

Supplemental Specifications to the August 2016 Standard Specifications

(Revised December, 28 2018)

*****Note: Modifications to the Supplemental Specifications under this Revision have been highlighted in yellow for easy identification.*****

Table of Contents. (12/28/2018)

Rename section 705 as follows:

Section 705 – P.C.C. Sidewalk, Pedestrian Connections, and Surface Detectable Warning System

Subsection 105.06 Coordination of the Contract Documents; Duty to Report Errors to the Engineer; Use of Dimensions over Scaled Measurements. (12/28/2018)

Replace the first paragraph with the following:

Each individual Contract Document is an essential part of the Contract and a requirement occurring in one is binding as though occurring in all. All of the Contract Documents are intended to be complementary and to describe and provide for a complete Contract. In the case of a discrepancy between the Contract Documents the governing ranking will be:

- A. General Description
- B. General Notices
- C. Plans
- D. Special Provisions
- E. Standard Construction Details
- F. Standard Specifications
- G. Electronic Design Data Files

Subsection 108.09 Schedule of Liquidated Damages. (12/28/2018)

Replace the first paragraph with the following:

The Specific rates Liquidated Damages are as follows:

Awarded Contract		Value Daily Charge	
For More Than	To and Including	Work Day	Calendar Day
\$ 0	\$ 25,000	\$440.00	\$310.00
25,000	50,000	\$450.00	\$320.00
50,000	100,000	\$610.00	\$430.00
100,000	500,000	\$940.00	\$670.00

500,000	1,000,000	\$1,210.00	\$870.00
1,000,000	2,000,000	\$1,720.00	\$1,220.00
2,000,000	5,000,000	\$1,810.00	\$1,300.00
5,000,000	10,000,000	\$2,020.00	\$1,440.00
10,000,000	15,000,000	\$2,260.00	\$1,610.00
15,000,000	20,000,000	\$3,770.00	\$2,700.00
20,000,000	25,000,000	\$5,260.00	\$3,750.00
25,000,000	30,000,000	\$6,760.00	\$4,830.00
30,000,000	35,000,000	\$8,270.00	\$5,900.00
35,000,000	over	11,340.00	8,100.00

Subsection 207.03 Construction. (6/15/2018)

D. Backfill (1.)

Replace the second sentence with the following:

Compact to 95-percent or more of the maximum density before placing the next lift.

Subsection 207.05 Basis of Payment. (12/28/2018)

Delete the third paragraph:

The quantity of Structural excavation, rock excavation and Structural backfill will be paid at the Contract Unit Price per cubic yard. Price and payment constitutes full compensation for excavating, hauling, and disposal of excavated Materials; for furnishing, placing and compacting backfill; for placing shoring and bracing; for dewatering the Work area; and for all labor, Equipment, tools, and incidentals required to complete the Work.

Section 209 (6/15/2018)

Replace section 209 with the following:

SECTION 209 - BORROW

209.01 Description. This work consists of furnishing and placing additional Material from approved borrow areas or other approved sources when suitable Material available within the Right-Of-Way is not sufficient in quantity for construction purposes. This Work includes all clearing, grubbing, or stripping required to prepare the borrow area for cross-sectioning and excavating. This Work also consists of furnishing borrow for use as backfill in utility trenches, excavations for structures and excavations for pipes.

209.02 Materials. Provide Materials as specified in:

Borrow

Section 1001

209.03 Construction.

209.03.1 Borrow Sources. Provide a borrow source. Notify the Department's Materials and Research Section at least ten (10) Working Days in advance of Material being removed from any

borrow source so that samples may be obtained and tested prior to use. Submit for approval by the Department's Materials and Research Section, the limits of the approved Material within the borrow source and the method of excavation. Clear and grub the ground surface in the manner described in Section 201 and strip of all unsuitable material, as determined by the Engineer, before the excavation of any borrow. Excavation of borrow within 100 feet of the right-of-way lines is not permitted, except with written permission from the Engineer.

Secure any borrow source that is tested, approved and cross-sectioned for excavation by means of physical control. The method of control is dependent on the conditions at the source, but may consist of complete or partial fencing, earth berms, guardrails, or other physical barriers. Provide secure access at the entrance to the borrow source with a gate, chain, cable or other acceptable device and secure by padlock. The key to the padlock will be retained by the Department, once the security method is approved.

Submit a physical control plan to the Engineer after the borrow source has been tested and approved, and the overburden removed. The physical control plan must be implemented and approved before the source is cross-sectioned. Upon completion of excavation, trim and leave the borrow area in a neat condition to permit accurate measurement. Water is not permitted to collect or stand within the excavated borrow area, where practicable.

209.03.2 Source Testing. The Department will assist the Contractor in determining the quality and quantity of Material from sources the Contractor proposes to use. The Department will perform soil analysis tests on one boring for each 500 cubic yards of borrow.

209.03.3 Placing and Compacting. Place and compact all borrow under this Section in accordance with the requirements of Section 202.03.10.

209.03.4 Furnishing Backfill for Structure Excavations, Pipes and Utility Trenches. Furnish backfill for structure excavations, pipe and utility trenches conforming to the requirements of Section 1001, Borrow Type C. Furnish sufficient material meeting the requirements of Section 1001, Borrow Type C for utility trenches to backfill to a height of 12 inches above the top of the utility structure.

When furnishing backfill Material for pipe and utility trenches, stockpile Materials at location(s) mutually agreed upon by the Contractor, the utility, and the Engineer.

Coordinate with the utility organizations the operation of backfilling utility trenches. Backfilling utility trenches is to be performed by the respective utility organizations involved and in conformance to the requirements of Section 202.03.10 except proof rolling will not be required.

Utility companies will be required to remove all excess excavation Material directly related to the utility trenching from the Project, unless the Engineer directs it to be used by the Contractor as part of the Project.

209.04 Method of Measurement. The quantity of borrow Material will be measured in cubic yards of approved and acceptable borrow Material. The volume will be measured at the source, in its original position by cross-sections and computed by the method of average end areas, exclusive of the volume of overburden or stripping.

When requested by the Contractor and approved by the Department in writing, borrow Material, which is specified to be measured in cubic yards, may alternatively be weighed and the weight

converted to cubic yards. Factors for conversion from weight measurement to volumetric measurement will be determined by the Engineer and shall be agreed to by the Contractor, before the method is used.

Where the Engineer determines it to be impracticable to obtain weight-volume conversion factors for the borrow types specified, 3050 pounds of borrow will be considered equivalent to one cubic yard.

Unless stated otherwise, all borrow Material that is to be measured by weight shall be calculated as specified in Section 109.01. Payment for borrow furnished for backfilling pipes and structures will in no case exceed 1.3 times the volume determined in accordance with Section 207 less the volume of structures or pipes.

209.05 Basis of Payment. The quantity of borrow will be paid for at the Contract Unit Price per cubic yard. Price and payment will constitute full compensation for clearing, grubbing, stripping, securing the borrow source, excavating, hauling, placing, and compacting the borrow Material and for all labor, Equipment, tools, and incidentals required to complete the Work. Pay items for furnishing borrow do not include payment for placing and compacting the borrow Material.

Subsection 301.03 Construction. (6/15/2018)

Add the following after the final sentence:

Use of Different GABC Sources. Different sources of materials used for GABC on a single project must be kept in separate stockpiles. The Contractor and Engineer must agree on placement limits when multiple sources are used. Each area of base course constructed must be from a single source for full depth placement within agreed limits.

Recycled Concrete Aggregates (RCA) is not acceptable as a final surface on a project.

Subsection 301.04 Method of Measurement. (6/15/2018)

Replace the first paragraph with the following:

The total quantity (from all sources) will be measured as the actual number of cubic yards or tons, as specified in the Contract Documents, of GABC placed and accepted. The weight will be determined according to Section 109.01

Subsection 301.05 Basis of Payment. (6/15/2018)

Replace with the following:

GABC is paid at the Contract Unit Price per cubic yard or ton for preparing, furnishing, hauling, placing, and compacting all Materials, and for all labor, Equipment, tools, and incidentals required to complete the Work. There will be no additional payment for any work performed to bring Recycled Concrete Aggregate or Bituminous Concrete Millings into compliance with requirements specified in Section 1005.

If the Contractor generates Recycled GABC from materials that were to be milled or excavated under other items in the Contract, then payment will be made under both the milling or excavating items and the GABC item.

Subsection 401.03 Construction. (12/28/2018)

D. Paver.

Replace with the following:

1. *Paver.* Self-propelled unit with automated screed or strike-off assembly that automatically controls grade leveling and slope, heated, and capable of spreading and finishing bituminous pavement Materials in lane widths specified. Equip with an attachment that confines the Material at the end of the gate and extrudes the asphalt Material in such a way results in a compacted wedge shape pavement edge (safety edge) of 30 degrees (construction tolerance range of 26 to 40 degrees). Stopping the paver unit so that the attachment can be adjusted at cross roads, driveways, and obstructions is not permitted. Omit the safety edge when the final lift of the top wearing course is less than 1 ¼ inches.

Subsection 401.03 Construction. (6/15/2018)

C. Hauling Equipment.

Replace with the following:

- C. *Hauling Equipment.* Trucks shall be furnished with a tight, clean and smooth metal body that is free from any holes, cracks or debris. Only approved release agents shall be used to thinly coat the body to prevent any adherence of material. Provide each truck with a securely fastened cover of canvas or other suitable waterproof material that covers the bed from front to back and over the sides and rear of the body. Each tarp shall be free of rips, tears, and holes. Fasten the front of the tarp securely to the body and protect by an airfoil/dam. A minimum of three straps will be used on the sides to securely hold the tarp over the sides of the body, if the tarp does not reach over the back of the body, to protect the mixture from the weather and to minimize heat loss, straps on the rear of the body will be required. Do not remove any loads 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.

D. Paver.

Replace with the following:

- D. *Paver.* Self-propelled unit with automated screed or strike-off assembly that automatically controls grade leveling and slope, heated, and capable of spreading and finishing bituminous pavement Materials in lane widths specified. Equip with an attachment that confines the Material at the end of the gate and extrudes the asphalt Material in such a way results in a compacted wedge shape pavement edge (safety edge) of 32 degrees (construction tolerance range of 26 to 40 degrees). Stopping the paver unit so that the attachment can be adjusted at cross roads, driveways, and obstructions is not permitted. Omit the safety edge when the final lift of the top wearing course is less than 1 ¼ inches.

F. Weather Limitations.

Replace Table 401-A with the following:

Table 401-A. Minimum Ambient Air Temperature for Placement of Types of Bituminous Concrete

Material Type	Temperature
B	32 °F
C	40 °F
Stone Matrix Asphalt, Thin Lift, and Wedge Lift	50 °F

I. Placement. (3.)

Replace the second paragraph with the following:

The Type B Superpave placed in lieu of BCBC will be paid at the Contract Unit Price for BCBC and the Asphalt Cement Cost Adjustment will be based on the virgin asphalt of the Type B Superpave.

M. Joints.

Replace with the following:

M. Joints. Construct joints to ensure surface and compaction requirements are met. Tack all vertical contact surfaces before placing any new mixture against the joint. Seal all newly created pavement joints that will not be overlaid, with the exception of those created from placement of newly laid adjacent passes. Seal all joint openings. Submit the joint sealant Material(s), appropriate for the dimension of the opening(s), for approval in accordance with the Contract Documents. For joint openings exceeding 1/4 inch width, the Engineer may require additional corrective action at no expense to the Department.

Subsection 401.05 Basis of Payment. (6/15/2018)

Replace the first paragraph with the following:

Payment will be for the accepted quantity of bituminous pavement Materials at the Contract Unit Price per ton for furnishing, preparing, hauling, and placing all Materials, including tack coat, joint sealing, and safety edge; for removing Material from around manholes, drainage valves, and similar features; for removing and replacing excess asphalt cement; and for all labor, Equipment, tools, and incidentals required to complete the Work, including the correction of defective work.

Subsection 501.02 Materials. (6/15/2018)

Add the following Materials:

Joint/Crack Sealant Materials	Section 1042
Joint Backup Material	Section 1043

Subsection 501.03.2.1 Equipment. (6/15/2018)

Delete (B.4.):

4. Place a minimum width pavement of 24 feet in one pull

Re-number existing (B.5.) to (B.4.)

Re-number existing (B.6.) to (B.5.)

Re-number existing (B.7.) to (B.6.)

Re-number existing (B.8.) to (B.7.)

Re-number existing (B.9.) to (B.8.)

Subsection 501.03.2.2. Construction Methods. (12/28/2018)

E. Placing Concrete (10.)

Replace with the following:

10. Safety Edge - Construct a safety edge as specified in the Contract Documents. The safety edge is required longitudinally along the pavement edges (generally an interior and exterior shoulder) on all mainline and ramp paving unless otherwise approved by the Engineer. In P.C.C. pavement sections, the paver screed shall be modified to provide a chamfer at the end of the P.C.C. pavement that result in a compacted wedge shape pavement edge of 30 degrees (construction tolerance range of 26 to 40 degrees).

Subsection 501.03.2.2. Construction Methods. (6/15/2018)

E. Placing Concrete (10.)

Replace with the following:

10. Safety Edge - Construct a safety edge as specified in the Contract Documents. The safety edge is required longitudinally along the pavement edges (generally an interior and exterior shoulder) on all mainline and ramp paving unless otherwise approved by the Engineer. In P.C.C. pavement sections, the paver screed shall be modified to provide a chamfer at the end of the P.C.C. pavement that result in a compacted wedge shape pavement edge of 32 degrees (construction tolerance range of 26 to 40 degrees).

F. Finishing (3.)

Replace with the following:

3. Finish all longitudinal pavement edges with a 1/4 inch, rounded edging tool where safety edge is not required.

Subsection 501.03.3.2. Equipment. (6/15/2018)

Delete (B.4.):

4. Place a minimum width pavement of 12 feet in one pull

Re-number existing (B.5.) to (B.4.)

Subsection 501.03.3.3. Construction Methods. (6/15/2018)

Replace (A.) with the following:

- A. Place and grade base course to the tolerance specified under the applicable Specification. No hardware may be placed on the grade until the Engineer has given approval.

