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Released
D
C
B
A

Reach 9 Nonstructural Thrust Blocks								
P.I. Station	Head (ft)	Angle	Direction	D (inches)	Cv (ft)	R1 (ft)	L1 (ft)	W (ft)
90002+35.00	600	10°38'32"	Horizontal	48	6.0	67	13	21
90004+15.00	600	10°37'51"	Horizontal	48	8.5	51	10	16
90023+90.00	650	9°01'38"	Convex Down	48	17.0	N/A	N/A	8
90024+13.00	650	10°43'29"	Horizontal	48	13.5	N/A	N/A	12
90024+50.00	650	8°46'05"	Convex Up	48	9.5	82	13	13
90038+00.00	625	30°15'19"	Horizontal	48	11.0	44	25	38
90042+58.00	625	28°59'10"	Combined	48	4.0	N/A	N/A	*
90044+50.00	625	9°37'16"	Convex Up	48	5.0	117	20	24
90045+55.00	625	17°52'42"	Horizontal	48	7.5	57	19	24
90048+38.00	650	2°3'02'49"	Horizontal	48	5.5	79	33	53
90067+71.00	650	14°32'02"	Horizontal	48	8.5	56	15	23
90072+38.04	650	12°20'58"	Horizontal	48	4.5	89	20	33
90074+00.00	650	7°36'16"	Convex Up	48	5.0	124	17	19
90075+00.00	650	7°36'18"	Convex Down	48	19.0	147	20	6
90082+91.00	650	35°51'39"	Horizontal	48	4.0	86	59	105
90093+99.00	650	32°08'14"	Horizontal	48	5.0	78	47	80
90098+00.00	650	8°36'45"	Convex Down	48	13.5	130	20	10
90098+60.00	650	6°46'03"	Convex Up	48	6.0	112	13	15
90099+76.64	625	39°07'30"	Horizontal	48	7.0	56	43	73
90102+00.00	625	5°20'22"	Convex Up	48	6.0	110	11	11
90160+00.00	600	7°12'39"	Convex Up	48	5.5	N/A	N/A	15
90164+40.00	600	14°36'55"	Convex Down	48	32.0	N/A	N/A	7
90165+40.00	600	14°11'32"	Convex Up	48	6.5	N/A	N/A	25
90177+30.00	550	14°42'39"	Horizontal	48	4.5	74	20	33
90215+26.26	500	12°53'08"	Horizontal	48	6.0	54	13	21
90236+89.00	500	14°17'05"	Combined	48	4.0	72	19	32
90282+00.00	525	18°10'18"	Convex Up	48	7.5	N/A	N/A	26
90282+50.00	525	20°27'11"	Convex Down	48	24.5	N/A	N/A	11
90283+70.00	525	11°30'25"	Convex Down	48	18.0	N/A	N/A	8
90284+60.00	525	10°38'51"	Convex Up	48	5.0	N/A	N/A	21
90291+60.00	500	14°32'39"	Combined	48	4.0	75	20	32
90317+23.00	500	13°46'13"	Horizontal	48	6.5	55	14	21
90320+99.00	525	13°33'52"	Horizontal	48	8.5	43	11	18
90345+00.00	500	7°46'19"	Convex Down	48	6.0	71	10	12
90347+00.00	475	7°46'04"	Convex Up	48	4.5	90	13	14
90356+50.00	450	10°51'35"	Convex Up	48	6.0	77	15	16
90375+00.00	500	9°51'25"	Convex Up	48	5.0	94	17	19
90375+79.00	500	12°17'08"	Horizontal	48	16.0	N/A	N/A	9
90376+00.00	500	9°29'48"	Convex Down	48	16.5	N/A	N/A	7
90376+80.00	500	13°36'16"	Convex Down	48	18.0	N/A	N/A	9
90378+00.00	500	10°55'41"	Convex Up	48	8.0	N/A	N/A	14
90389+00.00	475	11°37'38"	Convex Up	48	5.0	88	18	30
90389+50.00	475	12°25'04"	Convex Down	48	13.5	N/A	N/A	10
90390+00.00	475	13°24'07"	Convex Down	48	13.0	N/A	N/A	11
90390+40.00	475	12°54'54"	Convex Up	48	4.5	N/A	N/A	25
90394+00.00	500	9°03'03"	Convex Up	48	5.0	95	15	17
90396+00.00	500	8°10'37"	Convex Down	48	5.5	67	10	15
90412+90.00	500	22°21'14"	Horizontal	48	5.0	62	26	42
90415+90.00	500	21°34'59"	Horizontal	48	5.5	57	23	38
90421+99.00	475	25°39'42"	Horizontal	48	5.0	61	29	46
90426+05.00	500	24°27'21"	Horizontal	48	5.0	65	29	46
90464+00.00	475	13°04'35"	Convex Up	48	5.0	87	20	23
90464+90.00	475	12°38'01"	Convex Down	48	25.0	N/A	N/A	6
90466+20.00	475	14°57'42"	Convex Down	48	27.5	N/A	N/A	7
90466+92.00	475	15°54'20"	Combined	48	9.0	N/A	N/A	18
90479+29.00	425	11°14'46"	Horizontal	48	6.0	48	10	16
90481+00.00	425	6°31'12"	Convex Down	48	7.0	85	10	8
90482+00.00	425	8°15'21"	Convex Down	48	14.0	N/A	N/A	6
90483+00.00	425	12°14'23"	Convex Up	48	7.5	N/A	N/A	13
90483+45.00	375	4°56'21"	Convex Up	48	5.0	73	7	7
90558+89.00	375	21°02'07"	Combined	48	4.5	50	20	32
90565+17.00	375	21°07'43"	Horizontal	48	6.0	39	16	26
90577+50.00	375	9°57'43"	Convex Up	48	5.0	71	13	14
90578+00.00	375	9°23'36"	Convex Down	48	12.5	70	12	7
90579+80.00	375	9°24'04"	Convex Down	48	12.0	58	10	7
90580+20.00	375	9°33'11"	Convex Up	48	5.5	68	12	13
90598+00.00	375	28°08'52"	Horizontal	48	5.0	50	26	40

