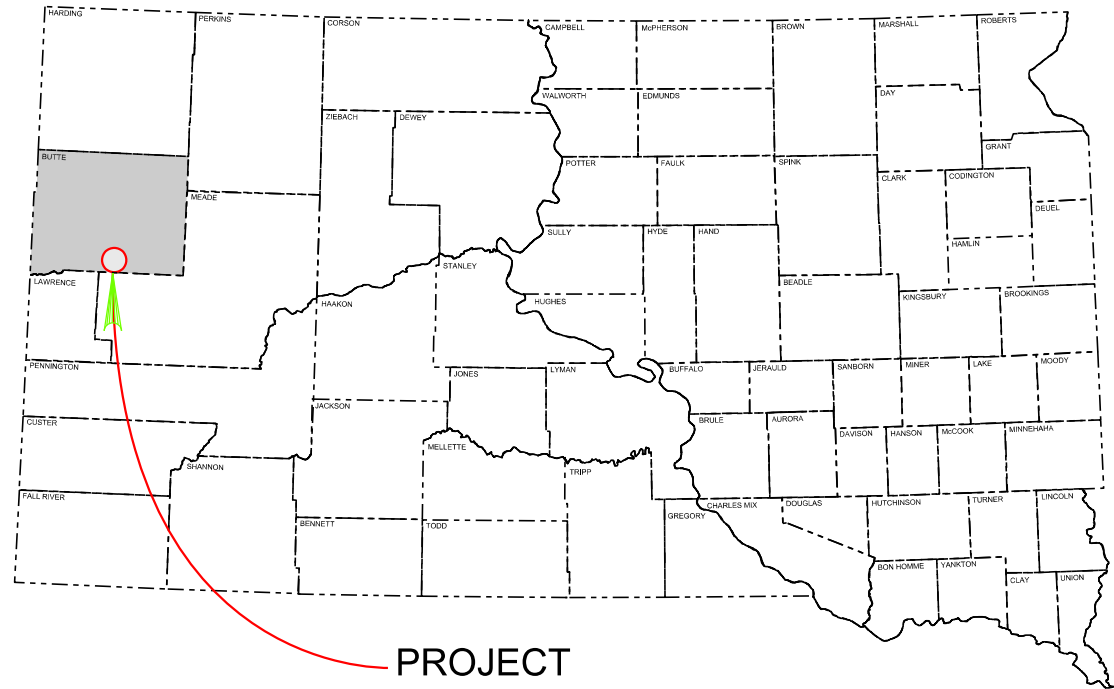


Plot Scale - 1:200

Plotted From - irrc11610



PROJECT

STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
PLANS FOR PROPOSED  
**PROJECT 212-471**  
**US HIGHWAY 212**  
**BUTTE COUNTY**

PIPE REPLACEMENT  
PCN I37N

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	1	28

Plotting Date: 05/14/2014

INDEX OF SHEETS

- |         |   |
|---------|---|
| 1       | General Layout W/Index                                  |
| 2 - 3   | Estimate of Quantities and<br>Environmental Commitments |
| 4 - 9   | General Notes & Tables                                  |
| 10      | Typical Sections  |
| 11      | Horizontal Alignment Sheets                             |
| 12      | Control Data Sheet                                      |
| 13      | Topography Symbology & Legend                           |
| 14      | Plan & Profile Sheet                                    |
| 15      | Temporary Barrier for Two Lane Road Detail              |
| 16 - 25 | Standard Plates   |
| 26 - 27 | Cross Sections  |
| 28      | Pipe Section  |

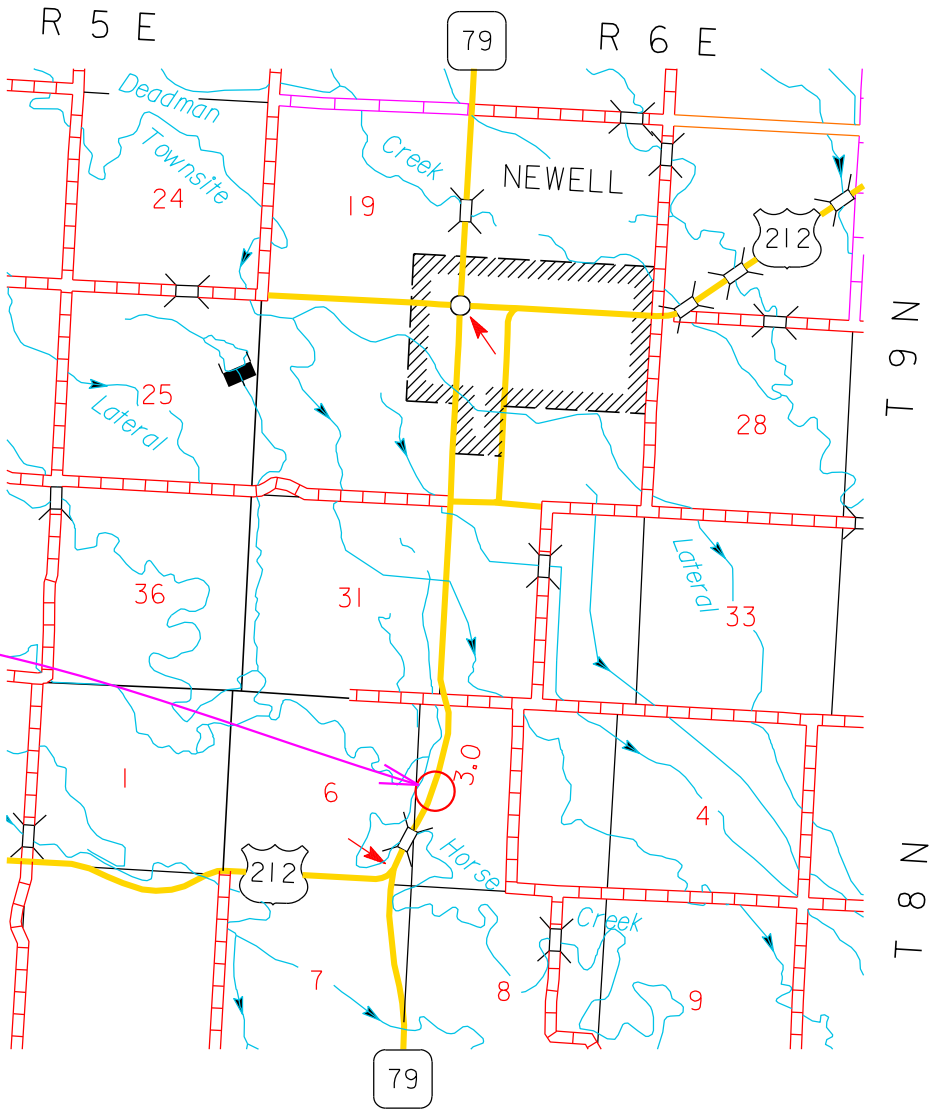
PROJECT  
212-471  
MRM 36.9

DESIGN DESIGNATION

ADT (2013)	1425
ADT (2033)	1606
DHV	272.9
D	51 %
T DHV	2.9 %
T ADT	6.5 %
V	65 MPH

STORM WATER PERMIT

None Required



# ESTIMATE OF QUANTITIES AND ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	2	28

## ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E1010	Remove Asphalt Concrete Pavement	214.6	SqYd
110E7802	Remove Fence for Reset	35	Ft
120E0010	Unclassified Excavation	1,674	CuYd
120E0600	Contractor Furnished Borrow	211	CuYd
230E0100	Remove and Replace Topsoil	Lump Sum	LS
250E0010	Incidental Work	Lump Sum	LS
260E1010	Base Course	243.7	Ton
320E1200	Asphalt Concrete Composite	105.0	Ton
421E0100	Pipe Culvert Undercut	35	CuYd
450E0162	30" RCP Class 2, Furnish	116	Ft
450E0170	30" RCP, Install	116	Ft
450E2204	30" RCP Sloped End, Furnish	2	Each
450E2205	30" RCP Sloped End, Install	2	Each
620E4100	Reset Fence	35	Ft
632E2510	Type 2 Object Marker Back to Back	1	Each
633E1400	Pavement Marking Paint, 4" White	140	Ft
633E1405	Pavement Marking Paint, 4" Yellow	20	Ft
634E0010	Flagging	60	Hour
634E0100	Traffic Control	684	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0525	Linear Delineation System Panel, Barrier Mounted	47	Each
634E0640	Temporary Pavement Marking	1,600	Ft
634E0700	Traffic Control Movable Concrete Barrier	47	Each
634E0705	Remove and Reset Traffic Control Movable Concrete Barrier	47	Each
720E1015	Bank and Channel Protection Gabion	16.0	CuYd
734E0010	Erosion Control	Lump Sum	LS
734E0154	12" Diameter Erosion Control Wattle	160	Ft
831E0110	Type B Drainage Fabric	35	SqYd

## SPECIFICATIONS

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

## ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

### COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

#### Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

### COMMITMENT C: WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment before entering South Dakota to reduce the risk of invasive species introduction into the project vicinity.

### COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

#### Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

## COMMITMENT H: WASTE DISPOSAL SITE

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

#### Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the State ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Highway, Road, and Railway Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the State ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the State ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

# ESTIMATE OF QUANTITIES AND ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	3	28

**COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES**

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all designated option borrow sites provided within the plans.

**Action Taken/Required:**

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: staging areas, borrow sites, waste disposal sites, and all material processing sites.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for staging areas, borrow sites, waste disposal sites, or material processing sites that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

**BELLE FOURCHE IRRIGATION DISTRICT**

The existing pipe typically carries overflow from the Belle Fourche Irrigation District. The Contractor shall contact the Belle Fourche Irrigation District (605 456-2541) to coordinate work with irrigation season.

**GRADING OPERATIONS**

Water for Embankment is estimated at the rate of 10 gallons of water per cubic yard of Embankment minus Waste. The estimated quantity of Water for Embankment is 19 MGal. No separate payment will be made for the Water for Embankment and all costs associated shall be incidental to the contract unit price per cubic yard of “Unclassified Excavation”.

Temporary fence and/or permanent fence shall be placed ahead of the grading operation unless otherwise directed by the Engineer.

**UTILITIES**

The Contractor shall be responsible for locating and protecting any utility that would conflict with any work. Utilities are not planned to be affected on this project. If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the contractor shall contact the project engineer to determine modifications that will be necessary to avoid utility impacts.

The Contract shall be responsible for protecting the utility in the area of the Bank and Channel Protection Gabions installation area. Any damage done to a utility will be the Contractor’s responsibility to repair.

**TABLE OF FENCE QUANTITIES**

Station to Station		Side (L/R)	Right-of-Way Fence	
			Remove Fence for (Ft)	Reset Fence (Ft)
372+00	372+35	L	35	35
TOTALS:			35	35

**SAWING EXISTING SURFACING**

Where new asphalt concrete is placed adjacent to existing asphalt concrete the existing asphalt concrete (except cold milled areas) shall be sawed full depth to a true line with a vertical face. No separate payment shall be made for sawing.

**SURFACING THICKNESS DIMENSIONS**

Plans tonnage will be applied even though the thickness may vary from that shown in the plans. At those locations where material must be placed to achieve a required elevation, plans tonnages may be varied to achieve the required elevation.

**SHRINKAGE FACTOR:** Embankment +30%

**TABLE OF EXCAVATION QUANTITIES BY BALANCES**

Station to	Station	Excavation (CuYd)	* Contractor Furnished Borrow (CuYd)	Total Excavation (CuYd)
371+80	372+50	140	211	0
Totals:		0	211	0

\* The quantities for these items are in the Estimate of Quantities under their respective bid items.

**TABLE OF UNCLASSIFIED EXCAVATION**

Excavation	140
Exc. for Deep Pipe Removal	1534
Total	1674

**PROCEDURES FOR DETERMINING UNCLASSIFIED EXCAVATION QUANTITY**

Plan quantities shall be used for final payment for the Unclassified Excavation quantity.

**CONTRACTOR FURNISHED BORROW**

The Contractor shall provide a suitable site for Contractor furnished borrow material. The Contractor is responsible for obtaining all required permits and clearances for the borrow site. The borrow material shall be approved by the Engineer. The plans quantity for “Contractor Furnished Borrow” as shown in the Estimate of Quantities will be the basis of payment for this item.

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

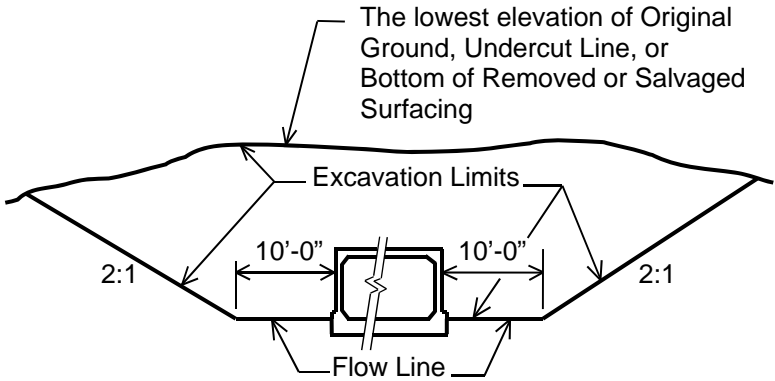
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	4	28

**EXCAVATION FOR DEEP PIPE REMOVAL**

Included in the quantity of “Unclassified Excavation” are 1534 cubic yards of excavation for removal of deep pipes. Deep pipes are existing mainline pipes at depths of 10 feet or greater (measured from the flow line to the lowest elevation of either the existing ground line, undercut line, or bottom of removed or salvaged surfacing).

All work necessary to excavate and backfill the deep pipes including labor, equipment, and incidentals shall be incidental to the contract unit price per cubic yard for “Unclassified Excavation”. Payment for deep pipe excavation shall be based only on plans quantity and measurement of these excavation quantities during construction shall not be performed.

The quantities computed for excavation of the deep pipes are based on the limits shown in the drawing below. The drawing shows a box culvert for illustration purposes only; the limits are similar for a pipe.



**TABLE OF EXCAVATION FOR DEEP PIPE REMOVAL**

Station	Type	Quantity (CuYd)
* 372+14	Pipe	1534
Total:		1534

\* The excavation quantity includes excavation for the installation of the new pipe at Station 372+14.

**TEMPORARY WORKS**

Temporary works may be necessary during the removal and installation of the pipe. No payment will be made for temporary works. All costs involved in designing, constructing, and removing temporary works shall be incidental to the other contract items.

TABLE OF PIPE CULVERT

Station	Reinforced Concrete			
	Circular		Circular Sloped End	
	30"		30"	
	Cl. 2			
Station	Ft		Each	
372+14	116		2	
Total:	116		2	

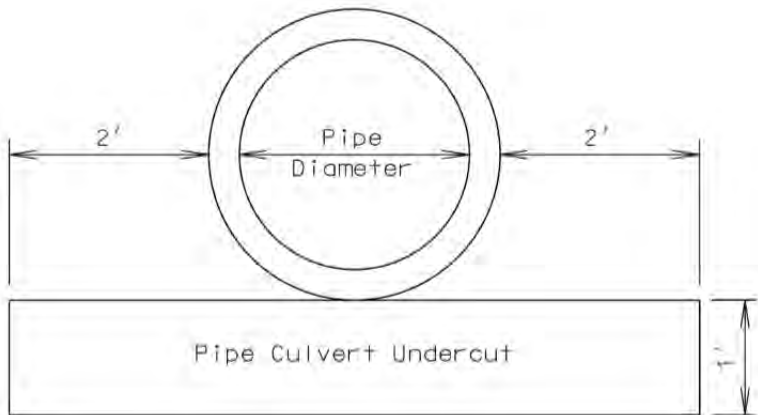
TABLE OF PIPE CULVERT UNDERCUT

The Table of Pipe Culvert Undercut is intended to be used to establish an estimated quantity of Pipe Culvert Undercut for bidding purposes only. The depth of undercut is an estimate and the actual depth necessary shall be determined during construction. Pipes shown may or may not require undercutting and pipes not shown may require undercutting. The Engineer will determine which pipe shall be undercut in accordance with Section 421 of the Standard Specifications.

Station	Undercut Depth (Ft)	Quantity (CuYd)
372+14	1	34.5
Total:		34.5

The table contains the rate of pipe culvert undercut per foot of pipe length and should be used as an aid in determining the actual amount of undercut to be performed during construction. The table is derived from the drawing below and conforms to the Standard Specifications. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.

