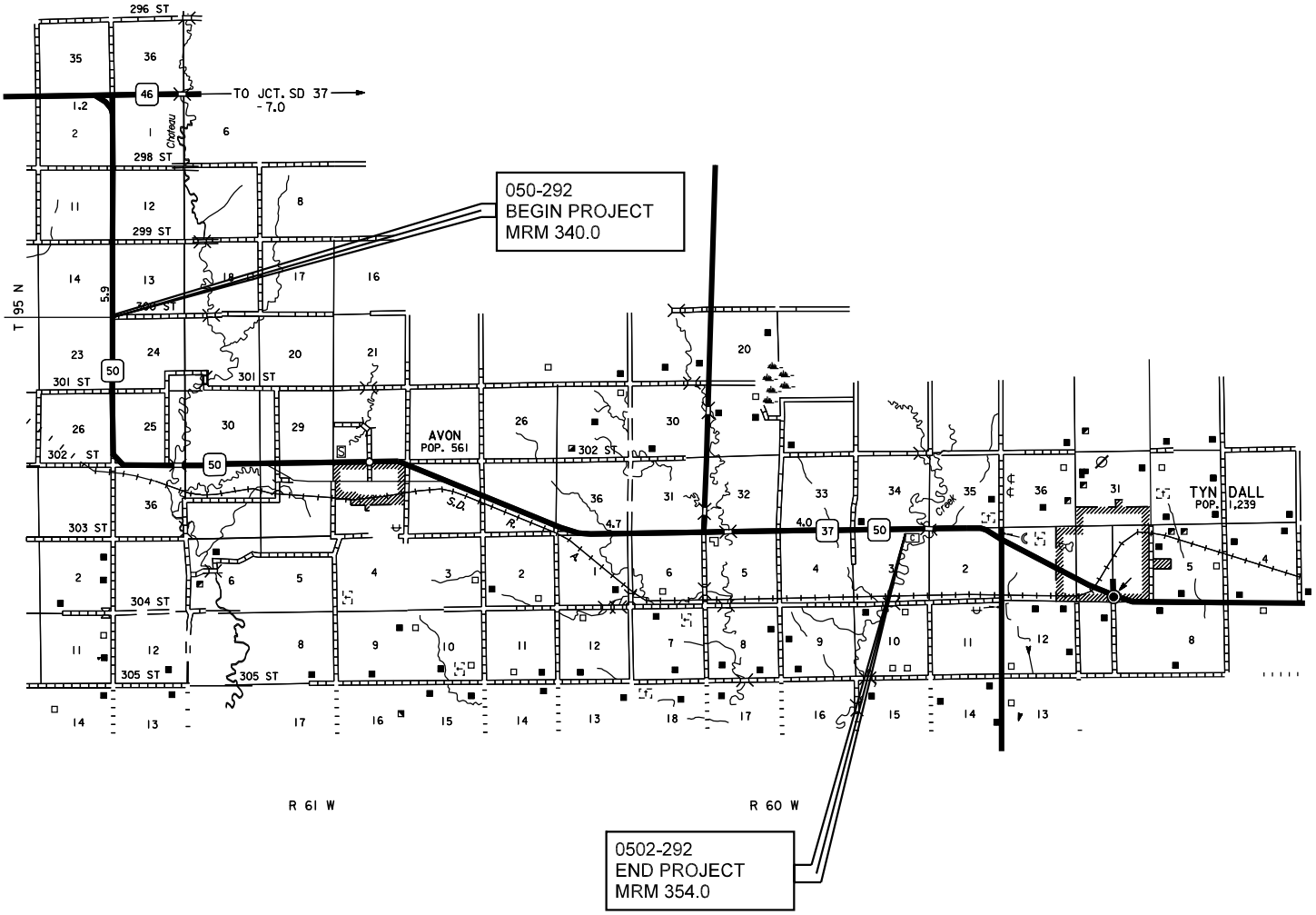
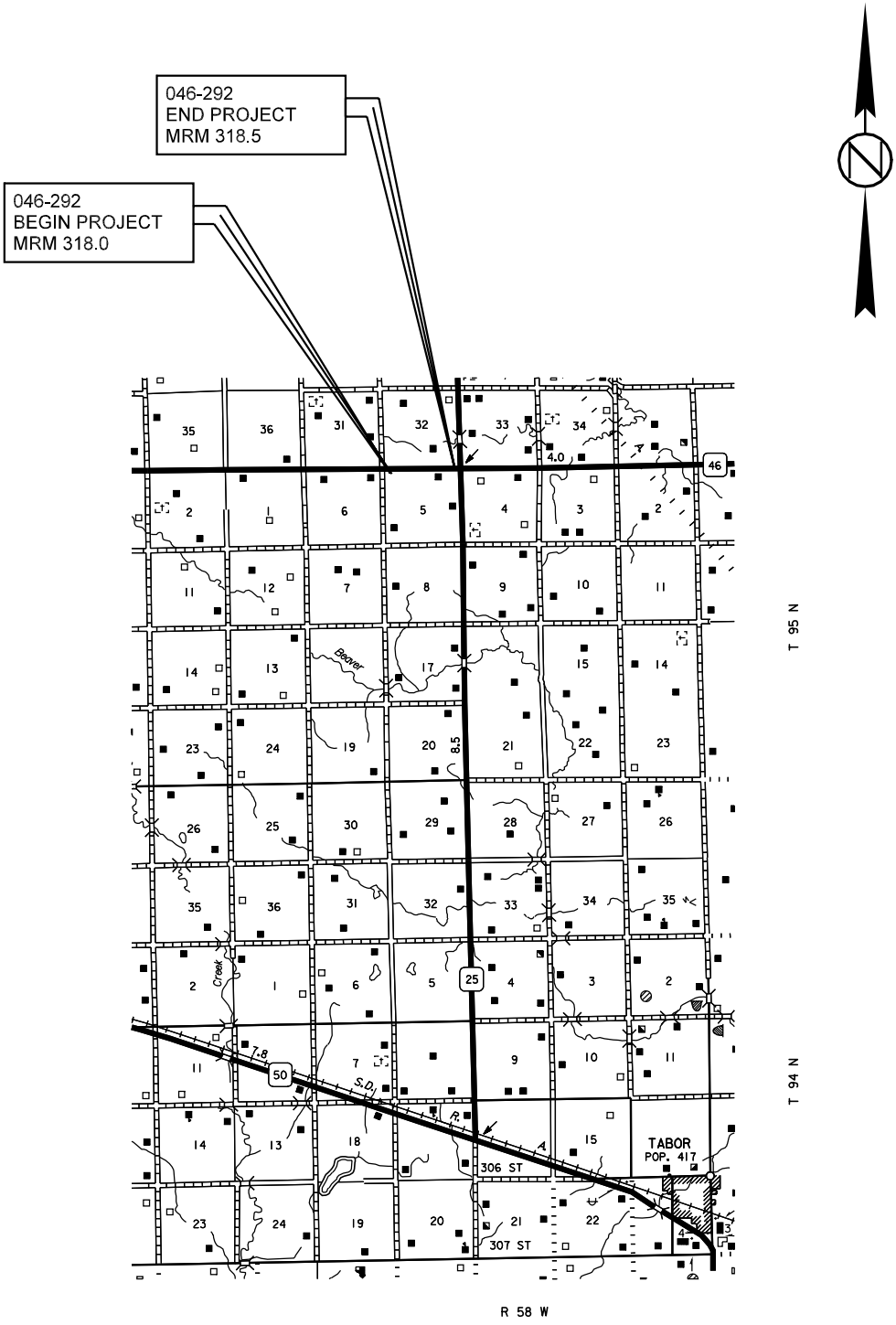
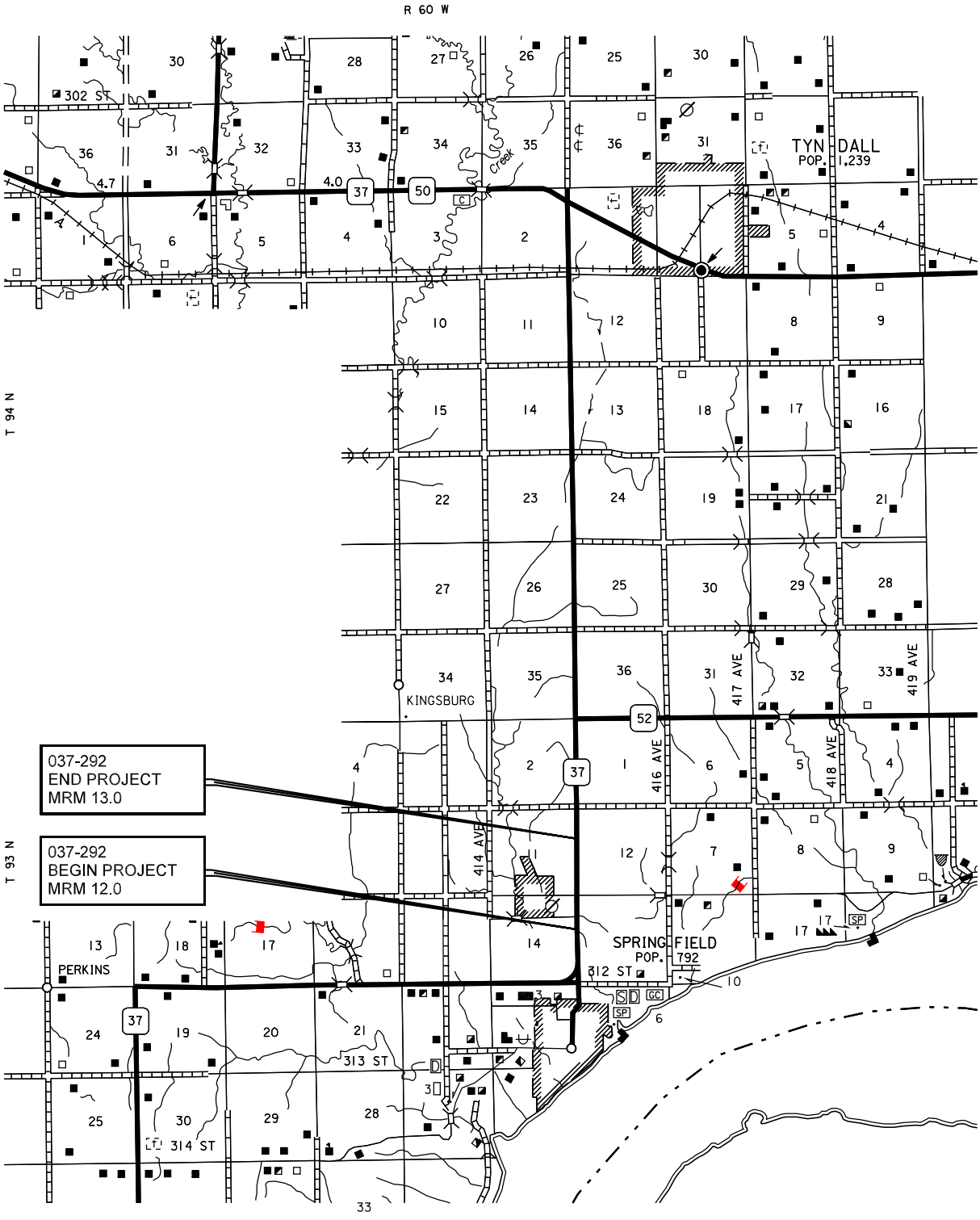
050-292
BON HOMME & CHARLES MIX COUNTIES
PIPE REPAIR
PCN I0Z3



