.
6. Embed the geotextile in the excavated trench.
7. Backfill and compact the trench over the geotextile to prevent water flow under the geotextile.
8. On slopes, turn the terminal ends of silt fence upslope a sufficient distance to eliminate flow around the ends of the silt fence.
9. Do not construct the silt fence across any ditch, swale, or any area of concentrated water flow.

B. *Construction of Reinforced Silt Fence*

1. Construct according to Subsection 251.03.

2. Fasten wire mesh to the posts between the geotextile and the posts at the required spacing.
- C. *Maintenance of Silt Fence.*
1. Repair or replace to the satisfaction of the Engineer all geotextile damaged at anytime during the life of the Contract.
 2. Replace all deteriorated or clogged geotextile.
 3. Periodically remove accumulated trash.
 - a. Do not allow trash to accumulate to the height of the fence.
- D. *Sediment Removal*
1. Remove trapped sediment, when it has reach 50% of the exposed height of the fabric.
 - a. After every heavy rainfall, check for and remove excessive buildup of sediment.
 2. Clean the geotextile of trapped sediment by tapping the geotextile when dry.
- E. *Removal of Silt Fence.*
1. Remove the silt fence and all materials incidental to the silt fence construction when the Engineer determines that it is no longer required.
 2. Restore all areas affected by the construction of the silt fence to the original or plan contours.
 3. Stabilize all areas affected by the construction of the silt fence with seed and mulch.

Method of Measurement:

The Engineer will measure the quantity of work acceptably completed. Silt fence will be measured by the linear feet of silt fence placed and accepted exclusive of overlap(s). Sediment removal will be measured according to Section 250.

Basis of Payment:

The quantity of silt fence and reinforced silt fence will be paid for at the Contract unit price per linear foot for each type of fence.

Price and payment constitutes full compensation for furnishing all materials; for excavating and backfilling associated with the construction of the silt fence; for maintaining the silt fence during the Project construction period; for removing the silt fence with all related hardware at the completion of the Project; for restoring the site; for seeding and mulching; and for all labor, equipment, tools and incidentals required to complete the work.

The quantity of sediment removal will be paid for according to Section 250.

No payment will be made for required maintenance of the silt fence or the reinforced silt fence.

Subsection 274.02 Materials: (10/12/2010)

Delete 274.02 (a) & (b) in their entirety and replace with the following:

- a. *Clay Borrow, Cut-Off Trench.* Clay borrow, Cut-Off Trench shall conform to the Unified Soil Classification System designation SC, CL or CH and shall be free of rubbish; organic matter such as leaves, roots, grass, or sewage; and stones larger than 6" (150 mm) and other objectionable material.
- b. *Clay Borrow, Pond Liner.* Clay borrow, Pond Liner shall conform to the Unified Soil Classification System designation GC, SC, CL, or CH and shall be free of rubbish; organic matter such as leaves, roots, grass, or sewage; and stones larger than 6" (150 mm) and other objectionable material.

Section 302 – Graded Aggregate Base Course (1/15/2010)

Add the following to Section 302 (In accordance with Section 101.01 of the 2001 Standard Specifications):

302009 - DEL. NO. 1 STONE
302010 - DEL. NO. 2 STONE
302011 - DEL. NO. 3 STONE
302012 - DEL. NO. 57 STONE
302013 - DEL. NO. 67 STONE
302014 - DEL. NO. 8 STONE
302015 - DEL. NO. 10 STONE

Description:

Furnish, haul, place, and compact stone, in accordance with the details and notes shown on the Plans and/or as directed by the Engineer.

Materials:

- A. Provide materials as specified in:
Stone Section 805 and 813

Construction Methods:

- A. Construct using methods conforming to the requirements of notes on the Plans and/or as directed by the Engineer.
- B. Remove and dispose of stone used in a temporary situation as directed by the Engineer.

Method of Measurement:

The quantity of stone will be measured as the actual number of tons (metric tons) for stone placed and accepted. The weight will be determined according to Subsection 109.01.

Basis of Payment:

The quantity of stone will be paid for at the Contract unit price per ton (metric ton). Price and payment will constitute full compensation for furnishing, hauling, and placing all materials, and for all labor, equipment, tools, and incidentals required to complete the work.

Subsection 302.02 Materials. (5/15/2006)

Modify the paragraph as follows:

The material used to construct graded aggregate base course shall conform to the requirements of Section 821. Crushed portland cement concrete may be used as graded aggregate base course, Type B, provided it conforms to the requirements of Section 821.

Subsection 302.04 Placement. Subpart (c) Performance. (5/15/2006)

Delete the first sentence in the 2nd paragraph as follows:

Compaction of graded aggregate Type B shall continue until each layer is thoroughly and uniformly compacted to 98% or more of the laboratory maximum density obtained on a sample of the same material. If the material is too coarse to use the test methods listed below, compaction shall continue until there is no movement of the material under the compaction equipment.

Subsection 401.04 Hauling Equipment (10/10/2011)

Remove the current language and replace with the following:

Trucks used for hauling bituminous concrete shall have tight, clean, smooth metal beds which have been thinly coated with an emulsified oil, soap solution, or other approved release agent to prevent adherence of the bituminous mixture to the bed of the truck. Each truck shall have a securely fastened cover of canvas or other suitable waterproof material that covers the bed from front to back and over the sides. The front of the tarp shall be securely fastened to the body or protected by an air foil. The cover shall have at least three straps to a side and two straps on the back to prevent the cover from ballooning up, to protect the mixture from the weather, and to prevent heat loss. No loads shall be sent out so late in the day that spreading and compacting of the

mixture cannot be completed by sunset unless approval for nighttime paving has been granted by the Engineer.

Subsection 401.08 Placing Bituminous Mixtures. (1/3/2008) (10/10/2011)

Add the following to the 2nd paragraph:

Type B Hot-Mix shall be placed in single individual lifts from 2.25” to 3” in depth.
 Type C Hot-Mix shall be placed in single individual lifts from 1.25” to 2” in depth.

Add the following to the 4th paragraph:

The Contractor is required to carefully plan the placement of the surface course to ensure that the joints in the surface course will correspond with the traffic lanes. Longitudinal joints must be parallel to the centerline. The Contractor must establish and follow reference lines or other approved markings to control the true alignment of the longitudinal joints.

Replace Table 401-A with the following:

Table 401-A			
Minimum Ambient Air Temperature for Placement of Types of Bituminous Material			
<i>Material</i>	<i>1" (25 mm) Lift</i>	<i>1.25 to 2" (32 mm to</i>	<i>Greater than</i>
<i>Type</i>	<i>or Less</i>	<i>50 mm) Lift</i>	<i>2.25 to 3" (56 mm to 75) Lift</i>
B	50 °F (10 °C)	40 °F (4 °C)	32 °F (0 °C)
C	50 °F (10 °C)	40 °F (4 °C)	N/A

Note:

Type B - Dense graded base and binder course
 Type C - Dense graded surface course

Subsection 401.09 Deep Lift Base Course. (1/3/2008)

Modify paragraph (a) as follows:

The base course shall be placed with an approved paver or spreader in approximately equal layers of not less than 3” and not to exceed 6” in depth after compaction.

Add the following to paragraph (a):

When the contractor requests to use Type B Hot-Mix in lieu of BCBC, the Contractor shall request approval from the Engineer for this change. If approved by the Engineer, the Type B Hot-Mix may be placed in lifts of not less than 3” and not to exceed 6” in depth after compaction.

The Type B Hot-Mix placed in lieu of BCBC will be paid at the unit price for BCBC and the asphalt cement cost adjustment will be based on the virgin asphalt of BCBC, not the Type B Hot-Mix.

Modify paragraph (b) as follows:

Base course placed in irregular shaped areas of pavement, such as transitions, crossovers, and entrances, may be placed using a grader.

Subsection 501.02 Materials. (3/28/2012)

Remove Concrete Mix Composition, Class B, Fixed-Form Paving and Remove Concrete Mix Composition, Class B, Slip-Form Paving and replace with the following:

501.02 Materials.

Concrete Mix Composition, Class B, Fixed-Form Paving	812.03
Concrete Mix Composition, Class B, Slip-Form Paving	812.03

Subsection 503.02 – Portland Cement Concrete. (3/28/2012)

Remove the last paragraph and replace with the following:

The consistency of portland cement concrete, Class A or Class B, shall conform to the requirements of Subsection 812.03, except as noted above.

Subsection 601.07 Hardware. (3/18/2004)

Modify the first paragraph as follows:

Machine bolts, drift pins, dowels, nuts, washers, lag screws, and nails shall conform to the requirements of ASTM A307 Grade A.

Modify the first sentence of the second paragraph as follows:

Machine bolts shall have a hex head and nut, unless otherwise specified and shall conform to the requirements of ASTM A307, Grade A.

Subsection 602.02 Materials. (3/28/2012)

Replace concrete Mix Composition, Classes A, B, C, and D with the following:

Concrete Mix Composition, Classes A, B, C, and D 812.03

Subsection 602.17 Finishing Concrete Surfaces, (b) Ordinary Surface Finish. (5/15/2006)

Modify the 2nd sentence as follows:

On all surfaces, the cavities produced by form ties and all other holes, honeycomb spots, broken corners or edges, and other defects shall be thoroughly cleaned, saturated with water, and carefully pointed and trued with mortar mixed in the proportion of one part portland cement to three parts fine aggregate.

Subsection 602.19 Removal of Forms and Falsework, and Placement of Superimposed Vertical Loads: (2/23/2011)

Modify the first sentence of the first paragraph after the chart as follows:

During cold weather [less than 40 °F (4 °C)] forms for vertical surfaces shall remain in place for a minimum of five days.

Subsection 602.20 Bridge Decks. (10/12/2010) (3/28/12)

Add the following sentence to 602.20 (a)(1):

These drawings and all calculations must be signed and sealed by a Professional Engineer registered in the State of Delaware.

Update the last paragraph of 602.20 (3) (C) (1) to read as follows:

Perform continuous removal of all waste materials, including slurry, resulting from the grooving operations in accordance with subsections 106.09 and 110.17, leaving all surfaces in a washed and clean condition.

Subsection 602.26 Method of Measurement. (Concrete Structures) (1/3/2008)

Add the following sentence:

Haunches will be computed using the lesser of the designed dimensions or as-built dimensions.

Subsection 603.08 Method of Measurement: (10/10/2011)

Remove existing language and bar chart and replace with following:

The quantity of bar reinforcement will be measured by using the approved shop drawing rebar schedule.

Subsection 603.09 Basis of Payment: (10/10/2011)

Remove existing language and replace with following:

The quantity of bar reinforcement will be paid for at the Contract unit price per pound (kilogram), based upon the approved shop drawing rebar schedule. Price and payment will constitute full compensation for furnishing and placing all materials, including clips, wire, chairs, and other material used for fastening the bar reinforcement in place, for banding and splicing, and for all labor, equipment, tools, and incidentals required to complete the work.

Subsection 612.05 Excavation. (3/18/2004) (2/23/2011)

Delete the entire paragraph and insert the following:

Excavate the pipe trench in accordance with Section 208 and the Standard Construction Details.

Subsection 612.06 Bedding of Pipe. (3/18/2004)

Delete the entire paragraph and insert the following:

Unless noted otherwise, all pipes shall receive a Class C bedding as shown on the Standard Construction Details.

Subsection 612.11 Basis of Payment. (3/18/2004)

Modify the second sentence of the first paragraph as follows:

Price and payment will constitute full compensation for furnishing, hauling, and installing pipe; for all cribbing or foundation treatment (Class C bedding) necessary to

prevent settlement; for all shoring and sheeting; for the replacement of any pipe which is not true in alignment or which shows any settlement after laying; and for all material, labor, equipment, tools, and incidentals required to complete the work.

Modify the first sentence of the second paragraph as follows:

For round pipe under 24" (600 mm) nominal inside diameter, and elliptical pipe under 24" (600 mm) nominal inside horizontal dimension, the excavation (excluding rock), Class C bedding, backfill, and backfilling will be included in the price for this work.

Modify the last paragraph as follows:

Payment for excavation and replacement of unsuitable material encountered below the Class C bedding will be provided for under Section 208.

Subsection 614.11 Basis of Payment. (3/18/2004)

Modify the second sentence of the first paragraph as follows:

Price and payment will constitute full compensation for furnishing, hauling, and installing pipe; for all cribbing or foundation treatment (Class C bedding) necessary to prevent settlement; for all shoring and sheeting; for the replacement of any pipe which is not in true alignment or which shows any detrimental settlement after laying; for coating if required; and for all material, labor, equipment, tools, and incidentals required to complete the work.

Modify the first sentence of the second paragraph as follows:

For pipe under 24" (600 mm) nominal inside diameter and arch pipe under 24" (600 mm) nominal inside horizontal dimension, the excavation (excluding rock), Class C bedding, backfill, and backfilling will be included in the price of this work.

Modify the last paragraph as follows:

Payment for excavation and replacement of unsuitable material encountered below the Class C bedding will be provided for under Section 208.

Subsection 617.02 Materials. (5/15/2006)

Add the following sentence:

Reinforced concrete flared end sections shall be Class III for all types and class of pipes unless otherwise noted in the Plans.

Subsection 619.11 Test Piles. (3/18/2004)

In paragraph (a) (7) modify the second sentence as follows:

However, in no case shall the pile be driven to exceed 240 blows per 12" (300 mm) or 20 blows per 1" (25 mm) of driving for 3 consecutive inches (75 mm).

Subsection 619.12 Driving Production Piles. (3/18/2004)

In paragraph (5) modify the first sentence as follows:

In no case shall production piles be driven to exceed 240 blows per 12 inches (300 mm) or 20 blows per 1" (25 mm) for 3 consecutive inches (75 mm).

Subsection 623.07 Non-Shrink Grout. (3/18/2004)

Delete the entire paragraph and replace with the following:

Non-shrink grout shall conform to ASTM C1107, Grade C with one modification. The minimum 24-hour strength shall be increased to 5.0 KSI. The sampling and testing procedures of ASTM C1107 need not be changed.

Subsection 623.11 Design Criteria. (1/3/2008)

Modify the first paragraph as follows:

The design of the prestressed, precast, reinforced concrete members shall meet the requirements of the AASHTO LRFD Specifications for Highway Bridges.
The design load shall be HL 93.

Section 701 - Curb and Integral Curb and Gutter (5/15/2006)

Section 701 of the Standard Specifications is replaced with the following:

701.01 Description. This work consists of constructing curbs and integral curbs and gutters on a prepared foundation using either fixed forms or slip forms.

MATERIALS.

701.02 Portland Cement Concrete. Portland cement concrete shall conform to the requirements of Section 812, Class B for either fixed-form work or slip-form work.

701.03 Liquid Membrane Curing Compounds. Liquid membrane curing compound shall comply with Subsection 812.02 (i), (1) Curing Materials.

701.04 Preformed Expansion Joint Material. Preformed cork expansion joint material shall be 1/2" (13 mm) nominal thickness and conform to the requirements of Subsection 808.06.

701.05 Bituminous Joint Sealant. Bituminous joint sealant, when needed for longitudinal joints as noted on C-1 and P-2 of the Standard Construction Details, shall conform to the requirements of Subsection 808.04 (c).

CONSTRUCTION METHODS.

701.06 Preparation of Foundation. The foundation shall be prepared at the required grade to accommodate the elevations, dimensions, and details shown on the Plans. Grades shall be checked to ensure the drainage is adequate to prevent ponding. Existing subgrade shall be compacted until the surface is firm and unyielding. All unsuitable material shall be removed and replaced with approved material. Graded Aggregate Base Course Type B, (GABC) meeting the requirements of Subsection 302.02 shall be used unless otherwise directed. GABC shall be compacted with water as required in Subsection 302.04 except no spreader box will be required. Where rock is encountered, the grade shall be excavated to 6" (150 mm) below the bottom of the curb and integral curb and gutter and backfilled with GABC.

