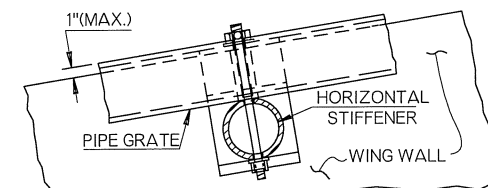


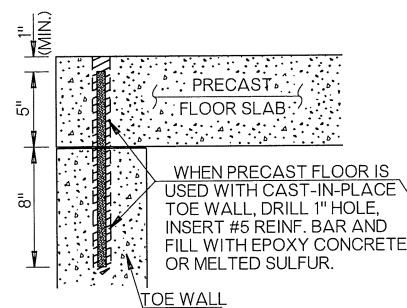
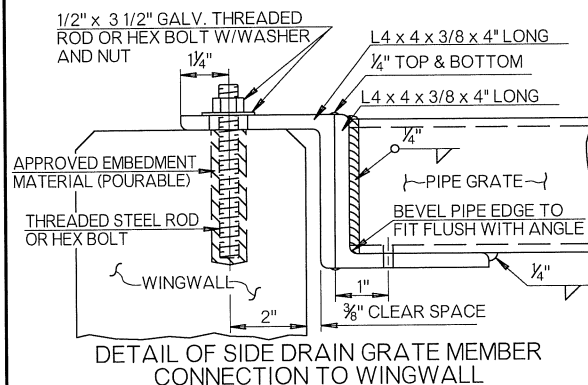
SHALL BE USED TO CONNECT CORRUGATED PIPE CULVERT TO END SECTION.

SCES END SECTION TYPES		END SECTION DIMENSIONS										SUMMARY-QUANTITIES					
		ROUND CULV. SIZE		W		T2		T3		H		LO		NL		1:4 SLOPE	
A4	A6	18"	3'-0"	6"	6"	2'-1"	2'-9 3/4"	1	1	7'-0"	7'-9"	3	1	9'-0"	9'-10"	4	1
B4	B6	24"	3'-0"	6"	6"	2'-7"	2'-9 3/4"	1	1	9'-0"	9'-10"	4	1	13'-6"	14'-2"	6	4
C4	C6	30"	4'-0"	8"	8"	3'-2"	3'-9 3/4"	1	1	11'-4"	12'-4"	5	2	17'-0"	17'-11"	8	4
D4	D6	36"	4'-0"	8"	8"	3'-8"	3'-9 3/4"	1	1	13'-4"	14'-5"	6	2	20'-0"	20'-11"	9	4
E4	E6	42"	6'-0"	8"	8"	4'-3"	5'-9 3/4"	2	2	15'-8"	16'-10"	7	3	23'-6"	24'-6"	11	4
F4	F6	48"	6'-0"	8"	8"	4'-9"	5'-9 3/4"	2	2	17'-8"	18'-11"	8	3	26'-6"	27'-6"	13	4

NH=NUMBER OF HORIZONTAL GRATES REQUIRED FOR SIDE DRAIN.
NL=NUMBER OF LONGITUDINAL GS REQUIRED FOR CROSS DRAIN.
NS=NUMBER OF HORIZONTAL STIFFENER(S) EVENLY SPACED FOR CROSS DRAINS (SEE SEC B-B).