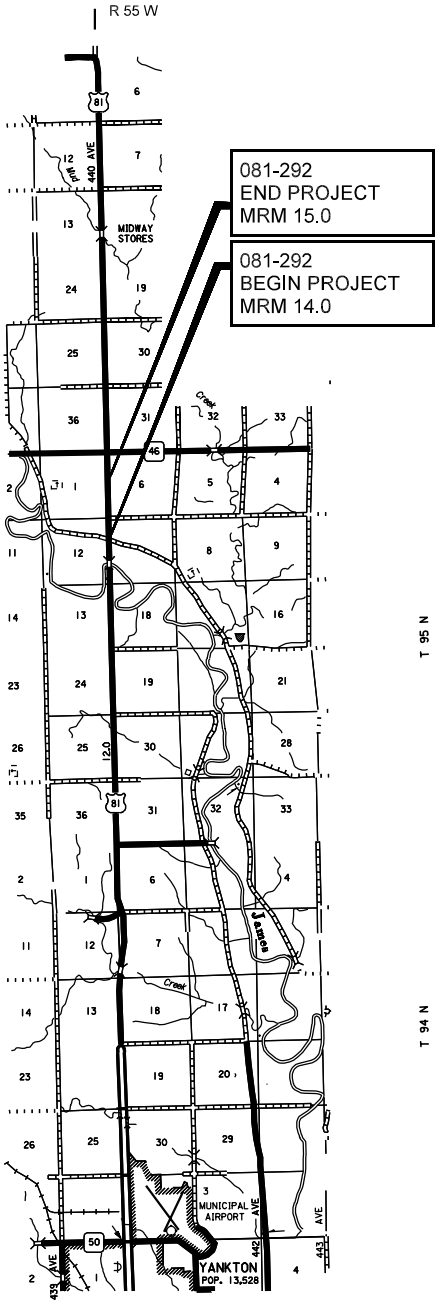
046-292
BON HOMME COUNTY
PIPE REPAIR
PCN I0Z4



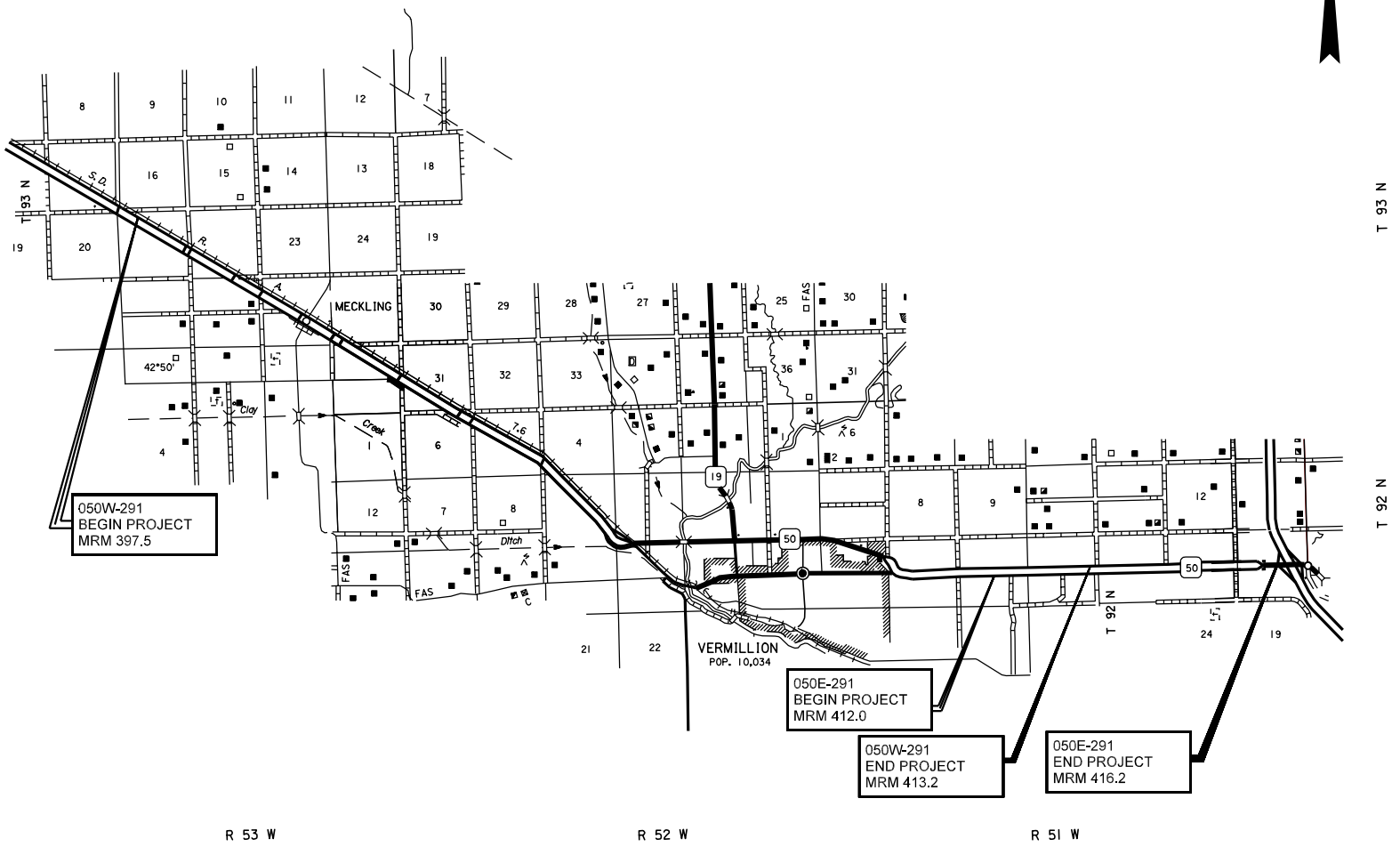
037-292
BON HOMME COUNTY
PIPE REPAIR
PCN I0Z5



081-292
YANKTON COUNTY
PIPE REPAIR
PCN I0Z6



050W-291 & 050E-291
CLAY & UNION COUNTIES
PIPE REPAIR
PCN I0Z7 & I0Z8



INDEX OF PLANS SHEETS

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Sheet 7 to 9 (Incl.)	Estimate of Quantities
Sheet 10	Table of Pipe Repair
Sheet 11 to 13 (Incl.)	Plan Notes
Sheet 14	Itemized List for Traffic Control
Sheet 15	Gabion Placement Details
Sheet 16 to 27 (Incl.)	Standard Plates

ESTIMATE OF QUANTITIES

050-292 PCN I0Z3
BON HOMME & CHARLES MIX COUNTIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	82	Ft
110E7510	Remove Pipe End Section for Reset	9	Each
120E0010	Unclassified Excavation	148	CuYd
120E0600	Contractor Furnished Borrow	9	CuYd
250E0010	Incidental Work	Lump Sum	LS
450E9000	Reset Pipe	82	Ft
450E9001	Reset Pipe End Section	9	Each
634E0010	Flagging	10	Hour
634E0100	Traffic Control	74	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
720E1015	Bank and Channel Protection Gabion	120.0	CuYd
730E0204	Type C Permanent Seed Mixture	10	Lb
732E0100	Mulching	1.1	Ton

046-292 PCN I0Z4
BON HOMME COUNTY

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0500	Remove Pipe Culvert	32	Ft
110E0510	Remove Pipe End Section	2	Each
120E0010	Unclassified Excavation	27	CuYd
120E0600	Contractor Furnished Borrow	10	CuYd
250E0010	Incidental Work	Lump Sum	LS
450E5539	36" CMP Arch 16 Gauge, Furnish	45	Ft
450E5540	36" CMP Arch, Install	45	Ft
450E6021	36" CMP Arch Safety End with Bars, Furnish	2	Each
450E6023	36" CMP Arch Safety End, Install	2	Each
634E0100	Traffic Control	73	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
730E0204	Type C Permanent Seed Mixture	8	Lb
732E0100	Mulching	0.9	Ton

ESTIMATE OF QUANTITIES (Continued)

037-292 PCN I0Z5
BON HOMME COUNTY

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
120E0600	Contractor Furnished Borrow	4	CuYd
250E0010	Incidental Work	Lump Sum	LS
634E0010	Flagging	10	Hour
634E0100	Traffic Control	73	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
720E1015	Bank and Channel Protection Gabion	9.0	CuYd
730E0204	Type C Permanent Seed Mixture	4	Lb
732E0100	Mulching	0.4	Ton