Pipe Diameter (In)	Round Pipe Undercut Rate for 1' Depth (CuYd/Ft)	Arch Pipe Undercut Rate for 1' Depth (CuYd/Ft)
30	0.2623	0.2847



INCIDENTAL WORK

Station	L/R	Remarks
372+15		Take out 30" CMP – 140'
372+06 to 372+29	L	Salvage Delineators (4)

SALVAGED ITEMS

All salvaged items noted on the plans shall be salvaged for future highway use and hauled to the Department of Transportation's Newell Maintenance Yard as directed by the Engineer. Care shall be taken not to damage the structural properties of the items during dismantling and transporting. All broken concrete and materials not salvaged shall be disposed of in accordance with the Standard Specifications. All costs for salvaging and transporting the items shall be incidental to the contract lump sum price for "Incidental Work". Before preparing his/her bid, the Contractor shall make a visual inspection of the project to verify the extent of the work and material involved.

TABLE OF ASPHALT CONCRETE PAVEMENT REMOVAL

Station	to	Station	Quantity (SqYd)
371+80		372+50	214.6
Total:			214.6

TABLE OF BANK AND CHANNEL PROTECTION GABIONS

Station	L/R	Quantity (CuYd)
372+17	L	16.0
Total:		16.0

TABLE OF DRAINAGE FABRIC

Station	L/R	Type B Drainage Fabric (SqYd)
372+17	L	35
Totals:		35

TABLE OF SUPERELEVATION

Station	to	Station	
371+20		372+80	- 3820' Radius Curve Left 4.5998' Superelevation Rate

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	5	28

BASE COURSE

Base Course shall be furnished by the Contractor.

All other requirements of the Standard Specifications for Base Course shall apply.

Water for compaction shall be incidental to contract unit price per ton for "Base Course". Compaction shall be to the satisfaction of the Engineer.

TABLE OF BASE COURSE

Station	to	Station	Quantity (Ton)
371+80		372+50	243.7
			243.7

ASPHALT CONCRETE COMPOSITE

Mineral aggregate for the Asphalt Concrete Composite shall conform to the requirements of the Standard Specifications for Class E, Type 1

Seasonal limitation will be April 20 to November 1 for Asphalt Concrete Composite to accommodate the Belle Fourche Irrigation District restrictions for the pipe installation.

All other requirements in the Standard Specifications for Asphalt Concrete Composite shall apply.

The asphalt binder used in the mixture shall be PG 64-22, PG 64-28 or PG 64-34 Asphalt Binder.

TABLE OF ASPHALT CONCRETE COMPOSITE

Station	to	Station	Quantity (Ton)
371+80		372+50	105
Total:			105.0

REMOVE AND REPLACE TOPSOIL

Prior to the culvert removal, a 4” depth of topsoil shall be salvaged and stockpiled. The stockpile location will be directed by the Engineer. Following completion of construction, topsoil shall be spread evenly over the disturbed areas.

The estimated amount of topsoil to be removed and replaced is 51 CuYd.

All cost associated with removing and replacing the topsoil shall be incidental to the lump sum price for “Remove and Replace Topsoil”.

EROSION CONTROL

The contract lump sum price for Erosion Control shall include all material, equipment, and labor necessary to seed, mycorrhizal inoculum, fertilizer and fiber mulch all areas disturbed by construction of this project. The Engineer, at the time of construction, shall determine limits of the Erosion Control work. The estimated area to be seeded is approximately 0.1 acre.

MYCORRHIZAL INOCULUM

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

<i>Glomus intraradices</i>	25%
<i>Glomus aggregatu</i>	25%
<i>Glomus mosseae</i>	25%
<i>Glomus etunicatum</i>	25%

All seed shall be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed shall be incidental to the contract lump sum price for “Erosion Control”.

The mycorrhizal inoculum shall be from the list below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
MycoApply	Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 http://www.mycorrhizae.com/

FERTILIZING

The Contractor shall apply an all-natural slow release fertilizer prior to seeding or placing sod. The all-natural fertilizer shall have a minimum guaranteed analysis of 4-6-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 3.2%, a minimum of 6% (P2O5) available phosphate, a minimum of 4% (K2O) soluble potash, and a maximum carbon to nitrogen ratio (C:N ratio) of 5:1. The all-natural fertilizer shall be free of weed-seed and pathogens accomplished through thermophilic composting, and not mechanical or chemical sterilization, to assure presence of beneficial soil microbiology. The fertilizer shall have a near neutral pH, a low salt index, a low biological oxygen demand, contain organic humic and fulvic acids, and have high aerobic organism counts. The fertilizer shall also be stable, free of bad odors, and be unattractive as a food source for animals. It should also be in a granular form that is easily spread.

The all-natural slow release fertilizer shall be applied according to the manufacturer’s application recommendations.

The application rate is 1,500 pounds per acre.

The all-natural slow release fertilizer shall be from the list below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
Sustane	Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 http://www.sustane.com/

DRILLS

In addition to the drills specified in Section 730 of the Standard Specifications, other types of drills including no-till drills will be allowed as long as they have baffles, partitions, agitators, or augers which keep the seed distributed throughout the seed box and the seed is planted at a depth of ¼” to ½”.

PERMANENT SEEDING

The areas to be seeded comprise of all newly graded areas within the project limits except for the top of roadways.

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.

The varieties listed for the seed mixture are preferred varieties. Native harvest seed will be allowed.

Type F Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	7
Green Needlegrass	Lodorm	4
Sideoats Grama	Butte, Killdeer, Pierre, Trailway	3
Blue Grama	Bad River, Willis	2
Oats or Spring Wheat: April through May; Winter Wheat: August through November		10
Total:		26

COVER CROP SEEDING

Oats or spring wheat seed shall be used April through July and winter wheat seed shall be used August through November.

Cover crop seeding may be used on this project as a temporary erosion control measure if the work is completed during permanent seeding seasonal limitation time frame. The actual limits and use of cover crop seeding shall be determined by the Engineer during construction.

All cost for Cover Crop Seeding shall be incidental to the contract lump sum price for “Erosion Control”.

FIBER MULCHING

Fiber mulch shall be applied in a separate operation following permanent seeding.

Fiber mulch shall be applied at the rate of 2000 pounds per acre.

The Contractor shall allow the fiber mulch to cure a minimum of 18 hours prior to watering or any storm event to ensure proper cohesion between the soil and fiber particles.

The fiber mulch provided shall be from the approved product list. The approved product list for fiber mulch may be viewed at the following internet site:

<http://sddot.com/business/certification/products/Default.aspx>

EROSION CONTROL WATTLE

Erosion control wattles for restraining the flow of runoff and sediment shall be installed at locations noted in the table and at locations determined by the Engineer during construction. Refer to Standard Plate 734.06 for details.

The Contractor shall provide certification that the erosion control wattles do not contain noxious weed seeds.

Erosion control wattles shall remain on the project to decompose.

An additional quantity of 12” Diameter Erosion Control Wattles has been added to the Estimate of Quantities for temporary erosion and sediment control in highway ditch channels and as an alternative to low flow or high flow silt fence at wetland areas adjacent to the highway.

The erosion control wattle provided shall be from the approved product list. The approved product list for erosion control wattle may be viewed at the following internet site:

<http://sddot.com/business/certification/products/Default.aspx>

TABLE OF EROSION CONTROL WATTLE

Station	L/R	Diameter (Inch)	Location	Quantity (Ft)
372+14	R	R	Pipe	60
Additional Quantity:				100
Total:				160

TRAFFIC CONTROL – GENERAL NOTES

- 1. Mainline pipe replacements shall be done half roadway width at a time.
- 2. Requests to deviate from the sequence of operations shall be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department's intent for traffic control and sequencing of the work. An alternate sequence shall be submitted for review a minimum of one week prior to potential implementation.
- 3. Unless otherwise stated in these plans, no work will be allowed during hours of darkness. Hours of darkness are defined as ½ hour after sunset until ½ hour before sunrise.
- 4. Storage of vehicles and equipment shall be as near the right-of-way as possible. 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 of 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.
- 5. Existing guide, route, informational logo, regulatory, and warning signs shall be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including but not limited to, traffic signal heads, delineation, and signing shall be the responsibility of the Contractor. Non-applicable signing and all traffic control devices shall be covered or removed during periods of inactivity. Periods of inactivity shall be defined as no work taking place for a period of more than 48 hours. The cost of removing or covering non-applicable signs shall be incidental to the contract lump sum price for "Traffic Control, Miscellaneous".
- 6. Construction signing mounted on portable supports shall not be used for a duration of more than 3 days, unless approved by the Engineer. Construction signing that remains in the same location for more than 3 days shall be mounted on fixed location, ground mounted, breakaway supports.
- 7. The quantity of traffic control units paid for will be for the greatest number of installations per sign in place at any one time regardless of the number of set-ups on the project.
- 8. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.
- 9. All materials and equipment shall be stored a minimum distance of 30' from the traveled way during nonworking hours.
- 10. The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 or MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

- 11. The Contractor shall be required to have a person available 24 hour/day, 7 days/week to maintain traffic control devices. The name and cellular telephone number of this individual shall be given to the Engineer at the preconstruction meeting.
- 12. The Contractor or designated traffic control subcontractor shall make night inspections at the initial set up of traffic control and every week thereafter to ensure the adequacy, legibility and reflectivity of each sign and device. A written summary of each inspection shall be given to the Engineer within 24 hours after completion of the inspection. The cost for the nighttime inspection work shall be incidental to the contract lump sum price for "Traffic Control, Miscellaneous".
- 13. Vehicles working in traffic or alongside traffic shall be equipped with a flashing amber light visible from all directions. The amber light shall be mounted on the uppermost part of the Contractor's vehicle. Lights must have peak intensity within the range of 40 to 400 candelas and must flash at 75 ± 15 flashes per minute. Vehicle flasher/hazard lights are not acceptable. All haul trucks shall be equipped with a second flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights shall be incidental to the various related contract bid items.
- 14. All construction operations shall be conducted in the general direction of traffic movement.
- 15. If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD – whichever is more stringent shall be used, as determined by the Engineer.
- 16. Temporary Road Markers (Tabs) shall be used for lane closure tapers or lane shift tapers and shall be installed at 5' spacing. Tabs used for tapers and shifts will not be measured for payment. All costs associated to furnish, install, maintain (including replacement as required by the Engineer at no added cost to the Department), and remove all markers will be incidental to the contract lump sum price for "Traffic Control, Miscellaneous".
- 17. Drums are required in all lane closure tapers.
- 18. If inappropriate/conflicting pavement markings exist, the markings shall be removed and replaced with applicable temporary pavement markings when the work duration is more than 3 days. When the work duration is less than 3 days, the channelizing devices in the area where the pavement markings conflict shall be placed at a spacing of ½ G. Pavement marking removals shall be paid for at the contract unit price for Remove Pavement Marking, 4" or equivalent. Temporary pavement marking shall be paid for at the contract unit bid price for Temporary Pavement Marking. The additional channelizing devices shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
- 19. Bump Signs (W8-1, black on orange) with appropriate Advisory Speed Plaque (W13-1P, black on orange) shall be placed 500' in advance of the bump or as approved by the Engineer for adequate sight distance. Type I Object Markers (orange - 18"x18") shall be placed at the bump location.
- 20. No uneven lanes will be allowed during the overnight hours when both lanes are open to traffic.

- 21. Any damage to the shoulder shall be repaired by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

SEQUENCE OF OPERATIONS

- 1. Set up traffic control using Standard Plate 634.25 and traffic control sheet for Temporary Moveable Concrete Barrier Placement on Two Lane Highways with a Stop Condition. The Contractor shall maintain a minimum width of 17'.
- 2. Remove pipe, install new RC pipe, build embankment and place base course to an elevation to carry traffic.
- 3. Place bump marker and Bump sign.
- 4. Switch lane closure. Set up traffic control using Standard Plate 634.25 and traffic control sheet for Temporary Moveable Concrete Barrier Placement on Two Lane Highways with a Stop Condition. The Contractor shall maintain a minimum width of 17'.
- 5. Remove pipe, install new RC pipe, build embankment and place base course to an elevation to carry traffic.
- 6. Place bump marker and Bump sign.
- 7. Remove lane closure and setup traffic control using Standard Plate 634.23 for asphalt paving.
- 8. Place asphalt concrete.
- 9. Remove bump markers and traffic control.

BARRIER MOUNTED LINEAR DELINEATION SYSTEM PANELS

A linear delineation system (LDS) panel shall be attached to each side of the barrier section. One panel shall be white and the other panel shall be yellow. The color shall be the same as the nearest pavement marking, white along outside edgelines or yellow for the left side on one way traffic sections. The linear delineation system shall be 34 inches long and 6 inches in height and be constructed of aluminum formed into a shape to provide retroreflective properties across a wide range of angles. It shall be sheeted with sheeting designated as ASTM D4956 Type XI. The panels shall be installed at the center of the barrier when measured along the length, with the top of the panel 4 inches below the top of the barrier. Installation shall be as per the manufacturer's recommendation using stainless steel inserts and bolts. This will allow for easy removal for replacement of damaged panels or to replace with an alternate color. The Contractor shall furnish and install one panel along each side of the barrier if any panels are missing from the barriers. Replacement of damaged linear delineation system panels shall be furnished and replaced by the Contractor. All costs associated with furnishing and installing the linear delineation system shall be included in the contract unit price per each for Linear Delineation System Panel, Barrier Mounted.

All linear delineation system panels shall remain attached to the barrier sections and shall become the property of the State of South Dakota upon completion of the project.

The Contractor shall verify the number of LDS panels that will need to be installed or replaced on the Traffic Control Movable Concrete Barriers. The contract amount of LDS panels is an estimate and the full contract amount may not be required.

Maintaining the linear delineation system, including moving LDS panels from one side of the barrier to the other side of barrier to match the applicable color of the nearest pavement marking shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	8	28



TRAFFIC CONTROL MOVABLE CONCRETE BARRIERS

Concrete barriers will be provided by the State and are available for pickup from the SDDOT Maintenance Yard located adjacent to Sturgis Road approximately one mile north of Peaceful Pines Road. The barriers shall be hauled back to the SDDOT Maintenance Yard located adjacent to Hwy 79 approximately two miles south of Rapid City when they are no longer needed on the project.

Barriers to be adjusted or moved shall be disconnected from adjacent barriers to minimize damage to connecting pins. Pins damaged by the Contractor shall be replaced at no cost to the Department.

Concrete barrier sections shall be placed as depicted in the plans to comply with clear zone requirements and as required by the Engineer. The barriers shall be pinned and bolted together as directed by the Engineer.

Concrete barriers shall, at all times, be set on a flat surface for a minimum of 4' behind the barrier. Where 4' of flat surfacing is not attainable behind the barriers due to steep inslopes, the Contractor shall furnish and install Guardrail Post and Block behind the barriers at 6'-3" spacing. All costs associated with furnishing and installing Guardrail Post and Block shall be included in the contract unit price per each for Traffic Control Moveable Concrete Barriers.

All costs associated with picking up from the SDDOT Maintenance Yard, transporting, setting, connecting, and hauling back to the SDDOT Maintenance Yard shall be included in the contract unit price per each for Traffic Control Movable Concrete Barrier.

After the initial placement, concrete barriers may need to be adjusted. All costs associated with removing concrete barriers from the initial placement or onsite storage location and resetting/bolting, etc. in the new location will be paid for at the contract unit price per each for Remove and Reset Traffic Control Movable Concrete Barrier. No additional payment will be made for concrete barriers that are not immediately reset at a new location on the project and will be stored onsite until they are either reset or returned to the SDDOT Maintenance Yard as determined by the Engineer.