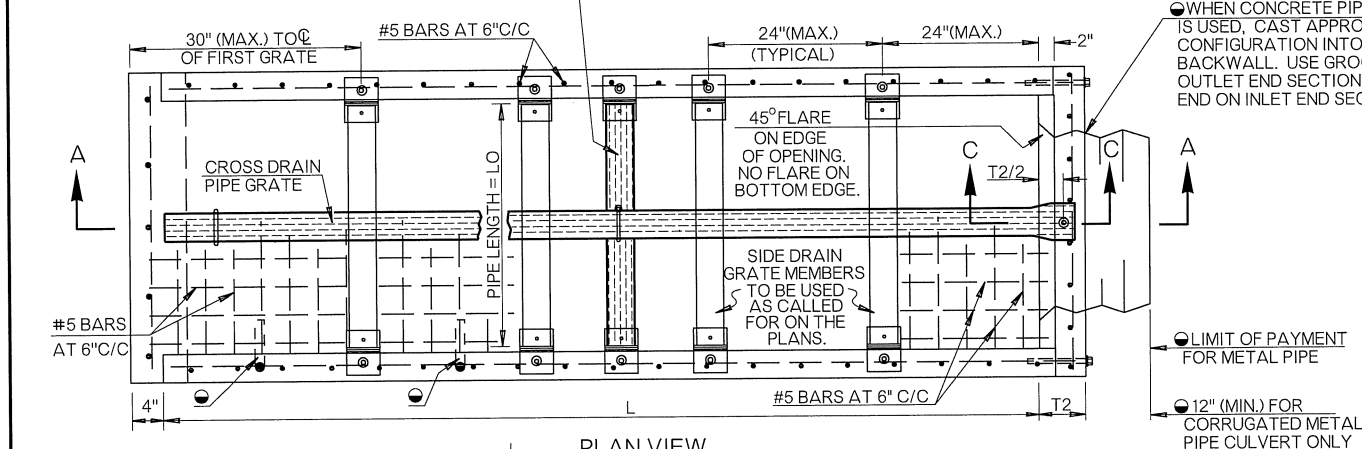


SECTION B-B

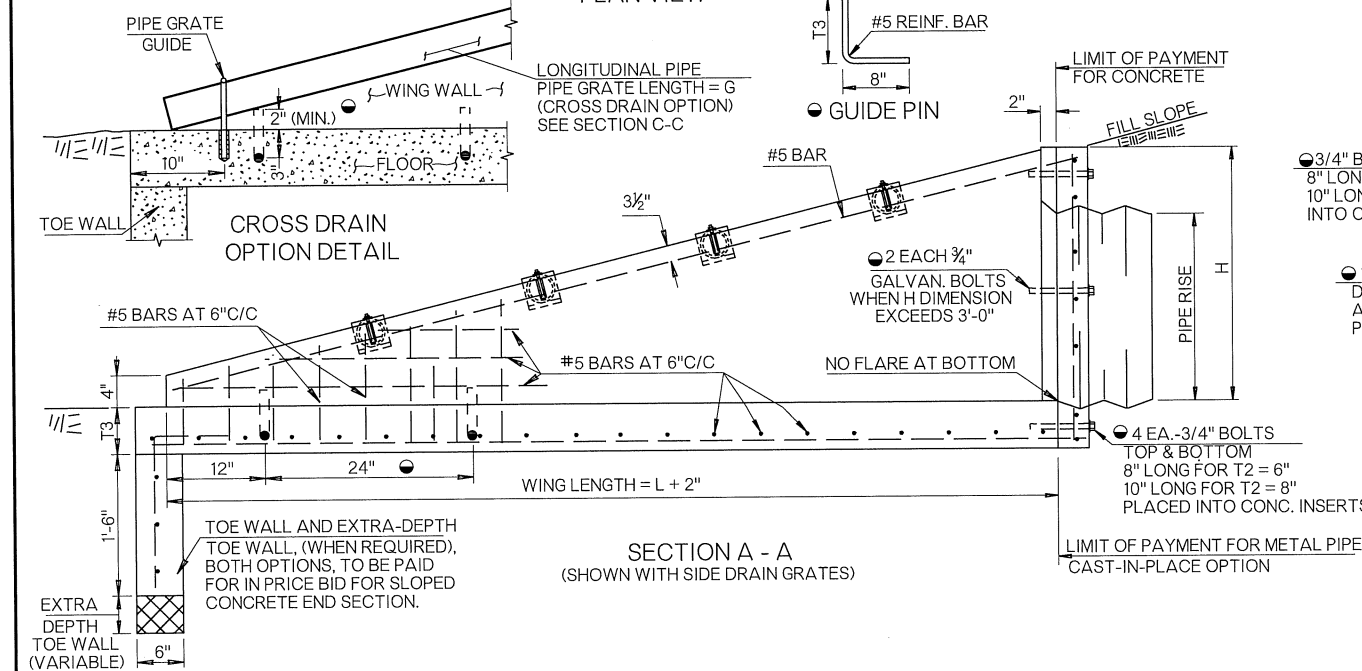
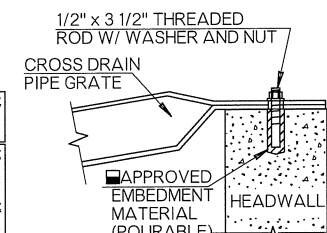


