STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	022-171 & 028-171	1	11

Plotting Date: 08/18/2021

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT 022-171 & 028-171
S.D. HIGHWAYS 22 & 28
DEUEL COUNTY

CURED IN PLACE CULVERT LINING
PCN i6k4 & i6k5

INDEX OF SHEETS

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Sheet 3	Environmental Commitments
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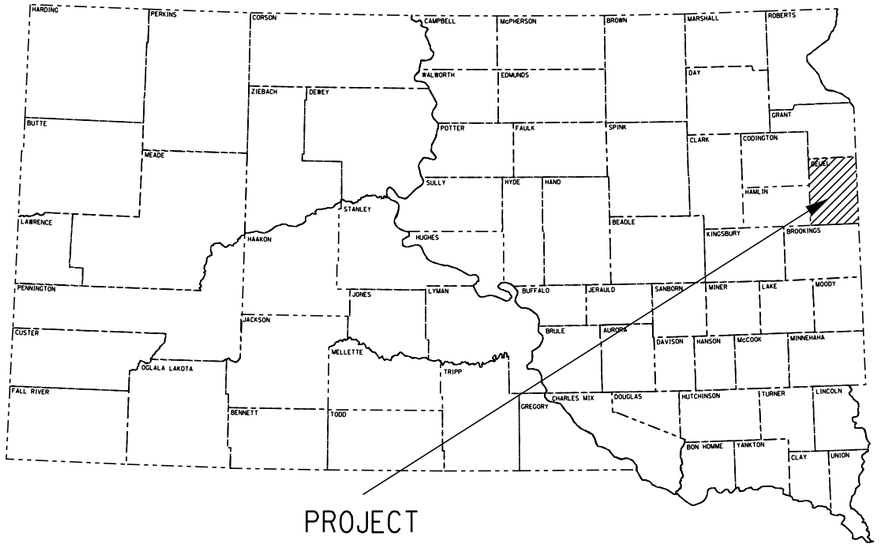
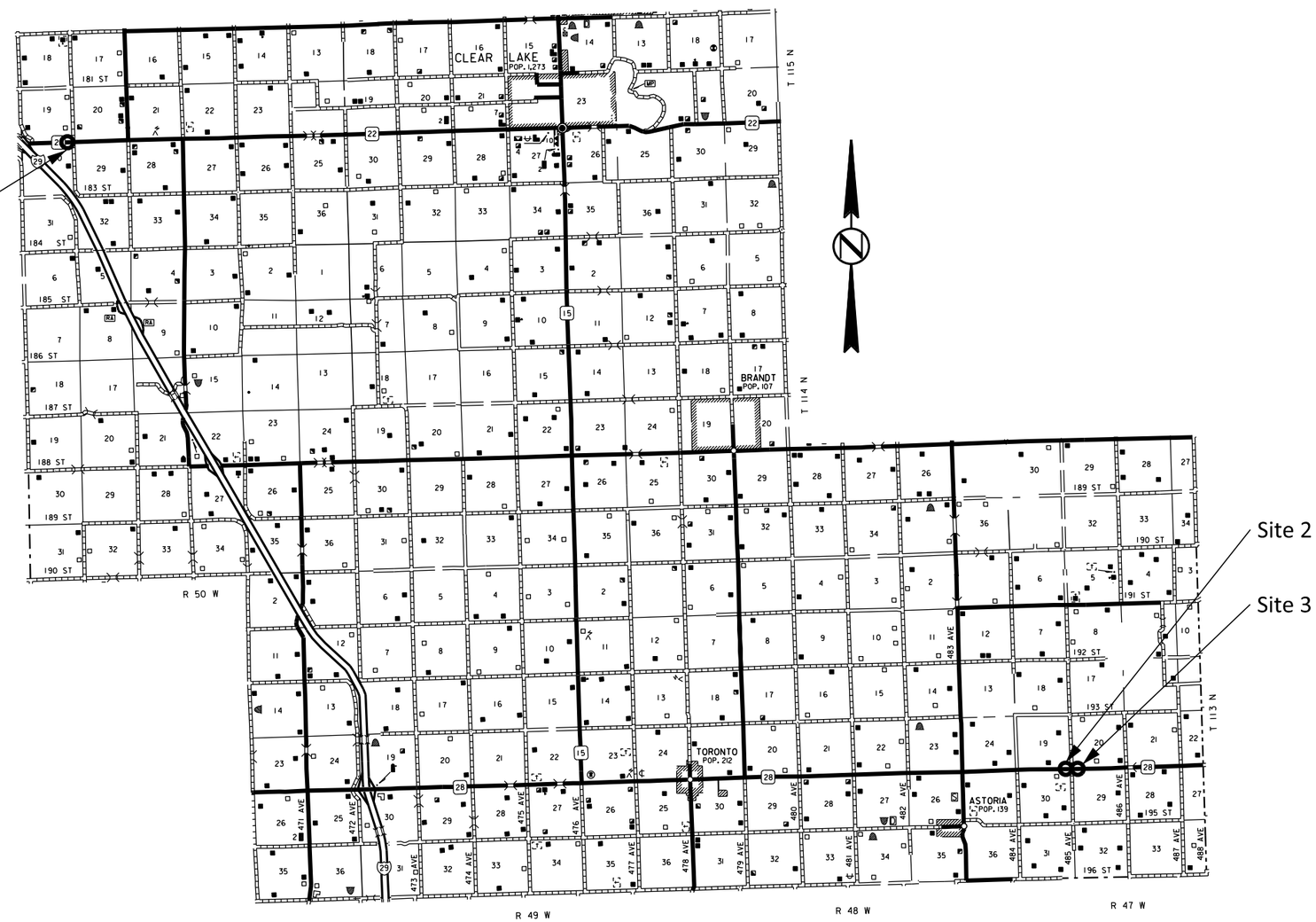
Sheet 9-11	Standard Plates





