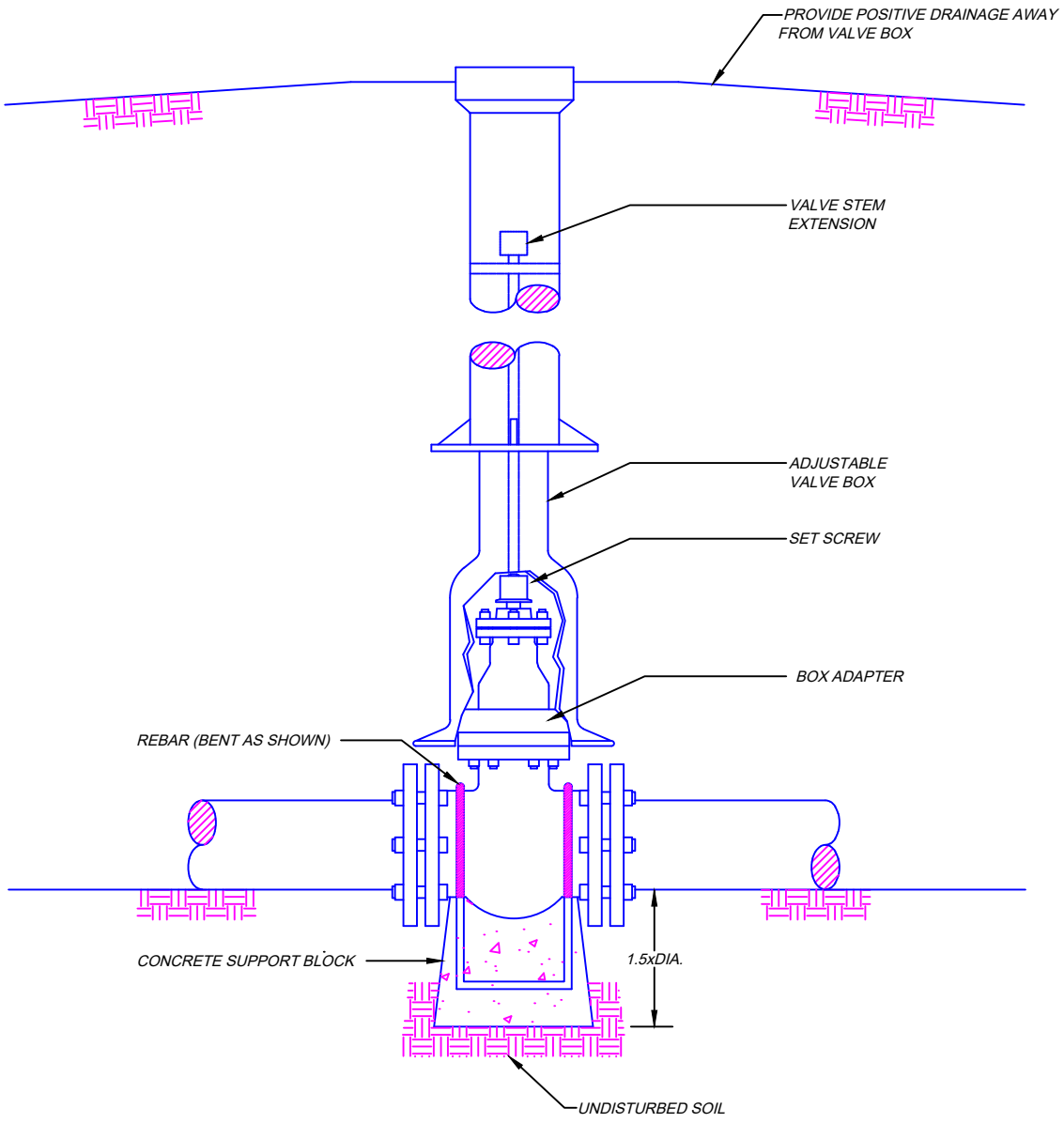
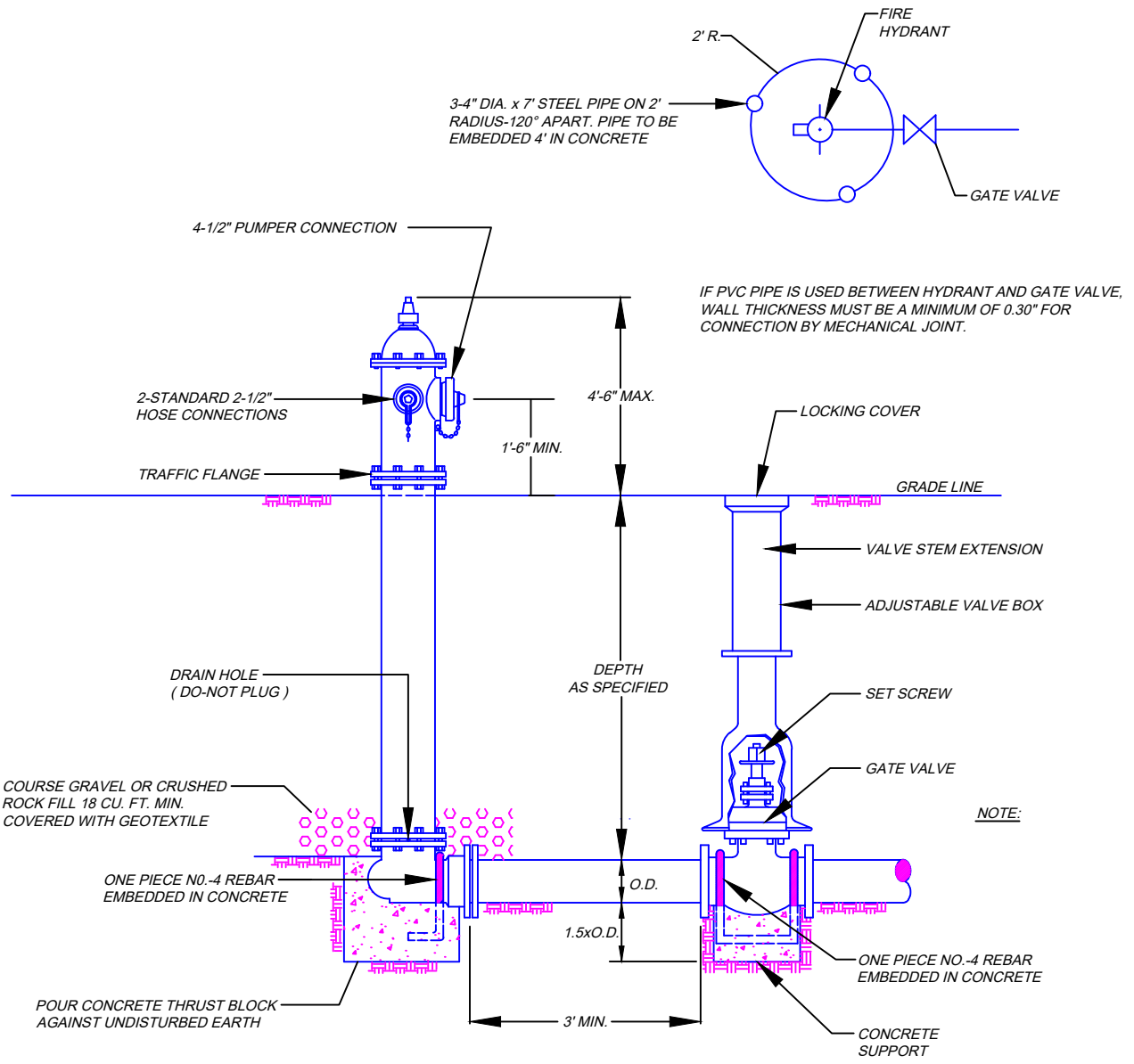
City of Box Elder Standard Construction Details
Table of Contents



GATE VALVE & BOX
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL W01
GATE VALVE & BOX

DETAIL #W01 REVISED 01/2020



HYDRANT WITH GATE VALVE & BOX

NOT TO SCALE

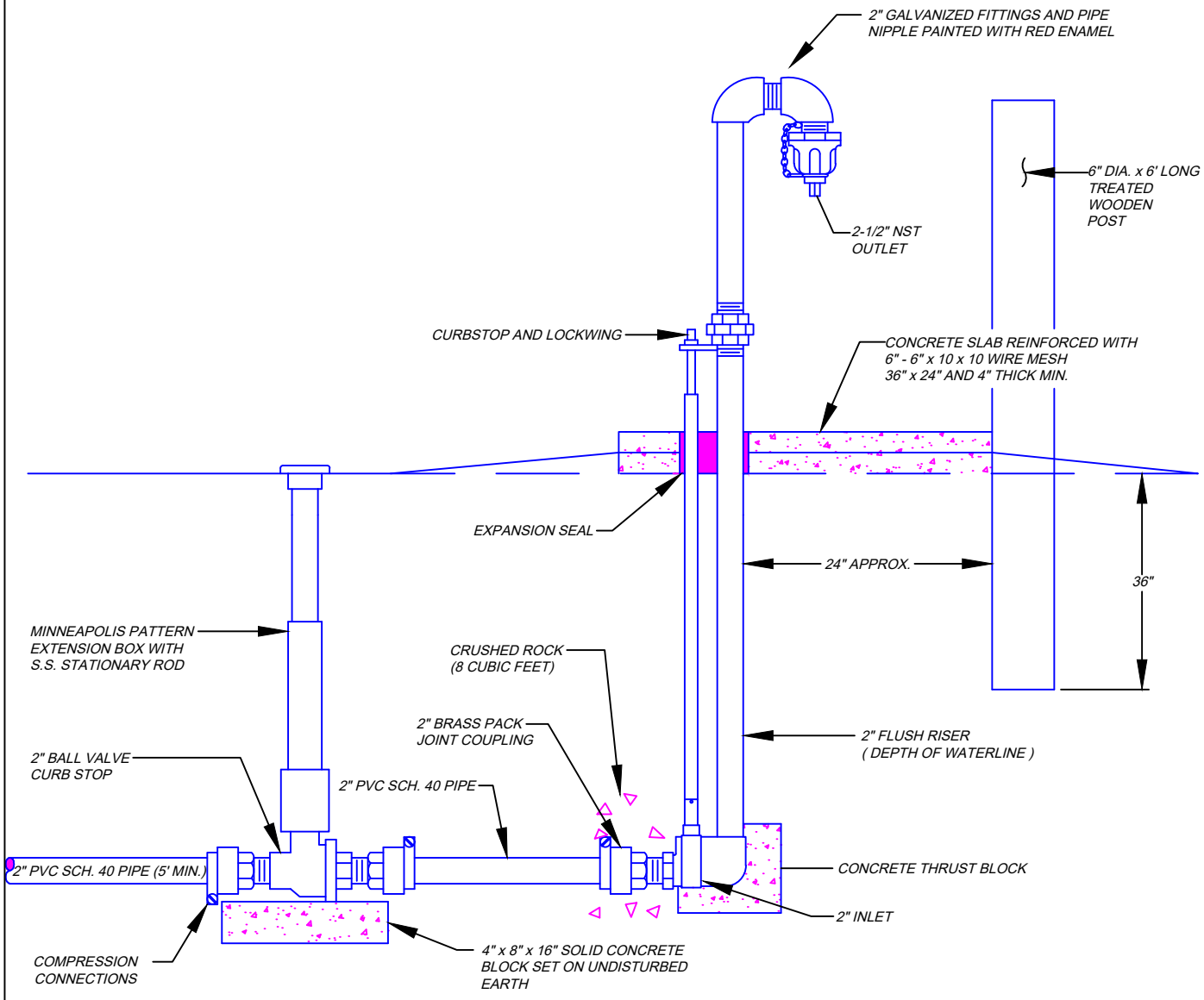
CITY OF BOX ELDER

STANDARD DETAIL W02

HYDRANT WITH GATE VALVE & BOX

DETAIL #W02 REVISED 01/2020

DETAIL W03-FLUSH RISER



FLUSH RISER
NOT TO SCALE

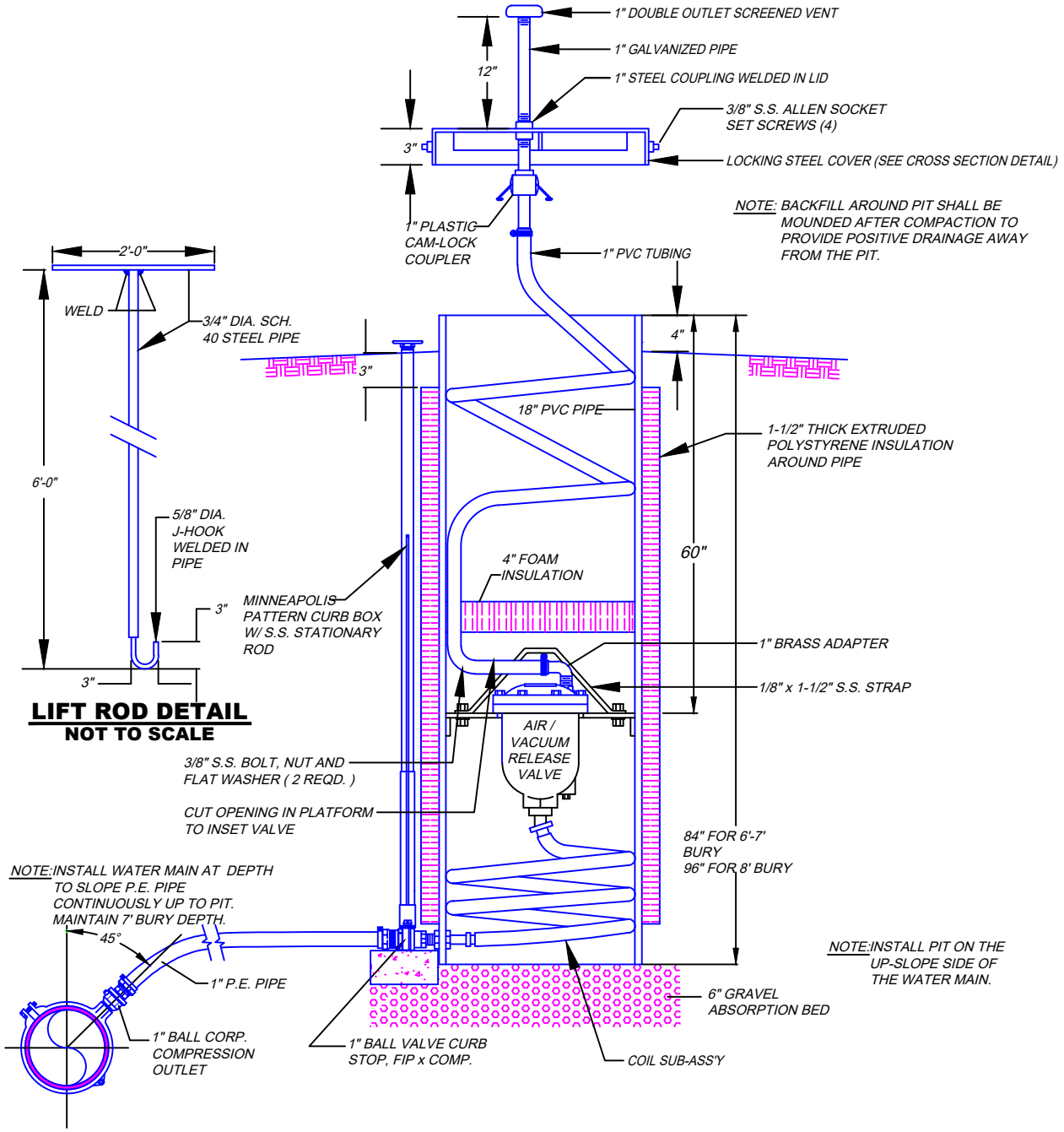
CITY OF BOX ELDER

STANDARD DETAIL W03

FLUSH RISER

DETAIL #W03

REVISED 01/2020



AIR / VACUUM RELEASE VALVE PIT INSTALLATION

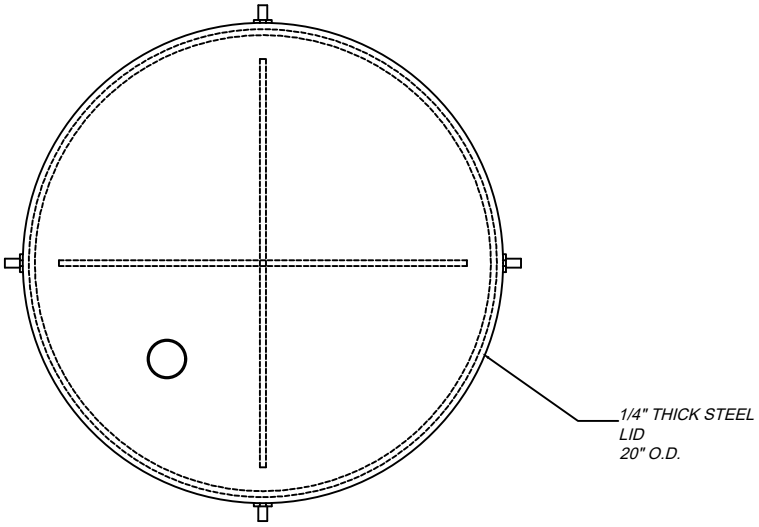
NOT TO SCALE

CITY OF BOX ELDER

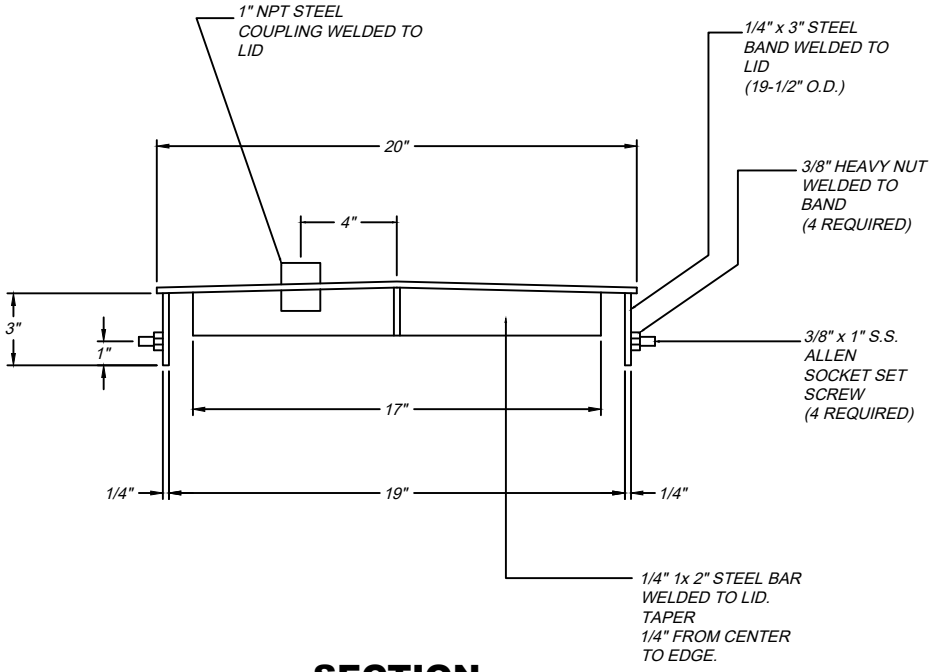
STANDARD DETAIL W04

AIR/VACUUM RELEASE VALVE PIT

DETAIL #W04 REVISED 01/2020



TOP VIEW



SECTION

NOTE: ALL SURFACES OF COVER REQUIRE SURFACE PREPARATION TO SSPC-SP6 AND POLYAMIDE EPOXY COATING OF 4.0 TO 6.0 MILS THICKNESS

CITY OF BOX ELDER

STANDARD DETAIL W05

AIR/VACUUM REL. VALVE PIT-COVER

DETAIL #W05

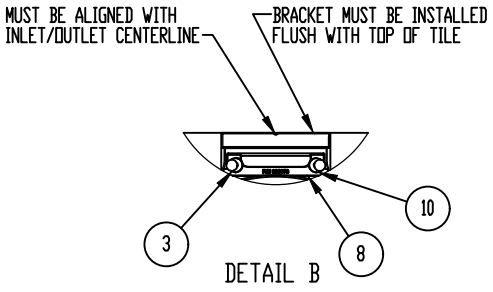
REVISED 01/2020

DETAIL W06-WATER SERVICE METER PIT

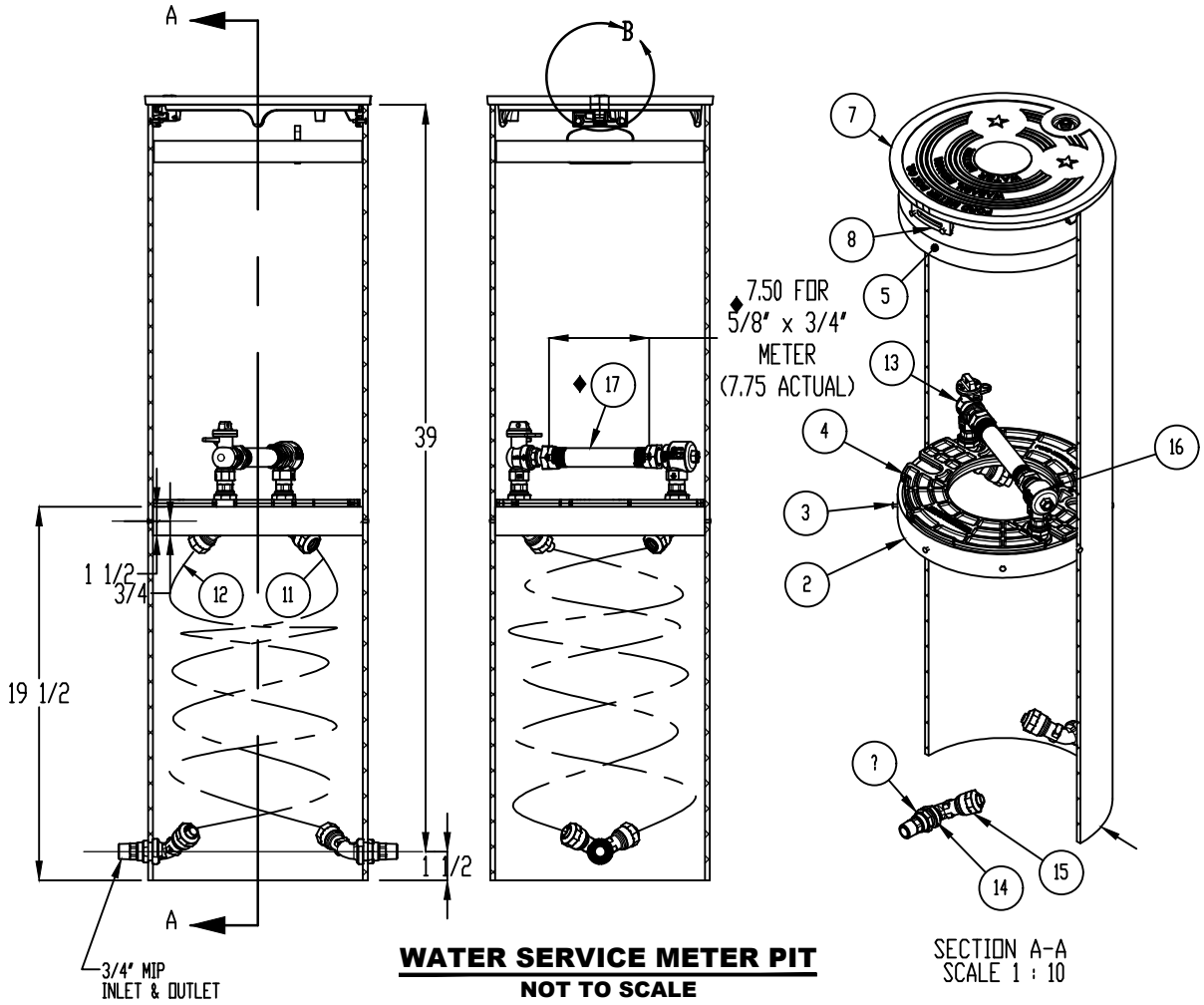
	ITEM NO.	DESCRIPTION
	1	15" TILE (.300 THICK WALL)
	2	LOWER PLATE STOP
	3	RIVET
	4	MOUNTING PLATE
*	5	INSULATING DISC
	6	NUT
*	7	LOCKING LID
	8	LID LOCKING BRACKET
	9	INSERT, 3/4 CTS #51 (NOT SHOWN)
	10	WASHER
	11	3/4" COIL TUBE
	12	3/4" COIL TUBE
	13	70 DEG INLET ASSEMBLY
	14	3/4" 60 DEGREE END PIECE
	15	NUT ASSY
	16	70 DEG OUTLET ASSEMBLY
♦	17	PVC IDLER
	18	METER GASKET

* ORDERED SEPARATELY, BUT REQUIRED.
♦ IDLER TO BE REMOVED UPON INSTALLATION OF METER PIT.

METER PIT SHALL BE:
FORD PFCBHH-288-15-XX-FP-R-NL
5/8" x 3/4" COIL PITSETTER, FP BV INLET, HHA
OUTLET (CHARTED FOR 36" TO 96" PIT DEPTH)
AS SHOWN OR APPROVED EQUAL.



DETAIL B

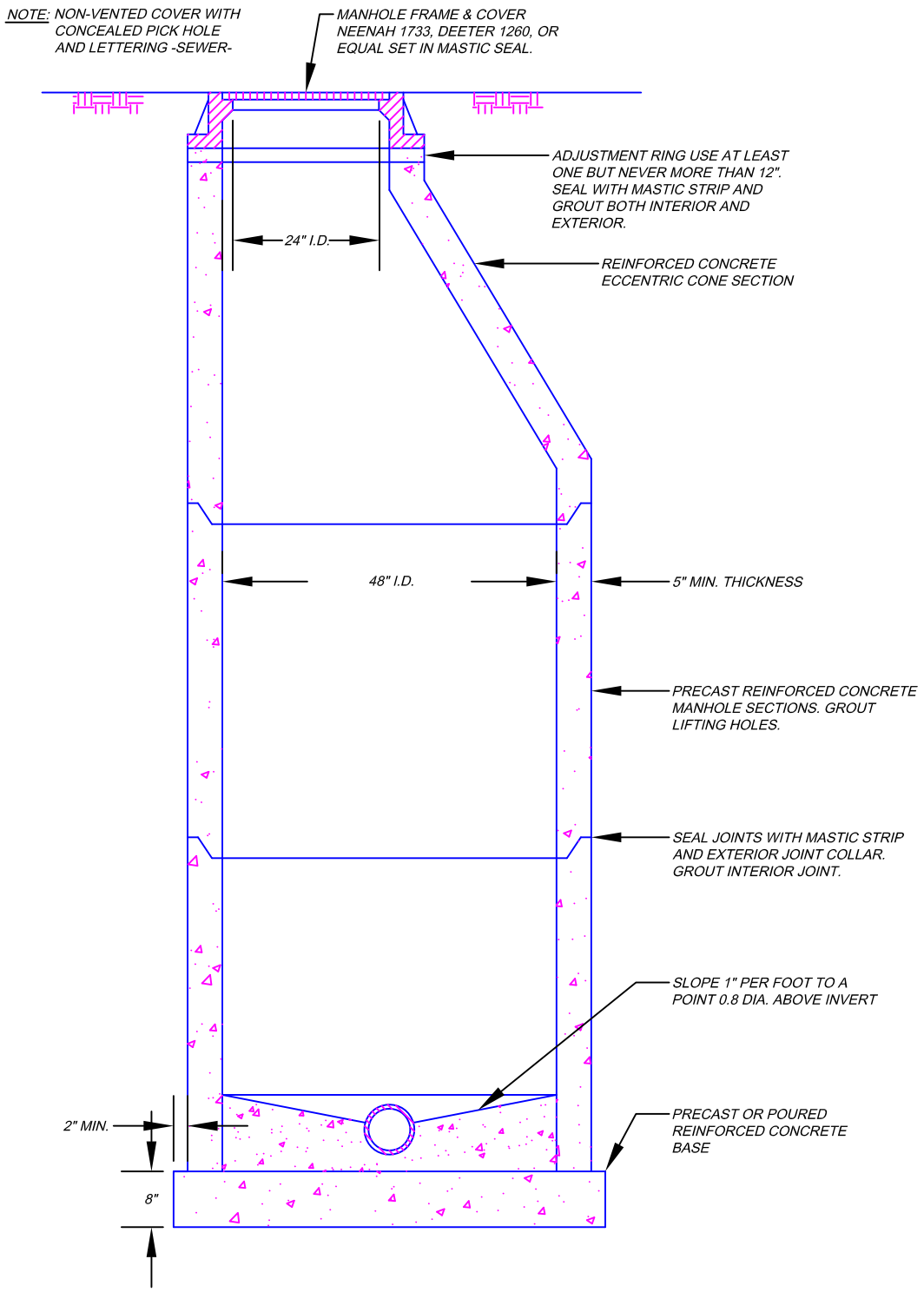


WATER SERVICE METER PIT
NOT TO SCALE

SECTION A-A
SCALE 1 : 10

CITY OF BOX ELDER
STANDARD DETAIL W06
WATER SERVICE METER PIT

DETAIL #W06 REVISED 01/2020



STANDARD SEWER MANHOLE

NOT TO SCALE

CITY OF BOX ELDER

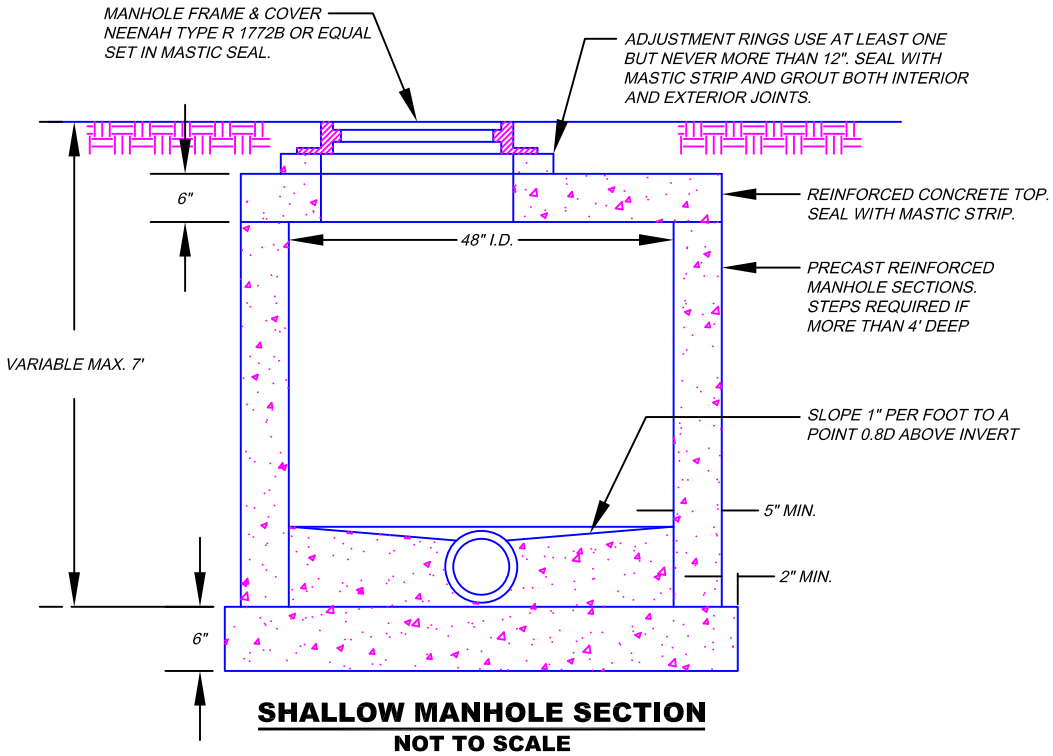
STANDARD DETAIL S01

STANDARD SEWER MANHOLE

DETAIL #S01

REVISED 02/2021

NOTE: 1. NON-VENTED COVER WITH CONCEALED PICK HOLE AND LETTERING-SEWER.
2. INSTALL EXTERIOR JOINT COLLAR ON MANHOLE SECTION JOINTS.



SHALLOW MANHOLE SECTION
NOT TO SCALE

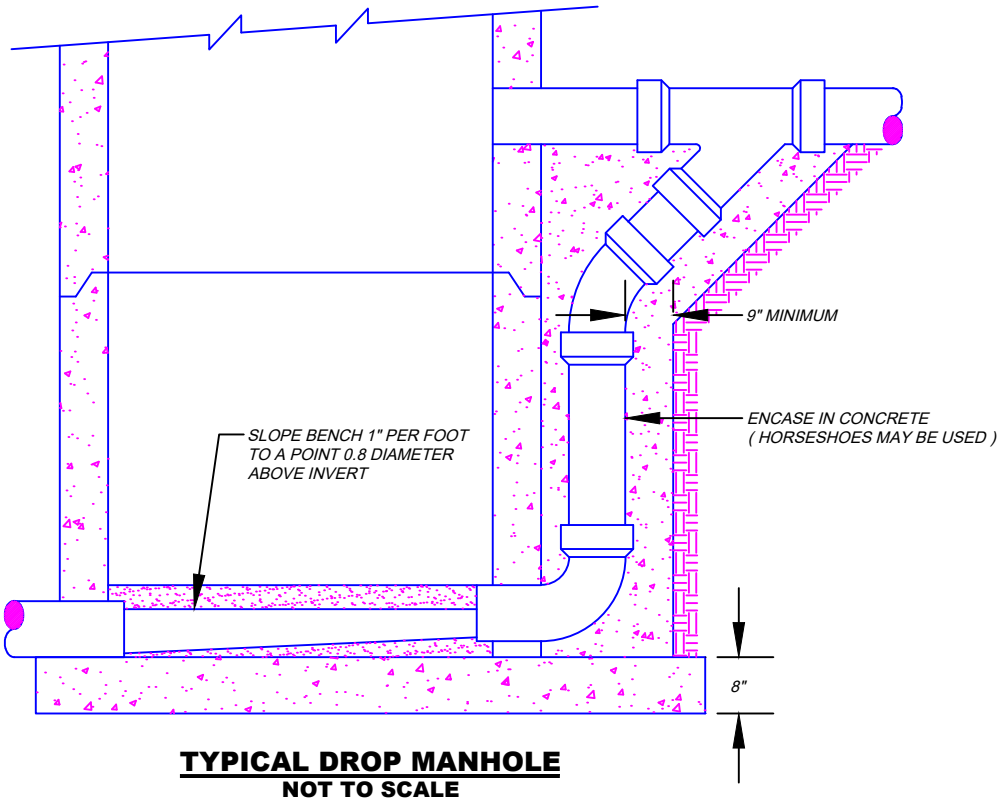
CITY OF BOX ELDER

STANDARD DETAIL S02

SHALLOW MANHOLE SECTION

DETAIL #S02

REVISED 01/2020



TYPICAL DROP MANHOLE
NOT TO SCALE

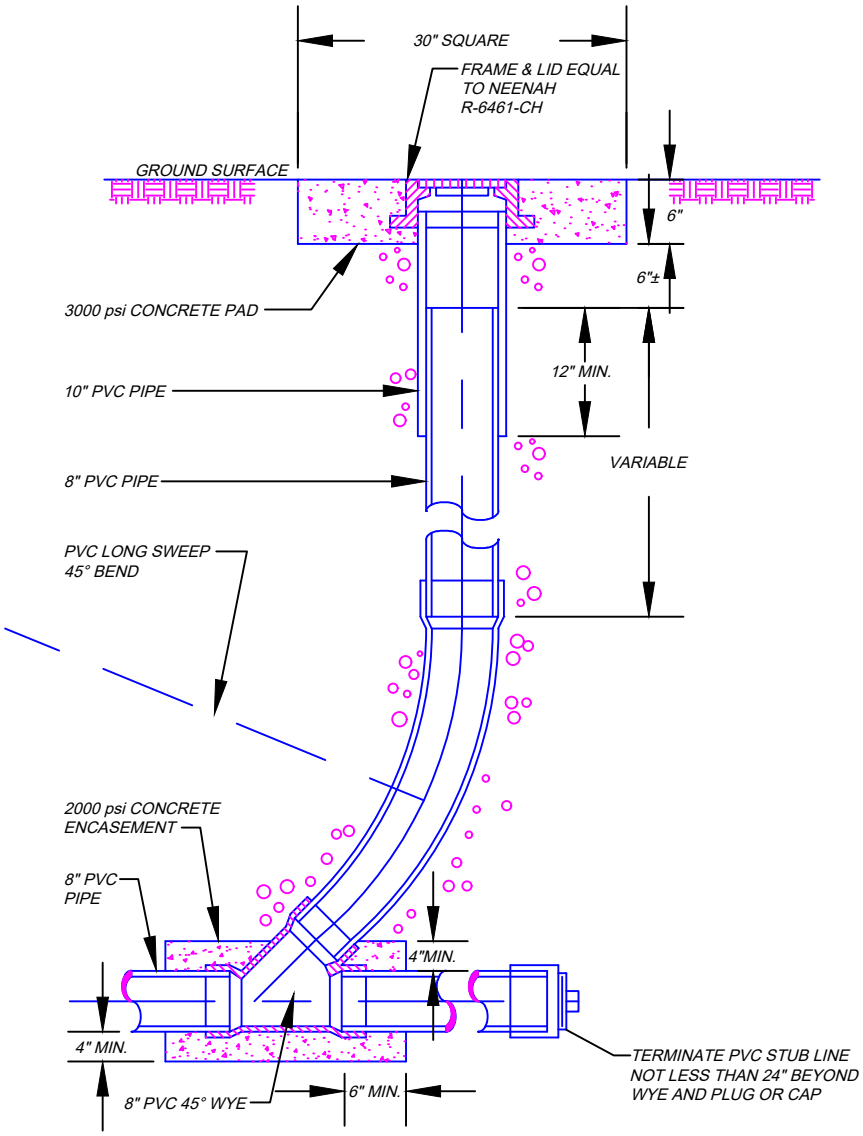
CITY OF BOX ELDER

STANDARD DETAIL S03

TYPICAL DROP MANHOLE

DETAIL #S03

REVISED 01/2020



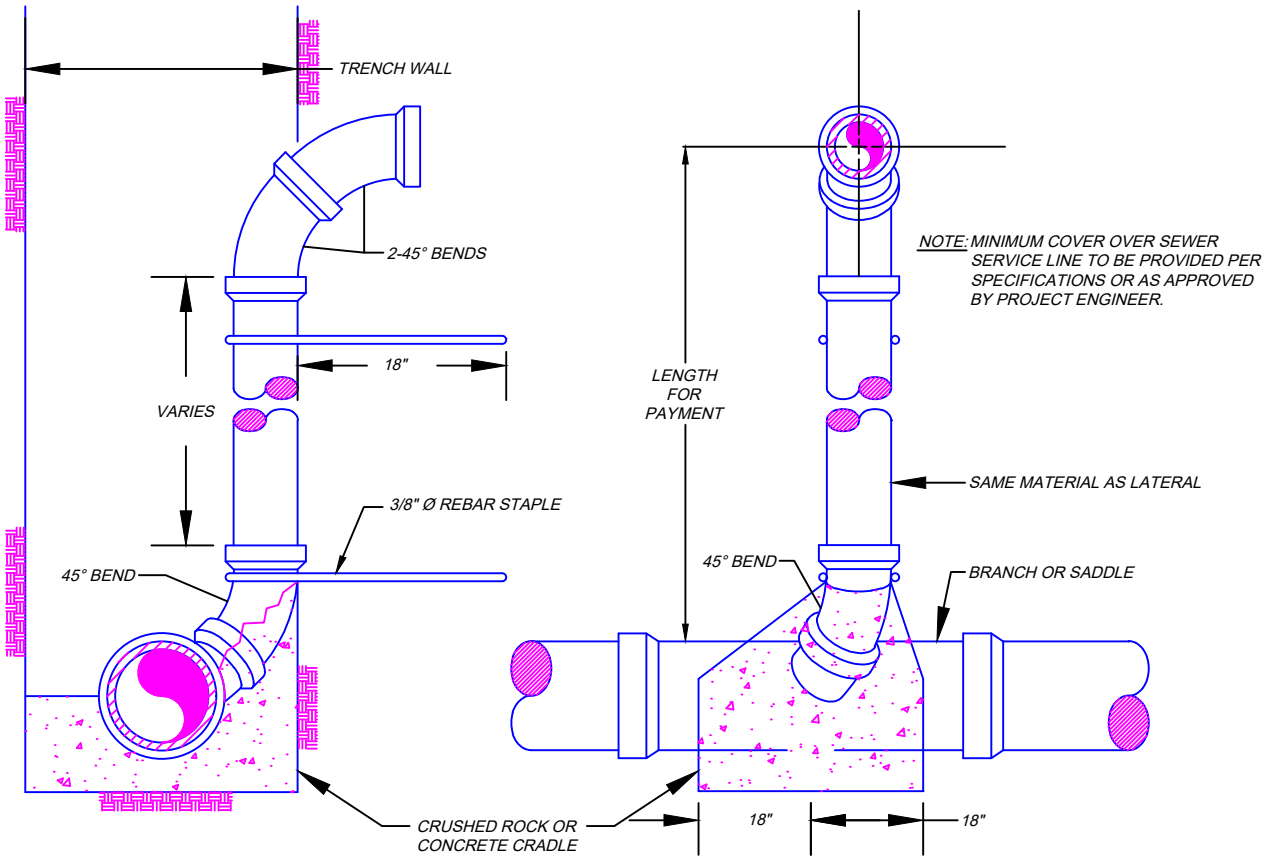
SEWER MAIN CLEANOUT
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL S04

SEWER MAIN CLEANOUT

DETAIL #S04 REVISED 01/2020

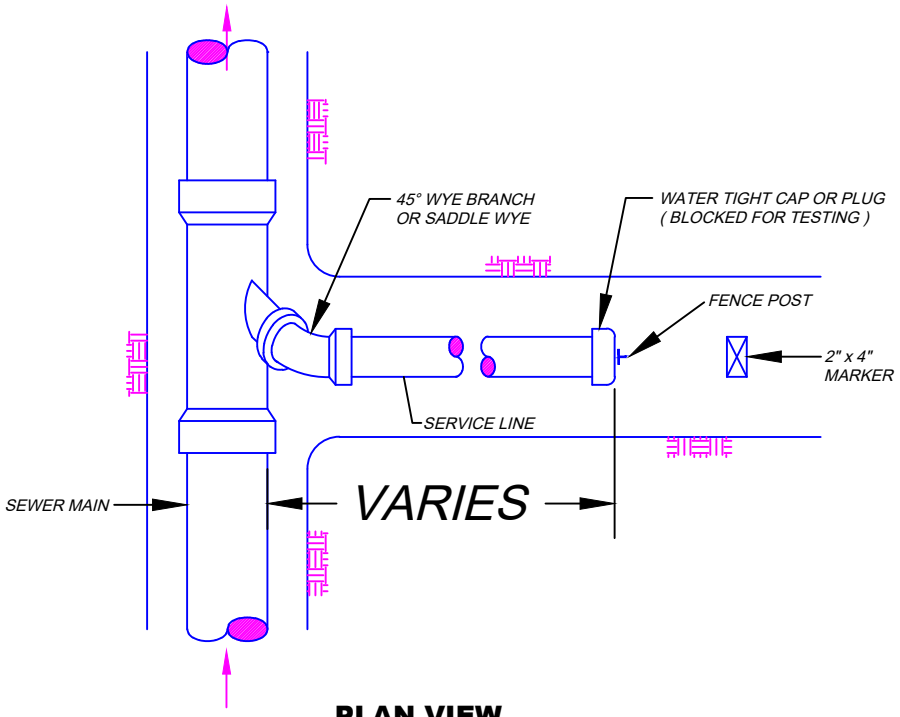


SEWER SERVICE RISER
NOT TO SCALE

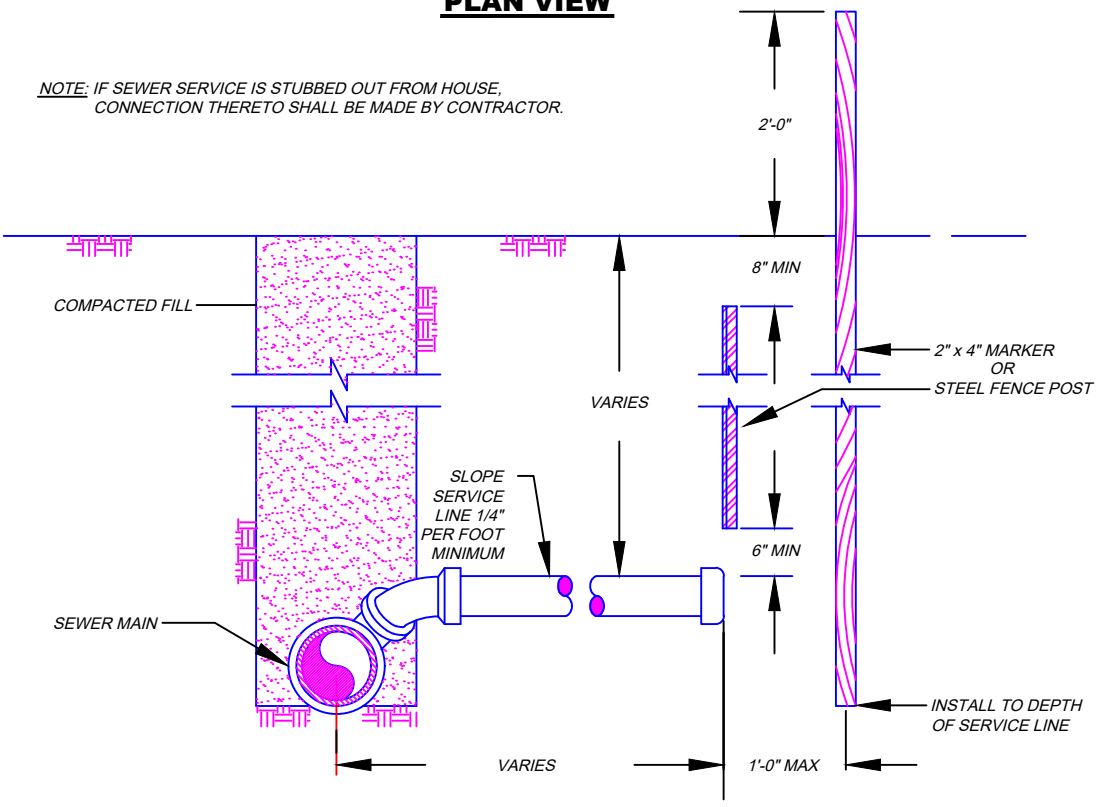
CITY OF BOX ELDER
STANDARD DETAIL S06
SEWER SERVICE RISER

DETAIL #S06 REVISED 01/2020

DETAIL S07-SEWER SERVICE CONNECTION STUB



PLAN VIEW



PROFILE VIEW

SEWER SERVICE CONNECTION STUB

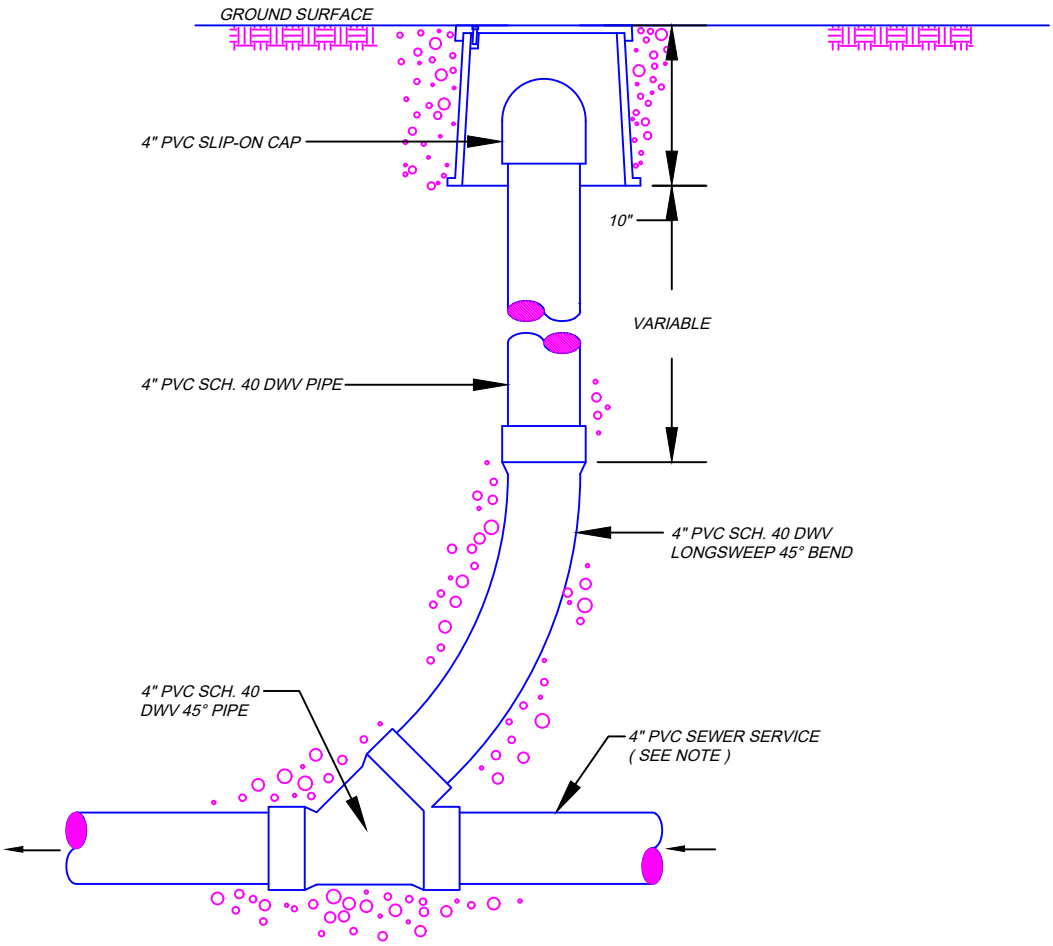
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL S07

SEWER SERVICE CONNECTION STUB

DETAIL #S07 REVISED 01/2020



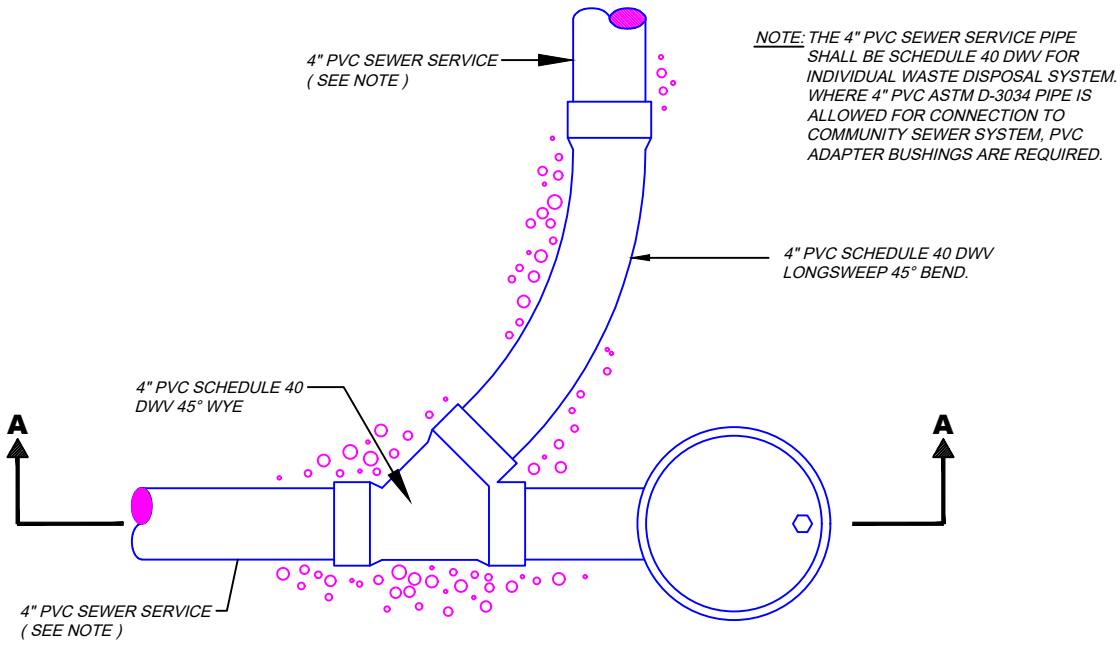
NOTE: THE 4" PVC SEWER SERVICE SHALL BE SCHEDULE 40 DWV PIPE FOR INDIVIDUAL WASTE DISPOSAL SYSTEM. WHERE 4" PVC ASTM D-3034 PIPE IS ALLOWED FOR CONNECTION TO COMMUNITY SEWER SYSTEM, PVC ADAPTER BUSHINGS ARE REQUIRED ON THE WYE.

SEWER SERVICE CLEANOUT
NOT TO SCALE

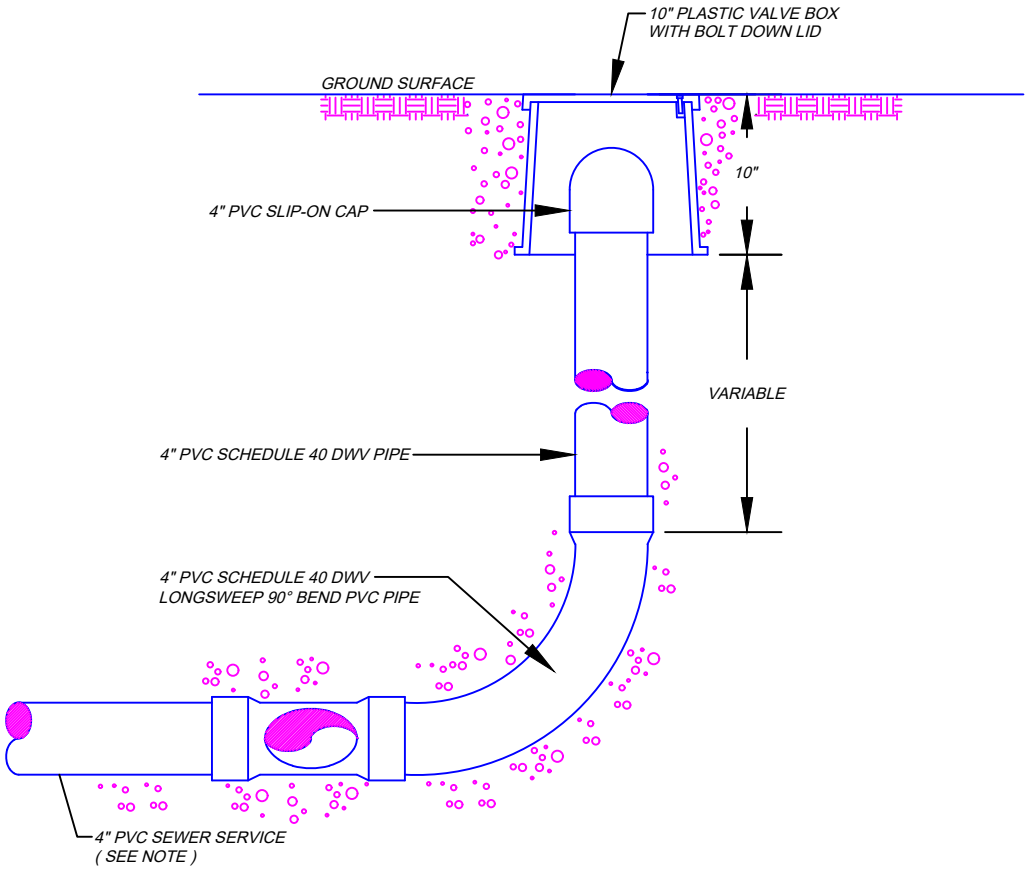
CITY OF BOX ELDER
STANDARD DETAIL S08
SEWER SERVICE CLEANOUT

DETAIL #S08 REVISED 01/2020

DETAIL S09-SEWER SERVICE CLEANOUT AT BEND



PLAN VIEW



SECTION A-A

SEWER SERVICE CLEANOUT AT BEND

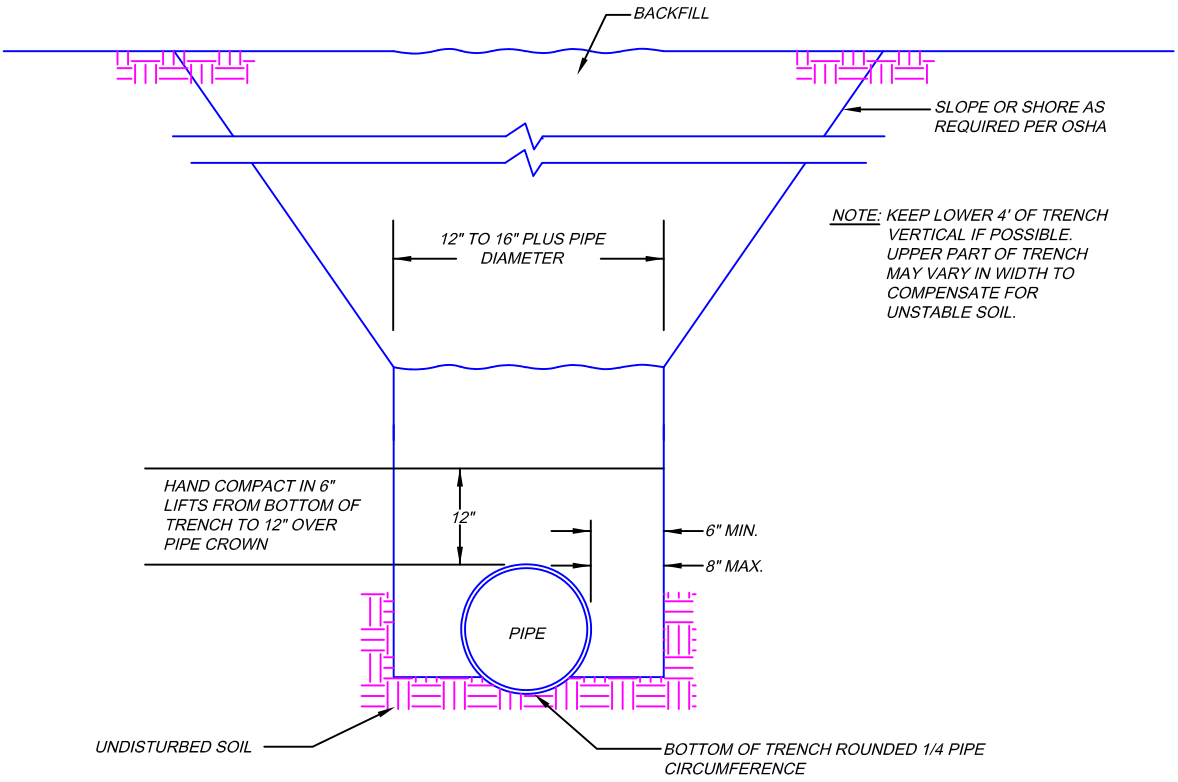
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL S09

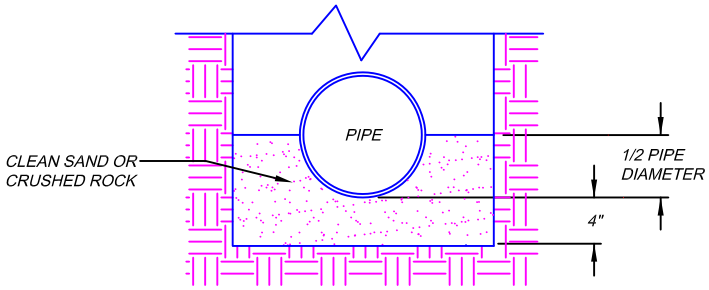
SEWER SERVICE CLEANOUT AT BEND

DETAIL #S09 REVISED 01/2020



TYPICAL TRENCH

NOT TO SCALE



ALTERNATE TRENCH BOTTOM PREPARATION

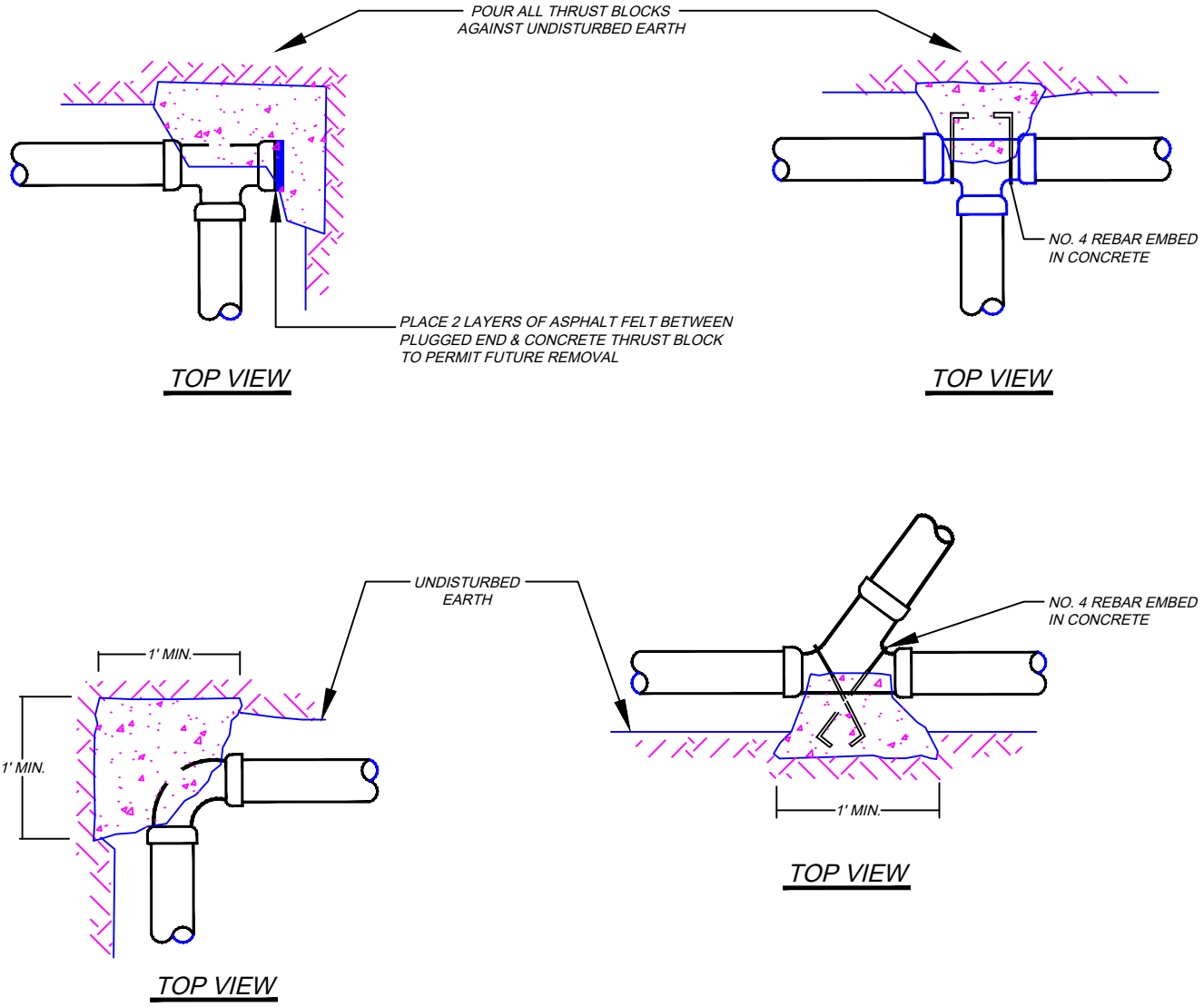
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL M01

TRENCH-TYPICAL & ALTERNATE

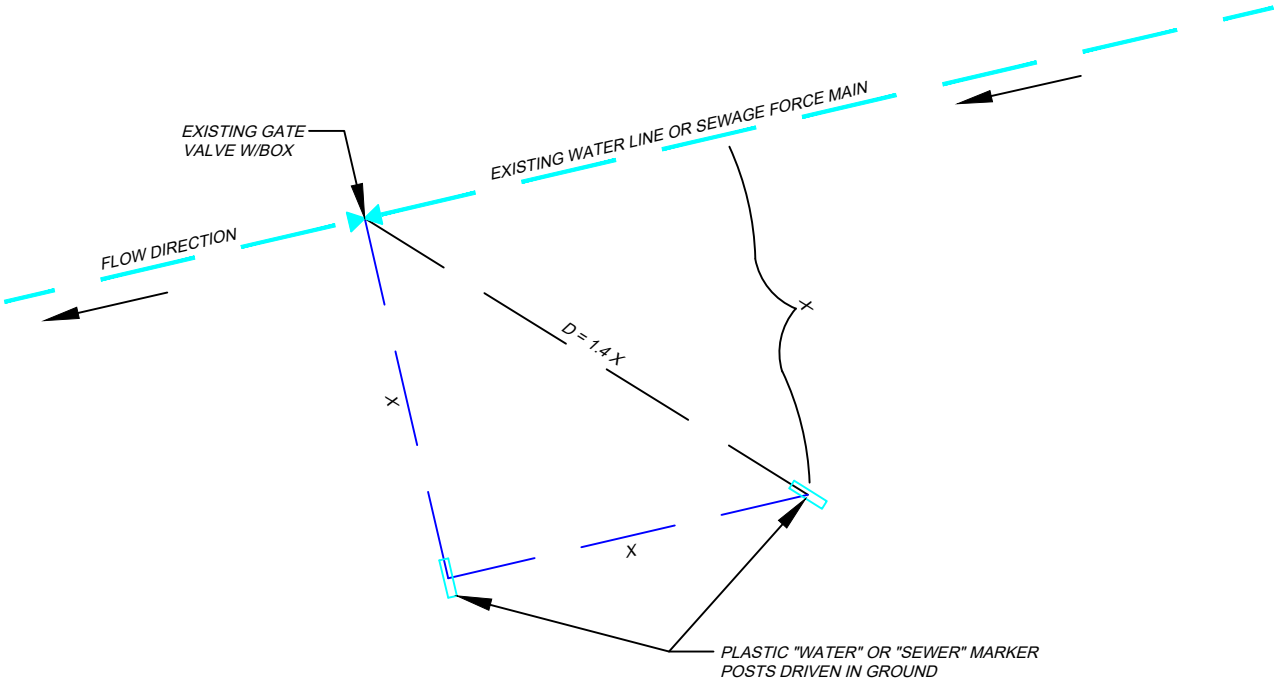
DETAIL #M01 REVISED 02/2021



THRUST BLOCK SETTINGS
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL M02
THRUST BLOCK SETTINGS

DETAIL #M02 REVISED 01/2020

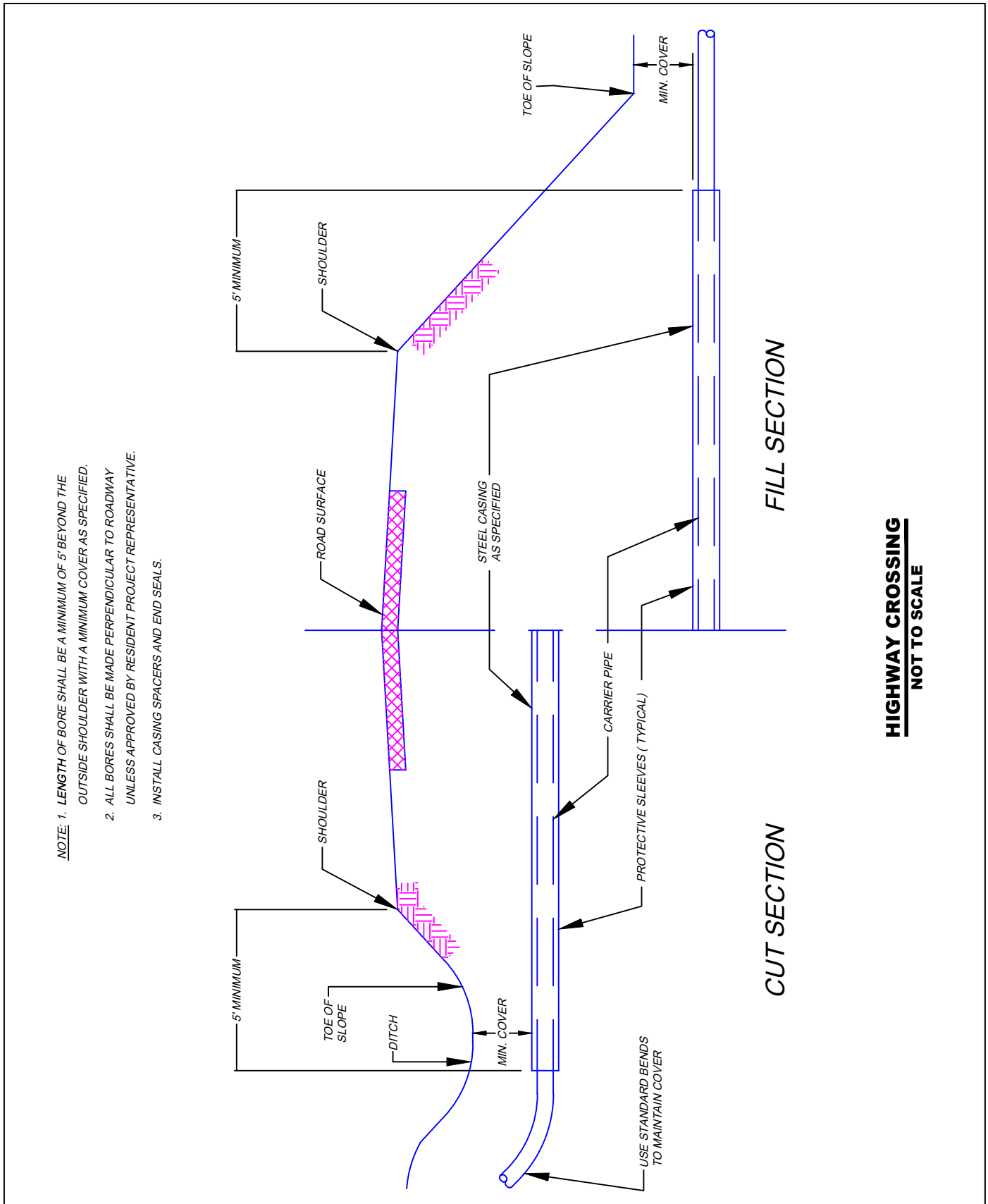


INSTALL PLASTIC MARKERS WITH FLAT SIDES POINTED IN DIRECTION OF VALVE OR MANHOLE. LOCATE MARKERS AT DISTANCES FROM THE VALVE OR MANHOLE TO FORM A 45° RIGHT TRIANGLE WITH ONE SHORT SIDE PERPENDICULAR TO THE VALVE OR MANHOLE. THE CONVERGING ANGLE OF THE MARKER SHALL POINT AT THE LINE AND ALSO IN THE FLOW DIRECTION. PLASTIC MARKER POST SHALL BE EQUAL TO 62" COLORED CARSONITE UTILITY MARKER AS MANUFACTURED BY AMETEK, INC., CARSON CITY, NEVADA. USE BLUE MARKERS FOR INLINE GATE VALVES AND AIR RELEASE MANHOLES ON WATER TRANSMISSION LINES. USE GREEN MARKERS FOR INLINE GATE VALVE AND AIR RELEASE MANHOLES ON SEWER FORCE MAINS. MARKERS (GREEN) CAN ALSO BE USED FOR SEWER MANHOLES FOR SPECIAL CIRCUMSTANCES.

UTILITY MARKER & INSTALLATION
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL M03
UTILITY MARKER & INSTALLATION

DETAIL #M03 REVISED 01/2020



NOTE: 1. **LENGTH** OF BORE SHALL BE A MINIMUM OF 5' BEYOND THE OUTSIDE SHOULDER WITH A MINIMUM COVER AS SPECIFIED.

2. ALL BORES SHALL BE MADE PERPENDICULAR TO ROADWAY UNLESS APPROVED BY RESIDENT PROJECT REPRESENTATIVE.

3. INSTALL CASING SPACERS AND END SEALS.

CITY OF BOX ELDER

STANDARD DETAIL M04

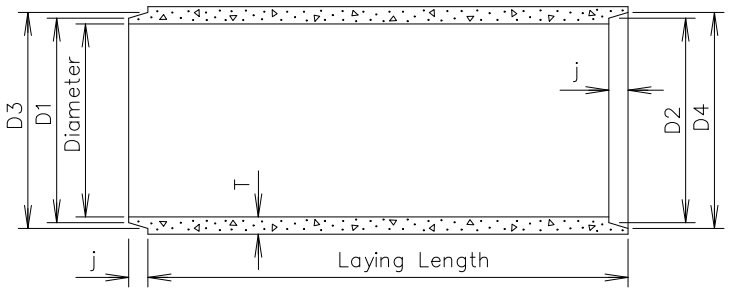
HIGHWAY CROSSING

DETAIL #M04

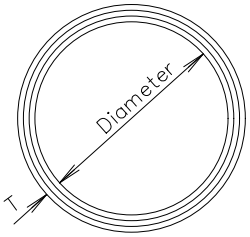
REVISED 01/2020

TOLERANCES IN DIMENSIONS

Diameter: ±1.5% for 24" Dia. or less and +1% or 3/8" whichever is more for 27" Dia. or greater.
Diameters at joints: + 3/16" for 30" Dia. or less and +_ 1/4" for 36" or greater.
Length of joint (j): + 1/4".
Wall thickness (T): not less than design T by more than 5% or 3/16", whichever is greater.
Laying length: shall not underrun by more than 1/2".



LONGITUDINAL SECTION



END VIEW

GENERAL NOTES:

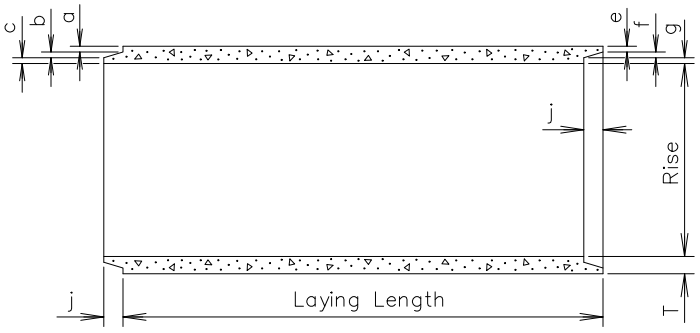
Not more than 2 four–foot sections shall be permitted near the ends of any culvert. Four–foot lengths shall be used only to secure the required length of culvert.

Diam. (in.)	Approx. Wt. /Ft. (lb.)	T (in.)	J (in.)	D1 (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	13/4	131/4	135/8	137/8	141/4
15	127	21/4	2	161/2	167/8	171/4	175/8
18	168	21/2	21/4	195/8	20	203/8	203/4
21	214	23/4	21/2	227/8	231/4	233/4	241/8
24	265	3	23/4	26	263/8	27	273/8
27	322	31/4	3	291/4	295/8	301/4	305/8
30	384	31/2	31/4	323/8	323/4	331/2	337/8
36	524	4	33/4	383/4	391/4	40	401/2
42	685	41/2	4	451/8	455/8	461/2	47
48	867	5	41/2	511/2	52	53	531/2
54	1070	51/2	41/2	577/8	583/8	593/8	597/8
60	1296	6	5	641/4	643/4	66	661/2
66	1542	61/2	51/2	705/8	711/8	721/2	73
72	1810	7	6	77	771/2	79	791/2
78	2098	71/2	61/2	833/8	837/8	855/8	861/8
84	2410	8	7	893/4	901/4	921/8	925/8
90	2740	81/2	7	953/4	961/4	981/8	985/8
96	2950	9	7	1021/8	1025/8	1041/2	105
102	3075	91/2	71/2	109	1091/2	1111/2	112
108	3870	10	71/2	1151/2	116	118	1181/2

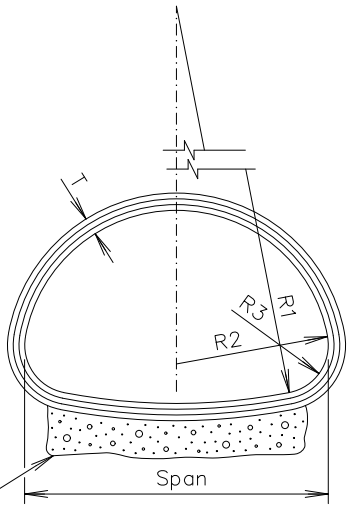
REINFORCED CONCRETE PIPE-ROUND
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL RC001
CULVERT-RCP-ROUND

DETAIL #RC001
REVISED 01/2020



LONGITUDINAL SECTION



END VIEW

TOLERANCES IN DIMENSIONS

Radial dimensions at joints: +_1/8" for 65" span or less and + 1/4" for longer spans.
Rise and Span: ±2% of tabular values.
Length of Joint (J): + 1/4".
Wall thickness (T): not less than design T by more than 5% or 3/16", whichever is greater.
Laying length: shall not underrun by more than 1/2".

Gravel Bedding Material shall be supplied for 102" to 169" spans. It shall be placed to a thickness of 6" (Min.) x 85% of the Span x Length of culvert and shall conform to the gradation requirements for gravel surfacing except material may be screened or may be plan provided material.

* Size (in.)	Approx. Wt./Ft. (lb.)	Rise (in.)	Span (in.)	T (in.)	a (in.)	b (in.)	c (in.)	j (in.)	e (in.)	f (in.)	g (in.)	R1 (in.)	R2 (in.)	R3 (in.)
18	170	131/2	22	21/2	13/8	3/8	3/4	2	11/8	3/8	1	271/2	133/4	51/4
24	320	18	281/2	31/2	15/8	1/2	13/8	3	13/8	1/2	15/8	4011/16	143/4	45/8
30	450	221/2	361/4	4	113/16	5/8	19/16	31/2	19/16	5/8	113/16	51	183/4	61/8
36	600	265/8	433/4	41/2	2	3/4	13/4	4	13/4	3/4	2	62	221/2	61/2
42	740	315/16	511/8	41/2	2	3/4	13/4	4	13/4	3/4	2	73	261/4	73/4
48	890	36	581/2	5	21/4	3/4	2	5	2	3/4	21/4	84	30	87/8
54	1100	40	65	51/2	21/2	3/4	21/4	5	21/4	3/4	21/2	921/2	333/8	10
60	1400	45	731/2	6	35/16	3/4	115/16	5	23/4	3/4	21/2	105	371/2	11
72	1900	54	88	7	313/16	1	23/16	6	31/4	1	23/4	126	45	135/16
84	2500	62	102	8	41/8	1	27/8	6	31/2	1	31/2	1621/2	52	141/2
96	3300	78	1223/8	9	41/2	1	31/2	7	4	1	4	218	62	20
108	4200	88	1381/2	10	5	1	4	7	41/2	1	41/2	269	70	22
120	5100	967/8	154	11	51/2	1	41/2	7	5	1	5	3013/8	78	24
132	5100	1061/2	1683/4	10		1	4	7	41/2	1	41/2	329	855/8	267/8

* Equivalent Diameter of Circular R. C. P.