Replace (C.) with the following:

- C. Furnish Hook Bolts (or W-Bolts) for use when lanes will longitudinally abut the pavement being placed, and #5 standard rebar for tie bars used under longitudinal sawed joints or for tying into concrete lanes placed under previous contracts.

D. Placing Concrete (9.)

Replace with the following:

9. Safety Edge – Construct a safety edge as specified in the Contract Documents. The safety edge is required longitudinally along the pavement edge (generally an inside and outside shoulder) on all mainline and ramp paving unless otherwise approved by the Safety Program Manager or Designee.

E. Finishing (3.)

Replace with the following:

3. Finish all longitudinal pavement edges with a 1/4 inch, rounded edging tool where safety edge is not required.

Subsection 501.03.7 Joints. (6/15/2018)

A. Transverse Sawed Joints

Replace with the following:

1. Saw the joints at the specified spacing to a depth of $T/3 + 1/4$ inch (T = Pavement Thickness) and a width of 3/8 inch.
2. Begin joint sawing as soon as the concrete can support the saw and operator with no damage to the pavement surface.
3. Time the sawing so that the concrete does not ravel behind the blade and so that random cracking does not occur.
4. Determine the timing of the saw cutting based on weather, temperature, and his/her judgment. Center the saw cuts over the load transfer dowels. Following transverse saw cutting, provide crack-free pavement except for the cracks under the designed saw cut joints.
5. All Transverse joints in the finished concrete pavement shall be sealed with hot-poured joint sealant conforming to Section 1042 and as shown in the plans. All sawed joints to be sealed with hot-poured joint sealant shall utilize a backup material that conforms to Section 1043, is sufficiently heat resistant to develop the required sealant shape and depth.

6. Construction joints shall be tooled and sealed as shown on the Plans. Immediately prior to installation of the backer road and joint sealant, each joint shall be air blown, clean and dry. Hot-poured joint sealant shall be placed in conformance with the manufacturer's recommendations concerning joint cleaning, application, and safe heating temperature. For rounded or beveled joints, the sealant shall be installed to a depth as shown in the Standard Construction Detail.
7. The sealing material shall be applied to each joint opening in accordance with the details shown on the Plans or as directed. Application shall be done in such a manner that the material will not be spilled on the exposed surfaces of the concrete. All excess material on the surface of the concrete pavement shall be removed immediately, and the pavement surface cleaned. Hot-poured joint sealing material shall not be placed when the air temperature in the shade is less than 50° F, unless approved by the Engineer.

B. Longitudinal Sawed Joints

Replace with the following:

1. Following the transverse joint saw cutting, perform longitudinal saw cutting on pavement placed in multi-lane (or lane and shoulder) pulls. Saw the joints to a depth of $T/3 + 1/4$ inch and to a width of 1/4 inch.
2. Determine the timing of the saw cutting based on weather, temperature, and his/her judgment. Center the saw cuts over the tie-bars. Following longitudinal saw cutting, provide crack-free pavement except for the cracks under the designed saw cut joints.
3. All Longitudinal joints in the finished concrete pavement shall be sealed with hot-poured joint sealant conforming to Section 1042 and as shown in the plans. All sawed joints to be sealed with hot-poured joint sealant shall utilize a backup material that conforms to Section 1043, is sufficiently heat resistant to develop the required sealant shape and depth.
4. Construction joints shall be tooled and sealed as shown on the Plans. Immediately prior to installation of the backer road and joint sealant, each joint shall be air blown, clean and dry. Hot-poured joint sealant shall be placed in conformance with the manufacturer's recommendations concerning joint cleaning, application, and safe heating temperature. For rounded or beveled joints, the sealant shall be installed to a depth as shown in the Standard Construction Detail.
5. The sealing material shall be applied to each joint opening in accordance with the details shown on the Plans or as directed. Application shall be done in such a manner that the material will not be spilled on the exposed surfaces of the concrete. All excess material on the surface of the concrete pavement shall be removed immediately, and the pavement surface cleaned. Hot-poured joint sealing material shall not be placed when the air temperature in the shade is less than 50° F, unless approved by the Engineer.

Delete (E.):

- E. Unless detailed otherwise in the Contract Documents, no joint sealant Material is required in any of the joints covered in this section.

Subsection 501.03.8 Opening the Road to Traffic. (6/15/2018)

Replace with the following:

When the compressive concrete strength has reached 3,500 pounds per square inch.

Subsection 501.03.11.1 General Description. (6/15/2018)

Replace with the following:

Test finished surfaces of concrete pavements, Bridge decks, approach slabs, and transition slabs in accordance with the Contract Documents.

Subsection 501.03.11.2 Straight Edge Surface Testing. (6/15/2018)

Replace the first sentence with the following:

Surface testing will be performed with a rolling straightedge or a conventional straightedge furnished by the Contractor.

Subsection 501.05 Basis of Payment. (6/15/2018)

Replace with the following:

Payment includes furnishing all Equipment, Materials, and incidentals; placing, finishing, texturing, and curing concrete pavement meeting the performance measures outlined in Section 501.03.9. Incidental to the Item are the following, but not limited to:

- A. Repairs to random crack areas.
- B. Repairs required to meet performance measures.
- C. Furnishing a "Thermal Plan" and any accompanying testing Equipment.
- D. Furnishing inertial profiling system, operator, and straight edge for smoothness testing; providing specified results for same.
- E. Performing diamond grinding for Specification compliance and/or ride quality improvement.
- F. Sawing, drilling, grouting, and constructing all pavement joints.
- G. Sealing sawed joints along the completed pavement edge prior to placing adjoining pavement.
- H. Constructing safety edge.
- I. Cold weather curing Materials if necessary.
- J. Lighting in order to perform Work, if needed.
- K. Template or other approved device for checking dowel bar assembly installation prior to concrete placement. This to be supplied to the Engineer for use during paving operations and returned to the Contractor at the conclusion of paving.

- L. Maintenance of traffic, if required for smoothness testing.
- M. Polyethylene covering and transverse bulkhead for protecting concrete during a rain event or other emergency.
- N. Verifying load transfer dowel bar location and alignment using non-destructive testing devices.
- O. Wire Reinforcement
- P. Dowels
- Q. Tie Bars
- R. Hook Bolts
- S. Load Transfer Devices
- T. Cleaning
- U. Sawing
- V. Tooling and Sealing of Joints
- W. Any other incidental Items mentioned in the body of this Specification.

Section 503.03 Construction. (12/28/2018)

Add (11) with the following:

Performance Measures. Pavement free of random cracks – Any uncontrolled random cracks must be repaired or removed and replaced prior to Final Acceptance and payment. Submit repair or replacement procedure and details for approval by the Engineer.

Section 601 (6/15/2018)

Replace section 601 with the following:

SECTION 601 - PIPE CULVERTS

601.01 Description.

Furnish and install pipe culverts, flared end sections and safety metal end sections where shown in the Contract Documents. This Work also includes the construction of connections to existing drainage inlets and manholes as may be required to complete the Work.

601.02 Materials. Provide Materials as specified in:

Reinforced concrete pipe	Section 1031
Thermoplastic pipe	Section 1031.04
Corrugated aluminum or steel pipe	Section 1031.01
Flared end section	Section 1022
Safety metal end section	Section 1031

Borrow

Section 1001

Flowable Fill

Section 1047

601.03 Construction.

601.03.1 Preconstruction Inspection.

The Department and Contractor will inspect all existing pipes to be used in the final drainage system and agree on the condition prior to the start of construction. Video inspection will be performed by the Department. Repair or replace in-kind any existing pipes damaged due to Contractor operations at no cost to the Department.

601.03.2 Excavation and Pipe Bedding.

Excavate the pipe trench and construct bedding in accordance with the Contract Documents. Remove any unsuitable material encountered below the proposed bedding of the pipe and replace as directed by the Engineer. Use Class C bedding unless noted otherwise in the Contract Documents.

When a pipe is to be placed either partially or completely in a fill, compact the embankment to an elevation of 12 inches plus the outside diameter of the pipe above the design invert of the pipe for a minimum of two pipe diameters on each side of the centerline of the pipe. Then, excavate the trench in accordance with this Section.

601.03.3 Reinforced Concrete Pipe.

A. Joints

1. Before laying the pipe in the trench, attach the rubber gasket or joint sealant to the spigot end of each pipe to ensure a watertight joint.
 - a. For bell and spigot pipe use a rubber gasket. Place the rubber gasket around the entire circumference of the spigot and set firmly against the shoulder. Prior to installation, the Contractor may apply a lubricant specified by the gasket manufacturer to the gasket for ease of installation
 - b. For pipe manufactured only with tongue and groove joints use a preformed flexible bitumen and butyl joint sealant, in conformance with ASTM C990. Place the sealant around the entire circumference of the spigot in a position and quantity to ensure a watertight joint. Lap sealant strips a minimum of 6 inch and position the lap such that it is not in the flow line of the pipe.
2. Carefully control pipe handling after the gasket has been affixed to avoid bumping the gasket and thus displacing it or covering it with dirt or other foreign material. Remove any gasket so disturbed and reposition if displaced or replace if damaged. Apply sufficient pressure in making the joint to ensure that the joint is tight.

B. Defects

1. Field inspections will be made to evaluate issues that may affect long-term performance such as cracks, joint quality, and alignment.

2. The following defects in reinforced concrete pipe constitute poor workmanship, and the presence of any of them in any individual pipe shall be sufficient cause for rejection:
 - a. Illegible brand
 - b. Misalignment, both vertical and horizontal
 - c. Spalls
 - d. Slabbing (large slabs of concrete peeling away from the sides with a straightening of the reinforcement)
 - e. Cracks greater than 0.1 inch in width
 - f. Crack widths greater than 0.01 inch in width and showing efflorescence or differential movement
 - g. Differential joint movement
 - h. Improper gasket or joint sealant placement
 - i. Joint leakage
 - j. Settlement
 - k. Joint separations greater than manufacturer's recommendation or as follows (whichever is less):

i. 12-36 inch diameter Round	0.75 inch
ii. 42 inch and larger diameter Round	1.25 inch
iii. All Elliptical	1.50 inch

C. Installing Pipe

1. Lay all pipe in accordance with the Contract Documents, requirements of Section 27 of the AASHTO LRFD Bridge Construction Specifications, ASTM C1479, or manufacturer's guidelines, whichever is more stringent, and in an upgrade direction. Lay the pipe with the lowest point of the inside diameter conforming to the flow line shown in the Contract Documents. Carefully lay all pipe with the bell ends upgrade, with the spigot ends fully entered into the adjoining bell, and true to the lines and grades shown in the Contract Documents or as directed by the Engineer. Remove and reinstall any pipe that is not in true alignment or that shows any settlement after placement.

601.03.4 Metal Culverts.

A. Bands

1. Furnish all corrugated aluminum or corrugated steel pipe in lengths specified in the Contract Documents. If any specified length of pipe is divided into shorter sections for convenience, furnish approved connecting bands for field joints.
2. Construct bands so as to lap an equal portion of each of the pipe sections to be connected. Fasten bands at the ends by galvanized angles having minimum

dimensions of 2 inch by 2 inch by 3/16 inch. Other equally effective methods of fastening the bands may be used if approved. Include an approved rubber gasket with all field joints to ensure a watertight joint. Do not use bituminous coated connecting bands.

B. Defects

1. Field inspections will be made and will include an examination of the pipe for deficiencies in lengths of sheet used, thickness of metal, nominal inside diameter, net length of finished pipe, and any evidence of poor workmanship as outlined in this Section. The inspection may include the taking of samples for chemical analysis and determination of coating thickness and quality. The following defects in corrugated steel or corrugated aluminum pipe constitute poor workmanship, and the presence of any of them in any individual pipe shall be sufficient cause for rejection:

- a. Illegible brand
- b. Uneven laps
- c. Deflection greater than 7.5 percent
- d. Elliptical shaping (circular pipe only)
- e. Misalignment, both vertical and horizontal
- f. Ragged or diagonal sheared edges
- g. Loose, unevenly lined or spaced rivets
- h. Imperfectly formed rivet heads
- i. Unfinished ends
- j. Lack of rigidity
- k. Bruised, scaled, or broken protective coating
- l. Dents or bends in the metal
- m. Improperly seated bells/spigots
- n. Bulging or hanging gaskets
- o. Joint separations greater than manufacturer's recommendation or as follows (whichever is less):
 - i. 12-36 inch diameter Round 0.75 inch
 - ii. 42 inch diameter and Larger 1.25 inch
 - iii. All Elliptical 1.50 inch

C. Installing Pipe

1. Carefully handle all pipe during unloading and placing in position. Do not drag the pipe over the ground or over timbers or planks.

2. Strut pipes as recommended by the manufacturer. Place struts before the Embankment is placed and remove as recommended by the manufacturer and directed by the Engineer.
3. Where the pipe sections are joined on the Project, join the ends with a standard band bolted firmly in place.
4. Lay all pipe in accordance with the Contract Documents, requirements of Section 26 of the AASHTO LRFD Bridge Construction Specifications, or manufacturer's guidelines, whichever is more stringent, and in an upgrade direction. Lay the pipe with the lowest point of the inside diameter conforming to the flow line shown in the Contract Documents. Remove and reinstall any pipe that is not in true alignment or that shows any detrimental settlement after laying.

601.03.5 High Density Polyethylene Pipe.

A. Joints

1. Provide only watertight joints when installing pipe.
2. For type S or D pipes, use gasketed watertight bell/spigot or bell/bell couplers. Provide a joint system that has sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joint.
3. For type C pipe, use bell and spigot, split-collar, or screw-on collar couplings that are corrugated to match the pipe corrugations and that provide sufficient longitudinal strength to preserve pipe alignment and prevent separation at the joint. For split-collar couplings, engage at least two full corrugations on each pipe section. Screw-on collars shall have a width of at least one-half the nominal diameter of the pipe.

B. Defects

1. Field inspections will be made to evaluate issues that may affect long-term performance such as cracks, joint quality, and alignment.
2. The following defects in plastic pipe constitute poor workmanship, and the presence of any of them in any individual pipe shall be sufficient cause for rejection:
 - a. Illegible brand
 - b. Deflection greater than 5 percent
 - c. Misalignment, both vertical and horizontal
 - d. Connections with a gap exceeding 3/16 inch
 - e. Cracking or tearing
 - f. Creases
 - g. Unpigmented or non-uniformly pigmented pipe
 - h. Joint separations greater than manufacturer's recommendation.