Site 1 - SD 22 @ MRM 361.16 - Culvert ID 2897 - 36" RCP (PCN i6k4)

Site 2 - SD 28 @ MRM 374.59 - Culvert ID 2856 - 30" CMP (PCN i6k5)

Site 3 - SD 28 @ MRM 374.61 - Culvert ID 2857 - 30" CMP (PCN i6k5)

STORM WATER PERMIT
NONE REQUIRED

PLOT SCALE - 1:13000

PLOT NAME - 1

FILE - ...\PRJ\DUEL16K4\TITLE SHEET.DGN

PLOTTED FROM - TRAB17882

ESTIMATE OF QUANTITIES AND ENVIRONMENTAL COMMITMENTS

Estimate of Quantities

For 022-171, PCN i6k4

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E1690	Remove Sediment	0.5	CuYd
110E7510	Remove Pipe End Section for Reset	1	Each
450E8910	Cleanout for Culvert Treatment	1	Each
450E9001	Reset Pipe End Section	1	Each
634E0010	Flagging	5.0	Hour
634E0110	Traffic Control Signs	137.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS
734E0154	12" Diameter Erosion Control Wattle	40	Ft
734E0602	Low Flow Silt Fence	40	Ft
734E0610	Mucking Silt Fence	5	CuYd

Estimate of Quantities

For 028-171, PCN i6k5

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E0510	Remove Pipe End Section	2	Each
110E1690	Remove Sediment	0.5	CuYd
450E5219	30" CMP Flared End, Furnish	2	Each
450E5220	30" CMP Flared End, Install	2	Each
450E8910	Cleanout for Culvert Treatment	2	Each
634E0010	Flagging	5.0	Hour
634E0110	Traffic Control Signs	137.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
734E0010	Erosion Control	Lump Sum	LS
734E0154	12" Diameter Erosion Control Wattle	60	Ft
734E0602	Low Flow Silt Fence	60	Ft
734E0610	Mucking Silt Fence	5	CuYd

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

36” Culvert Liners – Alternate A

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
450E9528	36" Cured in Place Pipe	86	Ft

36” Culvert Liners – Alternate B

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
450E9728	36" Fold and Form PVC Liner Pipe	86	Ft

30” Culvert Liners – Alternate A

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
450E9526	30" Cured in Place Pipe	108	Ft

30” Culvert Liners – Alternate B

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
450E9726	30" Fold and Form PVC Liner Pipe	108	Ft

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified 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. During construction, the Project Engineer will verify that the Contractor has met Environmental Commitment requirements. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: <https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.pdf >

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Engineer at 605-773-3180 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

Once construction is complete, the Project Engineer will review all environmental commitments for the project and document their completion.

COMMITMENT C: WATER SOURCE

The Contractor will not withdraw water with equipment previously used outside the State of South Dakota or previously used in aquatic invasive species (AIS) positive waters within South Dakota without prior approval from the SDDOT Environmental Office. To prevent and control the introduction and spread of invasive species into the project vicinity, all equipment will be power washed with hot water (≥140 °F) and completely dried for a minimum of 7 days prior to subsequent use. South Dakota administrative rule 41:10:04:02 forbids the possession and transport of AIS; therefore, all attached dirt, mud, debris and vegetation must be removed and all compartments and tanks capable of holding standing water must be drained. This includes, but is not limited to, all equipment, pumps, lines, hoses and holding tanks.

Action Taken/Required:

The Contractor will obtain the necessary permits from the regulatory agencies such as the South Dakota Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (USACE) prior to water extraction activities.

Additional information and mapping of water sources impacted by Aquatic Invasive Species in South Dakota can be accessed at:
< http://sdleastwanted.com/maps/default.aspx >

< South Dakota Administrative Rule 41:10:04 Aquatic Invasive Species:
https://sdlegislature.gov/rules/DisplayRule.aspx?Rule=41:10:04 >

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 will 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 Public ROW.

The waste disposal site(s) will be managed and reclaimed in accordance with the following from the General Permit for 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) will 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 Environmental Office and the Project Engineer.

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

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW with 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 not to exceed the duration of the project. Prior to project completion, the waste will 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) will be incidental to the various contract items.

COMMITMENT I: HISTORIC PRESERVATION OFFICE CLEARANCES

State Historic Preservation Office (SHPO or THPO) concurrence has not been obtained for this project.

Action Taken/Required:

All earth disturbing activities require a cultural resource review prior to scheduling the pre-construction meeting. This work includes but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor will arrange and pay for a record search and when necessary, a cultural resource survey. 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 if the site was previously surveyed; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor will provide ARC with the following: a topographical map or aerial view in 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 will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. 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.