GENERAL NOTES:

Not more than 2 four-foot sections shall be permitted near the ends of any culvert. Four-foot lengths shall be used only to secure the required length of culvert.

REINFORCED CONCRETE PIPE-ARCH

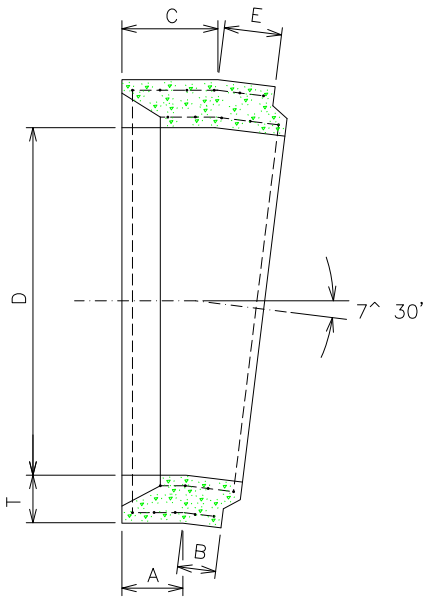
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC002

CULVERT-RCP-ARCH

DETAIL #RC002 REVISED 01/2020



D (in.)	Laying Length at Center of Pipe (in.)	Laying Length at Outside of Curve (in.)	T (in.)	A (in.)	B (in.)	C (in.)	E (in.)	Radius of Curve (ft.)	Weight of Section (lbs.)
12	7 3/4	8	2	4 3/4	2	5 3/4	3	4.9	70
15	11 1/4	12 1/2	2 1/4	5 1/4	4 3/4	6 1/2	6	7.2	120
18	12 1/8	13 5/8	2 1/2	5 1/2	5 1/8	7	6 5/8	7.7	170
21	9 1/2	11 1/4	2 3/4	5 1/2	2 1/4	7 1/4	4	6.1	170
24	9 13/16	11 3/4	3	5 9/16	2 5/8	7 1/2	4 1/4	6.2	215
27	9 11/16	12 1/8	3 1/4	5 7/16	2 5/16	7 5/8	4 1/2	6.2	260
30	10	12 3/8	3 1/2	5 5/16	2 5/16	7 11/16	4 11/16	6.4	320
33	11 3/16	13 7/8	3 3/4	5 15/16	2 9/16	8 5/8	5 1/4	7.1	420
36	12 3/16	15 1/16	4	6 1/2	2 5/16	9 3/8	5 11/16	7.7	530
42	14 1/16	17 1/2	4 1/2	6 13/16	3 13/16	10 5/16	7 3/16	8.9	800
48	16 1/16	20 1/4	5	7 15/16	4 11/16	11 3/4	8 1/2	10.5	1190
54	18 1/16	22 5/16	5 1/2	7 5/8	6 3/16	11 7/8	10 7/16	11.5	1600
60	20 1/2	25 1/4	6	8 5/8	7 1/8	13 3/8	11 7/8	13.0	2210
66	21 5/8	26 15/16	6 1/2	9	7 3/8	14 5/16	12 5/8	13.8	2790
72	22 5/8	28 1/4	7	9 3/8	7 5/8	13 1/4	15	14.4	3420

REINFORCED CONCRETE PIPE BEND-ROUND (SHORT RADIUS)

NOT TO SCALE

CITY OF BOX ELDER

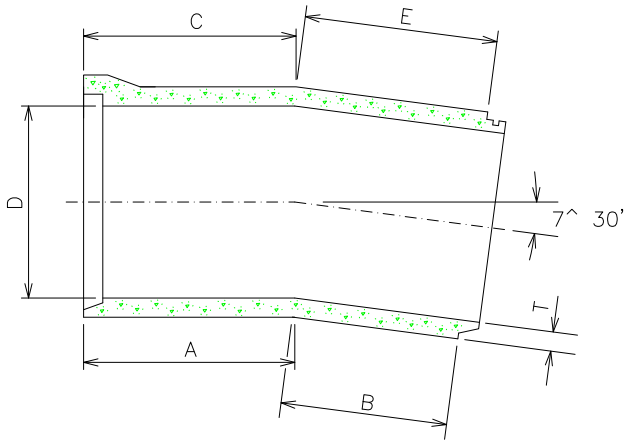
STANDARD DETAIL RC003

CULVERT-RCP BEND-ROUND (SHORT)

DETAIL #RC003

REVISED 01/2020

DETAIL RC004-CULVERT RCP- BEND-ROUND (LONG)



GENERAL NOTE:

Centerline laying length: 4'–0

Radius of Curve: 30.5'

D (in.)	T (in.)	A (in.)	B (in.)	C (in.)	E (in.)	Weight of Section (lbs.)
12	2	36 15/32	10 15/32	37 17/32	11 17/32	368
15	2 1/4	36 1/2	10 1/4	37 3/4	11 1/2	508
18	2 1/2	24 1/2	22	26	23 1/2	672
21	2 3/4	24 1/2	21 3/4	26 1/4	23 1/2	856
24	3	25 1/32	21 1/32	26 31/32	22 31/32	1060
27	3 1/4	25 1/32	20 25/32	27 7/32	22 31/32	1288
30	3 1/2	25 1/32	20 17/32	27 15/32	22 31/32	1536
33	3 3/4	24 15/16	20 7/16	27 9/16	23 1/16	1808
36	4	24 13/16	20 5/16	27 11/16	23 3/16	2096
42	4 1/2	24 27/32	19 27/32	28 5/32	23 5/32	2740
48	5	24 19/32	19 19/32	28 13/32	23 13/32	3468
54	5 1/2	24 5/8	19 1/8	29 11/32	23 3/8	4280
60	6	24 21/32	18 21/32	29 11/32	23 11/32	5184
66	6 1/2	24 11/16	18 3/16	29 13/16	23 5/16	6168
72	7	24 1/8	18 1/8	29 7/8	23 7/8	7240
84	8	24 1/4	17 1/4	30 3/4	23 3/4	9640
96	9	23 5/16	17 5/16	30 11/16	24 11/16	12400

REINFORCED CONCRETE PIPE BEND-ROUND (LONG RADIUS)

NOT TO SCALE

CITY OF BOX ELDER

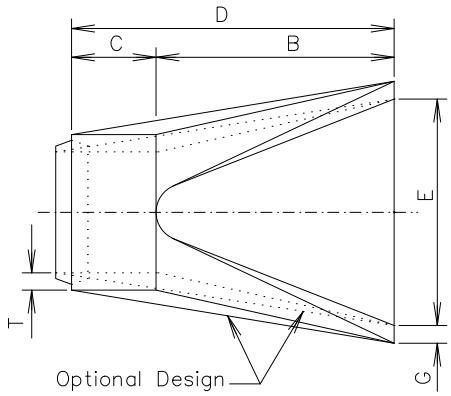
STANDARD DETAIL RC004

CULVERT-RCP BEND-ROUND (LONG)

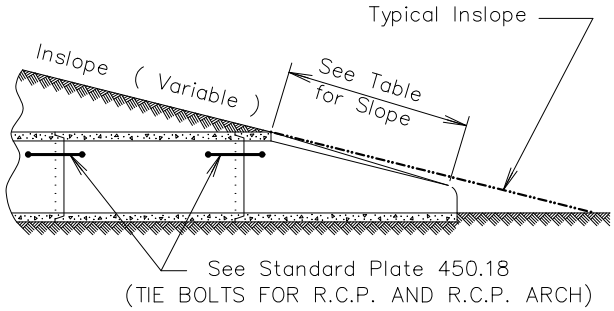
DETAIL #RC004

REVISED 01/2020

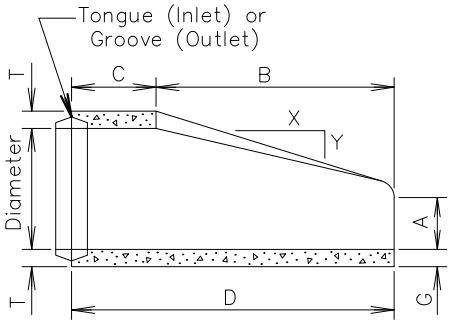
DETAIL RC005-CULVERT-RCP FLARED ENDS-ROUND



TOP VIEW



SLOPE DETAIL

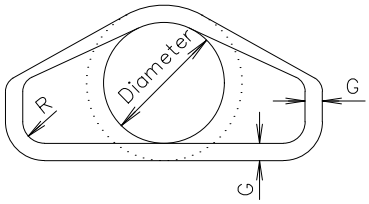


LONGITUDINAL SECTION

GENERAL NOTES:

Lengths of concrete pipe shown on plan sheets are between flared ends only.

Construction of R.C.P. Flared End shall conform to the requirements of Section 990 of the Specifications.



END VIEW

Dia. (in.)	Approx. Wt. of Section (lbs.)	Approx. Slope (X to Y)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	G (in.)	R (in.)
12	530	2.4: 1	2	4	24	487/8	727/8	24	2	11/2
15	740	2.4: 1	21/4	6	27	46	73	30	21/4	11/2
18	990	2.3: 1	21/2	9	27	46	73	36	21/2	11/2
21	1280	2.4: 1	23/4	9	36	371/2	731/2	42	23/4	11/2
24	1520	2.5: 1	3	91/2	431/2	30	731/2	48	3	11/2
27	1930	2.5: 1	31/4	101/2	491/2	24	731/2	54	31/4	11/2
30	2190	2.5: 1	31/2	12	54	193/4	733/4	60	31/2	11/2
36	4100	2.5: 1	4	15	63	343/4	973/4	72	4	11/2
42	5380	2.5: 1	41/2	21	63	35	98	78	41/2	11/2
48	6550	2.5: 1	5	24	72	26	98	84	5	11/2
54	8240	2: 1	51/2	27	65	331/4	981/4	90	51/2	11/2
60	8730	1.9: 1	6	35	60	39	99	96	5	11/2
66	10710	1.7: 1	61/2	30	72	27	99	102	51/2	11/2
72	12520	1.8: 1	7	36	78	21	99	108	6	11/2
78	14770	1.8: 1	71/2	36	90	21	111	114	61/2	11/2
84	18160	1.6: 1	8	36	901/2	21	1111/2	120	61/2	11/2
90	20900	1.5: 1	81/2	41	871/2	24	1111/2	132	61/2	6

REINFORCED CONCRETE PIPE FLARED ENDS-ROUND

NOT TO SCALE

CITY OF BOX ELDER

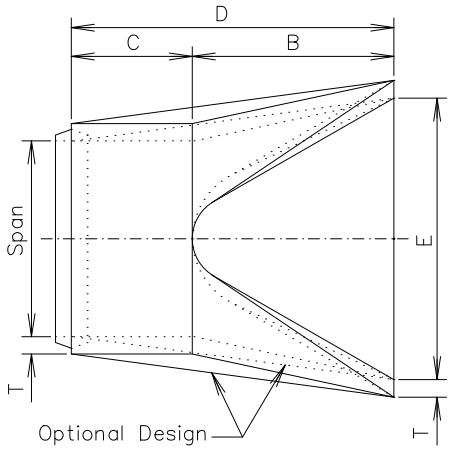
STANDARD DETAIL RC005

CULVERT-RCP FLARED ENDS-ROUND

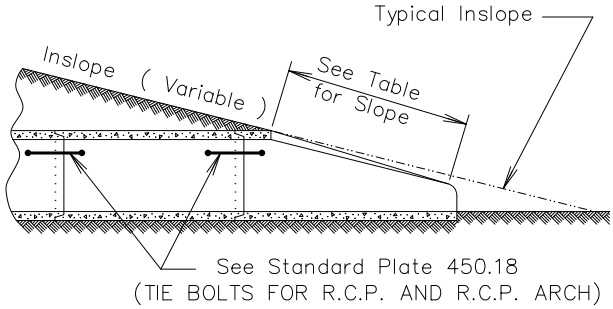
DETAIL #RC005

REVISED 01/2020

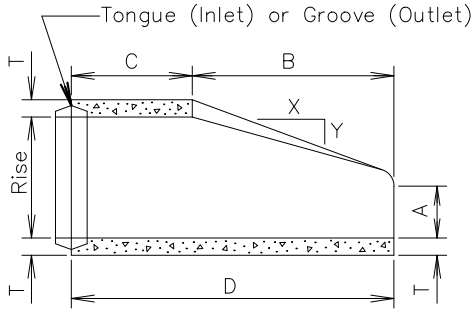
DETAIL RC006-CULVERT-RC FLARED ENDS-ARCHED



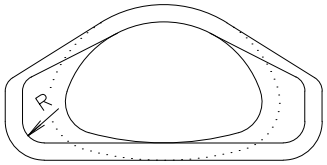
TOP VIEW



SLOPE DETAIL



LONGITUDINAL SECTION



END VIEW

GENERAL NOTES:

Lengths of concrete pipe shown on plan sheets are between flared ends only.

Construction of R. C. P. Arch Flared End shall conform to the requirements of Section 990 of the Specifications.

* Size (in.)	Approximate Weight of Section (lbs.)	Rise (in.)	Span (in.)	Slope (X: Y)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	R (in.)
18	1100	131/2	22	3: 1	21/2	7	27	45	72	36	2
24	1750	18	281/2	3: 1	31/2	81/2	39	33	72	48	3
30	3300	221/2	361/4	3: 1	4	91/2	50	46	96	60	3
36	4350	265/8	433/4	3: 1	41/2	1 11/8	60	36	96	72	6
42	5250	315/16	511/8	3: 1	41/2	1513/16	60	36	96	78	6
48	6400	36	581/2	3: 1	5	21	60	36	96	84	6
54	7850	40	65	3: 1	51/2	251/2	60	36	96	90	6
60	9500	45	731/2	3: 1	6	31	60	36	96	96	6
72	13550	54	88	2: 1	7	31	60	39	99	120	6
84	17950	62	102	2: 1	8	281/2	83	19	102	144	6

*Equivalent Diameter of Circular R. C. P.

REINFORCED CONCRETE PIPE FLARED ENDS-ARCH

NOT TO SCALE

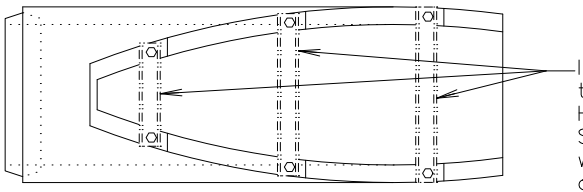
CITY OF BOX ELDER

STANDARD DETAIL RC006

CULVERT-RCP FLARED ENDS-ARCH

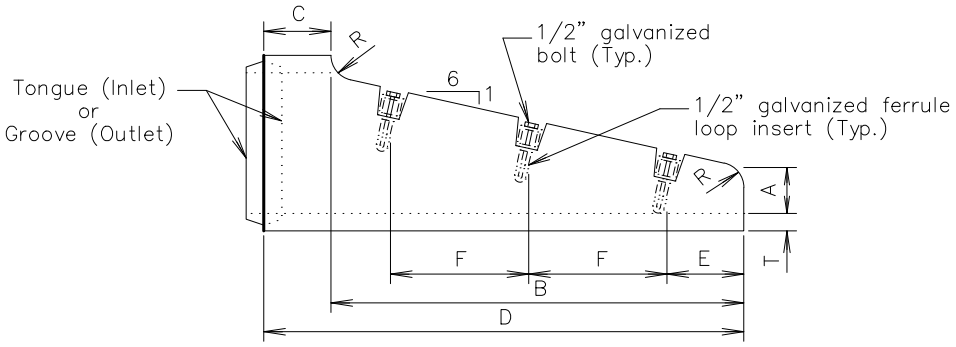
DETAIL #RC006

REVISED 01/2020

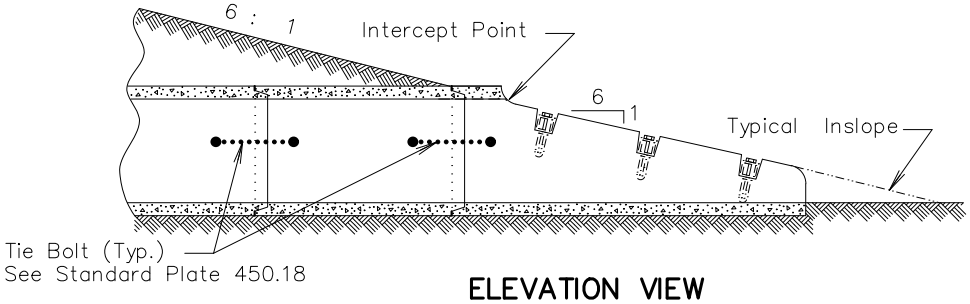


If bars are specified in the plans then provide HSS 2.5X2.5X.1875 Structural Steel Tubing in conformance with ASTM A500, Grade B or 3" Diameter Schedule 40 Pipe in conformance with ASTM A53, Grade B.

TOP VIEW



SIDE VIEW



ELEVATION VIEW

Dia. (in.)	T (in.)	R (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	No. Sections	No. Bars
FOR CIRCULAR PIPE										
15	21/4	3	6	48	9	57	6	18	1	3
18	21/2	3	6	69	9	78	9	24	1	3
*24	3	3	6	111	9	120	6	24	1 or 2	5
FOR ARCH PIPE										
**18	21/2	1	6	39	33	72	6	24	1	2

* The use of 2 sections must be an approved design.
** Equivalent Diameter of Circular R. C. P.

GENERAL NOTES:

The length of concrete pipe shown on the plans is between safety ends.

Safety ends without bars are acceptable with or without the bar notches.

Bars shall be galvanized after fabrication in accordance with ASTM A123.

REINFORCED CONCRETE PIPE SAFETY ENDS

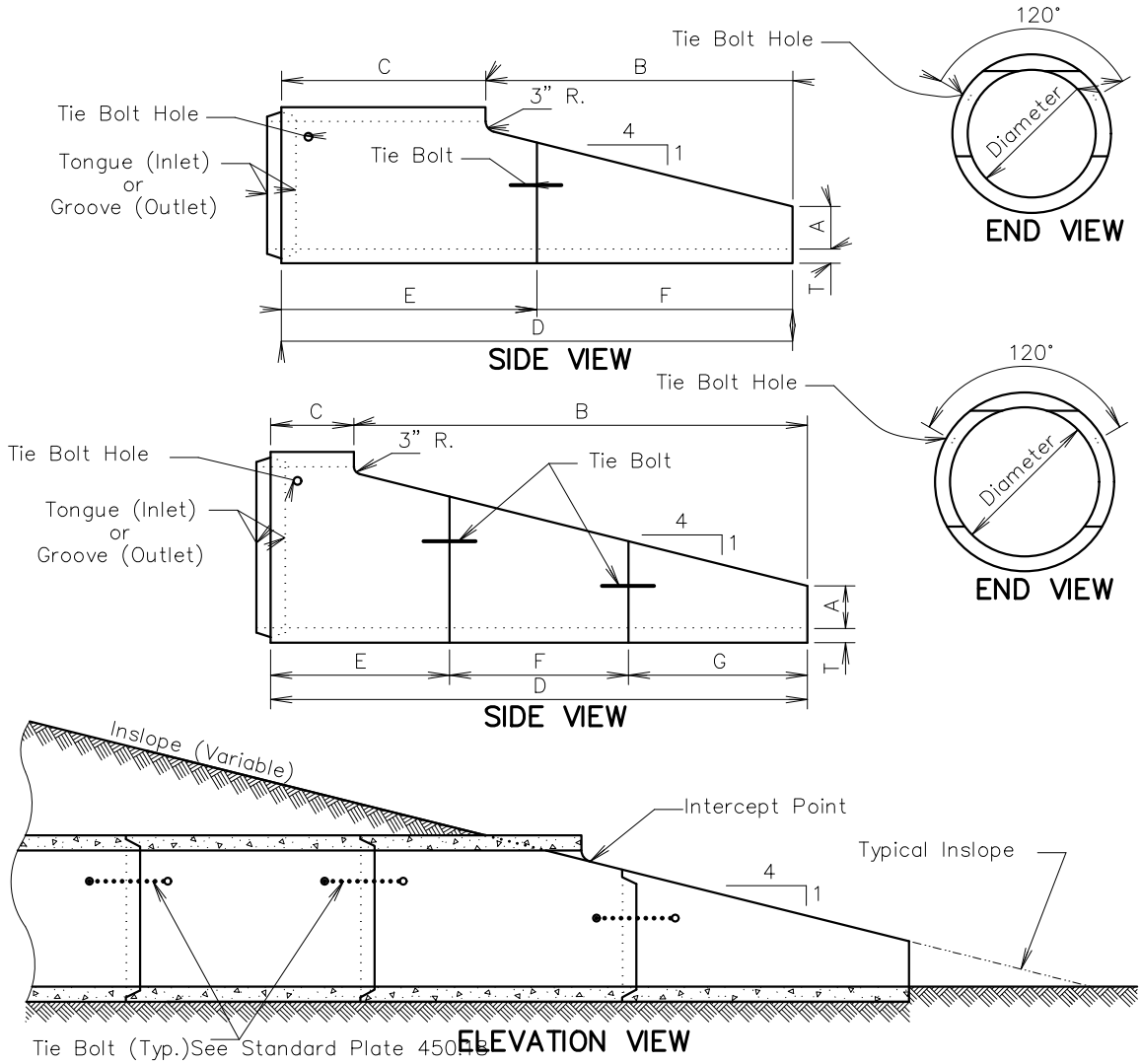
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC007

CULVERT-RCP SAFETY ENDS

DETAIL #RC007 REVISED 01/2020



Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	G (in.)
36	4	12	86.5	57.5	144	72	72	
42	4.5	12	110.5	33.5	144	72	72	
48	5	12	134.5	33.5	168	96	72	
54	5.5	12	158.5	33.5	192	96	96	
60	6	12	182.5	33.5	216	72	72	72

GENERAL NOTE:

The length of concrete pipe shown in the construction plans is between sloped ends. If bars are specified in the plans, then the bar assemblies shall be constructed in accordance with Standard Plate 450.15.

REINFORCED CONCRETE PIPE SLOPED ENDS-ROUND

NOT TO SCALE

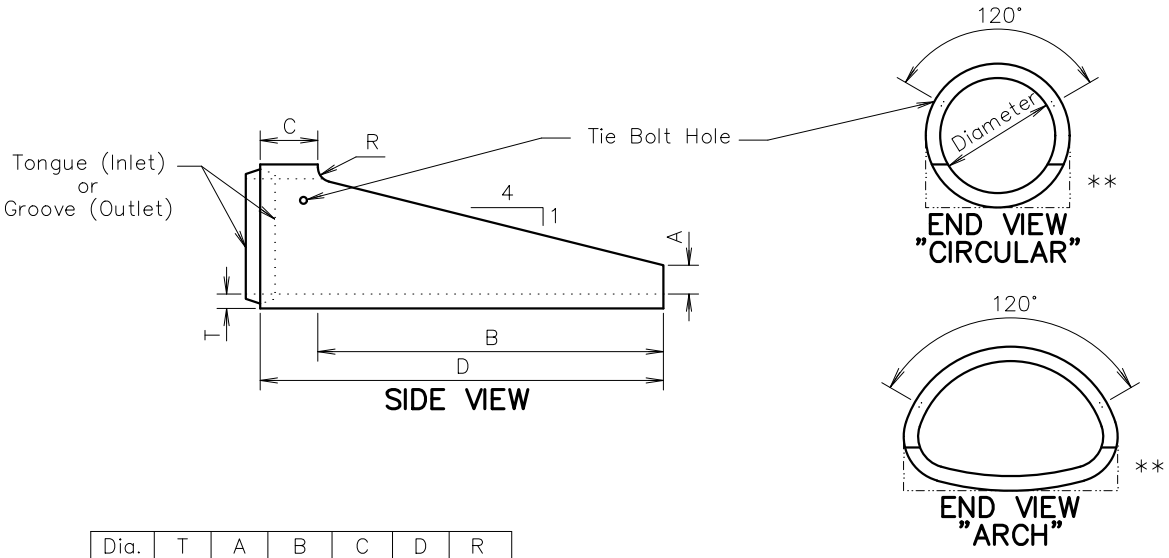
CITY OF BOX ELDER

STANDARD DETAIL RC008

CULVERT-RCP SLOPED ENDS-ROUND

DETAIL #RC008

REVISED 01/2020



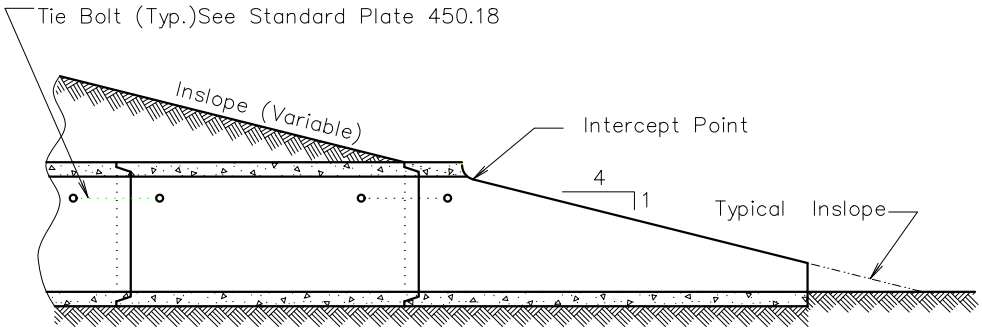
Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
FOR CIRCULAR PIPE						
24	3	6	72	12	84	3
30	31/2	71/2	90	12	102	31/2
FOR ARCH PIPE						
* 24	3	6	48	12	60	3
* 30	31/2	71/2	60	12	72	31/2
* 36	41/2	85/8	66	30	96	0
* 42	41/2	10	771/4	83/4	96	0

ALTERNATE

Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
FOR CIRCULAR PIPE						
24	3	9	72	12	84	0
30	31/2	11	90	12	102	0
FOR ARCH PIPE						
* 24	3	9	48	12	60	0
* 30	31/2	11	60	12	72	0

* Equivalent Diameter of Circular R.C.P.

** Acceptable Flat Bottom Alternate.



GENERAL NOTE:

The length of concrete pipe shown in the construction plans is between sloped ends.

REINFORCED CONCRETE PIPE SLOPED ENDS-ARCH

NOT TO SCALE

CITY OF BOX ELDER

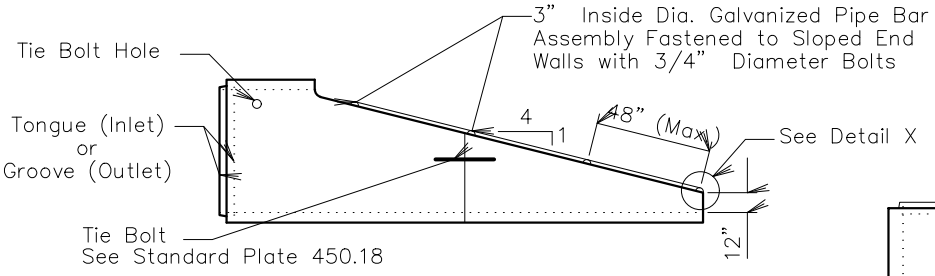
STANDARD DETAIL RC009

CULVERT-RCP SLOPED ENDS-ARCH

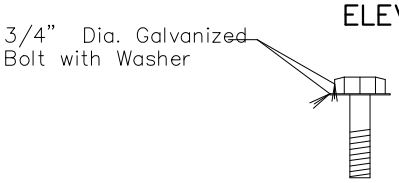
DETAIL #RC009

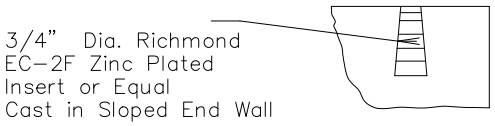
REVISED 01/2020

DETAIL RC010-CULVERT-RCP SLOPED END BAR ASSEMBLY-1

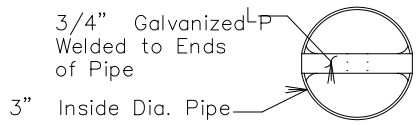


ELEVATION VIEW

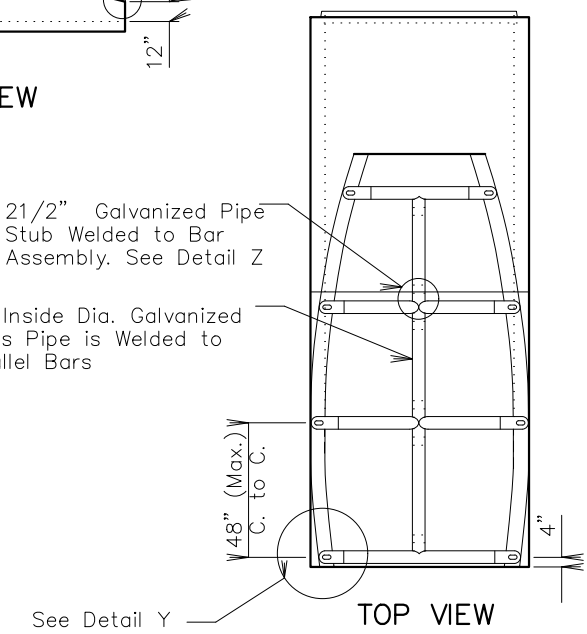




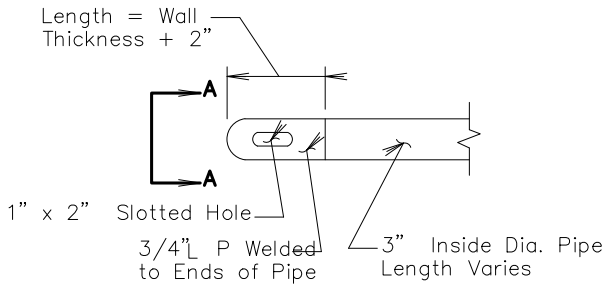
DETAIL X



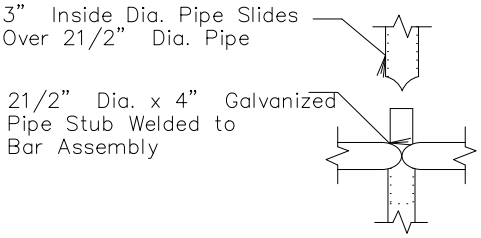
VIEW A-A



TOP VIEW



DETAIL Y



DETAIL Z

GENERAL NOTES:

The bar assembly shall be fabricated from steel in accordance with ASTM A53, Grade B or ASTM A500, Grade B.

The schedule 40 pipe sizes on the bar assembly drawings indicate sizes in regards to specification ASTM A53, Grade B. The allowable ASTM A500, Grade B sizes are HSS 3.5X.216 (for 3" schedule 40 pipe) and HSS 3X.25 (for 2.5" schedule 40 pipe).

Welding shall be accomplished by a certified welder.

The bar assembly shall be galvanized after fabrication in accordance with ASTM A123.

Cost for all work and materials required for fabrication and installation of the bar assembly shall be incidental to the bid items for the various sizes of sloped ends.

REINFORCED CONCRETE PIPE SLOPED END BAR ASSEMBLY-1

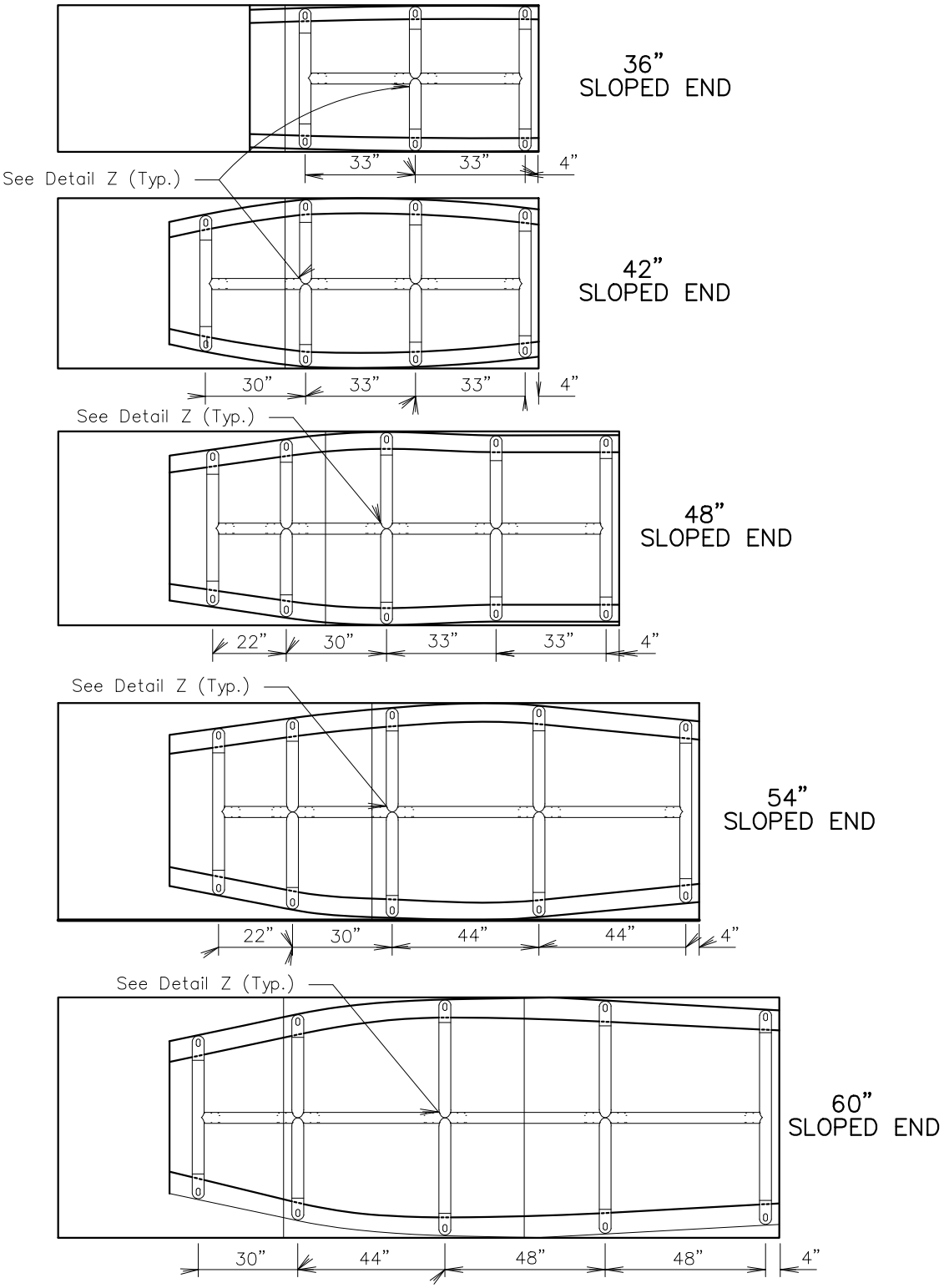
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC010

CULVERT-RCP SLOPED END BAR ASSEMBLY-1

DETAIL #RC010 REVISED 01/2020



REINFORCED CONCRETE PIPE SLOPED END BAR ASSEMBLIES-2

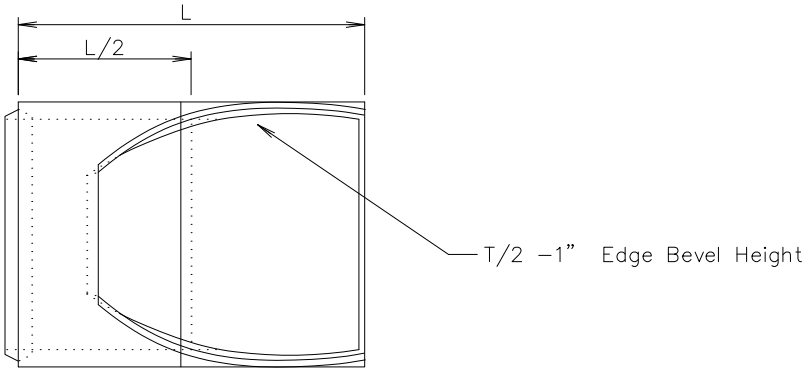
NOT TO SCALE

CITY OF BOX ELDER

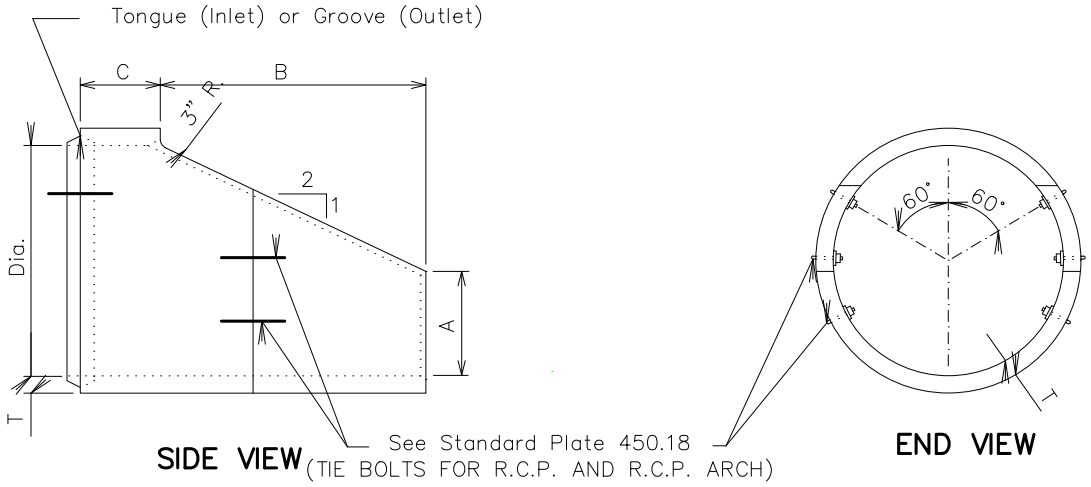
STANDARD DETAIL RC011

CULVERT-RCP SLOPED END BAR ASSEMBLY-2

DETAIL #RC011 REVISED 01/2020



TOP VIEW



SIDE VIEW

END VIEW

Dia.	T	L	INLET END			OUTLET END		
			A	B	C	A	B	C
(in.)	(in.)	(ft.)	(in.)	(in.)	(in.)	(in.)	(in.)	(in.)
96	9	12	42	104	40	44	99	45
108	10	16	42	128	64	44	123	69
120	11	16	42	152	40	44	147	45

GENERAL NOTES:

Reinforcement per Class 2 RCP with double reinforcement in the upper 120 degrees of pipe.

Lengths of concrete pipe shown on plan sheets are between sectional ends only. the full barrel portion.

REINFORCED CONCRETE PIPE SECTIONAL ENDS-ROUND

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC012

CULVERT-RCP SEC. ENDS-ROUND

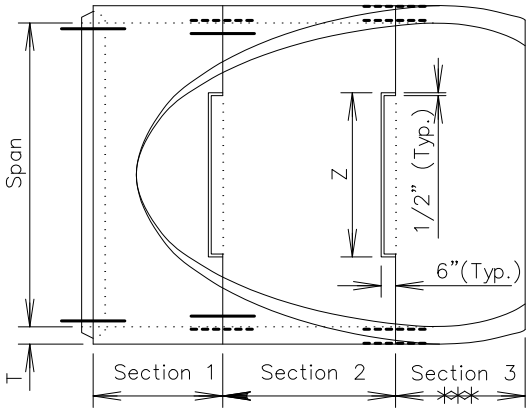
DETAIL #RC012

REVISED 01/2020

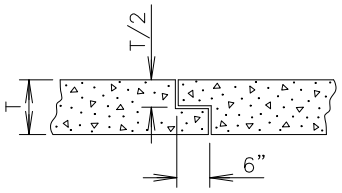
GENERAL NOTES:

Construction of R.C.P. Arch Sectional Ends shall conform to the requirements of Section 990 of the Specifications.

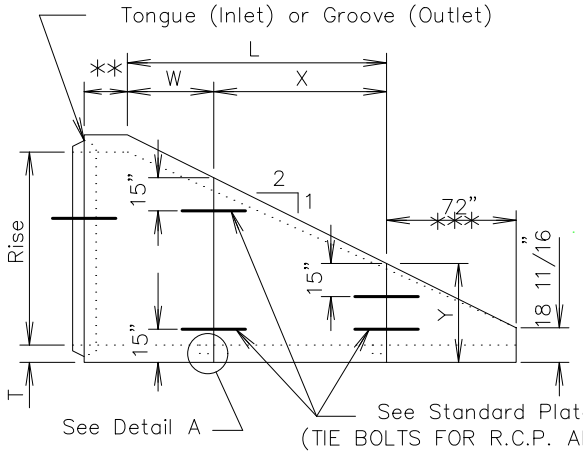
Lengths of concrete pipe shown on plan sheets are between sectional ends only.



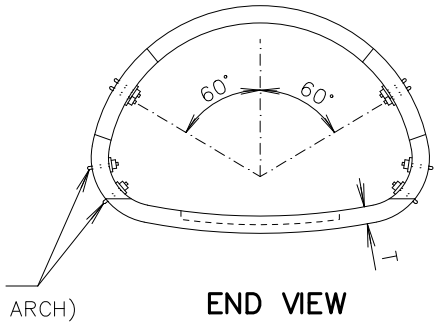
TOP VIEW



DETAIL A



SIDE VIEW



END VIEW

* Size (in.)	Approx. Weight Sect. 1 (lbs.)	Approx. Weight Sect. 2 (lbs.)	Approx. Weight Sect. 3 (lbs.)	Rise (in.)	Span (in.)	T (in.)	L (in.)	W (in.)	X (in.)	Y (in.)	Z (in.)
90	19100	3950		72	1151/2	81/2	1021/4	72	301/4	377/8	48
96	22000	6050		78	1223/8	9	1121/2	72	401/2	39	54
108	23000	15800		88	1381/2	10	1291/2	48	811/2	423/8	66
120	27000	24600		967/8	154	11	144	48	96	467/8	78
132	27950	25260	13640	1061/2	1683/4	10	144	48	96		90

*Equivalent Diameter of Circular R. C. P.
**2'-0" for Groove End and 2'-7" for Tongue End.
***Section 3 available for 132" size only.

REINFORCED CONCRETE PIPE SECTIONAL ENDS-ARCH

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC013

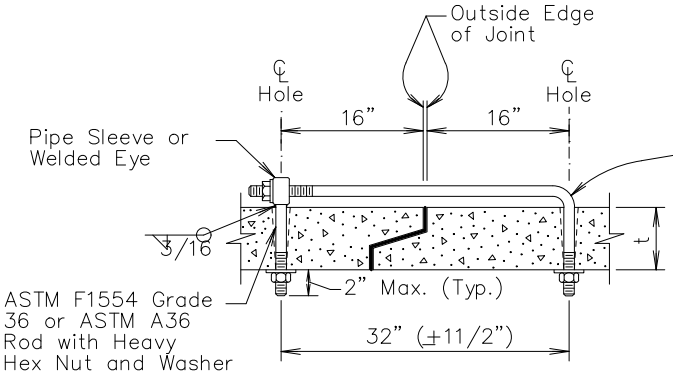
CULVERT-RCP SEC. ENDS-ARCH

DETAIL #RC013

REVISED 01/2020

DETAIL RC014-CULVERT-RCP TIE BOLTS

Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
≤ 31/4	5/8	3/4
31/2–61/2	3/4	1
≥ 7	1	11/4



ADJUSTABLE EYE BOLT TIE

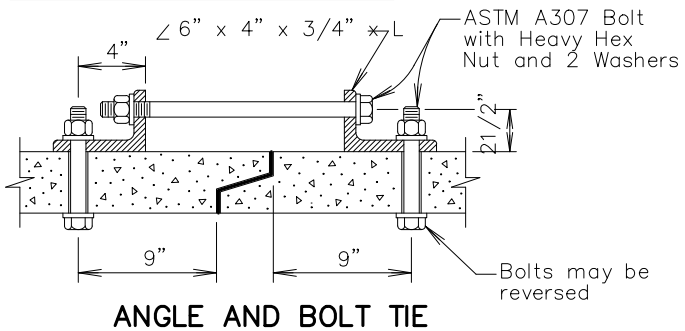
GENERAL NOTES:

Tie bolts shall conform to ASTM F1554 Grade 36 or ASTM A36. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Pipe Sleeve shall conform to ASTM A500 or A53, Grade B.

Galvanize adjustible eye bolt tie assembly in accordance with ASTM A153.

Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	3/4
> 48	6	1



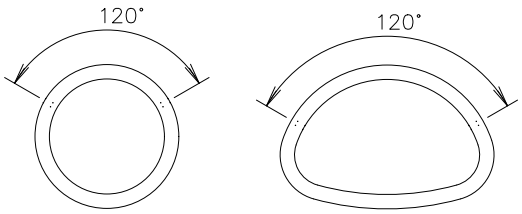
ANGLE AND BOLT TIE

GENERAL NOTES:

Angles shall conform to ASTM A36.

Bolts shall conform to ASTM A307. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Galvanize angles, bolts, nuts, and washers in accordance with ASTM A153.



END VIEW "CIRCULAR"

END VIEW "ARCH"

GENERAL NOTES:

In lieu of the tie bolts detailed above other types of tie bolt connections may be installed as approved by the Office of Bridge Design.

All pipe sections of R.C.P. and R.C.P. Arch shall be tied with tie bolts except for pipe located between drop inlets, manholes, and junction boxes. All pipe sections of pipes that only enter or exit drop inlets, manhole, and junction boxes shall be tied with tie bolts.

There will be no separate measurement or payment for the tie bolts. The cost for furnishing and installing the tie bolts shall be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. or R.C.P. Arch.

REINFORCED CONCRETE PIPE TIE BOLTS

NOT TO SCALE

CITY OF BOX ELDER

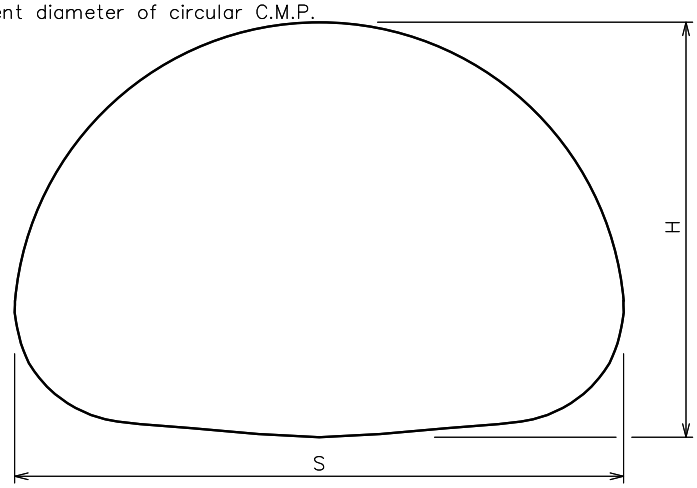
STANDARD DETAIL RC014

CULVERT-RCP TIE BOLTS

DETAIL #RC014 REVISED 01/2020

	2⅔" x ½" CORRUGATIONS			3" X 1" CORRUGATIONS		
* Dia. (in.)	S Span (in.)	H Rise (in.)	Area (Sq. Ft.)	S Span (in.)	H Rise (in.)	Area (Sq. Ft.)
15	17	13	1.1			
18	21	15	1.6			
21	24	18	2.2			
24	28	20	2.8			
30	35	24	4.4			
36	42	29	6.4	40	31	7.0
42	49	33	8.7	46	36	9.4
48	57	38	11.4	53	41	12.3
54	64	43	14.3	60	46	15.6
60	71	47	17.6	66	51	19.3
66	77	52	21.3	73	55	23.2
72	83	57	25.3	81	59	27.4
78				87	63	32.1
84				95	67	37.0
90				103	71	42.4
96				112	75	48.0
102				117	79	54.2
108				128	83	60.8
114				137	87	67.4
120				142	91	74.5

* Equivalent diameter of circular C.M.P.

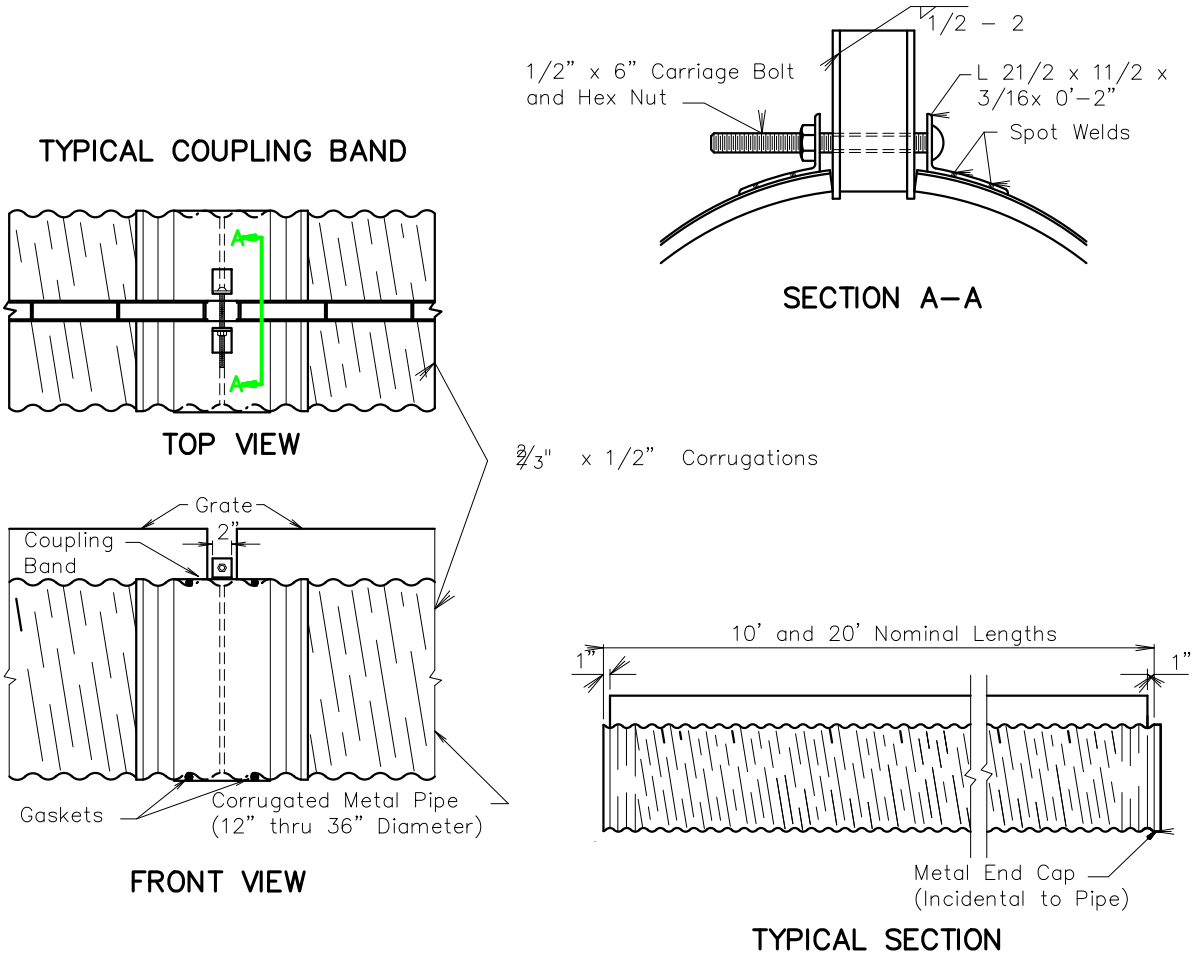


GENERAL NOTE:
All dimensions measured from inside crest.

CORRUGATED METAL PIPE ARCH CULVERT
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL RC020
CULVERT-CMP-ARCH

DETAIL #RC020 REVISED 01/2020



CORRUGATED METAL PIPE SLOTTED DRAIN-1

NOT TO SCALE

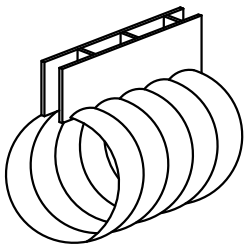
CITY OF BOX ELDER

STANDARD DETAIL RC021

CULVERT-CMP SLOTTED DRAIN 1

DETAIL #RC021

REVISED 01/2020



SLOTTED C.M.P. DRAIN

GENERAL NOTES:

A typical length of Slotted Drain is twenty (20) feet. Installation should be in multiples of ten (10) feet unless situations dictate otherwise.

All Slotted Drain materials and hardware shall be galvanized.

Metal end caps shall be provided for the closed end of each installation. The end caps shall be the same gage as the pipe.

All joints and end caps shall be watertight.

Close riveted soldered annular or continuously welded helical pipe shall be used and shall be watertight.

Units on which the spelter coating has been burned by welding or otherwise damaged in fabrication or during installation shall be regalvanized or painted with one full brush coat of zinc–rich paint conforming to Military Specification Mil–P–21035 or with at zinc–dust, zinc–oxide paint conforming to Federal Specification TT–P–641–B, Type III. Prior to painting, the surface shall be properly cleaned and approved.

Two gaskets will be required for each coupling band or joint and shall be rendered watertight by methods approved by the Engineer.

The slot shall be covered with an acceptable material during paving operations and/or installation of curb and gutter.

Anchors shall be ” Dia. x 3” galvanized bolts and nuts. The nuts shall be welded to the slot at two (2) foot spacing. Bolts shall be added just prior to installation to avoid damage.

A trapezoidal design for spacer bars, either vertical or slanted, may be an alternate for the vertical bars shown on the details. The Slotted Drain with slanted spacer bars shall be installed with the slanted spacer bars oriented toward the flow.

A Heel Guard (1/2 inch #13 expanded metal mesh) shall be furnished when called for in the plans and shall be welded to the grating before delivery to the project.

Slotted Drain will be measured along the centerline of the pipe. The length shall be the overall installed length from end to end including any coupling bands that may be between sections. The outlet pipe will be paid for as CMP and End Sections.

Slotted Drain will be paid for at the contract unit price per Foot of Slotted C.M.P. Payment will be full compensation for materials, labor, equipment, and incidentals required.

CORRUGATED METAL PIPE SLOTTED DRAIN-2

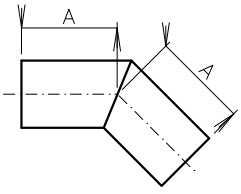
NOT TO SCALE

CITY OF BOX ELDER

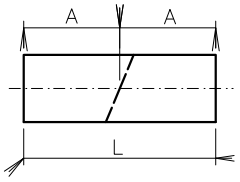
STANDARD DETAIL RC022

CULVERT-CMP SLOTTED DRAIN 2

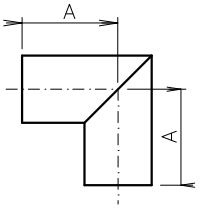
DETAIL #RC022 REVISED 01/2020



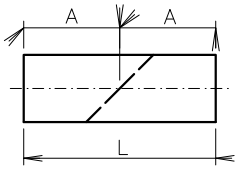
2 Piece



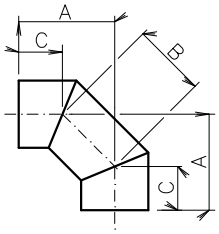
5° to 45° Elbow



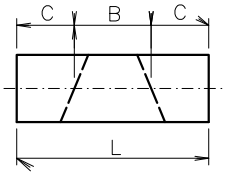
2 Piece



50° to 90° Elbow



3 Piece



90° Elbow

Diameter	A	L	Diameter	A	L	Diameter	A	B	C	L
Inches	Feet	Feet	Inches	Feet	Feet	Inches	Inches			Feet
12	1	2	12	2	4	12	25?	11	18?	4
15	1	2	15	2	4	15	26?	12	18	4
18	1	2	18	2	4	18	27	14	17	4
21	2	4	21	2	4	21	27	15	16?	4
24	2	4	24	2	4	24	27?	16	16	4
27	2	4	27	2	4	27	27?	17	15?	4
30	2	4	30	3	6	30	40	19	26?	6
33	2	4	33	3	6	33	40	20	26	6
36	2	4	36	3	6	36	40?	21	25?	6
42	2	4	42	3	6	42	41	23	24?	6
48	2	4	48	4	8	48	53?	26	35	8
54	3	6	54	4	8	54	54	28	34	8
60	3	6	60	4	8	60	54?	31	32?	8
66	3	6	66	4	8	66	54	33	31?	8
72	3	6	72	5	10	72	67?	36	42	10
78	3	6	78	5	10	78	68	39	40?	10
84	3	6	84	5	10	84	68?	41	39?	10
90	3	6	90	6	12	90	70	46	37	10
96	3	6	96	6	12	96	82	46	49	12

FABRICATED ELBOW LENGTHS FOR ALL CORRUGATIONS

GENERAL NOTES:

All dimensions shown are nominal.

L = Linear Feet of C.M.P. required to fabricate fitting.

CORRUGATED METAL PIPE FABRICATED LENGTHS FOR ELBOWS

NOT TO SCALE

CITY OF BOX ELDER

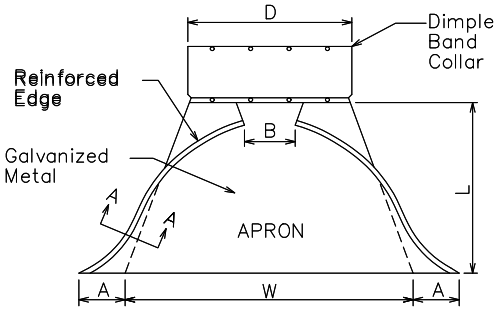
STANDARD DETAIL RC023

CULVERT-CMP ELBOWS

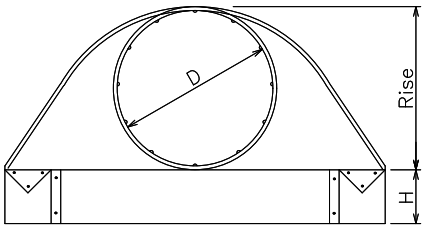
DETAIL #RC023

REVISED 01/2020

Alternate Type Connector Sections may be used with approval of the Engineer.



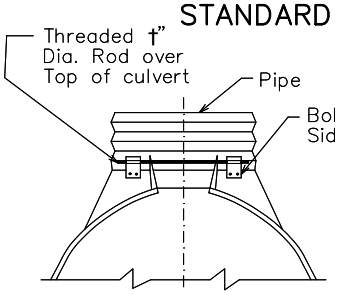
PLAN



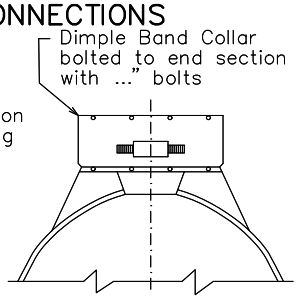
ELEVATION

Dia. D (in.)	Ga.	DIMENSIONS (in.) A	B	H	L	W	Approx. Slope	Body
12	16	6	6	6	21	24	2?:1	1 Pc.
15	16	7	8	6	26	30	2?:1	1 Pc.
18	16	8	10	6	31	36	2?:1	1 Pc.
21	16	9	12	6	36	42	2?:1	1 Pc.
24	16	10	13	6	41	48	2?:1	1 Pc.
30	14	12	16	8	46	60	2?:1	1 Pc.
36	14	14	19	9	51	72	2?:1	2 Pc.
42	12	16	22	11	60	84	2?:1	2 Pc.
48	12	18	27	12	69	90	2?:1	2 Pc.
54	12	18	30	12	78	102	2:1	3 Pc.
60	12	18	33	12	84	114	1?:1	3 Pc.
66	12	18	36	12	87	120	1?:1	3 Pc.
72	12	18	39	12	87	126	1 1/3:1	3 Pc.
78	12	18	42	12	87	132	1?:1	3 Pc.
84	12	18	45	12	87	138	1 1/6:1	3 Pc.

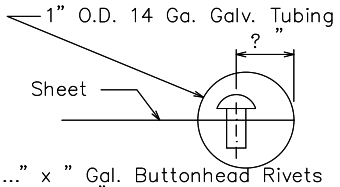
STANDARD CONNECTIONS



For 30" through 84"



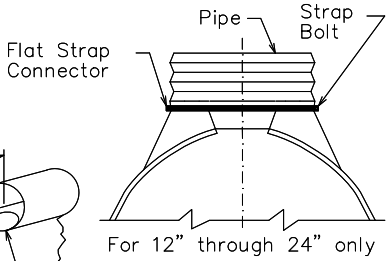
Alternate for all sizes



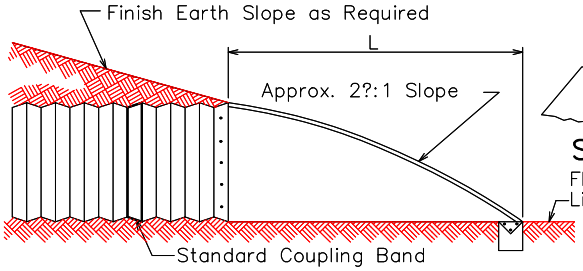
..." x " Gal. Buttonhead Rivets spaced 6" C. to C. Overall length of rivets=0.78"

TUBING ATTACHMENT DETAILS
SECTION A–A

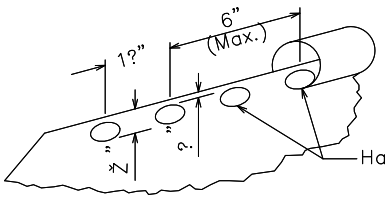
NOTE:
Tubing is slipped over the sheet and rivets or lugs prior to forming operations of the apron.



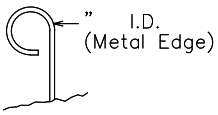
For 12" through 24" only



TYPICAL CROSS–SECTION



SECTION A–A (alternate)



SECTION A–A (alternate)

GENERAL NOTES:

All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams tightly joined by ..." Dia. galvanized rivets or bolts.

For 60" through 84" sizes, reinforced edges shall be supplemented with galvanized stiffener angles. The angles will be 2" x 2" x ," for 60" through 72" diameters and 2" x 2" x," for 78" and 84" diameters. The angles shall be attached by ..." diameter galvanized nuts and bolts.

Rivets and Bolts shall be ..." Dia, Min. for 10 Ga. and 12 Ga. sheet, and Š" Dia. Min. for 14 Ga. and 16 Ga. sheets. Tighten nuts with torque wrench to 25 lbs. torque.

CORRUGATED METAL PIPE FLARED ENDS-ROUND

NOT TO SCALE

CITY OF BOX ELDER

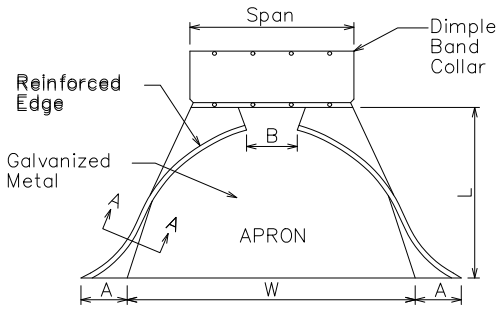
STANDARD DETAIL RC024

CULVERT-CMP FLARED ENDS-ROUND

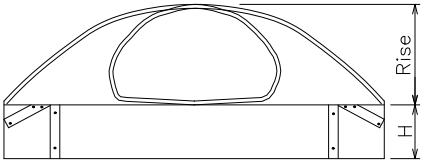
DETAIL #RC024 REVISED 01/2020

DETAIL RC025-CULVERT-CMP FLARED ENDS-ARCH

Alternate Type Connector Sections may be used with approval of the Engineer.



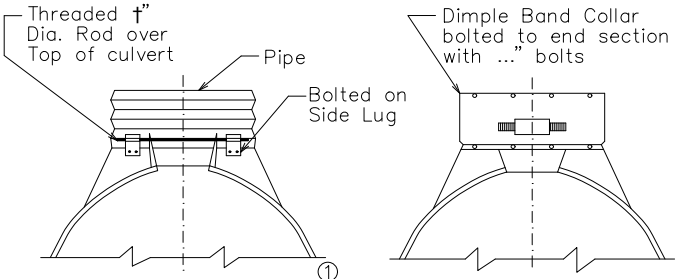
PLAN



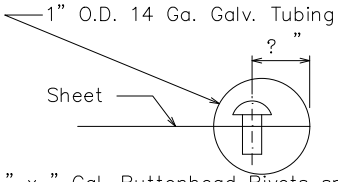
ELEVATION

Span x Rise (in.)x(in.)	Equiv. Dia. (in.)	Ga.	APPROX. DIMENSIONS (in.) A	B	H	L	W	Approx. Slope	Body
17x13	15	16	7	9	6	19	30	2?:1	1 Pc.
21x15	18	16	7	10	6	23	36	2?:1	1 Pc.
24x18	21	16	8	12	6	28	42	2?:1	1 Pc.
28x20	24	16	9	14	6	32	48	2?:1	1 Pc.
35x24	30	14	10	16	6	39	60	2?:1	1 Pc.
42x29	36	14	12	18	8	46	75	2?:1	1 Pc.
49x33	42	12	13	21	9	53	85	2?:1	2 Pc.
57x38	48	12	16	26	12	63	90	2?:1	2 Pc.
64x43	54	12	18	30	12	70	102	2?:1	2 Pc.
71x47	60	12	18	33	12	77	114	2?:1	3 Pc.
77x52	66	12	18	36	12	77	126	2:1	3 Pc.
83x57	72	12	18	39	12	77	133	2:1	3 Pc.

STANDARD CONNECTIONS



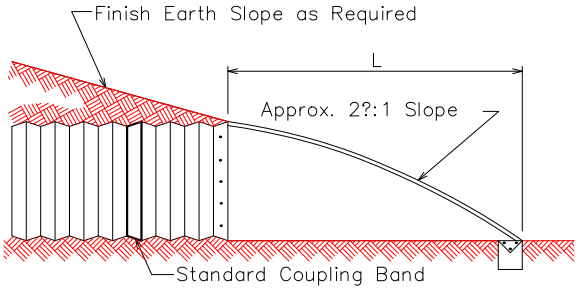
① For 17" through 28" span pipe-arches a flat strap connector may be used in place of the rod connection. Strap connector shall be 1" wide, 12 ga. strap with standard 6" long x " dia. bond bolt and nut.



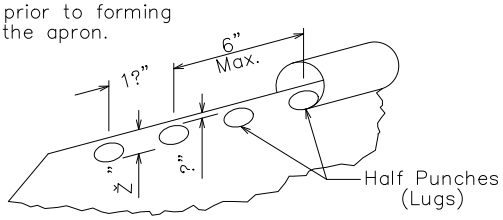
..." x " Gal. Buttonhead Rivets spaced 6" C. to C. Overall length of rivets=0.78"

TUBING ATTACHMENT DETAILS
SECTION A-A

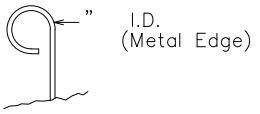
NOTE:
Tubing is slipped over the sheet and rivets or lugs prior to forming operations of the apron.



TYPICAL CROSS-SECTION



SECTION A-A (alternate)



SECTION A-A (alternate)

GENERAL NOTES:

All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies shall have lap seams tightly joined by ..." Dia. galvanized rivets or bolts.

For 77" x 52" and 83" x 57" sizes, reinforced edges shall be supplemented with galvanized stiffener angles. The angles will be 2" x 2" x ," for both the 77" x 52" size and the 83" x 57" size. The angles shall be attached by ..." Dia. galvanized nuts and bolts.

Rivets and Bolts shall be ..." Dia, Min. for 10 Ga. and 12 Ga. sheet, and Š" Dia. Min. for 14 Ga. and 16 Ga. sheets. Tighten nuts with torque wrench to 25 lbs. torque.

CORRUGATED METAL PIPE FLARED ENDS-ARCH

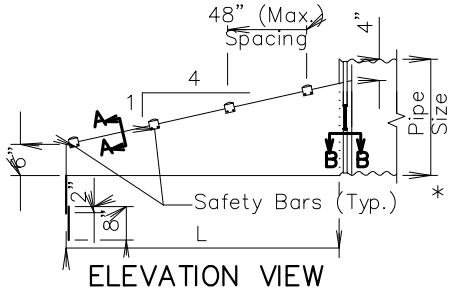
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC025

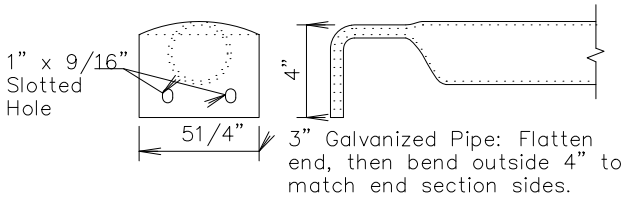
CULVERT-CMP FLARED ENDS-ARCH

DETAIL #RC025 REVISED 01/2020

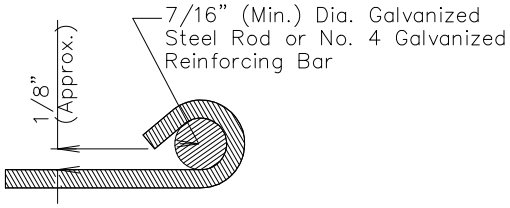


ELEVATION VIEW

* Number of bars required will vary depending on the length of the end section.

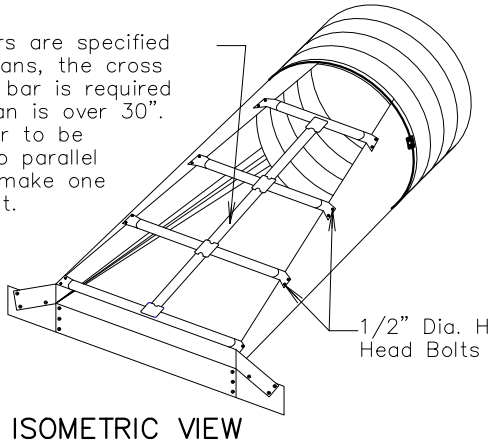


DETAIL OF SAFETY BARS

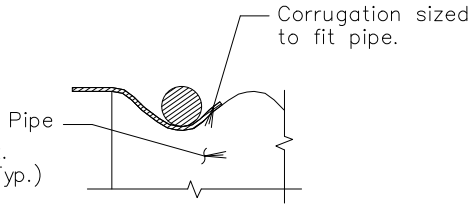


SECTION A–A

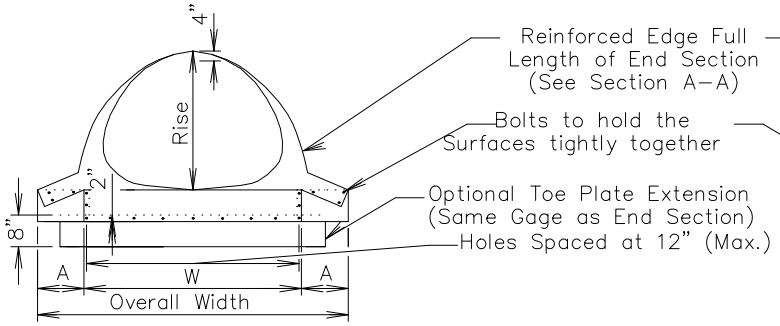
When bars are specified in the plans, the cross drainage bar is required when span is over 30". Cross bar to be welded to parallel bars to make one piece unit.



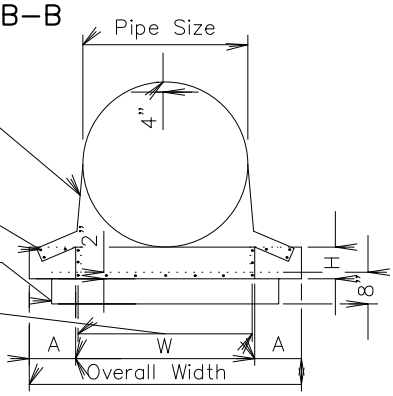
ISOMETRIC VIEW



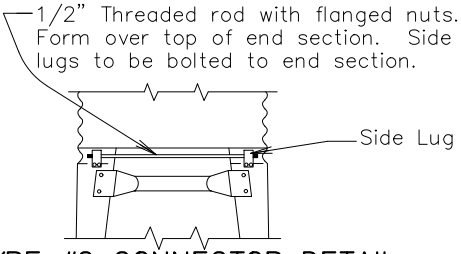
SECTION B–B



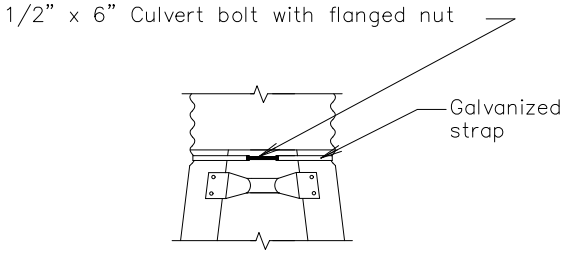
FRONT VIEW



FRONT VIEW



TYPE #2 CONNECTOR DETAIL
(For 30" and Larger)
(For 21" X 15" and Larger)



TYPE #1 CONNECTOR DETAIL
(For 15" Through 24")

CORRUGATED METAL PIPE SLOPED ENDS-1

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC026

CULVERT-CMP SLOPED ENDS 1

DETAIL #RC026 REVISED 01/2020

ARCH C.M.P. SLOPED ENDS										
Equv. Dia. (Inch)	(Inches)		Min. Thick.		Dimensions (Inches)				L Dimensions	
	Span	Rise	Inch	Gage	A	H	W	Overall Width	Slope	Length (Inch)
18	21	15	.064	16	8	6	27	43	4:1	20
21	24	18	.064	16	8	6	30	46	4:1	32
24	28	20	.064	16	8	6	34	50	4:1	40
30	35	24	.079	14	12	9	41	65	4:1	56
36	42	29	.109	12	12	9	48	72	4:1	76
42	49	33	.109	12	16	12	55	87	4:1	92
48	57	38	.109	12	16	12	63	95	4:1	112
54	64	43	.109	12	16	12	70	102	4:1	132
60	71	47	.109	12	16	12	77	109	4:1	148
72	83	57	.109	12	16	12	89	121	4:1	188

CIRCULAR C.M.P. SLOPED ENDS								
Pipe Dia. (Inch)	Min. Thick.		Dimensions (Inches)				L Dimensions	
	Inch	Gage	A	H	W	Overall Width	Slope	Length (Inch)
15	.064	16	8	6	21	37	4:1	20
18	.064	16	8	6	24	40	4:1	32
21	.064	16	8	6	27	43	4:1	44
24	.064	16	8	6	30	46	4:1	56
30	.109	12	12	9	36	60	4:1	80
36	.109	12	12	9	42	66	4:1	104
42	.109	12	16	12	48	80	4:1	128
48	.109	12	16	12	54	86	4:1	152
54	.109	12	16	12	60	92	4:1	176
60	.109	12	16	12	66	98	4:1	200

GENERAL NOTES:

Safety bars shall be attached to sloped ends over 30" in diameter only when specified in the plans.

Sloped ends shall be fabricated from galvanized steel and shall conform to the requirements of the Specifications.

Safety bars shall be fabricated from steel schedule 40 pipe in conformance with ASTM A53, grade B or HSS 3.5X.216 in conformance with ASTM A500, grade B.

Slotted holes for safety bar attachment shall be provided for all end sections.

Attachment to circular pipes 15" through 24" diameter shall be made with Type #1 straps. All other sizes shall be attached with Type #2 rods and lugs.

When stated in the plans, optional toe plate extension shall be punched and bolted to end section apron lip with 3/8" diameter galvanized bolts. Steel for toe plate extension shall be same gauge as end section. Dimensions shall be overall width less 6" by 8" high.

Cost of all work and materials required for fabrication and installation of sloped ends shall be incidental to the bid items for the various sizes of sloped ends.

CORRUGATED METAL PIPE SLOPED ENDS-2

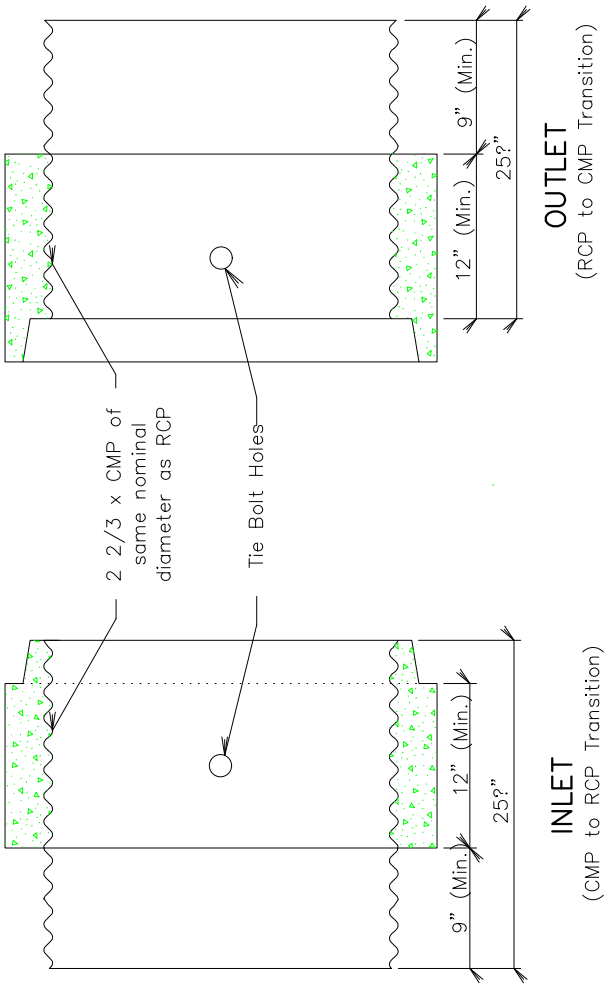
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC027

CULVERT-CMP SLOPED ENDS 2

DETAIL #RC027 REVISED 01/2020



GENERAL NOTE:

Arch pipe transitions shall be fabricated similar to the round transition shown above.