701.07 Fixed Forms. Fixed forms shall be of wood or metal and shall extend the full depth of the concrete. Composite material forms may be used for radii work. Forms shall be straight, free from warp greater than 1/8" in 10' (3 mm in 3 m), and of sufficient strength to resist the pressure of the concrete, and shall not displace more than 1/4" in 10' (6 mm in 3 m) from the vertical or horizontal plane. Forms shall remain in both horizontal and vertical alignment until their removal. Forms shall be clean and coated with an approved form release agent before concrete is placed. Divider plates shall be 1/8" thick metal.

701.08 Slip-Forming. Slip forming may be used provided that only approved equipment is used and the surface adjacent to the curb is firm and unyielding to support the weight of the machine.

701.09 Placing Concrete. The concrete shall be placed on a moist foundation, wetting the foundation if necessary. The concrete shall then be consolidated to eliminate air voids and worked sufficiently to bring mortar to the surface. The surface shall be struck off to the required contour and finished smooth and even with an approved float.

Limitations on placing concrete during hot or cold weather shall be as specified in Subsection 501.04.

701.10 Joints. Expansion joints shall be formed using templates or saw cut at no greater than 160' (49 m) intervals. Joints must be cut or formed vertically to the full depth of the curb to allow full contact of the expansion material with the entire surface. Additional expansion joints shall be constructed at each end of radii and at both sides of all structures or obstructions.

Contraction joints shall be constructed at 10' (3m) intervals. If not templated, all surfaces, front, top and back shall be tooled or saw cut to a minimum depth of 1" (25 mm) and a minimum width of 1/8" (3 mm). Saw cutting shall be done as soon as the concrete has sufficiently set or no more than 16 hours from the time of placement of the

concrete to avoid shrinkage cracking. Any curb showing shrinkage cracks shall be removed and replaced at no cost to the Department.

When constructed adjacent to concrete pavement, joints shall coincide with joints in the pavement. When sidewalk is behind the curb all joints shall be in alignment and the expansion joints in the curb shall coincide with expansion joints in the sidewalk.

When curb is placed adjacent to Portland Cement Concrete pavement the curb or pavement shall be formed or tooled to allow sealing as shown in the Standard Construction Details C-1 and P-2.

701.11 Finishing. A wood or magnesium float shall be used to rub the surface smooth while the concrete is still green. Front and back edges of the curb shall be rounded to a 1/4 " (6 mm) radius. A steel trowel finish shall next be applied, and finally a soft dampened brush shall be used longitudinally along the surface. Finishing shall be performed to a depth of 2" (50 mm) below the proposed pavement surface elevation.

Before the concrete is given the final finish, the flow line of the gutter shall be checked to ensure positive drainage. Vertical alignment shall match adjacent surfaces such as curbs and drainage inlets. Any deviations in the flow line of more than 1/8" in 10' (3 mm in 3 m) shall be corrected. Irregularities in grade or alignment of the front and back edges of the curb shall not exceed 1/4" in 10' (6 mm in 3 m).

The ends of all curbs shall be transitioned to be flush with the pavement at a ratio of twelve to one (12:1). All approach and exit ends of median island and curb shall also be transitioned flush with the pavement at a ratio of twelve to one (12:1). Triangular (pork chop) island curb shall have all corners transitioned flush with pavement at a slope of four to one (4:1).

701.12 Removal of Forms. Forms may be removed as soon as concrete has hardened sufficiently. Fill all defects with mortar mixed in the proportion of one part portland cement to three parts fine aggregate.

701.13 Curing. Within 30 minutes of the completion of finishing to any portion of the concrete work and prior to any dehydration of the concrete surface, all exposed concrete surfaces shall be cured according to Section 501 for a period of no less than five days. The curb may be opened to traffic prior to the expiration of the five-day cure period if compressive strengths of the representative cores taken by the Department indicate that the strength of the concrete exceeds 2000 psi (14 Mpa). Any additional surfaces exposed prior to the expiration of the five-day cure period, by removing forms for example, shall be immediately cured to the same requirements for the remainder of the five-day period. Formwork that is allowed to remain in place and eliminate the need to cure the respective surfaces must remain tight against the surface to prevent drying of the concrete surface.

The application rate shall be not more than 200 ft²/gal (4.9 m²/L). During the curing period, pedestrian and vehicular traffic shall not disturb newly completed curb or integral curb and gutter other than as noted above.

701.14 Method of Measurement. The quantity of portland cement concrete curb and integral curb and gutter will be measured as the number of linear feet (linear meters) along the front face of the finished curb. Any curb showing cracks shall be replaced in sections that have a minimum length of 10' (3 m), at no cost to the Department.

701.15 Basis of Payment. The quantity of portland cement concrete curb and integral curb and gutter will be paid for at the Contract price per linear foot (linear meter). Price and payment will constitute full compensation for excavating (unless it is included in the excavation for the roadway box and paid for under Section 202), furnishing, and placing all materials; for forming, placing, finishing, and curing concrete; for backfilling, compacting, and disposing of surplus materials; for rounding curb edges, for sealing joints; and for all labor, equipment, tools, and incidentals required to complete the work. Grade Aggregate Base Course will be measured and paid for under Section 302. Isolated rock removal shall be paid for under Section 206 unless already removed and included within Section 205.

Section 705 – Portland Cement Concrete Sidewalk (1/15/2010)

Add the following to Section 705 (In accordance with Section 101.01 of the 2001 Standard Specifications)

705007 - SIDEWALK SURFACE DETECTABLE WARNING SYSTEM

Description:

Furnish and install a detectable warning surface system that complies with the Americans with Disabilities Act (ADA) of 1990, as amended, for outdoor facilities, in accordance with the Plans, the Standard Construction Details and as directed by the Engineer.

Materials:

- A. Provide materials as specified in:
 - Portland Cement Concrete Section 801
 - Fine Aggregate Section 818
 - Water Section 803
 - Hydrated Lime Section 802
- B. Submit samples of the proposed system to the Engineer for approval prior to the start of work.

- C. Submit mortar mix formula for concrete sidewalk applications to the Engineer for approval prior to the start of work.
- D. Utilize the dome pattern shown in the Standard Construction Details.
- E. Use one of the following material systems:
1. Precast concrete, or fired clay brick, paver units: manufactured with the truncated dome pattern, set on the concrete sidewalk surface.
 - a. Use mortar for adhesion to the sidewalk surface and for joint filling.
 2. Cast iron plates: manufactured with the truncated dome pattern, set on the concrete sidewalk surface.
 - a. Anchor the plates down according to manufacturer's recommendations.
 3. Stamping systems, applied membranes, or ceramic tiles are not acceptable for new work.
 - a. Applied membranes may only be used if placing on an existing curb ramp which meets ADA standards upon approval by the Engineer.
- F. Submit test results certifying that the surface of the system is slip resistant using one of the following standard methods:
- ASTM C1028 B Determining the Static Coefficient of Friction of Ceramic Tile and Other Like Surfaces by the Horizontal Dynamometer Pull-Meter Method
 - ASTM D2047 B Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
 - ASTM D5859 B Determining the Traction of Footwear on Painted Surfaces Using the Variable Incidence Tester
 - ASTM E303 B Measuring Surface Frictional Properties Using the British Pendulum Tester
 - VOSI V41.21-98 B Universal Specification / Test Method for Slip Resistant Walkways, in the Field and Laboratory, as measured by a Drag Type Friction Tester (Voices of Safety International (VOSI): www.voicesofsafety.com)
- G. The color of the final surface of the system must conform to the table below or as specified on the Plans.

Sidewalk Surface	Detectable Warning System Color
Brick	white, federal yellow, pale yellow
Hot-mix	white, light gray, federal yellow, pale yellow
Concrete	brown, dark gray, red, brick red, black

The Engineer will determine the color, with a light to dark contrast, for sidewalk surfaces not listed above if not already specified on the Plans.

Construction Methods:

- A. *P.C.C. sidewalk*: Use precast concrete or fired brick paver units.
1. Construct the base material of the sidewalk section receiving the detectable warning surface at a lower elevation to allow the thickness of the concrete under the detectable warning system to be the same as the sidewalk (minimum of 4" (100 mm)).
 2. Install paver units to achieve a flush surface with the surrounding ramp/sidewalk surfaces.
 3. *Mortar*:
 - a. Mix portland cement mortar in the following proportion: one part portland cement to three parts fine aggregate, add hydrated lime not to exceed 10% of the cement by weight.
 - b. Dry mix the fine aggregate, portland cement, and lime until the mixture assumes a uniform color.
 - c. Add water as the mixing continues until the mortar attains a consistency that can be easily handled and spread with a trowel.
 - d. Mortar that is not used within 30 minutes after water has been added cannot be used.
 - e. Retempering of mortar will not be permitted.
 4. Place the mortar to form a firm bond.
 5. Set paver units in a bed of mortar and mortar the joints.
 - a. Maintain 1/4 in. (6 mm) wide joints, no larger than 3/8 in. (9 mm) Plastic spacers may be used.
 - b. Keep joints uniform and straight in all both directions.
 6. Maintain clean surfaces and joints prior to applying grout.
 7. Bevel edges of the system with grade changes in between 0.25 and 0.50 inch (6 and 13 mm) with a slope no steeper than 2 to 1.
 8. Grade changes up to 0.25 inch (6 mm) may be vertical.
- B. *Brick sidewalks*: Use precast concrete panels or fired brick paver units.
1. Place units on the same base material and lift thickness as used under the brick sidewalk.
 2. Place units to achieve a flush surface with the surrounding ramp/sidewalk surfaces.

Method of Measurement:

The quantity of sidewalk surface detectable warning system will be measured as the actual number of square feet (square meters) installed and accepted. The sidewalk is measured and paid for separately.

Basis of Payment:

The quantity of sidewalk surface detectable warning system will be paid for at the Contract unit price per square foot (square meter). Price and payment will constitute full compensation for furnishing all materials, installing a truncated dome patterned surface system, and for all labor, equipment, tools, and incidentals required to complete the work.

Section 705 – Portland Cement Concrete Sidewalk. (10/12/2010)

Add the following to Section 705 (In accordance with Section 101.01 of the 2001 Standard Specifications)

705008 - CURB RAMP, TYPE 1
705009 - CURB RAMP, TYPE 2, 3, AND/OR 4
705010- CURB RAMP, TYPE 5

Description:

Furnish all materials and construct curb ramp(s) at the indicated location(s) on existing sidewalks in accordance with the Standard Construction Details, notes and details shown on the Plans, and/or as directed by the Engineer.

Materials:

E. Provide materials as specified in:

Portland Cement Concrete	Section 812, Class B
Graded Aggregate	Section 821, Type B
Hot-Mix	Section 823

Construction Methods:

A. Construct Curb ramps in accordance with the requirements of the Standard Construction Details, any modifications on Plans and to all the applicable requirements of Sections(s) 302, 401, 705, 758 and 762 of the Standard Specifications.

Method of Measurement:

- A. The quantity of curb ramps will be the measured square foot (square meter) surface area of curb ramp acceptably completed.
1. The area of curb ramps will be established by the measurement of the curb, sidewalk and taper areas shown in the Standard Details.
 2. No measurement for payment will be made on vertical surfaces of curb or sidewalk.
- B. Sidewalk or curb removed and/or replaced beyond the minimum limits required to

achieve the slopes shown in the Standard Details as measured from the nearest edge of the landing area, are paid under the appropriate items for concrete removal, graded aggregate, sidewalk, and curb unless otherwise noted on the plans.

- C. Curb ramps constructed in conjunction with the new P.C.C. sidewalk shall be measured and paid for under other items.

Basis of Payment:

The area of curb ramps will be paid for at the Contract unit price per square foot (Square Meter). Price and payment constitutes full compensation for furnishing and placing all materials including concrete, aggregate, hot-mix or concrete for patching along the curb line, expansion material, saw cutting, removal and disposal of the existing curb, gutter, sidewalk, and pavement, excavation, grading and compacting, including the curb and pavement areas within the limits of the ramp, and for all equipment, labor, tools, and incidentals necessary to complete the work. The limits of removal and replacement shall be the minimum area required to achieve the allowable slopes as shown in the Standard Details.

Subsection 705.04 Curing Material. (3/28/2012)

Delete and replace with the following:

Curing Material. Curing materials shall conform to the requirements of Subsection 812.02 (m).

Subsection 705.09 Curing. (5/15/2006)

Modify the sentence as follows:

Concrete shall be cured according to Section 501 for a period of 72 hours. The sidewalk shall not be opened to pedestrian traffic for 72 hours. Vehicular traffic shall not be permitted until after 5 days.

Subsection 705.12 Basis of Payment. (5/15/2006)

Add the following sentence:

Curb ramps constructed along the new P.C.C. sidewalk shall be incidental to the sidewalk item in this Section 705-Portland Cement Concrete Sidewalk.

Section 708 – Drainage Inlets and Manholes: (10/10/2011)

Add the following:

708060 –REPLACE DRAINAGE INLET GRATE(S)

Description:

Furnish and install drainage inlet grate(s) at the location(s) shown on the Plans and/or as directed by the Engineer.

Materials:

Provide materials as specified in:

Drainage Inlet grates	AASHTO M 270 Grade 36 or ASTM A 36 capable of HS-25 load rating
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Standard construction
Details or noted in the
Plans

Construction Methods:

1. Meet with Engineer to confirm the quantity and location(s) of the existing drainage inlet grate(s) that do not conform to the requirements of the Standard Construction Details unless otherwise designated on plans.
2. Make field measurements to determine the exact sizes of the drainage inlet grate(s) prior to placing order.
3. Remove non-compliant drainage inlet grate(s) and install new grate(s).
4. Transport and unload old drainage inlet grate(s) to the Department's District Maintenance Yard as specified on the Plans, or as directed by the Engineer.

Method of Measurement:

The quantity of drainage inlet grate(s) replaced will be measured as the actual number of each that is installed and accepted.

Basis of Payment:

The quantity of drainage inlet grate(s) replaced will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing,

hauling, installing, transporting and unloading old drainage inlet grates to the District Maintenance Yard, for all labor, tools, equipment, and incidentals to complete the job.

708061 - REPLACE DRAINAGE INLET FRAME(S)

Description:

Remove, replace, and adjust drainage inlet frame(s) at the location(s) shown on the Plans and/or as directed by the Engineer.

All adjustments are to be made prior to paving operations.

Materials:

Provide materials as specified in:

GABC	Section 302
Portland Cement Concrete	Section 812, Class B
Expansion joint Material	Subsection 808.06
Bar Reinforcement	Section 824
Curing Compound	Subsection 812.02 (i)
Castings	AASHTO M 270 Grade 36 or ASTM A 36 capable of HS-25 load rating Standard Construction Details or as noted in the Plans
Borrow, Type C	Subsection 209.04(c)
Topsoil	Section 732
Seeding	Section 734

General: Submit all materials to Materials and Research Section for approval in accordance with Subsection 106.01.

Construction Methods:

1. Meet with the Engineer to confirm the quantity and the location(s) of the existing drainage inlet frame(s) that do not conform to the requirements of the Standard Construction Details unless otherwise designated on the Plans.
2. Make field measurements to determine the exact sizes of the grate(s) prior to placing order.
3. Sawcut existing hot-mix or PCC pavement (minimum 2' from face of drainage inlet).

4. Excavate materials from perimeter of the drainage inlet.
 - a. Dispose of waste materials in accordance with Subsection 106.09;
5. Prepare subgrade for patching to match existing pavement section.
6. Place forms for the new drainage inlet top unit to accommodate the replacement frame in accordance with the Standard Construction Details.
 - a. Place required bar reinforcement.
 - b. Placing the grate on bricks or blocks is not permitted.
7. Place expansion joint material at the outside limits of the drainage inlet curb section.
8. Place Portland Cement Concrete (PCC) for Drainage Inlet top unit in accordance with the Standard Construction Details.
 - a. Finish PCC in accordance with Subsection 701.11.
 - b. Remove forms in accordance with Subsection 701.12.
 - c. Cure in accordance with Subsection 701.13.
9. Backfill drainage inlet top unit.
 - a. Place bituminous concrete patching in accordance with Section 401.
 - b. Place topsoil to a depth of 6" in accordance with Section 732.
 - c. Seed topsoiled areas in accordance with Section 734.

Method of Measurement:

The quantity of replacing drainage inlet frame(s) will be measured as the actual number of each that is installed and accepted.

