

PLOT SCALE - 200,000,000:1,000,000

PLOTTED FROM - TRRC11610

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT 212-471
SD HIGHWAY 212
BUTTE COUNTY

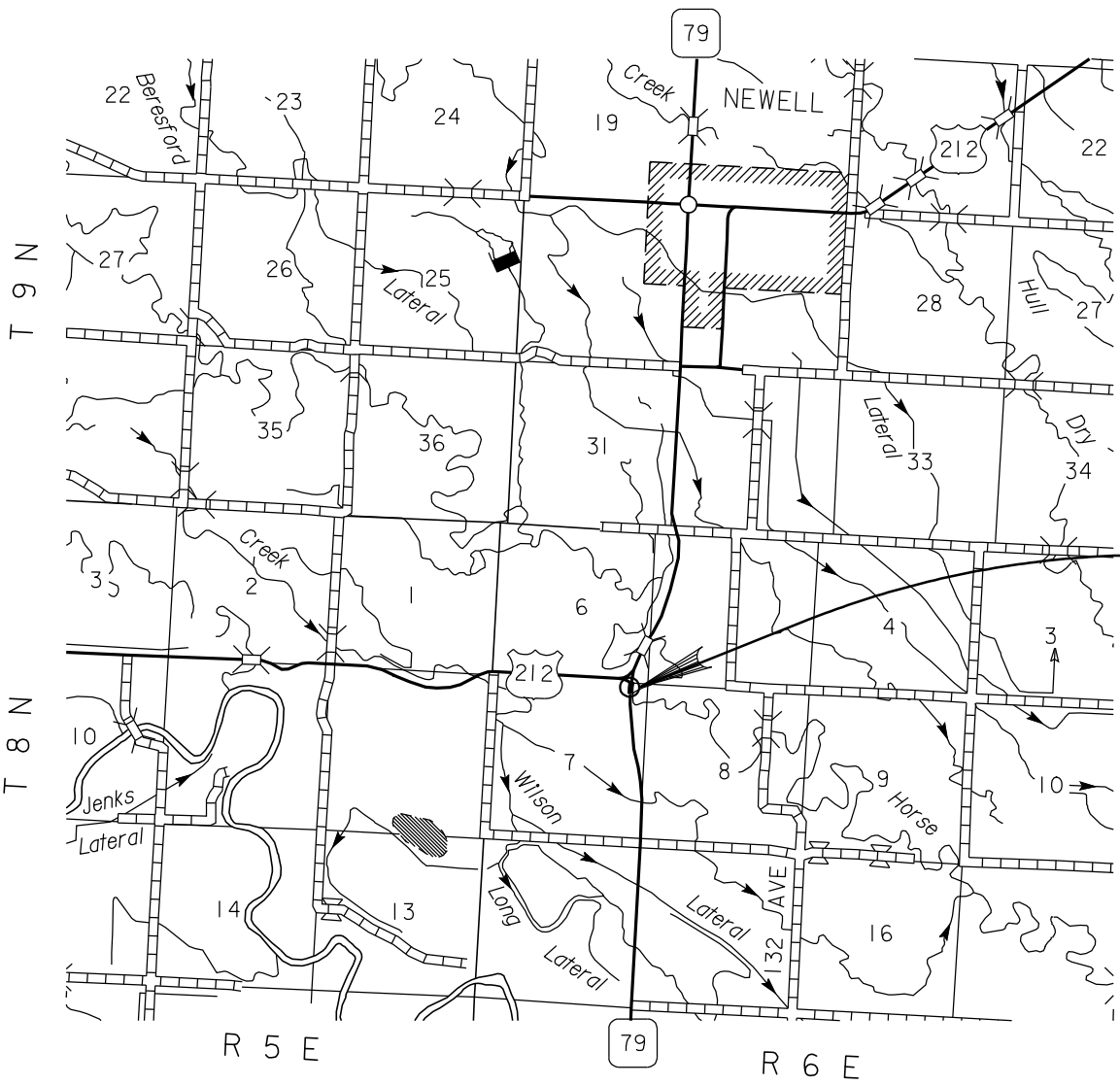
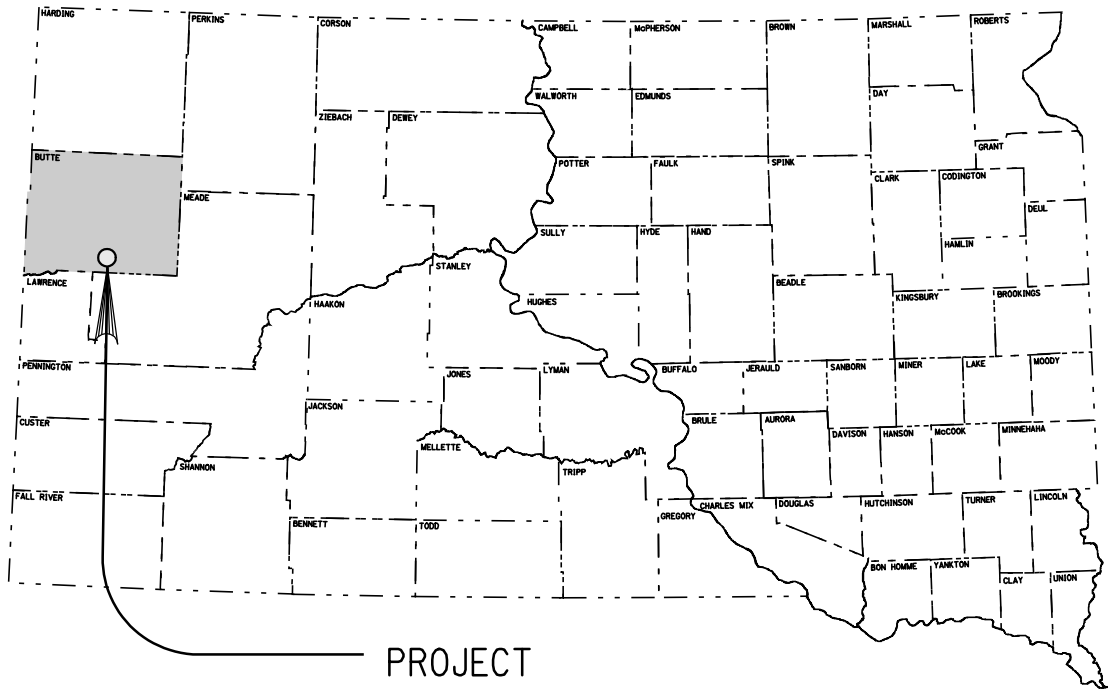
DOWNSPOUT REPAIR
PCN i25q

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	1	16

Plotting Date: 23-MAY-2011

INDEX OF SHEETS

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DESIGN DESIGNATION

ADT (2010)	2215
ADT (2030)	2375
DHV	380
D	50 %
T DHV	5.8 %
T ADT	12.8 %
V	65 mph

STORM WATER PERMIT

None Required

SCALES

PLAN	1"=40'
PIPE SECTIONS	{ HORIZONTAL: 1"=40' VERTICAL: 1"=20'

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0500	Remove Pipe Culvert	148	Ft
110E0510	Remove Pipe End Section	1	Each
110E1700	Remove Silt Fence	50	Ft
110E7802	Remove Fence for Reset	100	Ft
120E0010	Unclassified Excavation	510	CuYd
120E0600	Contractor Furnished Borrow	70	CuYd
230E0100	Remove and Replace Topsoil	Lump Sum	LS
421E0100	Pipe Culvert Undercut	26	CuYd
450E4769	24" CMP 16 Gauge, Furnish	24	Ft
450E4770	24" CMP, Install	24	Ft
450E4799	42" CMP 16 Gauge, Furnish	74	Ft
450E4800	42" CMP, Install	74	Ft
450E5015	24" CMP Elbow, Furnish	1	Each
450E5016	24" CMP Elbow, Install	1	Each
450E5030	42" CMP Elbow, Furnish	2	Each
450E5031	42" CMP Elbow, Install	2	Each
450E5227	42" CMP Flared End, Furnish	2	Each
450E5228	42" CMP Flared End, Install	2	Each
450E8900	Cleanout Pipe Culvert	1	Each
450E9230	Pipe Culvert Lining - 42"	288	Ft
462E0200	Controlled Density Fill	6.5	CuYd
620E0510	Type 1 Temporary Fence	620	Ft
620E4100	Reset Fence	100	Ft
634E0010	Flagging	40	Hour
634E0100	Traffic Control	289	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
720E1015	Bank and Channel Protection Gabion	12.0	CuYd
734E0010	Erosion Control	Lump Sum	LS
734E0154	12" Diameter Erosion Control Wattle	90	Ft
734E0604	High Flow Silt Fence	200	Ft
734E0610	Mucking Silt Fence	56	CuYd
734E0620	Repair Silt Fence	50	Ft

SPECIFICATIONS

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

SCOPE OF WORK

- Work on this project will consist of the following:
- Repair & cleanout 24” CMP downspout at Sta. 17+43
 - Slipline & repair 42” downspout at Sta. 23+02.

