## Illinois Tollway Standard Drawing Revisions

### Section B  Drainage Structures, Curbs, Curbs & Gutter

<table>
<thead>
<tr>
<th>Standard</th>
<th>Modification Summary</th>
<th>Effective: 03-31-2017</th>
</tr>
</thead>
</table>
| B9       | Sloped Headwalls Type I and Type II | Revised dimensions in column E.  
Revised the reinforcement bars table for sloped headwall Type II. |
| B10      | Sloped Headwalls Type III Details | Revised dimensions in column L. |
| B24      | Pipe Underdrain | Deleted the requirement to encased the pipe underdrains, 6” with fabric sleeve (sock).  
Revised subgrade slope configuration for “Locations with Variable Height Double Faced Barrier” detail.  
Revised Note 9.  
Added Note 10. |
| B28      | Gutter Transition at Traffic Barrier Terminal Type 1 (Special) | Deleted aggregate shoulder dimensions and references.  
Consolidated Gutter Type G-2 and G-3 notes and references on Sheet 1  
Deleted Sheet 3 and revised sheet numbers |
| B29      | Gutter Transition at Traffic Barrier Terminal Type 1-A (Special) | Deleted aggregate shoulder dimensions and references. |
| B32      | Flat Slab Manholes |  |

**Note:**  
New Sheet  
Retired Standard
GUTTER TRANSITION AT ENTRANCE RAMP TERMINALS

1. Provide an expansion joint with preformed joint filler between transition section and wingwall.

2. See Standard B3 for gutter transitions at bridge approach.

3. All slopes are expressed as units of horizontal displacement to units of vertical displacement (V:H).

4. Reinforcement bars shall be accurately placed and firmly held at the position using epoxy coated chairs. Chair spacing shall not exceed 6'-0".

5. Gutter reinforcement bars shall be placed 3" above bottom of gutter following subgrade slope.

6. Continuous #4 bars shall be lapped a minimum of 2'-0".

GUTTER TRANSITION AT EXIT RAMP TERMINALS

1. Provide 6" expansion joint with preformed joint filler between transition section and wingwall.

2. See Standard B3 for gutter transitions at bridge approach.

3. All slopes are expressed as units of vertical displacement to units of horizontal displacement (V:H).

4. Reinforcement bars shall be accurately placed and firmly held at the position using epoxy coated chairs. Chair spacing shall not exceed 6'-0".

5. Gutter reinforcement bars shall be placed 3" above bottom of gutter following subgrade slope.

6. Continuous #4 bars shall be lapped a minimum of 2'-0".
GUTTER, TYPE G-3 TRANSITION AT BRIDGE DEPARTURE

SECTION A-A

SECTION C-C

GUTTER, TYPE G-3

SECTION B-B

SECTION D-D

GUTTER, TYPE G-2

NOTE: SEE SHEET 1 OF THIS SERIES FOR NOTES.
CONCRETE PARAPET

*GUARDRAIL BLOCK-OUTS AND RAIL OMITTED FOR CLARITY

BACK OF GUTTER TAPER 37:1

GUTTER FLOW LINE

DIRECTION OF TRAFFIC

GUTTER, TYPE G-3

37'-0" GUTTER, TYPE G-3 TRANSITION

(PAY AS CONCRETE GUTTER, TYPE G-3)

GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.
3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF SEE ILLINOIS TOLLWAY STANDARDS 9/TRAFFIC BARRIER TERMINAL, TYPE T6.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL TO MATCH VERTICAL PROFILE OF TYPE F SAFETY SHAPE. MODIFY GUTTER FACE TO MATCH OTHER PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-11".

AGGREGATE SHOULDERS SPECIAL, TYPE C

LEGEND

1. AGGREGATE SHOULDERS SPECIAL, TYPE C

GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.
3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF SEE ILLINOIS TOLLWAY STANDARDS 9/TRAFFIC BARRIER TERMINAL, TYPE T6.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL TO MATCH VERTICAL PROFILE OF TYPE F SAFETY SHAPE. MODIFY GUTTER FACE TO MATCH OTHER PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-11".

AGGREGATE SHOULDERS SPECIAL, TYPE C

LEGEND

1. AGGREGATE SHOULDERS SPECIAL, TYPE C

GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.
3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF SEE ILLINOIS TOLLWAY STANDARDS 9/TRAFFIC BARRIER TERMINAL, TYPE T6.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL TO MATCH VERTICAL PROFILE OF TYPE F SAFETY SHAPE. MODIFY GUTTER FACE TO MATCH OTHER PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-11".

AGGREGATE SHOULDERS SPECIAL, TYPE C

LEGEND

1. AGGREGATE SHOULDERS SPECIAL, TYPE C

GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.
3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF SEE ILLINOIS TOLLWAY STANDARDS 9/TRAFFIC BARRIER TERMINAL, TYPE T6.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL TO MATCH VERTICAL PROFILE OF TYPE F SAFETY SHAPE. MODIFY GUTTER FACE TO MATCH OTHER PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-11".

AGGREGATE SHOULDERS SPECIAL, TYPE C

LEGEND

1. AGGREGATE SHOULDERS SPECIAL, TYPE C

GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.
3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF SEE ILLINOIS TOLLWAY STANDARDS 9/TRAFFIC BARRIER TERMINAL, TYPE T6.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL TO MATCH VERTICAL PROFILE OF TYPE F SAFETY SHAPE. MODIFY GUTTER FACE TO MATCH OTHER PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-11".

AGGREGATE SHOULDERS SPECIAL, TYPE C

LEGEND

1. AGGREGATE SHOULDERS SPECIAL, TYPE C

GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.
3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF SEE ILLINOIS TOLLWAY STANDARDS 9/TRAFFIC BARRIER TERMINAL, TYPE T6.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL TO MATCH VERTICAL PROFILE OF TYPE F SAFETY SHAPE. MODIFY GUTTER FACE TO MATCH OTHER PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-11".

AGGREGATE SHOULDERS SPECIAL, TYPE C

LEGEND

1. AGGREGATE SHOULDERS SPECIAL, TYPE C

GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.
3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF SEE ILLINOIS TOLLWAY STANDARDS 9/TRAFFIC BARRIER TERMINAL, TYPE T6.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL TO MATCH VERTICAL PROFILE OF TYPE F SAFETY SHAPE. MODIFY GUTTER FACE TO MATCH OTHER PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-11".