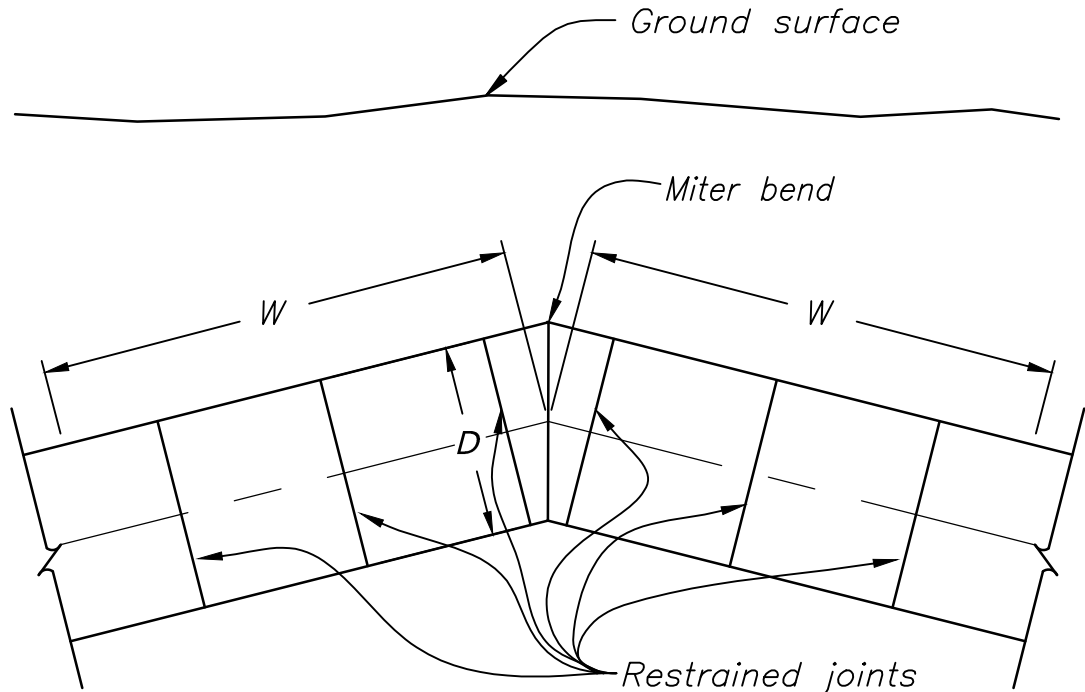
Reach 9 Nonstructural Thrust Blocks								
P.I. Station	Head (ft)	Angle	Direction	D (inches)	Cv (ft)	R1 (ft)	L1 (ft)	W (ft)
90607+93.00	400	29°17'30"	Combined	48	3.5	N/A	N/A	58
90608+60.00	400	14°39'58"	Convex Down	48	20.0	N/A	N/A	7
90609+70.00	400	15°00'41"	Convex Down	48	23.0	N/A	N/A	7
90610+34.00	400	41°14'37"	Combined	48	5.0	N/A	N/A	66
90619+99.00	400	16°29'10"	Horizontal	48	6.0	45	14	22
90631+74.00	400	30°37'10"	Horizontal	48	4.5	54	31	51
90638+96.00	400	18°28'55"	Combined	48	5.0	49	17	28
90645+00.00	375	6°18'55"	Convex Up	48	5.0	73	8	9
90645+70.00	375	13°58'05"	Horizontal	48	9.0	30	8	13
90672+00.00	375	7°50'28"	Convex Up	48	5.0	72	10	11
90753+76.00	325	10°48'13"	Horizontal	48	4.5	45	9	15
90795+22.00	325	11°53'07"	Horizontal	48	6.5	35	8	12
90801+21.00	325	12°01'25"	Horizontal	48	4.0	49	11	18
90824+69.00	325	22°29'25"	Horizontal	48	4.5	42	18	30
90828+82.00	325	22°36'18"	Horizontal	48	6.5	36	15	23
90831+70.00	325	8°58'14"	Convex Up	48	5.0	62	10	14
90832+14.00	325	24°02'53"	Combined	48	11.5	22	10	15
90833+80.00	325	11°14'28"	Convex Down	48	13.0	N/A	N/A	7
90834+20.00	325	11°08'34"	Convex Up	48	7.0	N/A	N/A	11
90836+24.00	325	22°19'29"	Horizontal	48	9.5	25	11	17
90925+65.00	275	11°46'28"	Horizontal	42	5.0	31	7	11
90953+85.00	250	27°28'24"	Horizontal	42	4.0	33	17	28
90959+24.00	250	29°54'42"	Horizontal	42	4.0	34	19	31
91031+33.00	250	43°26'40"	Combined	42	5.5	25	22	37
91074+45.00	225	25°30'31"	Horizontal	42	4.0	32	15	24
91077+10.00	200	25°48'40"	Horizontal	42	5.0	23	11	18
91116+94.00	175	18°54'03"	Horizontal	42	4.0	21	8	14
91120+10.00	175	20°07'50"	Horizontal	42	5.0	20	8	12
91185+50.00	125	9°44'34"	Convex Up	42	6.5	18	3	4
91186+00.00	125	9°27'16"	Convex Down	42	14.0	N/A	N/A	2
91186+70.00	125	9°10'20"	Convex Down	42	14.5	N/A	N/A	2
91187+20.00	125	8°00'59"	Convex Up	42	7.0	17	3	3