C. Installing Pipe

1. Install pipe per Contract Documents and in accordance with the requirements of Section 30 of the AASHTO LRFD Bridge Construction Specifications, ASTM D2321, or the manufacturer's published guidelines, whichever are more stringent.
2. Lay all pipe in an upgrade direction. Lay the pipe with the lowest point of the inside diameter conforming to the flow line shown in the Contract Documents. Lay all pipe carefully with the bell ends upgrade, with the spigot ends fully entered into the adjoining bell, and true to the lines and grades shown in the Contract Documents or as directed by the Engineer. Remove and relay any pipe that is not in true alignment or that shows any settlement after laying.

601.03.6 Flared End Section.

- A. Install flared end section in accordance with Section 601.03.3, manufacturer's recommendations, and Contract Documents.

601.03.7 Safety Metal End Section.

- A. Install safety metal end section in accordance with Section 601.03.4, manufacturer's recommendations, and Contract Documents.

601.03.8 Backfill.

- A. Backfill pipe in accordance with Section 207. Furnish backfill in accordance with section 209. Where heavy construction equipment travels over the pipe, place a cover of material to a minimum depth of 4 feet over the pipe. When multiple pipes are placed side by side, provide a minimum of 18 inch between outside diameter of the pipes.
- B. Use existing Material for backfill if it meets the requirements of Section 1001, Borrow, Type C. For these areas, compact the material to 95% or more of the maximum density according to the requirements of Section 202.03.10. Backfill pipe trenches outside the roadway with material conforming to the requirements of Section Borrow Type C to a height of 12 inches above the top of the pipe unless otherwise directed. For these areas, compact the backfill Material to 95% or more of maximum density according to the requirements of Section 202.03.10.
- C. Place an initial backfill lift that does not exceed 12 inches of loose material and is not higher than the spring line of the pipe. Slice the Material into the haunches of the pipe using a shovel. Place a maximum of 8 inches of loose Material for each remaining lift. Take caution not to hit the pipe with any mechanical compaction Equipment or to disturb the alignment of the pipe.
- D. When specified by the Contract Documents, use flowable fill as backfill material and do the following:
 1. Provide trench width that includes 6 inches between the trench wall and outside diameter of the pipe. When multiple pipes are placed side by side, provide a minimum of 6 inches between outside diameter of the pipes. Control floating of the pipe.

2. Place flowable fill equally to both sides of the pipe with no more than 1 foot height difference in placement on either side of a pipe.

601.03.9 Cleaning Pipe.

- A. Submit the source for the cleaning water to the Engineer for approval. Use only water that is safe for all downstream environments.
- B. Use Equipment and construction methods in accordance with the guidelines under Sewer Pipe Cleaning, latest edition, found in the [National Association of Sewer Service Companies \(NASSCO\) Specifications](#). Operate Equipment in accordance with the manufacturer's instructions. The cleaning operation shall consist of up to three passes of the hydrocleaning Equipment. If three passes do not adequately clean the pipe, the Engineer may direct the Contractor to use other procedures covered by heavy pipe cleaning or other items of Work. Dispose of material removed during the pipe cleaning operation at a site approved by the Engineer.
- C. Heavy Pipe Cleaning
 1. Submit methods for heavy pipe cleaning to the Engineer for approval prior to beginning Work.

601.03.10 Pipe Repair.

- A. Utilize Equipment and construction methods in accordance with the requirements under Pressure Testing and Grouting of Sewer Joints, Laterals and Lateral Connections (using the Packer Method with Solution Grouts), latest edition, found in the [NASSCO Specifications](#). Submit alternate methods and/or Equipment to the Engineer for approval.

601.03.11 Post Installation Inspection.

- A. For pipes 48 inches in diameter and less, the contractor will video inspect repaired or lined pipes and new pipe runs after installation to confirm condition. For pipes greater than 48 inches in diameter, the Department will visually inspect. Clean pipe prior to video or visual inspection and provide maintenance of traffic during the pipe video or visual inspection as needed. Inspection shall occur prior to placement of final layer of roadway pavement material.

601.04 Method of Measurement.

- A. The quantity of flared end sections will be measured as the actual number placed and accepted.
- B. The quantity of safety metal end sections will be measured as the actual number placed and accepted.
- C. The quantity of drainage pipe cleaned will be measured as the actual number of linear feet of pipe cleaned and accepted measured from end to end.
- D. The quantity of heavy pipe cleaning will be measured as the actual number of hours the Contractor is actively engaged in heavy pipe cleaning Work.

- E. The quantity of pipe joints pressure grouted will be measured as the actual number of joints grouted and accepted.
- F. The quantity of pipe culverts will be measured as the actual number of linear feet of each type of pipe placed and accepted, measured from end to end of pipe, including structure wall thickness, but excluding structure interior and flared end sections.
- G. Excavation will be measured in accordance with Section 207. Excavation for pipe trenches that occurs within the pay limits of excavation performed under Section 202 will be measured and paid in accordance with Section 202 and not measured or paid under any other item.
- H. Backfill will be measured in accordance with Section 209.

601.05 Basis of Payment.

- A. The quantity of flared end sections will be paid for at the Contract Unit Price per each. Price and payment will constitute full compensation for furnishing, hauling, installing Materials; for cribbing or foundation treatment necessary to prevent settlement; cribbing, shorting, sheeting; and for all labor equipment, tools, incidentals required to complete the Work.
- B. The quantity of metal safety end sections will be paid for at the Contract Unit Price per each. Price and payment will constitute full compensation for furnishing, hauling, installing Materials; for cribbing or foundation treatment necessary to prevent settlement; cribbing, shorting, sheeting; and for all labor equipment, tools, incidentals required to complete the Work.
- C. The quantity of pipe cleaned will be paid for at the Contract Unit Price per linear foot. Price and payment will constitute full compensation for furnishing Equipment and water, disposing of removed material, and for all labor, Equipment, tools, and incidentals to complete the Work.
- D. The quantity of heavy pipe cleaning will be paid for at the Contract Unit Price per hour. Price and payment will constitute full compensation for furnishing Equipment and water, disposing of removed material, and for all labor, Equipment, tools, and incidentals to complete the Work.
- E. The quantity of pipe joints pressure grouted will be paid for at the Contract Unit Price per each. Price and payment will constitute full compensation for furnishing and placing all Materials, pressure testing the joint, removing excess sealant Material in the pipe, and for all labor, Equipment, tools, and incidentals required to complete the Work.
- F. The quantity of pipe culverts will be paid for at the Contract Unit Price per linear foot for each type of pipe. Price and payment will constitute full compensation for furnishing, hauling, and installing Materials except borrow; for all cribbing or foundation treatment necessary to prevent settlement; for the replacement of any pipe which is not true in alignment or which shows any settlement after laying; for pipe bedding, cribbing, shoring, sheeting; for the pipe video inspection; and for all labor, Equipment, tools, and incidentals required to complete the Work.

G. Excavation, backfill and furnishing borrow will be paid under their respective items.

Subsection 602.02 Materials. (6/15/2018)

Replace “*Welding - AASHTO/ AWS D1.5 Welding Code*” with the following:

Welding	AASHTO / AWS D1.1 Welding Code
---------	--------------------------------

Subsection 602.03.A Working Drawings. (6/15/2018)

Replace (4.) with the following:

4. Use drainage inlet frames and grates and manhole frames and covers that are capable of meeting or exceeding HS-25 load rating requirements in accordance with AASHTO M306.

Subsection 607.03 Construction. (6/15/2018)

F. Backfill Placement

Replace the third sentence in (1.) with the following:

Place #57 stone for at least the first 3 feet normal to the back face of the panel for the full height of the wall.

Subsection 611.03 Construction. (6/15/2018)

D. Repair of Coating.

Add the following at the end of the sentence in (2.).

or ASTM A1094, whichever is applicable to the furnished material.

Subsection 612.03 Construction. (6/15/2018)

C. General Manufacturing Requirements

Add the following after (3.):

4. An office will be provided for the Engineer. The office will be furnished with heat, air conditioning, lighting, electrical outlets, wi-fi, bottled drinking water, a desk and chair for each occupant and a lockable file cabinet for the exclusive use of the Engineer.

Re-number existing (4.) to (5.)

D. Precast Concrete Elements

Replace (2.i.) with the following:

- I. Apply a water-miscible, penetrating, silane sealer in accordance with Section 613 to the top of each unit plus 2 feet – 0 inches down each side, and to all headwalls, end faces and exposed faces.

E. Prestressed Concrete Beam Elements

Replace (2.f.) with the following:

- f. Provide threaded inserts at diaphragm connections or beams as specified in the Contract Documents. Threaded inserts must have a minimum ultimate pullout capacity of 11,900 pounds each. Mechanically fasten threaded inserts to the forms. Threaded inserts and/or bar locations may be adjusted by 1/2 inch to avoid conflicts. Any deviations from this plan must be noted on the Working Drawings.

Replace the second sentence in (2.h.ii.) with the following:

Provide means for measuring the elongation of the pre-stressing strands to at least the nearest 1/16 inch.

Replace (2.h.iii.) with the following:

- iii. If there is a discrepancy of as much as 5 percent between the stresses determined by the jacking pressure and the elongation measurement, carefully check the entire operation and determine the source of error before proceeding.

Replace (2.k.) with the following:

- k. Apply a clear water-miscible, penetrating, alkyl epoxy silane sealer in accordance with Section 613 to the bottom and sides of the finished beams.

Subsection 615.04 Method of Measurement.

Replace Table 615.04-3 with the following:

Table 615.04-3. Weight of Fillet Welds

Fillet Weld (inch)	Weight (lb/ft)
3/16	0.08
1/4	0.14
5/16	0.22
3/8	0.30
1/2	0.55
5/8	0.80
3/4	1.10
7/8	1.49
1	2.00

Subsection 628.03 Construction. (6/15/2018)

A. Epoxy Injection

Replace the first sentence in (1.) with the following:

Minimum crack width is dependent upon exposure conditions and shall be in accordance with ACI 224R-01; Table 4.1. Maximum crack width shall be determined by the Engineer.

E. Spall and Delamination Repair

Replace the third sentence in (1.) with the following:

Rehabilitation of PCC masonry is defined as deep-spall patches that exceed the 0.5 cubic yard threshold in a single area.

Replace (2.) with the following:

2. Submit for review and approval, details for deep spall repair or rehabilitation.

Replace the fifth sentence in (7.) with the following:

Place new reinforcement bars to supplement an existing reinforcement bar when an existing bar has a section loss of 20 percent or more of the original cross section, as determined by the Engineer, or when the existing reinforcement bar is broken.

Replace the sixth sentence in (7.) with the following:

Use new bar of the same type and cross-sectional area as the existing bar and extend 30 bar diameters in each direction from where the section loss or breaks ends.

Subsection 702.03 Construction. (12/28/2018)

A. Construction of Triangular Channelizing Island(s)

Replace (8.) with the following:

Construct Pedestrian Connections, if applicable, in accordance with the requirements of the Standard Construction Details, any modifications on the plans and to all the applicable requirements of Section(s) 302 and 705 of the Standard Specifications.

Subsection 702.05 Basis of Payment. (12/28/2018)

Replace first paragraph with the following:

The quantity of Triangular Channelizing Island(s) will be paid for at the Contract Unit Price per square foot. Price and payment constitutes full compensation for saw cutting bituminous pavement, saw cutting concrete full depth, removal and disposal of existing Materials, foundation preparation, furnishing and placing all Materials including GABC, concrete for curb and sidewalk, expansion joint Material, construction of Pedestrian Connections within the limits of the island, bituminous and/or P.C.C. pavement patching, furnishing and installing delineator(s) and for all labor, tools and incidentals necessary to complete the Work.

Section 705. (12/28/2018)

Rename section with the following:

Section 705 – P.C.C. Sidewalk, Pedestrian Connections, and Surface Detectable Warning System

Subsection 705.01 Description. (12/28/2018)

Replace with the following:

Construct Portland Cement Concrete sidewalk and pedestrian connections, install sidewalk surface detectable warning system in accordance with the Contract Documents and as directed by the Engineer.

Subsection 705.03 Construction. (12/28/2018)

Rename (6.) with the following:

705.03.6 Pedestrian Connection

Subsection 705.03 Construction. (12/28/2018)

6. Pedestrian Connection

Replace (A.) with the following:

A. Construct pedestrian connections in accordance with the Contract Documents.

Subsection 705.04 Method of Measurement. (12/28/2018)

3. *Curb Ramp(s)*

Replace with the following:

Pedestrian Connection(s). The quantity of pedestrian connections will be the measured square feet surface area of pedestrian connection acceptably completed. The area of pedestrian connections will be established by the measurement of the curb, sidewalk and taper areas shown as per the Contract Documents.

Subsection 705.04 Method of Measurement. (6/15/2018)

3. *Curb Ramp(s)*

Add the following after the first sentence:

The area of curb ramps will be established by the measurement of the curb, sidewalk and taper areas shown as per plan.

Delete (A.) and (B.)

- A. The area of curb ramps will be established by the measurement of the curb, sidewalk and taper areas shown in the Standard Details.
- B. Curb ramp(s) constructed in conjunction with the new P.C.C. sidewalk will be measured and paid for under P.C.C. sidewalk.

Subsection 705.05 Basis of Payment. (12/28/2018)

3. *Curb Ramps*

Replace with the following:

Pedestrian Connections. The area of pedestrian connection shall be paid for at the Contract Unit Price per square foot. Price and payment constitutes full compensation for excavation within the template of this Item, grading and compacting, including the curb and pavement areas within the limits of the pedestrian connection, furnishing and placing all Materials including graded aggregate base course, curb, concrete, bituminous or concrete for patching along the curb line,

expansion material, saw cutting, removal and disposal of the existing curb, gutter, sidewalk and pavement, and for all equipment, labor, tools, and incidentals necessary to complete the Work.

Subsection 705.05 Basis of Payment. (6/15/2018)

1. *Sidewalk*

Replace the second sentence with the following:

Price and payment constitutes full compensation for excavation within the template of this Item, forms and forming, GABC, concrete, expansion joint material, backfill and backfilling, furnishing and installation of delineators on leading ends/corners of islands if concrete is placed within triangular channelized islands, removal of surplus Materials, removal and replacement of cracked and/or damaged sidewalk in complete 5 foot long sections, and for all labor, Equipment, tools and incidentals required to complete the Work.

