

Plotting Date:

Date: 08/28/2025

Rev 08/27/2025 RG

SECTION B ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3220	Reestablish Right-of-Way and Property Corner	2	Each
009E3225	Reestablish Public Land Survey System Corner	21	Each
009E3230	Grade Staking	2.500	Mile
009E3250	Miscellaneous Staking	1.735	Mile
009E3280	Slope Staking	1.250	Mile
009E3301	Engineer Directed Surveying/Staking	40.0	Hour
009E4200	Construction Schedule, Category II	Lump Sum	LS
110E0600	Remove Fence	5,207	Ft
110E0700	Remove 3 Cable Guardrail	590	Ft
110E0707	Remove High Tension 4 Cable Guardrail	260	Ft
110E0730	Remove Beam Guardrail	287.5	Ft
110E0745	Remove 3 Cable Guardrail Slip Base Anchor Assembly	4	Each
110E1010	Remove Asphalt Concrete Pavement	10,045.7	SqYd
110E1100	Remove Concrete Pavement	19,066.7	SqYd
110E6006	Remove High Tension 4 Cable Guardrail for Reset	227	Ft
110E6016	Remove High Tension 4 Cable Guardrail Anchor Assembly for Reset	3	Each
110E6200	Remove Double Thrie Beam Guardrail for Reset	12.5	Ft
110E6250	Remove Beam Guardrail Trailing End Terminal for Reset	2	Each
110E7510	Remove Pipe End Section for Reset	6	Each
120E0010	Unclassified Excavation	28,341	CuYd
120E0600	Contractor Furnished Borrow Excavation	52,097	CuYd
120E1000	Muck Excavation	476	CuYd
120E6100	Water for Embankment	727.0	MGal
250E0020	Incidental Work, Grading	Lump Sum	LS
260E6010	Granular Material	72.0	Ton
421E0100	Pipe Culvert Undercut	39	CuYd
450E0122	18" RCP Class 2, Furnish	82	Ft
450E0130	18" RCP, Install	82	Ft
450E0142	24" RCP Class 2, Furnish	232	Ft
450E0150	24" RCP, Install	232	Ft
450E2304	18" RCP Safety End, Furnish	3	Each
450E2307	18" RCP Safety End, Install	3	Each
450E2308	24" RCP Safety End, Furnish	6	Each
450E2311	24" RCP Safety End, Install	6	Each
450E3052	48" RCP Arch Class 2, Furnish	60	Ft
450E3060	48" RCP Arch, Install	60	Ft
* 450E8900	Cleanout Pipe Culvert	3	Each
450E9001	Reset Pipe End Section	6	Each
462E0100	Class M6 Concrete	3.3	CuYd
464E0100	Controlled Density Fill	11.2	CuYd
480E0100	Reinforcing Steel	386	Lb

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
600E0300	Type III Field Laboratory	1	Each
620E0030	Type 3 Right-of-Way Fence	5,207	Ft
620E0515	Type 1A Temporary Fence	1,900	Ft
620E1020	2 Post Panel	4	Each
620E1030	3 Post Panel	4	Each
629E0110	High Tension 4 Cable Guardrail	725	Ft
629E0211	Reset High Tension 4 Cable Guardrail	227	Ft
629E0290	High Tension Cable Guardrail Anchor Assembly	4	Each
629E0295	Reset High Tension Cable Guardrail Anchor Assembly	3	Each
* 629E1107	Furnish High Tension Cable Guardrail Post	50	Each
630E0010	Straight Class A Thrie Beam Guardrail with Wood Posts	37.5	Ft
630E0110	Straight Double Class A Thrie Beam Guardrail with Wood Posts	37.5	Ft
630E0500	Type 1 MGS	75.0	Ft
630E2001	Asymmetrical W Beam to Thrie Beam Guardrail Transition	3	Each
630E2017	MGS MASH Flared End Terminal	1	Each
630E2018	MGS MASH Tangent End Terminal	2	Each
630E5110	Reset Double Thrie Beam Guardrail with Wood Posts	12.5	Ft
630E5210	Reset Beam Guardrail Trailing End Terminal	2	Each
670E4205	Type M Frame and Grate Assembly	2	Each

^{* -} Denotes Non-Participating

GRADING OPERATIONS

Water for Embankment is estimated at the rate of 10 gallons of water per cubic yard of Embankment minus Waste.

The estimated cubic yards of excavation and/or embankment required to construct outlet ditches and ditch blocks are included in the earthwork balance notes on the profile sheets.

Special ditch grades and other sections of the roadway different than the typical section(s) will be constructed to the limits shown on the cross sections. If significant changes to the cross sections are necessary during construction, the Engineer will contact the Designer for the proposed change.

Generally, all shallow inlet and outlet ditches as noted on the plan sheets will be cut with a 10-foot wide bottom with 5:1 backslopes. However, the Engineer may direct the Contractor to adjust the ditch width for proper alignment with the drainage structure.

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

TYPE III FIELD LABORATORY

The Contractor will provide high-speed broadband internet connection to the field lab. The multiport internet connection may be hardwired, through a cellular method, or other approved service that allows Wi-Fi connection. Prior to obtaining the internet connection, the Contractor will submit the internet connection's technical data to the Area Office to check for compatibility with the state's computer equipment. The Contractor's personnel are prohibited from using the internet connection unless pre-approved by the Project Engineer. The internet service will be incidental to the contract unit price per each for "Type III Field Laboratory".

UTILITIES

The Contractor will be aware that the existing utilities shown in the plans were surveyed prior to the design of this project and might have been relocated or replaced by a new utility facility prior to construction of this project, might be relocated or replaced by a new utility facility during the construction of this project, or might not require adjustment and may remain in its current location. The Contractor will contact each utility owner and confirm the status of all existing and new utility facilities. The utility contact information is provided elsewhere in the plans or bidding documents.

GENERAL GEOLOGY

The project alignment traverses glacial terrain typical of eastern South Dakota. Included within this terrain may be areas of loess, shale, sand, gravel, glacial till and boulder till. As is the case with most glacial terrain, the materials throughout the project can vary greatly in a short distance.

CLASSIFICATION OF EXCAVATION

Large glacial boulders may be encountered sporadically within the project limits. Very large boulders could require more effort to excavate. Most of the material encountered should be able to be excavated using conventional methods associated with normal Unclassified Excavation. Muck Excavation will be required at the areas shown in the plans or as directed by the Engineer.

STATE OF	PROJECT	SHEET	TOTAL
SOUTH DAKOTA	PT 0907(89)317	B3	B31

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TABLE OF EXCAVATION QUANTITIES BY BALANCES

		Excavation	* Undercut	* Muck Exc.	* Contractor Furnished Borrow Exc.	Total Excavation	** Waste
Station to	Station	(CuYd)	(CuYd)	(CuYd)	(CuYd)	(CuYd)	(CuYd)
32+00 WB	65+00	939	8271	238	27358	36806	238
32+00 EB	65+00	1542	9852	238	24739	36371	238
	Totals:	2481	18123	476	52097	73177	476

- * The quantities for these items are in the Estimate of Quantities under their respective contract items.
- ** The quantities for these items are for information only.

TABLE OF UNCLASSIFIED EXCAVATION

		(CuYd)
Excavation		2481
Undercut		18123
Topsoil		<u>7737</u>
	Total	28341

PROCEDURES FOR DETERMINING UNCLASSIFIED EXCAVATION QUANTITY

When plan quantities are used for payment, the Unclassified Excavation quantity will be used for final payment and the plans quantity of Topsoil and salvaged surfacing items listed in the Table of Unclassified Excavation will not be adjusted according to field measurements.

The following paragraphs are general earthwork information and information in regard to computing the Unclassified Excavation quantity when final cross sections are taken in the field:

The Unstable Material Excavation quantity is included in the Excavation quantity listed in the Table of Unclassified Excavation. When finaling a project, the Unstable Material Excavation quantity will be added to the Excavation quantity to compute the Unclassified Excavation quantity.

The Topsoil quantity in the Table of Unclassified Excavation is an estimate. When finaling a project, the total quantity of field measured Topsoil will be used in place of the estimated Topsoil quantity. The quantity of Topsoil from the cuts will be paid for twice as Unclassified Excavation, as it will be in both the Excavation and Topsoil quantities. This will be full compensation for Excavation, which includes necessary undercutting to provide space for placement of topsoil.

The Excavation quantities from individual balances and the Table of Unclassified Excavation have been reduced by the volume of in place surfacing that will be removed and/or salvaged.

The volume of in place Concrete Surfacing and Asphalt Surfacing removed will NOT be paid for as Unclassified Excavation.

The Excavation quantities from individual balances and the table above have been reduced by the volume of in place concrete pavement and asphalt pavement that will be removed.

When finaling a project, the estimated quantity of 6,442.7 cubic yards of Concrete Pavement and Asphalt Pavement removed from the cut sections will be subtracted from the Unclassified Excavation quantity for final payment. The quantity of Concrete Pavement and Asphalt Pavement from cut sections subtracted from the Unclassified Excavation quantity will be plans quantity and will not be adjusted according to field measurements.

WASTE EXCAVATION

The quantity of waste in the Table of Excavation Quantities by Balances will be disposed of at a Contractor furnished site acceptable to the Engineer.

UNDERCUTTING 32+00 to 48+00 AND 58+00 to 64+25

In all cut sections the earthen subgrade will be undercut 2 feet below the earthen subgrade surface. The undercut material or other suitable material, as directed by the Engineer, will then be replaced and compacted to the density specified for the section being constructed.

Shallow embankment sections, fills less than 2 feet in height measured at the finished subgrade shoulders, will be undercut to ensure a minimum 2 foot height of earth embankment for the entire width of roadbed. The upper 6 inches of undercut material that consists of topsoil with a high humus content will be used as topsoil, placed in the fill slopes outside the shoulders of the earthen subgrade, or placed in the lower portion (below 4 foot depth) in fills which are greater than 4 feet in height. The remaining undercut soil and soil obtained from adjacent excavation (excluding the upper 6 inches) will then be replaced and compacted to the density specified for the section being constructed.

UNSTABLE MATERIAL EXCAVATION

The areas of unstable material excavation are drawn on the cross sections with a normal depth of 2 feet. The estimated quantity of 3650 cubic yards of unstable material excavation will be paid for at the contract unit price per cubic yard for "Unclassified Excavation".

All areas designated as Unstable will be excavated. The unstable material excavated on this project will be placed outside the subgrade shoulder in fill sections or stockpiled and used as topsoil.

Field measurement of unstable material excavation will not be made. However, if there are additional areas of unstable material excavation other than what is shown in the plans, the Engineer will direct removal of these areas and the additional areas will be measured according to the Engineer.

TABLE OF UNSTABLE MATERIAL EXCAVATION

Station	to	Station	L/R	Depth (Ft)	Quantity (CuYd)
43+00		54+00 WB	L	2	1511
43+00		54+00 EB	R	2	1511
56+50		59+50 EB	R	2	314
56+50		59+50 WB	L	2	314
				Total·	3650

MUCK EXCAVATION

The areas of muck excavation are drawn on the cross sections with a normal depth of 3 feet. The estimated quantity of 476 cubic yards of muck excavation will be paid for at the contract unit price per cubic yard for "Muck Excavation".

Muck excavation consists of the removal of highly organic and/or highly saturated material from the designated areas shown on the cross sections. Highly organic muck material will not be used in the embankment but may be used as topsoil. Non-organic muck material may be used as embankment outside of the fill subgrade shoulder if it is properly handled and dried prior to placement in the embankment.

Field measurement of muck excavation will not be made unless the Engineer orders additional excavation, or when the Engineer determines, in accordance with Section 120.3 A.1 of the Specifications, that the classification of excavation be changed.

If the areas designated as muck excavation can be removed with similar equipment and procedures as used for unclassified excavation, the material will be measured and paid for as "Unclassified Excavation".

TABLE OF MUCK EXCAVATION

				Depth	Quantity
Station	to	Station	L/R	(Ft)	(CuYd)
54+00		56+50 WB	L	3	238
54+00		56+50 EB	R	3 _	238
				Total:	476

CONTRACTOR FURNISHED BORROW EXCAVATION

The Contractor will provide a suitable site for contractor furnished borrow excavation material. The Contractor is responsible for obtaining all required permits and clearances for the borrow site.

Restoration of the contractor furnished borrow excavation site will be the responsibility of the Contractor.

The contractor furnished borrow excavation material will be uniform in texture and free from organic material. The liquid limit will not exceed 45 and the plastic index will not exceed 25.

The Contractor will be responsible for the following minimum testing prior to use of each borrow site:

A minimum of one test for liquid limit and plastic index for each location and soil type, with samples obtained according to SD201.

The Department will be responsible for the following minimum testing:

A minimum of one test for liquid limit and plastic index for every 100,000 cubic yards or a major change in soil type. Independent Assurance testing will not be required.

PIPE CULVERT UNDERCUT

The table includes undercut for 36 inch and larger pipe culverts. The depth of undercut is an estimate and the actual depth necessary will be determined during construction. Pipes listed may or may not require undercutting and pipes not listed may require undercutting. The Engineer will determine which pipe will be undercut in accordance with Section 421 of the Specifications.

	Undercut	Pipe Culvert
Station	Depth	Undercut
	(Ft)	(CuYd)
54+98	1	13
55+05	1	13
55+12	1 _	13
	Total:	39

Granular material may be required for backfilling the pipe culvert undercut areas where site conditions warrant. Granular material will conform to the gradation requirements in Section 421.2.A of the Specifications and will be paid for at the contract unit price per ton for "Granular Material". A quantity of 72 tons of granular material is included in the estimate of quantities for use where it is determined to be needed. The quantity will be adjusted or eliminated by construction change order, depending on field conditions.