CORRUGATED METAL PIPE (CMP) TO REINFORCED CONCRETE PIPE (RCP) AND RCP TO CMP TRANSITIONS

NOT TO SCALE

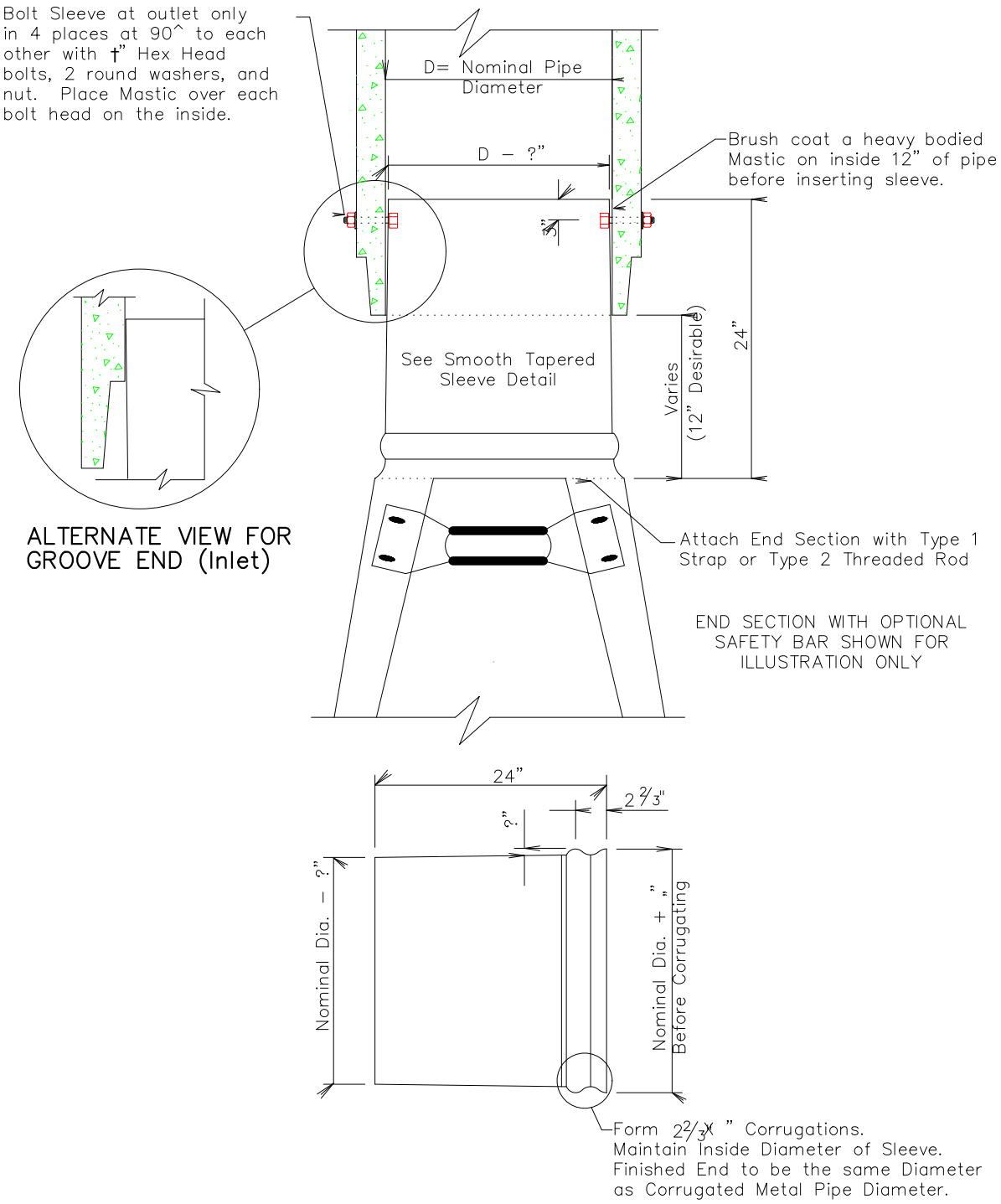
CITY OF BOX ELDER

STANDARD DETAIL RC028

CULVERT-CMP/RCP TRANSITIONS

DETAIL #RC028

REVISED 01/2020



SMOOTH TAPERED SLEEVE DETAIL

GENERAL NOTE:

Metal shall be 12 gauge smooth Galvanized in accordance with AASHTO M218.

CORRUGATED METAL PIPE SMOOTH TAPERED SLEEVE

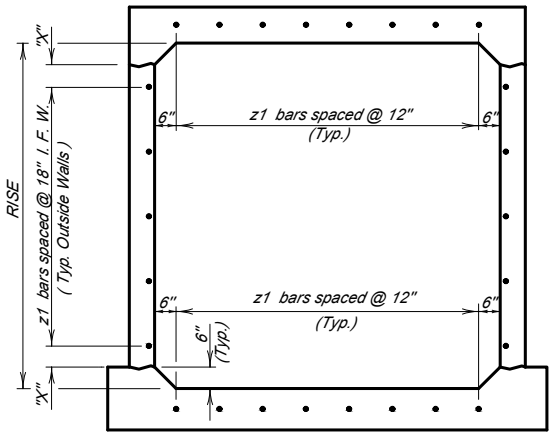
NOT TO SCALE

CITY OF BOX ELDER

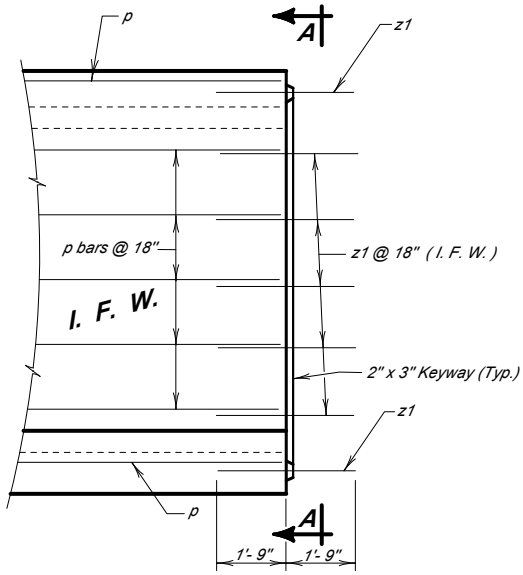
STANDARD DETAIL RC029

CULVERT-CMP SMOOTH TAPERED SLEEVE

DETAIL #RC029 REVISED 01/2020



TYPICAL SINGLE BARREL VIEW A - A

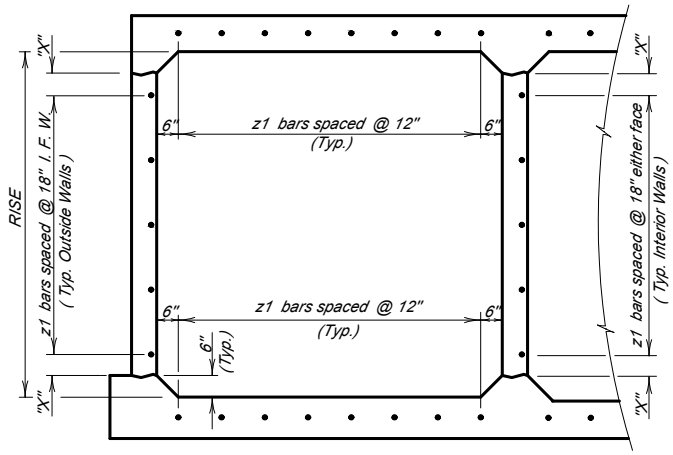


ELEVATION

LEGEND FOR PLACING RE-STEEL

I. F. W. - Inside Face Wall

RISE	"X"
3'- 0"	3"
4'- 0"	9"
5'- 0"	6"
6'- 0"	3"
7'- 0"	9"
8'- 0"	6"
9'- 0"	3"
10'- 0"	9"
11'- 0"	6"
12'- 0"	3"



TYPICAL MULTIPLE BARREL VIEW A - A

GENERAL NOTES:

1. z1 bars shall be placed in the middle of the 2" X 3" keyway in the top and bottom slabs. z1 bars shall be lapped with the longitudinal p bars in the inside face of the wall for outside walls and in either face for interior walls. z1 bars are listed and included elsewhere in plans.
2. Drainage Fabric Protection shall be placed in accordance with Section 422, or Section 560, whichever is applicable.

CULVERT-PRECAST BOX BARREL TIE REINFORCEMENT

NOT TO SCALE

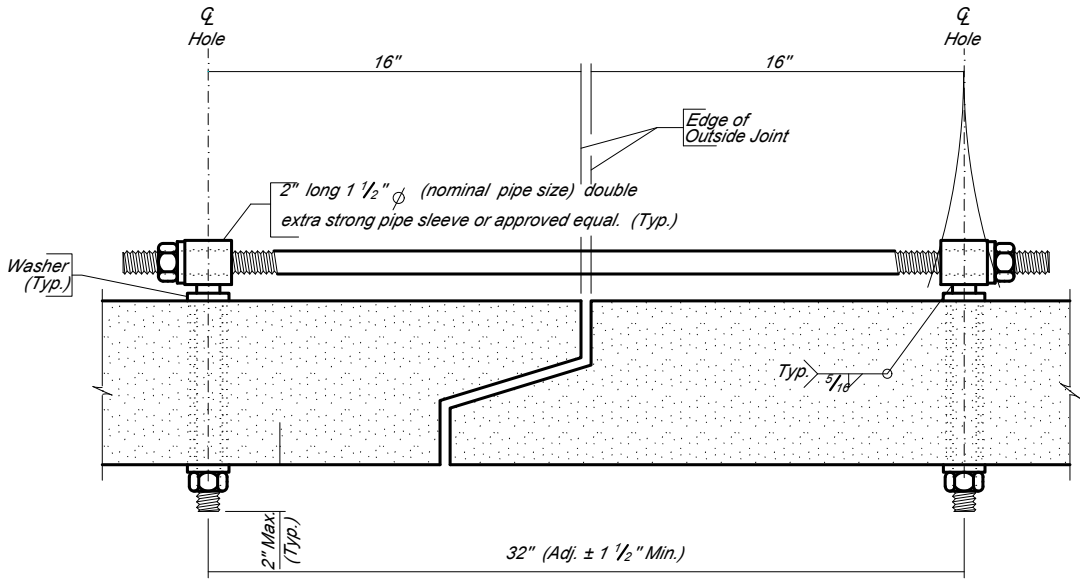
CITY OF BOX ELDER

STANDARD DETAIL RC040

CULVERT-PRECAST BOX BARREL TIE

DETAIL #RC040

REVISED 01/2020



TIE BOLT ASSEMBLY

GENERAL NOTES:

1. *All holes for tie bolts shall be cast-in-place, 16 inches from outside edge of joint. Cast in inserts or sleeves, if used, shall be made of a corrosion resistant material.*
2. *Ties shall be 1 inch ϕ and conform to the requirements of ASTM A36, ASTM A307, or ASTM F1554, Gr. 36. Nuts shall be heavy hex in conformance with ASTM A563. Washers shall conform to ASTM F436, Type 1. The welded pipe sleeve shall conform to ASTM A53, Grade B.*
3. *Welding and weld inspection shall be in conformance with AWS/ANSI D1.1 - (Current Year) Structural Welding Code - Steel.*
4. *Tie Bolt Assembly shall be galvanized in accordance with ASTM A153 or ASTM F2329 as applicable.*
5. *Tie Bolt Assembly details may vary from that shown, but alternate tie bolt assemblies are subject to testing to demonstrate equal strength. Submit details, through proper channels, to the Office of Bridge Design for approval.*
6. *All costs for furnishing and installing the precast box culvert tie bolt assembly shall be incidental to the contract unit price per Foot for "Precast Concrete Box Culvert, Furnish".*

PRECAST BOX CULVERT TIE BOLT ASSEMBLY

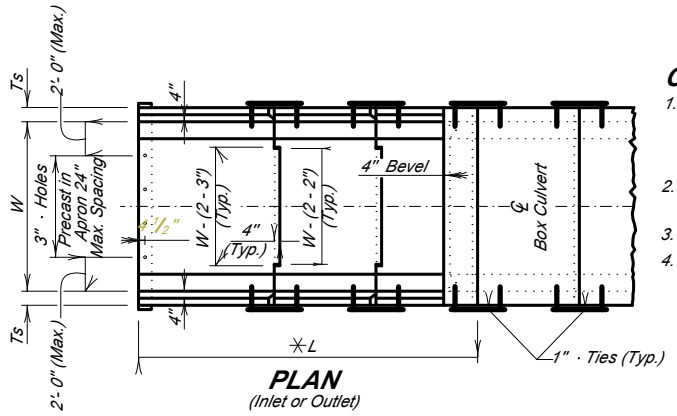
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC041

CULVERT-PRECAST BOX TIE BOLT ASSEMBLY

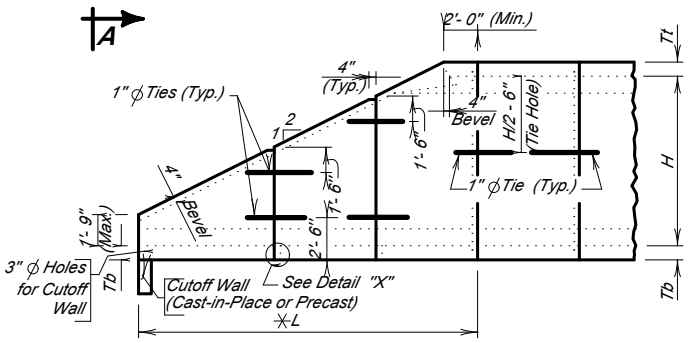
DETAIL #RC041 REVISED 01/2020



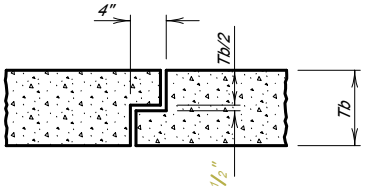
PLAN
(Inlet or Outlet)

CUTOFF WALL

1. All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".
2. Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.
3. All reinforcing steel shall conform to ASTM A615 Grade 60.
4. Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.

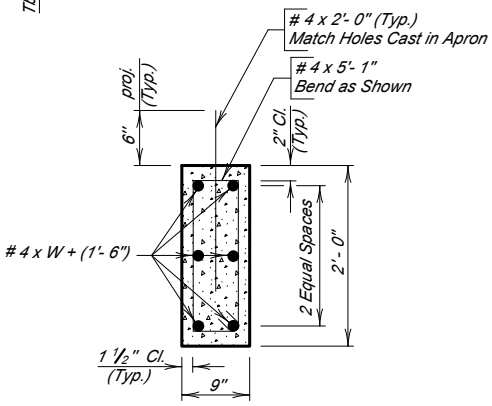


ELEVATION
(Inlet or Outlet)

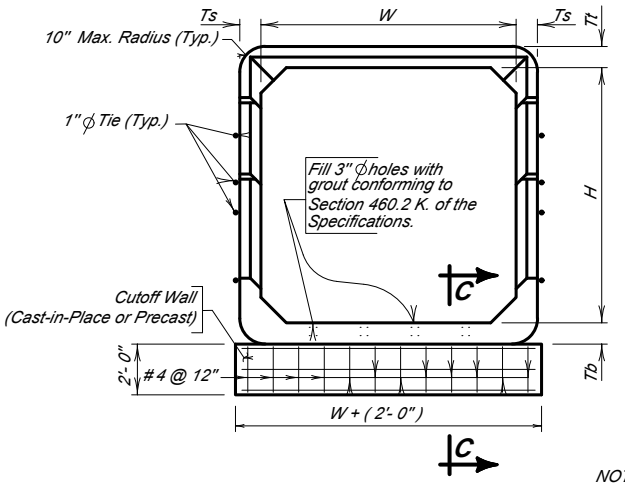


DETAIL "X"

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



SEC. C - C



VIEW A - A

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
L = Length of End Section

NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, L, and Ts dimensions shall be furnished by the Contractor.
⚹ Length and number of units may vary from that shown.

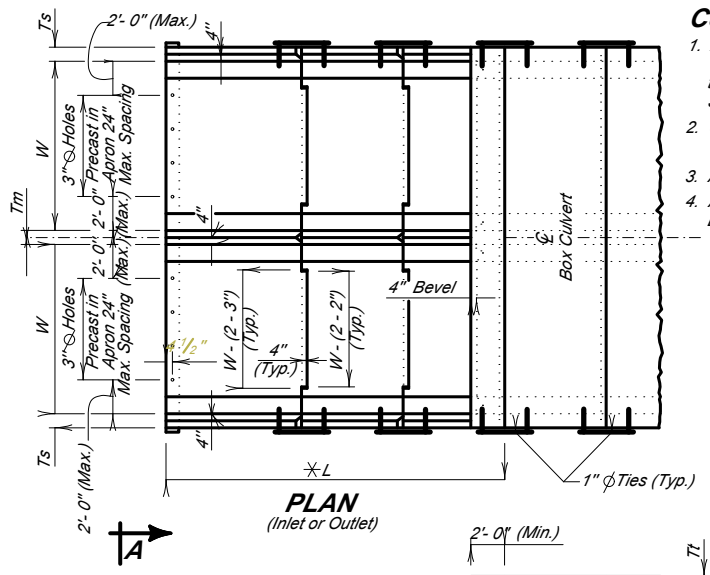
PRECAST BOX CULVERT WITH SLOPED END SECTION
NOT TO SCALE

CITY OF BOX ELDER

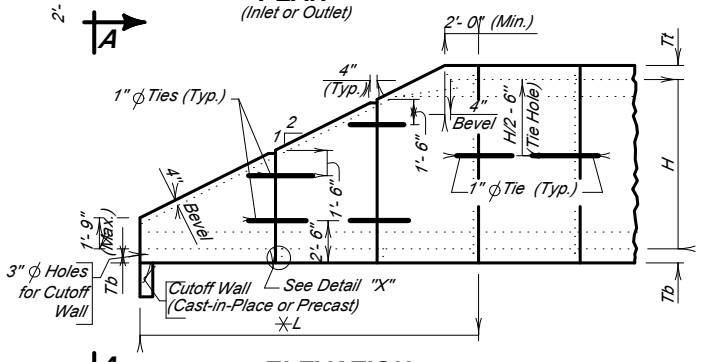
STANDARD DETAIL RC042

CULVERT-PRECAST BOX SLOPED END SECTION

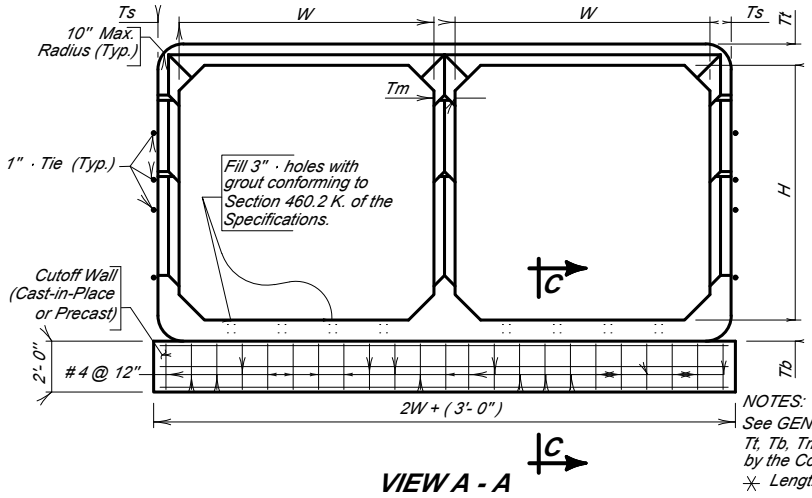
DETAIL #RC042 REVISED 01/2020



PLAN
(Inlet or Outlet)



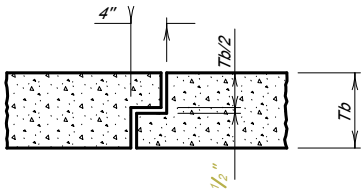
ELEVATION
(Inlet or Outlet)



VIEW A - A

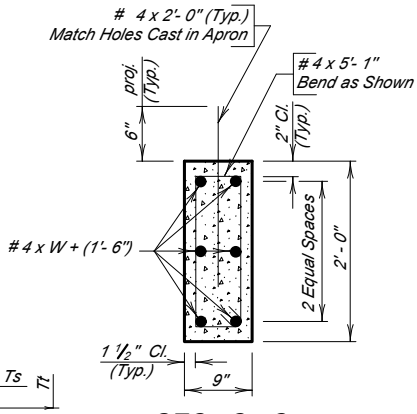
CUTOFF WALL

1. All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".
2. Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.
3. All reinforcing steel shall conform to ASTM A615 Grade 60.
4. Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.



DETAIL "X"

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



SEC. C - C

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
Tm = Thickness of Middle Wall
L = Length of End Section

NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, Tm, L, and Ts dimensions shall be furnished by the Contractor.
⚹ Length and number of units may vary from that shown.

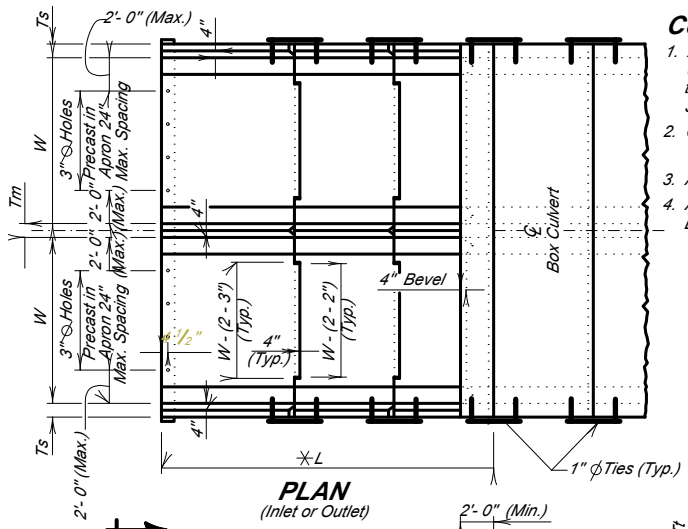
PRECAST DOUBLE BOX CULVERT WITH SLOPED END (2' CUTOFF WALL)
NOT TO SCALE

CITY OF BOX ELDER

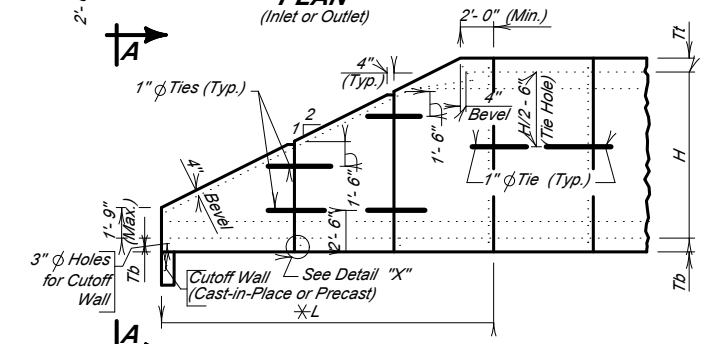
STANDARD DETAIL RC045

CULVERT-PRECAST DOUBLE BOX-2'

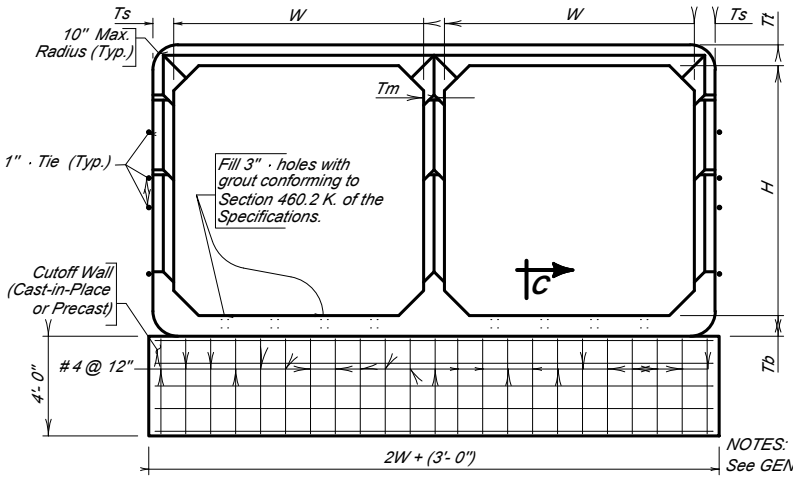
DETAIL #RC045 REVISED 01/2020



PLAN
(Inlet or Outlet)



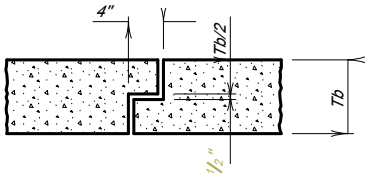
ELEVATION
(Inlet or Outlet)



VIEW A - A

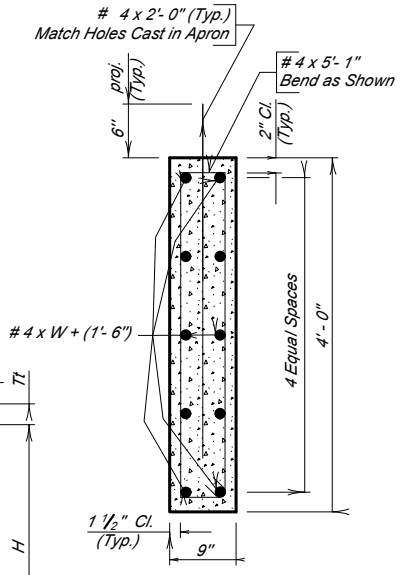
CUTOFF WALL

1. All costs associated with furnishing and installing the Cutoff Wall, whether precast or cast-in-place, shall be incidental to the contract unit price per each for "Precast Box Culvert End Section, Furnish".
2. Concrete for cast-in-place cutoff wall shall be Class M6 concrete in accordance with Section 462 of the Specifications.
3. All reinforcing steel shall conform to ASTM A615 Grade 60.
4. Alternate details will be allowed, subject to the approval of the Bridge Construction Engineer.



DETAIL "X"

NOTE: Joint details may vary from that shown, according to the manufacturer's design. Submit details with shop plans for approval.



SEC. C - C

LEGEND

W = Width of Opening
H = Height of Opening
Tt = Thickness of Top Slab
Tb = Thickness of Bottom Slab
Ts = Thickness of Side Wall
Tm = Thickness of Middle Wall
L = Length of End Section

NOTES:
See GENERAL DRAWING for W and H dimensions.
Tt, Tb, Tm, L, and Ts dimensions shall be furnished by the Contractor.
⁜ Length and number of units may vary from that shown.

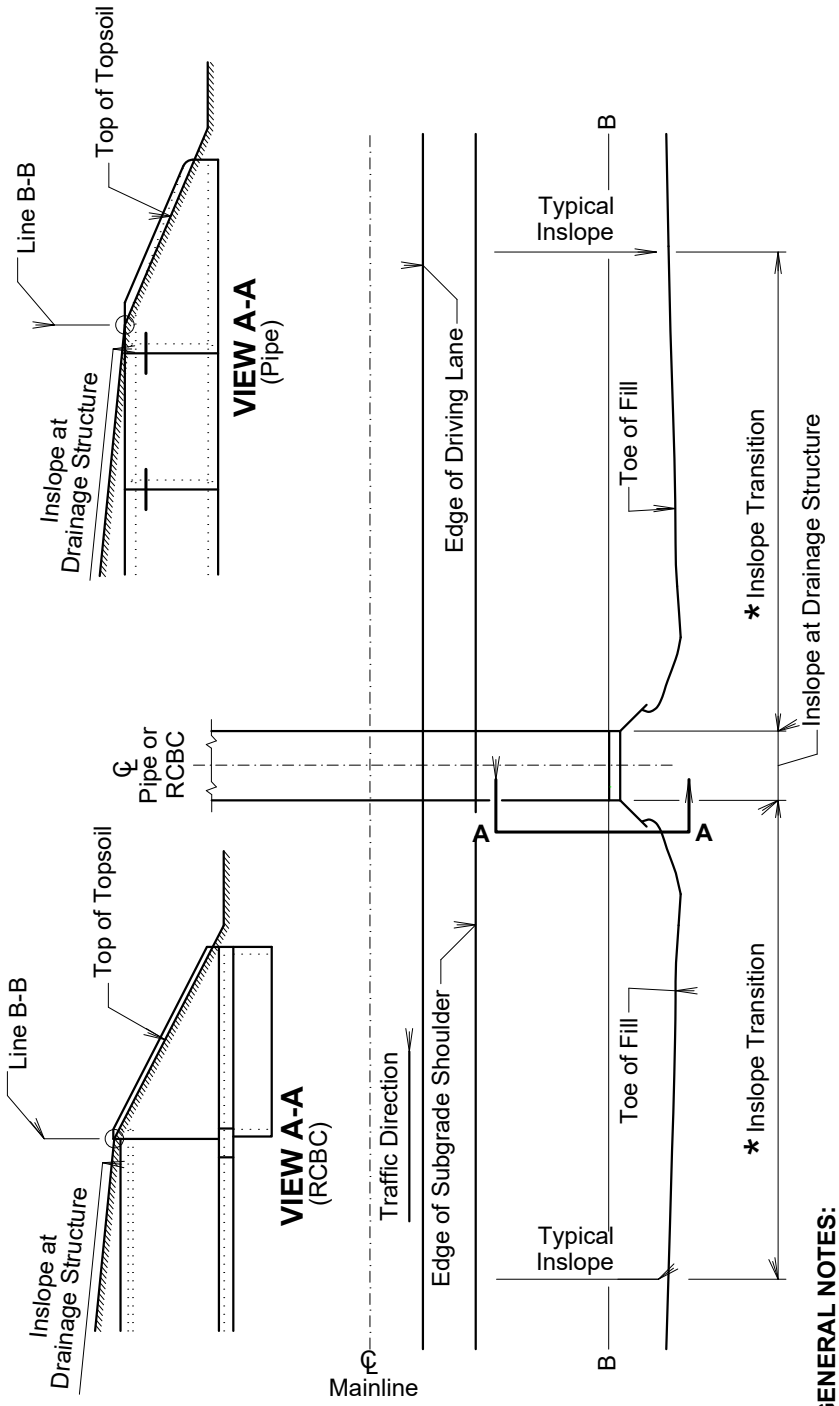
PRECAST DOUBLE BOX CULVERT WITH SLOPED END (4' CUTOFF WALL)
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RC046

CULVERT-PRECAST DOUBLE BOX-4'

DETAIL #RC046 REVISED 01/2020



GENERAL NOTES:

This Type 1 Inslope Transition is used when the specified inslope at the drainage structure is flatter than the typical inslope and the inslope at the drainage structure is between a 4:1 slope and 6:1 slope.

Line B-B represents the clear zone line, the location where soil intercepts the parapet on an RCBC, the location where the soil intercepts the top of the pipe adjacent to the opening of the pipe end section, or may represent a change in slope.

* Transition from the typical inslope to the inslope at the drainage structure. Within the clear zone (area from edge of subgrade shoulder to line B-B) use 100' length for each 1:1 slope change. Example: transition from a 4:1 to a 6:1 would require a 200' length transition. The typical inslope outside of the clear zone will be transitioned gradually to the slope necessary adjacent to the RCBC wing wall or pipe culvert end section within the transition length necessary for the transition within the clear zone.

SLOPE TRANSITIONS AT PIPE CULVERTS OR REINFORCED CONCRETE BOX CULVERTS-TYPE 1

NOT TO SCALE

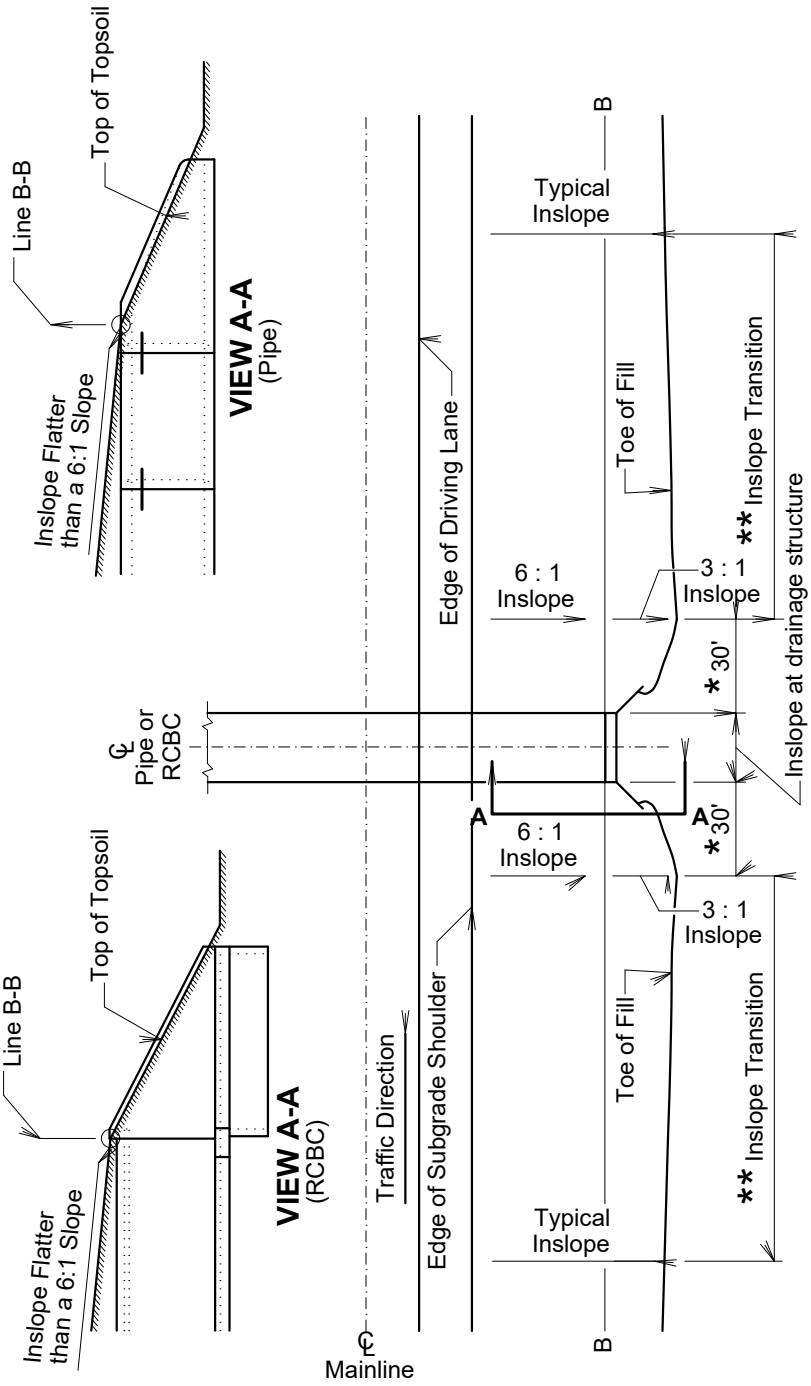
CITY OF BOX ELDER

STANDARD DETAIL RC050

CULVERT-SLOPE TRANSITIONS-1

DETAIL #RC050

REVISED 01/2020



GENERAL NOTES:

This Type 2 Inslope Transition is used when the specified inslope at the pipe or RCBC is flatter than a 6:1 slope.

Line B-B represents the clear zone line, the location where soil intercepts the parapet on an RCBC, the location where the soil intercepts the top of the pipe adjacent to the opening of the pipe end section, or may represent a change in slope.

Transition from Inslope at drainage structure to a 6 : 1 inslope and 3:1 inslope.

* Transition from typical inslope to the inslopes adjacent to the drainage structure. Within the clear zone (area from edge of subgrade shoulder to line B-B) use 100' length for each 1:1 slope change. Example: transition from a 4:1 to a 6:1 would require a 200' length transition. The typical inslope outside of the clear zone will be transitioned to a 3:1 inslope within the transition length necessary for the transition within the clear zone.

SLOPE TRANSITIONS AT PIPE CULVERTS OR REINFORCED CONCRETE BOX CULVERTS-TYPE 2

NOT TO SCALE

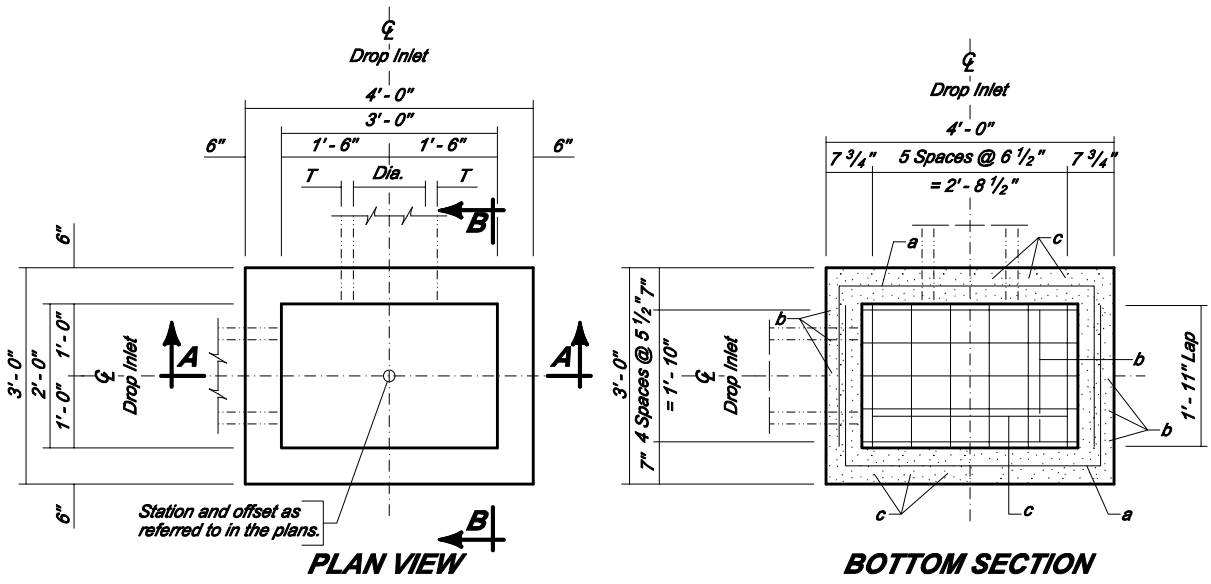
CITY OF BOX ELDER

STANDARD DETAIL RC051

CULVERT-SLOPE TRANSITIONS-2

DETAIL #RC051

REVISED 01/2020



ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
Class M6 Concrete	Cu. Yd.	0.26	0.22H
Reinforcing Steel	Lb.	83.03	28.97H
Frame and Grate Assembly	Each	1	———

DROP INLETS FOR 12" TO 24" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plan to the Engineer for approval.

Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

Maximum R.C.P. diameter shall not exceed 18 inches on the 2-foot wide side and shall not exceed 24 inches (24 inches for R.C. arch) on the 3-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

PIPE DISPLACEMENT REDUCTIONS			
	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09

DROP INLET-CONCRETE-TYPE B (2'X3')

NOT TO SCALE

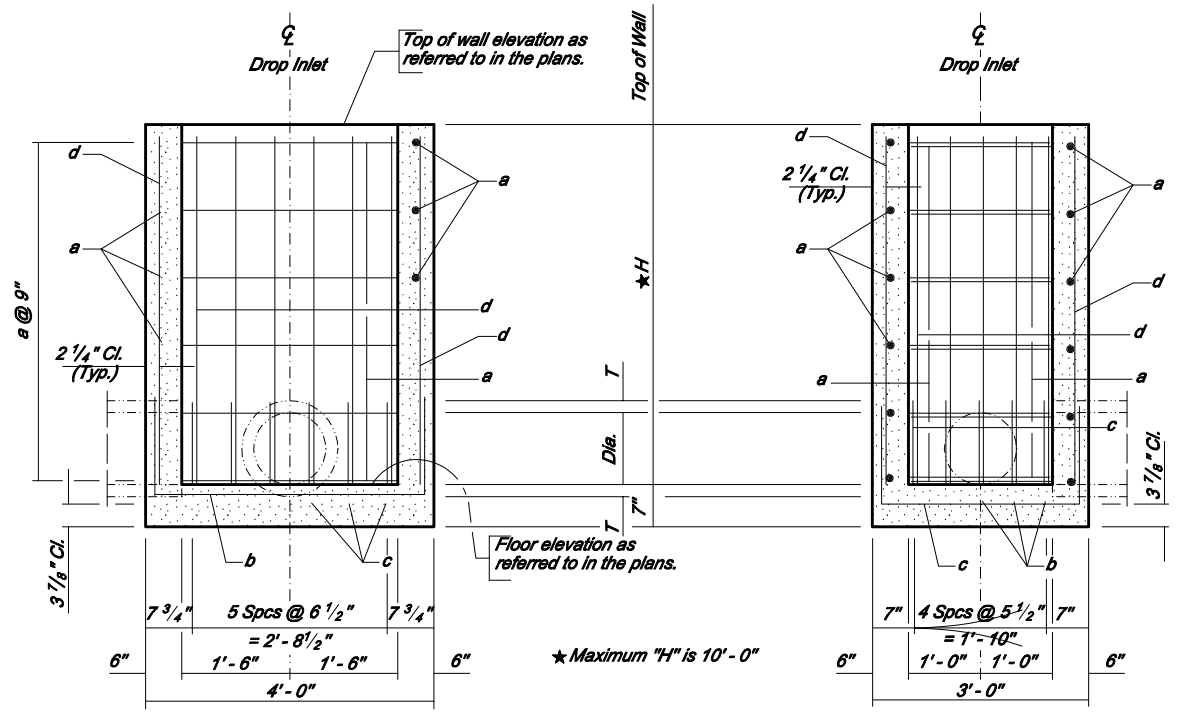
CITY OF BOX ELDER

STANDARD DETAIL RD001

DROP INLET-CONC.-TYPE B-2X3-1

DETAIL #RD001

REVISED 01/2020

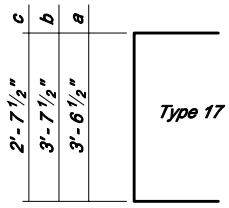


REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a	2.67H	4	8' - 0"	17
b	5	5	6' - 3"	17
c	6	4	5' - 3"	17
d	22	4	H - 2"	Str.

NOTE:
All dimensions are out to out of bars.

Bending Details



a	2' - 2 1/2"
b	1' - 3 1/2"
c	1' - 3 1/2"

DROP INLET-CONCRETE-TYPE B (2'X3')

NOT TO SCALE

CITY OF BOX ELDER

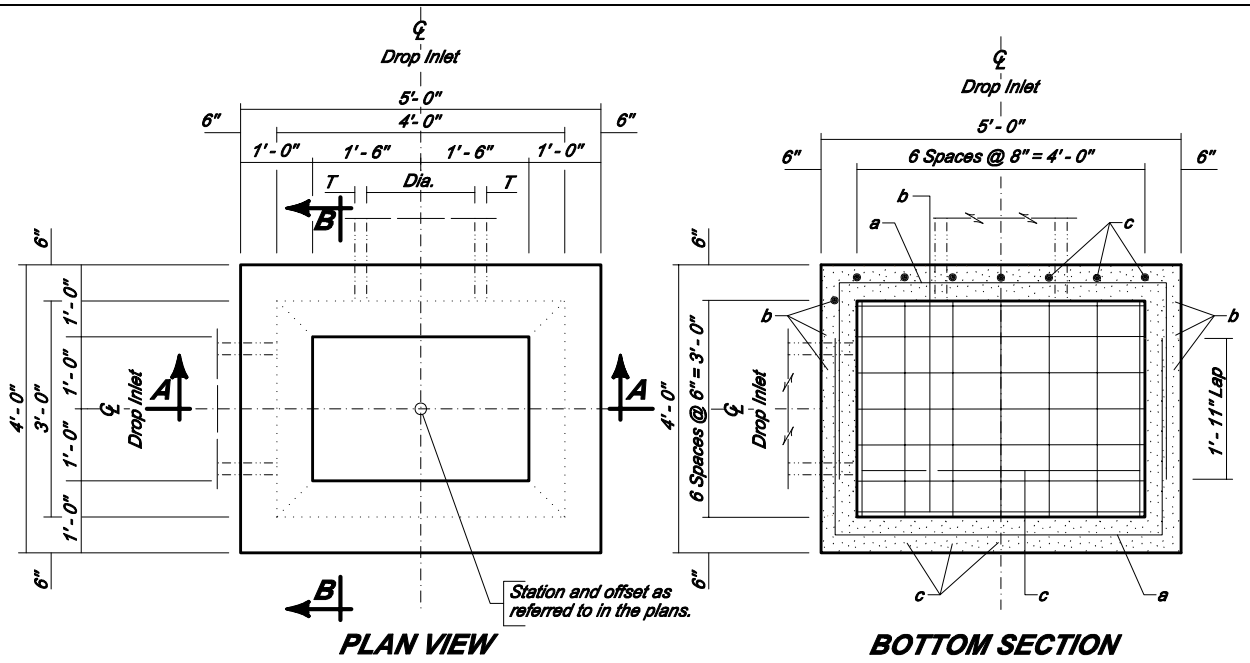
STANDARD DETAIL RD002

DROP INLET-CONC.-TYPE B-2X3-2

DETAIL #RD002

REVISED 01/2020

DETAIL RD003-DROP INLET-CONCRETE-TYPE B (3X4)-1



ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANTQUANTITY	VARIABLE QUANTITY
Class M6 Concrete	Cu. Yd.	0.72	0.30H
Reinforcing Steel	Lb.	130.93	36.54H
Frame and Grate Assembly	Each	1	———

DROP INLETS FOR 12" TO 36" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Engineer for approval.

Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

Maximum R.C.P. diameter shall not exceed 24 inches (24 inches for R. C. arch) on the 3-foot wide side and shall not exceed 36 inches (30 inches for R.C. arch) on the 4-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

PIPE DISPLACEMENT REDUCTIONS			
	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09
	30	4	0.14

DROP INLET-CONCRETE-TYPE B (3'X4')

NOT TO SCALE

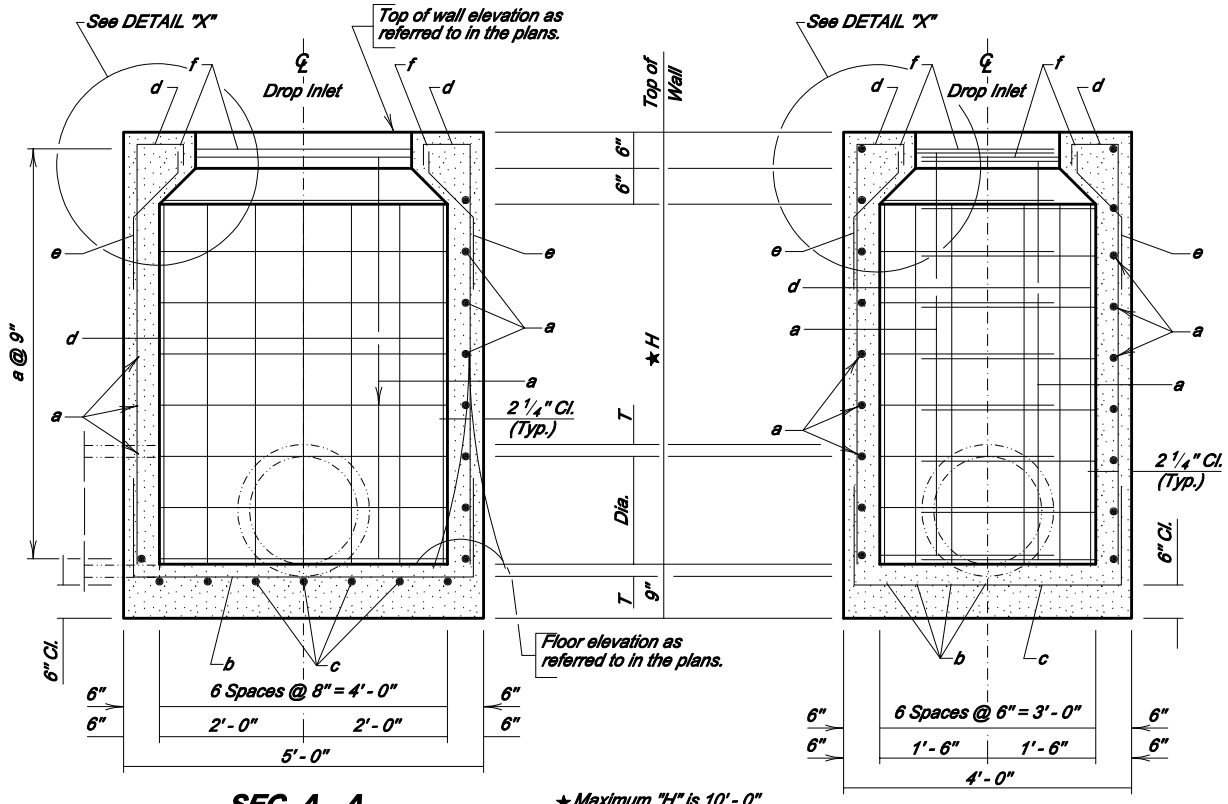
CITY OF BOX ELDER

STANDARD DETAIL RD003

DROP INLET-CONC.-TYPE B-3X4-1

DETAIL #RD003

REVISED 01/2020

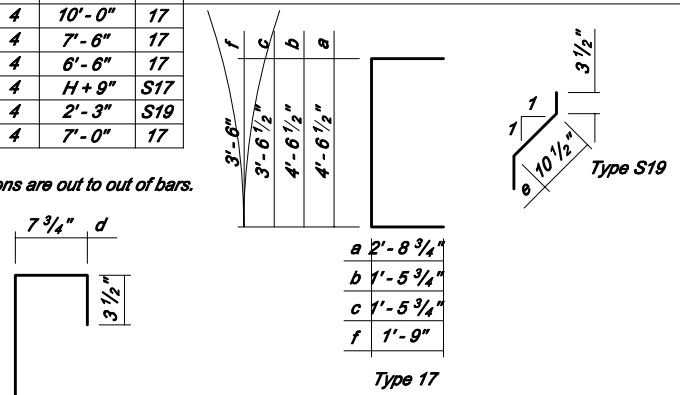


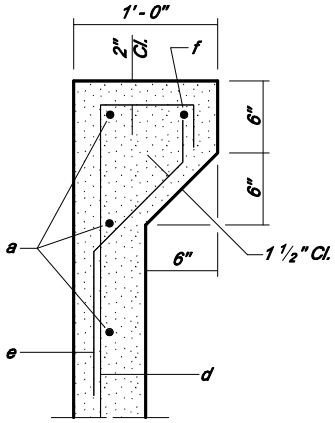
REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a	2.67H	4	10' - 0"	17
b	7	4	7' - 6"	17
c	7	4	6' - 6"	17
d	28	4	H + 9"	S17
e	28	4	2' - 3"	S19
f	2	4	7' - 0"	17

NOTE:
All dimensions are out to out of bars.

Bending Details





DETAIL "X"

DROP INLET-CONCRETE-TYPE B (3'X4')

NOT TO SCALE

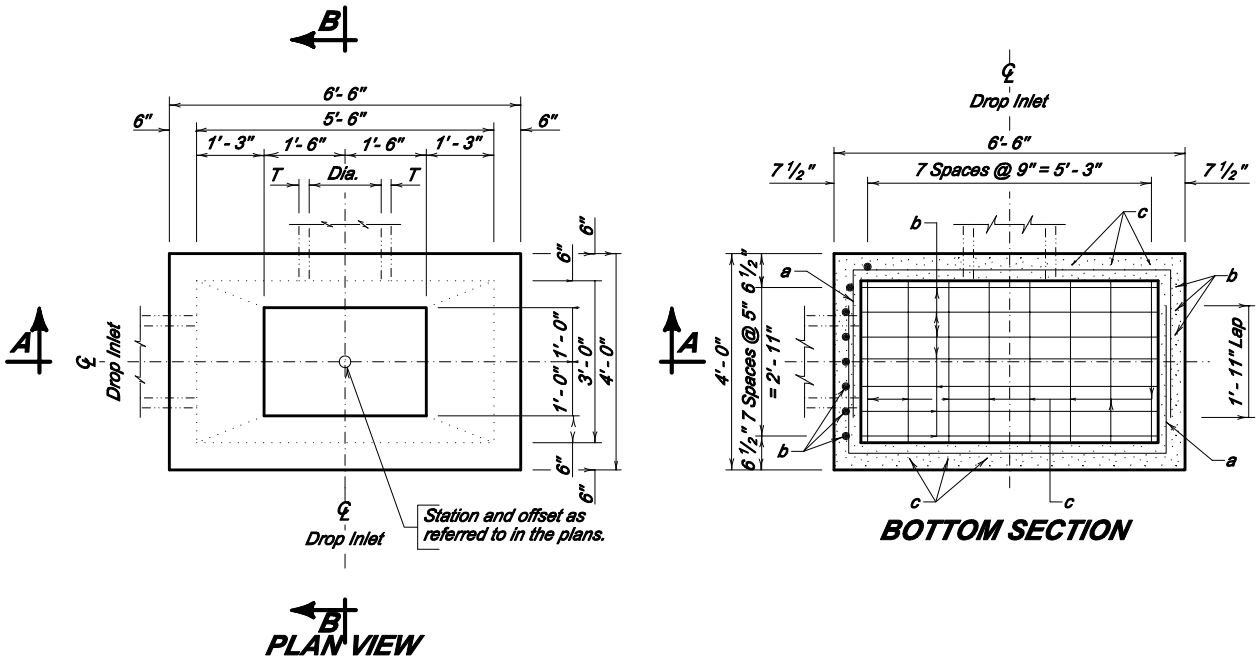
CITY OF BOX ELDER

STANDARD DETAIL RD004

DROP INLET-CONC.-TYPE B-3X4-2

DETAIL #RD004

REVISED 01/2020



ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
* Class M6 Concrete	Cu. Yd.	1.02	0.35H
Reinforcing Steel	Lb.	130.93	31.2H
Frame and Grate Assembly	Each	1	———

DROP INLETS FOR 12" TO 54" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The d and e bars shall be lapped 12 inches with the c and b bars, respectively. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Engineer for approval.

* *Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.*

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter though the corners.

Maximum R.C.P. diameter shall not exceed 24 inches (24 inches for R. C. arch) on the 3-foot wide side and shall not exceed 54 inches (42 inches for R.C. arch) on the 5.5-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

PIPE DISPLACEMENT REDUCTIONS			
	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
	42	4 1/2	0.26
	48	5	0.34
	54	5 1/2	0.43
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09
	30	4	0.14
	36	4 1/2	0.19
	42	4 1/2	0.24

DROP INLET-CONCRETE-TYPE B (3'X5.5')

NOT TO SCALE

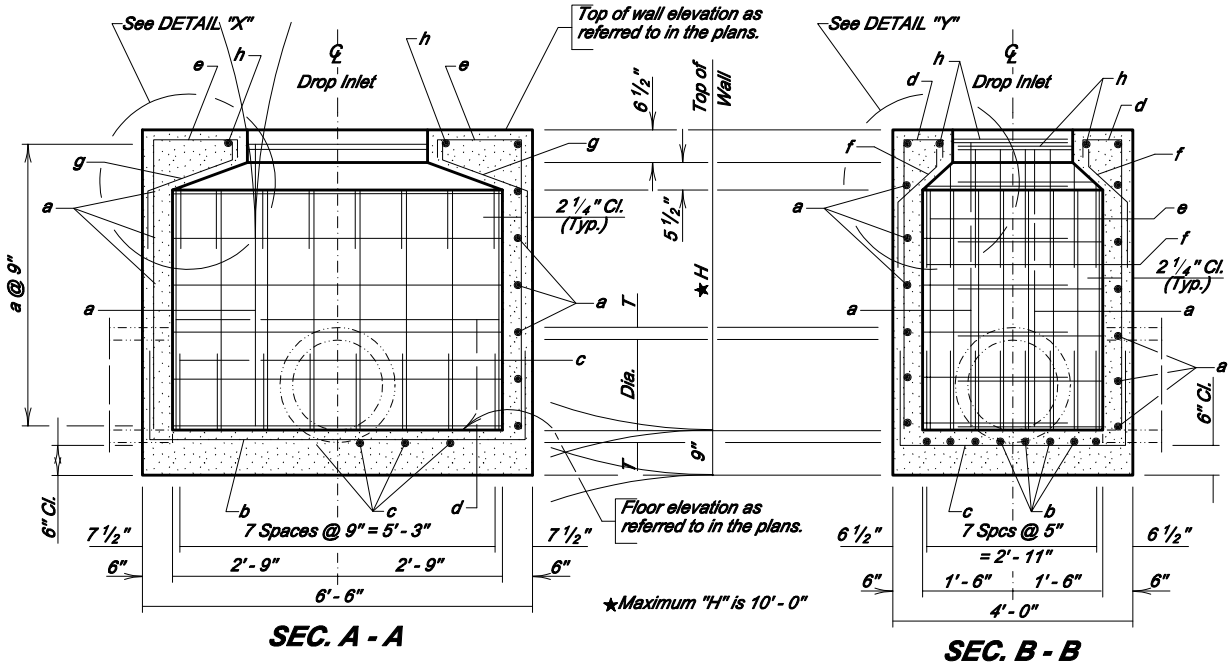
CITY OF BOX ELDER

STANDARD DETAIL RD005

DROP INLET-CONC.-TYPE B-3X5.5-1

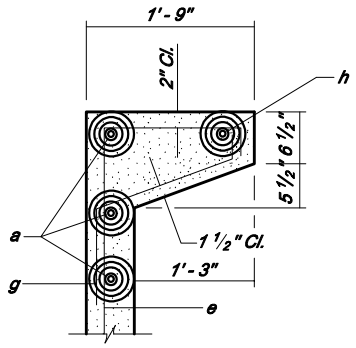
DETAIL #RD005

REVISED 01/2020

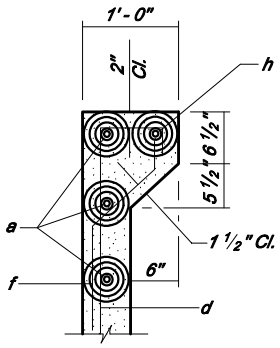


SEC. A - A

SEC. B - B



DETAIL "X"



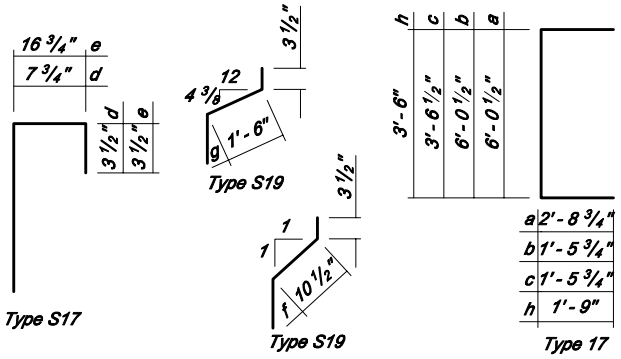
DETAIL "Y"

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a	2.67H	4	11' - 6"	17
b	8	4	9' - 0"	17
c	8	4	6' - 6"	17
d	8	4	H + 9"	S17
e	8	4	H + 18"	S17
f	8	4	2' - 3"	S19
g	8	4	2' - 9"	S19
h	2	4	7' - 0"	17

NOTE:
All dimensions are out to out of bars.

Bending Details



DROP INLET-CONCRETE-TYPE B (3'X5.5')

NOT TO SCALE

CITY OF BOX ELDER

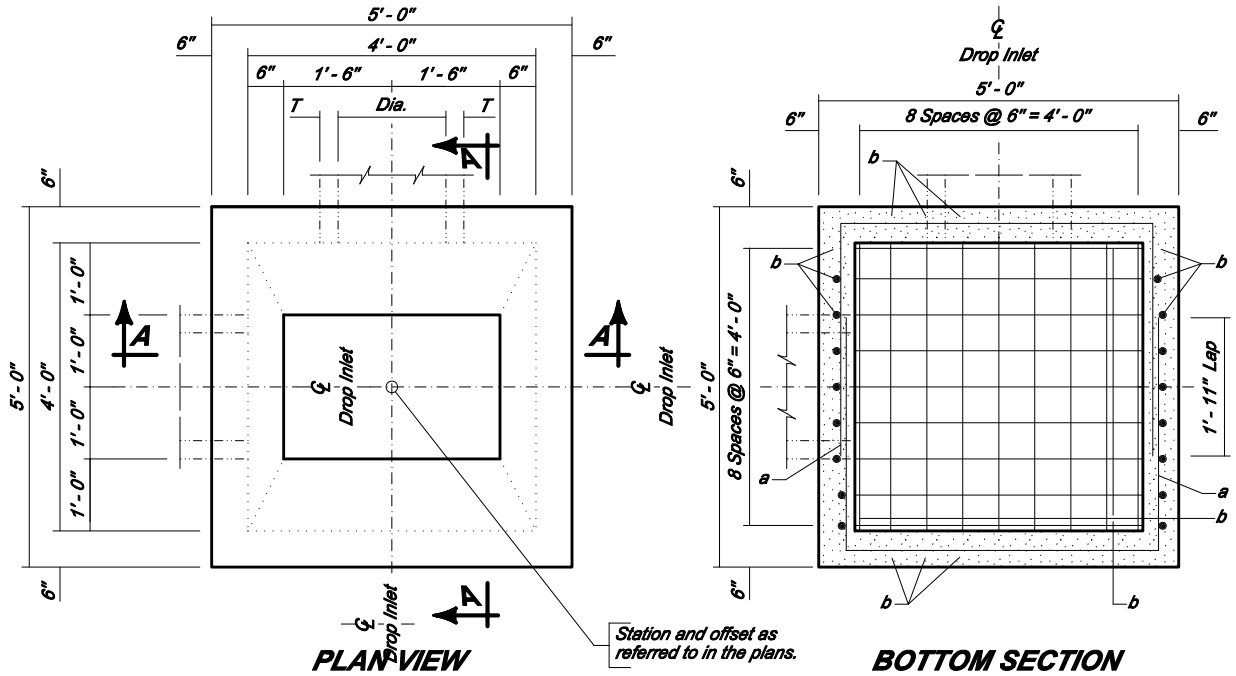
STANDARD DETAIL RD006

DROP INLET-CONC.-TYPE B-3X5.5-2

DETAIL #RD006

REVISED 01/2020

DETAIL RD007-DROP INLET-CONCRETE-TYPE B (4X4)-1



ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
Class M6 Concrete	Cu. Yd.	0.98	0.33H
Reinforcing Steel	Lb.	180.69	43.67H
Frame and Grate Assembly	Each	1	———

DROP INLETS FOR 12" TO 36" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Engineer for approval.

Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

Maximum R.C.P. diameter shall not exceed 36 inches (30 inches for R. C. arch) on the 4-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

PIPE DISPLACEMENT REDUCTIONS			
	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09
	30	4	0.14

DROP INLET-CONCRETE-TYPE B (4'X4')

NOT TO SCALE

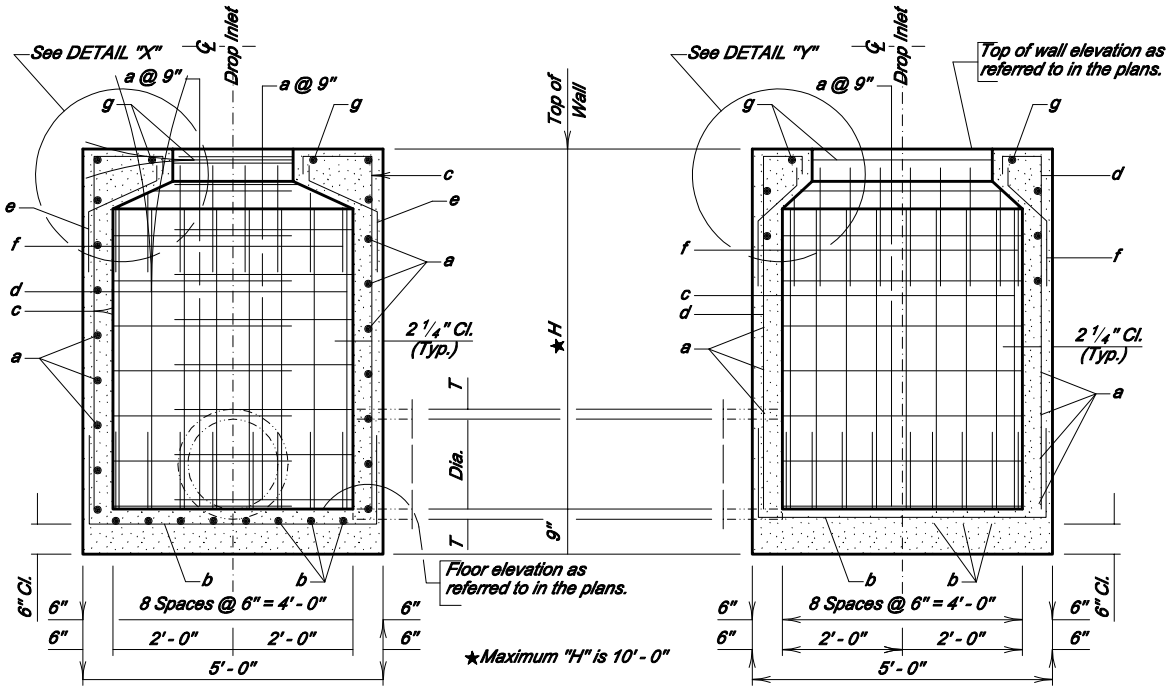
CITY OF BOX ELDER

STANDARD DETAIL RD007

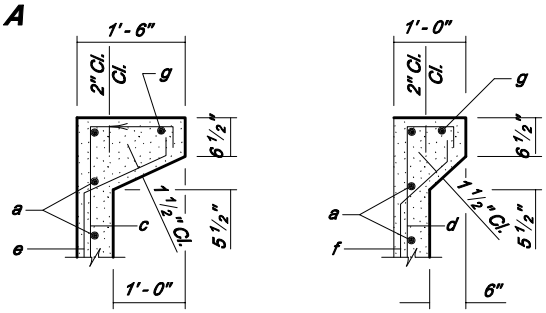
DROP INLET-CONC.-TYPE B-4X4-1

DETAIL #RD007

REVISED 01/2020



SEC. A - A **SEC. B - B**



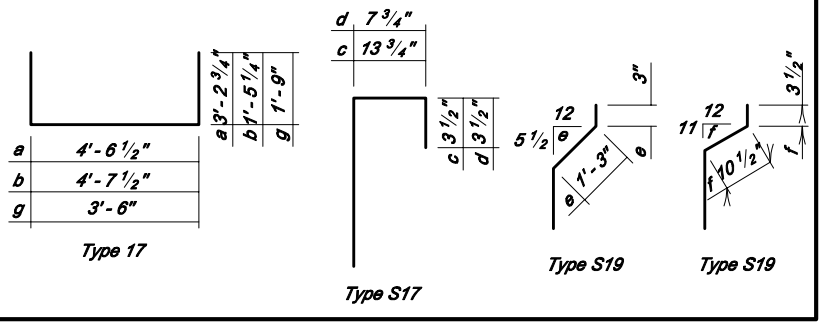
DETAIL "X" **DETAIL "Y"**

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a	2.67H	4	11' - 0"	17
b	18	4	7' - 6"	17
c	18	4	H + 15"	S17
d	18	4	H + 9"	S17
e	18	4	2' - 6"	S19
f	18	4	2' - 3"	S19
g	2	4	7' - 0"	17

NOTE:
All dimensions are out to out of bars.

Bending Details



DROP INLET-CONCRETE-TYPE B (4'X4')

NOT TO SCALE

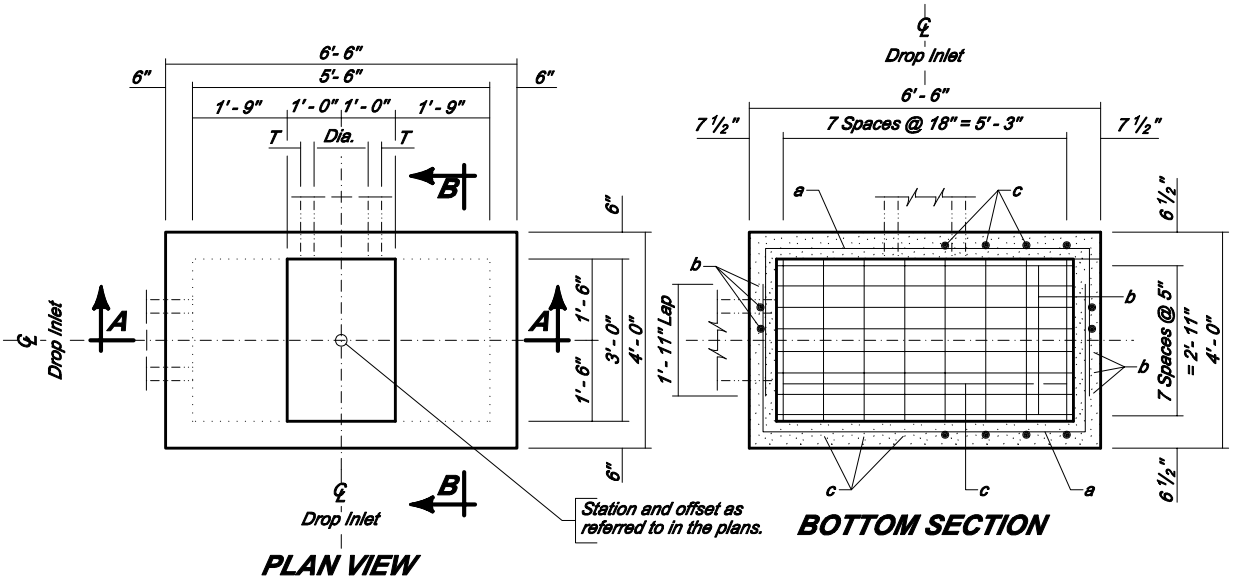
CITY OF BOX ELDER

STANDARD DETAIL RD008

DROP INLET-CONC.-TYPE B-4X4-2

DETAIL #RD008

REVISED 01/2020



ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
Class M6 Concrete	Cu. Yd.	1.03	0.35H
Reinforcing Steel	Lb.	161.19	47.89H
Grate Assembly	Each	1	———

DROP INLETS FOR 12" TO 54" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Engineer for approval.

Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

Maximum R.C.P. diameter shall not exceed 54 inches (42 inches for R. C. arch) on the 5.5-foot wide side and shall not exceed 24 inches (24 inches for R. C. arch) on the 3-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

PIPE DISPLACEMENT REDUCTIONS			
	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 ¼	0.04
	18	2 ½	0.05
	24	3	0.09
	30	3 ½	0.14
	36	4	0.20
	42	4 ½	0.26
	48	5	0.34
	54	5 ½	0.43
R.C. ARCH	18	2 ½	0.05
	24	3 ½	0.09
	30	4	0.14
	36	4 ½	0.19
	42	4 ½	0.24

DROP INLET-CONCRETE-TYPE B (5.5'x3')

NOT TO SCALE

CITY OF BOX ELDER

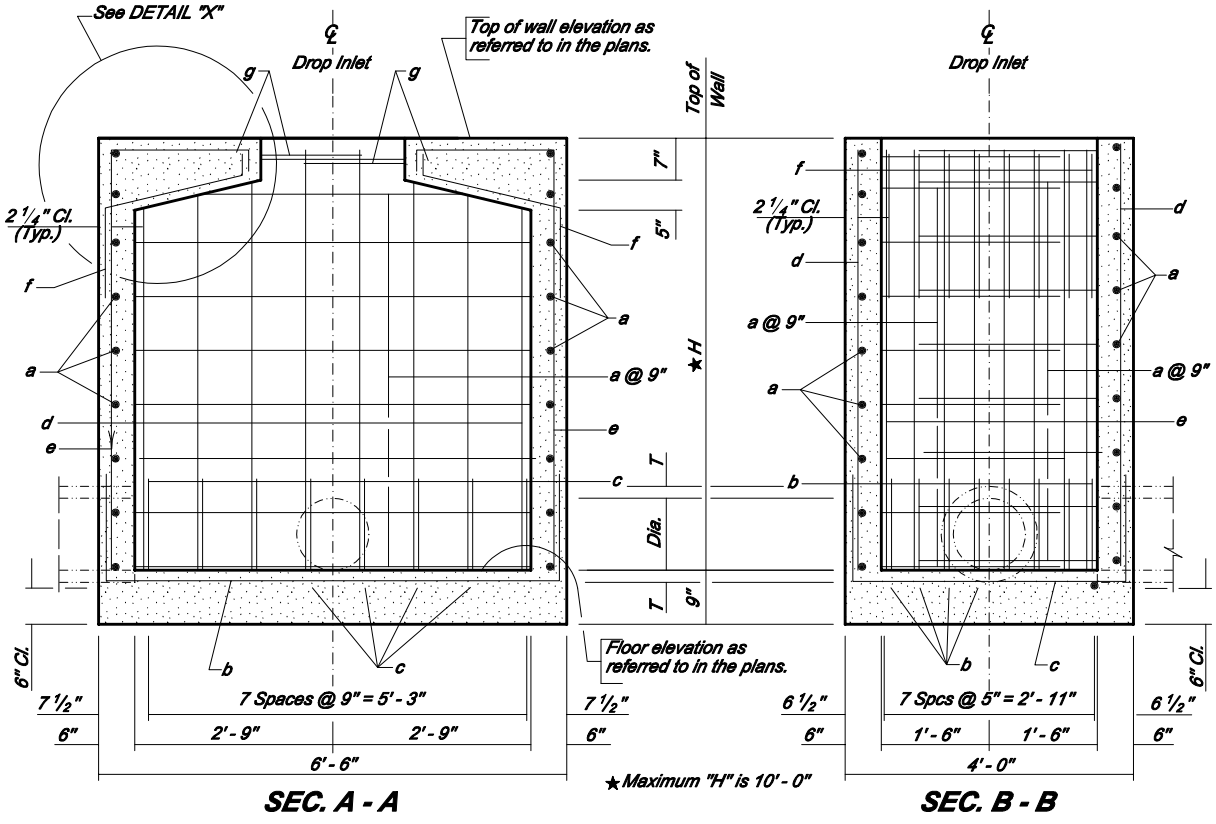
STANDARD DETAIL RD009

DROP INLET-CONC.-TYPE B-5.5X3-1

DETAIL #RD009

REVISED 01/2020

DETAIL RD010-DROP INLET-CONCRETE-TYPE B (5.5X3)-2

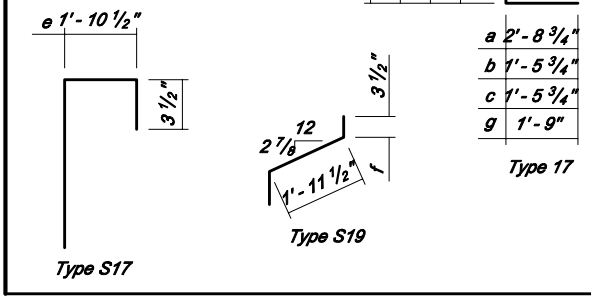


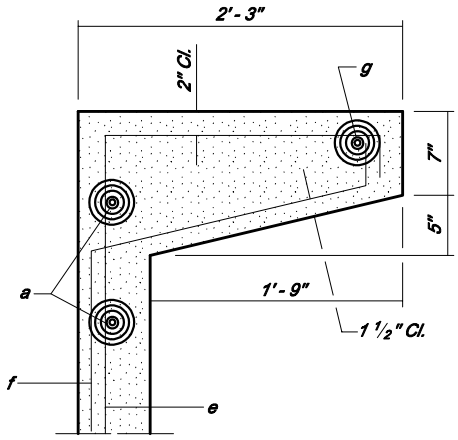
REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a	2.67H	4	11' - 6"	17
b	8	4	9' - 0"	17
c	8	4	6' - 6"	17
d	16	4	H - 2"	Str.
e	16	5	H + 24"	S17
f	16	4	3' - 6"	S19
g	2	4	7' - 0"	17

Bending Details

NOTE:
All dimensions are out to out of bars.





DETAIL "X"

DROP INLET-CONCRETE-TYPE B (5.5'X3')

NOT TO SCALE

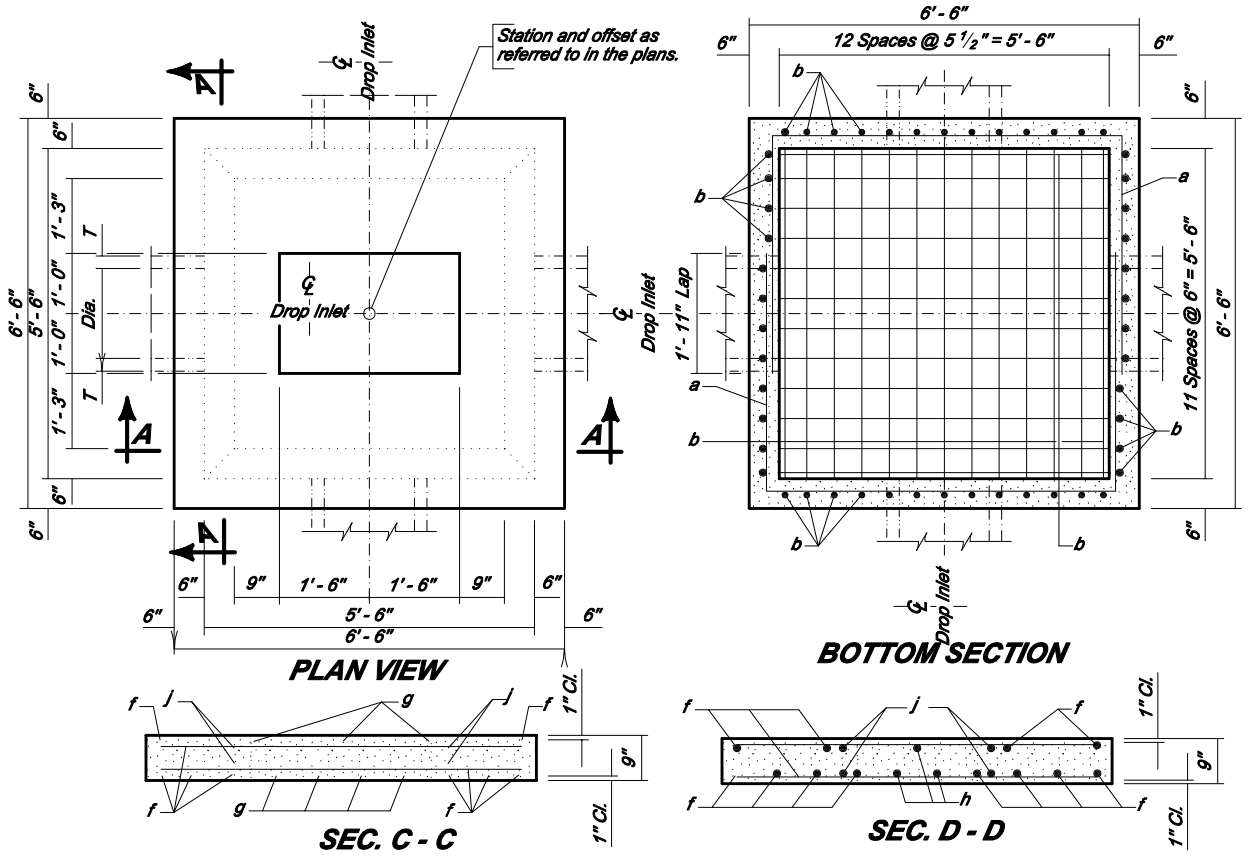
CITY OF BOX ELDER

STANDARD DETAIL RD010

DROP INLET-CONC.-TYPE B-5.5X3-2

DETAIL #RD010

REVISED 01/2020



DROP INLETS FOR 12" TO 54" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The c bars shall be lapped 12 inches with the b bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Engineer for approval.