3. *Curb Ramps*

Delete (A.)

- A. Curb ramps constructed along the new P.C.C. sidewalk are paid in accordance with Item 705002 – P.C.C. Sidewalk, 6”

Section 709 (6/15/2018)

Replace section 709 with the following:

SECTION 709 –UNDERDRAINS

709.01 Description. Construct underdrains in accordance with the Contract Documents and as directed by the Engineer.

709.02 Materials. Provide Materials as specified in the following:

Metal Pipe	Section 1031
Polyethylene Pipe	Section 1031
Stone, Delaware No. 57	Section 1004
Geotextile	Section 1060
Borrow, Type C	Section 1001
Delineator	Section 1072

709.03 Construction Methods.

Construct underdrain in accordance with the Contract Documents. Place the pipe as directed by the Engineer. Make lateral connections to the pipe with connectors recommended by the manufacturer.

Backfill perforated pipe underdrain trench with stone backfill in 6 inch lifts and compacted to the satisfaction of the Engineer.

Backfill Underdrain outlet pipe trenches and outlet structures with applicable Sections of 207 including backfill requirements of Section 207.03.D. Backfill using Borrow, Type C or existing Material meeting Borrow, Type C for the entire depth of the trench up to the bottom of patching Materials under existing and proposed roadways and shoulders. In areas outside of the roadway or proposed roadway including shoulders, place Borrow, Type C Material at least one foot over above the top of the underdrain outlet pipe. Excavated Material may be used for backfill above any the Borrow, Type C in areas outside of the roadway and shoulders provided that the excavated material is below or at optimum moisture and free of organic material.

The entire underdrain system shall be videoed prior to placement of final layer of roadway pavement material. If guardrail is placed within 3 feet from the underdrain, that section shall be videoed after the installation of the guardrail.

Install outfall delineator in accordance with Contract Documents.

709.04 Method of Measurement.

709.04.1 *Perforated Pipe.* The quantity of perforated pipe underdrains will be measured from end-to-end in linear feet of pipe completed and accepted.

709.04.2 *Underdrain Outlet Pipe.* The quantity of underdrain outlet pipe will be measured from end-to-end in linear feet of pipe completed and accepted.

709.04.3 *Underdrain Outlet.* The quantity of underdrain outlets will be measured as the actual number of outlets installed and accepted.

709.05 Basis of Payment.

709.05.1 *Perforated Pipe.* The quantity of perforated pipe underdrains will be paid for at the Contract Unit Price per linear foot. Price and payment will constitute full compensation for furnishing and placing all Materials, including perforated pipe, connectors, stone for backfill and filter fabric; for constructing perforated pipe drains; for excavating, backfilling, compacting, and video inspection; and for all labor, tools, Equipment, and incidentals required to complete the Work.

709.05.2 *Underdrain Outlet Pipe.* The quantity of underdrain outlet pipe will be paid for at the Contract Unit Price per linear foot. Price and payment will constitute full compensation for furnishing and placing all Materials, including smooth pipe, connectors, and backfill; for constructing underdrain outlet pipe; for excavating, backfilling, compacting and video inspection; and for all labor, tools, Equipment, and incidentals required to complete the Work.

709.05.3 *Underdrain Outlet.* The quantity of underdrain outlets will be paid for at the Contract Unit Price of each. Price and Payment will constitute full compensation for furnishing, hauling and installing all Materials, including the underdrain outfall, connectors, backfill, rodent screen, and outfall delineator; for excavating, backfilling and compacting; and for all labor, tools, Equipment, and incidentals required to complete the Work.

If rock is encountered during excavation for perforated pipe underdrain, outlet pipe or outlet payment for rock removal will be made under Section 202.

Subsection 720.02 Materials. (6/15/2018)

Replace the first paragraph with the following:

Furnish guardrail systems that have been tested in conformance with the requirements of the 2016 Manual on Assessing Safety Hardware (MASH) published by the American Association of State Highway and Transportation Officials (AASHTO). Submit, for approval, shop drawings and Federal Highway Administration (FHWA) eligibility letter(s) for guardrail systems or individual components.

H. Offset blocks

Replace (b.ii.) with the following:

- ii. Meets 2016 MASH testing requirements

Subsection 721.02 Materials. (6/15/2018)

1. Guardrail End Treatment

Replace the first paragraph with the following:

Furnish guardrail end treatment, selected from the Approved Products List (https://www.deldot.gov/Business/prodlists/pdfs/DeIDOTAPL-EndTerminals_Final_12132017.pdf), for the location depicted on the Plans and design speed of the roadway. Prior to installation, provide in writing which guardrail end treatment(s) will be installed on the Project and the associated manufacturer's installation instructions. Guardrail end treatment designs shall be as follows:

Subsection 724.02 Materials. (6/15/2018)

Replace the first paragraph with the following:

Furnish impact attenuators, selected from the Approved Products List (https://www.deldot.gov/Business/prodlists/pdfs/DeIDOTAPL-ImpactAttenuators_FINAL_12132017.pdf), for the location depicted on the Plans and design speed of the roadway. Prior to installation, provide in writing which impact attenuator(s) will be installed on the Project. Submit manufacturer's installation instructions.

Subsection 801.03.1 General Temporary Traffic Control/Maintenance of Traffic. (6/15/2018)

Replace (B.) with the following:

- B. Submit to the Engineer, in writing, a Temporary Traffic Control Plan (TTCP) signed and sealed by a Professional Engineer registered in the State of Delaware, in accordance with all applicable DeIDOT standards for approval prior to the start of Work at each and every location.

Subsection 801.03.5 Travel Lane and Road Closure Restrictions. (6/15/2018)

Replace with the following:

Travel lane, turn lane, ramp closures and/or road closures are not permitted on Interstates, other freeways/expressways and principal arterials during the following Holiday periods, unless otherwise noted in the Contract Documents:

- A. Christmas

- B. New Year's
- C. Memorial Day
- D. 4th of July
- E. Labor Day
- F. Thanksgiving Day

The period of time that lanes are to be open depends on the day of the week on which the legal or observed holiday or event falls. The following schedule determines this periods, notwithstanding allowable lane closure times permitted by the Contract:

Day of holiday or event	Time all lanes must be open to traffic
Sunday	12:00 PM Friday through 5:59 AM Monday
Monday	12:00 PM Friday through 11:59 PM Monday
Tuesday	3:00 PM Monday through 11:59 PM Tuesday
Wednesday	3:00 PM Tuesday through 11:59 PM Wednesday
Thursday	3:00 PM Wednesday through 11:59 PM Thursday
Thursday (Thanksgiving only)	6:00 AM Wednesday through 11:59 PM Sunday
Friday	12:00 PM Thursday through 5:59 AM Monday
Saturday	12:00 PM Friday through 5:59 AM Monday

Travel lane, ramp or road closures are not permitted on any road within one mile of a designated polling place during the primary and general elections that fall during an even numbered year.

Additional restrictions may apply as noted in the Contract Documents or as directed by the Engineer.

Subsection 809.03.1 Equipment. (12/28/2018)

A. Replace (2.) with the following:

Select from Approved Products List (https://www.deldot.gov/Business/prodlists/pdfs/DeIDOTAPL-ImpactAttenuators_FINAL_12132017.pdf), for the location depicted on the Plans and design speed of the roadway. Prior to installation, provide in writing which impact attenuator(s) will be installed on the Project. Submit manufacturer's drawings and installation instructions.

B. Replace (2.) with the following:

Select from Approved Products List (https://www.deldot.gov/Business/prodlists/pdfs/DeIDOTAPL-ImpactAttenuators_FINAL_12132017.pdf), for the location depicted on the Plans and design speed of the roadway. Prior to installation, provide in writing which impact attenuator(s) will be installed

on the Project. Submit manufacturer's drawings and installation instructions.

Subsection 809.03.1 Equipment. (6/15/2018)

A. Temporary Impact Attenuator (TIA)

Replace (2.a.) with the following:

- a. Select from Approved Products List (https://www.deldot.gov/Business/prodlists/pdfs/DelDOTAPL-ImpactAttenuators_FINAL_12132017.pdf). Provide in writing which temporary impact attenuator(s) will be installed on the Project.

B. Sand Crash Cushions

Replace (2.a) with the following:

- a. Select from Approved Products List (https://www.deldot.gov/Business/prodlists/pdfs/DelDOTAPL-ImpactAttenuators_FINAL_12132017.pdf). Provide in writing which sand crash cushion array(s) will be installed on the Project.

Subsection 905.02 Materials. (6/15/2018)

Add the following Material:

Fence	Section 1061
-------	--------------

Subsection 905.03 Construction. (6/15/2018)

A. Silt Fence.

Replace (2.a.) with the following:

- a. Construct according to Section 905.03.A.1 except for (d.).

Add new subsection 905.03.A.3:

3. *Construction of Super Silt Fence.* Construct super silt fence as follows:
 - a. Construct according to Section 905.03.A.1 except for (d.).
 - b. Fasten geotextile to fence securely to chain link with ties spaced every 24" at the top and midsection.

Change subsection 905.03.A.3. *Maintenance of Silt Fence* to 905.03.A.4. *Maintenance of Silt Fence*

Change subsection 905.03.A.4. *Removal of Silt Fence* to 905.03.A.5. *Removal of Silt Fence*

Subsection 905.04 Measurement. (6/15/2018)

Replace (A.) with the following:

- A. Silt fence, reinforced silt fence and super silt fence by the linear feet of fence placed and accepted exclusive of overlap(s).

Section 908 (12/28/2018)

Replace section 908 with the following:

SECTION 908 – SOIL STABILIZATION PRACTICES

908.01 Description. Provide an acceptable, uniform stand of established perennial grasses, including topsoil, topsoiling and, mulching, on all areas to be treated as shown per the Contract Documents and/ or as directed by the Engineer.

Temporarily Stockpiled Material. Temporary stockpiled Materials should be handled as follows:

Store stockpiled material a minimum of 50 feet away from streams and wetlands within the LOC.

Install the erosion and sediment control items as shown in the Contract Documents and/ or as directed by the Engineer about the base of the pile in advance of the actual stockpiling operation.

Place erodible earth material in neat piles. Height requirements are at the discretion of the Engineer within operational right of way. Piles not within operational right of way will not exceed 20 feet. Seed and mulch all erodible temporary stockpile surfaces in accordance with the interim or final stabilization requirements of this Section.

No payment will be made for costs associated with the installation of erosion and sediment controls or stabilization required by other agencies having jurisdiction on stockpiles located outside the areas designated in the Contract Documents.

Interim and Final Stabilization. All erodible earth material exposed by the Work will be stabilized within the time frames specified below:

Location	Type of Stabilization	Maximum Time to Stabilize
Sediment Controls	Interim Stabilization	Seven (7) Calendar Days from the completion of active construction of the bmp device (ex: ditches, sediment traps, dewatering basins, etc.
Short term inactivity not meeting final grade and not to exceed six (6) months	Interim Stabilization	Fourteen (14) Calendar Days from the ceasing of ground disturbing work in the location.
Areas meeting final grades or areas that will be inactive longer than six (6) months	Final Stabilization	Seven (7) Calendar Days from the ceasing of ground disturbing work in the location.

Interim Stabilization is defined as any and all operations required for complete temporary stabilization as determined by the Engineer.

Final Stabilization is defined as complete vegetation growth consisting of perennial grasses reaching a height of 3 inches and 70 percent uniform density over all seeded areas as determined by the Engineer.

Tracking of Slopes. During grading operations, track all areas. The tracking will 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. Upon request from the Contractor, the Engineer can approve a different tracking pattern.

Points of Ingress and Egress. Construct, maintain, and remove stabilized pads of aggregate on a geotextile base at each exit from the construction site so that construction vehicles and Equipment do not track sediment off-site.

908.02 Materials. Provide Materials for soil stabilization as specified below:

A. *Topsoil.* Provide Materials for topsoil as follows:

1. Topsoil friable loam soil of uniform quality and free from heavy clay, frozen clods, lumps exceeding 2 inches in diameter, and foreign materials harmful to plant growth, such as fragments of bituminous, concrete pavement, stones, and surface treatment.
2. Topsoil completely void of Johnsongrass (*Sorghum halapense*), Canada Thistle (*Cirsium arvense*), Burcucumber (*Sicyos angulatus*), Giant Ragweed (*Ambrosia trifida*) and Texas Amaranth (*Amaranthus palmeri*).
3. The Contractor shall determine and incorporate the type and amount of soil amendments and supplements needed to create proper conditions for acceptance of permanent vegetation.

B. *Topsoiling.* Provide Materials for topsoiling as follows:

1. Topsoiling Material is the existing soils designated to be stripped, salvaged and temporarily stockpiled in accordance with Section 202 for later use.
2. The contractor shall determine and incorporate the type and amount of soil amendments and supplements needed to create the proper conditions for acceptance of permanent vegetation.