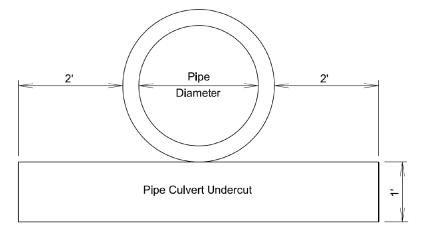
The table below contains the rate for one-foot depth of pipe culvert undercut per foot of pipe length and should be used as an aid in determining the actual amount of undercut to be performed during construction. The table is derived from the drawing below and conforms to the Specifications. When calculating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

Storm sewer and approach pipes do not require undercutting unless specified otherwise in these plans.

Pipe	Round Pipe	Arch Pipe
Diameter	Undercut Rate	Undercut Rate
	for 1' Depth	for 1' Depth
(ln)	(CuYd/Ft)	(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	

STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	PT 0907(89)317	B4	В31

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INCIDENTAL WORK, GRADING

Station	L/R	Remarks
34+99.99 (WB)		Take Out 18" – 66' RCP
45+00 (WB)		Take Out 18" – 66' RCP
54+77 (EB)	L	Take Out 18" RCP Safety End
55+33 (EB)	L	Take Out 18" RCP Safety End
66+25 (EB)	L	Take Out 18" RCP Flared End

REMOVAL OF EXISTING ASPHALT CONCRETE PAVEMENT

The Los Angeles Abrasion Loss value on the aggregate used for the in-place asphalt concrete was 26. This value was obtained from testing during construction of the in-place asphalt concrete.

An estimated 10,045.7 Square Yards of the in-place asphalt concrete surfacing will be removed from the existing highway according to the in-place surfacing typical sections and wasted as directed by the Engineer.

The quantity of removed asphalt material is estimated from the in-place surfacing typical sections. This estimated quantity is not included in the unclassified excavation quantities.

REMOVAL OF EXISTING CONCRETE PAVEMENT

Sta. 32+00 to Sta. 65+00 - The existing concrete is 10.5" Plain Jointed PCC Pavement. The existing transverse joints are perpendicular and are spaced at 20 feet. The aggregate in the existing Plain Jointed PCC Pavement is quartzite.

RECYCLED CONCRETE AGGREGATE (RCA) USED AS CONTRACTOR FURNISHED BORROW EXCAVATION

Existing PCC Pavement removed from within the project limits (estimated at 5,593.4 cu.yds.) may be used as Contractor Furnished Borrow Excavation material if the following requirements are met:

- It will be crushed to a minus 2.5-inch size.
- All in-place rebar will be separated and removed from the existing PCC Pavement.
- No existing asphalt concrete pavement will be allowed in the subgrade.
- The Contractor will blend the RCA and the borrow/excavated material at a rate of approximately 85% soil and approximately 15% RCA.
- The top 2 feet of subgrade will be constructed using this blended material.
- Field measurement of the borrow material and the RCA used on the project will be required. Total quantity of borrow material and RCA will be payment for the bid item "Contractor Furnished Borrow Excavation".

All costs to crush the PCC Pavement, remove the rebar, blend RCA and borrow material, obtaining borrow material, and placement of blended material in the subgrade will be incidental to the contract unit price per cubic yard for "Contractor Furnished Borrow Excavation".

All costs to remove the existing PCC Pavement will be incidental to the contract unit price per square yard for "Remove Concrete Pavement".

See Section F for alternative use of RCA.

REINFORCED CONCRETE PIPE

High sulfate levels are likely to be encountered on this project. The type of cement will be either a Type V or Type II with 20% to 25% Class F Modified Fly Ash substituted for cement in accordance with Section 605 of the Specifications. The Water/Cementitious material ratio will not exceed 0.45 as defined in Section 460.3 C of the Specifications. The mix will be as per the fabricator's design; however, minimum compressive strength will not be less than 4500 psi at 28 days. The pipe must be marked in an acceptable way to designate meeting requirements for sulfate resistance.

CONTROLLED DENSITY FILL FOR PIPE

Controlled density fill will be in conformance with Section 464 of the Specifications.

The controlled density fill will be placed between the pipes from the base of pipe elevation to the haunch of the pipes and extend to the end of the end section.

TABLE OF CONTROLLED DENSITY FILL FOR PIPE

		Quantity
Station		(CuYd)
55+04 L		6.22
55+04 R		4.96
	Total·	11 2

CONCRETE PIPE CONNECTIONS

Pipe connections to existing pipes, manholes, junction boxes, and drop inlets will be done by breaking a hole into the existing structure and inserting the pipe. A concrete collar will then be poured around the pipe in the area of the connection.

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

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

PIPE COVER

The earthen subgrade cover for some pipe installations is less than one foot. The Contractor will take the necessary precautions to ensure the structural properties of the pipes are not damaged after installation and prior to the placement of final surfacing. Any additional costs for preventing damage to these pipes will be incidental to the contract unit price per foot for the corresponding pipe installation contract item.

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SOUTH DAKOTA	PT 0907(89)317	B5	В31

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TABLE OF TYPE M MEDIAN DRAINS

				Type M
				Frame and
		Class M6	Reinforcing	Grate
		Concrete	Steel	Assembly
Station	L/R	(CuYd)	(Lb)	(Each)
54+83 EB	L	1.65	192	1
55+27 EB	L	1.66	194	1
	Totals:	3.31	386	2

TEMPORARY FENCE

The Contractor will verify the location of the temporary fence with the landowner prior to installation of the fence.

BRACE PANELS FOR ROW FENCE

The E-Z Brace or an approved equal may be utilized as an alternate horizontal brace in the brace panels if approved by the Engineer. The E-Z Brace will be attached to each wood post utilizing two 5/16" x 3" lag screws. Holes of appropriate diameter, based on wood post condition, will be drilled before placement of lag screws. The following is the contact regarding the E-Z Brace:

Charlie Mack Macksteel E-Z Braces 415 20th Ave. SE. Watertown, SD 57201 605-882-2177

TABLE OF CABLE GUARDRAIL

	Remove	Remove 3	Remove	Remove	Reset	High	High Tension	Remove High	Reset High	Furnish High
	3 Cable	Cable Guardrail	High	High Tension	High	Tension 4	Cable	Tension Cable	Tension Cable	Tension
	Guardrail	Slip Base	Tension 4	Cable	Tension	Cable	Guardrail	Guardrail Anchor	Guardrail	Cable
		Anchor	Cable	Guardrail for	Cable	Guardrail	Anchor	Assembly for	Anchor	Guardrail
Location		Assembly	Guardrail	Reset	Guardrail		Assembly	Reset	Assembly	Post
	(Ft)	(Each)	(Ft)	(Ft)	(Ft)	(Ft)	(Each)	(Each)	(Each)	(Each)
I-90 EBL										
Median Shoulder	289	2	67	227	227	294	2	2	2	50
Outside Shoulder										
I-90 WBL										
Median Shoulder	301	2	193			431	2	1	1	
Outside Shoulder										
Totals:	590	4	260	227	227	725	4	3	3	50

STATE OF SOUTH DAKOTA PROJECT SHEET TOTAL SHEETS PT 0907(89)317 B6 B31

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TABLE OF BEAM GUARDRAIL

	Remove Beam	Remove Beam Guardrail	Reset Beam	Remove Double	Reset Double	Asymmetrical W Beam to	Type	Class A Thrie	Double Class A	MGS MASH Tangent	MGS MASH
Location	Guardrail	Trailing End Terminal for Reset	Guardrail Trailing End Terminal	Class A	Class A Thrie Beam	Thrie Beam Guardrail Transition	MGS	Beam	Thrie Beam	End Terminal	Flared End Terminal
	(Ft)	(Each)	(Each)	(Ft)	(Ft)	(Each)	(Ft)	(Ft)	(Ft)	(Each)	(Each)
I-90 EBL											
Median Shoulder											
Outside Shoulder	179.5	1	1	12.5	12.5	2	75		37.5	1	1
I-90 WBL											
Median Shoulder											
Outside Shoulder	108.0	1	1			1		37.5		1	
Totals:	287.5	2	2	12.5	12.5	3	75	37.5	37.5	2	1

REMOVE CABLE AND BEAM GUARDRAIL

All removed guardrail items will become the property of the Contractor and will be removed from the project limits.

HIGH TENSION CABLE GUARDRAIL

The Contractor will furnish and install a high tension cable guardrail system that meets the Test Level 3 crash testing requirements of the Manual for Assessing Safety Hardware (MASH). The maximum dynamic deflection of the system will be less than 10'-0" and the maximum post spacing will be 10'-6" unless specified otherwise in the plans. High Tension 4 Cable Guardrail will be one of the following products:

Valtir (Trinity) – CASS S3 M10 Brifen – 4 Rope O-Post System

The Contractor will install the system according to the manufacturer's installation recommendations except where stated otherwise in the plans. A copy of the detail drawings and installation instructions for the high tension cable guardrail and anchor assemblies will be given to the Engineer a minimum of 4 weeks prior to installation of the high tension cable guardrail system.

All posts will be galvanized and inserted into driven galvanized steel sleeves with soil plates. The driven sleeves must be designed for a minimum frost depth of 42" and to resist the additional lateral component of curved cable sections.

Delineation of the high tension cable guardrail will be in conformance with standard plate 632.40.

The cables provided will be pre-stretched in the factory.

The Contractor will check and adjust the tension of the cables a minimum of 3 weeks after installation and not longer than 6 weeks after installation. Cost for this work will be incidental to the contract unit price per foot for "High Tension 4 Cable Guardrail".

High tension cable guardrail will be installed on a 10:1 or flatter slope and the embankment limits will match the high tension cable guardrail limits. The embankment quantities may vary from plans quantity.

The lengths of high tension cable guardrail stated in the plans are based on a minimum effective length (length of need). The length and location of the high tension cable guardrail at each site will need to be adjusted during construction as necessary depending on the system provided and will be

approved by the Design Engineer before installation. When the Valtir (Trinity) CASS S3 M10 system is installed adjacent to one-way traffic roadways, 26' of the anchor assembly on the approach end is considered non-effective, and

51' on the non-approach end is considered non-effective; however, when the same system is installed adjacent to two-way traffic roadways, 26' of the anchor assembly on both the approach and non-approach ends is considered non-effective. For Brifen 4 Rope O-Post System installations, the anchor assembly is non-effective.

The Contractor will provide a signed letter of compliance to the Engineer upon completion of the high tension cable guardrail installation(s) stating that the high tension cable barrier system has been installed in conformance to the manufacturer installation instructions and specifications, meets the Test Level 3 crash test requirements of MASH, and is terminated with an approved anchor assembly.

The high tension cable guardrail will be measured along the centerline of the cable guardrail from the beginning to the end of the minimum effective length.

All costs for furnishing and installing the high tension cable guardrail system including all labor, materials, and equipment will be incidental to the contract unit price per foot for "High Tension 4 Cable Guardrail".

HIGH TENSION CABLE GUARDRAIL ANCHOR ASSEMBLY

The beginning and end of each "run" of high tension cable guardrail will terminate with an anchor assembly. The High Tension Cable Anchor Assemblies will be one of the following products:

Valtir (Trinity) – CASS Cable Terminal (CCT) Brifen – MASH Gating Terminal (MGT)

The footing(s) for the anchor assembly will be designed to allow for 1 inch maximum of lateral deflection. The allowable design soil pressure will be 1000 psf. The top 2 feet of soil pressure will be neglected in the design of the footing(s). The footing(s) will be a minimum of 5' deep. The footing(s) design will be submitted through proper channels to the Office of Bridge Design for a one-time approval. Any changes to the anchor assembly that could affect footing size including configuration changes such as different number of cables and different number of footings will be resubmitted for approval. The approval will be obtained a minimum of 4 weeks prior to construction of the anchor footing(s).

Delineation of the high tension cable guardrail anchor assembly will be in conformance with standard plate 632.40.

All costs for furnishing and installing the High Tension Cable Guardrail Anchor Assembly including all labor, equipment, and materials which include the anchor footing(s), hardware, and all attachments to the anchor footing(s), will be incidental to the contract unit price per each for "High Tension Cable Guardrail Anchor Assembly".

FURNISH HIGH TENSION CABLE GUARDRAIL POST

The Contractor will furnish an additional 50 galvanized posts with all necessary hardware and accessories to complete the post installation along with 50 caps or cable spacers with back to back white reflective sheeting and will deliver and stockpile the materials at the DOT DOT Mitchell Maintenance Yard located off I-90 Exit 330 in Mitchell. The posts will be the same type of posts provided in the installation of the high tension cable guardrail on the project.

All costs for furnishing the posts and caps and delivering them to the Mitchell Maintenance Yard will be incidental to the contract unit price per each for "Furnish High Tension Cable Guardrail Post".

<u>PUBLIC LANDS SURVEY SYSTEM, RIGHT OF WAY, AND PROPERTY CORNERS</u>

The Contractor will have a Land Surveyor, licensed in the State of South Dakota, to set, reestablish or verify public land survey system (PLSS) corners, right of way (ROW) corners, and property corners as directed by the appropriate SDDOT Region Land Surveyor. It is estimated that 2 PLSS corners and 21 ROW and property corners will be set, reestablished, or verified for this project. The Contractor's Land Surveyor, under the direction of the Region Land Surveyor, will set, reestablish, or verify all corner monuments after surfacing and fencing operations are completed in accordance with the PUBLIC LANDS SURVEY SYSTEM CORNERS section and the RIGHT OF WAY AND PROPERTY CORNERS section in Chapter 8 of the SDDOT Survey Manual.

