



Pipe Issues and Concerns

PE / PS Workshop 2009

Rob Goldner, P.E. / Mike Milligan, P.E.



Overview

- Applicable Specifications / Standards
- Acceptance/Storage of Materials
- Installation
- Backfill
- Post Installation Inspection
- Measurement and Payment
- Other Issues / Questions



Applicable Specifications

- 715 -Pipe Culverts, Storm and Sanitary Sewers
- 716 - Trenchless Pipe Installation
- 717 - Structural Plate Pipe, Pipe-Arches, & Arches
- 718 – Underdrains
- 719 - Tile Drains
- 720 - Manholes, Inlets, and Catch Basins



Applicable Specifications, (Cont'd)

- 721 - Automatic Drainage Gates
- 725 – Slip Lining of Existing Pipe
- 905 – Masonry Units
- 906 – Joint Materials
- 907 – Concrete, Clay & Plastic Drainage Components
- 908 – Metal Pipe
- 916 – Materials Certifications



Applicable Recurring Special Provisions

- 211-R-543 – B Borrow and Structural Backfill *
- 213-R-446 – Flowable Backfill *
- 713-B-076 – Temporary Pipe
- 715-R-561d – Pipe Height of Cover Limits *
- 717-R-152 – Alternates to Structural Plate Structures
- 720-R-104 – Capped Inlet
- 720-T-021 – Drainage Structures
- 725-R-543 – Slip Lining of Existing Pipe

* To be incorporated in 2010 Specifications or Standards effective 9/1/2009.



Applicable Standard Drawings

- Drawing “Series” 715 to 720 relate to Pipe and Drainage
- Pipe Backfill – 715-BKFL-01 to 715-BKFL-10
- Height of Cover Limits – 715-PHCL-1 to 715-PHCL-23
717-PHCL-1 to 717-PHCL-10
- Underdrains - 718-UNDR-01 to 718-UNDR-07



Acceptance and Storage of Materials

- Basis for Use
 - Refer to Frequency Manual for Guidance
- Visual Inspection
- Store according to Specifications
 - Goal: Prevent On-site Damage or Deterioration
 - Use Common Sense



715.02 Materials

Pipe materials, minimum thickness or strength classification, and protective treatments for pipes except underdrains and drain tile will be determined based on height of cover, required service life, site abrasiveness, and structure pH criteria shown on the plans. Pipe with material thickness, strength classification, or protective coatings in excess of the minimum required by the above noted criteria may be used.



Keys to Good Installation

- Proper Material
- Excavation
- Proper Pipe Support
- Tight Joints
- Proper Compaction
- Perform Proper Post-Inspection



211 - Structural Backfill Types

- Type 1
 - structure backfill in accordance with 904.05.
 - non-removable or removable flowable backfill in accordance with 213.
- Type 2
 - crushed stone aggregate or ACBF structure backfill in accordance with 904.05, except No. 30, No. 4 and 2 in. (50 mm) nominal size aggregate shall not be used.
 - non-removable or removable flowable backfill in accordance with 213.



211 - Structural Backfill Types (Cont'd)

- Type 3
 - structure backfill in accordance with 904.05, except only No. 30 or No. 4 nominal size aggregates, or No. 8, No. 9, or No. 11 coarse aggregate shall be used. No slag other than ABCF will be permitted.
- Type 4
 - removable flowable backfill in accordance with 213.
- Type 5
 - non-removable flowable backfill in accordance with 213.



Post Installation Inspection

Visual Inspection – 715.09

- Mandrel Testing – 715.09
 - All polyethylene and smooth wall polyvinyl chloride pipes 36 in. (900 mm) or less in pipe pay item diameter shall be mandrel tested.

- Video Inspection - 718.07
 - Pipes that cannot be visually inspected shall be video inspected.
 - Underdrains shall be video inspected after guardrail, lighting, sign installation, and other operations are completed.



Measurement and Payment of Pipe Items

- Agreement on Quantities is Important
- Pipe
 - Refer to 715.13 and 715.14 for Details
- Backfill
 - Structural Backfill – Refer to 211.09 and 211.10 for Details
 - Flowable Backfill - Refer to 213.08 and 211.09 for Details



Questions / Comments / Discussion



If you have comments or questions:

Michael A. Milligan, P.E.
Specifications Engineer
INDOT, Division of Construction Management
Office – 317 232 5353
E-mail – mmilligan@indot.in.gov