C. *Seeding.* Provide Materials for seeding as follows:

1. *Water.* Use only water meeting the requirements of Section 1021.
2. *Grass and Agricultural Seeds.*
 - a. All seeds shall conform to 3 Del. C. 1953, §1501 and all requirements therein.
 - i. All blended seed shall display a seed tag on the bag, sewn into or otherwise attached to the bag.
 - ii. Seed mixtures may also be mixed to project specifications at the project site for special seed formulas or mixtures not specified in Tables A – C & E, if all specified seed have been previously inspected, tested, and approved by the Delaware Department of Agriculture for the designated purity, germination, weed seed limits, and pure live seed analysis.
 - iii. Be completely void of Johnsongrass (*Sorghum halapense*), Canada Thistle (*Cirsium arvense*), Burcucumber (*Sicyos angulatus*), Giant Ragweed (*Ambrosia trifida*) and Texas Amaranth (*Amaranthus palmeri*).

b. *Permanent and Temporary Seeding.* The seeding chart on the following pages shall be used for the following specified seeding:

Table A. *Permanent Grass Seeding - Dry Ground (PGS-DG)*

Table B. *Grass Seeding – Stormwater Facility (GS-SF)*

Table C. *Permanent Grass Seeding - Subdivision (PGS-SUB)*

Table D. *Temporary Grass Seeding (TGS)*

Table E. *Permanent Grass Seeding - Streambank (PGS-SB)*

Table A. Permanent Grass Seeding – Dry Ground (PGS-DG)					
Species	%Weed¹	% Purity	% Germination	Lbs./Ac.	Seeding Dates
Hard Fescue Mixture (<i>Festuca longifolia</i> and <i>Festuca trachyphylla</i>)	0.15	98	85	100	
Creeping Red Fescue (<i>Festuca rubra</i> L.)	0.15	98	85	85	
Redtop (<i>Agrostis alba</i>)	0.75	95	90	40	
Trifolium repens L. var. "White Clover" ⁵	0.10	75	80	5	
Total Perennial Seed Quantity² (lbs./Ac.)				230	
Winter Cereal Rye (<i>Secale cereal</i>)	0.75	98	85	20	1 Nov – 15 Feb
Annual Ryegrass (<i>Lolium multiflorum</i>)	0.15	95	90	10	16 Feb – 30 Apr 1 Aug – 31 Oct
Foxtail Millet (<i>Setaria italic</i>)	0.5	95	95	20	1 May – 31 July

Table B. Grass Seeding - Stormwater Facility (GS-SF)					
Species	%Weed¹	% Purity	% Germination	Lbs./Ac.	Seeding Dates
Redtop (<i>Agrostis alba</i>)	0.15	95	90	30	
Indian Grass (<i>Sorghastrum nutans</i>)	1.00	85	75	20	
Deertongue (<i>Dichanthelium clandestinum</i>)	1.00	95	60	20	
Switchgrass (<i>Panicum virgatum</i>)	1.00	95	70	40	
Tickseed Sunflower (<i>Bidens aristosa</i>)	0.09	98	91	10	
Black-Eyed Susan (<i>Rudbeckia hirta</i>)	0.00	99	97	10	
Partridge Pea (<i>Chamaecrista fasciculata</i>)	0.22	99	93	10	
Yellow Blossom Sweetclover (<i>Melilotus officinales</i>)	0.10	99	92	10	
Total Perennial Seed Quantity² (lbs/Ac.)				150	
Winter Cereal Rye (<i>Secale cereal</i>)	0.75	98	85	50	1 Nov – 15 Feb
Annual Oats (<i>Avena sativa</i>)	0.15	95	90	40	16 Feb – 30 Apr 1 Aug – 31 Oct
Foxtail Millet (<i>Setaria italica</i>)	0.5	95	95	40	1 May – 31 July

Table C. Permanent Grass Seeding – Subdivision Mix (PGS-SUB)					
Species	%Weed¹	% Purity	% Germination	Lbs./Ac.	Seeding Dates
Turf-type Tall Fescue Cultivar ⁴ (<i>Festuca arundinacea</i> var.)	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>)	0.75	95	90	40	
Trifolium repens L. var. “White Clover” ⁵	0.10	75	85	5	
Annual Ryegrass (<i>Lolium multiflorum</i>)	0.15	95	90	20	
Total Seed Quantity (lbs/Ac.)				315	

Table D. Temporary Grass Seeding (TGS)					
Species	% Weed¹	% Purity	% Germination	Lbs./Ac.	Seeding Dates
Winter Cereal Rye (<i>Secale cereal</i>)	0.75	98	85	50	1 Nov – 15 Feb
Annual Ryegrass (<i>Lolium multiflorum</i>)	0.15	95	90	40	16 Feb – 30 Apr 1 Aug – 31 Oct
Foxtail Millet (<i>Setaria italic</i>)	0.5	95	95	40	1 May – 31 July

Table E. Permanent Grass Seeding - Streambank (PGS-SB)					
Species	% Weed¹	% Purity	% Germination	Lbs./Ac.	Seeding Dates
Tall Fescue KY 31 (<i>Festuca arundinacea</i>)	0.5	98	90	180	X
Perennial Ryegrass (<i>Lolium perenne</i>)	0.4	90	90	20	X
Redtop (<i>Agrostis alba</i>)	0.75	95	90	20	X
Annual Ryegrass (<i>Lolium multiflorum</i>)	0.15	98	90	10	X
Total Seed Quantity (lbs/Ac.)				230	X

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 Add the applicable quantity of seasonal nurse crop as listed according to the seeding date.

³ *Festuca ovina* must be an improved variety of Sheep Fescue as approved by the Engineer. Selection should be based on performance within the Mid-Atlantic region as determined by the most current National Turfgrass Evaluation Program Progress Report.

⁴ Turf-type Tall Fescue Cultivars - Selection should be based on performance within the Mid-Atlantic region as determined by the most current National Turfgrass Evaluation Program Progress Report.

⁵ *Trifolium repens* L. var. "White Clover" requires inoculation by *Rhizobium leguminosarum biovar trifoli* prior to seeding, unless purchased as pre-treated. Inoculant and process is incidental to the item.

D. Erosion Control and Mulching Products.

- 1. Rolled Erosion Control Products.** Select from the Approved Products List (https://www.deldot.gov/Business/prodlists/pdfs/soil/approved_product_list_rolled_erosion_control_products.pdf?01032018) for the location and type of blanket (ECB, TRM Type 1, or TRM Type 2) designated on the Plans. Photodegradable products are not acceptable.

2. *Hydraulic Mulch.* Use hydraulic mulches where all components are pre-packaged by the manufacturer and no field mixing of hydraulic mulch additives or hydraulic mulch components will be acceptable. For hydraulic mulches, no paper or paper blend mulches are acceptable.
 3. *Straw Mulch.* Straw mulch shall be unrotted small grain straw that is free of weeds and noxious weeds.
- E. *Stabilized Construction Entrance.* Provide Materials for stabilized construction entrance as follows:
1. *Pipe.* Meets the requirements of Section 1031.
 2. *Seed.* Use seed that meets the requirements of Section 908.
 3. *Stone.* Use Delaware No. 3 that meets the requirements of Section 1004.
 4. *Geotextile.* Use geotextile that meet the requirements of Section 1060.

908.03 Construction. Use the following construction methods for soil stabilization:

- A. *Topsoil.* Construct and maintain topsoil placement as follows.
1. *Construction methods for Topsoil.* Construct topsoil placement as follows:
 - a. Clear all areas from which topsoil is to be secured 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.
 - b. Placement of frozen topsoil or topsoil on frozen grade is not permitted. Remove clods and lumps exceeding 2 inches in diameter.
 - c. The contractor shall determine and incorporate the type and amount of soil amendments and supplements needed to create the proper conditions for acceptance of permanent vegetation.
 - d. Thoroughly loosen topsoil to a depth of 3 inches within 72 hours before seeding.
 2. *Maintenance.* Maintain the topsoil until Project Acceptance. Maintenance consists of preserving, protecting, replacing, and such other Work as may be necessary to keep the topsoil in a satisfactory condition.
- B. *Topsoiling.* Construct and maintain topsoiling as follows.
1. Place topsoil in accordance with Section 908.03.A.1.
 2. *Maintenance.* Maintain topsoil in accordance with Section 908.03.A.2.
- C. *Seeding.* Construct and maintain seeding placement as follows.
1. *Construction methods for Seeding.*
 - a. Seed tags will be documented from the seed bags, prior to seeding, by the Engineer. Seed mixes will conform to Section 908.02.C.2 or as indicated in the contract documents. Mulch will be placed with no bare ground visible and/or erosion incidence. Mulch is incidental to seeding.

2. *Maintenance.* Maintain all seeded areas free from weeds and debris in accordance with Section 105.13.

D. *Erosion Control and Mulching Products.* Apply and maintain erosion control products as follows:

1. Submit product information and manufacturer's recommendations for installation to the Engineer no less than 2 working days prior to placement.
2. Placement of channel stabilization shall occur immediately after seeding application. All other placement shall occur within one week or before the next rain event.
3. All erosion control product maintenance will be determined by the Engineer.
4. Hydraulic Mulches.
 - a. Spray all hydraulic mulches in accordance with the manufacturer's recommendations.
5. Straw Mulch.
 - a. Spread straw mulch uniformly by hand or mechanically. The rate of application will be 2 tons/acre. Immediately after the straw mulch is placed, anchor by one of the following methods: crimping, tracking, liquid mulch binder, paper fiber, or netting. Liquid binder shall be applied at the manufacturer's application rate. Netting must be 100% biodegradable and properly secured so that the straw mulch does not move. No plastic netting will be accepted. No bare ground will be visible at the conclusion of the operation.
6. Erosion Control Blanket.
 - a. Erosion Control Blanket will be installed as per the manufacturer's recommendation depending on the site placement, i.e. slope or channel application.
7. Turf Reinforcement Mat.
 - a. Turf Reinforcement Mat will be installed per the manufacturer's recommendation depending on the site placement, i.e. slope or channel application.

E. *Stabilized Construction Entrance.* Construct, maintain, and remove stabilized construction entrance as follows.

1. *Construction of Stabilized Construction Entrance.* Construct Stabilized Construction Entrance in accordance with the Contract Documents and where shown on the plans. Construct stabilized Construction Entrance as follows:
 - a. Obtain the approval of the Engineer before any additions, deletions, or changes in the location of a stabilized construction entrance.
 - b. When pipe underneath the Stabilized Construction Entrance is required, place the entrance pipe in Class C bedding and grade to drain. Install the pipe before placing the geotextile or stone. Excavate to the required dimensions as shown in

the Standard Construction Details and the compact the subgrade of the stabilized construction entrance. Place the geotextile on the compacted subgrade and place the stone on top to the required depth.

- c. Stabilize as described above the entire width at points where ingress and egress occur. The Engineer may direct the Contractor to widen the entrance as required to prevent the entrance location from becoming a source of sediment.

2. *Maintenance of Stabilized Construction Entrance.* Maintain Stabilized Construction Entrance placement as follows:

- a. Leave all paved surfaces adjoining the project limits free of accumulated sediment at the end of each Day. The Contractor may utilize any means and methods available to remove sediment provided the cleaning operation itself does not violate the water or air pollution laws of the State.
- b. After heavy use and after each rain, inspect the stabilized construction entrance to ensure proper functioning. When the voids in the stone pad are filled, rake the surface to reestablish the voids in the stone pad. If sedimentation of the entrance is severe, and the raking is unsuccessful in restoring void space, replace the top 2 inches of the stone with 2 inches of clean Delaware No. 3 stone.

3. *Removal of Stabilized Construction Entrance.* When the stabilized construction entrance is no longer needed for access to the Project or when directed by the Engineer, remove all Stabilized Construction Entrance Materials. Restore to grade and stabilize the restored areas.

908.04 Method of Measurement. The Engineer will measure the quantity of Work acceptably completed for soil stabilization as follows:

- A. Topsoil by the number of square yards or tons acceptably placed.
- B. Topsoiling by the number of square yards or tons acceptably placed.
- C. Seeding by the number of square yards acceptably placed.
- D. Erosion Control and Mulching Product is incidental to seeding, unless specified in the plans. ECB and TRM specified in the plans will be measured by the number of square yards acceptably placed.
- E. Stabilized construction entrance by the actual number of square yards acceptably placed. Stone used for the topdressing shall be measured as the actual number of tons of stone acceptably placed. Drainage pipe, if used, will be measured as the actual number of linear feet of pipe acceptably placed.

908.05 Basis of Payment.

- A. **Topsoil.** The quantity of topsoil will be paid for at the Contract Unit Price per Square Yard or Ton. Price and payment constitutes full compensation for preparing the grade; for furnishing, hauling, and placing all Materials including maintaining topsoil; for loosening of the topsoil; for all soil amendments and supplements needed to create the proper

conditions for the acceptance of permanent vegetation and for all labor Equipment, tools, and incidentals required to complete the Work.

B. **Topsoiling.** The quantity of topsoiling will be paid for at the Contract Unit Price per Square Yard or Ton. Price and payment constitutes full compensation for preparing the grade; for hauling, and placing all topsoil salvaged under Section 202; for maintaining topsoil; for loosening of the topsoil, for all soil amendments and supplements needed to create the proper conditions for the acceptance of permanent vegetation and for all labor, Equipment, tools, and incidentals required to complete the Work.

C. **Seeding.** The quantity and type of seeding will be paid for at the Contract Unit Price per Square Yard. Price constitutes full compensation for preparing the ground; for furnishing and placing all Materials including seed, any required inoculants, and mulch; and for all labor, Equipment, tools, Maintenance Bond and incidentals required to complete the Work.

Acceptance of Permanent and Temporary Grass Seeding. Repair all areas failing to meet the specified perennial grass cover at no additional expense to the Department.

Payment Schedule			
Seed Type	Permanent Seed	Permanent Seed	Temporary Seed
Completed Work	at the time seed is acceptably placed	production of a uniform stand of established perennial grass species having attained a height of 3 inches with a density of 70% of the seeded area for acceptance by the Engineer.	at the time seed is acceptably placed
Percent of Total Item Price	100%	0%	100%

D. **Erosion Control and Mulching Products.** The quantity of Erosion Control and Mulching Product will be paid for at the contract unit price per square yard. Price and payment constitutes full compensation for furnishing and placing all materials, including staples, and for all labor, equipment, tools, and incidentals required to complete the work until accepted by the Department. Should the contractor elect to use multiple products from the approved product list the unit price shall apply to all products listed under the corresponding item description on the DeIDOT approved product list.

E. **Stabilized Construction Entrance.** The quantity of stabilized construction entrance will be paid for at the Contract Unit Price per Square Yard. Price and payment constitutes full compensation for the furnishing and placing of all material except the stone, including the geotextile; for maintaining the stabilized construction entrance during the project construction period, excluding the placing additional stone for topdressing; for removing the stabilized construction entrance as well as topdressing after completion of the

project; for restoring the site, including any required seeding; and for all labor, equipment, tools, and incidentals required to complete the work.

The quantity of drainage pipe is paid for separately in accordance with section 601.

F. **Stabilized Construction Entrance, Topdressing.** The quantity of stabilized construction entrance, topdressing will be paid for at the Contract Unit Price per ton of stone. Price and Payment constitutes full compensation for the furnishing and placing all material; removing the existing topdressing material; for maintaining the topdressing of the stabilized construction entrance during the project construction period; and for all labor, equipment, tools, and incidentals required to complete the work.