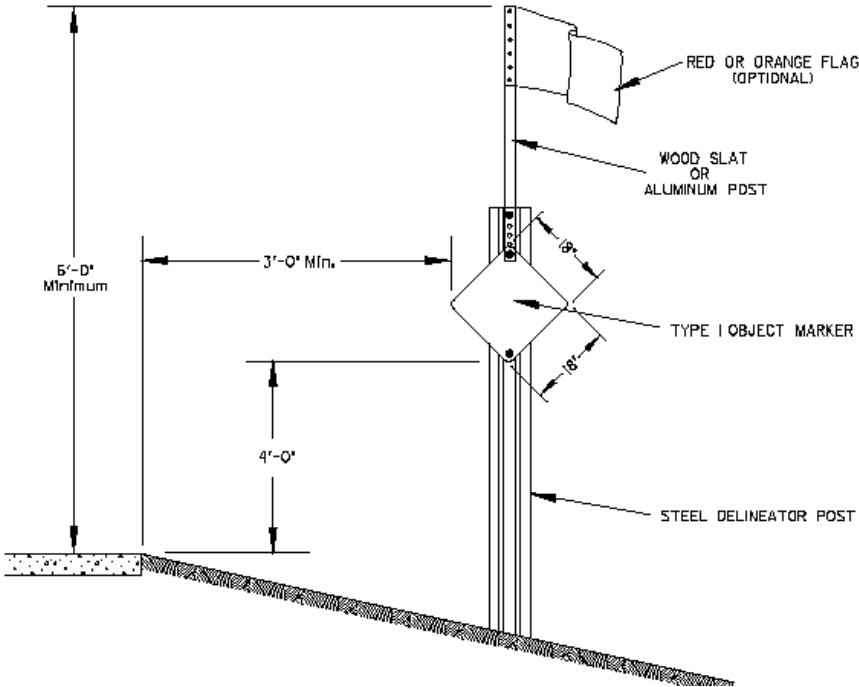
BUMP MARKERS

Bump markers shall be placed adjacent to the bump location.

After placing the bump markers, "Bump" warning signs with the appropriate speed advisory plates shall be placed 500 feet to 750 feet in advance of the bump location in rural areas, or 250 feet to 500 feet in advance of the bump location in urban areas. These distances may be adjusted by the Engineer if local conditions do not allow the placement of warning signs within the specified areas.

The steel delineator post shall be 1.12 lb/ft flanged channel post for ground mounted installation. If the duration is less than 3 days, the Type 1 Object Marker can be installed on temporary supports.

Payment for bump markers shall be incidental to the contract lump sum price for "Traffic Control, Miscellaneous".



FLAGS

Flags shall be installed on traffic control signs as detailed in the plans and as directed by the Engineer. Payment for the flags shall be 10 traffic control units per each flag. Payment will be full compensation for all costs associated to furnish, install, maintain (including replacement as required by the Engineer at no cost to the Department), and remove flag.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	9	28

TABLE OF TRAFFIC CONTROL DEVICES

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
R1-1	30" x 30"	STOP	2	21	42
W1-4	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)	1	34	34
W3-1	48" x 48"	STOP AHEAD (SYMBOL)	2	34	68
W8-1	48" x 48"	BUMP	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	2	34	68
W13-1P	30" x 30"	ADVISORY SPEED PLATE	2	21	42
W20-1	48" x 48"	ROAD WORK ##### FT. OR AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD ##### FT. OR AHEAD	2	34	68
W20-7a	48" x 48"	FLAGGER	2	34	68
SPECIAL		FLAGS	4	10	40
*****		TYPE III BARRICADE - 6 FT. DOUBLE SIDED	2	42	84
TOTAL UNITS					684

PERMANENT PAVEMENT MARKING

All materials shall be applied as per manufacturer's recommendations.

Application of permanent pavement marking shall be completed within 7 days following completion of final surfacing.

All costs involved in furnishing and application of the pavement marking paint and glass beads shall be incidental to the contract unit price per foot for Pavement Marking Paint, White and Pavement Marking Paint, Yellow.

Striper and advance and trailing warning vehicles shall be equipped with flashing amber lights or advance warning arrow panels operated in a caution mode.

RATES OF APPLICATION

Centerline striping (yellow) – 4.6 gallons per mile. \*  
Edgeline striping (white) – 16.9 gallons per mile. \*\*  
Glass Beads - 8 lbs per gallon

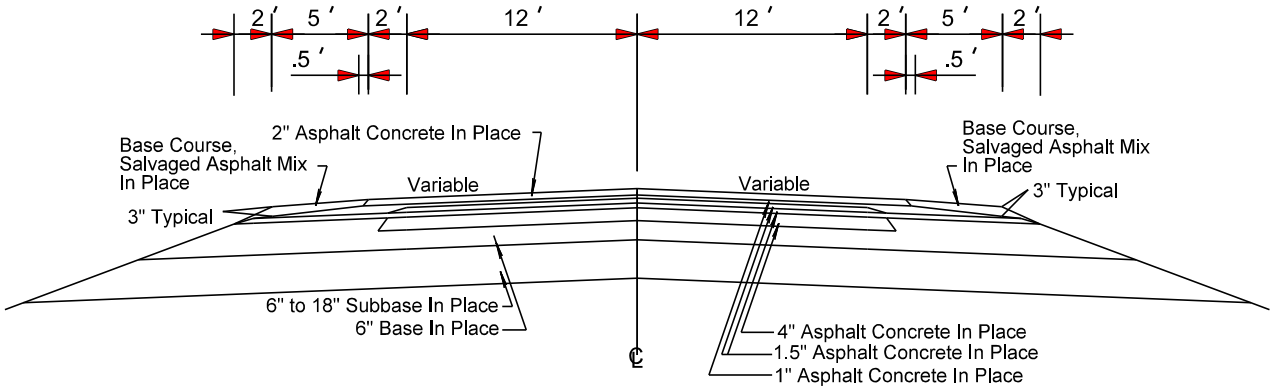
\* Rate is for yellow centerline skip  
\*\* Rate is for single edge line.

# TYPICAL SECTION

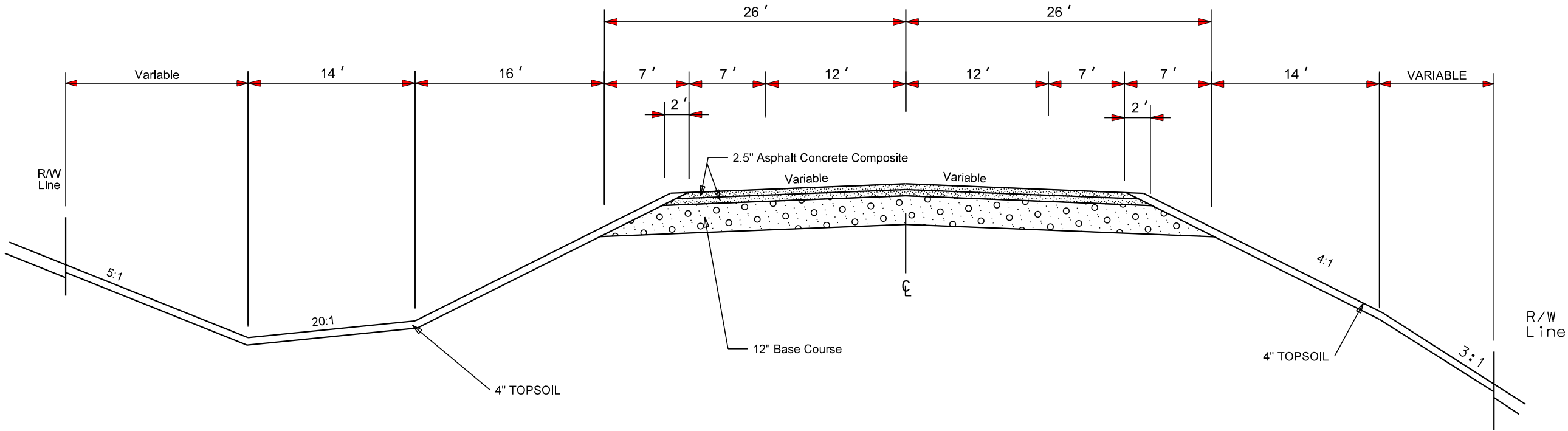
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	10	28

Plotting Date: 05/14/2014

## In Place Section



## Surfacing Section



# HORIZONTAL ALIGNMENT DATA

## MAINLINE

Type	Station			Northing	Easting
POB	352+35.94			328549.430	1077588.312
		TL= 244.66	N 26°43'47" E		
PC	354+80.60			328767.949	1077698.357
PI	365+49.46	R = 3820.00	Delta = 31°15'49" L	329722.583	1078179.106
PT	375+65.00			330788.091	1078094.611
		TL= 105.03	N 4°32'03" W		
POE	376+70.04			330892.793	1078086.308

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. North Zone (NAD 83/96) SF = 0.00000000

# CONTROL DATA

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	12	28

HORIZONTAL AND VERTICAL CONTROL POINTS						
Point	Station	Offset	Description	Northing	Easting	Elevation
AC7910			REFERENCE MARK	342182.751	1084809.460	2786.56
CP10			REFERENCE MARK	331362.920	1077970.298	2790.51

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System.  
North Zone (NAD 83/96) SF = 0.0000000000  
The elevations shown on this sheet are based on NAVD 88.

# EXISTING TOPOGRAPHY SYMBOLOGY AND LEGEND

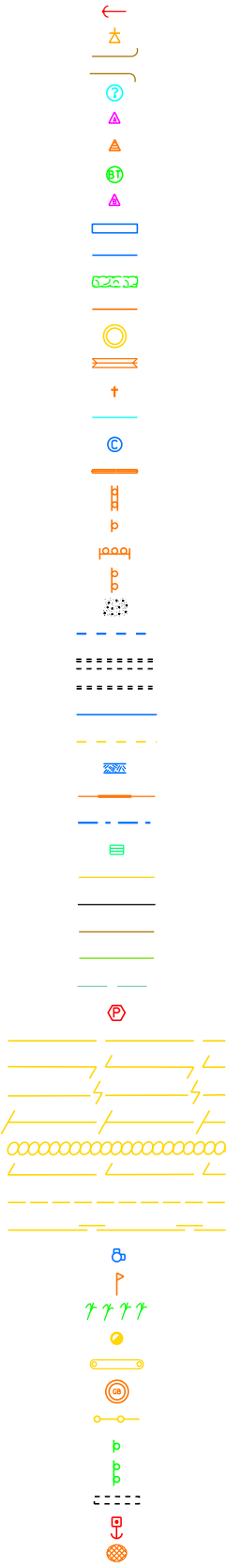
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	13	28

Plotting Date: 05/14/2014

Plot Scale - 1:200

Plotted From - Irrc11610

Anchor  
Antenna  
Approach  
Assumed Corner  
Azimuth Marker  
BBQ Grill/ Fireplace  
Bearing Tree  
Bench Mark  
Box Culvert  
Bridge  
Brush  
Buildings  
Bulk Tank  
Cattle Guard  
Cemetery  
Centerline  
Cistern  
Clothes Line  
Commercial Sign Double Face  
Commercial Sign One Post  
Commercial Sign Overhead  
Commercial Sign Two Post  
Concrete Symbol  
Creek Edge  
Curb/Gutter  
Curb  
Dam Grade/Dike/Levee  
Deck Edge  
Ditch Block  
Doorway Threshold  
Drainage Profile  
Drop Inlet  
Edge Of Asphalt  
Edge Of Concrete  
Edge Of Gravel  
Edge Of Other  
Edge Of Shoulder  
Elec. Trans./Power Jct. Box  
Fence Barbwire  
Fence Chainlink  
Fence Electric  
Fence Misc.  
Fence Rock  
Fence Snow  
Fence Wood  
Fence Woven  
Fire Hydrant  
Flag Pole  
Flower Bed  
Gas Valve Or Meter  
Gas Pump Island  
Grain Bin  
Guardrail  
Guide Sign One Post  
Guide Sign Two Post  
Gutter  
Guy Pole  
Haystack



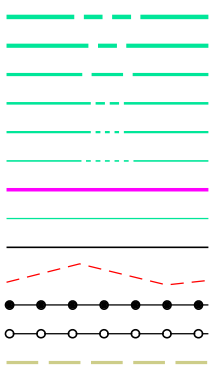
Hedge  
Highway R.O.W. Marker  
Interstate Close Gate  
Iron Pin  
Irrigation Ditch  
Lake Edge  
Lawn Sprinkler  
Mailbox  
Manhole Electric  
Manhole Gas  
Manhole Misc  
Manhole Sanitary Sewer  
Manhole Storm Sewer  
Manhole Telephone  
Manhole Water  
Merry-Go-Round  
Microwave Radio Tower  
Misc. Line  
Misc. Property Corner  
Misc. Post  
Overhang Or Encroachment  
Overhead Utility Line  
Parking Meter  
Pipe With End Section  
Pipe With Headwall  
Pipe Without End Section  
Playground Slide  
Playground Swing  
Power And Light Pole  
Power And Telephone Pole  
Power Meter  
Power Pole  
Power Pole And Transformer  
Power Tower Structure  
Propane Tank  
Property Pipe  
Property Pipe With Cap  
Property Stone  
Public Telephone  
Railroad Crossing Signal  
Railroad Milepost Marker  
Railroad Profile  
Railroad R.O.W. Marker  
Railroad Signs  
Railroad Switch  
Railroad Track  
Railroad Trestle  
Rebar  
Rebar With Cap  
Reference Mark  
Regulatory Sign One Post  
Regulatory Sign Two Post  
Retaining Wall  
Riprap  
River Edge  
Rock And Wire Baskets  
Rockpiles  
Satellite Dish  
Septic Tank

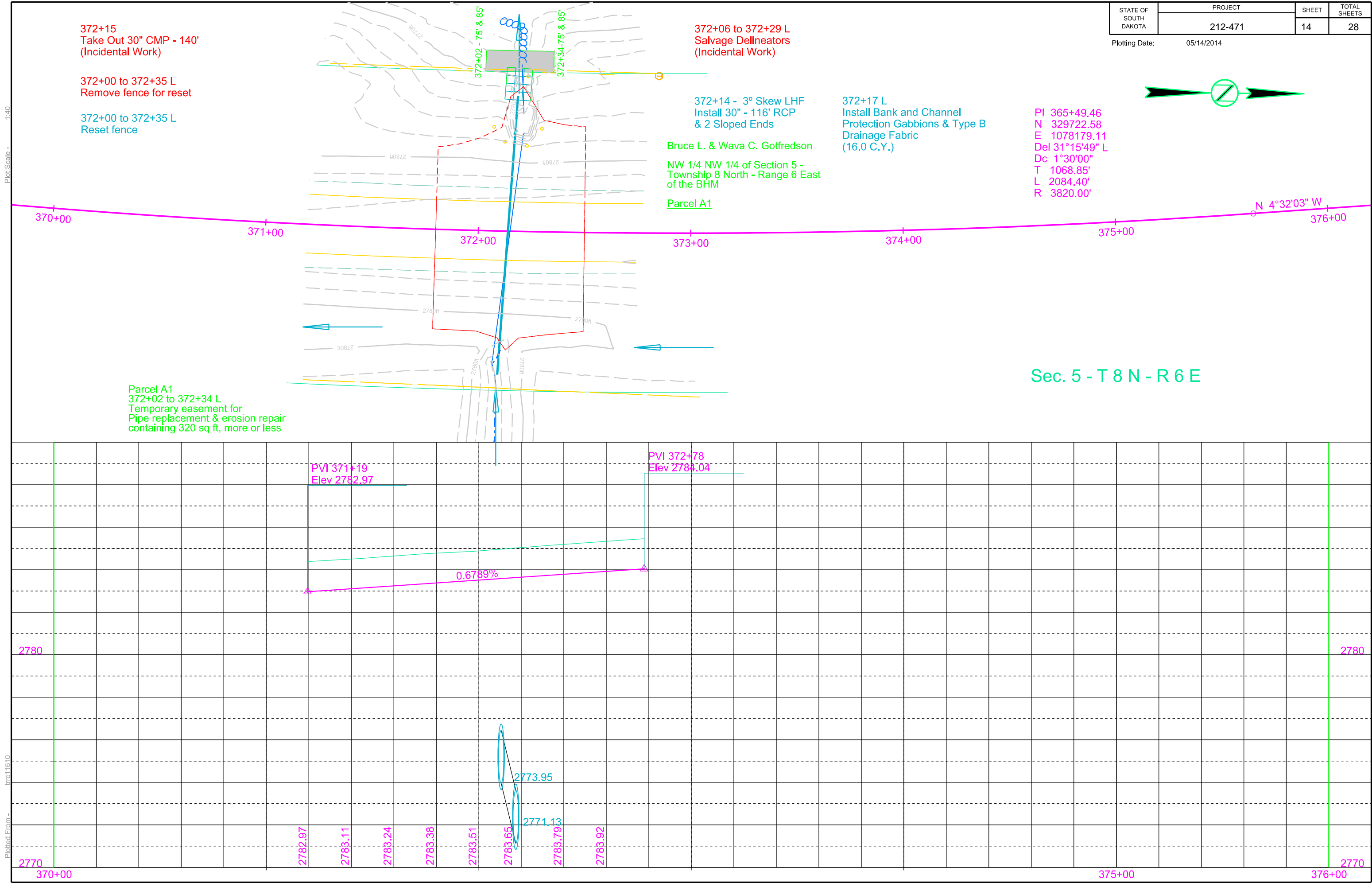


Shrub Tree  
Sidewalk  
Sign Face  
Sign Post  
Slough Or Marsh  
Spring  
Stream Gauge  
Street Marker  
Subsurface Utility Exploration Test Hole  
Telephone Fiber Optics  
Telephone Junction Box  
Telephone Pole  
Television Cable Jct Box  
Television Tower  
Test Wells/Bore Holes  
Traffic Signal  
Trash Barrel  
Tree Belt  
Tree Coniferous  
Tree Deciduous  
Tree Stumps  
Triangulation Station  
Underground Electric Line  
Underground Gas Line  
Underground High Pressure Gas Line  
Underground Sanitary Sewer  
Underground Storm Sewer  
Underground Tank  
Underground Telephone Line  
Underground Television Cable  
Underground Water Line  
Warning Sign One Post  
Warning Sign Two Post  
Water Fountain  
Water Hydrant  
Water Meter  
Water Tower  
Water Valve  
Water Well  
Weir Rock  
Windmill  
Wingwall  
Witness Corner



