

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

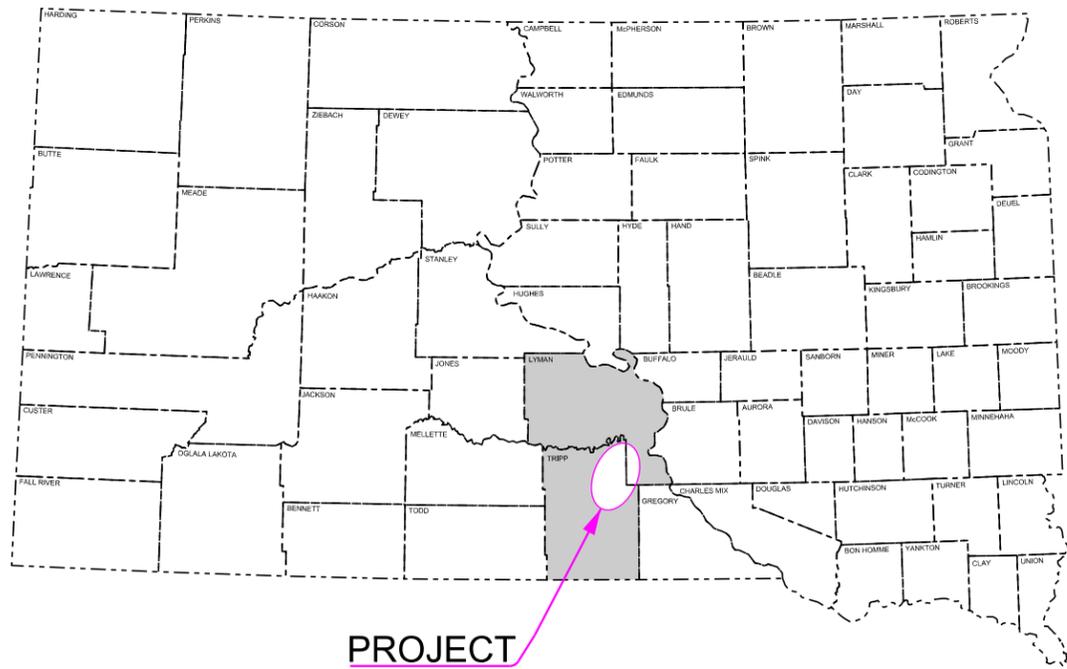
PLANS FOR PROPOSED
**PROJECTS P 0049(005)27
& 049-392**
S.D. HIGHWAY 49
TRIPP & LYMAN COUNTIES

COLD MILLING, ASPHALT CONCRETE RESURFACING,
BRIDGE RAIL UPGRADE AND GUARDRAIL REPLACEMENT,
PIPE WORK, CURED IN-PLACE PIPE REPAIR, EROSION REPAIR,
FAULT HEAVE SPOT GRADING REPAIR, AND
CONTRACTOR FURNISHED ASPHALT CONCRETE

PCN 04F4 & i65r

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PROJECT



EXCEPTION:
Structure No. 62-283-191
Sta. 326+21.75 to Sta. 327+08.25
86.5' = 0.016 Mile
MRM 35.32

EXCEPTION:
Structure No. 62-280-133
Sta. 21+40.50 to Sta. 22+59.50
119' = 0.023 Mile
MRM 41.10

EQUATION:
Sta. 619+48.5 Bk on S1391(1)
Sta. 0+00.00 Ah on S1411

EXCEPTION:
Structure No. 62-308-092
Sta. 367+73.84 to Sta. 368+46.15
72.3' = 0.0137 Mile
MRM 46.56

END P 0049(05)27
at Station 737+75.92 =
Station 737+75.92 on S1411
MRM 27.50 + 0.030

DESIGN DESIGNATION

AADT (2020)	556
AADT (2040)	617
DHV	73
D	50%
DHV T%	7.7%
AADT T%	16.9%
V	65 mph

STORM WATER PERMIT

Major Receiving
Body of Water: White River
Area Disturbed: 13.4 Acres
Total Project Area: 538.0 Acres
Approx. Begin Lat, Long: 43.3858°, -99.6923°



EXCEPTION:
Structure No. 62-283-124
Sta. 581+16.0 to Sta. 582+84.0
168' = 0.0318 Mile
MRM 42.23

Gross Length 135,614.42 Feet 25.685 Miles

Length of Exceptions 445.81 Feet 0.084 Miles

Net Length 135,168.61 Feet 25.601 Miles

BEGIN P 0049(05)27
at Station 1+10 =
Station 1+10 on S1392(1)
MRM 53.499

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ESTIMATE OF QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0049(05)27	2	164

Revised 7/07/21 by M. Yeske

P 0049(05)27 – PCN04F4:

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3200	Construction Staking	Lump Sum	LS
009E3301	Engineer Directed Surveying/Staking	40.0	Hour
009E3320	Checker	Lump Sum	LS
009E4200	Construction Schedule, Category II	Lump Sum	LS
100E0020	Clear and Grub Tree	2	Each
110E0300	Remove Concrete Curb and/or Gutter	128	Ft
110E0420	Remove Drop Inlet Frame and Grate Assembly	1	Each
110E0500	Remove Pipe Culvert	73	Ft
110E0510	Remove Pipe End Section	3	Each
110E0600	Remove Fence	805	Ft
110E0730	Remove Beam Guardrail	1,425.0	Ft
110E1010	Remove Asphalt Concrete Pavement	1,920.0	SqYd
110E1690	Remove Sediment	12.6	CuYd
110E1693	Remove Erosion Control Wattle	1,355	Ft
110E7152	Remove Delineator for Reset	618	Each
110E7500	Remove Pipe for Reset	144	Ft
110E7510	Remove Pipe End Section for Reset	41	Each
120E0010	Unclassified Excavation	83,535	CuYd
120E0100	Unclassified Excavation, Digouts	1,280	CuYd
120E0600	Contractor Furnished Borrow Excavation	11,170	CuYd
120E2000	Undercutting	58,041	CuYd
120E4100	Reprofiling Ditch	7.5	Sta
120E6100	Water for Embankment	4.7	MGal
120E6200	Water for Granular Material	312.5	MGal
205E0010	Dust Control Chloride	23,861	Lb
230E0010	Placing Topsoil	8,653	CuYd
260E1010	Base Course	32,922.7	Ton
270E0020	Salvage and Stockpile Asphalt Mix Material	11,291.5	Ton
320E1200	Asphalt Concrete Composite	5,219.3	Ton
320E1800	Asphalt Concrete Blade Laid	3,840.0	Ton
320E5020	Saw Joint in Asphalt Concrete	410	Ft
320E7012	Grind 12" Rumble Strip or Stripe in Asphalt Concrete	51.2	Mile
320E7040	Grind 6" Transverse Rumble Strip in Asphalt Concrete	425.0	Ft
330E0010	MC-70 Asphalt for Prime	40.9	Ton
330E0100	SS-1h or CSS-1h Asphalt for Tack	282.6	Ton
330E0210	SS-1h or CSS-1h Asphalt for Flush Seal	100.2	Ton
330E1000	Blotting Sand for Prime	105.7	Ton
330E2000	Sand for Flush Seal	1,334.0	Ton
332E0010	Cold Milling Asphalt Concrete	375,796	SqYd
430E0700	Precast Concrete Headwall for Drain	2	Each

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BID ITEM NUMBER	ITEM	QUANTITY	UNIT
450E0122	18" RCP Class 2, Furnish	60	Ft
450E0130	18" RCP, Install	60	Ft
450E0182	36" RCP Class 2, Furnish	12	Ft
450E0190	36" RCP, Install	12	Ft
450E2008	18" RCP Flared End, Furnish	2	Each
450E2009	18" RCP Flared End, Install	2	Each
450E2028	36" RCP Flared End, Furnish	2	Each
450E2029	36" RCP Flared End, Install	2	Each
450E4699	Tie Bolts for RCP	76	Each
450E4738	12" CMP 14 Gauge, Furnish	20	Ft
450E4740	12" CMP, Install	20	Ft
450E5203	12" CMP Flared End, Furnish	1	Each
450E5204	12" CMP Flared End, Install	1	Each
450E5215	24" CMP Flared End, Furnish	4	Each
450E5216	24" CMP Flared End, Install	4	Each
450E8300	Culvert Joint Cleaning	874.0	Ft
450E8305	Repair Culvert Joint	874.0	Ft
450E8310	Chemical Grout Void Fill	190.0	Gal
* 450E8900	Cleanout Pipe Culvert	6	Each
450E8910	Cleanout for Culvert Treatment	2	Each
450E9000	Reset Pipe	144	Ft
450E9001	Reset Pipe End Section	39	Each
450E9524	24" Cured in Place Pipe	212	Ft
451E0514	4" PVC Pipe	20	Ft
460E0380	Install Dowel in Concrete	6	Each
462E0100	Class M6 Concrete	6.3	CuYd
480E0200	Epoxy Coated Reinforcing Steel	551	Lb
600E0300	Type III Field Laboratory	1	Each
620E0020	Type 2 Right-of-Way Fence	853	Ft
620E0515	Type 1A Temporary Fence	665	Ft
620E1020	2 Post Panel	16	Each
620E1030	3 Post Panel	6	Each
630E0500	Type 1 MGS	1,275.0	Ft
630E1500	Type 1 Guardrail Transition	8	Each
630E1505	Type 2A Guardrail Transition	8	Each
630E2017	MGS MASH Flared End Terminal	16	Each
632E2022	4"x4" White Delineator Back to Back with 1.12 Lb/Ft Post	20	Each
632E2100	Reset Delineator	618	Each
632E2220	Guardrail Delineator	50	Each
632E2510	Type 2 Object Marker Back to Back	4	Each
633E1200	High Build Waterborne Pavement Marking Paint, White	1,156	Gal

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BID ITEM NUMBER	ITEM	QUANTITY	UNIT
633E1205	High Build Waterborne Pavement Marking Paint, Yellow	450	Gal
634E0010	Flagging	1,675.0	Hour
634E0020	Pilot Car	837.5	Hour
634E0110	Traffic Control Signs	1,911.1	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	10	Each
634E0630	Temporary Pavement Marking	105.4	Mile
650E2100	Special Concrete Curb and Gutter	65	Ft
670E3200	Type D Frame and Grate	1	Each
670E5400	Precast Drop Inlet Collar	1	Each
680E0040	4" Underdrain Pipe	35	Ft
680E1040	4" Pipe Sock	35	Ft
680E2500	Porous Backfill	10.0	Ton
720E1010	PVC Coated Bank and Channel Protection Gabion	30.0	CuYd
730E0100	Cover Crop Seeding	1.0	Bu
730E0210	Type F Permanent Seed Mixture	349	Lb
731E0100	Fertilizing	20,144	Lb
732E0250	Fiber Mulching	26,859	Lb
734E0132	Type 2 Turf Reinforcement Mat	56.0	SqYd
734E0154	12" Diameter Erosion Control Wattle	5,473	Ft
734E0165	Remove and Reset Erosion Control Wattle	1,368	Ft
734E0450	Temporary Water Barrier	480	Ft
734E4990	Dewatering	2.0	Day
831E0110	Type B Drainage Fabric	98	SqYd
831E0300	Reinforcement Fabric (MSE)	3,297	SqYd
831E0400	Impermeable Plastic Membrane	20	SqYd
900E0010	Refurbish Single Mailbox	11	Each
900E1980	Storage Unit	1	Each

* - Denotes Non-Participating

ESTIMATE OF QUANTITIES

Revised 7/13/21 by M. Yeske

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Alternate A

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
* 260E6000	Granular Material, Furnish	20,157.7	Ton
* 270E0200	Blend, Haul, and Stockpile Granular Material	40,315.4	Ton
320E0005	PG 58-34 Asphalt Binder	2,884.1	Ton
320E1202	Class Q2R Hot Mixed Asphalt Concrete	57,312.4	Ton
320E4000	Hydrated Lime	608.0	Ton

* - Denotes Non-Participating

Alternate B

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
* 260E6000	Granular Material, Furnish	19,778.7	Ton
* 270E0200	Blend, Haul, and Stockpile Granular Material	39,557.4	Ton
320E0005	PG 58-34 Asphalt Binder	2,447.6	Ton
320E1202	Class Q2R Hot Mixed Asphalt Concrete	58,823.2	Ton
320E4000	Hydrated Lime	621.7	Ton

* - Denotes Non-Participating

Structure No. 62-283-191

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
110E0010	Remove Concrete Bridge Approach Slab	206.0	SqYd
110E0020	Remove Bridge Railing	160	Ft
460E0070	Class A45 Concrete, Bridge Repair	15.2	CuYd
460E0300	Breakout Structural Concrete	2.8	CuYd
460E0380	Install Dowel in Concrete	180	Each
480E0200	Epoxy Coated Reinforcing Steel	1,042	Lb
480E5000	Galvanic Anode	24	Each

049-392 – PCNi65r

Alternate A

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
* 320E0005	PG 58-34 Asphalt Binder	45.5	Ton
* 320E1400	Contractor Furnished Asphalt Concrete	1,000.0	Ton
* 320E4000	Hydrated Lime	10.0	Ton

* - Denotes Non-Participating

Alternate B

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
* 320E0005	PG 58-34 Asphalt Binder	36.6	Ton
* 320E1400	Contractor Furnished Asphalt Concrete	1,000.0	Ton
* 320E4000	Hydrated Lime	10.0	Ton

* - Denotes Non-Participating

SPECIFICATIONS

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

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 A: WETLANDS

All efforts to avoid and minimize wetland impacts from the project have resulted in approximately 0.08 acre of wetlands (includes temporary and permanent) becoming impacted.

Table of Impacted Wetlands

Wetland No.	Station	Perm. Impact Left (Acres)	Perm. Impact Right (Acres)	Temp. Impact Left (Acres)	Temp. Impact Right (Acres)	Total Impact (Acres)
1	417+85 to 418+15	0.00	0.00	0.02	0.02	0.04
2	432+86 to 433+16	0.00	0.00	0.02	0.02	0.04

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

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

Action Taken/Required:

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

COMMITMENT B3: AMERICAN BURYING BEETLE

This project is in an area that contains habitat associated with the American Burying Beetle. All work included within the project limits, SDDOT designated sources and sites, and designated option sources and sites provided in the plans have been coordinated with the USFWS.

Action Taken/Required:

Earth disturbing activities will not occur outside the designated work limits shown in the plans unless specifically stated. The Contractor is responsible for obtaining USFWS review for any borrow sites, staging areas, waste sites, additional easements, and other ground disturbing activities outside the project work limits shown in the plans. At the pre-construction meeting the Contractor will provide the Project Engineer a copy of the USFWS review for any work outside the designated work limits shown in the plans to ensure all permit conditions and plans are clearly understood.

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 waters within South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment to prevent and control the introduction and spread of invasive species into the project vicinity.

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 Aquatic Invasive Species in South Dakota can be accessed at:

<http://sdleastwanted.com/maps/default.aspx>.

COMMITMENT D: WATER QUALITY STANDARDS

COMMITMENT D1: SURFACE WATER QUALITY

This project may be in the vicinity of multiple streams and wetlands. These waters are considered waters of the state and are protected under Administrative Rules of South Dakota (ARSD) Chapter 74:51. Special construction measures may have to be taken to ensure that water quality standards are not violated.

The Moccasin Creek, Black Dog Creek, and unnamed tributaries are classified as fish and wildlife propagation, recreation, irrigation, and stock watering waters. Because of these beneficial uses, special construction measures may have to be taken to ensure that this water body is not impacted.

Action Taken/Required:

The Contractor is advised that the South Dakota Surface Water Quality Standards, administered by the South Dakota Department of Environment and Natural Resources (DENR), apply to this project. Special construction measures will be taken to ensure the above standard(s) of the surface waters are maintained and protected.

COMMITMENT E: STORM WATER

Construction activities constitute 1 acre or more of earth disturbance and/or work in a waterway.

Action Taken/Required:

The DENR General Permit for Storm Water Discharges Associated with Construction Activities is required for construction activity disturbing one or more acres of earth and work in a waterway. The SDDOT is the owner of this permit and will submit the NOI to DENR 15 days prior to project start in order to obtain coverage under the General Permit. Work can begin once the DENR letter of approval is received.

The Contractor must adhere to the "Special Provision Regarding Storm Water Discharges to Waters of the State."

The Contractor will complete the DENR Contractor Certification Form prior to the pre-construction meeting. The form certifies under penalty of law that the Contractor understands and will comply with the terms and conditions of the permit for this project. Work may not begin on this project until this form is signed and submitted to DENR.

The form can be found at:

< <https://denr.sd.gov/des/sw/eforms/CGPAppendixCCA2018Fillable.pdf> >

The Contractor is advised that permit coverage may also be required for off-site activities, such as borrow and staging areas, which are the responsibility of the Contractor.

COMMITMENT E: STORM WATER (CONTINUED)

Storm Water Pollution Prevention Plan

The Storm Water Pollution Prevention Plan (SWPPP) will be developed prior to the submittal of the NOI and will be implemented for all construction activities for compliance with the permit. The SWPPP must be kept on-site and updated as site conditions change. Erosion control measures and best management practices will be implemented in accordance with the SWPPP.

The Storm Water, Erosion, and Sediment Control Inspection Report Form DOT 298, will be used for site inspections and to document changes to the SWPPP. A copy of the completed inspection form will be filed with the SWPPP documents and retained for a minimum of three years.

The inspection will include disturbed areas of the construction site that have not been finally stabilized, areas used for storage materials, structural control measures, and locations where vehicles enter or exit the site. These areas will be inspected for evidence of, or the potential for, pollutants entering the drainage system. Erosion and sediment control measures identified in the SWPPP will be observed to ensure that they are operating correctly and sediment is not tracked off of the site.

Information on storm water permits and SWPPPs are available on the following websites:

SDDOT: < <https://dot.sd.gov/doing-business/environmental/stormwater> >

DENR: < <http://denr.sd.gov/des/sw/stormwater.aspx> >

EPA: < <https://www.epa.gov/npdes> >

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 completely 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 of time 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: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities not designated within the plans 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 of 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 will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for 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.

COMMITMENT N: SECTION 404 PERMIT

The SDDOT has obtained a Section 404 Permit from the USACE for the permanent actions associated with this project.

Action Taken/Required:

The Contractor will comply with all requirements contained in the Section 404 Permit.

The Contractor will also be responsible for obtaining a Section 404 Permit for any dredge, excavation, or fill activities associated with material sources, storage areas, waste sites, and Contractor work sites outside the plan work limits that affect wetlands, floodplains, or waters of the United States.

STORMWATER POLLUTION PREVENTION PLAN CHECKLIST
(The numbers left of the title headings are reference numbers to the GENERAL PERMIT FOR STORM WATER DISCHARGES ASSOCIATED WITH CONSTRUCTION ACTIVITIES (Stormwater Permit))

5.3 (2): STAFF TRAINING/SWPPP IMPLEMENTATION
 To promote stormwater management awareness specific for this project, the Contractor's Erosion Control Supervisor should provide correspondence of how the SWPPP will be implemented. The Contractor's Erosion Control Supervisor is responsible for providing this information at the preconstruction meeting, and subsequently completing an attendance log, which should identify site-specific implementation of the SWPPP and the names of the personnel who attended the preconstruction meeting. Documentation of the preconstruction meeting will be filed with the SWPPP documents.

- 5.3 (3): DESCRIPTION OF CONSTRUCTION ACTIVITIES**
- **5.3 (3a): Project Limits** (See Title Sheet)
 - **5.3 (3a): Project Description** (See Title Sheet)
 - **5.3 (4): Site Map(s)** (See Title Sheet and Plans)
 - **Major Soil Disturbing Activities** (check all that apply)
 - Clearing and grubbing
 - Excavation/borrow
 - Grading and shaping
 - Cutting and Filling
 - Other (describe):
 - **5.3 (3b): Total Project Area** 538.0 acres
 - **5.3 (3b): Total Area to be Disturbed** 13.4 acres
 - **5.3 (3c): Maximum Area Disturbed at One Time** 13.4 acres
 - **5.3 (3d): Existing Vegetative Cover (%)** 65
 - **5.3 (3d): Description of Vegetative Cover** Mixed grass prairie dominated by spear grass, wheat grass, and blue grama stem.
 - **5.3 (3e): Soil Properties:** AASHTO Soil Classification: A-2-6 and A-7-6; USDA-NRCS Soil Series Classification: Clay, Silty Clay, and Silt Clay
 - **5.3 (3f): Name of Receiving Water Body/Bodies** White River and Missouri River
 - **5.3 (3g): Location of Construction Support Activity Areas**

- 5.3 (3h): ORDER OF CONSTRUCTION ACTIVITIES**
- **Special sequencing requirements** (see sheet).
 - **Install perimeter protection where sheet flow runoff occurs from site.**
 - **Install channel and ditch bottom protection.**
 - **Remove and windrow topsoil.**
 - **Stabilize disturbed areas.**
 - **Reprofiling to establish positive drainage at mainline pipe locations.**
 - **Install inlet and culvert protection after completing mainline pipe resets and reprofiling.**
 - **Complete final paving.**
 - **Reseed, mulch, and fertilize areas disturbed by removal activities.**

The Contractor will enter the Estimated Start Date.

Description	Estimated Start Date
Install stabilized construction entrance(s).	
Install perimeter protection where runoff may exit site.	
Install perimeter protection around stockpiles.	
Install channel and ditch bottom protection.	

Remove and stockpile topsoil.	
Stabilize disturbed areas with erosion control wattles and cover crop seeding as needed.	
Install inlet and culvert protection after completing mainline pipe resets and reprofiling.	
Final grading.	
Final paving.	
Removal of protection devices.	
Reseed, fertilize, and mulch areas disturbed by removal activities.	

5.3 (5): DESCRIPTION AND MAINTENANCE OF CONTROL MEASURES
 All controls will be maintained in good working order. Necessary repairs will be initiated within 24 hours of the site inspection report. Include the technical reasoning for selecting each control. (check all that apply)

Perimeter Controls (See Detail Plan Sheets)

Description	Estimated Start Date
<input checked="" type="checkbox"/> Natural Buffers (within 50 ft of Waters of State)	
<input type="checkbox"/> Silt Fence	
<input checked="" type="checkbox"/> Erosion Control Wattles	
<input checked="" type="checkbox"/> Temporary Berm / Windrow	
<input type="checkbox"/> Floating Silt Curtain	
<input type="checkbox"/> Stabilized Construction Entrances	
<input type="checkbox"/> Entrance/Exit Equipment Tire Wash	
<input type="checkbox"/> Other:	

Structural Erosion and Sediment Controls

Description	Estimated Start Date
<input type="checkbox"/> Silt Fence	
<input checked="" type="checkbox"/> Temporary Berm/Windrow	
<input checked="" type="checkbox"/> Erosion Control Wattles	
<input type="checkbox"/> Temporary Sediment Barriers	
<input type="checkbox"/> Erosion Bales	
<input type="checkbox"/> Temporary Slope Drain	
<input checked="" type="checkbox"/> Turf Reinforcement Mat	
<input type="checkbox"/> Riprap	
<input checked="" type="checkbox"/> Gabions	
<input type="checkbox"/> Rock Check Dams	
<input type="checkbox"/> Sediment Traps/Basins	
<input type="checkbox"/> Culvert Inlet Protection	
<input type="checkbox"/> Transition Mats	
<input type="checkbox"/> Median/Area Drain Inlet Protection	
<input type="checkbox"/> Curb Inlet Protection	
<input type="checkbox"/> Interceptor Ditch	
<input type="checkbox"/> Concrete Washout Facility	

<input type="checkbox"/> Work Platform	
<input type="checkbox"/> Temporary Water Barrier	
<input type="checkbox"/> Temporary Water Crossing	
<input type="checkbox"/> Permanent Stormwater Ponds	
<input type="checkbox"/> Permanent Open Vegetated Swales	
<input type="checkbox"/> Natural Depressions to allow for Infiltration	
<input type="checkbox"/> Sequential Systems that combine several practices	
<input type="checkbox"/> Other:	

Dust Controls

Description	Estimated Start Date
<input type="checkbox"/> Tarps & Wind impervious fabrics	
<input type="checkbox"/> Watering	
<input type="checkbox"/> Stockpile location/orientation	
<input type="checkbox"/> Dust Control Chlorides	
<input type="checkbox"/> Other:	

Dewatering BMPs

Description	Estimated Start Date
<input type="checkbox"/> Sediment Basins	
<input type="checkbox"/> Dewatering bags	
<input type="checkbox"/> Weir tanks	
<input type="checkbox"/> Temporary Diversion Channel	
<input type="checkbox"/> Other:	

Stabilization Practices (See Detail Plan Sheets)

(Stabilization measures will begin the following work day whenever earth disturbing activity on any portion of the site has temporarily or permanently ceased. Temporary stabilization will be completed as soon as practicable but no later than 14 days after initiating soil stabilization activities (3.18))

Description	Estimated Start Date
<input type="checkbox"/> Vegetation Buffer Strips	
<input checked="" type="checkbox"/> Temporary Seeding (Cover Crop Seeding)	
<input checked="" type="checkbox"/> Permanent Seeding	
<input type="checkbox"/> Sodding	
<input type="checkbox"/> Planting (Woody Vegetation for Soil Stabilization)	
<input type="checkbox"/> Mulching (Grass Hay or Straw)	
<input checked="" type="checkbox"/> Fiber Mulching (Wood Fiber Mulch)	
<input type="checkbox"/> Soil Stabilizer	
<input type="checkbox"/> Bonded Fiber Matrix	
<input type="checkbox"/> Fiber Reinforced Matrix	
<input type="checkbox"/> Erosion Control Blankets	
<input type="checkbox"/> Surface Roughening (e.g. tracking)	
<input checked="" type="checkbox"/> Other: Windrow topsoil/utilize existing vegetation	

Wetland Avoidance

Will construction and/or erosion and sediment controls impinge on regulated wetlands? Yes No If yes, the structural and erosion and sediment controls have been included in the total project wetland impacts and have been included in the 404 permit process with the USACE.

5.3 (6): PROCEDURES FOR INSPECTIONS

- Inspections will be conducted at least once every 7 days.
- All controls will be maintained in good working order. Necessary repairs will be initiated within 24 hours of the site inspection report.
- Silt fence will be inspected for depth of sediment and for tears to ensure the fabric is securely attached to the posts and that the posts are well anchored. Sediment buildup will be removed from the silt fence when it reaches 1/3 of the height of the silt fence.
- Sediment basins and traps will be checked. Sediment will be removed when depth reaches approximately 50 percent of the structure's capacity, and at the conclusion of the construction.
- Check dams will be inspected for stability. Sediment will be removed when depth reaches 1/2 the height of the dam.
- All seeded areas will be checked for bare spots, washouts, and vigorous growth free of significant weed infestations.
- Inspection and maintenance reports will be prepared on form DOT 298 for each site inspection, this form will also be used to document changes to the SWPPP. A copy of the completed inspection form will be filed with the SWPPP documents.
- The SDDOT Project Engineer and Contractor's Erosion Control Supervisor are responsible for inspections. Maintenance and repair activities are the responsibility of the Contractor. The SDDOT Project Engineer will complete the inspection and maintenance reports and distribute copies per the distribution instructions on DOT 298.

5.3 (7): POST CONSTRUCTION STORMWATER MANAGEMENT

Stormwater management will be handled by temporary controls outlined in "DESCRIPTION AND MAINTENANCE OF CONTROL MEASURES" above, and any permanent controls needed to meet permanent stormwater management needs in the post construction period will be shown in the plans and noted as permanent.

5.3 (8): POLLUTION PREVENTION PROCEDURES

5.3 (8a): Spill Prevention and Response Procedures

➤ **Material Management**

▪ Housekeeping

- Only needed products will be stored on-site by the Contractor.
- Except for bulk materials the contractor will store all materials under cover and/or in appropriate containers.
- Products must be stored in original containers and labeled.
- Material mixing will be conducted in accordance with the manufacturer's recommendations.
- When possible, all products will be completely used before properly disposing of the container off-site.
- The manufacturer's directions for disposal of materials and containers will be followed.
- The Contractor's site superintendent will inspect materials storage areas regularly to ensure proper use and disposal.
- Dust generated will be controlled in an environmentally safe manner.

▪ Hazardous Materials

- Products will be kept in original containers unless the container is not resealable and provide secondary containment as applicable.
- Original labels and material safety data sheets will be retained in a safe place to relay important product information.
- If surplus product must be disposed of, manufacturer's label directions for disposal will be followed.
- Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants will be conducted on an impervious surface and under cover during wet weather to prevent the release of contaminants onto the ground.
- Wheel wash water will be collected and allowed to settle out suspended solids prior to discharge. Wheel wash water will not be discharged directly into any stormwater system or stormwater treatment system.
- Potential pH-modifying materials such as: bulk cement, cement kiln dust, fly ash, new concrete washings, concrete pumping, residuals from concrete saw cutting (either wet or dry), and mixer washout waters will be collected on site and managed to prevent contamination of stormwater runoff.

➤ **Spill Control Practices**

- In addition to the previous housekeeping and management practices, the following practices will be followed for spill prevention and cleanup if needed.
- For all hazardous materials stored on site, the manufacturer's recommended methods for spill cleanup will be clearly posted. Site personnel will be made aware of the procedures and the locations of the information and cleanup supplies.

- Appropriate cleanup materials and equipment will be maintained by the Contractor in the materials storage area on-site. As appropriate, equipment and materials may include items such as brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for cleanup purposes.
- All spills will be cleaned immediately after discovery and the materials disposed of properly.
- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- After a spill a report will be prepared describing the spill, what caused it, and the cleanup measures taken. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, as well as clean up instructions in the event of reoccurrences.
- The Contractor's site superintendent, responsible for day-to-day operations, will be the spill prevention and cleanup coordinator.

➤ **Spill Response**

- The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize migration into stormwater runoff and conveyance systems. If the release has impacted on-site stormwater, it is critical to contain the released materials on-site and prevent their release into receiving waters. If a spill of pollutants threatens stormwater or surface water at the site, the spill response procedures outlined below must be implemented in a timely manner to prevent the release of pollutants.
- The Contractor's site superintendent will be notified immediately when a spill or the threat of a spill is observed. The superintendent will assess the situation and determine the appropriate response.
 - If spills represent an imminent threat of escaping erosion and sediment controls and entering receiving waters, personnel will be directed to respond immediately to contain the release and notify the superintendent after the situation has been stabilized.
 - Spill kits containing appropriate materials and equipment for spill response and cleanup will be maintained by the Contractor at the site.
 - If oil sheen is observed on surface water (e.g. settling ponds, detention ponds, swales), action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.
 - If a spill occurs the superintendent or the superintendent's designee will be responsible for completing the spill reporting form and for reporting the spill to SDDENR.
 - Personnel with primary responsibility for spill response and cleanup will receive training by the Contractor's site superintendent or designee. The training must include identifying the location of the spill kits and other spill response equipment and the use of spill response materials.
 - Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

5.3 (8b): WASTE MANAGEMENT PROCEDURES

➤ **Waste Disposal**

- All liquid waste materials will be collected and stored in approved sealed containers. All trash and construction debris from the site will be deposited in the approved containers. Containers will be serviced as necessary, and the trash will be hauled to an approved disposal site or licensed landfill. All onsite personnel will be instructed in the proper procedures for waste disposal and notices stating proper practices will be posted. The Contractor is responsible for ensuring waste disposal procedures are followed.

➤ **Hazardous Waste**

- All hazardous waste materials will be disposed of in a manner specified by local or state regulations or by the manufacturer. Site personnel will be instructed in these practices, and the Contractor will be responsible for seeing that these practices are followed.

➤ **Sanitary Waste**

- Portable sanitary facilities will be provided on all construction sites. Sanitary waste will be collected from the portable units which must be secured to prevent tipping and serviced in a timely manner by a licensed waste management Contractor or as required by any local regulations.

5.3 (9): CONSTRUCTION SITE POLLUTANTS

The following materials or substances are expected to be present on the site during the construction period. These materials will be handled as noted under the heading "POLLUTION PREVENTION PROCEDURES" (check all that apply).

- Concrete and Portland Cement
- Detergents
- Paints
- Metals
- Bituminous Materials
- Petroleum Based Products
- Diesel Exhaust Fluid
- Cleaning Solvents
- Wood
- Cure
- Texture
- Chemical Fertilizers
- Other:

Product Specific Practices

▪ **Petroleum Products**

All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled.

▪ **Fertilizers**

Fertilizers will be applied only in the amounts specified by the SDDOT. Once applied, fertilizers will be worked into the soil to limit the exposure to stormwater. Fertilizers will be stored in an enclosed area. The contents of partially used fertilizer bags will be transferred to sealable containers to avoid spills.

▪ **Paints**

All containers will be tightly sealed and stored when not required for use. The excess will be disposed of according to the manufacturer's instructions and any applicable state and local regulations.

▪ **Concrete Trucks**

Contractors will provide designated truck washout facilities on the site. These areas must be self-contained and not connected to any stormwater outlet of the site. Upon completion of construction, the area at the washout facility will be properly stabilized.

5.3 (10): NON-STORMWATER DISCHARGES

The following non-stormwater discharges are anticipated during the course of this project (check all that apply).

- Discharges from water line flushing.
- Pavement wash-water, where no spills or leaks of toxic or hazardous materials have occurred.
- Uncontaminated ground water associated with dewatering activities.

5.3 (11): INFEASIBILITY DOCUMENTATION

If it is determined to be infeasible to comply with any of the requirements of the Stormwater Permit, the infeasibility determination must be thoroughly documented in the SWPPP.

7.0: SPILL NOTIFICATION

In the event of a spill, the Contractor's site superintendent will make the appropriate notification(s), consistent with the following procedures:

- A release or spill of a regulated substance (includes petroleum and petroleum products) must be reported to SDDENR immediately **if any one of the following** conditions exists:
 - The release or spill threatens or is able to threaten waters of the state (surface water or ground water)
 - The release or spill causes an immediate danger to human health or safety
 - The release or spill exceeds 25 gallons
 - The release or spill causes a sheen on surface water
 - The release or spill of any substance that exceeds the ground water quality standards of ARSD Chapter 74:54:01
 - The release or spill of any substance that exceeds the surface water quality standards of ARSD Chapter 74:51:01
 - The release or spill of any substance that harms or threatens to harm wildlife or aquatic life
 - The release or spill is required to be reported according to Superfund Amendments and Reauthorization Act (SARA) Title III List of Lists, Consolidated List of Chemicals Subject to Reporting Under the Emergency Planning and Community Right to Know Act, US Environmental Protection Agency.
- To report a release or spill, call SDDENR at 605-773-3296 during regular office hours (8 a.m. to 5 p.m. Central Standard Time). To report the release after hours, on weekends or holidays, call South Dakota Emergency Management at 605-773-3231. Reporting the release to SDDENR does not meet any obligation for reporting to other state, local, or federal agencies. Therefore, you must also contact local authorities to determine the local reporting requirements for releases. A written report of the unauthorized release of any regulated substance, including quantity discharged, and the location of the discharge will be sent to SDDENR within 14 days of the discharge.

5.4: SWPPP CERTIFICATIONS

➤ **Certification of Compliance with Federal, State, and Local Regulations**

The Storm Water Pollution Prevention Plan (SWPPP) for this project reflects the requirements of all local municipal jurisdictions for storm water management and sediment and erosion control as established by ordinance, as well as other state and federal requirements for sediment and erosion control plans, permits, notices or documentation as appropriate.

➤ **South Dakota Department of Transportation**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Joanne M. Hight

Authorized Signature (See the General Permit, Section 7.4 (1))

➤ **Prime Contractor**

This section is to be executed by the General Contractor after the award of the contract. This section may be executed any time there is a change in the Prime Contractor of the project.

I certify under penalty of law that this document and all attachments will be revised or maintained under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Authorized Signature

CONTACT INFORMATION

The following personnel are duly authorized representatives and have signatory authority for modifications made to the SWPPP:

➤ **Contractor Information:**

- Prime Contractor Name: _____
- Contractor Contact Name: _____
- Address: _____
- _____
- City: _____ State: _____ Zip: _____
- Office Phone: _____ Field: _____
- Cell Phone: _____ Fax: _____

➤ **Erosion Control Supervisor**

- Name: _____
- Address: _____
- _____
- City: _____ State: _____ Zip: _____
- Office Phone: _____ Field: _____
- Cell Phone: _____ Fax: _____

➤ **SDDOT Project Engineer**

- Name: _____
- Business Address: _____
- Job Office Location: _____
- City: _____ State: _____ Zip: _____
- Office Phone: _____ Field: _____
- Cell Phone: _____ Fax: _____

➤ **SDDENR Contact Spill Reporting**

- Business Hours Monday-Friday (605) 773-3296
- Nights and Weekends (605) 773-3231

➤ **SDDENR Contact for Hazardous Materials.**

- (605) 773-3153

➤ **National Response Center Hotline**

- (800) 424-8802.