N/A – Not Allowed, restrained joints are required.

* See table on (60315) for restrained joint distance.

Reach 10 Nonstructural Thrust Blocks								
P.I. Station	Head (ft)	Angle	Direction	D (inches)	Cv (ft)	R1 (ft)	L1 (ft)	W(ft)
10040+10.00	75	16°16'20"	Horizontal	42	11.0	4	2	3
10043+67.00	75	18°37'22"	Horizontal	42	7.0	7	3	4

Reach 11 Nonstructural Thrust Blocks								
P.I. Station	Head (ft)	Angle	Direction	D (inches)	Cv (ft)	R1 (ft)	L1 (ft)	W(ft)
11166+00.00	600	17°03'34"	Convex Up	42	5.5	N/A	N/A	32
11166+70.00	600	16°35'05"	Convex Down	42	27.5	N/A	N/A	8
11167+20.00	600	15°37'26"	Convex Down	42	27.0	N/A	N/A	8
11168+00.00	600	15°25'04"	Convex Up	42	5.5	N/A	N/A	29
11190+20.00	575	22°47'19"	Horizontal	42	4.5	70	29	49
11197+50.00	575	43°40'09"	Combined	42	5.5	53	46	86
11237+90.00	525	14°27'39"	Horizontal	42	5.5	56	15	24
11269+80.00	475	32°05'00"	Horizontal	42	4.0	59	36	62



MITER RESTRAINED JOINT PIPE DETAIL

DESIGN PARAMETERS

1. Passive Earth Pressure, $P_e = 148 \text{ psf /ft. (factored)}$, in rock, $P_e = 200 \text{ psf / ft. (factored)}$.
2. Cover of Earth over Pipe, $C_v = \text{See Tables}$.
3. Weight of Earth Cover, $E_c = 100 \text{ pcf}$.
4. Allowable bearing earth pressure, $B_e = 3000 \text{ psf}$.

NOTES

1. For construction details of concrete blocking, see (60316).
2. See specification for limitations concerning W length and the different pipe material type options, in lieu of concrete thrust restraint.

ALWAYS THINK SAFETY

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION
NAVAJO-GALLUP WATER SUPPLY PROJECT
NEW MEXICO

SAN JUAN LATERAL

BLOCK 9-11 - LINE PIPE

DESIGNED
D.L. Gesundheit
DRAWN
Daniel Gibas / Kylie Fink
CHECKED
Bowles, Linda M P.E.
TECH. APPR.
Duke, Wylie C (Chris) P.E.
APPROVED
PEER REVIEWER - Manager - Water Conveyance Group
DENVER, CO 2017-03-30

CONCRETE ENCASED
MITER BENDS

DATA TABLES

1695-D-60317

SHEET 1

REV NO	2017-08-03	D	Added Note 5 for additional pipe materials allowed.
DESIGNED	2	Manier, Andrew (Andy) J P.E.	
DRAWN	1	Bowles, Linda M P.E.	
CHECKED			
TECH. APPR.			
APPROVED			
REVIEWER			
DENVER, CO			2017-03-30

Amy Latham
DESIGNED
Amy Latham
DRAWN
D.L. Gesundheit
CHECKED
Bowles, Linda M P.E.
TECH. APPR.
Duke, Wylie C (Chris) P.E.
APPROVED
REVIEWER - Manager - Water Conveyance Group
DENVER, CO 2017-03-30