< https://dot.sd.gov/doing-business/engineering/design-services/surveyors >

All costs associated with furnishing and installing PLSS caps, rebar, and all other materials associated with setting, reestablishing, or verifying PLSS, ROW corners, and property corners in accordance with the SDDOT Survey Manual will be incidental to the contract unit price per each for "Reestablish Public Land Survey System Corner" and/or "Reestablish Right-of-Way and Property Corner".

TABLE OF CONSTRUCTION STAKING

(See Special Provision for Contractor Staking)

						G	rade Staking	1		
Roadway and Description	Begin Station	End Station	Number of Lanes	Length (Ft)	Length (Mile)	Lane Factor	*Sets of Stakes	**Grade Staking Quantity (Mile)	Miscellaneous Staking Quantity (Mile)	Slope Staking Quantity (Mile)
190 WB	32+00	65+00	2	3,300	0.625	1	2	1.250	0.625	0.625
190 EB	32+00	65+00	2	3,300	0.625	1	2	1.250	0.625	0.625
Median Crossovers										
Sta. 16+00				1,288					0.244	
Sta. 95+00				1,272					0.241	
							Totals:	2.500	1.735	1.250

 ^{1 =} Blue Top Stakes Only (Asphalt Concrete Pavement)
 2 = Blue Top and Paving Hub Stakes (PCC Pavement)

STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	PT 0907(89)317	B7	B31

Plotting Date:

04/28/2025

^{**} Grade Staking Quantity = (Length) x (Lane Factor) x (Sets of Stakes)

PIPE & FENCE QUANTITIES

STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	PT 0907(89)317	B8	В31

Plotting Date: 04/28/2025

Pipe Quanties

			Reinforced Concrete									
			Circular		Arch	RCP	Circular Safety End		y End	Reset A	Arch Flared End	
		18" Cl. 2	24" Cl. 2			48" Cl. 2		18"	24"		48"	
Station	Offset (L/R)	Ft	Ft			Ft		Each	Each		Each	
34+50 (WB)		74						2				
43+00 (WB)			76						2			
49+00 (WB)			82						2			
55+04						60					6	
60+50 (WB)			74						2			
66+25-28' L to 66+27-	-38.7' L	8						1				
	Total:	82	232			60		3	6		6	

Fence Quanties

			Right-of-Way Fence	Temporary Fence	Post I	Panels	Fence
		Side	Type 3	Type 1A		3 Post Panel	Remove
Station	to Station	(L/R)	(Ft)		(Each)	(Each)	(Ft)
37+60	63+80	L	2620	1900	1	2	2620
37+92	63+79	R	2587		3	2	2587
			5007	1000			5007
		TOTALS:	5207	1900	4	4	5207

Post Type and Sequence:

Right-of-way fence will be constructed using alternate wood and steel posts except as noted.

TRPR13418

TYPICAL GRADING SECTION

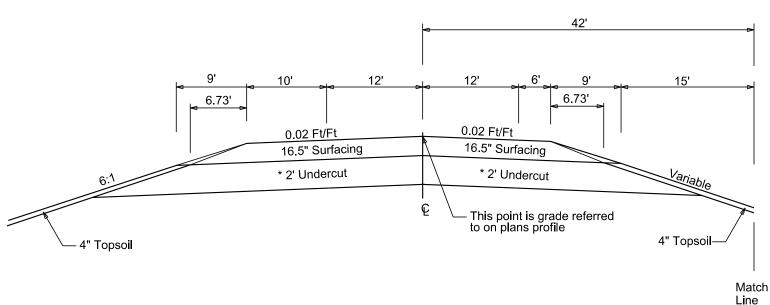
STATE OF	PROJECT	SHEET	TOTAL SHEETS
SOUTH DAKOTA	PT 0907(89)317	B9	В31

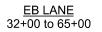
Plotting Date:

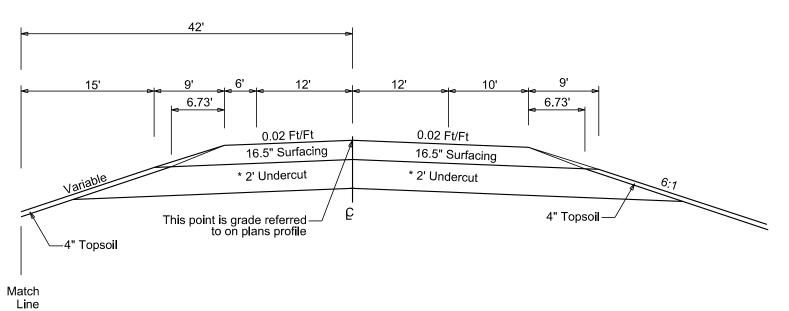
03/11/2025

Rev 3/11/2025 RG









HORIZONTAL ALIGNMENT DATA

 STATE OF SOUTH DAKOTA
 PT 0907(89)317
 SHEET SHEETS
 TOTAL SHEETS

 B10
 B31

Plotting Date: 03/10/2025

<u>WB</u>

_	01-11-			NI - distan	Faction
Type	Station			Northing	Easting
POB	10+00.00			503092.544	2499346.897
50	00.00.00	TL= 1066.08	N 87°45'12" E	500404.000	0500440400
PC	20+66.08	D 444000.00	D II 005010 III D	503134.338	2500412.160
PI 	30+50.87	R = 114633.60	Delta = 0°59'04" R	503172.945	2501396.193
PT	40+35.61			503194.640	2502380.745
		TL= 2380.48	N 88°44'16" E		
PI	64+16.09			503247.082	2504760.644
		TL= 4321.45	N 88°44'00" E		
PC	107+37.54			503342.603	2509081.037
PI	116+53.57	R = 24598.00	Delta = 4°15'56" R	503362.851	2509996.843
PT	125+68.75			503314.928	2510911.619
		TL= 806.49	S 87°00'04" E		
PC	133+75.25			503272.736	2511717.007
PI	142+92.80	R = 24514.00	Delta = 4°17'14" L	503224.733	2512633.302
PT	152+09.49			503245.362	2513550.622
		TL= 9652.09	N 88°42'42" E		
PI	248+61.58			503462.366	2523200.270
		TL= 2630.96	N 88°42'29" E		
PI	274+92.54			503521.680	2525830.557
		TL= 690.07	N 88°44'09" E		
PC	281+82.61			503536.904	2526520.461
PI	287+02.26	R = 57254.00	Delta = 1°02'24" L	503548.368	2527039.984
PT	292+21.88			503569.260	2527559.213
		TL= 918.01	N 87°41'45" E		
PI	301+39.89			503606.168	2528476.478
		TL= 2198.49	N 87°41'45" E		
PC	323+38.38			503694.557	2530673.192
PI	328+13.02	R = 34422.00	Delta = 1°34'48" R	503713.640	2531147.452
PT	332+87.61			503719.639	2531622.059
		TL= 4145.98	N 89°16'33" E		
PC	374+33.58			503772.039	2535767.704
PI	379+56.36	R = 59254.00	Delta = 1°00'40" L	503778.646	2536290.443
PT	384+79.12			503794.476	2536812.984
		TL= 1180.96	N 88°15'53" E		
PI	396+60.08			503830.235	2537993.406
		TL= 3524.57	N 88°15'53" E		
PI	431+85.00			503936.975	2541516.709
		TL= 103.00	N 88°30'10" E		
PI	432+88.00			503939.666	2541619.674
		TL= 5217.74	N 88°15'37" E		
POE	485+05.74			504098.077	2546835.012

Туре	Station		<u>EB</u>	Northing	Easting
турс	Otation			Northing	Lasting
POB	10+00.00			503000.431	2499349.029
		TL= 1060.97	N 87°36'15" E		
PC	20+60.97		_ ,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	503044.781	2500409.073
PI	31+94.73	R = 114549.60	Delta = 1°08'03" R	503092.174	2501541.836
PT	43+28.41	TI - 2007 60	N. 00%44140" F	503117.137	2502675.316
PI	64+16.09	TL= 2087.69	N 88°44'18" E	503163.103	2504762 407
FI	04+10.09	TL= 4321.45	N 88°44'00" E	303 103, 103	2504762.497
PC	107+37.55	16-4321.43	N 00 44 00 L	503258.624	2509082.893
PI	116+50.45	R = 24514.00	Delta = 4°15'56" R	503278.803	2509995.573
PT	125+62.51	10 21011.00	Bella 1 1000 IX	503231.043	2510907.225
		TL= 806.49	S 87°00'04" E		
PC	133+69.00			503188.851	2511712.612
PI	142+89.69	R = 24598.00	Delta = 4°17'14" L	503140.683	2512632.048
PT	152+09.53			503161.383	2513552.511
		TL= 9652.09	N 88°42'42" E		
PI	248+61.62			503378.388	2523202.161
		TL= 2630.94	N 88°42'29" E		
PI	274+92.56			503437.701	2525832.430
		TL= 690.05	N 88°44'09" E		
PC	281+82.61			503452.924	2526522.315
PI	287+03.02	R = 57338.00	Delta = 1°02'24" L	503464.405	2527042.599
PT	292+23.41			503485.328	2527562.590
51	004.44.44	TL= 918.01	N 87°41'45" E	500500 000	0500.470.055
PI	301+41.41	TI = 2408 40	N 07844145" F	503522.236	2528479.855
PC	323+39.90	TL= 2198.49	N 87°41'45" E	503610.625	2530676.569
PI	328+13.39	R = 34338.00	Delta = 1°34'48" R	503610.625	2530076.569
PT	332+86.82	11 - 34330.00	Della - 1 34 40 TC	503635.646	2531623.120
	002.00.02	TL= 4145.98	N 89°16'33" E	000000.040	2001020.120
PC	374+32.79	12 1110.00		503688.046	2535768.765
PI	379+56.31	R = 59338.00	Delta = 1°00'40" L	503694.663	2536292.246
PT	384+79.81			503710.515	2536815.528
		TL= 1180.96	N 88°15'53" E		
PI	396+60.77			503746.273	2537995.949
		TL= 3524.57	N 88°15'53" E		
PI	431+85.34			503853.004	2541518.903
		TL= 102.57	N 88°19'26" E		
PI	432+87.91			503856.004	2541621.426
		TL= 712.03	N 88°17'10" E		
PI	439+99.94			503877.298	2542333.140
B05	405 : 22 44	TL= 4506.49	N 88°15'37" E	504044 445	0540007.550
POE	485+06.44			504014.115	2546837.556

CONTROL DATA

1	STATE OF	PROJECT	SHEET	TOTAL SHEETS
	SOUTH DAKOTA	PT 0907(89)317	B11	В31

Plotting Date: 03/10/2025

HORIZONTAL AND VERTICAL CONTROL POINTS										
POINT	STATION	OFFSET	DESCRIPTION	NORTHING	EASTING	ELEVATION				
CP1 (I90 314.3)	Not on project		REFMRK	502718.642	2487883.924	1447.77				
CP2 (A 454)	10+56	141' R	REFMRK	502903.973	2499409.258	1421.43				
CP3 (I90 321.7)	286+42	148' L	REFMRK	503654.490	2526975.555	1409.51				
CP4 (I90 323.7)	392+37 148' L		REFMRK	503922.902	2537566.155	1383.86				

LEGEND

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STATE OF	PROJECT	SHEET	TOTAL SHEETS	
SOUTH DAKOTA	PT 0907(89)317	B12	B31	

Plotting Date:

03/10/2025

Anchor	← ★
Antenna	
Approach Assumed Corner	<u></u>
Azimuth Marker	△
BBQ Grill/ Fireplace	_ _
Bearing Tree	(1)
Bench Mark	<u> </u>
Box Culvert	
Bridge	
Brush/Hedge	ಹಾವಾ
Buildings	
Bulk Tank	
Cattle Guard	==
Cemetery	t
Centerline	
Cistern	©
Clothes Line	
Concrete Symbol	
Control Point	₾
Creek Edge	
Curb/Gutter	
Curb	
Dam Grade/Dike/Levee	
Deck Edge Ditch Block	2007
Doorway Threshold	<u></u>
Drainage Profile	
Drop Inlet	
Edge Of Asphalt	
Edge Of Concrete	
Edge Of Gravel	
Edge Of Other	
Edge Of Shoulder	
Electric Transformer/Power Junction Box	P
Fence Barbwire ——	
Fence Chainlink ——	
Fence Electric	—— 5 ——— 5 —
Fence Miscellaneous /	/ /-
rence Snow	
Fence Wood ——	
Fence Woven	R.
Fire Hydrant	& ▶
Flag Pole Flower Bed	777
Gas Valve Or Meter	()
Gas Pump Island	<u> </u>
Grain Bin	
Guardrail	●
Gutter	=====
Guy Pole	9
Haystack	ŏ
Highway ROW Marker	0
Interstate Close Gate	Ţ Ţ
Iron Pin	⊙
Irrigation Ditch	
Lake Edge	
Lawn Sprinkler	ds .