In the event of an inadvertent discovery of human remains, funerary objects, or if evidence of cultural resources is identified during project construction activities, then such activities within 100 feet of the inadvertent discovery will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office, who will contact the appropriate SHPO/THPO within 48 hours of the discovery to determine an appropriate course of action.

The Contractor is responsible for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor will not utilize a site known or suspected of having contaminated soil or water. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

TABLE OF MAINLINE PIPE CULVERT REPAIRS

Culvert #	MRM	+ Disp	Station	Side	Per Original Plans: In Place Culvert Size and Type	Per Original Plans: Culvert Length (Ft)	Per Original Plans: Culvert End Type	Per Original Plans: Direction of Flow	Per Original Plans: Drain-age Area Acre	Remove Pipe: End Section (Each)	Remove Pipe: End Section for Reset (Each)	Furnish and Install: 30" CMP Flared End (Each)	Reset Pipe End Section (Each)	Cleanout for Culvert Treatment (Each)	30" CIPP or FFPP Liner (Ft)	36" CIPP or FFPP Liner (Ft)	Pavement Type	Pipe Condition for Design	Height of Fill from Top of Pipe to Top of Road (Ft)	Approximate Water Level in Culvert Comments	Approximate Debris Level in Culvert Comments	Repair Comments
SD 22																						
289	361.00	0.17	650+71.5	L	36"	RCP	80	Flared	North	59				1		86	Flexible	Partially Deteriorated	12.5	2" at north end on 8-17-21.	Minimal	Reset Flared End on south side. Clean culvert and install liner
				R				Flared				1	1									
SD 28																						
285	374.00	0.59	489+00	L	30"	CMP	50	Flared	North	94	1		1		1	50		Flexible	Fully Deteriorated	3	No water on 8-17-21.	1/4 to 1/3 full	Replace Flared End on North side. South Flared End is newly installed and should not require any work. Clean culvert and install liner.
				R				Flared														
285	374.00	0.61	490+39	L	30"	CMP	58	Flared	North	46	1		1		1	58		Flexible	Fully Deteriorated	4	No water on 8-17-21.	1/4 to 1/3 full	Replace Flared End on North side. South Flared End is newly installed and should not require any work. Clean culvert and install liner.
				R				Flared														
									Total		2	1	2	1	3	108	86					

SCOPE OF WORK

Work on this project involves installing culvert end sections, cleaning and inspection of pipe culverts. Subsequent to the cleaning and inspection additional repairs are anticipated which include lining of the pipe culverts.

UTILITIES

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 will contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

SEQUENCE OF OPERATIONS

The Contractor will submit to the Area Engineer a minimum of 14 days prior to the Preconstruction Meeting a detailed plan of how the pipe culvert cleaning and inspection will be staged. The plan will show how the Contractor is going to maintain traffic at each pipe culvert site, where equipment is going to be stored, the total length of the work space if a lane of traffic needs to be closed to traffic, and the methods used to prevent material removed from the pipe culverts from entering the waterway. These plans will be approved by the Area Engineer prior to starting work on the pipe culvert cleaning and inspection.

TRAFFIC CONTROL

The roadways will remain open to traffic at all times.

On a 2 lane roadway, one lane of traffic may be closed during work hours, with traffic control being handled with the use of Flaggers as per Standard Plate 634.23. If work can safely be performed from the shoulder of the roadway or beyond the shoulder, traffic control will be as per Standard Plate 634.03.

Flaggers and FLAGGER symbol signs will be in place when work activities or equipment present a hazard to workers, through traffic, or encroaches into driving lanes open to traffic.

Traffic control devices will be placed beyond the surfaced edge of the roadway when not in use.

Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, will be the responsibility of the Contractor. Cost of this work will be incidental to the various contract items unless otherwise specified in the plans. Delineators and signs damaged or lost will be replaced by the Contractor at no cost to the State.

Work activities during non-daylight hours are subject to prior approval.

The bottom of signs on portable or temporary supports will 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 will be on fixed location, ground mounted, breakaway supports.

Traffic will be maintained on the driving lanes. Use of the shoulder as a driving lane will not be permitted. Any damage to the shoulder due to rerouted traffic or Contractor's equipment will be repaired at no expense to the Department.

The Contractor will accommodate vehicles up to 16 feet wide through the work area at all times.

TRAFFIC CONTROL SIGNS

Traffic control signs have been included in a table for each route. Payment will only be for those signs used on each route.

FLAGGING

Operations will be conducted so that the traveling public will not have to wait longer than 15 minutes at the flagger station.

ENGINEER DRAWING AND DESIGN CALCULATION SUBMITTALS

The Contractor will submit the engineering drawing and design calculations for the culvert liners, as required by the various culvert lining Special Provisions in Adobe PDF format.

Adobe PDF submittals will be sent to the following email addresses:

Scott.Schneider@state.sd.us
Michael.Welch@state.sd.us

RCP AND CMP CULVERT REPAIRS FOR MAINLINE PIPE CULVERTS

Resetting and replacement of CMP will be completed prior to culvert lining.

All pipe and end treatments designated for removal will become the property of the Contractor for his disposal.

When necessary to remove end sections of CMP culverts, they may be cut with a torch. If the pipe culvert is cut the damaged area will be painted with a galvanizing paint approved by the Engineer. All costs associated with cutting and painting will be incidental to the various contract items.