SEQUENCE OF OPERATIONS

The intent of the plan sequence of operations is to have the least amount of impact on the traveling public and adjacent landowners. 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 two week prior to potential implementation. Work shall proceed according to the following sequence or as approved by the Engineer:

- Set up Traffic Control.
- Remove damaged section of 24” CMP & elbow.
- Cleanout existing 24” diameter CMP downspout.
- Fill void with Contractor Furnished Borrow.
- Install 24” CMP & Elbow.
- Remove damaged section of 42” diameter CMP, elbows and end section.
- Install silt fence.
- Clean out existing 42” diameter CMP
- Install culvert liner in existing culver.
- Prepare bulkheads on each end for grouting of annular space between existing culvert and liner.
- Grout annular space with controlled density fill
- Install 42” CMP, Elbows, Flared Ends and Gabions.
- Shape area, seed, fertilize, mulch, and install erosion control measures.
- Remove Traffic Control

UTILITIES

The Contractor shall be responsible for locating and protecting any utility that would conflict with any work. 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.

Any damage done to a utility will be the Contractor’s responsibility to repair.

Utilities within the limits of the proposed construction shall be adjusted by the owner unless otherwise indicated in these plans.

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WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the DOT Environmental Office.

The DOT Environmental Office contact person is Ryan Huber, 605-773-3568. The WATER SOURCE plan note does not relieve the Contractor of his/her responsibility to obtain the necessary permits from other agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE).

Surface Water Discharge

If construction dewatering is required, the Contractor is required to obtain a Surface Water Discharge Permit from the DENR. Contact the DENR Surface Water Program at 605-773-3351 to apply for a permit.

Storm Water

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.

HISTORICAL PRESERVATION OFFICE CLEARANCES

To obtain State Historical Preservation Office (SHPO) clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. In lieu of a cultural resources survey, the Contractor could request a records search from Jim Donohue, State Archaeological Research Center (SARC). Provide SARC 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 no artifacts have been found on the site. The Contractor shall arrange and pay for the cultural resource survey and/or records search.

If any earth disturbing activities occur within the current geographical or historic boundaries of any South Dakota reservation, the Contractor shall obtain Tribal Historical Preservation Office (THPO) clearance. If no THPO exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

To facilitate SHPO or THPO responses, the Contractor should submit a records search or cultural resources survey report to the DOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3268). Allow 30 days from the date this information is submitted to the Environmental Engineer for SHPO/THPO approval. The Contractor is responsible for obtaining all required permits and clearances for staging areas, borrow sites, waste disposal sites, and all material processing sites. The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

WASTE DISPOSAL SITE

The Contractor will be required to furnish a site(s) for the disposal of construction/demolition debris generated by this project.

Construction/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 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/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/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.

CORRUGATED METAL PIPE

Corrugated metal pipes shall have 2 ⅔-inch X ½-inch corrugations for 42-inch and smaller round pipe and 48-inch and smaller arch pipe unless otherwise stated in the plans. Corrugated metal pipes shall have 3-inch X 1-inch or 5-inch X 1-inch corrugations for 48-inch and larger round pipe and 54-inch and larger arch pipe unless otherwise stated in the plans.

PIPE CONNECTIONS

When it is not possible to use a normal pipe joint (male-female ends), connections to existing pipe shall be made by placing a 2’ wide by 6" thick M6 concrete collar around the outside of the connection. The concrete collar shall be reinforced with 6x6 W2.9 x W2.9 wire mesh.

All costs for constructing the concrete collars including materials and labor shall be incidental to the contract unit price per foot for the corresponding pipe bid item.

CLEAN PIPE CULVERT

This work shall consist of cleaning out, removing and disposing of the earth and debris within the existing culvert.

The existing culvert 17+43 is a 24” diameter CMP x 186’ downspout.

Cleaning method shall be approved by the Engineer. The culvert shall be cleaned to the satisfaction of the Engineer. The Contractor shall be responsible for repairing any damage caused by the cleaning process.

All earth and debris removed from the culvert shall be disposed of outside the existing right-of-way. The Contractor shall shape the area of the culvert ends to restore flow. All costs associated with cleaning out the existing culvert, the removal of debris and shaping of the outlet area shall be incidental to the contract unit price per each for “Cleanout Pipe Culvert”.

SLIPLINE PIPE

The Contractor shall furnish and install slipliner pipe at locations specified in the Table of Slipline Pipe. This work consists of slipping high density polyethylene (HDPE) or PVC pipe liner inside existing inplace pipe and grouting the void between the liner and the existing pipe.

Slipliner pipe shall conform to one of the following material types.

1. Closed Profile HDPE:

- Meet requirements of ASTM F894 and ASTM D3350 with cell classification 345464C. Minimum pipe stiffness shall be 46 psi in accordance with ASTM D2412.

- Pipe joints shall be threaded and approved by the Engineer.
2. Solid Wall HDPE:

- Meet requirements of ASTM F714 (SDR 32.5) and ASTM D3350 with cell classification 345464C.

- Pipe joints may be grooved press-on joints or heat fused with heat fusion equipment as approved by the Engineer. Heat fused joints shall follow recommendations of the pipe manufacturer and use an experienced operator of the heat fusion equipment.
3. PVC:

- Meet requirements of ASTM F949 with minimum pipe stiffness of 46 psi, and ASTM D1784 with minimum cell classification 12454B.

- Pipe joints shall be elastomeric sealing gaskets meeting requirements of ASTM F477.
4. Spirally Wound PVC:

- Meet requirements of ASTM F949 with minimum pipe stiffness of 46 psi.

- Pipe joints shall be per pipe manufacturer’s recommendations and approved by the Engineer.

Slipliner pipe shall have a smooth interior surface.

Slipliner pipe shall be joined into a continuous length with joints that are adequate for pushing, pulling or winding the liner pipe though the existing pipe. The joints shall be watertight to prevent seepage during pressure grouting. The joints should not create an increase in the outside diameter of the liner pipe to allow a more smooth insertion of the liner.

The diameter specified in the bid item is the diameter of the existing pipe to be sliplined. The slipliner pipe size to use within the existing pipe size is provided in the following slipliner pipe dimension table unless otherwise specified. This provides the largest diameter liner pipe that will fit into the existing pipe to maximize flow capacity.

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SLIPLINE PIPE (Cont.)

Slipliner Pipe Dimension Table

Existing Pipe I.D. (inch)	Closed Profile HDPE O.D. (inch)	Closed Profile HDPE I.D. (inch)	Solid Wall HDPE O.D. (inch)	Solid Wall HDPE I.D. (inch)	PVC O.D. (inch)	PVC I.D. (inch)	Spirally Wound PVC O.D. (inch)	Spirally Wound PVC I.D. (inch)
24	20.24	18.00	22.00	20.65	22.60	20.70	20.45	20.00
30	27.06	24.00	28.00	26.29	25.60	23.50	27.45	27.00
36	33.82	30.00	32.00	30.03	32.20	29.50	32.79	32.00
42	40.65	36.00	40.00	36.95	38.70	35.50	38.79	38.00
48	45.20	40.00	42.00	39.42			42.79	42.00
54	47.47	42.00	48.00	44.33			48.79	48.00
60			54.00	50.68			54.79	54.00

Prior to sliplining, the Contractor shall clean the existing pipe of all debris, silt, obstructions, etc. in order to ensure that the liner can be inserted, the grout will flow to all voids and the inserted liner will not be resting on or irregularly supported by such material. Cleaning shall be accomplished by the use of jet rodding equipment or other approved methods. Silt fence shall be used to catch any sediment.

The slipliner pipe shall be inserted into the existing pipe by pushing, pulling or winding methods that do not damage the slipliner pipe. The slipliner pipe shall be clean and substantially dry before insertion.

Pressure grouting shall be done to ensure all the voids are filled between the liner pipe and existing pipe including all breaks or holes in and around the existing pipe. Grouting pressures used shall ensure all voids are filled, but do not collapse the slipliner pipe. The Contractor shall provide a pressure gauge that will measure the grouting pressure and a means to accurately measure the volume of grout injected.

Slipliner pipe shall be held down to minimize the change in flowline, especially at the inlet end. This may be accomplished by attaching fasteners or blocks at the top of the pipe, adding weight to the invert, placing multiple grout lifts, or other means to prevent the slipliner from floating during the grouting operation.

Grout at the inlet end shall be finished with a 45 degree mitered bevel transition between the existing pipe and the inside of the slipliner pipe with the slipliner pipe face pushed inside the existing pipe face.

If grout holes are utilized, cylindrical wooden plugs or other approved plugs shall be inserted to plug holes until the grout has set and then removed and filled with concrete.

The Contractor shall submit the manufacturer's certificate of compliance for the slipliner pipe used and shall submit the Contractor's proposed procedure for sliplining pipes including the grouting procedure to the Engineer at least two weeks prior to beginning this work.

Controlled density fill material shall be used as the flowable grout. The quantity of Controlled density fill is estimated based on using a Closed Profile HDPE and estimating the void volume outside the existing pipe.

All costs for furnishing and installing the slipliner pipe, including work area excavation and backfilling, pipe cleaning, and incidentals necessary to satisfactorily complete the work shall be incidental to the contract unit price per foot for the corresponding diameter bid item for "Slipline 42" Pipe".

SLIPLINE PIPE (Cont.)

All costs for furnishing and installing the controlled density fill, including method to prevent slipliner from floating, inlet bevel construction, and incidentals necessary to satisfactorily complete the work shall be incidental to the contract unit price per cubic yard for "Controlled Density Fill".

TABLE OF SLIPLINE PIPE

Location	Slipline 42" Pipe (Ft)	Controlled Density Fill (CuYd)
23+02	288	6.5
Total:	288	6.5

CONSTRUCTION REQUIREMENTS

The liners shall be unloaded from the truck delivering them to the project by using slings and boom-type trucks or the equivalent. Chains or wire rope will not be permitted for handling. A winch truck or other equipment may be required to install the liner.