➤ **SDDENR Stormwater Contact Information**

- SDDENR Stormwater (800) 737-8676
- Surface Water Quality Program (605) 773-3351

5.5: REQUIRED SWPPP MODIFICATIONS

➤ **5.5 (1): Conditions Requiring SWPPP Modification**

The SWPPP must be modified, including the site map(s), in response to any of the following conditions:

- When a new operator responsible for implementation of any part the SWPPP begins work on the site.
- When changes to the construction plans, sediment and erosion control measures, or any best management practices on site that are no longer accurately reflected in the SWPPP. This includes changes made in response to corrective actions triggered by inspections.
- To reflect areas on the site map where operational control has been transferred (including the date of the transfer) or has been covered under a new permit since initiating coverage under this general permit.
- If inspections by site staff, local officials, SDDENR, or U.S. EPA determine that SWPPP modifications are necessary for compliance with the Stormwater Permit.
- To reflect any revisions to applicable federal, state, or local requirements that affect the control measures implemented at the site.
- If approved by the Secretary, to reflect any changes in chemical water treatment systems or controls, including the use of a different water treatment chemical, age rates, different areas, or methods of application.

➤ **5.5 (2): Deadlines for SWPPP Modification**

Any required revisions to the SWPPP must be completed within 7 calendar days following any of the items listed above.

➤ **5.5 (3): Documentation of Modifications to the Plan**

All SWPPP modification records are required to be maintained showing the dates of when the modification occurred. The records must include the name of the person authorizing each change and a brief summary of all changes.

➤ **5.5 (4): Certification Requirements**

All modifications made to the SWPPP must be signed and certified as required in Section 7.4.

➤ **5.5 (5): Required Notice to Other Operators**

If there are multiple operators at the site, the Contractor's Erosion Control Supervisor must notify each operator that may be impacted by the change to the SWPPP within 24 hours.

When modifications as described above occur, the SWPPP will be modified to provide appropriate protection to disturbed areas, all storm water structures, and adjacent waters. The SDDOT Project Engineer will modify the SWPPP using the DOT 298 form and drawings on the plan will be modified to reflect the needed changes. Copies of the DOT 298 forms and the SWPPP will be retained on site in a designated place for review throughout the course of the project. A copy of the DOT 298 form will be given to the Contractor Erosion Control Supervisor and a copy will be emailed to the SDDOT Environmental Section in accordance with the DOT 298 Form.

SCOPE OF WORK

The work required for this project includes, but is not limited to, the following items, not listed in order of execution.

- Install Fixed Location Signing
- Install Temporary Erosion and Sediment Controls
- Removal of Embankment Topsoil at Areas Requiring Work
- Spot Grading and Backfill with Earthen Material and Base Course; Apply Prime, Blotting Sand and 3" Asphalt Concrete Composite Bottom Lift
- Repair Mainline Pipe, Scour Areas, and Install Gabions
- Remove Fence and Install Temporary Fence (2 Sites)
- Place Pavement Profile Correction Lifts
- Remove Guardrail & Place Temporary Devices (4 Sites)
- Remove Bridge Rail & Construct Concrete Bridge Rail (1 Site)
- Cold Mill Asphalt Concrete
- Remove Delineators (As directed by the Engineer)
- Blend & Stockpile Base Course, Salvaged
- Unclassified Excavation for Dugouts & Backfill Operations
- Construct Approach Pavement Thickened Sections (4 Sites)
- Construct Mailbox Turnouts (6 Sites)
- Perform Asphalt Concrete Strengthening & Leveling
- Place Blade Laid Mix
- Mainline Asphalt Concrete Paving Operations
- Install MGS Guardrail (4 Sites)
- Complete Gravel Placement Operations at Field Entrances/Intersecting Roads
- Replace Topsoil
- Grind Rumble Strips
- Place Flush Seal on Roadway and Rumble Strips
- Install Permanent Pavement Markings
- Refurbish Mailboxes
- Reset Delineators
- Remove Project Temporary Signing
- Complete Any Remaining Project Cleanup

The Contractor is encouraged to inspect the project site prior to bidding to evaluate the extent of work that will be required for construction.

SEQUENCE OF OPERATIONS

The Contractor will submit a sequence of operations for approval two weeks prior to the preconstruction meeting.

Contractor requests to deviate from the sequence of operations will be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department's intent for traffic control and sequencing of the work. An alternate sequence will be submitted for review a minimum of one week prior to potential implementation.

Thickened Section Construction at Structures will be either completed prior to or in conjunction with the Mainline Asphalt Concrete Paving Operations on the project. The Contractor will ensure that the paving lifts throughout those limits will be placed as a continuous operation as shown on the Approach Pavement Thickened Sections.

Once work starts to inconvenience traffic, work will be pursued in a near continuous, expeditious manner to its completion. Any work that restricts the motorist from driving the posted speed limit, reduces existing roadway width, or causes a potentially unsafe condition due to Contractor operations such as frequent movement of equipment or materials on or through the project, is considered to be an inconvenience to traffic.

The Contractor will coordinate with the Contractor on Project NH-P 0033(15), PCN 041V, of which some of the pipe work is located within the limits of this project. Coordination of the scheduling of work is highly recommended to avoid any potential conflicts that may arise during the progress of the contract work.

GENERAL NOTES

The Contractor is responsible for weekly notification of the public, law enforcement and emergency personnel on the project status and expected delays due to the construction. Agencies to be notified will include; but are not limited to the following: SD State Radio (605-773-3536), Tripp County Sheriff (605-842-3600), and Winner Regional Hospital (605-842-7100). Radio Stations: KWYR (AM 1260) and KWYR (FM 93.7) (605-842-3333) will also be notified.

The Contractor will notify the Winner Area Office (605) 842-0810 at least two weeks prior to beginning work on this project so SDDOT personnel can mow or spray along the shoulder in-slopes. The Department will not be responsible for the effectiveness of the mowing or spraying.

Traffic must be maintained through the project at ALL times. The Contractor may perform work on the roadway during daylight hours only, unless additional hours are approved by the Engineer. Traffic will be returned to two-way traffic during non-working hours.

The Contractor will provide a minimum traffic width of 12 feet for one-way operations and 24 feet for two-way operations during the daytime construction period. The Contractor will restore traffic to normal driving lanes during periods when no construction activity is occurring. Contractor will accommodate all over width traffic for the duration of the project.

The Contractor will maintain the driving surface on the project to eliminate hazards to the traveling public. The driving surface is defined as both driving lanes along with both outside shoulders on the project.

The Contractor will maintain access on and off the highway for local residences and county roads.

The Contractor will be responsible for maintaining the temporary Base Course surface at the Approach Pavement Thickened Section sites by providing a means of safe thoroughfare for the traveling public at all times for the duration of the material placement. The temporary surfacing and transition will be constructed and maintained to the satisfaction of the Engineer.

Once existing guardrail has been removed, the Contractor will install devices at the exposed bridge end for each direction of traffic in accordance with Section 630 of the Specifications.

The Contractor will remove all existing in-place delineators from the project and reset after completion of the permanent seeding operations.

Rumble Strip installation will be completed prior to application of the Flush Seal and Permanent Pavement Markings.

UTILITIES

The Contractor will contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It will be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

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.

GENERAL TRAFFIC CONTROL

Existing guide, route, informational logo, regulatory, and warning signs will be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging, and resetting of existing traffic control devices, including Type 2 Object Markers and delineation, will be the responsibility of the Contractor. Cost for this work will be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost will be replaced by the Contractor at no cost to the Department.

All temporary traffic control sign locations will be set in the field by the Contractor and verified by the Engineer prior to installation.

All construction operations will be conducted in the general direction of traffic movement.

If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD, whichever is more stringent will be used, as determined by the Engineer.

Traffic Control Signs, as shown in the Estimate of Quantities, are estimates. Contractor's operation may require adjustments in quantities, either more or less. Payment will be for those signs actually ordered by the Engineer and used.

Fixed location signing placed more than 4 calendar days prior to the start of construction will be covered or laid down until the time of construction. The covers must be approved by the Engineer prior to installation. The cost of materials, labor, and equipment necessary to complete this work will be incidental to other contract items. No separate payment will be made.

All fixed location signs, sign posts, and breakaway bases will be removed within 7 calendar days following permanent pavement marking.

All haul trucks will be equipped with an additional flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights will be incidental to the various related contract items.

GENERAL TRAFFIC CONTROL (CONTINUED)

At no time will a vertical drop-off of greater than 3 inches be left overnight adjacent to the traveled way. The Contractor will utilize embankment material to ensure a 3-inch vertical drop-off is not exceeded. The slope of the embankment material will not be steeper than a 4:1 within 30 feet of the traveled way.

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.

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 a fixed support and meet the minimum mounting heights of 5 foot for rural areas and 7 foot for urban areas.

The Contractor will furnish, install, maintain, and remove TRUCK CROSSING (W8-6) signs daily. The TRUCK CROSSING signs will be displayed always when haul vehicles are hauling material. When hauling conditions no longer exist, the signs will be covered or removed from view. The exact number and location will be determined during construction. Payment for additional signs will be based on the contract unit price per square foot for "Traffic Control Signs".

GROOVED PAVEMENT (W8-15) signs with MOTORCYCLE (W8-15P) plaques are required in advance of areas that have been cold milled and are not resurfaced the same day. The GROOVED PAVEMENT sign assemblies will be installed a minimum of 1000 feet in advance of cold milled sections and remain in place until the sections have been resurfaced.

The Contractor will notify businesses/homeowners a minimum of two weeks prior to construction to inform them of upcoming construction and again a minimum of 48 hours prior to any blocked access to make appropriate arrangements.

A mobile work operation will be allowed provided the rumble strip or rumble stripe grooving, flush sealing, and pavement marking can be completed satisfactorily by a continuously moving work operation. A mobile work operation will require approval by the Engineer.

A shadow vehicle, equipped with flashing amber light and a ROAD MACHINERY AHEAD sign prominently displayed, will be used in advance of landscaping, clean up, and other mobile work activities. The cost of ROAD MACHINERY AHEAD sign will be incidental to the contract lump price for "Traffic Control Miscellaneous".

Channelizing devices in a series must be of the same type. All traffic control devices will be in "like new" condition.

BUMP signs must be used in conjunction with the spot grading areas, bridge approach roadway reconstruction, and cold milling transitions at the end of the day.

TRAFFIC CONTROL SIGNS

Sufficient traffic control devices have been included in these plans to sign two workspaces. If the Contractor elects to work on additional locations simultaneously, the cost for additional traffic control devices will be incidental to the contract unit price per square foot for "Traffic Control Signs".

TRAFFIC CONTROL FOR ASPHALT CONCRETE RESURFACING

The Contractor will need to install LOOSE GRAVEL (W8-7) signs with advisory speed plaques (W13-1P) in areas where loose sand is present during the flush seal operation. LOOSE GRAVEL signs have been included in these plans for this.

TRAFFIC CONTROL FOR ASPHALT CORING

Coring operations will be completed during daylight hours only. Traffic control for coring operations will be as per Standard Plate 634.06, "Guides For Traffic Control Devices Mobile Operations On 2-Lane Road".

FLAGGING

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

Additional flagger warning signs and flagger hours have been included in the Estimate of Quantities to be used as directed by the Engineer for work that is occurring at different locations on the project. Also included in the Estimate of Quantities are special sign WAIT FOR PILOT CAR (Black on Orange [refer to "Special Sign" sheet]) that may be used without a flagger on intersecting low volume minor side road entrances to control the traffic activity area during hours when pilot cars are operating. These signs will be mounted on portable supports and placed at the stop sign. This assembly will not block the view of the stop sign.

It is required that the flaggers and pilot car operators be able to communicate with one another. If an emergency vehicle needs to pass through the project, the Contractor will be required to expedite traffic movement. All costs associated with this will be incidental to the contract unit price per hour for "Flagging".

TEMPORARY PAVEMENT MARKING

The total length of no passing zone on this project is estimated to be 11.698 miles.

It is estimated that 54 DO NOT PASS (R4-1) and 54 PASS WITH CARE (R4-2) signs will be required to mark the no passing zones, should the Contractor elect to use these signs.

Temporary flexible vertical markers (tabs) will be used to mark dashed centerline, No Passing Zones, and applicable lane lines. Paint will not be allowed for temporary pavement marking on the asphalt concrete wear course or after application of the flush seal.

Covers on the tabs will be sufficiently secured to prevent traffic from dislodging the cover and when removed, the covers will be properly disposed of. The Contractor will remove and properly dispose of the tabs after permanent pavement marking is applied. Method of removal will be nondestructive to the road surface and will be accomplished within one week of completion of the permanent pavement marking.

Any temporary flexible vertical markers (tabs) with covers removed before the flush seal will be replaced prior to application of the flush seal. Full reflectivity of all temporary flexible vertical markers (tabs) is required at all times. The Contractor will be required to replace any missing or non-reflective tabs at no additional cost to the Department.

Quantities of Temporary Pavement Markings consist of:

- One pass on top of the blotting sand surface at spot grading locations
- One pass on top of the asphalt concrete composite surface
- One pass on top of milled and pavement profile corrected surfaces
- One pass on top of the asphalt concrete blade laid lift
- One pass on top of the asphalt concrete lift
- One pass on top of the flush seal

If the flush seal is eliminated, the application of the temporary pavement marking on top of the flush seal will be eliminated. No adjustment in the contract unit price for "Temporary Pavement Marking" will be made because of a variation in quantities.

In the absence of a signed lane closure or pilot car operation, FLAGGER (W20-7) symbol signs and flaggers, or a shadow vehicle with rotating yellow lights or strobe lights will be positioned on the shoulder in advance of workers for both directions of traffic during the installation and removal of the temporary flexible vertical markers (tabs). The traffic control device used will be moved intermittently to provide proper warning of the work operation. A ROAD WORK AHEAD (W20-1) sign, a WORKER (W21-1) symbol sign or a BE PREPARED TO STOP (W3-4) sign will be mounted on the rear of the shadow vehicle. The method of traffic control used by the Contractor for this work must be approved by the Engineer.

Prior to nightfall, tabs will be required to mark centerline on segments of roadway where existing centerline markings have been removed and new markings have not been installed.

PERMANENT PAVEMENT MARKING

The Contractor will be required to repaint all existing pavement markings including centerline, edge line, lane lines, and (2) turn arrows. This list is approximate. The Contractor will be required to document and be able to relocate for replacement of the existing pavement markings and turn arrows before the markings are obliterated. The cost to duplicate the existing marking locations will be incidental to the contract unit prices for the various contract items.

REMOVE, FURNISH, AND INSTALL DELINEATORS

Removal and reset of all existing delineators as directed by the Engineer will be the responsibility of the Contractor. Furthermore, the Contractor will furnish and install new delineators at locations deemed necessary by the Engineer where the delineators have been damaged by traffic and not by the Contractor's activities. The Contractor will install the delineators as per standard plates shown in the plans. The Contractor will obtain Engineer's approval of locations prior to installation.

The Contractor will stockpile all removed delineators at a location approved by the Engineer where they will remain the property of the State. The Contractor will obtain the Engineer's approval of stockpile location prior to stockpiling of delineators. The removal of delineators for reset will not begin until after the cold milling operation is completed and reset will not commence until the asphalt paving operation is completed. If the asphalt paving operation is not completed before the end of the seasonal paving end date, the delineators will be reset after the completion of the permanent seeding operations over the following months. All cost for materials, labor and equipment necessary to remove and stockpile the delineators will be incidental to the contract unit price per each for "Remove Delineator for Reset".

All cost for materials, labor and equipment necessary to furnish and install delineators will be incidental to the contract unit price per each for "4"x4" White Delineator Back to Back with 1.12 lb/ft Post".

The stationing and radius of the superelevations for the computations of the spacing (S) of the delineators using the $S = 3[(R-50)]^{1/2}$ equation is provided below.

Stationing of Superelevations	Radius Of Curve (ft)
Sta. 72+12.43 to Sta. 92+78.23	5730
Sta. 108+17.24 to Sta. 132+29.37	3820
Sta. 163+61.80 to Sta. 178+58.44	5730
Sta. 203+46.04 to Sta. 224+32.06	3820
Sta. 236+02.16 to Sta. 254+67.08	3820

Sta. 258+83.40 to Sta. 281+43.31	3820
Sta. 429+10.89 to Sta. 442+06.69	5730
Sta. 599+92.70 to Sta. 618+98.00	2292
Sta. 299+58.80 (2 nd) to Sta. 332+49.79 (2 nd)	3820
Sta. 332+49.79 (2 nd) to Sta. 365+38.77 (2 nd)	3820

PROTECTION OF BRIDGE JOINTS

It may be necessary to use special methods and equipment to remove/place material as close as practical to structure appurtenances. Also, the Contractor will mask all expansion joints prior to any removal/placement of material near the joints. The joints will be protected throughout completion of the work. Once the masking has been removed, any loose material contained within the joint will be cleaned from the joint. Any damage to the expansion joints along with any existing structure appurtenances will be repaired by the Contractor to the satisfaction of the Engineer at no cost to the Department. All costs related to this work will be incidental to various contract items.

COLD MILLING ASPHALT CONCRETE

Cold milling activities will not begin prior to 30 days of the start date of the mainline asphalt paving operations.

The Los Angeles Abrasion Loss value on the aggregate used for the in-place asphalt concrete was 28 from MRM 27.5 to 41.10+0.406 and 23 from MRM 41.10+0.406 to 53.52. This value was obtained from testing during construction of the in-place asphalt concrete.

Cold milling asphalt will be done according to the typical section. In areas where maintenance patches have raised and/or widened the road, additional asphalt concrete will be milled to provide a uniform typical section from centerline to the edge of the finished shoulder. These areas also include farm, residential, field entrances and intersecting roads. Milling will be daylighted to the outside edge of the roadway. Any additional costs associated with this additional cold milling will be incidental to the contract unit price per square yard for "Cold Milling Asphalt Concrete".

Cold milling asphalt is estimated to produce 19,913.1 tons of cold milled asphalt concrete material.

The salvaged asphalt concrete will be blended and stockpiled in the SE ¼ of Section 22, Township 101 North, Range 72 West of the 5th P.M., Lyman County, South Dakota.

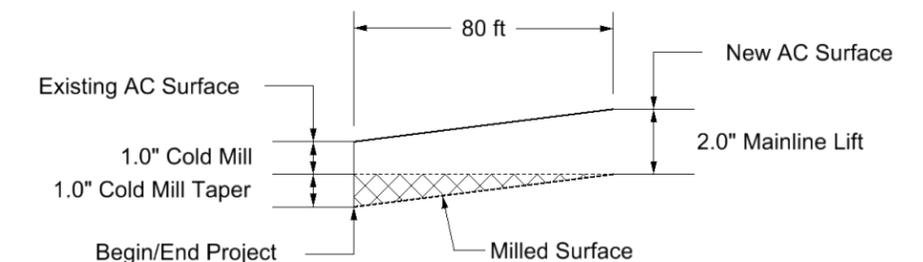
The Contractor must utilize some hot mix asphalt material to construct a 20:1 temporary on/off transition at surface transition locations and at locations deemed necessary by the Engineer between the milled surface and existing surface so as to provide a means of safe thoroughfare for the traveling public. This material must be removed once mainline paving commences. The material will become the property of the Contractor once it is determined by the Engineer that it is no longer needed on the project. All costs associated constructing and removing the transitions will be incidental to the contract unit price per ton for "Class Q2R Hot Mixed Asphalt Concrete, Alternate A or Alternate B".

After completion of the milling operation, the Contractor must clean up and dispose of any remaining debris to the satisfaction of the Engineer.

COLD MILLING ASPHALT CONCRETE TRANSITIONS

In order to construct the new surfacing flush with the existing asphalt concrete pavement it will be necessary to transition the depth of cold milling to the limits as shown in the layout below. The transitions will be approved by the Engineer. The cold milling of the transition will include the full roadway width.

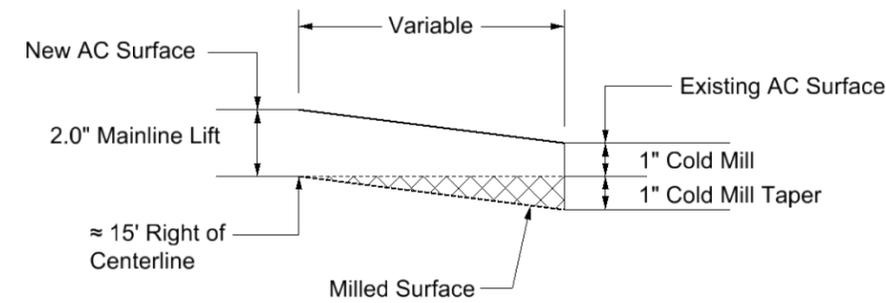
Cold Milling Transition Layout – Begin/End Project



The cross hatched area is the approximate limits of cold milling asphalt concrete transition.

COLD MILLING ASPHALT CONCRETE (CONTINUED)

Cold Milling Transition Layout – Intersecting Roads and Field Entrances



The cross hatched area is the approximate limits of cold milling asphalt concrete transition.

All costs associated with this work will be incidental to the contract unit price per square yard for "Cold Milling Asphalt Concrete".

SALVAGE AND STOCKPILE ASPHALT MIX MATERIAL

The Los Angeles Abrasion Loss value on the aggregate used for the in-place asphalt concrete was 28 from MRM 27.5 to 41.10+0.406 and 23 from MRM 41.10+0.406 to 53.52. This value was obtained from testing during construction of the in-place asphalt concrete.

An estimated 11,291.5 tons (5,794.9 Cubic Yards) of asphalt mix material will be salvaged from the existing highway according to the in-place surfacing typical sections and stockpiled at a site furnished by the Contractor and satisfactory to the Engineer to be used as RAP in the Class Q2R Hot Mixed Asphalt Concrete. The Contractor is responsible to assure enough salvaged asphalt concrete is available for the Class Q2R Hot Mixed Asphalt Concrete.

Salvaged material will be processed to meet the requirements of Section 884.2 C.1 prior to stockpiling. The salvaged material will be removed from the stockpile for use as RAP at the satisfaction of the Engineer. Any additional crushing of the salvaged material will be included in the contract unit price per ton for "Salvage and Stockpile Asphalt Mix Material".

The salvaged material not used on the project will be stockpiled or disposed of as directed by the Engineer.

The quantity of salvaged asphalt mix material may vary from the plans. No adjustment will be made to the contract unit price for variations of the quantity of "Salvage and Stockpile Asphalt Mix Material."

The quantity of salvageable material is estimated from the in-place surfacing typical sections. This estimated quantity was included in the unclassified excavation quantities.

BLEND, HAUL, AND STOCKPILE GRANULAR MATERIAL

Excess salvaged asphalt concrete material estimated at 20,252.2 tons for (Alternate A) and 19,874.1 for (Alternate B) (for informational purposes only) will be blended with 20,252.2 (Alternate A) or 19,874.1 (Alternate B) tons of Granular Material, Furnish and will be hauled, blended and stockpiled in the SE ¼ of Section 22, Township 101 North, Range 72 West of the 5th P.M, Lyman County, South Dakota.

A computerized scale, portable platform scale, stationary commercial scale, stationary commercial plant, portable plant scale, or a belt scale along with a scale operator will be provided by the Contractor at the stockpile site to weigh the salvaged material prior to blending.

The salvaged asphalt mix material will be crushed to meet the requirements of Section 884.2 D.3 prior to blending into the stockpile.

Salvaged asphalt mix material will be blended with Granular Material, Furnish at a rate of 50% salvaged asphalt mix material and 50% Granular Material, Furnish to obtain stockpile material.

No further gradation testing of the blended material will be required.

All costs for crushing the salvaged asphalt mix material, stockpiling, and blending the materials will be incidental to the contract unit price per ton for "Blend & Stockpile Granular Material".

Prior to stockpiling the salvaged asphalt concrete, the site will be prepared by the removal of at least 6" of topsoil and the area bladed smooth. Erosion control wattles will be placed as required by the Engineer along the disturbed area at the stockpile site where runoff would exist. Payment for erosion control wattles will be at contract unit price per foot for "12" Diameter Erosion Control Wattle".

GRANULAR MATERIAL, FURNISH

Granular Material will be furnished by the Contractor for use in blending with the salvaged asphalt mix material from this project

The Granular Material will be Base Course meeting the requirements of Section 882.

BASE COURSE

Base Course will be furnished by the Contractor to be utilized as the base course section at the Spot Grading, Approach Pavement Thickened Section, and Mailbox Turnout locations, as detailed in the plans. Base Course will also be furnished by the Contractor to be utilized as surfacing of intersecting roads and approaches.

The prime application will closely follow the base finishing operation at the spot grading locations. The cure time for the processed base, prime, and blotting sand application will be determined during construction.

All other requirements for Base Course will apply.

WATER FOR GRANULAR MATERIAL

The moisture content for compaction of all granular material used as specified in the plans will be approximately optimum moisture or as directed by the Engineer. The quantity for Water for Granular Material is based on 4% of the quantity. All costs for furnishing and placing the water will be incidental to the contract unit price per MGal for "Water for Granular Material".

WATER FOR EMBANKMENT MATERIAL

Water for Embankment is estimated at the rate of 15.0 gallons of water per cubic yard of Embankment and will be paid for at the contract unit price per MGal for "Water For Embankment". For informational purposes only, an estimated 4.7 MGal is required to complete the work.

UNCLASSIFIED EXCAVATION, DIGOUTS

The locations and extent of digout areas will be determined in the field by the Engineer. The backfilling material for the digouts will be Base Course and Class Q2R Hot Mix Asphalt Concrete. The depth of asphalt concrete will match the in-place thickness.

Included in the Estimate of Quantities are 50 cubic yards of "Unclassified Excavation, Digouts" and 75 square yards of "Remove Asphalt Concrete Pavement" per mile for the removal of asphalt and unstable material throughout the project.

Included in the Estimate of Quantities are 100 tons of Base Course and 25 tons of Class Q2R Asphalt Concrete per mile for backfill of "Unclassified Excavation, Digouts".

The digouts will be extended to the shoulder and backfilled with granular material that will daylight to the inslope to allow water to escape the subsurface to allow water to escape from the subsurface.

A copy of the surfacing/subgrade investigation for this project is available at the Winner Area and the Pierre Region offices.

UNCLASSIFIED EXCAVATION

Unclassified Excavation will occur at the sites listed in the Table of Unclassified Excavation shown below.

The Unclassified Excavation includes the remaining in place asphalt, base course, and 3' of earthen subgrade at locations as listed in the Table of Undercutting and the quantity is based on the limits as shown in the Typical Spot Grading Section plan sheets. The plans quantity for the Unclassified Excavation as given in the Table of Additional Quantities will be the basis of payment for this item as no adjustment will be made to the contract unit price per cubic yard for variations of the quantity.

Measurement of topsoil quantities will not be made as plans quantity will be the basis for payment, however for information purposes only, the Table of Unclassified Excavation shows the estimated topsoil removal of 4" at the locations listed below.

The anticipated topsoil removal locations are from the edge of the outside shoulder to 16' down the embankment inslope at Spot Grading areas and the entire embankment inslope behind the Embankment Inslope Reconstruction limits at the bridge sites.

Any Unclassified Excavation material not used or retained on the project will become the property of the Contractor for its disposal.

TABLE OF UNCLASSIFIED EXCAVATION

Location	Quantity (CuYd)
Approach Pavement Thickened Section at Structures <i>(Structures at MRM 35.32, 41.10, 42.23, & 46.56)</i>	
Excavation (refer to Approach Pavement Thickened Sections for details)	1,588
Salvage and Stockpile Asphalt Mix Material	787
Spot Grading Areas	
Excavation (refer to Typical Spot Grading Sections for details)	62,878
Salvage and Stockpile Asphalt Mix Material	10,505
Topsoil Removal	7,777
Total Unclassified Excavation	83,535

SPOT GRADING / UNDERCUTTING / FAULT HEAVE REPAIR

The roadway subgrade will be undercut 3 feet below the earthen subgrade surface at the fault-heave areas specified in the table shown below. The undercut material or other suitable material, as directed by the Engineer, will then be replaced and compacted to final subgrade elevation. The undercut will utilize a 4:1 slope or flatter from the top of the base course material to the bottom of the undercut. The remaining undercut subgrade material will be moved to area(s) where borrow material is needed or disposed of as approved by the Engineer.

Compaction of the earth embankment material will be governed by the Specified Density Method. However, for embankment soil with an optimum moisture of 20% or greater, the Density Specification (Percent of Maximum Dry Density) will be 92% to 98% and the Moisture Specification (Percent of Optimum Moisture) will be -2% to +3%.

An application of MC-70 Asphalt for Prime at a rate of 0.30 Gal/SqYd and Blotting Sand at a rate of 10 pounds per square yard will be placed on the Base Course finished surface at the Spot Grading Locations or where necessary for maintenance of traffic as directed by the Engineer. The application will closely follow the processing operation and at no time will the prime operation be more than 10 calendar days from the base finishing operation. The cure time for the base course, prime, and blotting sand application will be determined on construction. Any damage to the primed surface will be repaired by the Contractor prior to asphalt paving and will be done at no cost to the Department. Temporary transitions will be constructed and maintained to the satisfaction of the Engineer.

TABLE OF UNDERCUTTING

MRM to	MRM	Station to	Station	Quantity (CuYd)
50.50	50.65	151+40	159+32	5,859
47.05	47.40	323+39	341+87	13,672
45.35	45.60	418+56	432+19	10,083
43.80	44.00	503+46	514+16	7,916
42.60	42.75	569+62	577+64	5,933
38.50	38.90	137+21 (2 nd)	158+08 (2 nd)	14,577
Total:				58,040

Experience with similar soil types plus allowances for other factors indicate a shrinkage factor for embankment of +20% that was included in the quantity for the above generalized areas.

The plan shown quantity will be the basis of payment. However, if there are additional areas of undercut 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. All costs associated with Undercutting will be paid for at the unit price per cubic yard for "Undercutting".

Refer to the Special Provisions for the required staking at areas requiring excavation and inslope reconstruction. The project grading plans are available at the Winner Area Office for use to reestablish centerline and roadway profile.

DEPTH OF EXISTING CULVERTS ON SD HIGHWAY 49

The contractor is cautioned that some of the pipe culverts on SD Highway 49 may be near or within the anticipated 3' undercut depth (at MRM 38.00+0.763, Sta 145+00 (2nd)). Damage to the pipe culverts and/or pipe culverts end sections caused by any of the construction operations will be the responsibility of the Contractor and will be repaired by the Contractor at no additional cost to the Department.

REPROFILING DITCH

The Contractor will reprofile the ditch to restore drainage profile into/out of designated mainline pipe locations. This work will require removing sedimentation along with placing the removed material to areas where borrow material is needed or to area(s) approved by the Engineer for disposal. The quantities and locations of reprofiling may change depending on the degree of erosion/sedimentation that has taken place from time of the survey to the time of construction. Refer to Table of Mainline Pipe and Erosion Repair, for locations of reprofiling.

The Contractor will remove 4" of topsoil within the areas to be reprofiled. The Contractor will stockpile the material at a site approved by the Engineer, and/or windrow the material near the disturbed areas to control potential sediment runoff as determined by the Engineer. The replacement of topsoil will be spread evenly throughout all disturbed areas upon completion of the work. Any clumps larger than 3 inches will be broken up prior to seeding the areas.

Geotechnical Engineering Activity performed a Surfacing/Subsurface Investigation and noted fault traces in both ditches at MRM locations as shown in the table below. The ditches will be reprofiled to correct the distortions caused by the fault traces and to reestablish proper drainage. This work will require removing soils along with placing the removed material to areas where borrow material is needed or to area(s) approved by the Engineer for disposal. The extent of the ditch reprofiling may require adjustments to be made in the field by the Engineer due to changes of the field conditions since the completion of the field work.

Location	Station to	Station	Lt/Rt		Reprofile Ditch (Station)	Disturbed Area (ft ²) (for info only)
MRM 42.64±	575+28	575+78	Lt	Rt	1.0	6,440
MRM 42.68±	573+17	573+67	Lt	Rt	1.0	6,175
MRM 50.55±	156+44	156+94	Lt		0.5	3,322
MRM 50.55±	156+11	156+61		Rt	0.5	3,266
MRM 50.57±	155+37	155+87	Lt	Rt	1.0	6,606
MRM 50.59±	154+32	154+82	Lt	Rt	1.0	6,459

Field measurement of ditch reprofiling will not be made. All costs associated with clearing and reshaping of the existing ditch, labor, excavation, placing material, equipment, and incidentals will be paid for at the contract unit price per station for "Reprofiling Ditch".

ENGINEER DIRECTED SURVEYING/STAKING

The use of "Engineer Directed Surveying/Staking" is intended for verifying the cross slopes at the areas of superelevation and other areas as deemed necessary by the Engineer.

These areas of superelevation are as follows:

North Portion

Sta 72+12.43 to Sta 92+78.23
 Sta 108+17.24 to Sta 132+29.37
 Sta 161+61.80 to Sta 178+58.44
 Sta 203+46.04 to Sta 224+32.06
 Sta 236+02.16 to Sta 254+67.08
 Sta 258+83.40 to Sta 281+43.31
 Sta 429+10.89 to Sta 442+06.69
 Sta 599+92.70 to Sta 618+98.00

South Portion

Sta 299+58.80(2nd) to Sta 332+49.79(2nd)
 Sta 332+49.79(2nd) to Sta 365+38.77(2nd)

TYPE III FIELD LABORATORY

The lab will be equipped with an internet connection such as DSL, cable modem, or other approved service. The internet connection will be provided with a multi-port wireless router. The internet connection will be a minimum speed of 5 Mbps unless limited by job location and approved by the DOT. Prior to installing the wireless router the Contractor will submit the wireless router's technical data to the Area Office to check for compatibility with the state's computer equipment. The internet connection is intended for state personnel usage only. The Contractor's personnel are prohibited from using the internet connection unless pre-approved by the Project Engineer. These items will be incidental to the contract unit price per each for "Type III Field Laboratory".

STORAGE UNIT

The Contractor will provide a storage unit such as a portable storage container or a semi-trailer meeting the minimum size requirements from the table below:

Project Total Asphalt Concrete Tonnage	Minimum Internal Size (Cu Ft)	Minimum External Size (L x W x H)
Less than 50,000 ton	1,166	20' x 8' x 8.6' std
More than 50,000 ton	2,360	40' x 8' x 8.6' std
All Gyratory Controlled QC/QA Projects	2,360	40' x 8' x 8.6' std

The storage unit is intended for use only by the Engineer for the duration of the project. The QC lab personnel or the Contractor will not be allowed to use the storage container while it is on the project, without permission of the Engineer.

STORAGE UNIT

The storage unit will be on site and operational prior to asphalt concrete production. Upon completion of asphalt concrete production, the Engineer will notify the Contractor when the storage unit can be removed from the project. The storage unit use will not exceed 30 calendar days from the completion of asphalt concrete production. The storage unit will remain the property of the Contractor.

The storage unit will be weather proof and will be set in a level position. The storage unit will be able to be locked with a padlock.

The storage unit will be placed adjacent to the QA lab, as approved by the Engineer.

The following will apply when the storage unit provided on the project is a portable storage container:

1. The portable storage container will be constructed of steel.
2. The portable storage container will be set such that it is raised above the surrounding ground level to keep water from ponding under or around the storage container.

The following will apply when the storage unit provided on the project is a semi-trailer:

1. A set of steps and hand railings will be provided at the exterior door.
2. If the floor of the semi-trailer is 18 inches or more above the ground, a landing will be constructed at the exterior door. The minimum dimensions for the landing will be 4 feet by 5 feet. The top of the landing will be level with the threshold or opening of the doorway.
3. The semi-trailer may be connected to the QA lab by a stable elevated walkway. The walkway will be a minimum of 48 inches wide and contain handrails installed at 32 inches above the deck of the walkway. The walkway will be constructed such that it is stable and the deck does not deform during use and allows for proper door operation. Walkway construction will be approved by the Engineer.

All cost for furnishing, maintaining, and removing the storage unit including labor, equipment, and materials including any necessary walkways, landings, stairways, and handrails will be included in the contract unit price per each for "Storage Unit".

CHECKING SPREAD RATES

The Contractor will be responsible for checking the Base Course at grading locations and Q2R Hot Mixed Asphalt Concrete, and taking the weigh delivery tickets as the surfacing material arrives on the project and is placed onto the roadway.