STEEP PIPE ANCHOR
BLOCKS

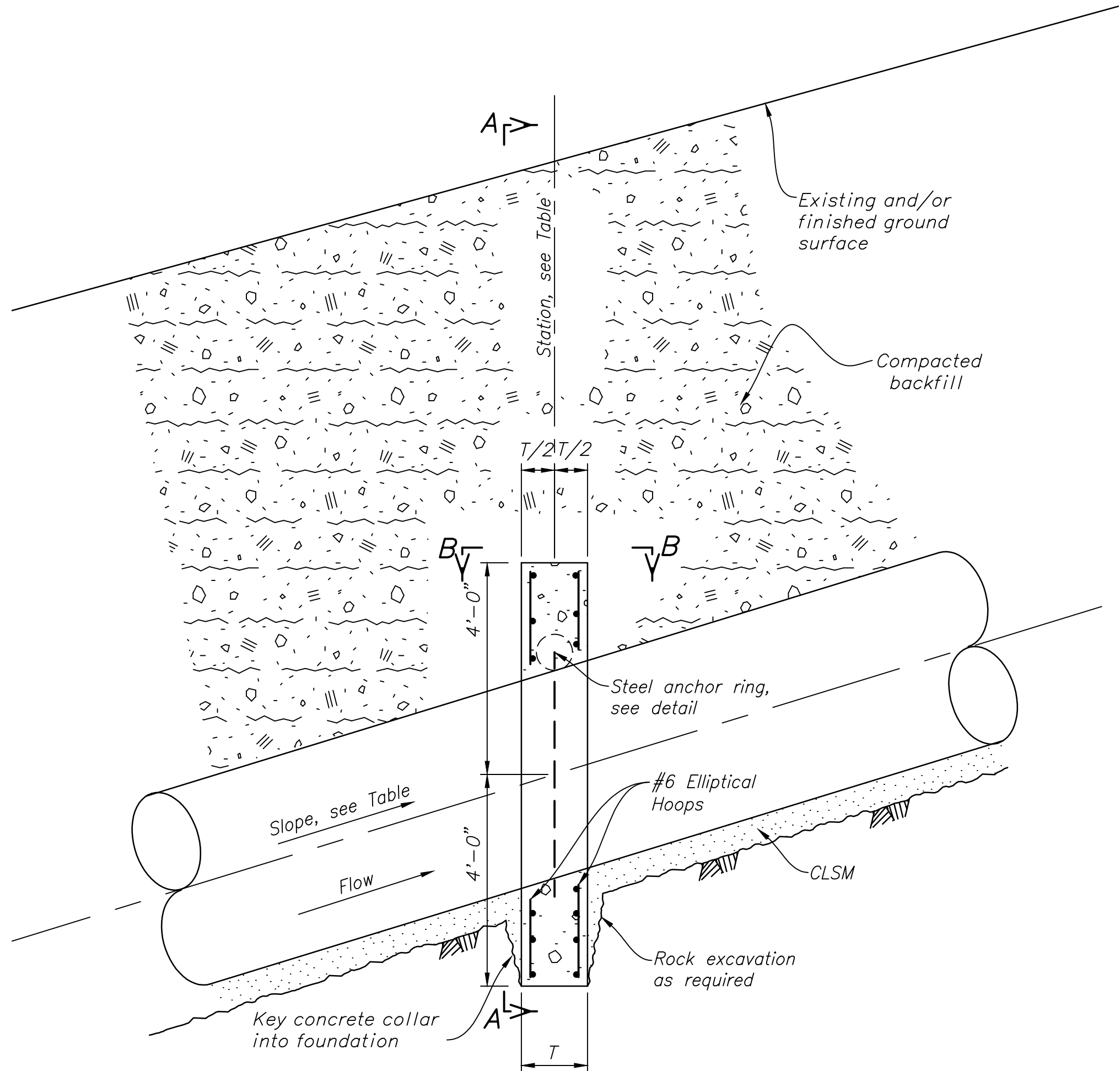
PROFILE, SECTIONS, AND
DETAILS

1695-D-60333