Lawn Sprinkler

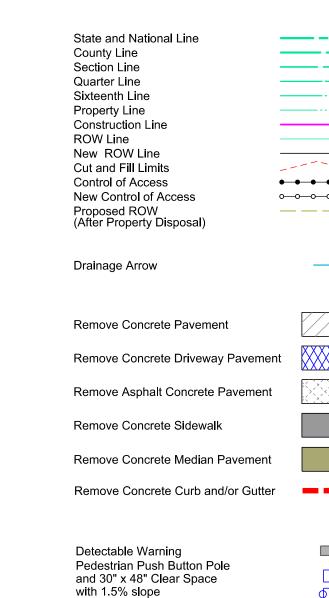
Mailbox Manhole Electric
Manhole Electric Manhole Gas
Manhole Miscellaneous
Manhole Sanitary Sewer
Manhole Storm Sewer
Manhole Telephone
Manhole Water
Merry-Go-Round
Microwave Radio Tower
Miscellaneous Line
Miscellaneous Property Corner
Miscellaneous Post Overhang Or Encroachment
Overhead Utility Line
Parking Meter
Pedestrian Push Button Pole
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 ROW Marker
Railroad Signs
Railroad Switch
Railroad Track
Railroad Trestle
Rebar
Rebar With Cap
Reference Mark
Retaining Wall
Riprap River Edge
Rock And Wire Baskets
Rockpiles
Satellite Dish
Septic Tank
Shrub Tree
Sidewalk
Sign Face
Sign Post
Slough Or Marsh