The Contractor will compute the required spread rates for each typical surfacing section and create a spread chart prior to the start of material delivery and placement. The Engineer will review and check the Contractor's calculations and spread charts. The station to station spread will be written on each ticket as the surfacing material is delivered to the roadway.

At the end of each day's shift, the Contractor will verify the following:

- All tickets are present and accounted for,
- The quantity summary for each item is calculated,
- The amount of material wasted if any,
- Each day's ticket summary is marked with the corresponding 'computed by',
- The ticket summary is initialed and certified that the delivered and placed quantity is correct.

All daily tickets and the summary by item will be given to the Engineer no later than the following morning.

If the checker is not properly and accurately performing the required duties, the Contractor will correct the problem or replace the checker with an individual capable of performing the duties to the satisfaction of the Engineer. Failure to do so will result in suspension of the work.

The Department will perform depth checks. The Contractor will be responsible for placement of material to the correct depth unless otherwise directed by the Engineer. If the placed material is not within a tolerance of $\pm 1/2$ inch of the plan shown depth, the Contractor will correct the problem at no additional cost to the Department. Excess material above the tolerance will not be paid for. Achieving the correct depth may require picking up and moving material or other action as required by the Engineer.

All costs for providing the Contractor furnished checker and performing all related duties will be incidental to the contract lump sum price for CHECKER. No allowances will be made to the contract lump sum price for CHECKER due to authorized quantity variations unless the quantities for the material being checked vary above or below the estimated quantities by more than 25 percent. Payment for the Checker will then be increased or decreased by the same proportion as the placed material quantity bears to the estimated material quantity.

SURFACING THICKNESS DIMENSIONS

The plans shown spread rates will be applied even though the thickness may vary from that shown on the plans.

At those locations where material must be placed to achieve a required elevation, the depth/quantity may be varied to achieve the required elevation.

INTERSECTING ROADS AND ENTRANCES

Intersecting roads and entrances will be satisfactorily cleared of vegetation, shaped and compacted prior to placement of mainline surfacing. This work will be considered incidental to other contract items. Separate measurement and payment will not be made.

SHOULDER PREPARATION

Prior the placing of pavement profile correction lifts and mainline pavement, the shoulders will be bladed and broomed of all vegetation and loose/accumulated material to the satisfaction of the Engineer. Shoulder Clearing will not be measured for payment, and all costs associated with Roadway and Shoulder Clearing will be incidental to the various contract items.

Vegetation and accumulated material adjacent to the existing surface edge will be removed to the satisfaction of the Engineer prior to placement of mainline surfacing. Any remaining windrow of accumulated material will be re-spread evenly on the in-slope adjacent to the asphalt shoulder to the satisfaction of the Engineer prior to the application of the flush seal.

PAVEMENT PROFILE CORRECTION

The Pavement profile will be corrected as shown on the Typical Pavement Profile Correction Sections by placing an asphalt lift or a number of asphalt lifts on both sides of the apex of the bump heave. A single asphalt lift of less than 1.5" will be placed at the apex elevation and extended across the low area, then tapered out at a rate of 1" per 40'. The Contractor may be required to place multiple paving lifts at each location as shown in the table below to correct the pavement profile.

Pavement profile correction lifts should be laid at these locations to obtain an acceptable profile prior to milling operations. Areas where pavement profile correction lifts have been placed will not be milled unless necessary to correct the profile for or to taper into the final lift of pavement. Milling the apex of the heave could result in a thinner, inadequate pavement section at these locations.

The pavement profile correction lifts will be compacted by the Specified Roller Coverage Method. All remaining requirements for Class Q2R Hot Mixed Asphalt Concrete will apply.

The height between uneven roadway lanes cannot be greater than 3" within a lane closure boundary. The lane closures and paving operations will alternate between lanes until the pavement profile has been corrected to the satisfaction of the Engineer. The Contractor will allow sufficient cooling time of each lift of asphalt prior to opening the lane to traffic.

Plans tonnage may be varied at locations where material must be placed to achieve a required pavement elevation.

Base Course backing may be required to eliminate drop offs greater than 3" and inslope transitions steeper than 4:1. Placement of the Base Course will be at areas directed by the Engineer and will not commence until the completion of the mainline paving operations. Base Course will be compacted to the satisfaction of the Engineer.

Reflectorized drums will be placed on the edge of the asphalt shoulder at a spacing of 100' where a shoulder drop off is greater than 3" before opening the lane to traffic.

TABLE OF PAVEMENT PROFILE CORRECTION LIFTS

MRM to	MRM	Station to	Station	Quantity Alt A (Tons)	Quantity Alt B (Tons)
52.44	52.35	56+35	61+35	98.4	101.0
47.75	47.45	305+17	321+01	311.6	320.0
47.09	46.90	340+23	350+23	196.7	202.0
46.05	45.95	394+92	400+20	103.9	106.7
45.00	44.90	441+02	446+30	103.9	106.7
44.35	44.28	484+95	488+64	72.7	74.7
40.64	40.55	46+07(2 nd)	51+07(2 nd)	96.1	98.7
40.08	39.95	75+89(2 nd)	82+75(2 nd)	131.9	135.5
37.94	37.85	187+68(2 nd)	192+68(2 nd)	96.1	98.7
34.60	34.51	363+93(2 nd)	368+93(2 nd)	96.1	98.7
Totals:				1307.4	1342.7

ASPHALT CONCRETE BLADE LAID

Included in the Estimate of Surfacing Quantities are 150 tons of Asphalt Concrete Blade Laid, 1.5 tons of Hydrated Lime, and 11.3 tons of PG 58-34 Asphalt Binder per mile and will be tight bladed on the existing surface 24 feet wide prior to the overlay. Asphalt Concrete Blade Laid material will be placed at all locations that have been cold milled prior to the overlay.

Mineral Aggregate for tight bladed material will use only the fine aggregate components combined in the same proportions as the Class Q2R Hot Mixed Asphalt Concrete mix. Quality testing is not required on the coarse aggregate (+No. 4 sieve) in this mixture.

The Asphalt Concrete Blade Laid Lift will be designed using a N_{design} Gyratory Compactive Effort of 65. The asphalt binder content will be determined so that the air voids of Asphalt Concrete Blade Laid Lift are between 3.0% and 5.0%.

Included in the Estimate of Surfacing Quantities are 131.8 tons of SS-1h or CSS-1h Asphalt for Tack for use prior to the application of the Blade Laid lift. (Rate = 0.09 Gal./Sq.Yd.)

SPOT LEVELING, STRENGTHENING, AND REPAIR

Included in the Table of Additional Quantities per mile for Alternate A are 100 tons of Class Q2R Hot Mixed Asphalt Concrete, 1.0 ton of Hydrated Lime, and 4.6 tons of PG 58-34 Asphalt Binder. Included per mile for Alternate B are 100 tons of Class Q2R Hot Mixed Asphalt Concrete, 1.0 ton of Hydrated Lime, and 3.7 tons of PG 58-34 Asphalt Binder. And an additional 6.4 tons of SS-1h or CSS-1h Asphalt for Tack is also included for spot leveling, strengthening, and repair of the existing surface throughout the project.

THICKENED SURFACING SECTION AT STRUCTURES

At Str. No. 62-280-133, Str. No. 62-283-124, Str. No. 62-283-191, and Str. No. 62-308-092

The Contractor will refer to Approach Pavement Thickened Section plan sheets and various detail sheets at structures in the plan set for further construction details.

The Contractor will remove a portion of the existing asphalt concrete surface, base course, and a portion of the subgrade as shown on the Approach Pavement and Guardrail and Embankment Reconstruction and Approach Pavement Thickened Section plan sheets and as directed by the Engineer. The plans quantity for the material as shown in the Table of Additional Quantities will be the basis of payment for this item as no adjustment will be made to the contract unit price for variations of the quantity.

After removal of materials throughout the Approach Roadway Thickened Section Limits, an inspection of the remaining subgrade will be made. Areas of excess moisture will be dried, loose material will be removed, and disturbed areas will be leveled and compacted to the satisfaction of the Engineer prior to placing of Reinforcement Fabric (MSE) and Base Course. All costs associated with the preparatory work will be incidental to the contract unit price per ton for "Base Course".

Reinforcement Fabric (MSE) Specification

The fabric will conform to Section 831 of the Specifications. The fabric will be on the Approved Products List for this material or will be certified by the supplier to meet this specification prior to installation.

Fabric will be paid for at the contract unit price per square yard for Reinforcement Fabric (MSE). Payment quantities will be based on area covered plus 15%. Overlaps are accounted for by the additional 15%. Payment will be full compensation for furnishing and installing the fabric only. Granular backfill materials will be paid for under a separate bid item.

Installation Procedure

The top of the subgrade will be prepared by smoothing the surface of the subgrade to minimize any ruts, ridges, and depressions. Any rocks or other protrusions will be removed prior to placement of Reinforcement Fabric (MSE).

The fabric will be placed as taut as possible with minimal wrinkles. Placement will be done so that subsequent granular cover material does not shove, wrinkle or distort the in-place fabric. The fabric will be overlapped a minimum of 2 feet. The overlaps will be shingled in a manner that assures granular material will not be forced under the fabric during backfilling operations.

The fabric may be held in place with small piles of granular material or staples. No traffic or equipment will be allowed on the uncovered fabric.

Granular material will be dumped at least 20 feet behind the leading edge of the backfill and pushed into place with a loader or dozer from the covered areas to the uncovered areas. Granular material will be placed in 4-inch max. lifts and compacted by the Specified Density Method.

REMOVAL AND INSTALLATION OF CONCRETE CURB AND GUTTER

The existing curb and gutter will need to be removed at Str. No. 62-283-191 (MRM 35.32) so the bridge approaches can be reconstructed as detailed in the plans. Care will be taken not to damage the existing abutment when removing the existing concrete curb and gutter. Any damage to the structure will be repaired by the Contractor and no cost to the Department. The removed curb and gutter will become the property of the Contractor. Refer to Special Concrete Curb & Gutter Details plan sheet for construction information.

Refer to the section entitled Removal of Concrete Bridge Approach Slab included in the Bridge Rail Upgrade portion of the plan set.

REMOVE AND REPLACE DROP INLET AND, FRAME AND GRATE ASSEMBLIES

The Contractor will remove the existing drop inlet, pipe, and pipe end section and construct the drop inlet, pipe, and pipe end section as shown on the "Drop Inlet Removal / Installation Layout" sheet. All removed items will become the property of the Contractor for their disposal.

A watertight seal will be constructed to the satisfaction of the Engineer, between the pipe and the drop inlet connection. All other joints will be effectively protected against infiltration to the satisfaction of the Engineer.

The drop inlets will be covered throughout construction operations as necessary with an Engineer approved cover to provide safe travel for motorists and to prevent materials from entering into the drop inlet and pipe. After the permanent surfacing has been placed, the Contractor will remove all debris from the drop inlet. All costs involved with the coverings and removing debris from the drop inlets will be incidental to the contract unit prices for the components of the drop inlets.

The plan shown quantities of the drop inlet components such as Class M6 Concrete, Reinforcing Steel, Type D Frame and Grate, and Precast Drop Inlet Collar will be the basis of payment for these items.

The soils within the project area are highly corrosive to steel. Corrugated metal pipe will be 14 gauge steel and the corrugated metal pipe including the connection bands will be polymer coated and will be in conformance with AASHTO M245 and AASHTO M36. Riveted pipe will not be allowed. The connection bands will be 24 inches wide.

All damage to the polymer coating will be repaired in accordance with the manufacturer's recommendations prior to installation of the pipe.

All costs associated with the polymer coating including repair of polymer coating will be incidental to the corresponding CMP contract items.

Metal pipe end sections connected to polymer coated CMP will be aluminum-coated (Type 2) in accordance with AASHTO M36. All costs associated for gauge, coating, and connections will be incidental to the corresponding CMP End Section contract items

Backfill will be earthen material and Base Course as shown on the Approach Pavement Thickened Section plan sheet for the removed drop inlet and earthen material for the removed pipe.

The quantities of base course and earthen material as backfill have been included in the Table of Additional Quantities under their respective material estimates for Str No 62-283-191.

Payment for the base course and earthen material will be incidental to the contract unit price per cubic yard for "Base Course" and "Contractor Furnished Borrow Excavation".

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. The borrow material will be approved by the Engineer.

Borrow material will be utilized to construct the additional embankment at bridge approaches, spot grading/fault heave locations and mailbox turnouts, and as fill material at pipe erosion repair areas as specified in the plans. A shrinkage factor of 20% for the borrow material has been estimated.

Prior to removal of fill material, the Contractor will be required to remove four inches of topsoil and replacing the removed topsoil upon completion of the work. The placing of topsoil will be spread evenly throughout all disturbed areas. Any clumps larger than 3 inches will be broken up prior to seeding the areas. Removing and replacing topsoil will not be measured for payment but will be incidental to the contract unit price per cubic yard for "Contractor Furnished Borrow Excavation". Restoration of the borrow site will be the responsibility of the Contractor.

It is not anticipated that water for compaction will be required. If in the opinion of the Engineer the fill material is below optimum moisture, the Contractor will be directed to moisture condition the borrow material to the satisfaction of the Engineer. All costs for furnishing and placing the water will be paid for at the contract unit price per MGal of "Water for Embankment".

The plans quantity for the "Contractor Furnished Borrow Excavation" as given in the Table of Additional Quantities will be the basis of payment for this item as no adjustment will be made to the contract unit price per cubic yard for variations of the quantity.

GUARDRAIL EMBANKMENT

Once the reconstruction of the guardrail embankment has begun, the Contractor will ensure that the in-slope is constructed throughout the designated areas as shown below and as per applicable Standard Plate(s).

Structure	Location	Guardrail Location	In-Slope
Str No 62-280-133	North and South Bridge Approaches	At structure to End of Embankment Reconstruction Limits	4:1
Str No 62-283-124	North and South Bridge Approaches	At structure to begin of flared end terminal Begin of flared end terminal to End of Embankment Reconstruction Limits	3:1 4:1 27' from centerline then 3:1 to ditch bottom
Str No 62-283-191	North and South Bridge Approaches	At structure to End of Embankment Reconstruction Limits	5:1
Str No 62-308-092	North and South Bridge Approaches	At structure to End of Embankment Reconstruction Limits	4:1

The field entrance at MRM 35.268 – Lt and its underlying reinforced concrete pipe will be excavated and its new centerline will be relocated approximately 75' or a distance as directed by the Engineer to the southwest of its original centerline. Refer to the plan sheet entitled Approach Guardrail & Approach Pavement Reconstruction for Str. No. 62-283-191 – End Bridge for more details.

The relocated field entrance will be furnished with a new 18" reinforced concrete pipe of 60' in length with 2 flared end sections. The removed RCP and end sections will become the property of the Contractor for their disposal.

The construction of the relocated field entrance will be as per Standard Plate 120.01. The Unclassified Excavation quantity for the relocation of the field approach has been included in the Table of Additional Quantities for Str. No. 62-283-191.

The Contractor will utilize removed material from the modified embankment inslope as directed by the Engineer prior to using Contractor Furnished Borrow Excavation material.

CUTOFF DRAIN

Prior to overlay operations, a cutoff drain will be installed perpendicular to centerline across both lanes immediately beyond the furthest limit of the approach pavement thickened section work uphill (north) of Str. No. 62-283-124.

Care must be taken to ensure that the membrane and drainage tubing are not damaged during construction.

The cutoff drain will be installed in a trench 2 feet wide by 3 feet deep. The trench will be graded to maintain a minimum of 0.01ft/ft or 1% drop from centerline to the ditch inslopes. Once the trench is excavated, place Impermeable Plastic Membrane on the trench bottom and against the downgrade side of the trench the entire width of the finished subgrade surface. The membrane will ultimately extend upward through the base course overlying the subgrade. The membrane will be folded, not cut, to fit against the bottom and the downgrade side of the trench. This may be done by rolling out the membrane perpendicular to centerline, folding the membrane into the trench, and cutting off the excess membrane from the top of the trench after backfilling.

After the membrane is placed into the trench, place 4-inch Perforated PVC Drain Pipe with a filter fabric drain sleeve on top of the membrane in the center of the trench bottom. Using SDR solvent weld and a PVC coupling, connect 4-inch PVC Outlet Pipe to both ends of the Perforated PVC Drain Pipe and place in the center of the unlined trench. The outlet tubing will daylight at a headwall placed intersecting the ditch inslope and above the ditch bottom to provide positive drainage from the outlet and blend into the inslope. The depth of the trench may be adjusted to maintain the minimum grade needed to maintain positive drainage and proper placement of the headwalls. Backfill the membrane lined trench containing the 4-inch Perforated PVC Drain Pipe with Porous Backfill and 12 inches of Base Course. The remainder of the trench from the edge of the subgrade top to the headwall will be backfilled with compacted soil.

Outlet headwalls will be cleared of topsoil, straw, or other debris after seeding operations have been completed. The as-built headwall locations will be recorded and submitted to the Engineer. Each headwall location will be identified by GPS coordinates and Station and Offset. The headwall locations will be cataloged in the Winner Area office for future reference in post-construction maintenance.

The 4-inch diameter Perforated PVC Drain Pipe will be SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034. The 4-inch diameter PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Filter Fabric Drain Sleeve will conform to ASTM D6707.

The Porous Back fill will conform to Section 430.2.A of the Specifications and the Base Course will conform to Section 882.2, Table 1, Aggregate Base Course.

The drain location and depth given are based on the best information available to the Geotechnical Engineering Activity. The actual field conditions may require that adjustments be made by the Project Engineer to provide for sufficient drainage. The Geotechnical Engineering Activity will be available for onsite assistance if necessary. No adjustment in the contract unit prices for the various contract items for the Cutoff Drain will be made because of a variation in quantities.

GUARDRAIL REMOVAL

If mainline asphalt paving operations are not scheduled for completion before the end of the 2021 paving season, the existing guardrail at the bridge sites will remain in place through the winter months. When the 2022 paving season resumes and with the Engineer's approval, the existing guardrail at the bridge sites can be removed.

All steel beam rail, end terminals, and hardware items along with posts and blocks will become the property of the Contractor for their disposal and will be removed from the project limits.

The Contractor will place drums or Type II Barricades at 25-foot intervals for a distance of 175 feet beyond the exposed bridge end for each direction of traffic in accordance with Section 630 of the Specification. These drums or barricades will remain in place until the new guardrail has been installed.

MIDWEST GUARDRAIL SYSTEM (MGS) END TERMINALS

MGS MASH Flared End Terminals will be provided at the ends of the MGS at locations stated elsewhere in the plans. The MGS MASH Flared End Terminals will be installed in accordance with the manufacturer's installation recommendations. The drawing for the installed end terminal and installation instructions will be provided to the Engineer prior to installation.

The MGS MASH Flared End Terminals will be paid for at the contract unit price per each for "MGS MASH Flared End Terminal". Payment will be full compensation for labor, materials, equipment, and incidentals required for furnishing and installing the end terminal.

GUARDRAIL DELINEATORS

The Contractor will place guardrail delineators on all portions of guardrail. Furnishing and placing these reflectors will be per standard plate 632.40. All costs for furnishing and installing guardrail delineation will be incidental to the contract unit price per each for "Guardrail Delineator".

CLASS Q2R HOT MIXED ASPHALT CONCRETE

Mineral Aggregate:

Asphalt concrete aggregates will consist of reclaimed asphalt pavement (RAP) and virgin aggregate.

Virgin mineral aggregate for Class Q2R Hot Mixed Asphalt Concrete, Alternate A, will conform to the requirements of Class Q2.

Virgin mineral aggregate for Class Q2R Hot Mixed Asphalt Concrete, Alternate B, will consist of a minimum of 80 percent crushed limestone ledge rock and will conform to the requirements of Class Q2.

The Class Q2R Hot Mixed Asphalt Concrete will include 20 percent RAP in the mixture. RAP will be obtained from the material produced by cold milling on this project.

Mix Design Criteria – Alternate B:

Gyratory Controlled QC/QA Mix Design requirements for the Class Q2R Hot Mixed Asphalt Concrete will conform to the requirements of Class Q2 except as modified by the following:

Voids in Mineral Aggregate (VMA):

	Minimum VMA (%):
Class Q2R	13.0

Pay Factor Attributes:

Air Voids:

	Air Voids (%):
Class Q2R	3.5 ±1.0

All remaining requirements for Class Q2 will apply.

FLEXIBLE PAVEMENT SMOOTHNESS PROVISION

All sections, not excluded by the Special Provision for Flexible Pavement Smoothness, will be evaluated as 2 opportunity.

ASPHALT CONCRETE COMPOSITE

Asphalt Concrete Composite will include MC-70 Asphalt for Prime placed at the rate of 0.30 gallons per square yard. The Asphalt for Prime will be applied to the Base Course for the full width of the bottom layer of Asphalt Concrete Composite plus one foot additional on the outside shoulder.

Asphalt for tack SS-1h or CSS-1h will be applied prior to each lift of Asphalt Concrete Composite. Asphalt for tack will be applied at a rate of 0.09 gallons per square yard on existing pavement or milled asphalt concrete surfaces and at a rate of 0.06 gallons per square yard on primed base course or new asphalt concrete pavement. The Asphalt for tack will be applied for the full width of the bottom layer of Asphalt Concrete Composite plus one-half foot additional on the outside shoulder.

The asphalt binder used in the mixture will be PG 64-34 Asphalt Binder.

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

The Contractor will utilize some asphalt concrete composite to construct a 20:1 temporary on/off transition at surface transition locations between the bottom 3" asphalt composite surface and the existing in place asphalt concrete surface so as to provide a means of safe thoroughfare for the traveling public. The material must be removed once mainline paving commences. The material will become the property of the Contractor once it is determined by the Engineer that it is no longer needed on the project. All costs associated constructing and removing the transitions will be incidental to the contract unit price per ton for "Asphalt Concrete Composite".

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0049(05)27	19	164

Revised 7/13/21 by M. Yeske

CONTRACTOR FURNISHED ASPHALT CONCRETE

Projects:

- 049-392 PCN I65R – 1,000 tons ~ SD 49 from Colome north to SD 44

An estimated 1,000 tons of Asphalt Concrete will be produced by the Contractor for use by Department of Transportation Maintenance forces at locations other than on this project.

The Contractor Furnished Asphalt Concrete will be produced in accordance with the same specifications and job mix requirements as the Class Q2R Hot Mixed Asphalt Concrete used on the project.

The material will be loaded, directly from the plant, into Department of Transportation trucks. The Contractor will not be expected to disrupt the paving operations in order to produce this material, but it is the intent that it be produced intermittently during the course of this project and only during the normal hours of plant operation.

All costs involved in producing the Contractor Furnished Asphalt Concrete and loading into Department of Transportation trucks will be measured and paid for at the contract unit price per ton for "Contractor Furnished Asphalt Concrete", Alternate A or Alternate B.

An estimated 10.0 tons of "Hydrated Lime" to be used in the production of Contractor Furnished Asphalt Concrete will be measured and paid for at the contract unit price per ton for "Hydrated Lime".

Alternate A:

An estimated 45.5 tons of PG 58-34 Asphalt Binder to be used in the production of Contractor Furnished Asphalt Concrete will be measured and paid for at the contract unit price per ton for "PG 58-34 Asphalt Binder".

Alternate B:

An estimated 36.6 tons of PG 58-34 Asphalt Binder to be used in the production of Contractor Furnished Asphalt Concrete will be measured and paid for at the contract unit price per ton for "PG 58-34 Asphalt Binder."

RUMBLE STRIP ROADWAY CLEANING

The Contractor will be required to remove loose material from the driving surface and/or asphalt shoulders of the roadway. Loose material may be swept to the edge of shoulders and it will be the Contractor's responsibility to ensure the loose material does not enter any vegetated areas and/or waterways. Cleaning will be to the satisfaction of the Engineer.

Traffic will be restored to the normal lanes at least 1 hour before sunset to avoid visibility issues with residue remaining on the driving surface due to grinding operations.

All costs associated with this work will be incidental to the contract unit price per mile for "Grind 12" Rumble Strip or Stripe in Asphalt Concrete".

GRIND RUMBLE STRIPS IN ASPHALT CONCRETE

Asphalt Concrete Rumble Strips will be constructed on the shoulders. Rumble Strips will be paid for at the contract unit price per mile for "Grind 12" Rumble Strip Or Stripe In Asphalt Concrete". It is estimated that 51.2 miles of asphalt concrete rumble strips will be required.

The Contractor will install rumble strips on both shoulders as per Standard Plate 320.24 for "12" Rumble Strip in Asphalt Concrete On Nondivided Highway Shoulders". The rumble strips must be grooved into the asphalt concrete surfacing. Following completion, the rumble strips will be flush sealed with SS-1h or CSS-1h Asphalt for Flush Seal.

Rumble Strip installation will be completed prior to application of the Flush Seal and Permanent Pavement Markings. In the event the Flush Seal is eliminated from the contract, the Contractor will still be required to apply a Flush Seal to the newly installed 12" Rumble Strips at a width of 1.5' and at the same rate as specified in this plan set. No adjustment in payment will be made and SS-1h or CSS-1h Asphalt for Flush Seal will be paid at the contract unit price per ton.

Any damage to the existing shoulders or roadway during construction of rumble strips will be repaired by the Contractor at no cost to the Department. The gaps in the rumble strip installation as detailed on the standard plates will be included with the measurement and payment.

Begin and End locations will be marked by the Contractor and verified by the Engineer.

FLUSH SEAL

Application of Flush Seal will be completed within 10 working days following completion of the asphalt concrete surfacing.

Application of Flush Seal may be eliminated by the Engineer. If the paved surface remains tight, the Engineer will notify the Contractor as soon as possible that the Flush Seal is unnecessary.

SAND FOR FLUSH SEAL

The sand application will be placed 11' wide in each lane, leaving 12" on center line and 6" on each edge line free of sand. Sand for Flush Seal will be furnished by the Contractor meeting the requirements of Section 879.1.

PIPE NOTES

The Contractor is responsible for verifying the size of each pipe prior to ordering any pipe or pipe ends. The Contractor will obtain the approval of the Engineer before ordering any pipe or pipe end section.

Pipe culverts and end sections that are removed and not reset will become the property of the Contractor. They will be disposed of as per the Environmental Commitment Notes and will not be in view from the project upon completion of the project.

The excavation required to expose the remove/reset existing pipe and end sections throughout the project will be incidental to the remove/reset pipe and end section bid items. Refer to the Table of Mainline Pipe and Erosion Repair for work associated at each site.

Joints between concrete pipe culvert sections will be protected against infiltration as indicated in Section 450.3 A of the Specifications. If an existing concrete pipe culvert section has a damaged joint or there is poor alignment of the joints, 2 layers of drainage fabric will be placed over the joint.

Topsoil removal and replacement and seeding of all disturbed areas will be accomplished as specified elsewhere in these plans for this project.

TIE BOLTS FOR REINFORCED CONCRETE PIPE

All joints for RCP including installed new and reset, will be tied together with tie bolts as per applicable Standard Plate(s). This includes connection from existing culvert sections to new or reset sections. Existing tie bolts may be salvaged and reused if condition is acceptable to the Engineer. The cost for furnishing and installing the tie bolts for new and reset sections will be incidental to resetting or installing the pipe and end sections.

For informational purposes: Field drilling will be required to install the tie bolts on reset culvert, on reset culvert ends, existing culvert when installing a new/reset end section. All costs for removing/resetting existing tie bolts, drilling tie bolt holes, and furnishing and installing the tie bolts will be incidental to corresponding pipe items.

CLEANOUT PIPE CULVERT

Material in existing mainline culverts as listed in the Table of Mainline Pipe and Erosion Repair will be cleaned out by water flushing or other approved methods. Each culvert will be cleaned such that the bottom of the pipe is visible throughout its length so as to re-establish the flow line. It is the responsibility of the Contractor to visit the site to determine the extent of pipe cleaning work required.

The Contractor will implement appropriate sediment control measures prior to water flushing in order to prevent discharges beyond the project boundaries to comply with Storm Water Permit. Material removed from the pipe culverts will become the property of the Contractor for disposal.

The contract item Cleanout Pipe Culvert will be paid for a maximum of one time for each pipe culvert.

All costs for this work will be included in the contract unit price per each for "Cleanout Pipe Culvert".

CLEANOUT FOR CULVERT TREATMENT

Cleanout of pipe culverts will be done in advance of pipe culvert repair operations. The pipe culvert cleaning and inspection will be scheduled such that there is adequate time to evaluate what repairs are required and allow for ordering and delivery of pipe culvert repair materials. Following cleaning, pipe inspection will be completed with a CCTV camera. The inspection will determine any deviations in the vertical and horizontal alignments, location and size of any gaps in joints, and location of any damage.

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

Material removed from the pipe culverts will become the property of the Contractor for disposal.

The Contractor will implement appropriate sediment control measures prior to water flushing in order to prevent discharges from the project boundaries to comply with the Storm Water Permit.

Pipe culverts may need to be dewatered to allow for CCTV inspection.

The pipe culvert will be cleaned to the satisfaction of the Engineer and the cleaning will be adequate to determine pipe condition and potential repair techniques.

The following costs will be incidental to contract unit price per each for "Cleanout For Culvert Treatment":

- Cleaning of pipe culverts and disposal of removed materials
- CCTV camera pipe inspections for pipe culverts requiring CIPP liner as noted in Table of Mainline Pipe & Erosion Repair.

The contract item "Cleanout For Culvert Treatment" will be paid for a maximum of one time for each pipe culvert. This contract item will only be paid for:

- When indicated in the Table of Mainline Pipe and Erosion Repair,
- When cleaning and CCTV inspection is required to determine or verify what repairs are required,
- When CIPP lining a pipe.

When the contract item "Cleanout for Culvert Treatment" is indicated at a culvert site, the SDDOT will not be responsible for any materials that were ordered prior to the culvert being cleaned and CCTV inspected.

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

TEMPORARY WATER BARRIER

Temporary water barriers will be placed in a manner that creates the least amount of disturbance. Temporary water barriers are placed to keep the work area dry and separate from the water body. Contaminated water within the work area collected by the water barriers will be removed and treated in conformance with the Dewatering and Sediment Collecting notes and detail drawings in the plans.

All costs for furnishing, installing, maintaining, and removal of the temporary water barrier including hauling, materials, equipment, labor, and incidentals necessary will be paid for at the contract unit price per foot for "Temporary Water Barrier".

Properly designed sheet pile is an acceptable alternate temporary water barrier as approved by the Engineer.

The temporary water barrier will be from the list below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
Environmental Barricades	Environmental Barricades Inc. Eagle Creek, OR Phone: 1-800-656-1296
Portadam	Portadam, Inc. Williamstown, NJ Phone: 1-800-346-4793 www.portadam.com
Aquadam	Water Structures Unlimited Carlotta, CA Phone: 1-800-682-9283 www.aquadam.com

Typar Geocell

Fiberweb Inc.
Old Hickory, TN
Phone: 1-615-847-7500
www.typargeosynthetics.com

DEWATERING AND SEDIMENT COLLECTING

The Contactor has the option to treat sediment laden water trapped within the project limits or the Contractor may elect to transport sediment laden water off the project. Refer to the Options For Dewatering And Sediment Collecting detail sheet for more information.

Water transported off the project limits will not be disposed of in an area where it can enter a waterway. The disposal site must be approved by the Engineer.

The cost to dewater the pipe culverts requiring a CIPP liner will be paid at the contract unit price per day for "Dewatering". The cost to dewater the other pipe culverts, if needed, will be incidental to the contract unit price per each for "Cleanout Pipe Culvert".

CLOSED-CIRCUIT TELEVISION (CCTV) CAMERA

The CCTV camera will be mounted on a crawler. The crawler will be capable of traveling the entire length of the pipe culvert. If unable to travel through the culvert due to an obstacle or large void, then the CCTV camera will be run from both ends of the culvert as far as possible.

The CCTV camera will travel through the culvert at a speed not exceeding 30 feet per minute.

The CCTV camera will be equipped with an accurate working footage counter that shows accurate distances on the video recordings.

The CCTV camera will have the ability to pan and tilt. Lighting for the CCTV camera will be suitable to allow a clear picture of the entire periphery of the pipe. The CCTV monitor and other components of the CCTV system will be capable of producing a clear color picture/CCTV image.

A DVD recording of each CCTV camera inspection of each pipe culvert will be provided to the Engineer. Other methods of transferring video recordings may be considered and approved by the Engineer.

All defects such as holes, cracks, and open joints will be fully documented when doing the CCTV inspections.

CURED-IN-PLACE PIPE (CIPP)

A. CIPP LINER MATERIAL

The CIPP liner will be manufactured in accordance to ASTM F2019. In addition, the liner will meet the following requirements:

1. fit the host pipe tightly
2. have a maximum thickness of ½ inch
3. provide a continuous lining of the host pipe
4. use a nontoxic curing process
5. is nontoxic when cured
6. have a minimum 50-year design life.

CIPP liner will be shipped, stored, and handled in a manner consistent with written recommendations of the manufacturer.

B. CIPP LINER SUBMITTALS

For each host pipe to be lined the Contractor will submit the following to the Area Engineer a minimum of 2 weeks before the preconstruction meeting for their approval. Information will be provided into the category breakdown as shown below:

1. Liner Data

The following information will be provided with the CIPP liner structural data:

- a. pipe liner material type and trade name
- b. nominal inside and outside pipe liner diameters
- c. manufacturer's recommended maximum and minimum fill heights for the identified liner
- d. certification that liner meets specifications
- e. include calculations showing that the liner is designed for AASHTO HL-93 live loading when the pipe is considered to be fully deteriorated

Provide copy of engineering drawing and calculations, signed and sealed by a Professional Engineer registered in the state of South Dakota.

As an alternate to designing to AASHTO HL-93, design for ASTM F2019 based upon a fully deteriorated pipe. ASTM F1216 will be the basis of furnished calculations and engineering drawing.

2. Work Area Plan

Provide work area plans that includes the following:

- a. the work area required for the liner installation
- b. method of preventing water from interfering with the installation
- c. a site restoration plan

3. Pipe Cleaning

Provide a plan that includes the cleaning of the host pipe and disposal of the debris.

4. Liner Installation

Provide a liner installation plan which will include the following:

- a. method of liner installation
- b. curing method identifying required cure times, temperatures, and pressures
- c. containment plan for collection of contaminated water
- d. management and disposal plan for contaminated materials resulting from the liner installation

5. Training Certification and Experience

Provide written proof that at least 1 member of the installation team has attended training and been certified by the manufacturer on the liner material being installed.

The installer must supply the Engineer with 5 prior job references of projects where they have successfully installed CIPP liners.

C. HOST PIPE PREPARATION AND INSPECTION

The host pipe will be thoroughly cleaned using a high-pressure water jet or hydro-mechanical methods. The cleaning method will produce a clean, sound surface that demonstrates no evidence of loose material, debris or contaminants. The host pipe will be cleaned just prior to insertion of the CIPP liner. The Contractor will implement appropriate sediment control measures prior to cleaning in order to prevent discharges from the project boundaries to comply with the Storm Water Permit.

Host pipe inspection will be completed with a CCTV camera. A DVD recording of the inspection will be provided to the Engineer. The inspection will determine the suitability of the liner for the host pipe including such items as the horizontal and vertical alignments, location of gaps in the joints and pipe damage. The Engineer will be notified if any pipe sections are impassible or the pipe cannot be lined.

Any intrusions into the pipe will be cut or ground off flush with the host pipe interior wall before installing the liner. Cut off existing pipe tie bolts flush with the nut or as per the manufacturer's recommendation, if manufacturer's recommendations are more stringent.

Control groundwater infiltration that will interfere with installation of the CIPP liner. Dewatering may be necessary. Host pipe will be in a dry condition as prescribed by the CIPP liner manufacturer.

The Engineer will inspect host pipes prior to lining to determine the pipes acceptance for lining including if additional cleaning is required. The host pipe will be clean and in a dry condition prior to commencing the lining process.

D. PIPE LINER INSTALLATION

The manufacturer's representative will be on site to provide training to Contractor's staff. A manufacturer's representative will be present for at least one complete liner installation and until the Engineer is satisfied that the Contractor's staff is competent in performing this work. A manufacturer's representative will also provide education to the Engineer on the liner installation and curing process.

Prior to inserting the CIPP liner, a sliding foil protector will be pulled into the host pipe to protect the CIPP liner from damage.

Installation of the liner into the host pipe will be in accordance with ASTM F2019.

CCTV camera inspection will be completed after inflation and prior to curing.

The cured CIPP liner will be continuous over the entire length of an installation run and be free of material defects. The lining will be impervious and free of any leakage from the pipe to the surrounding ground or from the ground to inside the lined pipe.