CONTROLLED DENSITY FILL FOR PIPE

Controlled density fill shall be a flowable mortar material. Materials shall be in accordance with the Standard Specifications, except as modified below. The mix design shall be the following:

Material	Rate per Cubic Yard
Portland Cement, Type II	100 Lb
Fine Aggregate	2600 Lb
Coarse Aggregate	None
Water	60 Gal
Fly Ash, Type C	300 Lb

The fine aggregate shall be natural sand consisting of mineral aggregate particles conforming to the following gradation requirements:

Passing 3/8 Inch Sieve	100%
Passing No. 200 Sieve	0-10%

The mix design shown above is designed to produce a minimum compressive strength of 100 psi. The Engineer may allow adjustments to the proportion of water at the site to provide the necessary consistency of the mix.

The quantity of Controlled Density Fill is estimated based on using a Closed Profile HDPE and estimating the void volume outside the existing pipe.

All costs for furnishing and installing the Controlled Density Fill, including method to prevent pipe liner from floating, inlet bevel construction, and incidentals necessary to satisfactorily complete the work shall be incidental to the contract unit price per cubic yard for "Controlled Density Fill".

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4

TOTAL
SHEETS

16

EXCAVATION FOR PIPE REMOVAL

Included in the quantity of "Unclassified Excavation" are 510 cubic yards of excavation for removal of pipes.

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

Station	L/R	Quantity (CuYd)
17+43	R	74
23+02	L	111
23+02	R	325
Total:		510

PIPE REMOVAL

Removal of CMP Elbows shall be incidental to the contract unit price per foot for "Remove Pipe Culvert".

TABLE OF PIPE CULVERT UNDERCUT

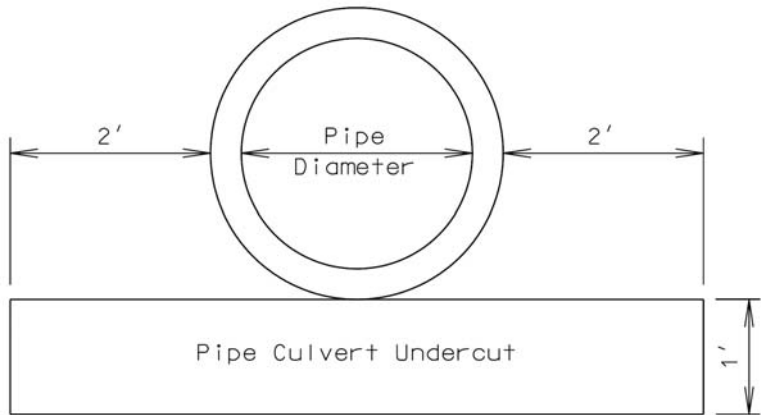
The Table of Pipe Culvert Undercut is intended to be used to establish an estimated quantity of Pipe Culvert Undercut for bidding purposes only. The table includes undercut for 36 inch and larger pipe culverts. The depth of undercut is an estimate and the actual depth necessary shall be determined during 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)
23+02	1	25.7
Total:		25.7

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.

TABLE OF PIPE CULVERT UNDERCUT(Cont.)

Pipe Diameter (In)	Round Pipe Undercut Rate for 1' Depth (CuYd/Ft)	Arch Pipe Undercut Rate for 1' Depth (CuYd/Ft)
24	0.2407	0.2577
30	0.2623	0.2847
36	0.2840	0.3110
42	0.3056	0.3337
48	0.3272	0.3596
54	0.3488	0.3827
60	0.3704	0.4105
66	0.3920	---
72	0.4136	0.4630
78	0.4352	---
84	0.4568	0.5123
90	0.4784	---



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 for filling voids caused by erosion from the existing pipe to the satisfaction of the Engineer at Sta. 17+43. It is the Contractor’s responsibility to inspect and verify the actual field conditions. The Contractor shall be responsible for protecting the utility in the area that is to be filled with Contractor Furnished Borrow. Any damage done to a utility will be the Contractor’s responsibility to repair.

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

TABLE OF BANK AND CHANNEL PROTECTION GABIONS

Station	L/R	Quantity (CuYd)
23+02	R	12.0
Total:		12.

REMOVE AND REPLACE TOPSOIL

Topsoil shall also be salvaged and stockpiled prior to removing the ditch block and placing the embankment at the pipe ends. Limits of this work, depth of salvage, and 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 87 CuYd.

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

EROSION CONTROL

The contract lump sum price for Erosion Control includes material, equipment, and labor to seed, fertilize and fiber mulching the disturbed areas within the right of way resulting from the work required by this contract.

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

Hand seeding devices approved by the Engineer will be allowed. Following seeding operations, the areas shall be hand raked (incorporated) within the top ¼” to ½” of topsoil when possible to the satisfaction of the Engineer.

The areas to be seeded, fertilized, and mulched are estimated at 0.16 acres.

Limits of Erosion Control work will be as determined by the Engineer on construction.

FERTILIZING

A commercial fertilizer with a minimum guaranteed analysis of 18-46-0, 11-52-0, or an approved alternate fertilizer shall be applied to all areas designated for permanent seeding. The application rate of fertilizer shall be 3 pounds per 1000 SqFt.

FIBER MULCHING

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

An additional 2% by weight of tackifier shall be added to the fiber mulch product selected from the list below. If the product selected has guar gum tackifier included, then the additional 2% of tackifier shall be guar gum. If the product selected has synthetic tackifier included, then the additional 2% of tackifier shall be synthetic.

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.

All costs for the additional tackifier added to the fiber mulch including labor, equipment, and materials shall be incidental to the lump sum price for “Erosion Control”.

The fiber mulch used on this project shall be one from the list below:

Product	Manufacturer
Mat-Fiber Plus	Mat, Inc. Floodwood, MN Phone: 1-888-477-3028 www.matinc.biz
Conwed Hydro Mulch 2000	Profile Products LLC Buffalo Grove, IL Phone: 1-800-366-1180 www.conwedfibers.com
EcoFibre Plus Tackifier	Profile Products LLC Buffalo Grove, IL Phone: 1-800-366-1180 www.profile-eco.com
Terra-Mulch Wood with Tacking Agent 3	Profile Products LLC Buffalo Grove, IL Phone: 1-800-726-6371 www.terra-mulch.com
Excel Fiber Mulch II with Tackifier	American Excelsior Co. Arlington, TX Phone: 1-800-777-7645 www.curlex.com

TABLE OF FIBER MULCHING

(Quantities Shown for Information Only)

Station	to	Station	L/R	Quantity (Lb)
82+00		83+60	R	317
82+80		83+20	L	57
Total:				374

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.

The erosion control wattle provided shall be from the list shown below:

Product	Manufacturer
Curlex Sediment Log	American Excelsior Company Arlington, TX Phone: 1-800-777-7645 www.amerexcel.com
Aspen Excelsior Logs	Western Excelsior Corporation Mancos, CO Phone: 1-800-833-8573 www.westernexcelsior.com
Patriot Wood Fiber Logs	Patriot Environmental Products, Inc. Mesa, AZ Phone: 1-480-345-7293 www.digitaldesigncore.com/patriot/WattleSpecs.pdf

TABLE OF EROSION CONTROL WATTLE

Station	L/R	Diameter (Inch)	Location	Quantity (Ft)
17+43	R	12	Slope & Pipe Outlet	30
23+02	R	12	Slope	60
Total:				90

HIGH FLOW SILT FENCE

The high flow silt fence fabric provided shall be from the approved product list. The approved product list for high flow silt fence may be viewed at the following internet site:

<http://apps.sd.gov/Applications/HC54ApprovedProducts/main.asp>

High flow silt fence shall be placed at the locations noted in the table and at locations that will minimize siltation of adjacent streams, lakes, dams, or drainage areas as determined by the Engineer during construction. Refer to Standard Plate 734.05 for details.

TABLE OF HIGH FLOW SILT FENCE

Station	L/R	Location	Quantity (Ft)
23+02	L	Inlet	100
23+02	R	Outlet	100
Total:			200

MUCKING SILT FENCE

Mucking silt fence shall consist of removing muck trapped by the silt fence and spreading the material evenly over the adjacent area to conform to the existing grade.

REMOVE SILT FENCE

Silt fence shall be removed when vegetation is established. Some or all of the silt fence may be left on the project until vegetation is established.

GENERAL MAINTENANCE OF TRAFFIC

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Removing, relocating, covering, salvaging and resetting of permanent traffic control devices, including delineation, 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 bottom of signs on portable or temporary supports shall not be less than seven feet above the pavement in urban areas and one foot above the pavement in rural areas. Portable sign supports may be used as long as the duration is less than 3 days. If the duration is more than 3 days the signs shall be on fixed supports.

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.

All vehicles entering and exiting closed lanes of traffic shall display a flashing amber light.

Work activities shall only be during daylight hours. Daylight hours are considered to be ½ hour before sunrise until ½ hour after sunset.

If the Contractor elects not to work in an area for more than 3 days, for reasons within the control of the Contractor, the Contractor shall remove applicable traffic control devices and replace them when work resumes. There will be no payment for this work.