081-292 PCN I0Z6
YANKTON COUNTY

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7510	Remove Pipe End Section for Reset	1	Each
120E0600	Contractor Furnished Borrow	2	CuYd
250E0010	Incidental Work	Lump Sum	LS
450E9001	Reset Pipe End Section	1	Each
634E0100	Traffic Control	74	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
730E0204	Type C Permanent Seed Mixture	2	Lb
732E0100	Mulching	0.2	Ton

ESTIMATE OF QUANTITIES (Continued)

050W-291 PCN I0Z7
CLAY COUNTY

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E7500	Remove Pipe for Reset	12	Ft
120E0600	Contractor Furnished Borrow	6	CuYd
250E0010	Incidental Work	Lump Sum	LS
450E9000	Reset Pipe	12	Ft
634E0010	Flagging	10	Hour
634E0100	Traffic Control	74	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
730E0204	Type C Permanent Seed Mixture	5	Lb
732E0100	Mulching	0.6	Ton

050E-291 PCN I0Z8
CLAY & UNION COUNTIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0510	Remove Pipe End Section	3	Each
110E7510	Remove Pipe End Section for Reset	11	Each
120E0010	Unclassified Excavation	148	CuYd
120E0600	Contractor Furnished Borrow	14	CuYd
250E0010	Incidental Work	Lump Sum	LS
450E2008	18" RCP Flared End, Furnish	2	Each
450E2009	18" RCP Flared End, Install	2	Each
450E4516	42" RCP Arch Flared End, Furnish	1	Each
450E4517	42" RCP Arch Flared End, Install	1	Each
450E9001	Reset Pipe End Section	11	Each
634E0010	Flagging	10	Hour
634E0100	Traffic Control	74	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
730E0204	Type C Permanent Seed Mixture	16	Lb
732E0100	Mulching	1.8	Ton

TABLE OF PIPE REPAIR

PROJECT NUMBER	MILAGE REFERENCE MARKER	SIZE AND TYPE	REMOVE PIPE CULVERT (FT)	REMOVE PIPE END SECTION (EACH)	REMOVE PIPE FOR RESET (FT)	REMOVE PIPE END SECTION FOR RESET (EACH)	UNCLASSIFIED EXCAVATION (CUYD) (beyond normal work area)	CONTRACTOR FURNISHED BORROW (CUYD)	18" RCP FLARED END, FURNISH (EACH)	18" RCP FLARED END, INSTALL (EACH)	42" RCP ARCH FLARED END, FURNISH (EACH)	42" RCP ARCH FLARED END, INSTALL (EACH)	36" CMP ARCH 16 GAUGE, FURNISH (FT)	36" CMP ARCH 16 GAUGE, INSTALL (FT)	36" CMP ARCH SAFETY END WITH BARS, FURNISH (EACH)	36" CMP ARCH SAFETY END, INSTALL (EACH)	RESET PIPE (FT)	RESET PIPE END SECTION (EACH)	1.5 ft DEEP BANK AND CHANNEL PROTECTION GABIONS (CUYD)	3 ft DEEP BANK AND CHANNEL PROTECTION GABIONS (CUYD)
050-292	340.7	72 inch RCP			12	1											12	1		4
050-292	341.2	36 inch RCP				2		1										2	3	
050-292	342.6	Twin 60 inch RCP Arch			12	2	148		remove corrugated steel and concrete slurry in washout and dispose of off the project								12	2	40	64
050-292	344.3	30 inch RCP			24	1		2									24	1	9	
050-292	350.4	24 inch RCP			16	2		2									16	2		
050-292	353.4	72 inch RCP			18	1		4									18	1		
050-292 SUBTOTAL			**0**	**0**	**82**	**9**	**148**	**9**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**82**	**9**	**52**	**68**
046-292	318.2	15 inch RCP	32	2			27	10					45	45	2	2				
046-292 SUBTOTAL			**32**	**2**	**0**	**0**	**27**	**10**	**0**	**0**	**0**	**0**	**45**	**45**	**2**	**2**	**0**	**0**	**0**	**0**
037-292	12.3	4 x 4 box culvert						4											3	6
037-292 SUBTOTAL			**0**	**0**	**0**	**0**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**3**	**6**
081-292	14.4	36 inch CMP				1		2										1		
081-292 SUBTOTAL			**0**	**0**	**0**	**1**	**0**	**2**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**0**	**0**
050W-291	397.6 WBL	36 inch RCP			4			2									4			
050W-291	398.8 WBL	36 inch RCP						2												
050W-291	413.2 WBL	30 inch RCP			8			2									8			
050W-291 SUBTOTAL			**0**	**0**	**12**	**0**	**0**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**12**	**0**	**0**	**0**
050E-291	412.0 EBL	18 inch RCP				2		1										2		
050E-291	413.1 EBL	24 inch RCP				2	148	1										2		
050E-291	413.8 EBL	18 inch RCP				1		1										1		
050E-291	414.3 EBL	18 inch RCP		1				1	1	1										
050E-291	414.45 EBL	42 inch RCP Arch				1		3										1		
050E-291	414.46 EBL	42 inch RCP Arch		1				3			1	1								
050E-291	414.6 EBL	18 inch RCP		1				1	1	1										
050E-291	415.2 EBL	18 inch RCP				1		1										1		
050E-291	416.1 EBL	Twin 24 inch RCP				4		2										4		
050E-291 SUBTOTAL			**0**	**3**	**0**	**11**	**148**	**14**	**2**	**2**	**1**	**1**	**0**	**0**	**0**	**0**	**0**	**11**	**0**	**0**
PROJECT TOTALS			**32**	**5**	**94**	**21**	**323**	**45**	**2**	**2**	**1**	**1**	**45**	**45**	**2**	**2**	**94**	**21**	**129**	

SPECIFICATIONS

Standard Specifications for Road and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

SCOPE OF WORK

The scope of work on these projects shall include, but is not limited to the following:

1. Remove and reset separated pipe culvert sections.
2. Install tie bolts on pipe sections.
3. Clean silt from ditches adjacent to pipe culverts.
4. Clean silt from inside pipe culverts.
5. Install gabions and erosion control as required.
6. Seed and mulch disturbed areas.

COMPLETION DATE

Work on the project shall not begin before June 16, 2008. All work shall be completed on or before November 7, 2008.

CONTRACTOR FURNISHED BORROW

The Contractor shall provide a suitable site for Contractor Furnished Borrow material. The Contractor Furnished Borrow may be obtained from ditch cleanout at the pipe end in most locations.

The borrow material shall be approved by the Engineer.

Compaction of the fill material shall be to the satisfaction of the Engineer.

It is not anticipated that water for compaction will be required; however, if in the opinion of the Engineer the fill material is extremely dry, water may be ordered and placed to the satisfaction of the Engineer. Cost for water shall be incidental to the contract unit price per cubic yard for Contractor Furnished Borrow.

The basis for payment for Contractor Furnished Borrow will be plans quantity. Additional quantities will be included for payment only in the event that work sites other than those shown on the plans are added to the contract.

Restoration of the Contractor furnished borrow site shall be the responsibility of the Contractor.

The Contractor is responsible for obtaining all required permits and clearances for the borrow site.

To obtain State Historic Preservation Office (SHPO) clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. The Contractor shall arrange and pay for this survey. In lieu of a cultural resources survey, the Contractor could request a literature search on the site (contact Jim Donohue, State Archaeological Research Center (1-605-394-1937) for the literature search) and provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that no artifacts have been found on the site.

To facilitate prompt SHPO response, the Contractor should submit either a cultural resources survey report or the results of the literature search, a legal description of the site, a topographical map with the site clearly marked, along with evidence of prior site disturbance to: Dave Graves, SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (1-605-773-5727). Allow 30 days from the date this information is submitted to the Environmental Engineer for SHPO approval.

UNCLASSIFIED EXCAVATION

The Unclassified Excavation listed in the table of pipe repair is for locations where the normal pipe end ditch shaping is not adequate to reestablish proper drainage. The material generated from this shaping may be reused as Contractor Furnished Borrow. Payment for Unclassified Excavation shall include all costs for disposal of any unused material. Acceptable material may be disposed of at the DOT maintenance yard at Tyndall and at the Vermillion stockpile site.

SALVAGING, STOCKPILING, AND PLACING TOPSOIL

Prior to starting construction operations, a sufficient volume of topsoil shall be removed from the construction limits to cover the disturbed areas to the required thickness as indicated in these plans.

Following completion of grading operations, topsoil shall be spread evenly over the disturbed areas. The thickness will be approximately 4 inches.

Removal and replacement of topsoil will not be measured for payment but shall be incidental to the contract unit prices for the various bid items.

CLEANING OF EXISTING PIPE – INCIDENTAL WORK

Material in the existing pipe culverts shall be cleaned out by water flushing or other approved methods.

The ditches shall be excavated in each direction from pipe ends to obtain proper water flow through the pipe. The average length of excavation from the end of the pipe is 50 feet. Excavated material may be used as Contractor Furnished Borrow if soil is determined acceptable by the Engineer. Unacceptable soil shall be wasted outside the right-of-way by the Contractor.

Cleaning of existing pipe, ditch grading, and disposal of soil shall be included in the bid item for Incidental Work.

REINFORCED CONCRETE PIPE

All reinforced concrete pipe used on this project is Class II unless otherwise noted in the plans.

TIE BOLTS FOR RCP/RCP ARCH CULVERTS

Tie Bolts shall be installed at the inlet and outlet on the first three sections of new/reset culvert and on new/reset culvert ends (requires connection from existing culvert to new end section).

For informational purposes:

> Field drilling will be required to install the tie bolts on reset culvert, on reset culvert ends and on existing culvert when installing a new/reset end section.

Cost for removing tie bolts for reuse, drilling tie bolt holes and providing, installing and reinstalling tie bolts shall be incidental to the contract unit prices for installing or resetting RCP Culverts and End Sections.