Basis of Payment:

The quantity of replacing drainage inlet frame(s) will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for sawcutting, PCC and/or hot-mix removal and disposal, graded aggregate base course, bar reinforcement, furnishing, forming, finishing and curing PCC for drainage inlet top unit, furnishing, hauling and installing frame, backfilling, topsoil and seeding, transporting and unloading old frame to the Department's District Maintenance Yard, and for all labor, tools, equipment, and incidentals to complete the job. Payment for hot-mix patching will be paid under Section 406.

708062 - FURNISH DRAINAGE INLET FRAME(S)

Description:

Furnish drainage inlet frame(s) at the location(s) shown on the Plans and/or as directed by the Engineer.

Materials:

Provide materials as specified in:

Drainage Inlet grates

AASHTO M 270 Grade
36 or ASTM A 36

Standard construction
Details or noted in the
Plans

Construction Methods:

1. Make field measurements to determine the exact sizes of the drainage inlet frame(s) prior to placing order.
2. Transport and unload old drainage inlet grate(s) to the Department's District Maintenance Yard as specified on the Plans, or as directed by the Engineer.

Method of Measurement:

The quantity of furnish drainage inlet frame(s) will be measured as the actual number of each that is furnished.

Basis of Payment:

The quantity of furnish drainage inlet frames(s) will be paid for at the Contract unit price per each. Price and payment will constitute full compensation for furnishing, hauling, installing, transporting and unloading old drainage inlet grates to the District Maintenance Yard, for all labor, tools, equipment, and incidentals to complete the job.

Subsection 708.05 – Frames. (3/18/2004)

Add the following paragraph:

Frames for drainage grates fabricated from structural steel that meets or exceeds requirements of AASHTO M 270 Grade 36 or ASTM A 36 will also be acceptable. Such frames shall be fabricated from ½" (minimum thickness) stock, provide a 1 ¼" lip for support of the grate, have a 2" depth to accommodate a 2" thick grate, and have a bottom width of 4". Tolerances shall be + 1/8", -0". All cutting and welding shall be done in accordance with applicable portions of Subsection 826.12 by certified welders. The fabricated frame shall be hot dip galvanized in accordance with AASHTO M 111 (ASTM A 123) with a minimum of 2 ounces per square foot of zinc coating.

Subsection 708.06 Gratings. (3/18/2004)

Add the following paragraph:

Gratings for drainage inlets fabricated from structural steel that meets or exceed requirements of AASHTO M 270 or ASTM A 36 capable of HS-25 load rating will also be acceptable. Grates shall be of the Type 1, 2, or 3 style as shown in the Standard Construction Details. Type 1 shall have 1" x 2" perimeter bars. Type 2 and 3 shall have 3/4" x 2" perimeter bars. Type 1, 2, and 3 shall have 1/2" x 2" internal bars. Grating spacers shall be flush with the top surface of the grate. Tolerances shall be + 1/8", -0". All cutting and welding shall be done in accordance with applicable portions of Subsection 812.12 by certified welders. The fabricated grate shall be hot dip galvanized in accordance with AASHTO M 111 (ASTM A 123) with a minimum of 2 ounces per square foot of zinc coating.

Subsection 708.10 Precast and Cast-In-Place Drainage Inlets and Manholes.
(5/15/2006)

Modify the subsection title as shown above and modify the 1st paragraph as follows:

Precast and Cast-In-Place drainage inlets and manholes shall be constructed as shown on the Standard Construction Details. Cast-In-Place construction shall be used for drainage structures that tie into existing pipes and structures unless the Engineer approves the use of Precast. Shop drawings are not required for drainage inlets and manholes that match the Standard Construction Details. Shop drawing and design calculations, signed and sealed by a professional engineer, registered in the State of Delaware, shall be submitted for approval for all drainage structures that differ from the Standard Construction Details.

Subsection 708.13 Inlet and Outlet Pipes. (5/15/2006)

Modify the third sentence as follows:

Any space between the pipe and the walls of the drainage inlet shall be filled with non-shrink grout conforming to the requirements of ASTM C1107 with a strength of 5000 psi.

Section 710 – Adjusting and Repairing Drainage Inlets and Manholes (10/10/2011)

Add the following:

710001 – ADJUST AND REPAIR EXISTING DRAINAGE INLET(S)

Description:

Adjust and repair existing drainage inlet(s) at the location(s) shown on the Plans and/or as directed by the Engineer.

All adjustments are to be made prior to paving operations.

Materials:

Provide material as specified in:

GABC	Section 302
Portland Cement Concrete	Section 812, Class B
Expansion joint Material	Subsection 808.06
Bar Reinforcement	Section 824
Curing Compound	Subsection 812.02 (i)
Castings	AASHTO M 270 Grade 36 or ASTM A 36 capable of HS-25 load rating Standard Construction Details or as noted in the Plans
Borrow, Type C	Subsection 209.04(c)
Topsoil	Section 732
Seeding	Section 734

Construction Methods:

A. Adjusting and Repairing Drainage Inlet(s);

1. Remove covers of drainage inlets for inspection by Engineer.
2. Sawcut existing PCC or hot-mix pavement and dispose of excess materials in accordance with Subsection 106.09.
3. Excavate and remove existing castings.
 - a. Take care to not damage castings, clean and set aside for reuse;
 - b. Replace castings where specified.
4. If existing structure is in good condition, adjust the drainage inlet frame and grate to grade.
 - a. Set forms for adjusting frame such that frame is encased in Class B PCC.
 - b. Placing frame on bricks, blocks or other materials will not be permitted.
5. If existing structure is in poor condition, repair as directed.
 - a. Keep silt and debris away from structure until work is complete.
 - b. Set frame as directed in 4a.
6. Install steps on the back wall of drainage inlet(s) that are 4' (1.2m) in depth, measured from top of grate to the invert of the lowest pipe, or as directed on Plans.
 - a. Begin installation within 24" (600 mm) of the top of grate and end installation no more than 12" (300 mm) above the lowest invert, space at 12" (300 mm) intervals.
 - b. Embed steps a minimum of 3" (75 mm) in the wall and protrude 6" (150 mm) out from the wall.
7. Pour flow channel.
8. Form drainage inlet top unit as shown in the Standard Construction Details

9. Place Class B Concrete in accordance with Section 701.
 - a. Cure Concrete in accordance with 501.11.
 - b. Remove forms.
10. Topsoil in accordance with Section 733.
11. Seed in accordance with Section 734.

Method of Measurement:

The quantity of adjust and repair existing drainage inlet(s) will be measured as the actual number of each adjusted and/or repaired.

Drainage inlet(s) repaired from the top of the drainage inlet frame to a depth of 3' (900 mm) below will be paid at Contract unit price.

Drainage inlet(s) repaired below a depth greater than 3' (900 mm) to not more than 4 ½' (1.4 m) will be paid for at 1.5 times the Contract unit price.

Drainage inlet(s) repaired below a depth greater than 4 ½' (1.4 m) will be paid for at 2 times the Contract unit price.

In no case will the payment exceed 2 times the Contract unit price regardless of the depth of repairs.

Basis of Payment:

The quantity of adjust and repair existing drainage inlet(s) will be paid for at the Contract unit price for each based on the depth of adjustment. Price and payment will constitute full compensation for sawcutting, PCC or hot-mix pavement removal and disposal, excavation, cleaning and reusing existing castings, adjustment and repair, furnishing and placing PCC for drainage inlet top unit, furnishing and installing steps, pouring flow channel, topsoil, seeding, and for all labor, tools, equipment, and incidentals to complete the job.

If drainage inlet frame cannot be reused, payment for drainage inlet frame will be in accordance with 708062 – Furnish Drainage Inlet Frame.

If drainage inlet grate cannot be reused, payment for drainage inlet grate will be in accordance with 708060 – Replace Drainage Inlet Grate.

710002 – ADJUST AND REPAIR EXISTING MANHOLES

Description:

Adjust and repair existing and manhole(s) at the location(s) shown on the Plans and/or as directed by the Engineer.

All adjustments are to be made prior to paving operations.

Materials:

Provide material as specified in:

GABC	Section 302
Portland Cement Concrete	Section 812, Class B
Riser Ring	Section 812, Class A
Riser Gasket	In accordance with AASHTO M 198
Curing Compound	Subsection 812.02 (i)
Castings	AASHTO M 270 Grade 36 or ASTM A 36 capable of HS-25 load rating Standard Construction Details or as noted in the Plans
Borrow, Type C	Subsection 209.04(c)

Construction Methods:

A. Adjusting and Repairing Existing Manholes;

1. Remove covers of manholes for inspection by Engineer;
2. Sawcut existing PCC or hot-mix pavement and dispose of excess materials in accordance with 106.09.
3. Excavate and remove existing castings.
 - a. Take care to not damage castings, clean and set aside for reuse.
 - b. Replace castings where specified.
4. If existing structure is in good condition, adjust the manhole casting cover to the correct grade with an approved device.
 - a. Ensure devices form a watertight seal.
5. If existing structure is in poor condition, repair with Class B Concrete as specified in Section 812, setting the manhole casting cover to the correct grade.
 - a. Cure wet, exposed concrete surfaces for at least 48 hours.
 - b. Keep silt and debris away from structure until work is complete.

Method of Measurement:

The quantity of adjust and repair existing manhole(s) will be measured as the actual number of each adjusted and/or repaired.

Manhole(s) repaired from the top of the manhole cover to a depth of 3' (900 mm) below will be paid at Contract unit price.

Manhole(s) repaired below a depth greater than 3' (900 mm) to not more than 4 ½' (1.4 m) will be paid for at 1.5 times the Contract unit price.

Manhole(s) repaired below a depth greater than 4 ½' (1.4 m) will be paid for at 2 times the Contract unit price.

In no case will the payment exceed 2 times the Contract unit price regardless of the depth of repairs.

Basis of Payment:

The quantity of adjust and repair existing manhole(s) will be paid for at the Contract unit price for each based on the depth of adjustment. Price and payment will constitute full compensation for sawcutting, PCC or hot-mix pavement removal and disposal, excavation, cleaning and reusing existing castings, adjustment and repair and for all labor, tools, equipment, and incidentals to complete the job.

710004 – ADJUST AND REPAIR EXISTING DOUBLE DRAINAGE INLET(S)

Description:

Adjust and repair existing double drainage inlet(s) at the location(s) shown on the Plans and/or as directed by the Engineer.

All adjustments are to be made prior to paving operations.

Materials:

Provide material as specified in:

GABC	Section 302
Portland Cement Concrete	Section 812, Class B
Expansion joint Material	Subsection 808.06
Bar Reinforcement	Section 824
Curing Compound	Subsection 812.02 (i)
Castings	AASHTO M 270 Grade 36 or ASTM A 36 capable of HS-25 load rating Standard Construction Details or as noted in the Plans
Borrow, Type C	Subsection 209.04(c)
Topsoil	Section 732
Seeding	Section 734

Construction Methods:

A. Adjusting and Repairing Existing Double Drainage Inlet(s).

1. Remove covers of drainage inlets for inspection by Engineer.
2. Sawcut existing PCC or hot-mix pavement and dispose of excess materials in accordance with Subsection 106.09.
3. Excavate and remove existing castings.
 - a. Take care to not damage castings, clean and set aside for reuse.
 - b. Replace castings where specified.
4. If existing structure is in good condition, adjust the drainage inlet frame and grate to grade.
 - a. Set forms for adjusting frame such that frame is encased in Class B PCC.
 - b. Placing frame on bricks, blocks or other materials will not be permitted.
5. If existing structure is in poor condition, repair as directed.
 - a. Keep silt and debris away from structure until work is complete.
 - b. Set frame as directed in 4a and 4b.
6. Install steps on the back wall of drainage inlet(s) that are 4' (1.2m) in depth, measured from top of grate to the invert of the lowest pipe, or as directed on the Plans.
 - a. Begin installation within 24" (600 mm) of the top of grate and end installation no more than 12" (300 mm) above the lowest invert, space at 12" (300 mm) intervals.
 - b. Embed steps a minimum of 3" (75 mm) in the wall and protrude 6" (150 mm) out from the wall.
7. Pour flow channel.
8. Form drainage inlet top unit as shown in the Standard Construction Details.
9. Place Class B Concrete in accordance with Section 701.
 - a. Cure Concrete in accordance with 501.11.
 - b. Remove forms.
10. Topsoil in accordance with Section 733.
11. Seed in accordance with Section 734.

Method of Measurement:

The quantity of adjust and repair existing double drainage inlet(s) will be measured as the actual number of each adjusted and/or repaired.

Drainage inlet(s) repaired from the top of the drainage inlet frame to a depth of 3' (900 mm) below will be paid at Contract unit price.

Drainage inlet(s) repaired below a depth greater than 3' (900 mm) to not more than 4 ½' (1.4 m) will be paid for at 1.5 times the Contract unit price.

Drainage inlet(s) repaired below a depth greater than 4 ½' (1.4 m) will be paid for at 2 times the Contract unit price.

In no case will the payment exceed 2 times the Contract unit price regardless of the depth of repairs.

Basis of Payment:

The quantity of adjust and repair existing double drainage inlet(s) will be paid for at the Contract unit price for each based on the depth of adjustment. Price and payment will constitute full compensation for sawcutting, PCC or hot-mix pavement removal and disposal, excavation, cleaning and reusing existing castings, adjustment and repair, furnishing and installing steps, pouring flow channel, topsoil, seeding, and for all labor, tools, equipment, and incidentals to complete the job.

Subsection 713.02 Stabilization. (1/3/2008)

Modify the sentence as follows:

Geotextile for stabilization shall conform to the requirements of AASHTO M 288, Class 1, and Table 4.

Subsection 713.03 Separation. (1/3/2008)

Modify the sentence as follows:

Geotextile for separation shall confirm to the requirements of AASHTO M 288 Class 2, and Table 3.

Subsection 713.04 Erosion Control. (Modify title) (1/3/2008)

Modify the sentence as follows:

Geotextile, woven monofilament for erosion control, shall confirm to the requirements of AASHTO M 288, Class 2, and Table 5. All other non- woven geotextiles for erosion control, shall conform to AASHTO M 288 Class 1 and Table 5.

Subsection 715.03 Perforated, Corrugated Polyethylene Tubing (CPT). (5/15/2006)

Delete the entire paragraph and replace with the following:

Perforated, CPT shall conform to the requirements of AASHTO M252.

Subsection 715.04 Stone. (3/18/2004)

Modify the first sentence as follows:

Stone for backfill shall conform to the requirements of Section 813, Delaware No. 57.

Subsection 715.05 Geotextile. (Modify Title) (1/3/2008)

Modify the sentence as follows:

Geotextile shall conform to the requirements of AASHTO M 288 Class 2 or 3 and Table 2.

Subsection 715.07 – Video Inspection. (3/18/2004)

Delete the first sentence. Insert the following two sentences:

The entire underdrain system shall be videoed prior to the Project's final inspection. The Contractor may video the underdrain system prior to the placement of the final surface course over the area of the underdrain. If guardrail is placed within 3' (.9 m) from the underdrain, that section shall be videoed after installation of the guardrail.

Section 720 Galvanized Steel Beam Guardrail. (5/15/2006)

Change "Reflectorized Washers" to "Guardrail Reflectors".

Subsection 720.05 Basis of Payment. (5/15/2006)

After the third sentence, add the following sentences:

When specified in the Plans to place/replace or salvage individual elements of guardrail, and an item is listed for those items, then those individual components will be measured/paid as the number of each component under their respective bid item. When installing new guardrail, paid by the linear foot, these items are incidental to guardrail.

Section 725 Guardrail-to-Barrier Connection (Approach and Exit Types). (5/15/2006)

Change "Reflectorized Washers" to "Guardrail Reflectors".

Section 726 Guardrail End Treatment. (5/15/2006)

Change "Reflectorized Washers" to "Guardrail Reflectors".

Section 727 – Fences and Gates. (10/12/2010)

Add the following to Section 727 (In accordance with Section 101.01 of the 2001 Standard Specifications)

727014 - CONSTRUCTION SAFETY FENCE

Description:

Furnish all materials, erect, relocate, maintain, and repair construction safety fence at location(s) as noted on the Plans or as directed by the Engineer. Remove and dispose of the construction safety fence after it is no longer required as determined by the Engineer.

