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SECTION 3 - STORM DRAINAGE CONSTRUCTION

3.1 GENERAL

- 3.1.1 Description - This work shall consist of the construction of storm drainage systems utilizing plant fabricated pipe and other appurtenant materials, installed for conveyance of storm water. The work includes construction of manholes, catch basins, culverts and other related items as specified.

All work must be performed in accordance to these specifications, the Blaine Standards Detail Plates, the plans and applicable MNDOT Standard Plates.

- 3.1.2 References - All general pipe installation requirements and materials shall be in accordance to Section 2 "Pipeline Installation Requirements" of these specifications.

- 3.1.3 Applicable MnDOT Standard Plates - The following are MnDOT Standard Plates that apply to specific items as shown on the plans or referenced in the specifications. Though listed, each Plate may not be used on every project, and some projects may identify another Plate or modify an existing Plate.

3000L	REINFORCED CONCRETE PIPE
3006G	GASKET JOINT FOR R.C. PIPE
3014J	REINFORCED CONCRETE PIPE ARCH
3040F	CORRUGATED METAL PIPE CULVERT
3100G	CONCRETE APRON FOR R.C. PIPE
3110G	CONCRETE APRON FOR R.C. PIPE ARCH
3123J	METAL APRON C.S. PIPE
3145G	CONCRETE PIPE TIES
4006L	CATCH BASIN, DESIGN H
4010H	CONCRETE SHORT CONE & ADJUSTING RING
4011E	PRECAST CONCRETE BASE
4020J	MANHOLE OR CATCH BASIN COVER
4180J	MANHOLE OR CATCH BASIN STEP
9102D	TURF ESTABLISHMENT AREAS

3.2 PRODUCTS

- 3.2.1 Storm Drainage Pipe - Storm drainage pipe shall meet the following requirements or as specified on the bid proposal.

- A. Reinforced Concrete Pipe and Fittings - Reinforced concrete pipe and fittings shall meet the requirements of MNDOT 3236, and MNDOT Standard Plates 3000M and 3006H. A rubber gasket joint shall be required.
- B. Reinforced Concrete Pipe Arch - Reinforced concrete pipe arch shall meet the requirements of MNDOT 3236 and MNDOT Standard Plate 3014J. Joints and lift holes shall be sealed with 1.25" round equivalent "EZ- Stick" premium butyl joint seal as manufactured by Press-Seal Gasket Corp. or approved equal. The exterior of the joint shall be wrapped with heavy duty filter fabric (MNDOT 3773, Type 4).
- C. Corrugated Steel Pipe - Corrugated steel pipe shall meet the requirements of MNDOT 3226 for the type, size and sheet thickness specified, except as modified or supplemented herein.

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1. When provided on the bid proposal, the pipe shall be coated as specified in accordance to MnDOT 3229 for Polymeric coated for the pipe section only.
 2. Unless otherwise specified all piping shall be 15-inch diameter round, minimum 16 gauge.
 3. Corrugated Aluminized Steel Pipe shall meet the requirements of MnDOT 3222.
- 3.2.2 Aprons – Aprons shall meet the requirements of MNDOT 3236 and MNDOT Standard Plate 3100G for reinforced concrete pipe; MNDOT 3236 and MNDOT Standard Plate 3110G for reinforced concrete pipe arch; MNDOT Standard Plate 3123 J for corrugated steel pipe; and MNDOT Standard Plate 3122K for corrugated steel pipe-arch.
- 3.2.3 Trash Guards – Trash guards shall be Heavy Duty as manufactured by Elk River Concrete Products; or Drawing No. P-17, 02/06, by County Materials Corp., or approved equal. Trash guards shall be installed on all upstream aprons and on downstream aprons in residential areas that are 27 inches or larger in diameter unless directed otherwise by the Engineer.
- 3.2.4 Rip – Rap and Filter Fabric – Material for rip-rap shall meet the requirements of MNDOT 3601 for Class III except as modified or supplemented herein. Material for filter fabric shall meet the requirements of MNDOT 3733 except as modified or supplemented herein.
- 3.2.5 Storm Sewer Manhole
- A. Manholes – Storm sewer manholes and catch basin/manholes shall meet requirements of MNDOT Standard Plate 4007, ASTM C478, and as noted on the plans, unless the manhole or catch basin manhole is to be constructed over an existing line or otherwise constructed as to require separate sections or block construction. Changes in manhole type construction must be approved by the Engineer.
 - B. Castings – Castings shall be Neenah R-1733 with "Platen" lids meeting the requirements of MNDOT Standard Plate 4110, casting No. 715, or as specified on the plans. Lids shall be marked "STORM SEWER". Castings shall be set 0.02 foot below finish grade. On development projects with an interim surface course, manholes shall be adjusted to the interim grade within one week of paving in accordance to Blaine Detail Plates.
- 3.2.6 Catch Basins
- A. Catch Basins – Catch Basins shall meet the requirements of applicable MNDOT Plates or Blaine Detail Plates as indicated on the Plans and type of catch basin.
 - B. Castings – Castings shall be as indicated on the plans.
- 3.2.7 Pipe Ties – Pipe ties shall meet the requirements of MNDOT Standard Plate 3145.
- 3.2.8 Skimming Device – Skimming devices shall be "The Snout" as manufactured by Best Management Products, Inc., 53 Mt. Archer Road, Lyme, CT 06371, or approved equal.
- 3.2.9 Adapter Plate – Adapter plate shall be "R-3067 Adaptor Plate" as manufactured by ESS Brothers and Sons, Inc., 9350 Co. Rd. 19, Loretto, MN 55357, or approved equal.