TOE WALL PLACEMENT DETAILS PRECAST OPTION

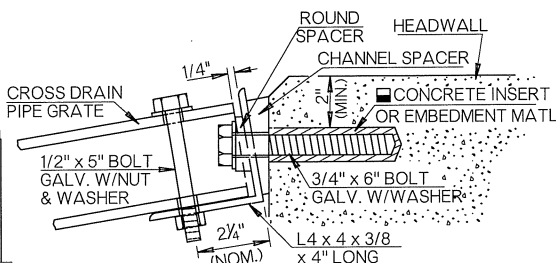
TYPICAL CROSS DRAIN HORIZONTAL STIFFENER(S) AT MID, THIRD AND QUARTER POINTS TO SUPPORT SINGLE OR MULTIPLE LONGITUDINAL PIPE SAFETY GRATES.



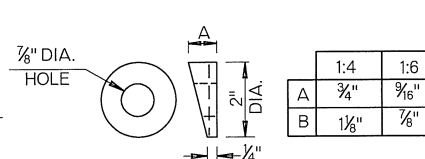
PLAN VIEW

SECTION A - A
(SHOWN WITH SIDE DRAIN GRATES)

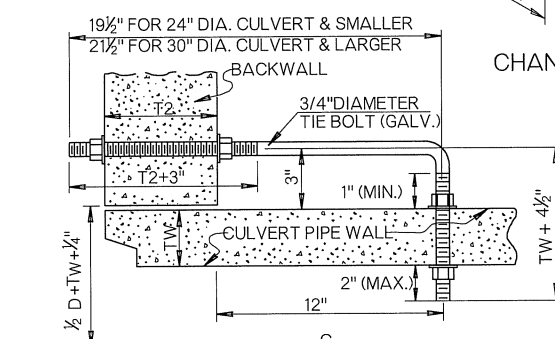
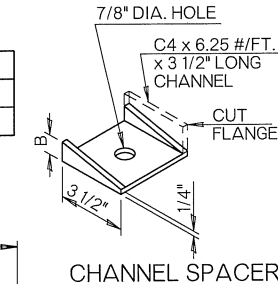
SECTION C-C



ALTERNATE SECTION C-C



ROUND SPACER

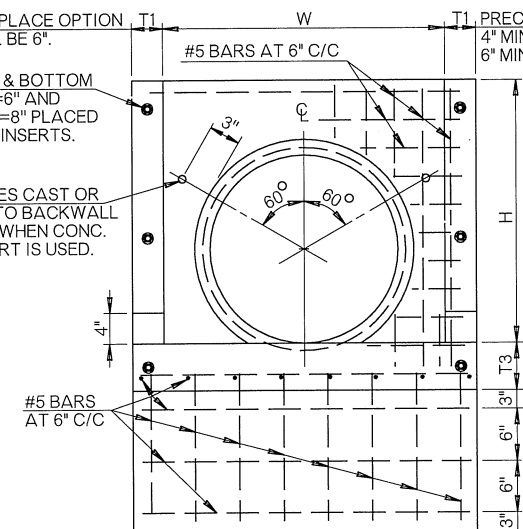
SECTION OF TIE BOLT INSTALLATION
TIE BOLT SHALL BE USED TO CONNECT CONCRETE PIPE CULVERT TO CONCRETE END SECTION.