Materials:

- A. Submit source of supply for all fencing materials including the posts for approval by the Engineer prior to installation.
- B. *Construction Safety Fence:*
 - 1. 4' (1.2 m) high, U.V. stabilized high visibility orange, high density polyethylene.
 - 2. Standard mesh opening size of approximately 1 1/2" (38 mm).
- C. *Fence Post:*
 - 1. Length sufficient for 18" (450 mm) embedment in the ground.
 - a. Oak wood, a minimum of 2" (50 mm) square.
 - b. T-Section steel 1.25" x 1.00" (32 mm x 25 mm).
 - 2. If the fence is to be installed on bituminous and/or concrete surface, use posts that can be anchored by placing sand bags at their base without damaging pavement.
- D. *Bottom Rail Edging:*
 - 1. If the fence is to be installed along a pedestrian sidewalk, provide bottom rail edging of wood or metal for cane detection.

Construction Methods:

- A. Space posts no more than 10' (3 meters).
 - 1. Alternate spacing may be approved only if specified by the construction safety fence manufacturer.
- B. Use 8" (200 mm) self-locking nylon safety ties for securing the fence to the post.
- C. Install bottom rail edging for cane detection must be at least 6 inches above the surface of the sidewalk or pathway, with the bottom of the edging a maximum of 2.5 inches above the surface.
- D. Maintain, repair, or replace construction safety fence as necessary when damaged, missing, or worn out.
- E. Reposition/relocate the safety fence as necessary to perform construction activities.
- F. Remove all construction safety fence and associated debris at the direction of the Engineer at the end of construction activities.

Method of Measurement:

The quantity of construction safety fence will be measured as the actual number of linear feet (meters) of safety fence furnished, installed and accepted.

Basis of Payment:

The quantity of construction safety fence will be paid for at the Contract unit price per linear foot (meter). Price and payment will constitute full compensation for furnishing, placing, maintaining, repairing, replacing, relocating, repositioning, cleaning the area, removal and disposal of the fence and related accessories, furnishing all labor, equipment, tools and all incidentals necessary to complete the work.

Section 727 – Fences and Gates. (2/23/2011)

Add the following to Section 727 (In accordance with Section 101.01 of the 2001 Standard Specifications)

727015 - MONUMENT

Description:

Furnish necessary materials and labor to set P.C.C. Monuments at the locations shown on the Plans, and as directed by the Engineer.

Materials:

Provide monument constructed in accordance with the details shown in the Standard Construction Details using materials specified in:

Portland Cement Concrete – Class B	Section 812
Bar Reinforcement	Section 824

Construction Methods:

- A. Exact location to be set by a Delaware Professional Land Surveyor in accordance with the plans or as directed by the Engineer.
- B. Place monuments in vertical positions in excavated holes at depths shown on the plans or designated, with two sides approximately parallel with the roadway.
- C. Place backfill material in layers and firmly tamp without disturbing the location set by the surveyor so that the monument is stable and secure.
- D. Take care not to break or damage monuments when removing and resetting.
- E. Replace broken or damaged monuments with similar type without added compensation.

Method of Measurement:

Monuments will be measured as the actual number of monuments set and accepted.

Basis of Payment:

The quantity of monuments will be paid for at the Contract unit price per Each. Price and payment will constitute full compensation for furnishing all materials required and setting the monuments by land surveyor, for excavation and backfill, and incidentals necessary to complete the item.

Existing monuments damaged and replaced as required by Subsection 107.09 of the Standard Specifications will be repaired, replaced, and set at the Contractor's expense.

Section 732 – Topsoil. (1/15/2010) (10/12/2010)

Delete in its entirety and replace with the following:

732.01 Description. This work consists of furnishing and placing topsoil for planting.

732.02 Materials. Topsoil shall be friable loam topsoil of uniform quality and free from heavy clay, frozen clods, lumps, plants, roots, sticks, and foreign materials harmful to plant growth, such as fragments of hot-mix, concrete pavement, and surface treatment.

Topsoil shall be reasonably free of noxious perennial weeds or wood vegetation and completely void of Johnsongrass (*Sorghum halapense*) and Canada Thistle (*Cirsium arvense*) as determined through prior inspection by an authorized representative of the Department.

The Department recommends that the Topsoil have an acidity range of pH 5.8 to pH 6.7, and a target pH of 6.25 prior to the time of seeding. The Contractors is responsible for all testing necessary to determine the amount of lime, sulfur or fertilizer needed to create the proper conditions necessary to produce acceptable permanent vegetation as specified elsewhere in the contract documents.

Topsoil shall not be delivered until the source of supply has been approved by the Engineer.

Construction Methods.

732.03 Clearing the Area. All areas from which topsoil is to be secured shall be cleaned of all brush, sticks, weeds, stones, bricks, ashes, and other refuse which may hinder or prevent growth of future plant materials placed in the topsoil.

732.04 Approval of Materials. When securing topsoil from an approved source, strata or seams of material not meeting the requirements of topsoil shall be removed from the source by the Contractor. If these materials cannot be removed without contaminating the topsoil brought to the jobsite, the source shall be abandoned.

732.05 Placing. Before placing or depositing topsoil upon any section as shown on the Plans, the foundation upon which the topsoil is to be placed shall be approved. Topsoil shall be thoroughly loosened to 3 inches (75mm) within 72 hours prior to seeding.

Topsoil shall be spread on these areas to a depth sufficiently greater than that specified on the Plans, so that after natural settlement has taken place the work shall conform to the elevations on the Plans.

732.06 Maintaining the Topsoil. The Contractor shall maintain the topsoil until final completion and acceptance of the Contract. Maintenance shall consist of preserving, protecting, replacing, and such other work as may be necessary to keep the topsoil in a satisfactory condition. No additional payment will be made to replace and/or regrade any topsoil damaged by vehicles or by storm damage, etc. except for circumstances specified in Standard Specifications sections 104.14 Contractor's Responsibility for Work and 105.14 Opening Sections of the Project to Traffic.

732.07 Method of Measurement. The quantity of topsoil will be measured as the number of Square Yards (Square Meters) or Tons (Metric Tons), of topsoil furnished, placed, and accepted only in the areas shown on the Plans or where directed. Measurements will be made along the surfaces of the completed topsoiled areas.

732.08 Basis of Payment. The quantity of topsoil will be paid for at the Contract unit price per Square Yard (Square Meter) or Ton (Metric Ton). Price and payment will constitute full compensation for preparing the grade; for furnishing, hauling, and placing all materials, including necessary soil supplements such as; lime, sulfur or fertilizer; for maintaining topsoil; for loosening of the topsoil to 3 inches (75mm) and for all labor, equipment, tools, and incidentals required to complete the work.

Section 733 – TOPSOILING (1/15/2010) (10/12/2010)

Delete in its entirety and replace with the following:

733.01 Description. This work consists of placing topsoil which has been salvaged from the jobsite and stockpiled under [Section 202](#)

733.02 Materials. Material for Topsoiling consists of existing soils that were designated to be stripped, salvaged and temporarily stockpiled for later use as shown on plans.

Topsoil tests conducted by the Department are given based on conditions when tests were conducted and may not reflect the conditions at time of seeding. The Contractor is responsible for determining the type and amount of soil supplements needed to create the proper conditions for acceptance of permanent vegetation specified elsewhere.

733.03 Construction Methods. The placement of topsoil shall conform to the requirements of Section 732.05. Topsoil shall be maintained in accordance with 732.06.

733.04 Method of Measurement. The quantity of topsoiling will be measured as the number of square yards (square meters) or Tons (Metric Tons) of topsoil placed and accepted only in the areas shown on the Plans or where directed by the Engineer. Measurements will be made along the surfaces of the completed topsoiling areas.

733.05 Basis of Payment. The quantity of topsoiling will be paid for at the Contract unit price per Square Yard (Square Meter) or Ton (Metric Ton). Price and payment will constitute full compensation for preparing the grade; for hauling and placing all topsoil salvaged under [Section 202](#); for maintaining topsoil; loosening of the topsoil, for additional soil testing performed at the Contractor's discretion, for adding soil supplements, and for all labor, equipment, tools, and incidentals required to complete the work.

Section 734 – SEEDING (10/12/2010) (2/23/2011)

Delete in its entirety and replace with the following:

734.01 Description. The work included in this item shall consist of providing an acceptable uniform stand of established perennial turf grasses, including mulching, on all areas to be treated as shown on the plans or where designated by the Engineer.

Materials.

734.02 Water. Any water used for this item shall conform to the requirements of Section 803.

734.03 Mulch. Use only Mulch that is biodegradable and free of contaminants

734.04 Grass and Agricultural Seeds.

(a) *Permanent and Temporary Seeding.* The Seeding Chart on the following pages shall be used for the following specified seeding:

Permanent Grass Seeding - Dry Ground (PGS-DG)

Permanent Grass Seeding - Wet Ground (PGS-WG)

Permanent Grass Seeding - Subdivision (PGS-SUB)

Temporary Grass Seeding - Dry Ground (TGS-DG)

Temporary Grass Seeding – Wet Ground (TGS-WG)

Seeding Chart					
Type	Species	Max % Weed Seed ¹	% Purity	% Germination	Seeding Rate (Lb/acre)
PGS-DG (≤1V:3H) or PGS- SUB	Turf Type Tall Fescue (<i>Lolium arundinaceum</i> , formerly; <i>Festuca arundinacea</i>)	0.5	98	90	200
	Perennial Ryegrass (<i>Lolium perenne</i>)	0.4	90	90	20
	Kentucky Bluegrass (<i>Poa pratensis</i>)	0.4	90	80	30
	Redtop (<i>Agrostis alba</i>) (PGS-DG ONLY)	75	95	90	5
	Redtop (<i>Agrostis alba</i>) (PGS-DG ONLY)	0.15	95	90	10
	Annual Ryegrass – Optional ⁵ (<i>Lolium multiflorum</i>)				
PGS-DG (>1V:3H)	Hard Fescue Mixture (<i>Festuca longifolia</i> and <i>Festuca trachyphylla</i>)	0.15	98	85	140
	Creeping Red Fescue (<i>Festuca rubra rubra</i>)	0.15	98	85	85
	Redtop (<i>Agrostis alba</i>)	75	95	90	5
	Annual Ryegrass (<i>Lolium multiflorum</i>)	0.15	95	90	25
PGS- WG ³	Redtop (<i>Agrostis alba</i>)	0.75	95	90	40
	Creeping Bentgrass (<i>Agrostis palustris</i>)	0.75	98	90	25
	Sheep Fescue ² (<i>Festuca ovina</i>)	0.5	98	85	35
	Rough-Stalked Bluegrass (<i>Poa trivialis</i>)	0.5	98	80	25
TGS-DG	Annual Ryegrass – Optional (<i>Lolium multiflorum</i>)	0.15	95	90	40
TGS-	Annual Barnyard	1.00	90	90	40

Seeding Chart					
Type	Species	Max % Weed Seed ¹	% Purity	% Germination	Seeding Rate (Lb/acre)
WG ⁴	Grass/Duck Millet (<i>Echinochloa spp.</i>)				

¹ Title 3 Delaware Code, Chapter 15, Seeds and its associated regulations identify several species of seed designated as Noxious Weeds by the Delaware Department of Agriculture and therefore may not be part of the allowable percentage of weed seeds in any quantity.

² *Festuca ovina* shall be an improved variety of Sheep Fescue as approved by the Department. Selection should be based on performance within the Mid-Atlantic region as determined by the most current National Turfgrass Evaluation Program Progress Report.

³ Permanent Seeding - Wet Ground should be used on saturated or seasonally flooded areas as dictated by the wetland limits on the Plans.

⁴ Wet, bare ground, leaf litter covered or partially vegetated retention ponds, traps, or basins, or all intermittently flooded sites in general may be seeded with *Temporary Seeding - Wet Ground*. No wood fiber mulch shall be added to the hydroseeder. Unless indicated on the Plans, *Echinochloa spp.* is equivalent to *E. muricata*, *E. crusgalli*, or *E. walteri*. No mulching, fertilizer or limestone shall be applied with this seeding.

⁵ The Contractor has the option of adding at his or her expense, up to 10 lbs. Annual Ryegrass (*Lolium multiflorum*) to the PGS-DG (≤1V:3H) and PGS-SUB seed mixes.

Construction Methods.

734.05 General. This work shall consist of preparing the soil, placing the seed and applying any soil supplements necessary to provide a suitable stand of turf grass and placing mulch.

Seeding Season. The calendar dates for seeding shall be Spring – March 1 to May 15 and Fall – August 15 to October 31. **Sussex County** fall season is August 15 to November 15.

All disturbed soil areas shall be treated during the seeding seasons as follows:

- a) **Areas meeting final grade.** Seeding and mulching shall be completed.

- b) **“Out of Season” Periods.** During “out of season” periods, unseeded areas shall be treated in accordance with temporary stabilization as per Section 110.09 (d).
- c) **“Out of Season” seeding.** “Out of Season” seeding shall be performed in the same manner as “in-season” seeding. Requests for out of season seeding will be considered if sufficient written justification is provided, with the understanding that in-season re-seeding will be required, at no cost to the Department, if the turf stand fails to conform to 734.07.
- d) **Temporary grass seeding.** Temporary grass seeding, when required, prior to Permanent Grass Seeding, shall be mowed and tracked (tracking shall be accomplished by driving cleated equipment such as a bulldozer over the surface).

734.06 Maintenance. The Contractor shall maintain all seeded and mulched areas free from weeds and debris in accordance with Section 105.13. Grass mowing shall be completed at the direction of the Engineer or as specified in the contract. Payment for grass mowing shall be incidental to the project unless it is included in another item of work.

734.07 Acceptance of Permanent and Temporary Grass Seeding. Acceptance of permanent grass seeding will require production of a uniform stand of established perennial grass species, as specified in Section 734.04, having attained a height of 3 inches with a density of 70% of the seeded area (a minimum of 100 plants per square foot). Any area identified without a uniform density of 70% specified perennial grass cover shall be repaired at the Contractor’s expense. Acceptance of Temporary seeding will be made at time of placement, provided the seed is mixed and placed as specified in Section 734.04

734.08 Maintenance Bond. Upon Substantial Completion of the Work, the Contractor shall furnish to the Department a Maintenance Bond on the form provided by the Department for item 734XXX - Seeding. The Maintenance Bond shall meet the following requirements:

- a) A sum equal to 100% of the value of all Permanent Grass Seeding Items paid to the Contractor;
- b) All signatures are original signatures, in ink, and not mechanical reproductions or facsimiles of any kind;
- c) The Contractor is the named principle;
- d) The term of the bond is for one full year;

- e) Section 734 – Seeding Work items associated with permanent seeding requires completion after substantial completion of the Project. The term of the Maintenance Bond will be for a period of one year beyond the completion of permanent seeding Work; and
- f) Written by a Surety or insurance company that is in good standing and currently licensed to write surety bonds in the State of Delaware by the Delaware Department of Insurance.

734.09 Method of Measurement. The Engineer will measure the quantity of acceptably placed permanent or temporary grass seed. The quantity of seeding will be measured in square yards (square meters) of surface area. Unless otherwise specified on the plans, mulching will not be measured.

734.10 Basis of Payment. The quantity and type of seeding will be paid for at the Contract unit price per square yard (square meter). Price and payment will constitute full compensation for preparing the ground; for furnishing and placing all materials including seed and mulch; and for all labor, equipment, tools, maintenance bond and incidentals required to complete the work.

Payment for permanent and temporary grass seeding will be made at the time seed is acceptably placed. The maintenance bond covering permanent seeding items will be released when the permanent seeding meets the requirements of 734.07. If the contractor fails to correct any areas where the seeding is not acceptable, the Department will collect on the Maintenance Bond to correct the Work.