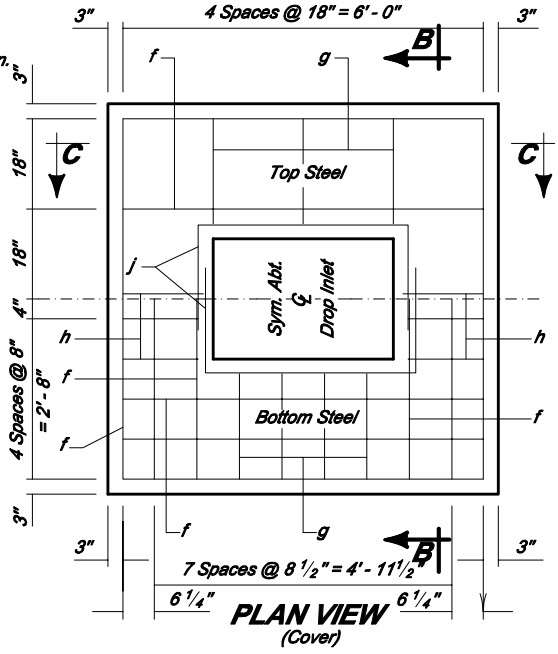
* *Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.*

Apply a thin layer of grout between the drop inlet and cover to ensure uniform bearing. Grout shall conform to the specifications.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

Maximum R.C.P. diameter shall not exceed 54 inches (42 inches for R. C. arch) of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.



DROP INLET-CONCRETE-TYPE B (5.5'X5.5')

NOT TO SCALE

CITY OF BOX ELDER

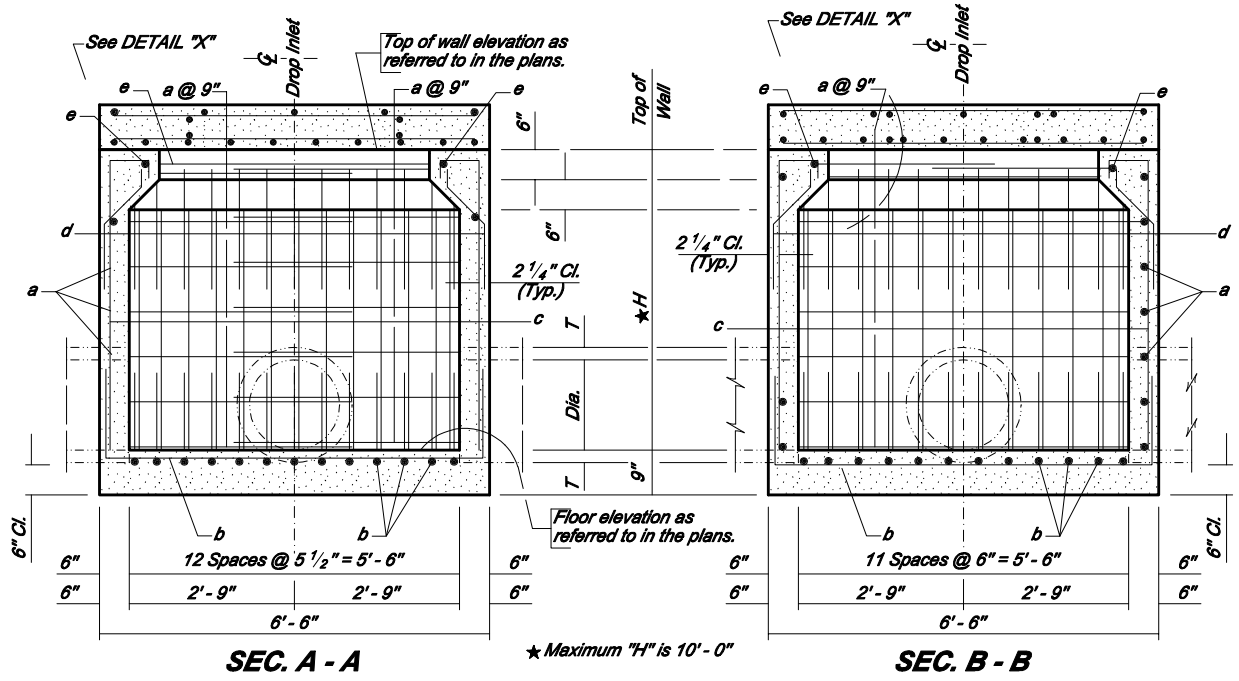
STANDARD DETAIL RD011

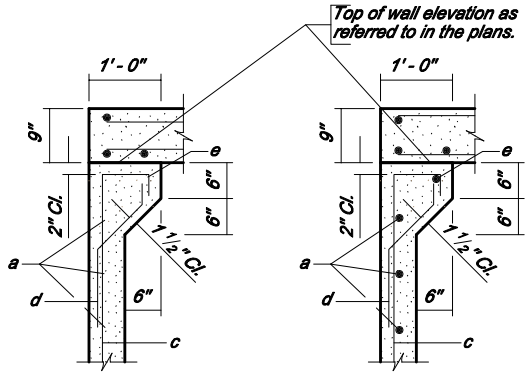
DROP INLET-CONC.-TYPE B-5.5X5.5-1

DETAIL #RD011

REVISED 01/2020

DETAIL RD012-DROP INLET-CONCRETE-TYPE B (5.5X5.5)-2





ESTIMATED QUANTITIES

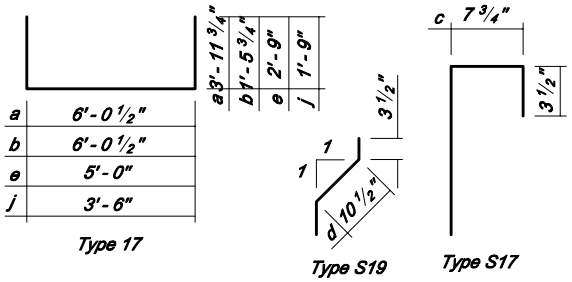
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
Class M6 Concrete	Cu. Yd.	2.46	0.44H
Reinforcing Steel	Lb.	380.09	58.37H
Frame and Grate Assembly	Each	1	———

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a	2.67H	4	14' - 0"	17
b	25	4	9' - 0"	17
c	50	4	H + 9"	S17
d	50	4	2' - 3"	S19
e	2	4	10' - 6"	17
f	18	4	6' - 0"	Str.
g	14	4	1' - 9"	Str.
h	10	4	1' - 3"	Str.
j	4	4	7' - 0"	17

NOTE:
All dimensions are out to out of bars.

Bending Details



PIPE DISPLACEMENT REDUCTIONS

	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
	42	4 1/2	0.26
	48	5	0.34
	54	5 1/2	0.43
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09
	30	4	0.14
	36	4 1/2	0.19
	42	4 1/2	0.24

DROP INLET-CONCRETE-TYPE B (5.5'X5.5')

NOT TO SCALE

CITY OF BOX ELDER

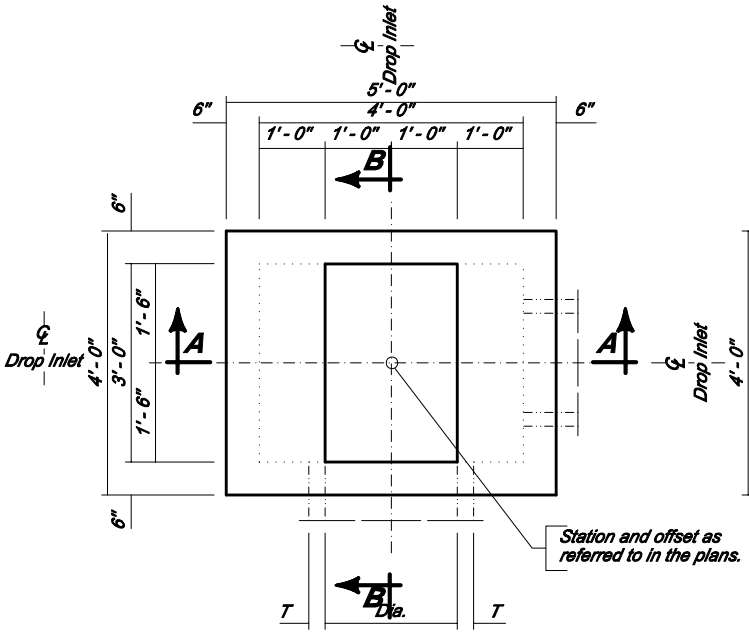
STANDARD DETAIL RD012

DROP INLET-CONC.-TYPE B-5.5X5.5-2

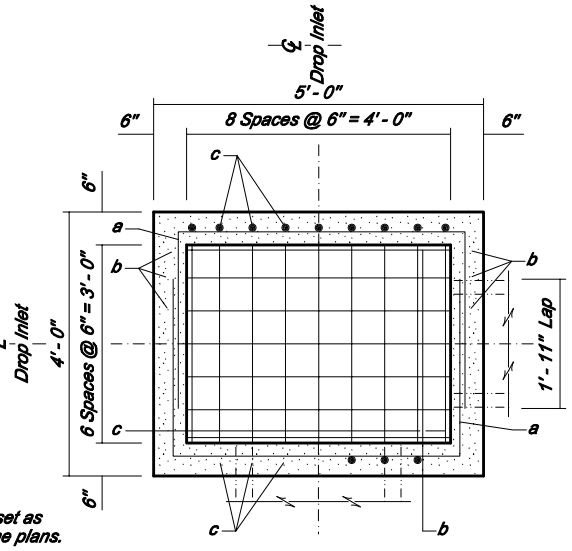
DETAIL #RD012

REVISED 01/2020

DETAIL RD013-DROP INLET-CONCRETE-TYPE B (4X3)-1



PLAN VIEW



BOTTOM SECTION

ESTIMATED QUANTITIES

ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
* Class M6 Concrete	Cu. Yd.	0.58	0.33H
Reinforcing Steel	Lb.	116.24	39.21H
Frame and Grate Assembly	Each	1	———

DROP INLETS FOR 12" TO 36" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The d and e bars shall be lapped 12 inches with the c and b bars, respectively. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Engineer.

* Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

PIPE DISPLACEMENT REDUCTIONS

	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09
	30	4	0.14

Maximum R.C.P. diameter shall not exceed 36 inches (30 inches for R. C. arch) on the 4-foot wide side and shall not exceed 24 inches (24 inches for R. C. arch)on the 3-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

DROP INLET-CONCRETE-TYPE B (4'X3')

NOT TO SCALE

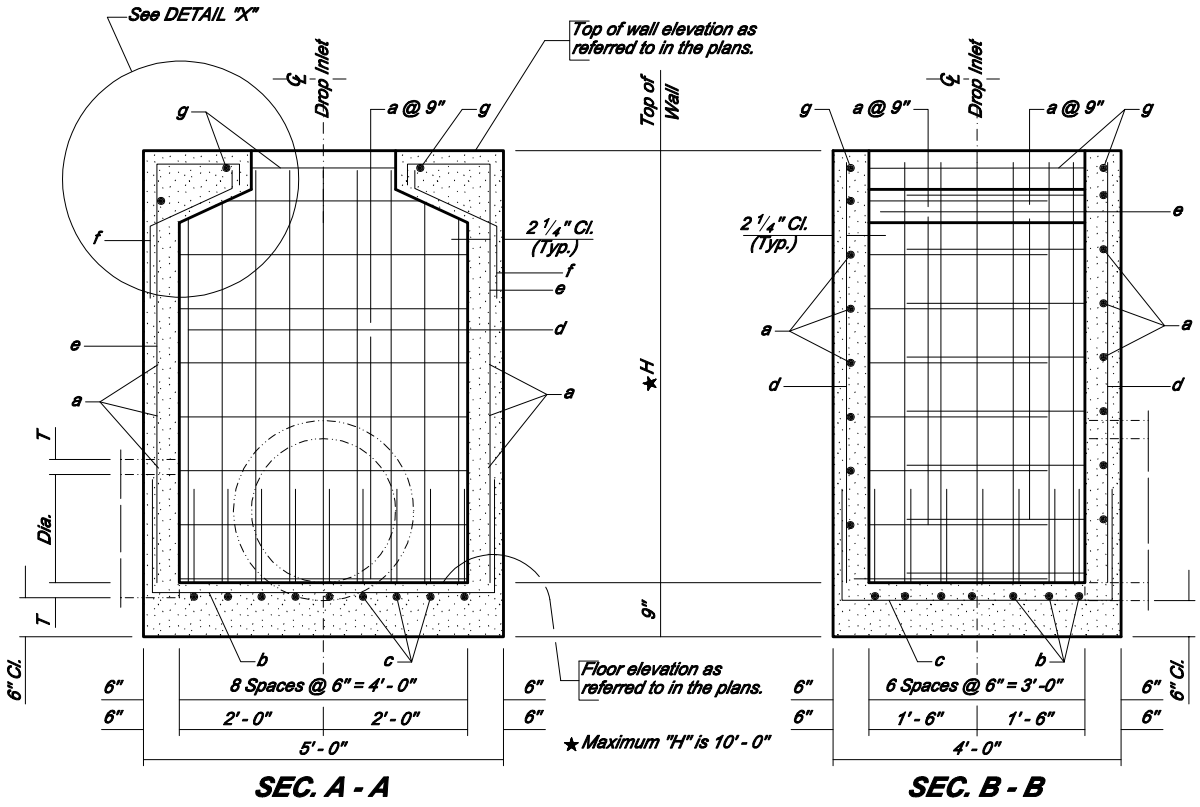
CITY OF BOX ELDER

STANDARD DETAIL RD013

DROP INLET-CONC.-TYPE B-4X3-1

DETAIL #RD013

REVISED 01/2020

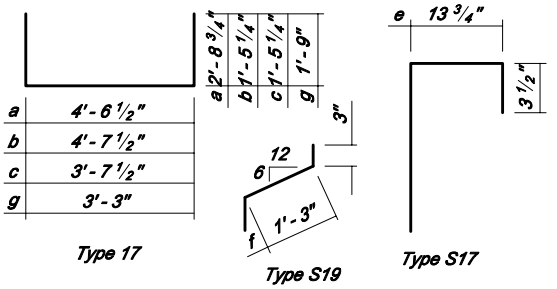


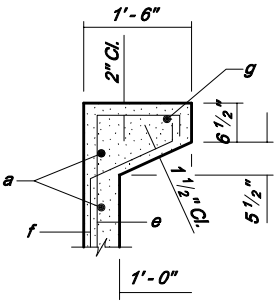
REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a	2.67H	4	10'-0"	17
b	7	4	7'-6"	17
c	9	4	6'-6"	17
d	18	4	H-2"	Str.
e	14	4	H+15"	S17
f	14	4	2'-6"	S19
g	2	4	6'-9"	17

NOTE:
All dimensions are out to out of bars.

Bending Details





DROP INLET-CONCRETE-TYPE B (4'X3')
NOT TO SCALE

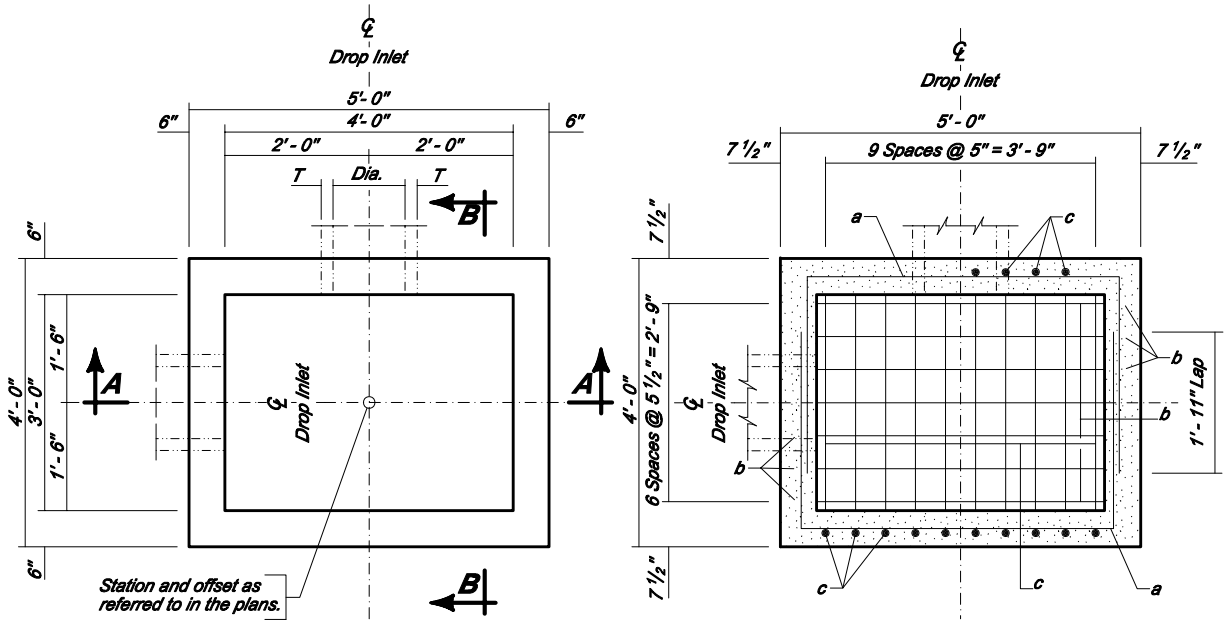
CITY OF BOX ELDER

STANDARD DETAIL RD014

DROP INLET-CONC.-TYPE B-4X3-2

DETAIL #RD014

REVISED 01/2020



ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
* Class M6 Concrete	Cu. Yd.	0.43	0.30H
Reinforcing Steel	Lb.	90.90	40.53H
Frame and Grate Assembly	Each	1	———

DROP INLETS FOR 12" TO 36" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Engineer for approval.

* Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

PIPE DISPLACEMENT REDUCTIONS			
	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 ¼	0.04
	18	2 ½	0.05
	24	3	0.09
	30	3 ½	0.14
	36	4	0.20
R.C. ARCH	18	2 ½	0.05
	24	3 ½	0.09
	30	4	0.14

Maximum R.C.P. diameter shall not exceed 24 inches (24 inches for R. C. arch) on the 3-foot wide side and shall not exceed 36 inches (30 inches for R. C. arch)on the 4-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

DROP INLET-CONCRETE-TYPE C (3'X4')

NOT TO SCALE

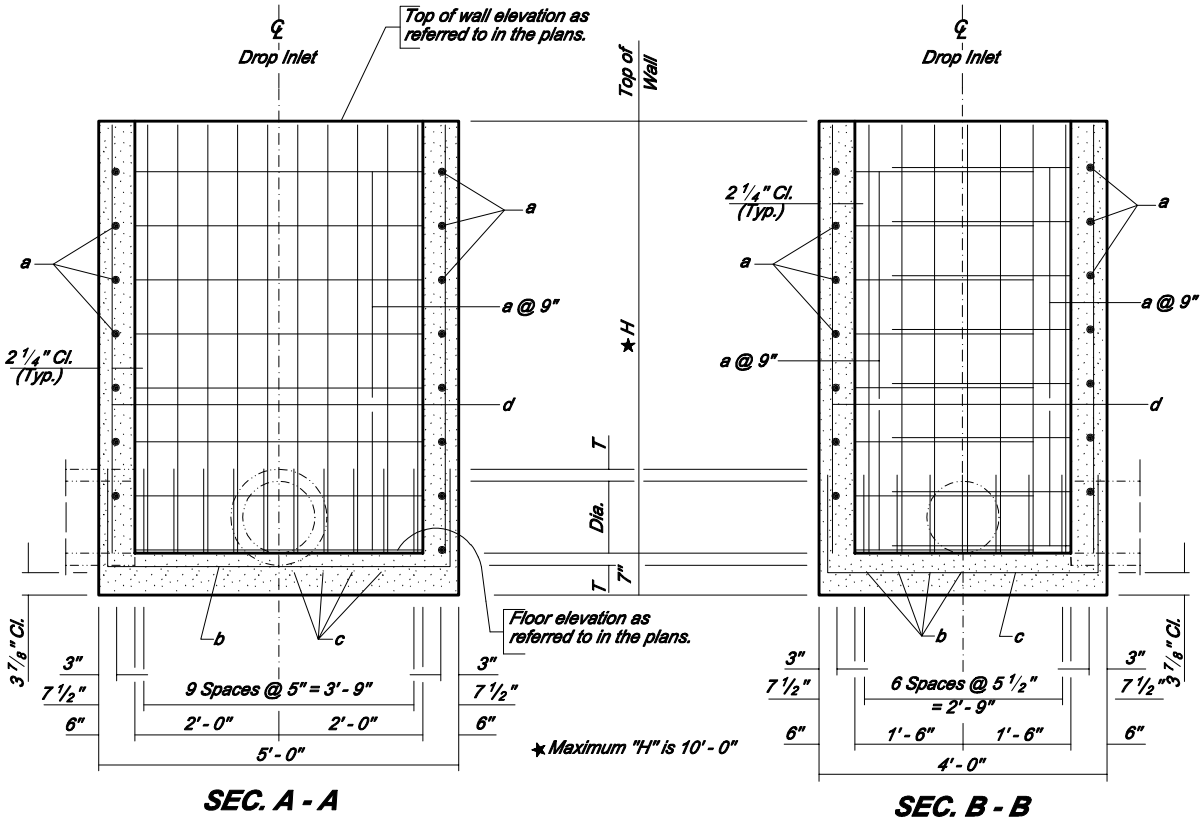
CITY OF BOX ELDER

STANDARD DETAIL RD015

DROP INLET-CONC.-TYPE C-3X4-1

DETAIL #RD015

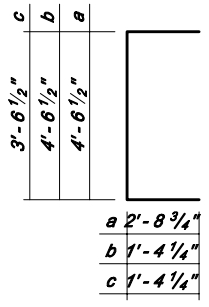
REVISED 01/2020



REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a	2.67H	4	10' - 0"	17	
b	7	5	7' - 3"	17	
c	10	4	6' - 3"	17	
d	34	4	H - 2"	Str.	

NOTE:
All dimensions are out to out of bars.



DROP INLET-CONCRETE-TYPE C (3'X4')

NOT TO SCALE

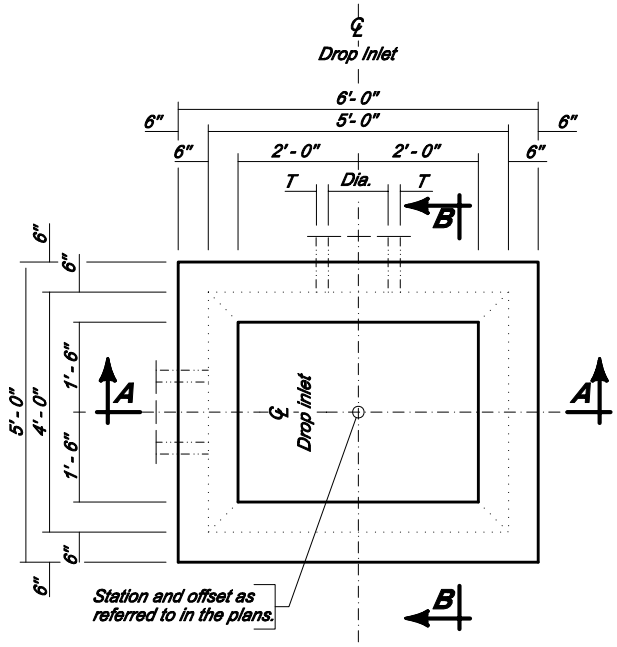
CITY OF BOX ELDER

STANDARD DETAIL RD016

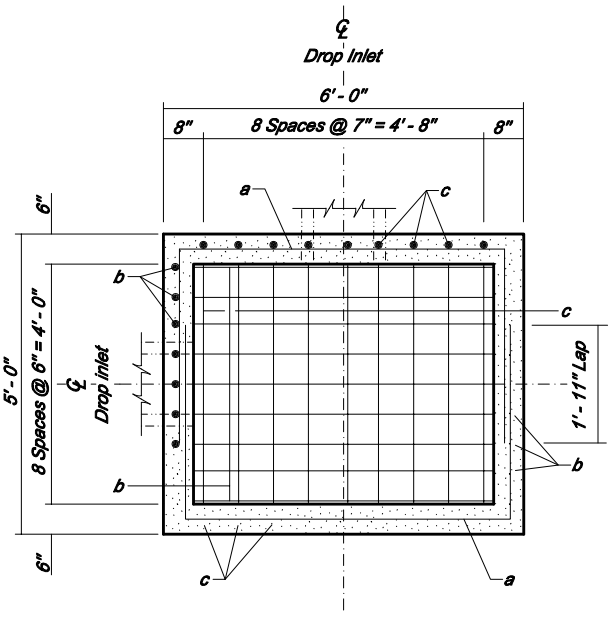
DROP INLET-CONC.-TYPE C-3X4-2

DETAIL #RD016

REVISED 01/2020



PLAN VIEW



BOTTOM SECTION

ESTIMATED QUANTITIES

ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
* Class M6 Concrete	Cu. Yd.	1.06	0.37H
Reinforcing Steel	Lb.	180.36	45.43H
Frame and Grate Assembly	Each	1	———

DROP INLETS FOR 12" TO 48" DIAMETER PIPE

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel shall conform to ASTM A615 grade 60. The d bars shall be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Drop inlet may be precast. If precast drop inlet details differ from this standard plate, submit a checked design done by a SD registered P.E. and Engineer for approval.

* Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

PIPE DISPLACEMENT REDUCTIONS

	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
	42	4 1/2	0.26
	48	5	0.34
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09
	30	4	0.14
	36	4 1/2	0.19

Maximum R.C.P. diameter shall not exceed 36 inches (30 inches for R. C. arch) on the 4-foot wide side and shall not exceed 48 inches (36 inches for R. C. arch)on the 5-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

DROP INLET-CONCRETE-TYPE C (4'X5')

NOT TO SCALE

CITY OF BOX ELDER

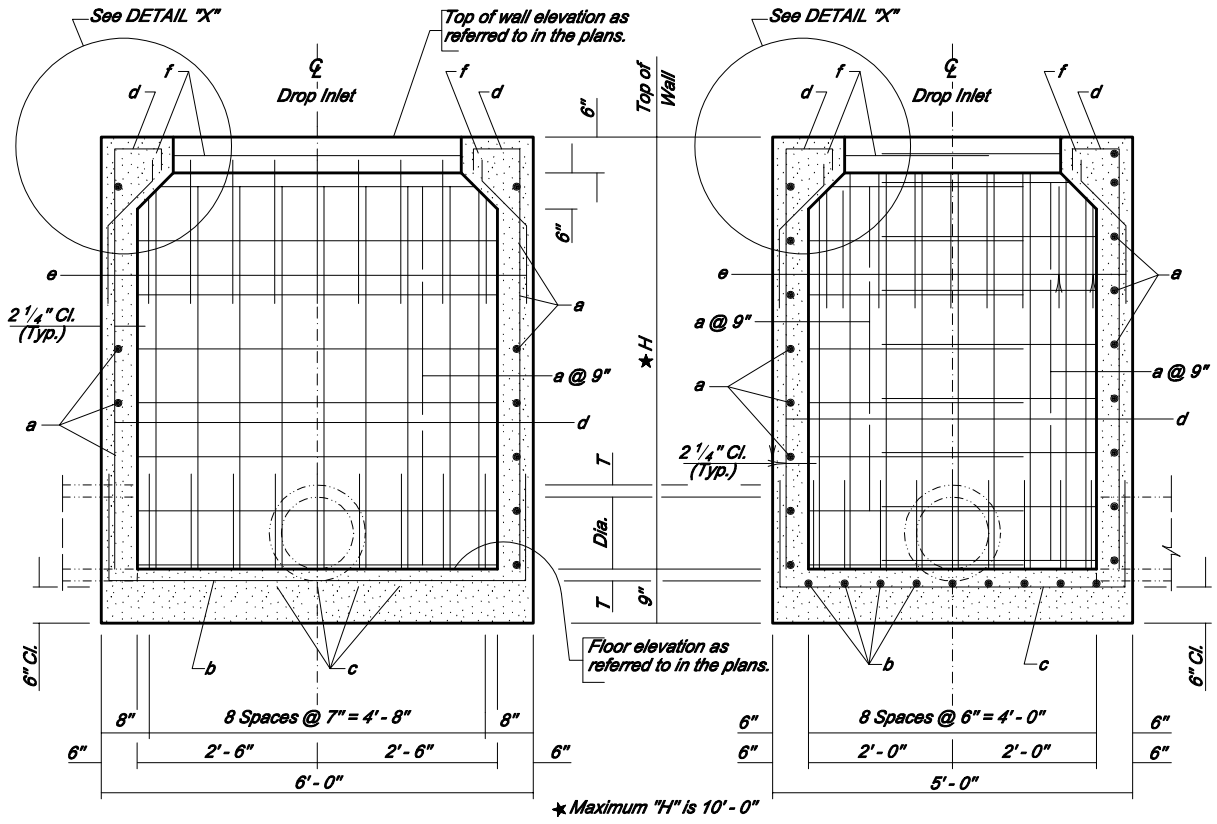
STANDARD DETAIL RD017

DROP INLET-CONC.-TYPE C-4X5-1

DETAIL #RD017

REVISED 01/2020

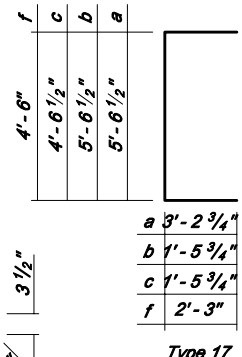
DETAIL RD018-DROP INLET-CONCRETE-TYPE C (4X5)-2

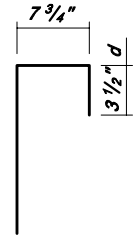


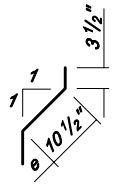
REINFORCING SCHEDULE

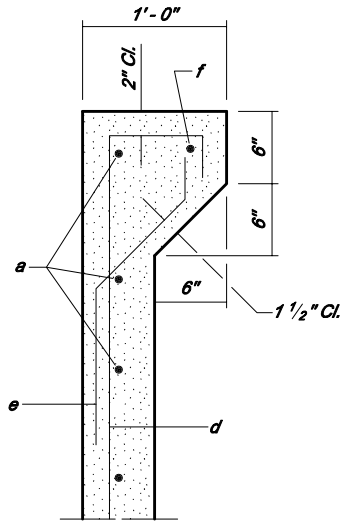
Mk.	No.	Size	Length	Type	Bending Details
a	2.67H	4	12' - 0"	17	
b	9	4	8' - 6"	17	
c	9	4	7' - 6"	17	
d	36	4	H + 9"	S17	
e	36	4	2' - 3"	S19	
f	2	4	9' - 0"	17	

NOTE:
All dimensions are out to out of bars.









DETAIL "X"

DROP INLET-CONCRETE-TYPE C (4'X5')

NOT TO SCALE

CITY OF BOX ELDER

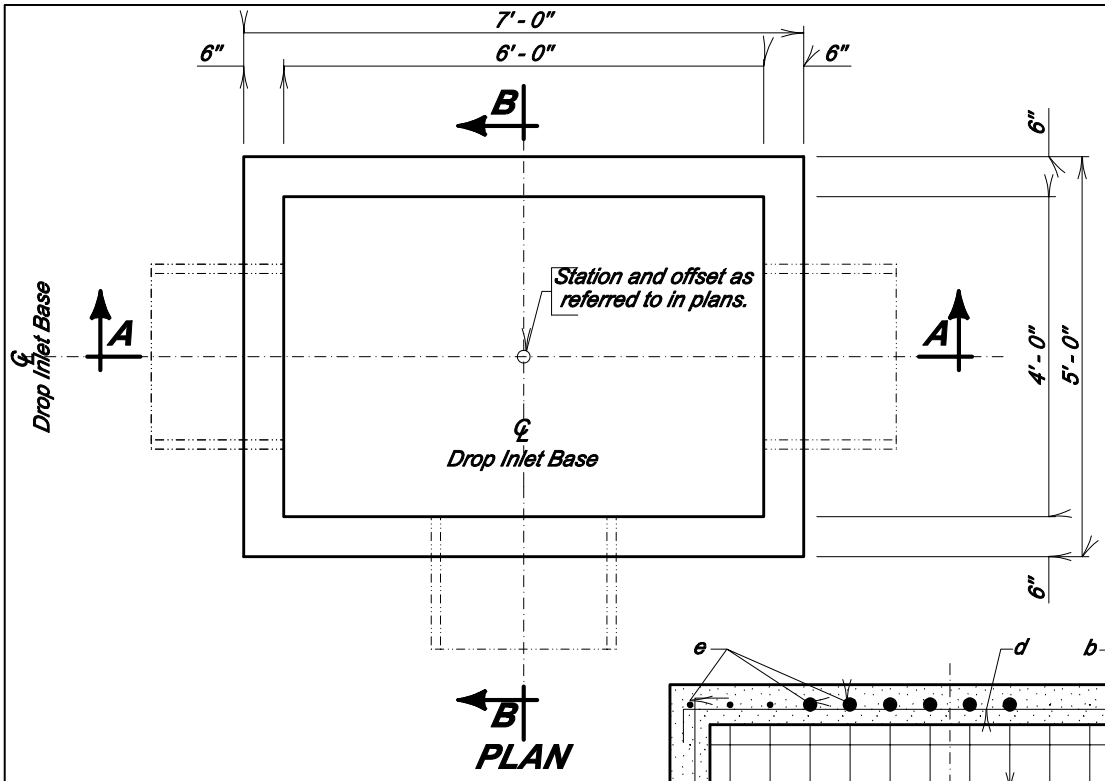
STANDARD DETAIL RD018

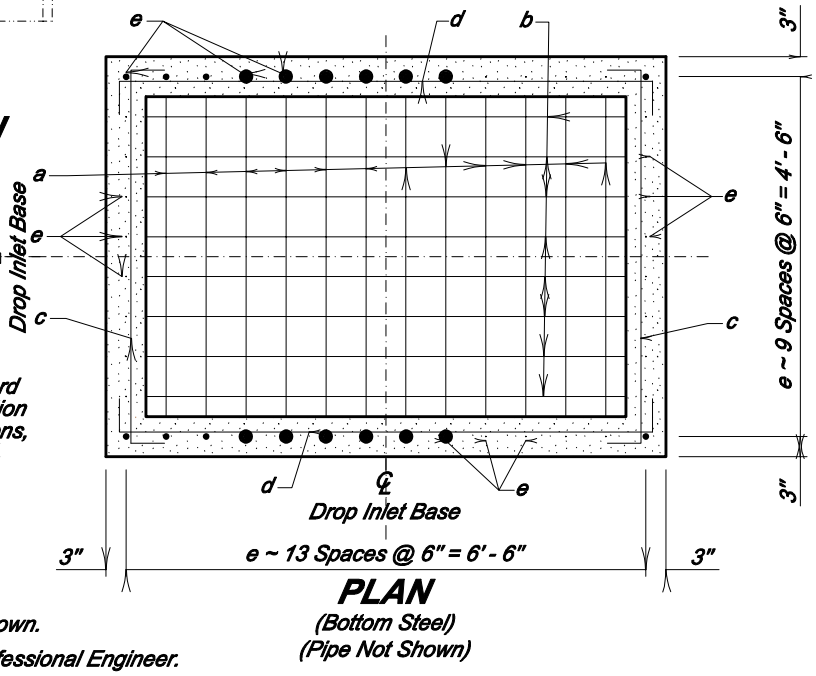
DROP INLET-CONC.-TYPE C-4X5-2

DETAIL #RD018

REVISED 01/2020

DETAIL RD019-DROP INLET-CONCRETE-TYPE S (4X6)-1





SPECIFICATIONS:

1. Design Specifications: AASHTO LRFD Bridge Design Specifications current edition.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Base is intended for use with a Precast Concrete Type S Drop Inlet Lid. Base may be precast. If precast base used, and details differ from that shown.
3. Design shall be by a South Dakota Registered Professional Engineer.
4. Reduce total quantities of concrete by the amount of concrete displaced by the pipe. The total quantity of concrete shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.
5. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
6. Maximum R.C.P. diameter shall not exceed 36 inches (30 inches for R.C. Arch) on the 4-foot wide side and shall not exceed 54 inches (48 inches for R.C. Arch) on the 6-foot wide side of the Drop Inlet.
7. Reinforcing steel shall conform to ASTM A615 Grade 60. Cut and bend reinforcing steel as required to place pipe(s) through the inlet wall.
8. Use 1 inch clear cover on all reinforcing steel unless otherwise noted.
9. The dimension of H is in feet. Maximum H is 8 feet.

DROP INLET-CONCRETE-TYPE S (4'X6')

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RD019

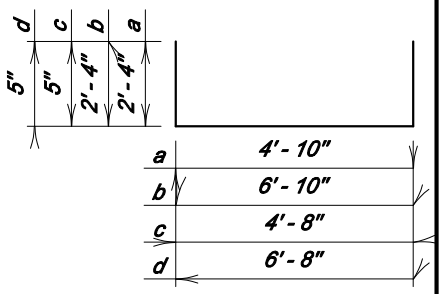
DROP INLET-CONC.-TYPE S-4X6-1

DETAIL #RD019

REVISED 01/2020

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details
a	14	5	9' - 6"	17	
b	10	5	11' - 6"	17	
c	2H	4	5' - 6"	17	
d	2H	4	7' - 6"	17	
e	44	4	H - 2"	Str.	



Type 17

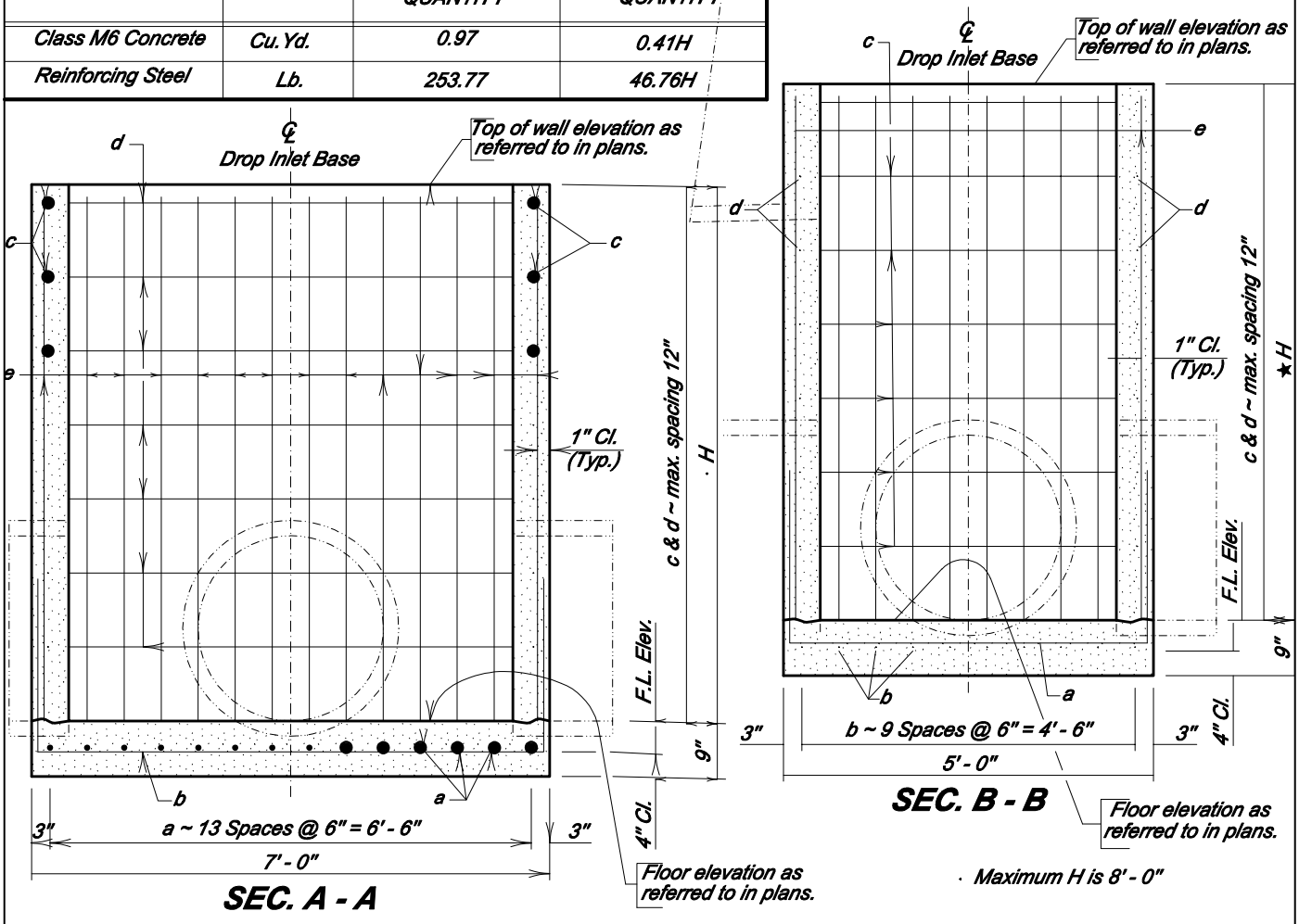
NOTE:
All dimensions are out to out of bars

PIPE DISPLACEMENT REDUCTIONS

	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
	42	4 1/2	0.26
	48	5	0.34
	54	5 1/2	0.43
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09
	30	4	0.14
	36	4 1/2	0.19
	42	4 1/2	0.24
	48	5	0.32

ESTIMATED QUANTITIES

ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
Class M6 Concrete	Cu. Yd.	0.97	0.41H
Reinforcing Steel	Lb.	253.77	46.76H



DROP INLET-CONCRETE-TYPE S (4'X6')

NOT TO SCALE

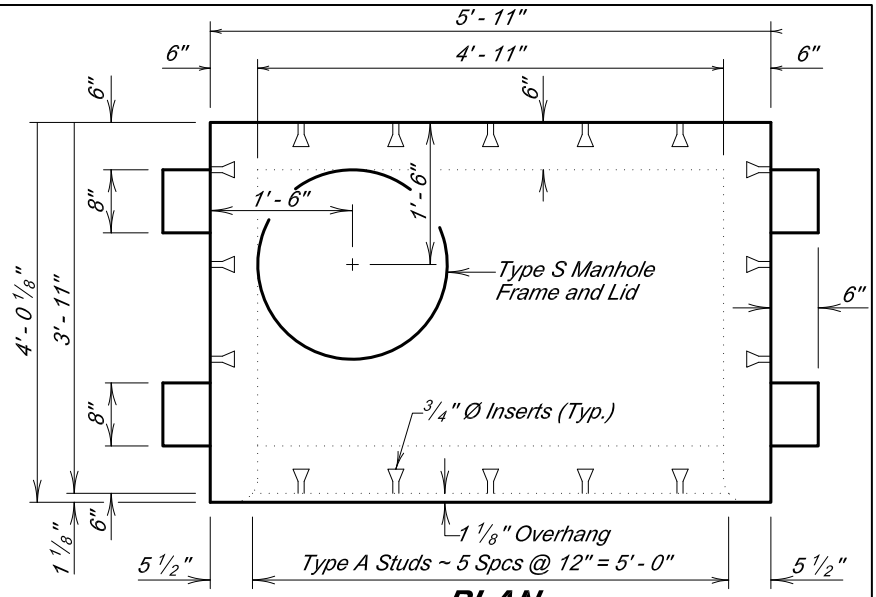
CITY OF BOX ELDER

STANDARD DETAIL RD020

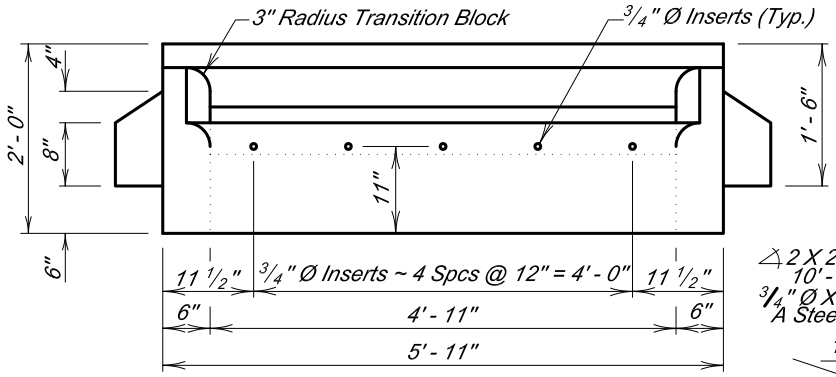
DROP INLET-CONC.-TYPE S-4X6-2

DETAIL #RD020

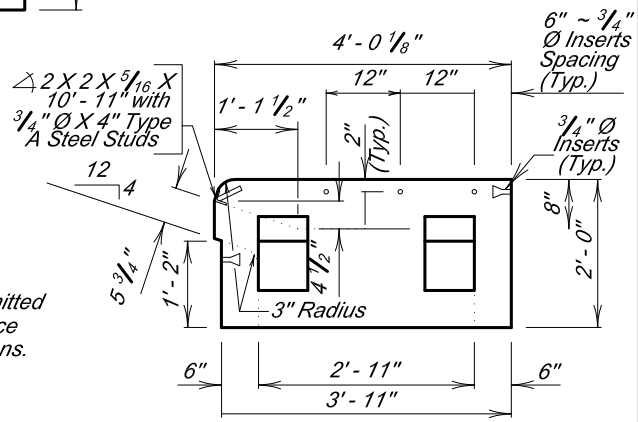
REVISED 01/2020



PLAN



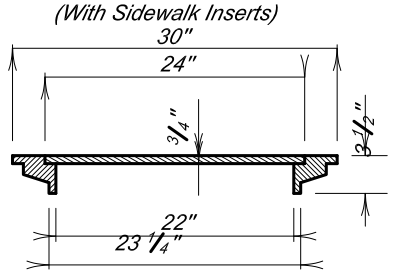
ELEVATION



SIDE VIEW
(With Sidewalk Inserts)

GENERAL NOTES:

1. The Precast Concrete Type S Drop Inlet Lid and the shims shall be submitted by a SD Registered Professional Engineer. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
2. Design Live Load shall be HL - 93.
3. Concrete mix shall be as per fabricators design, however, minimum compressive strength shall not be less than 4500 psi. Type II Cement is required.
4. The Type S Manhole Frame and Lid shall conform to AASHTO M105, Class 30.
5. Structural Steel shall conform to ASTM A36. The 3/4 inch diameter Headed Type A Steel Studs shall comform to Section 7 of the current edition of AWS DI. I Structural Steel Welding Code.
6. The 3/4 inch diameter Concrete Inserts shall be galvanized or made of a corrosion resistant material. Provide 3/4 inch diameter x 1' - 6" long dowels conforming to ASTM A615, Gr. 60 threaded to fit Inserts with each lid.
7. All costs associated with furnishing and installing the Precast Concrete Type S Drop Inlet Lid including the type S manhole frame and lid, shims, inserts, and dowels shall be included in the contract unit price per each for " 4' x 6' Precast Concrete Type S Drop Inlet Lid ".



TYPICAL SECTION THROUGH TYPE S MANHOLE FRAME AND LID
(Weight 140 Lbs.)

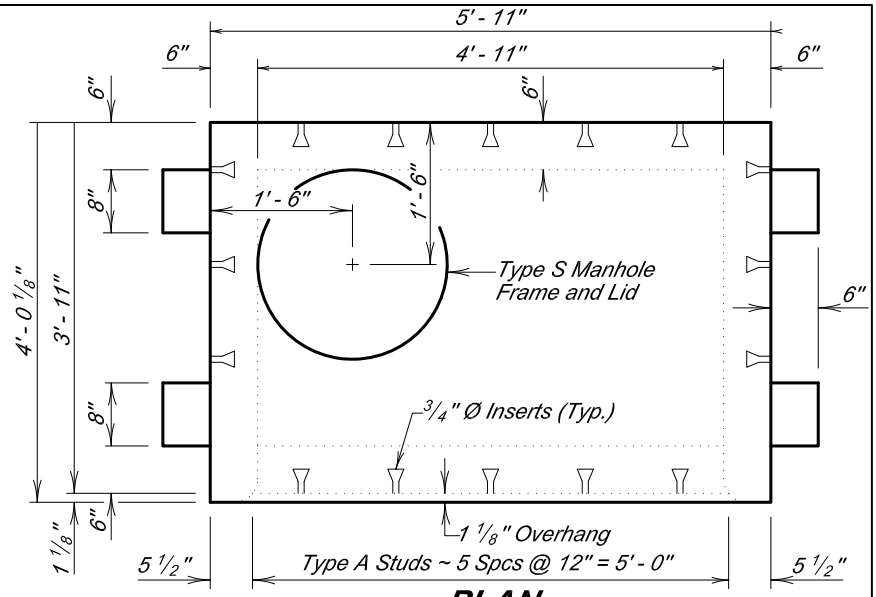
DROP INLET-CONCRETE-TYPE S (4'X6')
NOT TO SCALE

CITY OF BOX ELDER

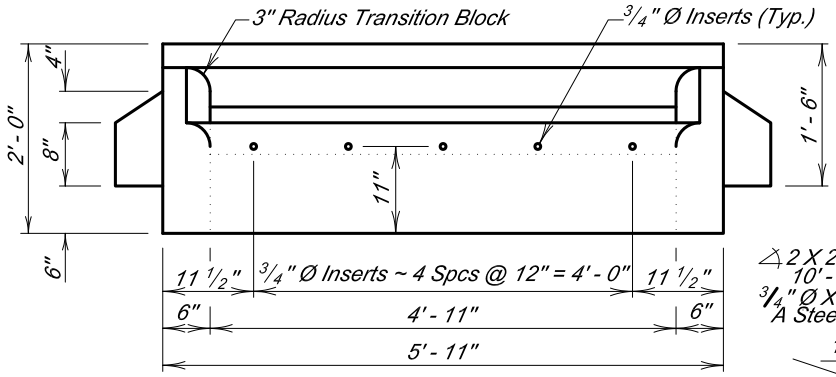
STANDARD DETAIL RD021

DROP INLET-CONC.-TYPE S-4X6-3

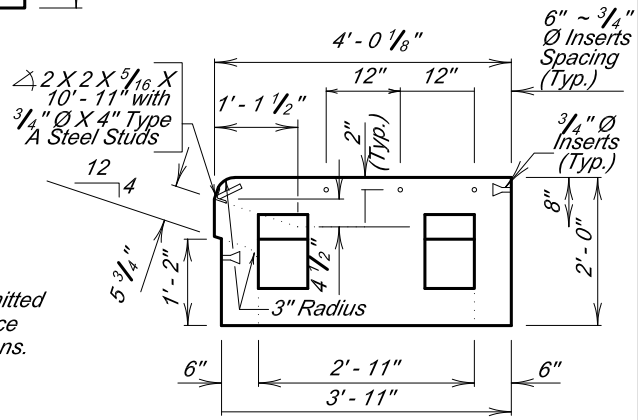
DETAIL #RD021 REVISED 01/2020



PLAN



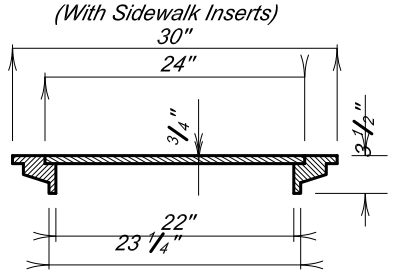
ELEVATION



SIDE VIEW
(With Sidewalk Inserts)

GENERAL NOTES:

1. The Precast Concrete Type S Drop Inlet Lid and the shims shall be submitted by a SD Registered Professional Engineer. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
2. Design Live Load shall be HL - 93.
3. Concrete mix shall be as per fabricators design, however, minimum compressive strength shall not be less than 4500 psi. Type II Cement is required.
4. The Type S Manhole Frame and Lid shall conform to AASHTO M105, Class 30.
5. Structural Steel shall conform to ASTM A36. The 3/4 inch diameter Headed Type A Steel Studs shall comform to Section 7 of the current edition of AWS DI. I Structural Steel Welding Code.
6. The 3/4 inch diameter Concrete Inserts shall be galvanized or made of a corrosion resistant material. Provide 3/4 inch diameter x 1' - 6" long dowels conforming to ASTM A615, Gr. 60 threaded to fit Inserts with each lid.
7. All costs associated with furnishing and installing the Precast Concrete Type S Drop Inlet Lid including the type S manhole frame and lid, shims, inserts, and dowels shall be included in the contract unit price per each for " 4' x 6' Precast Concrete Type S Drop Inlet Lid ".



TYPICAL SECTION THROUGH TYPE S MANHOLE FRAME AND LID
(Weight 140 Lbs.)

DROP INLET-CONCRETE-TYPE S (4'X6')
NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RD022

DROP INLET-CONC.-TYPE S-4X11-1

DETAIL #RD022 REVISED 01/2020

DETAIL RD023-DROP INLET-CONCRETE-TYPE S (4X11)-2

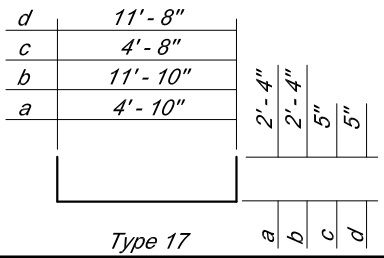
PIPE DISPLACEMENT REDUCTIONS

	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.05
	24	3	0.09
	30	3 1/2	0.14
	36	4	0.20
	42	4 1/2	0.26
	48	5	0.34
	54	5 1/2	0.43
	60	6	0.52
R.C. ARCH	18	2 1/2	0.05
	24	3 1/2	0.09
	30	4	0.14
	36	4 1/2	0.19
	42	4 1/2	0.24
	48	5	0.32
	54	5 1/2	0.39
	60	6	0.49
	72	7	0.70
	84	8	0.93

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
a	24	5	9' - 6"	17
b	10	5	16' - 6"	17
c	2H	4	5' - 6"	17
d	2H	4	12' - 6"	17
e	64	4	H - 2"	Str.

Bending Details

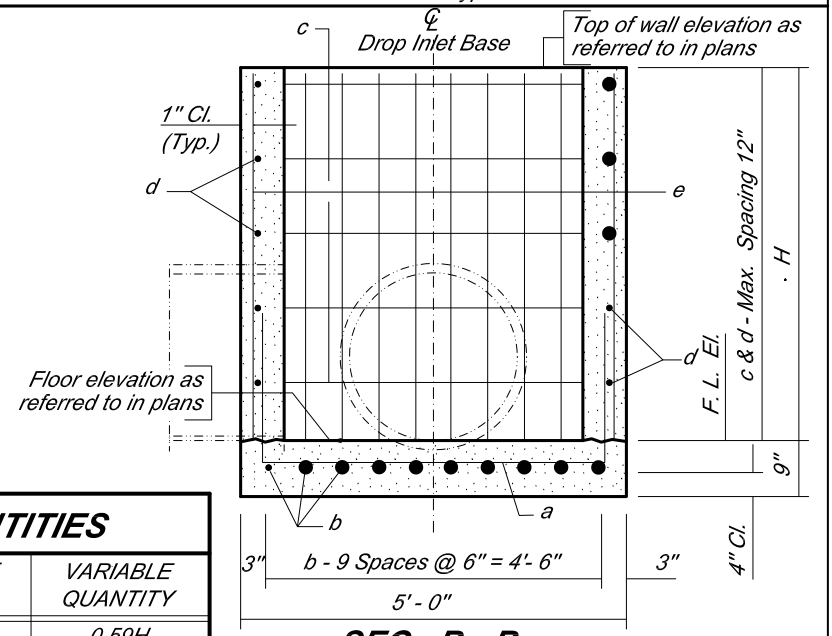


Type 17

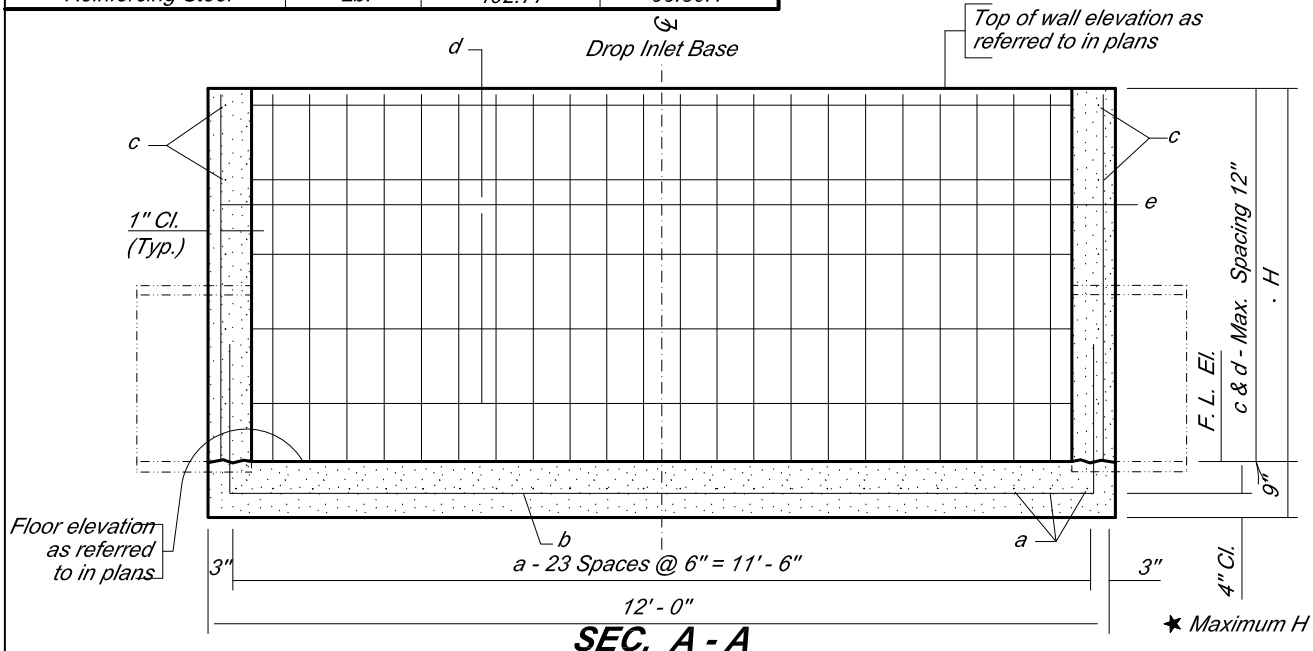
NOTE:
All dimensions are out to out of bars.

ESTIMATED QUANTITIES

ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
✳ Class M6 Concrete	Cu. Yd.	1.67	0.59H
Reinforcing Steel	Lb.	402.77	66.80H



SEC. B - B



SEC. A - A

✱ Maximum H is 8' - 0"

DROP INLET-CONCRETE-TYPE S (4'X11')

NOT TO SCALE

CITY OF BOX ELDER

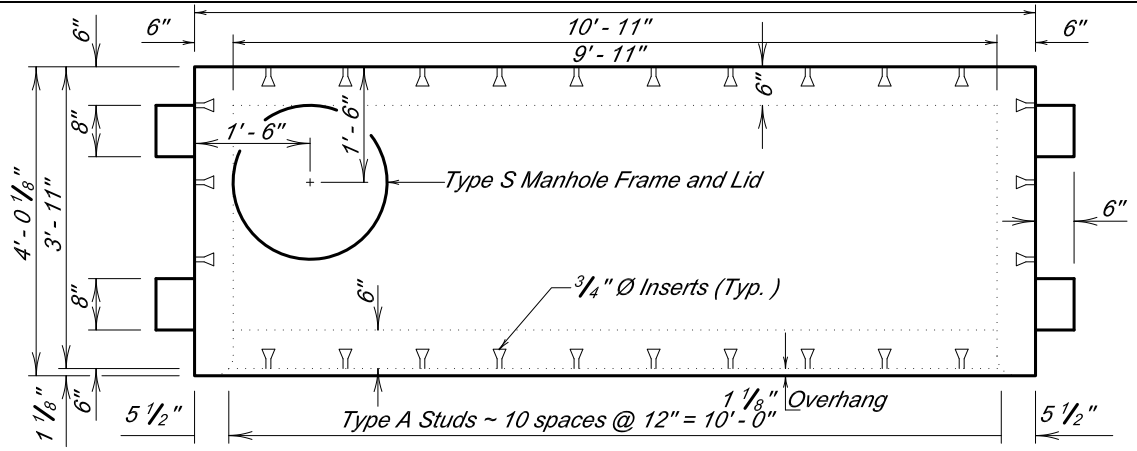
STANDARD DETAIL RD023

DROP INLET-CONC.-TYPE S-4X11-2

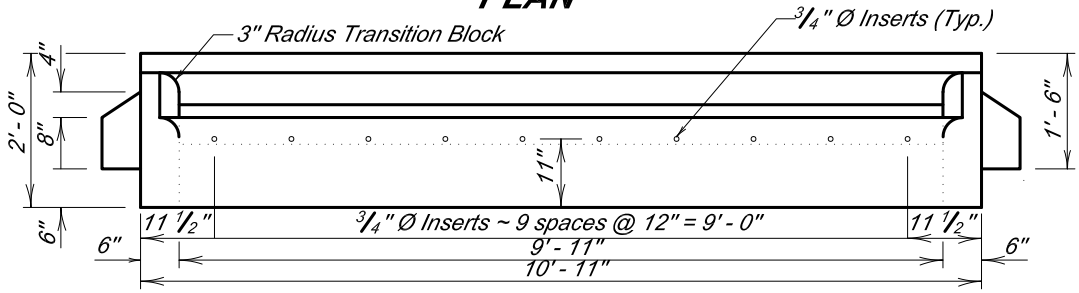
DETAIL #RD023

REVISED 01/2020

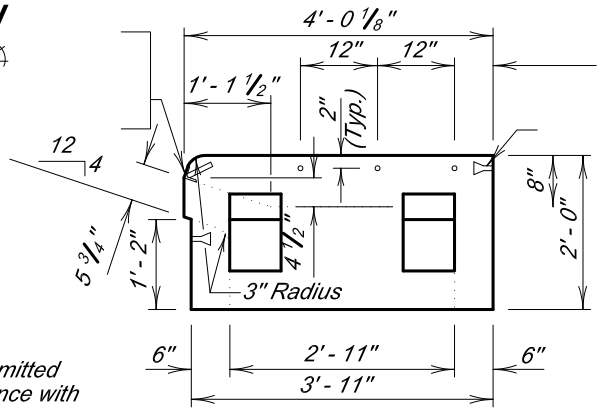
DETAIL RD024-DROP INLET-CONCRETE-TYPE B (4X11)-3



PLAN



ELEVATION

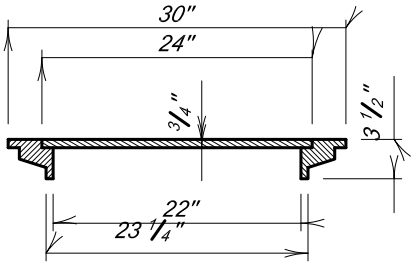


SIDE VIEW

(With Sidewalk Inserts)

GENERAL NOTES:

1. The Precast Concrete Type S Drop Inlet Lid and the shims shall be submitted by a SD Registered Professional Engineer. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
2. Design Live Load shall be HL - 93.
3. Concrete mix shall be as per fabricators design, however, minimum compressive strength shall not be less than 4500 psi. Type II Cement is required.
4. The Type S Manhole Frame and Lid shall conform to AASHTO M105, Class 30.
5. Structural Steel shall conform to ASTM A36. The 3/4 inch diameter Headed Type A Steel Studs shall conform to Section 7 of the current edition of AWS D1. 1 Structural Steel Welding Code.
6. The 3/4 inch diameter Concrete Inserts shall be galvanized or made of a corrosion resistant material. Provide 3/4 inch diameter x 1' - 6" long dowels conforming to ASTM A615, Gr. 60 threaded to fit inserts with each lid.
7. All costs associated with furnishing and installing the Precast Concrete Type S Drop Inlet Lid including the type S manhole frame and lid, shims, inserts, and dowels shall be included in the contract unit price per each for " 4' x 11' Precast Concrete Type S



TYPICAL SECTION THROUGH TYPE S MANHOLE FRAME AND LID

(Weight 140 Lbs.)

DROP INLET-CONCRETE-TYPE S (4'X11')

NOT TO SCALE

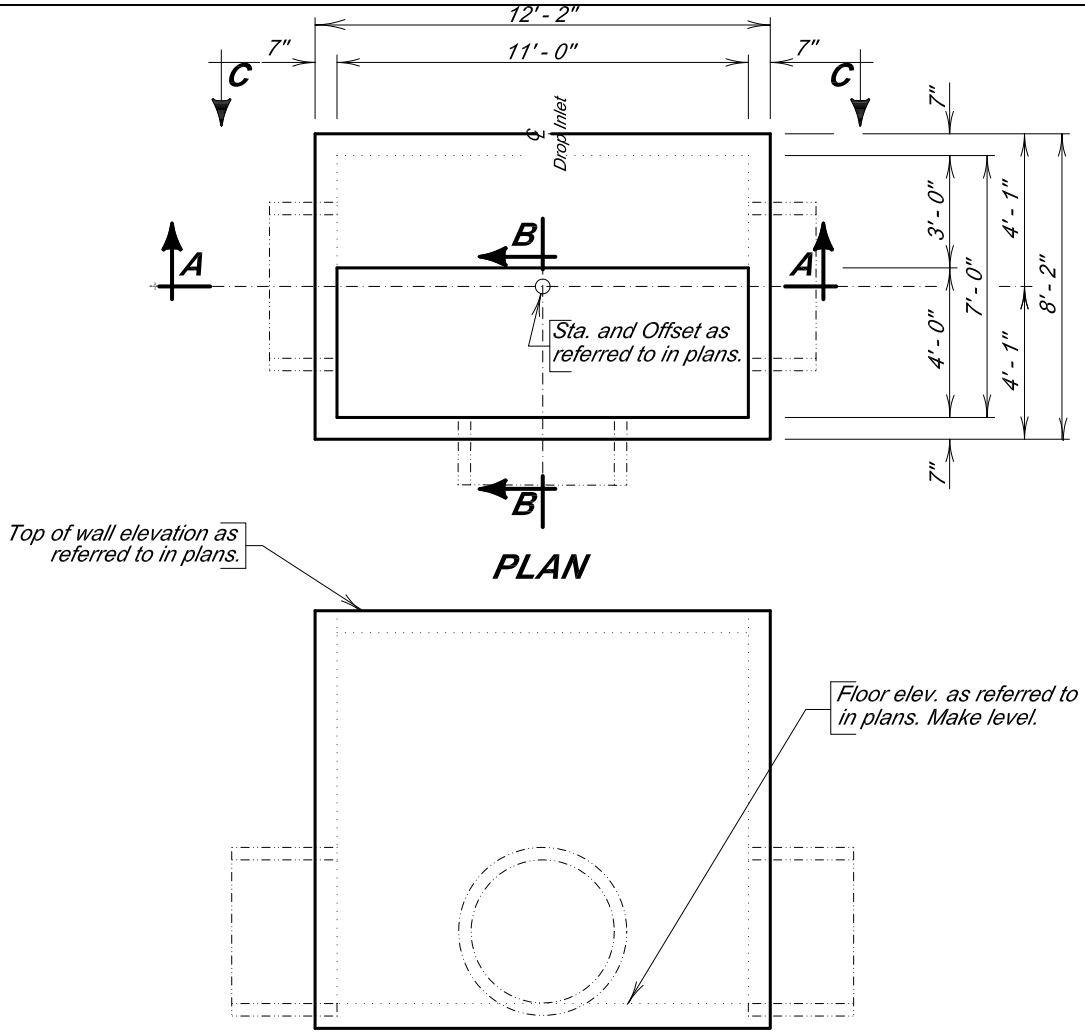
CITY OF BOX ELDER

STANDARD DETAIL RD024

DROP INLET-CONC.-TYPE S-4X11-3

DETAIL #RD024 REVISED 01/2020

DETAIL RD025-DROP INLET-CONCRETE-TYPE S (7X11)-1



SPECIFICATIONS:

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, current edition, and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

1. Design Live Load: HL-93 loading. No construction loading in excess of legal load was considered.
2. Base is intended for use with a Precast Concrete Type S Drop Inlet Lid. Base may be precast. If precast based used, and details differ from that shown, the precast base shop plans must be submitted by a SD Registered PE for approval. Design shall be in accordance with the current edition of the AASHTO LRFD Bridge Design Specifications.
3. Reduce total quantities of concrete by the amount of concrete displaced by the pipe. The total quantity of concrete shall be computed to the nearest 0.01 cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.
4. Inlets shown may be modified by the addition or omission of connecting pipes as shown on the layouts. Connecting pipes shall not enter the inlet through the corners.
5. Maximum R.C.P. diameter shall not exceed 66 inches (54 inches for R.C. Arch) on the 7-foot wide side of the Drop Inlet.
6. Reinforcing steel shall conform to ASTM A615 Grade 60. Cut and bend reinforcing steel as required to place pipe(s) through the inlet wall.
8. Use 1-inch clear cover on all reinforcing steel unless otherwise noted.
9. The dimension of H is in feet. Maximum H is 10 feet.