The Contractor is advised of the risk of lead exposure when cutting galvanized paint. The Contractor should plan his/her operations accordingly, and inform employees of hazards of lead exposure.

In place culvert markers shall be removed and reset as needed to complete work. All costs associated with this work shall be incidental to the various contract items.

Tie bolts will be installed at all joint locations where existing pipe sections and end treatments are being reset or installed new. This may require drilling holes into the existing pipe sections and end treatments. Tie bolts will be installed in accordance with Standard Plate No. 450.18.

CORRUGATED METAL PIPE

Corrugated metal pipes will 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 will 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.

For pipe segments of 10' or less, helical spun pipe with rolled ends will not be required. Riveted pipe will be allowed.

The gauge of the corrugated metal ends will match the thickest gauge of corrugated metal pipe it is connected to. When connecting to an existing culvert, the gauge of the corrugated metal ends will be 14 gauge.

TABLE OF MAINLINE PIPE CULVERT REPAIR

Pipe culvert lengths shown in the Table of Mainline Pipe Culvert Repairs were obtained from the original grading plans and were not verified in the field.

It is the Contractors responsibility to investigate each pipe culvert pipe repair site to determine the pipe culvert size and length, along with other information needed to prepare a bid.

ALTERNATES FOR CULVERT LINING

The Contractor has the option of bidding Cured in Place Pipe CIPP culvert liners (Alternate A) or Fold and Form PVC Pipe (FFPP) liners (Alternate B).

The Contractor must bid the same alternate for each specific bid item pipe size. (i.e. all 30" liners need to be the same liner material.)

The Contractor may choose to bid Alternate A for a specific pipe size and Alternate B for another specific pipe size. (i.e. the Contractor may bid CIPP for the 30" liner and bid the 36" liner as FFPP.)

SEDIMENT CONTROL

Sediment control may be required if water is flowing through the pipe culvert at the time of cleaning. Otherwise sediment control is not anticipated.

The Contractor will implement appropriate sediment control measures prior to water flushing in order to prevent discharges beyond the project boundaries.

Wattles and Silt Fence have been provided in the Estimate of Quantities and will be used to capture pipe cleanout material. Placement of the wattles and Silt Fence will be as directed by the Engineer.

EROSION CONTROL WATTLE

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

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

Erosion control wattles will 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 will be from the approved product list. The approved product list for erosion control wattle may be viewed at the following internet site:

http://apps.sd.gov/HC60ApprovedProducts/main.aspx

LOW FLOW SILT FENCE

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

http://apps.sd.gov/HC60ApprovedProducts/main.aspx

Low flow silt fence will be placed at locations determined by the Engineer 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 734.04 for details.

EROSION CONTROL

The areas to be seeded consist of areas at pipe culvert locations where resetting or replacement of pipe culvert sections or end treatments are required. In addition, any location where vegetation was destroyed, such that quick revegetation is not expected will be reseeded.

The estimated area requiring erosion control is 0.03 acre at locations where pipe culvert section and ends were reset or replaced. All costs for the erosion control work for furnishing, placing, and maintaining erosion control including equipment, labor, and seeding will be incidental to the contract lump sum price for EROSION CONTROL.

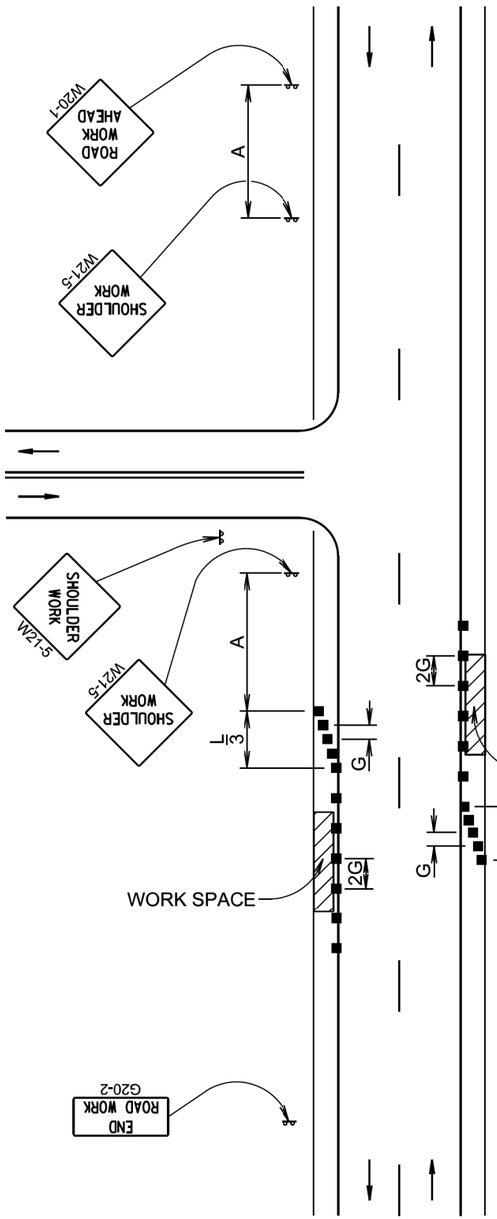
The limits of erosion control work will be determined by the Engineer during construction.