State and National Line  
County Line  
Section Line  
Quarter Line  
Sixteenth Line  
Property Line  
Construction Line  
R. O. W. Line  
New R. O. W. Line  
Cut and Fill Limits  
Control of Access  
New Control of Access  
Proposed ROW  
(After Property Disposal)





Plot Scale - 1:200

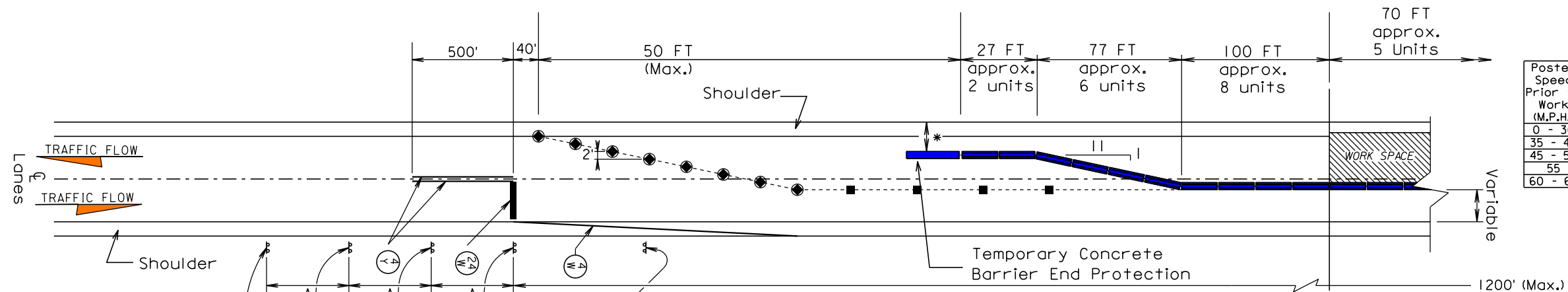
Plotted From - ttrc11610

# TEMPORARY MOVEABLE CONCRETE BARRIER PLACEMENT ON TWO LANE HIGHWAYS WITH A STOP CONDITION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	15	28

Plotting Date: 05/14/2014

Posted Speed Prior to Work (M.P.H.)	Minimum Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (L)
0 - 30	200	25	180
35 - 40	350	25	320
45 - 50	500	50	600
55	750	50	660
60 - 65	1000	50	780

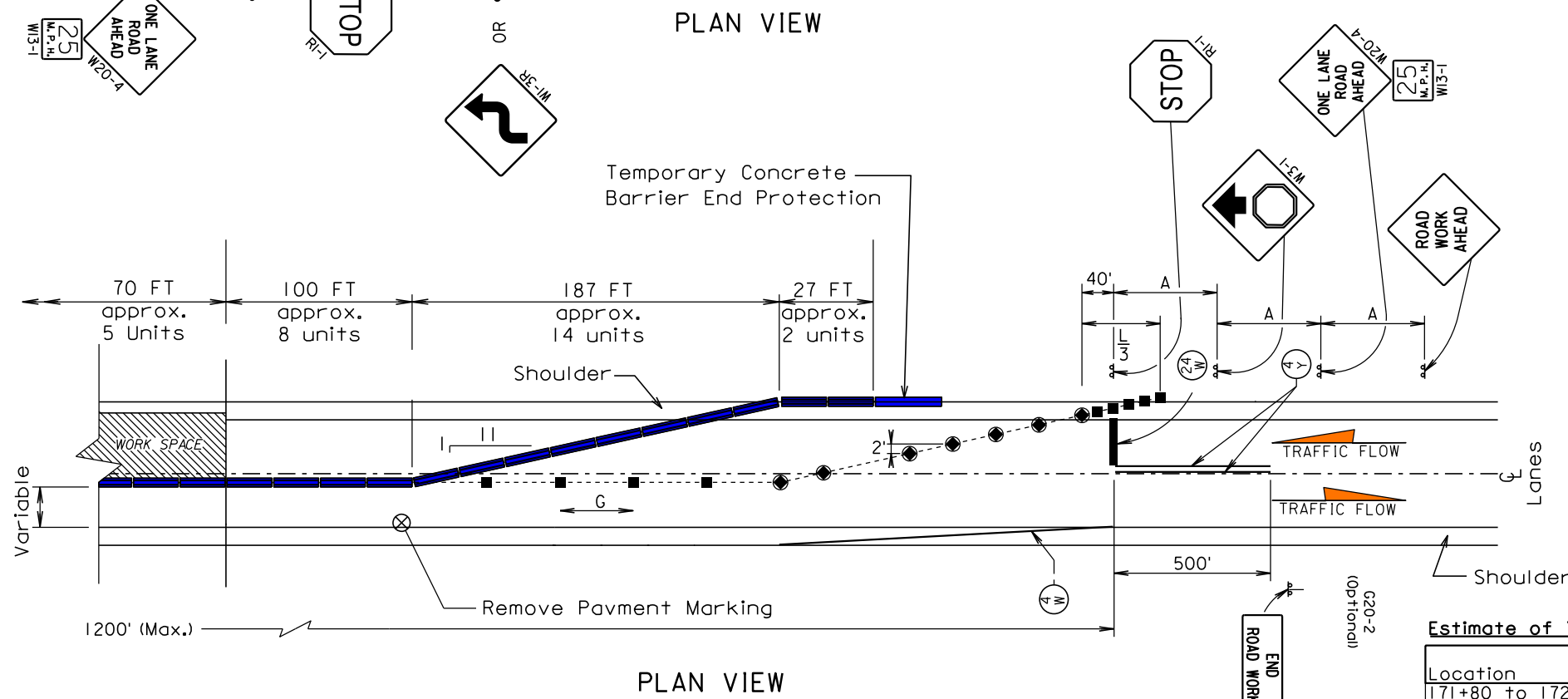


\*\*

- ②④ W 24" White Temporary Pavement Marking
- ④ Y 4" Yellow Temporary Pavement Marking
- ④ W 4" White Temporary Pavement Marking
- Channelizing Device
- Channelizing Device (Drum Required)

\* 10 Foot Maximum Distance from edge of shoulder to temporary concrete barrier end protection. If construction access is not needed, temporary concrete barrier end protection shall be placed at edge of shoulder.

The concrete barrier lengths were estimated to be 13.5 feet long.



TEMPORARY ROAD MARKER  
REFLECTORIZED YELLOW  
(INSTALL 1 PER BARRIER  
ON TRAFFIC SIDE)

## GENERAL NOTES:

- \* 10 FOOT MAXIMUM DISTANCE FROM EDGE OF SHOULDER TO TEMPORARY CONCRETE BARRIER END PROTECTION. IF CONSTRUCTION ACCESS IS NOT NEEDED, TEMPORARY CONCRETE BARRIER END PROTECTION SHALL BE PLACED AT EDGE OF SHOULDER.

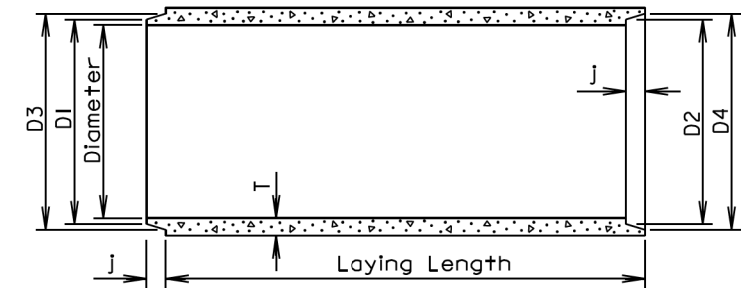
## Estimate of Traffic Control Moveable Concrete Barriers

Location	Approx. Length (ft)	Quantity of Barriers (each)
171+80 to 172+50	588	47 *

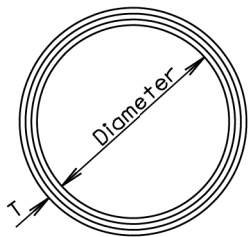
\* Includes 2 Tapered Ends to be used for Temporary Concrete Barrier End Protection

TOLERANCES IN DIMENSIONS

Diameter:  $\pm 1.5\%$  for 24" Dia. or less and  $\pm 1\%$  or  $\frac{3}{8}$ " whichever is more for 27" Dia. or greater.  
Diameters at Joints:  $\pm 3/16$ " for 30" Dia. or less and  $\pm 1/4$ " for 36" or greater.  
Length of joint (J):  $\pm 1/4$ ".  
Wall thickness (T): not less than design T by more than 5% or  $\frac{3}{16}$ ", whichever is greater.  
Laying length: shall not underrun by more than  $\frac{1}{2}$ ".



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

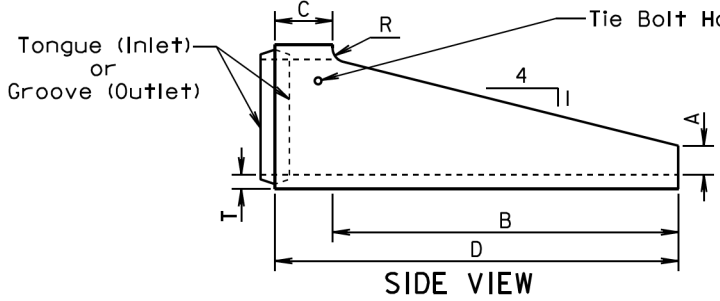
S  
D  
D  
O  
T

REINFORCED CONCRETE PIPE

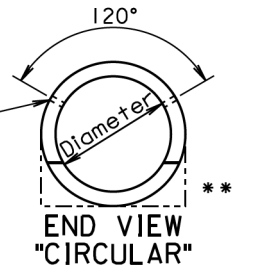
PLATE NUMBER  
450.01

Sheet 1 of 1

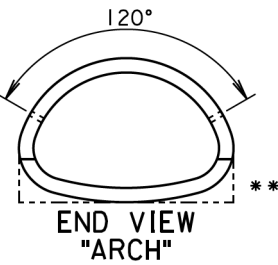
Published Date: 2nd Qtr. 2014



SIDE VIEW



END VIEW  
"CIRCULAR"



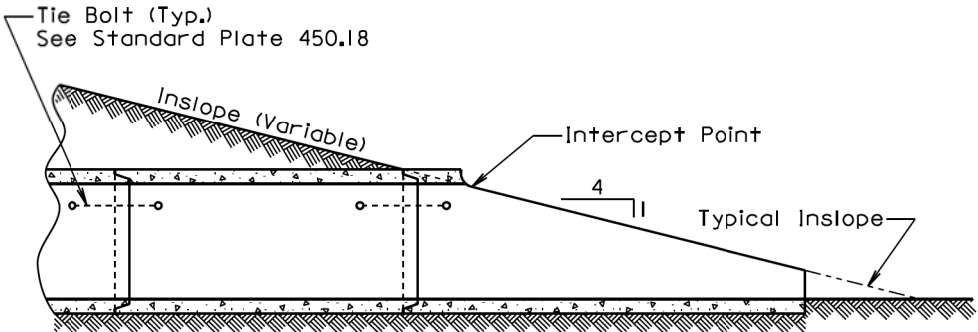
END VIEW  
"ARCH"

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	3 1/2	7 1/2	90	12	102	3 1/2
FOR ARCH PIPE						
* 24	3	6	48	12	60	3
* 30	3 1/2	7 1/2	60	12	72	3 1/2
* 36	4 1/2	8 5/8	66	30	96	0
* 42	4 1/2	10	77 1/4	18 3/4	96	0

\* Equivalent Diameter of Circular R.C.P.

\*\* Acceptable Flat Bottom Alternate.

Dia. (in.)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	R (in.)
ALTERNATE FOR CIRCULAR PIPE						
24	3	9	72	12	84	0
30	3 1/2	11	90	12	102	0
FOR ARCH PIPE						
* 24	3	9	48	12	60	0
* 30	3 1/2	11	60	12	72	0



SECTION  
(Along Centerline of Pipe)

GENERAL NOTE:

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

September 22, 2006

S  
D  
D  
O  
T

R. C. P. SLOPED ENDS

PLATE NUMBER  
450.13

Sheet 1 of 1

Published Date: 2nd Qtr. 2014



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 adjustable eye bolt tie assembly in accordance with ASTM A153.



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.



**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.

February 28, 2013



END VIEW  
"ARCH"

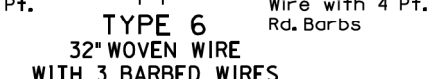
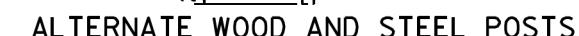
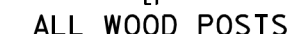
**Published Date: 2nd Qtr. 2014**

SD  
DOT

### **TIE BOLTS FOR R.C.P. AND R.C.P. ARCH**

PLATE NUMBER  
450.18

Sheet 1 of 1



GENERAL NOTES:

Fence types designated on the plans that are followed by the letter S shall 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.

September 14, 2009

**Published Date: 2nd Qtr. 2014**

**S  
D  
D  
C  
T**

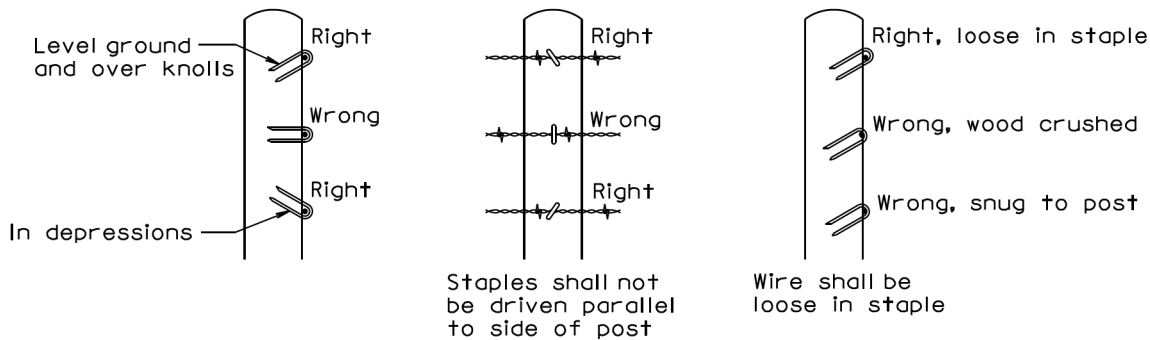
**RIGHT-OF-WAY FENCE**

PLATE NUMBER  
620.01

Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	18	28

Plotting Date: 05/14/2014



STAPLE INSTALLATION

GENERAL NOTES:

The Right-of-Way fence shall consist of barbed wire or a combination of woven wire and barbed wire. The barbed wire and/or woven wire shall be fastened to all wood posts or fastened to alternating wood and steel posts. Only wood posts shall be used for brace panels. Gates shall be of the type designated in the plans or as otherwise directed by the Engineer. Fence shall 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 shall 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 shall 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 shall be fabricated from zinc coated 14 ga. wire. Two point barbs shall be wrapped twice around one main strand at 4" spacings and the four point barbs shall be interlocked and wrapped around both main strands at 5" 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 shall be as stated in AASHTO M281. Woven wire shall conform to design and specifications of ASTM A116 and barbed wire shall conform to ASTM A121.