Trim the liner to length according to the manufacturer's recommendations. The liner will provide a smooth transition taper at each end of the pipe. There will not be any gaps between the liner and the host pipe. The ends will be sealed with an epoxy or resin mixture compatible with the liner and resin system, providing a watertight seal between the host pipe and the CIPP liner.

E. FINAL ACCEPTANCE AND PAYMENT

Host pipe inspection will be completed with a CCTV crawler after the liner has been cured. A DVD recording of the inspection will be provided to the Engineer.

Defects which will or could affect the structural integrity, strength, capacity, or future maintenance of the installed CIPP liner will be repaired at the Contractor's expense, in a manner approved by the Engineer.

Any disrupted areas will be restored and stabilized to the satisfaction of the Engineer.

All costs for equipment, material and labor for the CIPP liner work will be incidental to the contract unit price per foot for the various sizes of Cured In Place Pipe.

REINFORCED CONCRETE PIPE JOINT REPAIR AND VOID GROUTING – CATTLE PASSES

A. CULVERT JOINT CLEANING

1. This work will consist of cleaning of the culvert joints, washing the entire culvert and joints with a high pressure washer, and if needed, wire brush cleaning of each joint to be repaired as directed by the Engineer. The entire culvert will be clean and dry and most notably the specified joints will be thoroughly cleaned to the satisfaction of the Engineer using a power washer with water pressure of at least 2500 psi. The culvert must be in a clean condition so that no deleterious material is trapped in the joints that are being repaired. The Contractor will dispose of all debris removed from the culverts during the cleaning operation as approved by the Engineer.
2. All costs for equipment, material and labor for the culvert joint cleaning work will be incidental to the contract unit price per foot for Culvert Joint Cleaning which will be compensation in full for all equipment.
3. Contractor will visit the project to determine the extent of cleaning needed for Culvert Joint Cleaning prior to bidding work.

B. REPAIR CULVERT JOINT

This work will consist of repairing culvert joints in accordance with the Chemical Grout Manufacturer's directions for the sealing of each joint to prevent future infiltration/exfiltration of soils and water. Joint Sealing also prevents the soil stabilization and void filling grout from expanding back into the structure during injection. The following will apply:

1. The work will consist of repairing the concrete culvert joint with a sealant comprised of water reactive hydrophilic polyurethane resin and dry oil free oakum. The work will include the furnishing by the Contractor, of all supervision, training, labor, materials, tools, lighting and equipment for the performance of all operations necessary to repair or seal joints between concrete pipe sections throughout the culvert. All grout will be injected under such pressure so as not to damage the existing drainage structure or roadway structure.
2. The Contractor will provide a notarized statement, from the Manufacturer, that the polyurethane foam resin meets the specified requirements, along with submitting the Manufacturer's current product specification and installation instructions. The grout materials will be non-flammable and non-toxic when cured.
3. The Contractor will be an Approved Contractor of the Manufacturer of the specified product and will provide written certification from the Manufacturer attesting to their Approved Contractor status.
4. All product documentation and Contractor submittals must be submitted to the Engineer prior to or at the preconstruction meeting. The Contractor must have the Engineer's approval prior to commencing any of this work.

5. The Contractor will follow the Manufacturer's installation instructions throughout the repair process and install components in accordance with Manufacturer's specifications.
6. The Contractor will provide safe storage and handling of materials prior to delivery and at the project site. All material installation, handling and storage will be in accordance with Manufacturer's recommendations.
7. Temperature of the resin is critical from the point of pumping to the point of injection. All polyurethanes react faster at higher temperatures. Drum heaters and heated hoses are required when ambient or ground temperatures are below 70 degrees Fahrenheit. The optimum hose temperature will vary with the weather conditions and the particular job site conditions with the minimum hose temperature being 75 degrees Fahrenheit and the maximum hose temperature being 95 degrees Fahrenheit and the drum temperature not to exceed 90 degrees Fahrenheit.
8. The Contractor will provide worker and inspector safety and worker protective gear in accordance with the manufacturer, including but not limited to chemical goggles, face shields, eye wash system and NBR gloves.
9. The Contractor will submit to the Engineer for approval a detailed procedure for the installation of the polyurethane grout.
10. The work will include, but is not limited to sealing each pipe joint with a hydrophilic polyurethane grout meeting the following specifications:
 - GEL FOAM II (Saturated Oakum Rope Joint Packing) as manufactured by Green Mountain International, LLC or equal.
 - ULTRA (Single Component Grout For Joint Injection) as manufactured by Green Mountain International, LLC or equal.
11. UV Protection (Gel Coat) - The work will consist of trimming excess grout and oakum from the interior face of the joint prior to applying the Gel Coat. The epoxy gel compound will be recommended by the Manufacturer for both surface sealing and protecting the hydrophilic grout from UV exposure. The epoxy gel compound will be mixed and handled in accordance with the Manufacturer's recommendations and will meet the following requirements:
 - Epoxy gel sealant compounds manufactured by Green Mountain Grouts, LLC or equal.
12. All costs for all equipment, material and labor required to complete the work will be incidental to the contract unit price per foot for Repair Culvert Joint. Completion of the work includes initial saturated oakum rope packing of each joint, follow up injection of resin into the back side of each joint, trimming the excess grout and oakum from the interior face of the joint, application of the epoxy gel coat and site clean-up.
13. Contractor will visit the project to determine the extent of work needed for Repairing the Culvert Joints prior to bidding the work.

C. DUAL COMPONENT CHEMICAL GROUT FOR VOID FILLING

1. This work will consist of filling external voids surrounding the culvert, with an injected high expansion chemical grout compound. The work will include furnishing the chemical grout by the Contractor, all supervision, training, labor, materials, tools, lighting and equipment for the performance of all operations necessary to fill external voids around the drainage structure. Holes will be strategically drilled as required and grout injected throughout the structure to effectively fill all voids that have developed outside of the structure due to the infiltration of external soils and materials into the culvert and "piping" (water running outside and under the structure due to separated joints). All grout will be injected under such pressure so as not to damage the existing drainage structure or roadway structure. All joints will be appropriately cleaned and sealed, with appropriate recommended cure time, prior to the injection of the void grouting. After completion of the void filling, all holes will be properly sealed.
2. The Contractor must supply the Engineer with three (3) prior job references of projects where they have successfully injected urethane resin for subgrade void filling applications, or soil stabilization.
3. The Contractor will provide a notarized statement, from the Manufacturer, that the polyurethane foam resin meets the specified requirements for filling voids, along with submitting the Manufacturer's current product specification and installation instructions.
4. The Contractor will follow the Manufacturer's installation instructions throughout the repair process and install components in accordance with Manufacturer's specifications.
5. The Contractor will be an Approved Contractor of the Manufacturer of the specified product and will provide certification from the Manufacturer attesting to their Approved Contractor status.
6. The Contractor will provide safe storage and handling of materials prior to delivery and at the project site. All material installation, handling and storage will be in accordance with the Manufacturer's recommendations.
7. The Contractor will provide worker and inspector safety and worker protective gear in accordance with the Manufacturer, including but not limited to chemical goggles, face shields, eye wash system, Tyvek or equivalent clothing protection and NBR gloves.
8. All product documentation and Contractor submittals must be submitted to the Engineer prior to or at the preconstruction meeting. The Contractor must have the Engineer's approval prior to commencing on any of this work.

REINFORCED CONCRETE PIPE JOINT REPAIR AND VOID GROUTING – CATTLE PASSES (CONTINUED)

9. The chemical grout or void filling materials will be a dual component hydrophobic polyurethane grout compound.
10. The grout materials will be non-flammable and non-toxic when cured.
11. The grout mixture will have expansion properties listed in the data sheets of greater than twenty (20) times its original volume and cure to rigid closed cell polyurethane foam. The grout will expand to fill any voids and bond to the exterior surface of the structure. The grout will be in accordance with the Manufacturer's recommendations and will meet the following requirements:
 - VF dual component polyurethane grouts as manufactured by Green Mountain International, LLC or equal.
12. It is the Contractor's responsibility to locate reinforcing bars and conduit prior to drilling any grout holes.
13. The typical method consists of placing a layer of chemical grout behind or around the structure. The Contractor will submit for approval by the Engineer a detailed grouting plan showing the spacing, orientation and depth of the grout holes, as well as type of polyurethane grout to be used, range of gel times, equipment, mixing procedures, recommended injection pressure, technique for monitoring grout travel and any other pertinent information. The grouting plan should address the prevention of overfilling and prevention of damage to structures or roadway. The Contractor will submit this detailed procedure for the installation of the expansion grout to the Engineer for approval. The holes are drilled with a rotary percussion hammer drill using a sharp masonry bit with a minimum diameter of 3/8 inch to a maximum diameter of 5/8 inch. Care must be taken to prevent holes from causing damage to reinforcing bars or utility conduits. Drilled holes should be vacuumed and flushed. Use injection grout and methods as recommended by Manufacturer.

TEMPERATURE of the resin is critical from the point of pumping to the point of injection.

All polyurethanes react faster at higher temperatures. Drum heaters and heated hoses are required when ambient and ground temperatures are below 70 degrees Fahrenheit. The optimum hose temperature will vary with the weather conditions and the particular job site conditions with the minimum hose temperature being 75 degrees Fahrenheit and the maximum hose temperature being 95 degrees Fahrenheit and the drum temperature not to exceed 90 degrees Fahrenheit.

Injection can be monitored by either applicator's visual inspection or by pumping a specific amount of injection grout into each hole. The work will start at the inlet end of the pipe and proceed downstream to the outlet. Inject bottom row every other hole. When material appears at the adjacent port, discontinue injection at entry port and begin injection at the adjacent port.

Continue injection process section by section from bottom of pipe to top of pipe in a continuous manner to next pipe section. Injection pressure will vary from 200 psi to 3000 psi depending on the width of the joint, thickness of the structure, and condition of the concrete. After the grout cures, excess material will be trimmed to be flush with the pipe interior wall and the pipe left clean.

14. All costs for filling external voids surrounding the culvert will be incidental to the contract unit price per gallon for Chemical Grout Void Fill for all equipment, intermediate and post cleanup, material and labor required to complete the work. Any overfilling of voids that results in damage to overlying pavement, highway user ride quality, or drainage structure integrity will be corrected by the Contractor at no expense to the Department. All corrections will be approved by the Engineer.

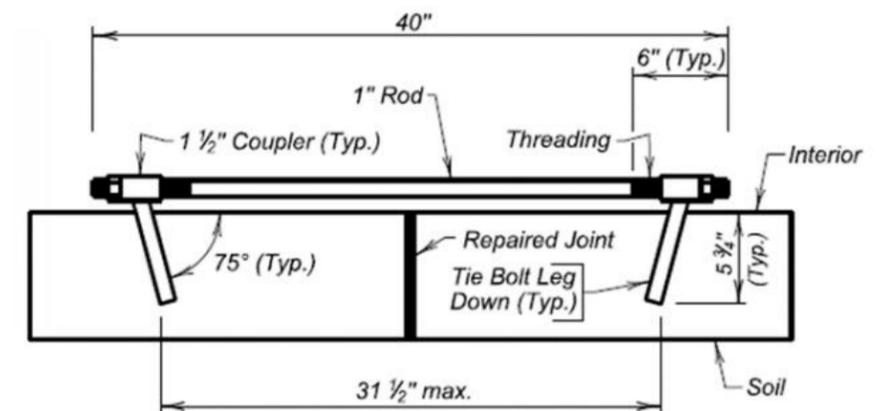
15. Contractor will visit the project to determine the extent of work needed for the Grout Void Fill prior to bidding the work.

Table of Reinforced Concrete Pipe Joint Repair and Void Grouting

Station	Type	No. Joints to Repair	Tie Bolts (Each)	Culvert Joint Cleaning (Feet)	Repair Culvert Joint (Feet)	Chemical Grout Void Fill (Gallon)
Sta. 604+43 (MRM 42.092)	5' x 7' CMP Cattle Pass	8	16	184	184	40
Sta. 224+68 (MRM 37.266)	5' x 7' CMP Cattle Pass	11	22	253	253	55
Sta. 633+08 (MRM 29.500)	5' x 7' CMP Cattle Pass	19	38	437	437	95
Totals:		38	76	874	874	190

TIE BOLTS FOR REINFORCED CONCRETE - CATTLE PASSES

All joints for the cattle passes listed in the Table of Reinforced Concrete Pipe Joint Repair and Void Grouting / Table of Mainline Pipe and Erosion Repair will have tie bolts installed on the inside of the culvert. The Contractor will drill holes at an angle as to cause the legs of the tie bolt to bind against the outside face of the hole upon tie bolt tightening. Bending of the tie bolt legs may need to be done in order to achieve this. Prior to inserting the tie bolt the Contractor will fill the hole with epoxy resin. The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, (Equivalent to ASTM C881, Type IV). The Contractor will allow the resin to properly set-up prior to the final tightening of the tie bolts. Cost for drilling tie bolt holes, epoxy resin, connections, and furnishing and installing the tie bolts for reinforced concrete pipe and reinforced concrete box culvert will be incidental to the contract unit price per each for "Tie Bolts for RCP".



Tie Bolt Detail

For informational purposes: Field drilling will be required to install the tie bolts on existing cattle pass culvert sections. All cost for removing/resetting existing tie bolts, drilling tie bolt holes, and furnishing and installing the tie bolts will be incidental to unit price per each for "Tie Bolts for RCP".

MAILBOXES

The Contractor will reset the existing mailboxes on new posts with the necessary support hardware for a single mailbox assemblies (See Standard Plate No's. 900.02 and 900.03). The Contractor may submit documentation of an alternate level 3 NCHRP 350 or MASH crashworthy compliant mailbox support system to the Department for review and approval. The local Postmaster will determine the recommended mounting height of the mailboxes throughout the project. The Contractor will coordinate with the Engineer on the proper postal representative to contact.

Mailboxes will be removed and reset on the nearest entrance or as determined by the Engineer at a minimum of 20 feet from the roadway centerline.

All costs for removing existing mailboxes, providing temporary mailboxes, and resetting mailboxes with new posts and necessary support hardware will be incidental to the contract unit price per each for "Refurbish Single Mailbox".

Table of Refurbish Mailboxes

MRM	L/R	Single (Each)
28.334	Rt	1
29.228	Lt	1
29.555	Lt	1
30.082	Rt	1
34.502	Lt	2
35.479	Lt	1
36.985	Lt	1
37.381	Lt	1
39.194	Lt	1
39.568	Lt	1
Total:		11

MAILBOXES (CONTINUED)

Mailbox Turnout Construction

The turnout will be constructed to the limits as detailed in the Standard Plate. The necessary area requiring the build-up to accommodate the limits will be done with Contractor Furnished Borrow Excavation material and 6" of Base Course material. The new embankment slope on the turnout will be a 3:1 slope or flatter. The area will be constructed to the satisfaction of the Engineer.

Refer to Table of Additional Quantities sheet for mailbox turnout quantities.

RIGHT-OF-WAY (ROW) FENCE

The Contractor will remove the existing fence and replace with new fence on the same alignment as existing. The alignment will be mowed and cleared of all vegetation and obstructions after the removal of the fence. It will be the Contractor's responsibility to preserve the fence alignment. The existing fence and brace panels that is removed will become property of the Contractor.

Fence will not be removed in any area where the adjacent landowner has livestock without the Contractor making some provisions to contain the livestock.

The Contractor will install the new Type 2 Right-of-Way fence as shown in the plans or as determined by the Engineer. Refer to Approach Pavement & Guardrail Removal & Embankment Reconstruction and Approach Guardrail & Approach Pavement Reconstruction plan sheets for fence locations and details. All costs associated with the Type 2 Right-of-Way fence will be incidental to the contract unit price per foot for "Type 2 Right-of-Way Fence". No adjustment in the contract unit price per foot for the contract item "Type 2 Right-of-Way Fence" will be made because of a variation in quantities.

The new 2 Post Panels and 3 Post Panels will be installed where new fence ties into the existing fence. Payment will be full compensation for furnishing material, (including posts, brace post, diagonal brace wire, and dowels), labor, equipment and all incidentals necessary to construct the post panels will be paid for at the contract unit price per each for "2 Post Panel" or "3 Post Panel". No adjustment in the contract unit price per each for the contract item "2 Post Panel" or "3 Post Panel" will be made because of a variation in quantities.

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 are contacts regarding the E-Z Brace:

Roger Papka
E-Z Brace
1160 Karen St.
Watertown, SD 57201
605-881-6142

Dennis Mack
E-Z Brace
108 18th St. NE
Watertown, SD 57201
605-881-4990

TEMPORARY FENCE

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

The Contractor will be responsible for erecting temporary fencing as required to maintain control of livestock and prevent livestock from leaving the pasture near the work areas.

All costs associated with the temporary fence will be incidental to the contract unit price per foot for "Type 1A Temporary Fence". No adjustment in the contract unit price per foot for the contract item "Type 1A Temporary Fence" will be made because of a variation in quantities.

CLEAR AND GRUB TREE

The Contractor will remove the 2 existing trees (approx. 12" dia x 28' high and 12" dia x 23' high) located within the R.O.W. at Str. No. 62-283-191 right of centerline. All removed material will become the property of the Contractor for their disposal.

All costs associated with removing the tree will be incidental to the contract unit price per each for "Clear and Grub Tree".

PAVEMENT MARKING PAINT

All materials will be applied as per the manufacturer's recommendations.

The Contractor will advise the Engineer a minimum of 3 weeks prior to the application of the permanent pavement marking to allow the Department to check and mark the location of no passing zones.

The application of permanent pavement marking will begin no sooner than 7 calendar days following completion of the fog or flush seal. Application of permanent pavement marking will be completed within 14 calendar days following completion of the final surfacing. If the flush seal is eliminated, the Contractor will complete the application of permanent pavement marking no sooner than 2 calendar days, but within 14 calendar days following the completion of the final surfacing.

HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

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

This material will consist of a durable high build, low VOC, fast drying, waterborne traffic paint with a 100% acrylic polymer (Arkema DT-400, Dow HD-21A, or equivalent). The Contractor will provide certification that the material is one of the following products or an equivalent as approved by the Operations Traffic Engineer:

Diamond Vogel's Waterborne High Build Polymer Marking Paint
Ennis-Flint's High Build Polymer Marking Paint

No further testing of this material will be required. Reflective media will consist of glass beads.

RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4" line = 22.5 Gals/Mile
Dashed 4" line = 6.2 Gal/Mile
Glass Beads = 8 Lbs/Gal.

All cost for materials, labor and equipment necessary to furnish and install the pavement markings will be incidental to the contract unit price for the respective High Build Waterborne Pavement Marking Paint items.

RETROREFLECTIVITY FOR PAVEMENT MARKING PAINT

The Department may take retroreflectivity readings on the pavement marking lines after 2 days and within 30 days of the line application using either a portable or mobile retroreflectometer that conforms to 30-meter geometry. If the Department chooses to take retroreflectivity readings, three retroreflectivity readings will be taken on each line at each test location. The three readings will be averaged and become the reading for that test location.

If the Department chooses to take retroreflectivity readings, three readings will be taken on the edge lines and lane lines in the direction of application. For combination solid yellow and skip yellow lines for turn lanes and for centerline markings on two-way roadways, three readings will be taken in one direction, the reflectometer will be turned 180 degrees and three more readings will be taken. The six readings for the centerline markings will be averaged and become the test reading for that test location.

If the Department chooses to take readings, the minimum retroreflectivity values will be 275 mc/m²/lux for white and 170 mc/m²/lux for yellow.

PLACING TOPSOIL

The Contractor will be required to place removed topsoil. The thickness will be approximately 4 inches. The placing of topsoil will be spread evenly throughout all disturbed areas upon completion of the work. Any clumps larger than 3 inches will be broken up prior to seeding the areas.

All topsoil replacement will be done as according to the plans and/or as directed by the Engineer.

Measurement of placing topsoil will not be made as plans quantity will be the basis for payment. An amount of 8,653 cubic yards has been estimated.

EROSION CONTROL

The areas disturbed as a result of work on this project will be restored and/or reshaped to the satisfaction of the Engineer. All disturbed areas will be seeded and mulched. Disturbed areas anticipated on the project include embankment reconstruction throughout the guardrail installation limits, spot grading areas (3' undercut), ditch reprofiling/fault traces, culvert repair sites, mailbox turnouts, and all other areas disturbed as a result of the Contractor's operations.

All permanent seed will be planted in the topsoil at a depth of 1/4" to 1/2". Hand seeding devices approved by the Engineer will be allowed. All seed broadcast must be raked or dragged in (incorporated) within the top 1/4" to 1/2" of topsoil when possible.

MYCORRHIZAL INOCULUM

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

- 25% *Glomus intraradices*
- 25% *Glomus aggregatum or deserticola*
- 25% *Glomus mosseae*
- 25% *Glomus etunicatum*

All seed will be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed will be incidental to the contract unit price per pound for the corresponding permanent seed mixture.

FERTILIZING

The Contractor will apply an all-natural slow release fertilizer prior to seeding. The all-natural fertilizer will have a minimum guaranteed analysis of 4-4-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 2.07%, a minimum of 4% (P2O5) available phosphate, a minimum of 4% (K2O) soluble potash, and a maximum carbon to nitrogen ratio (C:N ratio) of 5:1. The all-natural fertilizer will be free of weed-seed and pathogens accomplished through thermophilic composting, and not mechanical or chemical sterilization, to assure presence of beneficial soil microbiology. The fertilizer will have a near neutral pH, a low salt index, a low biological oxygen demand, contain organic humic and fulvic acids, and have high aerobic organism counts. The fertilizer will also be stable, free of bad odors, and be unattractive as a food source for animals. It should also be in a granular form that is easily spread.

The fertilizer will be applied at a rate of 1,500 pounds per acre in accordance with the manufacturer's recommended method of application.

The all-natural slow release fertilizer will be as shown below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
Sustane	Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 www.sustane.com
Perfect Blend	Perfect Blend, LLC Bellevue, WA Phone: 1-866-456-8890 www.perfect-blend.com

PERMANENT SEEDING

All disturbed areas as a result of Contractor's operations and work on this project will be restored, reshaped, seeded, and mulched to the satisfaction of the Engineer. The anticipated areas disturbed include the embankment reconstruction throughout the guardrail installation limits, spot grading areas (3' undercut), ditch reprofiling/fault traces, culvert repair sites, mailbox turnouts, and all other areas disturbed as a result of the Contractor's operations.

Type F Permanent Seed Mixture will consist of the following:

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

FIBER MULCHING

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

Fiber mulch will be applied at the rate of 2,000 pounds per acre.

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

All costs for the additional tackifier added to the fiber mulch including labor, equipment, and materials will be incidental to the contract unit price per ton for "Fiber Mulching".

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

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

COVER CROP SEEDING

Cover crop seeding may be used on this project as a temporary erosion control measure. The actual limits and use of cover crop seeding will be determined by the Engineer during construction.

TURF REINFORCEMENT MAT

Turf Reinforcement Mat will be installed at locations shown in the Table of Mainline Pipe and Erosion Repair and on the Drop Inlet Removal/Installation Layout at the widths specified, and at locations determined by the Engineer during construction. The Contractor will use a turf reinforcement mat from the approved products list. The approved product list for turf reinforcement mat may be viewed at the following internet site:

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

Turf Reinforcement Mat will be installed in accordance with the manufacturer's installation instructions.

EROSION CONTROL WATTLE

Erosion control wattles for restraining the flow of runoff and sediment will be installed at locations noted in the table, Table of Mainline Pipe and Erosion Repair, and 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.

An estimated quantity of erosion control wattles will remain on the project until vegetation has been established. The amount of erosion control wattles to be removed will be determined by the Engineer, otherwise they may remain in-place to decompose.

An additional quantity of 200' 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 at other areas as determined by the Engineer 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>

TABLE OF EROSION CONTROL WATTLE*

Bridge Approaches

MRM	L/R	Diameter (Inch)	Location	Quantity (Ft)
35.32	L/R	12	Str. No. 62-283-191	260/260
41.10	L/R	12	Str. No. 62-280-133	270/270
42.23	L/R	12	Str. No. 62-283-124	860/860
46.56	L/R	12	Str. No. 62-308-092	276/276
Subtotal:				3,332

Spot Grading/Fault Trace Areas

MRM	L/R	Diameter (Inch)	Location	Quantity (Ft)
38.747	R	12	Culvert Outlet Area	70
42.600	R	12	Embankment Toe	50
42.608	L	12	Embankment Toe	50
42.620	R	12	Embankment Toe	50
42.632	L/R	12	Ditch Channel	20/20
42.672	L/R	12	Ditch Channel	20/20
43.785	L/R	12	Ditch Channel	50/50
45.347 to 45.370	R	12	Ditch Channel along ROW	120
45.347 to 45.374	L	12	Ditch Channel along ROW	140
45.576 to 45.603	R	12	Ditch Channel along ROW	140
45.581 to 45.601	L	12	Ditch Channel along ROW	105
47.029	R	12	Ditch Channel upgrade of culvert	50
47.041	L	12	Ditch Channel upgrade of culvert	50
50.497	L/R	12	Ditch Channel	30/30
50.544	L	12	Ditch Channel	20
50.551	R	12	Ditch Channel	20
50.565	L/R	12	Ditch Channel	20/20
50.584	L/R	12	Ditch Channel	20/20
Subtotal:				1,185

Mailbox Turnouts

MRM	L/R	Diameter (Inch)	Location	Quantity (Ft)
29.228	R	12	Mailbox Turnout	20
35.479	R	12	Mailbox Turnout	20
36.985	R	12	Mailbox Turnout	20
39.568	R	12	Mailbox Turnout	60
39.194	R	12	Mailbox Turnout	150
Subtotal:				270

Total: 4,787

*Locations and Lengths will be determined in the Field by the Engineer

TABLE OF TOPSOIL STABILIZATION AND RESTORATION

Description	Location (MRM)	Area (acres)	Replace Topsoil (CuYd)	Fertilizer (lbs)	Permanent Seeding (lbs)	Fiber Mulch (lbs)
Str. No. 62-283-191	35.32	0.711	382	1067	18	1422
Str. No. 62-280-133	41.10	1.045	562	1567	27	2089
Str. No. 62-283-124	42.23	2.110	1135	3166	55	4221
Str. No. 62-308-092	46.56	1.168	628	1752	30	2336
Spot Grading/ Fault Heave Repair	38.50 to 38.90	2.344	1636	3516	61	4688
	42.60 to 42.75	0.583	487	875	15	1166
	43.80 to 44.00	0.716	557	1074	19	1432
	45.35 to 45.60	1.076	887	1614	28	2152
	47.05 to 47.40	1.387	1035	2081	36	2775
	50.5 to 50.65	0.658	469	987	17	1316
Fault Trace Areas/Ditch	42.64	0.148	80	222	4	296
	42.68	0.142	76	213	4	284
	50.55	0.151	81	227	4	302
	50.57	0.152	82	227	4	303
	50.59	0.148	80	222	4	297
Pipe Repairs*		0.548	295	822	14	1096
Mailbox Turnouts	29.228	0.0551	27	83	1	110
	35.479	0.0647	35	97	2	129
	36.985	0.0614	33	92	2	123
	37.381	0.0325	17	49	1	65
	39.568	0.0723	39	108	2	145
	39.194	0.0569	31	85	1	114
Totals:		13.430	8,653	20,144	349	26,859

TYPICAL SURFACING SECTIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0049(05)27	27	164

Plotting Date: 06/15/2021

Sta. 0+00(2nd) to Sta. 137+21(2nd)
Sta. 158+08(2nd) to Sta. 737+75.92(2nd)

Exceptions:

Cold Milling Asphalt Concrete at

Sta 46+07(2nd) to Sta 51+07(2nd)
Sta 75+89(2nd) to Sta 82+75(2nd)
Sta 187+68(2nd) to Sta 192+68(2nd)
Sta 363+93(2nd) to Sta 368+93(2nd)

LEGEND



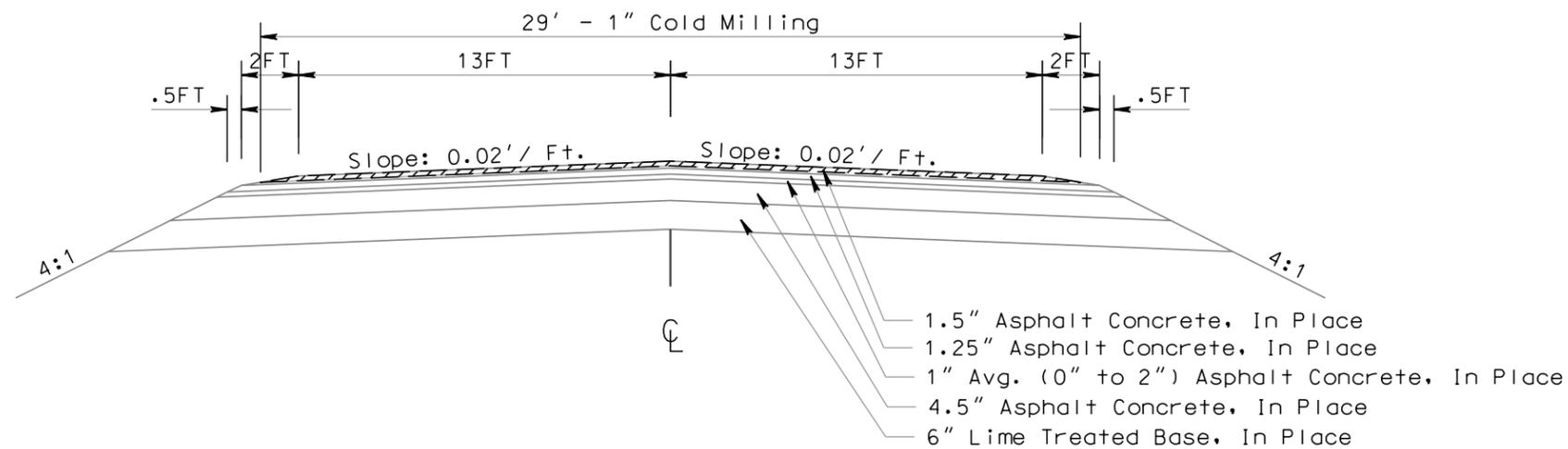
Cold Mill Section



2" Class Q2R Asphalt Concrete

Section 1

In Place & Cold Milling Section

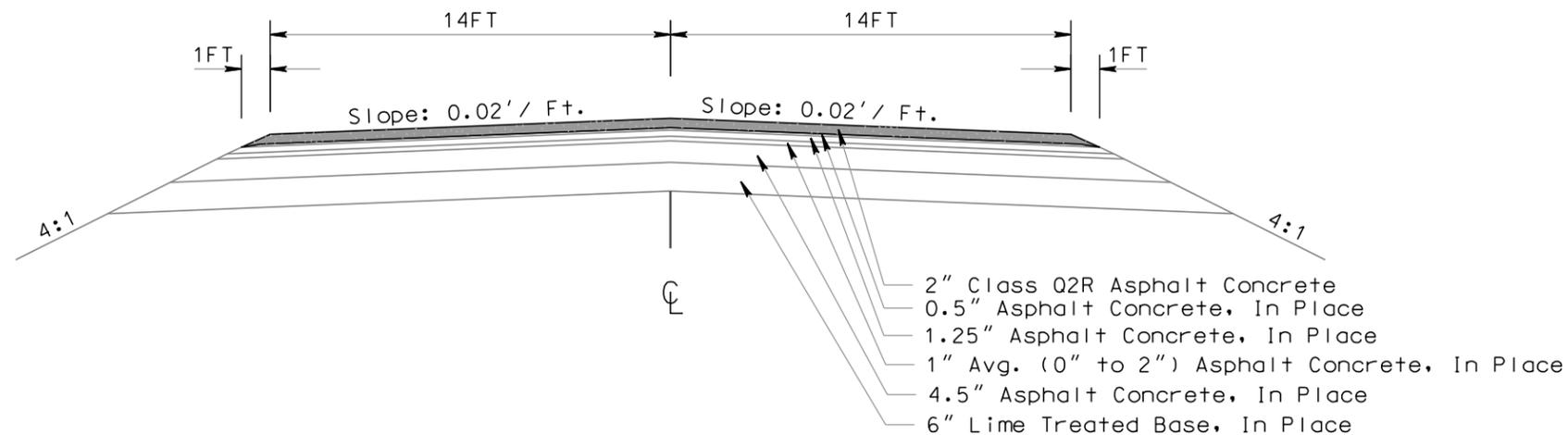


Exceptions:

Transition/Approach Pavement Thickened Section Limits

Sta 18+31.50(2nd) to Sta 26+52.50(2nd)
Sta 322+87.75(2nd) to Sta 330+31.25(2nd)

Surfacing Section



TYPICAL SURFACING SECTIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0049(05)27	28	164

Plotting Date: 05/07/2021

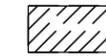
Sta. 1+10	to	Sta. 151+40
Sta. 159+32	to	Sta. 323+39
Sta. 341+87	to	Sta. 418+56
Sta. 432+19	to	Sta. 503+46
Sta. 514+16	to	Sta. 569+62
Sta. 577+64	to	Sta. 619+48.50

Exceptions:

Cold Milling Asphalt Concrete at

- Sta 56+35 to Sta 61+35
- Sta 305+17 to Sta 321+01
- Sta 340+23 to Sta 350+23
- Sta 394+92 to Sta 400+20
- Sta 441+02 to Sta 446+30
- Sta 484+95 to Sta 488+64

LEGEND



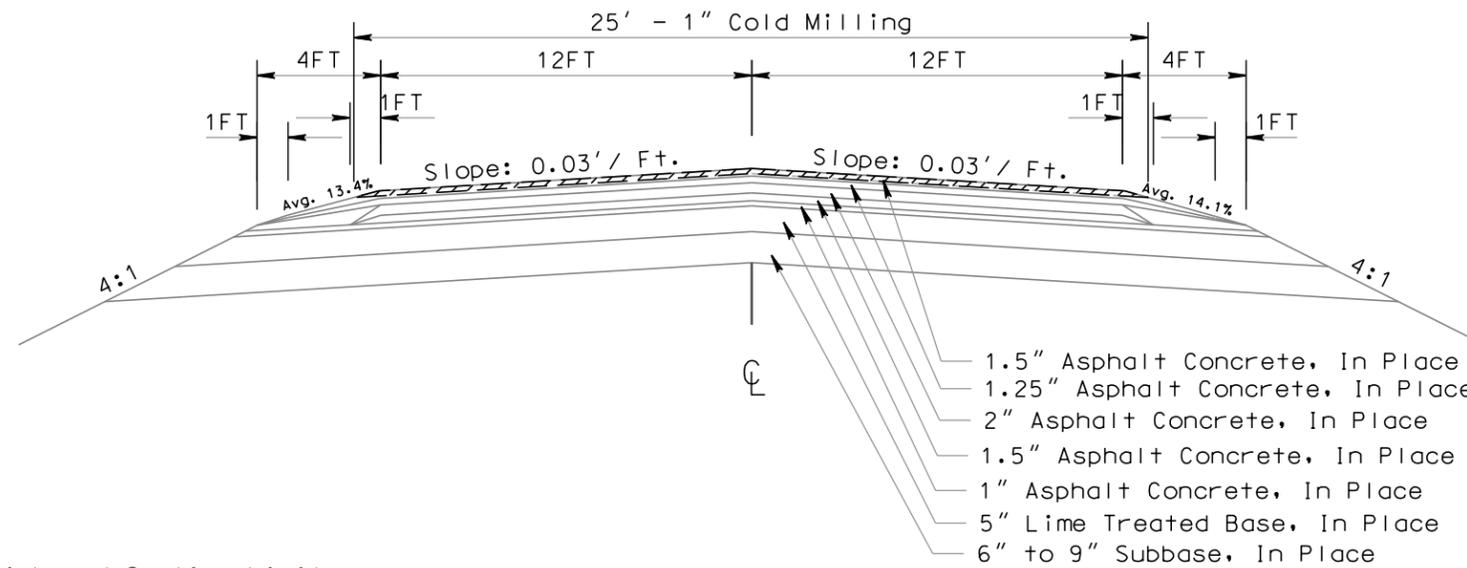
Cold Mill Section



2" Class Q2R Asphalt Concrete

Section 2

In Place & Cold Milling Section

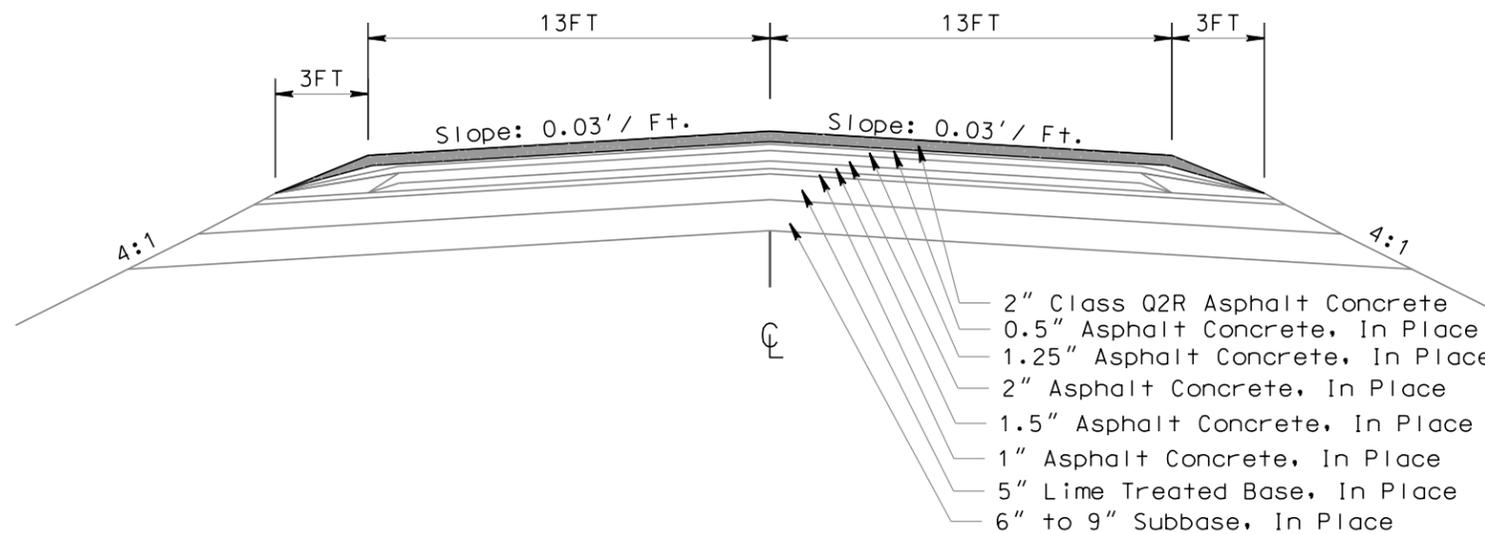


Exceptions:

Transition/Approach Pavement Thickened Section Limits

- Sta 363+47.84 to Sta 372+72.15
- Sta 577+64 to Sta 586+60

Surfacing Section



Plotting Date: 05/25/2021

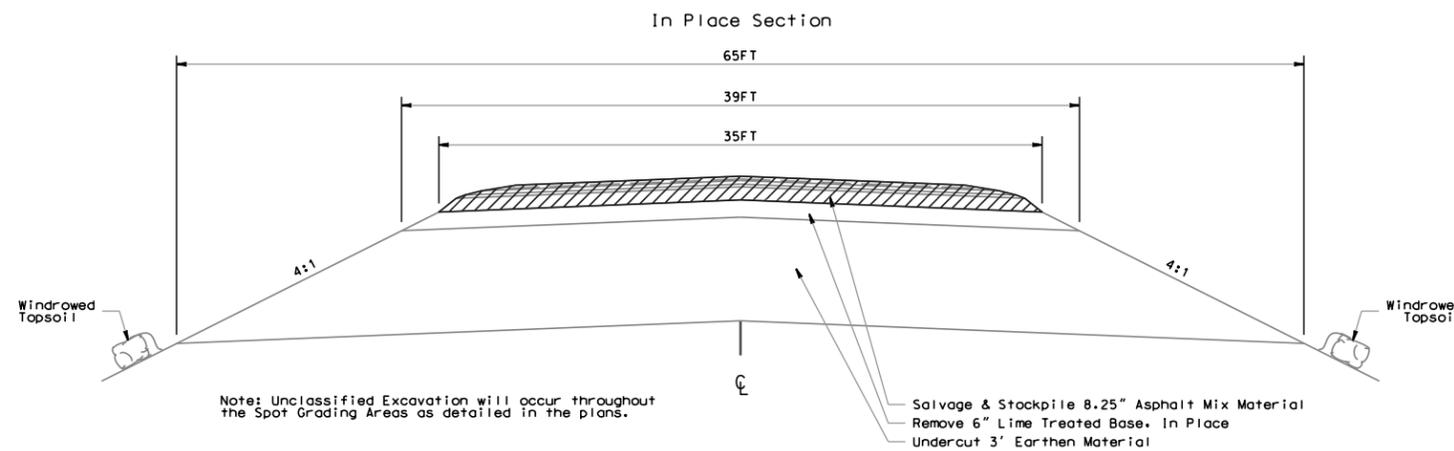
TYPICAL SPOT GRADING SECTION

Sta. 137+21(2nd) to Sta. 158+08(2nd)

Section 3

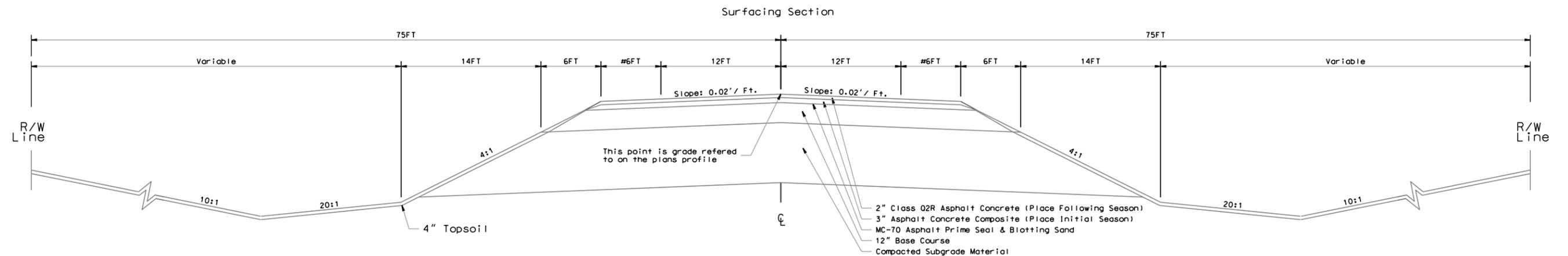
LEGEND

 Salvage and Stockpile Asphalt Mix Material



#Shoulder Transition

Sta 135+11(2nd) to Sta 137+21(2nd) - 3' to 6'
 Sta 158+08(2nd) to Sta 160+18(2nd) - 6' to 3'

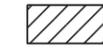


Plotting Date: 05/25/2021

TYPICAL SPOT GRADING SECTION

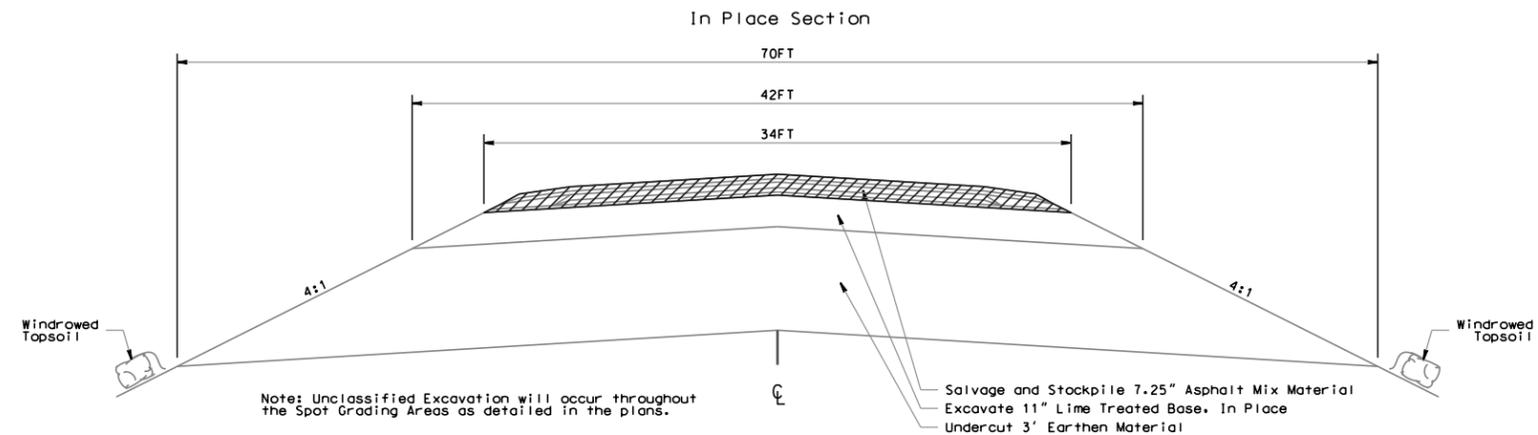
Sta. 151+40 to Sta. 159+32
 Sta. 323+39 to Sta. 341+87
 Sta. 418+56 to Sta. 432+19*
 Sta. 503+46 to Sta. 514+16
 Sta. 569+62 to Sta. 577+64

LEGEND

 Salvage and Stockpile Asphalt Mix Material

* Portion of the Spot Grading Section is within a Superelevated Curve.

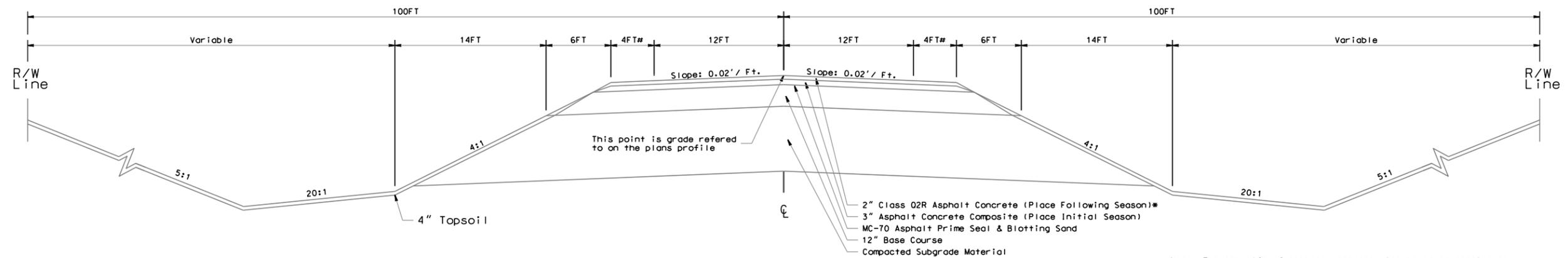
Section 4



#Shoulder Transitions

Sta 150+80 to Sta 151+40 - 3' to 4'
 Sta 159+32 to Sta 159+92 - 4' to 3'
 Sta 322+79 to Sta 323+39 - 3' to 4'
 Sta 341+87 to Sta 342+47 - 4' to 3'
 Sta 417+96 to Sta 418+56 - 3' to 4'
 Sta 432+19 to Sta 432+79 - 4' to 3'
 Sta 502+86 to Sta 503+46 - 3' to 4'
 Sta 514+16 to Sta 514+76 - 4' to 3'
 Sta 569+02 to Sta 569+62 - 3' to 4'
 Sta 577+64 to Sta 578+24 - 4' to 3'

Surfacing Section

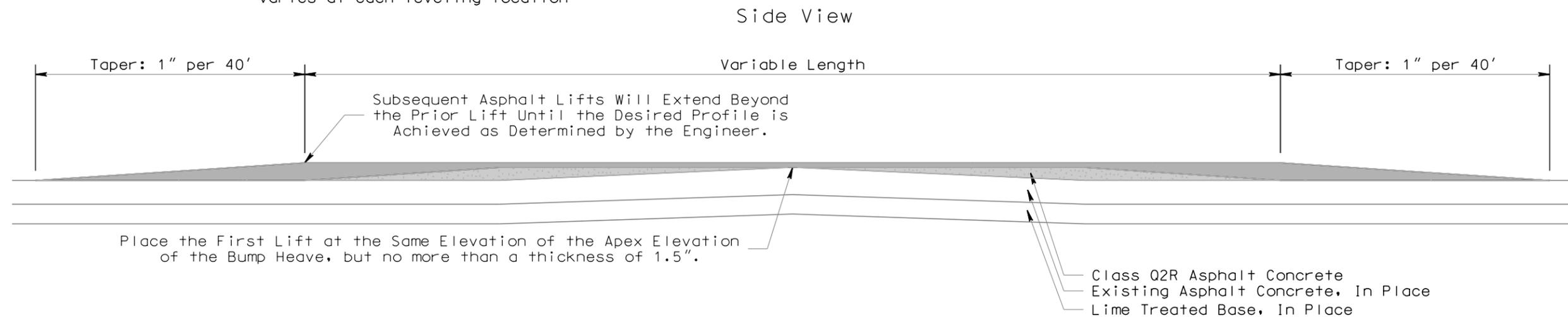
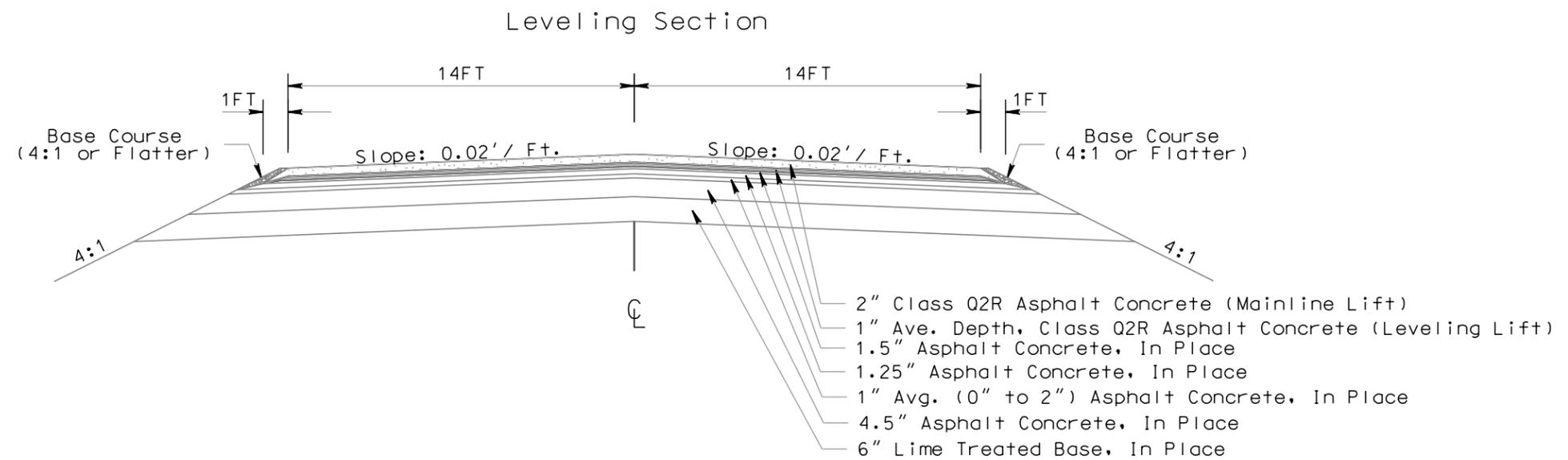


*Note: The top lift of asphalt concrete will be paved continuously throughout the entire length of the spot grading construction limits.

TYPICAL PAVEMENT PROFILE CORRECTION SECTION

Roadway Located within Section 1

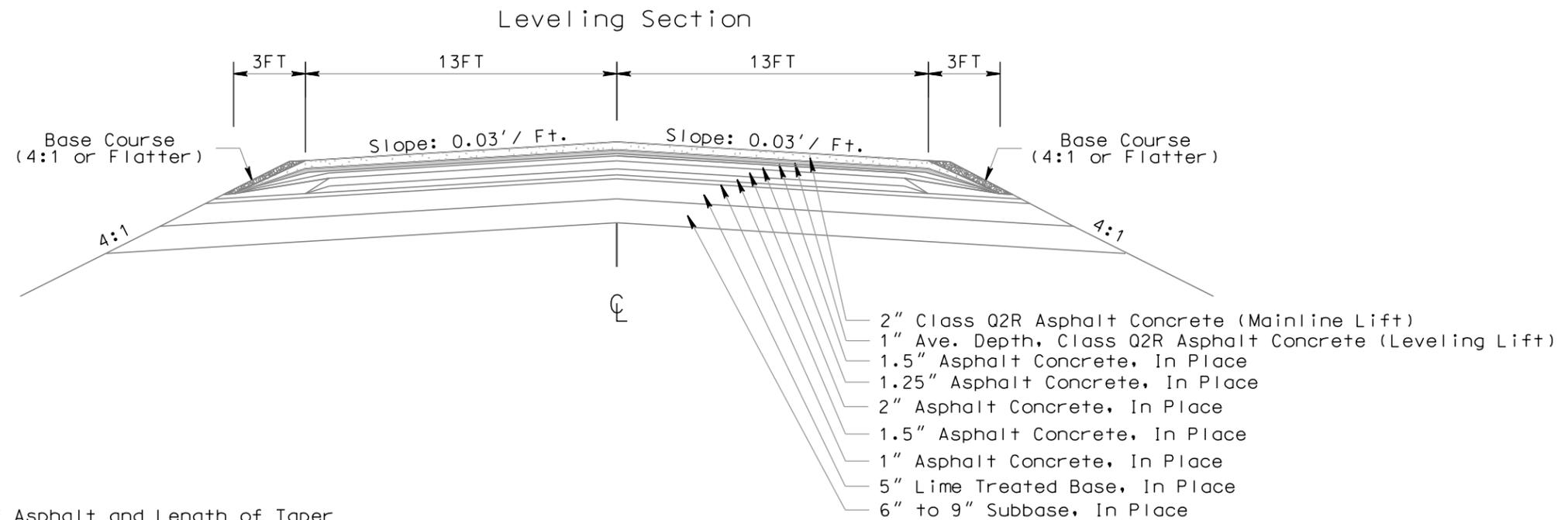
Sta 46+07(2nd) to Sta 51+07(2nd)
 Sta 75+89(2nd) to Sta 82+75(2nd)
 Sta 187+68(2nd) to Sta 192+68(2nd)
 Sta 363+93(2nd) to Sta 368+93(2nd)



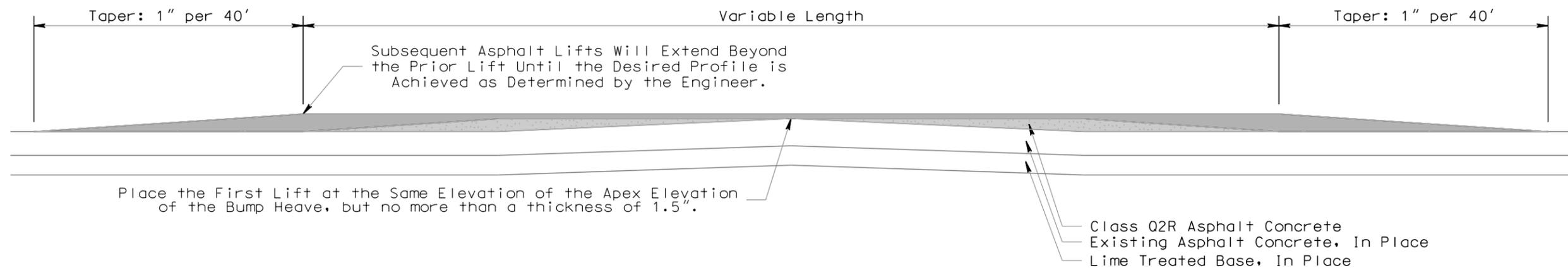
TYPICAL PAVEMENT PROFILE CORRECTION SECTION

Roadway Located within Section 2

Sta 56+35 to Sta 61+35
 Sta 305+17 to Sta 321+01
 Sta 340+23 to Sta 350+23
 Sta 394+92 to Sta 400+20
 Sta 441+02 to Sta 446+30
 Sta 484+95 to Sta 488+64



Side View



FIXED LOCATION SIGN LAYOUT

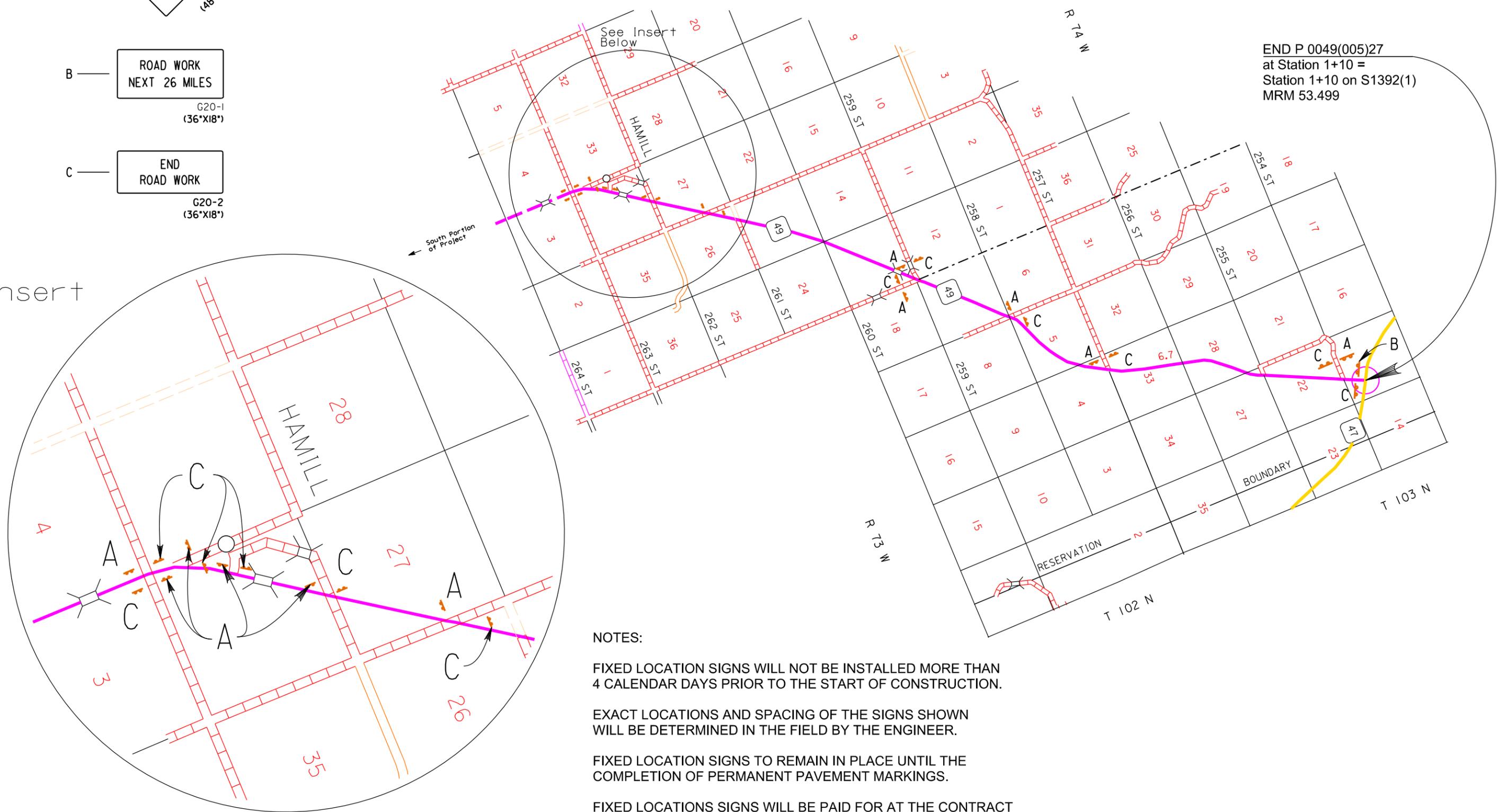
Section 2



END P 0049(005)27
at Station 1+10 =
Station 1+10 on S1392(1)
MRM 53.499

- A —
- B —
- C —

Insert

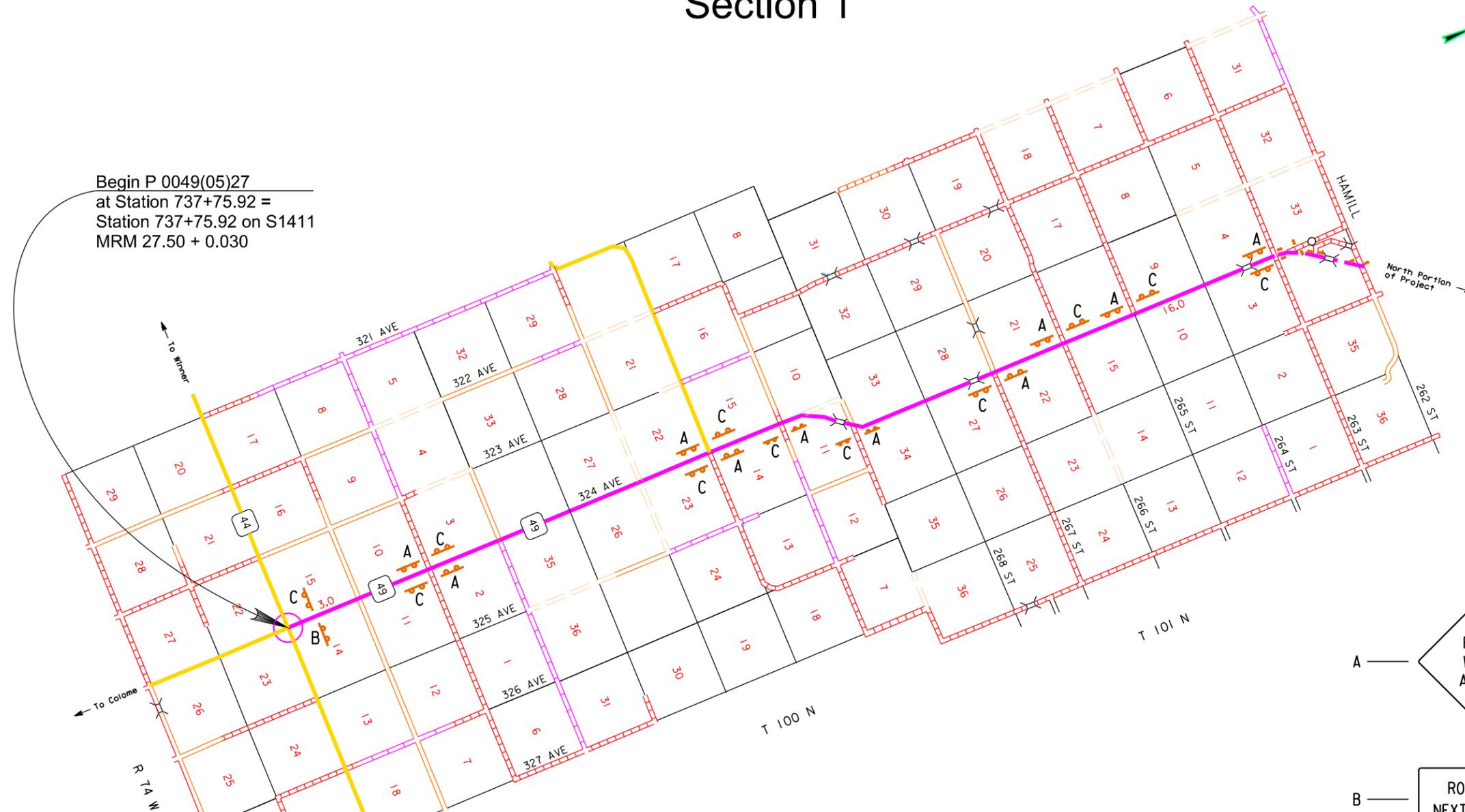


NOTES:

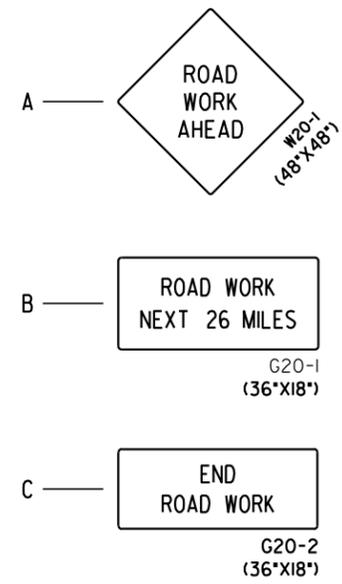
- FIXED LOCATION SIGNS WILL NOT BE INSTALLED MORE THAN 4 CALENDAR DAYS PRIOR TO THE START OF CONSTRUCTION.
- EXACT LOCATIONS AND SPACING OF THE SIGNS SHOWN WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.
- FIXED LOCATION SIGNS TO REMAIN IN PLACE UNTIL THE COMPLETION OF PERMANENT PAVEMENT MARKINGS.
- FIXED LOCATIONS SIGNS WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER SQ. FT. FOR "TRAFFIC CONTROL SIGNS".

FIXED LOCATION SIGN LAYOUT

Section 1



Begin P 0049(05)27
 at Station 737+75.92 =
 Station 737+75.92 on S1411
 MRM 27.50 + 0.030



NOTES:

FIXED LOCATION SIGNS WILL NOT BE INSTALLED MORE THAN 4 CALENDAR DAYS PRIOR TO THE START OF CONSTRUCTION.

EXACT LOCATIONS AND SPACING OF THE SIGNS SHOWN WILL BE DETERMINED IN THE FIELD BY THE ENGINEER.

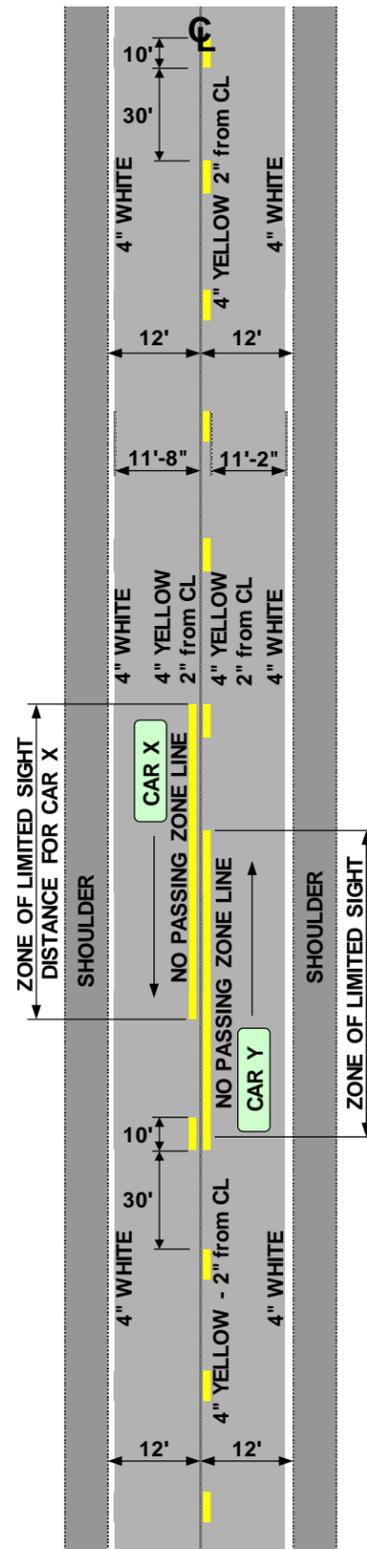
FIXED LOCATION SIGNS TO REMAIN IN PLACE UNTIL THE COMPLETION OF PERMANENT PAVEMENT MARKINGS.

FIXED LOCATIONS SIGNS WILL BE PAID FOR AT THE CONTRACT UNIT PRICE PER SQ. FT. FOR "TRAFFIC CONTROL SIGNS".

PROJECT PAINT AND SIGN TABULATION

PAVEMENT MARKING

TWO LANE ROADWAY



Typical pavement marking as shown on this sheet will be applied throughout the entire length of two lane roadway.

Traffic Control will be incidental to the cost of application. The striping and advance or trailing warning vehicle will be equipped with flashing amber lights and advance warning arrow board.

Application rates will be as follows:

Two Lane Roadway (Rates for one line)	
Dashed Yellow Centerline	Rate = 6.2 Gals./Pass-Mile
Solid Yellow Centerline	Rate = 22.5 Gals./Pass-Mile
Solid White Edgeline	Rate = 22.5 Gals./Pass-Mile

4" Yellow Skip Centerline (when not adjacent to a 4" Yellow No Passing Zone) will be placed consistently to the south or east side of centerline.

Exact location of NO PASSING ZONE lines will be determined in the field by the Engineer. A dash of white paint will mark the beginning and end of all no passing zones. NO PASSING ZONE signs and the ending post in fence lines, if present, will not be used as the beginning and ending of NO PASSING ZONE lines.

ESTIMATED QUANTITIES (BASED ON ONE APPLICATION)	
PAINT	TOTALS GALLONS
WHITE	1156
YELLOW	450

NOTE: All pavement marking dimensions are based on 12' driving lanes.

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W3-4	BE PREPARED TO STOP	4	48" x 48"	16.0	64.0
W8-1	BUMP	12	48" x 48"	16.0	192.0
W8-6	TRUCK CROSSING	4	48" x 48"	16.0	64.0
W8-7	LOOSE GRAVEL	8	48" x 48"	16.0	128.0
W8-11	UNEVEN LANES	4	48" x 48"	16.0	64.0
W8-12	NO CENTER LINE	6	48" x 48"	16.0	96.0
W8-15	GROOVED PAVEMENT	2	48" x 48"	16.0	32.0
W8-15P	MOTORCYCLE (plaque)	2	24" x 18"	3.0	6.0
W8-17	SHOULDER DROP-OFF (symbol)	6	48" x 48"	16.0	96.0
W13-1P	ADVISORY SPEED (plaque)	12	30" x 30"	6.3	75.6
W16-2P	___ FEET (supplemental distance plaque)	4	30" x 24"	5.0	20.0
W20-1	ROAD WORK AHEAD	24	48" x 48"	16.0	384.0
W20-4	ONE LANE ROAD AHEAD	4	48" x 48"	16.0	64.0
W20-7	FLAGGER (symbol)	4	48" x 48"	16.0	64.0
W21-1	WORKERS (symbol)	2	48" x 48"	16.0	32.0
W21-2	FRESH OIL	12	48" x 48"	16.0	192.0
W21-3	ROAD MACHINERY AHEAD	2	48" x 48"	16.0	32.0
W21-5	SHOULDER WORK	4	48" x 48"	16.0	64.0
G20-1	ROAD WORK NEXT 26 MILES	2	36" x 18"	4.5	9.0
G20-2	END ROAD WORK	25	36" x 18"	4.5	112.5
SPECIAL	SPECIAL SIGN (WAIT FOR PILOT CAR)	10	48" x 36"	12.0	120.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT 1911.1			

RATES OF MATERIALS

SECTION 1 (per mile)

Station 0+00 (2nd) to Station 137+21 (2nd)
Station 158+08 (2nd) to Station 737+75.92 (2nd)

Cold Milling Asphalt Concrete

Cold Mill Asphalt Concrete at a rate of 17,013 square yards at a width of 29' and a depth of 1".

Class Q2R Hot Mixed Asphalt Concrete

Provide SS-1h or CSS-1h Asphalt for Tack at a rate of 5.6 tons applied 25 feet wide (rate = 0.09 gallons per square yard), prior to the Asphalt Concrete Blade Laid.

Provide SS-1h or CSS-1h Asphalt for Tack at a rate of 4.6 tons applied 31 feet wide (rate = 0.06 gallons per square yard), prior to the 2" mainline lift of Class Q2R Hot Mixed Asphalt Concrete.

Q2R Hot Mixed Asphalt Concrete (Tons per Mile)

2.0" Mainline Lift

ASPHALT MIX	Alternate A	Alternate B
Aggregate (80% Contractor Furnished)	1437	1490
Salvaged Asphalt Concrete (20%)	359	373
PG 58-34 Asphalt Binder	86	72
TOTAL MIX	1882	1935
Hydrated Lime	19	19
TOTAL MIX WITH HYDRATED LIME	1901	1954

The exact proportions of these materials will be determined on construction.

Flush Seal

Provide SS-1h or CSS-1h Asphalt for Flush Seal at a rate of 3.7 tons applied 30 feet wide (rate = 0.05 gallons per square yard).

Provide Sand for Flush Seal at a rate of 52.0 tons applied 22 feet wide (rate = 8 pounds per square yard).

SECTION 2 (per mile)

Station 1+10 to Station 151+40
Station 159+32 to Station 323+39
Station 341+87 to Station 418+56
Station 432+19 to Station 503+46
Station 514+16 to Station 569+62
Station 577+64 to Station 619+48.50

Cold Milling Asphalt Concrete

Cold Mill Asphalt Concrete at a rate of 14,667 square yards with a at of 25' and a depth of 1".