DROP INLET-CONCRETE-TYPE S (7'X11')

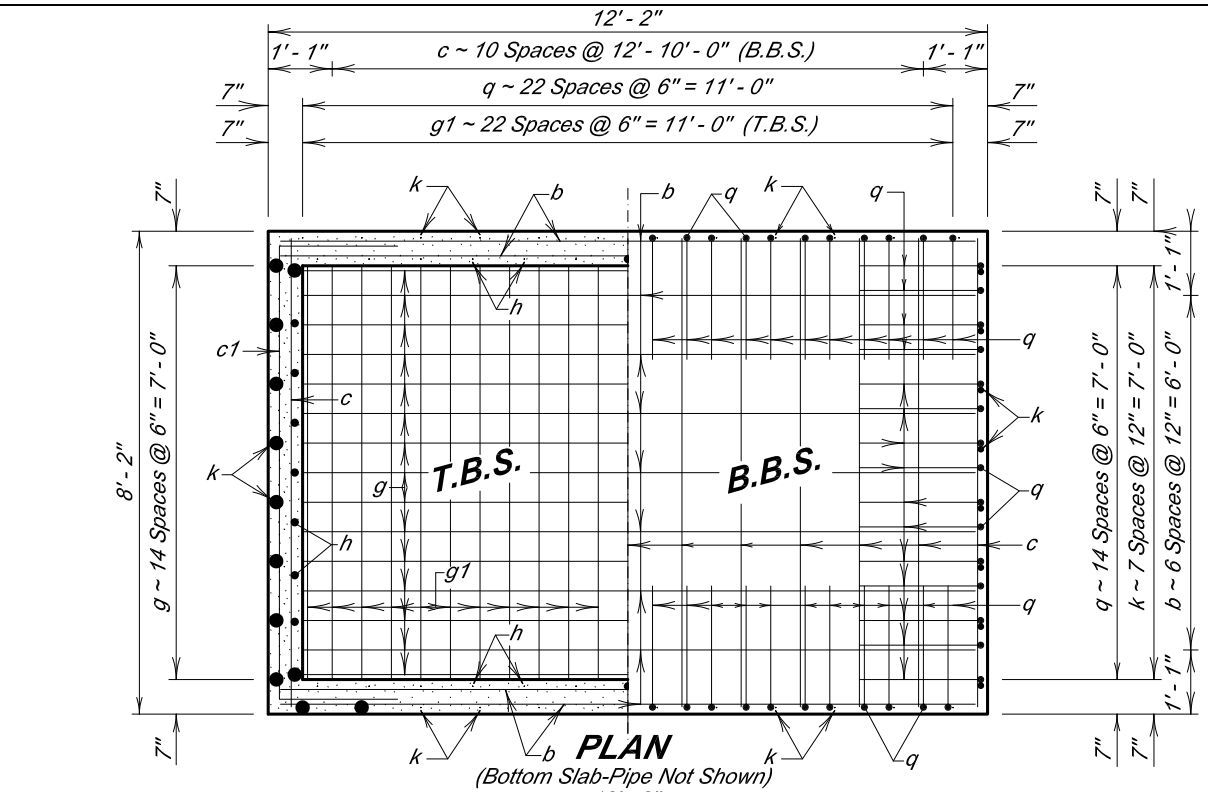
NOT TO SCALE

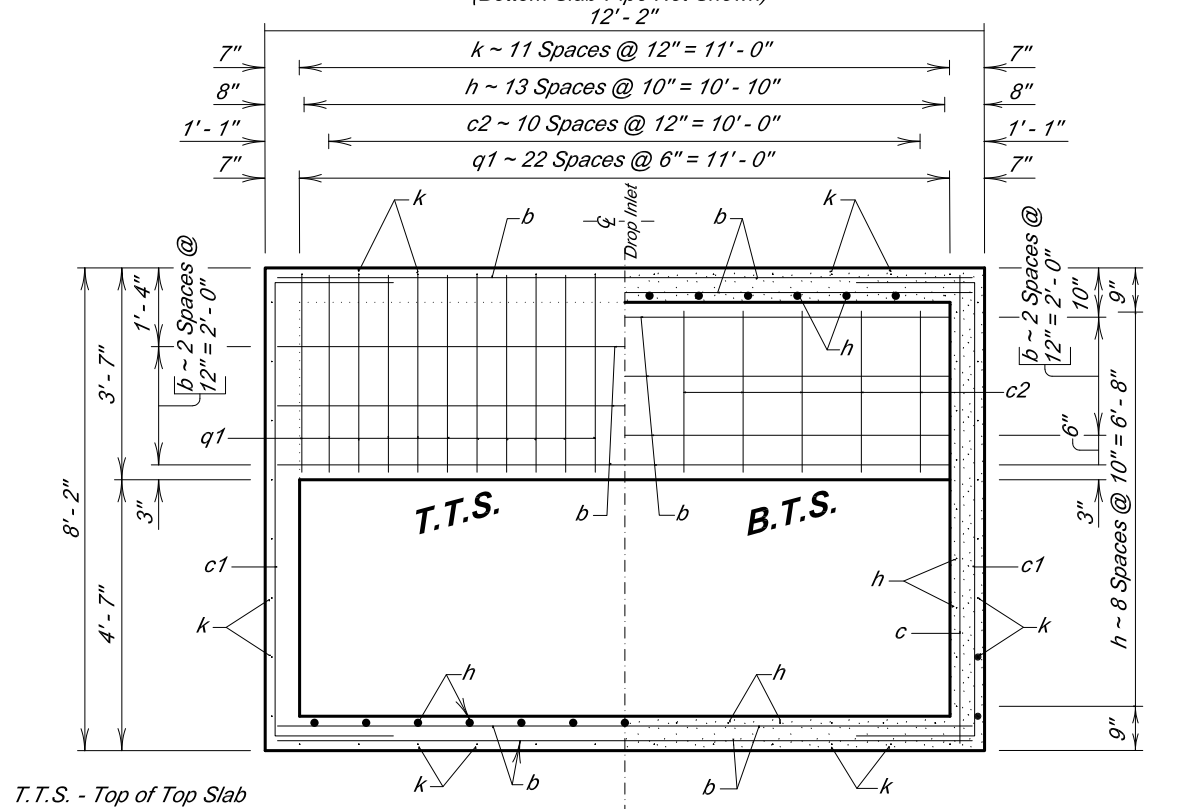
CITY OF BOX ELDER

STANDARD DETAIL RD025

DROP INLET-CONC.-TYPE S-7X11-1

DETAIL #RD025 REVISED 01/2020





T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab

DROP INLET-CONCRETE-TYPE S (7'X11')

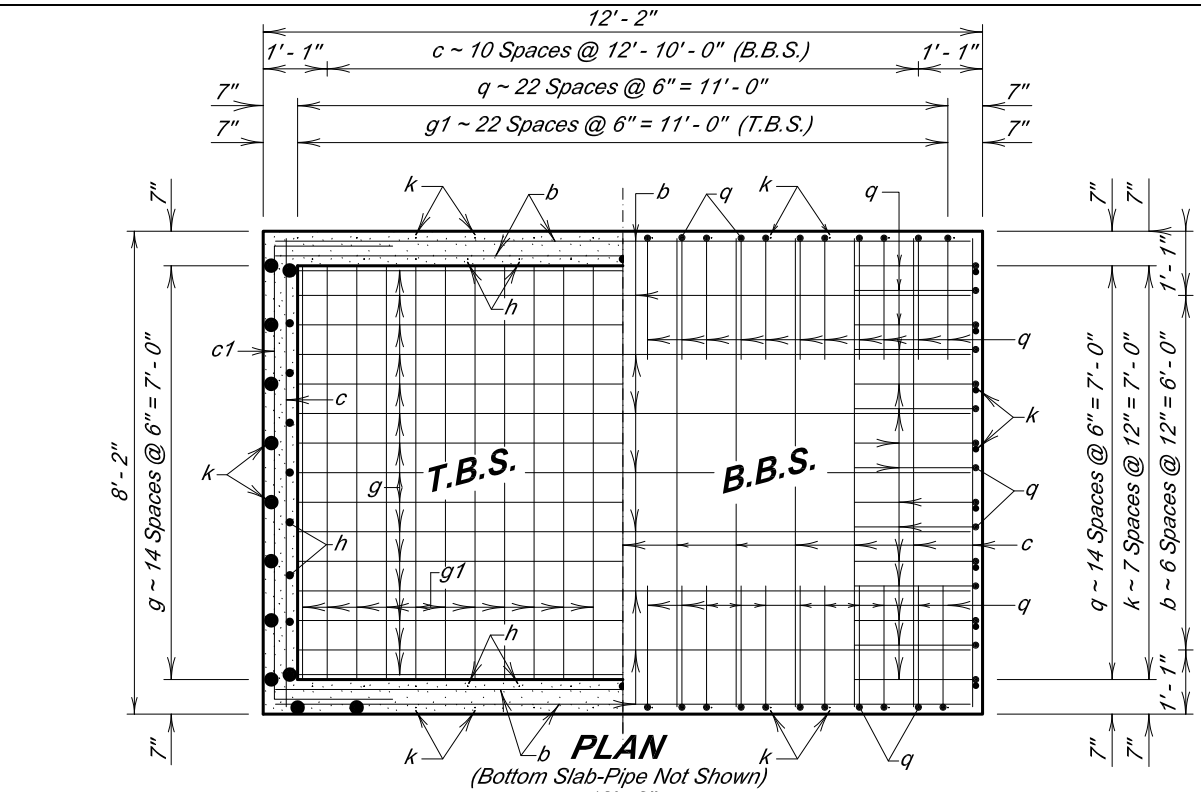
NOT TO SCALE

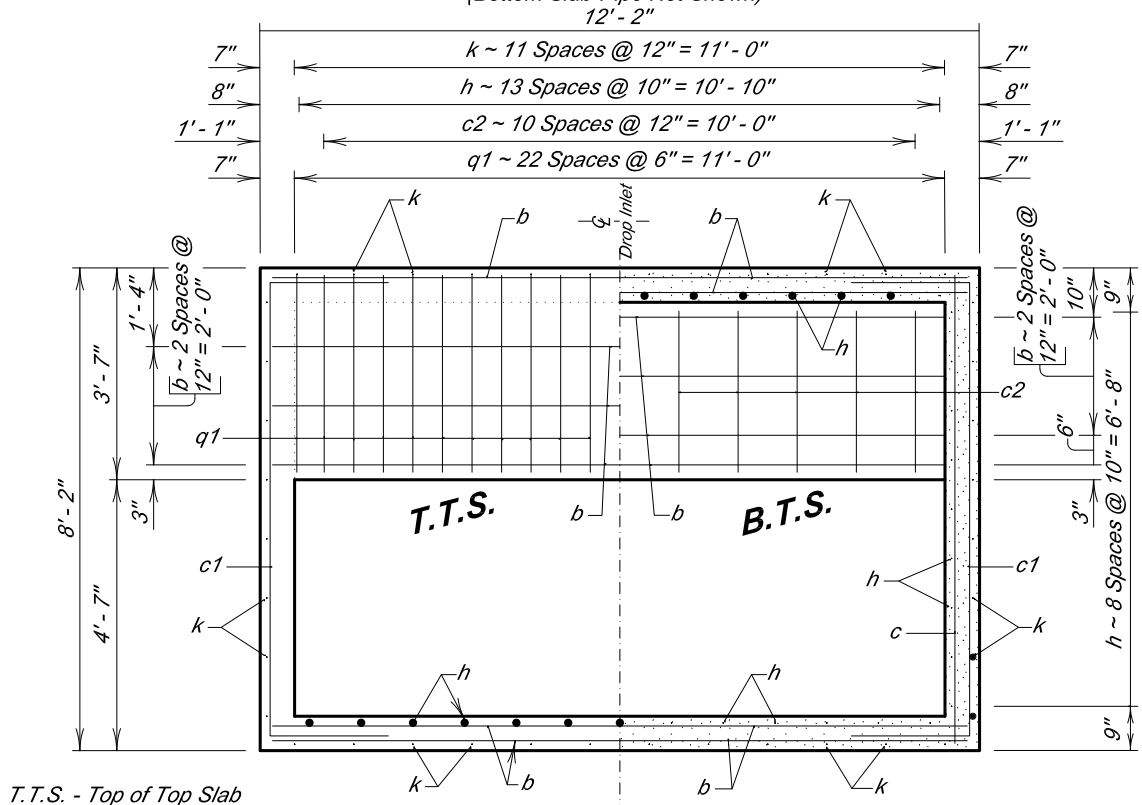
CITY OF BOX ELDER

STANDARD DETAIL RD026

DROP INLET-CONC.-TYPE S-7X11-2

DETAIL #RD026 REVISED 01/2020





T.T.S. - Top of Top Slab
B.T.S. - Bottom of Top Slab
T.B.S. - Top of Bottom Slab
B.B.S. - Bottom of Bottom Slab

DROP INLET-CONCRETE-TYPE S (7'X11')

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RD027

DROP INLET-CONC.-TYPE S-7X11-3

DETAIL #RD027 REVISED 01/2020

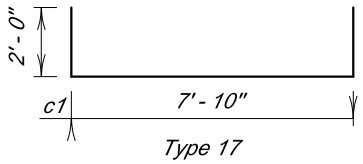
DETAIL RD028-DROP INLET-CONCRETE-TYPE S (7X11)-4

REINFORCING SCHEDULE

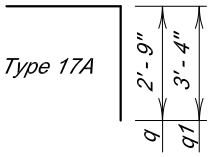
Mk.	No.	Size	Length	Type
b	19 + 4H	4	11' - 9"	Str.
c	15 + 2H	4	7' - 9"	Str.
c1	2 + 2H	4	11' - 10"	17
c2	11	4	2' - 10"	Str.
g	15	5	11' - 9"	Str.
g1	23	5	7' - 9"	Str.
h	46	5	H + 5"	Str.
k	40	5	H + 5"	Str.
q	76	5	5' - 6"	17A
q1	23	5	6' - 8"	17A

NOTE:
All dimensions are out to out of bars

Bending Details



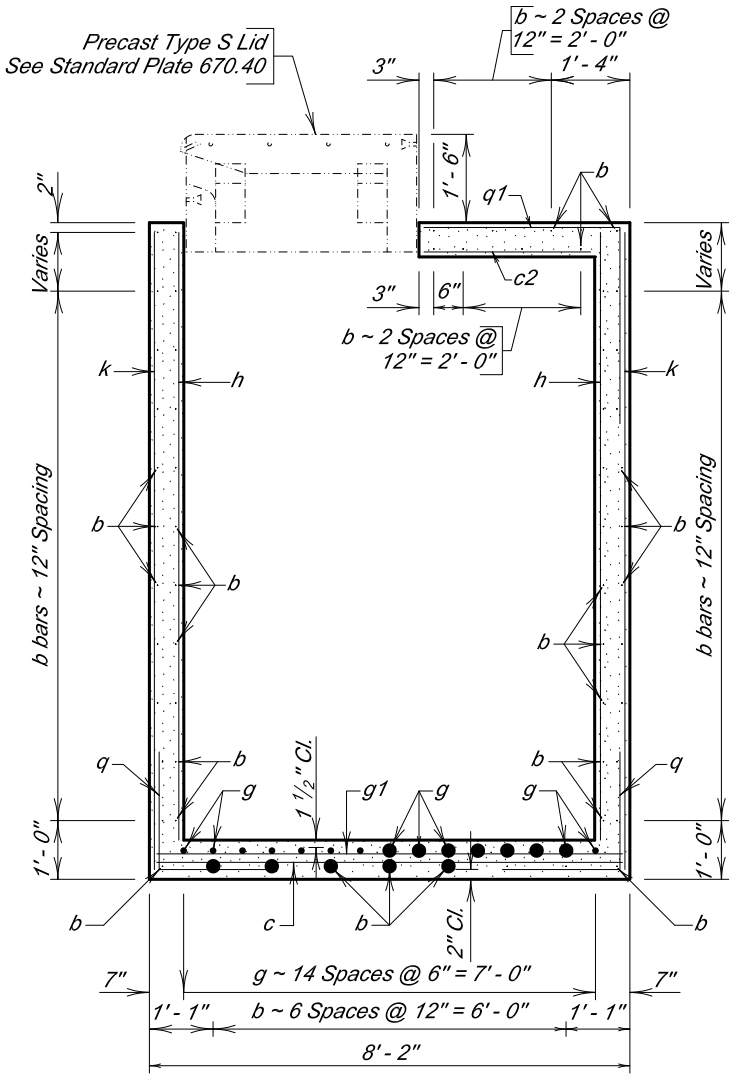
Type 17



Type 17A

ESTIMATED QUANTITIES

ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
Class M6 Concrete	Cu.Yd.	3.65	0.83H
Reinforcing Steel	Lb.	1266	147.26H



SEC. A - A
(Pipe Not Shown)

PIPE DISPLACEMENT REDUCTIONS

	Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
R.C.P.	12	2	0.03
	15	2 1/4	0.04
	18	2 1/2	0.06
	24	3	0.11
	30	3 1/2	0.16
	36	4	0.23
	42	4 1/2	0.31
	48	5	0.40
	54	5 1/2	0.50
	60	6	0.61
R.C. ARCH	18	2 1/2	0.06
	24	3 1/2	0.11
	30	4	0.16
	36	4 1/2	0.22
	42	4 1/2	0.29
	48	5	0.37
	54	5 1/2	0.46
	60	6	0.57
	72	7	0.82
	84	8	1.09

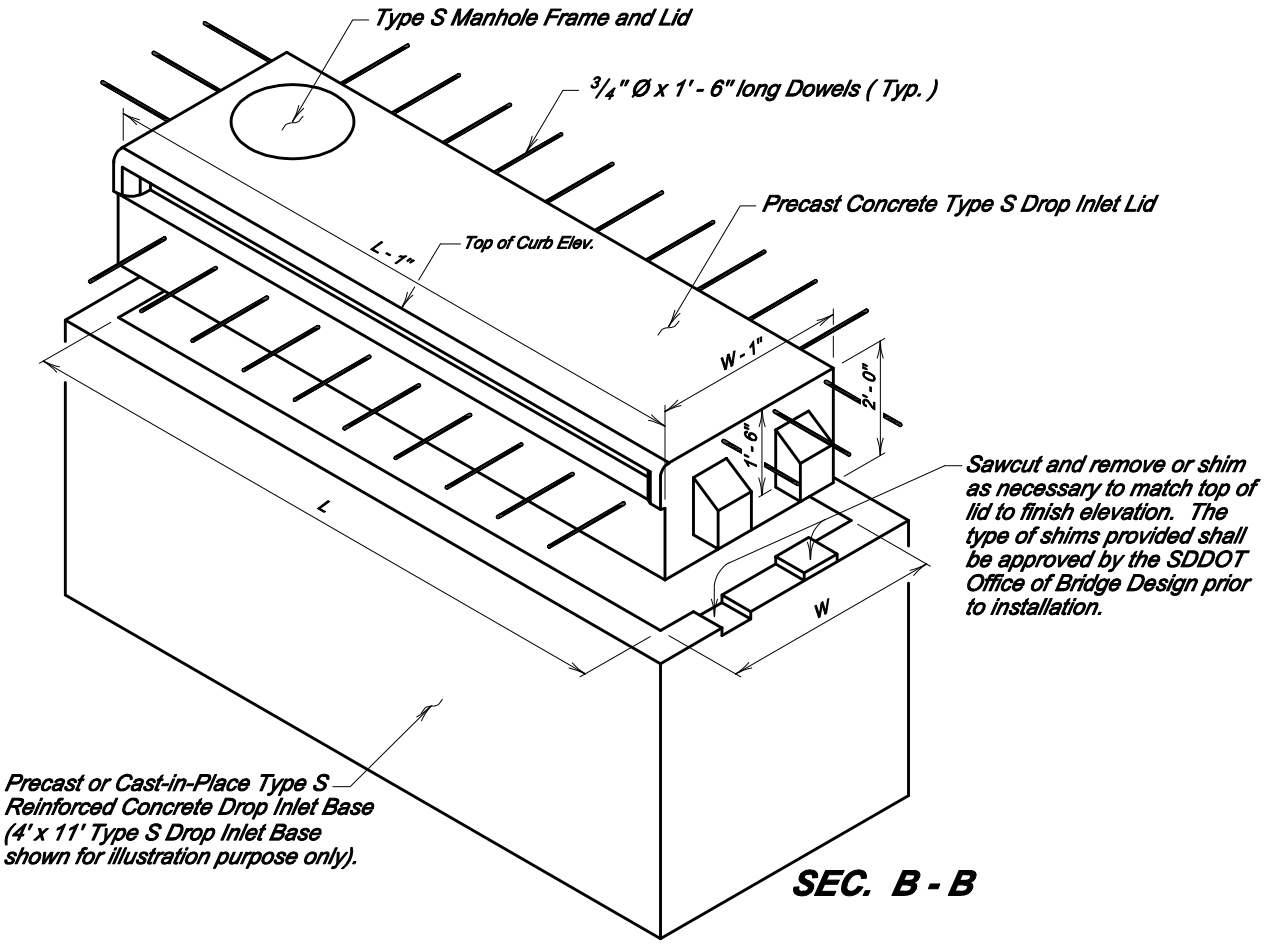
DROP INLET-CONCRETE-TYPE S (7'X11')
NOT TO SCALE

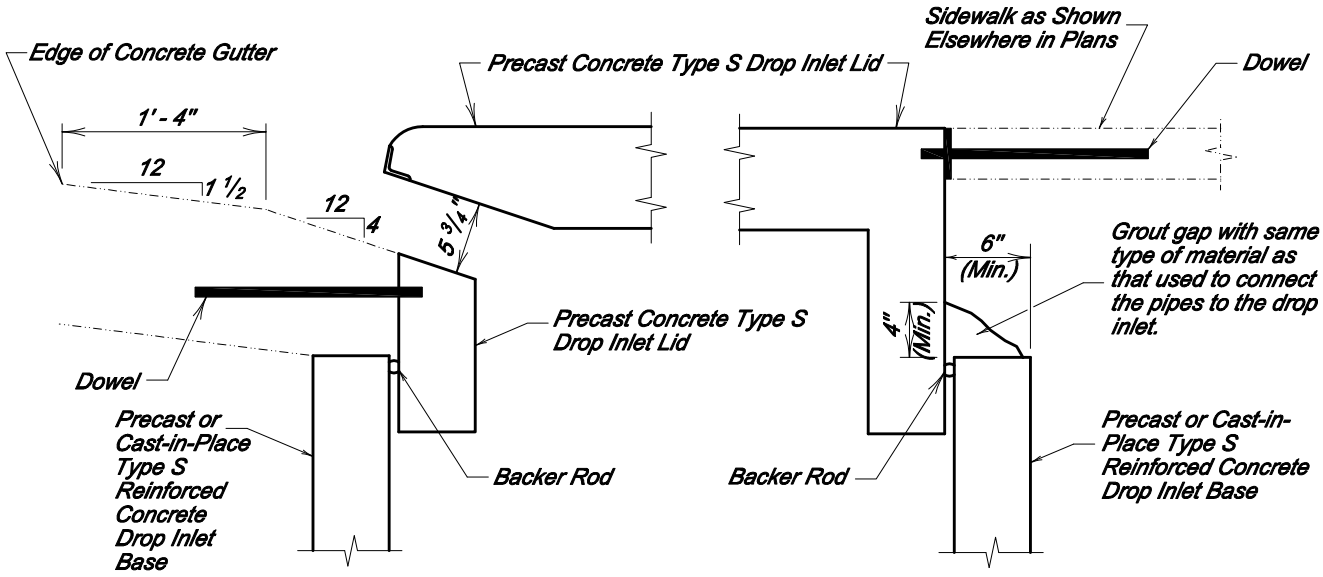
CITY OF BOX ELDER

STANDARD DETAIL RD028

DROP INLET-CONC.-TYPE S-7X11-4

DETAIL #RD028 REVISED 01/2020





DROP INLET-CONCRETE-TYPE S-INSTALLATION

NOT TO SCALE

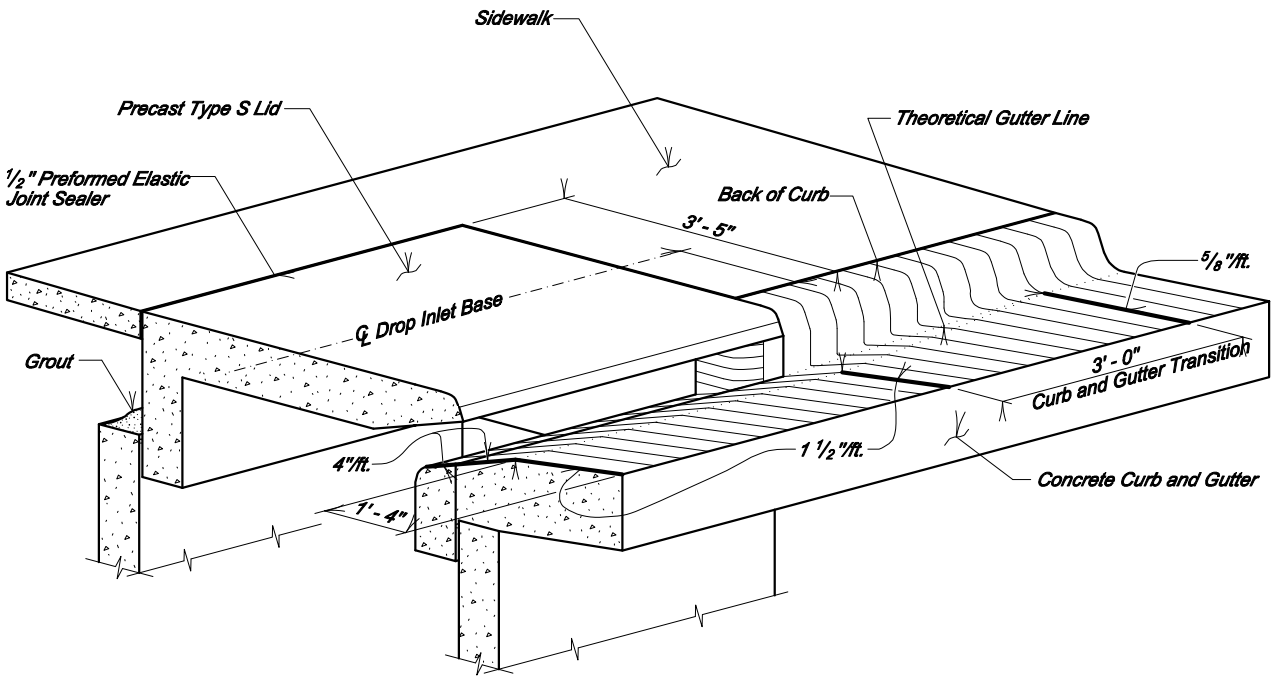
CITY OF BOX ELDER

STANDARD DETAIL RD029

DROP INLET-CONC.-TYPE S-INST.-1

DETAIL #RD029

REVISED 01/2020



CURB AND GUTTER TRANSITION DETAILS

Drop Inlet Base Unit Size	⟊ Distance
4' x 6'	1' - 5 1/2"
4' x 11'	1' - 5 1/2"
7' x 11'	2' - 11 1/2"

GENERAL NOTES:

1. Dowels shall be used to anchor the precast concrete Type S drop inlet lid to the concrete gutter. If there is sidewalk adjacent dowels shall be used to anchor the precast concrete Type S drop inlet lid to the sidewalk. If there is sidewalk adjacent to the drop inlet, the precast lid shall match the finish elevations and cross slopes of the sidewalk.

2. The sidewalk shall be steel reinforced when the sidewalk adjoins the precast lid.

DROP INLET-CONCRETE-TYPE S-INSTALLATION

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RD030

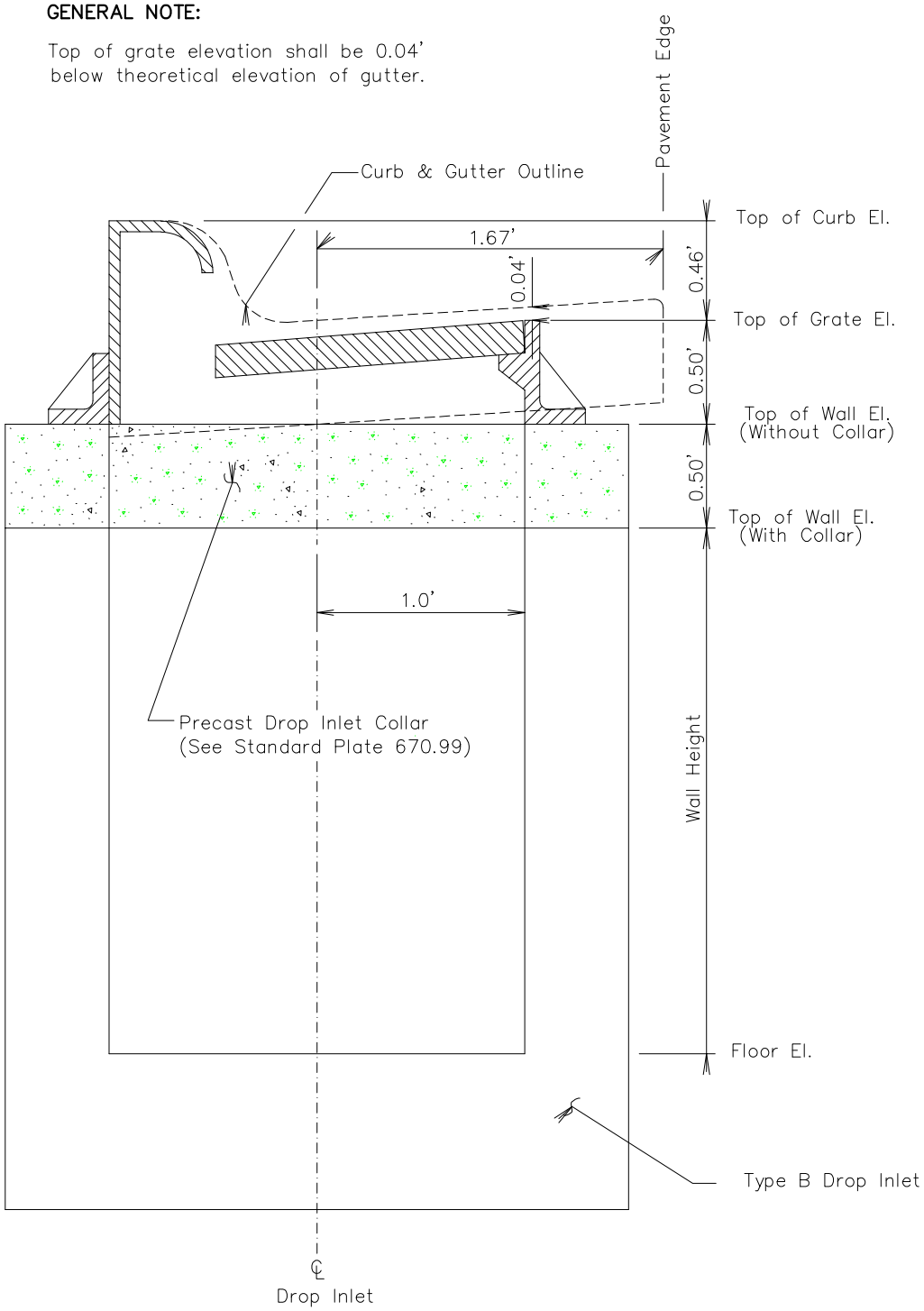
DROP INLET-CONC.-TYPE S-INST.-2

DETAIL #RD030

REVISED 01/2020

GENERAL NOTE:

Top of grate elevation shall be 0.04' below theoretical elevation of gutter.



DROP INLET-CONCRETE-TYPE B-INSTALLATION

NOT TO SCALE

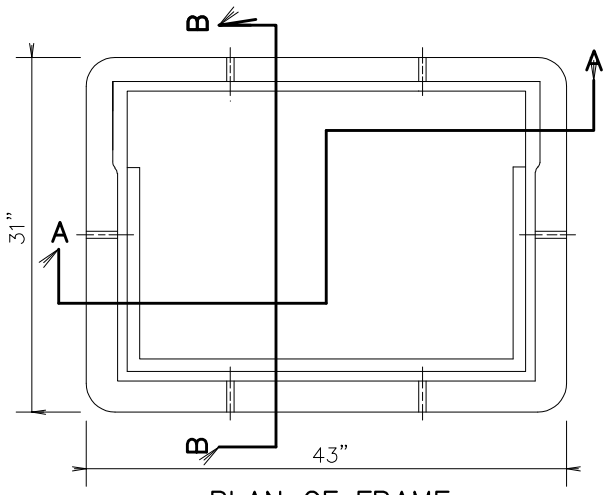
CITY OF BOX ELDER

STANDARD DETAIL RD031

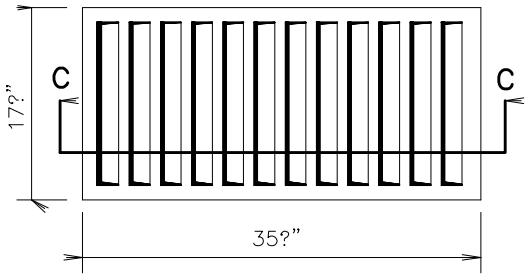
DROP INLET-CONC.-TYPE B-INST.

DETAIL #RD031

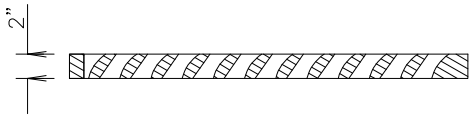
REVISED 01/2020



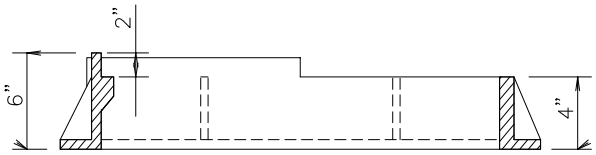
PLAN OF FRAME



PLAN OF GRATE

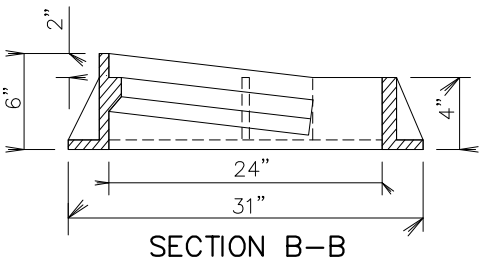


SECTION C–C

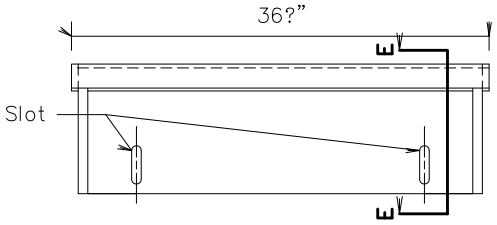


SECTION A–A

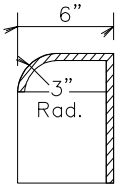
TOP VIEW OF CURB BOX



SECTION B–B



ELEVATION OF CURB BOX



SECTION E–E

GENERAL NOTE:

Total weight of the assembly shall be 490 Lbs. minimum and the curb box shall be adjustable 6" to 9".

DROP INLET-CONCRETE-TYPE B-FRAME AND GRATE ASSEMBLY

NOT TO SCALE

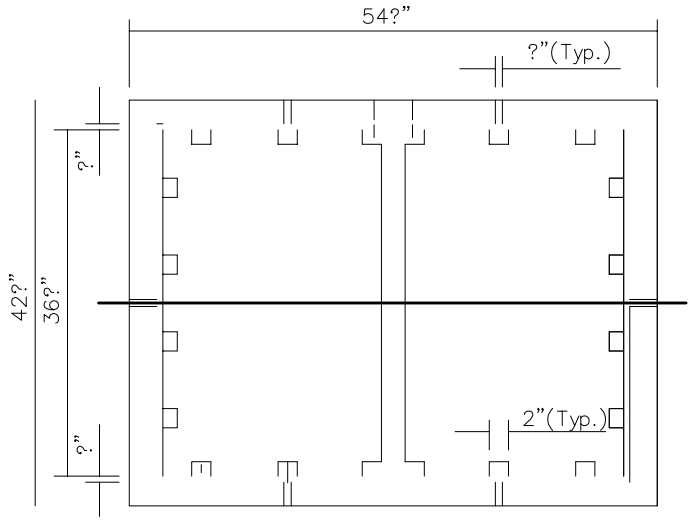
CITY OF BOX ELDER

STANDARD DETAIL RD032

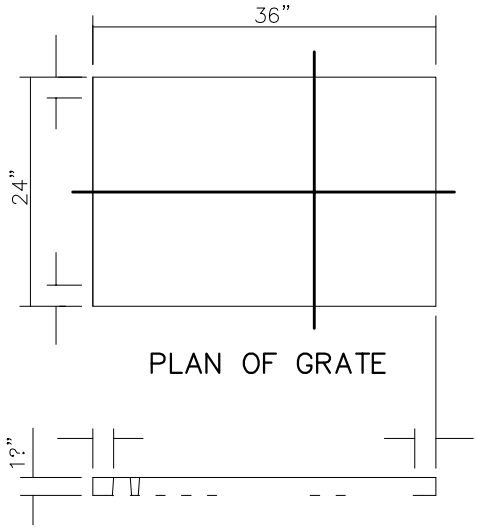
DROP INLET-CONC.-TYPE B-FRAME AND GRATE ASSEMBLY

DETAIL #RD032

REVISED 01/2020

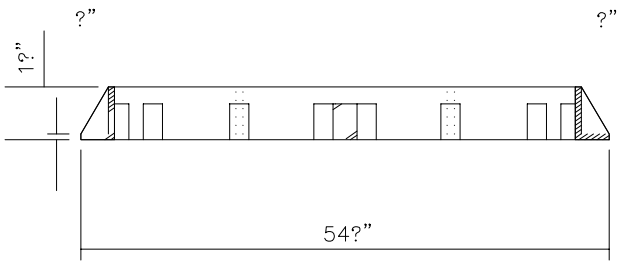


PLAN OF FRAME

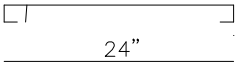


PLAN OF GRATE

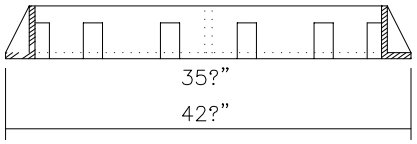
SECTION C–C



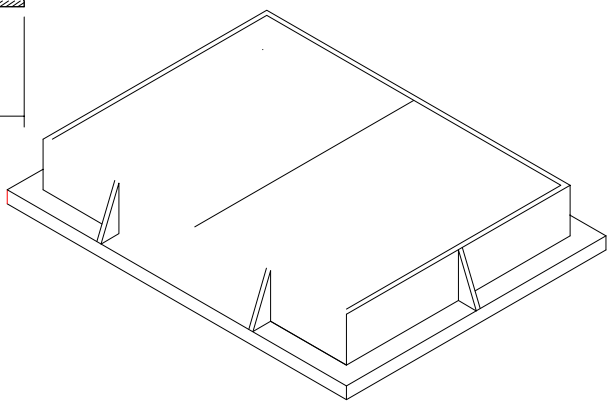
SECTION A–A



SECTION D–D



SECTION B–B



ASSEMBLED VIEW

DROP INLET-CONCRETE-TYPE C-FRAME AND GRATE ASSEMBLY

NOT TO SCALE

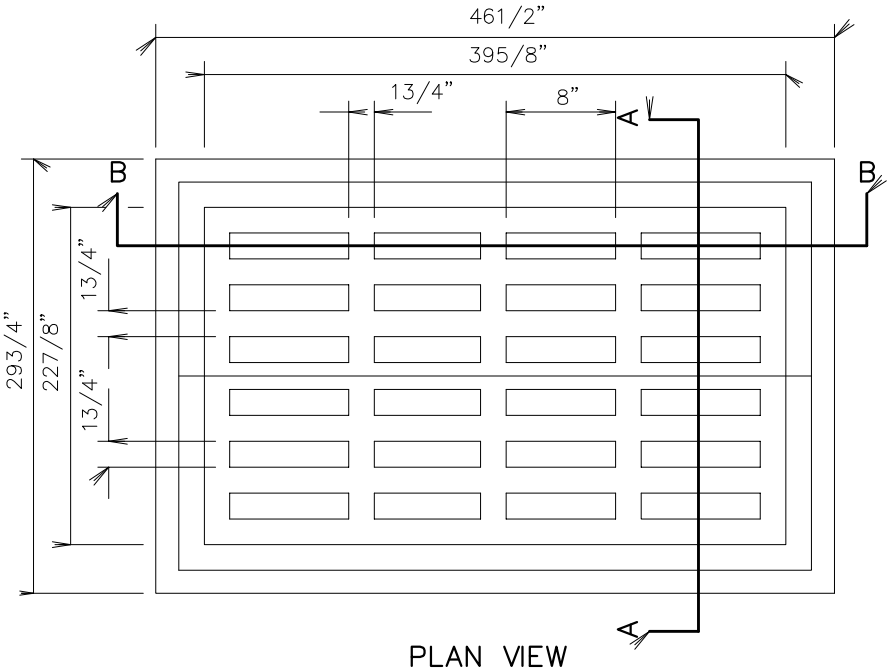
CITY OF BOX ELDER

STANDARD DETAIL RD033

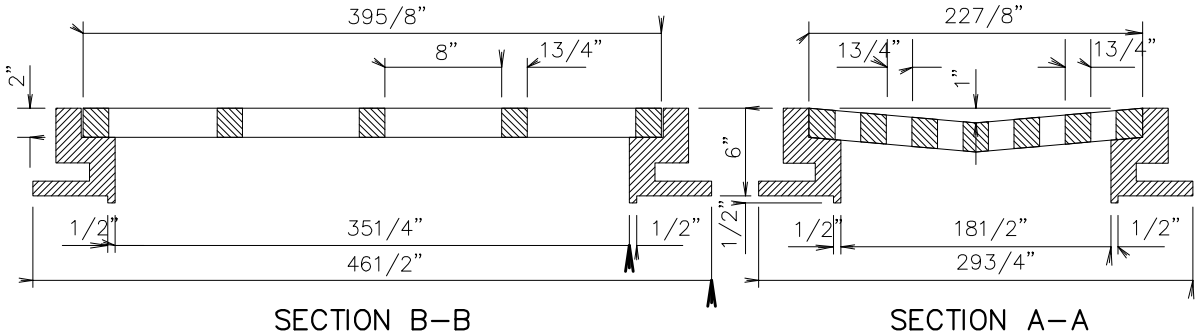
DROP INLET-CONC.-TYPE C-FRAME AND GRATE ASSEMBLY

DETAIL #RD033

REVISED 01/2020

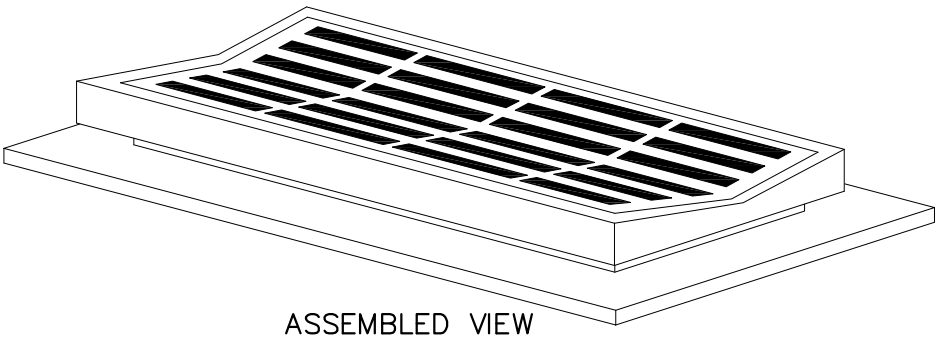


PLAN VIEW



SECTION B–B

SECTION A–A



ASSEMBLED VIEW

GENERAL NOTES:

The total weight of frame and grate shall be 810 pounds minimum.
The Type E frame and grate is used typically with valley gutter.

DROP INLET-CONCRETE-TYPE E-FRAME AND GRATE ASSEMBLY

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RD034

DROP INLET-CONC.-TYPE E-FRAME AND GRATE ASSEMBLY

DETAIL #RD034

REVISED 01/2020

INFORMATIONAL QUANTITIES			
ITEM	Class M6 Concrete	Reinforcing ⚹ Steel	Install Dowel in Concrete
DROP INLET COVER SIZE	Cu. Yd.	Lb.	Each
4' - 0" x 11' - 0"	1.1	116	12
5' - 6" x 11' - 0"	1.5	153	12
7' - 0" x 11' - 0"	1.9	218	12

⚹ Quantity of z1 Dowel Bars is not included in Reinforcing Steel.

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, current edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Drop inlet covers may be precast. If precast drop inlet cover details differ from this standard plate, submit a checked design done by a SD registered P.E. with shop plans to the Engineer for approval. If precast, top side of lid shall be marked.

Use 1 $^1/_2$ inch clear cover on all reinforcing steel except as shown.

All exposed edges shall be chamfered $^3/_4$ inch.

Maximum fill over drop inlet cover shall be 3 feet, including surfacing.

Contractor shall break out drop inlet walls as necessary for the drop inlet cover to fit below roadway surfacing.

Apply a thin layer of grout between drop inlet and cover to ensure uniform bearing. Grout shall conform to the Specifications.

All costs involved in furnishing and installing the drop inlet cover including the epoxy resin and dowels shall be incidental to the contract unit price per Each for "4' x 11' Drop Inlet Cover", "5.5' x 11' Drop Inlet Cover, or "7' x 11' Drop Inlet Cover".

INSTALLING DOWELS IN CONCRETE

Holes drilled in the existing concrete shall be true and normal or as shown in the plans. Care shall be taken not to damage the existing reinforcing steel. It is very likely that some of the existing reinforcing steel shown in the original construction plans may have been placed out of position during original construction. In spite of this precaution, the Contractor can still expect to encounter and have to drill through reinforcing steel or shift the dowel spacing as approved by the Engineer to miss the existing reinforcing steel.

The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

The diameter of the drilled holes shall not be less than $^1/_8$ inch greater, nor more than $^3/_8$ inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. Use compressed air or other techniques to ensure that the hole is free of any loose material before epoxy resin is applied.

Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the bottom of the drilled holes, fill the holes $^1/_3$ to $^1/_2$ full of epoxy resin. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed.

No loads shall be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.

Embed dowels 9 inches into existing concrete.

DROP INLET-CONCRETE-PERMANENT COVERS (VARIOUS)

NOT TO SCALE

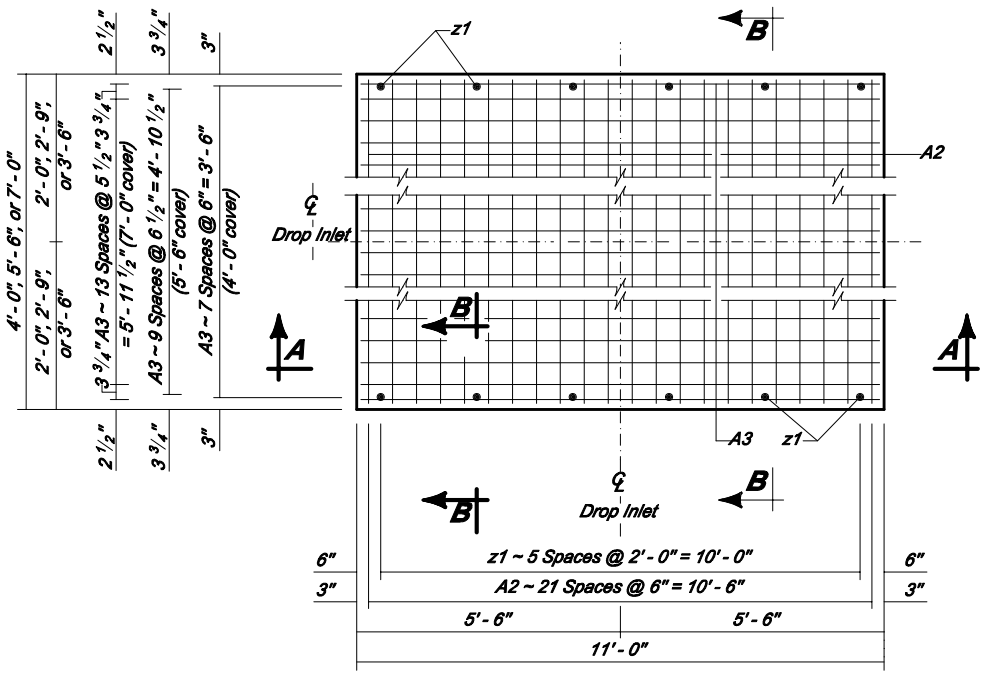
CITY OF BOX ELDER

STANDARD DETAIL RD040

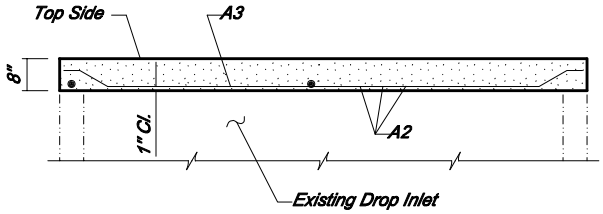
DROP INLET-CONC.-PERM. COVERS-1

DETAIL #RD040

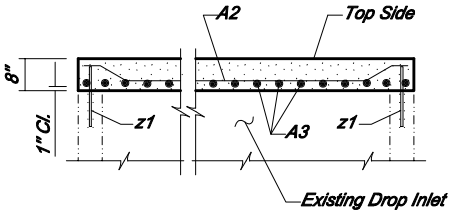
REVISED 01/2020



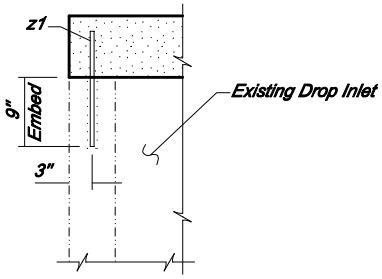
PLAN VIEW



SEC. A - A



SEC. B - B



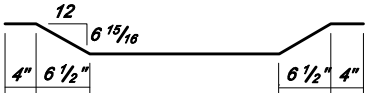
SEC. C - C

REINFORCING SCHEDULE
(for one cover)

WIDTH	Mk.	No.	Size	Length	Type
4'-0"	A2	22	4	3' - 11"	14A
	A3	8	4	10' - 11"	14A
	✳z1	12	4	1' - 3"	Str.
5'-6"	A2	22	4	5' - 5"	14A
	A3	10	4	10' - 11"	14A
	✳z1	12	4	1' - 3"	Str.
7'-0"	A2	22	4	6' - 11"	14A
	A3	16	4	10' - 11"	14A
	✳z1	12	4	1' - 3"	Str.

✳ Dowel Bar

Bending Details



A2	2' - 0"	4' - 0"
A3	9' - 0"	4' - 0"
A2	3' - 6"	5' - 6"
A3	9' - 0"	5' - 6"
A2	5' - 0"	7' - 0"
A3	9' - 0"	7' - 0"

Type 14A

DROP INLET-CONCRETE-PERMANENT COVERS (VARIOUS)

NOT TO SCALE

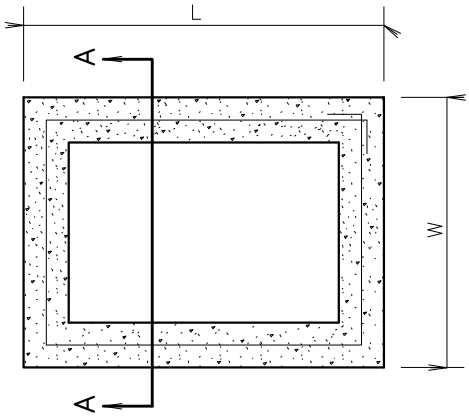
CITY OF BOX ELDER

STANDARD DETAIL RD041

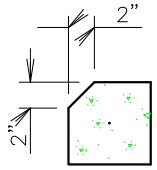
DROP INLET-CONC.-PERM. COVERS-2

DETAIL #RD041

REVISED 01/2020

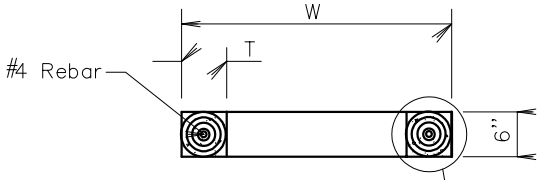


PLAN VIEW



For Type D Drop Inlets only:
Use Precast Drop Inlet Collar with 2" chamfer on L sides only.

DETAIL B



SECTION A–A

See Detail B (For Type D Drop Inlets Only)

INFORMATIONAL QUANTITIES					
FRAME AND GRATE TYPE	L Ft–In	W Ft–In	T In	CLASS M6 CONCRETE CuYd	REINFORCING STEEL Lb
TYPE B	4'–0"	3'–0"	6	0.11	9
TYPE C	5'–0"	4'–0"	6	0.15	11
TYPE D	4'–0"	2'–6"	6	0.10	8

GENERAL NOTES:

All reinforcing steel shall conform to ASTM A615, Grade 60.

The reinforcement bar shall lap 6 inches and shall be centered in the concrete.

The cost of furnishing and installing Precast Drop Inlet Collars, including labor, materials, and incidentals shall be incidental to the contract unit price per Each for "Precast Drop Inlet Collar".

DROP INLET-CONCRETE-PRECAST COLLAR

NOT TO SCALE

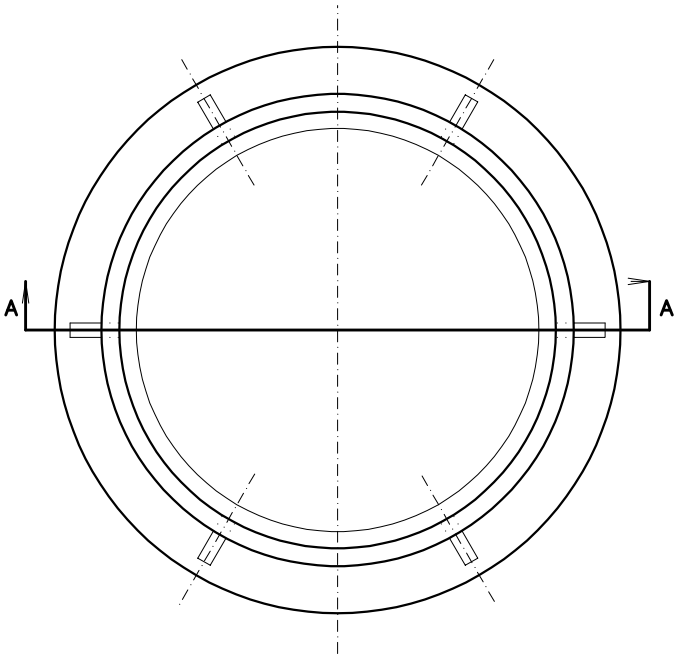
CITY OF BOX ELDER

STANDARD DETAIL RD042

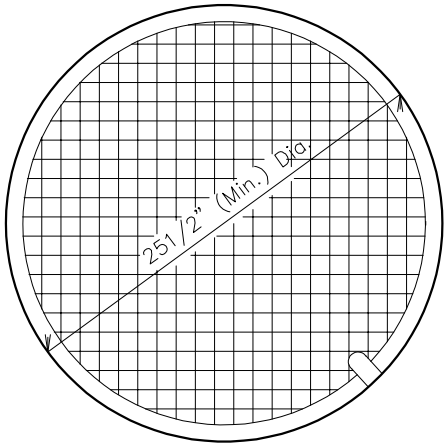
DROP INLET-CONC.-PRECAST COLLAR

DETAIL #RD042

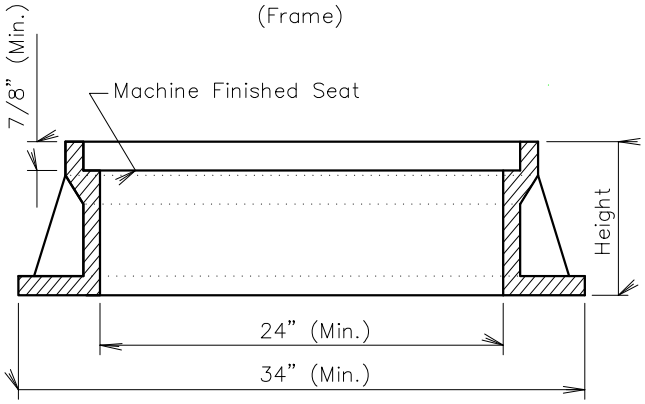
REVISED 01/2020



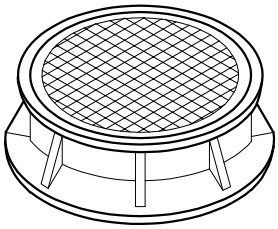
PLAN VIEW
(Frame)



PLAN VIEW
(Lid)



SECTION A–A



ISOMETRIC VIEW

TYPE	HEIGHT (Inches)	MINIMUM WEIGHT (Lb.)
A7	7	400
A8	8	440
A9	9	470
A10	10	480

GENERAL NOTE:

Geometric pattern on top of lid other than that shown shall be approved by the Engineer.

MANHOLE-FRAME AND LID-TYPE A

NOT TO SCALE

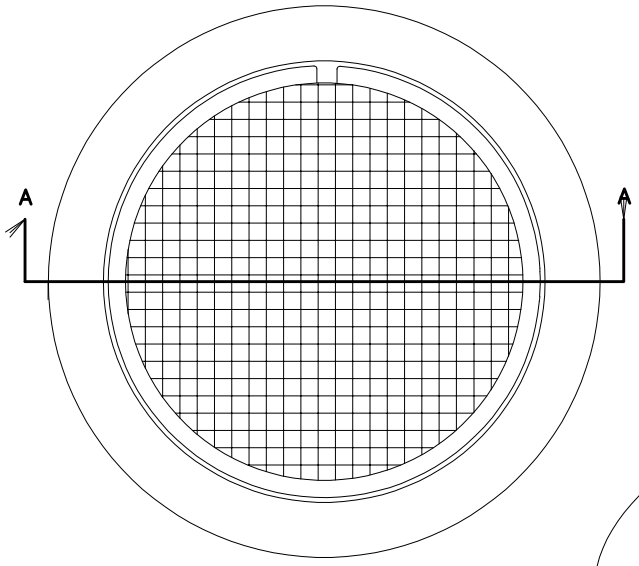
CITY OF BOX ELDER

STANDARD DETAIL RD050

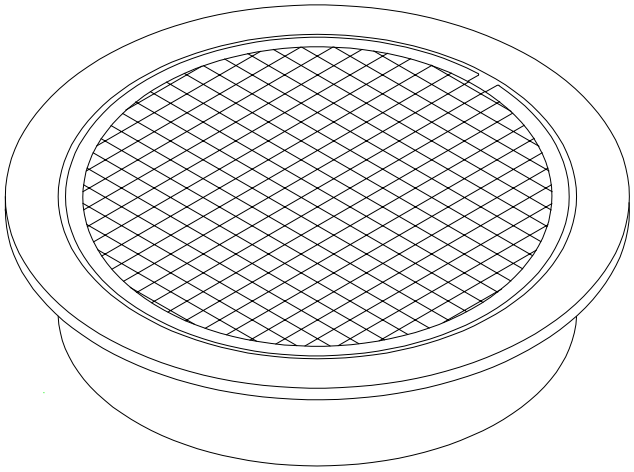
MANHOLE FRAME AND LID-TYPE A

DETAIL #RD050

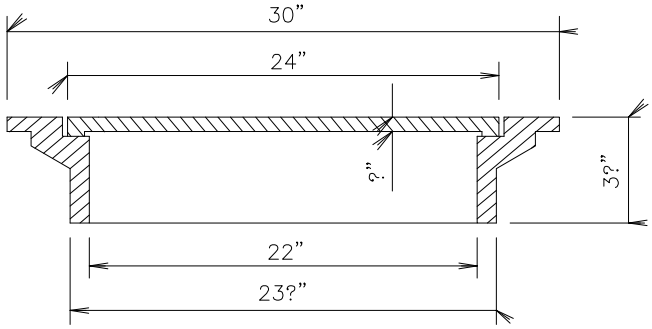
REVISED 01/2020



PLAN VIEW



ASSEMBLED VIEW



SECTION A–A

GENERAL NOTE:

Total weight of the frame and lid shall be 140 Lbs. minimum.

MANHOLE-FRAME AND LID-TYPE B

NOT TO SCALE

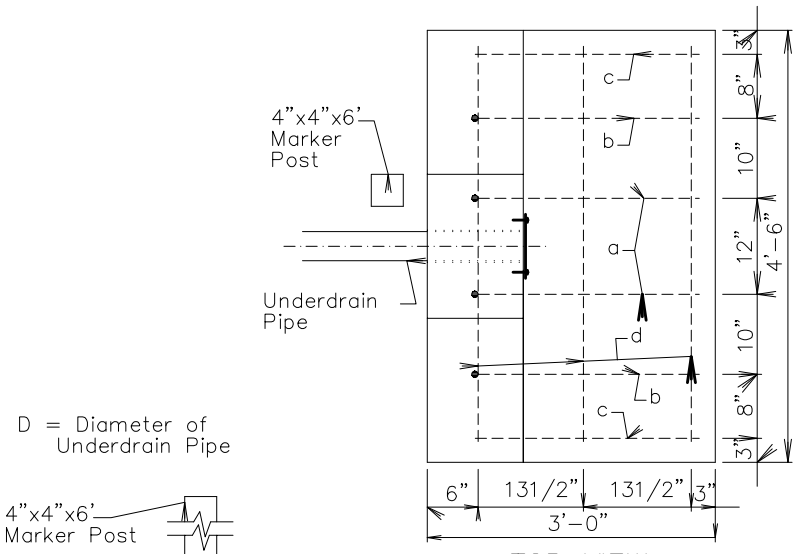
CITY OF BOX ELDER

STANDARD DETAIL RD051

MANHOLE FRAME AND LID-TYPE B

DETAIL #RD051

REVISED 01/2020

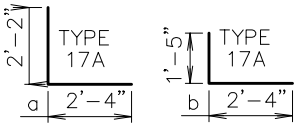


TOP VIEW

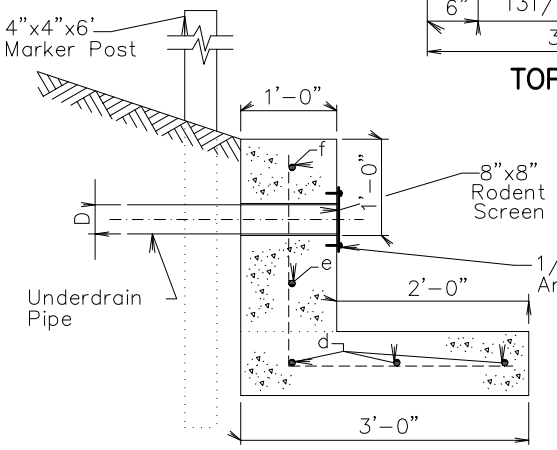
REINFORCING SCHEDULE				
MK.	No.	Size	Length	Type
a	2	4	4'-6"	17A
b	2	4	3'-9"	17A
c	2	4	2'-4"	Str.
d	3	4	4'-2"	Str.
e	1	4	3'-4"	Str.
f	1	4	1'-6"	Str.

NOTE:
All dimensions are out to out of bars.

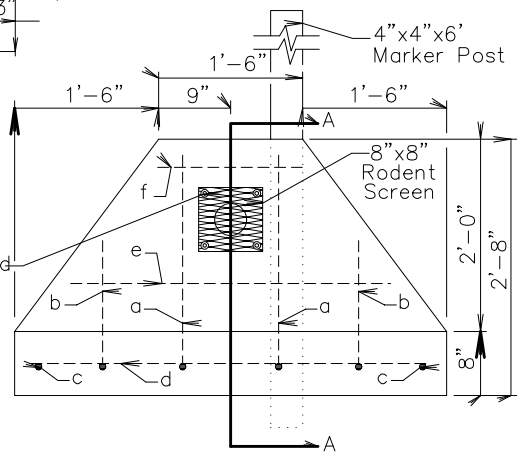
Bending Details



D = Diameter of Underdrain Pipe



SECTION A-A



END VIEW

GENERAL NOTES:

The concrete shall be Class M6. The concrete shall conform to the requirements of Section 462 of the Specifications except the minimum curing time shall be 72 hours. It is estimated that 0.55 cubic yards of concrete is required for each unit.

Four cast-in-place or drilled-in 1/4" galvanized anchors shall be placed in the headwall. Each galvanized anchor shall be placed approximately 1" from the outside corner of the rodent screen. It is preferred that the anchor location be centered at an opening in the rodent screen.

All reinforcing steel shall conform to ASTM A615 Grade 60. It is estimated that 25.7 pounds of reinforcing steel is required for each unit.

The underdrain pipe shall be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The 8"x8" rodent screen shall be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size shall be 1/2". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires. The rodent screen shall be centered about the hole in the headwall and fastened to the hole in the headwall with the appropriate bolts or nuts with washers.

A 4"x4"x6' marker post shall be placed at the approximate location as depicted in the above drawings for each concrete headwall. The marker post shall project 3'+ above the ground line. The marker post shall be cedar or treated with a wood preservative and shall be painted with two coats of white paint.

All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, rodent screen, anchors, and marker post shall be incidental to the contract unit price per each for "Concrete Headwall for Underdrain".

HEADWALL-CONCRETE-UNDERDRAIN

NOT TO SCALE

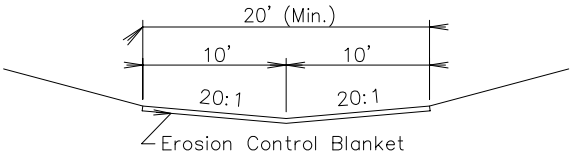
CITY OF BOX ELDER

STANDARD DETAIL RD060

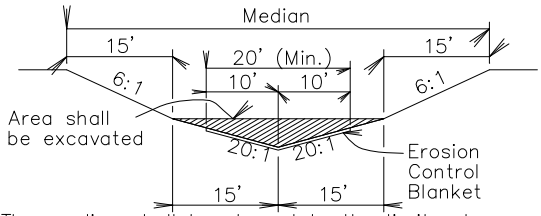
HEADWALL-CONC.-UNDERDRAIN

DETAIL #RD060

REVISED 01/2020

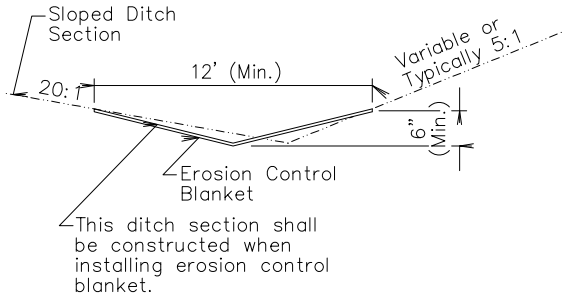


STANDARD DITCH SECTION

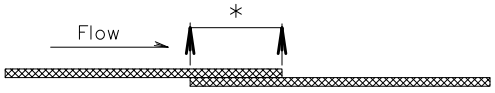


The median shall be shaped to the limits shown in this detail where the erosion control blanket will be placed.

MEDIAN SECTION



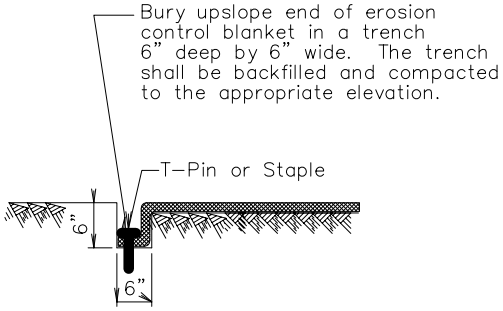
SLOPED DITCH SECTION



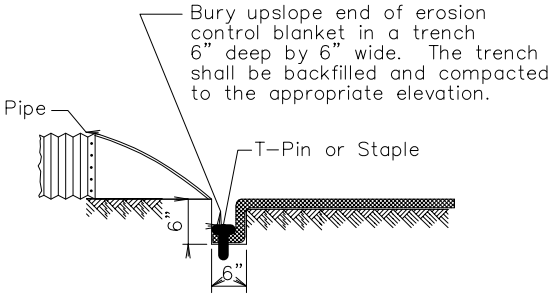
* Use a 4" (Min.) overlap wherever two widths of erosion control blanket are applied side by side.

* Use a 6" (Min.) overlap wherever one roll of erosion control blanket ends and another begins.

OVERLAP DETAIL



TRENCH DETAIL



PIPE END DETAIL

GENERAL NOTES:

Prior to placement of the erosion control blanket, the areas shall be properly prepared, shaped, seeded, and fertilized.

Erosion control blanket shall be unrolled in the direction of the flow of water when placed in ditches and on slopes. The upslope end of the erosion control blanket shall be buried in a trench 6" wide by 6" deep. There shall be at least a 6" overlap wherever one roll of erosion control blanket ends and another begins, with the upslope erosion control blanket placed on top of the downslope erosion control blanket.

The erosion control blanket shall be pinned to the ground according to the manufacturer's installation recommendations.

After the placement of the erosion control blanket, the Contractor shall fine grade along all edges of the blanket to maintain a uniform slope adjacent to the blanket and level any low spots which might prevent uniform and unrestricted flow of side drainage directly onto the erosion control blanket.

All ditch sections shall be shaped when installing the erosion control blanket. All costs for shaping the ditches shall be incidental to the contract unit price per foot for "Shaping for Erosion Control Blanket".

EROSION CONTROL-BLANKET

NOT TO SCALE

CITY OF BOX ELDER

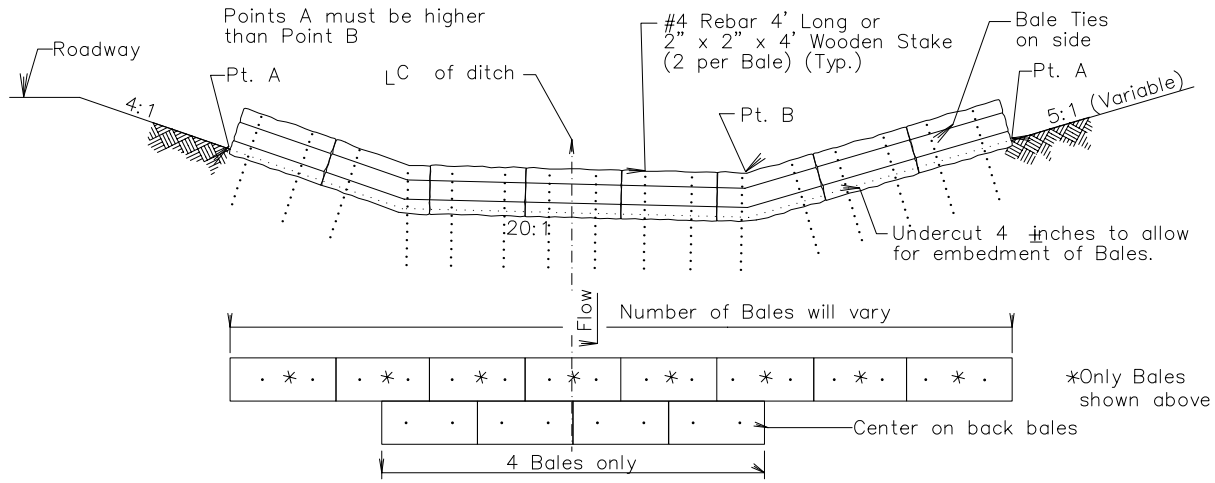
STANDARD DETAIL RE001

EROSION CONTROL-BLANKET

DETAIL #RE001

REVISED 01/2020

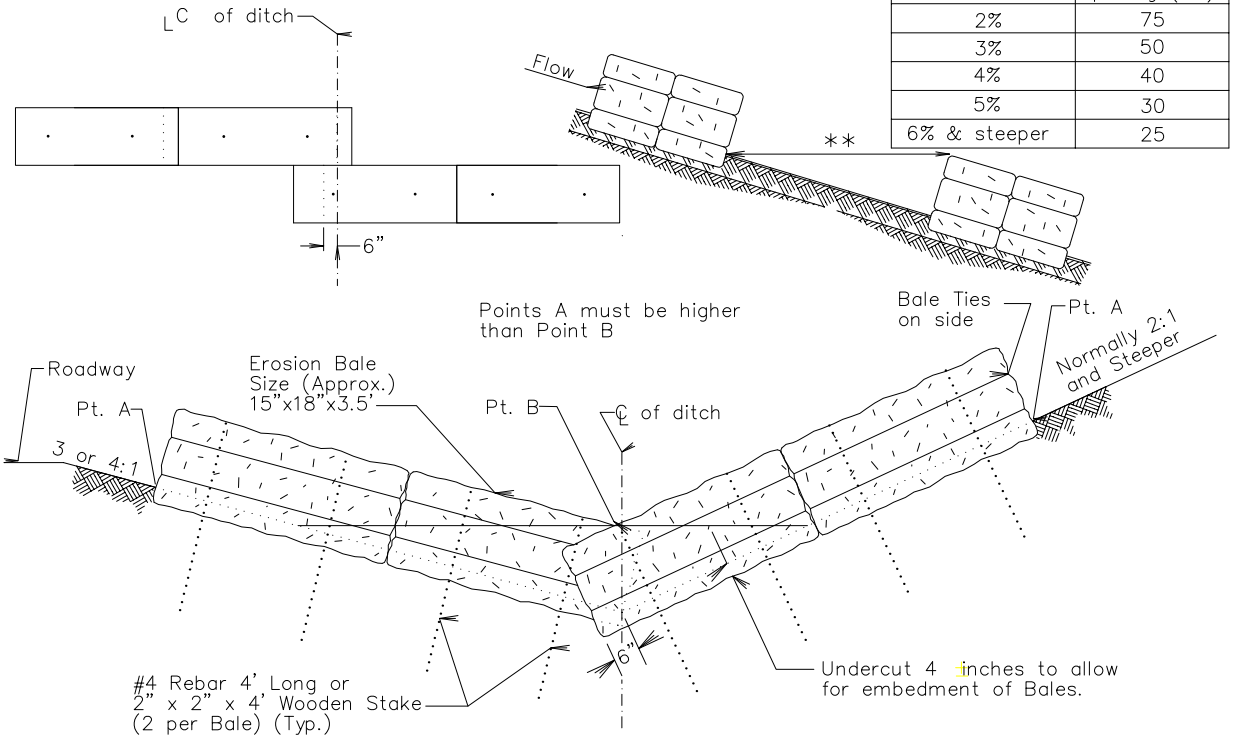
DETAIL RE002-EROSION CONTROL-BALES



NORMAL DITCH SECTION FOR EROSION BALE INSTALLATION

**The maximum spacing between sediment barriers should be such that the toe of the upstream sediment barrier is at the same elevation as the top of the downstream sediment barrier.

Grade	Spacing (Ft.)
2%	75
3%	50
4%	40
5%	30
6% & steeper	25



EROSION BALE INSTALLATION
(This Ditch Section and Erosion Bale Installation Typically Used in Black Hills)

GENERAL NOTES:

The erosion bale sediment barrier must be entrenched and backfilled. A trench should be excavated the width of a bale and the length of the proposed sediment barrier to a minimum depth of 4 inches. After the bales are staked with rebar or wood stakes, the excavated soil must be backfilled against the sediment barrier. The sediment barrier must be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale.

EROSION CONTROL-BALES

NOT TO SCALE

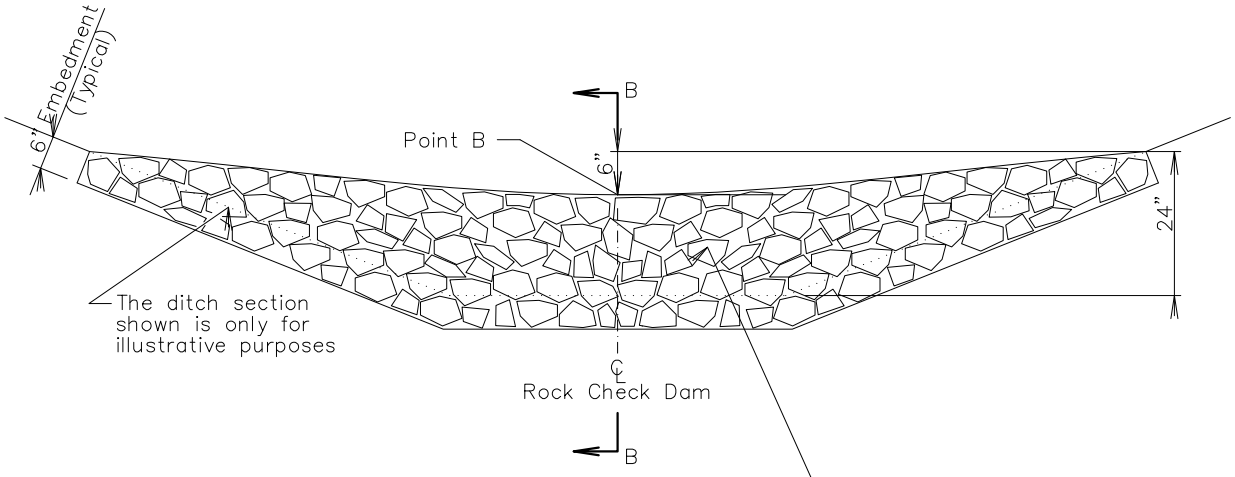
CITY OF BOX ELDER

STANDARD DETAIL RE002

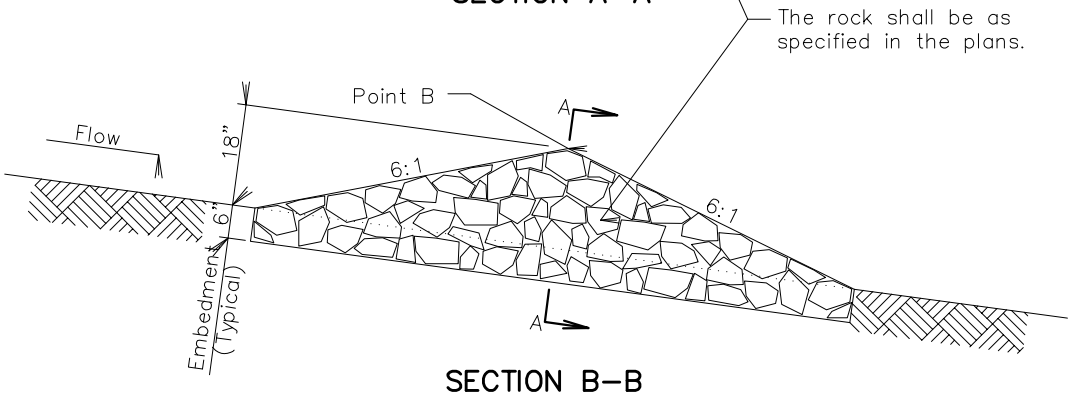
EROSION CONTROL-BALES

DETAIL #RE002

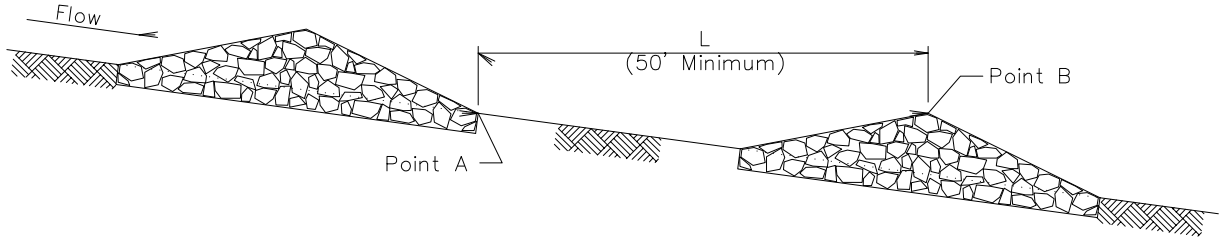
REVISED 01/2020



SECTION A–A



SECTION B–B



SECTION ALONG CENTERLINE
OF ROCK CHECK DAMS

GENERAL NOTES:

The elevation of Point A and Point B shall be the same. The distance L is the distance required such that Point A and Point B are at the same elevation.

All costs for constructing the Rock Check Dam including labor, equipment, excavation, and rock shall be incidental to the contract unit price per cubic yard for "Rock Check Dam".

EROSION CONTROL-ROCK CHECK DAM

NOT TO SCALE

CITY OF BOX ELDER

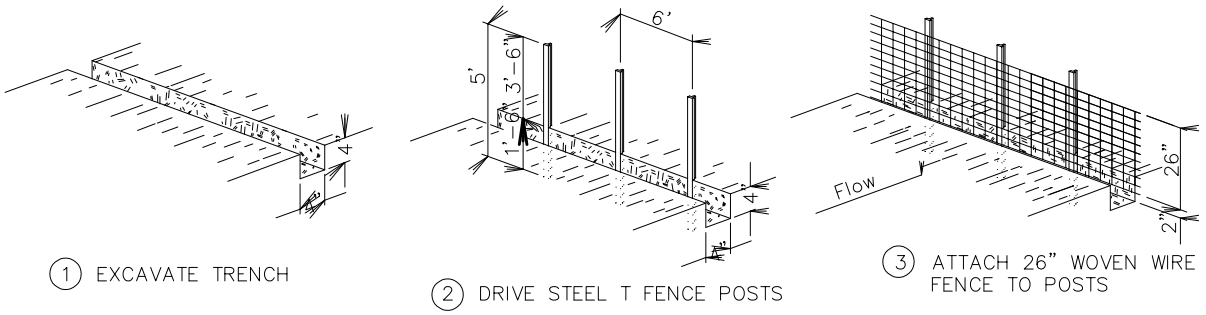
STANDARD DETAIL RE003

EROSION CONTROL-ROCK CHECK DAM

DETAIL #RE003

REVISED 01/2020

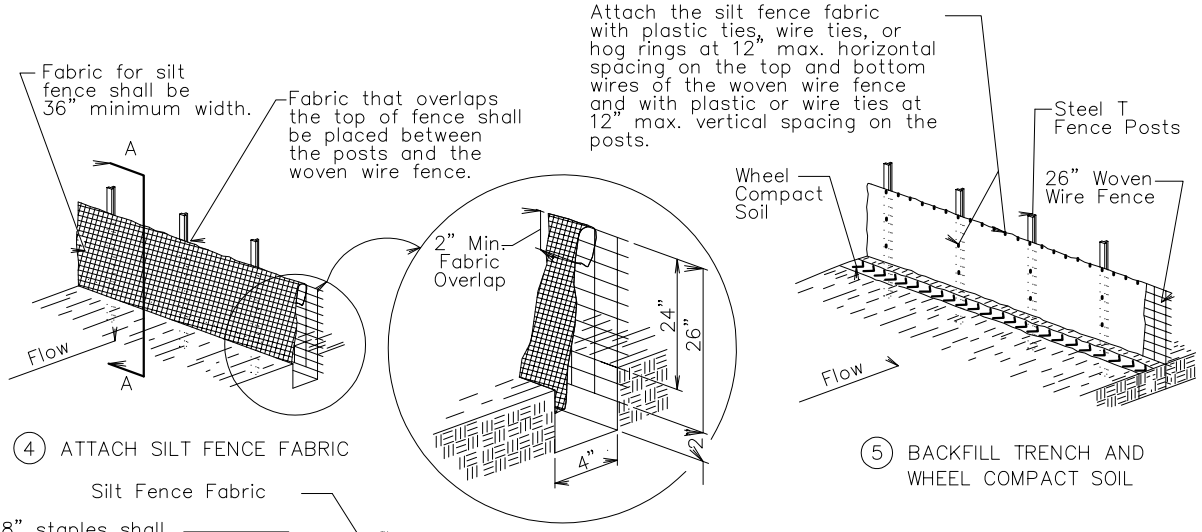
MANUAL LOW FLOW SILT FENCE INSTALLATION



(1) EXCAVATE TRENCH

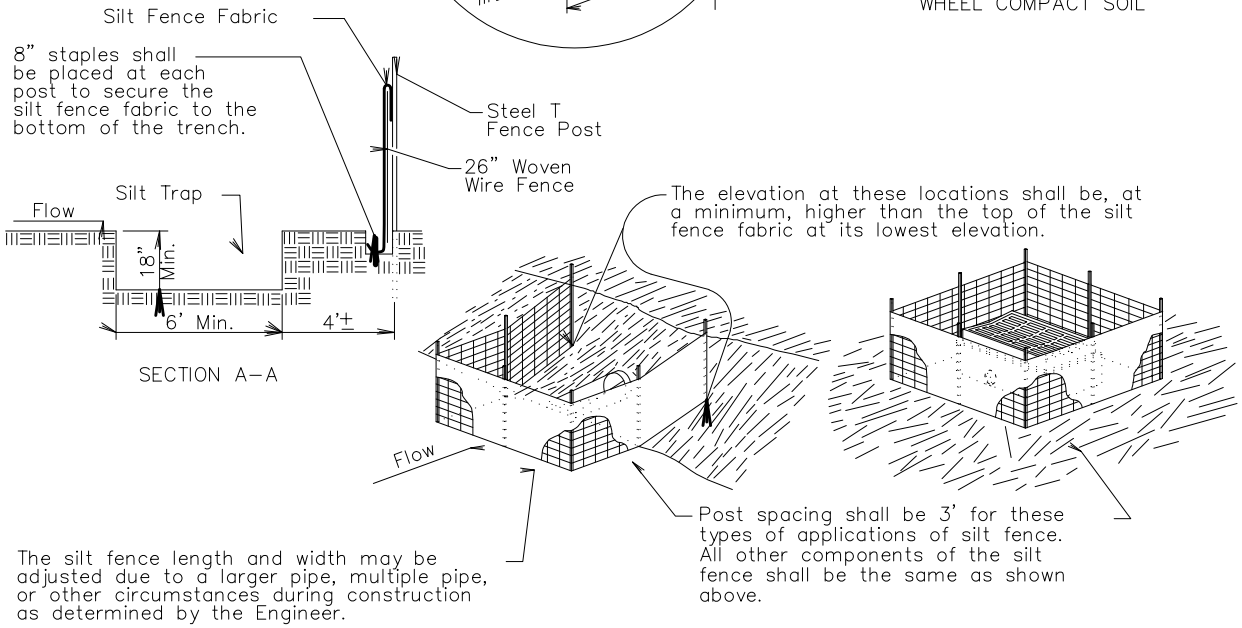
(2) DRIVE STEEL T FENCE POSTS

(3) ATTACH 26" WOVEN WIRE FENCE TO POSTS



(4) ATTACH SILT FENCE FABRIC

(5) BACKFILL TRENCH AND WHEEL COMPACT SOIL



EROSION CONTROL-LOW FLOW SILT FENCE AND TRAP

NOT TO SCALE

CITY OF BOX ELDER

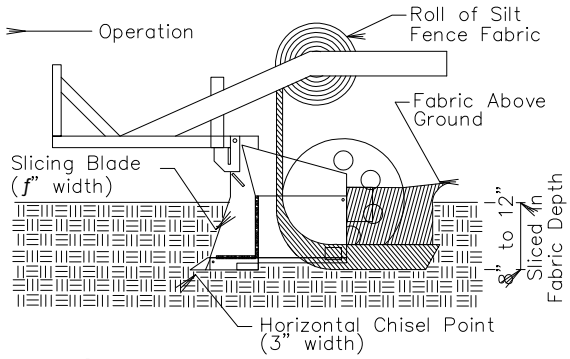
STANDARD DETAIL RE004

EROSION CONTROL-SILT FENCE-1

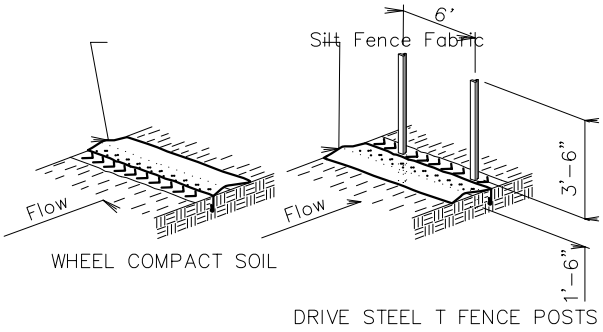
DETAIL #RE004

REVISED 01/2020

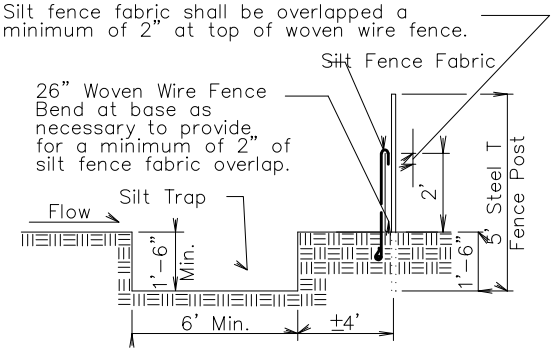
MACHINE SLICED LOW FLOW SILT FENCE INSTALLATION

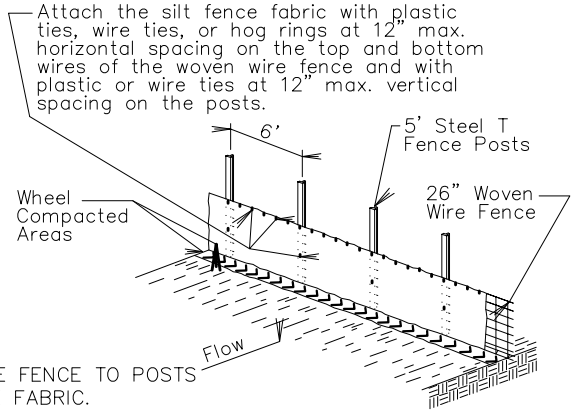


(1) INSTALL SILT FENCE FABRIC BY MACHINE SLICING METHOD.