December 23, 2004

<b>Published Date: 2nd Qtr. 2014</b>	<b>S D D O T</b>	<b>STAPLE INSTALLATION AND GENERAL RIGHT-OF-WAY FENCE NOTES</b>	PLATE NUMBER 620.02
			Sheet 1 of 1

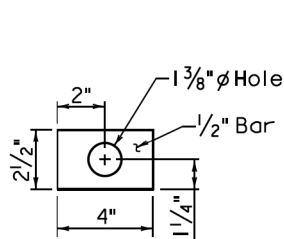
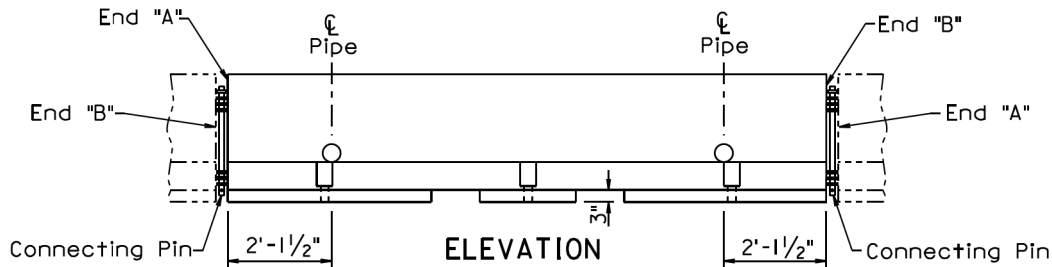
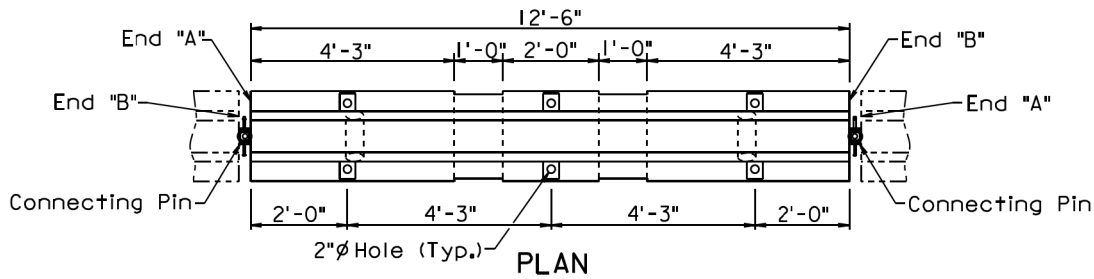
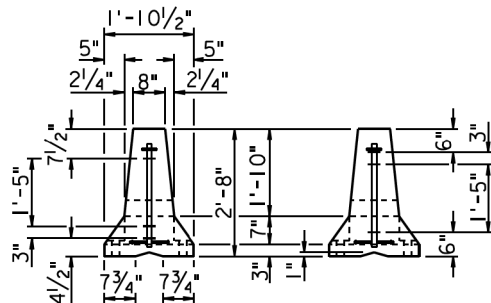
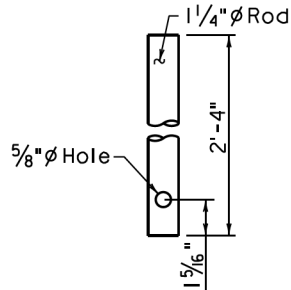


PLATE A

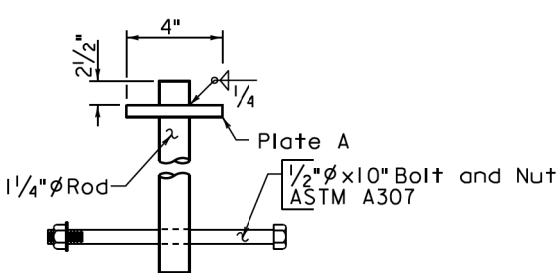


VIEW  
END A

VIEW  
END B



CONNECTING PIN DETAIL



ASSEMBLED CONNECTING PIN

June 26, 2009

<b>Published Date: 2nd Qtr. 2014</b>	<b>S D D O T</b>	<b>TRAFFIC CONTROL MOVABLE CONCRETE BARRIERS (F SHAPE INTERIOR SECTION)</b>	PLATE NUMBER 628.01
			Sheet 1 of 2

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	19	28

Plotting Date: 05/14/2014

GENERAL NOTES:

The detailed drawings are for illustrative purpose and depicts the current version of the F shape concrete barrier. If new movable concrete barriers are requested on a project, they shall be constructed according to the F shape movable concrete barrier details on standard plate 628.10.

Each movable concrete barrier section weighs 5030 ± pounds.

Each movable concrete barrier section is detailed to provide end "A" to end "B" connection by insertion of a pin through steel loops.

The Jersey shape or any version of the F shape traffic control movable concrete barriers may be used on a project, however, only the same type or version shall be used for each run of barriers.

Movable concrete barrier sections shall be placed to provide uniform bearing of the sections with the paved surface as approved by the Engineer.

Movable concrete barrier sections shall never be moved or lifted using the end loops.

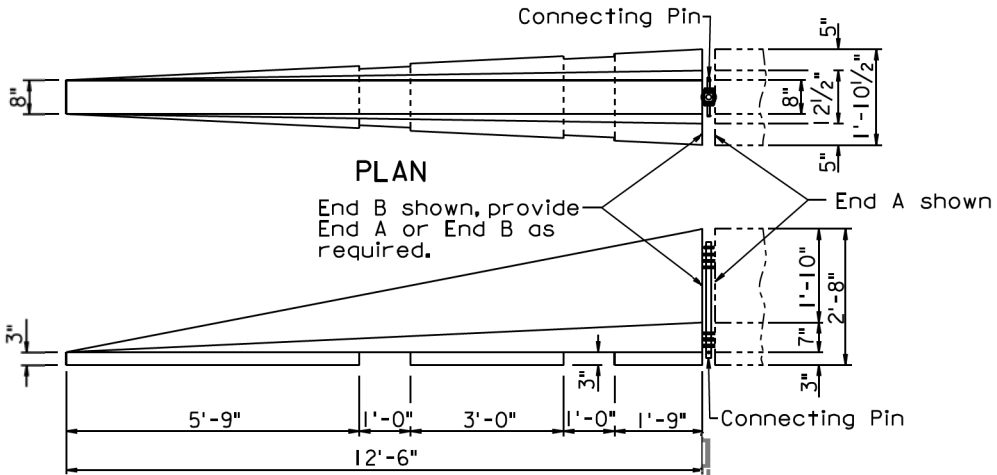
Movable concrete barrier sections that have been damaged shall not be used. Barrier sections are considered damaged if the loops are end welded onto existing damaged loops, loops are fractured, or there is exposed rebar from fractured concrete.

All cost for transporting the barriers from the specified location to the project site, installing, and returning the barriers to the specified location shall be incidental to the contract unit price per each for "Traffic Control Movable Concrete Barrier".

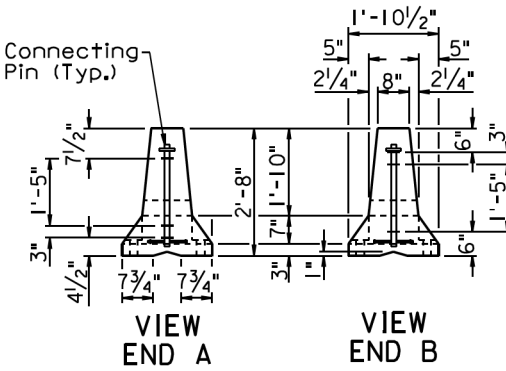
If the concrete barriers need to be moved and reset on the project, requiring the barriers to be transported by truck, all cost for removing, transporting, and resetting the barriers shall be incidental to the contract unit price per each for "Remove and Reset Traffic Control Movable Concrete Barrier". All cost for small shifts in alignment of the barriers, not requiring the barriers to be transported by truck, shall be incidental to various contract items.

June 26, 2009

<i>Published Date: 2nd Qtr. 2014</i>	<b>S D D O T</b>	<b>TRAFFIC CONTROL MOVABLE CONCRETE BARRIERS (F SHAPE INTERIOR SECTION)</b>	PLATE NUMBER 628.01
			Sheet 2 of 2

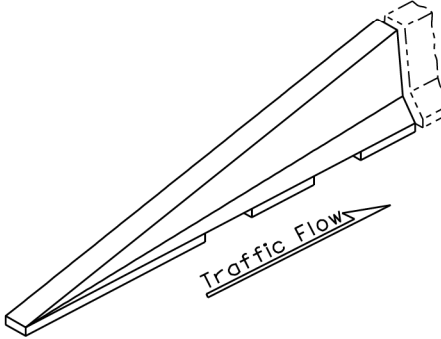


ELEVATION



VIEW  
END A

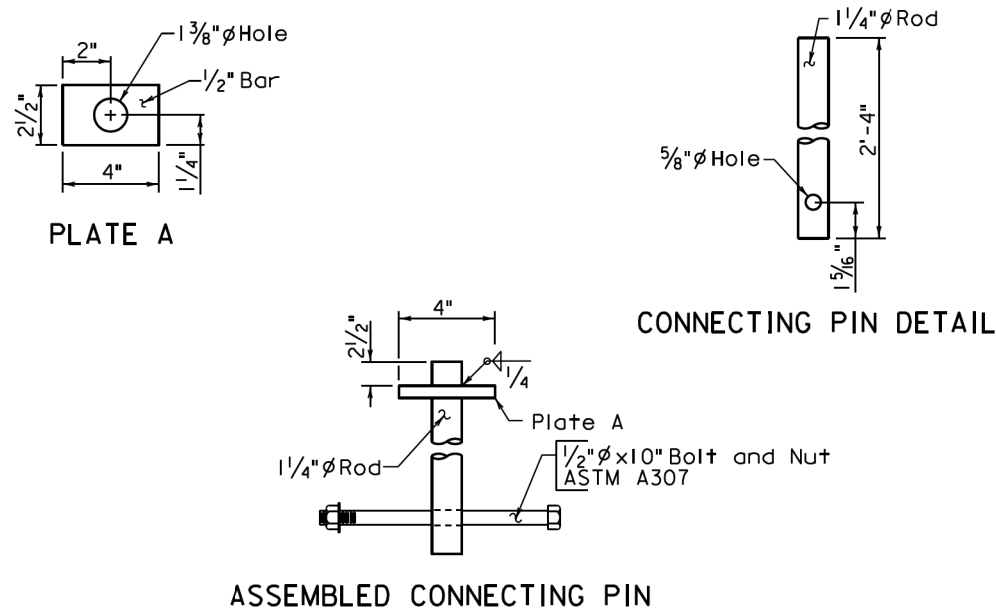
VIEW  
END B



ISOMETRIC

June 26, 2009

<i>Published Date: 2nd Qtr. 2014</i>	<b>S D D O T</b>	<b>TRAFFIC CONTROL MOVABLE CONCRETE BARRIERS (F SHAPE END SECTION)</b>	PLATE NUMBER 628.02
			Sheet 1 of 2



GENERAL NOTES:

The detailed drawings are for illustrative purpose and depicts the current version of the F shape concrete barrier end section. If new concrete barrier end sections are requested on a project, they shall be constructed according to the F shape movable concrete barrier end section details on standard plate 628.11.

Each movable concrete barrier end section weighs 2450 ± pounds.

Each movable concrete barrier end section is detailed to provide end "A" to end "B" connection by insertion of a pin through steel loops.

The Jersey shape or any version of the F shape traffic control movable concrete barriers may be used on a project, however, only the same type or version shall be used for each run of barriers.

Movable concrete barrier sections shall be placed to provide uniform bearing of the sections with the paved surface as approved by the Engineer.

Movable concrete barrier end sections shall never be moved or lifted using the end loops.

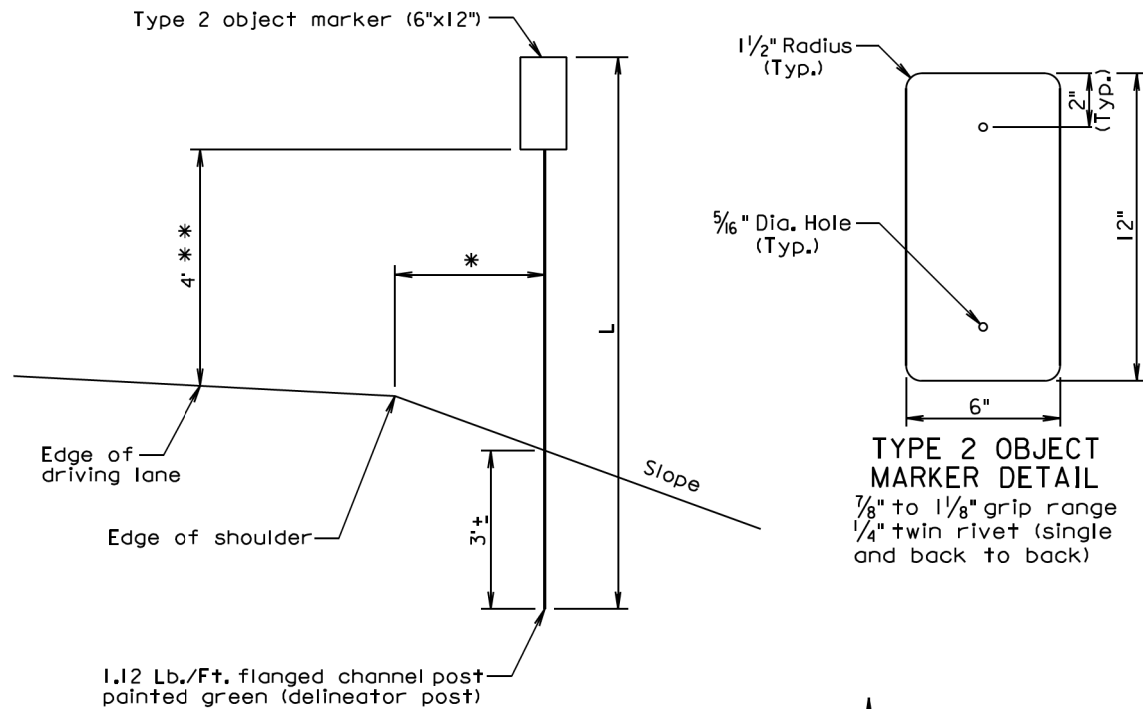
Movable concrete barrier end sections that have been damaged shall not be used. Barrier sections are considered damaged if the loops are end welded onto existing damaged loops, loops are fractured, or there is exposed rebar from fractured concrete.

All cost for transporting the barriers from the specified location to the project site, installing, and returning the barriers to the specified location shall be incidental to the contract unit price per each for "Traffic Control Movable Concrete Barrier".

If the concrete barriers need to be moved and reset on the project, requiring the barriers to be transported by truck, all cost for removing, transporting, and resetting the barriers shall be incidental to the contract unit price per each for "Remove and Reset Traffic Control Movable Concrete Barrier". All cost for small shifts in alignment of the barriers, not requiring the barriers to be transported by truck, shall be incidental to various contract items.