Working Days Note:

When the sequence of construction precludes completion of 734 – Seeding Work items associated with permanent seeding within the Calendar Day Contract Completion date, the Contractor will submit with his/her bid proposal a separate Working Day schedule to govern completion of 734 – Seeding items. The Contractor shall submit a separate schedule in Bar Chart Format reflecting all work associated with this item for review and approval at the preconstruction meeting. Failure to submit an acceptable Working Day schedule for completion of 734 – Seeding items may result in delay in “Notice to Proceed.” Failure to complete 734 – Seeding items within the specified number of Working Days above will result in assessment of Liquidated Damages based on the total of Item 734xxx, per Working Day as detailed in Subsection 108.09, Schedule of Liquidated Damages. Sections 734.09, Method of Measurement, and Section 734.10, Basis of Payment, remain unaffected by this requirement.

SECTION 743 - TEMPORARY TRAFFIC CONTROL AND DEVICES. (3/28/2012)

Delete Section 743 and all Previous Supplemental Updates in their entirety and replace with the following:

743.01 Description

Furnish, install, maintain, relocate, replace, and remove Arrow Boards, Portable Changeable Message Boards, Portable Light Assemblies, Plastic Drums, Traffic Officers, Reflector Panels, Truck Mounted Attenuators, Crash Cushions, Portable PCC Safety Barriers, Temporary Tubular Delineators, Temporary Impact Attenuators, Temporary Barricades, Temporary Warning Signs, Flaggers, and other temporary traffic control devices in accordance with the latest edition of the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD), the approved temporary traffic control plan, standard Typical Applications from the DE MUTCD and as directed by the Engineer.

743.02 Materials

Provide only crashworthy temporary traffic control devices in accordance with the requirements of the National Cooperative Highway Research Program (NCHRP) Report 350 or the Manual for Assessing Safety Hardware (MASH) published by the American Association of State Highway and Transportation Officials (AASHTO). Certification of compliance with NCHRP Report 350 and/or MASH is required for Category I through Category III temporary traffic control devices. For Category I devices, the manufacturer or Contractor may self-certify that the devices meet the NCHRP Report 350 and/or MASH criteria. Supply to the Engineer the Federal Highway Administration's NCHRP Report 350 and/or MASH acceptance letter including all applicable attachments, for each type of device that falls under Category II and III devices. Provide the self-certification and/or the FHWA acceptance letters at the pre-construction conference.

Project specific dimensional requirements, if any, are noted on the Plans. Meet Chapter 6F. Temporary Traffic Control Zone Devices of the DE MUTCD and all other Contract requirements.

Maintain temporary traffic control devices in good condition in accordance with the brochure entitled "Quality Guidelines for Temporary Traffic Control Devices", published by the American Traffic Safety Services Association (ATSSA).

743.03 General Temporary Traffic Control

The Contractor is responsible for making an independent determination that the safety measures outlined within the contract and the DE MUTCD are sufficient to protect the traveling public or the persons working on the project. The provisions of this Specification do not supersede or release the provisions of Standard Specification 107.10, Responsibility for Damage Claims.

A. Implement additional safety measures not expressly required by the Contract and

necessary to ensure the safety of all persons, either independently or at the direction of the Engineer.

- B. Submit to the Engineer in writing justifications for any Contractor proposed changes to the TTC plan or additions to the TTC plan included in the contract documents;
 - 1. Prepare a new (TTCP), signed and sealed by a Professional Engineer registered in the State of Delaware, in accordance with all applicable DelDOT standards to the Engineer for approval prior to the start of work at each and every location;
 - 2. Submit the TTCP 14 calendar days in advance of starting work.
 - 3. Longitudinal dimensions for maintenance of traffic configurations may be adjusted slightly to fit field conditions as directed by the Engineer.
- C. Final approval of proposed changes, deviations, or additions will be determined by the Traffic Safety Section.
- D. Inventory existing signs within the Contract limits.
 - 1. Maintain signs that must remain in place during the project.
 - 2. Remove any other existing signs and properly store to prevent loss or damage.
 - 3. Immediately prior to the final inspection, inventory the traffic signs and account for any lost or damaged signs with the Engineer.
 - 4. Replace or reimburse the Department for any lost or damaged signs.
- E. Throughout the duration of the Contract within the Project limits maintain access to:
 - 1. All businesses and residences;
 - a. Coordinate any temporary closure of a driveway or entrance for tie-in purposes with the Engineer and the property owner in advance of the closure.
 - 2. all transit stops unless otherwise directed by the Plans or the Engineer;
 - a. Maintain an area for the transit vehicle to allow for safe pick-up and drop-off of passengers;
 - b. Provide an accessible path for pedestrians to safely access the transit stop.
- F. Conduct construction operations in a manner that will minimize delays to traffic, and meet the following requirements:
 - 1. When work is being conducted within 200 feet in advance or up to 200 feet beyond an intersection that is controlled by a traffic signal, the Flagger must direct the flow of traffic in concert with the traffic signal to avoid queuing unless active work prohibits such action. The Flagger must direct traffic to prevent traffic from queuing through an intersection (i.e., blocking an intersection).
 - 2. When work is being conducted within a signalized intersection, a Traffic Officer may be required to direct traffic against the operation of the traffic signal only until the operation occurring within the intersection is completed.
 - 3. Schedule work in the vicinity of traffic signals to minimize the time during which the signal is operated without detectors.

4. When a lane adjacent to an open lane is closed, set temporary traffic control devices 2' (.61 m) into the closed lane from the edge of the open lane, unless an uncured patch exists or actual work is being performed closer to the open lane with minimum restriction to traffic.
5. Do not close lanes unless construction activity requiring lane closure is taking place or will take place within one hour, except for "buffer lanes" on high volume and/or high speed roadways. Reopen lanes immediately upon completion of the work. Shorten the lane closure for moving operations as work progresses and as traffic conditions warrant to keep the length of the closure to a minimum. Conduct construction operations in a manner that minimizes disruption to traffic during peak hours and periods of heavy traffic flow. The Department reserves the right to stop the Contractor's operations if, in the opinion of the Engineer, such operations are unnecessarily impeding traffic.

743.04 Notifications to the Engineer

A. Road Closures and Detours:

1. No less than fourteen (14) calendar days prior to the start of any detours and road closures.
2. Roadway closures or lane closures beyond those specified and approved in the Contract Documents, must be approved by the Chief Traffic Engineer or Designee a minimum of 48 hours in advance of the proposed restriction.

B. Loop Detectors at Signalized Intersections:

1. Submit a schedule seven (7) days in advance of the proposed start date of work. Obtain Engineer approval prior to the start of work.
2. The DelDOT Transportation Management Center (TMC) requires 48 hours advance notice of the cutting of a loop detector, and immediate notification once the loop detector has been reinstalled.
3. Coordinate with the Engineer sufficiently in advance of loop detector work to ensure that these requirements are met.

C. Property Owners, Businesses, and Residents:

1. Written notice, 48 hours in advance of the start of construction work.
 - a. Include the scope of work, working hours, anticipated start and completion dates, a summary of construction activities that might interfere with access to the property;
 - b. A schedule and access coordination plan;
 - c. Contractor's name and address, and a DelDOT contact phone number;
 - d. Provide written verification to the Engineer that the property owners and residents were notified.
2. Failure to give proper notice is justification for suspension of work as specified in Standard Specification Section 104.07, Suspension of Work until proper notice is provided.

D. Fire Hydrant Obstruction:

1. Notify the local 911 center if access to a fire hydrant is temporarily obstructed or restricted.
2. Provide written confirmation to the Engineer that the local 911 center was notified.

743.05 Pavement Edge Drop-offs and Vertical Differences

Correct all pavement edge drop-offs at the end of each workday:

- A. Use Temporary Road Material (TRM) to accomplish this work with unless an alternate method is specified in the Plans.
- B. Fill all ruts and potholes with TRM as soon as possible.
- C. Place TRM in accordance with the applicable sections of the Delaware Standard Specifications;
 1. TRM is incidental to the appropriate item in the Contract.
 2. When temporary elimination of a drop-off hazard cannot be accomplished, follow the requirements of Section 6G.20 of the DE MUTCD:
 - a. Properly mark and protect the drop-off hazard with additional temporary barriers, barricades, warning signs, flashing lights, etc. .

Steel Plates:

Steel plates may be used to protect an open trench area accessible by vehicular traffic that cannot be backfilled prior to the end of the working day.

1. Submit steel plate shop drawings prepared and signed by a Professional Engineer registered in the State of Delaware for approval prior to the start of construction:
 - a. Show the intended method to brace, sheet, support, or shore the excavation to prevent a trench failure.
 - b. Show details of the plating design, the method of fastening plates, plate thickness, span, bearing and the method of preventing the movement of the plates.
 - c. When steel plates are placed on a travel lane or shoulder, follow the standards presented in Table 6G-1 of the Delaware MUTCD.
 - i. Provide a ramp (wedge) around the steel plate using TRM placed at a slope of 20 to 1 or flatter.
 - d. Steel plates are not permitted between November 1 and April 1, without the prior approval of the Engineer.

743.06 Temporary Pavement Markings

Apply temporary striping to locations that require permanent striping at the end of each day's operation and before traffic is returned to unrestricted roadway use.

- A. Apply temporary pavement markings in accordance with the requirements of Section 748 of the Delaware Standard Specifications, DE MUTCD and DeIDOT's Temporary Pavement Markings Policy.
- B. Submit to the temporary striping placement scheduling to the Engineer proving that the temporary striping can be completed prior to fully opening the roadway to

traffic prior to the start of any activity that requires the placement of temporary striping.

- C. Match temporary pavement striping to permanent pavement striping as shown on the Plans or as directed by the Engineer.
 - 1. Maintain temporary markings in at least the "Marginal" condition in accordance with the ATSSA Quality Guidelines.
 - 2. Maintain retroreflectivity levels in accordance with the appropriate temporary marking Special Provisions.
 - 3. Refresh the temporary pavement markings as required or as directed by the Engineer.
- D. Remove all conflicting striping as directed by the Engineer in accordance with 748530 Removal of Pavement Striping.
 - 1. Painting over the conflicting striping is not permitted unless specifically stated in the Plans.
- E. When pavement marking information is not provided in the Plans, prior to beginning construction:
 - 1. Submit for approval, detailed drawings that depict the existing pavement markings for each project location.
 - a. Include all lane and shoulder widths, turn lane lengths, locations of stop bars, turn arrows, crosswalks and railroad crossings;
 - b. Changes may be required to the final pavement markings;
 - 2. Approval is required prior to placement of any temporary pavement markings.

743.07 Travel Lane and Road Closure Restrictions

Travel lane and ramp closings are not permitted during the following holiday periods, unless otherwise noted on the plans:

- A. December 24 through December 27 (Christmas Day)
- B. December 31 through January 3 (New Years Day)
- C. Friday prior to Easter through Easter Sunday
- D. Thursday prior to Memorial Day through the Tuesday following Memorial Day
- E. Dover International Speedway Race Weekends (Thursday prior to the race event through the day after the race event)
- F. July 3 through July 5 (Independence Day)
- G. Thursday prior to Labor Day through the Tuesday following Labor Day
- H. Wednesday prior to Thanksgiving Day through the Monday following Thanksgiving Day

Additional time restrictions may apply as noted in the project plans or as directed by the Engineer.

743.08 General Construction

Place and install temporary traffic control devices at their specified location in accordance with Chapter 6 of the DE MUTCD and the manufacturer's installation instructions and recommendations prior to start of construction by personnel certified by the manufacturer when applicable. Submit personnel certification to the Engineer prior to installation of temporary traffic control devices.

Provide written certification within 24 hours of installation, or relocation, for certifying that temporary impact attenuators, crash cushions and temporary PCC safety barrier is properly installed and crashworthy in accordance with the manufacturer's current specifications and NCHRP 350 or MASH.

Maintain temporary traffic control devices throughout the duration of the Project. Replace damaged temporary traffic control devices within 24 hours of notification. After replacement is completed re-inspection and recertification is required as described above.

Repair or replace temporary traffic control devices damaged by actions of the Contractor at no cost to the Department.

Temporary traffic control devices are the property of the Contractor unless otherwise indicated in the Contract Documents.

743.09 Non-Compliance

Failure to comply with the requirements of this Section 743 is justification for suspension of work as specified in Standard Specification Section 104.07, Suspension of Work. Time charges will continue to be assessed until all deficiencies are corrected and certified.

- A. Failures include but are not limited to the following:
1. Deficiencies not corrected within 24 hours related to temporary traffic control or traffic control devices reported to the Contractor in writing unless otherwise directed by the Engineer.
 2. Non-compliance with the Delaware MUTCD, the specifications or the Plans.
 3. Unsafe operations.
 4. Placement of non-compliant temporary traffic control devices.
- B. Serious or willful disregard for the safety of the traveling public or construction workers, may result in the Engineer placing temporary traffic control devices in the proper configuration. The cost of corrections to temporary traffic control by the Engineer will be deducted from Contractor payments.

743.10 Item Specific Construction

A. Arrow Boards:

1. The arrow boards furnished remain the property of the Contractor.
2. The back panel of arrow boards must be equipped with three indicator lamps, visible to the work area indicating the proper functioning of the board.

B. Portable Changeable Message Sign (PCMS)

1. Approval is required from the Engineer prior to placement of the PCMS.
2. If approved messages are not provided in the Plans, submit a PCMS Approval Form to the Engineer for review and approval of messages and location of PCMS.
3. Have qualified and trained PCMS programmer(s) to program desired messages, and mechanic(s) to perform required service on the PCMS unit, available on a 24 hour basis.

C. Portable Light Assembly Unit (Floodlights):

1. Repair or replace portable light assembly units within 30 minutes or less after receipt of notification of an operational problem.
 - a. Failure to correct the problem within the required time frame will result in deduction of payment for the day the unit is not satisfactorily operating.
 - b. Designate an on-site representative to be the Department's contact person on all issues related to the light assembly. The on-site representative should be the ATSSA Traffic Control Supervisor. If an ATSSA Traffic Control Supervisor is not required by the Contract Documents, then the on-site representative can be the Superintendent, or designee.

D. Plastic Drums

1. Provide plastic drums as specified in the DE MUTCD.
2. Equip each plastic drum with a weighted sand filled base or other approved ballast material.
 - a. Do not weight drums with sand bags.
 - b. Do not weight drums with sand, water or any material to the extent that would make them hazardous to road users when struck.
3. A minimum of two fluorescent orange and two white prismatic retroreflective strips with the top stripe being fluorescent orange.
4. Plastic drums must meet applicable reflectivity requirements.

E. Reflector Panels

1. Provide reflector panels for enhanced conspicuity of P.C.C. Safety Barrier as specified in the DE MUTCD
2. Install reflector panels as specified in the DE MUTCD.

F. Traffic officers:

1. Use Traffic Officers in a highway work zone in accordance with the latest version of DeIDOT's "Guidelines for the Use of Uniformed Law Enforcement Officers in Work Zones."
2. All traffic officers are required to wear police officer uniforms.
3. Traffic officers outside of their vehicle are required to wear high-visibility safety apparel as required in DE MUTCD Section 6E.02.

4. Traffic officers ensure not just the safety of the construction personnel but the safety of the traveling public as well.
5. The Engineer may authorize additional officers to be used for speed enforcement.
6. Vehicles used are required to be marked police vehicles equipped as follows:
 - a. full external light bar that is clearly visible for 360 degrees around the vehicle and at a distance of not less than 300 feet under normal atmospheric conditions at night;
 - b. radar unit or any other speed-measuring device;
 - c. radio communication available to inform 911 and DeIDOT's Transportation Management Center (TMC) of traffic backups or other emergencies.
7. The traffic officers can be Town Police, Municipal Police, County Police or State Troopers in accordance with the jurisdictional location of the project and availability of the police officers. When questions of jurisdiction arise, the Delaware State Police Department will make the determination as to which force has jurisdiction.
8. Discuss with the Engineer in advance for approval of the schedule of hours and number of traffic officers anticipated for each site or operation. It will be the responsibility of the Contractor to explain to the officer the project activities pertaining to where the officer's services are needed.
9. Do not use Traffic officers to close lanes without additional temporary traffic control except for rolling road blocks or emergencies.
 - a. Rolling road blocks require advance approval from the Engineer through DeIDOT's Traffic Section.