TRAFFIC CONTROL DEVICES INVENTORY

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	3	17	51
W20-1	48" x 48"	ROAD WORK ##### FT. OR AHEAD	3	34	102
W20-7a	48" x 48"	FLAGGER	2	34	68
W21-5	48" x 48"	SHOULDER WORK	2	34	68
TOTAL UNITS					289

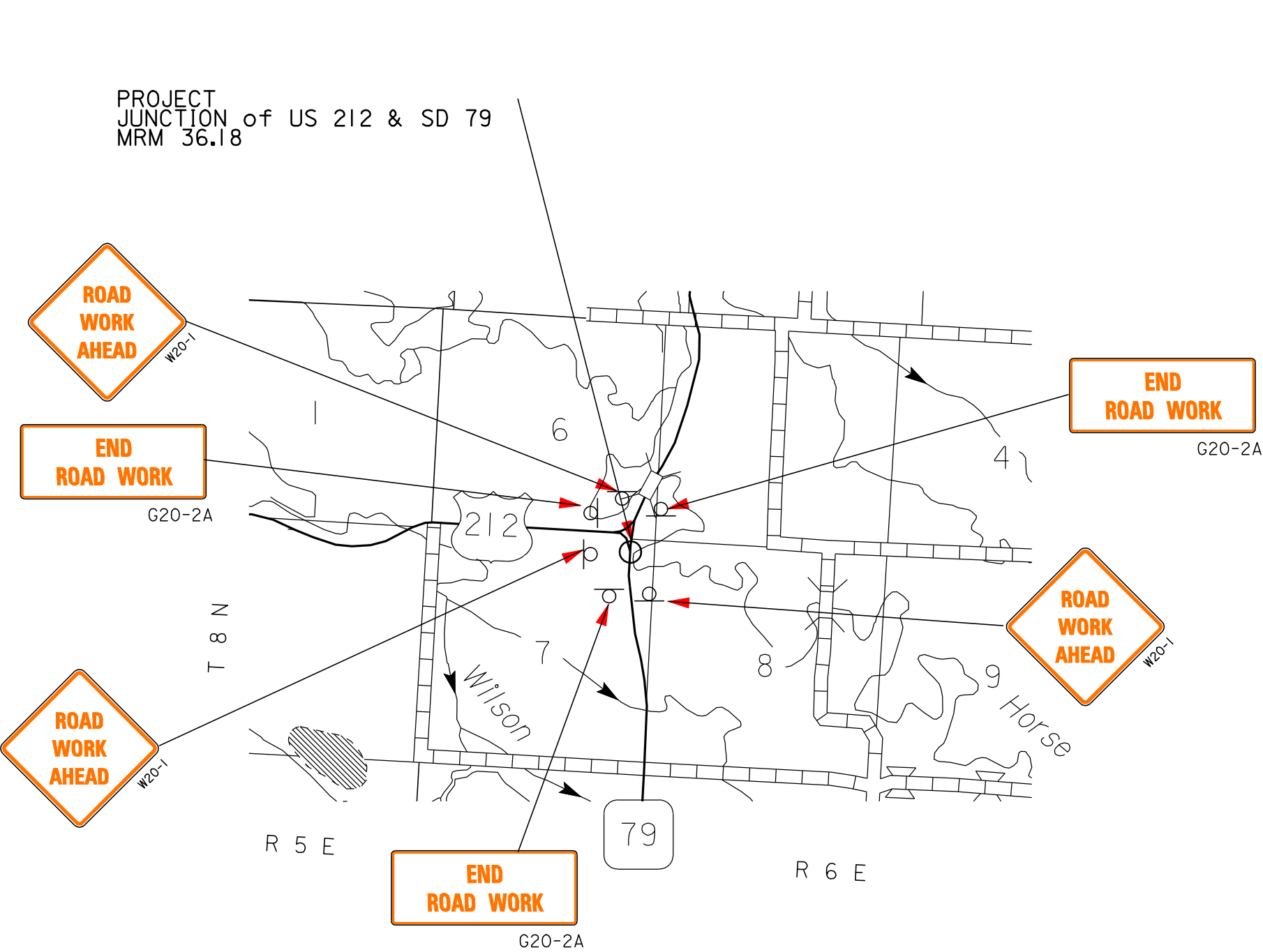
PLOT SCALE - 200.000000:1.000000

PLOTTED FROM - TRRC11610

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	8	16

Plotting Date: 23-MAY-2011

FIXED LOCATION SIGNS



PLOT SCALE - 100,000,000:1,000,000

PLOTTED FROM - TRRC11610

17+43 - 59.6' R to 17+43 - 84.0' R
Remove 24" - 24' CMP
And 1 - Elbow

17+43 - 59.6' R to 17+43 - 84.0' R
Install 24" - 24' CMP
And 1 - 20.0° Elbow

17+43 R
Cleanout Pipe 24" Pipe

Install (12") Diameter Erosion Control Wattles
on slope contour at 30 FT spacing
at the following locations:
17+43 R 30 FT
23+02 R 60 FT

17+18 R to 17+68 R
Remove & Rest Fence

23+02 - 232.3' L to 23+02 - 207.2' L
Remove 42" - 20' CMP
& 1 Flared End

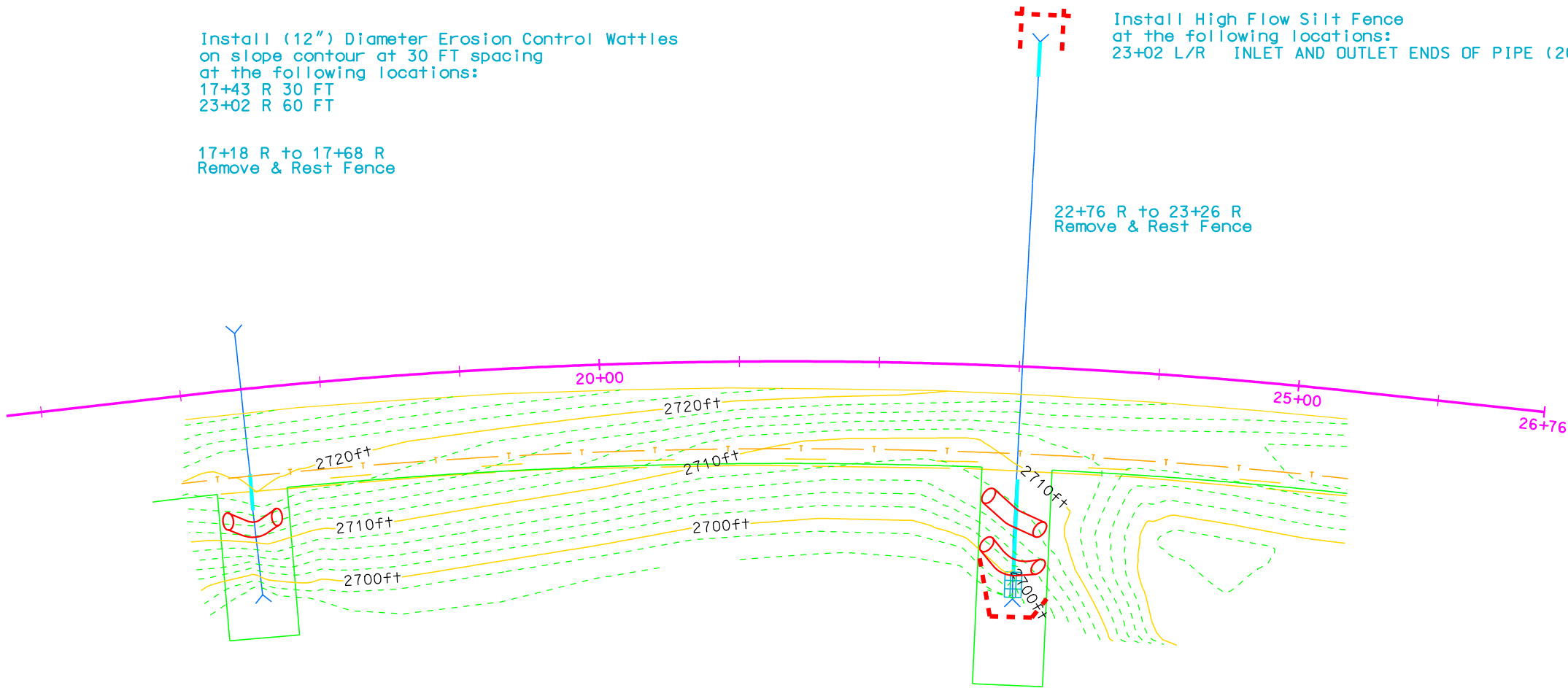
23+02 - 80.7' R to 23+02 - 166.2' R
Remove 42" - 102' CMP

23+02
Slipline 42" - 288' CMP
Install 42" - 74' CMP (20', 30', 6' & 18')
And 2 - 20.0° Elbows
& 2 CMP Flared Ends

23+02 149.0' R
Install Bank and Channel
Protection Gabions
(12.0 CY)

Install High Flow Silt Fence
at the following locations:
23+02 L/R INLET AND OUTLET ENDS OF PIPE (200 FT EACH END)