June 26, 2009

<i>Published Date: 2nd Qtr. 2014</i>	<b>S D D O T</b>	<b>TRAFFIC CONTROL MOVABLE CONCRETE BARRIERS (F SHAPE END SECTION)</b>	<b>PLATE NUMBER</b> <b>628.02</b>
			<i>Sheet 2 of 2</i>



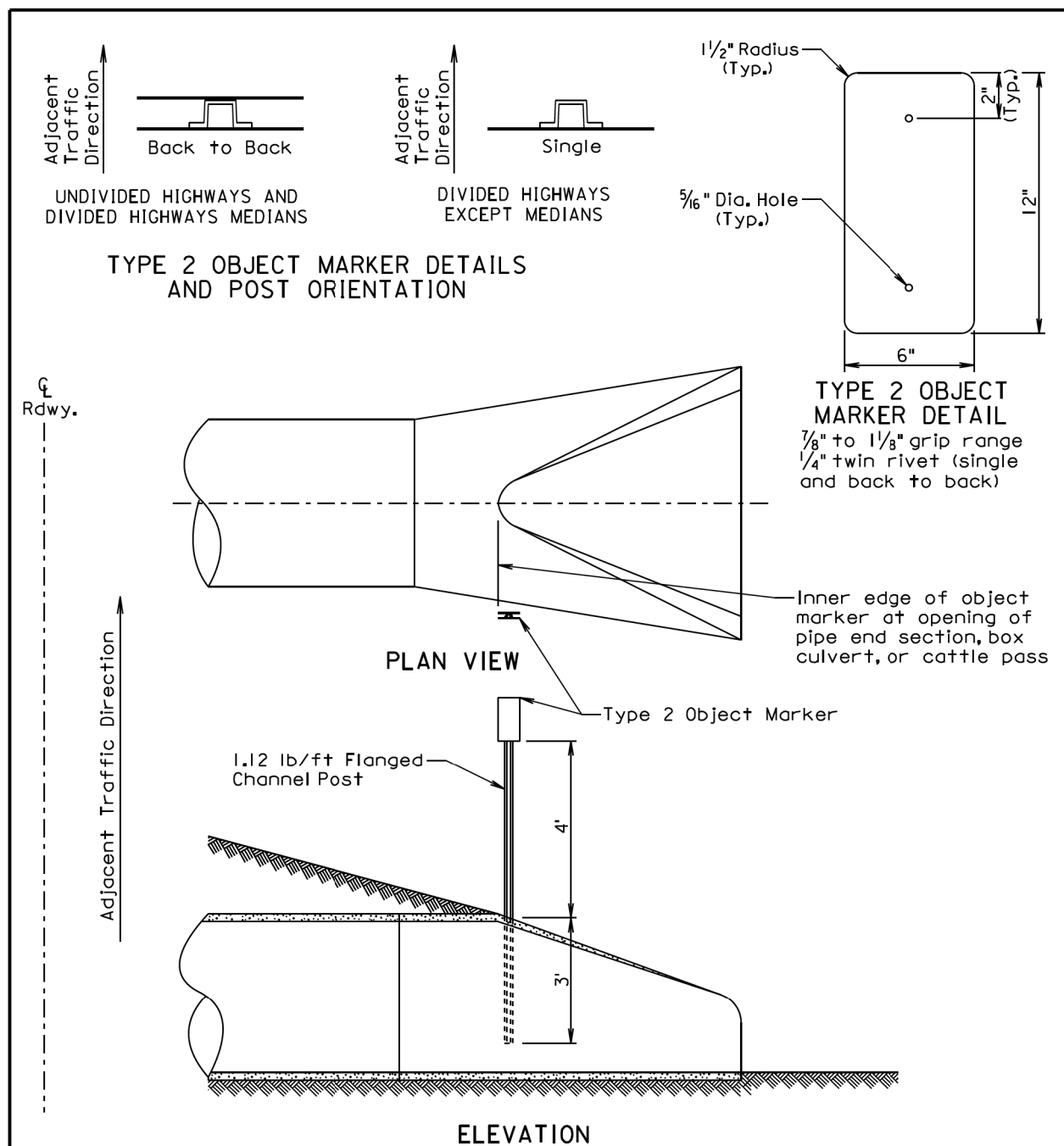
\* Type 2 object markers to be in same line as existing delineators. If no delineators are present, place type 2 object markers 6' from the edge of shoulder.

\*\* Type 2 object markers shall be 4' above the ground when placed more than 8' from edge of shoulder.

Distance To Marker (Ft.) *		2	3	4	5	6	7	8
		Post Length L (Ft.)						
Slope	4:1	9	9	9	9	10	10	10
	3:1	9	9	9	10	10	10	11

June 26, 2006

<i>Published Date: 2nd Qtr. 2014</i>	<i>S D D O T</i>	<i>TYPE 2 OBJECT MARKER (DIRECT DRIVE)</i>	<i>PLATE NUMBER</i> <i>632.01</i>
			<i>Sheet 1 of 1</i>



**GENERAL NOTES:**

The type 2 object markers shall conform to Standard Specifications Section 982.2 I.

The 1.12 lb/ft flanged channel post shall conform to Standard Specifications Section 982.2 1.6.

Payment for the type 2 object markers shall be in conformance with Standard Specification Section 632.5 C.

June 26, 2006

***S  
D  
D  
O  
T***

## TYPE 2 OBJECT MARKER INSTALLATION AT PIPE CULVERTS, BOX CULVERTS, AND CATTLE PASSES

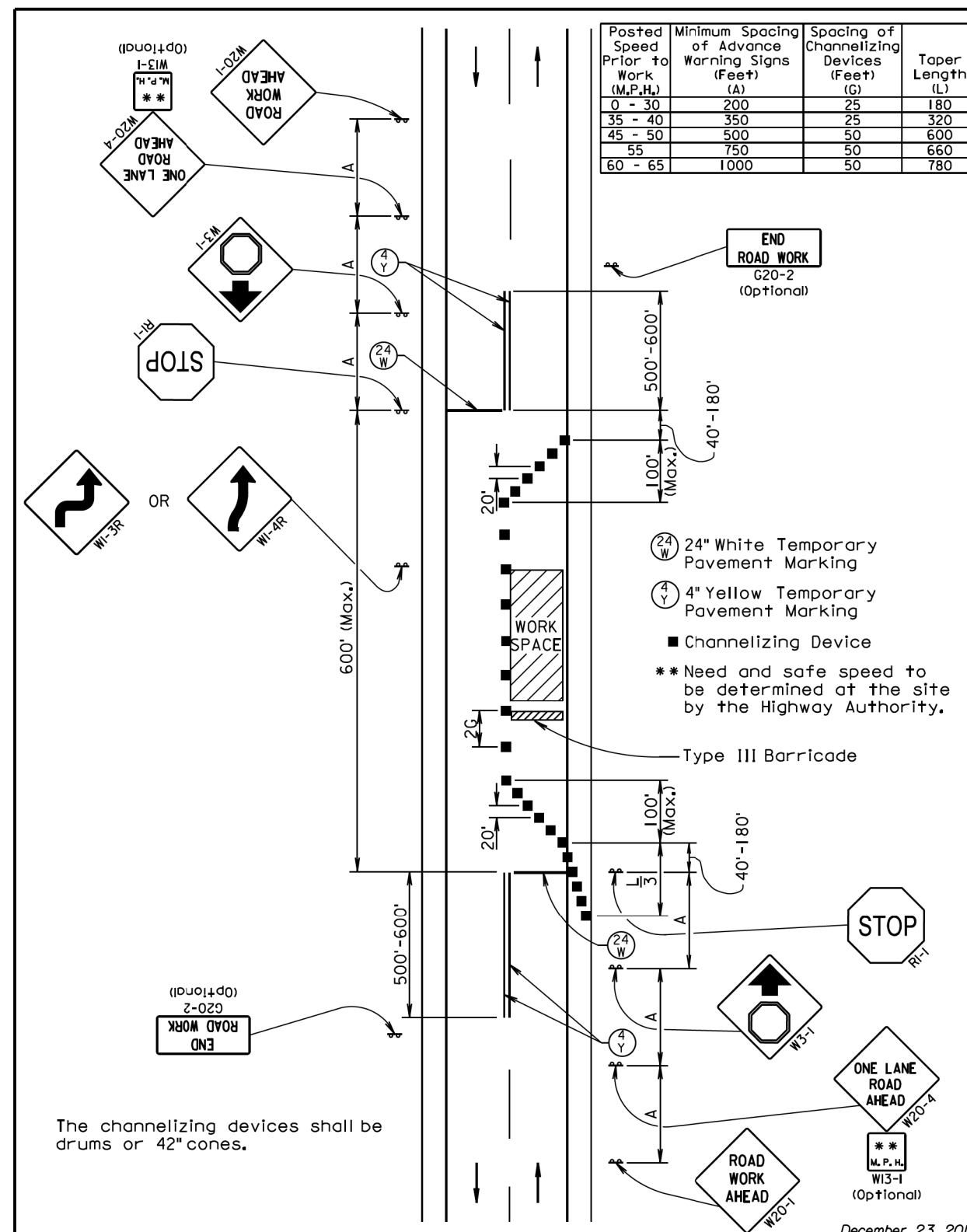
PLATE NUMBER  
632.10

Sheet 1 of 1

**Published Date: 2nd Qtr. 2014**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	21	28

Plotting Date: 05/14/2014



The channelizing devices shall be drums or 42" cones.

December 23, 2010

SDOT

## GUIDES FOR TRAFFIC CONTROL DEVICES

### LANE CLOSURE USING STOP SIGNS

PLATE NUMBER  
634.25

Sheet 1 of 1

**Published Date: 2nd Qtr. 2014**

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 42" cones.

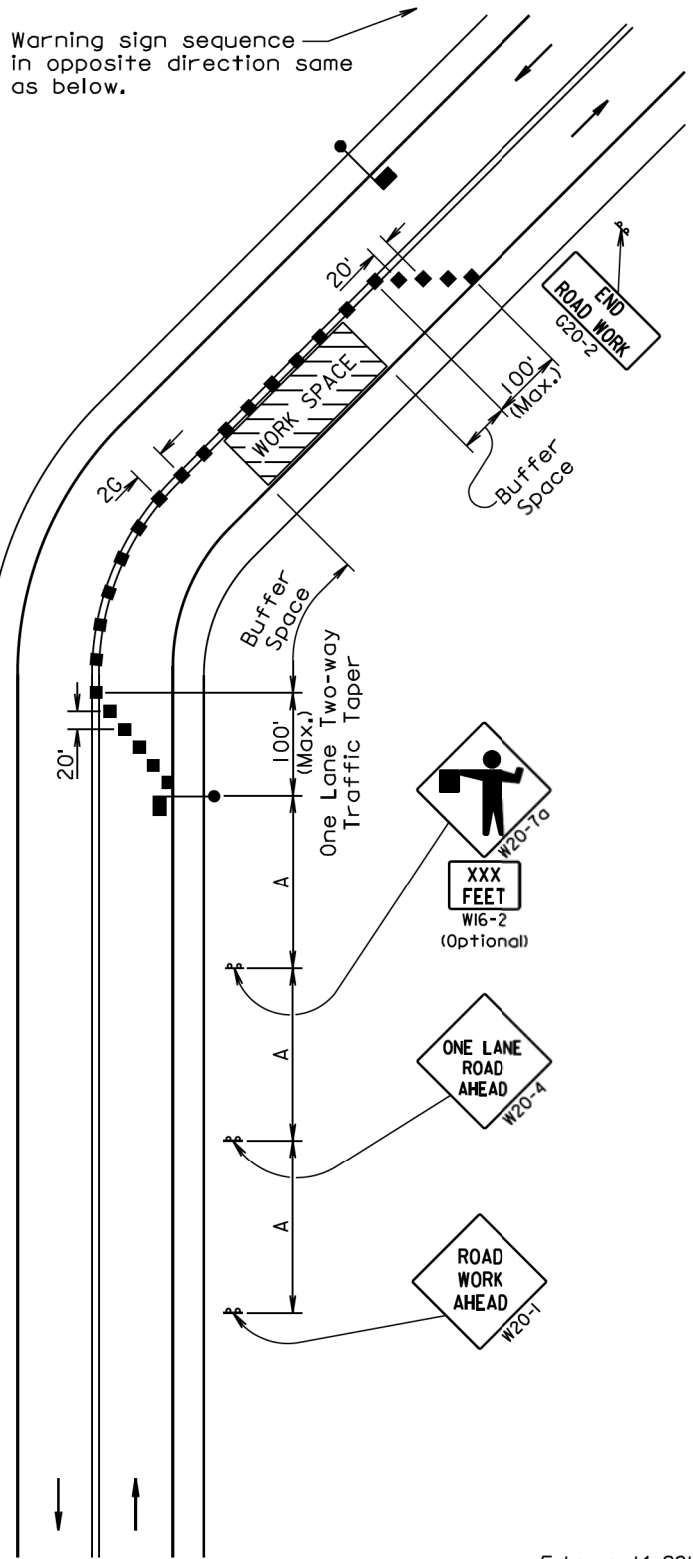
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

END ROAD WORK G20-2

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

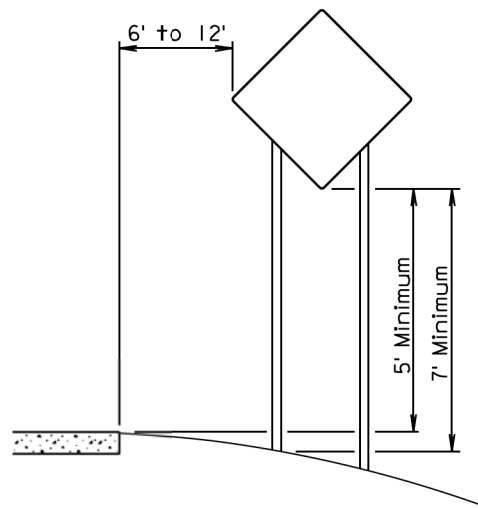
The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.

Warning sign sequence in opposite direction same as below.

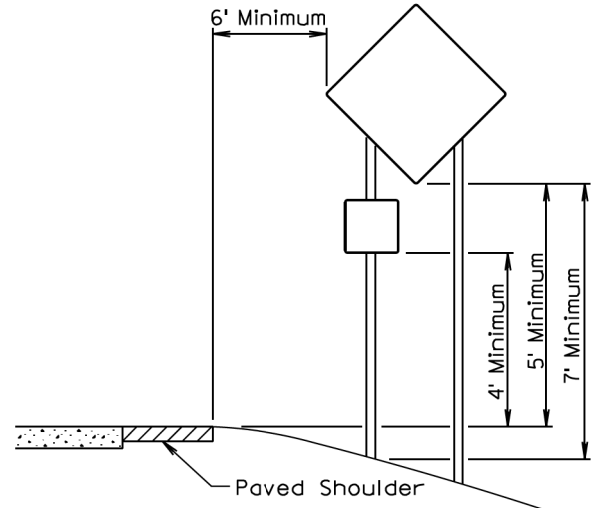


February 14, 2011

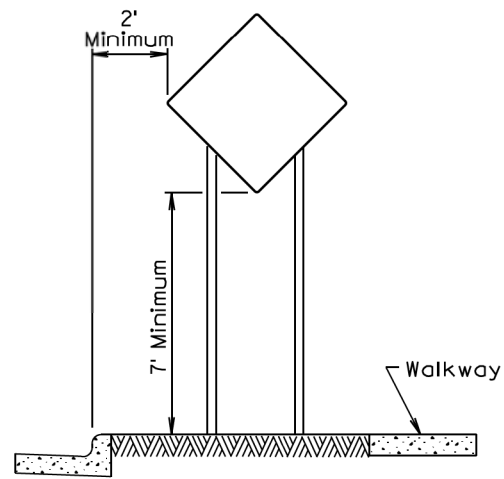
Published Date: 2nd Qtr. 2014	S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1



