

Figure 5-395.110(A)

Precast Concrete End Section Type III – Single or Double Barrel For Skews $7\frac{1}{2}^\circ$ To 45°

Approved, and signed, March 24, 2011. Last date revised: October 9, 2015.

Revised 10-09-2015

At END VIEW:

- Changed note: “1’-0” MAX. RADIUS (TYP.)” to “RADIUS (7” MIN., 1’-0” MAX.) OR CHAMFER (4” MIN., 7” MAX.) (TYP.)”

At FABRIC LAYER DETAIL:

- Changed the title of “FABRIC LAYER DETAIL” to “REINFORCEMENT LAYER DETAIL”.
- Changed all cases of “welded wire fabric” to “welded wire reinforcement” in notes and text.

At SECTION A-A:

- Changed “welded wire fabric” to “welded wire reinforcement”.

Under CONSTRUCTION NOTES:

- Fourth note changed from “Precast concrete shall be mix no. 3W36 with no calcium chloride allowed.” to “Use concrete mix 3W82 with no calcium chloride allowed.” Concrete mix designation updated to match 2016 spec. book.
- Changed “Dropwall concrete shall be mix no. 1A43 or 3Y43.” to “Use dropwall concrete mix 3S52, or 3Y82 if precast.” in the fifth note.
- Changed sixth note from “Longitudinal reinforcement shall be a minimum of 0.06 sq. in. per ft. on both faces.” to “Place longitudinal reinforcement with a minimum of 0.06 sq. in. per ft. on both faces.”
- Changed “Except as noted, culvert ties are to be 1” dia. rods.” to “Except as noted, use 1” dia. culvert ties.” in circled note ④.
- Changed both instances of “welded wire fabric” to “welded wire reinforcement” in circled note ⑩.
- Changed circled note ⑬ from “Fill hole with grout. Grout shall consist of 1 part cement and 2 parts sand. Use 1A air entrained Portland cement. Grout mix shall have a maximum slump of 4”.” to “Fill hole with grout. Grout consists of 1 part cement and 2 parts sand. Use type 1A air entrained Portland cement. Grout mix maximum slump is 4”.”

Revised 09-11-2014

Under CONSTRUCTION NOTES:

- Changed/Corrected the Fig. number in the first note *From: 5.393.101(B) To: 5-395.101(B)*
- Changed numbered note ⑨ to read: Refer to the general plan and elevation sheet for the distance between barrels of adjacent boxes and to standard figure 5-395.115 for material requirements for fill between adjacent boxes.

At PLAN VIEW - DOUBLE BARREL OPTION:

- Added the 3’-0” (TYP.) dimension, detailing the outside end of the drop wall.

Revised 11-06-2013

At END VIEW:

- Changed the haunch bar note to identify the length of the haunch bar based on wall or slab thickness.
- Changed the dimensions “H” to “RISE” and “W” to “SPAN”.
- Changed the bottom slab reinforcement note *from 0.24 IN 2/FT. to Abt*②

At ELEVATION:

- Added numbered note ⑭ to the 10” dimension at the end of the apron.
- Changed the dimensions “H” to “RISE” at the tie hole location.
- Changed the look of the dimension at the tie hole location to better represent the actual dimension.

At SECTION A-A:

- Added “Bottom Slab Only” to the end of the welded wire fabric note.
- Added numbered note ⑭ to the 10” dimension.

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At CONSTRUCTION NOTES:

- Added the word “Standard” to precede the figure number in all instances.
- Changed numbered note ③ to read: Number of sections varies with culvert rise.
- Added to the end of numbered note ④: Tongue and Groove Joint on All Three Sides of Apron is Permissible.
- Changed numbered note ⑤ to read: 3'-6" min. tongue and 3'-7" min. groove for culverts with 6'-0" spans. 5'-0" min. tongue and 5'-1" min. groove for culverts with spans greater than 6'-0". Center tongue and groove on centerline of each apron joint. Tongue and groove joint on all three sides of apron is permissible.
- Added numbered note ⑭: Apron bottom slab thickness may be 8" for culverts with 6' spans only. Bottom slab thickness may be increased up to 2" max. provided cover is 1 ½" min., 2" max

Changed the first column on the LENGTH P and LENGTH Q tables from “WIDTH W (FT.)” to “SPAN”(FT.).