22+76 R to 23+26 R
Remove & Rest Fence

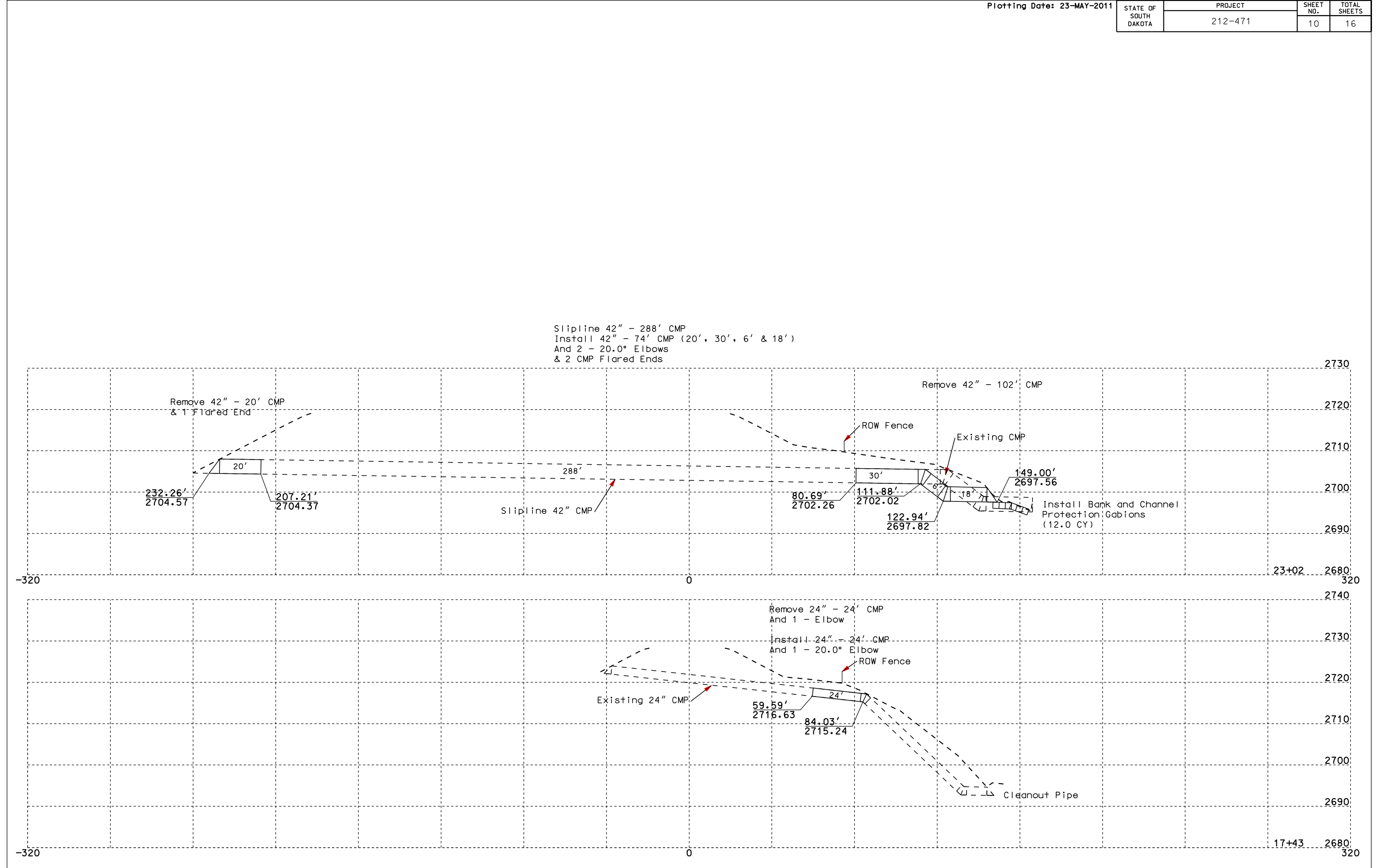


STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	212-471	9	16

Plotting Date: 23-MAY-2011



STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	212-471	10	16



Plotting Date: 23-MAY-2011

2 Piece			2 Piece			3 Piece				
5° to 45° Elbow			50° to 90° Elbow			90° Elbow				
Diameter	A	L	Diameter	A	L	Diameter	A	B	C	L
Inches	Feet	Feet	Inches	Feet	Feet	Inches	Inches			Feet
12	1	2	12	2	4	12	25½	11	18½	4
15	1	2	15	2	4	15	26½	12	18	4
18	1	2	18	2	4	18	27	14	17	4
21	2	4	21	2	4	21	27	15	16½	4
24	2	4	24	2	4	24	27½	16	16	4
27	2	4	27	2	4	27	27½	17	15½	4
30	2	4	30	3	6	30	40	19	26½	6
33	2	4	33	3	6	33	40	20	26	6
36	2	4	36	3	6	36	40½	21	25½	6
42	2	4	42	3	6	42	41	23	24½	6
48	2	4	48	4	8	48	53½	26	35	8
54	3	6	54	4	8	54	54	28	34	8
60	3	6	60	4	8	60	54½	31	32½	8
66	3	6	66	4	8	66	54	33	31½	8
72	3	6	72	5	10	72	67½	36	42	10
78	3	6	78	5	10	78	68	39	40½	10
84	3	6	84	5	10	84	68½	41	39½	10
90	3	6	90	6	12	90	70	46	37	10
96	3	6	96	6	12	96	82	46	49	12

FABRICATED ELBOW LENGTHS FOR ALL CORRUGATIONS

GENERAL NOTES:
All dimensions shown are nominal.
L = Linear Feet of C.M.P. required to fabricate fitting.

June 26, 2001

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

PLAN

ELEVATION

TUBING ATTACHMENT DETAILS SECTION A-A

TYPICAL CROSS-SECTION

GENERAL NOTES:
All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams tightly joined by 3/8" Dia. galvanized rivets or bolts.
For 60" through 84" sizes, reinforced edges shall be supplemented with galvanized stiffener angles. The angles will be 2" x 2" x 1/4" for 60" through 72" diameters and 2 1/2" x 2 1/2" x 1/4" for 78" and 84" diameters. The angles shall be attached by 3/8" diameter galvanized nuts and bolts.
Rivets and Bolts shall be 3/8" Dia. Min. for 10 Ga. and 12 Ga. sheet, and 5/16" Dia. Min. for 14 Ga. and 16 Ga. sheets. Tighten nuts with torque wrench to 25 lbs. torque.

Dia. D (in.)	Ga.	DIMENSIONS (in.)					Approx. Slope	Body
		A	B	H	L	W		
12	16	6	6	6	21	24	2½:1	1 Pc.
15	16	7	8	6	26	30	2½:1	1 Pc.
18	16	8	10	6	31	36	2½:1	1 Pc.
21	16	9	12	6	36	42	2½:1	1 Pc.
24	16	10	13	6	41	48	2½:1	1 Pc.
30	14	12	16	8	46	60	2½:1	1 Pc.
36	14	14	19	9	51	72	2½:1	2 Pc.
42	12	16	22	11	60	84	2½:1	2 Pc.
48	12	18	27	12	69	90	2¼:1	2 Pc.
54	12	18	30	12	78	102	2:1	3 Pc.
60	12	18	33	12	84	114	1¾:1	3 Pc.
66	12	18	36	12	87	120	1½:1	3 Pc.
72	12	18	39	12	87	126	1½:1	3 Pc.
78	12	18	42	12	87	132	1¼:1	3 Pc.
84	12	18	45	12	87	138	1¼:1	3 Pc.

STANDARD CONNECTIONS

For 30" through 84"

Alternate for all sizes

For 12" through 24" only

SECTION A-A (alternate)

SECTION A-A (alternate)

March 31, 2000

Plotting Date: 23-MAY-2011

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.

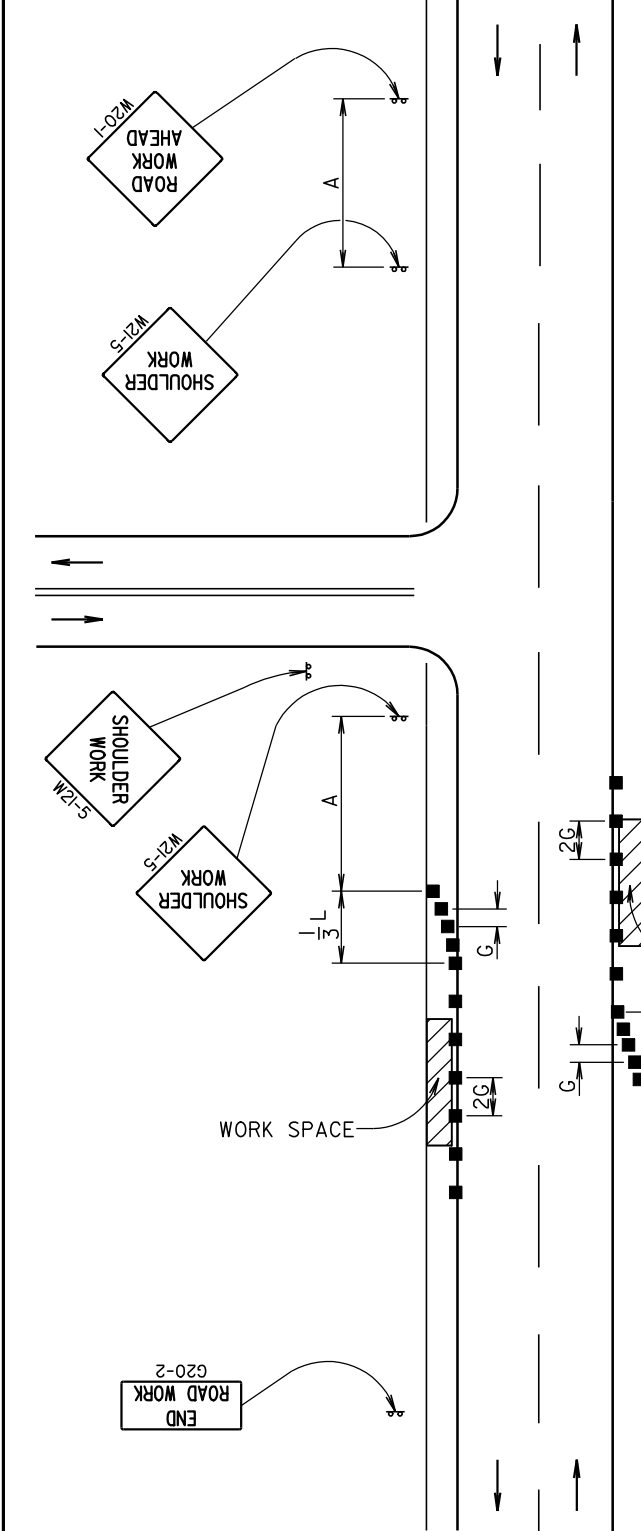
For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.