G. **Tracking of Slopes.** All costs associated with tracking of slopes at regular increments are incidental to Section 202. All costs associated with tracking of slopes to prepare a seedbed are incidental to the topsoil Item being applied to the slope surface.

908.05.1 Maintenance Bond. Furnish to the Department a Maintenance Bond for the appropriate seeding Items, upon Substantial Completion of the Work. The Maintenance Bond shall meet the following requirements:

- A. A sum equal to 100 percent 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 908 – 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.

Section 910 (12/28/2018)

Replace section 910 with the following:

SECTION 910 – STORMWATER MANAGEMENT FACILITIES

910.01 Description. This work consists of constructing stormwater management facilities.

910.02 Materials. Provide material as specified below and in accordance with what is shown in the plans:

- A. **Infiltration Stone (No. 3, No. 8, or No. 57).** Place infiltration stone meeting the following requirements:

1. *Stone.* Use stone that meets the material and gradation requirements of respective Section 1004 of the DelDOT Standard Specifications. Use infiltration stone that is washed, free of stone dust, fines or soil particles and has a maximum of 2.0 percent passing the #200 sieve when tested according to AASHTO T11. Do not use crushed concrete or recycled asphalt pavement (RAP) for this purpose.
 2. Use geotextile fabric meeting the requirements in Section 1060 of DelDOT's Standard Specifications.
- B. Clay Borrow.** Use clay borrow that conforms to the following requirements:
1. *Cut-Off Trench.* Use clay borrow that conforms to Section 1002.01, Clay Borrow, Type 2.
 2. *Pond Liner.* Use clay borrow that conforms to Section 1002.01, Clay Borrow, Type 1.
 3. *Borrow Sources.* Comply with the requirements of Section 209.03.1.
 4. *Borrow Source Testing.* Comply with the requirements of Section 209.03.2.
- C. Outlet Structure, Concrete.** Construct concrete outlet structures that meet the following requirements:
1. *Borrow.* Provide material as specified in Section 209 and Section 1001.
 2. *Concrete.* Concrete used in riser structures may be precast or cast in place. Use only cast-in-place concrete for walls, anti-seep collars, and bedding for a principle spillway. Use Class A concrete for foundations, riser structures, walls, anti-seep collars, and bedding for a principle spillway pipe. Use Class A concrete meeting the requirements of Section 1022.
 3. *Reinforcing Steel.* Use Grade 60 reinforcing steel meeting the requirements of Section 1037.
 4. *Grout.* Use non-shrink grout conforming to the requirements of Section 1047.02.
 5. *Pipe.* Refer to Section 1031 of these Standard Specifications for the reinforced concrete pipe when used as a principal spillway.
 6. *Gaskets.* Refer to Section 1031 of these Standard Specifications for the gaskets to be used with reinforced concrete pipe.
 7. *Steps.* When steps are required, use molded plastic steps with a reinforcing bar core conforming to the requirements of AASHTO M31 / M31M, ASTM C478, and ASTM D4101.
 8. *Trash Rack.* All trash racks supplied for outlet structures will be aluminum, unless stated otherwise on the plans.
- D. Stormwater Management Pond.** If the basin will have a pond liner and/or a cut-off trench, provide material that meets the requirements of Section 910.02B. All other material will meet the requirements of Section 209, Section 908, and Section 1001.

E. *Infiltration Trench.* Provide materials for infiltration trenches that meet the following requirements:

1. *Infiltration Stone, No. 3.* Stone will meet the requirements of Section 910.02.A.
2. *Geotextile.* Geotextile will meet the requirements of Section 1060.01.G.
3. *Polyvinyl Chloride (PVC) Pipe, 6".* Use schedule 40 PVC pipe meeting the requirements of Section 1031.04.D.
4. *HDPE Pipe.* If needed, provide pipe in accordance with Section 1031.04.A.
5. *Reinforcing Bar.* Use epoxy-coated, No. 4 reinforcing bar that conforms to the requirements of AASHTO M31, Grade 60 and ASTM A775.

F. *Bioretention Area.* Construct bioretention areas that meet the following requirements:

1. *Biosoil Mix.* Provide from a DNREC approved vendor.
2. *Infiltration Stone, No. 8.* Stone will meet the requirements of Section 910.02.A.
3. *Polyvinyl Chloride (PVC) Pipe, 6".* Use schedule 40 PVC pipe meeting the requirements of Section 1031.04.D.
4. *Perforated, Corrugated Polyethylene Pipe, 6".* Will meet the requirements of Section 1031.
5. *Reinforcing Bar.* Use epoxy-coated, No. 4 reinforcing bar that conforms to the requirements of AASHTO M31, Grade 60 and ASTM A775.
6. *Triple Shredded Mulch.* Mulch will be hardwood and aged for a minimum of six months.

910.03 Construction. Before construction starts on any stormwater management facility during any phase of production, the Stormwater Engineer or the delegated representative will be contacted a minimum of two working days in advance.

A. *Outlet Structure, Concrete.* Construct as in accordance with Section 610 and the following.

1. *Excavation.* Excavate for the outlet structure to the required depth. Compact the foundation upon which the structure is to be placed to a firm, level, and unyielding surface. If dewatering is needed, than follow the requirements of Section 902 and Section 906.
2. *Riser.* To construct concrete riser, pour the concrete in place or use pre-cast concrete elements. If the concrete risers are pre-cast, design the lifting lugs, and all hardware required to transport and install the structure. Do not use the top slab to lift the riser structure. Fill any space between pipes and the walls of the pre-cast riser with non-shrink grout. The largest dimension of the opening in the riser of connection of the outfall pipe shall be no greater than the outfall pipe diameter plus 4 inches.
3. *Anti-Seep Collars.* To construct anti-seep collars, excavate the subgrade to the dimensions of the bottom half of the collars. Use the excavation as the form for

the bottom half of the anti-seep collars. Place formwork for the top half of the anti-seep collars.

4. *Principal Spillway Outfall Pipe.* Construct as in accordance with Section 601 and the following.

a. Use Class A concrete meeting the requirements of Section 1022 and place as shown per the Standard Construction Detail, Pipe Bedding. Use concrete shims to establish grade and alignment of the pipe. Do not use lumber, masonry bricks, or any other non-concrete material for shims. Exercise care during backfill to prevent any pipe movement from the proposed horizontal and vertical alignment. The length of Class A pipe bedding to be installed will be specified on the plans.

b. When the principal spillway outfall pipe is to be placed partially or completely in fill, construct the fill embankment 24 inches above the proposed top of pipe, then excavate the trench to the required grade.

5. *Maintenance.* Maintenance of the outlet structure will continue until Project Acceptance. Maintenance will include removal of accumulated sediment and/or trash, stabilization of eroded areas, maintaining water tight joints, and as determined by the Engineer. Dispose of sediment in accordance with Section 106.08.

B. *Stormwater Management Pond.* Use the following construction methods to construct a stormwater management pond.

1. *Foundation and Reservoir Preparation.* Prior to constructing the dam foundation and reservoir, clear and grub the area of trees, logs, stumps, roots, brush, boulders, sod, topsoil, and rubbish. Grade all surfaces under the foundation to remove irregularities.

2. *Outlet Structure Placement.* Construct outlet structure in accordance 910.03.A and as noted on the plans.

3. *Excavation.*

a. *Wet or Dry Stormwater Management Pond.* Excavate to the lines and grades shown on the plans or as directed by the Engineer with concurrence from the Stormwater Engineer.

b. *Infiltration Basin.* Excavate for an infiltration basin to within two feet of the designed bottom elevation, while maintaining the slope required as shown on the plans. At no time should any construction equipment traverse within two feet of the designed bottom of an infiltration basin. At no time should any stockpiling operation occur within the bottom foot print area of the infiltration basin.

Concurrence from the Stormwater Engineer must be obtained first before removal of the last two feet of material of an infiltration basin. No construction equipment will be allowed to traverse within two feet of the designed bottom. Removal of the material will progress from the middle of the facility working

towards the outside or can start on one side and move across. Limit the amount of ingress and egress points to as few as possible. As the last two foot of the material is being removed, scarify the bottom elevation. Immediately stabilize ingress and egress points when no longer needed.

4. *Foundation, Embankment, and Slope Construction.* Foundation, embankment, and slope construction will be completed as in accordance with Section 202, except for an infiltration basin bottom elevation. Use all suitable excavated material to construct the foundation and embankment. If permitted by the Engineer, materials determined to be unsuitable for use in the dam foundation and embankment may be deposited on slopes. Otherwise, use all excess material meeting the requirements for embankment to construct embankments as required by the contract documents. Remove all material in excess of the project's embankment requirements and all material that is unsuitable for embankment. If rock is encountered, excavate per Section 202.
 - a. *Cut-Off Trench.* If needed, key the foundation cut-off trench into original ground as shown on the plans. Excavate the foundation cutoff trench prior to placing the dam embankment. The trench shall have a minimum 4 foot bottom width. The side slopes of the cut-off trench shall be no steeper than 1:1. As the embankment construction progresses, so will the cut-off trench as shown on the plans.
 - b. *Pond Liner.* If needed, construct the pond liner after lines and grades are obtained for the area needed and as shown in the plans. Liner placement will be constructed as in accordance with Section 202.
 5. *Standing Water.* If standing water is encountered during excavation or construction, dewatering will be as in accordance with Section 902 and Section 906.
 6. *Stabilization.* Stabilization will be in accordance with Section 908 and as stated on the plans.
 7. *Maintenance of the Stormwater Management Pond.* Maintenance of the stormwater management facility will continue until Project Acceptance. Maintenance will include annual mowing of side slopes, removal of accumulated sediment and/ or trash, stabilization of eroded areas, removal of vegetative noxious or invasive species as listed by the Delaware Department of Agriculture, and as determined by the Engineer. Dispose of sediment in accordance with Section 106.08.
- C. *Infiltration Trench.* Use the following construction methods for infiltration trench. At no time should any construction equipment traverse within two feet of the designed bottom of the infiltration trench area. At no time should any stockpiling operation occur on or within ten feet of the infiltration trench area. Construct the infiltration trench to the dimensions shown on the plans after concurrence from the Stormwater Engineer.
1. *Subgrade Establishment.*
 - a. Excavate to the design subgrade elevation and scarify the bottom to a minimum depth of 6 inches. At no time, shall any construction equipment traverse within two feet of the designed bottom elevation.

- b. After excavation is complete, line the sides of the stone reservoir with geotextile. Place the geotextile as smoothly as possible with a 12 inch minimum overlap on the trench sides. Provide enough geotextile to completely cover the stone surface with a minimum two feet overlap, which will be secured in place utilizing excess infiltration stone or other approved method by the Engineer. Excess geotextile covering the stone surface will be removed after a satisfactory stand of permanent vegetation has been established as determined by the Engineer with concurrence from the Stormwater Engineer.

2. *Aggregate Placement.*

- a. Construct the inspection port using 6 inch diameter Schedule 40 PVC with 4 rows of 3/8 inch diameter holes, evenly spaced around the pipe and 6 inch on center vertically. Place a removable cap on the top and place an 18 inch length of rebar through the pipe and secure on the bottom to serve as an anchoring system. Extend the inspection port from the bottom of the trench to 1 foot above the top stone elevation.
- b. Place infiltration stone as noted on the plans.
- c. If needed, place HDPE pipe as noted on the plans.

3. *Maintenance.* Maintenance of the infiltration trench will continue until Project Acceptance. Maintenance will include annual mowing of side slopes, removal of accumulated sediment and/ or trash, stabilization of eroded areas, removal of vegetative noxious or invasive species as listed by the Delaware Department of Agriculture, and as determined by the Engineer. Dispose of sediment in accordance with Section 106.08

- D. *Bioretention Area.* Use the following construction methods for bioretention area. At no time should any construction equipment traverse within one foot of the designed bottom of the bioretention area. At no time should any stockpiling operation occur on or within ten feet of the bioretention area. Construct the bioretention area to the dimensions shown on the plans.

1. *Outlet Structure Placement.* Construct outlet structure in accordance 910.03.A and as noted on the plans.

2. *Subgrade Establishment.* Excavate to the design subgrade elevation and scarify the bottom to a minimum depth of 6 inches. At no time, shall any construction equipment traverse within two feet of the designed bottom elevation.

3. *Bioretention Area Components Placement.*

- a. Construct the inspection port using 6 inch diameter Schedule 40 PVC with 4 rows of 3/8 inch diameter holes, evenly spaced around the pipe and 6 inch on center vertically. Place a removable cap on the top and place an 18 inch length of rebar through the pipe and secure on the bottom to serve as an anchoring system. Extend the inspection port from the bottom of the trench to 1 foot above the top biosoil mix elevation.

- b. Place infiltration stone as noted on the plans.
 - c. Place 6" perforated, corrugated polyethylene pipe as noted on the plans.
 - d. Place biosoil mix as noted on the plans.
 - e. Place triple shredded mulch over the entire surface of the biosoil mix a minimum of 4 inches thickness.
4. *Standing Water.* If standing water is encountered during excavation or construction, dewatering will be in accordance with Section 902 and Section 906.
5. *Stabilization.* Stabilization will be in accordance with Section 908 and as stated on the plans.
6. *Maintenance.* Maintenance of the bioretention area will continue until Project Acceptance. Maintenance will include annual mowing of the side slopes, removal of accumulated sediment and/ or trash, stabilization of eroded areas, removal of vegetative noxious or invasive species as listed by the Delaware Department of Agriculture, and as determined by the Engineer. Dispose of sediment in accordance with Section 106.08.

910.04 Measurement. The Engineer will measure the quantity of work acceptably completed for stormwater management facilities as follows:

- A. Infiltration Stone by the cubic yard of stone placed and accepted.
- B. Clay Borrow by the cubic yard measured in accordance with Section 209.04.
- C. Outlet Structure, Concrete by each, constructed and accepted.
- D. The quantity of stormwater management pond will be measured as the actual number of cubic yards of material to construct and maintain the stormwater management pond and in accordance with Section 202.04.
- E. Infiltration Trench by the cubic yard constructed and accepted.
- F. Bioretention Area by the cubic yard constructed and accepted.
- G. Biosoil Mix by the cubic yard of material placed and accepted.