Type C Permanent Seed Mixture will be used on this project.

Application of fertilizer will not be required on this project.

Type C Permanent Seed Mixture will consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Arriba, Flintlock, Rodan, Rosana, Walsh	16
Canada Wildrye	Mandan	2
	Total:	18



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	200	180	25
35 - 40	350	320	25
45	500	600	25
50	500	600	50
55	750	660	50
60 - 65	1000	780	50

■ Channelizing Device

END ROAD WORK
G20-2

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

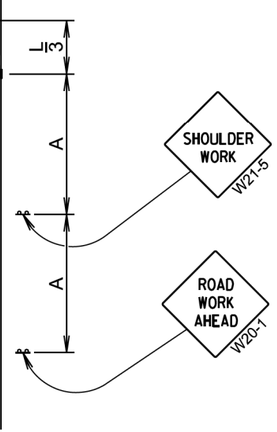
For short duration operations (1 hour or less) all channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

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



January 22, 2021

Published Date: 3rd Qtr. 2021	SDDOT	WORK ON SHOULDERS	PLATE NUMBER 634.03
			Sheet 1 of 1

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	500	25
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) will 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 will be drums or 42" cones.

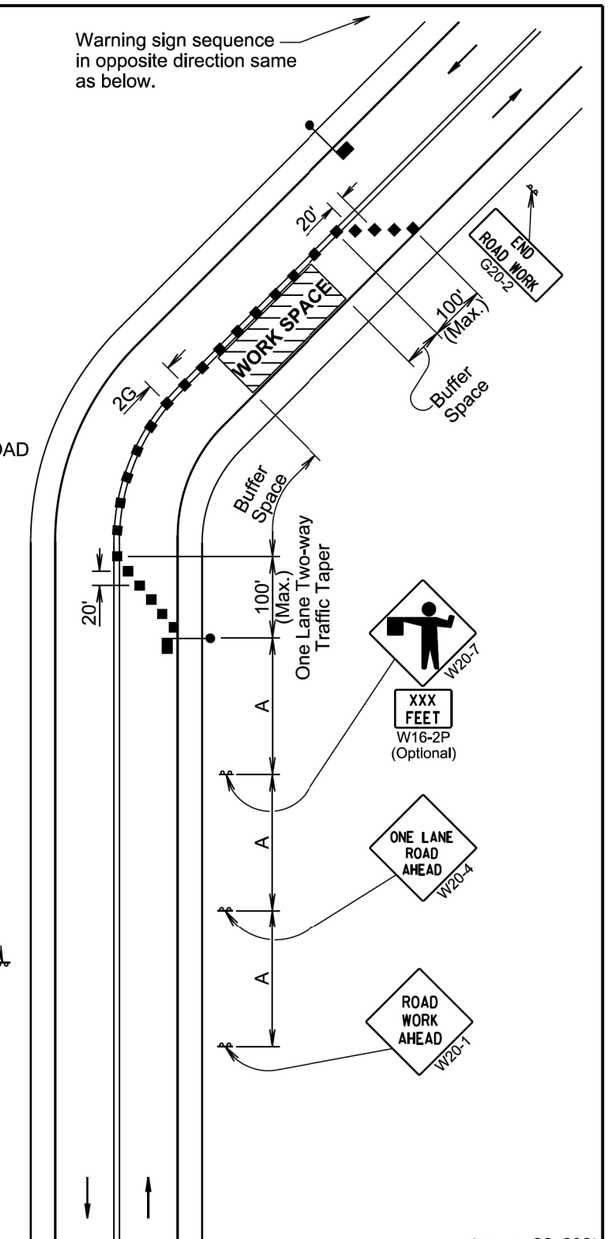
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

END ROAD WORK
G20-2

Channelizing devices and flaggers will 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.

The length of A may be adjusted to fit field conditions.



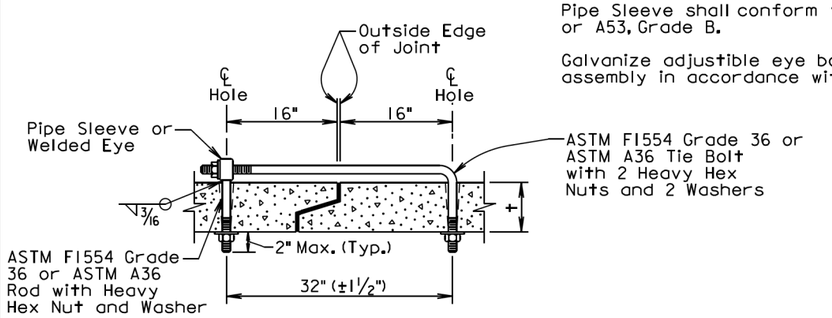
January 22, 2021

Published Date: 3rd Qtr. 2021	SDDOT	LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS FOR EACH ROUTE

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
W21-5	SHOULDER WORK	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK	2	36" x 18"	4.5	9.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			137.0

Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
≤ 3¼	⅝	¾
3½-6½	¾	1
≥ 7	1	1¼



ADJUSTABLE EYE BOLT TIE

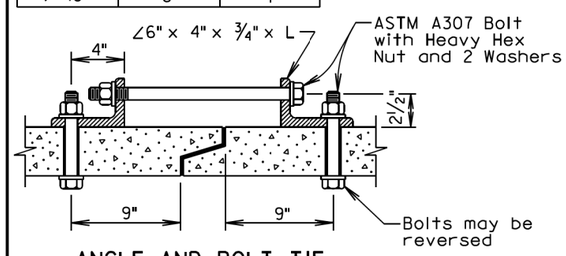
GENERAL NOTES:

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

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

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

Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	¾
> 48	6	1



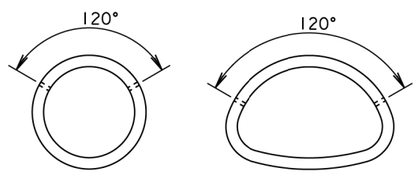
ANGLE AND BOLT TIE

GENERAL NOTES:

Angles shall conform to ASTM A36.