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

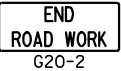


July 1, 2005



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	100 - 200	180	25
35 - 40	350	320	25
45 - 50	500	600	50
55	750	660	50
60 - 65	1000	780	50

■ Channelizing Device



The channelizing devices shall be drums or 42" cones if traffic control must remain overnight or longer.

For short duration operations (1 hour or less) all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Worker signs (W21-1 or W21-1a) may be used instead of SHOULDER WORK signs.

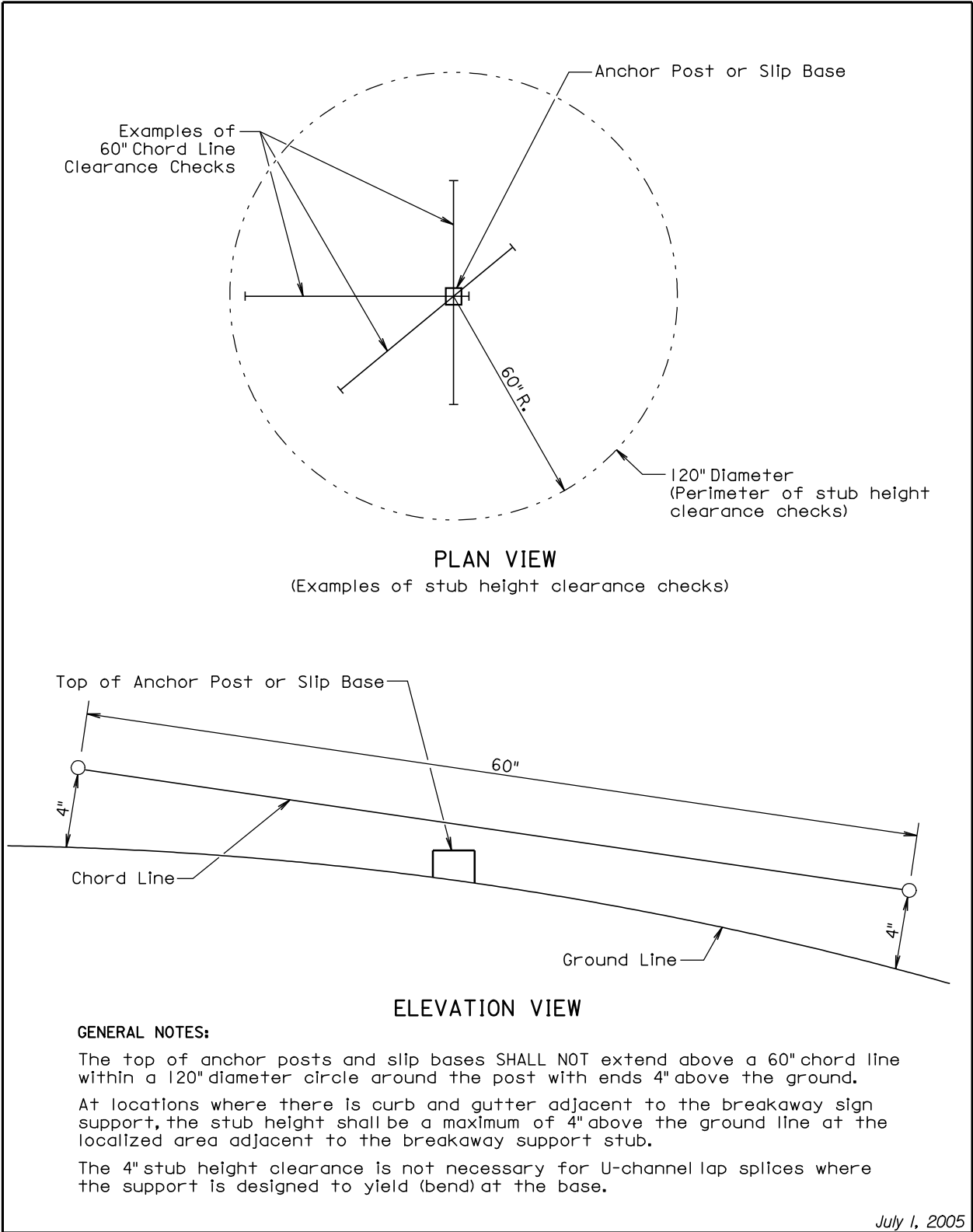
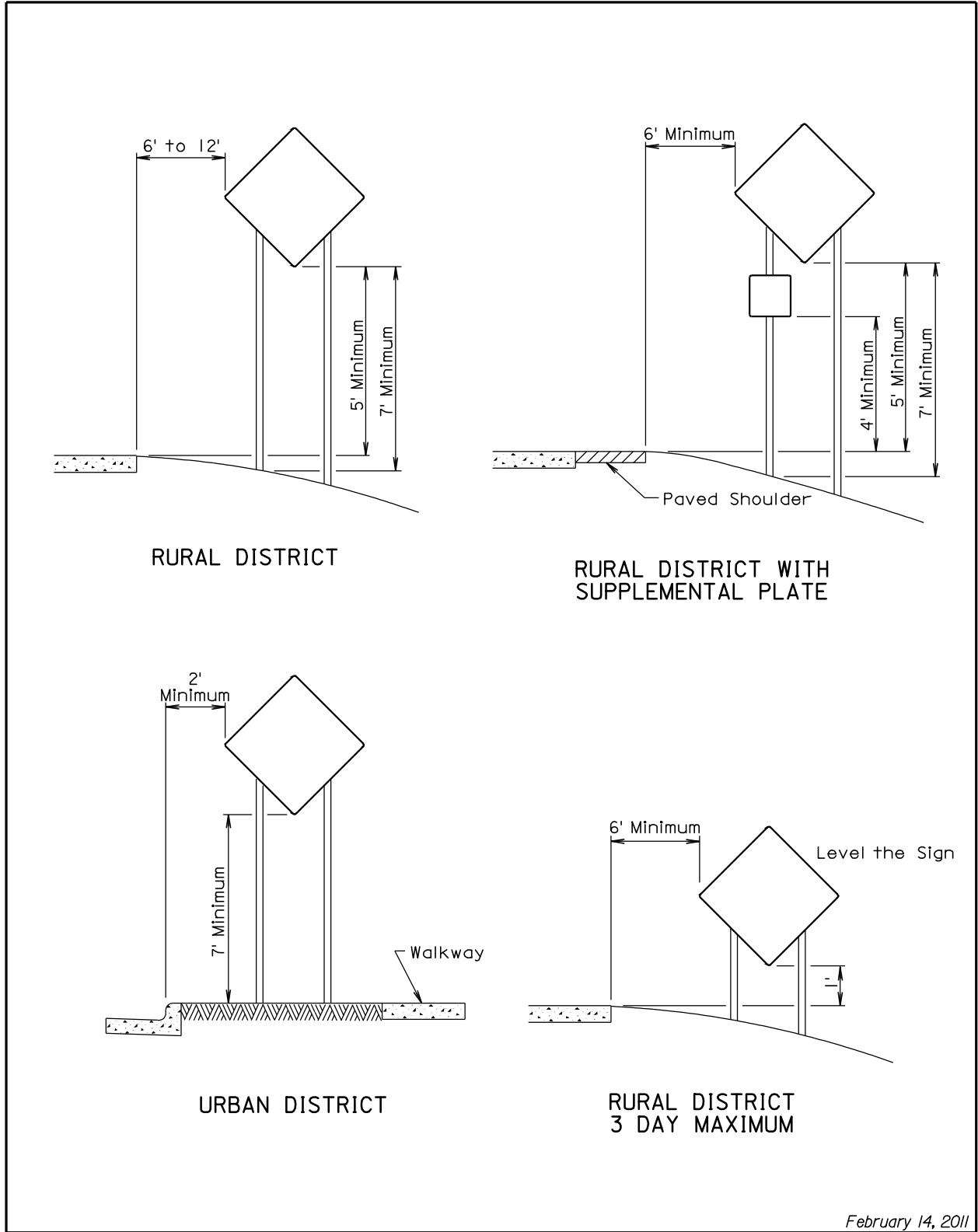
A SHOULDER WORK sign should be placed on the left side of a divided or one-way roadway only if the left shoulder is affected.

The SHOULDER WORK sign on an intersecting roadway is not required if drivers emerging from that roadway will encounter another advance warning sign before they reach a work activity area.