APPROACH PIPE REPLACEMENT

The Contractor shall install the 36 inch CMP arch and 2 safety ends in the field entrance at MRM 318.2 on the south side of SD 46.
The work to complete the installation shall include:

Furnish and Install 45 feet of 36 inch CMP Arch and 2 - 36 inch CMP Arch safety ends
Complete minor excavation to establish the new flowline approximately 0.4 feet lower at the inlet
Complete minor ditch shaping for 96 feet upstream (to the fence line) to reestablish the proper flowline
Complete minor excavation to establish the new flowline approximately 0.4 feet lower at the outlet
Complete minor ditch shaping from the outlet to 300 feet downstream by 6 feet wide with an average depth of 0.4 feet to insure proper drainage. (Approximately 27 cubic yards of excavation to be placed on the approach inslopes and will be paid for as Unclassified Excavation.)

The existing 15 inch RCP shall be salvaged where possible and shall become property of the State. The Contractor shall dispose of any unusable material. The Contractor shall seed and mulch all disturbed areas at the contract rates.

Gravel Surfacing shall be furnished and delivered by the State and will be placed on the entrance by the Contractor. No payment will be made for this work.

All work to complete the installation shall be incidental to the contract unit prices for the various bid items.

BANK AND CHANNEL PROTECTION GABION

The final dimensions to be stabilized with the Bank and Channel Protection Gabions shall be marked by the Engineer at the locations listed in the Table of Pipe Repair. See Sheet 15 for the approximate layout for selected sites. The Gabions shall be placed to fill the eroded area at the other locations.

Drainage fabric will be required at all gabion placement locations for the entire area to be covered by the gabions and will be included in the bid item for with the Bank and Channel Protection Gabions.

PERMANENT SEEDING

The areas to be seeded and mulched include all disturbed areas within the right-of-way resulting from the work required by this contract.

All permanent seed shall be planted in the topsoil at a depth of ¼" to ½".

All seed broadcast must be raked or dragged in (incorporated) within the top ¼" to ½" of topsoil when possible. This requirement may be waived by the Engineer during construction when raking or dragging is deemed not feasible by conventional methods.

South Dakota native grown seed is an acceptable alternative to any of the seed varieties listed below. South Dakota native grown seeds used as an alternative shall conform to the same specification and requirements for that individual seed type.

Type C Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosanna	16
Slender Wheatgrass	Adanac, Pryor, Primar, Revenue	2
	Total:	18

The areas to be seeded and mulched are estimated at 2.5 acres.

MULCHING (GRASS HAY OR STRAW)

Following permanent seeding, a mulch consisting of grass hay or straw shall be blown on at the rate of 2 tons per acre and punched in on slopes 3:1 and flatter and on 2:1 slopes where equipment can be operated without rutting the slope due to slippage. Mulch shall be substantially free of noxious weed seeds and objectionable foreign matter.

GENERAL MAINTENANCE OF TRAFFIC

Removing, relocating, covering, salvaging and resetting of permanent traffic control devices, including delineation and culvert end markers, shall be the responsibility of the Contractor. Cost for this work shall be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

Storage of vehicles and equipment shall be outside the clear zone and as near as possible to the right-of-way line. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work.

Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

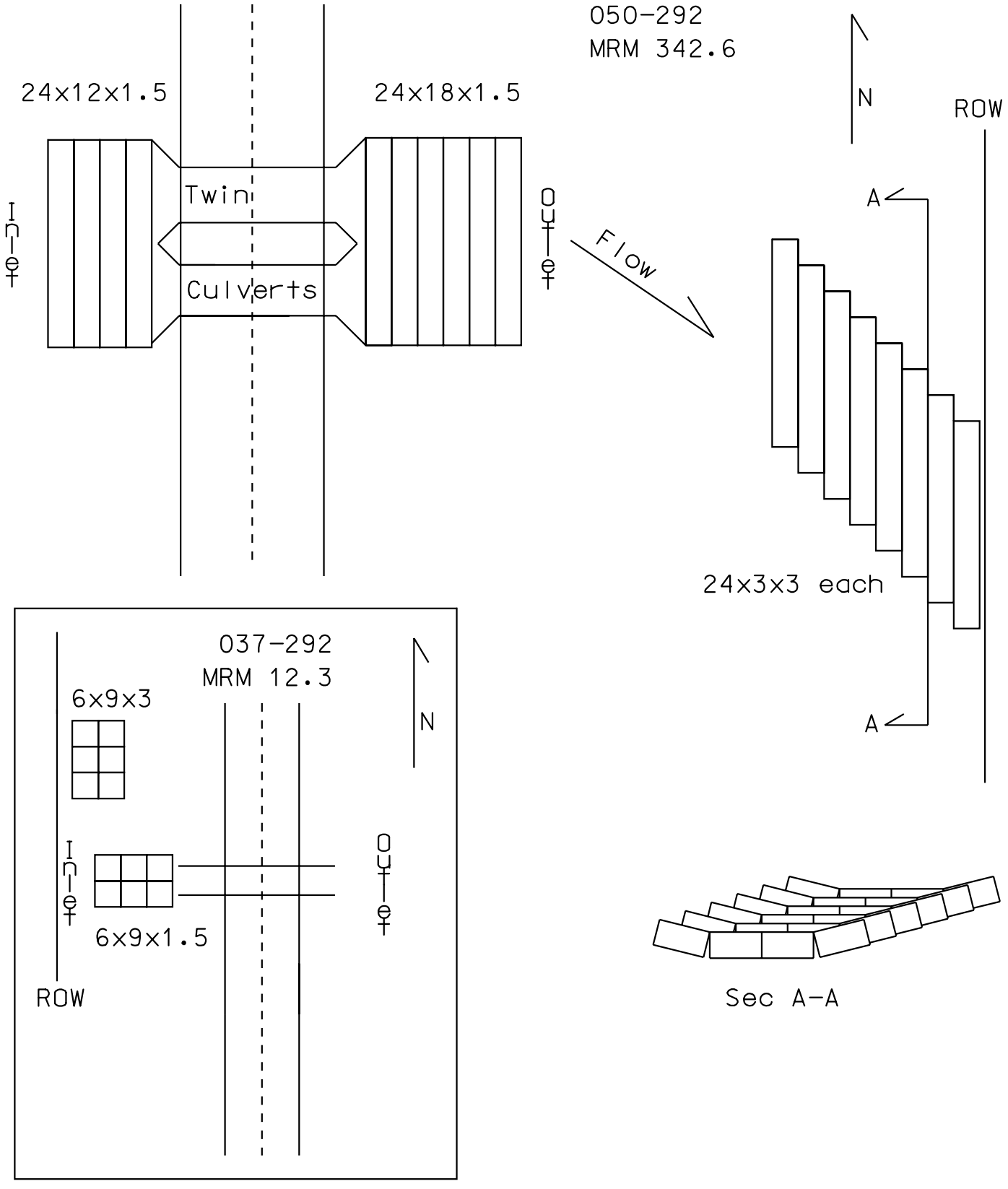
The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

Sufficient traffic control devices have been included in these plans to sign one workspace. If the Contractor elects to work on additional sites simultaneously, the cost for additional traffic control devices shall be incidental to the contract unit price per unit for Traffic Control.

ITEMIZED LIST FOR TRAFFIC CONTROL

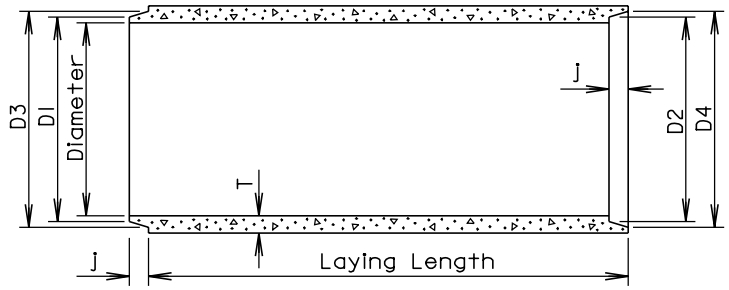
SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT ## MILES	0	24	
G20-2A	36" x 18"	END ROAD WORK	2	17	34
W6-3	48" x 48"	TWO WAY TRAFFIC (SYMBOL)	0	34	
W8-1	36" x 36"	BUMP	0	27	
W8-6	48" x 48"	TRUCK CROSSING	0	34	
W8-7	36" x 36"	LOOSE GRAVEL	0	27	
W8-9a	48" x 48"	SHOULDER DROP-OFF	0	34	
W13-1	24" x 24"	ADVISORY SPEED PLATE	0	16	
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	4	34	136
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	2	34	68
W20-7a	48" x 48"	FLAGGER	4	34	136
W20-7b	48" x 48"	BE PREPARED TO STOP	0	34	
W21-1a	48" x 48"	WORKERS (SYMBOL)	0	34	
W21-3	48" x 48"	ROAD MACHINERY AHEAD	0	34	
W21-5	48" x 48"	SHOULDER WORK	2	34	68
W21-5a	48" x 48"	RIGHT SHOULDER CLOSED	0	34	
W21-5b	48" x 48"	RIGHT SHOULDER CLOSED AHEAD	0	34	
				TOTAL UNITS	**442**

Gabion Detail for selected sites

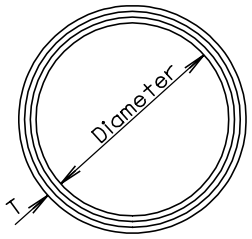


TOLERANCES IN DIMENSIONS

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:

Construction of R. C. P. shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges.