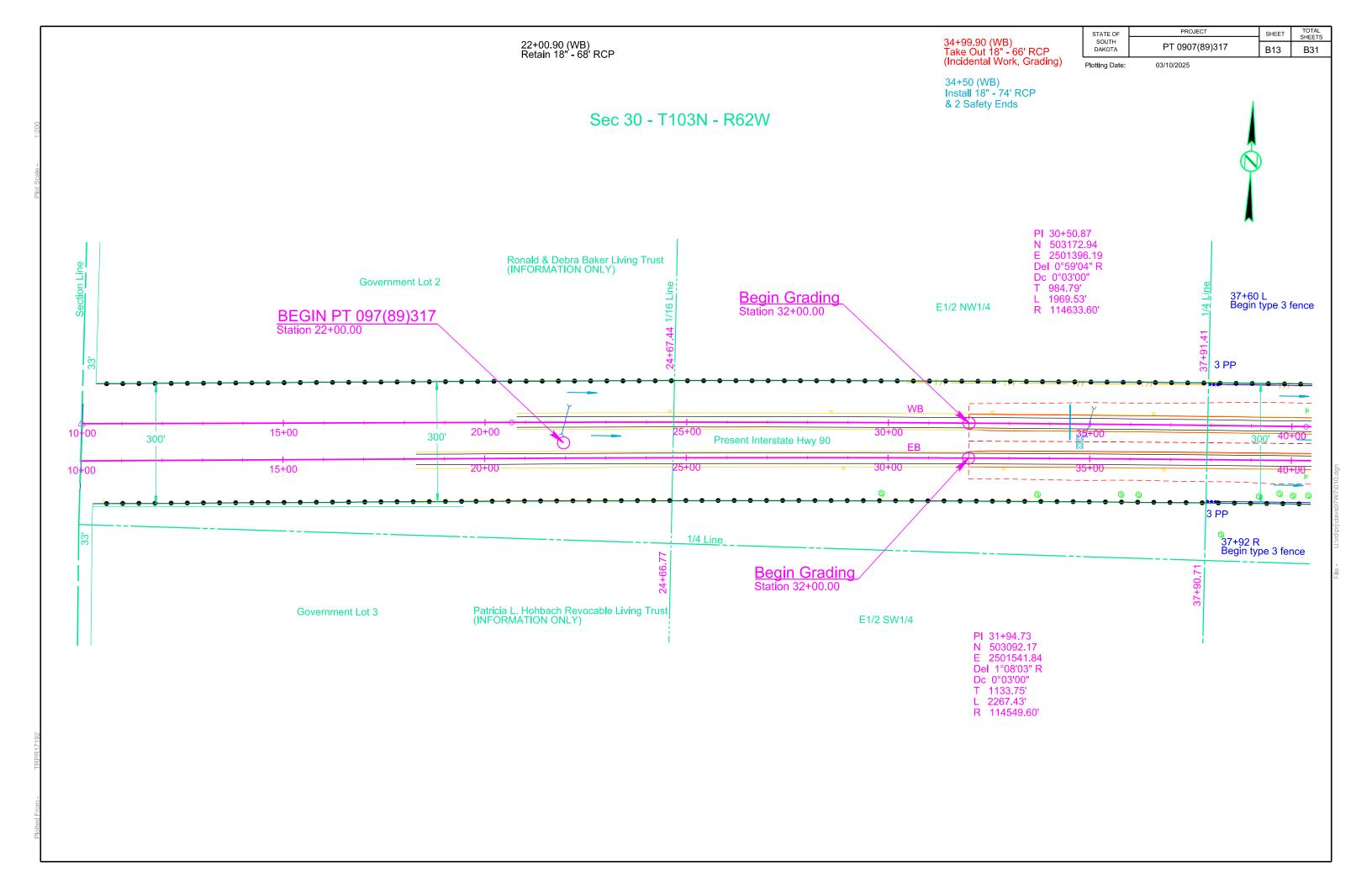
Spring

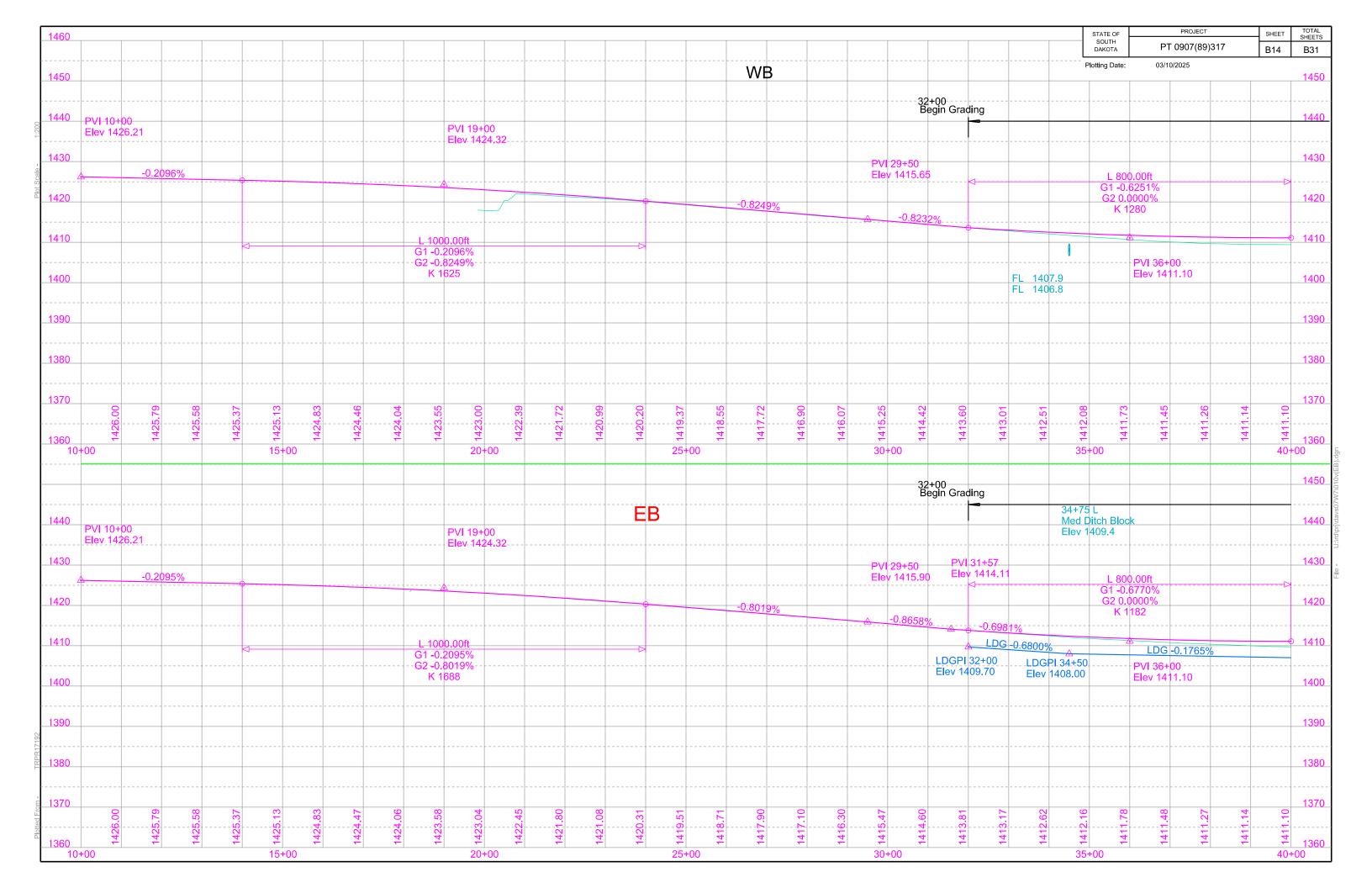
Stream Gauge

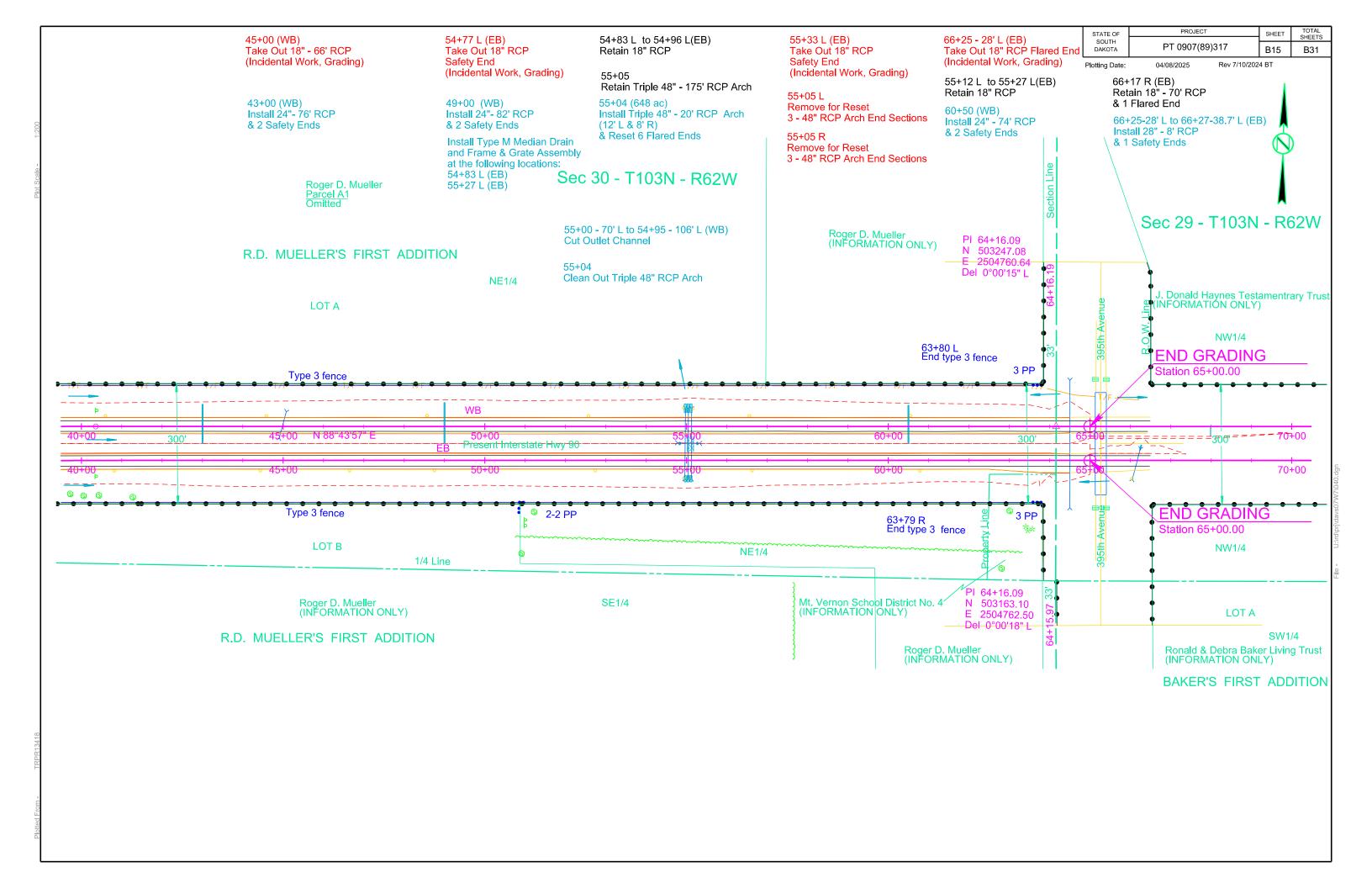
Street Marker

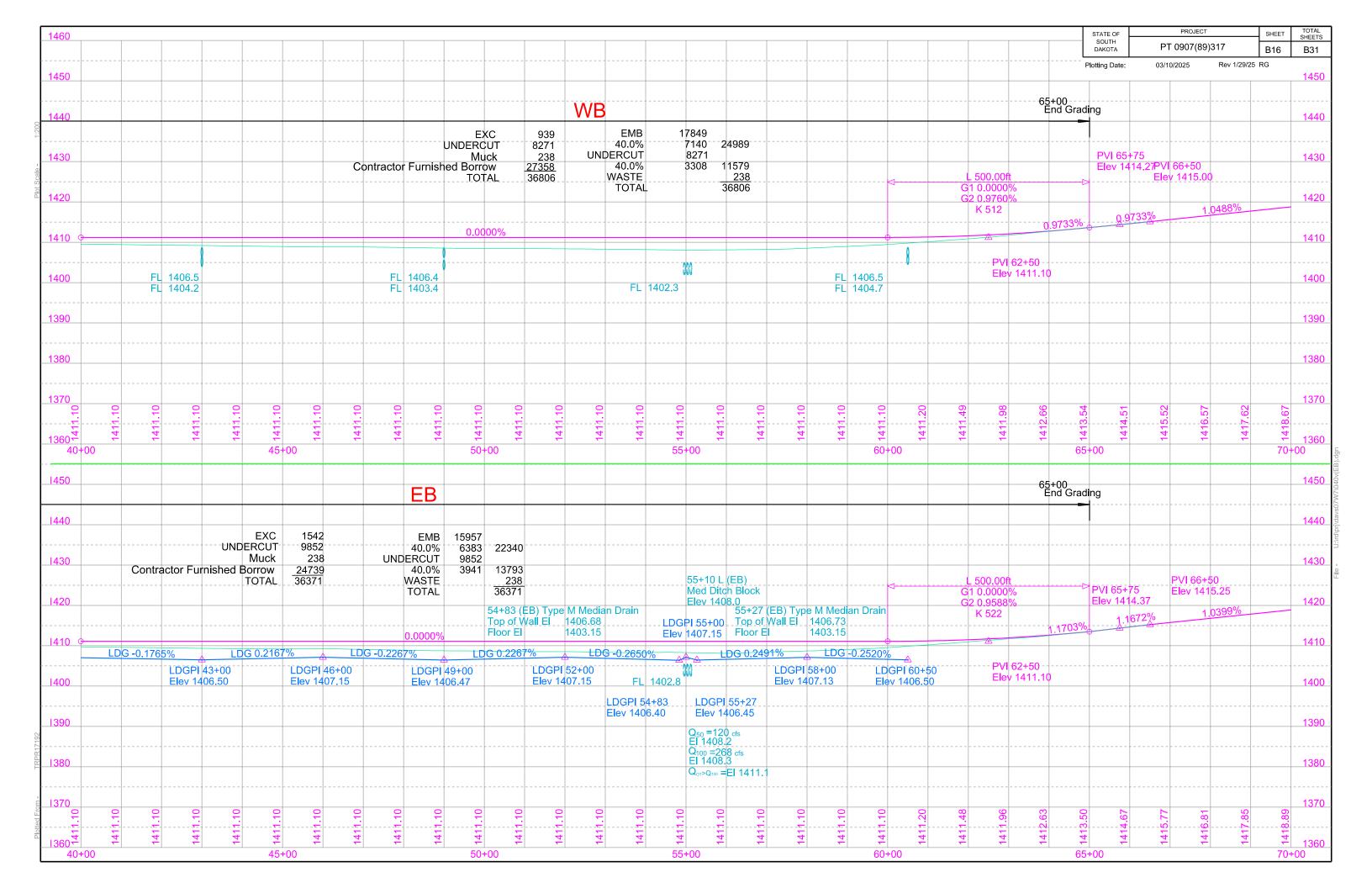
Subsurface Utility Exploration Test Hole	•
Telephone Fiber Optics	— T/F —
Telephone Junction Box	T
Telephone Pole	Ø
Television Cable Jct Box	™
Television Tower	夲
Test Wells/Bore Holes	
Traffic Sign Double Face	B B
Traffic Sign One Post	þ
Traffic Sign Two Post	b
Traffic Signal	✡
Trash Barrel	0
Tree Belt	~~
Tree Coniferous	*
Tree Deciduous	<u> </u>
Tree Stumps	A
Triangulation Station	Δ
Underground Electric Line	— Р —
Underground Gas Line	— G —
Underground High Pressure Gas Line	— HG —
Underground Sanitary Sewer	- s -
Underground Storm Sewer	= s =
Underground Tank	
Underground Telephone Line	— т —
Underground Television Cable	— TV —
Underground Water Line	— w —
Water Fountain	ı
Water Hydrant	O _D
Water Meter	M
Water Tower	<u> </u>
Water Valve	0
Water Well	•
Weir Rock	
Windmill	8
Wingwall	
Witness Corner	(NC)











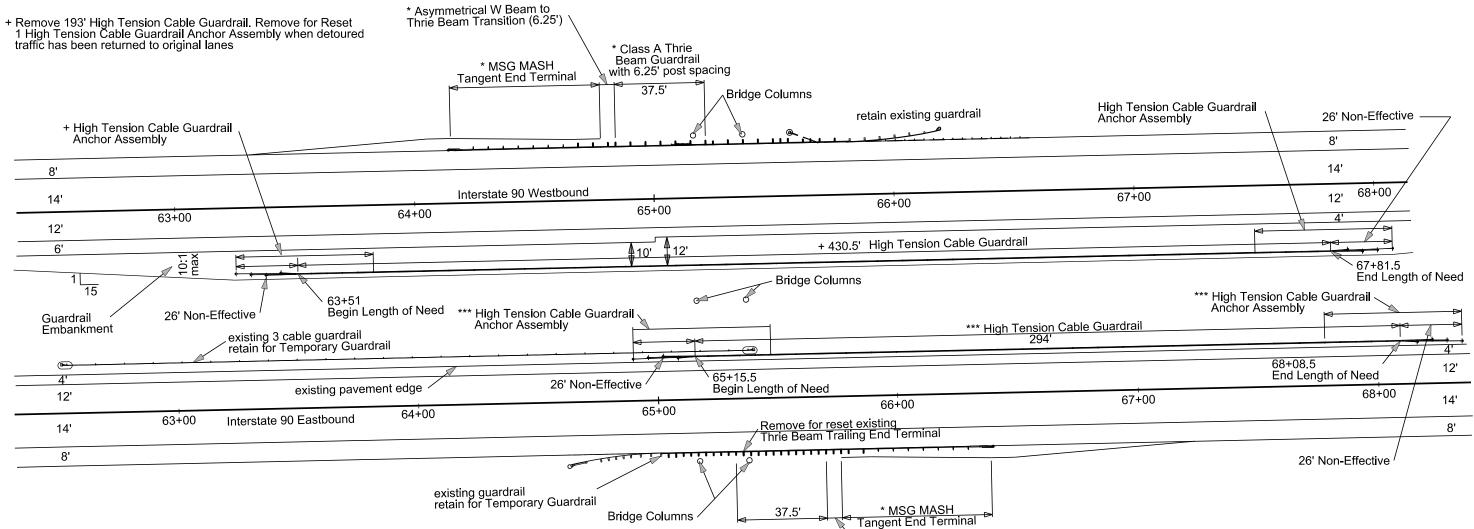
TEMPORARY GUARDRAIL LAYOUT

PROJECT STATE OF SHEET TOTAL SHEETS PT 0907(89)317 B17 B31 DAKOTA

Plotting Date:

04/28/2025

- * New Temporary Traffic Control beam guardrail will be removed when the detoured traffic has been returned to original lanes
- Remove for Reset 12.5' & Remove 25' Double Class A Thrie Beam Guardrail when traffic has been moved to the WB lanes
- *** Remove for Reset 227' & Remove 67' High Tension Cable Guardrail. Remove for Reset 2 High Tension Cable Guardrail Anchor Assemblies when traffic has been moved to the WB lanes



** Double Class A Thrie Beam Guardrail with 3'-1 1/2" post spacing

37.5'

Bridge Columns

Asymmetrical W Beam to Thrie Beam Transition (6.25')

	PERMAN	ENT GUARDF	RAIL LAYOUT	STATE (SOUTI DAKOT	PT 0907(89)317 B18 B
	Rese	et Trailing End Terminal	Retain existing Guar	drail	8'
	8'	51' Non-Effective ∖	65+43.5 Begin Length of Need	High Te	nsion Cable Guardrail 14' Assembly
	14' 64+00 Reset Hig	th Tension Cable 65+00 Anchor Assembly	66+00	67+00	68+00 12'
63+00	12' 64+00 Reserving Guardrail	Anchor Assembly	High Ten	nsion Cable Guardrail 4 12'	
set High Tension Cable ardrail Anchor Assembly ' Non-Effective	Reset High Tension Cable Guardrail 227'	gh Tension Cable I Anchor Assembly	Bridge Columns Gual	rdrail Embankment	67+81.5 End Length of Need 26' Non-Effective
62+69 6' Begin Length of Need	9'		51' Non-Effective	Existing Pavement Edge	67+37 12'
v <u> </u>	nterstate 90 Eastbound	64+96.0 End Length of Need 65+00	66+00	67+00	14' ⁶⁸⁺⁰⁰
2+00 14' 63+00	64 + 00	03+00			8'
8' 1 15	ASH Flared End Terminal		Reset Thrie Beam Trailing End Terminal Bridge Columns etain Existing puble Thrie Beam puble Class A am Guardrail 1/2" post spacing		

PROJECT STATE OF SHEET TOTAL SHEETS PT 0907(89)317 B19 B31 DAKOTA

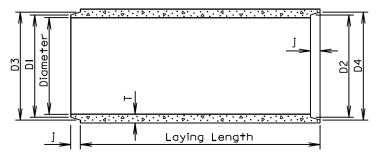
Plotting Date:

03/10/2025

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 $\frac{3}{6}$ " for 30" Dia. or less and \pm $\frac{1}{4}$ " for 36" or greater. Length of joint (j): $\pm \frac{1}{4}$ ".

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:

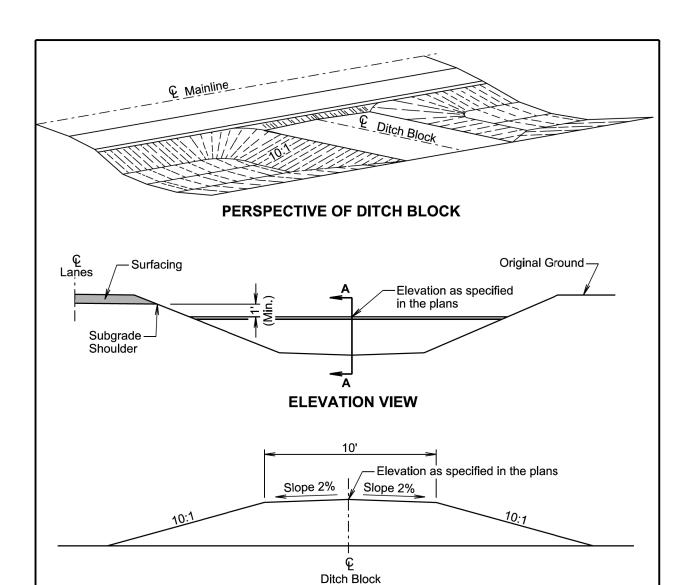
Construction of R.C.P. shall conform to the requirements of Section 990 of the Specifications.

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. (Ib.)		J (in.)	DI (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	13/4	13 ¹ / ₄	135⁄8	13%	141/4
15	127	21/4	2	161/2	16%	17 ¹ /4	175/8
18	168	21/2	21/4	195/8	20	20¾	20¾
21	214	23/4	21/2	22 1/8	231/4	23¾	24 ¹ / ₈
24	265	3	23/4	26	26 %	27	273/8
27	322	31/4	3	29 ¹ / ₄	295/8	30 ¹ / ₄	30%
30	384	31/2	31/4	32¾	32¾	331/2	33%
36	524	4	3¾	38¾	391/4	40	401/2
42	685	41/2	4	451/8	45%	461/2	47
48	867	5	41/2	511/2	52	53	$53\frac{1}{2}$
54	1070	51/2	41/2	57%	58¾	59¾	59%
60	1296	6	5	64 ¹ / ₄	64¾	66	661/2
66	1542	61/2	51/2	70%	711/8	721/2	73
72	1810	7	6	77	771/2	79	791/2
78	2098	71/2	61/2	83%	83%	85 %	861/8
84	2410	8	7	89¾	901/4	921/8	925/8
90	2740	81/2	7	95¾	96 ¹ / ₄	981/8	98%
96	2950	9	7	1021/8	102%	1041/2	105
102	3075	91/2	71/2	109	1091/2	1111/2	112
108	3870	10	71/2	1151/2	116	118	1181/2

June 26, 2015

S D D	REINFORCED CONCRETE PIPE	PLATE NUMBER 450.01
Published Date: 2025		Sheet Lof L



GENERAL NOTES:

The ditch section shown above in the perspective and elevation view is only for illustrative purpose.

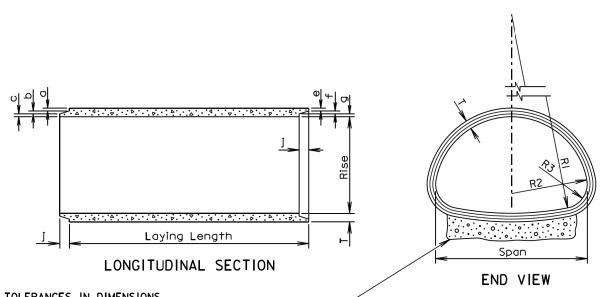
The inslopes of the ditch block will be 10:1 or as specified in the plans.

The transition area between the mainline inslope and the ditch block inslope will be rounded to eliminate an abrupt transition.