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

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



END VIEW "CIRCULAR"

END VIEW "ARCH"

GENERAL NOTES:

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

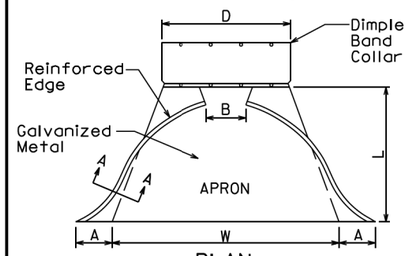
All pipe sections of R.C.P. and R.C.P. Arch shall be tied with tie bolts except for pipe located between drop inlets, manholes, and junction boxes. All pipe sections of pipes that only enter or exit drop inlets, manhole, and junction boxes shall be tied with tie bolts.

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

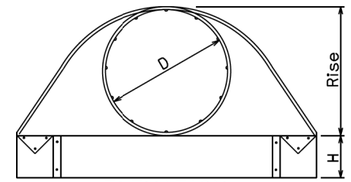
February 28, 2013

Published Date: 3rd Qtr. 2021	SDDOT	TIE BOLTS FOR R.C.P. AND R.C.P. ARCH	PLATE NUMBER 450.18
			Sheet 1 of 1

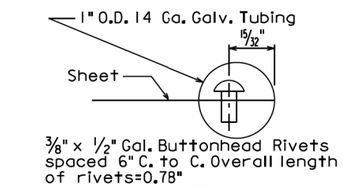
Alternate Type Connector Sections may be used with approval of the Engineer.



PLAN



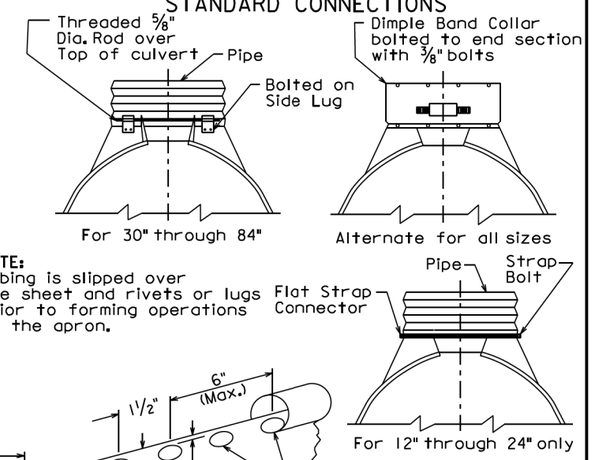
ELEVATION



TUBING ATTACHMENT DETAILS
SECTION A-A

Dia. D (in.)	Ga.	DIMENSIONS (in.) A	B	H	L	W	Approx. Slope	Body
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	1⅓:1	3 Pc.
78	12	18	42	12	87	132	1¼:1	3 Pc.
84	12	18	45	12	87	138	1⅙:1	3 Pc.

STANDARD CONNECTIONS

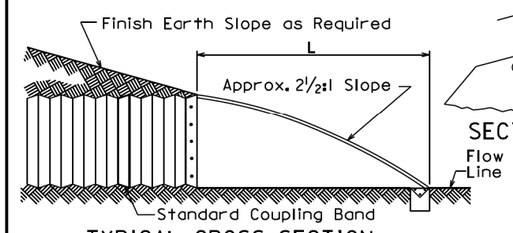


For 30" through 84"

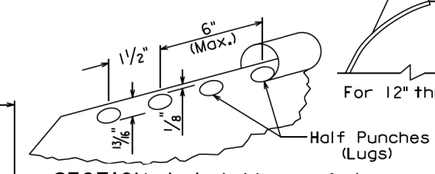
Alternate for all sizes

For 12" through 24" only

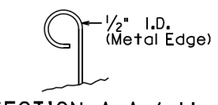
NOTE:
Tubing is slipped over the sheet and rivets or lugs prior to forming operations of the apron.



TYPICAL CROSS-SECTION



SECTION A-A (alternate)



SECTION A-A (alternate)

GENERAL NOTES:

All 3 pc. bodies shall have 12 Ga. sides and 10 Ga. center panels. Width of center panels shall be greater than 20% of the pipe periphery. Multiple panel bodies to have lap seams tightly joined by ⅜" 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 ¼" for 60" through 72" diameters and 2½" x 2½" x ¼" for 78" and 84" diameters. The angles shall be attached by ⅜" diameter galvanized nuts and bolts.

Rivets and Bolts shall be ⅜" 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.