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	1 3/4	13 1/4	13 5/8	13 7/8	14 1/4
15	127	2 1/4	2	16 1/2	16 7/8	17 1/4	17 5/8
18	168	2 1/2	2 1/4	19 5/8	20	20 3/8	20 3/4
21	214	2 3/4	2 1/2	22 7/8	23 1/4	23 3/4	24 1/8
24	265	3	2 3/4	26	26 3/8	27	27 3/8
27	322	3 1/4	3	29 1/4	29 5/8	30 1/4	30 5/8
30	384	3 1/2	3 1/4	32 3/8	32 3/4	33 1/2	33 7/8
36	524	4	3 3/4	38 3/4	39 1/4	40	40 1/2
42	685	4 1/2	4	45 1/8	45 5/8	46 1/2	47
48	867	5	4 1/2	51 1/2	52	53	53 1/2
54	1070	5 1/2	4 1/2	57 7/8	58 3/8	59 3/8	59 7/8
60	1296	6	5	64 1/4	64 3/4	66	66 1/2
66	1542	6 1/2	5 1/2	70 5/8	71 1/8	72 1/2	73
72	1810	7	6	77	77 1/2	79	79 1/2
78	2098	7 1/2	6 1/2	83 3/8	83 7/8	85 5/8	86 1/8
84	2410	8	7	89 3/4	90 1/4	92 1/8	92 5/8
90	2740	8 1/2	7	95 3/4	96 1/4	98 1/8	98 5/8
96	2950	9	7	102 1/8	102 5/8	104 1/2	105
102	3075	9 1/2	7 1/2	109	109 1/2	111 1/2	112
108	3870	10	7 1/2	115 1/2	116	118	118 1/2

March 31, 2000

Published Date: 2nd Qtr. 2008

SDDOT

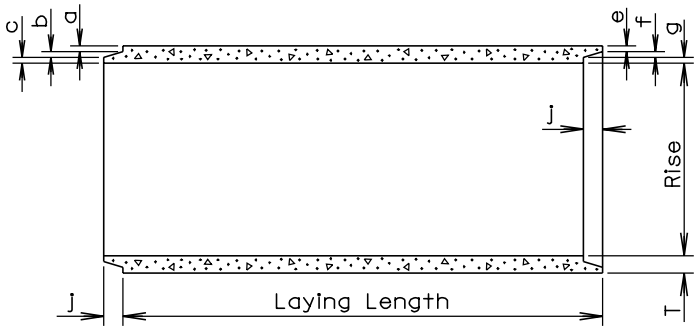
REINFORCED CONCRETE PIPE

PLATE NUMBER 450.01

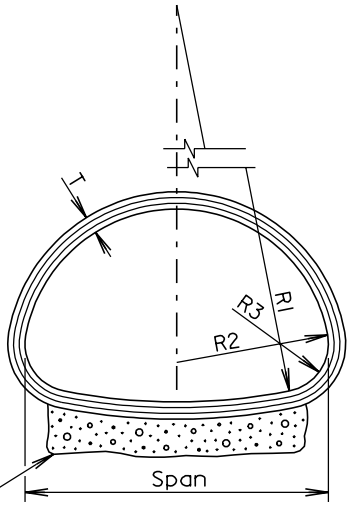
Sheet 1 of 1

Plotting Date: 08-APR-2008

Username - tryalnt45



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	13 1/2	22	2 1/2	1 3/8	3/8	3/4	2	1 1/8	3/8	1	27 1/2	13 3/4	5 1/4
24	320	18	28 1/2	3 1/2	1 5/8	1/2	1 3/8	3	1 3/8	1/2	1 5/8	40 11/16	14 3/4	4 5/8
30	450	22 1/2	36 1/4	4	1 13/16	5/8	1 9/16	3 1/2	1 9/16	5/8	1 13/16	51	18 3/4	6 1/8
36	600	26 5/8	43 3/4	4 1/2	2	3/4	1 3/4	4	1 3/4	3/4	2	62	22 1/2	6 1/2
42	740	31 5/16	51 1/8	4 1/2	2	3/4	1 3/4	4	1 3/4	3/4	2	73	26 1/4	7 3/4
48	890	36	58 1/2	5	2 1/4	3/4	2	5	2	3/4	2 1/4	84	30	8 7/8
54	1100	40	65	5 1/2	2 1/2	3/4	2 1/4	5	2 1/4	3/4	2 1/2	92 1/2	33 3/8	10
60	1400	45	73 1/2	6	3 5/16	3/4	1 15/16	5	2 3/4	3/4	2 1/2	105	37 1/2	11
72	1900	54	88	7	3 13/16	1	2 3/16	6	3 1/4	1	2 3/4	126	45	13 5/16
84	2500	62	102	8	4 1/8	1	2 7/8	6	3 1/2	1	3 1/2	162 1/2	52	14 1/2
96	3300	78	122 3/8	9	4 1/2	1	3 1/2	7	4	1	4	218	62	20
108	4200	88	138 1/2	10	5	1	4	7	4 1/2	1	4 1/2	269	70	22
120	5100	96 7/8	154	11	5 1/2	1	4 1/2	7	5	1	5	301 3/8	78	24
132	5100	106 1/2	168 3/4	10		1	4	7	4 1/2	1	4 1/2	329	85 5/8	26 7/8

* Equivalent Diameter of Circular R. C. P.

GENERAL NOTES:

Construction of R.C.P. Arch shall conform to the requirements of Section 990 of the Standard Specifications for Roads and Bridges. 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.

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SDDOT

REINFORCED CONCRETE PIPE ARCH

PLATE NUMBER 450.02

Sheet 1 of 1

Plotting Date: 08-APR-2008

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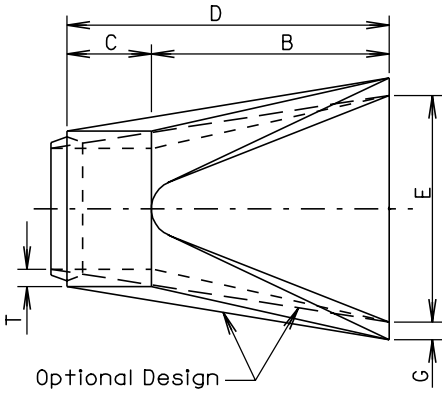
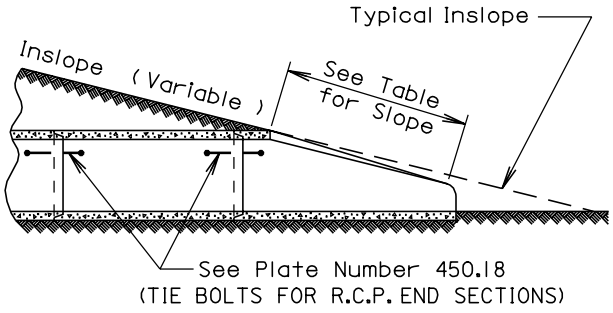


TOP VIEW

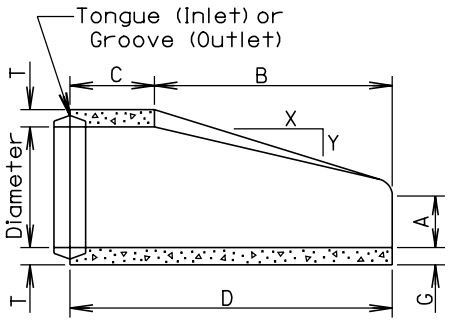


SLOPE DETAIL

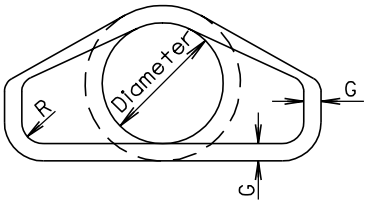
GENERAL NOTES:

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 Standard Specifications for Roads and Bridges.



LONGITUDINAL SECTION



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	48 7/8	72 7/8	24	2	1 1/2
15	740	2.4: 1	2 1/4	6	27	46	73	30	2 1/4	1 1/2
18	990	2.3: 1	2 1/2	9	27	46	73	36	2 1/2	1 1/2
21	1280	2.4: 1	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	1 1/2
24	1520	2.5: 1	3	9 1/2	43 1/2	30	73 1/2	48	3	1 1/2
27	1930	2.5: 1	3 1/4	10 1/2	49 1/2	24	73 1/2	54	3 1/4	1 1/2
30	2190	2.5: 1	3 1/2	12	54	19 3/4	73 3/4	60	3 1/2	1 1/2
36	4100	2.5: 1	4	15	63	34 3/4	97 3/4	72	4	1 1/2
42	5380	2.5: 1	4 1/2	21	63	35	98	78	4 1/2	1 1/2
48	6550	2.5: 1	5	24	72	26	98	84	5	1 1/2
54	8240	2: 1	5 1/2	27	65	33 1/4	98 1/4	90	5 1/2	1 1/2
60	8730	1.9: 1	6	35	60	39	99	96	5	1 1/2
66	10710	1.7: 1	6 1/2	30	72	27	99	102	5 1/2	1 1/2
72	12520	1.8: 1	7	36	78	21	99	108	6	1 1/2
78	14770	1.8: 1	7 1/2	36	90	21	111	114	6 1/2	1 1/2
84	18160	1.6: 1	8	36	90 1/2	21	111 1/2	120	6 1/2	1 1/2
90	20900	1.5: 1	8 1/2	41	87 1/2	24	111 1/2	132	6 1/2	6

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SDDOT

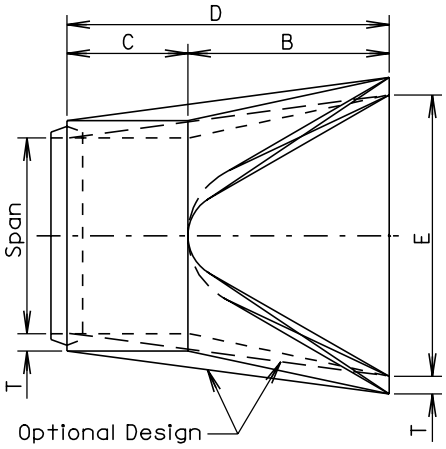
R. C. P. FLARED ENDS

PLATE NUMBER 450.10

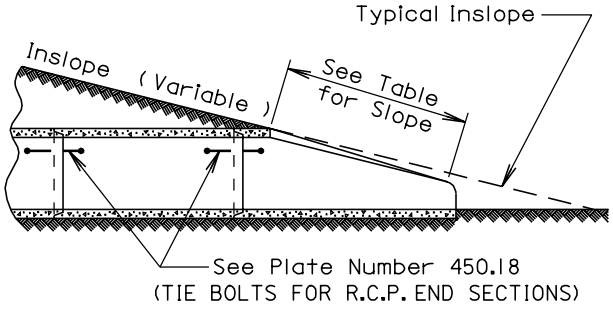
Sheet 1 of 1

Plotting Date: 08-APR-2008

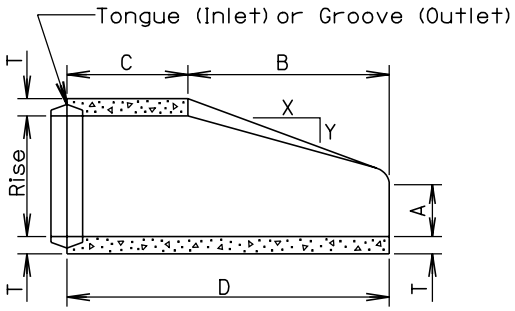
Username - tryalnt45



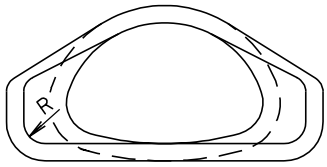
TOP VIEW



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 Standard Specifications for Roads and Bridges.