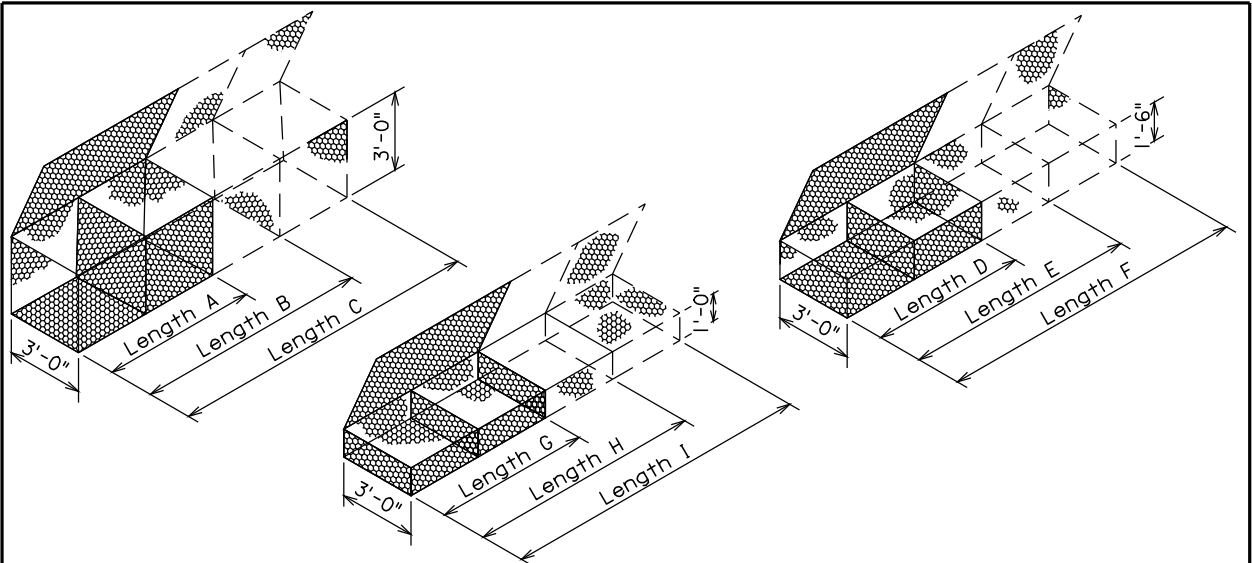
WORK SPACE



February 14, 2011



Plotting Date: 23-MAY-2011



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:

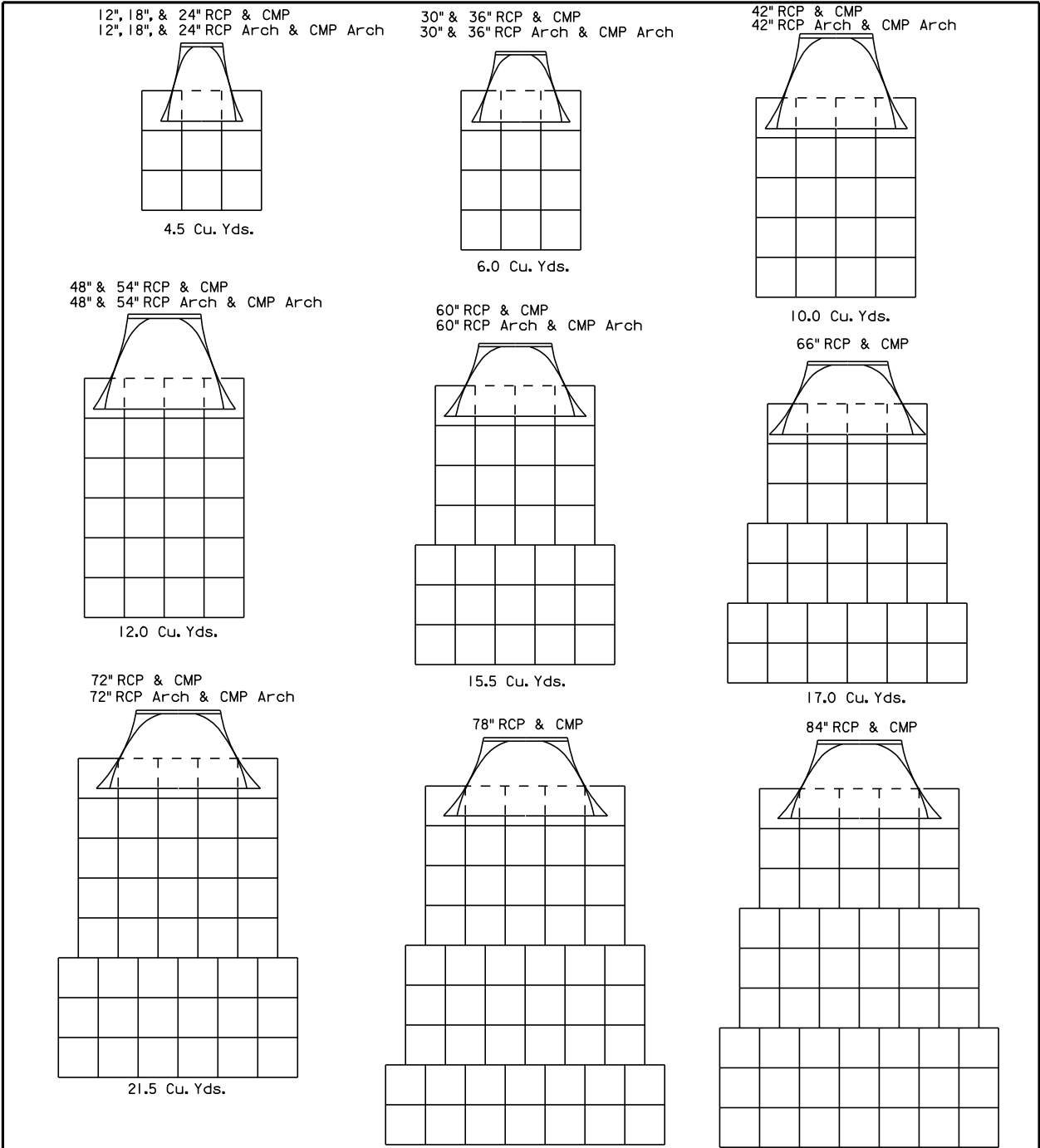
1. Cut a length of lacing wire approximately 1 1/2 times the distance to be laced but not exceeding 5 feet.
2. Secure the wire terminal at the corner by looping and twisting.
3. Proceed lacing with alternating single and double loops at a spacing not to exceed 6 inches.
4. Securely fasten the other lacing 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. 2011	S D D O T	BANK AND CHANNEL PROTECTION GABIONS	PLATE NUMBER 720.01
			Sheet 1 of 1



GENERAL NOTES:

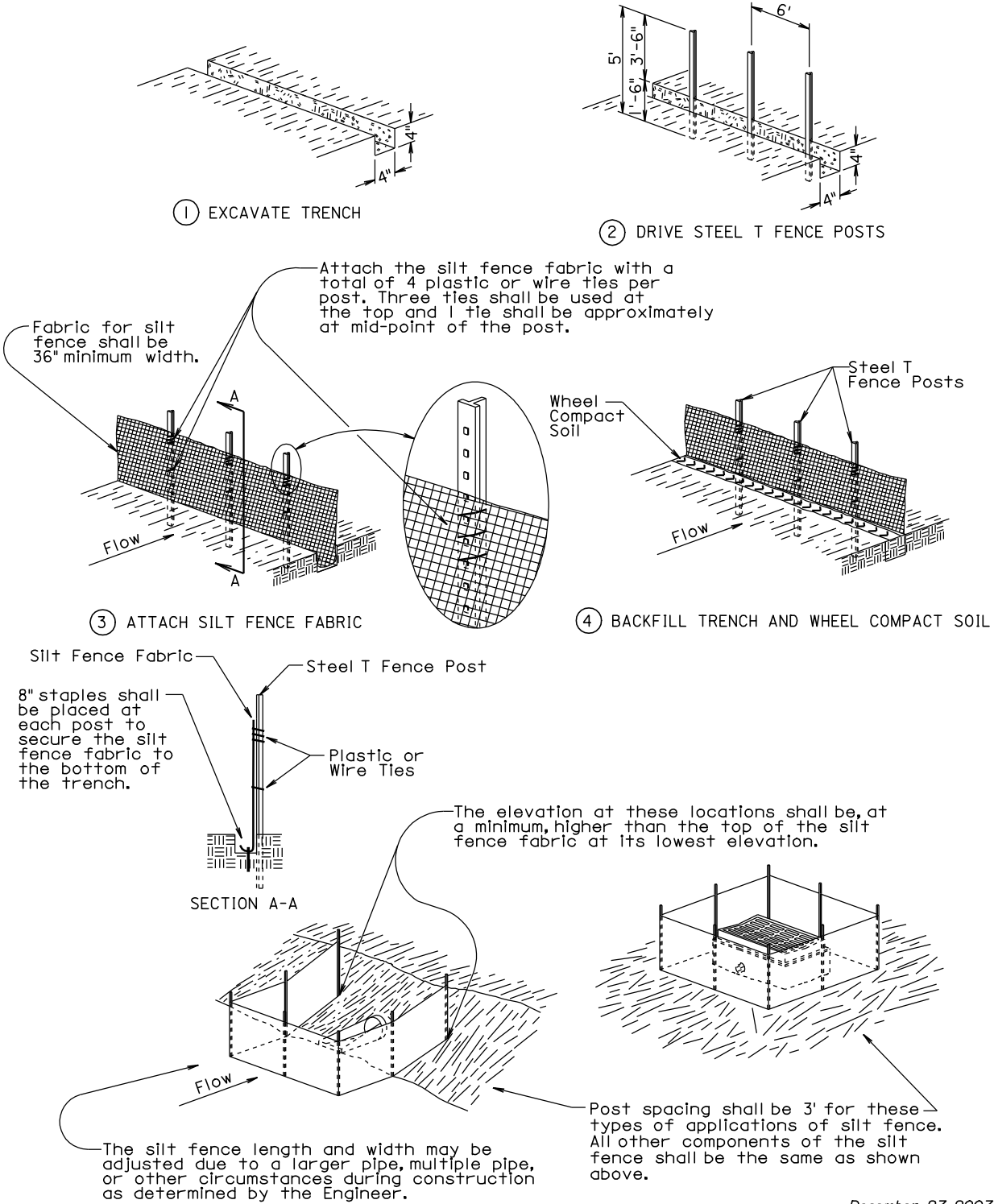
Gabions at outlets of C.M. pipe and R.C. pipe shall be placed under the end section a distance of 2' from the outlet end of the section. For C.M. pipe end section installations, the upper fabric of the gabions shall be modified to accommodate the metal end section in a manner approved by the Engineer.