CHANNEL SPACER

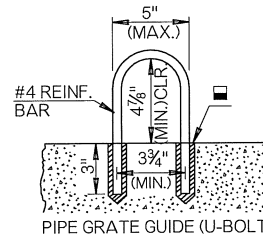
CAST IN PLACE OPTION T1 SHALL BE 6". PRECAST OPTION T1 SHALL BE: 4" MIN. FOR TYPE A, B, C & D 6" MIN. FOR TYPE E & F

3/4" BOLTS TOP & BOTTOM 8" LONG FOR T2 = 6" AND 10" LONG FOR T2 = 8" PLACED INTO CONCRETE INSERTS.

1" DIA. HOLES CAST OR DRILLED INTO BACKWALL AS SHOWN WHEN CONC. PIPE CULVERT IS USED.

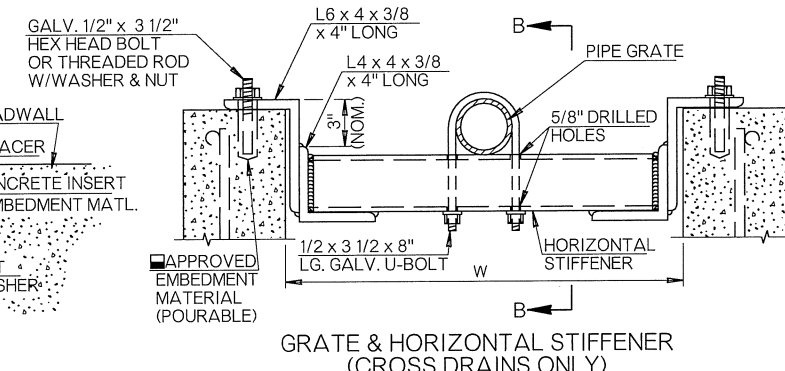


FRONT ELEVATION



TYPICAL LEGEND FOR PLAN SUMMARY

SD4 - SIDE DRAIN 1:4
SD6 - SIDE DRAIN 1:6
CD4 - CROSS DRAIN 1:4
CD6 - CROSS DRAIN 1:6
GR - GRATED
NG - NON-GRATED

GRATE & HORIZONTAL STIFFENER
(CROSS DRAINS ONLY)