* 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	13 1/2	22	3:1	2 1/2	7	27	45	72	36	2
24	1750	18	28 1/2	3:1	3 1/2	8 1/2	39	33	72	48	3
30	3300	22 1/2	36 1/4	3:1	4	9 1/2	50	46	96	60	3
36	4350	26 5/8	43 3/4	3:1	4 1/2	1 1 1/8	60	36	96	72	6
42	5250	31 5/16	51 1/8	3:1	4 1/2	15 13/16	60	36	96	78	6
48	6400	36	58 1/2	3:1	5	21	60	36	96	84	6
54	7850	40	65	3:1	5 1/2	25 1/2	60	36	96	90	6
60	9500	45	73 1/2	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	28 1/2	83	19	102	144	6

*Equivalent Diameter of Circular R. C. P.

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Published Date: 2nd Qtr. 2008

SDDOT

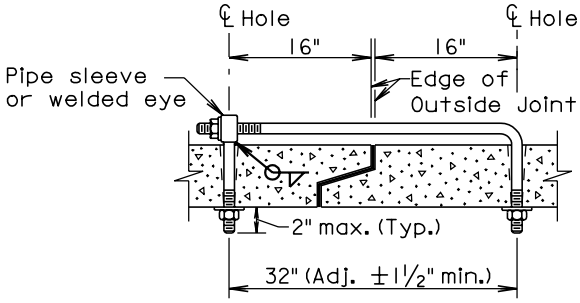
R. C. P. ARCH FLARED ENDS

PLATE NUMBER 450.11

Sheet 1 of 1

Plotting Date: 08-APR-2008

Username - tryalnt45

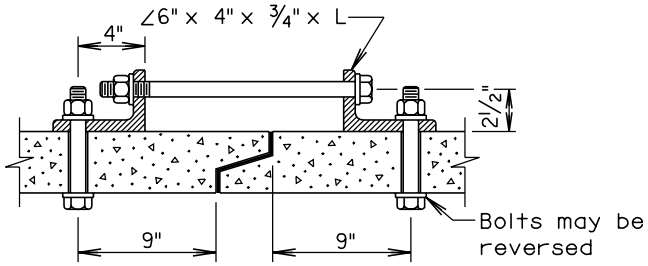


ADJUSTABLE EYE BOLT TIE

GENERAL NOTES:

Tie bolts to be furnished with 2 washers and 2 nuts except for the 9/16" rod which has unthreaded legs.

Use 9/16" rod diameter and 5/8" thread diameter for pipe wall thickness of 2" to 3¼".
Use 11/16" rod diameter and ¾" thread diameter for pipe wall thickness of 3½" to 6½".
Use 29/32" rod diameter and 1" thread diameter for pipe wall thickness of 7" and larger.

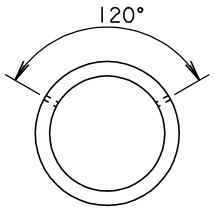


ANGLE AND BOLT TIE

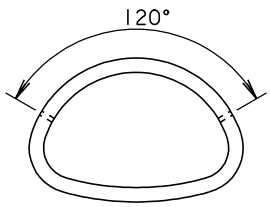
GENERAL NOTES:

L = 4" for ¾" Bolt. L = 6" for 1" Bolt.

Use 3/4" Tie Bolts for pipe diameters less than 48".



END VIEW
"CIRCULAR"



END VIEW
"ARCH"

GENERAL NOTES:

In lieu of Tie Bolts detailed above, Tecktonius Fasteners or other type Tie Bolt connections may be installed if approved by the Engineer.

There will be no separate measurement or payment for Tie Bolts.

The cost of the Tie Bolts shall be incidental to the contract unit price per Foot for the corresponding Bid Item for R.C.P. and/or R.C.P. Arch.

The first three Sections (both inlet and outlet) on R.C.P. and R.C.P. Arch up to and including the 78" diameter or equivalent pipe shall be tied with Tie Bolts. Pipe sizes above 78" diameter or equivalent diameter shall have all Sections tied. Each End Section is considered as one section.

March 31, 2000

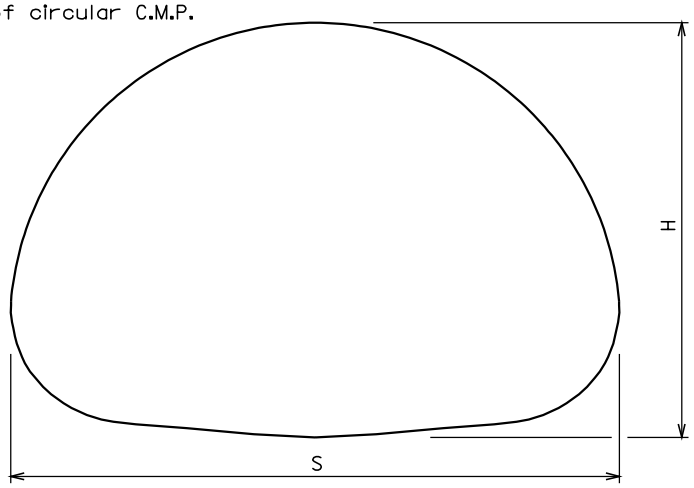
Published Date: 2nd Qtr. 2008	SDDOT	**TIE BOLTS FOR R.C.P. END SECTIONS**	*PLATE NUMBER* 450.18
			Sheet 1 of 1

Plotting Date: 08-APR-2008

Username - tryalnt45

	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.

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SDDOT

CORRUGATED METAL PIPE ARCH CULVERT

PLATE NUMBER 450.30

Sheet 1 of 1

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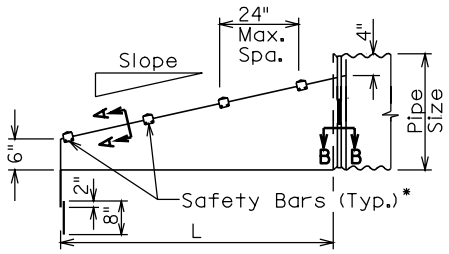
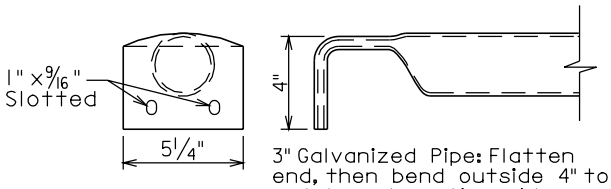
Username - tryalnt45

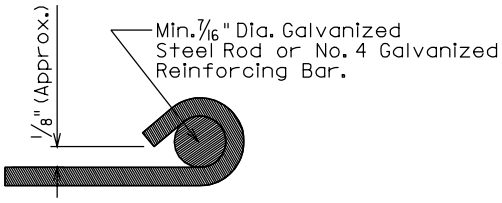


SIDE ELEVATION

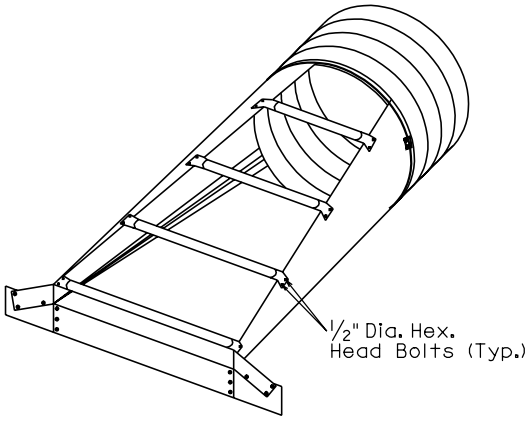


DETAIL OF SAFETY BARS

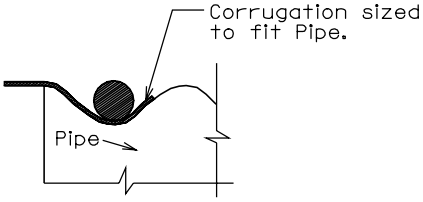
* Number of bars required will vary depending on the length of the End Section.