March 31, 2000

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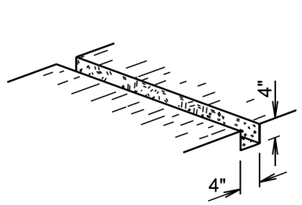
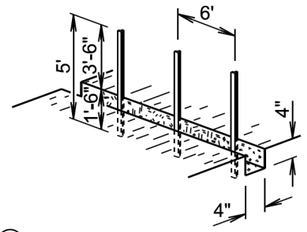
			Sheet 1 of 1

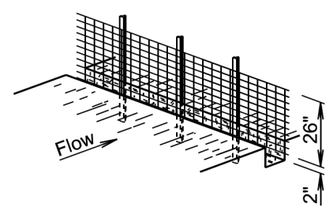
MANUAL LOW FLOW SILT FENCE INSTALLATION



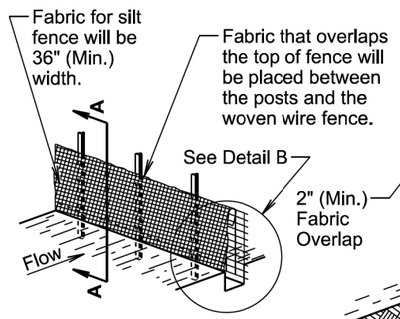
① EXCAVATE TRENCH



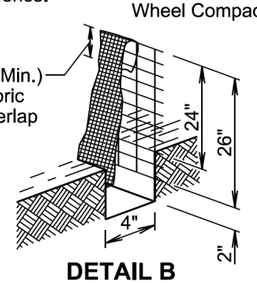
② DRIVE STEEL T FENCE POSTS



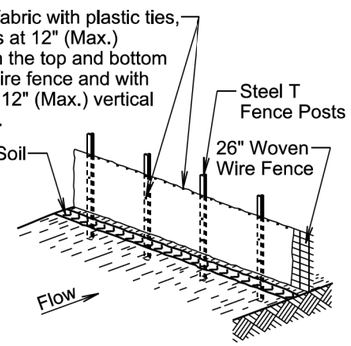
③ ATTACH 26" WOVEN WIRE FENCE TO POSTS



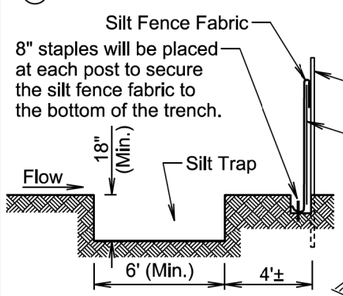
④ ATTACH SILT FENCE FABRIC



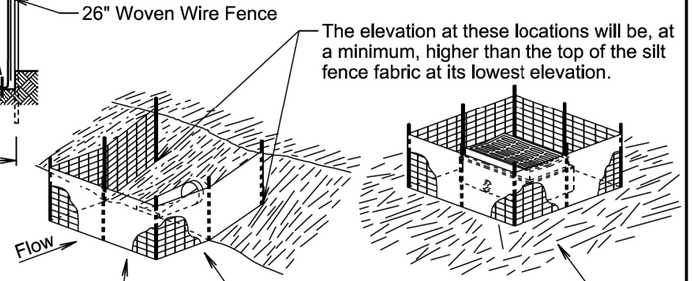
DETAIL B



⑤ BACKFILL TRENCH AND WHEEL COMPACT SOIL



SECTION A-A



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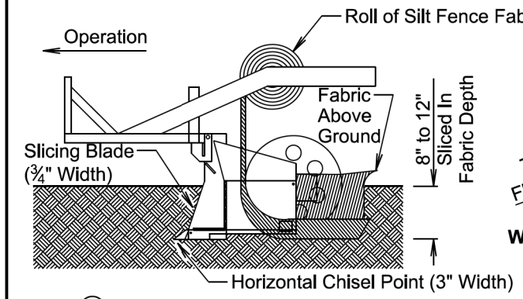
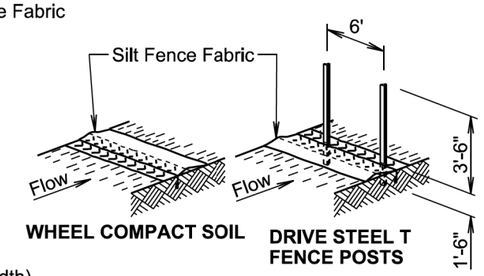
Published Date: 3rd Qtr. 2021	SDDOT	LOW FLOW SILT FENCE AND SILT TRAP	PLATE NUMBER 734.04
			Sheet 1 of 2

MACHINE SLICED LOW FLOW SILT FENCE INSTALLATION



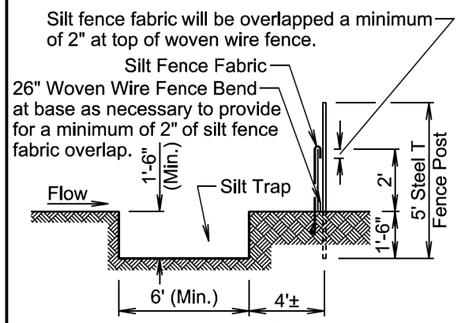
① INSTALL SILT FENCE FABRIC BY MACHINE SLICING METHOD.