Class Q2R Hot Mixed Asphalt Concrete

Provide SS-1h or CSS-1h Asphalt for Tack at a rate of 5.6 tons applied 25 feet wide (rate = 0.09 gallons per square yard), prior to the Asphalt Concrete Blade Laid.

Provide SS-1h or CSS-1h Asphalt for Tack at a rate of 4.9 tons applied 33 feet wide (rate = 0.06 gallons per square yard), prior to the 2" mainline lift of Class Q2R Hot Mixed Asphalt Concrete.

Class Q2R Hot Mixed Asphalt Concrete (Tons per Mile)

2.0" Mainline Lift

ASPHALT MIX	Alternate A	Alternate B
Aggregate (80% Contractor Furnished)	1449	1502
Salvaged Asphalt Concrete (20%)	362	376
PG 58-34 Asphalt Binder	87	72
TOTAL MIX	1898	1950
Hydrated Lime	19	20
TOTAL MIX WITH HYDRATED LIME	1917	1970

The exact proportions of these materials will be determined on construction.

Flush Seal

Provide SS-1h or CSS-1h Asphalt for Flush Seal at a rate of 4.0 tons applied 32 feet wide (rate = 0.05 gallons per square yard).

Provide Sand for Flush Seal at a rate 52.0 tons applied 22 feet wide (rate = 8 pounds per square yard).

RATES OF MATERIALS

SECTION 3 (per station)

Station 137+21 (2nd) to Station 158+08 (2nd)

Class Q2R Hot Mixed Asphalt Concrete (2" Top Lift)

Provide SS-1h or CSS-1h Asphalt for Tack at a rate of 0.11 tons applied 41 feet wide (rate = 0.06 gallons per square yard), prior to the 2" mainline lift of Class Q2R Hot Mixed Asphalt Concrete.

Q2R Hot Mixed Asphalt Concrete (Tons per Mile)

2.0" Mainline Lift

ASPHALT MIX	Alternate A	Alternate B
Aggregate (80% Contractor Furnished)	35.80	37.11
Salvaged Asphalt Concrete (20%)	8.95	9.28
PG 58-34 Asphalt Binder	2.16	1.78
TOTAL MIX	46.91	48.17
Hydrated Lime	0.47	0.48
TOTAL MIX WITH HYDRATED LIME	47.38	48.65

The exact proportions of these materials will be determined on construction.

Flush Seal

Provide SS-1h or CSS-1h Asphalt for Flush Seal at a rate of 0.10 tons applied 40 feet wide (rate = 0.05 gallons per square yard).

Provide Sand for Flush Seal at a rate of 0.98 tons applied 22 feet wide (rate = 8 pounds per square yard).

SECTION 4 (per mile)

Station 151+40 to Station 159+32
 Station 323+39 to Station 341+87
 Station 418+56 to Station 432+19
 Station 503+46 to Station 514+16
 Station 569+62 to Station 577+64

Class Q2R Hot Mixed Asphalt Concrete (2" Top Lift)

Provide SS-1h or CSS-1h Asphalt for Tack at a rate of 5.5 tons applied 37 feet wide (rate = 0.06 gallons per square yard), prior to the 2" mainline lift of Class Q2R Hot Mixed Asphalt Concrete.

Class Q2R Hot Mixed Asphalt Concrete (Tons per Mile)

2.0" Mainline Lift

ASPHALT MIX	Alternate A	Alternate B
Aggregate (80% Contractor Furnished)	1691	1753
Salvaged Asphalt Concrete (20%)	423	438
PG 58-34 Asphalt Binder	102	84
TOTAL MIX	2216	2275
Hydrated Lime	22	23
TOTAL MIX WITH HYDRATED LIME	2238	2298

The exact proportions of these materials will be determined on construction.

Flush Seal

Provide SS-1h or CSS-1h Asphalt for Flush Seal at a rate of 4.5 tons applied 36 feet wide (rate = 0.05 gallons per square yard).

Provide Sand for Flush Seal at a rate 52.0 tons applied 22 feet wide (rate = 8 pounds per square yard).

TABLE OF PROJECT STATIONING

SECTION	STATION	TO	STATION	DESCRIPTION	GROSS LENGTH	TRANSITION LENGTH	EXCEPTION LENGTH	RESURFACING LENGTH
2	Begin Project 1+10	to	151+40	Rural 2 Lane	15,030.00'			15,030.00'
4	151+40	to	159+32	Rural 2 Lane - Spot Grading, MRM 50.50 to 50.65	792.00'			792.00'
2	159+32	to	323+39	Rural 2 Lane	16,407.00'			16,407.00'
4	323+39	to	341+87	Rural 2 Lane - Spot Grading, MRM 47.05 to 47.40	1,848.00'			1,848.00'
2	341+87	to	363+47.84	Rural 2 Lane	2,160.84'			2,160.84'
Transition	363+47.84	to	367+73.84	Transition/Thickened Section	426.00'	426.00'		426.00'
Exception	367+73.84	to	368+46.15	Str No 62-308-092	72.31'		72.31'	
Transition	368+46.15	to	372+72.15	Transition/Thickened Section	426.00'	426.00'		426.00'
2	372+72.15	to	418+56	Rural 2 Lane	4,583.85'			4,583.85'
4	418+56	to	432+19	Rural 2 Lane - Spot Grading, MRM 45.35 to 45.60	1,363.00'			1,363.00'
2	432+19	to	503+46	Rural 2 Lane	7,127.00'			7,127.00'
4	503+46	to	514+16	Rural 2 Lane - Spot Grading, MRM 43.80 to 44.00	1,070.00'			1,070.00'
2	514+16	to	569+62	Rural 2 Lane	5,546.00'			5,546.00'
4	569+62	to	577+64	Rural 2 Lane - Spot Grading, MRM 42.60 to 42.75	802.00'			802.00'
Transition	577+64	to	581+16	Transition/Thickened Section	352.00'	352.00'		352.00'
Exception	581+16	to	582+84	Str No 62-283-124	168.00'		168.00'	
Transition	582+84	to	586+60	Transition/Thickened Section	376.00'	376.00'		376.00'
2	586+60	to	619+48.50	Rural 2 Lane	3,288.50'			3,288.50'
Equation	619+48.50 Bk	=	0+00.00 Ah					
1	0+00 (2nd)	to	18+31.50 (2nd)	Rural 2 Lane	1,831.50'			1,831.50'
Transition	18+31.50 (2nd)	to	21+40.50 (2nd)	Transition/Thickened Section	309.00'	309.00'		309.00'
Exception	21+40.50 (2nd)	to	22+59.50 (2nd)	Str No 62-280-133	119.00'		119.00'	
Transition	22+59.50 (2nd)	to	26+52.50 (2nd)	Transition/Thickened Section	393.00'	393.00'		393.00'
1	26+52.50 (2nd)	to	137+21 (2nd)	Rural 2 Lane	11,068.50'			11,068.50'
3	137+21 (2nd)	to	158+08 (2nd)	Rural 2 Lane - Spot Grading, MRM 38.50 to 38.90	2,087.00'			2,087.00'
1	158+08 (2nd)	to	322+87.75 (2nd)	Rural 2 Lane - SuperElevated	16,479.75'			16,479.75'
Transition	322+87.75 (2nd)	to	326+21.75 (2nd)	Transition/Thickened Section - SuperElevated	334.00'	334.00'		334.00'
Exception	326+21.75 (2nd)	to	327+08.25 (2nd)	Str No 62-283-191	86.50'		86.50'	
Transition	327+08.25 (2nd)	to	330+31.25 (2nd)	Transition/Thickened Section - SuperElevated	323.00'	323.00'		323.00'
1	330+31.25 (2nd)	to	332+49.79 (2nd)	Rural 2 Lane - SuperElevated	218.54'			218.54'
1	332+49.79 (2nd)	to	365+38.77 (2nd)	Rural 2 Lane - SuperElevated	3,288.98'			3,288.98'
1	365+38.77 (2nd)	to	737+75.92 (2nd) End Project	Rural 2 Lane	37,237.15'			37,237.15'
PROJECT TOTALS					135,614.42' 25.685 Miles	2,939.00' 0.557 Miles	445.81' 0.084 Miles	135,168.61' 25.600 Miles

SUMMARY OF ASPHALT CONCRETE

Description/Location	ALTERNATE A		ALTERNATE B	
	Compaction With Specified Density for Class Q2R Hot Mixed Asphalt Concrete (Ton)	Compaction Without Specified Density for Class Q2R Hot Mixed Asphalt Concrete (Ton)	Compaction With Specified Density for Class Q2R Hot Mixed Asphalt Concrete (Ton)	Compaction Without Specified Density for Class Q2R Hot Mixed Asphalt Concrete (Ton)
Section 1 28' Finished Roadway Width with 1' Bevel	24,458.2	1,174.5	25,119.2	1,227.8
Section 2 26' Finished Roadway Width with 3' Bevel	17,535.5	2,936.1	18,009.5	3,028.7
Section 3 28' Finished Roadway Width 4' Shoulders with 2' Bevel	727.4	261.4	747.1	268.2
Section 4 26' Finished Roadway Width 3' Shoulders with 2' Bevel	1,903.3	587.6	1,954.7	603.0
Pavement Profile Correction Lifts Located within Section 1 28' Finished Roadway Width with 1' Bevel		420.2		431.6
Pavement Profile Correction Lifts Located within Section 2 26' Finished Roadway Width with 3' Bevel		887.1		911.1
Subtotal=	44,624.4	6,266.9	45,830.5	6,470.4
Table of Additional Quantities Totals Less Correction Lifts=		6,421.1		6,522.3
TOTALS =	44,624.4	12,688.0	45,830.5	12,992.7

TABLE OF SUPERELEVATED CURVES

<u>Station</u>	<u>To</u>	<u>Station</u>	<u>Remarks</u>	<u>Station</u>	<u>To</u>	<u>Station</u>	<u>Remarks</u>
Begin Project				253+75.88		258+83.40	Normal Crown Section
1+10		72+12.43	Normal Crown Section	258+83.40		261+51.40	Superelevation Transition
72+12.43		74+25.43	Superelevation Transition	261+51.40		278+75.31	1°30' Curve Lt 0.058 Superelevation Rate Point of Rotation – Centerline
74+25.43		90+65.23	1°0' Curve Rt 0.042 Superelevation Rate Point of Rotation – Centerline	278+75.31		281+43.31	Superelevation Transition
90+65.23		92+78.23	Superelevation Transition	281+43.31		429+10.89	Normal Crown Section
92+10.23		108+17.24	Normal Crown Section	429+10.89		431+23.89	Superelevation Transition
108+17.24		110+85.24	Superelevation Transition	431+23.89		439+93.69	1°0' Curve Lt. 0.042 Superelevation Rate Point of Rotation – Centerline
110+85.24		129+61.37	1°30' Curve Lt 0.058 Superelevation Rate Point of Rotation – Centerline	439+93.69		442+06.69	Superelevation Transition
129+61.37		132+29.37	Superelevation Transition	442+06.69		599+92.70	Normal Crown Section
131+38.17		161+61.80	Normal Crown Section	599+92.70		604+92.70	Spiral Curve
161+61.80		163+74.80	Superelevation Transition	604+92.70		613+98.00	Circular Curve
163+74.80		176+45.44	1°0' Curve Rt 0.042 Superelevation Rate Point of Rotation – Centerline	613+98.00		618+98.00	Spiral Curve
				618+98.00		619+48.50	Normal Crown Section
176+45.44		178+58.44	Superelevation Transition	0+00.00 (2 nd)		299+58.80 (2 nd)	Normal Crown Section
178+58.44		203+46.04	Normal Crown Section	299+58.80 (2 nd)		301+98.80 (2 nd)	Superelevation Transition
203+46.04		206+14.04	Superelevation Transition	301+98.80 (2 nd)		330+09.79 (2 nd)	1°30' Curve Rt. 0.044 Superelevation Rate Point of Rotation – 12' R of CL
206+14.04		221+64.06	1°30' Curve Rt 0.058 Superelevation Rate Point of Rotation – Centerline	330+09.79 (2 nd)		332+49.79 (2 nd)	Superelevation Transition
221+64.06		224+32.06	Superelevation Transition	332+49.79 (2 nd)		334+89.79 (2 nd)	Superelevation Transition
224+32.06		236+02.16	Normal Crown Section	334+89.79 (2 nd)		362+98.77 (2 nd)	1°30' Curve Lt. 0.044 Superelevation Rate Point of Rotation – 12' L of CL
236+02.16		238+70.16	Superelevation Transition	362+98.77 (2 nd)		365+38.77 (2 nd)	Superelevation Transition
238+70.16		251+99.08	1°30' Curve Rt. 0.058 Superelevation Rate Point of Rotation – Centerline	365+38.77 (2 nd)		737+75.92 (2 nd)	Normal Crown Section
							End Project
251+99.08		254+67.08	Superelevation Transition				

TABLE OF PROJECT ENTRANCES

Approach Number	MRM	East or West	Description
1	27.920	West	Field Entrance, AC Pad & Gravel
2	27.920	East	Field Entrance, AC Pad & Gravel
3	28.148	West	Field Entrance, AC Pad & Gravel
4	28.148	East	Field Entrance, AC Pad & Gravel
5	28.332	West	Field Entrance, AC Pad & Gravel
6	28.332	East	Private Entrance, AC Pad & Gravel
7	28.432	East	Field Entrance, AC Pad & Gravel
8	28.509	West	Intersection, AC Pad & Gravel
9	28.509	East	Intersection, AC Pad & Gravel
10	28.661	West	Field Entrance, AC Pad & Gravel
11	28.661	East	Field Entrance, AC Pad & Gravel
12	28.936	West	Field Entrance, AC Pad & Gravel
13	29.173	West	Field Entrance, AC Pad & Gravel
14	29.173	East	Field Entrance, AC Pad & Gravel
15	29.228	West	Private Entrance, AC Pad & Gravel
16	29.281	West	Field Entrance, AC Pad & Gravel
17	29.507	West	Intersection, Asphalt to Radius
18	29.507	East	Intersection, Asphalt to Radius
19	29.555	West	Private Entrance, AC Pad & Gravel
20	29.555	East	Field Entrance, AC Pad & Gravel
21	29.863	West	Field Entrance, AC Pad & Gravel
22	29.863	East	Field Entrance, AC Pad & Gravel

Approach Number	MRM	East or West	Description
23	30.007	West	Field Entrance, AC Pad & Gravel
24	30.007	East	Field Entrance, AC Pad & Gravel
25	30.065	East	Private Entrance, AC Pad & Gravel
26	30.082	East	Private Entrance, AC Pad & Gravel
27	30.164	East	Private Entrance, AC Pad & Gravel
28	30.244	East	Field Entrance, AC Pad & Gravel
29	30.312	West	Field Entrance, AC Pad & Gravel
30	30.502	West	Intersection, AC Pad & Gravel
31	30.502	East	Intersection, AC Pad & Gravel
32	30.796	West	Field Entrance, AC Pad & Gravel
33	30.796	East	Field Entrance, AC Pad & Gravel
34	31.371	West	Field Entrance, AC Pad & Gravel
35	31.371	East	Field Entrance, AC Pad & Gravel
36	31.500	West	Field Entrance, AC Pad & Gravel
37	31.500	East	Field Entrance, AC Pad & Gravel
38	31.742	West	Field Entrance, AC Pad & Gravel
39	31.742	East	Field Entrance, AC Pad & Gravel
40	32.005	East	Field Entrance, AC Pad & Gravel
41	32.026	West	Field Entrance, AC Pad & Gravel
42	32.505	West	Intersection, AC Pad & Gravel
43	32.505	East	Intersection, AC Pad & Gravel
44	32.809	West	Field Entrance, AC Pad & Gravel

Approach Number	MRM	East or West	Description
45	32.809	East	Field Entrance, AC Pad & Gravel
46	33.165	West	Field Entrance, AC Pad & Gravel
47	33.165	East	Field Entrance, AC Pad & Gravel
48	33.336	West	Field Entrance, AC Pad & Gravel
49	33.336	East	Field Entrance, AC Pad & Gravel
50	33.502	West	Intersection, Asphalt to Radius
51	33.502	East	Intersection, Asphalt to Radius
52	33.563	West	Field Entrance, AC Pad & Gravel
53	33.563	East	Field Entrance, AC Pad & Gravel
54	33.985	West	Field Entrance, AC Pad & Gravel
55	33.985	East	Field Entrance, AC Pad & Gravel
56	34.264	West	Field Entrance, AC Pad & Gravel
57	34.264	East	Field Entrance, AC Pad & Gravel
58	34.502	West	Intersection, AC Pad & Gravel
59	34.502	East	Intersection, Asphalt to Radius
60	34.737	West	Field Entrance, AC Pad & Gravel
61	34.964	West	Field Entrance, AC Pad & Gravel
62	34.964	East	Field Entrance, AC Pad & Gravel
63	35.268	West	Field Entrance, AC Pad & Gravel
64	35.268	East	Field Entrance, AC Pad & Gravel
65	35.363	West	Field Entrance, AC Pad & Gravel
66	35.363	East	Field Entrance, AC Pad & Gravel

TABLE OF PROJECT ENTRANCES

Approach Number	MRM	East or West	Description
67	35.488	West	Intersection, AC Pad & Gravel
68	35.488	East	Intersection, Asphalt to Radius
69	35.990	West	Field Entrance, AC Pad & Gravel
70	35.990	East	Field Entrance, AC Pad & Gravel
71	36.161	West	Field Entrance, AC Pad & Gravel
72	36.161	East	Field Entrance, AC Pad & Gravel
73	36.498	West	Field Entrance, AC Pad & Gravel
74	36.498	East	Field Entrance, AC Pad & Gravel
75	36.801	West	Field Entrance, AC Pad & Gravel
76	36.801	East	Field Entrance, AC Pad & Gravel
77	36.991	West	Private Entrance, AC Pad & Gravel
78	37.045	West	Field Entrance, AC Pad & Gravel
79	37.391	West	Private Entrance, AC Pad & Gravel
80	37.391	East	Field Entrance, AC Pad & Gravel
81	37.452	West	Field Entrance, AC Pad & Gravel
82	37.452	East	Field Entrance, AC Pad & Gravel
83	37.502	West	Intersection, AC Pad & Gravel
84	37.502	East	Intersection, Asphalt to Radius
85	37.525	West	Field Entrance, AC Pad & Gravel
86	37.885	West	Field Entrance, AC Pad & Gravel
87	37.885	East	Field Entrance, AC Pad & Gravel
88	38.339	West	Field Entrance, AC Pad & Gravel

Approach Number	MRM	East or West	Description
89	38.339	East	Field Entrance, AC Pad & Gravel
90	38.498	West	Intersection, Asphalt to Radius
91	38.498	East	Intersection, Asphalt to Radius
92	38.793	West	Field Entrance, AC Pad & Gravel
93	38.793	East	Field Entrance, AC Pad & Gravel
94	39.067	West	Field Entrance, AC Pad & Gravel
95	39.067	East	Field Entrance, AC Pad & Gravel
96	39.128	West	Intersection, Asphalt to Radius
97	39.194	East	Private Entrance, AC Pad & Gravel
98	39.246	East	Field Entrance, AC Pad & Gravel
99	39.274	West	Field Entrance, AC Pad & Gravel
100	39.504	West	Intersection, Asphalt to Radius
101	39.504	East	Field Entrance, AC Pad & Gravel
102	39.568	East	Private Entrance, AC Pad & Gravel
103	39.883	West	Field Entrance, AC Pad & Gravel
104	39.883	East	Field Entrance, AC Pad & Gravel
105	40.173	West	Field Entrance, AC Pad & Gravel
106	40.173	East	Field Entrance, AC Pad & Gravel
107	40.518	West	Field Entrance, AC Pad & Gravel
108	40.518	East	Field Entrance, AC Pad & Gravel
109	40.723	West	Field Entrance, AC Pad & Gravel
110	40.723	East	Field Entrance, AC Pad & Gravel

Approach Number	MRM	East or West	Description
111	40.977	East	Field Entrance, AC Pad & Gravel
112	41.162	West	Field Entrance, AC Pad & Gravel
113	41.162	East	Field Entrance, AC Pad & Gravel
114	41.362	West	Field Entrance, AC Pad & Gravel
115	41.362	East	Field Entrance, AC Pad & Gravel
116	41.507	West	Intersection, Asphalt to Radius
117	41.507	East	Intersection, Asphalt to Radius
118	41.683	West	Intersection, Asphalt to Radius
119	42.056	West	Field Entrance, AC Pad & Gravel
120	42.056	East	Field Entrance, AC Pad & Gravel
121	42.317	West	Intersection, Asphalt to Radius
122	42.770	West	Field Entrance, AC Pad & Gravel
123	42.770	East	Field Entrance, AC Pad & Gravel
124	42.978	West	Intersection, Asphalt to Radius
125	42.978	East	Intersection, Asphalt to Radius
126	43.121	West	Field Entrance, AC Pad & Gravel
127	43.121	East	Field Entrance, AC Pad & Gravel
128	43.402	East	Field Entrance, AC Pad & Gravel
129	43.402	East	Field Entrance, AC Pad & Gravel
130	43.711	East	Intersection, Asphalt to Radius
131	43.748	West	Intersection, Asphalt to Radius
132	43.894	West	Field Entrance, AC Pad & Gravel

TABLE OF PROJECT ENTRANCES

Approach Number	MRM	East or West	Description
133	43.894	East	Field Entrance, AC Pad & Gravel
134	44.18	West	Intersection, AC Pad & Gravel
135	44.204	East	Intersection, AC Pad & Gravel
136	44.366	West	Field Entrance, AC Pad & Gravel
137	44.366	East	Field Entrance, AC Pad & Gravel
138	44.764	West	Field Entrance, AC Pad & Gravel
139	44.764	East	Field Entrance, AC Pad & Gravel
140	44.953	West	Field Entrance, AC Pad & Gravel
141	44.953	East	Field Entrance, AC Pad & Gravel
142	45.433	West	Field Entrance, AC Pad & Gravel
143	45.433	East	Field Entrance, AC Pad & Gravel
144	45.692	West	Field Entrance, AC Pad & Gravel
145	46	East	Field Entrance, AC Pad & Gravel
146	45.906	West	Field Entrance, AC Pad & Gravel
147	45.906	East	Field Entrance, AC Pad & Gravel
148	46.138	West	Field Entrance, AC Pad & Gravel
149	46.138	East	Field Entrance, AC Pad & Gravel
150	46.262	West	Field Entrance, AC Pad & Gravel
151	46.262	East	Field Entrance, AC Pad & Gravel
152	46.47	West	Field Entrance, AC Pad & Gravel
153	46.47	East	Field Entrance, AC Pad & Gravel
154	46.716	West	Field Entrance, AC Pad & Gravel

Approach Number	MRM	East or West	Description
155	46.716	East	Field Entrance, AC Pad & Gravel
156	46.846	West	Intersection, Asphalt to Radius
157	46.846	East	Intersection, Asphalt to Radius
158	46.99	West	Field Entrance, AC Pad & Gravel
159	46.99	East	Field Entrance, AC Pad & Gravel
160	47.474	West	Field Entrance, AC Pad & Gravel
161	47.474	East	Field Entrance, AC Pad & Gravel
162	47.778	West	Field Entrance, AC Pad & Gravel
163	47.778	East	Field Entrance, AC Pad & Gravel
164	48.23	West	Intersection, Asphalt to Radius
165	48.23	East	Intersection, Asphalt to Radius
166	48.515	West	Field Entrance, AC Pad & Gravel
167	49	East	Field Entrance, AC Pad & Gravel
168	48.755	West	Field Entrance, AC Pad & Gravel
169	48.755	East	Field Entrance, AC Pad & Gravel
170	49.051	West	Field Entrance, AC Pad & Gravel
171	49.051	East	Field Entrance, AC Pad & Gravel
172	49.285	East	Field Entrance, AC Pad & Gravel
173	49.43	West	Field Entrance, AC Pad & Gravel
174	49.716	West	Field Entrance, AC Pad & Gravel
175	49.716	East	Field Entrance, AC Pad & Gravel
176	49.854	West	Intersection, Asphalt to Radius

Approach Number	MRM	East or West	Description
177	49.854	East	Intersection, AC Pad & Gravel
178	49.948	West	Field Entrance, AC Pad & Gravel
179	49.948	East	Field Entrance, AC Pad & Gravel
180	50.317	West	Field Entrance, AC Pad & Gravel
181	50.317	East	Field Entrance, AC Pad & Gravel
182	50.547	West	Field Entrance, AC Pad & Gravel
183	50.636	East	Field Entrance, AC Pad & Gravel
184	50.699	East	Field Entrance, AC Pad & Gravel
185	50.809	West	Field Entrance, AC Pad & Gravel
186	50.866	East	Field Entrance, AC Pad & Gravel
187	50.911	West	Field Entrance, AC Pad & Gravel
188	50.911	East	Field Entrance, AC Pad & Gravel
189	51	West	Field Entrance, AC Pad & Gravel
190	51.355	East	Field Entrance, AC Pad & Gravel
191	51.47	West	Field Entrance, AC Pad & Gravel
192	51.47	East	Field Entrance, AC Pad & Gravel
193	51.587	East	Field Entrance, AC Pad & Gravel
194	51.886	West	Field Entrance, AC Pad & Gravel
195	51.886	East	Field Entrance, AC Pad & Gravel
196	52.089	West	Intersection, Asphalt to Radius
197	52.189	East	Field Entrance, AC Pad & Gravel
198	52.585	East	Field Entrance, AC Pad & Gravel

TABLE OF PROJECT ENTRANCES

Approach Number	MRM	East or West	Description
199	52.671	West	Field Entrance, AC Pad & Gravel
200	52.671	East	Field Entrance, AC Pad & Gravel
201	53.186	West	Intersection, Asphalt to Radius
202	53.186	East	Intersection, AC Pad & Gravel
203	53.479	West	Field Entrance, AC Pad & Gravel

TABLE OF MAINLINE PIPE AND EROSION REPAIR

Stationing			206+00	241+53	252+00	263+00	277+50						
MRM			49.00+0.619	48.00+0.951	48.00+0.753	48.00+0.547	48.00+0.273						
In-Place Structure Type			24" RCP (122')	24" RCP (136')	18" CMP (58')	24" RCP (124')	24" RCP (88')						
In-Place End Treatment			Flared	Flared	Flared	Flared	Flared						
DESCRIPTION			Repair Notes		Repair Notes		Repair Notes		Repair Notes				
			remove/reset end section and 1 pipe section; install tie bolts on reset sections	remove/reset end section and 1 pipe section; install tie bolts on reset sections; fill scour hole and cover with fiber mulch; install wattle	remove/reset end section and 2 pipe sections; install tie bolts on reset sections; install gabion basket; install wattle	remove/reset end section and 1 pipe section; install tie bolts on reset sections	remove/reset end section; install tie bolts on reset sections; install wattle	remove/reset end section; install tie bolts on reset sections	remove/reset end section; install tie bolts on reset sections; fill scour hole and cover with fiber mulch; install gabion basket; install wattle	No Repairs	remove/reset end section and 1 pipe section; install tie bolts on reset sections; reprofile area approx. 20' L x 40' W beyond end section to ROW; install wattle	remove/reset end section; install tie bolts on reset sections	
Bid Item	Bid Item Description	Unit	SUBTOTAL	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt
110E7500	Remove Pipe for Reset	(Ft)	48	8	8	16	8					8	
110E7510	Remove Pipe End Section for Reset	(Each)	9	1	1	1	1	1	1	1		1	1
120E0600	Contractor Furnished Borrow Excavation	(CuYd)	8		4					4			
120E4100	Reprofiling Ditch -- Disturbed Area (for info only) --	(Sta) (SqFt)	0.2 800									0.2 800	
450E0182	36" RCP Class 2, Furnish	(Ft)	-										
450E0190	36" RCP, Install	(Ft)	-										
450E2028	36" RCP Flared End, Furnish	(Each)	-										
450E2029	36" RCP Flared End, Install	(Each)	-										
450E4699	Tie Bolts for RCP	(Each)	-										
450E5215	24" CMP Flared End, Furnish	(Each)	-										
450E5216	24" CMP Flared End, Install	(Each)	-										
450E8300	Culvert Joint Cleaning	(Ft)	-										
450E8305	Repair Culvert Joint	(Ft)	-										
450E8310	Chemical Grout Void Fill	(Gal)	-										
450E8900	Cleanout Pipe Culvert	(Each)	-										
450E8910	Cleanout for Culvert Treatment	(Each)	-										
450E9000	Reset Pipe	(Ft)	48	8	8	16	8					8	
450E9001	Reset Pipe End Section	(Each)	9	1	1	1	1	1	1	1		1	1
450E9524	24" Cured in Place Pipe	(Ft)	-										
720E1010	PVC Coated Bank and Channel Protection Gabion	(CuYd)	9			4.5				4.5			
730E0210	Type F Permanent Seed Mixture	(Lb)	3	0.3	0.4	0.5	0.3	0.1	0.1	0.2		0.8	0.1
731E0100	Fertilizing	(Lb)	164	16	24	31	16	6	6	14		44	6
732E0250	Fiber Mulching	(Lb)	218	22	32	41	22	8	8	19		58	8
734E0132	Type 2 Turf Reinforcement Mat	(SqYd)	-										
734E0154	12" Diameter Erosion Control Wattle	(Ft)	90		18	18		18		18		18	
734E0450	Temporary Water Barrier	(Ft)	-										
734E4990	Dewatering	(Day)	-										
831E0110	Type B Drainage Fabric	(SqYd)	30			15				15			

TABLE OF MAINLINE PIPE AND EROSION REPAIR

Stationing			301+00	343+43	352+50	377+67	403+00				
MRM			47.00+0.829	47.00+0.029	46.84+0.017	46.00+0.375	45.00+0.897				
In-Place Structure Type			36" RCP (52')	36" RCP (94')	36" RCP (86') - Twin Pipes	24" RCP (124')	24" RCP (50')				
In-Place End Treatment			Flared	None	Flared	Flared	Flared				
DESCRIPTION			Repair Notes		Repair Notes		Repair Notes		Repair Notes		
Bid Item	Bid Item Description	Unit	SUBTOTAL	Lt	Rt	Lt	Rt	Lt	Rt	Lt	Rt
110E7500	Remove Pipe for Reset	(Ft)	16		8					8	
110E7510	Remove Pipe End Section for Reset	(Each)	9	1	1			2	2	1	1
120E0600	Contractor Furnished Borrow Excavation	(CuYd)	10							10	
120E4100	Reprofiling Ditch -- Disturbed Area (for info only) --	(Sta) (SqFt)	0.4 2,350		0.1 600		0.2 1300			0.1 450	
450E0182	36" RCP Class 2, Furnish	(Ft)	-								
450E0190	36" RCP, Install	(Ft)	-								
450E2028	36" RCP Flared End, Furnish	(Each)	2			1	1				
450E2029	36" RCP Flared End, Install	(Each)	2			1	1				
450E4699	Tie Bolts for RCP	(Each)	-								
450E5215	24" CMP Flared End, Furnish	(Each)	-								
450E5216	24" CMP Flared End, Install	(Each)	-								
450E8300	Culvert Joint Cleaning	(Ft)	-								
450E8305	Repair Culvert Joint	(Ft)	-								
450E8310	Chemical Grout Void Fill	(Gal)	-								
450E8900	Cleanout Pipe Culvert	(Each)	-								
450E8910	Cleanout for Culvert Treatment	(Each)	-								
450E9000	Reset Pipe	(Ft)	16		8					8	
450E9001	Reset Pipe End Section	(Each)	9	1	1			2	2	1	1
450E9524	24" Cured in Place Pipe	(Ft)	-								
720E1010	PVC Coated Bank and Channel Protection Gabion	(CuYd)	11				6.0			4.5	
730E0210	Type F Permanent Seed Mixture	(Lb)	3	0.2	0.7	0.2	0.9	0.3	0.3	0.1	0.1
731E0100	Fertilizing	(Lb)	167	9	41	9	54	18	18	6	6
732E0250	Fiber Mulching	(Lb)	222	12	55	12	71	24	24	8	8
734E0132	Type 2 Turf Reinforcement Mat	(SqYd)	-								
734E0154	12" Diameter Erosion Control Wattle	(Ft)	72		18		18		18	18	
734E0450	Temporary Water Barrier	(Ft)	-								
734E4990	Dewatering	(Day)	-								
831E0110	Type B Drainage Fabric	(SqYd)	34				19			15	

TABLE OF MAINLINE PIPE AND EROSION REPAIR

Stationing			546+15	593+00	604+43	224+68 (2nd)	225+00 (2nd)		
MRM			43.00+0.194	42.00+0.304	42.00+0.092	37.00+0.266	37.00+0.241		
In-Place Structure Type			30" RCP (170')	18" RCP (58')	5' x 7' Cattle Pass (42')	5' x 7' Cattle Pass (76')	24" RCP (100')		
In-Place End Treatment			Flared	Flared	Flared	Flared	Flared		
DESCRIPTION			SUBTOTAL	Repair Notes		Repair Notes		Repair Notes	
Bid Item	Bid Item Description	Unit		Lt	Rt	Lt	Rt	Lt	Rt
110E7500	Remove Pipe for Reset	(Ft)	16	8	8				
110E7510	Remove Pipe End Section for Reset	(Each)	4	1	1	1	1		
120E0600	Contractor Furnished Borrow Excavation	(CuYd)	4	2	1			1	
120E4100	Reprofiling Ditch – Disturbed Area (for info only) –	(Sta) (SqFt)	0.5 1,450	0.2 450	0.2 400		0.1 600		
450E0182	36" RCP Class 2, Furnish	(Ft)	-						
450E0190	36" RCP, Install	(Ft)	-						
450E2028	36" RCP Flared End, Furnish	(Each)	-						
450E2029	36" RCP Flared End, Install	(Each)	-						
450E4699	Tie Bolts for RCP	(Each)	38					16	22
450E5215	24" CMP Flared End, Furnish	(Each)	-						
450E5216	24" CMP Flared End, Install	(Each)	-						
450E8300	Culvert Joint Cleaning	(Ft)	437			184		253	
450E8305	Repair Culvert Joint	(Ft)	437			184		253	
450E8310	Chemical Grout Void Fill	(Gal)	95			40		55	
450E8900	Cleanout Pipe Culvert	(Each)	2			1		1	
450E8910	Cleanout for Culvert Treatment	(Each)	-						
450E9000	Reset Pipe	(Ft)	16	8	8				
450E9001	Reset Pipe End Section	(Each)	4	1	1	1	1		
450E9524	24" Cured in Place Pipe	(Ft)	-						
720E1010	PVC Coated Bank and Channel Protection Gabion	(CuYd)	5						4.5
730E0210	Type F Permanent Seed Mixture	(Lb)	2	0.6	0.5	0.1	0.1	0.4	0.1
731E0100	Fertilizing	(Lb)	102	32	30	6	6	21	6
732E0250	Fiber Mulching	(Lb)	136	43	41	8	8	28	8
734E0132	Type 2 Turf Reinforcement Mat	(SqYd)	36	36					
734E0154	12" Diameter Erosion Control Wattle	(Ft)	54		18	18			18
734E0450	Temporary Water Barrier	(Ft)	-						
734E4990	Dewatering	(Day)	-						
831E0110	Type B Drainage Fabric	(SqYd)	15						15

TABLE OF MAINLINE PIPE AND EROSION REPAIR

Stationing.....			305+03 (2nd)	633+21 (2nd)	633+08 (2nd)	634+00 (2nd)	145+00 (2nd) - Spot Grading	
MRM.....			35.32+0.404	29.00+0.497	29.00+0.500	29.00+0.496	38.00+0.763	
In-Place Structure Type.....			2 - 24" RCP (54'); south pipe only		30" Arch RCP (130')	5' x 7' Cattle Pass (108')	30" Arch RCP (64')	36" RCP (66')
In-Place End Treatment.....			Flared		Flared	Flared	Flared	
DESCRIPTION			SUBTOTAL		Repair Notes		Repair Notes	
Bid Item	Bid Item Description	Unit	Lt	Rt	Lt	Rt	Lt	Rt
110E7500	Remove Pipe for Reset	(Ft)	-					
110E7510	Remove Pipe End Section for Reset	(Each)	2					1
120E0600	Contractor Furnished Borrow Excavation	(CuYd)	-					
120E4100	Reprofiling Ditch -- Disturbed Area (for info only) --	(Sta) (SqFt)	0.6 1,800				0.1 400	0.1 300
450E0182	36" RCP Class 2, Furnish	(Ft)	12					6
450E0190	36" RCP, Install	(Ft)	12					6
450E2028	36" RCP Flared End, Furnish	(Each)	-					
450E2029	36" RCP Flared End, Install	(Each)	-					
450E4699	Tie Bolts for RCP	(Each)	38			38		
450E5215	24" CMP Flared End, Furnish	(Each)	-					
450E5216	24" CMP Flared End, Install	(Each)	-					
450E8300	Culvert Joint Cleaning	(Ft)	437			437		
450E8305	Repair Culvert Joint	(Ft)	437			437		
450E8310	Chemical Grout Void Fill	(Gal)	95			95		
450E8900	Cleanout Pipe Culvert	(Each)	4	1	1	1	1	
450E8910	Cleanout for Culvert Treatment	(Each)	-					
450E9000	Reset Pipe	(Ft)	-					
450E9001	Reset Pipe End Section	(Each)	-					
450E9524	24" Cured in Place Pipe	(Ft)	-					
720E1010	PVC Coated Bank and Channel Protection Gabion	(CuYd)	6					6.0
730E0210	Type F Permanent Seed Mixture	(Lb)	1.2				0.2	0.2
731E0100	Fertilizing	(Lb)	72				14	10
732E0250	Fiber Mulching	(Lb)	96				18	14
734E0132	Type 2 Turf Reinforcement Mat	(SqYd)	12					34
734E0154	12" Diameter Erosion Control Wattle	(Ft)	36			18		18
734E0450	Temporary Water Barrier	(Ft)	-					
734E4990	Dewatering	(Day)	-					
831E0110	Type B Drainage Fabric	(SqYd)	19					19

CULVERT EXTENSION ELEVATION LAYOUT

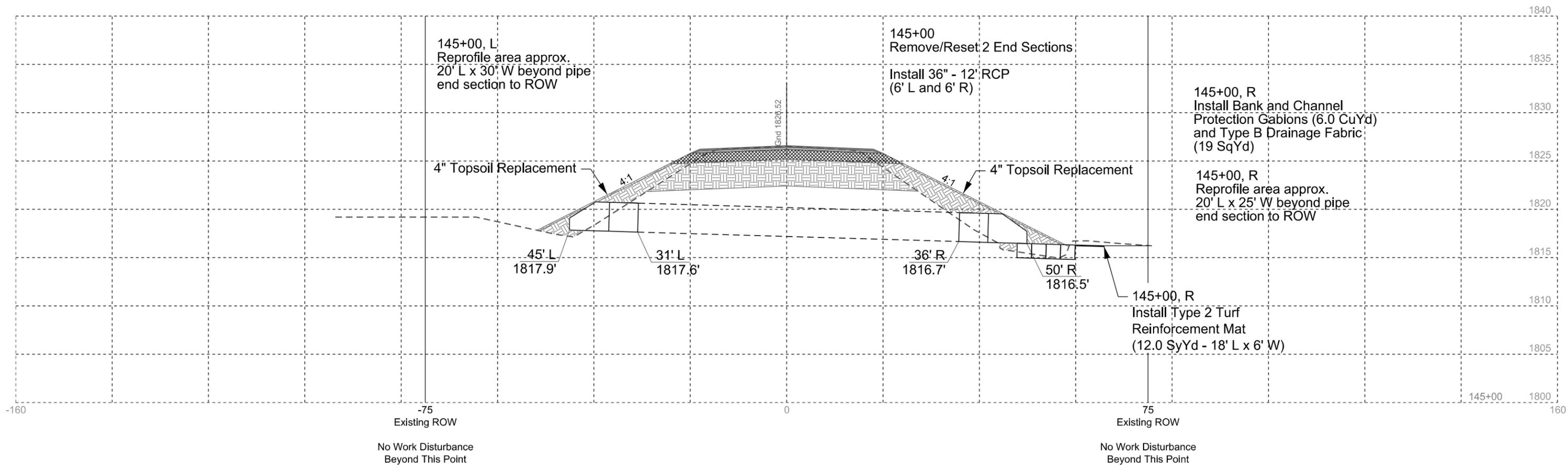
Sta 145+00(2nd) MRM 38.00 + 0.763

LEGEND

-  2" Q2R Asphalt Concrete
-  3" Composite Asphalt
-  Base Course
-  Undercut
-  Contractor Furnished Borrow
-  Existing Ground Surface

Note: No work, disturbance, or access of property beyond existing ROW.