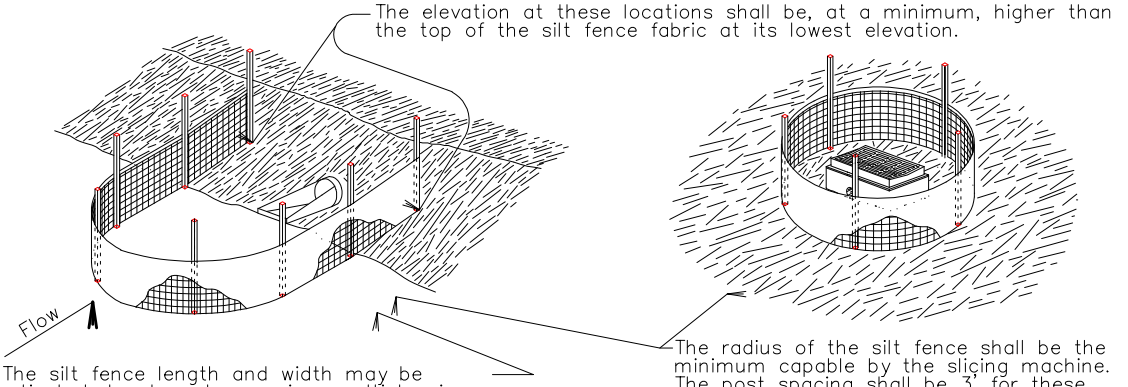


(2) WHEEL COMPACT SOIL ABOVE SLICED IN PORTION OF FABRIC AND THEN DRIVE STEEL T FENCE POSTS.





(3) ATTACH 26" WOVEN WIRE FENCE TO POSTS AND ATTACH SILT FENCE FABRIC.



GENERAL NOTES:

A silt trap shall be provided when specified by a plan note. All costs for constructing the silt trap shall be incidental to the contract unit price per cubic yard for "Silt Trap".

If a trench can not be dug or the silt fence fabric can not be sliced in due to the type of earthen material (such as rock), then a row of 30 to 40 pound sandbags butted end to end shall be provided on top of the extra length of silt fence fabric to prevent underflow.

EROSION CONTROL-LOW FLOW SILT FENCE AND TRAP

NOT TO SCALE

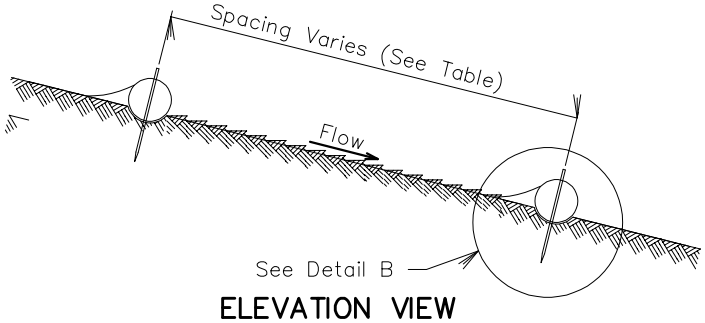
CITY OF BOX ELDER

STANDARD DETAIL RE005

EROSION CONTROL-SILT FENCE-2

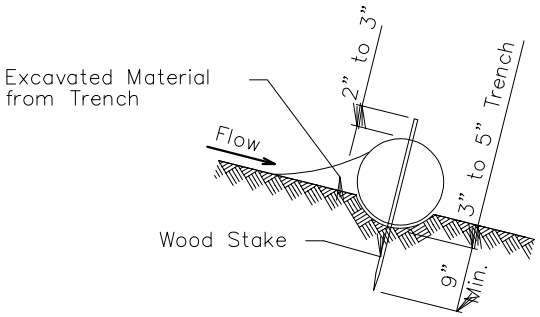
DETAIL #RE005

REVISED 01/2020

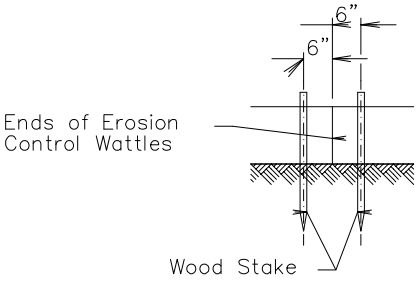


ELEVATION VIEW
CUT OR FILL SLOPE INSTALLATION

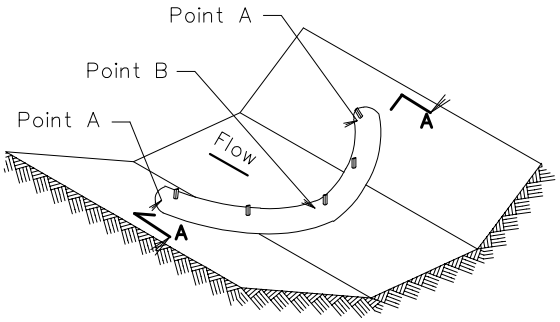
CUT OR FILL SLOPE INSTALLATION	
Slope	Spacing (Ft)
1:1	10
2:1	20
3:1	30
4:1	40



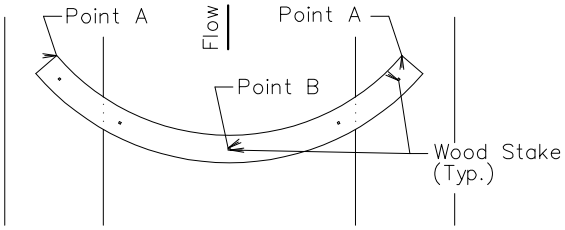
DETAIL B
(TYPICAL OF ALL INSTALLATIONS)



DETAIL C

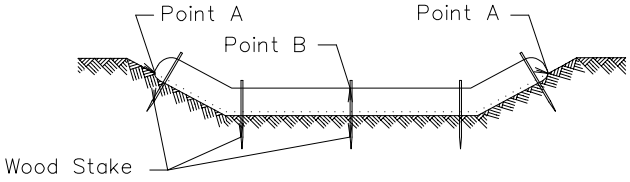


ISOMETRIC VIEW
DITCH INSTALLATION



PLAN VIEW
DITCH INSTALLATION

DITCH INSTALLATION	
Grade	Spacing (Ft)
2%	150
3%	100
4%	75
5%	50



SECTION A–A

EROSION CONTROL-WATTLE
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL RE006
EROSION CONTROL-WATTLE-1

DETAIL #RE006
REVISED 01/2020

GENERAL NOTES:

At cut or fill slope installations, wattles shall be installed along the contour and perpendicular to the water flow.

At ditch installations, point A must be higher than point B to ensure that water flows over the wattle and not around the ends.

The Contractor shall dig a 3" to 5" trench, install the wattle tightly in the trench so that daylight can not be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side. See Detail B.

The stakes shall be 1"x2" or 2"x2" wood stakes, however, other types of stakes such as rebar may be used only if approved by the Engineer. The stakes shall be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles shall be 3' to 4'.

Where installing running lengths of wattles, the Contractor shall butt the second wattle tightly against the first and shall not overlap the ends. See Detail C.

The Contractor and Engineer shall inspect the erosion control wattles once every week and within 24 hours after every rainfall event greater than 1/2" . The Contractor shall remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.

Sediment removal, disposal, or necessary shaping shall be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping shall be incidental to the contract unit price per cubic yard for "Remove Sediment".

All costs for furnishing and installing the erosion control wattles including labor, equipment, and materials shall be incidental to the contract unit price per foot for the corresponding erosion control wattle bid item.

All costs for removing the erosion control wattle from the project including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Remove Erosion Control Wattle".

EROSION CONTROL-WATTLE

NOT TO SCALE

CITY OF BOX ELDER

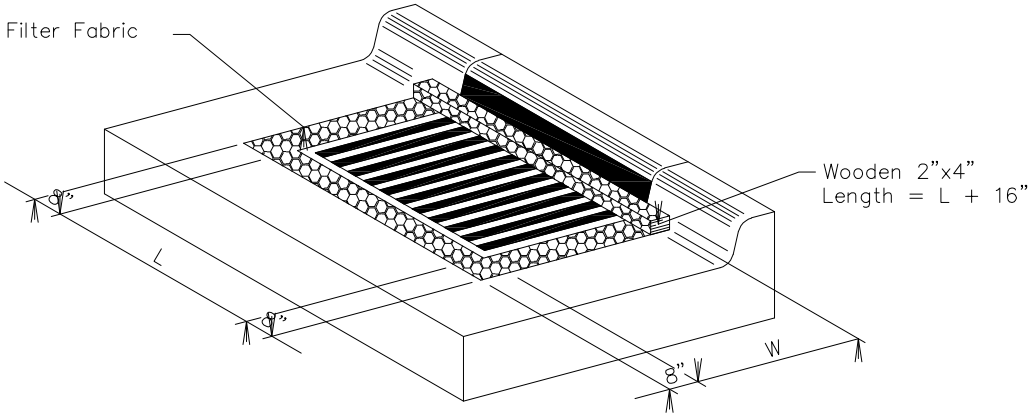
STANDARD DETAIL RE007

EROSION CONTROL-WATTLE-2

DETAIL #RE007

REVISED 01/2020

L = Length of Grate
W = Width of Grate



ISOMETRIC VIEW

GENERAL NOTES:

The grate and curb and gutter shown are for illustrative purposes only.

The sediment control at inlet with frame and grate shall be placed at locations stated in the plans or at locations determined by the Engineer.

The filter fabric shall be the type specified in the plans.

The filter fabric shall be placed in the inlet opening prior to placing the grate. Approximately 18 inches of excess filter fabric shall be wrapped around the 2"x4" and stapled securely to the 2"x4" after the grate has been placed.

The Contractor shall inspect and maintain the sediment control device once every week and within 24 hours after every rainfall event. The Contractor shall maintain the sediment control device by removing accumulated sediment and replacing torn filter fabric with new filter fabric.

The removed sediment shall be placed at a location away from the drop inlet where the sediment will not be washed back into the drop inlet or other storm sewer system.

All costs for furnishing, installing, inspecting, maintaining, removing, and replacing the sediment control device at the inlet including labor, equipment, and materials shall be incidental to the contract unit price per each for "Sediment Control at Inlet with Frame and Grate".

EROSION CONTROL-INLETS WITH FRAMES AND GRATES

NOT TO SCALE

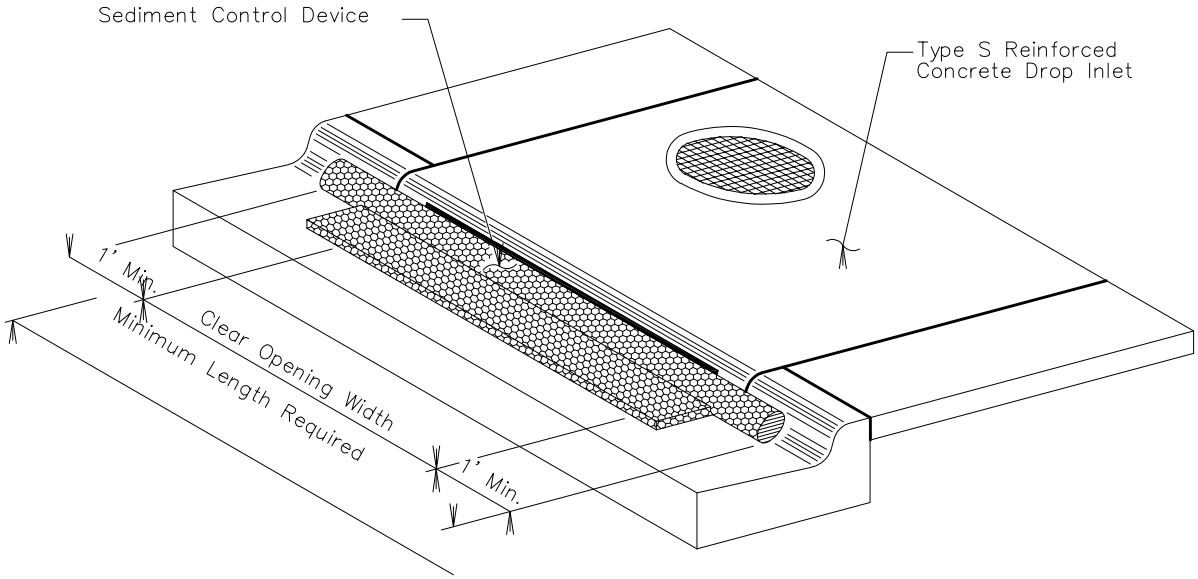
CITY OF BOX ELDER

STANDARD DETAIL RE008

EROSION CONTROL-INLETS-1

DETAIL #

REVISED 01/2020



ISOMETRIC VIEW

GENERAL NOTES:

The type of sediment control device shown is for illustrative purposes only.

The type of sediment control device used shall be one of the types as specified in the plans.

The sediment control device shall be placed at the drop inlets according to the manufacturers' installation instructions.

The sediment control at inlet for type S reinforced concrete drop inlet shall be placed at locations stated in the plans or at locations determined by the Engineer.

The Contractor shall inspect and maintain the sediment control device once every week and within 24 hours after every rainfall event. The Contractor shall maintain the sediment control device by removing the device, removing accumulated sediment, and resetting the device.

The removed sediment shall be placed at a location away from the drop inlet where the sediment will not be washed back into the drop inlet or other storm sewer system.

Payment for the "Sediment Control at Type S Drop Inlet" shall be based on the minimum length required at the drop inlets. Some of the sediment control devices specified in the plans will have to be longer due to available length.

All costs for furnishing, installing, inspecting, maintaining, removing, and resetting the sediment control device at the drop inlet including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Sediment Control at Type S Reinforced Concrete Drop Inlet".

EROSION CONTROL-INLETS FOR TYPE S DROP INLETS

NOT TO SCALE

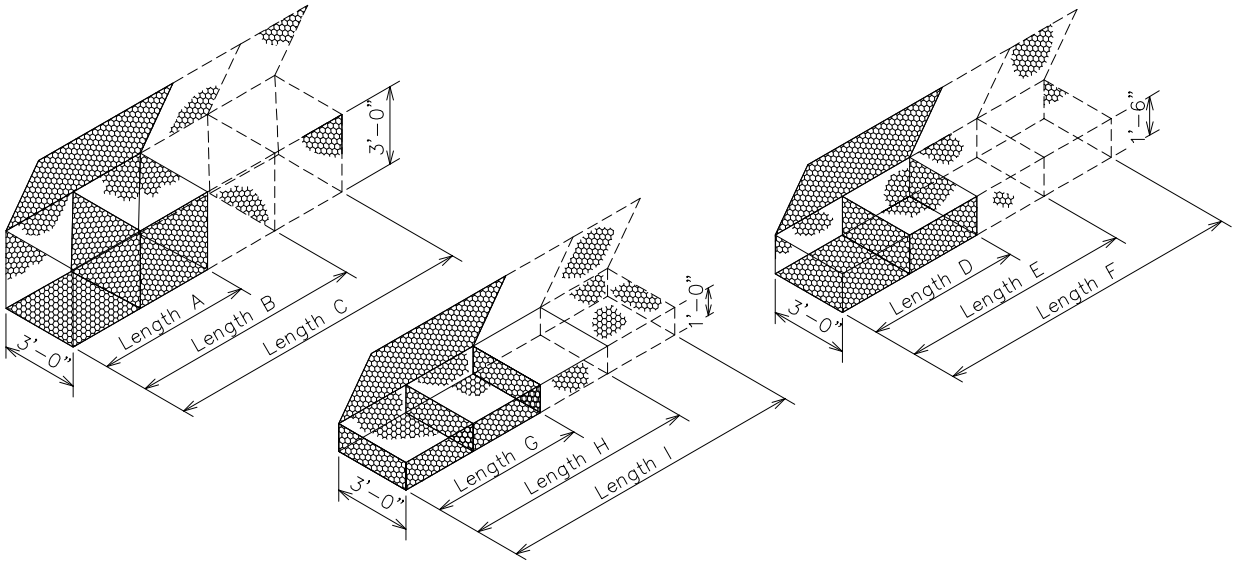
CITY OF BOX ELDER

STANDARD DETAIL RE009

EROSION CONTROL-INLETS-2

DETAIL #RE009

REVISED 01/2020



GABION DETAILS

STANDARD SIZES

SIZE	LENGTH	WIDTH	HEIGHT	NUMBER OF CELLS	CAPACITY, Cu. Yd.
A	6'-0"	3'-0"	3'-0"	2	2.0
B	9'-0"	3'-0"	3'-0"	3	3.0
C	12'-0"	3'-0"	3'-0"	4	4.0
D	6'-0"	3'-0"	1'-6"	2	1.0
E	9'-0"	3'-0"	1'-6"	3	1.5
F	12'-0"	3'-0"	1'-6"	4	2.0
G	6'-0"	3'-0"	1'-0"	2	0.7
H	9'-0"	3'-0"	1'-0"	3	1.0
I	12'-0"	3'-0"	1'-0"	4	1.3

Above Dimensions subject to mill tolerances.

GENERAL NOTES:

Lacing and internal connecting wire shall be 0.0866 inch diameter steel wire ASTM A641 Class 3 soft temper measured after galvanizing and for PVC coated gabions shall be 0.0866 inch diameter steel wire measured after galvanizing but before PVC coating.

The lacing procedure is as follows:
1. Cut a length of lacing wire approximately 1 times the distance to be laced but not exceeding 5 feet.
2. Secure the wire terminal at the corner by looping and twisting.
3. Proceed lacing with alternating single and double loops at a spacing not to exceed 6 inches.
4. Securely fasten the other lacing wire terminal.

Wire lacing or interlocking type fasteners shall be used for gabion assembly and final construction of gabion structures. Interlocking fasteners for galvanized gabions shall be high tensile 0.120 inch diameter galvanized steel wire measured after galvanizing. The galvanizing shall conform to ASTM A641-92 Class 3 coating. Fasteners shall also be in accordance with ASTM A764, Class II, Type III.

Interlocking fasteners for PVC coated gabions shall be high tensile 0.120 inch diameter stainless steel wire conforming to ASTM A313, Type 302, Class 1. The spacing of the interlocking fasteners during all phases of assembly and construction shall not exceed 6 inches. All fasteners shall be placed where the mesh weaves around the selvage wire at the vertical and horizontal joints.

EROSION CONTROL-GABION-BANK AND CHANNEL

NOT TO SCALE

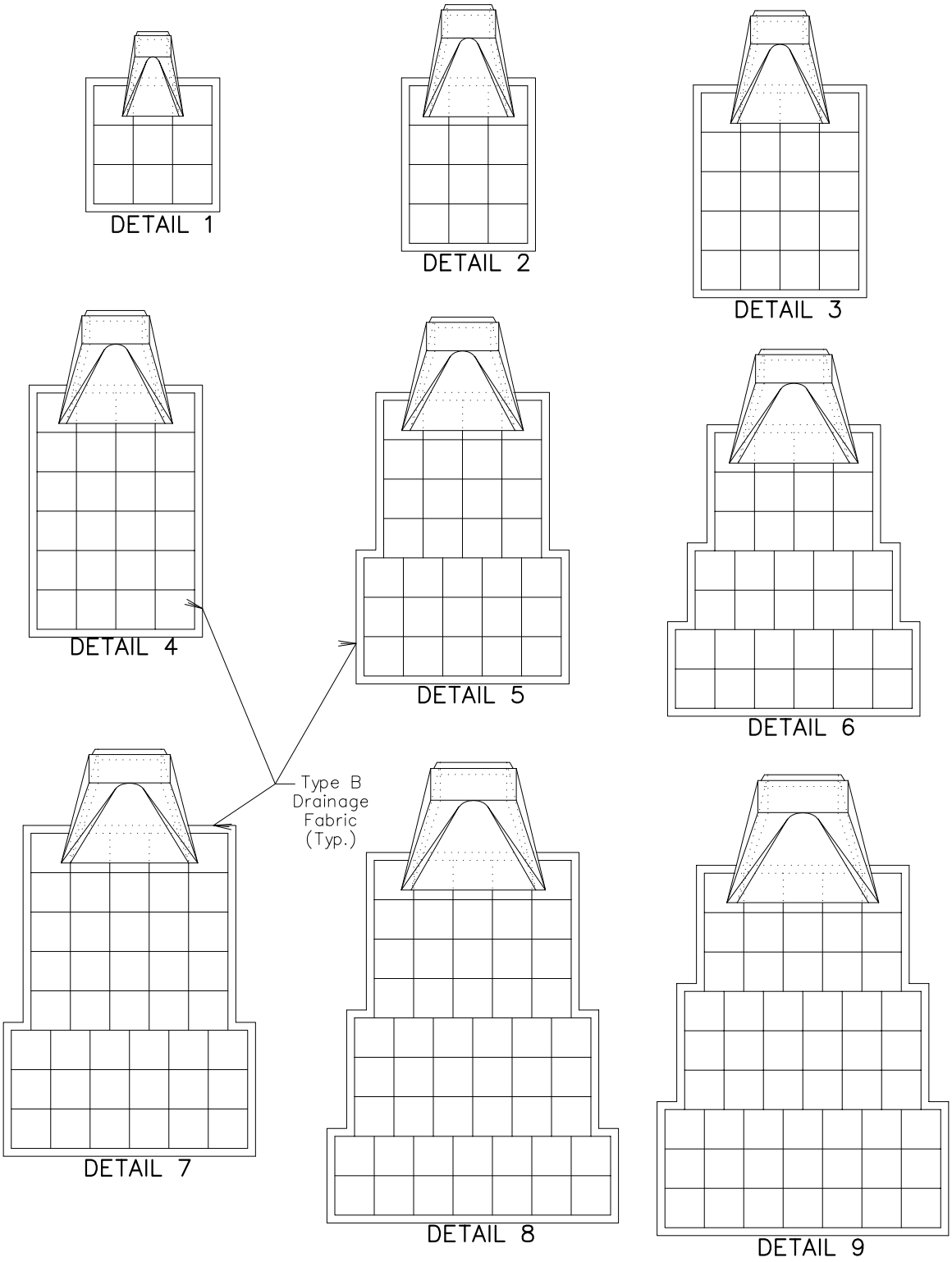
CITY OF BOX ELDER

STANDARD DETAIL RE020

EROSION CONTROL-GABION-1

DETAIL #RE020

REVISED 01/2020



EROSION CONTROL-GABION-UNDER PIPE SECTIONS

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RE021

EROSION CONTROL-GABION-2

DETAIL #RE021

REVISED 01/2020

	ESTIMATED QUANTITIES *			
	Detail	Pipe Diameter (Inches)	Gabion (Cu. Yd.)	Type B Drainage Fabric (Sq. Yd.)
RCP, RCP Arch, CMP, and CMP Arch	1	12, 18, and 24	4.5	15
	2	30 and 36	6.0	19
	3	42	10.0	29
	4	48 and 54	12.0	34
	5	60	15.5	43
	6	66	17.0	47
	7	72	21.5	57
	8	78	26.0	68
	9	84	27.0	70

GENERAL NOTES:

Gabions at outlets of CMP and RCP shall be placed under the end section a distance of 2' from the outlet end. For CMP end section installations, the upper fabric of the gabions shall be modified to accommodate the metal end section as approved by the Engineer.

* Gabion and type B drainage fabric quantities on this standard plate are based on standard gabion sizes D, E, and F as depicted on Standard Plate 720.01.

Type B drainage fabric shall be placed under the gabions and around the exterior sides (perimeter) of the gabions as approved by the Engineer. The type B drainage fabric shall be in conformance with Section 831 of the Specifications. Measurement and payment of the type B drainage fabric shall be in conformance with Section 720 of the Specifications.

EROSION CONTROL-GABION-UNDER PIPE END SECTIONS

NOT TO SCALE

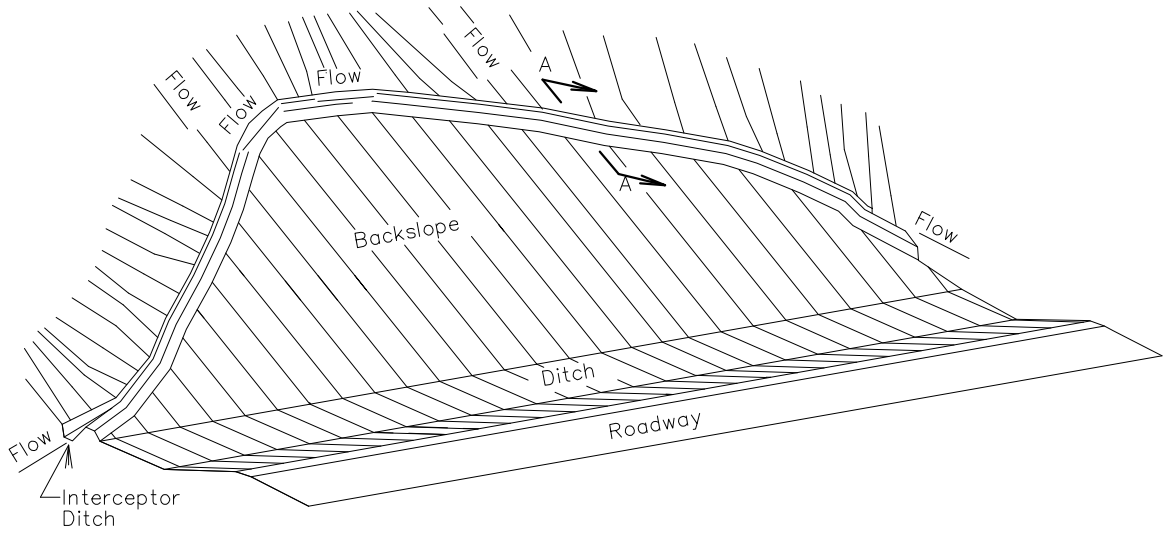
CITY OF BOX ELDER

STANDARD DETAIL RE022

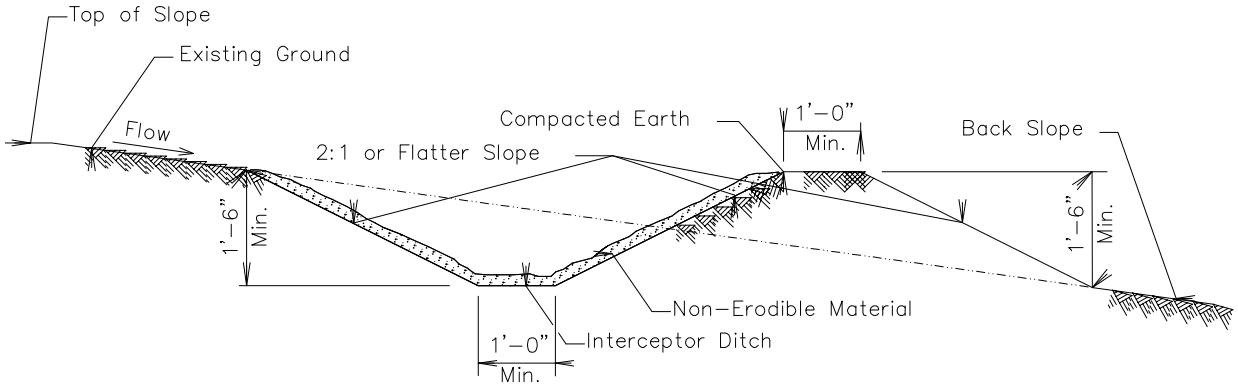
EROSION CONTROL-GABION-3

DETAIL #RE022

REVISED 01/2020



ISOMETRIC VIEW



SECTION A–A

GENERAL NOTES:

The Contractor shall inspect the interceptor ditch once every week and within 24 hours after every rainfall event. The Contractor shall maintain the interceptor ditch by removing accumulated sediment once it has reached a depth of 1'.

The non–erodible material used shall be an erosion control blanket or a 2" thickness of shotrock, base course, or gravel cushion material.

The Engineer shall determine when or if the interceptor ditch shall be removed.

All costs for constructing, inspecting, and maintaining the interceptor ditch including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Cut Interceptor Ditch".

EROSION CONTROL-CUT INTERCEPTOR DITCH

NOT TO SCALE

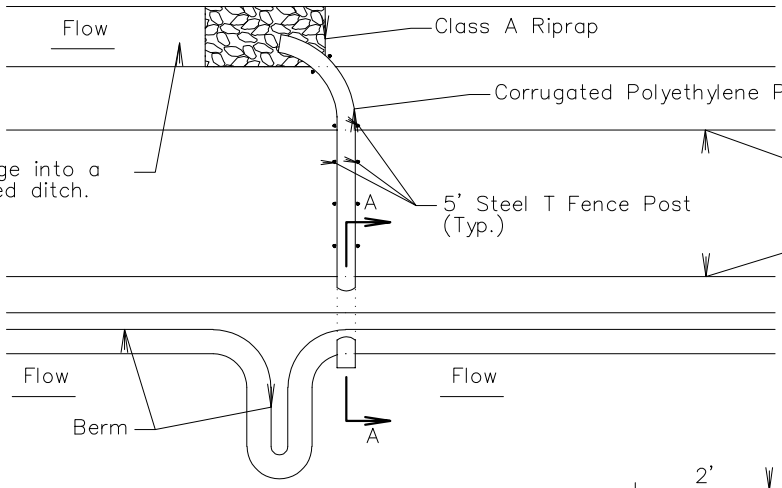
CITY OF BOX ELDER

STANDARD DETAIL RE030

EROSION CONTROL-DITCH

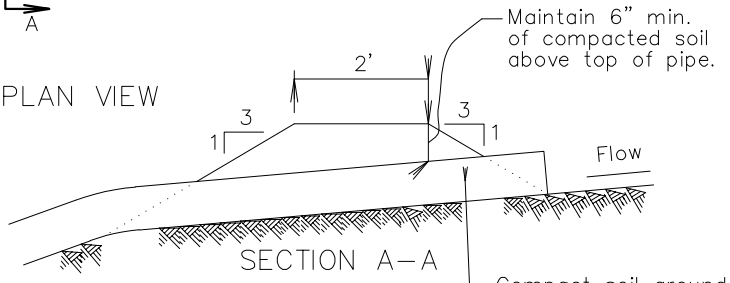
DETAIL #RE030

REVISED 01/2020

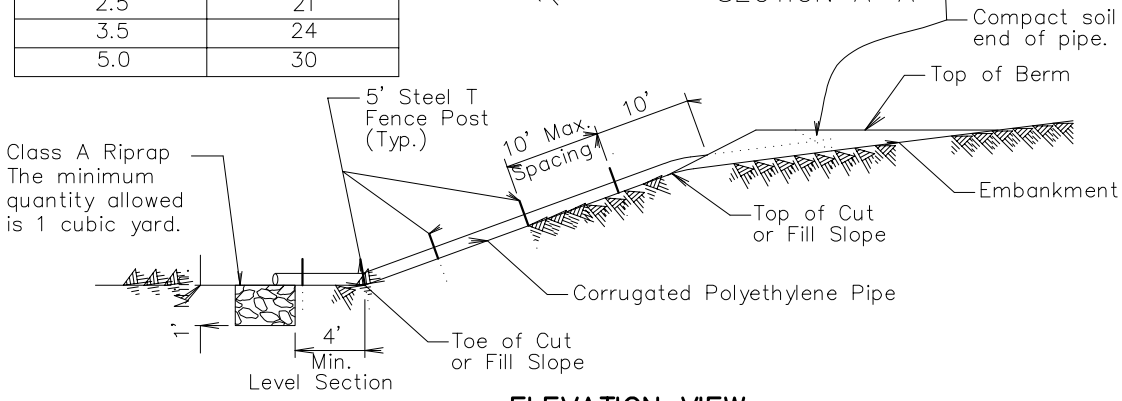


PLAN VIEW

TEMPORARY SLOPE DRAIN PIPE SIZE REQUIREMENTS	
Drainage Area (Acres)	Pipe Diameter (In)
0.5	12
1.5	18
2.5	21
3.5	24
5.0	30



SECTION A–A



ELEVATION VIEW

GENERAL NOTES:

The temporary slope drains shall be placed at locations stated in the plans or at locations deemed necessary by the Engineer.

The extra length of berm shown in the left side of the plan view illustrates an extension of the berm to alleviate erosion of the cut or fill slope. The length and locations of the berms shall be approved by the Engineer.

The corrugated polyethylene pipe shall be secured in place by wrapping 16 Ga. wire around the pipe and steel T fence posts multiple times as necessary and shall be approved by the Engineer.

The quantity of class A riprap shall be determined by the Engineer, however, the minimum quantity allowed is 1 cubic yard.

The temporary slope drain shall be measured to the nearest foot.

All costs for constructing and removing the temporary slope drains including labor, equipment, and materials which include the class A riprap, corrugated polyethylene pipe, steel T fence posts, wire, and necessary earthwork, shall be incidental to the contract unit price per foot for the corresponding temporary slope drain bid item.

EROSION CONTROL-TEMPORARY SLOPE DRAIN

NOT TO SCALE

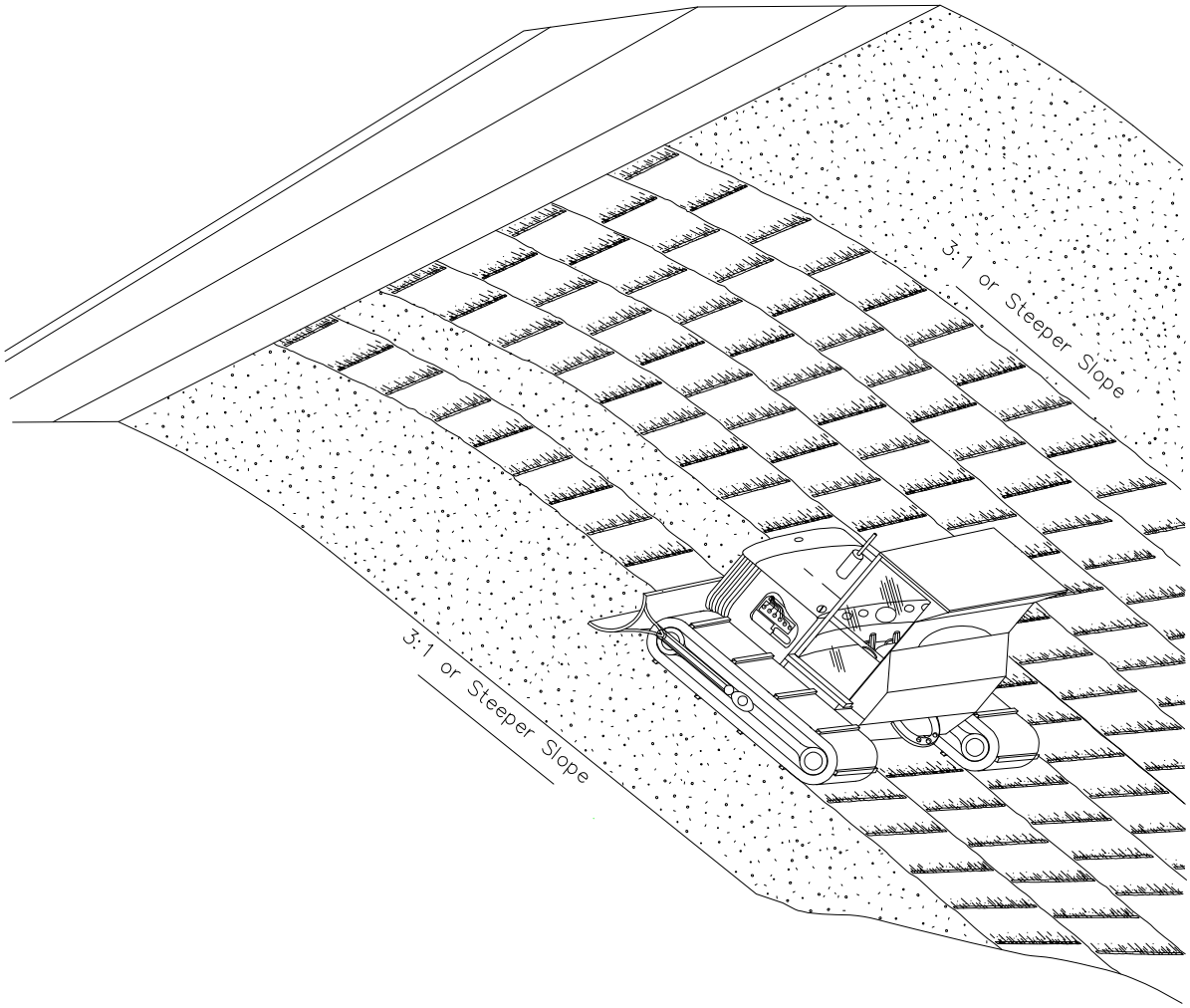
CITY OF BOX ELDER

STANDARD DETAIL RE031

EROSION CONTROL-SLOPE DRAIN

DETAIL #RE031

REVISED 01/2020



GENERAL NOTES:

Where practical, surface roughening shall be done on slopes 3:1 and steeper and on slopes deemed necessary by the Engineer.

The equipment used for surface roughening shall be equipped with tracks that are capable of creating ridges in the soil that are perpendicular to the slope. The final condition of the surface roughening shall be approved by the Engineer.

Measurement for surface roughening shall be to the nearest tenth of an acre.

All costs associated with surface roughening including labor, equipment, and materials shall be incidental to the contract unit price per acre for "Surface Roughening".

EROSION CONTROL-SURFACE ROUGHENING

NOT TO SCALE

CITY OF BOX ELDER

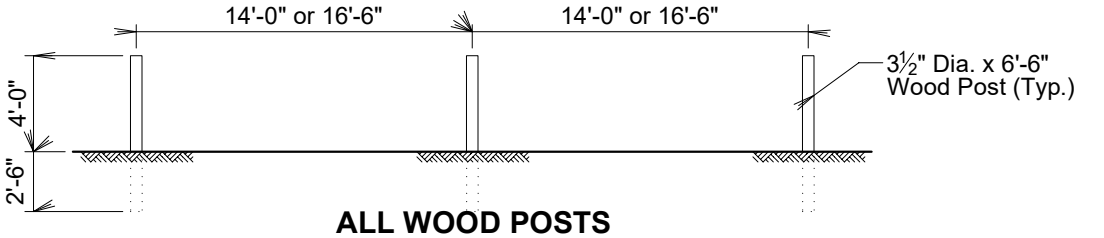
STANDARD DETAIL RE032

EROSION CONTROL-SURFACE ROUGH

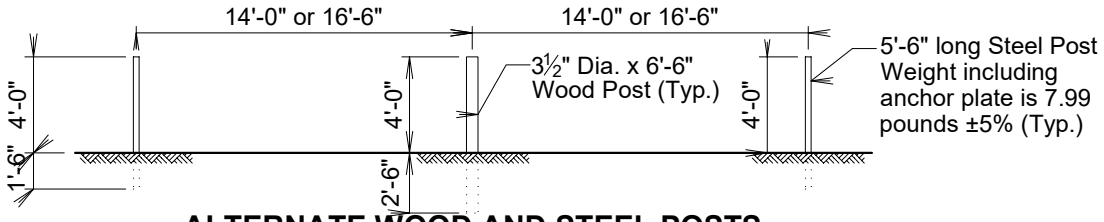
DETAIL #RE032

REVISED 01/2020

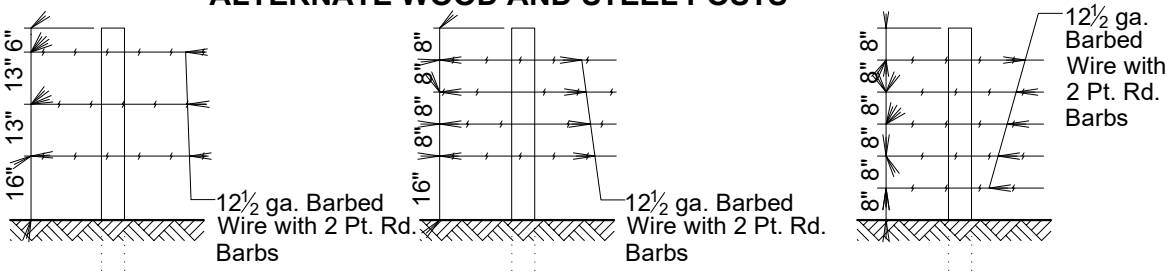
DETAIL RF001-FENCING-RIGHT-OF-WAY



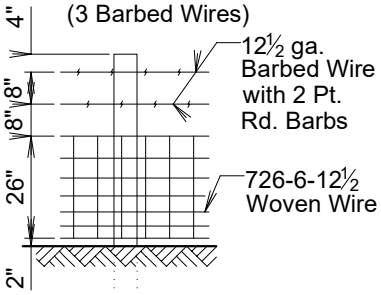
ALL WOOD POSTS



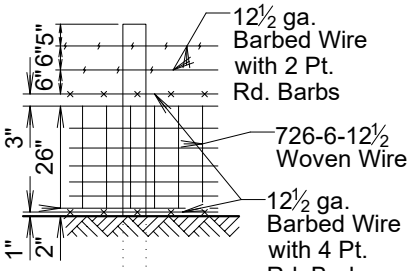
ALTERNATE WOOD AND STEEL POSTS



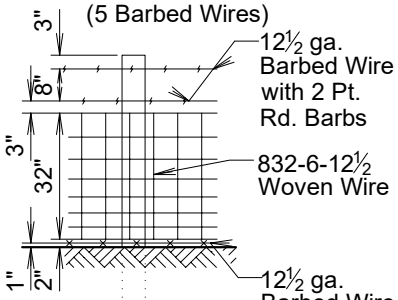
TYPE 1
(3 Barbed Wires)



TYPE 2
(4 Barbed Wires)



TYPE 3
(5 Barbed Wires)



TYPE 4
(26" Woven Wire with 2 Barbed Wires)

TYPE 5
(26" Woven Wire with 4 Barbed Wires)

TYPE 6
(32" Woven Wire with 3 Barbed Wires)

TYPE OF FENCE		LINE POST SPACING	BARBED WIRE		WOVEN WIRE
TYPE	DESCRIPTION		WIRE GAGE	NUMBER AND SHAPE OF BARBS	STYLE OR DESIGN NO.
1	3 Barbed Wires	16'-6"	12½	2 Point Round	—
2	4 Barbed Wires	16'-6"	12½	2 Point Round	—
3	5 Barbed Wires	16'-6"	12½	2 Point Round	—
4	26" Woven Wire with 2 Barbed Wires	14'-0"	12½	2 Point Round	726-6-12½
5	26" Woven Wire with 4 Barbed Wires	14'-0"	12½	2 wires with 2 Pt. Rd. 2 wires with 4 Pt. Rd.	726-6-12½
6	32" Woven Wire with 3 Barbed Wires	14'-0"	12½	2 wires with 2 Pt. Rd. 1 wire with 4 Pt. Rd.	832-6-12½

GENERAL NOTES:

Fence types designated on the plans that are followed by the letter S will have smooth (barbless) wires.

When type 5S or 6S is designated the bottom wire may be barbed, smooth, or left off.

All degrees of curvature stated for fence are at centerline of roadway.

FENCING-RIGHT-OF-WAY

NOT TO SCALE

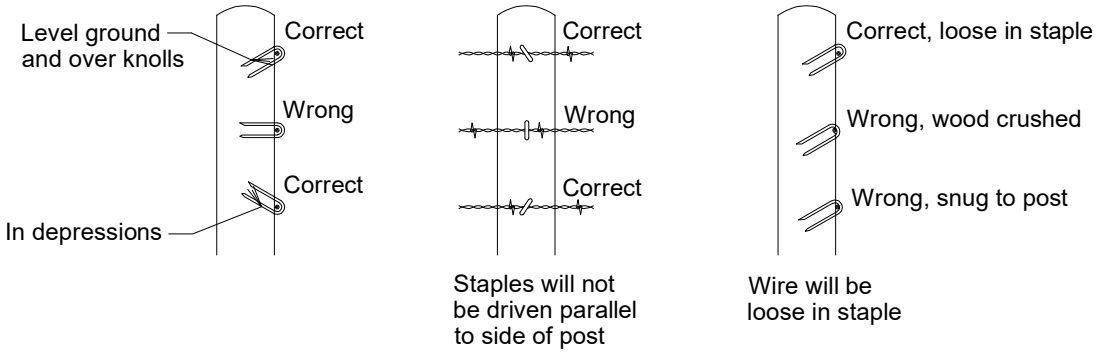
CITY OF BOX ELDER

STANDARD DETAIL RF001

FENCING-RIGHT-OF-WAY

DETAIL #RF001

REVISED 01/2020



STAPLE INSTALLATION

GENERAL NOTES:

The Right-of-Way fence will consist of barbed wire or a combination of woven wire and barbed wire. The barbed wire and/or woven wire will be fastened to all wood posts or fastened to alternating wood and steel posts. Only wood posts will be used for brace panels. Gates will be of the type designated in the plans or as otherwise directed by the Engineer. Fence will be constructed conforming to the details on the standard plates and in the plans unless otherwise directed by the Engineer.

Right-of-Way fence on Interstate Projects will be constructed one foot within the Interstate Right-of-Way lines except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

Right-of-Way fence other than on Interstate Projects will be constructed within one foot of the Right-of-Way on the Landowner's side except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

Barbs will be fabricated from zinc coated 14 ga. wire. Two point barbs will be wrapped twice around one main strand at four-inch spacings and the four point barbs will be interlocked and wrapped around both main strands at five-inch spacings.

The gages of wire and wood post lengths and sizes are the minimum acceptable unless otherwise specified in the plans. The tolerances for steel posts will be as stated in AASHTO M281. Woven wire will conform to design and specifications of ASTM A116 and barbed wire will conform to ASTM A121.

FENCING-RIGHT-OF-WAY INSTALLATION

NOT TO SCALE

CITY OF BOX ELDER

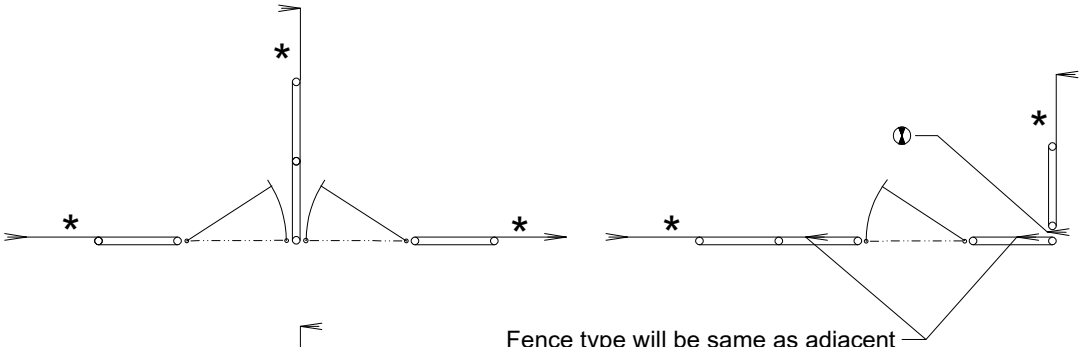
STANDARD DETAIL RF002

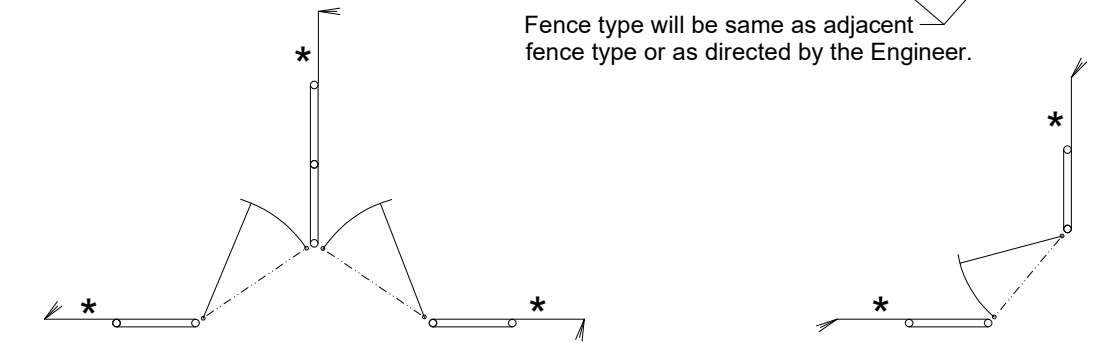
FENCING-RIGHT-OF-WAY INSTALL

DETAIL #RF002

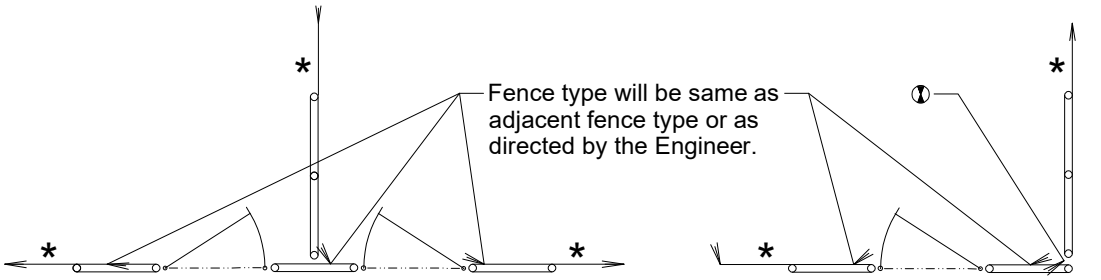
REVISED 01/2020

ENTRANCE
(Not on corner)





DOUBLE ENTRANCES



ENTRANCES AT CORNERS

GATES

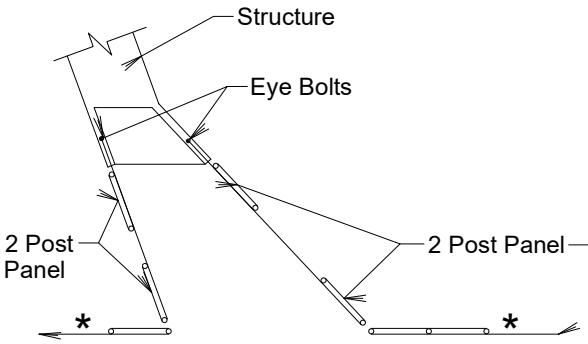
* If fence length is less than 600' to next corner use a 2 post panel.
If fence length is greater than 600' to next corner use a 3 post panel.

◐ See Detail B on Sheet 1 of 3.

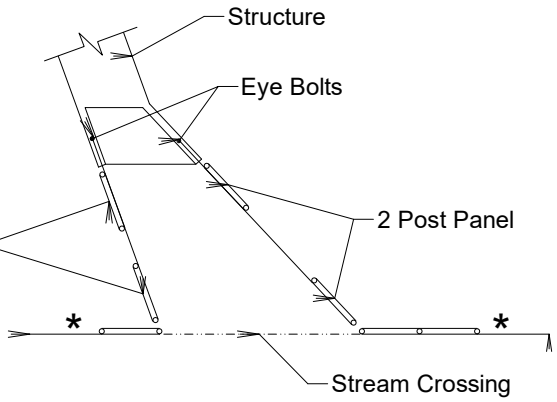
FENCING-BRACE PANELS AND APPLICATIONS
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL RF003
FENCING-BRACE PANEL APP.-1

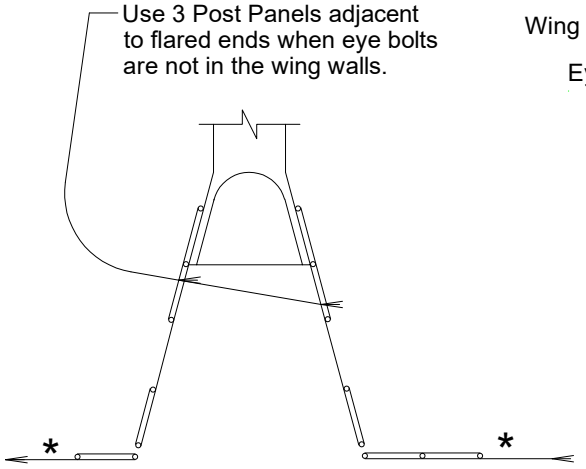
DETAIL #RF003 REVISED 01/2020



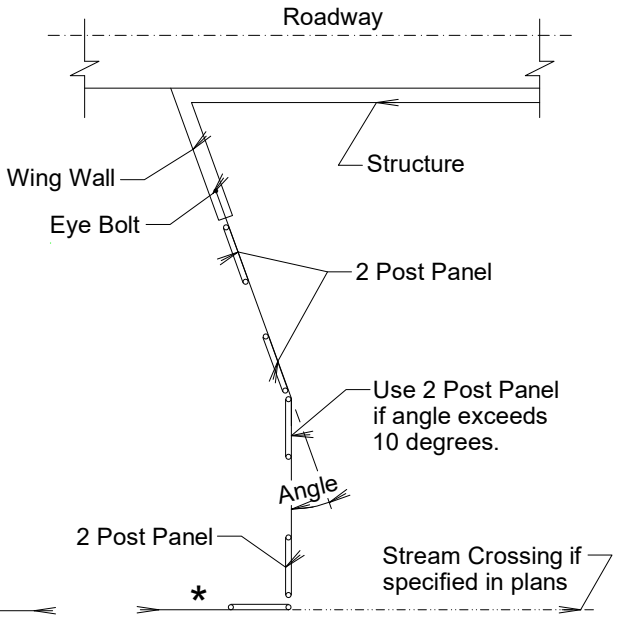
R.C. BOX CULVERT OR CATTLE PASS



STRUCTURE WITH STREAM CROSSING FENCE



R.C. BOX CULVERT OR CATTLE PASS



BRIDGE

* If fence length is less than 600' to next corner use a 2 post panel.
If fence length is greater than 600' use a 3 post panel.

FENCING-BRACE PANEL APPLICATIONS AT STRUCTURES

NOT TO SCALE

CITY OF BOX ELDER

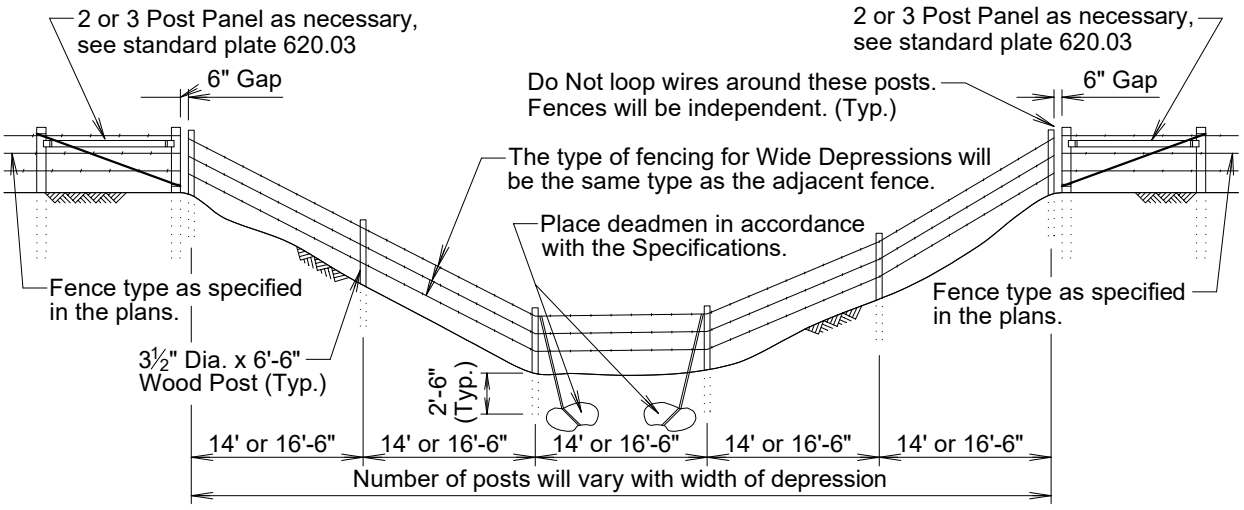
STANDARD DETAIL RF004

FENCING-BRACE PANEL APP.-2

DETAIL #RF004

REVISED 01/2020

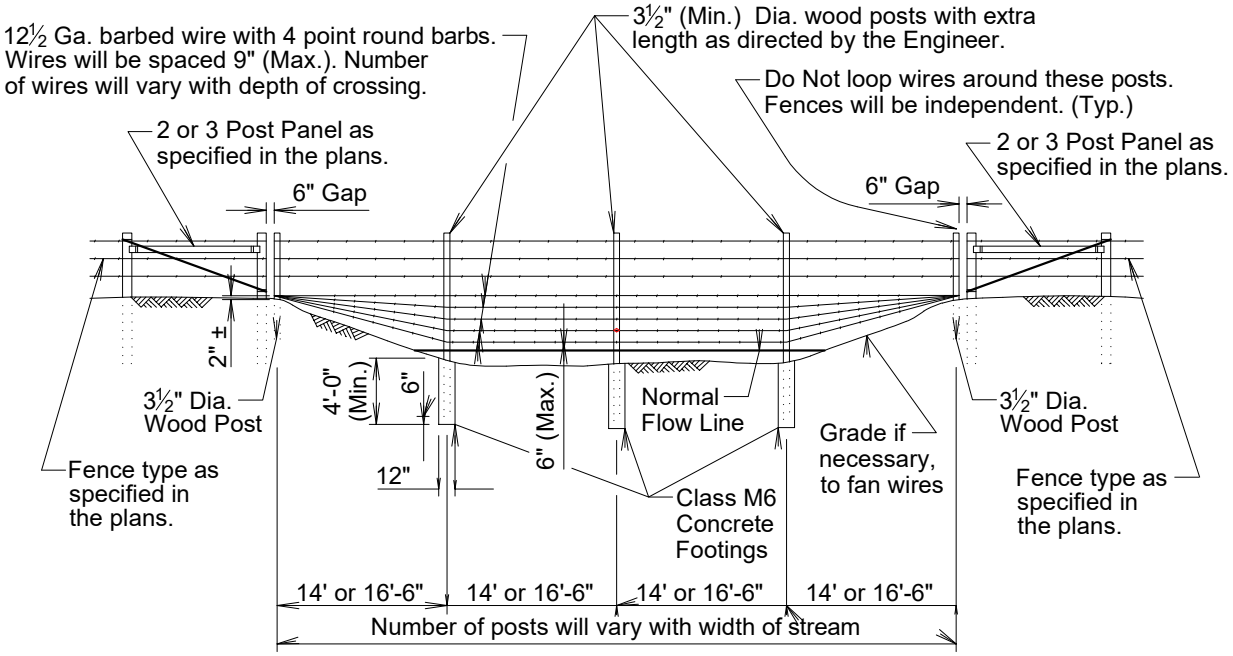
DETAIL RF005-FENCING-WIDE DEPRESSIONS AND STREAM CROSSINGS



This installation will be made when requested by the Engineer.

FENCING AT WIDE DEPRESSION

(Subject to Flooding)



This installation will be made only when stated in the plans.

FENCING AT STREAM CROSSING

GENERAL NOTES:

There will be no extra payment for the additional work and materials required to construct the fencing at the wide depression(s) and/or the fencing at the stream crossing(s). The deadmen will be paid for in accordance with 620.5 A of the Specifications.

Measurement and payment for the fencing at the wide depression(s) and/or the fencing at the stream crossing(s) will be at the contract unit price per foot for the corresponding Right-of-Way fence contract item.

FENCING-WIDE DEPRESSIONS AND STREAM CROSSINGS

NOT TO SCALE

CITY OF BOX ELDER

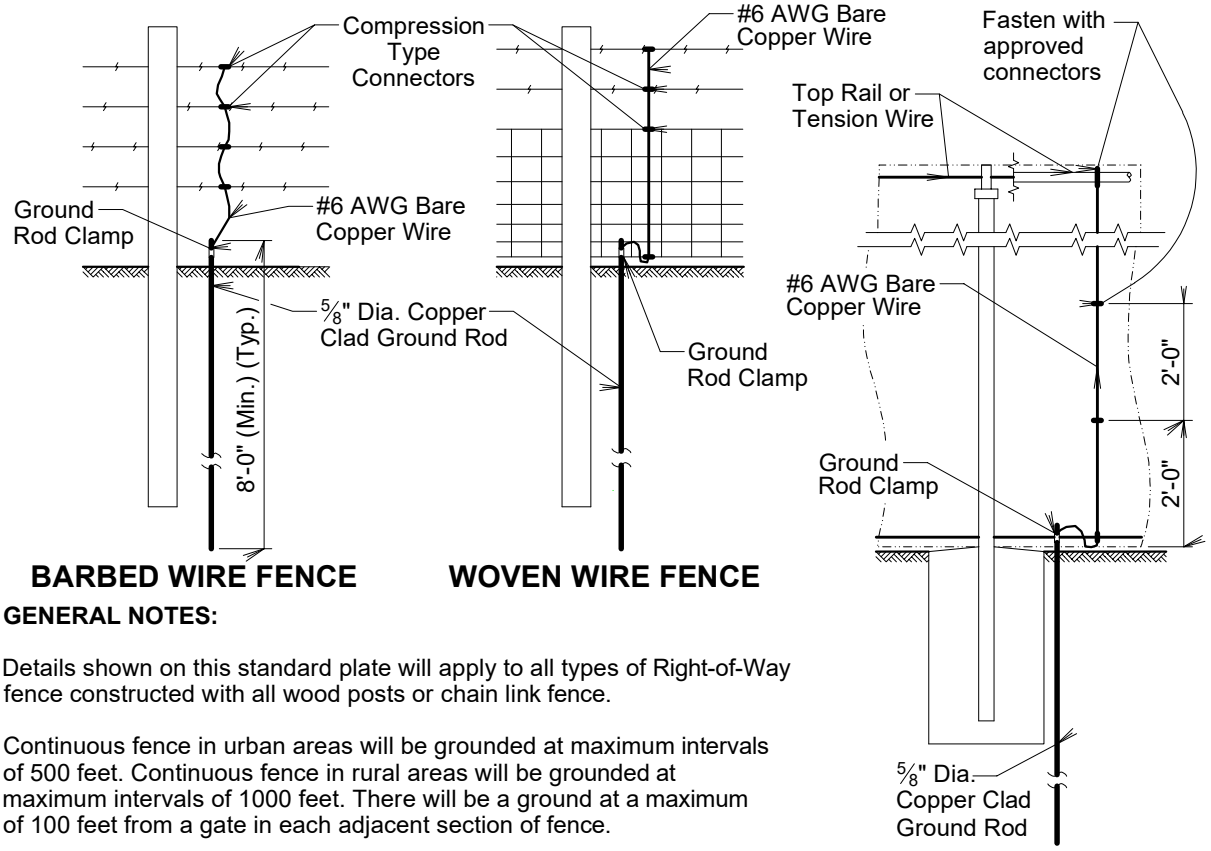
STANDARD DETAIL RF005

FENCING-DEPRESSIONS/CROSSINGS

DETAIL #RF005

REVISED 01/2020

DETAIL RF006-FENCING-GROUNDING



BARBED WIRE FENCE **WOVEN WIRE FENCE**

CHAIN LINK FENCE

GENERAL NOTES:

Details shown on this standard plate will apply to all types of Right-of-Way fence constructed with all wood posts or chain link fence.

Continuous fence in urban areas will be grounded at maximum intervals of 500 feet. Continuous fence in rural areas will be grounded at maximum intervals of 1000 feet. There will be a ground at a maximum of 100 feet from a gate in each adjacent section of fence.

Fence placed under a power line will be grounded with three grounds. One ground will be placed directly below the crossing and the other two will be placed 25 feet to 50 feet away, one on each side.

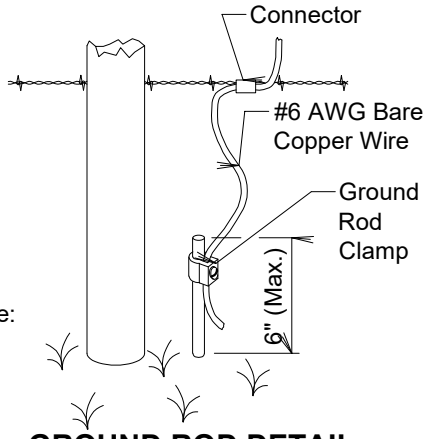
One ground will be placed directly below each telephone or cable crossing.

Ground rods will be located on the post side of the fence and will be as close as possible to the post and fence.

The cost of furnishing and placing all materials for grounding will be incidental to the contract unit price per foot for the respective Right-of-Way fence or chain link fence contract item.

The approximate quantites of materials per each installation of a ground are:

1 ground rod clamp.
1 ⅝" diameter x 8' long copper clad ground rod
1 #6 AWG bare copper wire; 7' long for Right-of-Way fence or 10' long for chain link fence.



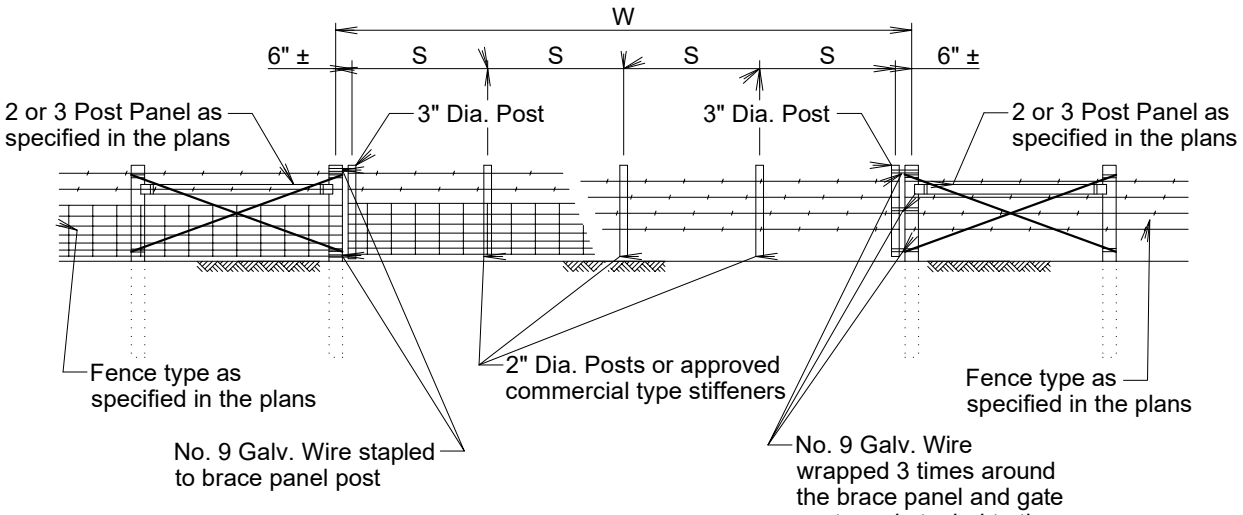
GROUND ROD DETAIL

Compression type or other type of connectors:
26" woven wire will have a total of two connectors, one secured to the top and one secured to the bottom.
32" woven wire will have a total of three connectors, one secured to the top, one secured to the middle, and one secured to the bottom.
One connector will be used for each strand of barbed wire.
A minimum of 3 connectors will be installed on chain link fence, the connectors will be placed vertically at every 2-foot increment and connectors will be placed on the top and bottom tension wires or top rail.

FENCING-GROUNDING
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL RF006
FENCING-GROUNDING

DETAIL #RF006 REVISED 01/2020



ELEVATION VIEW

W Gate Width (Ft.)	S Post Spacing
16	3 @ 5'-0" ±
20	4 @ 4'-9" ±
24	4 @ 5'-9" ±
30	5 @ 5'-10" ±
40	6 @ 6'-6" ±

GENERAL NOTES:

Creosote treatment of the gate posts will not be accepted.

The type of fencing in the gate will be of the same type as specified for the adjacent Right-of-Way fence.

All costs for furnishing and constructing the wire gate(s) will be incidental to the contract unit price per foot for the respective Right-of-Way fence contract item.

FENCING-WIRE GATES

NOT TO SCALE

CITY OF BOX ELDER

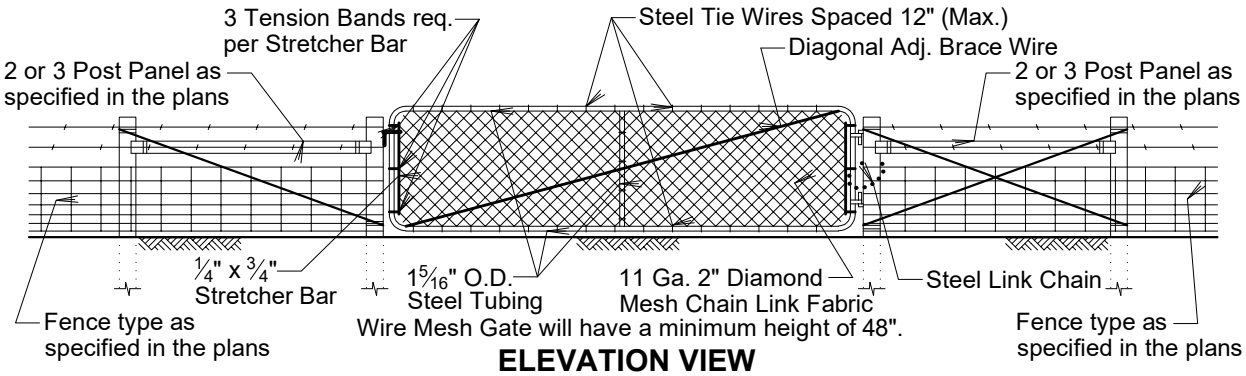
STANDARD DETAIL RF010

FENCING-WIRE GATES

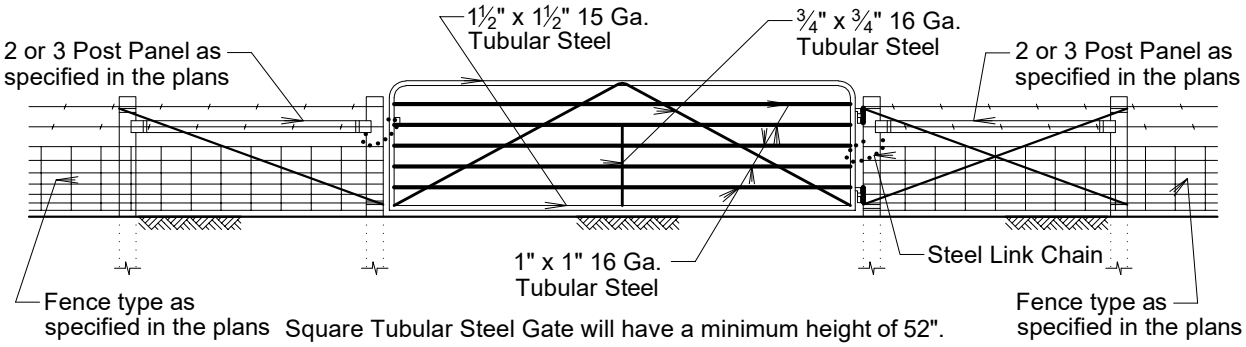
DETAIL #RF010

REVISED 01/2020

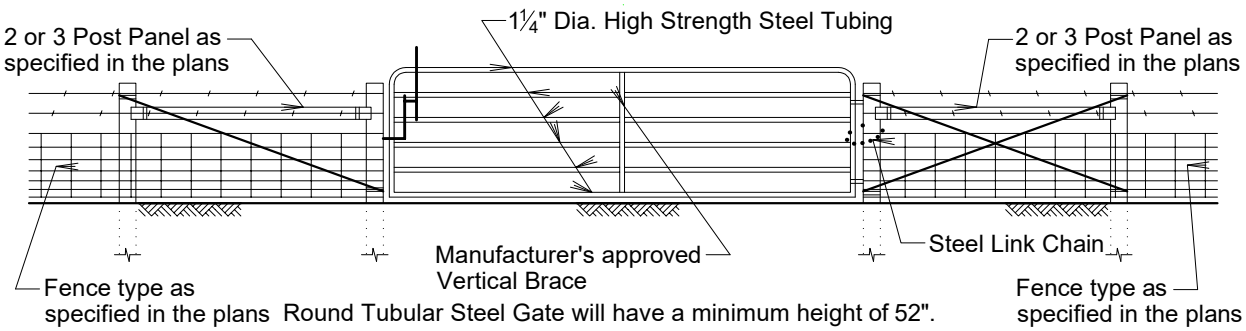
DETAIL RF011-FENCING-TUBULAR FRAME GATES



ELEVATION VIEW
(Wire Mesh Gate)



ELEVATION VIEW
(Square Tubular Steel Gate)



ELEVATION VIEW
(Round Tubular Steel Gate)

GENERAL NOTES:

Only single tubular frame gates are shown on this standard plate. If double tubular frame gates are specified, the gates will be of the same type and materials as shown above. Double tubular gates will swing toward the middle of the opening and will be secured by a chain, latch, or other suitable hardware.

Gate hardware will conform to the specific type of gate installed. The gate and gate hardware will either be painted or galvanized. The paint on the gates and hardware will be subject to approval by the Engineer.

The Steel Link Chain will be a minimum of ¼", 4' long, rust resistant, and have electrically welded links. The chain will be wrapped around the gate hinge post and gate frame and the ends of the chain will be welded together with enough slack in the chain to provide free operation of the gate.

