

SECTION 5500 - STORM SEWER INLETS

PART 1 – GENERAL

1.01 SCOPE: This Section covers construction of catch basins, area inlets, and field inlets for storm sewers, and includes precast suppliers qualification, removal of existing inlets, construction of boxes, lids and bases, construction of curb transitions and throat, and waterproofing.

1.02 RELATED WORK: Refer to the following sections for related work:

Mulch selection by slope	Section 1400-Construction Period Erosion Prevention
Concrete for cast in place inlets	Section 4200-Concrete Structures
Backfill under pavements	Section 2100-Trenching and Tunneling
Concrete work for transition and throat	Section 4100-Concrete Pavement and Flatwork

1.03 QUALITY ASSURANCE: If precast boxes are used, supplying plant shall be on KDOT preapproved list of precasters.

1.04 SUBMITTALS: Contractor shall submit the following for review:

- A. Current certification of KDOT approval for the precast suppliers.
- B. Shop drawings showing reinforcement and dimensions of inlets and tops.

1.05 FIELD VERIFICATION: Contractor shall field verify depth measurement. Contractor shall be responsible for the correct location of pipe penetrations.

1.06 NOMENCLATURE: Within this Section the following nomenclature is used to describe specific styles of storm sewer inlets:

- A. In-Line Catch Basin: A curb opening inlet with the front of the lid in line with the face of the curb on the adjoining street.
- B. Setback Catch Basin: A curb opening inlet with the front edge of the lid set back 2 feet behind the normal face of curb on the adjoining street.
- C. Field Inlet: An inlet open on one or more sides that is not adjacent to a street.
- D. Area Inlet, or Grated Area Inlet: An inlet whose only opening to surface water is a cast iron grate set in the top of the box.

PART 2 – PRODUCTS

- 2.01 PRECAST BOXES AND LIDS:** Precast boxes and lids shall conform to the dimensions in the Detailed Drawings. Precast supplier shall meet quality assurance requirements listed in Part 1. As installed, walls may vary from plumb by not more than 4 percent. For street slopes greater than 4 percent, the top face of the box shall be sloped to match the street grade. Radiused precast tops shall be cast for a 20-foot radius. Steps are not required.

Precast boxes may have openings for pipes pre-measured and cast in the box, or the openings may be cut in the field. Precast bases are allowed in new construction only. Precast bases are not allowed in reconstruction projects.

- 2.02 CAST-IN-PLACE BOXES AND LIDS:** Cast-in-place boxes and lids shall conform to the dimensions in the Detailed Drawings. Products and work shall conform to the requirements of concrete structures (see related work, Part 1). Walls shall not vary from plumb by more than 1/2-inch overall. Top face of box shall be sloped to match the adjacent street, to within a slope of 1/2-inch in 12 inches. Steps are not required.
- 2.03 MANUFACTURED PIPE CONNECTORS:** For locations where pipes are allowed to be butt connected at a field cut joint, connector shall be a manufactured, watertight, flexible connector made specifically for connecting the pipe materials encountered.
- 2.04 SIZE:** If not otherwise shown on the installation drawings, use a standard size box. Standard box shall be 3' x 5' inside dimension. Minimum box size shall be 2-1/2' x 4', inside dimension, for a catch basin or field inlet. Minimum size shall only be used to avoid a utility conflict. Standard and minimum box size for a grated area inlet shall be 3' x 3', inside dimension. Use larger boxes only where indicated on the installation drawings. Wall thickness shall be 6 inches. Dimension tolerance shall be $\pm 1/4$ -inch in wall thickness, $\pm 1/2$ -inch in interior dimension. Top shall be planar to within 1/4-inch.
- 2.05 CASTINGS:** Access covers and rings shall conform to ASTM A48, Class 35B, and shall be of the weight, dimension, and design shown on the Detail Drawings.

PART 3 – EXECUTION

- 3.01 DEMOLITION OF EXISTING INLET:** When inlet is a replacement of an existing inlet, the entire inlet, base, and lid shall be removed. Removal of adjacent surface improvements shall be to the limits marked in the field by Engineer. All excavated material shall be promptly removed from the site.
- 3.02 BOX AND LID CONSTRUCTION:** New inlets shall be precast or cast-in-place. Cast-in-place box or lid may be combined with a precast lid or box. Lids shall be sloped to match the adjacent street slope. Precast boxes may be tipped out of plumb by no more than 1/2-inch in 12 inches to accomplish this result. Walls of cast-in-place boxes shall be formed on both sides. Casting against the wall of the excavation is not acceptable. Grout beds for the inlet tops shall extend the full length and width of the wall. Grout beds shall be minimum of 1/2" to a maximum of 2". Grout that weeps

from the joint shall not be struck off, but shall be left for inspector's observation. Fill lift holes.