910.05 Payment. The Engineer will pay the quantity of work acceptably completed and as follows:

- A. For Infiltration Stone, price and payment will constitute full compensation for subgrade preparation, furnishing, hauling, placing stone, and for all labor, tools, equipment, and incidentals necessary to complete the item.
- B. For Clay Borrow, price and payment will constitute full compensation for stripping, excavating, hauling, placing, and compacting the borrow material and for all labor, equipment, tools, and incidentals required to complete the work.
- C. For Outlet Structure, Concrete, each, price and payment will constitute full compensation for excavating; for dewatering; for all ground preparation; for furnishing and placing all materials, reinforcing steel, concrete, concrete pipes, gaskets, grout, pipe bedding, steps, backfill, trash rack, dewatering, and all other materials required for pond outlet structure,

concrete; for welding; and for all labor, equipment, tools, and incidentals necessary to complete the work.

- D. For stormwater management pond, price and payment will constitute full compensation for clearing, grubbing, disposing of all obstructions, excavation, embankment, grading, compaction, removing and disposing of all unsuitable material, salvaging and stock piling any soils for re-use, dewatering, and for all labor, equipment, tools, and incidentals required to complete the work.

The removal and final disposal of materials not specified to be removed under this item will be paid under the respective pay items otherwise provided in the contract.

- E. For Infiltration Trench, price and payment will constitute full compensation for furnishing and installing all required materials, including geotextile, PVC pipe, HDPE pipe, anchor bar; and for all labor, tools, equipment, and incidentals required to complete the work.
- F. For Bioretention Area, price and payment will constitute full compensation for furnishing and installing all required materials, PVC pipe, perforated corrugated polyethylene pipe, anchor bar, dewatering, and for all labor, tools, equipment, and incidentals required to complete the work.
- G. For Biosoil Mix, price and payment will constitute full compensation for subgrade preparation, furnishing, hauling, placing material, triple shredded mulch, and for all labor, tools, equipment, and incidentals necessary to complete the item.

Section 910 (6/15/2018)

Replace section 910 with the following:

SECTION 910 – STORMWATER MANAGEMENT FACILITIES

910.01 Description. This work consists of constructing stormwater management facilities.

910.02 Materials. Provide material as specified below and in accordance with what is shown in the plans:

- B. *Infiltration Stone (No. 3, No. 8, or No. 57).* Place infiltration stone meeting the following requirements:
1. *Stone.* Use stone that meets the material and gradation requirements of respective Section 1004 of the DelDOT Standard Specifications. Use infiltration stone that is washed, free of stone dust, fines or soil particles and has a maximum of 2.0 percent passing the #200 sieve when tested according to AASHTO T11. Do not use crushed concrete or recycled asphalt pavement (RAP) for this purpose.
 2. Use geotextile fabric meeting the requirements in Section 1060 of DelDOT's Standard Specifications.
- C. *Clay Borrow.* Use clay borrow that conforms to the following requirements:
1. *Cut-Off Trench.* Use clay borrow that conforms to Section 1002.01, Clay Borrow, Type 2.

2. *Pond Liner.* Use clay borrow that conforms to Section 1002.01, Clay Borrow, Type 1.
 3. *Borrow Sources.* Comply with the requirements of Section 209.03.1.
 4. *Borrow Source Testing.* Comply with the requirements of Section 209.03.2.
- D. *Outlet Structure, Concrete.* Construct concrete outlet structures that meet the following requirements:
1. *Borrow.* Provide material as specified in Section 209 and Section 1001.
 2. *Concrete.* Concrete used in riser structures may be precast or cast in place. Use only cast-in-place concrete for walls, anti-seep collars, and bedding for a principle spillway. Use Class A concrete for foundations, riser structures, walls, anti-seep collars, and bedding for a principle spillway pipe. Use Class A concrete meeting the requirements of Section 1022.
 3. *Reinforcing Steel.* Use Grade 60 reinforcing steel meeting the requirements of Section 1037.
 4. *Grout.* Use non-shrink grout conforming to the requirements of Section 1047.02.
 5. *Pipe.* Refer to Section 1031 of these Standard Specifications for the reinforced concrete pipe when used as a principal spillway.
 6. *Gaskets.* Refer to Section 1031 of these Standard Specifications for the gaskets to be used with reinforced concrete pipe.
 7. *Steps.* When steps are required, use molded plastic steps with a reinforcing bar core conforming to the requirements of AASHTO M31, ASTM C478, and ASTM D4101.
 8. *Trash Rack.* All trash racks supplied for outlet structures will be aluminum, unless stated otherwise on the plans.
- E. *Stormwater Management Pond.* If the basin will have a pond liner and/or a cut-off trench, provide material that meets the requirements of Section 910.02B. All other material will meet the requirements of Section 209, Section 908, and Section 1001.
- F. *Infiltration Trench.* Provide materials for infiltration trenches that meet the following requirements:
1. *Infiltration Stone, No. 3.* Stone will meet the requirements of Section 910.02.A.
 2. *Geotextile.* Geotextile will meet the requirements of Section 1060.01.G.
 3. *Polyvinyl Chloride (PVC) Pipe, 6".* Use schedule 40 PVC pipe meeting the requirements of Section 1031.04.D.
 4. *HDPE Pipe.* If needed, provide pipe in accordance with Section 1031.04.A.
 5. *Reinforcing Bar.* Use epoxy-coated, No. 4 reinforcing bar that conforms to the requirements of AASHTO M31, Grade 60 and ASTM A775.
- G. *Bioretention Area.* Construct bioretention areas that meet the following requirements:
1. *Biosoil Mix.* Provide from a DNREC approved vendor.

2. *Infiltration Stone, No. 8.* Stone will meet the requirements of Section 910.02.A.
3. *Polyvinyl Chloride (PVC) Pipe, 6".* Use schedule 40 PVC pipe meeting the requirements of Section 1031.04.D.
4. *Perforated, Corrugated Polyethylene Pipe, 6".* Will meet the requirements of Section 1031.
5. *Reinforcing Bar.* Use epoxy-coated, No. 4 reinforcing bar that conforms to the requirements of AASHTO M31, Grade 60 and ASTM A775.
6. *Triple Shredded Mulch.* Mulch will be hardwood and aged for a minimum of six months.

910.03. Construction. Before construction starts on any stormwater management facility during any phase of production, the Stormwater Engineer or the delegated representative will be contacted a minimum of two working days in advance.

- A. *Outlet Structure, Concrete.* Construct as in accordance with Section 610 and the following.
 1. *Excavation.* Excavate for the outlet structure to the required depth. Compact the foundation upon which the structure is to be placed to a firm, level, and unyielding surface. If dewatering is needed, than follow the requirements of Section 902 and Section 906.
 2. *Riser.* To construct concrete riser, pour the concrete in place or use pre-cast concrete elements. If the concrete risers are pre-cast, design the lifting lugs, and all hardware required to transport and install the structure. Do not use the top slab to lift the riser structure. Fill any space between pipes and the walls of the pre-cast riser with non-shrink grout. The largest dimension of the opening in the riser of connection of the outfall pipe shall be no greater than the outfall pipe diameter plus 4 inches.
 3. *Anti-Seep Collars.* To construct anti-seep collars, excavate the subgrade to the dimensions of the bottom half of the collars. Use the excavation as the form for the bottom half of the anti-seep collars. Place formwork for the top half of the anti-seep collars.
 4. *Principal Spillway Outfall Pipe.* Construct as in accordance with Section 601 and the following.
 - a. Use Class A concrete meeting the requirements of Section 1022 and place as shown per the Standard Construction Detail, Pipe Bedding. Use concrete shims to establish grade and alignment of the pipe. Do not use lumber, masonry bricks, or any other non-concrete material for shims. Exercise care during backfill to prevent any pipe movement from the proposed horizontal and vertical alignment. The length of Class A pipe bedding to be installed will be specified on the plans.
 - b. When the principal spillway outfall pipe is to be placed partially or completely in fill, construct the fill embankment 24 inches above the proposed top of pipe, then

excavate the trench to the required grade.

B. *Stormwater Management Pond.* Use the following construction methods to construct a stormwater management pond.

8. *Foundation and Reservoir Preparation.* Prior to constructing the dam foundation and reservoir, clear and grub the area of trees, logs, stumps, roots, brush, boulders, sod, topsoil, and rubbish. Grade all surfaces under the foundation to remove irregularities.

9. *Outlet Structure Placement.* Construct outlet structure in accordance 910.03.A and as noted on the plans.

10. *Excavation.*

a. *Wet or Dry Stormwater Management Pond.* Excavate to the lines and grades shown on the plans or as directed by the Engineer with concurrence from the Stormwater Engineer.

b. *Infiltration Basin.* Excavate for an infiltration basin to within one foot of the designed bottom elevation, while maintaining the slope required as shown on the plans. At no time should any construction equipment traverse within one foot of the designed bottom of an infiltration basin. At no time should any stockpiling operation occur within the bottom foot print area of the infiltration basin.

Concurrence from the Stormwater Engineer must be obtained first before removal of the last foot of material of an infiltration basin. No construction equipment will be allowed to traverse within one foot of the designed bottom. Removal of the material will progress from the middle of the facility working towards the outside or can start on one side and move across. Limit the amount of ingress and egress points to as few as possible. As the last foot of material is being removed, scarify the bottom elevation. Immediately stabilize ingress and egress points when no longer needed.

11. *Foundation, Embankment, and Slope Construction.* Foundation, embankment, and slope construction will be completed as in accordance with Section 202, except for an infiltration basin bottom elevation. Use all suitable excavated material to construct the foundation and embankment. If permitted by the Engineer, materials determined to be unsuitable for use in the dam foundation and embankment may be deposited on slopes. Otherwise, use all excess material meeting the requirements for embankment to construct embankments as required by the contract documents. Remove all material in excess of the project's embankment requirements and all material that is unsuitable for embankment. If rock is encountered, excavate per Section 202.

a. *Cut-Off Trench.* If needed, key the foundation cut-off trench into original ground as shown on the plans. Excavate the foundation cutoff trench prior to placing the dam embankment. The trench shall have a minimum 4 foot bottom width. The side slopes of the cut-off trench shall be no steeper than 1:1. As the embankment construction progresses, so will the cut-off trench as shown on the plans.

- b. *Pond Liner.* If needed, construct the pond liner after lines and grades are obtained for the area needed and as shown in the plans. Liner placement will be constructed as in accordance with Section 202.
 - 12. *Standing Water.* If standing water is encountered during excavation or construction, dewatering will be as in accordance with Section 902 and Section 906.
 - 13. *Stabilization.* Stabilization will be in accordance with Section 908 and as stated on the plans.
 - 14. *Maintenance of the Stormwater Management Pond.* Maintenance of the stormwater management facility will continue until final project acceptance. Maintenance will include annual mowing, removal of accumulated sediment, and anything else which would hinder the pond being accepted at project completion. Disposal of sediment to be at a location approved by the Engineer. Refer to the plans on conversion of the facility from a sediment basin to a permanent facility.
- C. *Infiltration Trench.* Use the following construction methods for infiltration trench. At no time should any construction equipment traverse within one foot of the designed bottom of the infiltration trench area. At no time should any stockpiling operation occur on or within ten feet of the infiltration trench area. Construct the infiltration trench to the dimensions shown on the plans after concurrence from the Stormwater Engineer.
- 4. *Subgrade Establishment.*
 - a. Excavate to the design subgrade elevation and scarify the bottom to a minimum depth of 6 inches. At no time, shall any construction equipment traverse within one foot of the designed bottom elevation.
 - b. After excavation is complete, line the sides of the stone reservoir with geotextile. Place the geotextile as smoothly as possible with a 12 inch minimum overlap on the trench sides. Provide enough geotextile to completely cover the stone surface with a minimum two feet overlap, which will be secured in place utilizing excess infiltration stone or other approved method by the Engineer. Excess geotextile covering the stone surface will be removed after a satisfactory stand of permanent vegetation has been established as determined by the Engineer with concurrence from the Stormwater Engineer.
 - 2. *Aggregate Placement.*
 - a. Construct the inspection port using 6 inch diameter Schedule 40 PVC with 4 rows of 3/8 inch diameter holes, evenly spaced around the pipe and 6 inch on center vertically. Place a removable cap on the top and place an 18 inch length of rebar through the pipe and secure on the bottom to serve as an anchoring system. Extend the inspection port from the bottom of the trench to 1 foot above the top stone elevation.
 - b. Place infiltration stone as noted on the plans.
 - c. If needed, place HDPE pipe as noted on the plans.

- D. *Bioretention Area.* Use the following construction methods for bioretention area. At no time should any construction equipment traverse within one foot of the designed bottom of the bioretention area. At no time should any stockpiling operation occur on or within ten feet of the bioretention area. Construct the bioretention area to the dimensions shown on the plans.
7. *Outlet Structure Placement.* Construct outlet structure in accordance 910.03.A and as noted on the plans.
 8. *Subgrade Establishment.* Excavate to the design subgrade elevation and scarify the bottom to a minimum depth of 6 inches. At no time, shall any construction equipment traverse within one foot of the designed bottom elevation.
 9. *Bioretention Area Components Placement.*
 - a. Construct the inspection port using 6 inch diameter Schedule 40 PVC with 4 rows of 3/8 inch diameter holes, evenly spaced around the pipe and 6 inch on center vertically. Place a removable cap on the top and place an 18 inch length of rebar through the pipe and secure on the bottom to serve as an anchoring system. Extend the inspection port from the bottom of the trench to 1 foot above the top biosoil mix elevation.
 - b. Place infiltration stone as noted on the plans.
 - c. Place 6" perforated, corrugated polyethylene pipe as noted on the plans.
 - d. Place biosoil mix as noted on the plans.
 - e. Place triple shredded mulch over the entire surface of the biosoil mix a minimum of 4 inches thickness.
 10. *Standing Water.* If standing water is encountered during excavation or construction, dewatering will be in accordance with Section 902 and Section 906.
 11. *Stabilization.* Stabilization will be in accordance with Section 908 and as stated on the plans.
 12. *Maintenance of the Bioretention Area.* Maintenance of the bioretention area will continue until final project acceptance. Maintenance will include annual mowing, removal of accumulated sediment, and anything else which would hinder the bioretention area being accepted at project completion. Disposal of sediment to be at a location approved by the Engineer. Refer to the plans on conversion of the bioretention area from a sediment trap to a permanent facility, if needed.