FENCING-TUBULAR FRAME GATES
NOT TO SCALE

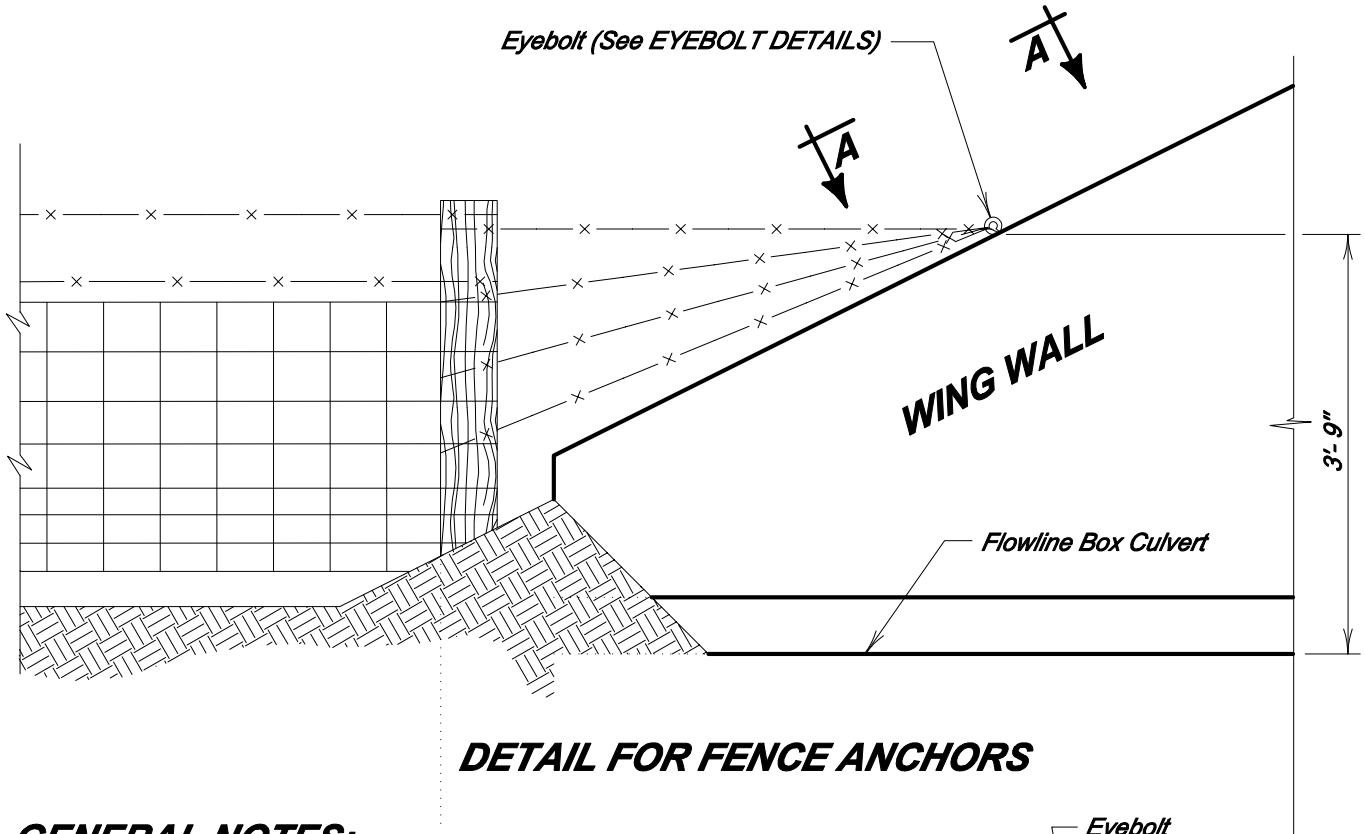
CITY OF BOX ELDER

STANDARD DETAIL RF011

FENCING-TUBULAR FRAME GATES

DETAIL #RF011

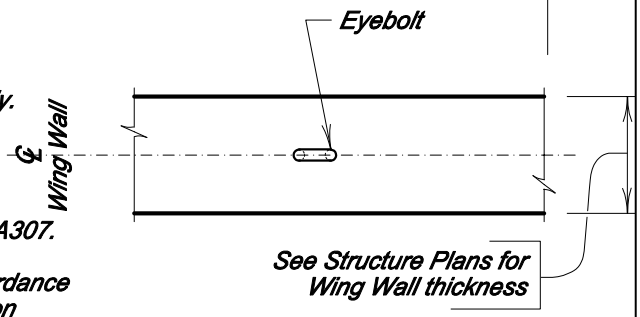
REVISED 01/2020



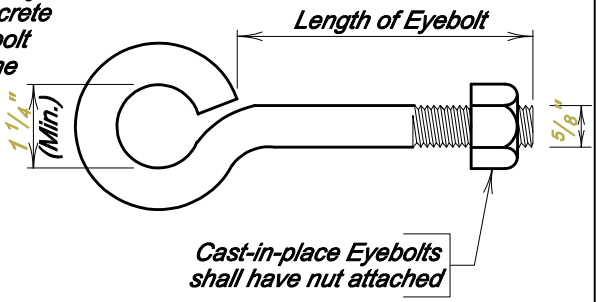
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the box culvert wing walls.
3. Eyebolts shall be $^{5}/_{8}$ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 $^{1}/_{2}$ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the $^{5}/_{8}$ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

FENCING-ANCHORS FOR BOX CULVERT WING WALLS

NOT TO SCALE

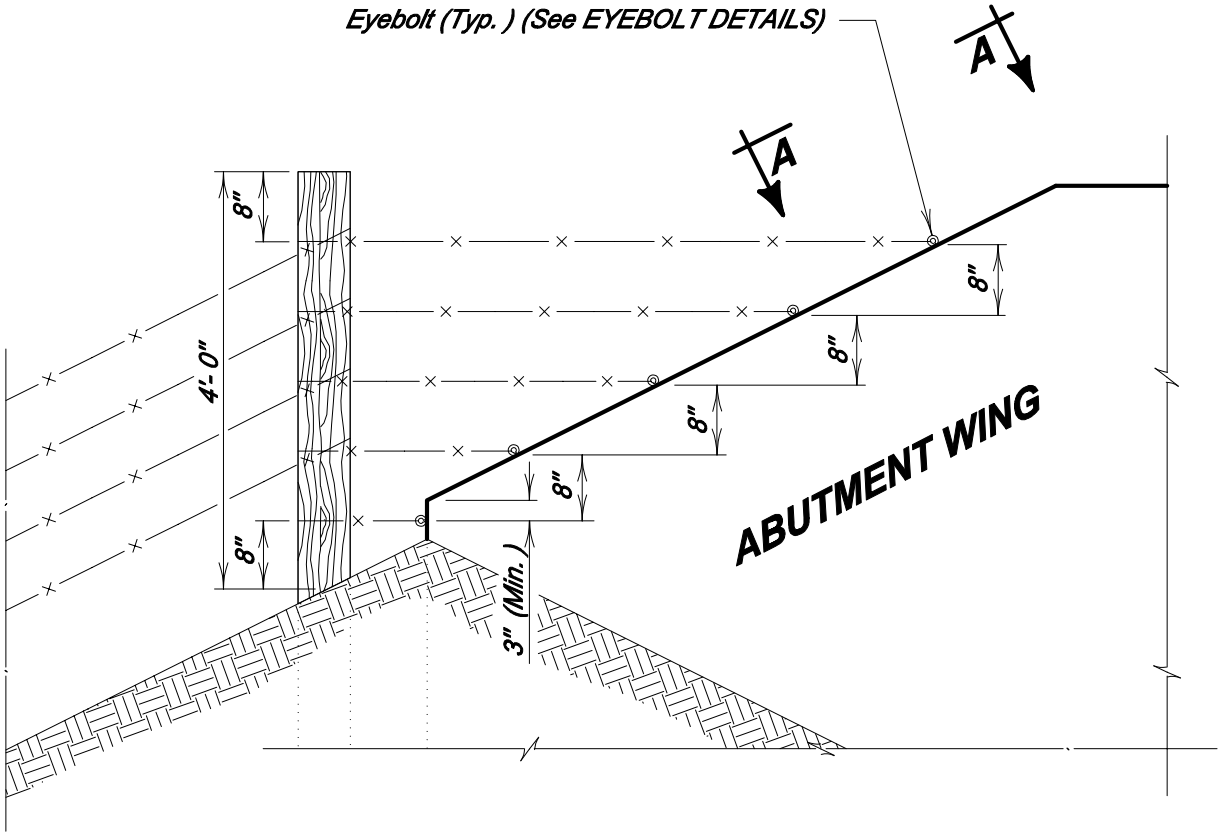
CITY OF BOX ELDER

STANDARD DETAIL RF020

FENCING-ANCHORS-1

DETAIL #RF020

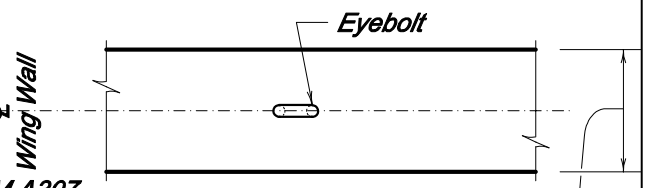
REVISED 01/2020



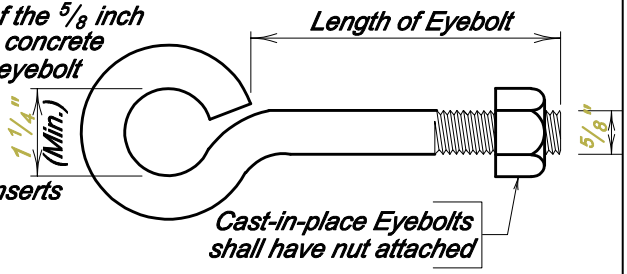
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the bridge abutment wings.
3. Eyebolts shall be $^{5}/_{8}$ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 $^{1}/_{2}$ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the $^{5}/_{8}$ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

FENCING-ANCHORS FOR BRIDGE ABUTMENT WING WALLS (GREATER THAN 6')

NOT TO SCALE

CITY OF BOX ELDER

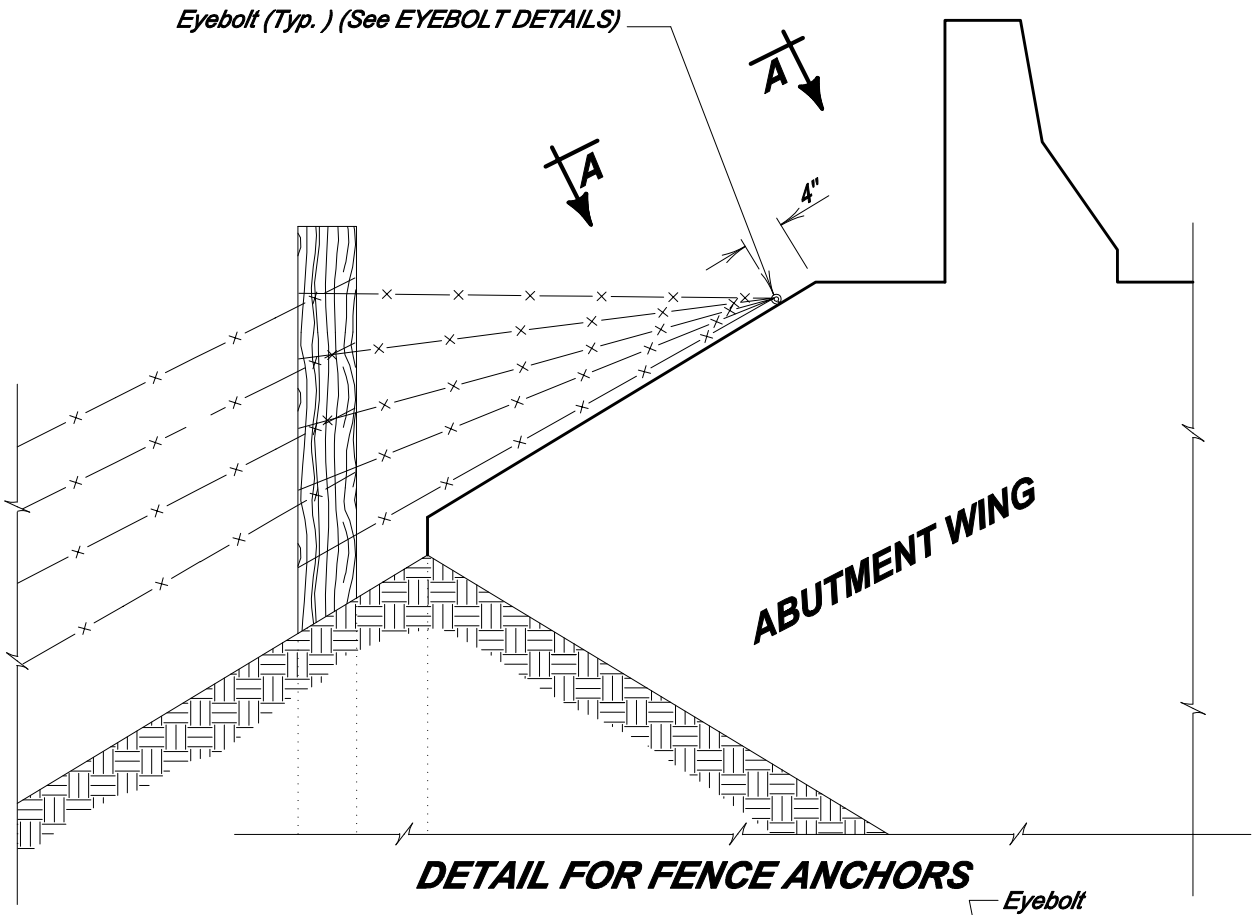
STANDARD DETAIL RF021

FENCING-ANCHORS-2

DETAIL #RF021

REVISED 01/2020

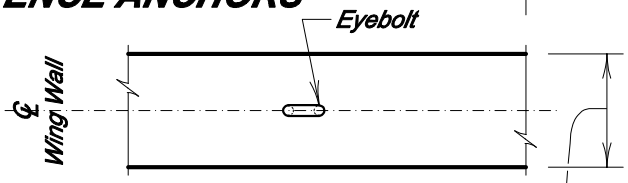
DETAIL RF022-FENCING-ANCHORS FOR BRIDGE ABUTMENT WING WALLS (≤6')



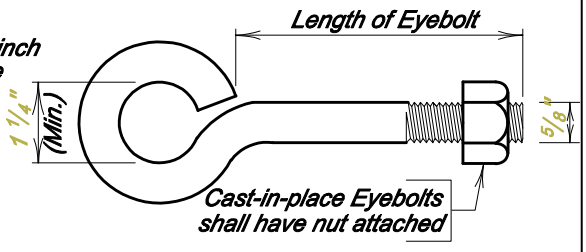
DETAIL FOR FENCE ANCHORS

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the bridge abutment wings.
3. Eyebolts shall be $^{5}/_{8}$ inch diameter and shall conform to ASTM A307.
4. Eyebolts, nuts, and concrete inserts shall be galvanized in accordance with AASHTO M232 (ASTM A153). Concrete inserts of corrosion resistant material need not be galvanized.
5. Cast-in-place eyebolts shall have a nut attached, be 4 $^{1}/_{2}$ inches (Min.) in length and shall be embedded such that the eye of the bolt is flush with the concrete surface. (See Eyebolt Details) As an alternate, cast-in-place concrete inserts, capable of developing the full strength of the $^{5}/_{8}$ inch diameter threaded eyebolt, may be used and shall be set in the concrete in accordance with the manufacturer's recommendations. The eyebolt shall be of sufficient length to develop its full strength. The eye of the eyebolt shall be flush with the concrete surface.
6. The cost for furnishing and installing eyebolts and/or concrete inserts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

FENCING-ANCHORS FOR BRIDGE ABUTMENT WING WALLS (6' AND LESS)

NOT TO SCALE

CITY OF BOX ELDER

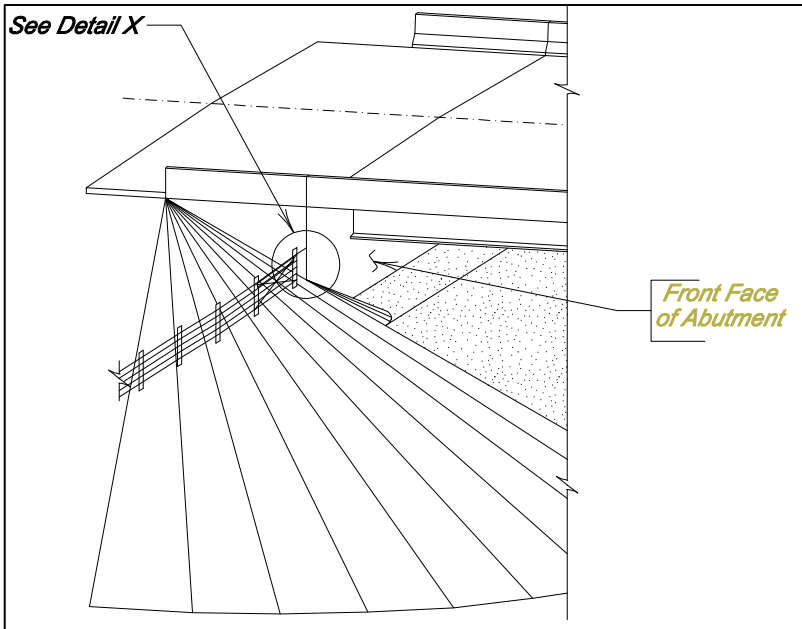
STANDARD DETAIL RF022

FENCING-ANCHORS-3

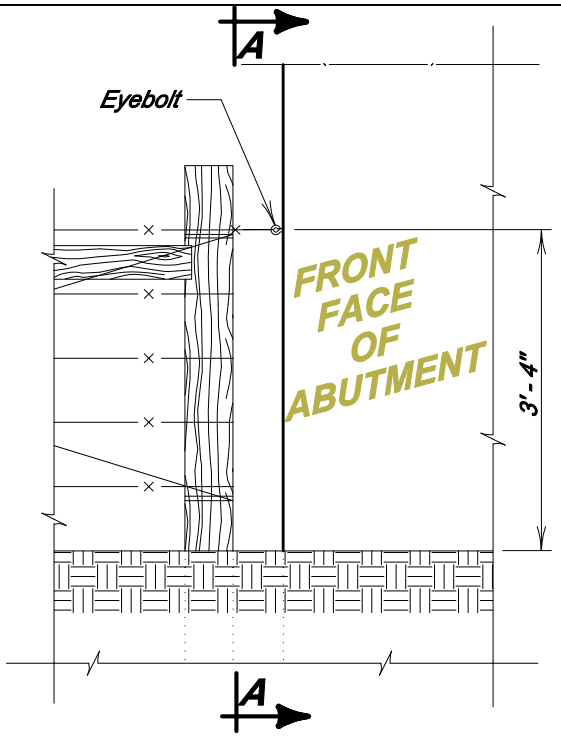
DETAIL #RF022

REVISED 01/2020

DETAIL RF023-FENCING-ANCHORS FOR BRIDGE ABUTMENT WITH SWEPT BACK WINGS



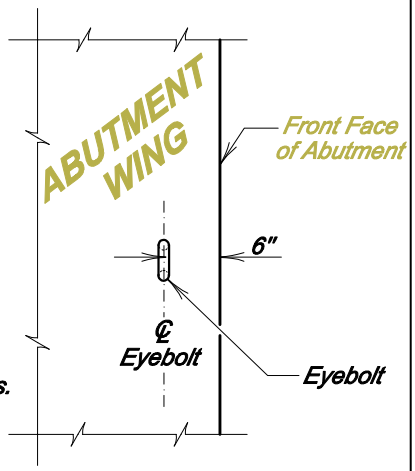
DETAILS FOR FENCE ANCHORS



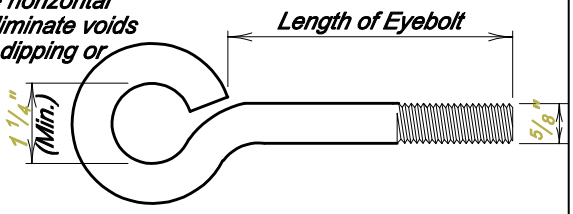
DETAIL "X"

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the bridge abutment wings.
3. Eyebolts shall be $^{5}/_{8}$ inch diameter and shall conform to ASTM A307.
4. Eyebolts shall be galvanized in accordance with AASHTO M232 (ASTM A153).
5. Eyebolts shall be installed after abutment wings are backfilled and berm construction is complete. Drill-in and epoxy eyebolts into abutment such that the eye of the bolt is flush with the concrete surface.
6. The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).
7. The diameter of the drilled holes shall not be less than $^{1}/_{8}$ inch greater, nor more than $^{3}/_{8}$ inch greater than the diameter of the eyebolts or per manufacturer's recommendations. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to be sure that all debris or loose material has been removed prior to epoxy injection.
8. Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes $^{1}/_{3}$ to $^{1}/_{2}$ full of epoxy, or as recommended by the Manufacturer, prior to insertion of the eyebolts. Care shall be taken to prevent epoxy from flowing out of the horizontal holes prior to eyebolt insertion. Rotate the eyebolt during installation to eliminate voids and ensure complete bonding of the bolt. Insertion of the eyebolts by the dipping or painting method will not be allowed.
9. Loads shall not be applied to the epoxy grouted eyebolts until the epoxy resin has had sufficient time to cure as specified by the epoxy resin man.
10. The cost for furnishing and installing the eyebolts shall be incidental to various contract items.



VIEW A - A



EYEBOLT DETAILS

FENCING-ANCHORS FOR BRIDGE ABUTMENTS WITH SWEPT BACK WINGS

NOT TO SCALE

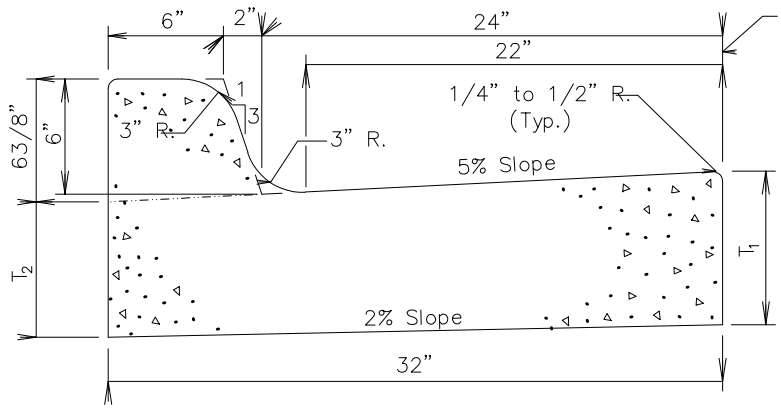
CITY OF BOX ELDER

STANDARD DETAIL RF023

FENCING-ANCHORS-4

DETAIL #RF023

REVISED 01/2020



Type	T_1 (Inches)	T_2 (Inches)	Cu. Yd. Per Lin. Ft.	Lin. Ft. Per Cu. Yd.
B66	6	51/16	0.057	17.7
B67	7	61/16	0.065	15.4
B68	8	71/16	0.073	13.7
B68.5	8.5	79/16	0.077	13.0
B69	9	81/16	0.081	12.3
B69.5	9.5	89/16	0.085	11.7
B610	10	91/16	0.090	11.2
B610.5	10.5	99/16	0.094	10.7
B611	11	101/16	0.098	10.2
B611.5	11.5	109/16	0.102	9.8
B612	12	111/16	0.106	9.4

GENERAL NOTES:

When concrete curb and gutter longitudinally adjoins new concrete pavement, the method of attachment shall be by one of the methods shown on Standard Plate 380.11.

See Standard Plate 650.90 for expansion and contraction joints in the curb and gutter.

CURB AND GUTTER-CONCRETE-TYPE B

NOT TO SCALE

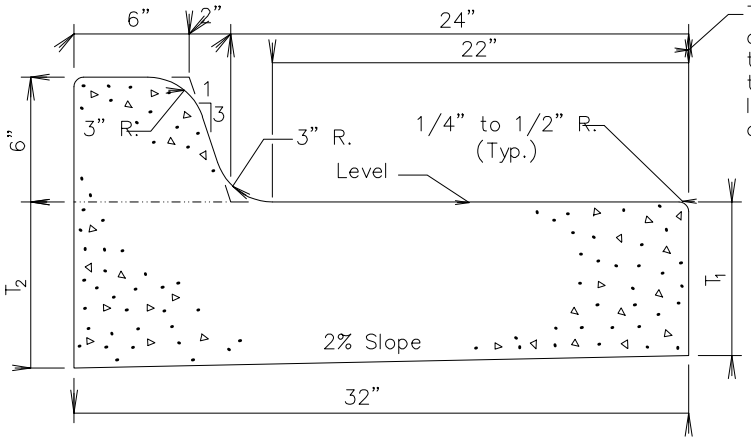
CITY OF BOX ELDER

STANDARD DETAIL RG001

CURB & GUTTER-TYPE B

DETAIL #RG001

REVISED 01/2020



Type	T_1 (Inches)	T_2 (Inches)	Cu. Yd. Per Lin. Ft.	Lin. Ft. Per Cu. Yd.
BL66	6	65/8	0.063	15.9
BL67	7	75/8	0.071	14.1
BL68	8	85/8	0.080	12.5
BL68.5	8.5	91/8	0.084	11.9
BL69	9	95/8	0.088	11.4
BL69.5	9.5	101/8	0.092	10.9
BL610	10	105/8	0.096	10.4
BL610.5	10.5	111/8	0.100	10.0
BL611	11	115/8	0.104	9.6
BL611.5	11.5	121/8	0.108	9.3
BL612	12	125/8	0.112	8.9

GENERAL NOTES:

When concrete curb and gutter longitudinally adjoins new concrete pavement, the method of attachment shall be by one of the methods shown on Standard Plate 380.11.

See Standard Plate 650.90 for expansion and contraction joints in the curb and gutter.

CURB AND GUTTER-CONCRETE-TYPE BL

NOT TO SCALE

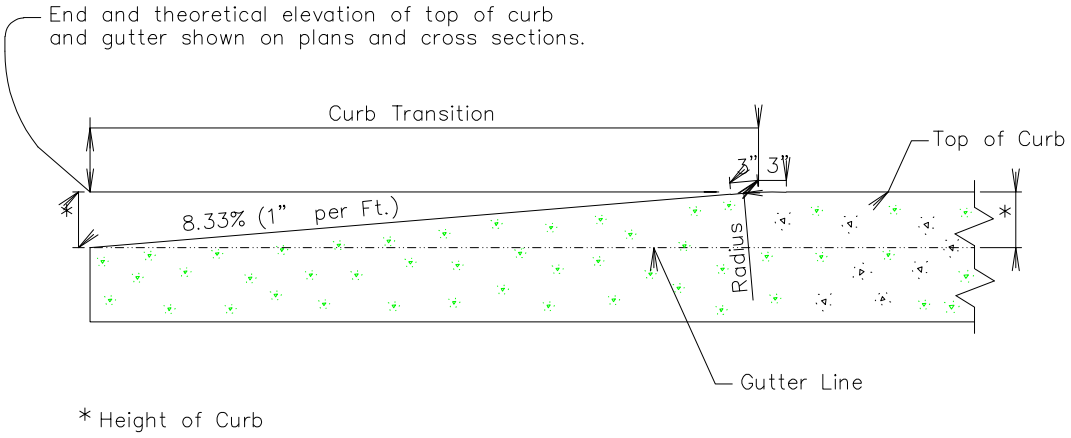
CITY OF BOX ELDER

STANDARD DETAIL RG002

CURB & GUTTER-TYPE BL

DETAIL #RG002

REVISED 01/2020



LONGITUDINAL SECTION OF CONCRETE CURB TAPER

CURB-CONCRETE-TAPER

NOT TO SCALE

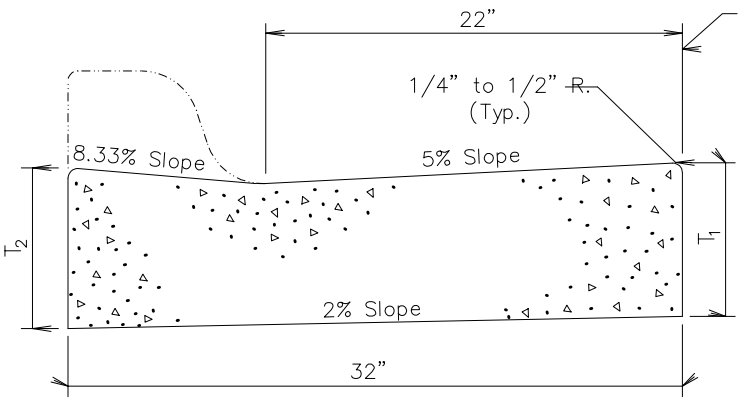
CITY OF BOX ELDER

STANDARD DETAIL RG003

CURB & GUTTER-TAPER

DETAIL #RG004

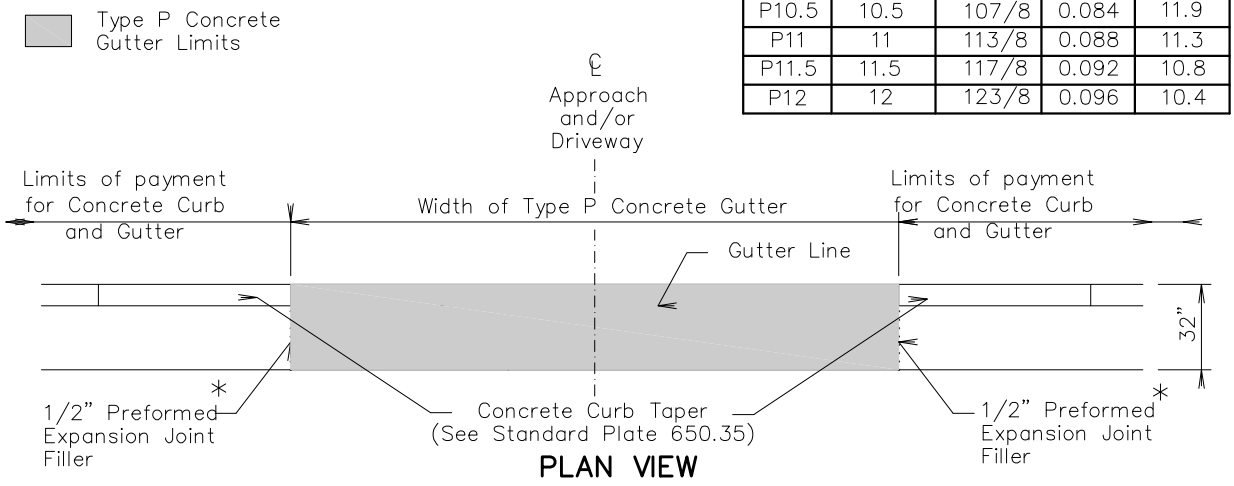
REVISED 01/2020



TRANSVERSE SECTION

The stated radii on the plans and cross sections refer to this line and it shall also be the basis for horizontal linear foot measurement and payment.

Type	T_1 (Inches)	T_2 (Inches)	Cu. Yd. Per Lin. Ft.	Lin. Ft. Per Cu. Yd.
P6	6	63/8	0.047	21.2
P7	7	73/8	0.055	18.1
P8	8	83/8	0.064	15.7
P8.5	8.5	87/8	0.068	14.8
P9	9	93/8	0.072	13.9
P9.5	9.5	97/8	0.076	13.2
P10	10	103/8	0.080	12.5
P10.5	10.5	107/8	0.084	11.9
P11	11	113/8	0.088	11.3
P11.5	11.5	117/8	0.092	10.8
P12	12	123/8	0.096	10.4



PLAN VIEW

* Joint will not be needed if concrete curb and gutter and type P concrete gutter is placed at the same time. If the 1/2" Preformed Expansion Joint Filler is provided, then the joint shall be sealed.

GENERAL NOTES:

The concrete for the Type P Concrete Gutter shall comply with the requirements of the Specifications for Class M6 Concrete.

When concrete gutter longitudinally adjoins new concrete pavement, the method of attachment shall be in accordance with SDDOT requirements.

Transverse contraction joints shall be constructed at 10' intervals in the concrete gutter except when concrete gutter is constructed adjacent to mainline PCC pavement. When concrete gutter is constructed adjacent to mainline PCC pavement, a transverse contraction joint shall be constructed in the concrete gutter at each mainline PCC pavement transverse contraction joint location.

When concrete gutter is placed monolithically with mainline PCC pavement, the transverse contraction joints in the concrete gutter shall be sawed and sealed the same as the transverse contraction joints in the mainline PCC pavement.

When concrete gutter is not placed monolithically with the mainline PCC pavement and when the adjacent mainline surfacing is not PCC concrete, the transverse contraction joints in the concrete gutter shall be 11/2 inches deep if formed in the fresh concrete using a suitable grooving tool. If a saw is used to cut the contraction joints, then the depth of the joint shall be at least 1/4 the thickness of the concrete.

GUTTER-CONCRETE-TYPE P

NOT TO SCALE

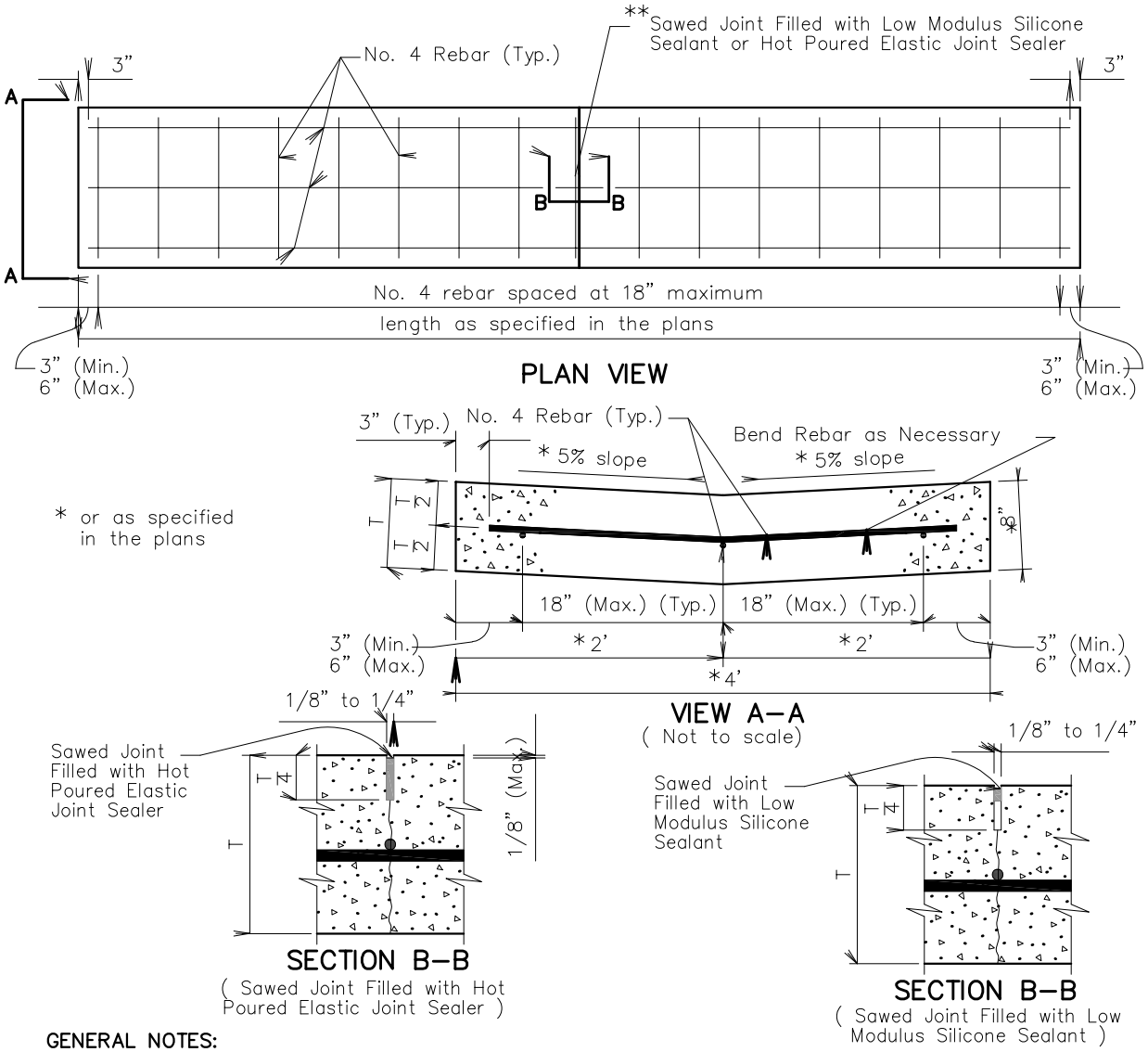
CITY OF BOX ELDER

STANDARD DETAIL RG004

CURB & GUTTER-TYPE P

DETAIL #RG003

REVISED 01/2020



GENERAL NOTES:

The concrete shall comply with the Specifications for Class M6 concrete.

The reinforcing steel shall comply with the requirements of the Specifications.

If a lap splice is provided the No. 4 rebar shall be lapped a minimum of 12".

** The sawed joints shall be spaced at 12' ; however, when the length of the valley gutter is 12' to 24' there shall be a joint at the midpoint of the length. The saw cut to control cracking shall be a minimum of 1/4 the thickness of the pavement.

All hot poured elastic joint sealer material spilled on the surface of the concrete pavement shall be removed as soon as the material has cooled. The extent of removal of material shall be to the satisfaction of the Engineer. All costs for removal of the spilled joint sealer material shall be borne by the Contractor.

The silicone sealant shall be be bonded to the sides of a clean joint to completely seal the joint as approved by the Engineer.

GUTTER-CONCRETE-VALLEY

NOT TO SCALE

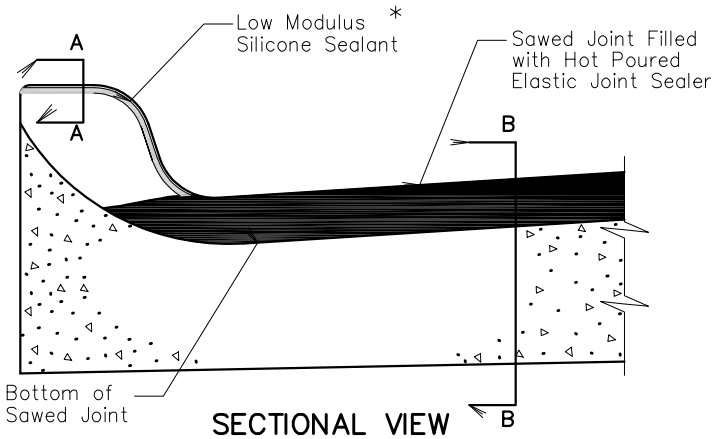
CITY OF BOX ELDER

STANDARD DETAIL RG005

CURB & GUTTER-VALLEY

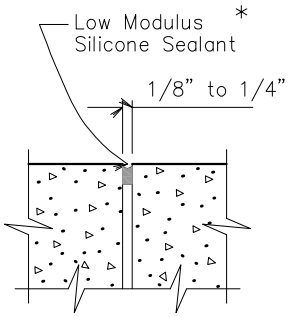
DETAIL #RG005

REVISED 01/2020

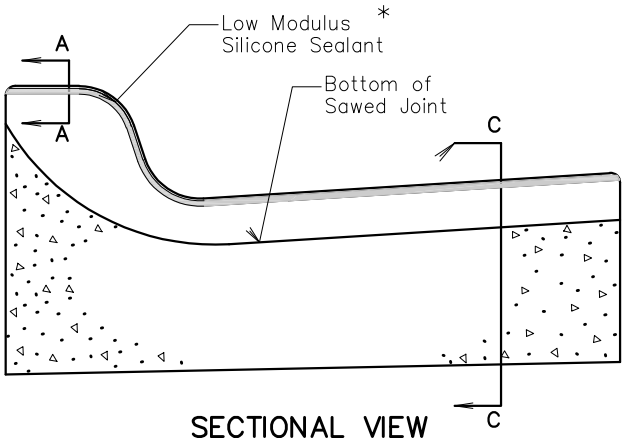


SECTIONAL VIEW

(Curb and Gutter Placed Monolithic with Adjacent Mainline PCC Pavement)

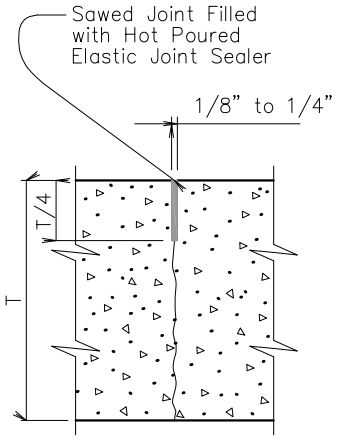


SECTION A–A

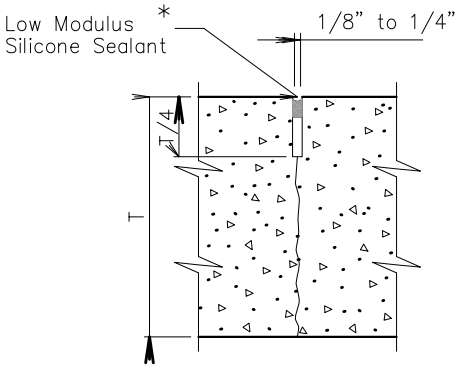


SECTIONAL VIEW

(Curb and Gutter not Placed Monolithic with Adjacent Mainline PCC Pavement or Mainline Surfacing is not PCC Pavement)



SECTION B–B



SECTION C–C

* The silicone sealant shall be placed such that it completely seals the joint and is bonded to the sides of the clean joint as approved by the Engineer.

CURB AND GUTTER-CONCRETE-JOINTS

NOT TO SCALE

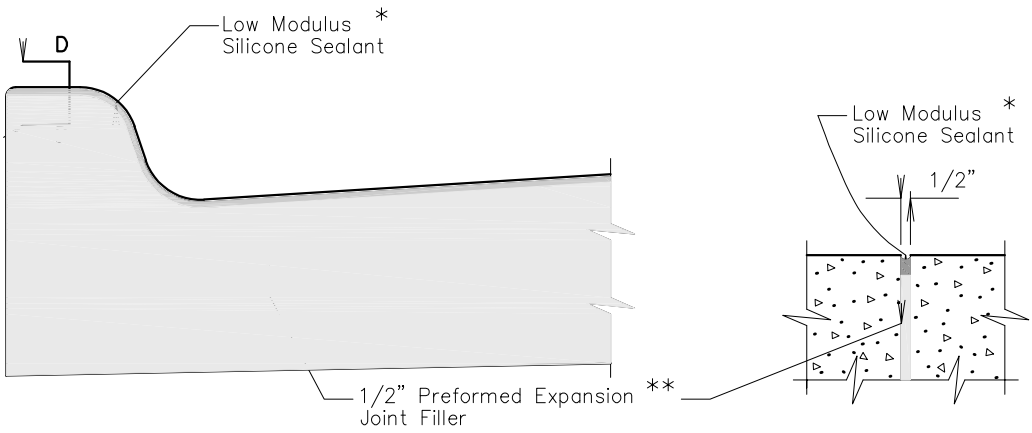
CITY OF BOX ELDER

STANDARD DETAIL RG006

CURB & GUTTER-JOINTS 1

DETAIL #RG006

REVISED 01/2020



SECTIONAL VIEW
(Curb and Gutter at 1/2" Preformed Expansion Joint Filler Location)

SECTION D–D

* The silicone sealant shall be placed such that it completely seals the joint and is bonded to the sides of the clean joint as approved by the Engineer.

GENERAL NOTES:

For illustrative reason, only the type B curb and gutter is shown.

** A 1/2" preformed expansion joint filler shall be placed transversely in the curb and gutter at the following locations:

1. At each junction between the radius return of curb and gutter and curb and gutter which is parallel to the project centerline.
2. At each junction between new curb and gutter and existing curb and gutter.

Transverse contraction joints shall be constructed at 10' intervals in the concrete curb and gutter except when the concrete curb and gutter is constructed adjacent to mainline PCC pavement. When concrete curb and gutter is constructed adjacent to mainline PCC pavement, a transverse contraction joint shall be constructed in the concrete curb and gutter at each mainline PCC pavement transverse contraction joint location.

When concrete curb and gutter is not placed monolithically with the mainline PCC pavement or when the adjacent mainline surfacing is not PCC concrete, the transverse contraction joints in the concrete curb and gutter shall be 11/2 inches deep if formed in the fresh concrete using a suitable grooving tool. If a saw is used to cut the contraction joints, then the depth of the joint shall be at least 1/4 the thickness of the concrete and the joint shall be sealed in accordance with the details shown above.

CURB AND GUTTER-CONCRETE-JOINTS

NOT TO SCALE

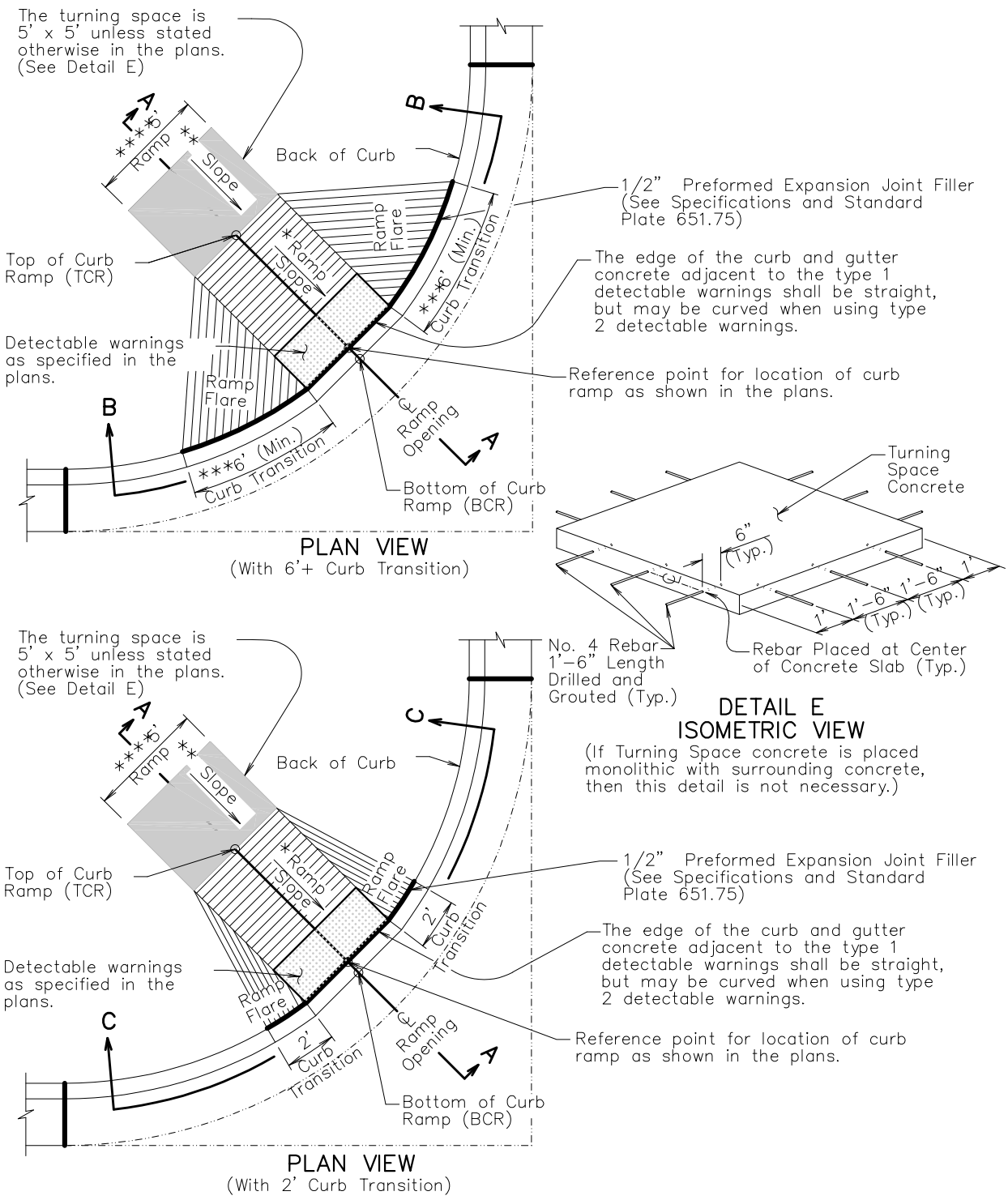
CITY OF BOX ELDER

STANDARD DETAIL RG007

CURB & GUTTER-JOINTS 2

DETAIL #RG007

REVISED 01/2020



PLAN VIEW
(With 6'+ Curb Transition)

DETAIL E
ISOMETRIC VIEW
(If Turning Space concrete is placed monolithic with surrounding concrete, then this detail is not necessary.)

PLAN VIEW
(With 2' Curb Transition)

CURB AND GUTTER-CURB RAMP-PERPENDICULAR

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RG010

CURB & GUTTER-RAMP-PERP. 1

DETAIL #RG010

REVISED 01/2020

* Curb ramp slopes are designed at 7.5% unless stated otherwise in the plans. The curb ramp may have a maximum slope of 8.3% and shall not exceed 15' in length unless stated otherwise in the plans.

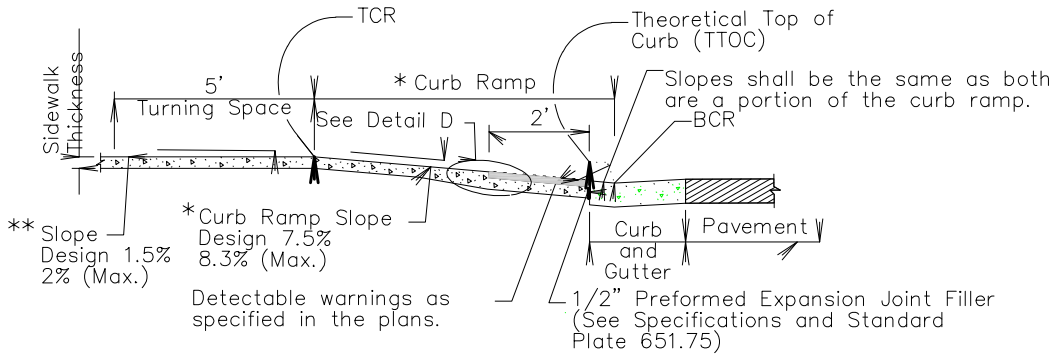
The curb ramp length may be computed based on the intersection of a continuous 1.5% theoretical slope from theoretical top of curb (TTOC) with the curb ramp using a continuous 7.5% curb ramp slope. The elevation of point TCR shall always be higher than the elevation of point TTOC unless specified otherwise in the plans. The curb ramp length dimension as shown in the plans shall be adjusted as necessary to meet all slope and length requirements based on field geometrics.

The cross slope of the ramp shall not be steeper than 2%. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

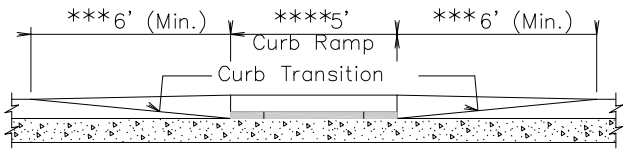
** The slope in the turning space shall not be steeper than 2% in any direction of pedestrian travel. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

*** The curb transition shall be a minimum of 6' long, a maximum of 10' long, and the curb transition slope shall not be steeper than 10% unless stated otherwise in the plans. The curb transition length shall be adjusted as necessary to meet slope and length requirements based on field geometrics.

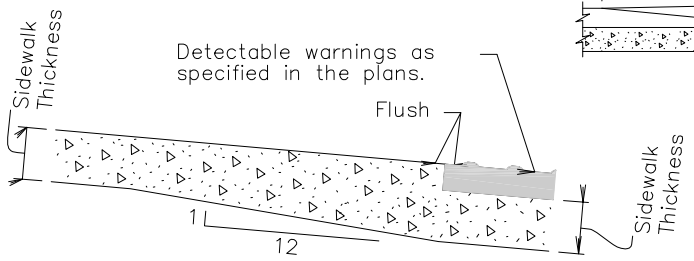
**** The ramp width is 5' unless stated otherwise in the plans.



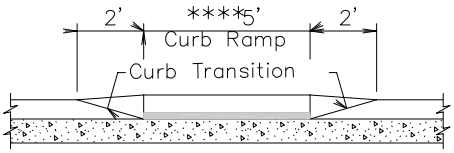
SECTION A–A



SECTIONAL VIEW B–B



DETAIL D



SECTIONAL VIEW C–C

CURB AND GUTTER-CURB RAMP-PERPENDICULAR

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RG011

CURB & GUTTER-RAMP-PERP. 2

DETAIL #RG011

REVISED 01/2020

GENERAL NOTES:

For illustrative purpose only, type 1 detectable warnings are shown in the drawings.

For illustrative purpose only, PCC fillet sections are shown in the drawings. The curb ramp depicted on this standard plate may be used with a PCC fillet section or curb and gutter.

For illustrative purpose only, the curb ramp location is shown at the center of a PCC fillet section. The curb ramp shall be placed at the location stated in the plans.

Sidewalk shall not be placed adjacent to the curb ramp flares when a 2' curb transition is used unless shown otherwise in the plans.

* Care shall be taken to ensure a uniform grade on the curb ramp, free of sags and short grade changes.

Surface texture of the curb ramp shall be obtained by coarse brooming transverse to the slope of the curb ramp.

The normal gutter line profile shall be maintained through the area of the ramp opening.

Joints shall be sawed or tooled into the concrete adjacent to the detectable warnings to alleviate possible corner cracking.

Care shall be taken to ensure that the surface of the detectable warnings are clean and maintains a uniform color.

The detectable warnings shall be cut as necessary to fit the plan specified limits of the detectable warnings. Cost for cutting the detectable warnings shall be incidental to the corresponding detectable warning bid item.

There will be no separate payment for curb ramps. The curb ramp shall be measured and paid for at the contract unit price per square foot for the corresponding concrete sidewalk bid item. The square foot area of the detectable warnings shall be included in the measured and paid for quantity of sidewalk.

If rebar is placed in the Turning Space as depicted in DETAIL E, the cost of the materials, labor, and equipment to furnish and install the rebar shall be incidental to the contract unit price per square foot for the corresponding concrete sidewalk bid item.

The curb transitions and ramp opening shall be measured and paid for at the contract unit price per foot for the corresponding curb and gutter bid item when curb and gutter is used. The curb transitions and ramp opening shall be measured and paid for at the contract unit price per square yard for the corresponding PCC fillet section bid item when a PCC fillet section is used.

The type 1 detectable warnings shall be measured to the nearest square foot. All costs for furnishing and installing the type 1 detectable warnings including labor, equipment, materials, and incidentals shall be paid for at the contract unit price per square foot for "Type 1 Detectable Warnings".

The type 2 detectable warnings shall be measured to the nearest square foot. All costs for furnishing and installing the type 2 detectable warnings including labor, equipment, and materials, including adhesive, necessary sealant or grout, and necessary grinding shall be paid for at the contract unit price per square foot for "Type 2 Detectable Warnings".

CURB AND GUTTER-CURB RAMP-PERPENDICULAR

NOT TO SCALE

CITY OF BOX ELDER

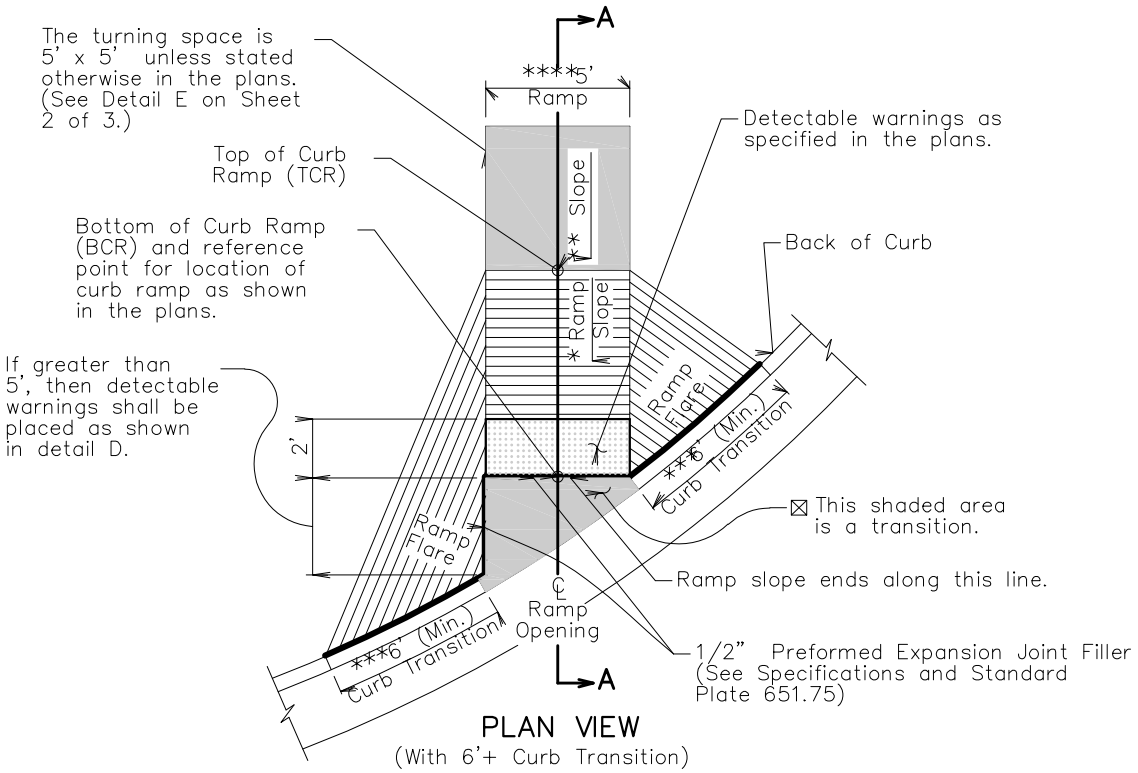
STANDARD DETAIL RG012

CURB & GUTTER-RAMP-PERP. 3

DETAIL #RG012

REVISED 01/2020

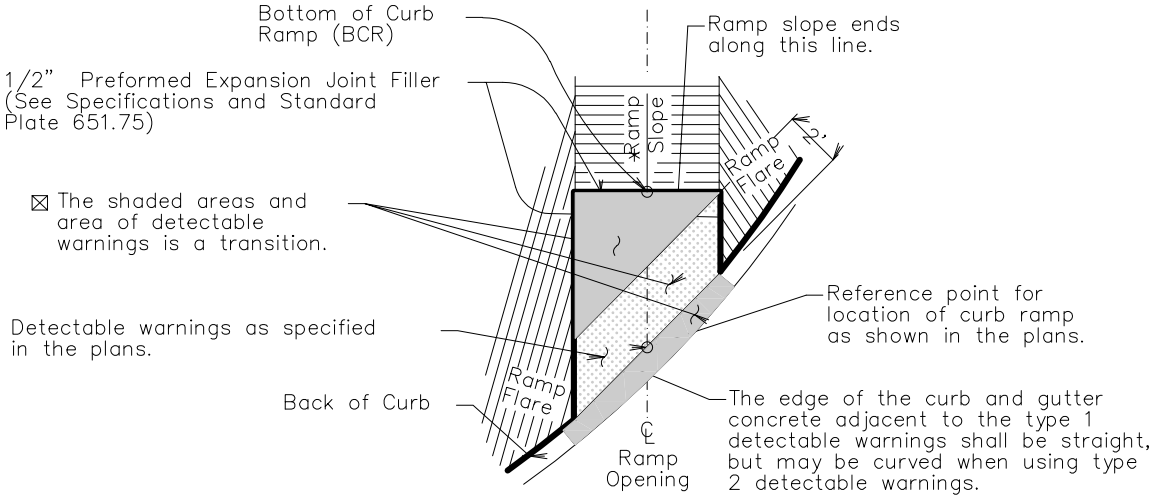
DETAIL RG013-CURB & GUTTER-CURB RAMP-DIRECTIONAL-1



PLAN VIEW
(With 6'+ Curb Transition)

☒ The slope within the transition area shall not be steeper than 5%. The concrete within the transition shall be placed monolithic with the curb and gutter or fillet section concrete. The concrete thickness within the transition shall be the same as the curb and gutter or fillet section concrete thickness.

*** The curb transition shall be a minimum of 6' long, a maximum of 10' long, and the curb transition slope shall not be steeper than 10% unless stated otherwise in the plans. The curb transition length shall be adjusted as necessary to meet slope and length requirements based on field geometrics.



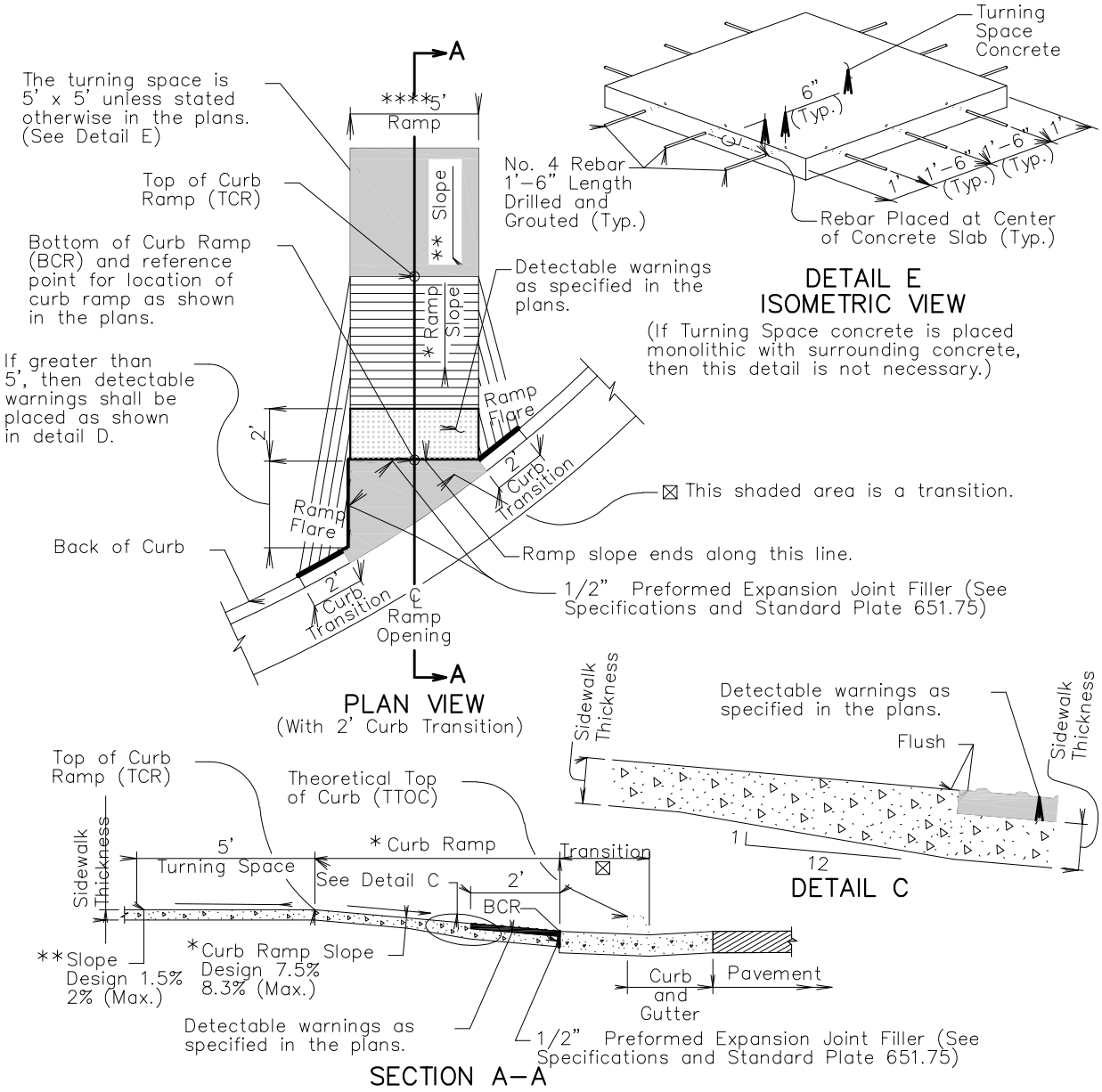
DETAIL D

CURB AND GUTTER-CURB RAMP-DIRECTIONAL

NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL RG013
CURB & GUTTER-RAMP-DIRECT. 1

DETAIL #RG013 REVISED 01/2020



Curb ramp slopes are designed at 7.5% unless stated otherwise in the plans. The curb ramp may have a maximum slope of 8.3% and shall not exceed 15' in length unless stated otherwise in the plans.

* The elevation of point TCR shall always be higher than the elevation of point TTOC unless specified otherwise in the plans. The curb ramp length dimension as shown in the plans shall be adjusted as necessary to meet all slope and length requirements based on field geometrics.

The cross slope of the ramp shall not be steeper than 2%. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

** The slope in the turning space shall not be steeper than 2% in any direction of pedestrian travel. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

**** The ramp width is 5' unless stated otherwise in the plans.

CURB AND GUTTER-CURB RAMP-DIRECTIONAL

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RG014

CURB & GUTTER-RAMP-DIRECT. 2

DETAIL #RG014

REVISED 01/2020

GENERAL NOTES:

For illustrative purpose only, type 1 detectable warnings are shown in the drawings.

The curb ramp depicted on this standard plate may be used with a PCC fillet section or curb and gutter. The curb ramp shall be placed at the location stated in the plans.

Sidewalk shall not be placed adjacent to the curb ramp flares when a 2' curb transition is used unless shown otherwise in the plans.

* Care shall be taken to ensure a uniform grade on the curb ramp, free of sags and short grade changes.

Surface texture of the curb ramp shall be obtained by coarse brooming transverse to the slope of the curb ramp.

The normal gutter line profile shall be maintained through the area of the ramp opening.

Joints shall be sawed or tooled into the concrete adjacent to the detectable warnings to alleviate possible corner cracking.

Care shall be taken to ensure that the surface of the detectable warnings are clean and maintains a uniform color.

The detectable warnings shall be cut as necessary to fit the plan specified limits of the detectable warnings. Cost for cutting the detectable warnings shall be incidental to the corresponding detectable warning bid item.

There will be no separate payment for curb ramps. The curb ramp shall be measured and paid for at the contract unit price per square foot for the corresponding concrete sidewalk bid item. The square foot area of the detectable warnings shall be included in the measured and paid for quantity of sidewalk.

If rebar is placed in the Turning Space as depicted in DETAIL E, the cost of the materials, labor, and equipment to furnish and install the rebar shall be incidental to the contract unit price per square foot for the corresponding concrete sidewalk bid item.

The curb transitions and ramp opening shall be measured and paid for at the contract unit price per foot for the corresponding curb and gutter bid item when curb and gutter is used. The curb transitions and ramp opening shall be measured and paid for at the contract unit price per square yard for the corresponding PCC fillet section bid item when a PCC fillet section is used.

All costs for furnishing and installing the transition area at the base of the curb ramp shall be incidental to the contract unit price per foot for the corresponding curb and gutter bid item when curb and gutter is used and shall be incidental to the contract unit price per square yard for the corresponding PCC fillet section bid item when a PCC fillet section is used.

The type 1 detectable warnings shall be measured to the nearest square foot. All costs for furnishing and installing the type 1 detectable warnings including labor, equipment, materials, and incidentals shall be paid for at the contract unit price per square foot for "Type 1 Detectable Warnings".

The type 2 detectable warnings shall be measured to the nearest square foot. All costs for furnishing and installing the type 2 detectable warnings including labor, equipment, and materials, including adhesive, necessary sealant or grout, and necessary grinding shall be paid for at the contract unit price per square foot for "Type 2 Detectable Warnings".

CURB AND GUTTER-CURB RAMP-DIRECTIONAL

NOT TO SCALE

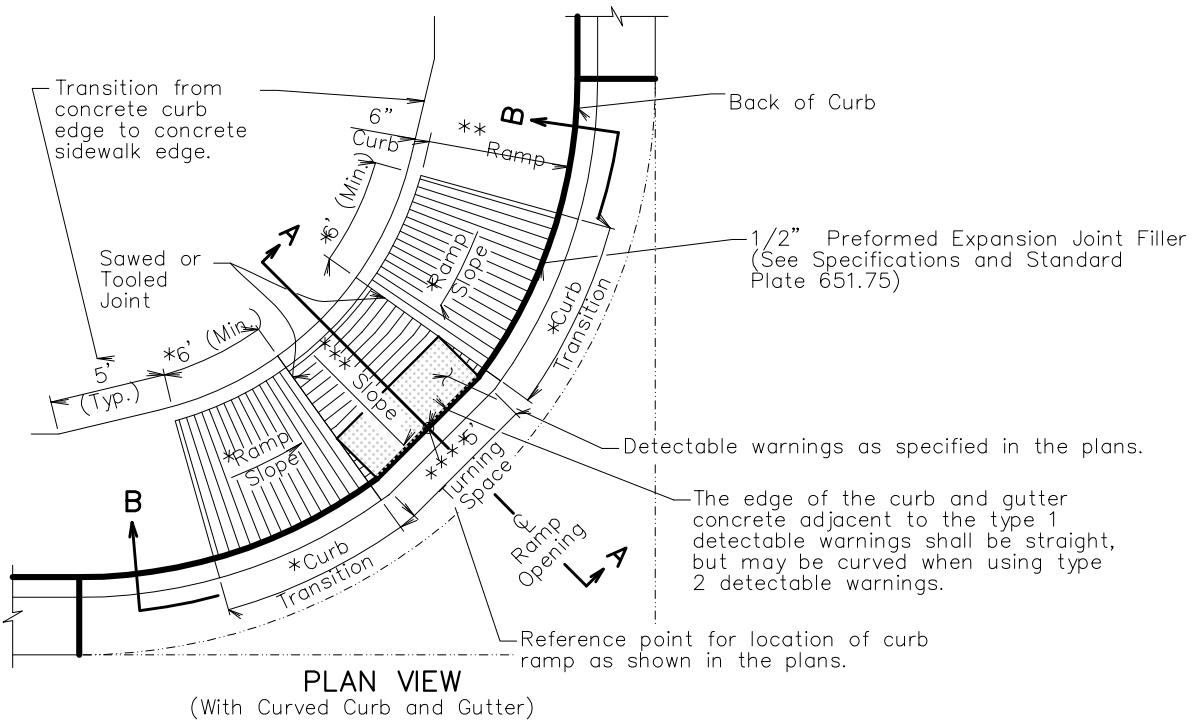
CITY OF BOX ELDER

STANDARD DETAIL RG015

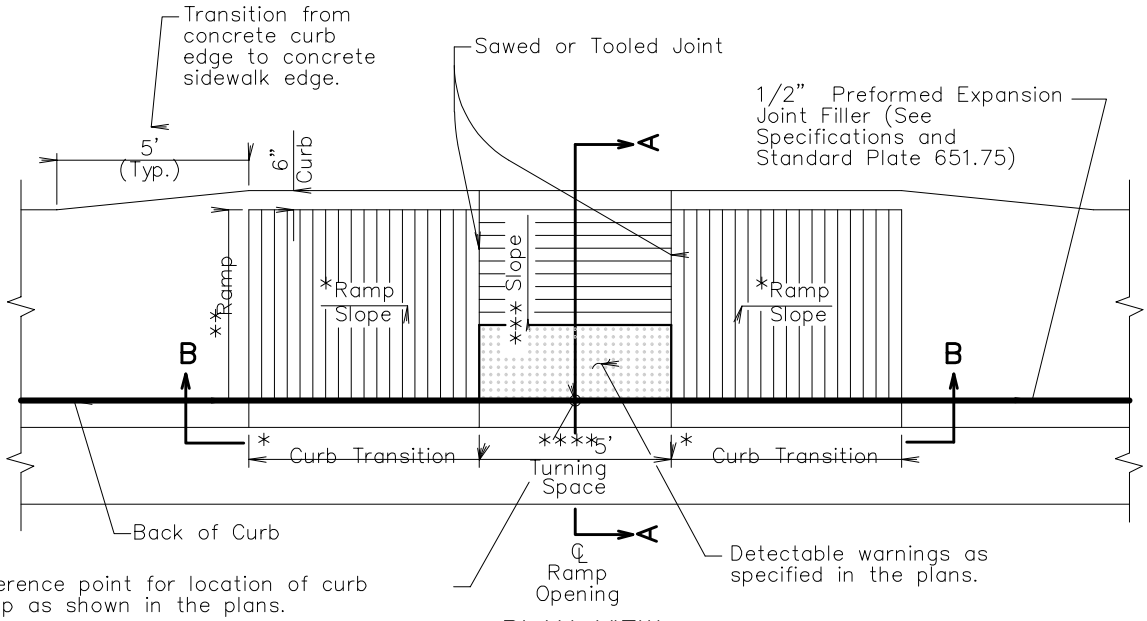
CURB & GUTTER-RAMP-DIRECT. 3

DETAIL #RG015

REVISED 01/2020



PLAN VIEW
(With Curved Curb and Gutter)



PLAN VIEW
(With Straight Curb and Gutter)

CURB AND GUTTER-CURB RAMP-PARALLEL

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RG016

CURB & GUTTER-RAMP-PARALLEL 1

DETAIL #RG016

REVISED 01/2020

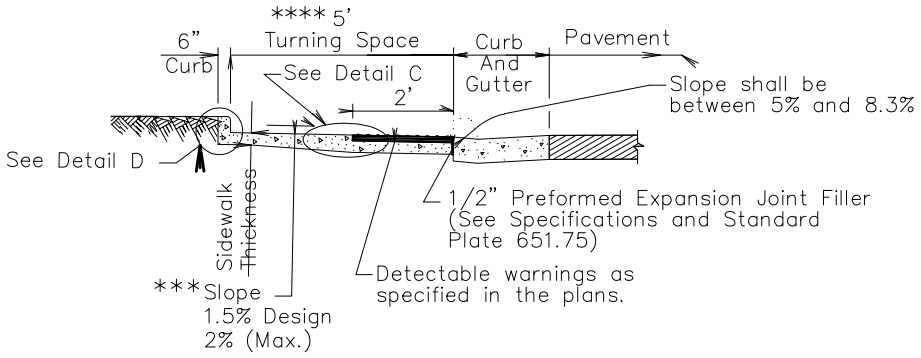
* The curb transition slope shall match the curb ramp slope. Curb ramp slopes are designed at 7.5% unless stated otherwise in the plans. The curb ramp may have a maximum slope of 8.3% at any location of the curb ramp and shall not exceed 15' in length unless stated otherwise in the plans. The curb transitions and curb ramp lengths shall be adjusted as necessary to meet all slope and length requirements based on field geometrics.

** The cross slope of the ramp shall not be steeper than 2% and the ramp width is 5' unless stated otherwise in the plans. Plans are designed using a 1.5% cross slope for the ramp unless stated otherwise in the plans.

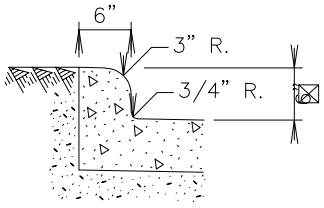
*** The slope in the turning space shall not be steeper than 2% in any direction of pedestrian travel. Plans are designed using a 1.5% slope unless stated otherwise in the plans.

**** The turning space is 5' x 5' unless stated otherwise in the plans.

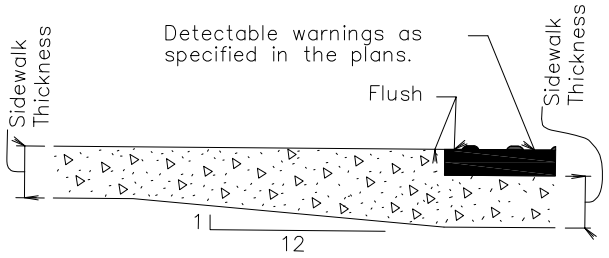
☒ The curb height shall be 6" unless stated otherwise in the plans.



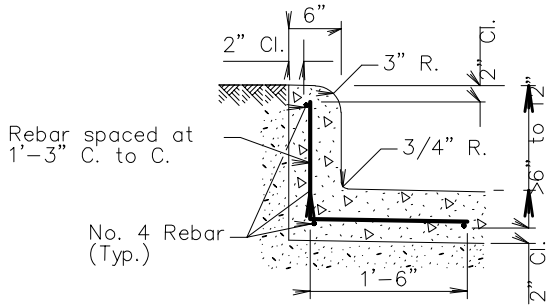
SECTION A–A



DETAIL D

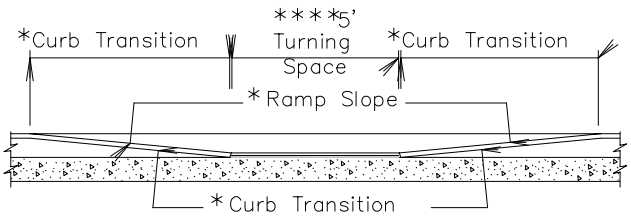


DETAIL C



DETAIL D

(Use this detail when the curb height is greater than 6" and less than 12")



SECTIONAL VIEW B–B

CURB AND GUTTER-CURB RAMP-PARALLEL

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RG017

CURB & GUTTER-RAMP-PARALLEL 2

DETAIL #RG017

REVISED 01/2020

GENERAL NOTES:

For illustrative purpose only, type 1 detectable warnings are shown in the drawings.

For illustrative purpose only, a PCC fillet section is shown in one of the drawings. The curb ramp depicted on this standard plate may be used with a PCC fillet section or with curb and gutter.

The curb ramp shall be placed at the location stated in the plans.

Sidewalk adjacent to the curb ramp shall be as shown in the plans.

Care shall be taken to ensure a uniform grade on the curb ramp, free of sags and short grade changes.

Surface texture of the curb ramp shall be obtained by coarse brooming transverse to the slope of the curb ramp.

The normal gutter line profile shall be maintained through the area of the ramp opening.

Joints shall be sawed or tooled into the concrete adjacent to the detectable warnings to alleviate possible corner cracking (see plan view for joint location).

Care shall be taken to ensure that the surface of the detectable warnings are clean and maintains a uniform color.

The detectable warnings shall be cut as necessary to fit the plan specified limits of the detectable warnings. Cost for cutting the detectable warnings shall be incidental to the corresponding detectable warning bid item.

When curb height is greater than 6" and less than 12", reinforcing steel is required in accordance with the detail on sheet 2 of 3. The reinforcing steel shall conform to ASTM A615, Grade 60. Cost for furnishing and installing the reinforcing steel shall be incidental to the contract unit price per square foot for the corresponding concrete sidewalk bid item.

There will be no separate payment for curb ramps. The curb ramp shall be measured and paid for at the contract unit price per square foot for the corresponding concrete sidewalk bid item. The square foot area of the detectable warnings and the curb along the short radius shall be included in the measured and paid for quantity of sidewalk.

The curb transitions and ramp opening shall be measured and paid for at the contract unit price per foot for the corresponding curb and gutter bid item when curb and gutter is used. The curb transitions and ramp opening shall be measured and paid for at the contract unit price per square yard for the corresponding PCC fillet section bid item when a PCC fillet section is used.

The type 1 detectable warnings shall be measured to the nearest square foot. All costs for furnishing and installing the type 1 detectable warnings including labor, equipment, materials, and incidentals shall be paid for at the contract unit price per square foot for "Type 1 Detectable Warnings".

The type 2 detectable warnings shall be measured to the nearest square foot. All costs for furnishing and installing the type 2 detectable warnings including labor, equipment, and materials, including adhesive, necessary sealant or grout, and necessary grinding shall be paid for at the contract unit price per square foot for "Type 2 Detectable Warnings".

CURB AND GUTTER-CURB RAMP-PARALLEL

NOT TO SCALE

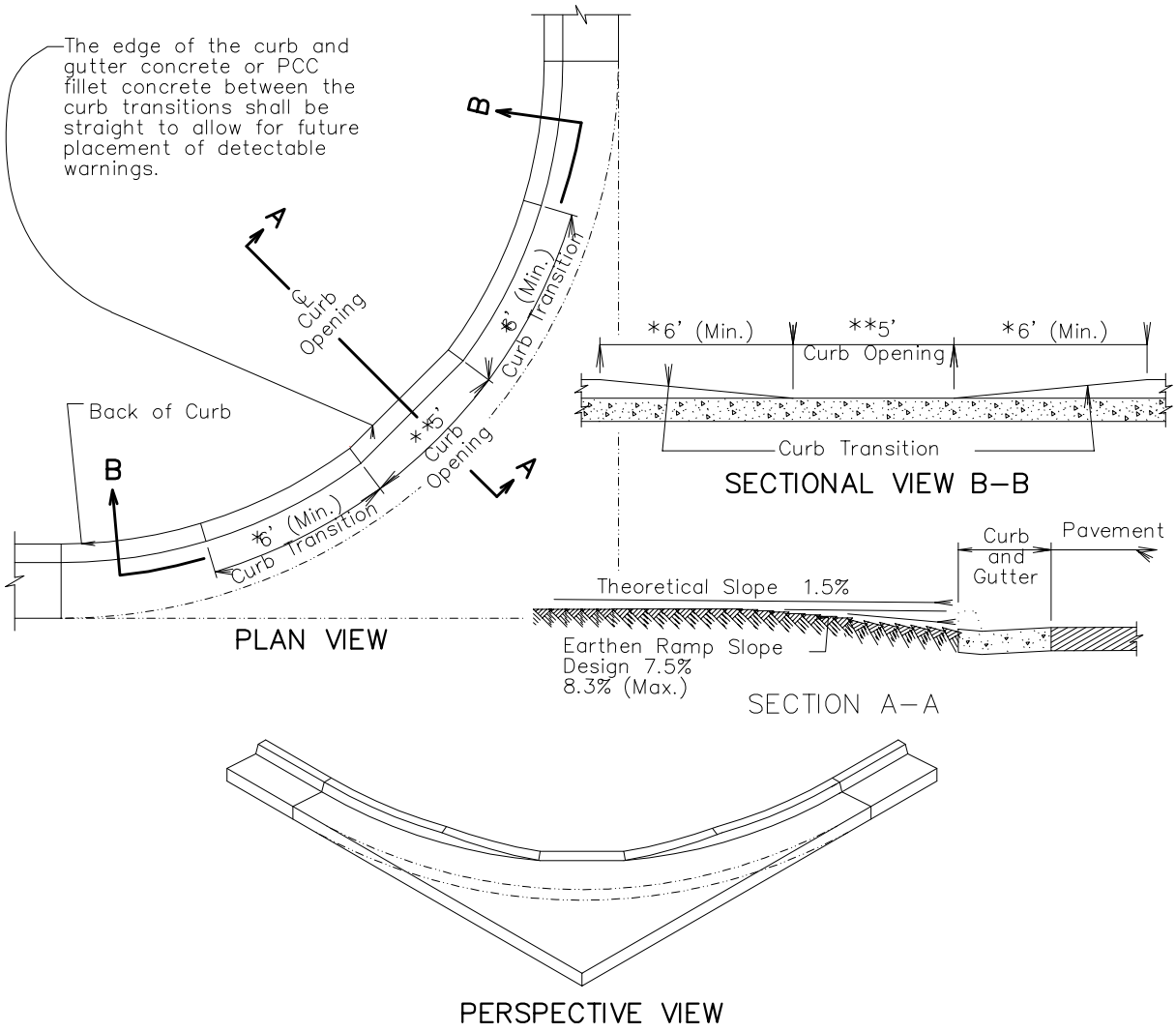
CITY OF BOX ELDER

STANDARD DETAIL RG018

CURB & GUTTER-RAMP-PARALLEL 3

DETAIL #RG018

REVISED 01/2020



PERSPECTIVE VIEW

GENERAL NOTES:

For illustrative purpose only, the curb opening location is shown at the center of the fillet section. The curb opening shall be placed at the location(s) stated in the plans.