SECTION A-A

September 14, 2018

S D D O T PLATE NUMBER 120.02 DITCH BLOCK Published Date: 2025 Sheet I of I



TOLERANCES IN DIMENSIONS

Radial dimensions at joints: $\pm \frac{1}{8}$ for 65" span or less and $\pm \frac{1}{4}$ for longer spans. Rise and Span: ±2% of tabular values. Length of Joint (J): $\pm \frac{1}{4}$ ". Wall thickness (T): not less than design T by more

∠Gravel Bedding Material shall be supplied for 102" to 169" spans. It shall be placed to a thickness of 6" (Min.) x 85% of the Span x Length of culvert and shall conform to the gradation requirements than 5% or $\frac{3}{6}$ ", whichever is greater. for gravel surfacing except material may Laying length; shall not underrun by more than $\frac{1}{2}$ " be screened or may be plan provided material.

* Size (in.)	Approx. Wt./Ft. (Ib.)	Rise (in.)	Span (in.)	T (in.)	a (in .)	b (in.)	c (in.)	j (in.)	e (in.)	f (in.)	g (in.)	RI (in.)	R2 (in.)	R3 (in.)
18	170	131/2	22	21/2	13/8	3/8	3/4	2	11/8	3/8	1	271/2	13¾	51/4
24	320	18	281/2	31/2	15/8	1/2	13/8	3	13/8	1/2	15/8	40 ¹¹ / ₁₆	143/4	45/8
30	450	221/2	36 ¹ / ₄	4	I 13/16	5/8	1 %	31/2	1 %	5/8	l 13/16	51	18¾	61/8
36	600	26%	43¾	41/2	2	3/4	13/4	4	13/4	3/4	2	62	221/2	61/2
42	740	31%	511/8	$4\frac{1}{2}$	2	3/4	13/4	4	13/4	3/4	2	73	26 ¹ / ₄	73/4
48	890	36	581/2	5	21/4	3/4	2	5	2	3/4	21/4	84	30	81/8
54	1100	40	65	51/2	21/2	3/4	21/4	5	21/4	3/4	21/2	921/2	33¾	10
60	1400	45	731/2	6	35/16	3/4	I 15/16	5	23/4	3/4	21/2	105	371/2	- 11
72	1900	54	88	7	3 ¹³ / ₁₆		23/16	6	31/4	I	23/4	126	45	135/16
84	2500	62	102	8	41/8		21/8	6	31/2		31/2	$162\frac{1}{2}$	52	$14\frac{1}{2}$
96	3300	78	122¾	9	41/2		31/2	7	4		4	218	62	20
108	4200	88	1381/2	10	5		4	7	41/2	I	41/2	269	70	22
120	5100	96%	154	П	51/2		41/2	7	5	I	5	301¾	78	24
132	5100	1061/2	168¾	10			4	7	41/2	I	41/2	329	85%	26 1/8

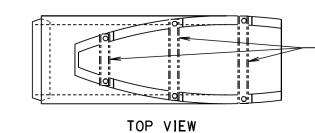
* Equivalent Diameter of Circular R.C.P.

GENERAL NOTES:

Construction of R.C.P. Arch shall conform to the requirements of Section 990 of the Specifications. 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. June 26, 2015

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	MIMPER

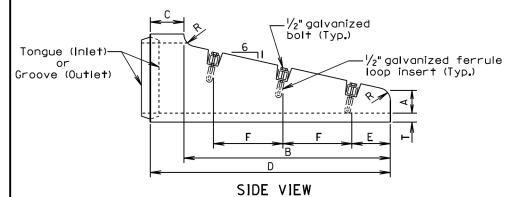
S D D 450.02 REINFORCED CONCRETE PIPE ARCH 0 Published Date: 2025 Sheet I of I

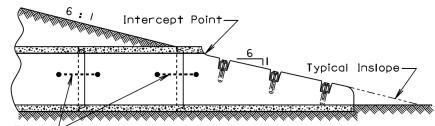


If bars are specified in the plans then provide HSS 2.5X2.5X.1875 Structural Steel Tubing in conformance with ASTM A500, Grade B or 3"Diameter Schedule 40 Pipe in conformance with ASTM A53, Grade B.

STATE OF

DAKOTA





Tie Bolt (Typ.)-See Standard Plate 450.18

ELEVATION VIEW

Dia. (in.)	(in.)	R (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	F (in.)	No. Sections	No. Bars
FOR CIRCULAR PIPE										
15	21/4	3	6	48	9	57	6	18	I	3
18	21/2	3	6	69	9	78	9	24	I	3
*24	3	3	6	111	9	120	6	24	I or 2	5
FOR ARCH PIPE										
**18	21/2	ı	6	39	33	72	6	24	I	2

*The use of 2 sections must be an approved design.

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

GENERAL NOTES:

The length of concrete pipe shown on the plans is between safety ends. Safety ends without bars are acceptable with or without the bar notches.

Bars shall be galvanized after fabrication in accordance with ASTM A123.

August 31, 2013

S D D 0 Published Date: 2025

R. C. P. SAFETY ENDS WITH OR WITHOUT BARS

PLATE NUMBER 450.12

Sheet I of I



Rod Dia. Pipe Sleeve Dia. GENERAL NOTES: (in.) (nominal) (in_{\bullet}) Tie bolts shall conform to ASTM F1554 Grade 36 or ASTM A36. Nuts shall be heavy hex conforming to ASTM A563. ≤ 3¹/₄ $3\frac{1}{2}-6\frac{1}{2}$ 11/4 Washers shall conform to ASTM F436. Pipe Sleeve shall conform to ASTM A500 -Outside Edge or A53, Grade B. of Joint Galvanize adjustible eye bolt tie assembly in accordance with ASTM A153. Hole Hole Pipe Sleeve or ASTM FI554 Grade 36 or Welded Eye ASTM A36 Tie Bolt with 2 Heavy Hex Nuts and 2 Washers <u></u> - 2" Max. (Typ.) ASTM FI554 Grade 36 or ASTM A36 32" (±1½") Rod with Heavy Hex Nut and Washer ADJUSTABLE EYE BOLT TIE Pipe Dia. (in.) BoIt Dia. (in.) GENERAL NOTES: (in.) Angles shall conform to ASTM A36. < 48 4 > 48 6 Bolts shall conform to ASTM A307. Nuts shall be heavy hex conforming to ASTM A563. Washers shall ASTM A307 Bolt ∠6" × 4" × ¾" × L with Heavy Hex conform to ASTM F436. Nut and 2 Washers Galvanize angles, bolts, nuts, and washers in accordance with ASTM A153. -Bolts may be reversed ANGLE AND BOLT TIE 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 END VIEW END VIEW be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. "CIRCULAR" "ARCH" or R.C.P. Arch. February 28, 2013 PLATE NUMBER D

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

D

0

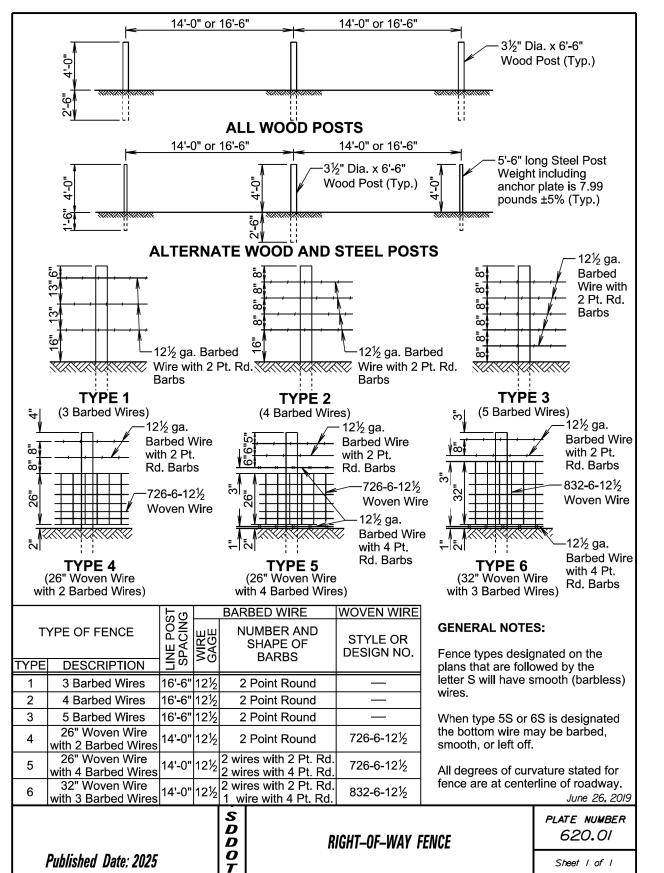
Published Date: 2025

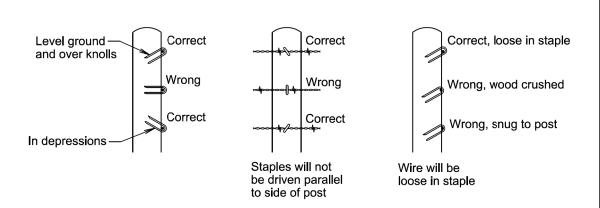
450.18

Sheet | of |

PROJECT TOTAL SHEETS SHEET STATE OF PT 0907(89)317 DAKOTA B21 B31

03/10/2025 Plotting Date:





STAPLE INSTALLATION

GENERAL NOTES:

Published Date: 2025

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

June 26, 2019

S D D

STAPLE INSTALLATION AND GENERAL RIGHT-OF-WAY FENCE NOTES

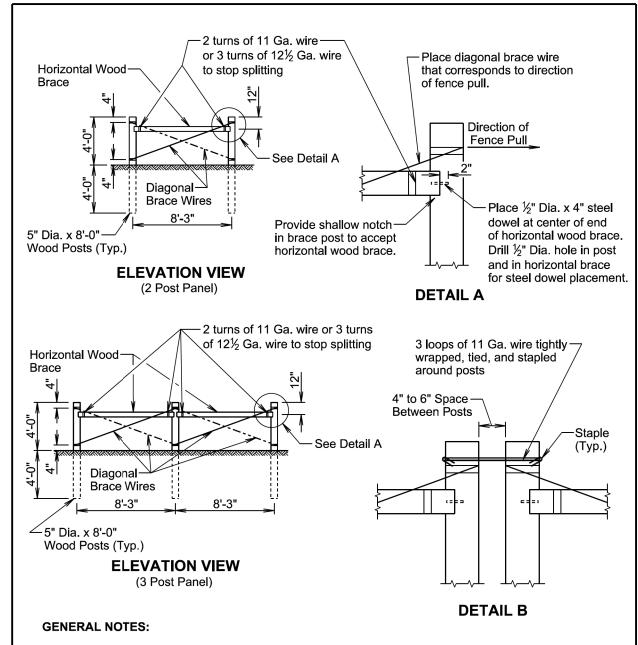
PLATE NUMBER 620.02

Sheet I of I

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PT 0907(89)317	B22	B31

Plotting Date:

03/10/2025



Two Post Panels will be installed at least every 1320' between corners.

Two Post Panels will be installed at any sharp vertical angle crest points and as directed by the Engineer.

Horizontal wood braces will consist of 4" dia. x 8' wood posts or rough 4" x 4" x 8' timbers.

Diagonal brace wires will be fabricated with 4 strands of 9 Ga. galvanized wire twisted tight. The diagonal brace wires will be installed in accordance with the direction of the fence pull. Two diagonal brace wires are required if fence pull is in both directions.

March 31, 2024

S D D 0 Published Date: 2025

BRACE PANELS AND APPLICATIONS OF BRACE PANELS PLATE NUMBER 620.03

Sheet I of 3

BRACE PANELS AND

APPLICATIONS OF BRACE PANELS

Published Date: 2025

620.03

Sheet 2 of 3

PROJECT STATE OF SHEET TOTAL SHEETS PT 0907(89)317 B23 B31 DAKOTA

Plotting Date:

03/10/2025

ENTRANCE (Not on corner) Fence type will be same as adjacent fence type or as directed by the Engineer. Fence type will be same asadjacent fence type or as directed by the Engineer. **ENTRANCES AT CORNERS DOUBLE ENTRANCES GATES** * If fence length is less than 600' to next corner use a 2 post panel.