AGGREGATE SHOULDERS SPECIAL, TYPE C

LEGEND

1. AGGREGATE SHOULDERS SPECIAL, TYPE C

GUTTER TRANSITION NOTES:

1. SLOPE TO MATCH ADJACENT SHOULDER SLOPE.
2. PROVIDE 1" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN TRANSITION SECTION AND WINGWALL OR BARRIER WALL.
3. INSTALLATION ON CURVED WINGWALLS SIMILAR.
4. FOR DETAILS OF SEE ILLINOIS TOLLWAY STANDARDS 9/TRAFFIC BARRIER TERMINAL, TYPE T6.
5. GUTTER TRANSITIONS SHALL BE CONSTRUCTED TO FIT THE STANDARD LOCATION OF THE TRAFFIC BARRIER TERMINAL, TYPE T6.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).
7. GUTTER SECTION SHOWN AT BARRIER WALL TO MATCH VERTICAL PROFILE OF TYPE F SAFETY SHAPE. MODIFY GUTTER FACE TO MATCH OTHER PARAPET PROFILES.
8. CONTINUOUS #4 BARS SHALL BE LAPPED A MINIMUM OF 1'-11".
Type T6 Barrier Terminal, Transition at Traffic Type G-2/G-3 Gutter approved.

**Plan**

- Gutter Flow Line
- Direction of Traffic

**Elevation**

- Front Edge Bottom of Gutter
- Type F, Safety Shape
- Pavement Shoulder
- Aggregate Shoulders Special, Type C
- Continuous #4 Epoxy Coated Bars (Typ.
- Subgrade Slope
- Level Line

**Sections**

- G-2 Section A-A
  - At Concrete Parapet (See Note B)
- G-2 Section B-B
  - 27'-6" From Parapet
- G-2 Section C-C
  - 15'-10" From Parapet
- G-2 Section D-D
  - 27'-6" From Parapet

**Notes**

- See Sheet 1 of This Series for Gutter Transition Notes.

**Legend**

- Aggregate Shoulders Special, Type C

**Standard**

- Type G-2/G-3 Gutter Transition at Traffic Barrier Terminal, Type T6

**Approval**

- Approved: 2-7-2012
CONCRETE FLUME DETAILS

**NOTES:**

1. **Concrete Flumes Shall be Constructed Flush with the Adjacent Existing or Proposed Surfaces.**

2. **Class Si Concrete Shall be Used Throughly.**

3. **Welded Wire Reinforcement Shall be Epoxy Coated 6x6 W4xW4, 58 lbs. per 100 sq. ft.**

4. **Epoxy coated tie bars 2'-6" long at 12" O/C shall be placed at all construction joints.**

5. **Epoxy Coated Expanded Metal Fabric or Equivalent Reinforcement Subject to Engineer's Approval.**

6. **The Location of the Anchor Wall May be Adjusted as Directed by the Engineer.**

7. **The Materials and Construction of the Concrete Flume Shall Conform to the Applicable Portions of the Standard Specifications.**

8. **All slopes are expressed as units of vertical displacement to units of horizontal displacement V:H.**

**REINFORCEMENT**

- **Class SI Concrete Shall be Used Throughout.**
- **Welded Wire Reinforcement shall be Epoxy Coated 6x6 W4xW4, 58 lbs. per 100 sq. ft.**
- **#4 Epoxy Coated Tie Bars 2'-6" Long at 12" O/C shall be placed at all construction joints.**
- **Welded Wire Reinforcement Shall be Epoxy Coated 6x6 W4xW4, 58 lbs. per 100 sq. ft.**

**NOTES:**

1. **Concrete Flumes Shall be Constructed Flush with the Adjacent Existing or Proposed Surfaces.**

2. **Class Si Concrete Shall be Used Throughly.**

3. **Welded Wire Reinforcement Shall be Epoxy Coated 6x6 W4xW4, 58 lbs. per 100 sq. ft.**

4. **Epoxy Coated Tie Bars 2'-6" Long at 12" O/C shall be placed at all construction joints.**

5. **Epoxy Coated Expanded Metal Fabric or Equivalent Reinforcement Subject to Engineer's Approval.**

6. **The Location of the Anchor Wall May be Adjusted as Directed by the Engineer.**

7. **The Materials and Construction of the Concrete Flume Shall Conform to the Applicable Portions of the Standard Specifications.**

8. **All slopes are expressed as units of vertical displacement to units of horizontal displacement V:H.**
## Grate Dimensions and Quantities in One Headwall Type III End Entrance 1/4 Slope

<table>
<thead>
<tr>
<th>Material Type</th>
<th>Number</th>
<th>Type</th>
<th>Length</th>
<th>Diameter</th>
<th>Grates</th>
<th>Bars per Grate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>36&quot;</td>
<td>0</td>
<td>2</td>
<td>6'-7&quot;</td>
<td>54&quot;</td>
<td>15</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>42&quot;</td>
<td>0</td>
<td>2</td>
<td>7'-1&quot;</td>
<td>54&quot;</td>
<td>15</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>48&quot;</td>
<td>0</td>
<td>2</td>
<td>8'-7&quot;</td>
<td>54&quot;</td>
<td>15</td>
<td>2</td>
<td>30</td>
</tr>
<tr>
<td>54&quot;</td>
<td>0</td>
<td>2</td>
<td>9'-1&quot;</td>
<td>54&quot;</td>
<td>15</td>
<td>2</td>
<td>30</td>
</tr>
</tbody>
</table>

**Notes:**
1. All structural steel shall be ASTM A 413, Grade 36 or 50.
2. Galvanizing shall be in accordance with the standard specifications.
3. For placement of grates, see Sheet 1 in this series.
4. All grate dimensions and quantities are for single Headwall Type III.
5. All slopes are expressed as units of vertical displacement in 1/16 of slope for 1" = 1'-0".

---

**Typical Grate**

---

**Headwall Type III**

---

**Sheet 3 of 4**
HEADWALL TYPE III ALTERNATE PRECAST CONCRETE DETAILS

1. Cast-in-Place Details
   - See Cast-in-Place Details for Bending Diagrams.
   - See Notes on Sheet 1 for Reinforcing Cover Requirements.

2. Precast Details
   - Precast Segments shown in Elevation 1 are for Example Only.
   - The Length and Number of Precast Segments Required for Construction must be determined by the Structural Engineer.