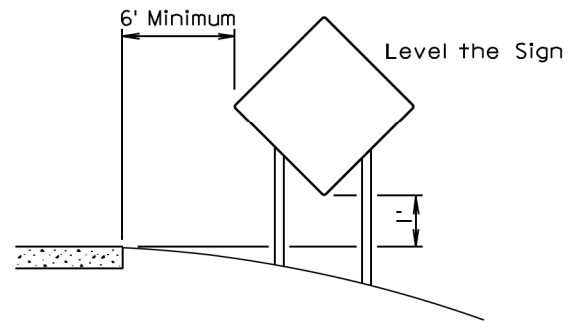
RURAL DISTRICT



RURAL DISTRICT WITH  
SUPPLEMENTAL PLATE



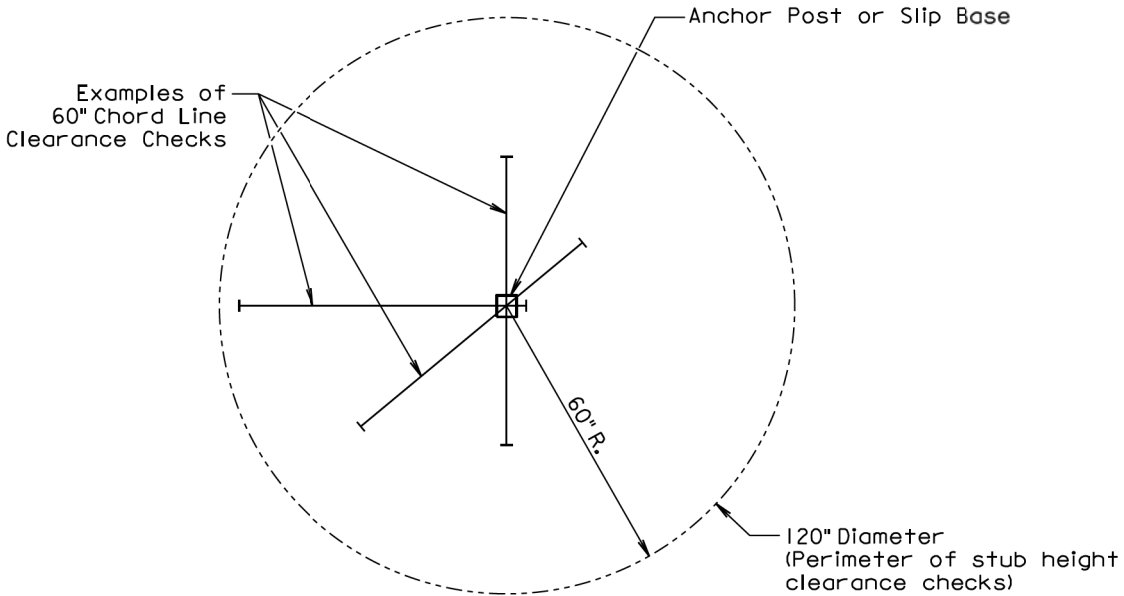
URBAN DISTRICT



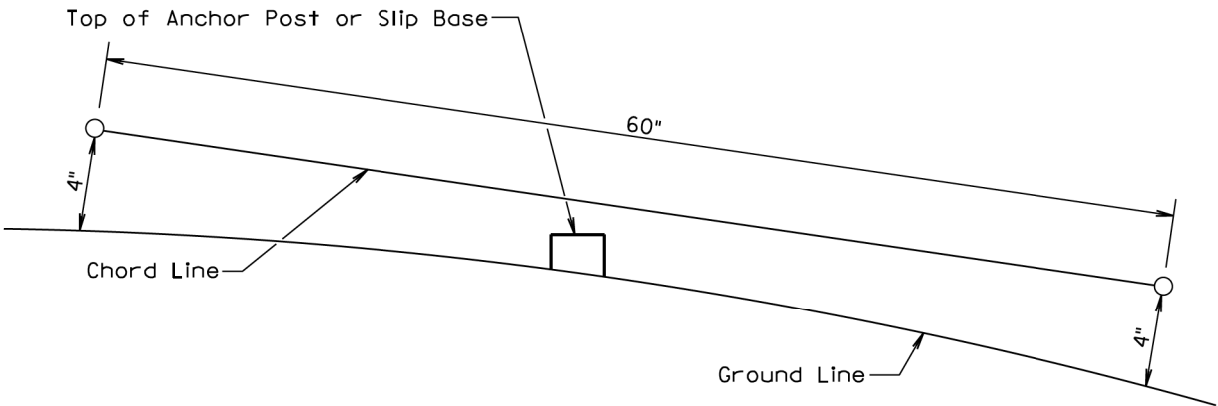
RURAL DISTRICT  
3 DAY MAXIMUM

February 14, 2011

Published Date: 2nd Qtr. 2014	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



**PLAN VIEW**  
(Examples of stub height clearance checks)



**ELEVATION VIEW**

**GENERAL NOTES:**

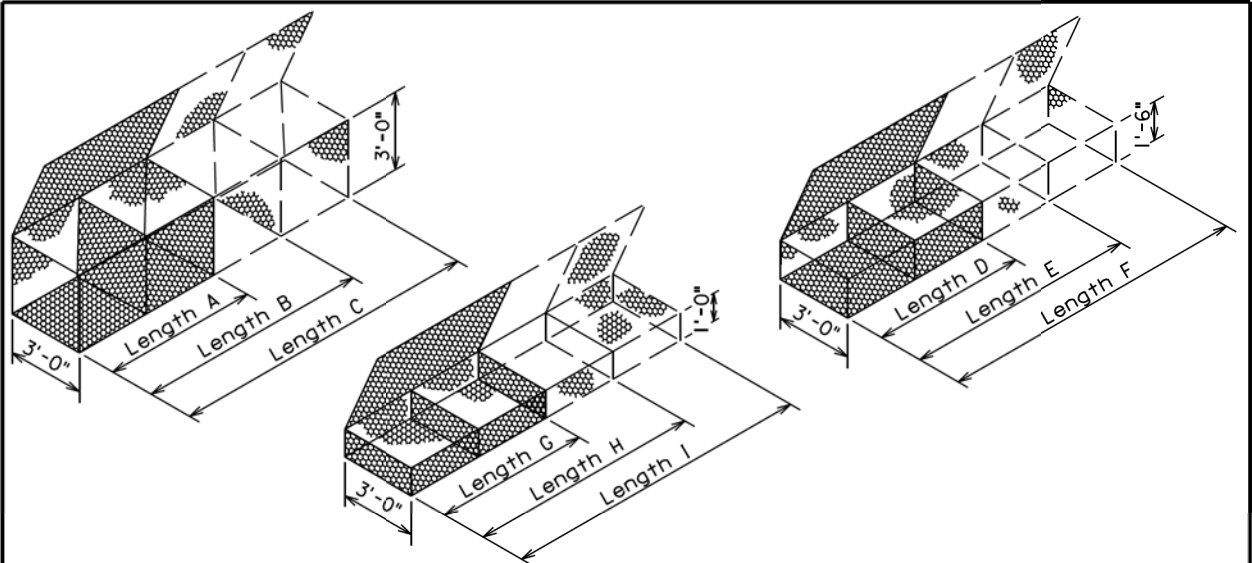
The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

<i>Published Date: 2nd Qtr. 2014</i>	<b>S D D O T</b>	<b>BREAKAWAY SUPPORT STUB CLEARANCE</b>	<b>PLATE NUMBER</b> <b>634.99</b>
			<i>Sheet 1 of 1</i>



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 1/2 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.

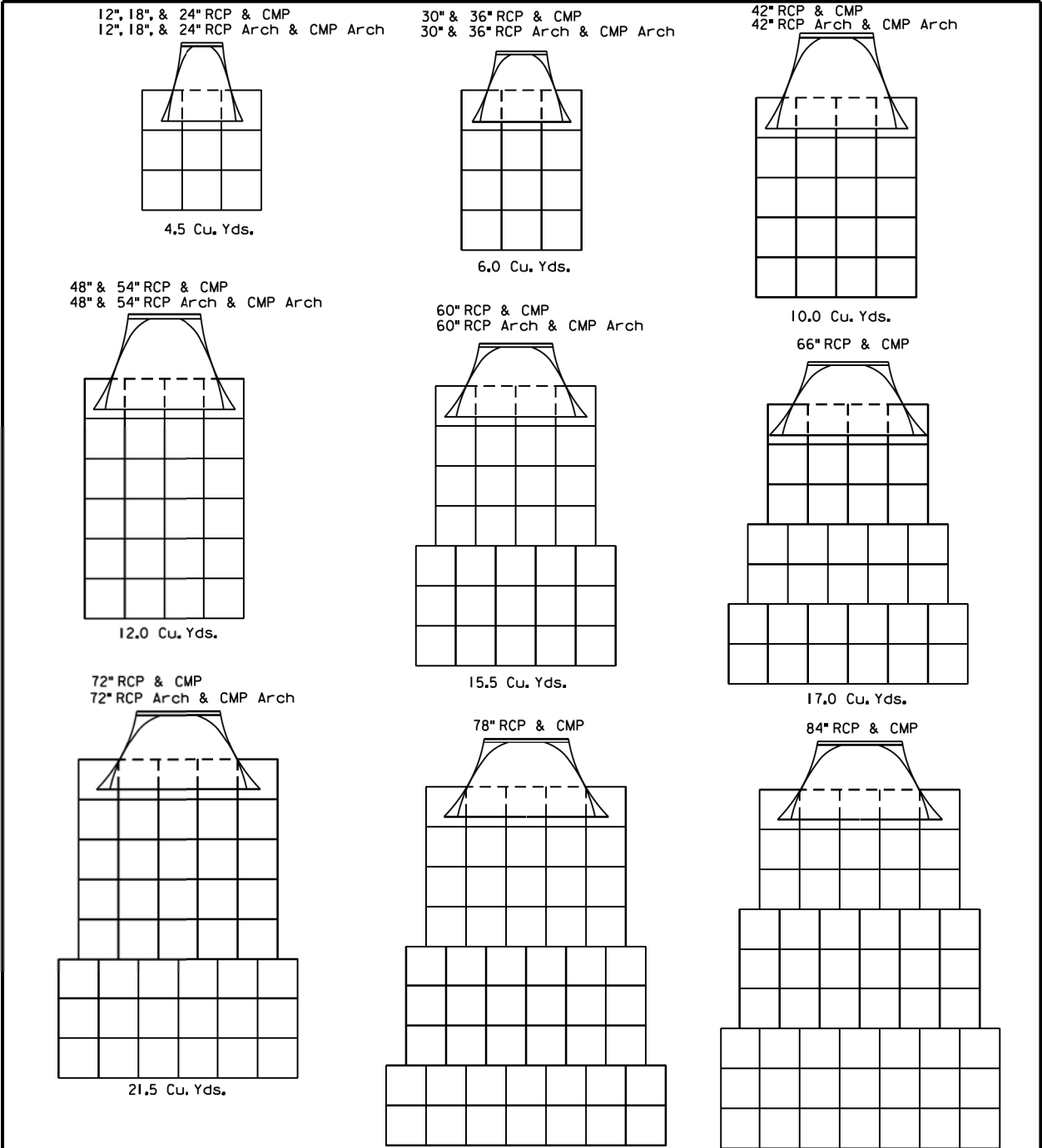
Wire lacing or interlocking type fasteners shall be used for gabion assembly and final construction of gabion structures. Interlocking fasteners for galvanized gabions shall be high tensile 0.120 inch diameter galvanized steel wire measured after galvanizing. The galvanizing shall conform to ASTM A641-92 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 I. 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.

June 26, 2001

Published Date: 2nd Qtr. 2014	S D D O T	BANK AND CHANNEL PROTECTION GABIONS	PLATE NUMBER 720.01
			Sheet 1 of 1



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).

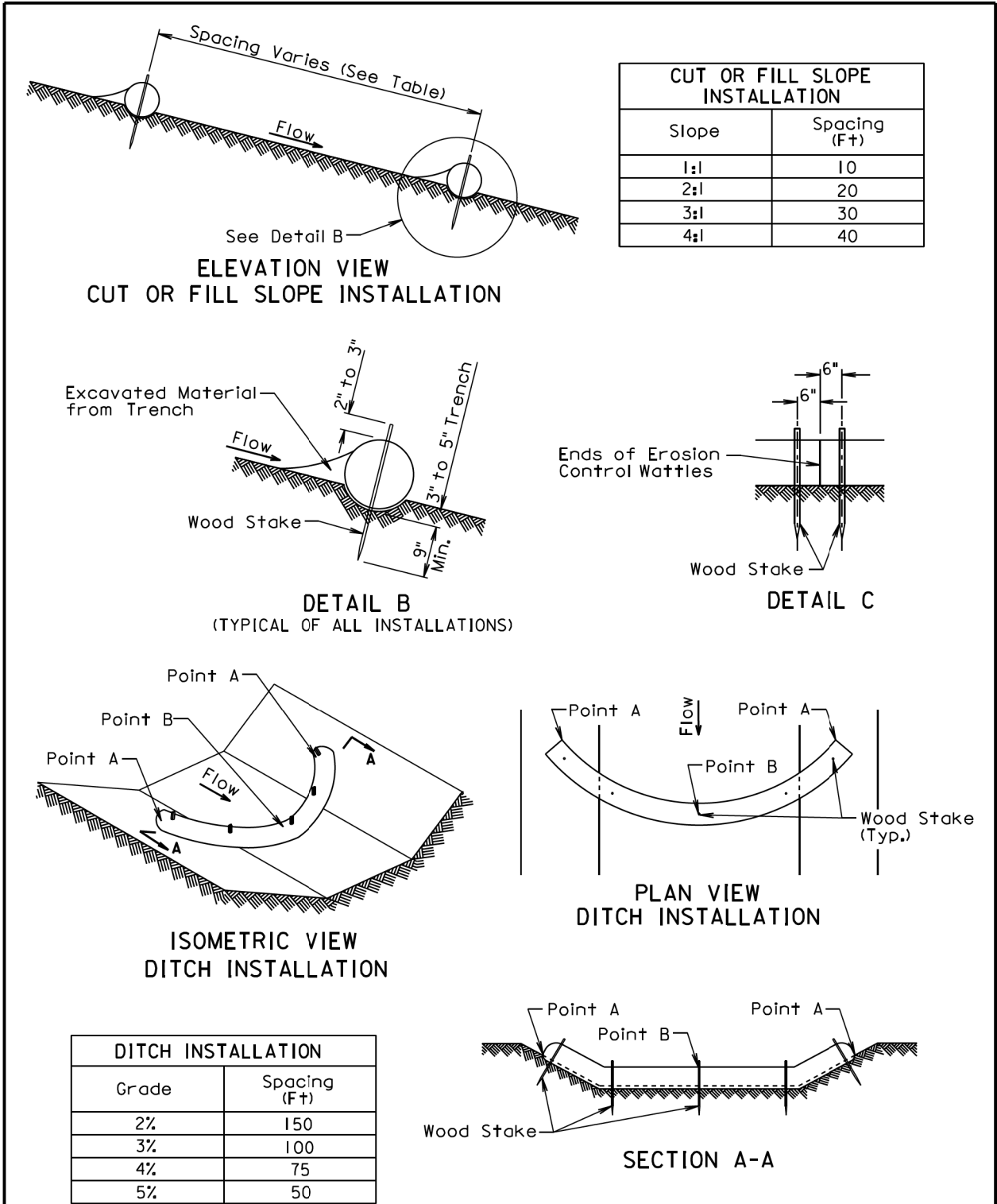
June 26, 2001

Published Date: 2nd Qtr. 2014	S D D O T	BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS	PLATE NUMBER 720.03
			Sheet 1 of 1



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	25	28

Plotting Date: 05/14/2014



December 23, 2004

<b>Published Date: 2nd Qtr. 2014</b>	<b>S D D O T</b>	<b>EROSION CONTROL WATTLE</b>	PLATE NUMBER 734.06
			Sheet 1 of 2