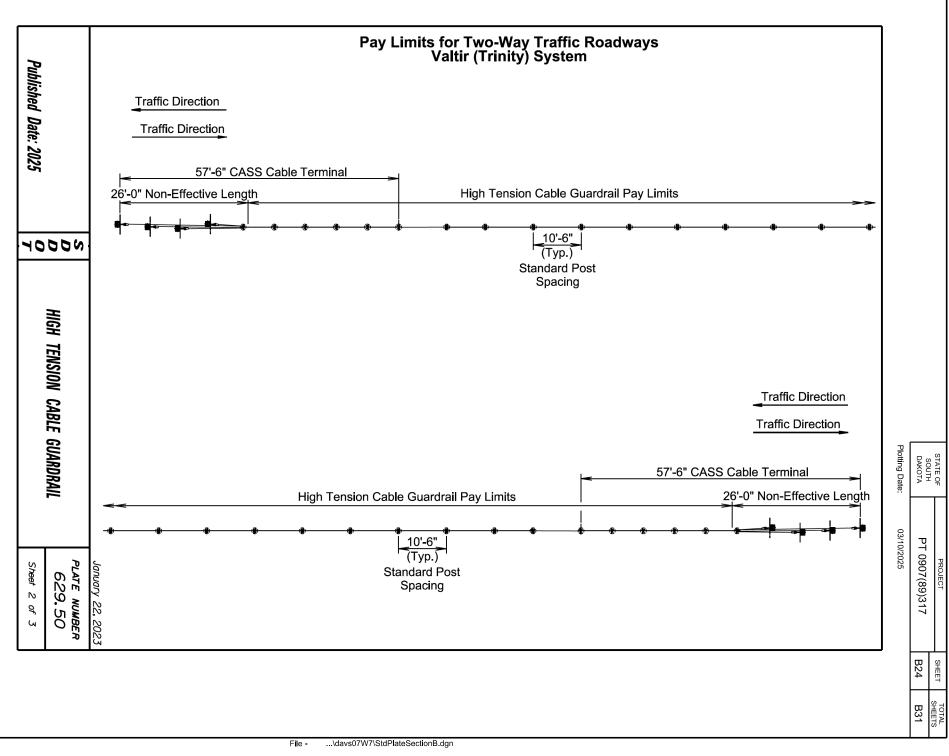
If fence length is greater than 600' to next corner use a 3 post panel. © See Detail B on Sheet 1 of 3. March 31, 2024 SDDOT PLATE NUMBER BRACE PANELS AND 620.03

Published Date: 2025

APPLICATIONS OF BRACE PANELS

Sheet 3 of 3

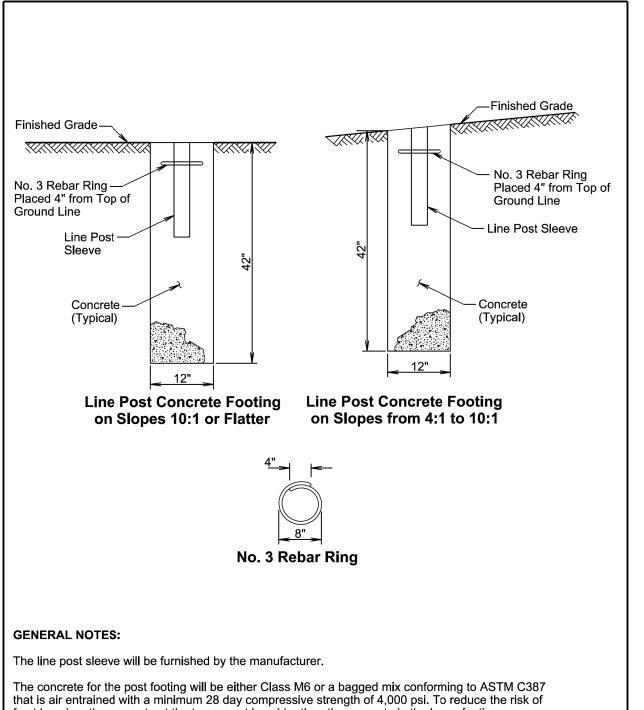
Plotted From -TRPR17192 Plot Scale Pay Limits for One-Way Traffic Roadways Valtir (Trinity) System Published Date: 2025 Traffic Direction Traffic Direction 57'-6" CASS Cable Terminal 26'-0" Non Effective Length High Tension Cable Guardrail Pay Limits (Traffic Approaching) _10'-6"_ (Typ.) Standard Post 7000 Spacing **GENERAL NOTES:** Valtir (Trinity) CASS Cable Terminal has a total length of 57'-6". On one-way traffic roadways, it has 31'-6" effective length on the approach end of the terminal and 6'-6" effective length on the non-approach HGH (departure) end. On two-way traffic roadways, it has 31'-6" effective length on both the approach and the non-approach ends of the terminal. TENSION CABLE GUARDRAIL The High Tension Cable Guardrail pay limits will be the length of need (LON) or the effective length. The High Tension Cable Guardrail Anchor Assembly pay limits will be the non-effective length of the terminal. Traffic Direction **Traffic Direction** 57'-6" CASS Cable Terminal High Tension Cable Guardrail Pay Limits 51'-0" Non-Effective Length (Traffic Departing) _10'-6" PLATE NUMBER 629.50 Sheet I of 3 (Typ.) Standard Post Spacing Pay Limits for Two-Way Traffic Roadways Valtir (Trinity) System Published Date: 2025 Traffic Direction Traffic Direction 57'-6" CASS Cable Terminal 26'-0" Non-Effective Length High Tension Cable Guardrail Pay Limits



PROJECT SHEET TOTAL SHEETS STATE OF PT 0907(89)317 B25 B31 DAKOTA

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frost heaving, the concrete at the top cannot be wider than the concrete in the lower footing.

All costs for materials, labor, equipment, and incidentals necessary to install the high tension cable guardrail line post footings will be incidental to the contract unit price per foot for "High Tension 3 Cable Guardrail" or "High Tension 4 Cable Guardrail".

March 31, 2024

S D D O Published Date: 2025

HIGH TENSION CABLE GUARDRAIL LINE POST CONCRETE FOOTING

PLATE NUMBER 629.60

Sheet I of I

TYPE AND DETAILS OF MGS							
Type of MGS	W Beam Rail Single or Double (Nested)	0:	Blockout Material		Post Material	Post Spacing	
1	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"	
1C	Single	6"x12"x14"	Wood	6"x8"x7'-6"	Wood	6'-3"	
2	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	3'-1½"	
3	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	1'-6¾"	
4	Double	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"	

STANDARD PLATE REFERENCE				
Type of MGS	See Standard Plate(s)			
1	630.20, 630.22			
1C	630.20, 630.25			
2	630.20			
3	630.20			
4	630.20			

GENERAL NOTES:

Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite".

Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

Topsoil is not shown in the transverse section drawing on sheet 2 of 6.

D D O

All W beam rail will be Type 1 and Class A (12 Ga.) unless specified otherwise in the plans.

W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used will be compatible with the total length of rail per site as shown in the plans.

Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

All costs for constructing the MGS including labor, equipment, and materials including all posts, blockouts, steel beam rail, and hardware will be incidental to the contract unit price per foot for the respective MGS contract item.

April 8, 2025

Published Date: 2026

MIDWEST GUARDRAIL SYSTEM (MGS)

PLATE NUMBER 630.20

Sheet I of 6

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Plotting Date: 06/03/2025 - 16d Galvanized Nails (Nail from blockout into post or from post into blockout.) 1½" (Max.) 0" (Min.) %"x22" Button Head Post Bolt Recess Nut Washer **TOP VIEW** (Type 1, 2, or 3 MGS Installation) 6"x12"x14" Wood Blockout 6"x8"x6'-0" Wood Post -|2 Face of Rail #X**#**¥## :::\: * 31" (±1") %" Diameter Hole 12" Installation Line -4'-0" (Min.) ***Slope Granular Material Subgrade Surface See Standard Plate 630.96 for leave-out and backfill requirements. TRANSVERSE SECTION * See Standard Plate 630.99 (Type 1, 2, or 3 MGS Installation) ** 2" asphalt concrete or as specified in the plans.

*** The cross slope will be as specified in the plans; however, the cross slope will not be steeper than a 10:1 slope.

Published Date: 2026

April 8, 2025

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MIDWEST GUARDRAIL SYSTEM (MGS)

PLATE NUMBER 630.20

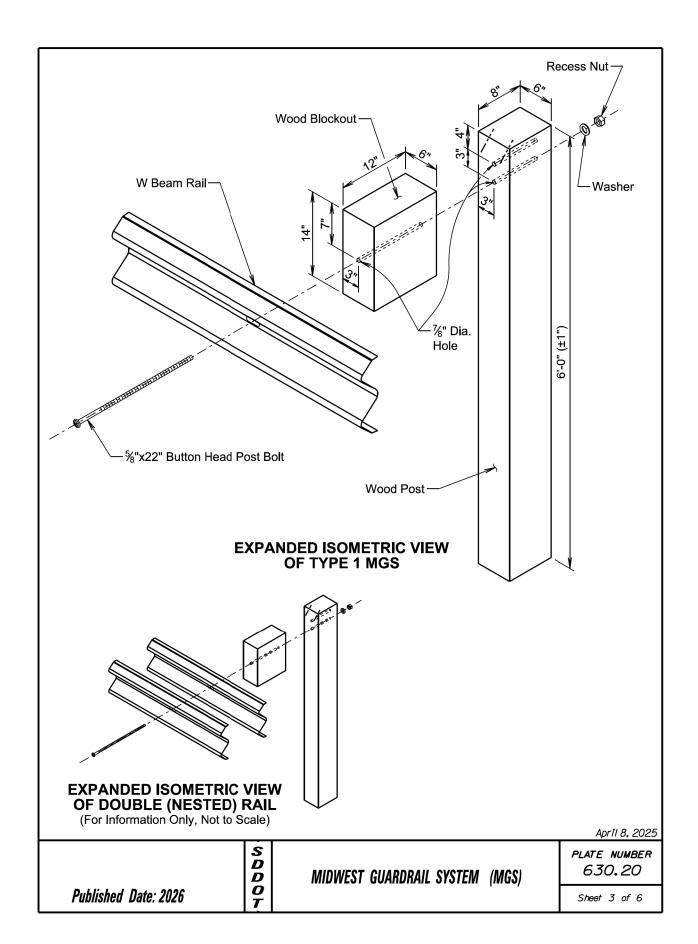
Sheet 2 of 6

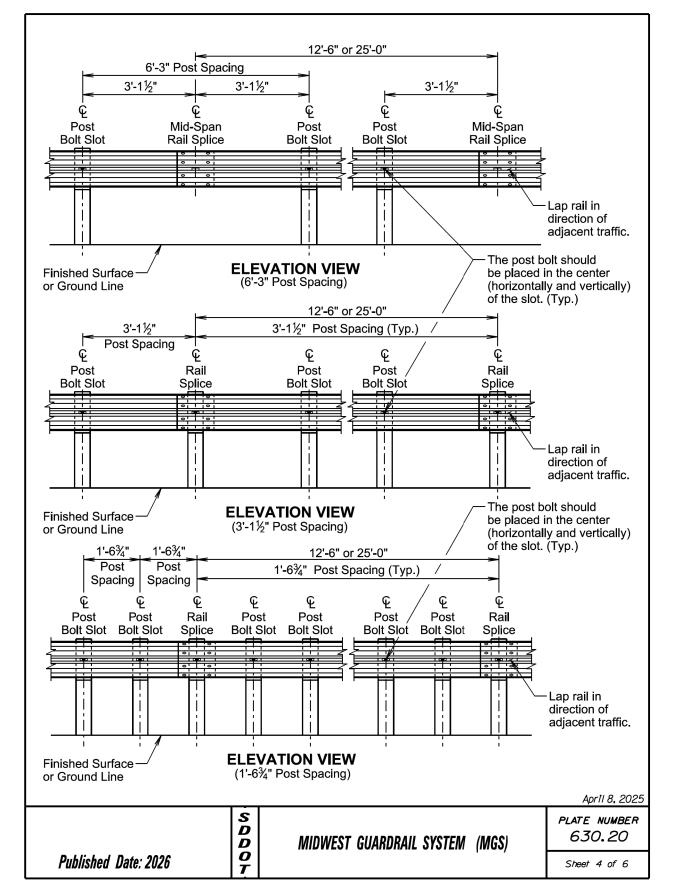
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e: 06/03/2025





TDDD13/18

PROJECT SHEET TOTAL SHEETS STATE OF PT 0907(89)317 B28 B31 DAKOTA

Plotting Date:

06/03/2025

15/16" or 17/16"