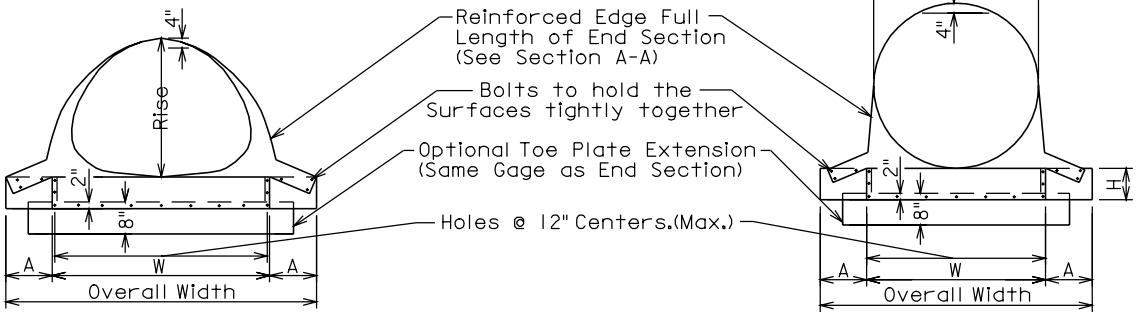
SECTION A-A



ISOMETRIC VIEW

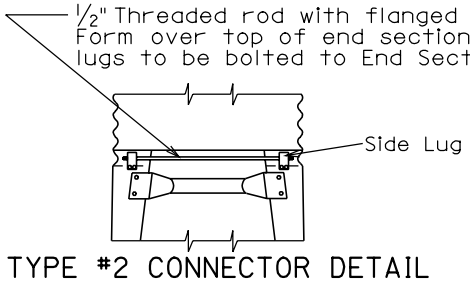


SECTION B-B

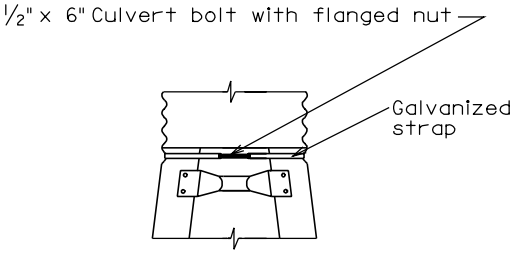


FRONT VIEW

FRONT VIEW



TYPE #2 CONNECTOR DETAIL
For 30" and Larger
21" x 15" and Larger



TYPE #1 CONNECTOR DETAIL
15" Through 24"

March 31, 2000

Published Date: 2nd Qtr. 2008

SDDOT

C. M. P. SAFETY ENDS

PLATE NUMBER
450.38

Sheet 1 of 2

Plotting Date: 08-APR-2008

Username - tryalnt45

ARCH C.M.P. SAFETY ENDS

Equv. Dia. (In.)	(Inches)		Min. Thick.		Dimensions (Inches)				L Dimensions	
	Span	Rise	In.	Gage	A	H	W	Overall Width	Slope	Length (In.)
18	21	15	.064	16	8	6	27	43	6:1	30
21	24	18	.064	16	8	6	30	46	6:1	48
24	28	20	.064	16	8	6	34	50	6:1	60
30	35	24	.079	14	12	9	41	65	6:1	84
36	42	29	.109	12	12	9	48	72	6:1	114
42	49	33	.109	12	16	12	55	87	6:1	138
48	57	38	.109	12	16	12	63	95	6:1	168
54	64	43	.109	12	16	12	70	102	6:1	198
60	71	47	.109	12	16	12	77	109	6:1	222
72	83	57	.109	12	16	12	89	121	6:1	282

CIRCULAR C.M.P. SAFETY ENDS

Pipe Dia. (In.)	Min. Thick.		Dimensions (Inches)				L Dimensions	
	In.	Gage	A	H	W	Overall Width	Slope	Length (In.)
15	.064	16	8	6	21	37	6:1	30
18	.064	16	8	6	24	40	6:1	48
21	.064	16	8	6	27	43	6:1	66
24	.064	16	8	6	30	46	6:1	84
30	.109	12	12	9	36	60	6:1	120
36	.109	12	12	9	42	66	6:1	156
42	.109	12	16	12	48	80	6:1	192
48	.109	12	16	12	54	86	6:1	228
54	.109	12	16	12	60	92	6:1	264
60	.109	12	16	12	66	98	6:1	300

GENERAL NOTES:

Safety bars shall be attached to safety ends over 24" in diameter only.

Safety ends shall be fabricated from galvanized steel conforming to the requirements of the Standard Specifications.

Safety bars shall be fabricated from steel pipe conforming to the requirements of ASTM A-53 Schedule 40 Specifications.

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 ⅜" 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.

Installation shall be performed in accordance with the Standard Specifications.

All work and materials required for fabrication and installation of safety ends shall be incidental to the bid items for the various sizes of safety ends.

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Published Date: 2nd Qtr. 2008	SDDOT	C. M. P. SAFETY ENDS	PLATE NUMBER 450.38
			Sheet 2 Of 2

Plotting Date: 08-APR-2008

Username - tryalnt45

The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

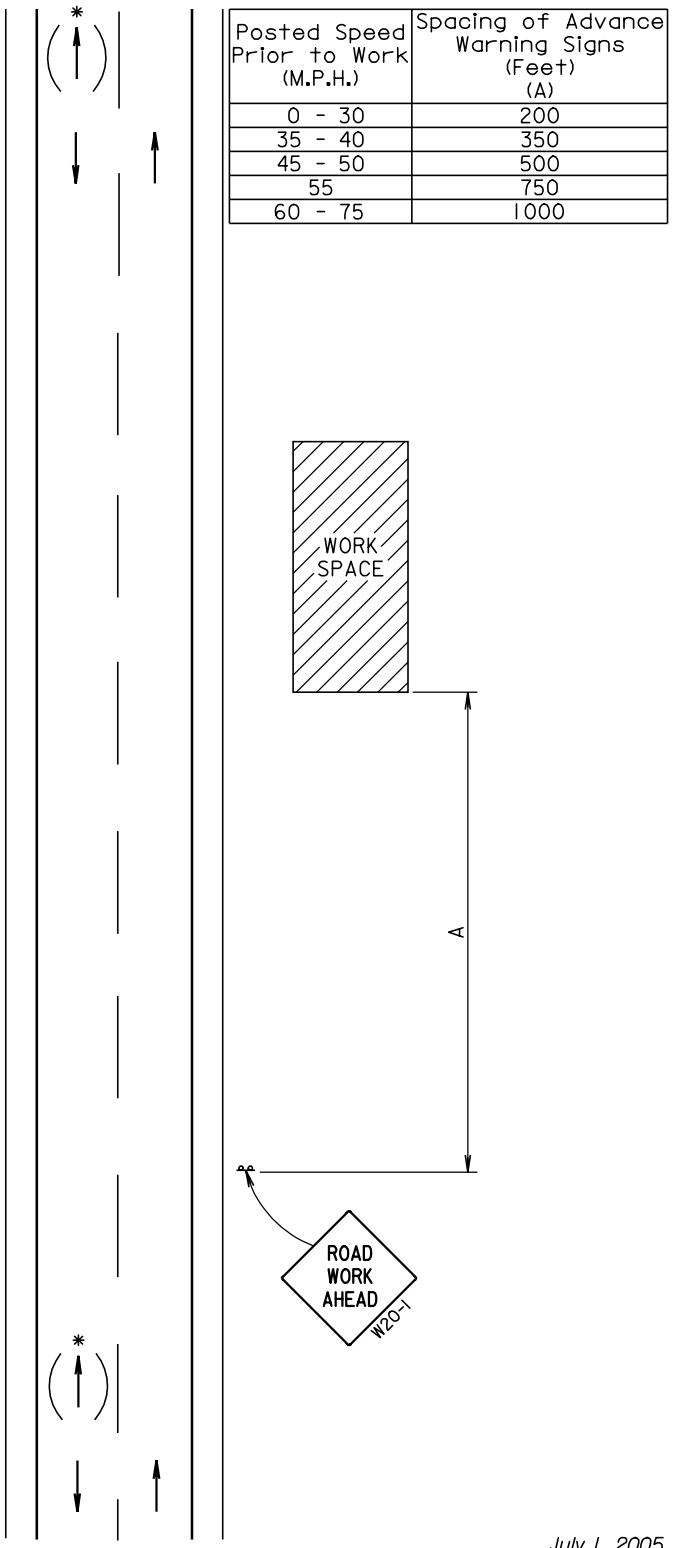
The signs illustrated shall be used where there are distracting situations; such as: vehicles parked on shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform work operations.

The ROAD WORK AHEAD sign may be replaced with other appropriate signs, such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.

* If the work space is on a divided highway, an advance warning sign should also be placed on the left side of the directional roadway.

For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 75	1000



July 1, 2005

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SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
WORK BEYOND THE SHOULDER

PLATE NUMBER
634.01

Sheet 1 of 1

Plotting Date: 08-APR-2008

Username - tryalnt45

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45 - 50	500	50
55	750	50
60 - 65	1000	50

Flagger

Channelizing Device

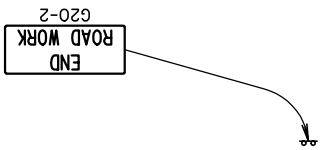
For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