The Contractor will ensure that positive drainage exists at the inlet and outlet ends prior to Gabion and Turf Mat installation. This may require profiling the drainage area within the ditches in each direction to the limits as determined by the Engineer at the time of construction. Topsoil will be removed prior to profiling and replaced upon completion. Payment for profiling the area will be incidental to the contact unit price per station for "Reprofiling Ditch".



APPROACH PAVEMENT THICKENED SECTION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0049(05)27	53	164

Plotting Date: 05/08/2021

Transition/Thickened Section Limits at Structures:

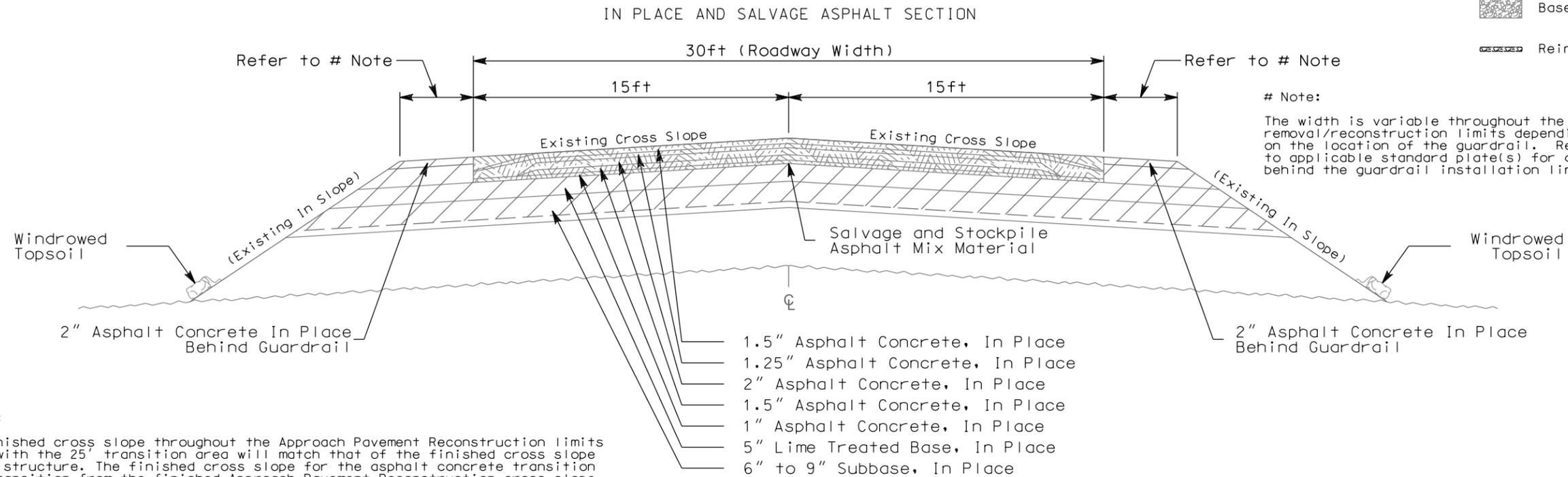
Str No 62-308-092
363+47.84 to 367+73.84
368+46.15 to 372+72.15

Str No 62-283-124
577+64 to 581+16
582+84 to 586+60

Str No 62-308-092
Str No 62-283-124

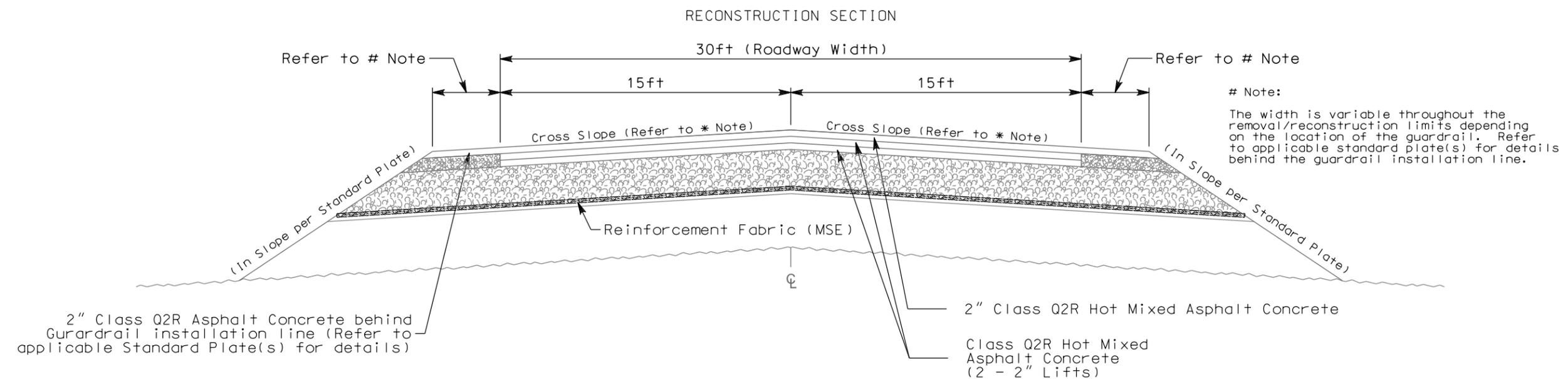
LEGEND:

-  Salvage & Stockpile Asphalt Mix Material
-  Excavation (10.75" to 18")
-  Base Course (12" to 16")
-  Reinforcement Fabric (MSE)



* Note:

The finished cross slope throughout the Approach Pavement Reconstruction limits along with the 25' transition area will match that of the finished cross slope on the structure. The finished cross slope for the asphalt concrete transition will transition from the finished Approach Pavement Reconstruction cross slope to the existing cross slope at the end of the asphalt concrete transition limit.



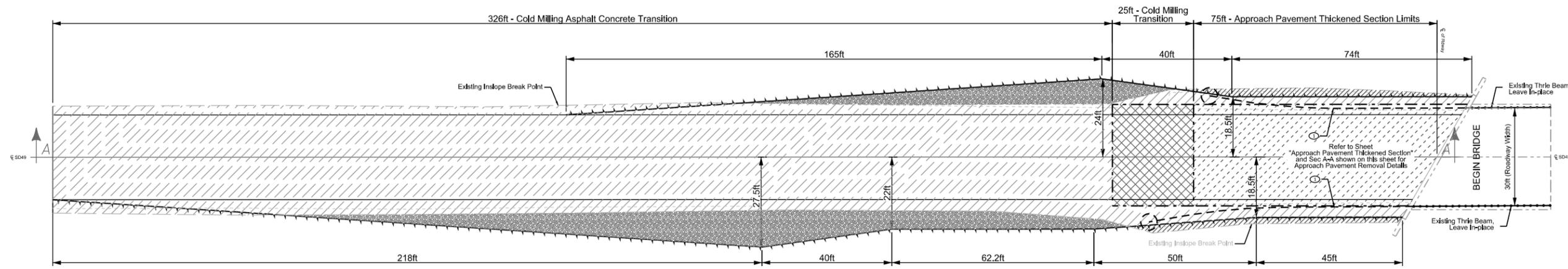
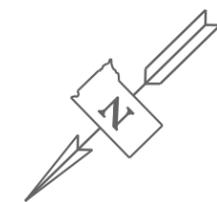
2" Class Q2R Asphalt Concrete behind Guardrail installation line (Refer to applicable Standard Plate(s) for details)

2" Class Q2R Hot Mixed Asphalt Concrete

Class Q2R Hot Mixed Asphalt Concrete (2 - 2" Lifts)

APPROACH PAVEMENT AND GUARDRAIL REMOVAL AND EMBANKMENT RECONSTRUCTION

Structure No. 62-308-092 on SD49 at MRM 46.56



GUARDRAIL QUANTITIES	
LOCATION	REMOVE BEAM GUARDRAIL (FT)
BEGIN BRIDGE	162.5
END BRIDGE	162.5

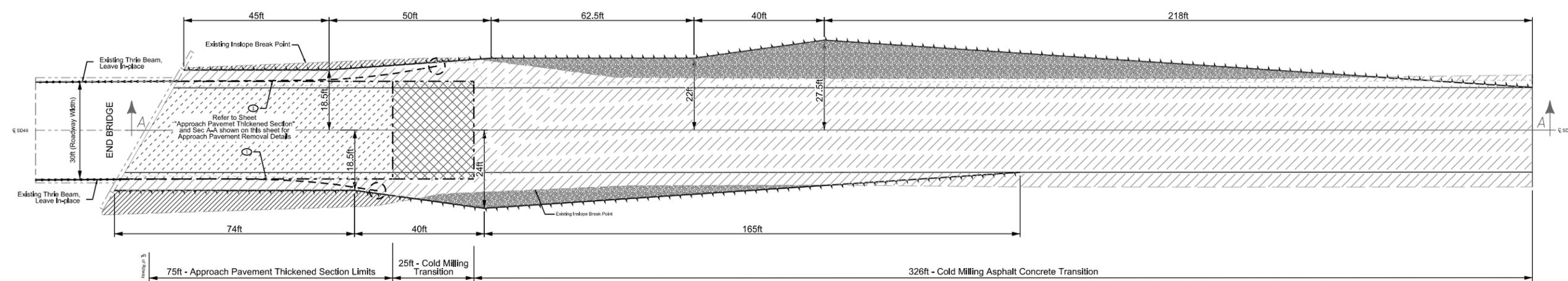
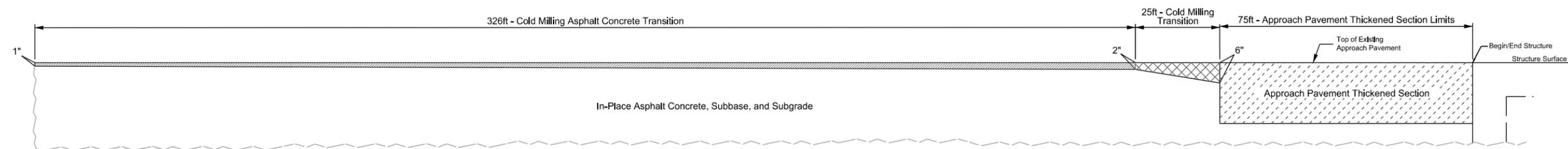
EMBANKMENT INSLOPE RECONSTRUCTION BREAK POINT LIMIT
 The Contractor will modify the existing embankment to accommodate the new guardrail embankment installation limits.

The existing embankment beyond this point will be modified through removing material to fit the proposed embankment reconstruction limits. In areas where the proposed new embankment limit lies beyond the existing inslope break point the area will require embankment widening. Earthen material removed from the modified areas along with Contractor Borrow will be used to widen the area at or below the existing mainline subgrade elevation to satisfy the necessary height of Base Course plus 2" Asphalt Concrete finished surface layer throughout the limits.

The embankment construction along with the finished slopes of the surface will be as per applicable Standard Plate(s) or as directed by the Engineer.

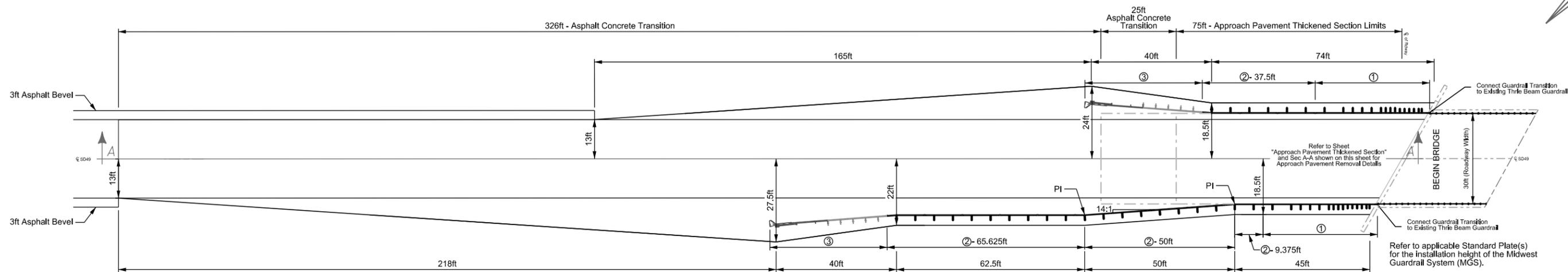
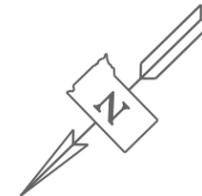
- Cold Milling Asphalt Concrete Transition (1" to 2" Depth)
- Cold Milling Asphalt Concrete Transition (2" to 6" Depth)
- Excavation (Existing Embankment Modification/Removal)
- Embankment Widening (Earthen material from modified areas & Contractor Borrow w/ 6" Base Course layer)
- Excavation (depth of 18" from top of bridge deck) (Refer to "Approach Roadway Reconstruction Section" for further details)
- Existing Embankment Inslope Break Point Limit
- Thickened Section Work Limits
- Existing Guardrail
- Existing Thrie Beam Guardrail

SEC. A-A (At Centerline of Roadway)



APPROACH GUARDRAIL INSTALLATION AND APPROACH PAVEMENT RECONSTRUCTION

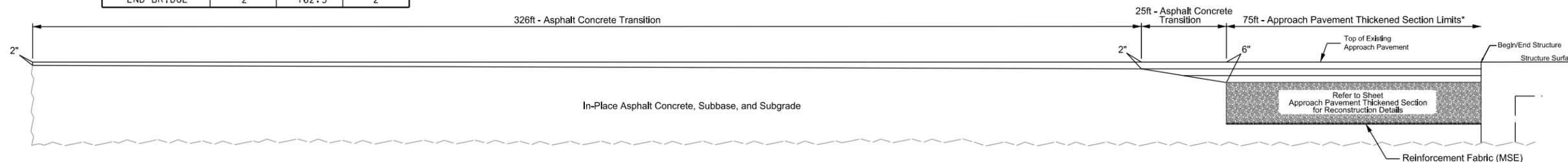
Structure No. 62-308-092 on SD49 at MRM 46.56



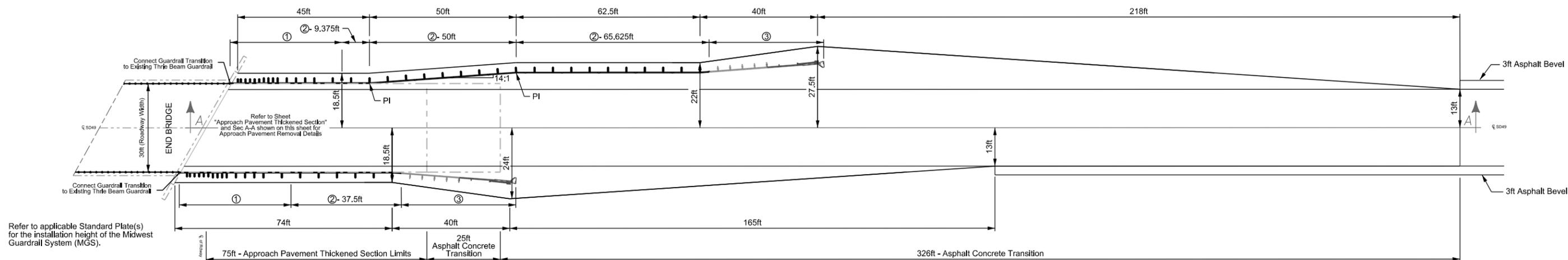
GUARDRAIL QUANTITIES			
LOCATION	① TYPE 2A GUARDRAIL TRANSITION (EACH)	② TYPE 1 MGS (FT)	③ MGS TANGENT END TERMINAL (EACH)
BEGIN BRIDGE	2	162.5	2
END BRIDGE	2	162.5	2

SEC. A-A (At Centerline of Roadway)

Base Course
Thickened Section Work Limits



*Note: The top lift of asphalt concrete will be paved continuously from the structure throughout the entire length (426') of the construction limits



Refer to applicable Standard Plate(s) for the installation height of the Midwest Guardrail System (MGS).

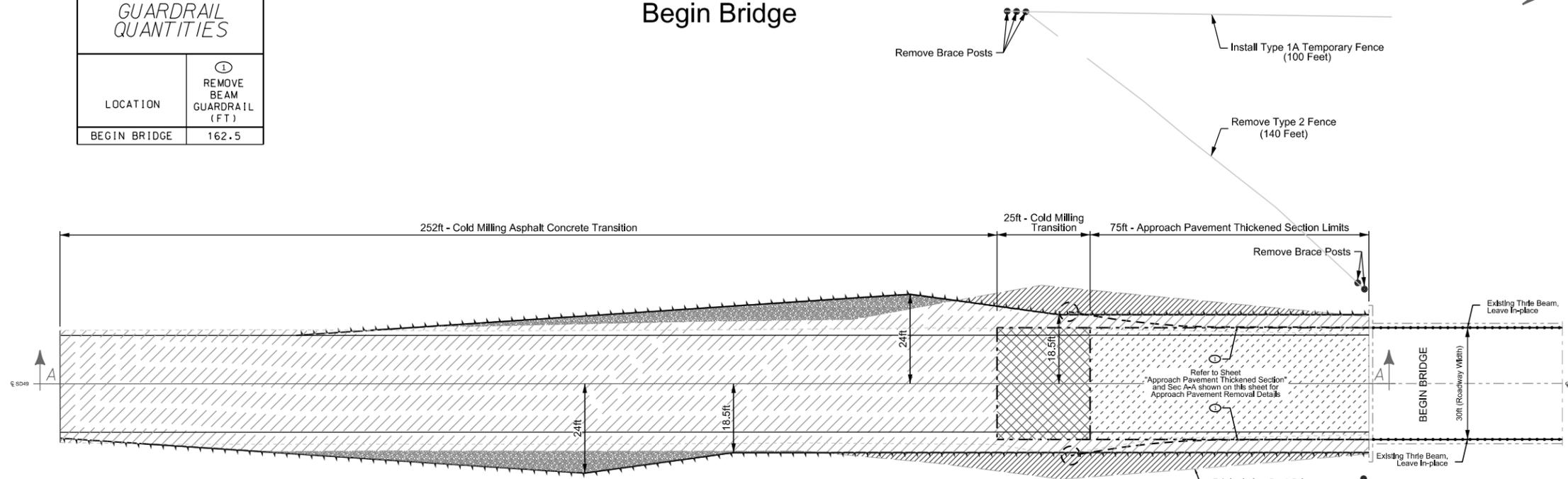
APPROACH PAVEMENT AND GUARDRAIL REMOVAL AND EMBANKMENT RECONSTRUCTION

Structure No. 62-283-124 on SD49 at MRM 42.23

Begin Bridge



GUARDRAIL QUANTITIES	
LOCATION	REMOVE BEAM GUARDRAIL (FT)
BEGIN BRIDGE	162.5

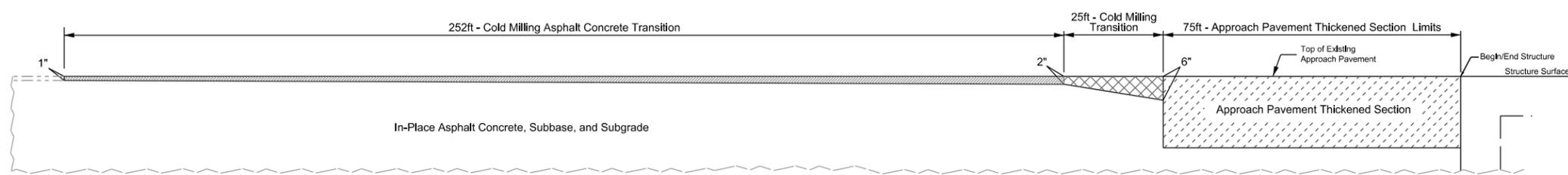


EMBANKMENT INSLOPE RECONSTRUCTION BREAK POINT LIMIT
 The Contractor will modify the existing embankment to accommodate the new guardrail embankment installation limits.
 The existing embankment beyond this point will be modified through removing material to fit the proposed embankment reconstruction limits. In areas where the proposed new embankment limit lies beyond the existing inslope break point the area will require embankment widening. Earthen material removed from the modified areas along with Contractor Borrow will be used to widen the area at or below the existing mainline subgrade elevation to satisfy the necessary height of Base Course plus 2" Asphalt Concrete finished surface layer throughout the limits.
 The embankment construction along with the finished slopes of the surface will be as per applicable Standard Plate(s) or as directed by the Engineer.

Existing Embankment Inslope Break Point Limit
 Thickened Section Work Limits
 Type 2 and Temporary Fence
 Existing Guardrail
 Existing Thrie Beam Guardrail

- Cold Milling Asphalt Concrete Transition (1" to 2" Depth)
- Cold Milling Asphalt Concrete Transition (2" to 6" Depth)
- Excavation (Existing Embankment Modification/Removal)
- Embankment Widening (Earthen material from modified areas & Contractor Borrow w/ 6" Base Course layer)
- Excavation (depth of 18" from top of bridge deck) (Refer to "Approach Pavement Thickened Section" for further details)

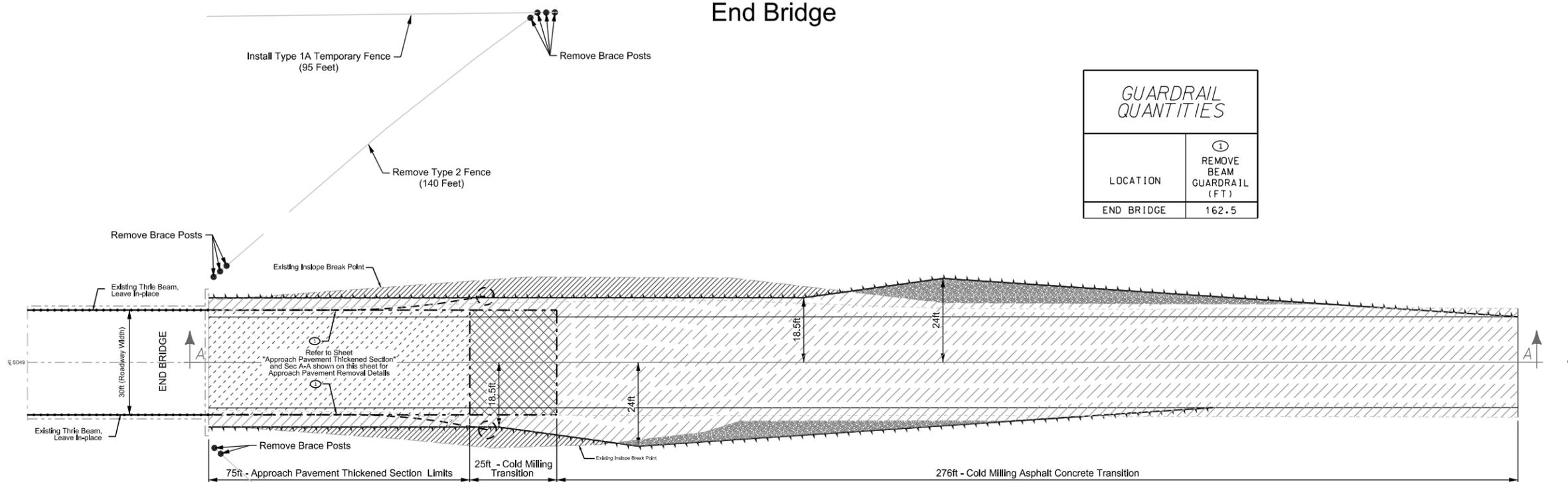
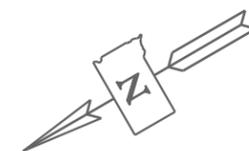
SEC. A-A (At Centerline of Roadway)



APPROACH PAVEMENT AND GUARDRAIL REMOVAL AND EMBANKMENT RECONSTRUCTION

Structure No. 62-283-124 on SD49 at MRM 42.23

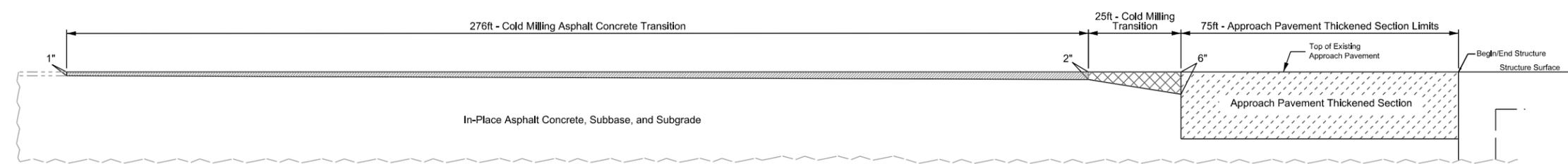
End Bridge



GUARDRAIL QUANTITIES	
LOCATION	REMOVE BEAM GUARDRAIL (FT)
END BRIDGE	162.5

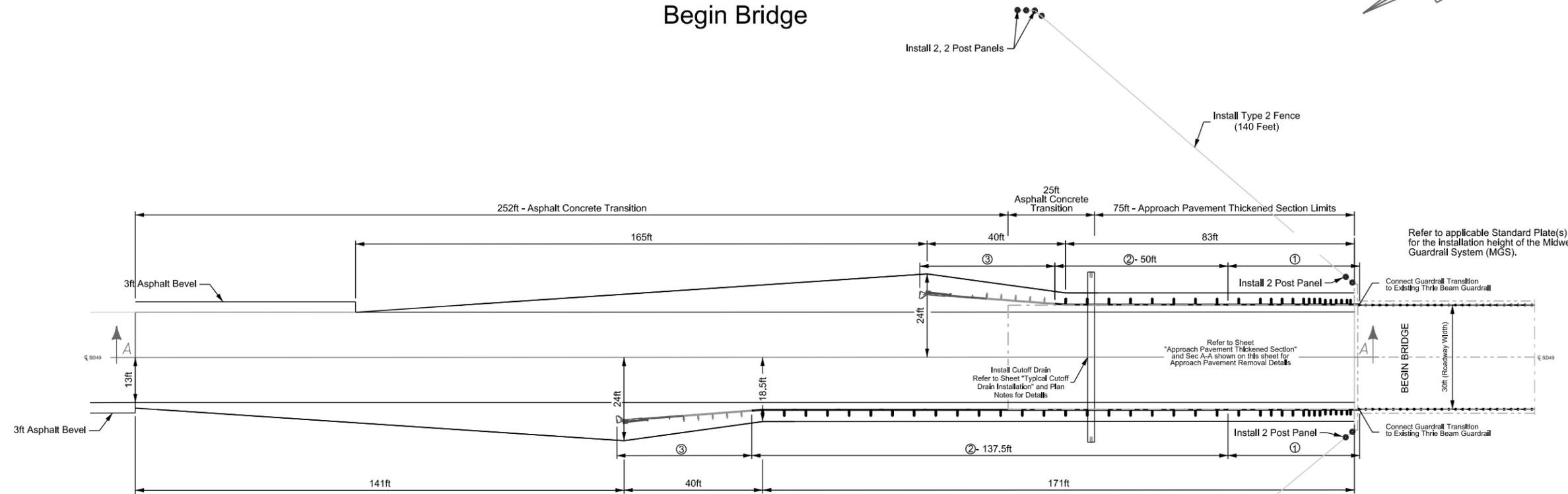
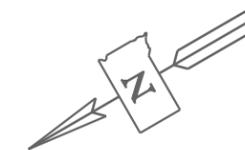
- Cold Milling Asphalt Concrete Transition (1" to 2" Depth)
- Cold Milling Asphalt Concrete Transition (2" to 6" Depth)
- Excavation (Existing Embankment Modification/Removal)
- Embankment Widening (Earthen material from modified areas & Contractor Borrow w/ 6" Base Course layer)
- Excavation (depth of 18" from top of bridge deck) (Refer to "Approach Roadway Reconstruction Section" for further details)
- EMBANKMENT INSLOPE RECONSTRUCTION BREAK POINT LIMIT
The Contractor will modify the existing embankment to accommodate the new guardrail embankment installation limits.
The existing embankment beyond this point will be modified through removing material to fit the proposed embankment reconstruction limits. In areas where the proposed new embankment limit lies beyond the existing inslope break point the area will require embankment widening. Earthen material removed from the modified areas along with Contractor Borrow will be used to widen the area at or below the existing mainline subgrade elevation to satisfy the necessary height of Base Course plus 2" Asphalt Concrete finished surface layer throughout the limits.
The embankment construction along with the finished slopes of the surface will be as per applicable Standard Plate(s) or as directed by the Engineer.
- Existing Embankment Inslope Break Point Limit
- Thickened Section Work Limits
- Type 2 and Temporary Fence
- Existing Guardrail
- Existing Thrie Beam Guardrail

SEC. A-A (At Centerline of Roadway)



APPROACH GUARDRAIL INSTALLATION AND APPROACH PAVEMENT RECONSTRUCTION

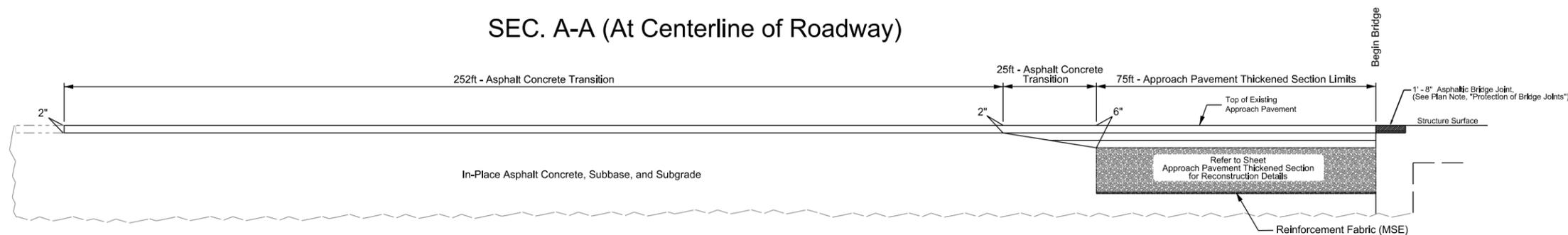
Structure No. 62-283-124 on SD49 at MRM 42.23
Begin Bridge



GUARDRAIL QUANTITIES			
LOCATION	① TYPE 2A GUARDRAIL TRANSITION (EACH)	② TYPE 1 MGS (FT)	③ MGS TANGENT END TERMINAL (EACH)
BEGIN BRIDGE	2	187.5	2

- Base Course
- Thickened Section Work Limits
- Type 2 Fence

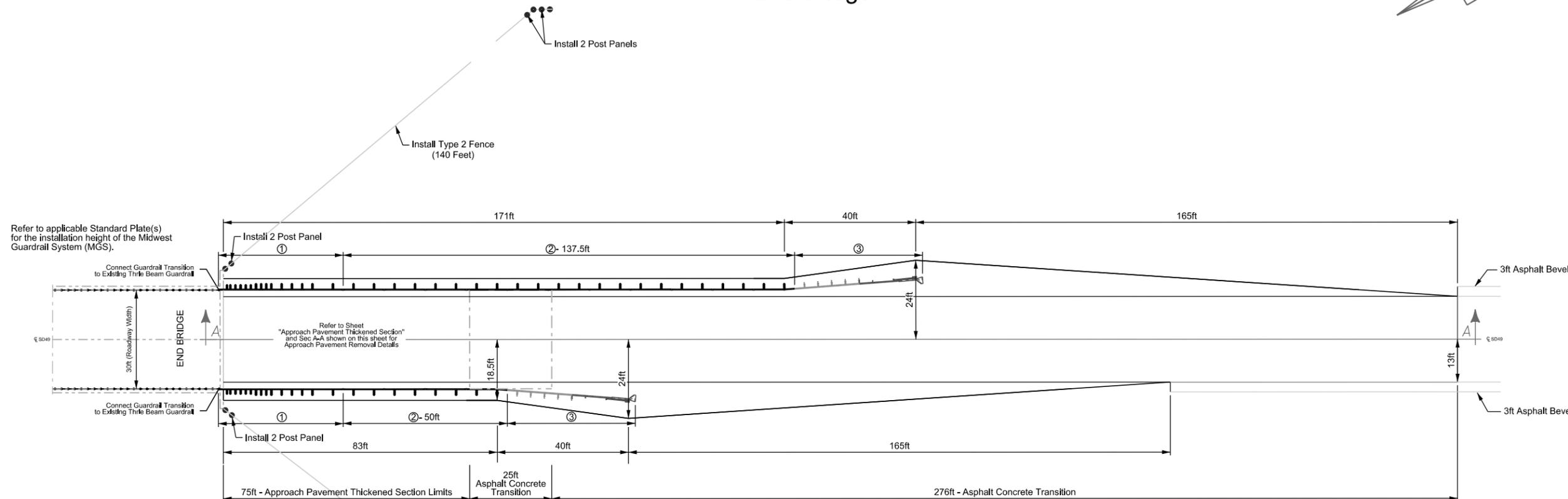
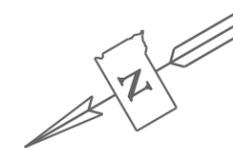
SEC. A-A (At Centerline of Roadway)