3. Concrete
   - Use Standard B6-06 "CLASS "SI" CONCRETE SHALL BE USED THROUGHOUT.
   - Concrete shall be filled with Class SI and the backwall to be void between the pipe and the endwall.

4. Reinforcing
   - See Reinforcing Bar Details on Sheet 1.
   - Reinforcing Bars (Grade 60) shall be epoxy coated. See Table 1.

5. Steel Grating Details
   - See Sheet 3 for Steel Grating Details.

6. Steel Fabrication
   - Hot Dipped Galvanized in Accordance with AASHTO M 111 after fabrication.
   - Shall conform with AASHTO M270 GR36, OR GR50 and shall be fabricated to AASHTO M111.

7. Restraint Angles, Restraint Rods and All Nuts and Washers
   - Restraint Angles, Restraint Rods and All Nuts and Washers shall be hot-dipped galvanized in accordance with AASHTO M111 after fabrication.

8. Damage to Reinforcing from Drilling Holes
   - Drilled using core bits in lieu of formed holes. Avoid damage to reinforcing from drilling holes.

9. Placement of Holes
   - Holes in the walls for the Precast Tie Assembly may be placed using core bits in lieu of formed holes. Avoid damage to reinforcing from drilling holes.

10. Restraint Angle with Tie Plate (Typ.)
    - See Tie Plate Details.

11. Section Joint, Typical
    - See Section Joint, Typical for mid-height of lower precast section tie assemblies.

12. Tie Plate Detail
    - See Tie Plate Details.

13. Section F-F
    - Showing Precast Section Tie Details.

14. Overall Width (W)
    - See overall width (W) on SHEET 1.

15. Overall Height (H)
    - See overall height (H) on SHEET 1.

16. Overall Length (L)
    - See overall length (L) on SHEET 1.

17. Bedding
    - Bed of Gravel, Min. 6" thick.

18. PRECAST CONNECTION DETAIL
    - See Precast Connection Detail.

19. General Notes
    - See General Notes.

20. FHWA Approval
    - See FHWA Approval.

21. Illinois Tollway
    - See Illinois Tollway.
NOTES:
1. FOR MATERIALS AND CONSTRUCTION REQUIREMENTS OF THE CATCH BASIN, REFER TO THE STANDARD SPECIFICATIONS.
2. FRAME AND GRATE FOR CATCH BASIN TYPE B SHALL BE JORDAN IRON WORKS V5360-1 OR APPROVED EQUAL.
3. REINFORCEMENT BARS DESIGNATED "E" SHALL BE EPOXY COATED.
CATCH BASIN, TYPE G-3, MODIFIED

NOTES:
1. PRECAST CONCRETE UNITS WILL BE ACCEPTABLE PROVIDED THEY MEET ALL THE REQUIREMENTS AS SHOWN ON THIS DRAWING. BASE EXTENSION OF 3" NOT REQUIRED FOR PRECAST UNITS. REINFORCEMENT STEEL SHOWING PIPE OPENINGS, REINFORCEMENT AND OTHER PERTINENT DIMENSIONS WILL BE REQUIRED FOR EACH UNIT, FOR APPROVAL BY THE ENGINEER PRIOR TO FABRICATION.

2. CATCH BASIN, TYPE G-2 SHALL BE PROVIDED ALONG RAMPS WHERE GUTTER TYPE G-2 IS PROVIDED.

3. CATCH BASIN, TYPE G-3 SHALL BE PROVIDED WHERE GUTTER TYPE G-3 IS PROVIDED.

4. CATCH BASIN, TYPE G-3 MODIFIED SHALL BE USED IN PAVEMENT SECTIONS AND ON THE LOW SIDE OF SUPERELEVATED PAVEMENT.

5. CATCH BASIN, TYPE G-3 MODIFIED SHALL BE PROVIDED WITH A REINFORCED CONCRETE SLAB TOP AS DETPHED ON THIS DRAWING.

6. TYPE G-2 FRAME AND GRATE SHALL BE NEENAH INLET FOR ROLL TYPE CURB R-3508-A2, EAST JORDAN IRON WORKS 7546 OR APPROVED EQUAL.

7. TYPE G-3 FRAME AND GRATE SHALL BE NEENAH INLET FOR ROLL TYPE CURB R-3501-U OR EAST JORDAN IRON WORKS 7300 OR APPROVED EQUAL.

8. TYPE G-2 FRAME AND GRATE SHALL BE NEENAH R-3508-A2, EAST JORDAN IRON WORKS 7545 OR APPROVED EQUAL.

9. CONCRETE SLAB TOP AS DETAILED ON THIS DRAWING. CATCH BASIN, TYPE G-3 MODIFIED SHALL BE PROVIDED WITH A REINFORCED CONCRETE LID AT OPP. CORNER.

10. OPENINGS, REINFORCEMENT AND OTHER PERTINENT DIMENSIONS WILL BE REQUIRED FOR EACH UNIT, FOR APPROVAL BY THE ENGINEER PRIOR TO FABRICATION.

11. REINFORCEMENT BARS DESIGNATED (E) SHALL BE EPOXY COATED.

12. E.O.P. = EDGE OF PAVEMENT.

13. ALL CONCRETE SHALL BE CLASS SI CONCRETE.

TYPICAL REINFORCEMENT AROUND STORM SEWER PIPE

NOTE:
POSITION OF STEEL VARIES FROM 3'-0" TO 5'-0" Measured FROM BACK OF GUTTER LINE.

MORTAR COURTS AS REQUIRED (TYP.)

STORM SEWER SIZE AND LOCATION AS SHOWN ON PLANS.

TYPICAL REINFORCEMENT:
- 3/8" #4 (E) BARS @ 9" CTRS. E.F. (TYPE G-1, G-2 & G-3)
- 3/8" #4 (E) BARS @ 6" CTRS. E.F. (TYPE G-3 MOD.)

LIFTING LOOP TO BE 3/8" x 3 1/2" IN DIAMETERS TO BE NUNURED AFTER PRECAST CONCRETE LID IS SET IN PLACE.