G. P.C.C. Barrier (All Types)

1. For each P.C.C. Barrier Contract Item:
 - a. Use only one type of barrier per run;
 - b. Use the same type of connecting system on each segment;
2. Prior to installation, schedule pre-inspection of barrier with Engineer and District Safety Officer.
3. Ensure that all segments are free from defects and have no exposed reinforcing bar.
4. Install reflector panels in accordance with the DE MUTCD.
5. Remove barrier that does not meet the "Marginal" criteria of the ATSSA Quality Guidelines and replace with compliant segments of barrier.

H. Truck Mounted Attenuators (TMA):

1. TMA, Type I is to be used on highways with non-construction posted speeds up to and including 40 mph (70 km/h);
2. TMA, Type II is to be used on highways with non-construction posted speeds greater than 40 mph (70 km/h).
3. Have replacement components for the TMA readily available for immediate repair.
4. Equip all TMAs as follows:
 - a. Cover the entire height and width of the end of the TMA with 6"

- (150 mm) diagonal, inverted "V" stripes of retroreflective material placed 6" (150 mm) apart;
 - b. Mount on the TMA vehicle a amber high-intensity rotating, flashing, oscillating, or strobe light so that it is clearly visible for 360 degrees around the vehicle and at a distance of not less than 3,000 ft (915 m) under normal atmospheric conditions at night;
 - c. Provide a Type C arrow panel.
 - 5. Attach the TMA to the back of a truck in conformance with the manufacturer's recommendations.
 - 6. *TMA Truck Requirements:*
 - a. Do not exceed the manufacturer's recommended load rating of the truck. (Refer to Section 105.12 Load Restrictions);
 - b. The truck must be in good operating condition.
 - c. The truck must have a valid registration, registration number plate, current inspection documentation, weight verification, and proof of insurance.
 - 7. Only operators with a valid driver's license of the required class may operate the TMA truck.
- I. *Temporary Impact Attenuators (TIA) All Types:*
 - 1. Furnish one complete replacement (stand-by) attenuator systems of each type used;
 - a. Store replacement TIAs on-site;
 - b. Only replacement TIAs that are properly installed and accepted will be paid for at the unit bid price of Each.
 - c. Payment of stand-by attenuator will be through the respective furnish item for the type(s) of attenuator(s) furnished.
 - 2. Install attenuator systems in accordance with the manufacturer's instructions.
 - 3. Repair or replace damaged attenuator system within 24-hours of notification.
 - 4. Relocate the attenuator systems in accordance with the Plans or as directed by the Engineer.
 - 5. Provide written certification within 24-hours of installation or relocation to the Engineer.
- J. *Temporary Warning Signs and Plaques in Temporary Traffic Control Zones:*
 - 1. Provide warning signs and plaques in compliance with the Contract Documents, the DE MUTCD and the FHWA's "Standard Highway Signs and Markings" book;
 - 2. Cover existing permanent signs that conflict with any temporary warning signs.
 - 3. Use only approved sign posts to permanently mount signs facing traffic when required for more than three consecutive calendar days;
 - a. Install sign posts in accordance with the manufacturer's instructions;
 - b. Temporary sign stands for signs facing traffic for a period longer than three calendar days may be used only in the following situations:
 - i. To avoid drilling through permanent concrete to ground mount signs placed on concrete islands in the median of a divided highway or other similar locations. Proper ballasting material is required;

- ii. A documented utility conflict exists and field adjustments to the sign location cannot be made. Proper ballasting material is required. Provide documentation of the utility conflict to the Engineer prior to using temporary sign stands;
 - iii. Other unforeseen situations as approved by the Traffic Safety Section.
- 4. When a permanent ground mounted sign message is not applicable to the work operation or temporary traffic control setup it must be completely covered with a black plastic bag or an approved sign cover. For example: a permanently ground mounted detour sign that is in place for the duration of the Contract, but only utilized during certain periodic operations.
- 5. Use only approved temporary sign stands to mount signs facing traffic for periods less than or equal to three calendar days.
 - a. Remove any sign and temporary sign stand from the roadway that is no longer needed for a work operation or temporary traffic control setup.
- 6. Signs cannot be placed on bicycle lanes, sidewalks or shared use paths in a manner that restricts the use of these locations by pedestrian or bicycle traffic.

K. *Flaggers:*

- 1. Provide Flaggers meeting the following requirements:
 - a. Certified within the last 4 years by American Traffic Safety Services Association (ATSSA) or an equivalent approved equal;
 - b. Provide appropriate documents showing the flagger certification status for each flagger throughout the duration of Contract;
 - i. Flaggers are required to have their approved flagger card, and a photo identification card on their person at all times while flagging;
 - ii. The Engineer will require the replacement of any flagger that fails to produce approved flagger card and photo identification.
 - c. Have available a person certified to flag that can relieve the flag person for any necessary breaks.
 - d. Equip working flaggers with two-way radios or other approved communication devices.
 - i. Cellular telephones with or without push-to-talk features, MP3 players or other similar electronic devices are not approved communication devices.
 - ii. Use of a cellular telephone or other unapproved electronic communication device while performing flagging operations is justification for immediate removal of a flagger by the Engineer
 - e. Equip working flaggers with an audible warning device, such as a horn or whistle, to alert workers of an errant vehicle
- 2. Any flagger not performing duties in accordance with the specifications is justification for suspension of work as specified in Standard Specification Section 104.07, Suspension of Work.
 - a. Once the offending flagger is replaced and all flaggers are in compliance with the requirements of this specification, the work may resume.
 - b. Flagger Cards may be confiscated from personnel flagging

improperly.

- i. The Engineer will contact the Contractor's supervisor who will then confiscate the card from the flagger;
 - ii. Turn the card over to the Engineer, who will forward it to DeIDOT's Safety Section;
 - iii. The Safety Section will either forward the card to ATSSA's main office, or send a letter if the person refuses to give up the card, in order to remove the individual's name from the certified list;
 - iv. Any flagger whose card has been confiscated must be retrained and retested prior to consideration for reinstatement;
- c. At least one month must pass after the infraction before retraining and retesting any flagger whose card has been confiscated.

L. ATSSA Certified Traffic Control Supervisor:

1. Provide ATSSA certified Traffic Control Supervisors for the term of the Project.
 - a. ATSSA certified Traffic Control Supervisor must be an employee of the General Contractor
 - b. Submit a copy of the certification for the ATSSA certified Traffic Control Supervisors at time of bid.
2. The responsibility of the ATSSA certified Traffic Control Supervisors is the maintenance of traffic and temporary traffic control devices throughout the project.
 - a. This responsibility includes, but is not limited to:
 - i. The installation, operations, maintenance and service of temporary traffic control devices;
 - ii. Daily maintenance of a log to record maintenance of traffic activities;
 - a.) including the number and location of temporary traffic control devices; and
 - b.) times of installation, changes, and repairs.
 - iii. Serve as the liaison with the Engineer concerning the temporary traffic control devices and the maintenance of traffic.

743.11 Method of Measurement

The Engineer will measure temporary traffic control devices as those acceptably furnished, installed, maintained, relocated, removed, and completed as specified.

743.12 Basis of Payment

Price and payment constitutes full compensation for installation, maintenance, and relocation of pay items at the pay unit(s) below; removal when no longer required; and for all labor, tools, equipment and necessary incidentals to complete the work included in the items listed below. Payment will only be made for those TTC devices and flaggers in place on the roadway and protecting active construction operations that have the required certification and required information on board. No payment will be made for TTC devices and flaggers available or in storage but not in use. The Engineer

will not pay for stolen or misused temporary traffic control devices or for temporary traffic control devices that become unusable due to normal wear. Payment will be made for accepted quantities at the contract unit price as follows:

<u>Item</u>	<u>Description</u>	<u>Pay Unit</u>
743000	Maintenance of Traffic	LS
743001	Arrow Panels Type A	EA-DY
743002	Arrow Panels Type B	EA-DY
743003	Arrow Panels Type C	EA-DY
743004	Furnish and Maintain Portable Changeable Message Board	EA-DY
743005	Furnish and Maintain Portable Light Assembly (Flood Lights)	EA-DY
743006	Plastic Drums	EA-DY
743007	Traffic Officers	HOUR
743008	Reflector Panels	EACH
743009	Furnish and Maintain Truck Mounted Attenuator, Type I	EA-DY
743010	Furnish and Maintain Truck Mounted Attenuator, Type II	EA-DY
743011	Crash Cushion (Sand Barrels)	EACH
743012	Relocating Crash Cushion (Sand Barrels)	EACH
743013	Furnishing Portable PCC Structure Mounted Safety Barrier (Pinned Barrier)	LF
743014	Relocating Portable PCC Structure Mounted Safety Barrier	LF
743015	Furnish and Maintain Portable PCC Safety Barrier	LF
743016	Relocating Portable PCC Safety Barrier	LF
743017	Portable Barrier	LF
743018	Relocating Portable Barrier	LF
743019	Temporary Tubular Delineators	EACH
743020	Install Portable Impact Attenuator	EACH
743021	Furnish Portable Impact Attenuator	EACH
743022	Relocate Portable Impact Attenuator	EACH
743023	Temporary Barricades, Type III	LF-DY
743024	Temporary Warning Signs and Plaques	EA-DY
743025	Install Temporary Impact Attenuator	EACH
743026	Furnish Temporary Impact Attenuator - Gating, Non-Redirective, Test-Level 2	EACH
743027	Furnish Temporary Impact Attenuator - Gating, Non-Redirective, Test-Level 3	EACH
743028	Furnish Temporary Impact Attenuator - Non-Gating, Redirective, Test-Level 2	EACH
743029	Furnish Temporary Impact Attenuator - Non-Gating, Redirective, Test-Level 3	EACH
743030	Relocate Temporary Impact Attenuator	EACH
743031	ATSSA Certified Traffic Control Supervisor	HOUR
743050	Flagger, New Castle County, State	HOUR
743051	Flagger, Kent County, State	HOUR
743052	Flagger, Sussex County, State	HOUR
743053	Flagger, New Castle County, Heavy Construction, State	HOUR
743054	Flagger, Kent County, Heavy Construction, State	HOUR
743055	Flagger, Sussex County, Heavy Construction, State	HOUR
743056	Flagger, New Castle County, Federal	HOUR

<u>Item</u>	<u>Description</u>	<u>Pay Unit</u>
743057	Flagger, Kent County, Federal	HOUR
743058	Flagger, Sussex County, Federal	HOUR
743059	Flagger, New Castle County, Heavy Construction, Federal	HOUR
743060	Flagger, Kent County, Heavy Construction, Federal	HOUR
743061	Flagger, Sussex County, Heavy Construction, Federal	HOUR
743062	Flagger, New Castle County, State, Overtime	HOUR
743063	Flagger, Kent County, State, Overtime	HOUR
743064	Flagger, Sussex County, State, Overtime	HOUR
743065	Flagger, New Castle County, Federal, Overtime	HOUR
743066	Flagger, Kent County, Federal, Overtime	HOUR
743067	Flagger, Sussex County, Federal, Overtime	HOUR
743068	New Castle County, Heavy Construction, State, Overtime	HOUR
743069	Flagger, Kent County, Heavy Construction, State, Overtime	HOUR
743070	Flagger, Sussex County, Heavy Construction, State, Overtime	HOUR
743071	Flagger, New Castle County, Heavy Construction, Federal, Overtime	HOUR
743072	Flagger, Kent County, Heavy Construction, Federal, Overtime	HOUR
743073	Flagger, Sussex County, Heavy Construction, Federal Overtime	HOUR

A. Method of Measurement and Basis of Payment for 743007 - Traffic Officers:

1. For bidding purposes, the unit price is fixed at \$75.00 per hour. Actual payment is based on the submitted invoice from the police department plus ten (10) percent. Payment constitutes full compensation for the traffic police officer's wages, vehicle and equipment, the Contractor's allowable administrative cost and any necessary incidentals.

B. Basis of Payment for 743000 – Maintenance of Traffic:

1. Price and payment will constitute full compensation for all maintenance of traffic activities accepted by the Engineer, including submission of temporary traffic control plans, submitting certifications, traffic cones, correction of edge drop-offs, and for all labor, equipment, tools and incidentals necessary to complete the item.
2. The cost to move temporary traffic control devices in accordance with the temporary traffic control plan or as necessary to address safety issues is included in this item.

C. If work is not completed within the contract completion time (including approved time extensions), provide the necessary temporary traffic control devices that are required to complete any remaining work. The cost of such temporary traffic control will be borne by the Contractor. No additional payment will be made to maintain traffic in accordance with the DE MUTCD, contract plans and specifications. Temporary traffic control items include, but are not limited to, temporary warning signs, barricades, plastic drums, P.C.C. safety barrier, flaggers, traffic officers, arrow panels, portable changeable message signs, portable light assemblies and temporary impact attenuators.

D. The Department will not make payment for any temporary traffic control devices when the Contractor sets up temporary traffic control to perform work, but

fails to perform any work. This does not include long-term temporary traffic control set-ups that are installed as part of the maintenance of traffic plans outlined in the contract documents.

- E. If steel plates are used, the cost of furnishing and installing steel plates, bracing, sheeting, supporting or shoring the excavation, the preparation of shop drawings, and TRM wedge material are incidental to the item being constructed.

Subsection 746.03 Construction Methods. (3/18/2004)

Delete the last paragraph. Insert the following two sentences:

The concrete for pole bases shall be placed in accordance with the applicable requirements of Section 602. The bases shall be edged and have a broom finish.

Subsection 748.09 Application. (5/15/2006)

Add the following at the end of this subsection:

- (f) *Removal of Pavement Markings when they are not properly applied.*

When it is necessary to remove pavement markings the following shall apply:

- (1.) For paint and epoxy resin, shot/abrasive grit blasting or water blasting equipment shall be used.
- (2.) For alkyd thermoplastic, in addition to the removal techniques discussed for paint and epoxy, burning or grinding equipment may be used.

The removal operation shall be performed in a manner that will not damage the pavement surface to a depth more than 1/8 inch. The contractor must satisfactorily demonstrate his/her proposed equipment and method of removal. Alternative equipment and methods will be considered if satisfactory results can be demonstrated.

The contractor shall collect and dispose of all shot/abrasive grit and pavement marking materials removed from the pavement surface. Washing or sweeping such materials to the roadside will not be permitted.

(3.) After removal of striping on bituminous concrete pavement, approved flat black paint or asphalt sealer shall be used to cover any exposed aggregate or embedded paint. Price and payment will also include payment for black paint or asphalt sealer.

Subsection 748.10 METHOD OF MEASUREMENT. (10/10/2011)

Delete Subsection 748.10 and replace with the following:

748.10 Method of Measurement. The different types of pavement markings will be measured as follows:

- (1) *Temporary Markings.* The quantity of temporary pavement markings will be measured by the linear foot (linear meter) of 4" (125 mm) line and by the square foot (square meter) for symbols, installed and accepted.
- (2) *Permanent Markings.* The quantity of permanent pavement markings will be measured by the linear foot (linear meter) of 5" (125 mm) line and by the square foot (square meter) for symbols, installed and accepted.

The linear foot (linear meter) of 4" (100 mm) and 5" (125 mm) line refers to all 4" (100 mm) and 5" (125 mm) lines parallel to the centerline. The square foot (square meter) of symbols refers to all STOP bars, transverse lines, arrows, and words. All symbols will be measured according to the following square foot (square meter) values.

Straight Arrow	12.5 ft ² (1.2 m ²)
Left and Right Arrow Symbol	15.5 ft ² (1.4 m ²)
Combination Arrow	20 ft ² (1.9 m ²)
"Only" Legend	23 ft ² (2.1 m ²)
"School" Legend	35 ft ² (3.3 m ²)
"Stop" Legend	23.5 ft ² (2.2 m ²)
8" (200 mm) Transverse Line	0.66 ft ² per linear foot (0.20 m ² , per linear meter)
12" (300 mm) Transverse Line	1.00 ft ² per linear foot (0.30 m ² , per linear meter)
16" (400 mm) Transverse Line	1.33 ft ² per linear foot (0.41 m ² , per linear meter)
24" (600 mm) Transverse Line	2.00 ft ² per linear foot (0.61 m ² , per linear meter)
"R X R" Railroad Crossing Symbol	69 ft ² (6.4 m ²)
Left and Right 18' Lane Reduction Arrow	40.9 ft ² (3.8 m ²)

Subsection 748.11 BASIS OF PAYMENT. (10/10/2011)

Replace the 1st paragraph with the following:

748.11 Basis of Payment. The quantity of temporary and permanent paint pavement marking will be paid for at the Contract unit price per linear foot (linear meter) for 4" (100 mm) and 5" (125 mm) line and the Contract unit price per square foot (square meter) of symbol. The quantity of permanent alkyd thermoplastic pavement marking will be paid for at the Contract unit price per linear foot (linear meter) of line and the Contract unit price per square foot (square meter) of symbol unless payment is reduced due to below minimum reflectivity as described below:

SECTION 753 - ADJUSTING SANITARY SEWER LATERALS. (10/12/2010)

Delete in its entirety and replace with the following:

753.01 Description. This work consists of adjusting sewer connections that interfere with the proposed construction or which are damaged by unavoidable construction operations.