GENERAL NOTES

- ALL CONSTRUCTION AND MATERIAL REQUIREMENTS SHALL BE IN ACCORDANCE WITH THE 2009 ODOT STANDARD SPECIFICATIONS.
- ALL NOTES DESIGNATED AS **●** APPLY ONLY TO PRECAST OPTION.
- QUANTITIES SHOWN ARE FOR ONE END ONLY. CONCRETE SHALL CONFORM TO THE MINIMUM REQUIREMENTS OF SECTION 509 OF THE SPECIFICATIONS. CLASS P CONCRETE, HAVING MINIMUM STRENGTH OF 5000 PSI, SHALL BE USED ON PRECAST UNITS. CLASS A CONCRETE SHALL BE USED ON CAST-IN-PLACE UNITS.
- DIMENSIONS SHOWN ARE MINIMUM. ACTUAL DIMENSIONS MAY VARY WITH FABRICATOR AND WITHIN INDUSTRY ACCEPTED TOLERANCES.
- UNITS SHALL BE ASSEMBLED USING BOLTS, AS SHOWN, AND EPOXY RESIN ADHESIVE CONFORMING TO AASHTO M 235, AT ALL JOINTS.
- FABRICATOR SHALL SUBMIT TO THE ENGINEER, FOR APPROVAL, PROVISIONS FOR LIFTING COMPONENT PARTS INTO PLACE.
- WHEN SHOWN ON PLANS, ARCH PIPE (METAL OR CONCRETE) OR ELLIPTICAL PIPE MAY BE USED IN LIEU OF FULL CIRCLE PIPE. WHEN USING ARCH OR ELLIPTICAL PIPE AS A SUBSTITUTE FOR FULL CIRCLE PIPE, THE RESPECTIVE INSIDE SPAN PLUS TWO WALL THICKNESSES MAY NOT EXCEED ANY W DIMENSION SHOWN IN THE TABLE OF END SECTION DIMENSIONS.
- SHARP EDGES ON PRECAST OR CAST-IN-PLACE UNITS MUST BE CHAMFERED OR ROUNDED TO THE POINT OF SAFE HANDLING. THE CHAMFER SHOULD BE 1/2", OR ROUNDED WITH AN EDGING TOOL.
- WHEN GRATE MEMBERS ARE REQUIRED, ALL BOLTS, NUTS, WASHERS, BRACKETS, AND STEEL PIPE ARE CONSIDERED PARTS OF THE END SECTION. PAYMENT FOR THESE ITEMS SHALL BE INCLUDED IN BID PRICE FOR THE END SECTION.
- PIPE FOR SAFETY GRATES SHALL BE 3" x 7.58 LBS./FT. STANDARD WEIGHT STEEL PIPE, SCHEDULE 40. IT SHALL BE FURNISHED GALVANIZED, PLAIN END AND SHALL MEET THE MINIMUM REQUIREMENTS OF ASTM A53.
- ANY GALVANIZED AREA(S) OF METAL PIPE DISTRESSED DURING THE POST FABRICATION AND/OR HANDLING PROCESS SHALL BE COATED WITH AN APPROVED ZINC RICH PAINT.
- THREADED ROD, BOLT AND NUTS SHALL CONFORM TO ASTM A307.
- ALIGNMENT SPACER HARDWARE SHALL CONFORM TO ASTM A36.
- ALL EXPOSED STEEL SHALL BE GALVANIZED OR PAINTED IN ACCORDANCE WITH SECTION 725.04 OF THE 2009 ODOT STANDARD SPECIFICATIONS.
- ALL REINFORCING STEEL TO BE #5 BARS AT 6" CENTERS, WITH 12" OVERLAPPING REINFORCING STEEL BETWEEN ADJACENT WALLS, WINGS, TOE WALL AND FLOOR.
- CRITERIA FOR USE OF PIPE SAFETY GRATE MEMBERS:
(A) ALL SIDE DRAIN AND CROSS DRAIN INSTALLATIONS INSIDE THE CLEARZONE.
(B) ALL INSTALLATIONS OUTSIDE THE CLEARZONE WHERE HAZARD POTENTIAL IS HIGH BASED ON TRAFFIC DIRECTION, SPEED, CLASS, VOLUME AND SIZE OF CULVERT.

NOTE: ANALYZE HYDRAULIC PERFORMANCE AT VARYING DEGREES OF CLOGGING AND APPLY RISK ASSESSMENT BEFORE USING GRATES.

BASIS OF PAYMENT

ITEM NO.	ITEM	UNIT
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613 (N) (A) SLOPED CONCRETE END SECTION EA

- SPECIFY TYPE (EXAMPLE: TYPE A4 SLOPED CONC. END SECTION)
■ SCES ORIENTATION, GRATED OR NON-GRATED SHALL BE SHOWN IN PLAN SUMMARIES.

APPROVED BY
ROADWAY ENGINEER

Caleb F. J.

DATE: 04/14/15

ROADWAY DESIGN DIVISION STANDARD

SLOPED CONCRETE END SECTIONS

OKLAHOMA DEPARTMENT OF TRANSPORTATION
2009 SPECIFICATIONS

SCES-3

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R-31