~ 3/8" (COLD BENT)

LIFTING LOOP DETAIL

REINFORCED CONCRETE LID

CATCH BASIN, TYPE G-3 MODIFIED

ILLINOIS TOLLWAY

DATE: 8-1-2009

APPROVED

SHEET 1 OF 4

STANDARD BB-05
CATCH BASIN TYPE G-4

NOTES:

1. See Sheet 1 of this series for additional notes.
2. Catch basins type G-4 shall be used in tangent sections and on the low side of super-elevated pavement.
3. Catch basins type G-4 shall be provided with a reinforced concrete slab top as detailed on this drawing.
4. Catch basins type G-4 shall be used when gutter type G-3 is provided.
5. Mortar or sealer shall be used when a precast reinforced concrete lid is used.
6. Edge of shoulders, frame and grate rim elevation and offset measured at this point.
7. 36" max. overall pipe for type G-4 catch basin.
8. All concrete shall be class 53 concrete.
9. Distance from Q outfall pipe to Q roadway to be verified by engineer.

TYPICAL REINFORCEMENT AROUND STORM SEWER PIPE

18-#3 S(E) BARS @ 5" CTRS.

GUTTER
BACK OF G2

2-#8 t(E) BARS @ 2" CTRS.

3" FOOTING

12'-0" (MAX.)

CONSTRUCTION JOINT (TYP.)

OUTFALL PIPE

SECTION B-B

1" MORTAR GROUT AS REQUIRED (TYP.)

SEE NOTE 9 ON SHT. 1

OUTFALL PIPE

SECTION A-A

18-#3 S(E) BARS @ 5" CTRS.

GUTTER
BACK OF G3

2-#8 t(E) BARS @ 2" CTRS.

3" FOOTING PROMULATION

12'-0" (MAX.)

CONSTRUCTION JOINT (TYP.)

OUTFALL PIPE

STANDARD BB-05
CATCH BASIN TYPE G-5

1. SEE SHEET 1 OF THIS SERIES FOR ADDITIONAL NOTES.
2. CATCH BASINS TYPE G-5 SHALL BE USED IN TANGENT SECTIONS AND ON THE LOW SIDE OF SUPERELEVATED PAVEMENT.
3. CATCH BASIN TYPE G-5 SHALL BE PROVIDED WITH A REINFORCED CONCRETE SLAB TOP AS DETAILED ON THIS DRAWING.
4. CATCH BASINS TYPE G-5 SHALL BE USED WHEN GUTTER TYPE G-3 IS PROVIDED.
5. MORTAR OR SEALER SHALL BE USED WHEN A PRECAST REINFORCED CONCRETE LID IS USED.
6. JOINT (TYP.) CONSTRUCTION JOINT (TYP.)
7. CONSTRUCTION J OINT (TYP.)
8. 1/8 MORTAR CLOTH AS REQUIRED (TYP.)
9. VARIES TO ~
10. VARIES TO ~

NOTES:

11-#8 h(E) BARS @ 3" CTRS. (TOP)
11-#8 h(E) BARS @ 3" CTRS. (BOT.)
18-#3 S(E) BARS @ 5" CTRS.
1-#8 t(E) TOP
1-#8 t(E) BOT.
1-#8 t1(E) TOP

TYPICAL REINFORCEMENT
AROUND STORM SEWER PIPE

REINFORCED CONCRETE LID
TYPE G-3 FRAME AND GRATE

REINFORCED CONCRETE LID
TYPE G-2 FRAME AND GRATE

CREW ENGINEER

APPROVED: "M.D. GRAY"
DATE: 6-1-2009

Illinois Tollway

CATCH BASINS, TYPE G AND TYPE G MODIFIED, FRAMES AND GRATES

STANDARD BB-05

Sheet 3 of 4
NOTE:
SEE SHEET 1 OF THIS SERIES FOR NOTES.
CUT OFF WALL
6"

TRANSITION
6'-0" (TYP.)

VARIES

VARIES

VARIES

VARIES

FLOW

SECTION H-H

SECTION D-D

SECTION C-C

DETAIL FOR PIPE ABOVE DITCH FLOW LINE

QUANTITIES FOR SLOPED HEADWALLS TYPE IV

<table>
<thead>
<tr>
<th>SLOPE</th>
<th>PIPE DIA.</th>
<th>CONCRETE HEADWALLS CLASS SI</th>
<th>CONCRETE HEADWALLS CLASS SI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2'-0&quot; BOTTOM</td>
<td>2'-0&quot; BOTTOM</td>
</tr>
<tr>
<td>W</td>
<td>6&quot;</td>
<td>814</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>10&quot;</td>
<td>218</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>12&quot;</td>
<td>218</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>18&quot;</td>
<td>218</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>24&quot;</td>
<td>218</td>
<td>204</td>
</tr>
<tr>
<td>F</td>
<td>6&quot;</td>
<td>144</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td>10&quot;</td>
<td>360</td>
<td>298</td>
</tr>
<tr>
<td></td>
<td>12&quot;</td>
<td>360</td>
<td>337</td>
</tr>
<tr>
<td></td>
<td>18&quot;</td>
<td>218</td>
<td>204</td>
</tr>
<tr>
<td></td>
<td>24&quot;</td>
<td>218</td>
<td>204</td>
</tr>
<tr>
<td>W</td>
<td>6&quot;</td>
<td>10,49</td>
<td>10,45</td>
</tr>
<tr>
<td></td>
<td>10&quot;</td>
<td>10,49</td>
<td>10,45</td>
</tr>
<tr>
<td></td>
<td>12&quot;</td>
<td>10,49</td>
<td>10,45</td>
</tr>
<tr>
<td></td>
<td>18&quot;</td>
<td>10,49</td>
<td>10,45</td>
</tr>
</tbody>
</table>

NOTES:
1. THE SLOPED HEADWALL TYPE IV SHALL BE CONSTRUCTED FLUSH WITH PROPOSED SLOPE.
2. THE SLOPED HEADWALL DETAILS SHOWN IN THIS DRAWING ARE FOR USE ONLY WITH PIPES HAVING AN INSIDE DIAMETER OR ARCH SPAN OF 6" OR LESS.
3. CLASS SI CONCRETE SHALL BE USED THROUGHOUT.
4. WELDED WIRE REINFORCEMENT SHALL BE EPOXY COATED 6"x6"x0.062" (1.6x1.6x1.6 mm), PER 100 SQ. FT.
5. QUANTITIES FOR CONCRETE HEADWALLS (CLASS SI) AND WELDED WIRE REINFORCEMENT SHOWN IN THE SCHEDULE OF QUANTITIES ARE BASED ON THE FOLLOWING:
   A. DIMENSION "W" IS PIPE I.D. OR ARCH SPAN.
   B. SLOPED HEADWALL TYPE IV LENGTH IS 20'-0" MIN.
   C. BACKSLOPE AND FORESLOPE ARE THE SAME. ADJUSTMENT TO QUANTITIES FOR HEADWALLS WITH DIMENSIONS OTHER THAN ABOVE SHALL BE INDICATED ON THE PLANS.
   D. THE QUANTITIES ARE SHOWN FOR INFORMATION ONLY.
6. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL DISPLACEMENT (V:H).