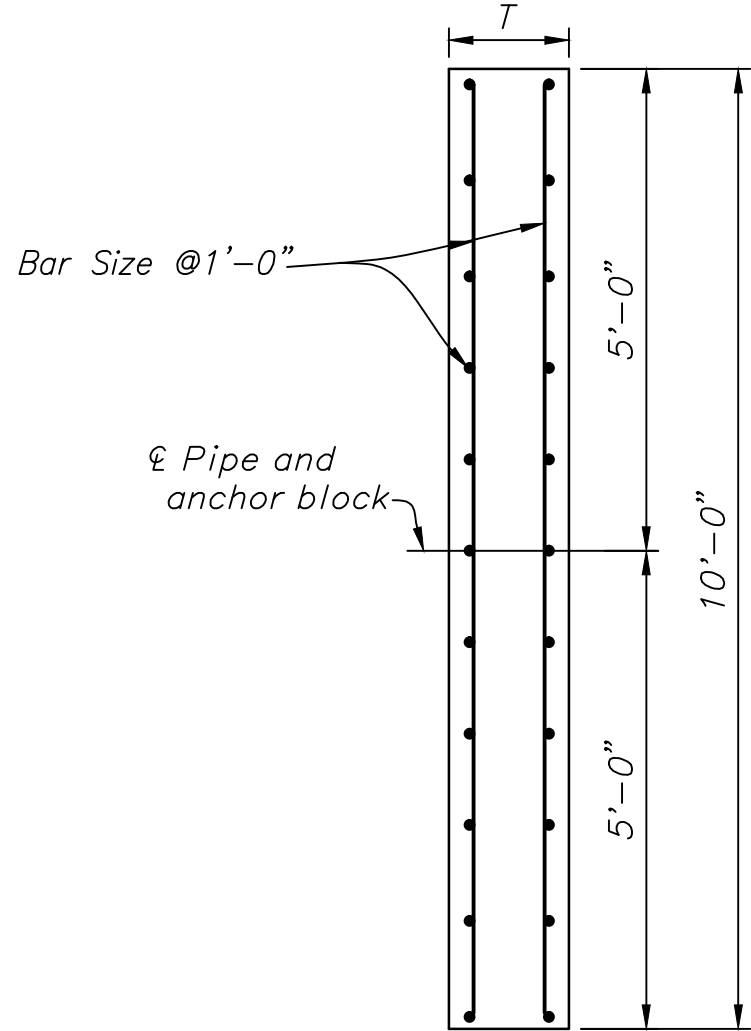
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Released