753.02 Materials. Materials for adjusting sanitary sewer laterals shall conform to the following Sections:

Backfill Material, Borrow Type C	209 (For use under all roadways)
Portland Cement Concrete, Class B	812
Stone, Delaware No. 8	813

All pipe, fittings, and hardware shall conform to the requirements shown on the Plans and to the standards and specifications of the utility owner.

753.03 Construction Methods. All sewer connections shall be adjusted in accordance with the details shown on the Plans and the standards and specifications of the utility owner or operator, and as directed by the Engineer. The Contractor shall acquaint itself with these standards and specifications prior to the submission of a proposal for the construction of the work included in the Contract documents.

The location of the sewer connections are shown on the Plans based on the best information available at the time of bid. It is the Contractor's responsibility to verify the location of sewer laterals by digging test holes where necessary and excavating by hand to avoid unnecessary damage to existing sewer laterals and adjacent property. Any damages to adjacent property resulting from the contractor's failure to use proper care in locating and avoiding damage to existing sanitary sewer laterals will be the responsibility of the Contractor.

No changes to the location of sanitary sewer laterals shall be made without the approval of the Engineer or the Engineer's authorized representative. The contractor must notify the property owner 48 hours prior to relocating any sanitary sewer laterals.

All existing sanitary or combined sewers must be retained in service during construction and until acceptance of portions of new replacement facilities. Temporary piping, if necessary, shall be utilized to maintain service during construction. All construction shall be coordinated with the utility owner or operator prior to the interruption for temporary connections or new facilities of existing sanitary or combined sewers.

753.04 Method of Measurement. The quantity of sanitary sewer laterals adjusted will be measured as the actual number of laterals adjusted and accepted.

753.05 Basis of Payment. The quantity of sanitary sewer laterals adjusted will be paid for at the unit price per each. Price and payment will constitute full compensation for all necessary locating, excavating, test hole excavating, Type C backfill, backfilling, compacting, and disposing of excess material; for all cribbing, shoring, and sheeting; for furnishing and installing pipe and fittings regardless of size; for concrete encasement of fittings, regardless of size; for concrete encasement of fittings and joints, if required; and for all material, labor, equipment, tools, and incidentals required to complete the work.

SECTION 760 – PAVEMENT – MILLING. (3/28/2012)

RUMBLE STRIPS

Description:

Cut rumble strips in bituminous concrete pavement or portland cement concrete (PCC) pavement in accordance with the notes and details on the Plans and as directed by the Engineer.

Construction Methods:

1. Provide a machine designed for cold-milling rumble strips in bituminous concrete pavement or P.C.C. pavement.
 - a. Equip machine with guides to provide uniformity and consistency in alignment of each cut;
 - b. Cut the rumble strips to the dimensions shown in the notes and details on the Plans without tearing or snagging;
 - c. Pickup and dispose of the waste material resulting from cutting rumble strips in accordance with Subsection 106.09. Wasting millings over the shoulder's edge will not be permitted.

Method of Measurement:

The Engineer will measure rumble strips longitudinally as the actual number of linear feet (linear meters) acceptably installed.

The twelve foot openings in bike-friendly rumble strips will not be measured for payment.

Basis of Payment:

Price and payment will constitute full compensation for all labor, tools, equipment, disposal of waste material and necessary incidentals to complete the work.

<u>Item</u>	<u>Description</u>	<u>Pay Unit</u>
760011	Rumble Strips, Full Lane Width	L.F. (L.M.)
760012	Bike-Friendly Rumble Strips, Hot-Mix	L.F. (L.M.)
760013	Bike-Friendly Rumble Strips, Concrete	L.F. (L.M.)
760014	Rumble Strips, Hot-Mix, Shallow Depth	L.F. (L.M.)
760015	Rumble Strips, Concrete, Shallow Depth	L.F. (L.M.)
760016	Rumble Strips, Hot-Mix	L.F. (L.M.)
760017	Rumble Strips, Concrete	L.F. (L.M.)
760018	Rumble Strips, Center Line, Hot-Mix	L.F. (L.M.)
760019	Rumble Strips, Center Line, Concrete	L.F. (L.M.)

Subsection 760.04 Basis of Payment. (5/15/2006)

Modify the paragraph as follows:

The quantity of pavement-milling will be paid for at the Contract unit price per square yard per inch of depth (square meter per 25 millimeters of depth) or at the Contract unit price per square yard (square meter). Price and payment will constitute full compensation for milling or planing the existing pavement; for the cleanup of the hot mix or concrete residue wedge left from the milling operation including but not limited to along the curb line, adjacent to speed humps, across intersecting streets, around manholes, and at the beginning and ending points of the milling operation, for removing and disposing of the milled material; and for all labor, tools, equipment, and incidentals required to complete the work.

SECTION 762 SAW CUTTING PORTLAND CEMENT AND BITUMINOUS CONCRETE PAVEMENT: (3/28/2012)

Modify Section Name and replace existing language with the following:

762.01 Description. Mechanically saw cut patch edges or tie-in joints into existing pavement.

762.02 Construction Methods.

1. Use a suitable walk behind, motor driven, wet type diamond blade, circular cutter with control devices, mounted on a sturdy frame designed to cut portland cement concrete and hot-mix, hot-laid, bituminous concrete pavements.
2. Cut a groove in a straight line to sufficient depth to produce an even, neat joint to allow for removal of material without damage to adjacent pavement.
 - a. Continuously supply water to the cutting blade either by water tank on the equipment or by other means.
 - b. Saw cut portland cement concrete pavement the full depth of the pavement.
3. Other equipment may be used for saw cutting hot-mix, hot-laid bituminous concrete.
4. Continuously remove waste material created by saw cutting in accordance with Subsections 106.09 and 110.17.

762.03 Method of Measurement. The quantity of saw cutting portland cement concrete and hot-mix, hot-laid bituminous concrete will be measured as the actual number of linear feet (linear meters) of pavement saw cut and accepted, measured along the cut, end to end.

762.04 Basis of Payment. The quantity of saw cutting portland cement concrete and hot-mix, hot-laid bituminous concrete will be paid for at the Contract unit price per linear foot (linear meter). Price and payment will constitute full compensation for saw cutting portland cement concrete and hot-mix, hot-laid bituminous concrete, disposing of waste material in compliance with Subsection 106.09, and for furnishing all materials, labor, equipment, tools, and incidentals required to complete the work.

Subsection 762.02 Construction Methods. (9/4/2009)

Modify the last sentence in the paragraph as follows:

When saw cutting portland cement concrete or hot-mix, hot-laid bituminous concrete for removal of pavement, the depth of saw cut shall be the full depth of the pavement.

Subsection 808.02 Portland Cement Concrete Pavement. (5/15/2006)

Modify Subpart (a) as follows:

a. *Hot-Poured Joint Sealant.* Hot-poured joint sealant shall conform to AASHTO M 324(Type-IV) or AASHTO M 282.

Subsection 808.04 Portland Cement Concrete Structures. (5/15/2006)

Modify Subpart (c) as follows:

c. *Bituminous Joint Sealant.* Bituminous joint sealants may be hot applied conforming to AASHTO M 324 Type-I, or cold applied elastomeric sealant conforming to Federal Specification SS-S-200E (2), Type H.

Subsection 808.06 Portland Cement Concrete Curb and Integral Curb and Gutter. (5/15/2006)

Modify the 1st Sentence as follows:

Materials for portland cement concrete curb and integral curb and gutter shall be preformed expansion joint material of ½" (13 mm) nominal thickness and shall conform to the requirements of AASHTO M 153, Type II.

Section 812 Portland Cement Concrete. (3/28/2012)

Delete Section 812 and all Previous Supplemental Updates in their entirety and replace with the following:

812.01 Description. This material consists of portland cement, supplementary cementitious materials, fine aggregate, coarse aggregate, water, and/or admixtures mixed in the specified proportions for the required class of concrete.

812.02 Materials.

(a) **Portland Cement** – conform to the requirements of Section 801.

(b) **Blended Hydraulic Cement** – conform to the requirements of ASTM C1157.

(c) **Fly Ash** – conform to the requirements of Section 822, with total alkali content less than 3.0%, and a CaO content ≤ 8.0%.

(d) **Ground Granulated Blast Furnace Slag** – conform to the requirements of AASHTO M 302, Grade 100 or 120.

(e) **Silica Fume** – conform to the requirements of AASHTO M 307.

(f) **Water** – conform to the requirements of Section 803.

(g) **Fine Aggregate** – conform to the requirements of Section 804.

- (h) **Coarse Aggregate** – conform to the requirements of Section 805. Conform the gradation to the requirements of Section 813 or AASHTO M 43 as applicable.
- (i) **Fibers** – conform to the requirements of Subsection 824.02(j).
- (j) **Air Entrainment agents** – conform to the requirements of AASHTO M154.
- (k) **Chemical Admixtures** – conform to the requirements of AASTHO M194 for the seven types as follows:
 - (1) Type A – Water reducing
 - (2) Type B – Retarding
 - (3) Type C – Accelerating (Non- Chloride)
 - (4) Type D – Water Reducing and Retarding
 - (5) Type E – Water Reducing and Accelerating
 - (6) Type F – Water Reducing, High Range
 - (7) Type G – Water Reducing, High Range and Retarding
- (l) **Lithium Admixtures** – shall be certified as nonhazardous based on the heavy metal content.
- (m) **Curing Materials** –as follows:
 - (1) Liquid Membrane compounds – conform to the requirements of AASHTO M 148, Type 2, Class A or B white pigmented liquid curing compounds.
 - (2) Sheeting – conform to the requirements of AASHTO M 171.
 - (3) Burlap – conform to the requirements of AASHTO M 182.
 - (4) Water – conform to Section 803.

812.03 Concrete Mix

A. Concrete Mix Designs.

Furnish a mix design for each class of concrete to be used. For normal weight concrete mixes, use the absolute volume method per ACI Publication 211.1. For lightweight concrete, select mix proportions based on trial mixes with the cement factor rather than water/cement ratio being determined by the specified strength per ACI Publication 211.2.

Design portland cement concrete mixes using properties specified in **Table 812.03-1a and Table 812.03-2a**. Obtain approval for each mix design used in project production. Submit each job mix formula at least 30 days before concrete production. Include laboratory test data and samples of all materials to be used in the mix in accordance with 812.03B. Identify the proposed source of the materials in each mix design.

Table 812.03-1a. Concrete Classes for Structures

Class of Concrete	Maximum w/cm ratio	Air Content (Percent)	Minimum 28-day Compressive Strength f'_c (psi)	Minimum 28-day Compressive Strength f'_c (MPa)	Maximum Permeability (Coulombs)
A	0.40	4.0 – 7.0	4,500	31.0	1,500

Class of Concrete	Maximum w/cm ratio	Air Content (Percent)	Minimum 28-day Compressive Strength f'_c (psi)	Minimum 28-day Compressive Strength f'_c (MPa)	Maximum Permeability (Coulombs)
B	0.45	4.0 – 7.0	3,000	20.7	3,000
B/SF	0.40	4.0 – 7.0	3,500	24.1	2,500
C	0.50	4.0 – 7.0	2,000	13.8	3,500
D	0.40	4.0 – 7.0	4,500	31.0	1,500

Notes:

- (a) Class A concrete for approach slabs and Class D concrete for decks require the use of nonferrous reinforcement fibers at a rate of 1.5 lb per cubic yard (0.90 kg per cubic meter).
- (b) Water reducing admixture(s) is required in all classes of concrete. Determine the quantity and type or combination of admixtures based on the admixture manufacturer recommendations, ambient temperature, concrete batch temperature(s), geometry of the work, concrete mix proportions, etc. The Contractor is responsible for the quality of the concrete placed in any weather or atmospheric conditions. Failure to produce a mix satisfying the contract specifications will be corrected as directed by the Engineer at the Contractor's expense.
- (c) If a Type F or G admixture is used, the maximum allowable slump may be increased not to exceed 8-inches (120 mm).
- (d) Concrete can only be placed only if the surface evaporation rate, as affected by ambient air temperature, concrete temperature, relative humidity, and wind velocity is less than or equal to 0.15 lb per square foot per hour (0.73 kg per square meter per hour) as published in ACI 305R-95 chart developed by Delmar Bloem. Copies of the chart may be obtained from the Department's Materials & Research Section.
- (e) The following test procedures will be used for verifying mix properties:
 - (1) Mix Consistency: AASHTO T 119
 - (2) Air Content: AASHTO T 152 Modified or AASHTO T 196
 - (3) Permeability: AASHTO T 277
 - (4) Making and curing concrete test specimens: AASHTO T 23
 - i) Provide a protective environment in accordance with AASHTO T 23 for the first 24 to 48 hours at no expense to the Department.

Table 812.03-2a. Concrete Consistencies

Type of Work	Nominal Slump (inches)	Nominal Slump (mm)
Formed Elements:		
Sections < 12 in.	1 to 3	25 to 75
Sections ≥ 12 in.	1 to 4	25 to 100
Cast-in-place piles/drilled shafts not vibrated	5 to 8	125 to 200
Concrete placed under water	5 to 8	125 to 200
Filling for riprap	3 to 7	75 to 175
Slip Formed elements	0.5 to 1.5	12 to 37

Use only Type F or Type G admixtures for slumps greater than 4 inches (100 mm) . The maximum allowable slump may be increased to but not exceed 8-inches (200 mm).

Evaluate coarse and fine aggregates for use in portland cement concrete for potential alkali-silica reactivity (ASR) using at least one of the means referenced in table 812.03-3a along with any field service records available for the materials in question. If a field service record for a particular source includes evidence of deleterious ASR occurring in that source, then that source shall be classified as potentially reactive regardless of any laboratory test result for that source. Provide test results of the proposed aggregates, stamped by a Professional Engineer to the Engineer for review at least 30 days prior to the incorporation of the mixture on a Department project.

Table 812.03-3a

Tests and Criteria for Proposed Aggregate		
Procedure	Description	Limit
AASHTO T303 ⁽¹⁾	Mortar Bar Expansion	< 0.08% at 28 days
ASTM C1293	Concrete Prism Expansion	< 0.04% at 1 year

¹ modify the w/cm ratio of the mortar to 0.47

Take mitigation steps if the proposed concrete mixture design exceeds any of the limits referenced above, or the aggregate has demonstrated deleterious ASR in the field. Mitigation steps can incorporate one, or a combination of, the following materials:

- Low Alkali Cement having an alkali content of 0.40 or less,
- Blended hydraulic cement
- Ground Granulated Blast Furnace Slag

- Silica Fume
- Fly Ash
- Lithium Admixture at a dosage rate based upon the sodium oxide equivalent (AASHTO M 85) of the Portland cement component of the concrete. For specific details on lithium testing required, see the attached page under Section I – Mixture Design in Appendix A.

Evaluate the effectiveness of mitigation steps by testing according to table 812.03-3b. All mixture design testing will be performed by a laboratory approved by the Engineer. Provide test results of the proposed concrete mixture components to the Engineer for review at least 30 days prior to the incorporation of the mixture .

Table 812.03-3b

Tests and Criteria for Proposed Concrete Components		
Procedure	Description	Limit
ASTM C1567 (modified ^{1,2})	Mortar Bar Expansion	< 0.08% at 28 days
ASTM C1293 (modified ³)	Concrete Prism Expansion	< 0.04% at 2 years

¹Low alkali cement cannot be evaluated by either of these test methods. If low alkali cement is used with aggregate shown to be potentially reactive as the only measure to minimize the ASR potential of the concrete, then the total alkali loading of the concrete mix design from the Portland cement cannot exceed 2.5 lb/yd³.