ILLINOIS DEPARTMENT OF TRANSPORTATION

APPROVED
DATE 1-1-2011

CHIEF ENGINEER

REVISIONS
DATE

STANDARD B11-05

SLOPED HEADWALLS
TYPE IV DETAILS
NOTES:

1. OUTLET PIPES AND PREFORMED CHANNEL INVERTS SHALL BE SLOPED AT 0.6% OR STEEPER TOWARD OUTLET REGARDLESS OF THE SURFACE SLOPE.

2. TRENCH DRAINS MAY BE STUBBED DIRECTLY INTO DRAINAGE STRUCTURES OR OUTLET PIPES MAY BE USED TO CONNECT TRENCH DRAINS TO DRAINAGE STRUCTURES.

3. TRENCH EXCAVATION MUST ALLOW FOR A MINIMUM OF 12 INCHES OF CONCRETE TO BE PLACED UNDER AND ALONGSIDE THE TRENCH DRAIN CHANNEL SYSTEM.

4. THE FINISHED LEVEL OF CONCRETE MUST BE APPROXIMATELY 1/8" ABOVE THE TOP OF THE DRAIN CHANNEL.

5. TRENCH DRAINS SHALL BE IN ACCORDANCE WITH THE MANUFACTURERS DETAILS AND SPECIFICATIONS.

6. PROVIDE 4" EXPANSION JOINT WITH PREFORMED JOINT FILLER BETWEEN PAVED SHOULDER AND TRENCH DRAIN ENCASMENT.

7. ALL SLOPES ARE EXPRESSED AS UNITS OF VERTICAL DISPLACEMENT TO UNITS OF HORIZONTAL PLACEMENT (V:H).

8. WHEN THE CONCRETE ENCASMENT FOR TRENCH DRAIN IS WITHIN 6' OF THE PAVEMENT, REPLACE THE SURFACE SURFACING WITH CLASS 9 CONCRETE 9" DEEPER. PAY 3% HORIZONTAL CEMENT CONCRETE SHOULDERS QUARTER 9'.
NOTE:
SEE SHEET 1 OF THIS SERIES FOR NOTES.
### Table of Reinforcing Steel for One End

<table>
<thead>
<tr>
<th>Length (in)</th>
<th>#4 @ 12&quot;</th>
<th>#5 @ 12&quot;</th>
<th>#6 @ 12&quot;</th>
<th>#7 @ 12&quot;</th>
<th>#8 @ 12&quot;</th>
<th>#10 @ 12&quot;</th>
<th>#12 @ 12&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'-0&quot;</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1'-3&quot;</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>2'-0&quot;</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>2'-3&quot;</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>3'-0&quot;</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>3'-3&quot;</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td>4'-0&quot;</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td>4'-3&quot;</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>5'-0&quot;</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>5'-3&quot;</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
<td>90</td>
</tr>
<tr>
<td>6'-0&quot;</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>6'-3&quot;</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
<tr>
<td>7'-0&quot;</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
<td>120</td>
</tr>
<tr>
<td>7'-3&quot;</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
<td>130</td>
</tr>
<tr>
<td>8'-0&quot;</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
<td>140</td>
</tr>
<tr>
<td>8'-3&quot;</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
<td>150</td>
</tr>
</tbody>
</table>

### Notes
- Reinforcement bars bending dimensions are out to out.
- Concrete in the headwall shall be added to the quantities shown.
- The weight of the additional bars and the additional quantity of "S" & "H" from sizes shown. Add the following additional bars:
  - For pipe arch or elliptical pipe culverts select appropriate bars.

---

**Pipe Arch and Elliptical Pipe Culverts**

For pipe arch or elliptical pipe culverts, select appropriate bars.

- From sizes shown, add the following additional bars:
  - For pipe arch or elliptical pipe culverts, select appropriate bars.

---

**Sheet 2 of 2**

**Approve:**

**Date:** 8-1-2009

---

**Field Cutting Diagram**

---

**Safety End Treatment for Single Culverts**

**Slope 6% 4'-6"**

**Standard: B13-05**
### Table of Reinforcement Bars for One End

<table>
<thead>
<tr>
<th>No.</th>
<th>Size (in.)</th>
<th>Quantity</th>
<th>Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
<td>40</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>40</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>60</td>
<td>14</td>
</tr>
</tbody>
</table>

### Table of Minimum Bars for Maximum "S"

<table>
<thead>
<tr>
<th>Size (in.)</th>
<th>6&quot;</th>
<th>8&quot;</th>
<th>10&quot;</th>
<th>12&quot;</th>
<th>14&quot;</th>
<th>16&quot;</th>
<th>18&quot;</th>
<th>20&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>6&quot;</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>8&quot;</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>10&quot;</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>12&quot;</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>14&quot;</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>16&quot;</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>18&quot;</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>20&quot;</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
<td>18</td>
</tr>
</tbody>
</table>

### Notes for Table of Dimensions

1. The number of S, T and Z bars shall be increased by 1 for each 1 foot of increase in dimension "S".
2. The number of Z bars shall be increased by 1 for each 1 foot of increase in dimension "S".
3. The number of S, T and Z bars shall be increased by 4 for each multiple of dimension "S" that is over 16.
4. The number of P and P bars shall be increased by 1 foot for each 1 foot of increase in dimension "S".
5. The number of Z bars shall be increased by 1 foot for each 1 foot of increase in dimension "S".
6. The number of P and P bars shall be increased by 1 foot for each 1 foot of increase in dimension "S".

---

**Approvals:**
- Prepared by: [Signature]
- Date: June 1, 2009
- Standard B14-05

**Illinois Tollway Safety End Treatment for Single and Multiple Culverts**

**Slope:** H ≤ 8°

**Note:**
- Reinforcement bars bending dimensions are out to out.
- Concrete quantities for minimum "S" will vary.

---

**Field Cutting Diagrams:**

- F(E) Bars
- W(E) Bars
- S(E) Bars
- T(E) Bars

---

**Notes:**

- **F(E) Bars:**
  - Cutting line for single and multiple culverts.
  - Cutting line for reinforcement bars.