910.04 Method of Measurement. The Engineer will measure the quantity of work acceptably completed for stormwater management facilities as follows:

- H. Infiltration Stone by the cubic yard of stone placed and accepted.
- I. Clay Borrow by the cubic yard measured in accordance with Section 209.04.
- C. Outlet Structure, Concrete by each, constructed and accepted.
- D. The quantity of stormwater management pond will be measured as the actual number of

cubic yards of material to construct and maintain the stormwater management pond and in accordance with Section 202.04.

- E. Infiltration Trench by the cubic yard constructed and accepted.
- F. Bioretention Area by the cubic yard constructed and accepted.
- G. Biosoil Mix by the cubic yard of material placed and accepted.

910.05 Basis of Payment.

The Engineer will pay the quantity of work acceptably completed and as follows:

- H. For Infiltration Stone, price and payment will constitute full compensation for subgrade preparation, furnishing, hauling, placing stone, and for all labor, tools, equipment, and incidentals necessary to complete the item.
- I. For Clay Borrow, price and payment will constitute full compensation for stripping, excavating, hauling, placing, and compacting the borrow material and for all labor, equipment, tools, and incidentals required to complete the work.
- C. For Outlet Structure, Concrete, each, price and payment will constitute full compensation for excavating; for dewatering; for all ground preparation; for furnishing and placing all materials, reinforcing steel, concrete, concrete pipes, gaskets, grout, pipe bedding, steps, backfill, trash rack, dewatering, and all other materials required for pond outlet structure, concrete; for welding; and for all labor, equipment, tools, and incidentals necessary to complete the work.
- D. For stormwater management pond, price and payment will constitute full compensation for clearing, grubbing, disposing of all obstructions, excavation, embankment, grading, compaction, removing and disposing of all unsuitable material, salvaging and stock piling any soils for re-use, dewatering, and for all labor, equipment, tools, and incidentals required to complete the work.

The removal and final disposal of materials not specified to be removed under this item will be paid under the respective pay items otherwise provided in the contract.

- E. For Infiltration Trench, price and payment will constitute full compensation for furnishing and installing all required materials, including geotextile, PVC pipe, HDPE pipe, anchor bar; and for all labor, tools, equipment, and incidentals required to complete the work.
- F. For Bioretention Area, price and payment will constitute full compensation for furnishing and installing all required materials, PVC pipe, perforated corrugated polyethylene pipe, anchor bar, dewatering, and for all labor, tools, equipment, and incidentals required to complete the work.
- G. For Biosoil Mix, price and payment will constitute full compensation for subgrade preparation, furnishing, hauling, placing material, triple shredded mulch, and for all labor, tools, equipment, and incidentals necessary to complete the item.

Subsection 1004.02 Material Requirements. (6/15/2018)

Replace “*Non Recycled (Quarried) Material Properties.*” with the following:

Material Properties.

Replace **Recycled Materials** Table with the following:

Recycled Materials																		
<i>Aggregate Size</i>	<i>Sieve Size (square openings), millimeters except where noted</i>																	
	4" (100)	3 1/2" (90)	3" (75)	2 1/2" (63)	2" (50)	1 1/2" (37.5)	1" (25)	3/4" (19)	1/2" (12.5)	3/8" (9.5)	1/4" (6.3)	# 4 (4.75)	# 8 (2.36)	#10 (2.00)	# 16 (1.18)	# 40 (425 μm)	# 100 (150 μm)	# 200 (75 μm)
RAP ¹						100												
RCA ¹						100		50-95				20-60						2-20
RAS ²										100								

Section 1005. (6/15/2018)

Replace section 1005 with the following:

SECTION 1005 – GRADED AGGREGATES

1005.01 Description.

Provide Materials for Graded Aggregate Base Course (GABC) items as described herein.

1005.02 Requirements.

Use material uniform in quality and free of silt, clay, decomposed fragments, overburden material, soil, reinforcement, and other deleterious debris.

The Contractor may elect to use any of the following materials to meet the requirements of GRADED AGGREGATE BASE COURSE, TYPE B:

- A. Quarried Materials (GABC) (per Section 1004) and
 - 1. Los Angeles Abrasion testing, per AASHTO T96, must show percent of wear less than or equal to 45%.
 - 2. Material must be uniform in quality and composed solely of stone and stone dust.
- B. Recycled Concrete Aggregate (RCA) (per Section 1004)
- C. Bituminous Concrete Millings
 - 1. All material must be uniformly graded with a maximum size of 1 1/2".

Subsection 1022.03.2 Mix Design Parameters. (12/28/2018)

Replace (C) with the following:

- C. Class D concrete for approach slabs and decks require use of nonferrous reinforcement fibers at a rate of 1.5 pounds per cubic yard.

Subsection 1031.01 Corrugated Metal Pipe. (6/15/2018)

Add (A.3.) with the following:

3. Furnish safety and longitudinal bars for safety metal end sections from steel pipe conforming to ASTM A53 Schedule 40 specification. Galvanize the bars in accordance with Section 1031.01(A)(1).

Subsection 1031.03 Reinforced Concrete Pipe Culverts. (6/15/2018)

Add (A.1.) with the following:

1. Furnish safety and longitudinal bars for safety metal end sections in accordance with Section 1031.01(A)(3).

Subsection 1032.01 Description. (6/15/2018)

Replace with the following:

Provide Materials for treated and untreated timber piles and test piles, cast-in-place concrete piles and test piles, steel H pile and test piles, and precast prestressed concrete piles and test piles, and steel sheet piles as specified herein.

Subsection 1032.05.2 Prestressing Strands. (6/15/2018)

Replace the first sentence with the following:

Furnish prestressing strands that are seven-wire stress relieved, strands conforming to the requirements of AASHTO M203, Grade 270, unless noted otherwise on the Plans.

Subsection 1032.05.3 Spiral Reinforcing. (6/15/2018)

Replace with the following:

Use spiral reinforcing conforming to requirements of AASHTO M32.

Subsection 1032.06.1 Material Requirements. (6/15/2018)

Replace with the following:

Submit mill certifications for approval. Furnish steel sheet piles conforming to the requirements of AASHTO M202.

Galvanize steel sheet piles in accordance with Section 1039.10.

Alternate cold-formed or hot-rolled steel sheet pile shape and size may be proposed for use in lieu of steel sheet pile shape and size specified on the Plans. Submit for review working drawings showing the alternate steel sheet pile shape and size, alternate layout, corner pieces, etc. The alternate steel sheet pile size must have a section modulus that is greater than or equal to the steel sheet pile size specified on the Plans. The Department is not obligated to approve alternate steel sheet pile shapes and sizes. There will be no additional payment if the alternate steel sheet pile shape and size is approved by the Engineer.

Subsection 1037.02 Coated Reinforcement. (6/15/2018)

Replace the first sentence in (A.) with the following:

Furnish epoxy-coated bar reinforcement in accordance with AASHTO M31, Grade 60 and ASTM A775.

Replace (D.) with the following:

D. Furnish galvanized bar reinforcement in accordance with ASTM A1094 or ASTM A767 with a zinc coating conforming to ASTM B6.

Subsection 1037.03 Stainless Steel Reinforcement. (6/15/2018)

Replace the first sentence in (A.) with the following:

Furnish stainless steel bar reinforcement in accordance with ASTM A955, Grade 60.

Subsection 1037.04 Pavement Hardware. (6/15/2018)

Replace (A.) with the following:

A. *Tie Bars*. Furnish tie bars in accordance with AASHTO M31, Grade 60 or AASHTO M322, Grade 60. Do not use rail-steel for tie bars to be bent and restraightened during construction.

Subsection 1037.05 Other Hardware. (6/15/2018)

Replace (A.) with the following:

A. *Splice Couplers*. Furnish splice couplers in accordance with AASHTO M31, Grade 60.

Replace (B.) with the following:

B. *Epoxy Coated Splice Couplers*. Furnish epoxy coated splice couplers in accordance with AASHTO M31, Grade 60 and ASTM A775.

Replace (C.) with the following:

C. *Tie Bars, Hook Bolts, W-bolts*. AASHTO M31, Grade 60.

Subsection 1039.03 High Strength Fasteners. (6/15/2018)

A. *High Strength Bolts and Bolting Materials*.

Add a new standalone sentence after "For ASTM A490 bolts, provide nuts meeting ASTM A563, Grades DH or DH3":

Do not use DH3 nuts with Type 1 bolts.

Subsection 1039.04 Anchor Bolts. (6/15/2018)

Replace (A.) with the following:

A. *Anchor Bolts*. For anchor bolts, meet AASHTO M314, Grades 36, 55, 105. Galvanize as specified in Section 1039.10.

Subsection 1039.07 Castings. (6/15/2018)

Replace (B.) with the following:

- B. *Iron Castings.*
 - 1. *Gray Iron Castings.* For gray iron castings, meet AASHTO M105, Class 35B.
 - 2. *Ductile Iron Castings.* For ductile iron castings, meet ASTM A536, Grade 60-40-18. Inlet and manhole castings (covers, frames, and grates) meet ASTM A536 Grade 80-55-06. Furnish specified test coupons per ASTM A1067, and test specimens from integral casting parts, such as risers, for castings with a weight exceeding 1,000 pounds.
 - 3. *Malleable Iron Castings.* For malleable iron castings, meet ASTM A47, Grade 32510. Clean scale and sand from all castings before delivery.

Subsection 1048.01.B. (6/15/2018)

Replace with the following:

- B. Provide concrete in accordance with Sections 610, 612, and 1022. Unless noted otherwise, concrete shall meet the following:
 - 1. Leveling Pad – Class B, 3000 pounds per square inch
 - 2. Wall Panels – Class A, 4500 pounds per square inch
 - 3. Coping – Class A, 4500 pounds per square inch

Subsection 1048.01.C. (6/15/2018)

Replace the second sentence with the following:

Provide galvanization for the mesh in accordance with AASHTO M111.

Subsection 1048.01.E. (6/15/2018)

Replace (3.) with the following:

- 3. Galvanized in accordance with AASHTO M111 or M232.

Subsection 1048.01.H. (6/15/2018)

Replace with the following:

- H. If using alignment pins, provide alignment pin that is 5/8 inch min. diameter, mild steel, round, and smooth and is galvanized to meet the requirements of AASHTO M111.

Subsection 1048.01.I. (6/15/2018)

Replace the second sentence with the following:

Provide galvanization in accordance with AASHTO M111.

Subsection 1048.01.J. (6/15/2018)

Replace the second sentence with the following:

Provide galvanization in accordance with AASHTO M111.

New Subsection 1048.01.K. (6/15/2018)

Add the following:

- K. In lieu of metallic reinforcement, provide structural geostrips made of high-tenacity polyester fibers with linear low-density polyethylene coating. Geostrips shall have high resistance to deformation under sustained long-term design load and shall also be resistant to ultraviolet degradation, to damage under normal installation practices and to all forms of biological and /or chemical degradation.

Subsection 1048.01.K. (6/15/2018)

Change subsection number to 1048.01.L

Replace with the following:

- L. Provide galvanized bolts and nuts in accordance with Section 1039.

Subsection 1048.01.L. (6/15/2018)

Change subsection number to 1048.01.M

Replace with the following:

- M. Provide cast-in-place concrete in accordance with Section 610 and Section 1022. Unless noted otherwise, concrete shall meet the following:
 1. Leveling Pad – Class B, 3000 pounds per square inch
 2. Coping – Class A, 4500 pounds per square inch

Subsection 1048.01.M. (6/15/2018)

Change subsection number to 1048.01.N.

Replace the second sentence in (2.) with the following:

Set rebar and lifting devices in place to the dimensions and tolerances shown on the drawings prior to casting.

Delete third and fourth sentences from (2.)

Place the PVC pipe in a manner as to insure that it is not bent or bowed. Set coil loop inserts on the rear face.

Delete (3.)

3. Attach all coil loop inserts to the alignment templates using the bolts provided with the forms. Place the vertical and horizontal alignment of the coil loop inserts, free of all concrete or debris, loose or otherwise, 2-1/4 inch deep in the finished panel. Ensure that no concrete or

other debris is on the interior surfaces of the coils of the coil loop inserts in the finished panels. Immediately after the alignment template is removed, place duct tape over the coil loop insert holes in order to prevent debris from entering the holes. Removal of the duct tape is only permitted by the crew that is assembling the wall. Take care to insure that the duct tape is not removed during shipping.

Re-number existing (4.) to (3.)

Re-number existing (5.) to (4.)

Re-number existing (6.) to (5.)

Re-number existing (7.) to (6.)

Re-number existing (8.) to (7.) and replace the second sentence with the following:

A production lot is defined as a group of panels representing 40 panels or a single shift's production, whichever is less.

Replace the third sentence in (7.a) with the following:

Prepare 4 inch x 8 inch cylinders for compressive strength tests and test in accordance with AASHTO T23 and T22, respectively.

Re-number existing (9.) to (8.)

Re-number existing (10.) to (9.) and replace with the following:

9. Marking – Clearly scribe on the rear face of each panel the date of manufacture, the production lot number, and the piece-mark.

Re-number existing (11.) to (10.)

Re-number existing (12.) to (11.)

Subsection 1061.03 Chain Link Fence. (6/15/2018)

Replace the first sentence in (C.) with the following:

For Bridge Safety Fence, meet the requirements specified in 1061.03.A and 1061.03.B and the Standard Construction Details for the respective Item along with the following requirements:

Replace (C.2.) with the following:

2. The fence post and rail must be made of steel pipe in accordance with the requirements of AASHTO M181, Grade 1 or Grade 2.

Replace (C.2.a.) with the following:

a. For fence post, use 2.875 inch O.D. Galvanized post.

Replace (C.2.b.) with the following:

b. For fence rail, use 1.66 inch O.D. Galvanized rail.

Replace (C.3.) with the following:

3. All base plates must be minimum steel grade of 36 ksi galvanized in accordance with ASTM A123.

Replace (D.1.) with the following:

1. Gate frames must be made of steel pipe in accordance with the requirements of ASTM A53, with an outside diameter of 1.90 inch.