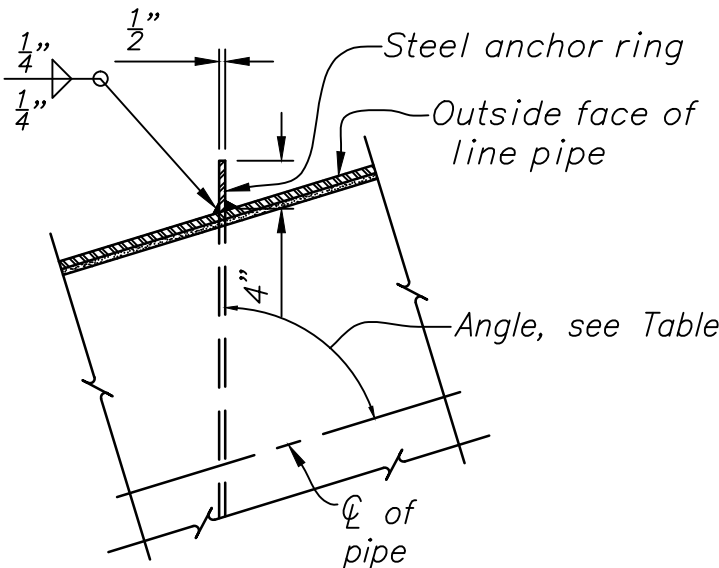
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PROFILE