- **W(E) Bars:**
  - Cutting line for single and multiple culverts.

- **S(E) Bars:**
  - Cutting line for single and multiple culverts.

- **T(E) Bars:**
  - Cutting line for single and multiple culverts.
### Table of Dimensions

<table>
<thead>
<tr>
<th>Category</th>
<th>Size (in)</th>
<th>Type</th>
<th>Diameter (in)</th>
<th>Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>A</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>B</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>C</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

### Table of Reinforcement Bars for One End

<table>
<thead>
<tr>
<th>Category</th>
<th>Size (in)</th>
<th>Type</th>
<th>Diameter (in)</th>
<th>Length (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>A</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>B</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>C</td>
<td>10</td>
<td>14</td>
</tr>
</tbody>
</table>

### Notes
- The design of the reinforce bars is for the appropriate size of concrete and reinforcing steel specified by the engineer.
- The dimensions for the reinforce bars shall be in accordance with the reinforcing bar manufacturer's specifications.
- The layout of the reinforce bars shall be as indicated by the engineer.

---

**Sheet 2 of 2**

**Illinois Tollway**

**Safety End Treatment for Single Culverts**

**Standard B15-04**
### TABLE OF DIMENSIONS

<table>
<thead>
<tr>
<th>NO.</th>
<th>LENGTH</th>
<th>WALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6'-10&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>2</td>
<td>3'-0&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>3</td>
<td>9'-8&quot;</td>
<td>3°</td>
</tr>
<tr>
<td>4</td>
<td>9'-0&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>5</td>
<td>5'-4&quot;</td>
<td>30°</td>
</tr>
<tr>
<td>6</td>
<td>22'-4&quot;</td>
<td>3°</td>
</tr>
</tbody>
</table>

### PIPE RUNNERS FOR ONE END

<table>
<thead>
<tr>
<th>NO.</th>
<th>LENGTH</th>
<th>WALL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>60'-10&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>2</td>
<td>60'-10&quot;</td>
<td>0°</td>
</tr>
<tr>
<td>3</td>
<td>60'-10&quot;</td>
<td>0°</td>
</tr>
</tbody>
</table>

### TABLE OF REINFORCEMENT BARS FOR ONE END

<table>
<thead>
<tr>
<th>CU. YD.</th>
<th>POUND</th>
</tr>
</thead>
<tbody>
<tr>
<td>81.00</td>
<td>103.50</td>
</tr>
</tbody>
</table>

### NOTES FOR TABLES:

1. The number of S, T, and Z bars shall be increased by 1 for each foot of increase in dimension "H."
2. The length of H- and V bars shall be increased by 10" for each foot of increase in dimension "H."
3. The number of K bars shall be increased by 1 if the number of S bars is increased by 1 for each foot of increase in dimension "H."
4. The total number shall be increased by 1 for each 1 foot increase in dimension "H."
5. 2 bars for 3° wall, 2 bars for 0° wall.
6. The length of the bar includes the two standard laps.

## Diagrams

- **Kiel Bars**
- **Kiel Dowels**
- **Nie and Niel Bars**
- **Si and Sviel Bars**
- **Zile Bars**
- **Piping Runner Layout**

**FOR SINGLE CULVERTS**

STANDARD B16-05
TABLE OF REINFORCEMENT BARS FOR ONE END

<table>
<thead>
<tr>
<th>No.</th>
<th>H(E) DOWELS</th>
<th>FOR PIPE CULVERTS</th>
<th>#5 @ 12&quot;</th>
<th>FOR BOX CULVERTS</th>
<th>#4-EQUALLY SPACED</th>
<th>#6</th>
<th>3'-0&quot;</th>
<th>7</th>
<th>3'-0&quot;</th>
<th>7</th>
<th>3'-0&quot;</th>
<th>7</th>
<th>3'-0&quot;</th>
<th>7</th>
<th>3'-0&quot;</th>
<th>7</th>
<th>3'-0&quot;</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table notes:
1. The number of H(E) and V(E) bars shall be increased by 1 for each foot of increase in dimension "W".
2. The number of H(E) and V(E) bars shall be increased by 1 for each foot of increase in dimension "W".
3. The number of V(E) bars shown are for single span pipes only. For each foot of increase in dimension "W", one V(E) bar shall be increased by 1 for each foot of pipe on each side.
4. This dimension shall be increased by 1 for each foot of increase in dimension "W".
5. 2 bars for 15° Wall, 2 bars for 45° Wall.
6. The length of V(E) bar includes one 1'-0" minimum lap.

Notes for Tables:
- The number of H(E) and V(E) bars shall be increased by 1 for each foot of increase in dimension "W".
- The number of V(E) bars shown is for single span pipes only. For each foot of increase in dimension "W", one V(E) bar shall be increased by 1 for each foot of pipe on each side.
- This dimension shall be increased by 1 for each foot of increase in dimension "W".
- 2 bars for 15° Wall, 2 bars for 45° Wall.
- The length of V(E) bar includes one 1'-0" minimum lap.
NOTES:

1. THE PREFERRED METHOD FOR ACHIEVING EROSION PROTECTION AT END SECTIONS SHALL BE THROUGH THE USE OF PRODUCTS THAT PROMOTE REVEGETATION WITHIN THE AREA OF CONCERN.

2. THICKNESS "t" WILL BE DETERMINED BY THE MANUFACTURER'S RECOMMENDATION FOR THE PRODUCT USED.

3. EROSION PROTECTION PLACEMENT SHALL BE INSTALLED FLUSH WITH ADJACENT GRADE.

4. FOR USE WITH STANDARDS B10 TO B18.

5. STONE RIPRAP SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATIONS AND DRAINAGE DESIGN MANUAL.
SECTION B-B

GRATING DIMENSIONS AND QUANTITIES

Based on a 1 foot width, 1:4 slope, and no skew

<table>
<thead>
<tr>
<th>SKEW</th>
<th>HEIGHT CULVERT</th>
<th>GAP NO. 1</th>
<th>GAP NO. 2</th>
<th>GAP NO. 3</th>
<th>GAP NO. 4</th>
<th>GAP NO. 5</th>
<th>GAP NO. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>30°</td>
<td>16.6W - 19.3</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>45°</td>
<td>18.3W - 22.4</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60°</td>
<td>20.0W - 24.0</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GENERAL NOTES:

1. All dimensions and quantities are for single box culvert headwalls. To adapt any of these tables for double box culverts, double the number of grate required and add an additional wall. Wall thickness shall be same as the center wall thickness of the box culvert.
2. For quantity calculations dimensions "W" shall be measured in feet.
3. Quantities for skewed headwalls not shown.
4. Pay items are identified by an asterisk (*).
5. All lengths are expressed as units of vertical displacement to units of horizontal displacement type.