For illustrative purpose only, PCC fillet sections are shown in the above drawings. The curb opening depicted on this standard plate may be used with a PCC fillet section or with curb and gutter.

*The curb transition shall be a minimum of 6' long, a maximum of 10' long, and the curb transition slope shall not be steeper than 10% unless stated otherwise in the plans. The curb transition length shall be adjusted as necessary to meet the slope and length requirements based on the field geometrics.

**The curb opening width is 5' unless stated otherwise in the plans.

The normal gutter line profile shall be maintained through the area of the curb opening.

The curb transitions and opening shall be measured and paid for at the contract unit price per foot for the corresponding curb and gutter bid item when curb and gutter is used. The curb transitions and opening shall be measured and paid for at the contract unit price per square yard for the corresponding PCC fillet section bid item when a PCC fillet section is used.

CURB OPENING AND TRANSITIONS IN CURB AND GUTTER FOR FUTURE CURB RAMP AND CURBSIDE SIDEWALK

NOT TO SCALE

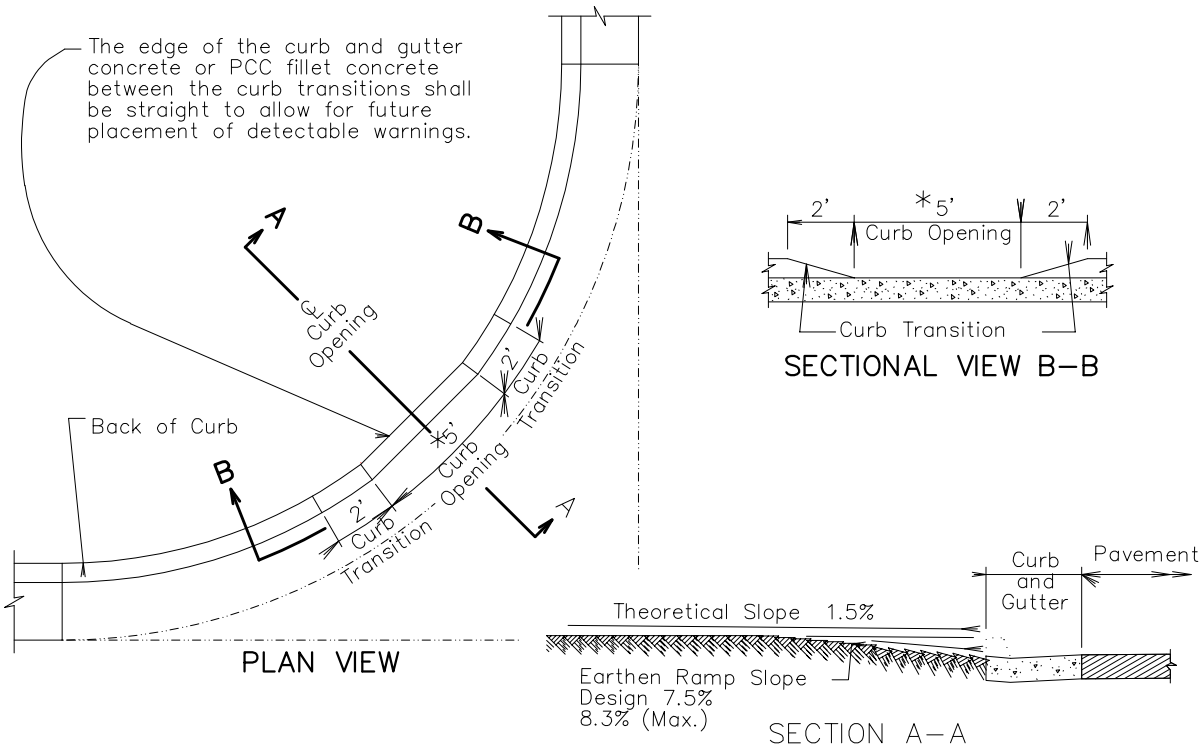
CITY OF BOX ELDER

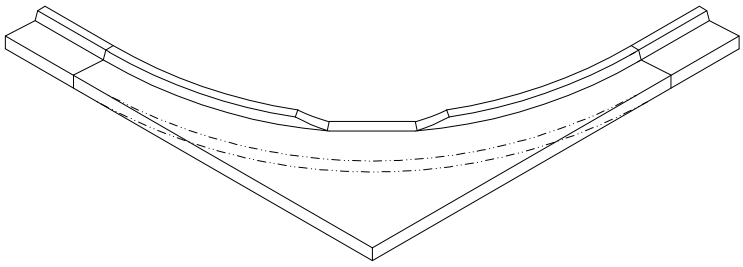
STANDARD DETAIL RG030

CURB & GUTTER-OPEN & TRANS. 1

DETAIL #RG030

REVISED 01/2020





PERSPECTIVE VIEW

GENERAL NOTES:

For illustrative purpose only, the curb opening location is shown at the center of the fillet section. The curb opening shall be placed at the location(s) stated in the plans.

For illustrative purpose only, PCC fillet sections are shown in the above drawings. The curb opening depicted on this standard plate may be used with a PCC fillet section or with curb and gutter.

* The curb opening width is 5' unless stated otherwise in the plans.

The normal gutter line profile shall be maintained through the area of the opening.

The curb transitions and opening shall be measured and paid for at the contract unit price per foot for the corresponding curb and gutter bid item when curb and gutter is used. The curb transitions and opening shall be measured and paid for at the contract unit price per square yard for the corresponding PCC fillet section bid item when a PCC fillet section is used.

CURB OPENING AND TRANSITIONS IN CURB AND GUTTER FOR FUTURE CURB RAMP AND BOULEVARD SIDEWALK

NOT TO SCALE

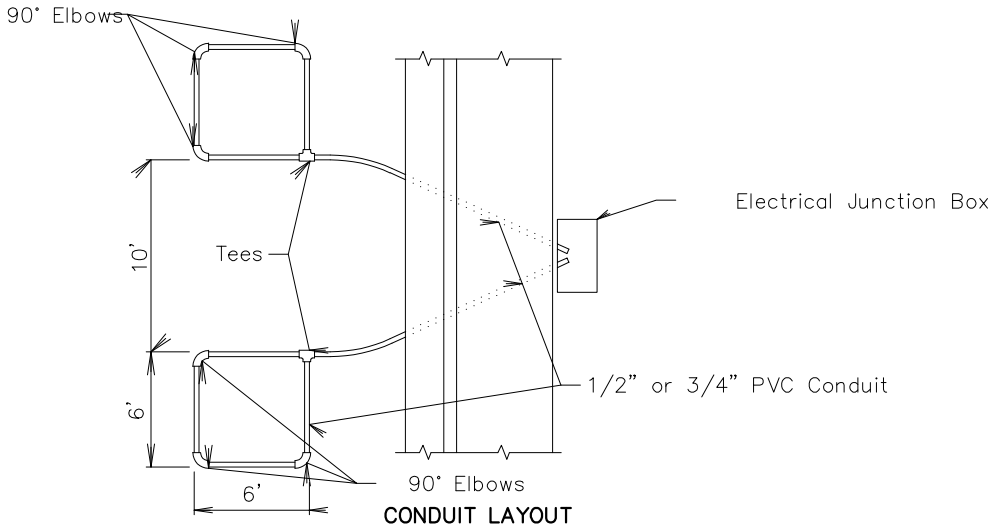
CITY OF BOX ELDER

STANDARD DETAIL RG031

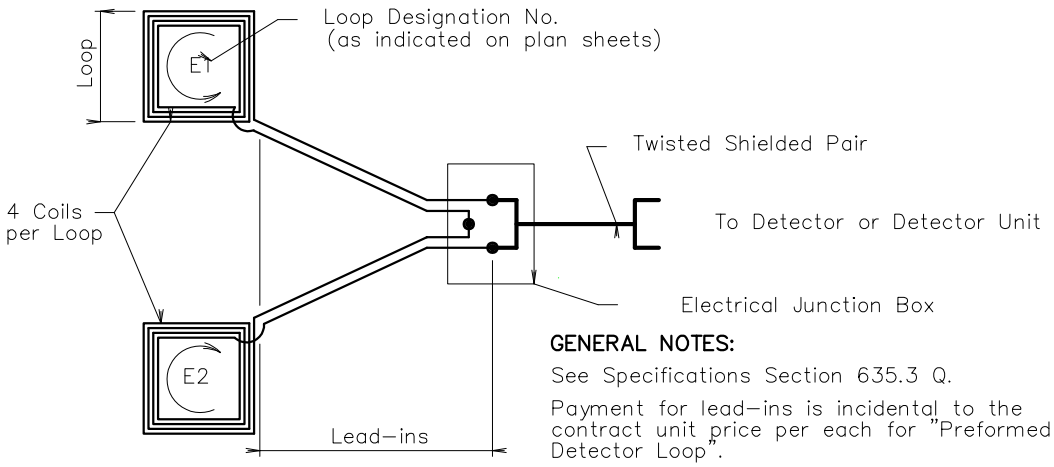
CURB & GUTTER-OPEN & TRANS. 2

DETAIL #RG031

REVISED 01/2020



CONDUIT LAYOUT

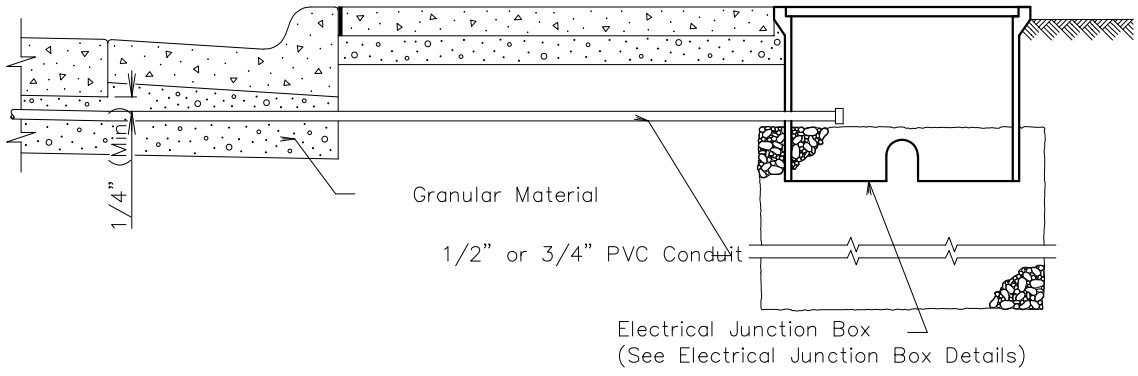


GENERAL NOTES:

See Specifications Section 635.3 Q.

Payment for lead–ins is incidental to the contract unit price per each for "Preformed Detector Loop".

WIRING DIAGRAM



LEAD–IN DETAIL

LIGHTING-DETECTOR LOOP-PREFORMED

NOT TO SCALE

CITY OF BOX ELDER

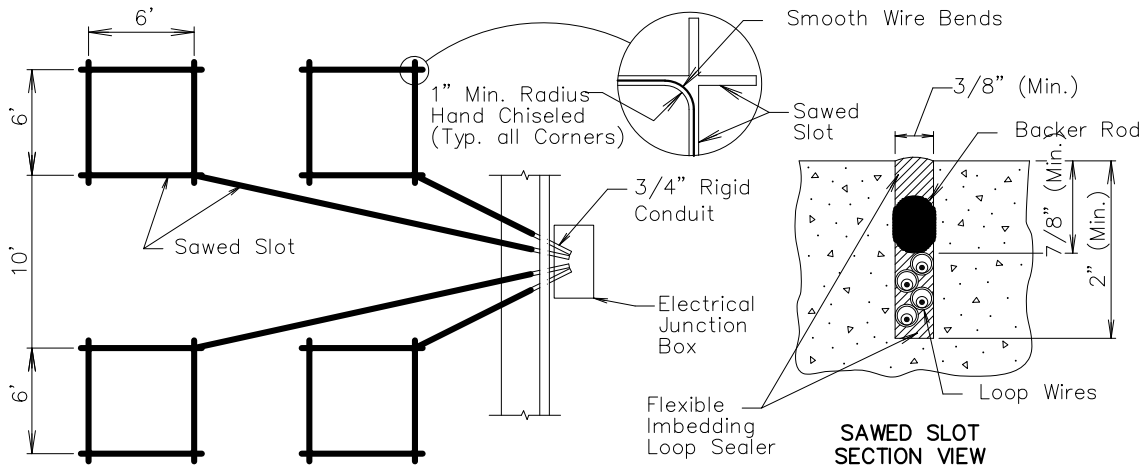
STANDARD DETAIL RL001

LIGHTING-DETECTOR LOOP-PREFORM

DETAIL #RL001

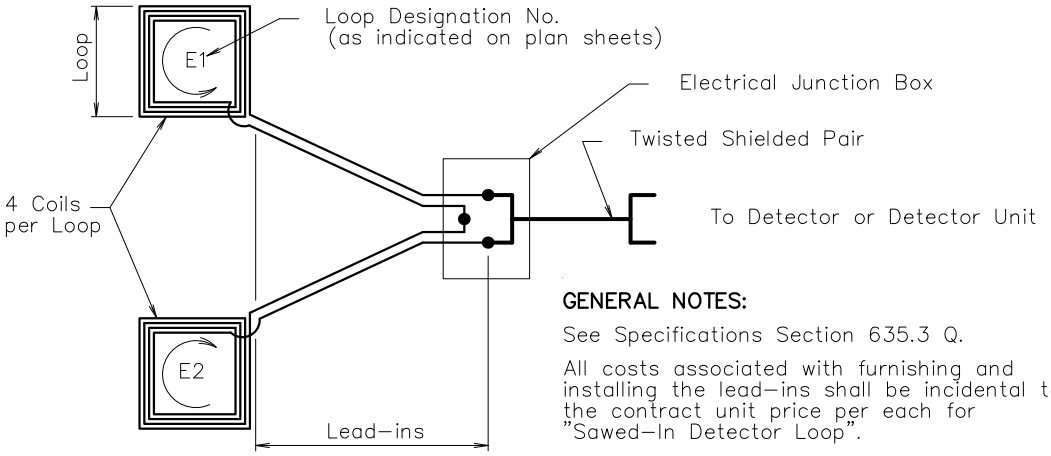
REVISED 01/2020

DETAIL RL002-LIGHTING-DETECTOR LOOP-SAWED IN



SAWED SLOT LAYOUT

SAWED SLOT
SECTION VIEW

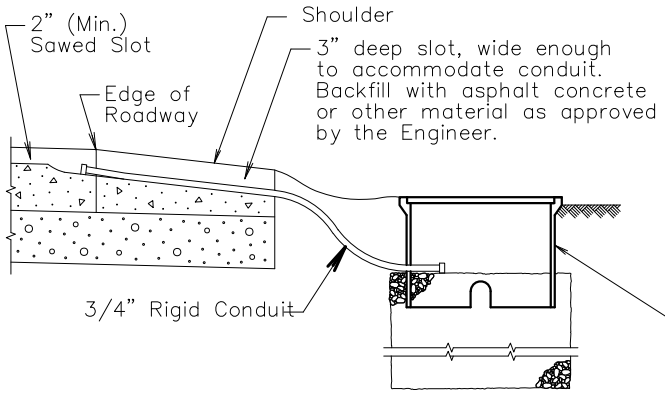


GENERAL NOTES:

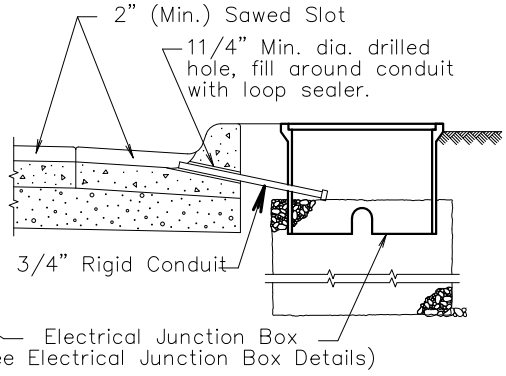
See Specifications Section 635.3 Q.

All costs associated with furnishing and installing the lead–ins shall be incidental to the contract unit price per each for "Sawed–In Detector Loop".

WIRING DIAGRAM



LEAD–IN THROUGH SHOULDER DETAIL



LEAD–IN THROUGH CURB AND GUTTER DETAIL

LIGHTING-DETECTOR LOOP-SAWED-IN

NOT TO SCALE

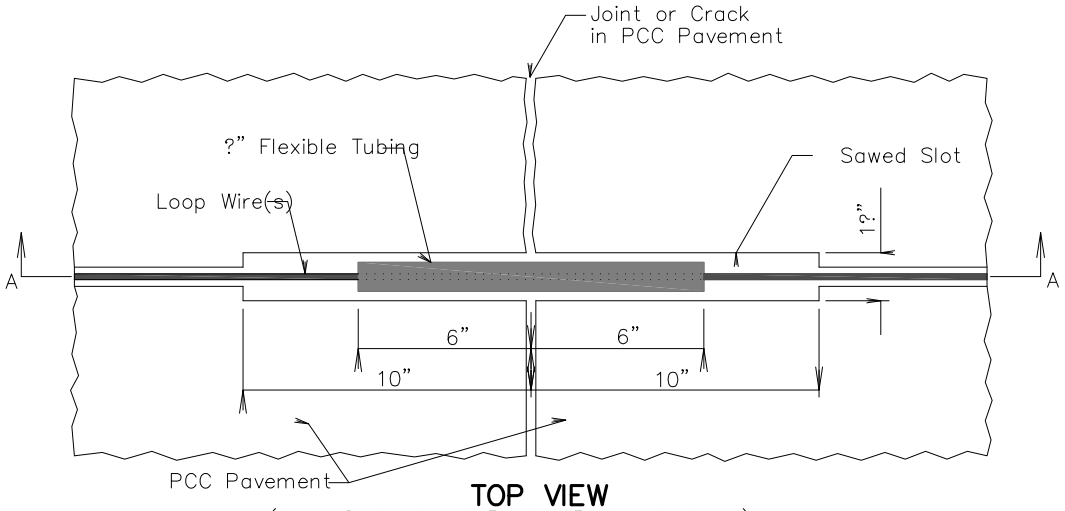
CITY OF BOX ELDER

STANDARD DETAIL RL002

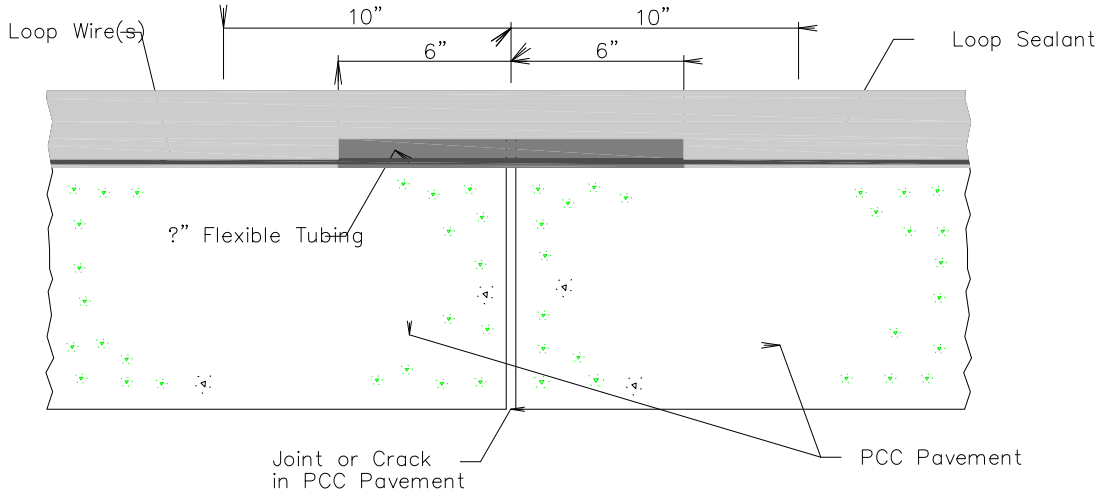
LIGHTING-DETECTOR LOOP-SAWED

DETAIL #RL002

REVISED 01/2020



TOP VIEW
(Loop Sealant and Backer Rod not shown)



SECTION A–A
(Backer Rod not shown)

GENERAL NOTE:

All costs for constructing the sawed–in detector loop protection including labor, equipment, and materials shall be incidental to the contract unit price per each for "Sawed–In Detector Loop".

LIGHTING-DETECTOR LOOP-SAWED-IN PCC

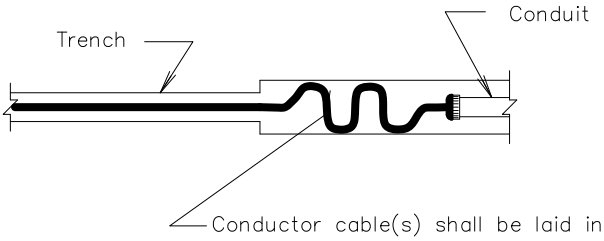
NOT TO SCALE

CITY OF BOX ELDER

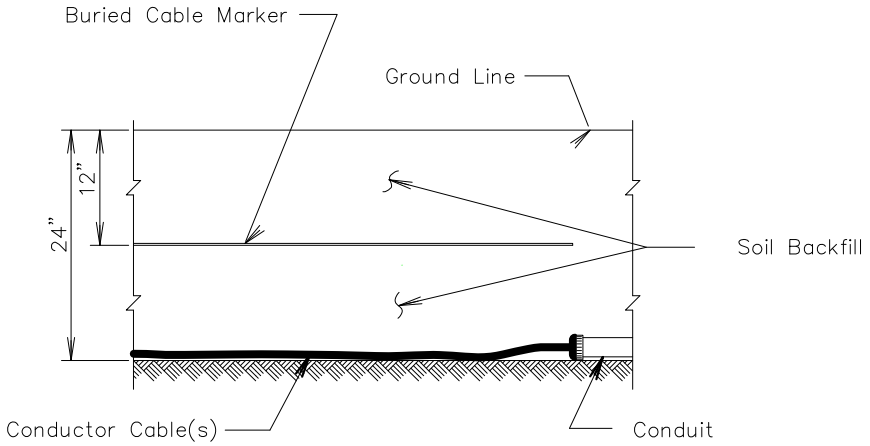
STANDARD DETAIL RL003

LIGHTING-DETECTOR LOOP-SAWED

DETAIL #RL003 REVISED 01/2020



PLAN VIEW



SECTION VIEW

GENERAL NOTE:

The Buried Cable Marker shall be plastic, approximately 6" wide, and shall be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker shall have a life expectancy approximately equal to that of the conductor(s) beneath it. A phrase indicating the presence of a buried electric circuit below shall be printed in a contrasting color on the cable marker. The Buried Cable Marker shall be subject to approval by the Engineer. All costs associated with furnishing and installing the Buried Cable Marker shall be incidental to the contract unit price per Foot for the bid item used for the electrical conductor.

LIGHTING-CONDUCTOR CABLES-DIRECT BURY

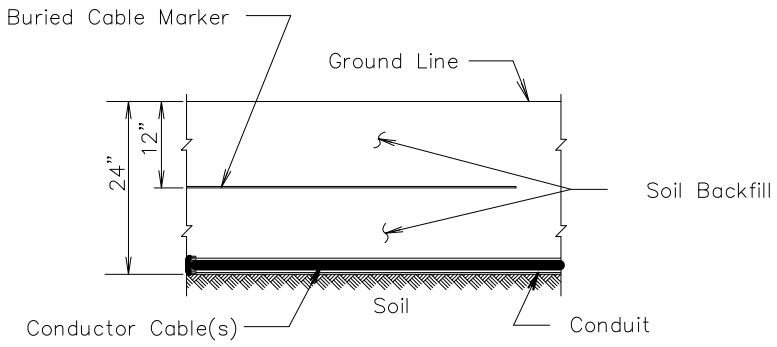
NOT TO SCALE

CITY OF BOX ELDER

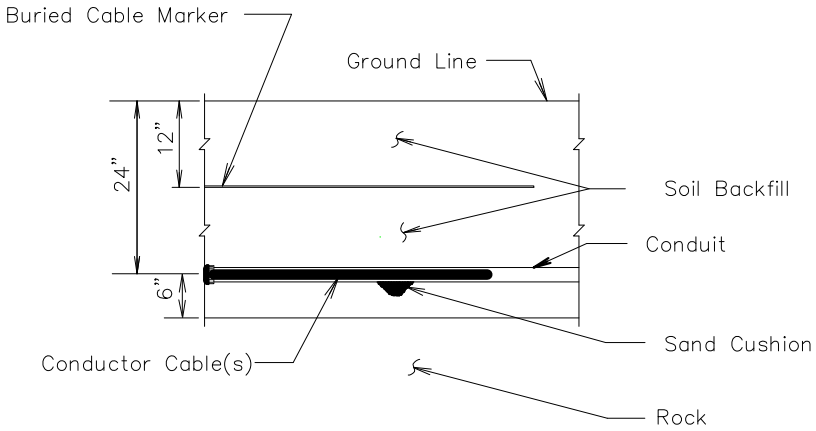
STANDARD DETAIL RL004

LIGHTING-CONDUCTOR CABLES-BURY

DETAIL #RL004 REVISED 01/2020



SECTION VIEW



SECTION VIEW

GENERAL NOTE:

The Buried Cable Marker shall be plastic, approximately 6" wide, and shall be capable of sustaining a minimum of a 350% tolerance of elongation without tearing. The Buried Cable Marker shall have a life expectancy approximately equal to that of the conductor(s) beneath it. A phrase indicating the presence of a buried electric circuit below shall be printed in a contrasting color on the cable marker. The Buried Cable Marker shall be subject to approval by the Engineer. All costs associated with furnishing and installing the Buried Cable Marker shall be incidental to the contract unit price per Foot for the bid item used for the electrical conductor.

LIGHTING-CONDUCTOR CABLES-CONDUIT

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RL005

LIGHTING-CONDUCTOR CABLES-CON.

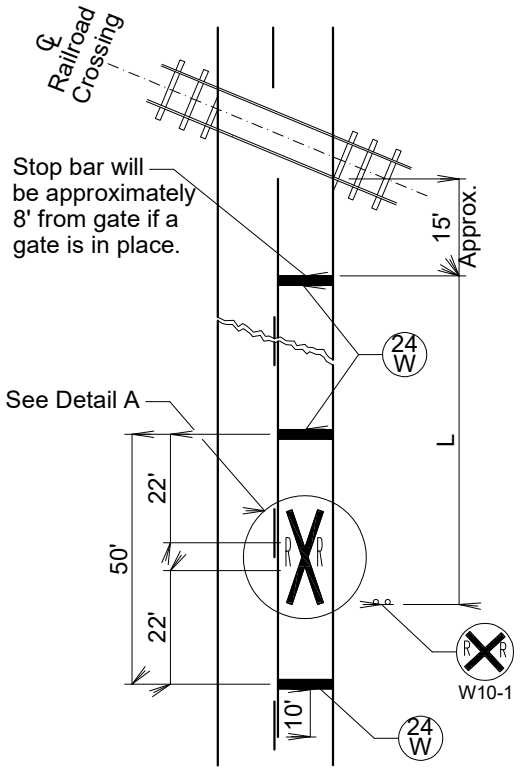
DETAIL #RL005

REVISED 01/2020

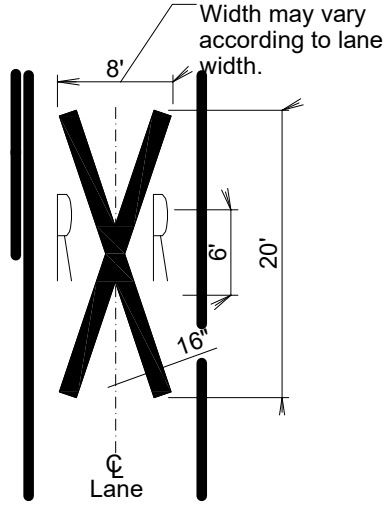
DETAIL RR001-RAILROAD-PAVEMENT MARKINGS AT CROSSINGS

KEY	ITEM
24 W	24" White
RXR	White

Posted Speed Limit (M.P.H.)	L (Ft.)
≤ 30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550



PLAN VIEW



DETAIL A

GENERAL NOTES:

The railroad crossing pavement markings will be placed symmetrically about the centerline of the railroad crossing.

When pavement markings are used, a portion of the RXR symbol will be placed directly opposite of the advance warning sign W10-1.

On multi-lane roads the transverse bands will extend across all approach lanes and individual RXR symbols will be placed in each approach lane.

The railroad crossing pavement markings will consist of all the transverse bands, stop bars, and RXR symbols.

When pavement marking paint is used for marking the railroad crossing, all costs for furnishing and painting the markings, materials, labor, and necessary equipment will be incidental to the contract unit price per gallon.

When pavement marking tape is used for marking the railroad crossing, all costs for furnishing and placing the markings, materials, labor, and necessary equipment will be incidental to the contract unit price per each..

RAILROAD-PAVEMENT MARKINGS AT CROSSINGS

NOT TO SCALE

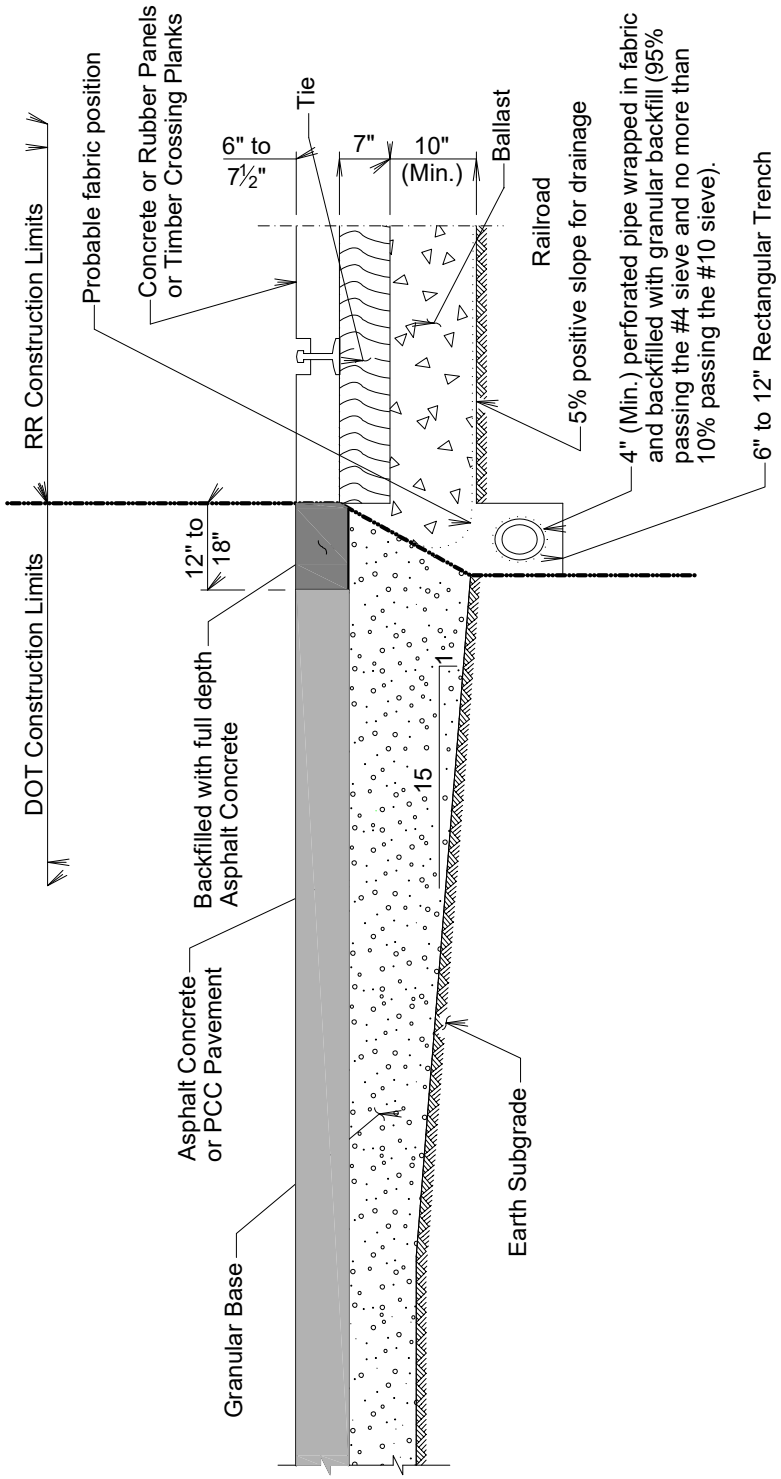
CITY OF BOX ELDER

STANDARD DETAIL RR001

RAILROAD-PAVEMENT MARKINGS

DETAIL #RR001

REVISED 01/2020



RAILROAD-TYPICAL APPROACH

NOT TO SCALE

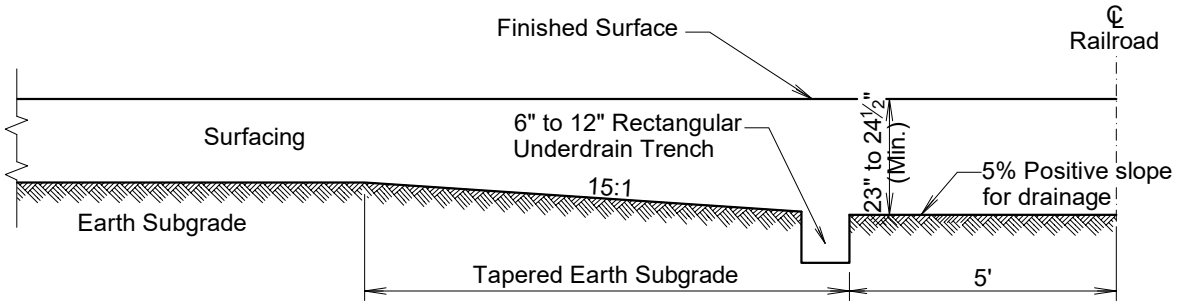
CITY OF BOX ELDER

STANDARD DETAIL RR002

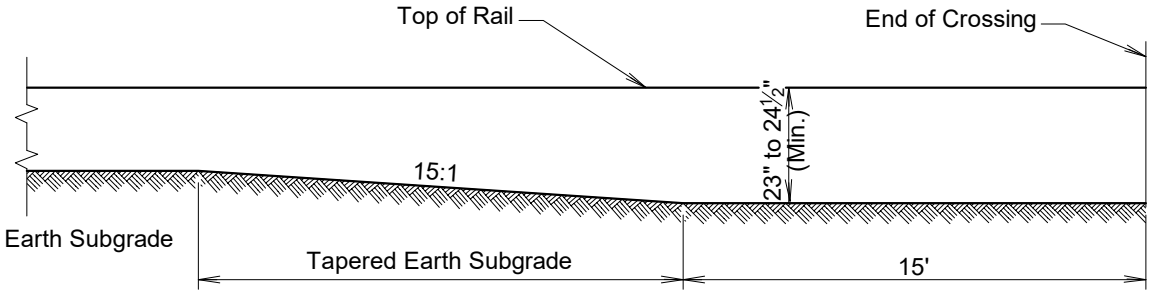
RAILROAD-TYPICAL APPROACH

DETAIL #RR002

REVISED 01/2020



EXCAVATION PROFILE ALONG ROADWAY



EXCAVATION PROFILE ALONG RAILROAD

RAILROAD-EXCAVATION PROFILES

NOT TO SCALE

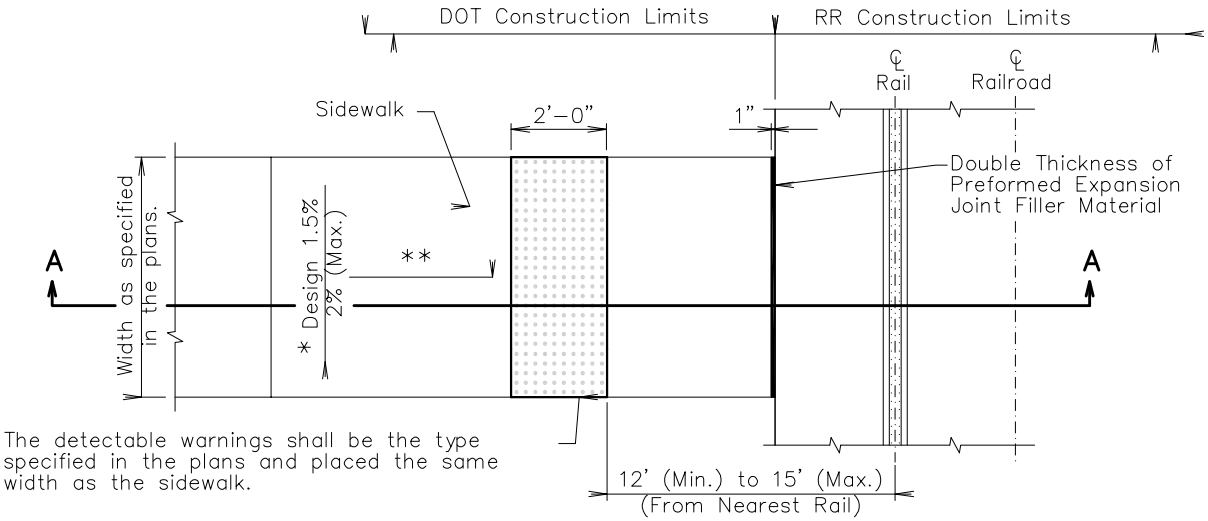
CITY OF BOX ELDER

STANDARD DETAIL RR003

RAILROAD-TYPICAL GRADING

DETAIL #RR003

REVISED 01/2020



PLAN VIEW

* The cross slope of the sidewalk shall not be steeper than 2%. Plans are designed using a 1.5% cross slope unless stated otherwise in the plans.

** If the sidewalk is curbside, then the surface of the curbside sidewalk shall match the slope of the curb transition. The longitudinal slope of the sidewalk and curb transition, where the sidewalk transitions to the railroad crossing elevation, is designed at 4.5% and shall not be steeper than 5% unless stated otherwise in the plans.

** The longitudinal slope of the sidewalk, where the sidewalk transitions to the railroad crossing elevation, is designed at 4.5% and shall not be steeper than 5% unless stated otherwise in the plans.

RAILROAD-DETECTABLE SIDEWALK WARNINGS ADJACENT TO CROSSINGS-1

NOT TO SCALE

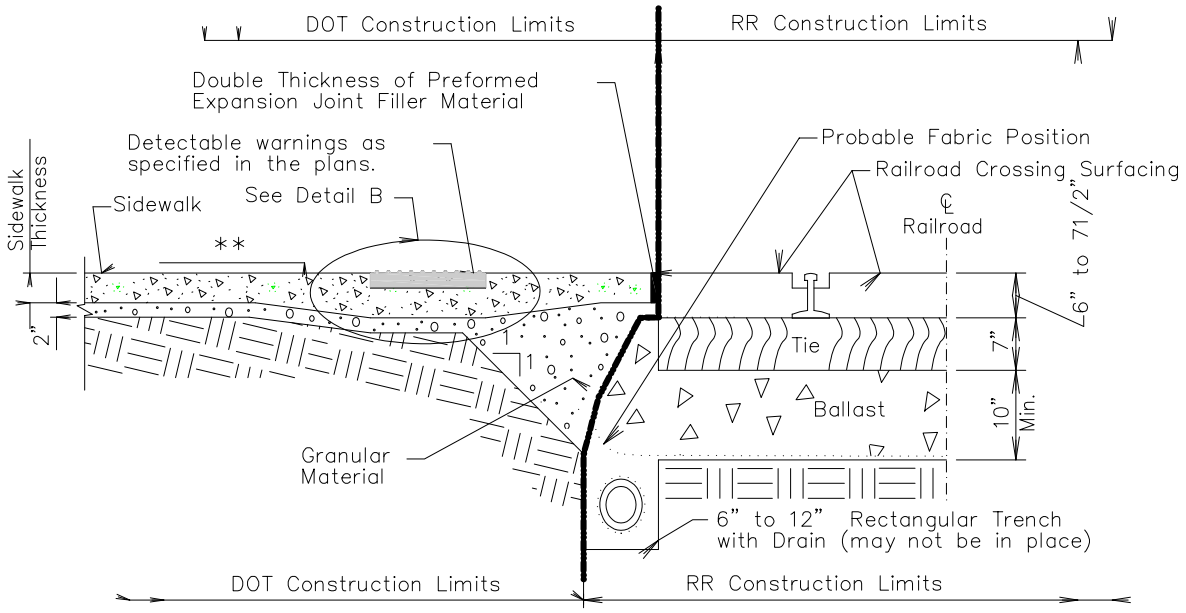
CITY OF BOX ELDER

STANDARD DETAIL RR010

RAILROAD-DETECTABLE SIDEWALK 1

DETAIL #RR010

REVISED 01/2020



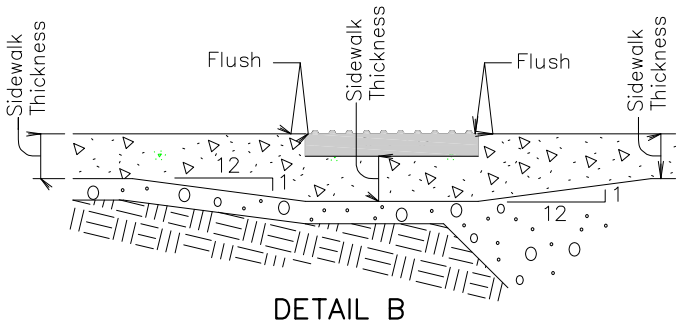
SECTION A–A

GENERAL NOTES:

For illustrative purpose only, type 1 detectable warnings are shown in the drawings.

Ballast material shall not be disturbed during construction work adjacent to the railroad crossing unless the adjacent work involves reconstruction or maintenance of the railroad crossing.

The sidewalk shall be placed at the location stated in the plans and shall be perpendicular to the railroad crossing.



DETAIL B

Care shall be taken to ensure that the surface of the detectable warnings are clean and maintains a uniform color.

If curb and gutter is required adjacent to the railroad crossing, the curb transition shall be measured and paid for at the contract unit price per foot for the corresponding curb and gutter bid item.

The type 1 detectable warnings shall be measured to the nearest square foot. All costs for furnishing and installing the type 1 detectable warnings including labor, equipment, materials, and incidentals shall be paid for at the contract unit price per square foot for "Type 1 Detectable Warnings".

The type 2 detectable warnings shall be measured to the nearest square foot. All costs for furnishing and installing the type 2 detectable warnings including labor, equipment, and materials, including adhesive, necessary sealant or grout, and necessary grinding shall be paid for at the contract unit price per square foot for "Type 2 Detectable Warnings".

The square foot area of the detectable warnings shall be included in the measured and paid for quantity of sidewalk.

RAILROAD-DETECTABLE SIDEWALK WARNINGS ADJACENT TO CROSSINGS 2

NOT TO SCALE

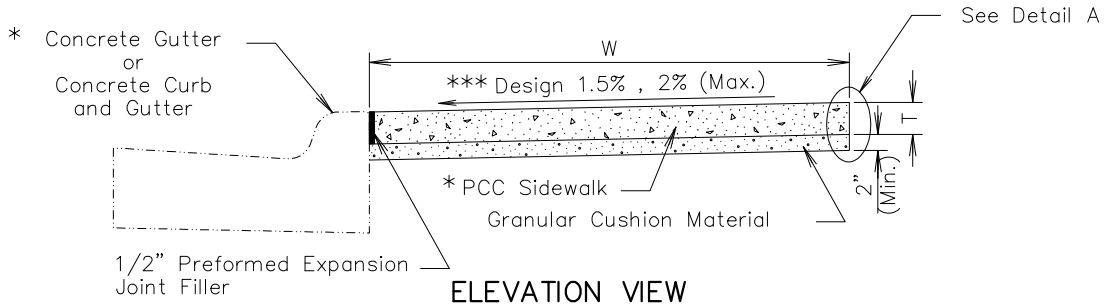
CITY OF BOX ELDER

STANDARD DETAIL RR011

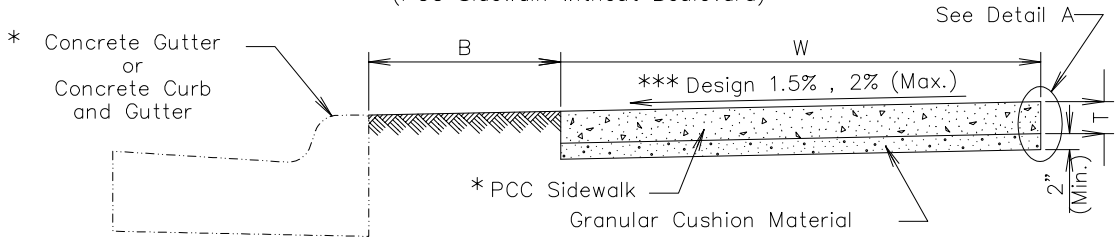
RAILROAD-DETECTABLE SIDEWALK 2

DETAIL #RR011

REVISED 01/2020

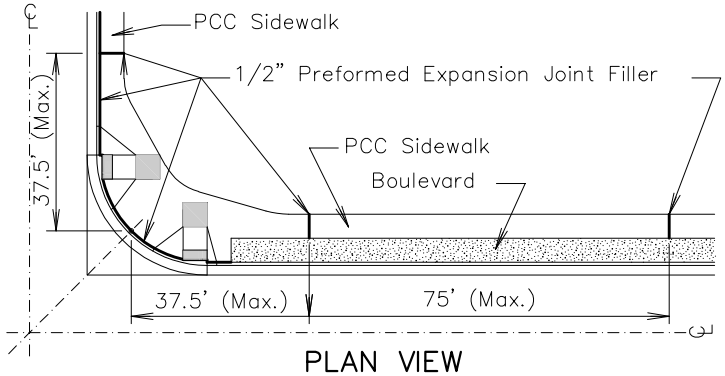


ELEVATION VIEW
(PCC Sidewalk without Boulevard)



ELEVATION VIEW
(PCC Sidewalk with Boulevard)

B Width of boulevard as specified in the plans.
T Thickness of PCC sidewalk as specified in the plans.
W Width of PCC sidewalk as specified in the plans.
* Type as specified in the plans.



PLAN VIEW

GENERAL NOTES:

The PCC sidewalk shall be constructed in accordance with the Specifications.

*** The cross slope of the sidewalk is designed at 1.5% and the maximum slope allowed is 2% unless specified otherwise in the plans.

The maximum length between expansion joints in PCC sidewalk is 75 feet.

PCC sidewalk placed adjacent to intersection of roadways shall have an expansion joint placed transversely a maximum of 37.5 feet from the intersection. See PLAN VIEW.

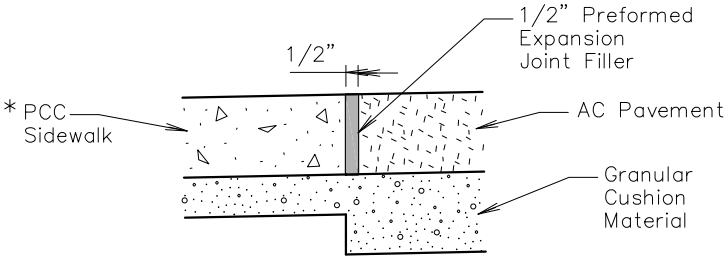
An expansion joint in PCC sidewalk shall consist of a 1/2 inch thick preformed expansion joint filler material placed full depth and width of the PCC sidewalk.

** Large areas of PCC pavement adjacent to PCC sidewalk may require a different joint treatment than shown in the detail. If a different joint detail is necessary, plans will contain the joint detail and the Contractor shall construct the joint treatment in accordance with the plans.

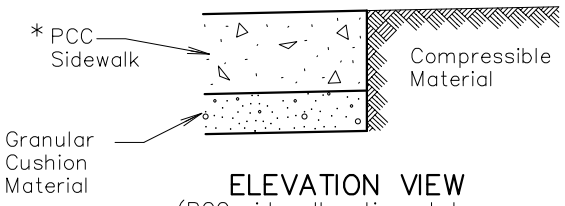
SIDEWALK-CONCRETE
NOT TO SCALE

CITY OF BOX ELDER
STANDARD DETAIL RS001
SIDEWALK-CONCRETE 1

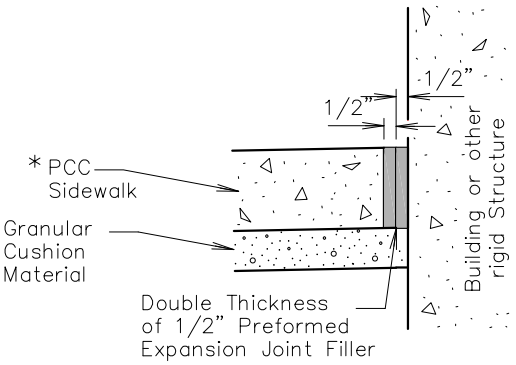
DETAIL #RS001 REVISED 01/2020



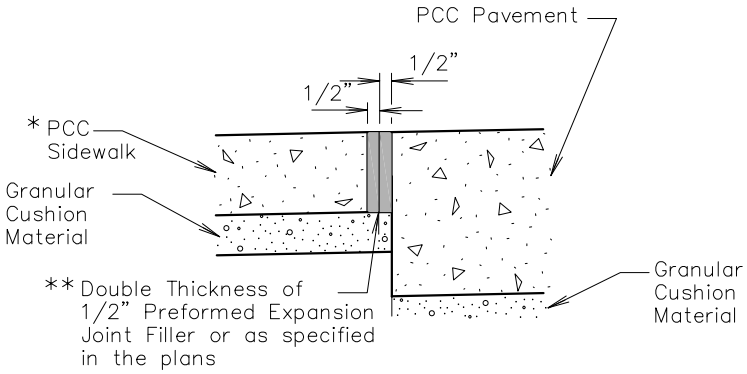
ELEVATION VIEW
(PCC sidewalk adjacent to asphalt concrete pavement)



ELEVATION VIEW
(PCC sidewalk adjacent to earthen material, landscape rock, or other compressible materials)



ELEVATION VIEW
(PCC sidewalk adjacent to building or other rigid structure)



ELEVATION VIEW
(PCC sidewalk adjacent to PCC pavement)

Detail A
(Use Appropriate Detail(s))

SIDEWALK-CONCRETE

NOT TO SCALE

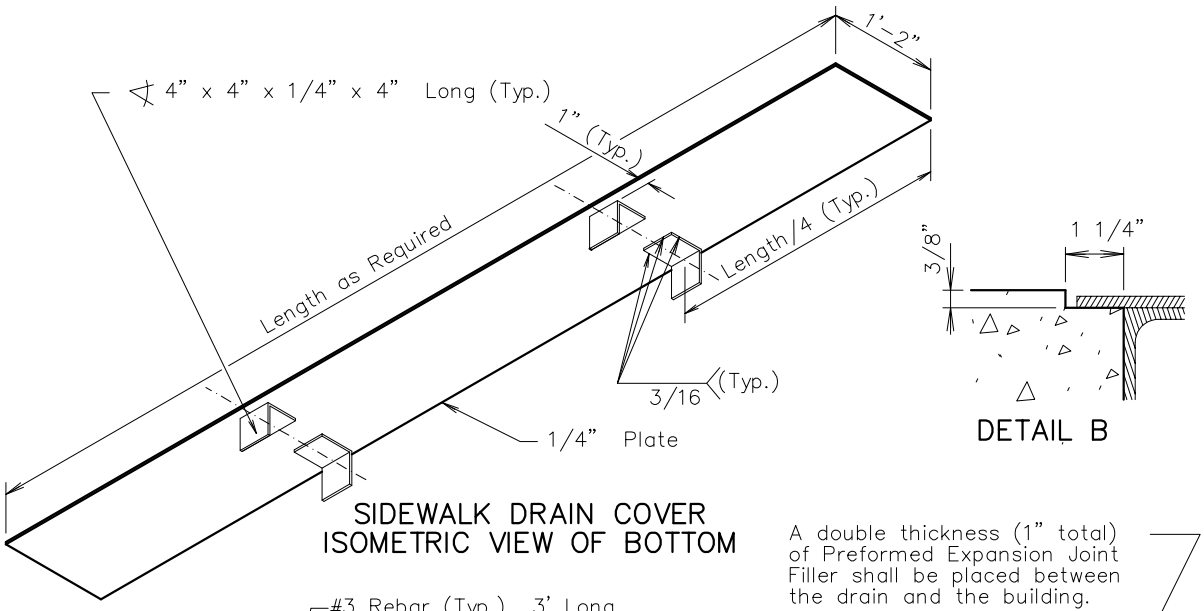
CITY OF BOX ELDER

STANDARD DETAIL RS002

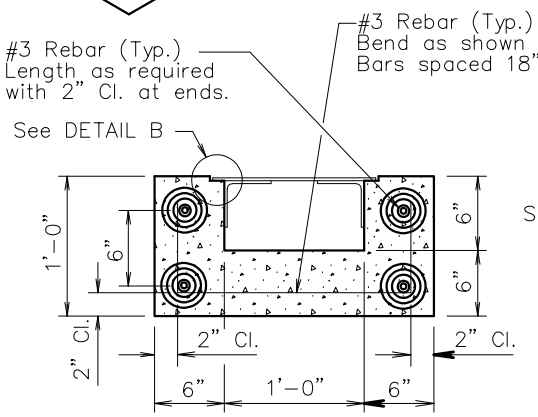
SIDEWALK-CONCRETE 2

DETAIL #RS002

REVISED 01/2020

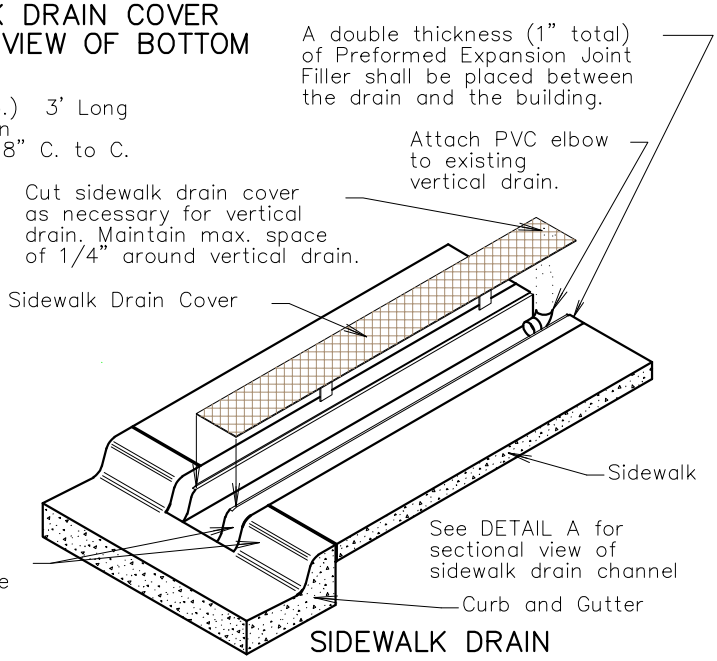


SIDEWALK DRAIN COVER
ISOMETRIC VIEW OF BOTTOM



DETAIL A

The end of the drain channel shall be the same shape as the adjacent curb face.



SIDEWALK DRAIN

GENERAL NOTES:

Concrete shall be Class M6 in accordance with the Specifications.

Reinforcing steel shall conform to ASTM A615, Grade 60.

Structural Steel shall conform to ASTM A36. The sidewalk drain cover shall conform to ASTM A786.

Welding and weld inspection shall be in conformance with the current edition of the AWS D1.1 Structural Welding Code–Steel.

The cover plate assembly shall be galvanized after fabrication. Galvanizing shall be in accordance with ASTM A123.

All costs associated for providing the required curb cut shall be incidental to the contract unit price per foot for the corresponding curb and gutter bid item.

SIDEWALK-DRAIN
NOT TO SCALE

CITY OF BOX ELDER

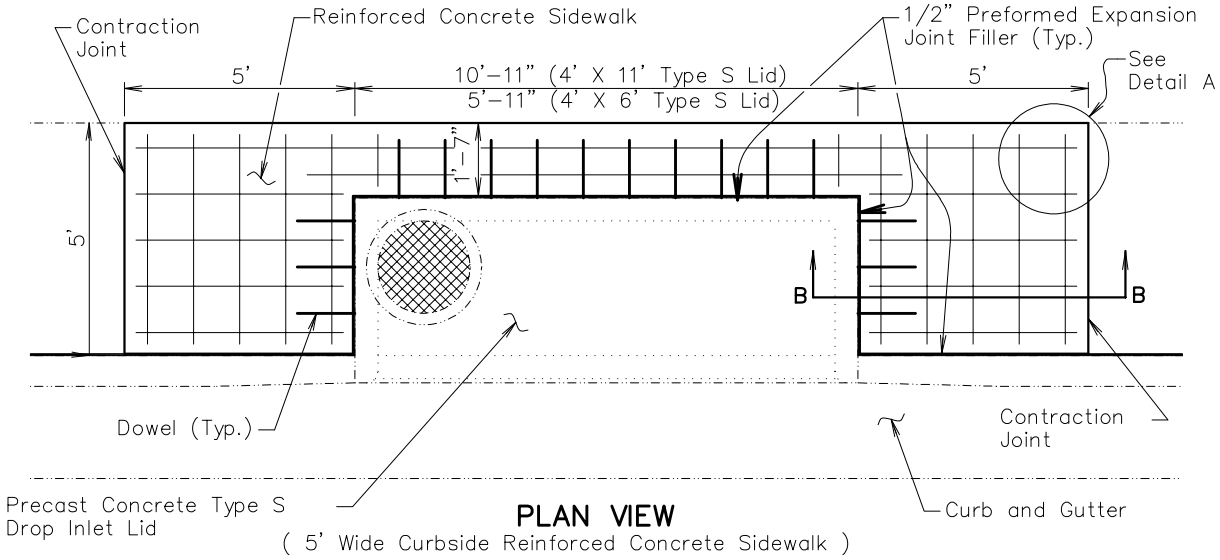
STANDARD DETAIL RS010

SIDEWALK-DRAIN

DETAIL #RS010

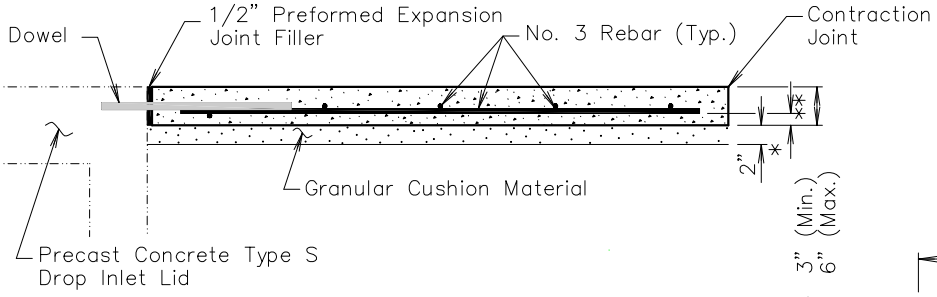
REVISED 01/2020

DETAIL RS011-SIDEWALK-ADJACENT TO TYPE S DROP INLET LID-1

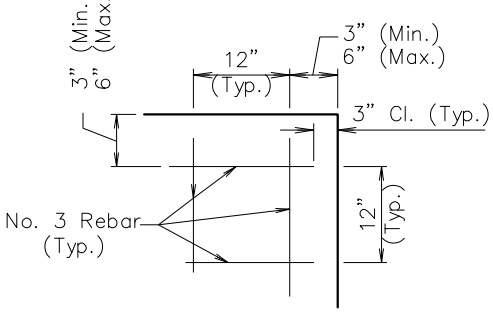


PLAN VIEW

(5' Wide Curbside Reinforced Concrete Sidewalk)



SECTION B–B



DETAIL A

** 4", 5", or 6" as specified elsewhere in the plans.

* 15/8" for 4" sidewalk, 21/8" for 5" sidewalk, and 25/8" for 6" sidewalk.

GENERAL NOTES:

The precast concrete Type S lids shown are 4' X 11' for illustrative purpose.

The cross slope of the sidewalk and precast concrete type S drop inlet lid shall be as specified elsewhere in the plans.

The reinforcing steel and workmanship shall conform to the Specifications.

When lapping of reinforcing steel is necessary, the No. 3 rebar shall be lapped 12".

The reinforced concrete sidewalk shall conform to the Specifications.

All costs for constructing the reinforced concrete sidewalk including labor, equipment, tools, backfilling, furnishing and placing materials, including granular cushion, reinforcing steel, preformed expansion joint filler, and incidentals shall be included in the contract unit price per square foot for the corresponding reinforced concrete sidewalk bid item.

SIDEWALK-ADJACENT TO TYPE S DROP INLET LID

NOT TO SCALE

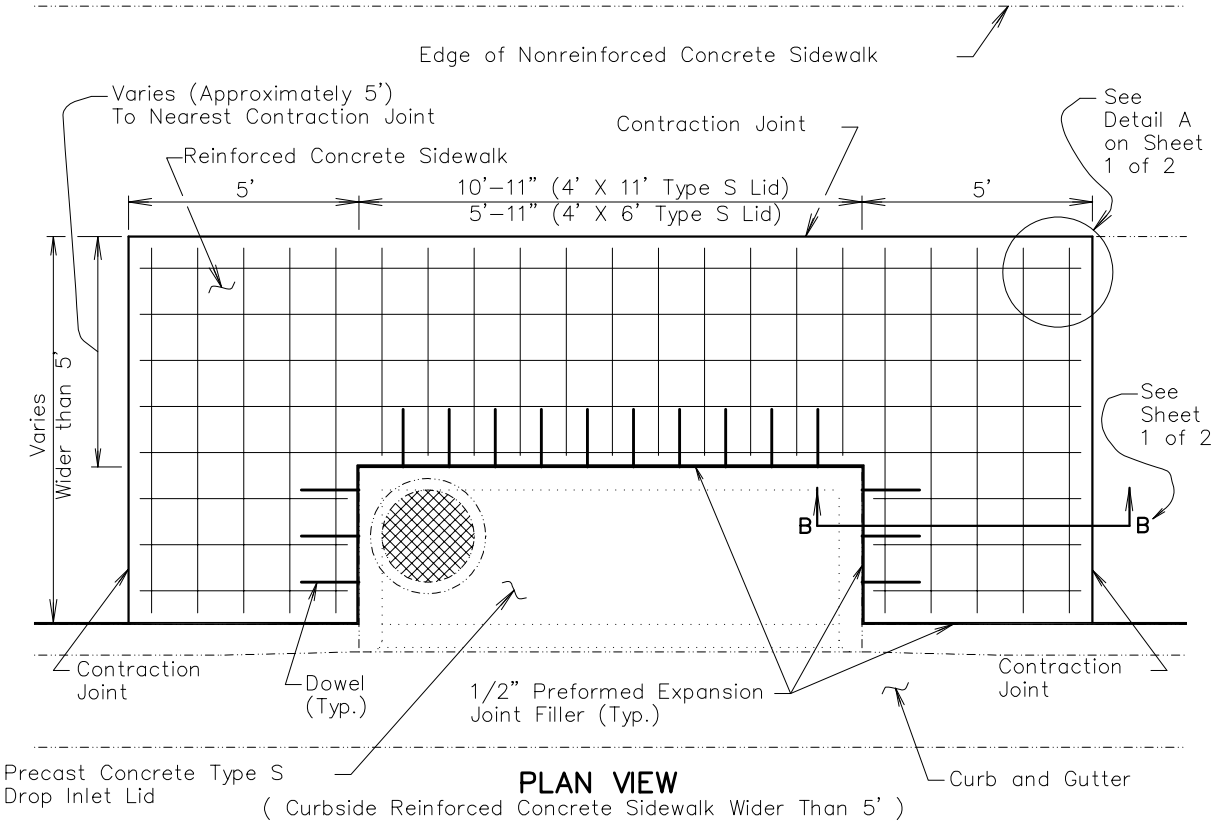
CITY OF BOX ELDER

STANDARD DETAIL RS011

SIDEWALK-TYPE S DROP INLET LID 1

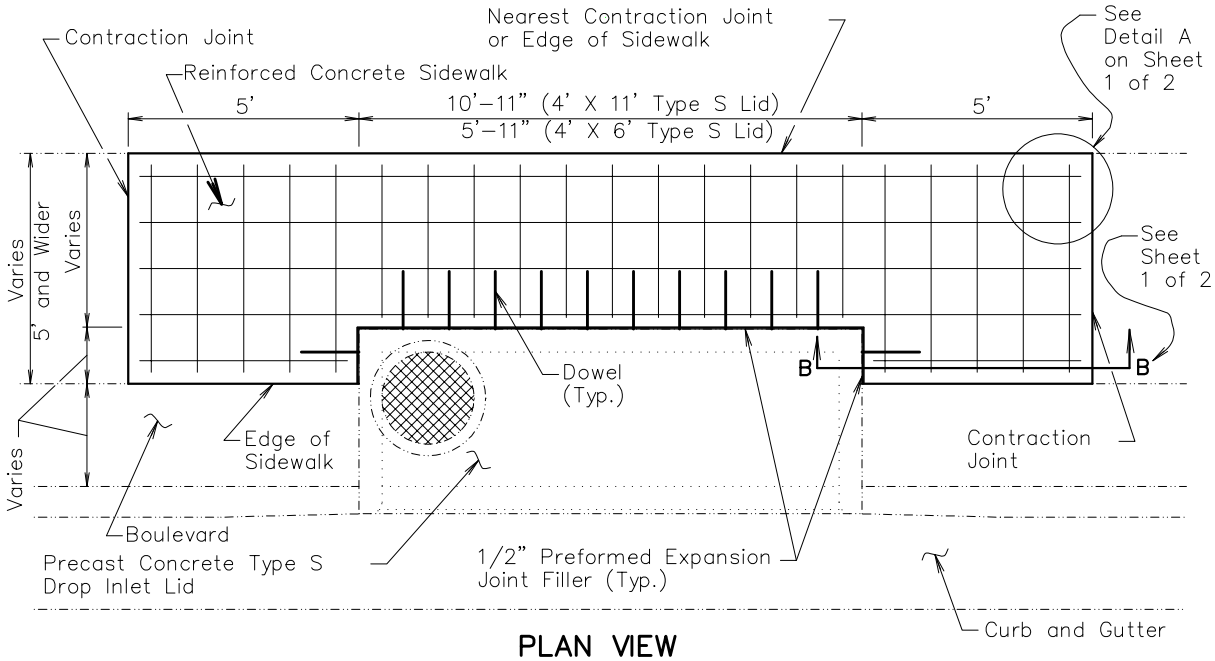
DETAIL #RS011

REVISED 01/2020



PLAN VIEW

(Curbside Reinforced Concrete Sidewalk Wider Than 5')



PLAN VIEW

(Reinforced Concrete Sidewalk With Boulevard)

SIDEWALK-ADJACENT TO TYPE S DROP INLET LID

NOT TO SCALE

CITY OF BOX ELDER

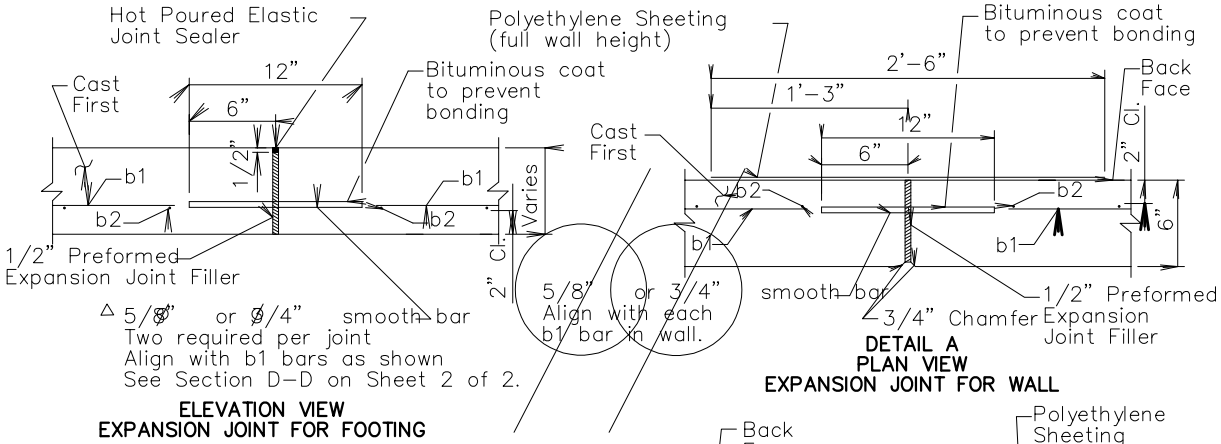
STANDARD DETAIL RS012

SIDEWALK-TYPE S DROP INLET LID 2

DETAIL #RS012

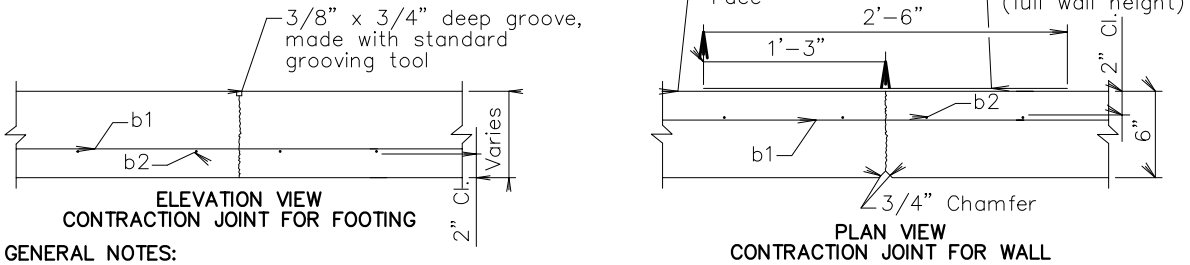
REVISED 01/2020

DETAIL RW001-CONCRETE RETAINING WALL-TYPE C-1



ELEVATION VIEW
EXPANSION JOINT FOR FOOTING

DETAIL A
PLAN VIEW
EXPANSION JOINT FOR WALL



ELEVATION VIEW
CONTRACTION JOINT FOR FOOTING

PLAN VIEW
CONTRACTION JOINT FOR WALL

GENERAL NOTES:

The Type C Concrete Retaining Wall shall be placed adjacent to pavement or curb and gutter as shown in Section D-D on sheet 2 of 2.

* The sidewalk width of the Type C Concrete Retaining Wall shall not be wider than 8 feet or narrower than 5 feet.

In the areas where the retaining wall footing is to be placed, a 2 inch thickness of cushion material shall be placed and compacted.

All concrete shall be Class M6 and conform to Section 462 of the Specifications.

All reinforcing steel shall be epoxy coated and shall conform to ASTM A615, Grade 60. The smooth bar may conform to ASTM A615, Grade 40. The epoxy coating shall conform to ASTM A775.

For variable height walls, the top b1 bar shall be placed parallel to the top of the wall.

The b1 bars shall be lapped a minimum of 12 inches.

A 3/4 inch chamfer shall be provided on all exposed retaining wall edges.

Use Detail B on sheet 2 of 2 for constructing corners in the retaining wall.

The maximum expansion joint spacing shall be 90 feet and the maximum contraction joint spacing shall be 30 feet. The contraction and expansion joints shall be placed to match pavement or curb joints where possible.

The exposed retaining wall surfaces shall receive a finish in accordance with 460.3 L of the Specifications. The exposed surface of the retaining wall footing, when used as a sidewalk, shall receive a broom finish.

The Type C Concrete Retaining Wall shall be measured to the nearest square foot of front face area of the wall. The front face of the footing is excluded from the measurement.

All costs for excavation, furnishing and placing backfill and cushion material, labor, equipment, preformed expansion joint filler, all reinforcing steel including the smooth bars, and all concrete except in the areas of PCC driveway and approach pavement, shall be incidental to the contract unit price per square foot for "Type C Concrete Retaining Wall".

The concrete used for the retaining wall footing that extends into the approach and/or driveway pavement shall be paid for at the contract unit price per square yard for the corresponding "PCC Approach Pavement" and/or "PCC Driveway Pavement" bid items.

CONCRETE RETAINING WALL-TYPE C

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RW001

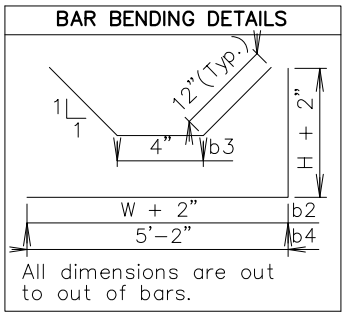
RETAINING WALL-CONC.-TYPE C 1

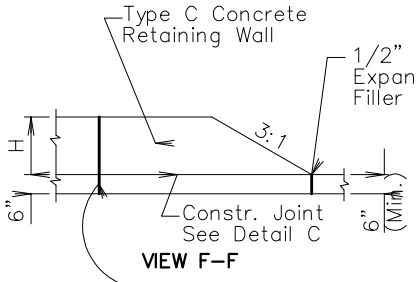
DETAIL #RW001

REVISED 01/2020

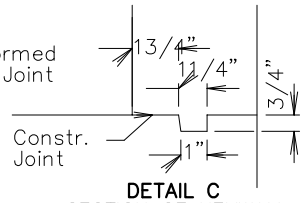
DETAIL RW002-CONCRETE RETAINING WALL-TYPE C-2

Use No. 4 bars for all reinforcing steel unless specified otherwise.

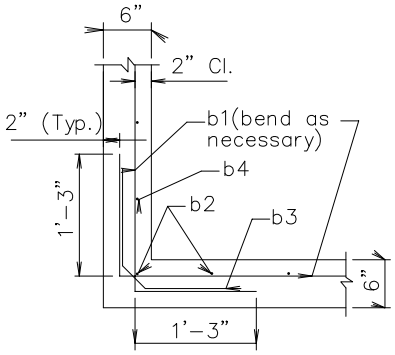




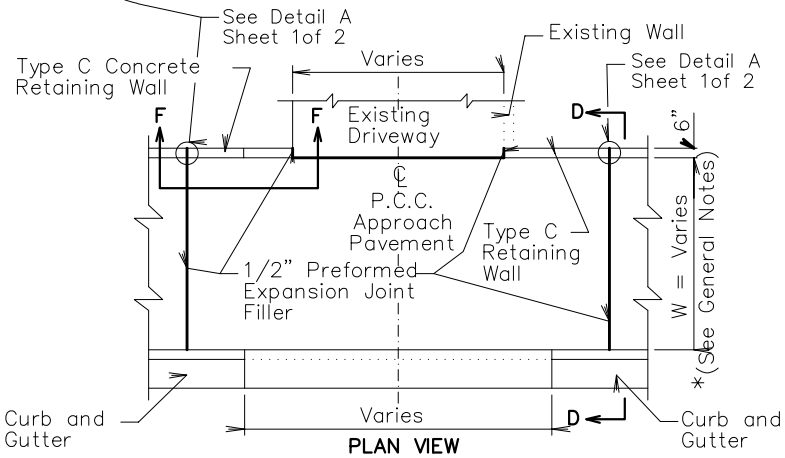
VIEW F–F



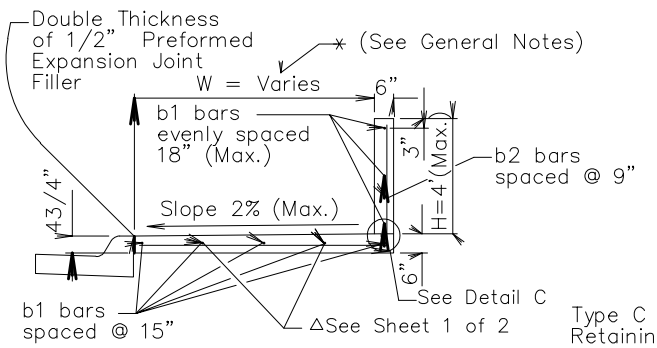
DETAIL C
SECTION OF KEYWAY SHOWING CONSTRUCTION JOINT BETWEEN WALL AND FOOTING



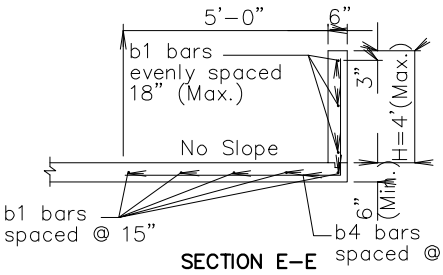
DETAIL B
PLAN VIEW OF WALL CORNER DETAIL



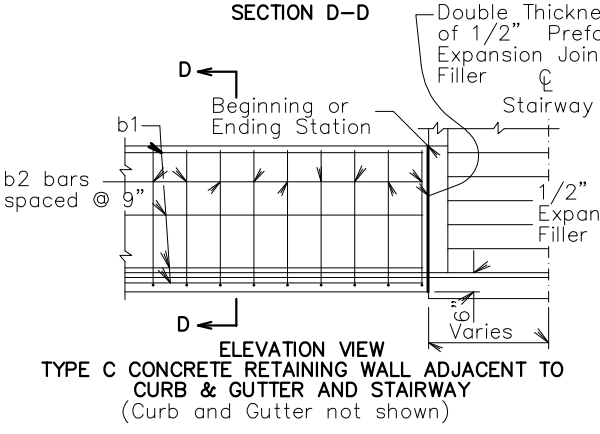
PLAN VIEW
TYPE C CONCRETE RETAINING WALL ON P.C.C. APPROACH PAVEMENT



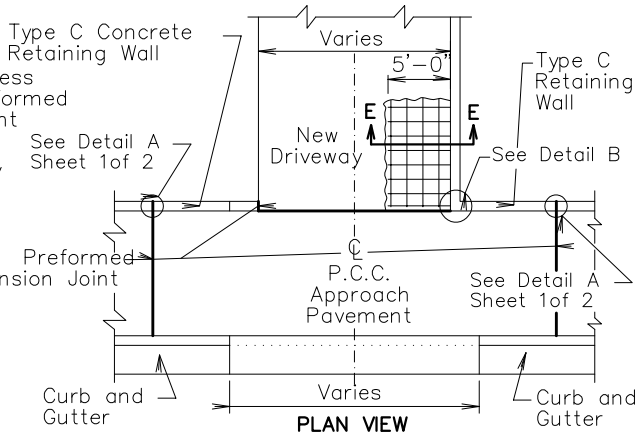
SECTION D–D



SECTION E–E



ELEVATION VIEW
TYPE C CONCRETE RETAINING WALL ADJACENT TO CURB & GUTTER AND STAIRWAY
(Curb and Gutter not shown)



PLAN VIEW
TYPE C CONCRETE RETAINING WALL ON P.C.C. DRIVEWAY AND APPROACH PAVEMENT

CONCRETE RETAINING WALL-TYPE C

NOT TO SCALE

CITY OF BOX ELDER

STANDARD DETAIL RW002

RETAINING WALL-CONC.-TYPE C 2

DETAIL #RW002

REVISED 01/2020