**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.

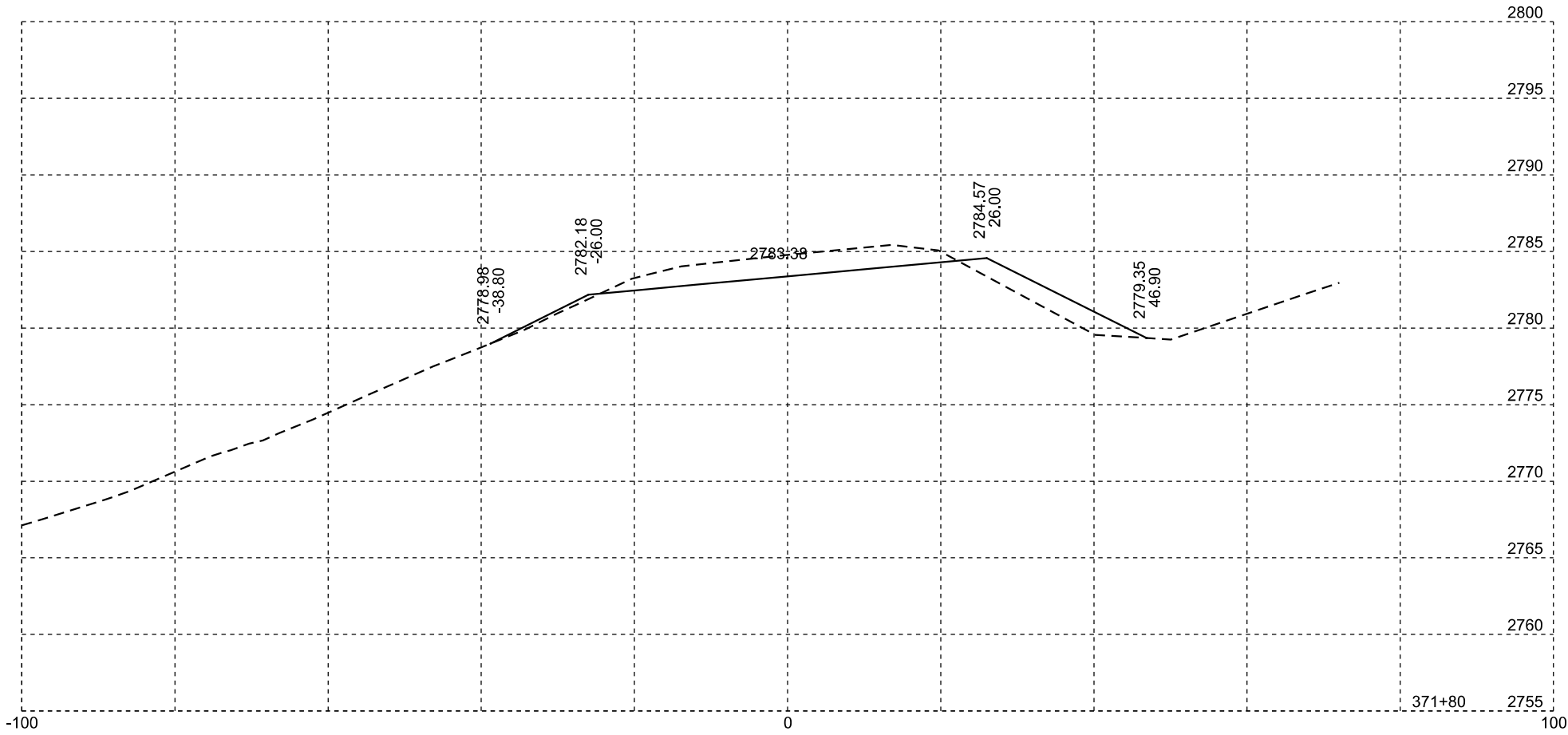
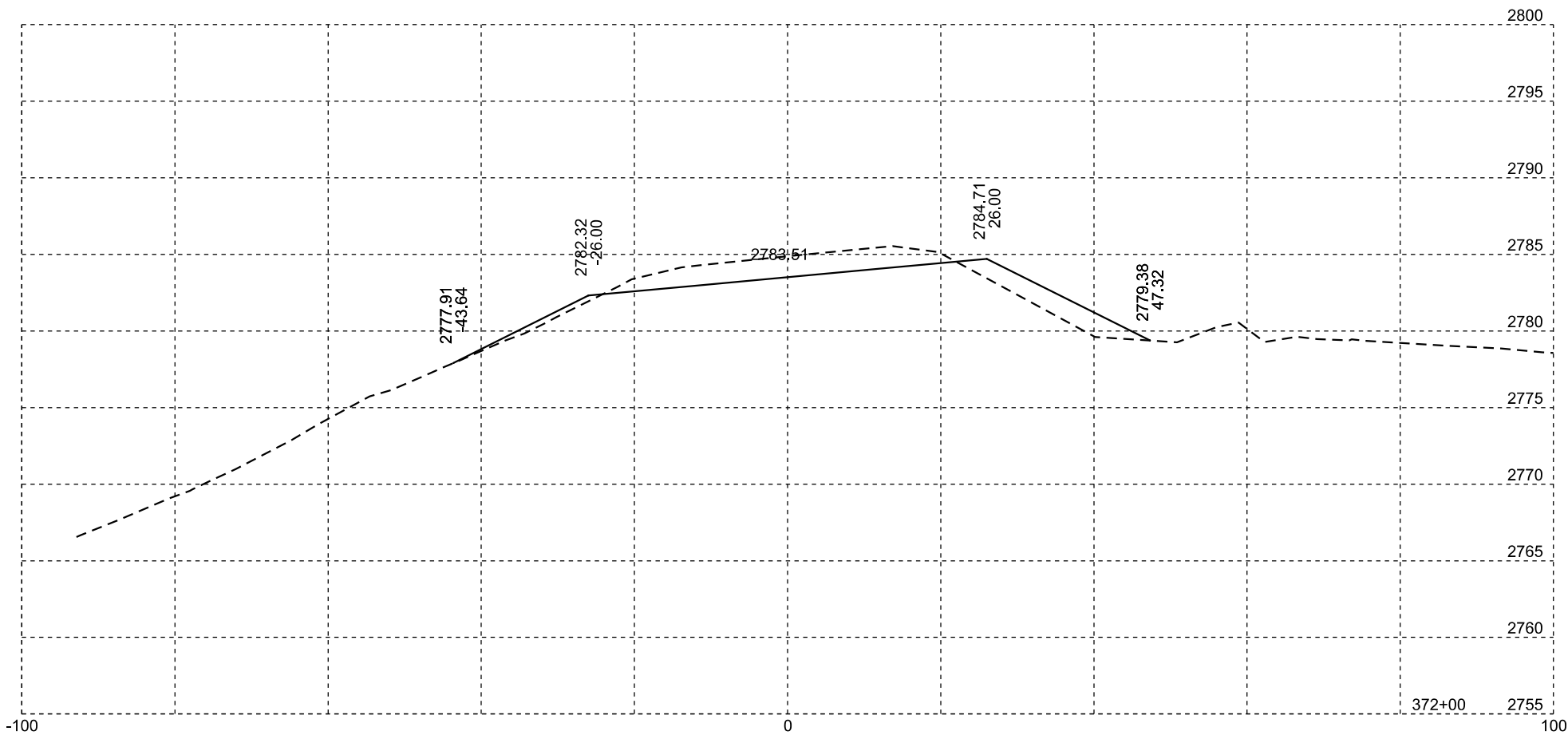
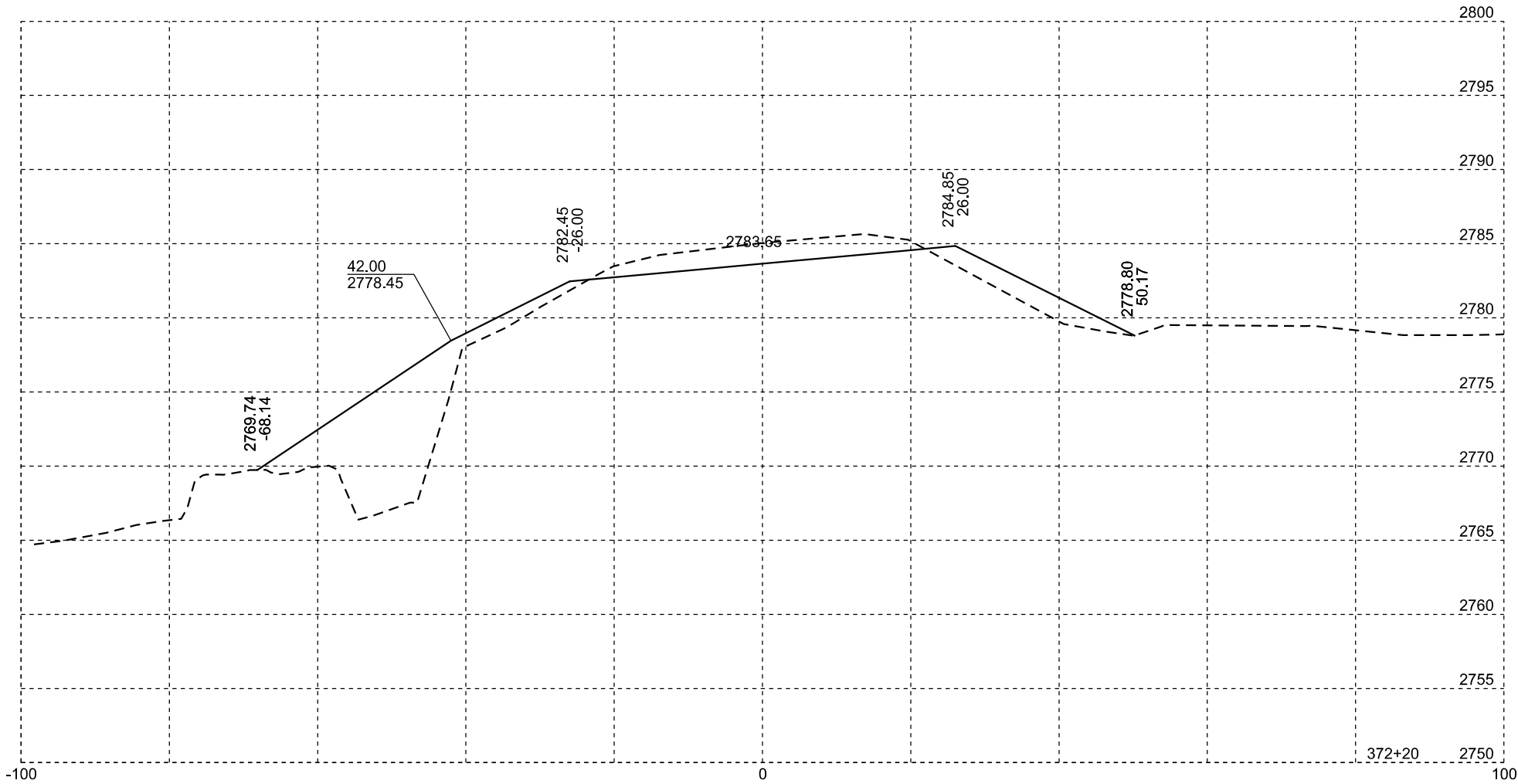
Sediment removal, disposal, or necessary shaping shall be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping shall be incidental to the contract unit price per cubic yard for "Remove Sediment".

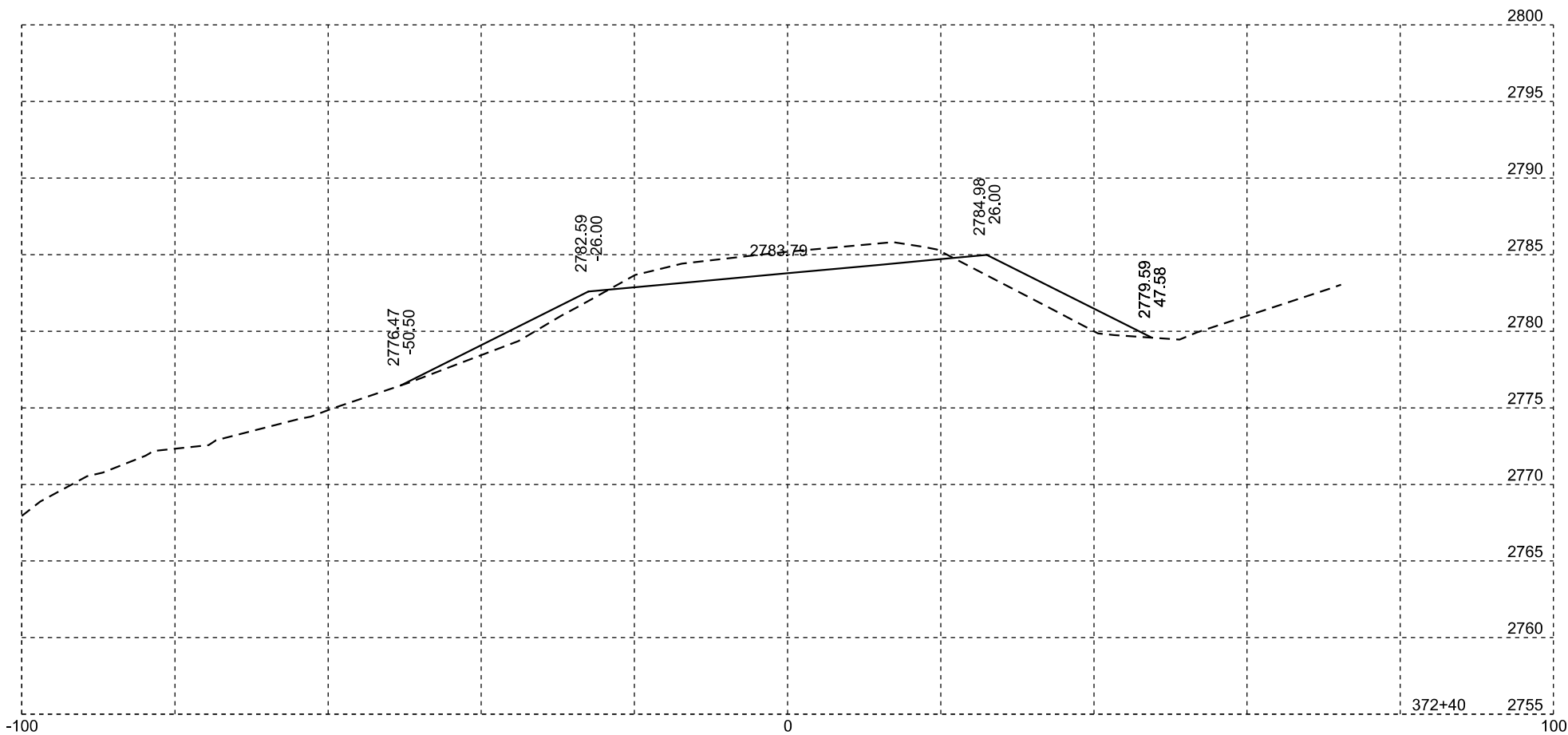
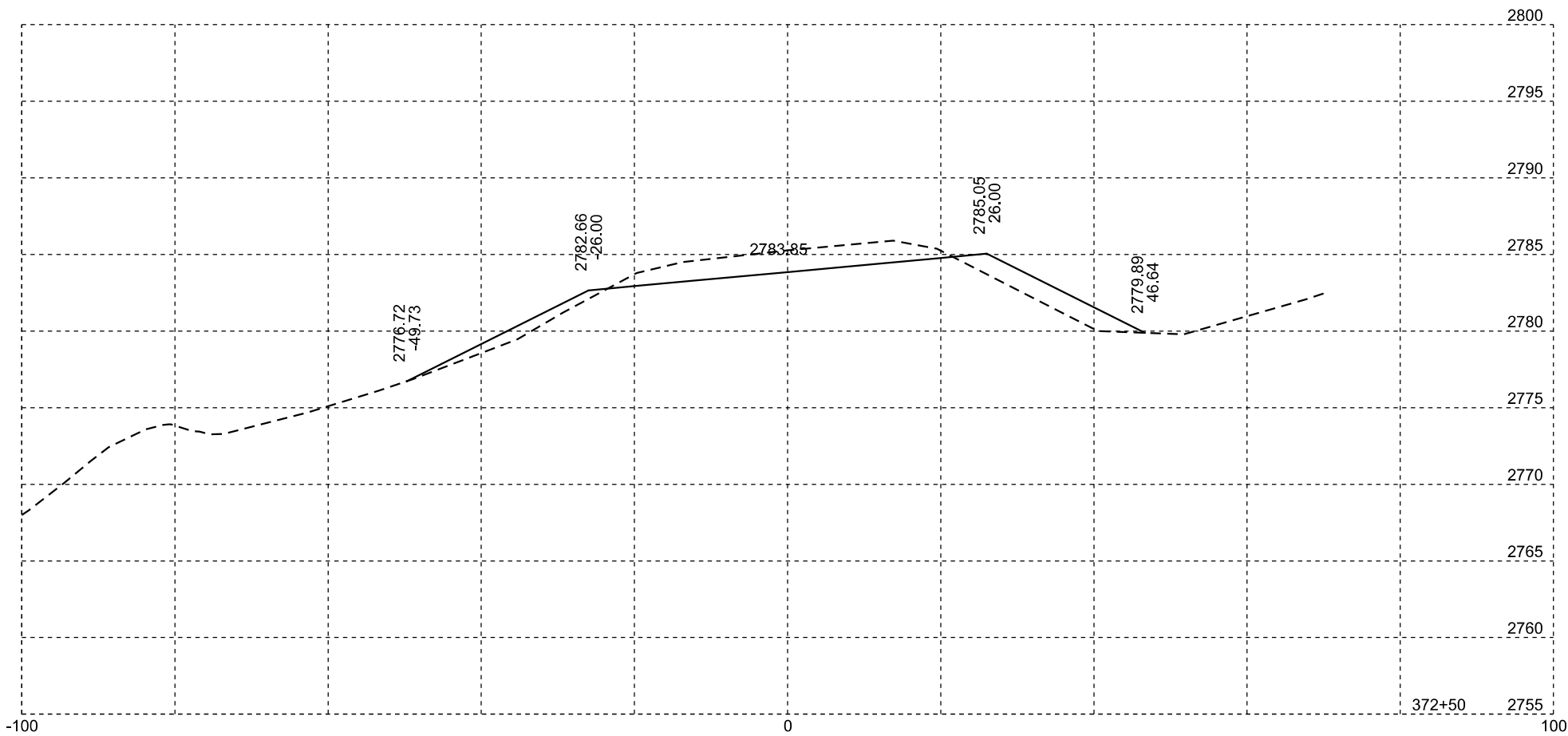
All costs for furnishing and installing the erosion control wattles including labor, equipment, and materials shall be incidental to the contract unit price per foot for the corresponding erosion control wattle bid item.

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".

December 23, 2004

<b>Published Date: 2nd Qtr. 2014</b>	<b>S D D O T</b>	<b>EROSION CONTROL WATTLE</b>	PLATE NUMBER 734.06
			Sheet 2 of 2





STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	212-471	28	28