END TREATMENT - MULTIPLE OR SINGLE CELL BOX CULVERT

NOTE:

- Reinforcement bars and grate spacing are typical of box culvert at normal (no skew).
- Measured along the slope, see typical grate details.

PLAN VIEW (NO SKEW)

SINGLE BOX CULVERT 84" WIDE

TYPICAL GRATE

NO SKEW

WITH SKEW

DIMENSIONS "W" FOR SLOPE 1:4

FOR VARIOUS CULVERT SIZES AND SKERS

<table>
<thead>
<tr>
<th>CULVERT WIDTH</th>
<th>GAP NO. 1</th>
<th>GAP NO. 2</th>
<th>GAP NO. 3</th>
<th>GAP NO. 4</th>
<th>GAP NO. 5</th>
<th>GAP NO. 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>16'-10&quot;</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18'-10&quot;</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20'-11&quot;</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23'-4&quot;</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23'-8&quot;</td>
<td>2</td>
<td></td>
<td>2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DETAIL OF VANES

SECTION C-C

NOTES:
1. ALL FRAMES AND GRATES SHALL CONFORM TO THE REQUIREMENTS OF ART. 1006.14 FOR GRAY IRON CASTINGS AND TO ART. 1006.15 FOR DUCTILE IRON CASTINGS.

2. FRAME AND GRATE TO BE NEENAH FOUNDRY COMPANY, NEENAH NO. R-3528-V, EAST JORDAN IRON WORKS TS55 OR APPROVED EQUAL.

3. GRATE SHALL NOT BE BOLTED TO FRAME.
28\(\frac{1}{8}\)" X \(\frac{1}{4}\)" X 1" SAFETY BAR (SHOWN IN TOP VIEW ONLY)

\(\frac{3}{8}\)" X 1" CORED SLOTS FOR GRATE ALIGNMENT (2 REQ'D)

28\(\frac{1}{8}\)" X \(\frac{1}{4}\)" X 1" SAFETY BAR (SHOWN IN TOP VIEW ONLY)

\(\frac{3}{8}\)" X 1" CORED SLOTS FOR GRATE ALIGNMENT (2 REQ'D)
DETAIL OF VANES

SECTION C-C

SECTION D-D

TOP VIEW

CURB BOX

SECTION E-E

FRONT VIEW

NOTES:

1. ALL FRAMES AND GRATES SHALL CONFORM TO THE REQUIREMENTS OF ART. 1006.14 FOR GRAY IRON CASTINGS AND TO ART. 1006.25 FOR DUCTILE IRON CASTINGS.

2. FRAME AND GRATE TO BE NEENAH FOUNDRY COMPANY, NEENAH NO. R-3527-VF, EAST JORDAN IRON WORKS 7540 OR APPROVED EQUAL.

3. GRATE SHALL NOT BE BOLTED TO FRAME.

4. CURB BOX SHALL BE BOLTED TO FRAME WITH \( \frac{1}{2}'' \) GALVANIZED HEX. NO. BOLT AND NAT WITH GALV WASHERS.

5. CURB BOXES SHALL ONLY BE USED AT SAG LOCATIONS.

CAST GRATE

TOP VIEW

CURB BOX

SECTION E-E

FRONT VIEW

SECTION C-C

SECTION D-D

DETIAL OF VANES

TOP VIEW
\( \frac{3}{4} \)" X 1" CORED SLOTS FOR GRATE ALIGNMENT (2 REQ'D PER FRAME)

22\( \frac{1}{4} \)" X 2\( \frac{1}{4} \)" SAFETY BAR (2 REQ'D (SHOWN IN TOP VIEW ONLY))

FRAMES BOLTED TOGETHER w/ 
(3) 1\( \frac{1}{4} \)" X 3 GALV. HEX. HD. BOLTS AND NUT w/ GALV. WASHERS

CAST FRAME
NOTES:
1. ALL FRAMES AND GRATES SHALL CONFORM TO
   THE REQUIREMENTS OF ART. 1006.14 FOR GRAY
   IRON CASTINGS AND TO ART. 1006.15 FOR
   DUCTILE IRON CASTINGS.
2. FRAME AND GRATE TO BE NEENAH FOUNDRY
   COMPANY, NEENAH NO. R-3529-V, EAST JORDAN
   IRON WORKS 7536 OR APPROVED EQUAL.
3. GRATE SHALL NOT BE BOLTED TO FRAME.
GENERAL NOTES:

1. Gutter transitions shall be paid for per foot as gutter, type G-2 or Gutter, type G-3, as specified in the plans.

2. Reference Illinois Tollway Standard Drawing C1 for additional guardrail information.


GUTTER, TYPE G-2 TRANSITION AND GUTTER, TYPE G-3, TRANSITION
AT TRAFFIC BARRIER TERMINAL, TYPE T1, SPECIAL

PLAN

SECTION A-A

SECTION B-B

GUTTER, TYPE G-2 OR GUTTER, TYPE G-3, MODIFIED

AGGREGATE SHOULDERS

GROUND LINE

REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C6 FOR SHOULDER
WIDENING INFORMATION.

REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR ADDITIONAL
GUARDRAIL INFORMATION.
GUTTER, TYPE G-3, MODIFIED (87'-0")

AGGREGATE SHOULDERS, TYPE B

GUTTER, TYPE G-3, MODIFIED (87'-0")

AGGREGATE SHOULDERS SPECIAL, TYPE C

SECTION C-C

SECTION D-D

ASPHALT SHOULDER TRANSITION

SECTION E-E

SECTION F-F

GUTTER, TYPE G-3, MODIFIED TRANSITION

SECTION G-G

NOTES:

SEE SHEET 1 OF THIS SERIES FOR NOTES

GUTTER TRANSITION AT TRAFFIC BARRIER TERMINAL,
TYPE T1 (SPECIAL)
GUTTER, TYPE G-2 TRANSITION AT TRAFFIC BARRIER TERMINAL, TYPE T1-A (SPECIAL)

GENERAL NOTES:

1. GUTTER TRANSITIONS SHALL BE PAID FOR PER FOOT AS GUTTER, TYPE G-2 OR AS SPECIFIED IN THE PLANS.

2. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C1 FOR ADDITIONAL GUARDRAIL INFORMATION.