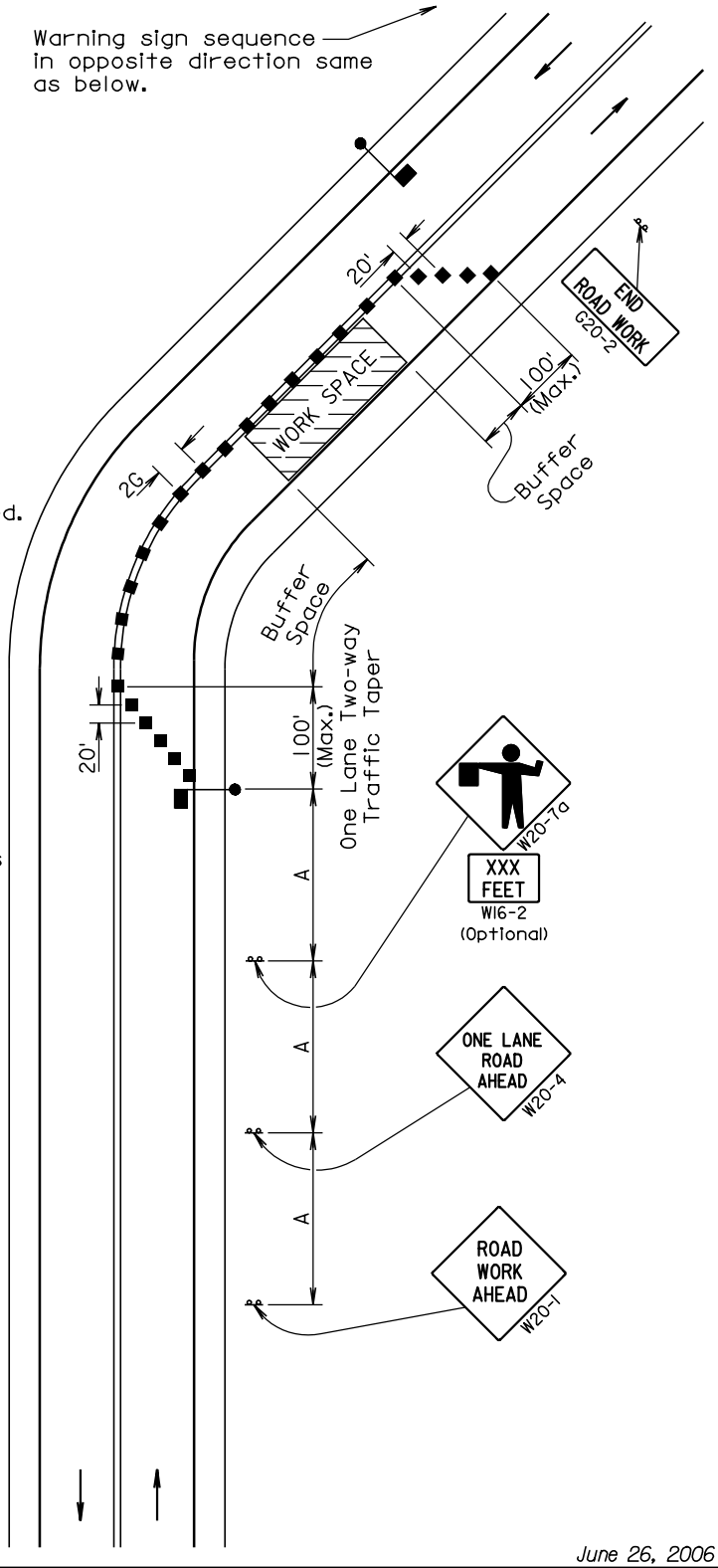
The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. During daylight hours, 42" cones may be used in lieu of drums or type II barricades along the centerline.



Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

The buffer space shall be a sufficient length so that the channelizing devices are visible to approaching traffic.



June 26, 2006

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SDDOT

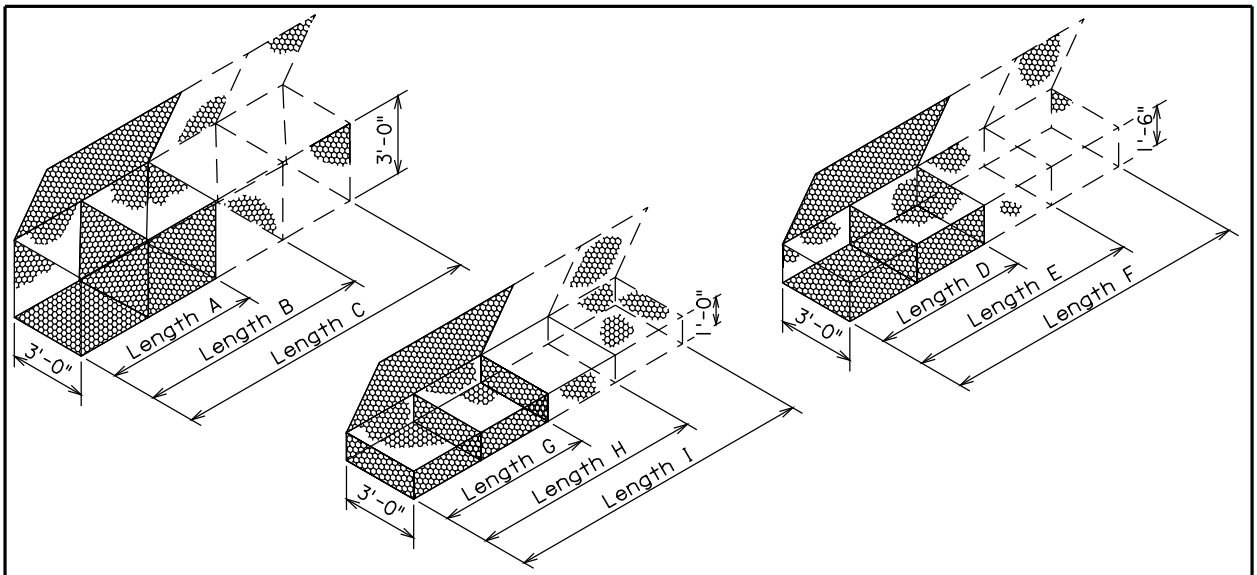
GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITH FLAGGER PROVIDED

PLATE NUMBER
634.23

Sheet 1 of 1

Plotting Date: 08-APR-2008

Username - tryalnt45



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 ½ 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.

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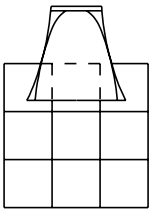
Published Date: 2nd Qtr. 2008	SDDOT	BANK AND CHANNEL PROTECTION GABIONS	PLATE NUMBER 720.01 Sheet 1 of 1

Plotting Date: 08-APR-2008

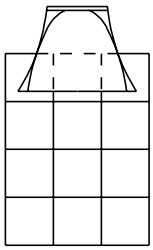
Username - tryalnt45

12", 18", & 24" RCP & CMP
12", 18", & 24" RCP Arch & CMP Arch



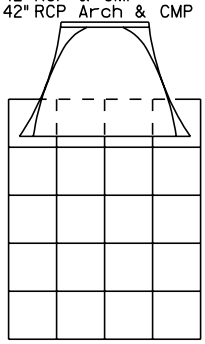
4.5 Cu. Yds.

30" & 36" RCP & CMP
30" & 36" RCP Arch & CMP Arch



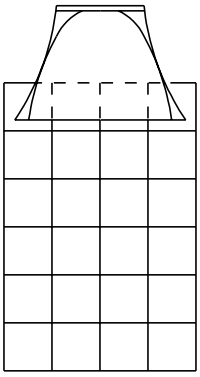
6.0 Cu. Yds.

42" RCP & CMP
42" RCP Arch & CMP Arch



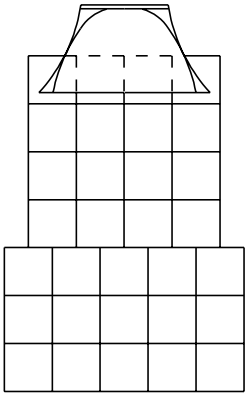
10.0 Cu. Yds.

48" & 54" RCP & CMP
48" & 54" RCP Arch & CMP Arch



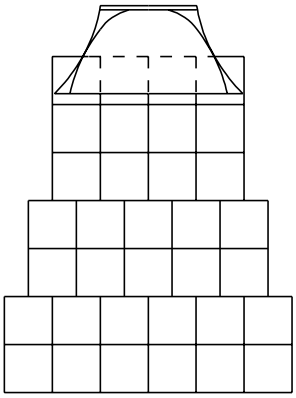
12.0 Cu. Yds.

60" RCP & CMP
60" RCP Arch & CMP Arch



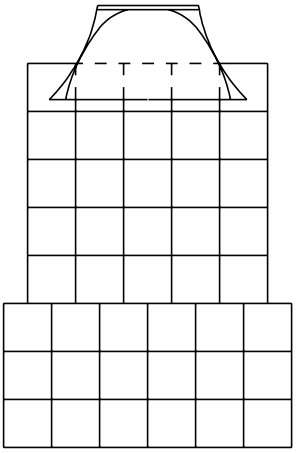
15.5 Cu. Yds.

66" RCP & CMP



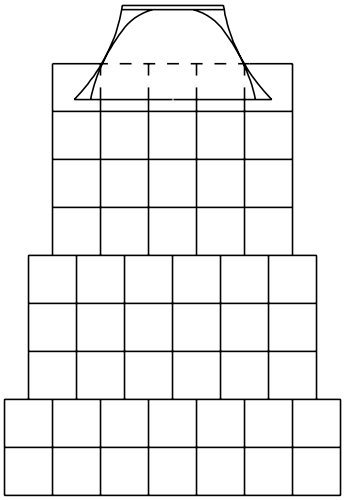
17.0 Cu. Yds.

72" RCP & CMP
72" RCP Arch & CMP Arch



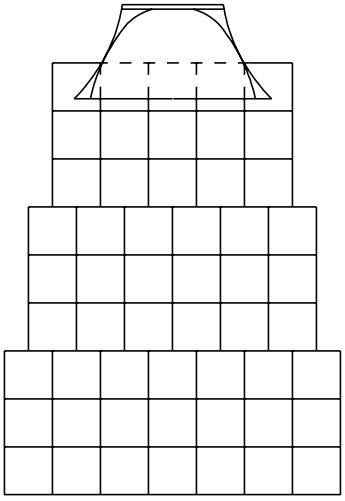
21.5 Cu. Yds.

78" RCP & CMP



26.0 Cu. Yds.

84" RCP & CMP



27.0 Cu. Yds.

GENERAL NOTES:

Gabions at outlets of C. M. pipe and R. C. pipe shall be placed under the end section a distance of 2' from the outlet end of the section. For C. M. pipe end section installations, the upper fabric of the gabions shall be modified to accommodate the metal end section in a manner approved by the Engineer.

Quantities shown on this standard plate are based on standard gabion sizes D, E, and F (See Standard Plate 720.01).

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SDDOT

BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS

PLATE NUMBER
720.03

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Username - tryalnt45