

**DESIGN NOTES:**

Design Specifications:  
AASHTO LRFD Bridge Design Specifications,  
4th Edition with California Amendments.

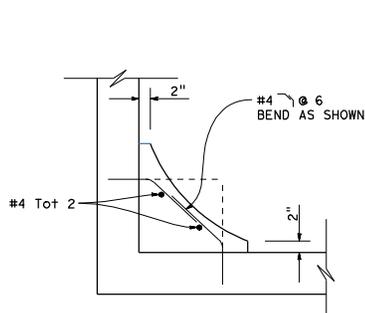
Loading:  
Live load: (AASHTO LRFD Chapter 3.6.1.2)  
HL-93 consists of design truck or  
design tandem and design lane load  
Impact Factor: (Apply to top slab only)  
 $IM = 33(1.0 - 0.125D_e) \geq 0\%$   
 $D_e$  = minimum depth of earth cover

Earth load:  
Earth pressure for one condition:  
140 pcf vertical, 100 pcf horizontal

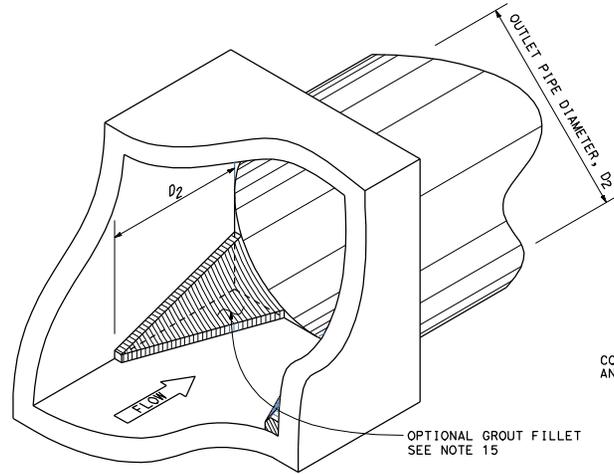
Load Factors:  
AASHTO LRFD Table 3.4.1.1 & Table 3.4.1.2

Unit stresses:  
 $f'_c = 3600$  psi  
 $f_y = 60,000$  psi

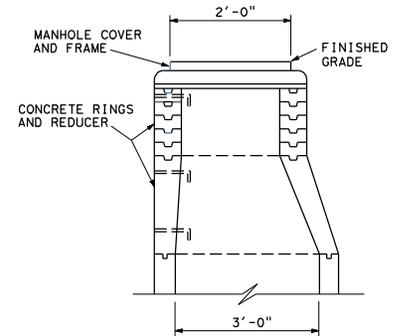
Shear:  
 $V_c = \text{Beta} \sqrt{f'_c} b_v d_v$  (Pounds)



**TYPICAL FILLET SECTION**



**ISOMETRIC FILLET DETAIL**



**TYPE MH  
UPPER STRUCTURE**

B	"b" BARS TOP & BOTTOM
2.5'	#5 Tot 4
3.0'	#5 Tot 4
3.5'	#5 Tot 4
4.0'	#5 Tot 4
4.5'	#5 Tot 4
5.0'	#6 Tot 4
5.5'	#6 Tot 6
6.0'	#6 Tot 6