Changed the first column on the MIN. LENGTH L table from “HEIGHT” H (FT.) to “RISE” (FT.).

Updated the signature block to make it similar to other standards.

Revised 04-17-2013

This standard was updated to convert reinforcing bar marks from metric to U.S. customary bar designations.

Re-Approved 03-24-2011

Under CONSTRUCTION NOTES:

- Removed 9th note: “Grout shall consist of one part.....”
- Changed numbered note ⑨ to read: “If the distance between double barrels is less than 2’-0” use either pea rock or lean mix backfill (Mn/DOT spec. 2520) between the culvert as approved by the engineer. If pea rock is used provide approved grout seepage cutoff core, minimum 12” thick, between the culvert’s two ends. See standard figure 5-395.115 for details. Minimum distance between the two barrels is 6”.
- Within the numbered note ⑩. Changed the words “MESH” or “WIRE MESH” to “WELDED WIRE FABRIC” .
- Added numbered note ⑫, “For box culverts with spans of 16’ the maximum skew shall be 30°.
- Added numbered note ⑬, “Fill hole with grout. Grout shall consist of 1 part cement and 2 parts sand. Use type 1A air entrained Portland cement. Grout mix shall have a maximum slump of 4”.

At END VIEW:

- Removed note: “Haunch to match that of barrel (typ.)”
- Changed note from: “0.192 in²/ft. (typ.)” to: “0.24 in²/ft. (typ.)” for the inside transverse wall reinforcement.
- Changed note from: “0.192 in²/ft.” to: “0.24 in²/ft.” for the inside bottom slab transverse reinforcement.
- Added 12” TYP. to the haunch in the vertical and horizontal directions.

At PLAN VIEW (single barrel option):

- Added note: “Curb ends may be fabricated parallel to skew” with circled leader line to end of curb.
- Added additional leader line pointing to the culvert ties from numbered note ⑦.
- Added numbered note ④ with leader line pointing to the culvert tie.
- Added circled numbered note ⑫ to the skew dimension at the end of the apron.

At the ELEVATION:

- Added numbered note ④ to the culvert ties at the interior segment locations.
- Added numbered note ④ & ⑦ to the culvert ties.
- Added note: “⑦ Only required on the outside of the high fill side.” to the lower tie on the high fill side along with a circled leader line.
- Added a dimension line from the bottom of the lintel beam to the culvert tie that reads: “Tie hole (H/2)-6”

At SECTION A-A:

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- Changed note *from*: “0.192 in²/ft.” to: “Abt”

At SECTION B-B:

- Changed note *from*: “No.13 dowel bar, 1’-0” long. Grout in place.” *to*: “No.19 dowel bar, 1’-0” long. Grout in place.”
- Changed the dimension *from* 1’-2” embedment *to* 6” embedment for the No.19 dowel in the drop wall.
- Changed the dimension *from* “1” dia. formed hole” *to* “3” dia. formed hole” and changed the dimension limits to the bottom slab depth.
- Added note: “May drill and grout” with numbered note ③ showing the hole for the dowel in the drop wall.

At PLAN VIEW: (double barrel option)

- Added circled numbered note ④ pointing to the culvert ties.
- Added circled numbered note ⑫ to the skew dimension at the end of the apron.
- Changed the note pointing to the 3” dia. holes at the end of the apron. Removed the words “Fill Holes With Grout” and replaced them with numbered note ③.

At the FABRIC LAYER DETAIL:

- Changed the words “MESH” or “STEEL FABRIC” to “WELDED WIRE FABRIC” throughout the detail.

At the “LENGTH P” TABLE:

- Added another row to the table for 16 ft. width.

At the “LENGTH Q” TABLE:

- Added another row to the table for 16 ft. width.

09-17-2004

At SECTION B-B: changed 1" DIA. FORMED HOLE WITH PVC PIPE note to 1" DIA. FORMED HOLE dimension

Approved, and signed, December 11, 2000