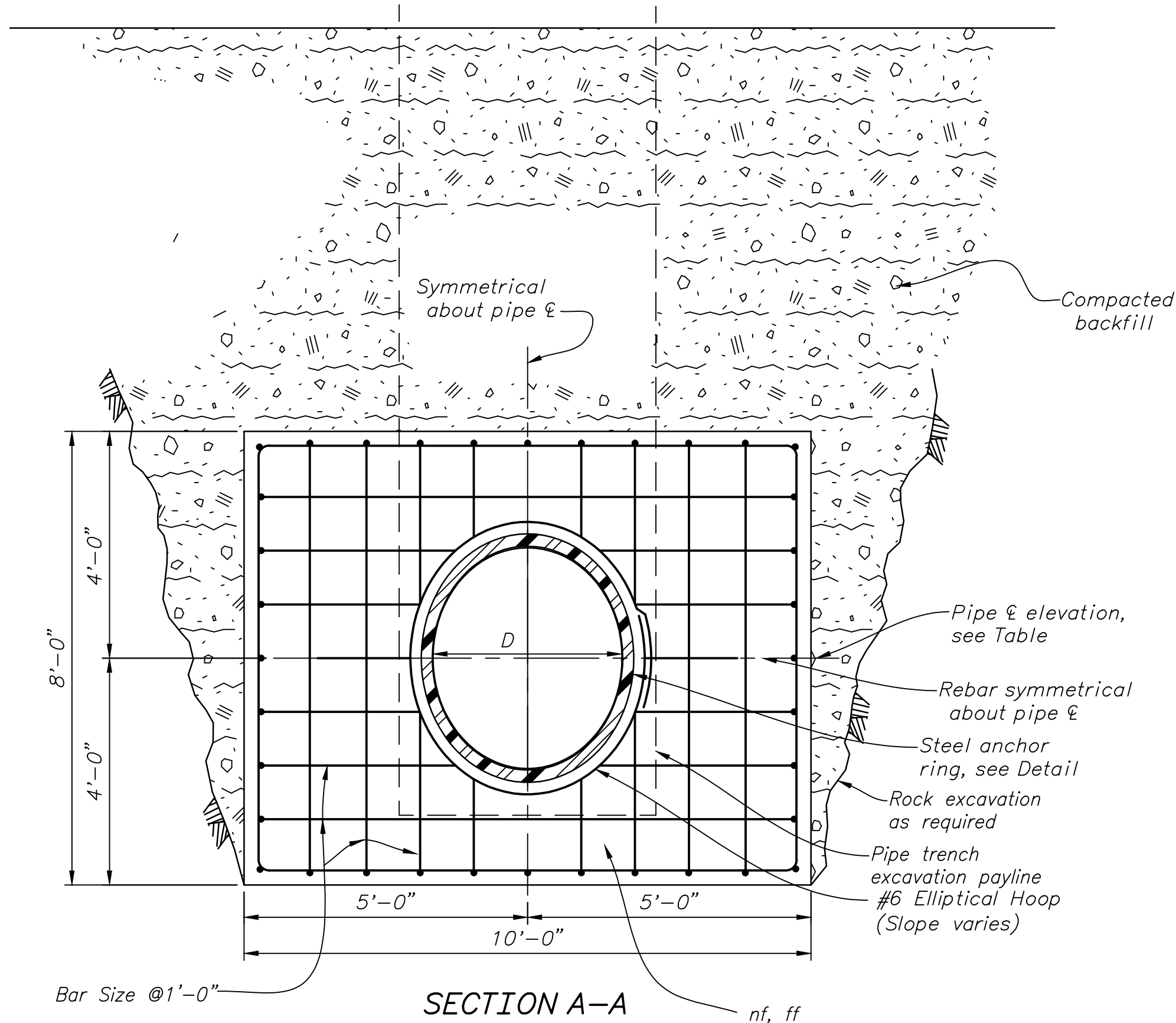
SECTION B-B



STEEL ANCHOR RING DETAIL
TYPICAL
(NOT TO SCALE)

BUTT WELDED STEEL PIPE	
Beginning Station	Ending Station
90164+40	90165+40
90282+00	90282+50
90376+80	90378+00
90390+00	90390+40
90466+20	90466+92
90482+00	90483+00
90607+93	90608+60
90609+70	90610+34
11166+00	11166+70
11167+20	11168+00

ANCHOR BLOCK DATA						
Station	Pipe CL EL	Slope	Angle	D (in)	T (ft-in)	Bar Size
90164+90.00	5,860.90	0.26000	75.4	48	1'-0"	7
90282+17.00	5,916.48	-0.37200	69.6	48	1'-3"	7
90282+33.00	5,910.52	-0.37200	69.6	48	1'-3"	7
90377+40.00	5,935.40	0.24333	76.3	48	1'-0"	5
90390+20.00	5,952.25	0.24250	76.4	48	1'-0"	5
90466+56.00	5,950.35	0.26806	75.0	48	1'-0"	7
90482+33.00	6,015.63	0.30700	72.9	48	1'-0"	8
90482+67.00	6,026.07	0.30700	72.9	48	1'-0"	8
90608+27.00	5,993.47	-0.26269	75.3	48	1'-0"	6
90610+02.00	5,993.25	0.26719	75.0	48	1'-0"	6
11166+35.00	6,271.40	-0.30000	73.3	42	1'-3"	7
11167+60.00	6,271.90	0.27750	74.5	42	1'-0"	7



SECTION A-A

GENERAL NOTES FOR CAST-IN-PLACE CONCRETE

- For general notes and minimum requirements for detailing reinforcement, see 40-D-60003, 40-D-60004.
- Structural design is based upon 4,500 psi concrete compressive strength at 28 days and reinforcement with a specified minimum yield strength of 60,000 psi.
- Unless otherwise shown, all exposed concrete edges are to be chamfered $\frac{3}{4}$ ".

NOTES

- For Plan and Profile drawings, see (60281) through (60313).
- For Typical Trench details, see (60314).
- CLSM equals controlled low strength material.
- All backfill shall be compacted to 85%.
- Installation shown is for Steel Pipe. For other material types allowed, see specifications.