**GENERAL NOTES:**

- Risers shall be positioned to either side of the structure as shown.
- Each riser shall have a ladder. For details see Standard Plan D93A.
- Thickness of deck shall vary as necessary to provide a level manhole seat. Hb is equal to the largest inside height dimension between the top and bottom slabs.
- Reinforcing steel shall be placed 2" clear, except as shown.
- Maximum skew of lateral pipe B is 45°.
- Lateral pipe may be placed in either side wall.
- Where D<sub>1</sub> or D<sub>2</sub> is less than 3.5', clear distance between side walls shall be 3.5'. Where D<sub>1</sub> or D<sub>2</sub> is less than 5.5', Hb shall be 5.5'. D<sub>1</sub> and D<sub>2</sub> limited to 10' maximum diameter. End walls shall be 6" thick with #4 @ 12 placed both ways.
- Side walls shall be flush with the inside of the inlet and outlet pipes when pipe diameters are 3.5' or more. Span is equal to the largest inside width dimension between the side walls.
- Length is 5'-0" minimum.
- When C is not specified, bring the lateral pipe directly into the wall of the structure.
- When C is specified, the Contractor may, at his option, bring the lateral pipe directly into the wall for use as an inside form. A collar conforming with the wall thickness and reinforcement as shown in section B-B shall be poured around the pipe.
- When the lateral pipe is extended directly into the wall, it shall be mitered as necessary to be flush with wall.
- "b" bars shall extend a minimum of 8" on either side of the opening.
- Adjacent to each side of the opening, place additional reinforcement equivalent to half the interrupted main reinforcement.
- Optional fillet at outlet pipe placed at the direction of the Engineer.
- Minimum thickness around pipe connections shall be 6". Wall and Slab thicknesses may be increased beyond the minimums shown in the design tables or a thickened collar may be added to the local pipe connection area to achieve the minimum thickness. If a thickened collar is used, minimum width shall be one half of the corresponding pipe diameter and centered on the pipe section.

SPAN	10.0' Max COVER		20.0' Max COVER	
	"a" BARS	TOP AND BOTTOM SLAB THICKNESS ( ts, bs )	"a" BARS	TOP AND BOTTOM SLAB THICKNESS ( ts, bs )
3.5'	#4 @ 7	14.5"	#4 @ 7	14.5"
4.0'	#4 @ 7	14.5"	#4 @ 7	14.5"
4.5'	#4 @ 6	13.5"	#4 @ 6	13.5"
5.0'	#4 @ 5	12"	#4 @ 5	12"
5.5'	#4 @ 4	10.5"	#4 @ 4	10.5"
6.0'	#4 @ 4	10.5"	#5 @ 5	10.5"
6.5'	#5 @ 6	10"	#5 @ 4.5	10.5"
7.0'	#5 @ 6	10"	#5 @ 4.5	11.5"
7.5'	#5 @ 5.5	10"	#5 @ 4.5	12.5"
8.0'	#5 @ 5	10"	#5 @ 4.5	13.5"
8.5'	#6 @ 5	9.5"	#6 @ 5.5	13.5"
9.0'	#6 @ 4.5	9.5"	#6 @ 5.5	14.5"
9.5'	#6 @ 4.5	10"	#6 @ 5	15.5"
10.0'	#6 @ 4.5	10.5"	#6 @ 5	16.5"

H <sub>b</sub>	10.0' Max COVER		20.0' Max COVER	
	"c" BARS	SIDEWALL THICKNESS ( t )	"c" BARS	SIDEWALL THICKNESS ( t )
5.5'	#4 @ 6	8"	#4 @ 4.5	9.5"
6.0'	#4 @ 5	8"	#5 @ 5.5	9.5"
6.5'	#5 @ 6	8"	#5 @ 4.5	9.5"
7.0'	#5 @ 5	8"	#5 @ 4.5	10"
7.5'	#5 @ 4.5	8"	#5 @ 4.5	11"
8.0'	#5 @ 4	8.5"	#5 @ 4	11.5"
8.5'	#6 @ 5	9"	#6 @ 6	12.5"
9.0'	#6 @ 5	9.5"	#6 @ 5	13"
9.5'	#6 @ 4.5	10"	#6 @ 5	14"
10.0'	#6 @ 4.5	10.5"	#6 @ 5	15"

STATE OF CALIFORNIA  
DEPARTMENT OF TRANSPORTATION  
**CAST-IN-PLACE  
REINFORCED CONCRETE  
JUNCTION STRUCTURE**  
NO SCALE

**D91B**

2010 STANDARD PLAN D91B

D16+	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET NO.	TOTAL SHEETS

REGISTERED CIVIL ENGINEER  
 May 20, 2011  
 PLANS APPROVAL DATE  
 THE STATE OF CALIFORNIA OR ITS OFFICERS  
 OR AGENTS SHALL NOT BE RESPONSIBLE FOR  
 THE ACCURACY OR COMPLETENESS OF SCANNED  
 COPIES OF THIS PLAN SHEET.