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. 2011	S D D O T	BANK AND CHANNEL PROTECTION GABION PLACEMENT UNDER PIPE END SECTIONS	PLATE NUMBER 720.03
			Sheet 1 of 1

MANUAL HIGH FLOW SILT FENCE INSTALLATION



December 23, 2003

Published Date: 2nd Qtr. 2011

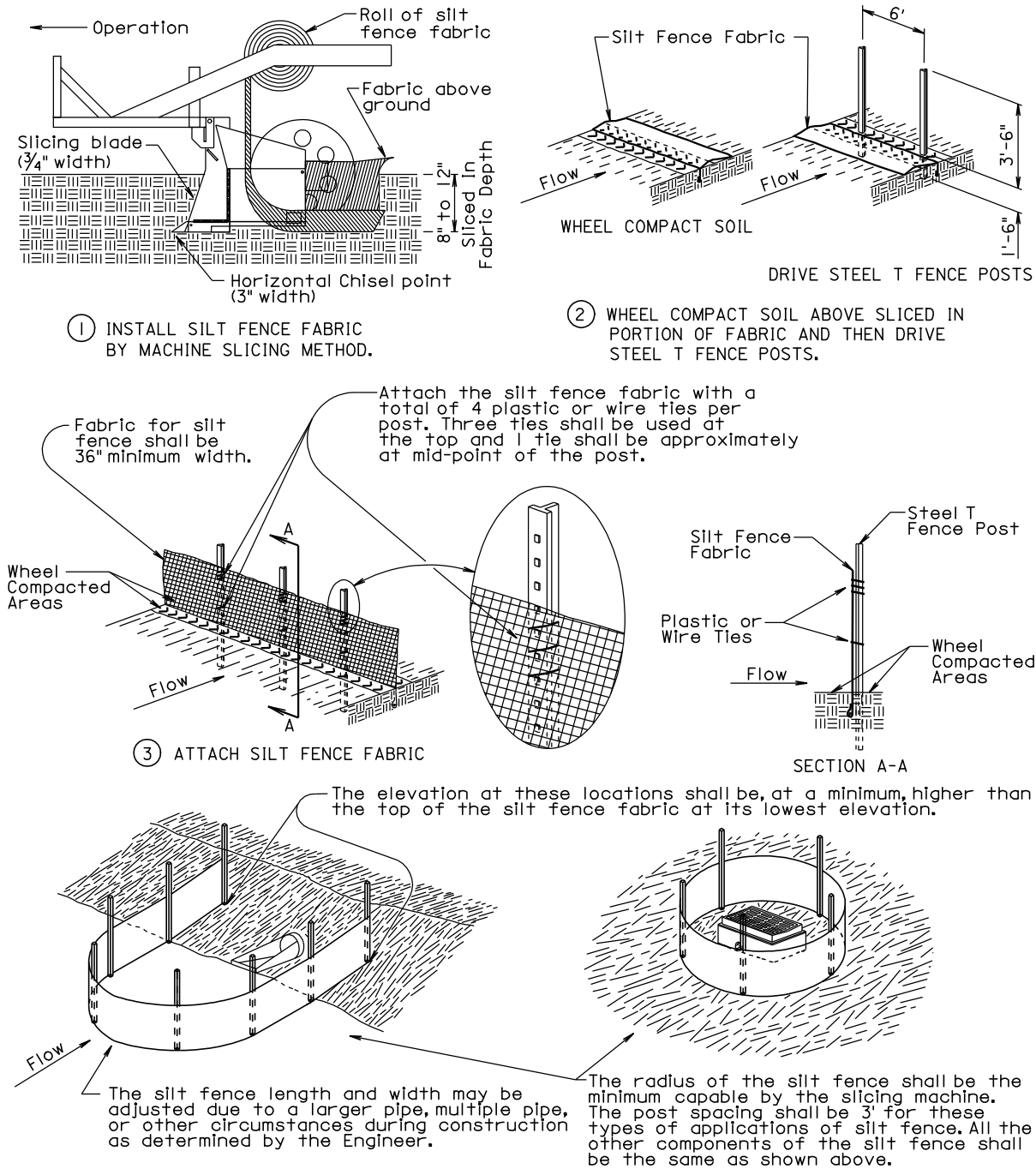
SDOT

HIGH FLOW SILT FENCE

PLATE NUMBER
734.05

Sheet 1 of 2

MACHINE SLICED HIGH FLOW SILT FENCE INSTALLATION



GENERAL NOTE:

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

December 23, 2003

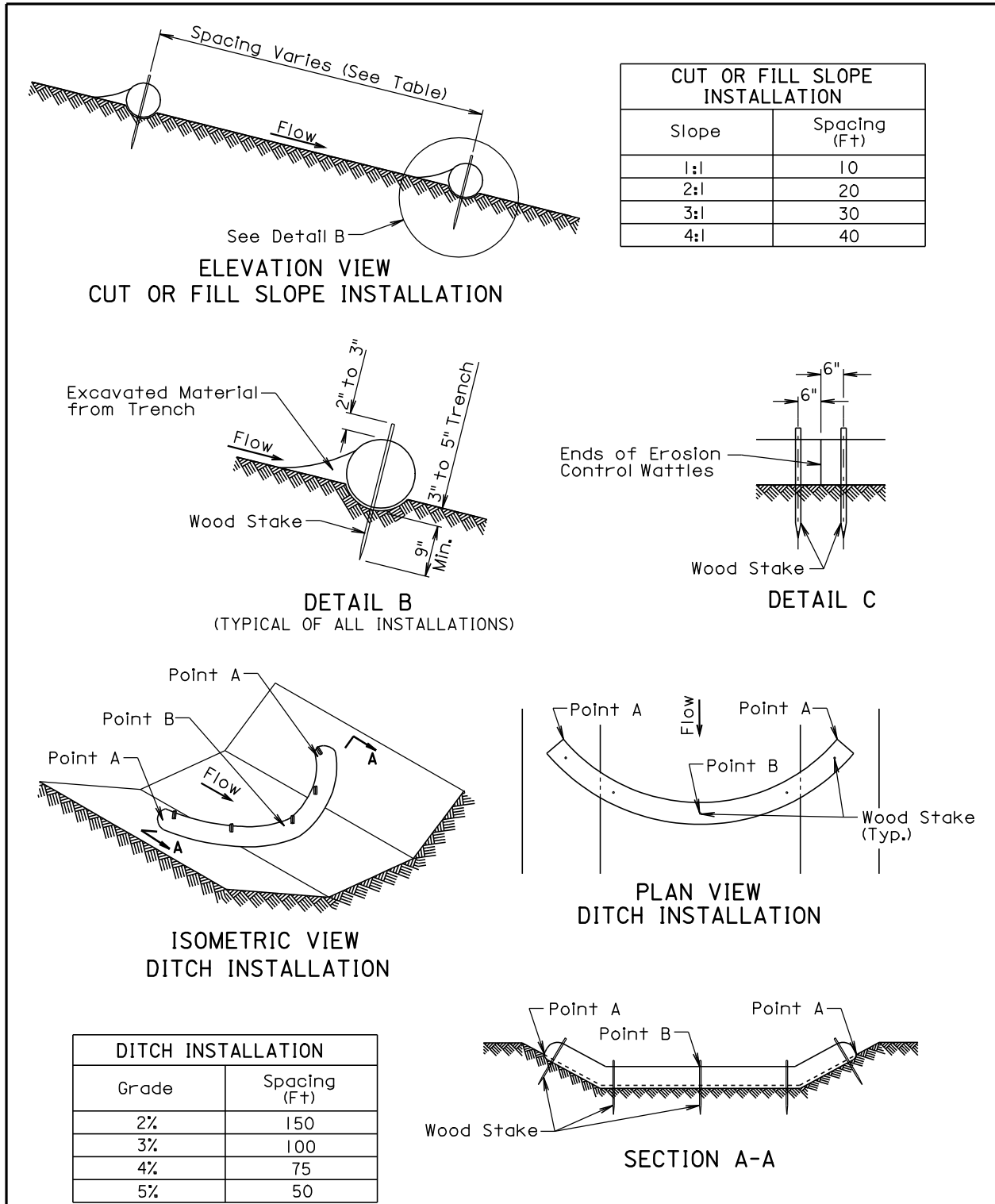
Published Date: 2nd Qtr. 2011

SDOT

HIGH FLOW SILT FENCE

PLATE NUMBER
734.05

Sheet 2 of 2



December 23, 2004

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