%" Dia.-

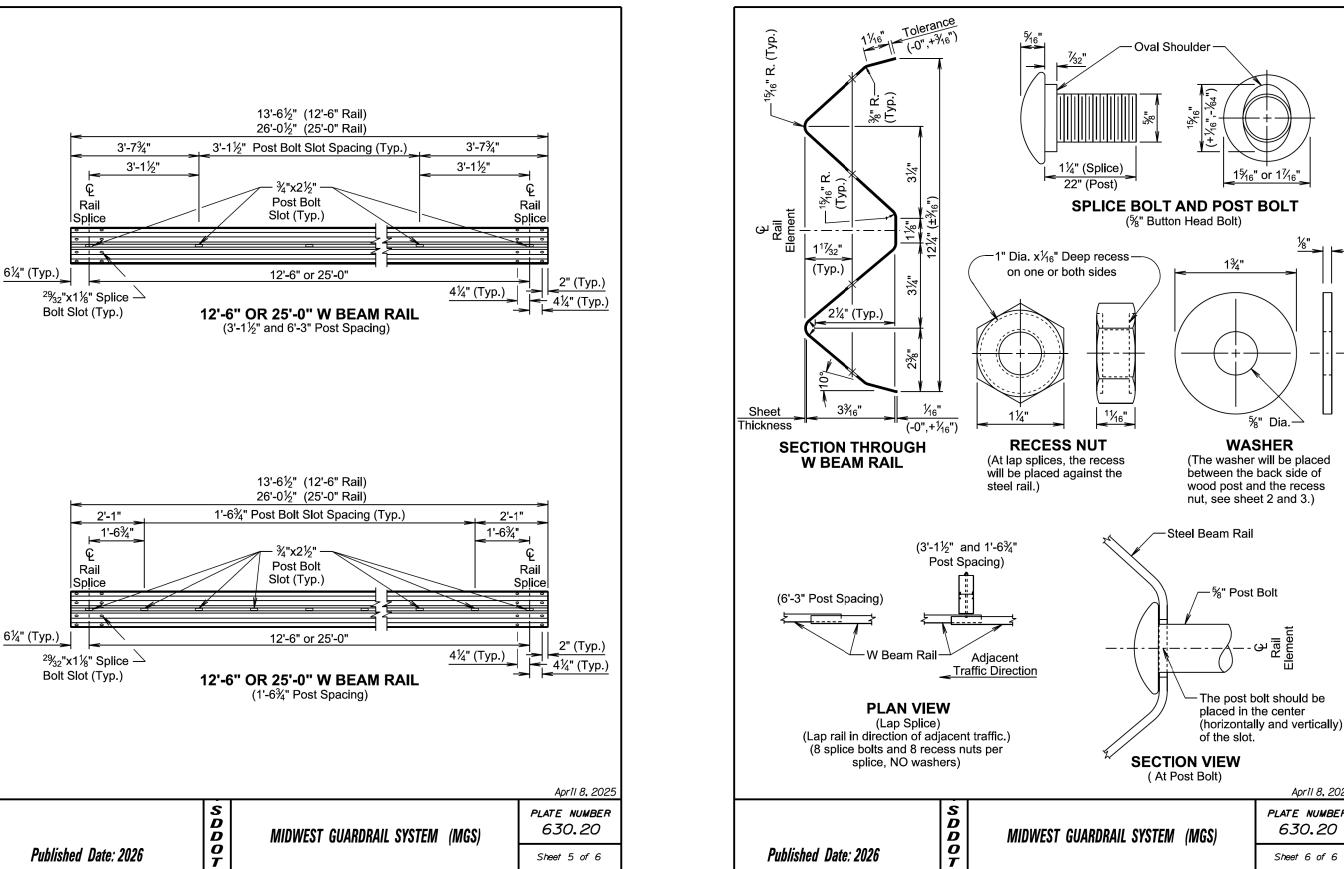
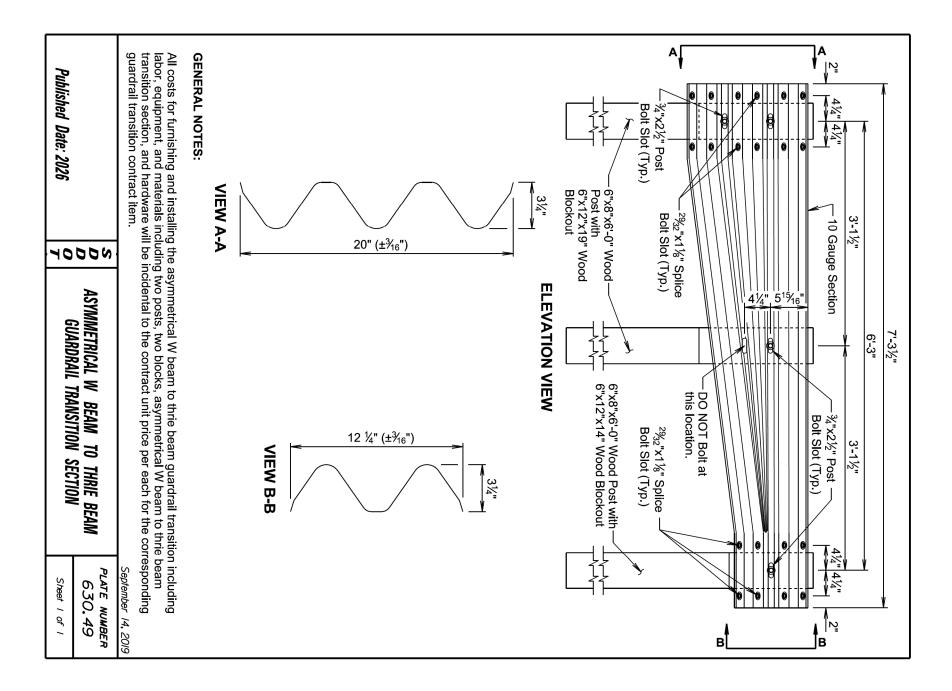
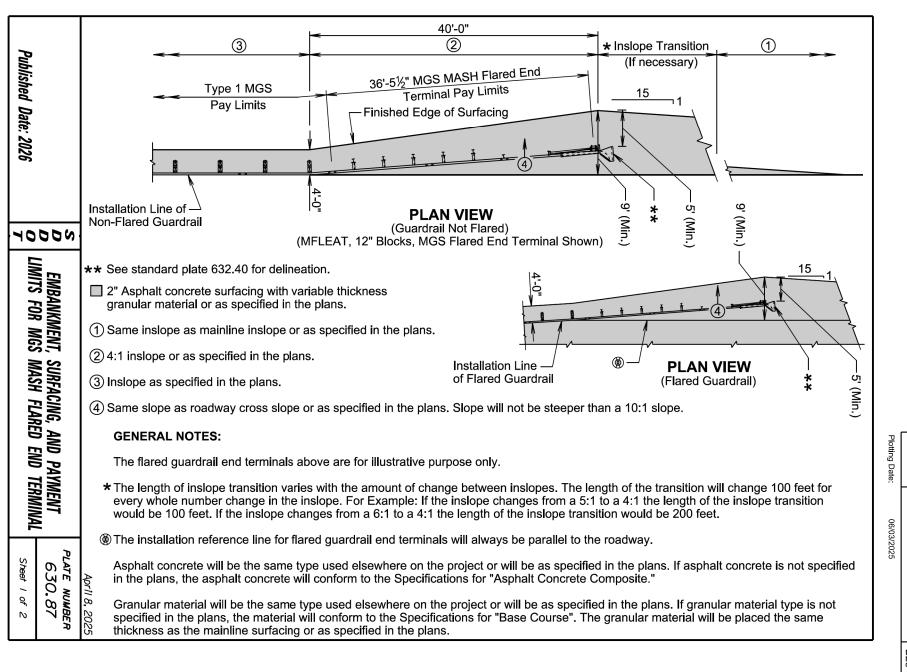


PLATE NUMBER 630.20

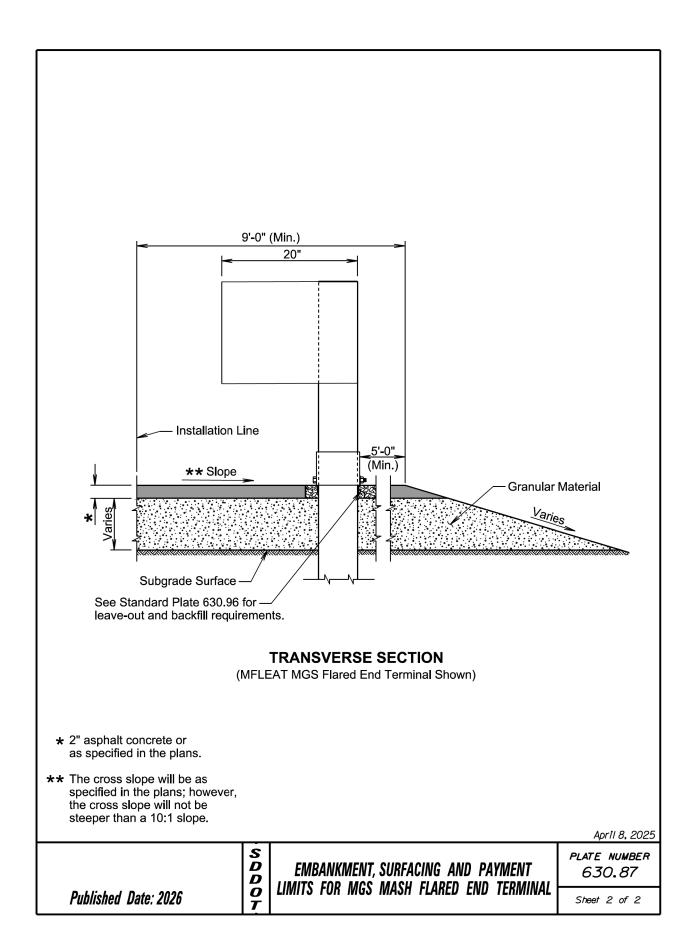
Sheet 6 of 6

April 8, 2025





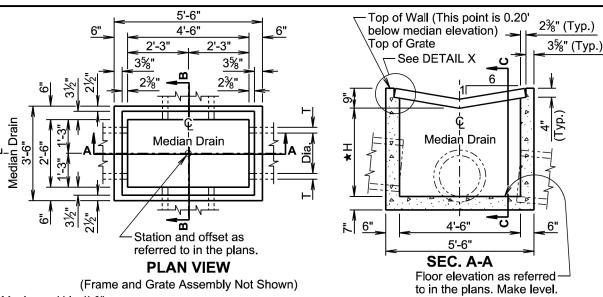
Plotted From - TRPR13



| STATE OF | SOUTH | DAKOTA | PT 0907(89)317 | B30 | B31 |

Plotting Date:

Date: 06/03/2025



★Maximum H is 4'-0"

SPECIFICATIONS

Design Specifications: AASHTO LRFD Bridge Design Specifications, 2012 Edition.

Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, Current Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES:

Design Live Load: HL-93. No construction loading in excess of legal load was considered.

Reinforcing steel will conform to ASTM A615, Grade 60. The d bars will be lapped 12 inches with the b and c bars. Cut and bend reinforcing steel as required to place pipe(s) through the drop inlet wall.

Median drain may be precast. If precast median drain details differ from this standard plate, submit a checked design done by a SD registered P.E. and shop plans to the Office of Bridge Design for approval.

*Reduce total quantities of concrete by the amount of concrete displaced by the pipe(s). The total quantity of concrete will be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel will be computed to the nearest pound.

Median drain shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering median drain must fit between the inside face of walls and will not enter through the corners.

Structural steel for angles and plates will conform to ASTM A36. Structural steel for rectangular HSS will conform to ASTM A500, Grade B or C. For informational purpose, the approximate weight of the frame is 100 pounds and the approximate weight of the grate is 254 pounds.

Maximum R.C.P. diameter will not exceed 30 inches (18 inches R.C. arch) on the 3-foot 6-inch wide side and will not exceed 42 inches (36 inches for R.C. arch) on the 5-foot 6-inch wide side of the median drain.

The dimension of H is in feet. Maximum H is 4 feet.

April 8, 2025

Published Date: 2026

TYPE M MEDIAN DRAIN

Plate Number 670.65

Sheet 1 of 3

TOTAL SHEETS PT 0907(89)317 B31 DAKOTA B31 Plotting Date: 06/03/2025 ∡ 3½"x3½"x¼" **≺** (Typ.) 2%" -See DETAIL X Mediah Drain 🕇 -HSS 3"x3"x¾₆" Median Drain Weld-Weld 10" d1-10" long **⊼** \ long No. 3 No. 3 rebar to plate rebar to a @ 9' plate 2¼" CI. 2¼" CI. 5-d1-2-d, 2-d1, (Typ.) (Typ.) and 4-d2 2-d, 2-d1 - **₽** 2"x¼" (Typ.) and 4-d2 *(Typ.) 3" 8" 4 Spaces @ ₩b|_| |_3" ·∡ 3½"x3½"x¼" \overline{c} $\overline{\mathbf{c}}$ 7 Spaces @ 7"=4'-1" **PLAN VIEW** 6½"=2'-2" - № 2"x¼" (Typ.) 6". _1'-3"_|_1'-3"_ 5'-6" 3'-6" ★Maximum H is 4'-0" SEC. D-D __3½"__ SEC. C-C -HSS 3"x3"x¾₆" (Typ.) - № 2"x¼" SEC. H - H SEC. G-G ₽ 4"x¼"x3'-1' −∡3½"x3½"x¼" -HSS 3"x3"x¾₆" (Grate) 10" long No. 3 Rebar (Typ.)-(Typ.)ム3½"x3½"x¼" (Typ.) **≺**(Typ.) - P2 21/8" x 1/4" x 2'-6" 10" long- $\frac{1}{12}$ (Typ.) <u></u>
<u>⅓"</u>
✓(Typ.) No. 3 rebar 4"x3½"x½" (Typ.) 6" ₽ 4"x¼"x3'-1" (Typ.) **DETAIL X ESTIMATED QUANTITIES** CONSTANT VARIABLE QUANTITY ITEM UNIT PIPE DISPLACEMENT -P2%"x¼"x2'-6" *Class M6 Concrete Cu. Yd. 0.59 0.30H **REDUCTIONS** Reinforcing Steel Lb. 71.84 35.20H Class M6 Wall Diameter Concrete Type M Frame and Grate Assembly Each (Inches) (Inches)|(Cu. Yd.) 0.03 12 REINFORCING SCHEDULE 21/4 15 0.04 Mk. No. Size Length Type Bending Details 4'-10¾" 18 $2\frac{1}{2}$ 0.05 P_4"x¼"x3'-0¾" a 2.67H 4 10'-0" 17 **PLAN VIEW** 24 3 0.09 2'-5½" - **P**_4"x¼"x3'**-**0¾" Weld 10" long-(Frame) 3½ 30 0.14 No. 3 rebar 36 4 0.20 to plate 42 $4\frac{1}{2}$ 0.26 d1 14 4 H+3" Str. See DETAIL X - № 2%"x¼"x2'-6" Type 17 a 2'-5¾ d2 8 4 H Str. 18 $2\frac{1}{2}$ 0.05 <u>/-</u>_∡_4"x3½"x¼" (Тур.) 4"x3½"x¼" (Typ. ₽ 2%"x¼"x2'-6"-3½ 24 0.09 SEC. F-F NOTE: 30 4 0.14 (Frame) All dimensions are out to out of bars. 36 4½ 0.19 April 8, 2025 April 8, 2025 S PLATE NUMBER PLATE NUMBER D D O T D D 670.65 *670.65* TYPE M MEDIAN DRAIN TYPE M MEDIAN DRAIN 0 Published Date: 2026 Published Date: 2026 Sheet 2 of 3 Sheet 3 of 3

PROJECT

STATE OF

SHEET