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3.3 **EXECUTION**

All storm drainage items shall be installed in accordance to Section 2 "Pipeline Installations Requirements" of these specifications except as modified or supplemented herein.

- 3.3.1 Rip-Rap and Filter Fabric – Rip-rap filter blanket and filter fabric shall be installed in accordance with MnDOT 2511 and Blaine Standard Detail Plates.
- 3.3.2 Pipe Ties - Pipe ties shall be installed in accordance to MNDOT Standard Plate 3145.
- 3.3.3 Testing and Acceptance – Prior to final acceptance of each section of pipe, the storm sewer and manholes shall be free of dirt, mortar and other debris. Any obvious leaks shall be repaired if in the Engineer's opinion the leakage cannot be tolerated.
- 3.3.4 Skimming Device – The device shall be installed in accordance to manufacturer's specifications and the plans.

Storm sewer pipes shall be straight and uniform in alignment and grade. No other specific tests other than visual inspection will be required for storm sewer construction.

3.4 **METHOD OF MEASUREMENT AND PAYMENT**

Measurement and payment for each item shall be in accordance to MNDOT Standard Specifications for Construction, 2016, and current supplements, unless modified or supplemented herein. The specification numbering references used herein shall refer to MNDOT Specifications.

Payment shall be at the Contract Bid price for each item shown on the bid form. The bid price shall include furnishing, installing and removal as specified. All bid items shall include labor and materials for a complete job.

Principal components are listed in each description and do not necessarily include all component parts required. All component parts required by the plans, specifications and detail plates, shall be considered included in the Contract Bid price. Payment for the items shown on the bid form shall be payment in full for a complete job as specified.

Work required by this contract, and obviously necessary for the timely and successful completion of the project, but not specifically provided for in the bid proposal, shall be included in the bid prices of the associated construction items.

- 3.4.1 Storm Drainage Pipe and Pipe-Arch – Measurement and payment shall be in accordance to MNDOT 2503 except as modified or supplemented herein.
- 3.4.2 Aprons – Measurement and payment shall be in accordance to MNDOT 2501 on a per each basis except as modified or supplemented herein.
 - A. Unless specified in the bid proposal, trash guards shall be incidental to the cost of the project.
- 3.4.3 Rip-Rap, Filter Blanket, and Filter Fabric – Measurement and payment of rip-rap, filter blanket, and filter fabric shall be in accordance with MNDOT 2511 except as modified or supplemented herein.
 - A. Rip-rap shall be measured and paid on a plan quantity based on Blaine Standard Detail Plates.
 - B. Filter fabric, and dewatering shall be incidental to the cost of the project.

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- 3.4.4 Pipe Culverts and Appurtenances – Measurement and payment of pipe culverts and appurtenances shall be in accordance with MNDOT 2503 except as modified or supplemented herein.
- 3.4.5 Storm Sewer Manhole or Catch Basin Manhole – Measurement and payment of shall be in accordance with MNDOT 2506 as indicated on the bid proposal for each type and size of manhole or catch basin manhole installed. The cost of furnishing and installing the frame and ring casting is included with the cost of storm sewer manhole or catch basin manhole unless otherwise indicated.
- 3.4.6 Catch Basin – Measurement and payment shall be in accordance to MNDOT 2506 as indicated on the bid proposal for each type and size of catch basin installed. The cost of furnishing and installing the frame and ring casting is included with the cost of the catch basin unless otherwise indicated.
- 3.4.7 Connect to Existing Manhole – Measurement and payment shall be per each connection made to an existing manhole and shall include excavating, dewatering, materials, labor, equipment, and backfilling as necessary to break into existing structure and invert, and reconstruct as needed and grouting structure.
- 3.4.8 Connect to Existing Pipe – Measurement and payment shall be per each connection made to an existing pipe and includes excavation, dewatering, removal of existing plug, cleaning of existing pipe, connection of new pipe and backfilling.
- 3.4.9 Pipe Ties – Pipe ties shall be incidental to the project cost.
- 3.4.10 Skimming Device – Measurement and payment shall be per each unit installed including furnishing and installing of all necessary gaskets, hardware, adjustment, and appurtenances necessary.
- 3.4.11 Adapter Plate – Measurement and payment shall be per each adapter plate installed including furnishing and installing of all necessary concrete, fabric and other materials necessary to comply with the standard detail plate.