3. REFERENCE ILLINOIS TOLLWAY STANDARD DRAWING C12 FOR SHOULDER WIDENING INFORMATION.
DEFINED CLEAR ZONE LOCATIONS

PLAN VIEW: NOT TO SCALE

SHIELDED LOCATIONS

PLAN VIEW: NOT TO SCALE

NOTES:

1. Install stone check dams at 50' spacing along furrow. Stone check dams to consist of CA-7 stone, 2' long, filled to full depth of furrow.

2. Furrow to be sliced/tilled along level contour design.

3. Furrows shall not be installed in undefined, undefined clear zone locations.

FURROW DETAIL

SECTION VIEW: NOT TO SCALE
**4' MANHOLE PLAN**

**SECTION A-A**

- No. 6 (No. 19) Bars
- Top & Bottom
- Bar C Top & Bottom (See Table)

**5' MANHOLE PLAN**

**SECTION B-B**

- No. 6 (No. 19) Bars
- Top & Bottom
- Bar C Top & Bottom (See Table)

### Table: NO. 4 (No. 13)

<table>
<thead>
<tr>
<th>BAR</th>
<th>LENGTH</th>
<th>RADIUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>6'-6&quot;</td>
<td>22</td>
</tr>
<tr>
<td>C1</td>
<td>6'-6&quot;</td>
<td>22</td>
</tr>
</tbody>
</table>

**Typical Location for Lifting Device.**

**USE MORTAR OR SEALER (Typ.)**

- No. 4 (No. 13) UNLESS OTHERWISE SHOWN

**Typical Location for Lifting Device.**

- No. 6 (No. 19) Bars
- Top & Bottom
- Bar C Top & Bottom (See Table)

**SHOWING REBAR REINFORCEMENT**

- No. 6 (No. 19) Bars
- Top & Bottom

**SECTOR (Typ.)**

- 1' (40)
- MIN.

**USE MORTAR OR SEALER (Typ.)**

- No. 4 (No. 13)

**LENGTH**

- 7'-0" (2.13 m)
- 6'-6" (1.98 m)
- 5'-2" (1.57 m)

**RADIUS**

- 5'-0" (1.52 m)
- 4'-0" (1.22 m)
- 3'-0" (0.91 m)

**APPROVED DATE**

- CHIEF ENGINEER

- 3-31-2017
SECTION A-A

SECTION B-B

6" MANHOLE PLAN
SHOWING REBAR REINFORCEMENT
NO. 6 ING. 18 UNLESS OTHERWISE SHOWN

BAR C TOP & BOTTOM (SEE TABLE)

6 (150)

MIN. 7'-2'' (2.18 m)

C L. (TYP.)

1 1/4 (40)

MIN. 6 (175)

SEALER (TYP.)

USE MORTAR OR BAR C

I.D.

6' (1.8 m)

(200)

8

SECTION A-A

SECTION B-B

7" MANHOLE PLAN
SHOWING REBAR REINFORCEMENT
NO. 8 ING. 25 UNLESS OTHERWISE SHOWN

BAR C TOP & BOTTOM (SEE TABLE)

8-4" (2.1 m)

MIN. 8'-4'' (2.54 m)

C L. (TYP.)

1 1/4 (40)

MIN. 7 (175)

SEALER (TYP.)

USE MORTAR OR BAR C

I.D.

7' (2.1 m)

(230)

9

TOP & BOTTOM

NO. 6 (NO. 19) BARS

LIFTING DEVICE.

TYPICAL LOCATION FOR
PLACED AT BOTTOM

REBAR - (TYP.)

TOP & BOTTOM

NO. 8 (NO. 25) BARS

LIFTING DEVICE.

TYPICAL LOCATION FOR
PLACED AT BOTTOM

REBAR - (TYP.)

TOP & BOTTOM

NO. 6 (NO. 19) UNLESS OTHERWISE SHOWN

SHOWING REBAR REINFORCEMENT

TOP & BOTTOM

NO. 8 (NO. 25) UNLESS OTHERWISE SHOWN

SHOWING REBAR REINFORCEMENT

NO. 4 (NO. 13) AT 12

TOP MAT IS

BOTTOM MAT OF REBAR

NO. 4 (NO. 13) AT 12

DIAMETER

TOP & BOTTOM

5'-6" (1.68 m) LONG

NO. 8 (NO. 25) BARS

TOP & BOTTOM

5'-6" (1.68 m) LONG

NO. 8 (NO. 25) BARS

TOP & BOTTOM

6'-0" (1.82 m) LONG

NO. 8 (NO. 25) BARS

TOP & BOTTOM

6'-0" (1.82 m) LONG
DIAMETER 8' (2.4 m) & 9' (2.7 m)

FLAT SLAB TOP & BOTTOM

BAR C

TOP & BOTTOM NO. 8 (NO. 25) UNLESS OTHERWISE SHOWN
SHOWING REBAR REINFORCEMENT

NO. 4 (NO. 13) AT 12 (300) CENTERS EACH DIRECTION

TOP MAT IS BOTTOM MAT OF REBAR

MIN. 10'-8'' (3.25 m) CL (TYP.) 1' (24)

MIN. 9'-6'' (2.90 m) CL (TYP.) 1' (24)

SEALER (TYP.) USE MORTAR OR BAR C

MIN. 9 (225)

MIN. 8 (200)

9'-6'' (2.90 m) CL (TYP.) 1' (24)

SEALER (TYP.) USE MORTAR OR BAR C

MIN. 9 (225)

MIN. 8 (200)

SECTION A-A

SECTION B-B

TOP & BOTTOM NO. 4 (NO. 13)
LENGTH 8'-6" (2.59 m)
RADIUS 8'-6"

TOP & BOTTOM NO. 4 (NO. 13)
LENGTH 5'-6" (1.68 m)
RADIUS 4'-2" (1.27 m)

TOP & BOTTOM NO. 8 (NO. 25) LONG 8' MANHOLE PLAN

9' MANHOLE PLAN

SHOWING REBAR REQUIREMENT
NO. 8 (NO. 25) UNLESS OTHERWISE SHOWN