²When evaluating lithium admixture, alone or in combination with ground granulated blast furnace slag, fly ash, or silica fume, four modifications to ASTM C1567 will be incorporated in the testing as referenced in, Section II – Footnote in Appendix B.

³The modifications to C1293 necessary to meet this table are described in the FHWA publication 'Guidelines for the Use of Lithium to Mitigate or Prevent Alkali-Silica Reaction', publication number FHWA-RD-03-047, July 2003, pages 60-62.

B. Concrete Trial Batches.

Conduct trial batch testing of the proposed mix and submit test results showing specified minimum strength, air content, aggregate gradation, workability requirements, permeability, and ASR expansion limits. Break histories in accordance with ACI 318M may be submitted to the Department for consideration in lieu of trial batches. The minimum sample population is 10 batches. Approval of proposed mix designs will be based upon criteria established in ACI 214 where the probability for any test property failing to meet contract criteria is not greater than 10% (Probability factor (p) not less than 1.30).

Establish exact proportions by testing trial mixes, and adjust to produce concrete that meets plasticity and workability requirements. Show aggregate

proportions in terms of saturated surface dry condition. The producer must monitor aggregate moisture content during production and make batch weight adjustments necessary to maintain mix consistency.

C. Mix Design Changes.

Provide a new mix design, based on trial mixes, for approval when there is any change in the source or character of materials used during production of concrete for the project. Provide the approved mix design proportions prior to concrete production.

D. Concrete Mix Design for Patches.

Early Strength concrete mix Designs

1. Early strength mix designs must meet all the requirements of this specification except that the minimum strength requirement is 2,000 psi before the work can be opened to vehicular traffic. The age at which this strength can be obtained will be per the contract schedule requirements.
2. Early strength can be obtained through the use of portland cement (type I, II, or III) and/or chemical admixtures meeting the requirements of 812.02.
3. All Early strength mix designs will be approved through successful trial batches per section 812.03

812.04 Handling and Storage of Materials

(a) Aggregates

- (1) Locate aggregate stockpiles on hard, clean, surfaces with positive drainage constructed of materials such as portland cement concrete or bituminous concrete of sufficient thickness to support the required traffic loads for this application. The base surface must be approved prior to stockpiling aggregates. If at any time the stockpile surfaces deteriorate and possibly contaminate aggregate stockpiles, concrete operations will immediately be suspended until such time as the surface is repaired to the satisfaction of the Engineer. Maintain suitable partitions to segregate and contain fine and coarse aggregate stockpiles. Coarse and fine aggregate must be kept segregated until batching.
- (2) Stockpile fine aggregates at the batch plant for a minimum of 24 hours prior to batching until surplus water has drained and the material has a uniform free moisture content. Batching directly from the washing plant is prohibited. Suitable partitions must be constructed to prevent wet fine aggregates from mixing with fine aggregate used for batching.
- (3) Construct haul roads to the concrete plants to prevent any deleterious materials from entering the batching process. If deleterious materials are discovered anywhere in the batching process, the operation will immediately be suspended until the conditions are corrected to the satisfaction of the Engineer.

(b) Cementitious Materials

- (1) Store Cement in suitable structures which protect the material from hydration.
- (2) Any cement or cementitious material which shows signs of hydration such as lumps or cakes shall not be used.

(c) Admixtures

- (1) Store admixtures so that contamination, stratifications, or deterioration is prevented.
- (2) Agitate admixtures thoroughly to the satisfaction of the Engineer.
- (3) When admixture dosage rates differ from the manufacturer's recommendations, discontinue the use of admixture until the cause of the problem is identified and corrected to the satisfaction of the Engineer.

812.05 Mix Temperature Limitations

- (a) Measure all temperatures at the point of placement.
- (b) The maximum allowable temperature for Class D concrete for bridge decks is 85 F.
- (c) The maximum allowable temperature for all other classes of concrete is 90 F.
- (d) The minimum allowable temperature for all classes of concrete is 50 F.
- (e) Take appropriate actions in accordance with ACI 318 recommendations for Hot Weather Concrete when batch temperatures at the mixing plant reach 6 degrees below the maximum allowed for the class of concrete being produced.
- (f) Take appropriate actions in accordance with ACI 306 recommendations for Cold Weather Concrete when batch temperatures at the mixing plant reach 6 degrees above the minimum allowable for the class of concrete being produced.

812.06 Delivery of Fresh Concrete Batches

- (a) The maximum allowable elapsed time between the introduction of the mix water and the final placement for slip form mixes is 45 minutes for non-agitating transport vehicles and 60 minutes for agitating transport vehicles.
- (b) The maximum allowable elapsed time between the introduction of the mix water and the final placement for all other mixes is 30 minutes for non-agitating transport vehicles and 60 minutes for agitating transport vehicles.
 - (1) The delivery time restrictions may be extended with the use of approved water reducing admixtures, set retarding admixtures, and/or replacement of a portion of the portland cement content with Fly Ash Cement or Ground Granulated Blast Furnace Slag Cement. All properties of the mix design will be verified through successful trial batches.
- (c) The interval between successive loads cannot exceed the lesser of
 - (1) 20 minutes, or
 - (2) the surface of the previous load exhibits signs of setting and cannot be mobilized through the use of mechanical concrete vibrators.

812.07 Plant Equipment Requirements

- (a) Meet the requirements of AASHTO M 157 except as modified herein.
- (b) Equip concrete batch plants for automatic batching and proportions of cement, aggregates, and water and visual observation of automatic insertion of admixtures.
 - (1) Weigh individual aggregates to within 1% of the target weight.
 - (2) Weigh combined aggregates to within 1% of the total target aggregate weight.
 - (3) The required batch quantity of water measured by either weight or volume must be within 1%.
 - (4) Weigh cement within 1% of the target batch weight.
 - (5) Admixture dispensers must be accurate to 1% of target volume.
- (c) Provide a computer printed ticket for each batch issued by the plant to the truck driver containing the following:

- (1) Name and location of the plant.
 - (2) Approved mix designation per table 812.01-2a
 - (3) Size and proportions of the batch.
 - (4) Type(s) and dosage rate(s) of admixture(s) used.
 - (5) Batch time as defined in 812.06.
 - (6) Allowable water in gallons withheld from meeting the maximum allowable water/cement ratio for the approved mix design.
- (d) Bins and hoppers must meet the requirements of section 812.04(a).
- (e) Weighing scales:
- (1) Scales for weighing material must be of rugged design, constructed to support the hopper or hoppers with minimum adjustments consistent with the accuracy required.
 - (2) Scales rated to 5,000 lbs or less measure in graduations not greater than 5 pounds.
 - (3) Scales rated greater than 5,000 lbs shall measure in graduations not greater than 0.1% of the maximum rated load.
 - (4) Maintain scales within a maximum tolerance of 0.5% of the net load in the hopper.
 - (5) Retain at least one set of the following calibration weights for verifying scale calibrations
 - (i) Ten standard 50 lb blocks
 - (ii) Eleven standard 20 kg blocks, one standard 5 kg block, and two standard 1 kg block.
 - (iii) The weights shall be constructed of high quality cast iron and finished in such a manner that foreign materials do not adhere to the surface.
 - (iv) These weights may be checked at the Engineer's discretion.
- (f) Central Mix plants
- (1) Central mix plants must be capable of weighing and mixing all materials for portland cement concrete before placing batches into approved transport vehicles.
 - (2) The minimum mixing time for batches of 10 cubic yards or less will be 60 seconds.
 - (3) The minimum mixing time for batches greater than 10 cubic yards will be determined by the Engineer.
 - (4) Mixing time begins when all materials excluding mix water have been added to the mixing drum.
- (g) Truck mixed portland cement concrete batches
- (1) Mix each batch greater than 70 but less than 100 revolutions at a rate of rotation specified by the manufacturer.
 - (2) Inspect mixer drums annually for wear and have verified by the Department's Materials and Research section.
 - (3) Keep interior drum surfaces clean of accumulations of hardened concrete material.
 - (4) Replace drum blades when wear exceeds 1 inch of original height.
 - (5) Do not load truck mixers greater than the maximum gross vehicle weight.
 - (6) Do not exceed the manufacturers rating for the size of the batch which may be transported in these units when used as an agitator.
- (h) Volumetric Truck Mixers
- (1) Calibrate volumetric truck mixers by the Department's Materials and Research section annually or within 12 months of being used on a DeIDOT project.
 - (2) Equip each truck with a ¼ cubic yard box constructed of suitable rigid materials

- at all times for calibration purposes.
- (3) Dispense cement at a constant volumetric weight equivalent during mixing operations. Calibrate aggregate bins at various gate openings to discharge the volumetric weight equivalent of aggregate required for the approved concrete mix.
 - (4) Dispense water through a calibrated meter displaying the discharge rate into the mixing auger.
 - (5) Provide only approved trucks capable of mixing batched materials sufficiently to dispense a uniformly homogenous mix at the point of placement with no further mixing required.
 - (6) The following tolerances for proportioning the various ingredients are as follows:
 - (i) Cement: -0% to +4% of target weight
 - (ii) Fine aggregate: $\pm 2\%$ of target weight
 - (iii) Coarse Aggregate: $\pm 2\%$ of target weight
 - (iv) Admixtures: $\pm 3\%$ of target weight or volume
 - (v) Water: $\pm 3\%$ of target weight or volume
 - (i) Provide a laboratory of 150 ft² (14 m²) minimum, for the exclusive use of the Engineer at all portland cement concrete facilities. The producer will furnish all heat, lights, air conditioning, telephone, electric, bottled drinking water, tables, desks, chairs, filing cabinets, and all testing equipment or devices to verify concrete properties in accordance with section 812.03 note (e). Furnish and maintain approved sanitary facilities.

Appendix A

Calculating Lithium dosage for mitigation of ASR without the use of Slag Cement or Fly Ash

I – Mixture Design

- (a) Report the alkali content of the Portland cement as a percentage by mass of sodium oxide equivalent. The minimum alkali content of the portland cement used in the Lithium dosage calculation is 0.60% total alkali.
- (b) The standard lithium dosage is 0.55 gallons of 30% lithium nitrate solution per pound of sodium oxide equivalent of the portland cement.
 - (1) If other lithium salts meeting the requirements of 812.01 are used, convert the lithium mass into an equivalent measurement of lithium nitrate salt.
- (c) Determine the gallons per cubic yard of 30% lithium nitrate solution by multiplying the cement content of the mix design (lb/CY) by the Alkali content of the cement in percent by 0.55 gallons of 30% lithium nitrate solution divided by 100
 - (1) If a weaker concentration of lithium nitrate is used, determine the standard lithium dosage of the weaker solution by multiply the gallons of the standard lithium dosage by 30% lithium nitrate concentration divided by the concentration of the lithium nitrate solution proposed.
- (d) The minimum dosage of lithium nitrate solution is 25% of the standard dosage calculation.

Maintain the water/cement ratio of the mix by one of the following measures:

(a) subtract 85% of the lithium admixture volume used in the batch from the required volume of mix water

OR

(b) subtract 70% of the lithium admixture mass used in the batch from the required mass of mix water

Appendix B

Procedure modifications to ASTM C1567 as found in publication CRD-C 662-09 “*Determining the potential Alkali-Silica Reactivity of Combinations of Cementitious materials, Lithium Nitrate Admixture, and Aggregate (Accelerated Mortar-Bar method)*”

II - Footnote

1. Portland Cement Source

- a. Use a portland cement having a total alkali content of 0.9 +/- 0.1%,
- b. portland cement must have a total autoclave expansion of 0.20% when tested according to AASHTO T-107/ASTM C-151.

2. Calculate the standard lithium dosage multiplying the alkali content of the portland cement in percent by 0.55 gallons of 30% Lithium Nitrate solution. (On a mass basis, this would be 0.012 lb of lithium admixture per gram of total alkali in the Portland cement contained in the mortar batch)

- a. The minimum dose of lithium solution is 25% of the standard dosage calculation.
- b. Maintain the water/cement ratio of the mix by one of the following measures:
 - i. subtract 85% of the lithium admixture volume used in the batch from the required volume of mix water

OR

- ii. subtract 70% of the lithium admixture mass used in the batch from the required mass of mix water

An Excel spreadsheet is available from the Engineer to calculate material amounts for the modifications. Amounts of components used in tests submitted by the contractor must match those in this spreadsheet.

3. Use a soak solution containing 0.019 gal of lithium admixture multiplied by the fraction of the standard dose as calculated above, plus 0.33 lb of NaOH per gal of soak solution. (Note – to make the solution, first dissolve the required amount of NaOH in approximately one half the total final volume, then add the required amount of lithium admixture, then dilute to the final volume.)

4. Obtain comparator readings of the mortar bars every 3 to 4 days while in the soak solution, culminating in the final reading at 28 days in the soak solution. The reported results must contain the calculated percent expansions along with a plot of the percent expansions versus days in the soak solution.

Section 814 – Timber Preservatives. (3/18/2004)

Delete Paragraph (a).

Subsection 821.01 Description. (5/15/2006)

Modify the paragraph as follows:

This material consists of coarse crushed stone, crushed slag fragments or portland cement concrete fragments. The Contractor shall certify that any recycled material, which is being proposed for use as graded aggregate, is neither hazardous nor toxic.

Subsection 821.03 Material Details. (c) Gradation. (5/15/2006)

Remove all references to graded aggregate, Type A (CR-1). Replace all of Subpart (c) Gradation with the following:

WEIGHT PERCENT PASSING	
Sieve Size	% Passing
	Type B
2 ½" (63.0 mm)	---
1 ½" (37.5 mm)	100
1" (25.0 mm)	---
¾" (19.0 mm)	50-95
No. 4 (4.75 mm)	20-50
No. 10 (2.00 mm)	15-40
No. 20 (850 um)	---
No. 100 (150 um)	2-20
No. 200 (75 um)	0-10

Materials. The graded aggregate shall meet the following properties:

Property	Range
Liquid Limit (T89) ¹	30 max
Plasticity Index (T90) ¹	4 max
Sand Equivalency ¹	25 min
Bituminous Concrete ²	5% max
Brick ²	5% max
Wood ²	0.1% max
Metals ²	0.1% max
Plaster ²	0.1% max
Deleterious materials ²	0.1% max
Los Angeles Abrasion	45% max

¹Minus 0.425 mm (No. 40) sieve material

²By weight

Once a stockpile of material has been tested and approved, no material shall be added to it until the stockpile is depleted.

Subsection 827.02 Silt Fence. (1/3/2008)

Modify the last sentence as follows:

The geotextile shall be inert to commonly encountered chemicals and shall meet the requirements of AASHTO M 288 Table 6.

Delete Table 827-A

Subsection 827.04 Inlet Sediment Control. (1/3/2008)

Modify the entire paragraph as follows:

The geotextile for inlet sediment control shall conform to AASHTO M 288 Class 1 or 2 Table 5 for erosion control.

Delete Table 827-B

Subsection 827.06 Riprap Ditch. (1/3/2008)

Modify the entire paragraph as follows:

The geotextile for a riprap ditch shall conform to AASHTO M 288 Class 2 or 3 Table-2 for drainage.

Subsection 827.12 Stabilized Construction Entrance. (1/3/2008)

Modify the last sentence as follows:

The geotextile shall be inert to commonly encountered chemicals and hydrocarbons, be mildew and rot resistant, and shall conform to AASHTO M288 Class 1 and Table 4 for Traffic < 3 Axles and Class 1 and Table 4 for Traffic > 3 Axles

Delete Table 827-C

Subsection 828.02 (f) Guardrail Reflectors. (5/15/2006)

Change "Reflectorized Washers" to "Guardrail Reflectors".

Modify the paragraph as follows:

Guardrail reflectors shall be fabricated from steel sheet plates conforming to the requirements of ASTM A-6, galvanized to ASTM A153. Retroreflectorized sheeting shall be AR-1000 (Type V) Abrasive resistant and shall be applied in accordance with Subsection 720.03.