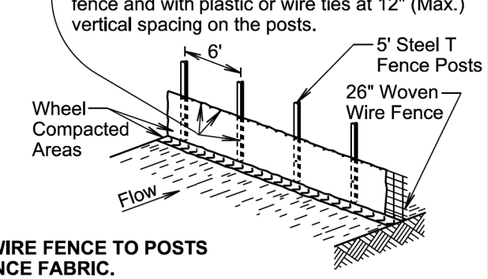


WHEEL COMPACT SOIL

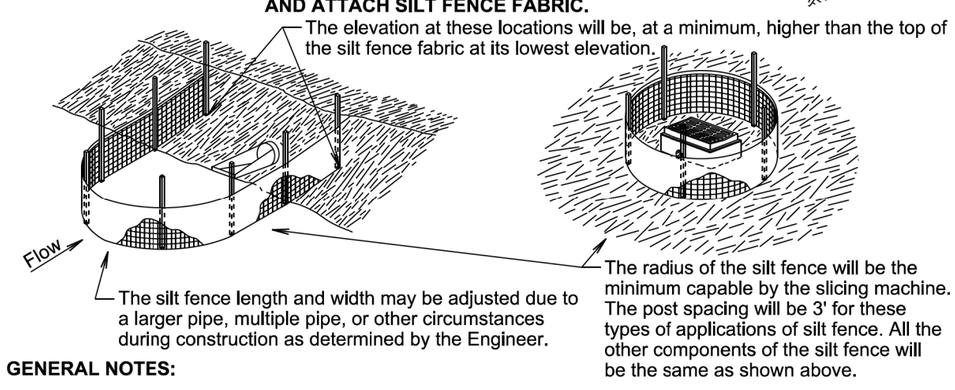
DRIVE STEEL T FENCE POSTS

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





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



GENERAL NOTES:

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

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

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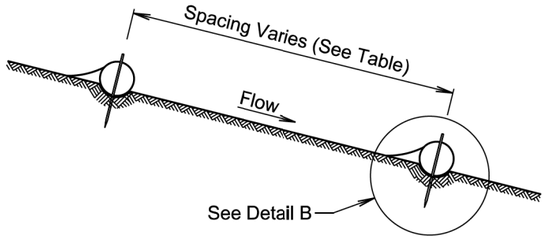
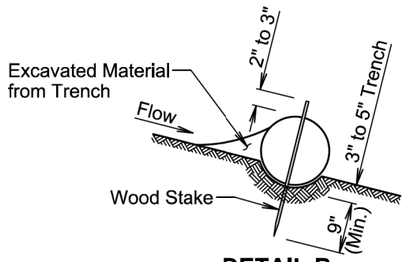
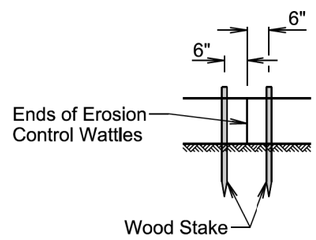


ELEVATION VIEW
(Cut or Fill Slope Installation)

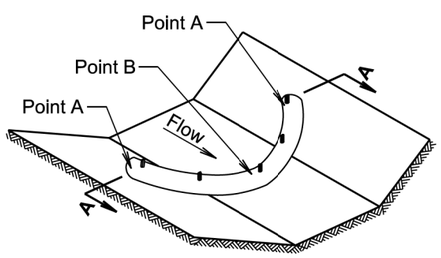
CUT OR FILL SLOPE INSTALLATION	
Slope	Spacing (Ft.)
1:1	10
2:1	20
3:1	30
4:1	40



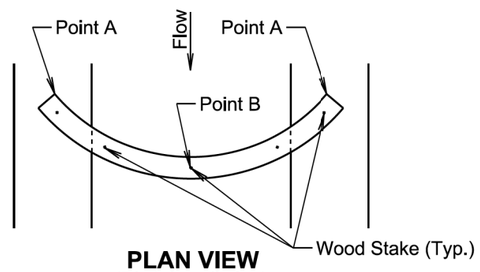
DETAIL B
(Typical of All Installations)



DETAIL C
(See General Notes)

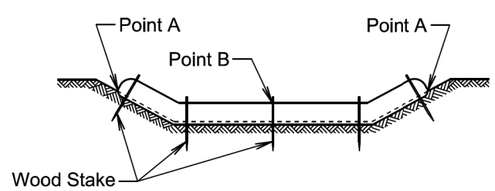


ISOMETRIC VIEW
(Ditch Installation)



PLAN VIEW
(Ditch Installation)

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



SECTION A-A

February 14, 2020

Published Date: 3rd Qtr. 2021	SDDOT	EROSION CONTROL WATTLE	PLATE NUMBER 734.06
			Sheet 1 of 2

GENERAL NOTES:

At cut or fill slope installations, wattles will 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 will 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 will 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 will be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles will be 3' to 4'.

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

The Contractor and Engineer will inspect the erosion control wattles in accordance with the storm water permit. The Contractor will remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.

Sediment removal, disposal, or necessary shaping will be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping will 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 will be incidental to the contract unit price per foot for the corresponding erosion control wattle contract item.

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

February 14, 2020

Published Date: 3rd Qtr. 2021	SDDOT	EROSION CONTROL WATTLE	PLATE NUMBER 734.06
			Sheet 2 of 2