- 3.03 BASE, INVERT AND PIPE CONNECTION TO BOX:** The minimum base thickness shall be 8 inches measured at flowline. Minimum base thickness under precast wall shall be 12 inches. Temporary supports for precast box shall be concrete block or other non-biodegradable, non-rusting, dimensionally stable, manufactured support. Support by stone or concrete rubble is not acceptable. Cast-in-place base shall extend not less than 4 inches or more than 10 inches beyond outside face of wall. Sides of base shall be formed by separate forms or by vertical wall of excavation that is within dimension tolerances. Concrete for base shall extend a minimum of 4 inches up both the inside and outside of the precast wall to form a soil-tight seal. A 6-inch thick, reinforced precast base with cast-in-place invert shaping is acceptable.

Where inlet has no inflow pipe, no channel is required, and invert shall be sloped to the flowline of the outflow pipe at no less than 2 percent nor more than 25 percent slope. Where inlet has one or more inlet pipes, construct invert channel. Invert channels shall be formed to a "U" shape, matching the lower half of the pipe cross section and extending to one-half the height of the pipe. Channels connecting pipes of different sizes shall transition smoothly over the length of the box. When the pipes come in at differing angles, the channel shall be formed with as large of radius as possible. Benches shall slope to the channel at 1:12 slope.

Where pipe openings in a precast box are cut in the field, saw kerf the outside to a minimum depth of 2 inches. To the extent clearance allows, saw kerf the inside to a minimum depth of 1 inch. Break out opening and cut reinforcing to clear pipe. Keep opening size small. If Engineer determines opening size is excessive or that excessive spalling occurred during break out, forms will be required on inside or both faces.

Connection of pipe to box shall form a soil-tight seal. Pipe shall be cut to skew and shall be recessed from 0 to 1 inch from the face of a cast-in-place wall, and 3 inches \pm 1/2-inch projecting from the face of a precast wall. For cast-in-place construction, a soil-tight seal shall be the cast wall fully bonded to the pipe with no honeycomb or gaps. For precast construction, a soil-tight seal may be built as follows: the pipe opening shall be packed full of low slump concrete or non-shrink grout. Such packing shall extend at least 1/2-inch onto the inside face of the wall and 3 inches onto the outside face of the wall. If the extension sags away from the face of wall, the joint between the precast box and the packing for the opening shall be sealed with mastic and covered with 2 layers of 10-mil plastic sheet. Plastic sheet corrective measure is required on the outside face only.

- 3.04 RECONNECTION TO EXISTING LATERAL:** Where a pipe is damaged by removal of an existing inlet, it shall be replaced with pipe of like material; except clay pipe, which shall be replaced with PVC (solid wall SDR 35 or closed cell profile wall). Connection shall be made at an existing joint or made with a manufactured pipe connector at a sawed butt joint. Where the lateral must be deflected from previous alignment, the desired method is to deflect pipe at joints within manufacturer's recommended limits only when approved by Engineer. Alignment break shall be sealed using a manufactured pipe connector surrounded by a concrete collar. When allowed, concrete collar shall extend a minimum 12 inches beyond the joint, shall be a minimum of 6 inches thick all around.

3.05 TRANSITIONS AND THROAT CONSTRUCTION: Dimension, cross section, and reinforcing of transitions and throat shall conform to the Detail Drawings. Concrete mix shall conform to concrete for curb and gutter. Transition sections shall have full gutter for the full length regardless of style of adjacent curb. Flowline of transition shall be straight grade. Curb shape in the transition shall match adjacent at the match end and shall be standard curb section at the catch basin. Curb shape shall transition smoothly between these two shapes. Transitions and throat shall be cast monolithic. Transition curb shall end in a hand-packed, radiused placement supporting the corner of the lid. Tolerance in height of throat opening shall be $\pm 1/2$ -inch.

3.06 BACKFILL AND RESTORATION: All fill shall be imported. Fill within 4 feet of pavements shall conform to the granular fill requirements for trenches (see related work in Part 1). Fill beyond these limits may be granular fill or may be a clean clay loam or sandy loam. Fat clay, lumpy, rocky, gravelly, or non-uniform material will not be accepted. The same source shall be used for fill for the entire project.

For spot repair contracts, all work at a given inlet, including restoration and turf restoration, shall be completed within two weeks of start of work at the inlet. Turf restoration shall be conducted promptly regardless of the planting season.

3.07 ACCEPTANCE TESTING: Inlets shall be subjected to visual inspection prior to acceptance:

- A. Visual inspection of inlet will evaluate the completeness of the inlet and the alignment of the invert channel, seal of pipe penetration, seal of lift holes, uniformity of grout bed for the lid, height and width of throat, and conformity of transition to requirements.
- B. Visual inspection of adjacent surfaces will evaluate the surface finish treatment, the grade match to the inlet, and elimination of areas where water may pond.
- C. Inlets failing acceptance tests shall be repaired or rebuilt and retested.

STANDARD DETAILS RELATED TO THE WORK OF THIS SECTION:

UG 5500-A CURB INLET DETAIL – SHEET 1 OF 4
 UG 5500-B CURB INLET DETAIL – SHEET 2 OF 4
 UG 5500-C CURB INLET DETAIL – SHEET 3 OF 4
 UG 5500-D CURB INLET DETAIL – SHEET 4 OF 4
 UG 5500-E STEPPED BOX DETAIL FOR CURB INLET
 UG 5500-F FIELD INLET
 UG 5500-G GRATED AREA INLET

END OF SECTION 5500