*Note: The top lift of asphalt concrete will be paved continuously from the structure throughout the entire length (376') of the construction limits

APPROACH GUARDRAIL INSTALLATION AND APPROACH PAVEMENT RECONSTRUCTION

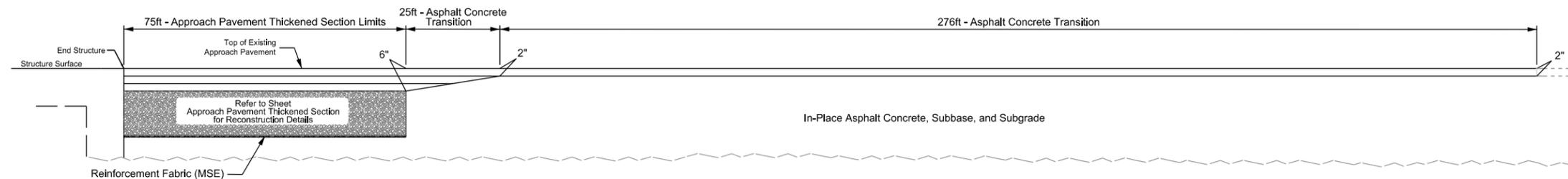
Structure No. 62-283-124 on SD49 at MRM 42.23
End Bridge



GUARDRAIL QUANTITIES			
LOCATION	① TYPE 2A GUARDRAIL TRANSITION (EACH)	② TYPE 1 MGS (FT)	③ MGS TANGENT END TERMINAL (EACH)
END BRIDGE	2	187.5	2

- Base Course
- Thickened Section Work Limits
- Type 2 Fence

SEC. A-A (At Centerline of Roadway)

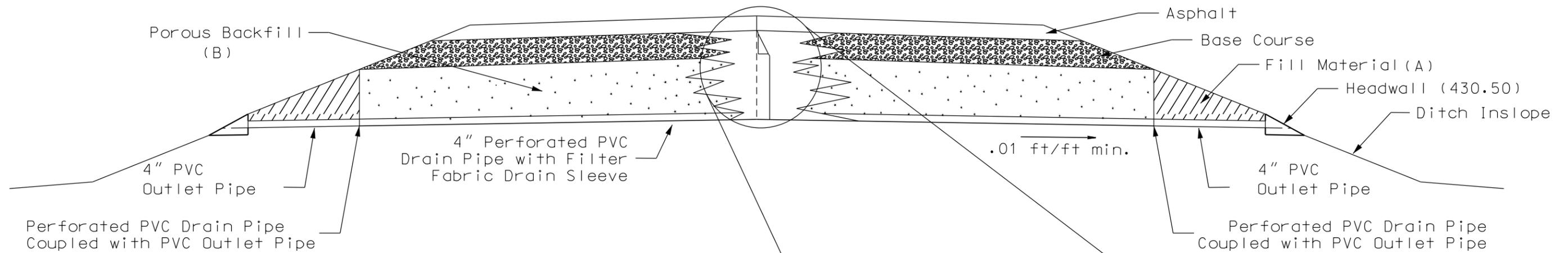


*Note: The top lift of asphalt concrete will be paved continuously from the structure throughout the entire length (376') of the construction limits

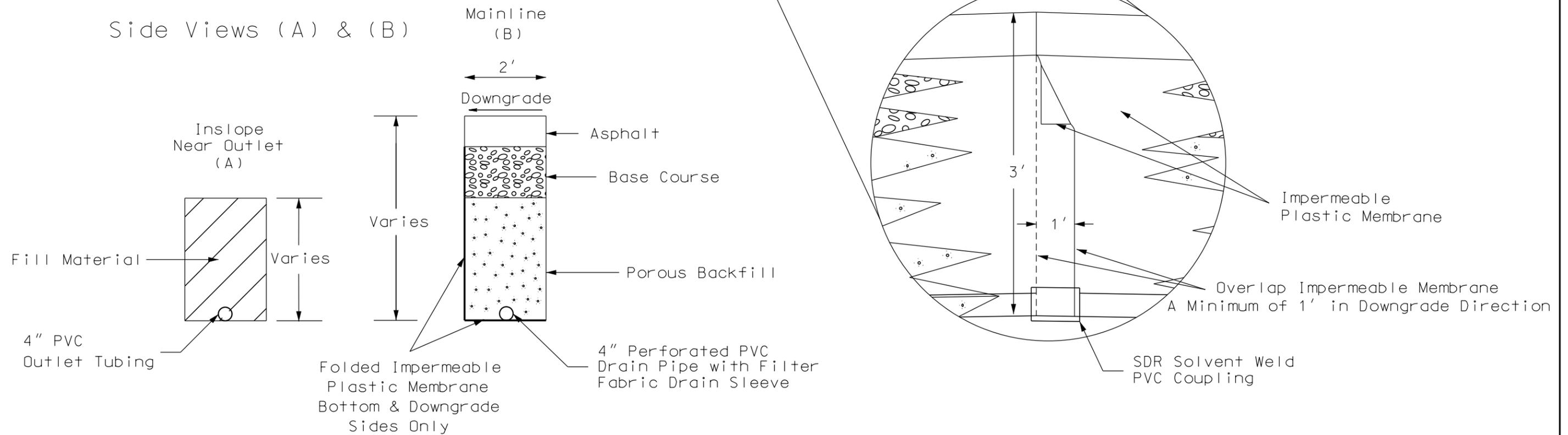
Typical Cutoff Drain Installation

Str. No. 62-283-124

Elevation View



Side Views (A) & (B)



4" Perforated PVC Drain Pipe will be SDR 35 perforated solvent weld PVC pipe conforming to ASTM D3034.

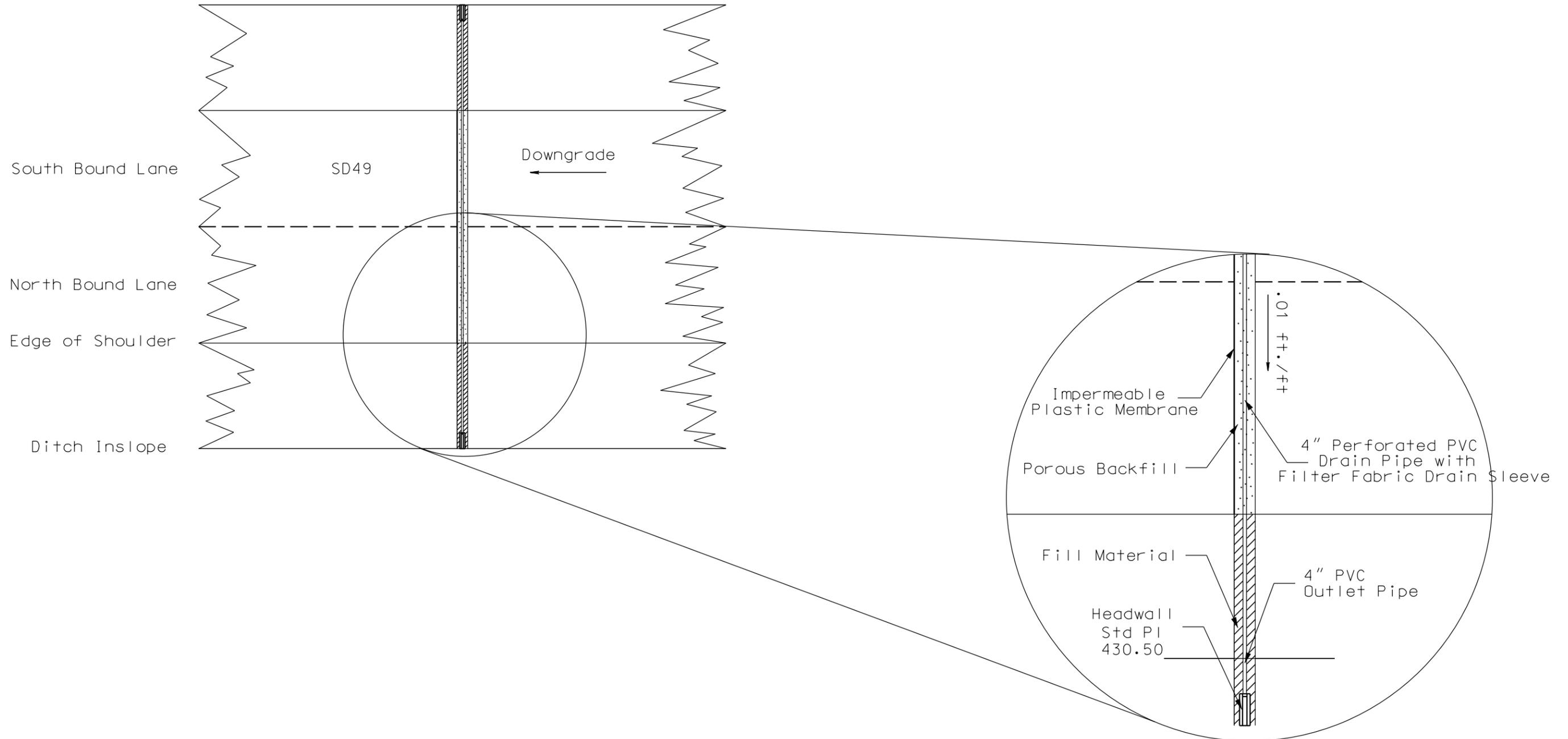
4" PVC Outlet Pipe will be schedule 40 PVC pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1200, or PVC 2120.

Not to Scale

Typical Cutoff Drain Installation

Str. No. 62-283-124

Plan View



APPROACH PAVEMENT THICKENED SECTION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	P 0049(05)27	62	164

Plotting Date: 05/21/2021

Transition/Thickened Section Limits at Structures:

Str No 62-280-133
18+31.50 (2nd) to 21+40.50 (2nd)
22+59.50 (2nd) to 26+52.50 (2nd)

Str No 62-283-191*
322+87.75 (2nd) to 326+21.75 (2nd)
327+08.25 (2nd) to 330+31.25 (2nd)

*Note: Transitions lie within a Superelevated curve.

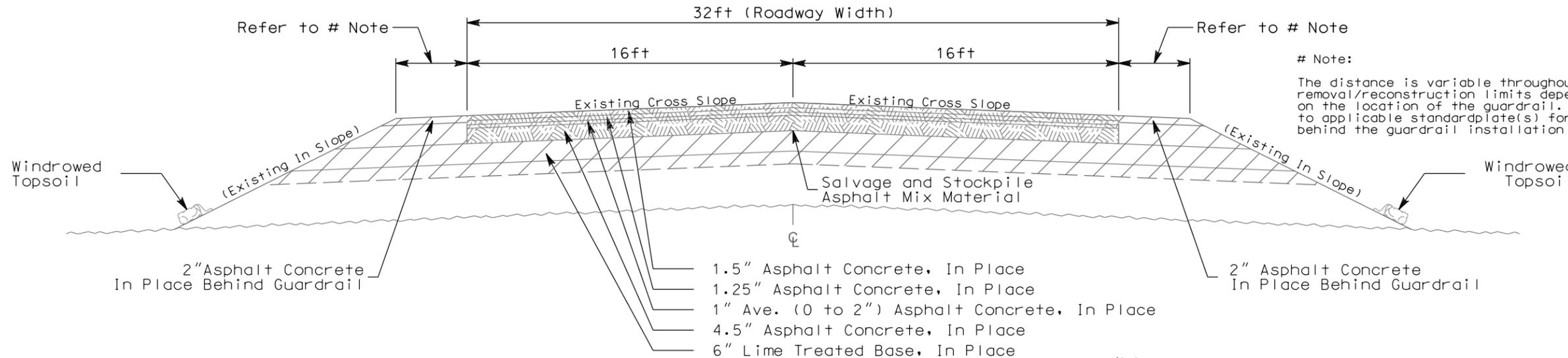
Refer to the Bridge Rail Upgrade portion of the plan set for details regarding the removal of the concrete approach slabs.

Str No 62-280-133
Str No 62-283-191°

LEGEND:

-  Salvage & Stockpile Asphalt Mix Material
-  Excavation (9.75" to 18")
-  Base Course (12" to 16")
-  Reinforcement Fabric (MSE)

IN PLACE AND SALVAGE ASPHALT SECTION



Note:

The distance is variable throughout the removal/reconstruction limits depending on the location of the guardrail. Refer to applicable standard plate(s) for details behind the guardrail installation line.

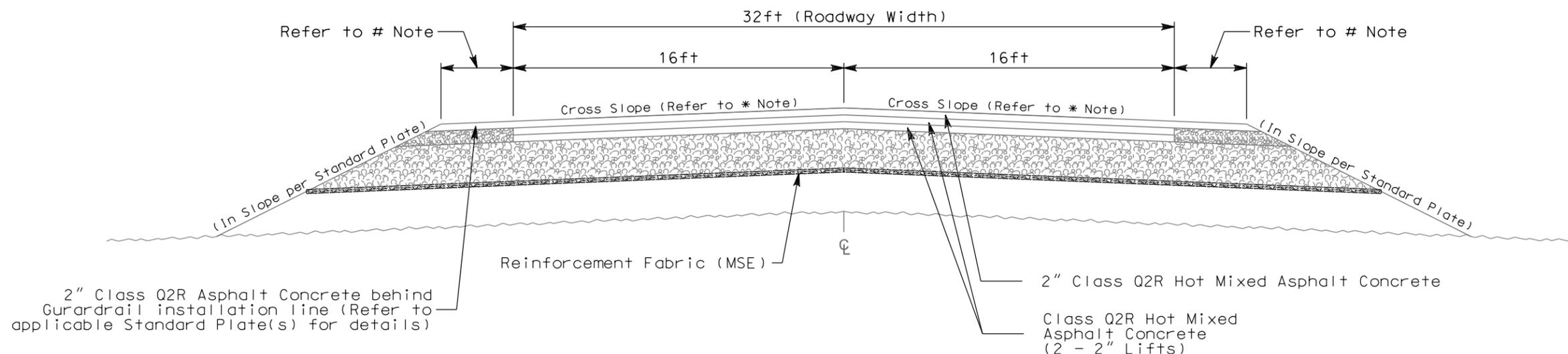
* Note:

The finished cross slope throughout the Approach Pavement Reconstruction limits along with the 25' transition area will match that of the finished cross slope on the structure. The finished cross slope for the asphalt concrete transition will transition from the finished Approach Pavement Reconstruction cross slope to the existing cross slope at the end of the asphalt concrete transition limit.

o Note:

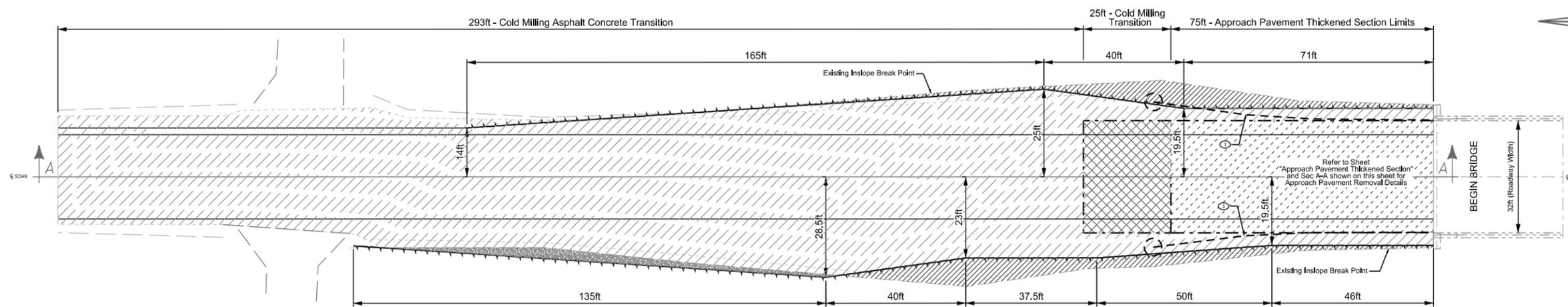
Str No 62-283-191 lies within a superelevated curve with a slope of 0.044ft/ft.

RECONSTRUCTION SECTION



APPROACH PAVEMENT AND GUARDRAIL REMOVAL AND EMBANKMENT RECONSTRUCTION

Structure No. 62-280-133 on SD49 at MRM 41.10



GUARDRAIL QUANTITIES	
LOCATION	① REMOVE BEAM GUARDRAIL (FT)
BEGIN BRIDGE	162.5
END BRIDGE	162.5

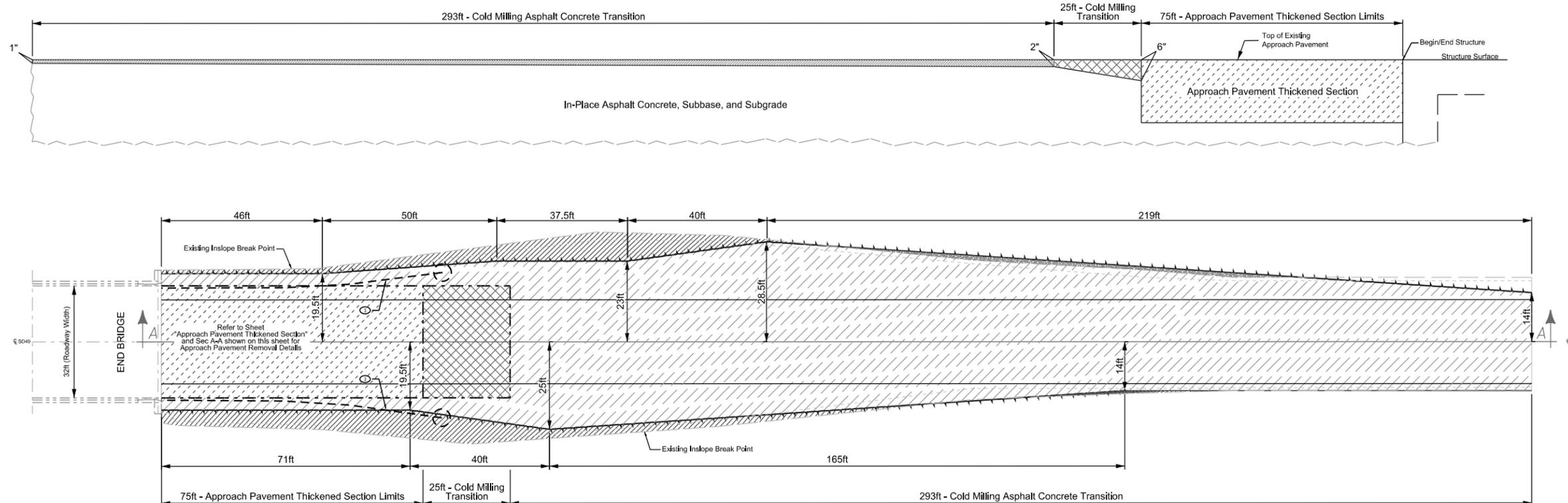
EMBANKMENT INSLOPE RECONSTRUCTION BREAK POINT LIMIT
 The Contractor will modify the existing embankment to accommodate the new guardrail embankment installation limits.
 The existing embankment beyond this point will be modified through removing material to fit the proposed embankment reconstruction limits. In areas where the proposed new embankment limit lies beyond the existing inslope break point the area will require embankment widening. Earthen material removed from the modified areas along with Contractor Borrow will be used to widen the area at or below the existing mainline subgrade elevation to satisfy the necessary height of Base Course plus 2" Asphalt Concrete finished surface layer throughout the limits.
 The embankment construction along with the finished slopes of the surface will be as per applicable Standard Plate(s) or as directed by the Engineer.

- Cold Milling Asphalt Concrete Transition (1" to 2" Depth)
- Cold Milling Asphalt Concrete Transition (2" to 6" Depth)

- Excavation (Existing Embankment Modification/Removal)
- Embankment Widening (Earthen material from modified areas & Contractor Borrow w/ 6" Base Course layer)
- Excavation (depth of 18" from top of bridge deck) (Refer to "Approach Roadway Reconstruction Section" for further details)

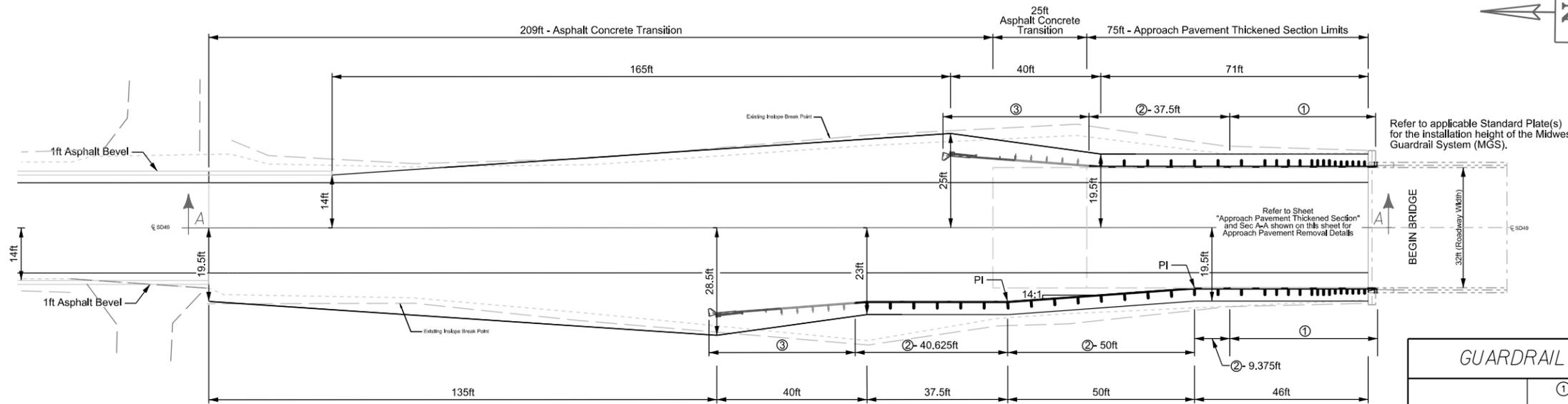
- Existing Embankment Inslope Break Point Limit
- Thickened Section Work Limits
- Existing Guardrail

SEC. A-A (At Centerline of Roadway)



APPROACH GUARDRAIL INSTALLATION AND APPROACH PAVEMENT RECONSTRUCTION

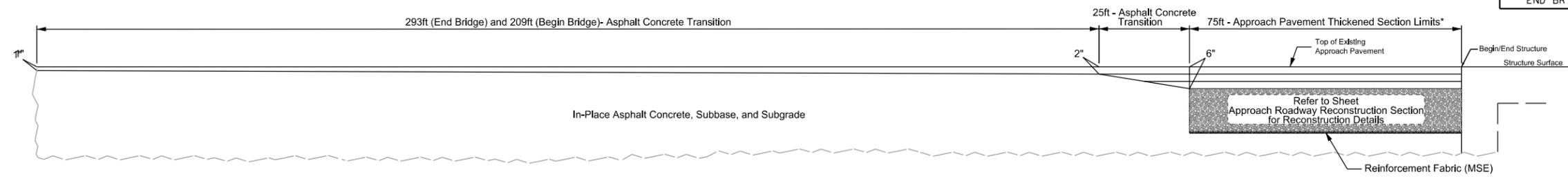
Structure No. 62-280-133 on SD49 at MRM 41.10



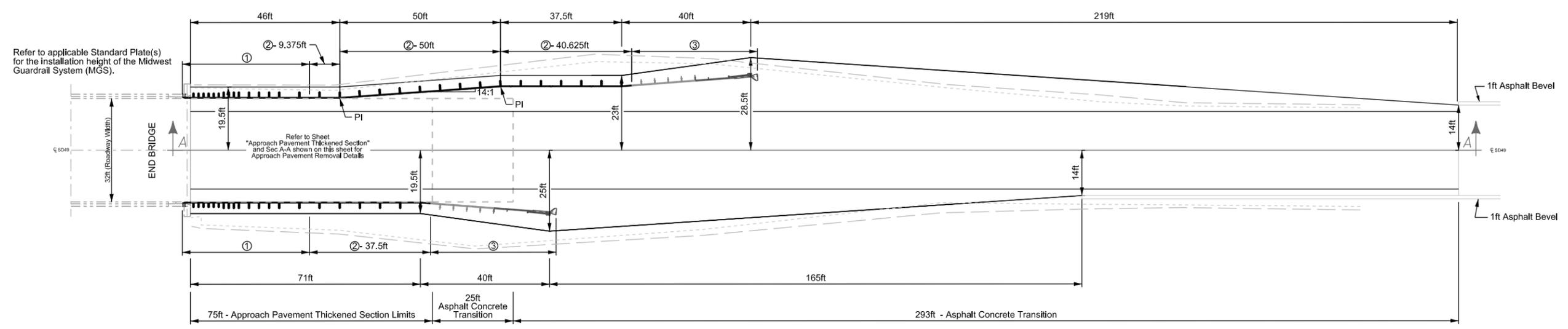
 Base Course
 Thickened Section Work Limits

SEC. A-A (At Centerline of Roadway)

GUARDRAIL QUANTITIES			
LOCATION	① TYPE 1 GUARDRAIL TRANSITION (EACH)	② TYPE 1 MGS (FT)	③ MGS MASH FLARED END TERMINAL (EACH)
BEGIN BRIDGE	2	137.5	2
END BRIDGE	2	137.5	2

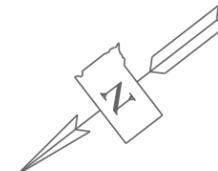
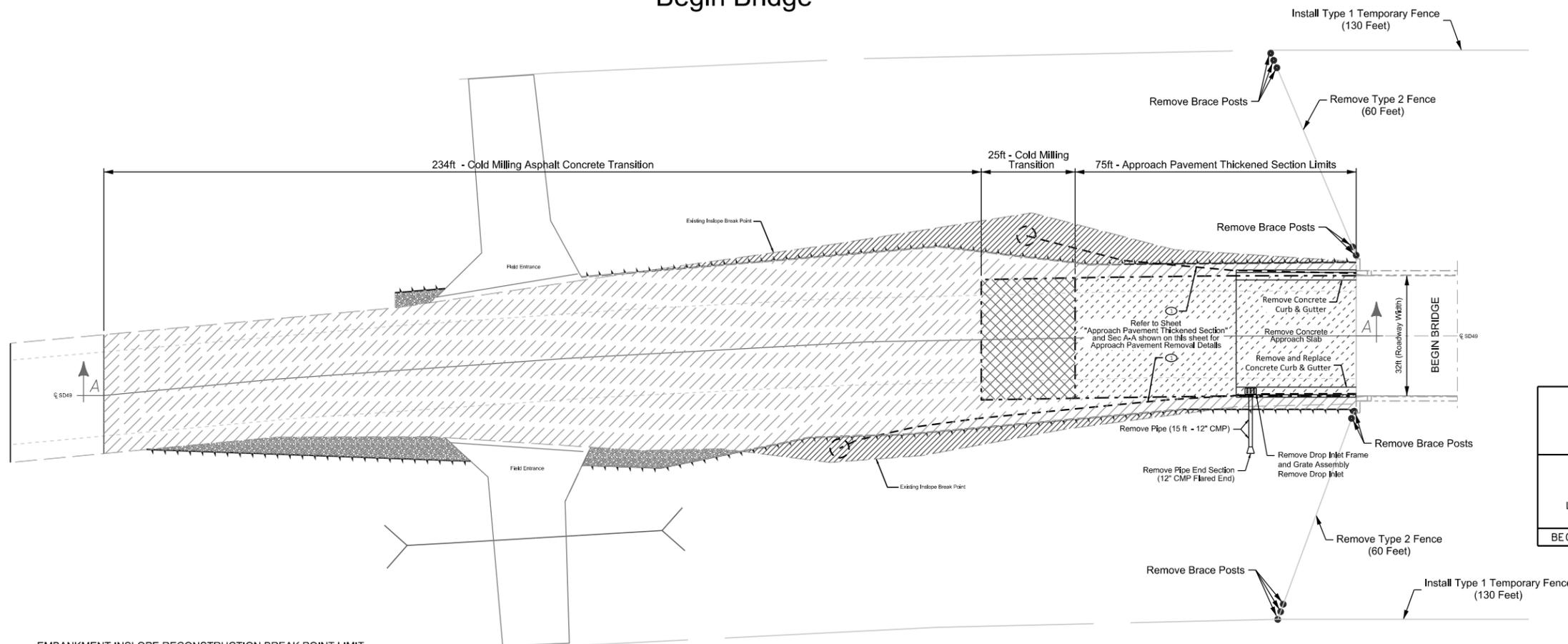


*Note: The top lift of asphalt concrete will be paved continuously from the structure throughout the entire length (309' and 393') of the construction limits



APPROACH PAVEMENT AND GUARDRAIL REMOVAL AND EMBANKMENT RECONSTRUCTION

Structure No. 62-283-191 on SD49 at MRM 35.32
Begin Bridge



GUARDRAIL QUANTITIES	
LOCATION	REMOVE BEAM GUARDRAIL (FT)
BEGIN BRIDGE	225.0

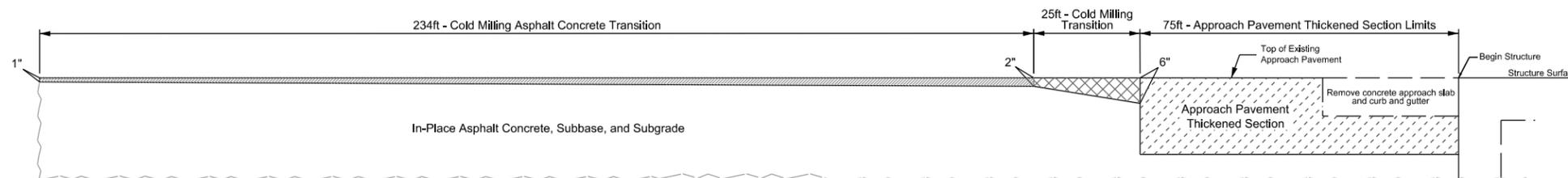
EMBANKMENT INSLOPE RECONSTRUCTION BREAK POINT LIMIT
The Contractor will modify the existing embankment to accommodate the new guardrail embankment installation limits.

The existing embankment beyond this point will be modified through removing material to fit the proposed embankment reconstruction limits. In areas where the proposed new embankment limit lies beyond the existing inslope break point the area will require embankment widening. Earthen material removed from the modified areas along with Contractor Borrow will be used to widen the area at or below the existing mainline subgrade elevation to satisfy the necessary height of Base Course plus 2" Asphalt Concrete finished surface layer throughout the limits.

The embankment construction along with the finished slopes of the surface will be as per applicable Standard Plate(s) or as directed by the Engineer.

- Cold Milling Asphalt Concrete Transition (1" to 2" Depth)
- Cold Milling Asphalt Concrete Transition (2" to 6" Depth)
- Excavation (Existing Embankment Modification/Removal)
- Embankment Widening (Earthen material from modified areas & Contractor Borrow w/ 6" Base Course layer)
- Excavation (depth of 18" from top of bridge deck) (Refer to "Approach Roadway Reconstruction Section" for further details)
- Existing Embankment Inslope Break Point Limit
- Thickened Section Work Limits
- Existing Guardrail
- Type 2 and Temporary Fence

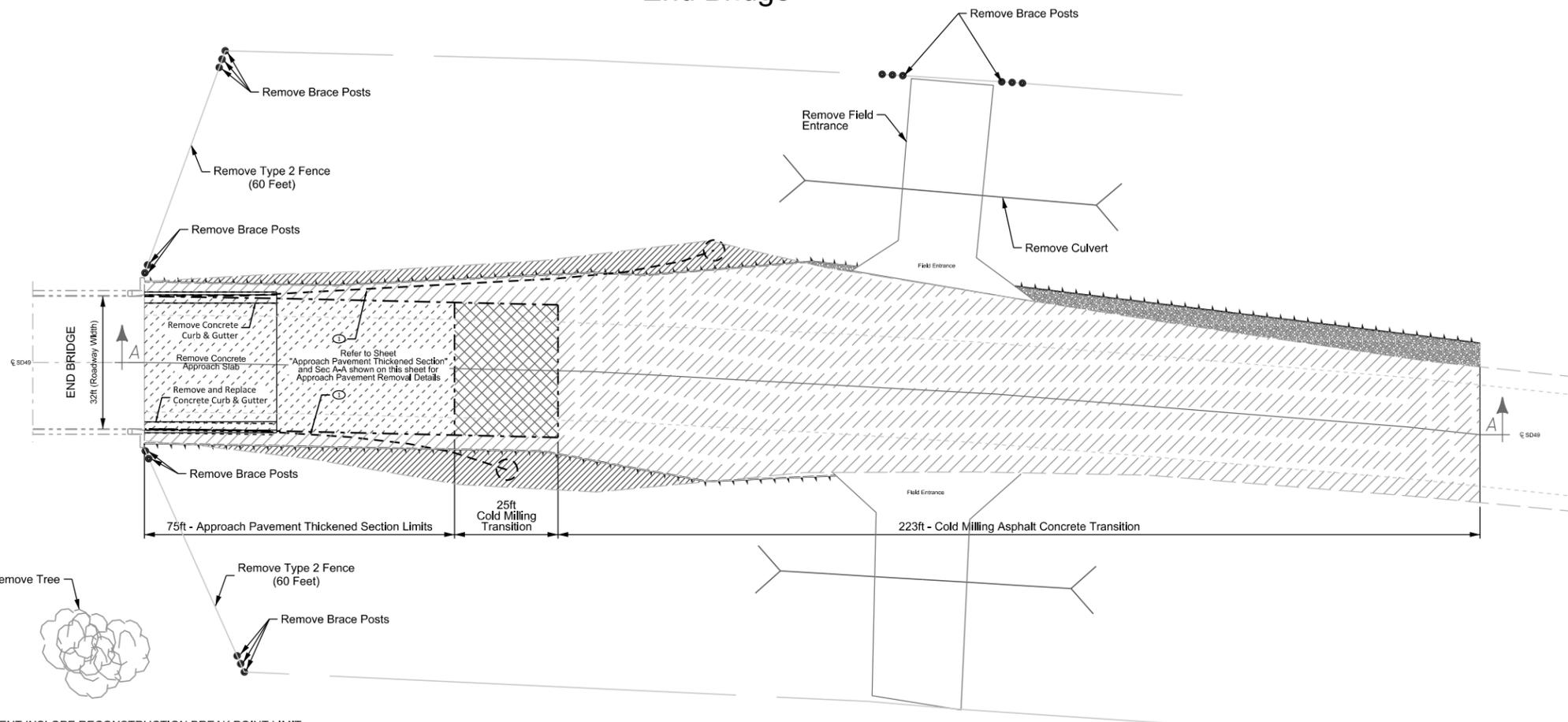
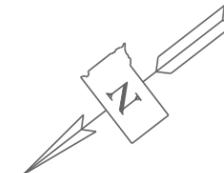
SEC. A-A (At Centerline of Roadway)



APPROACH PAVEMENT AND GUARDRAIL REMOVAL AND EMBANKMENT RECONSTRUCTION

Structure No. 62-283-191 on SD49 at MRM 35.32

End Bridge



GUARDRAIL QUANTITIES	
LOCATION	REMOVED BEAM GUARDRAIL (FT)
END BRIDGE	225.0

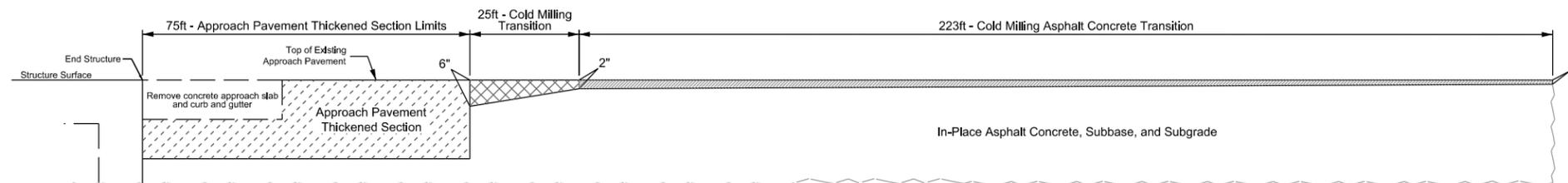
EMBANKMENT INSLOPE RECONSTRUCTION BREAK POINT LIMIT
 The Contractor will modify the existing embankment to accommodate the new guardrail embankment installation limits.

The existing embankment beyond this point will be modified through removing material to fit the proposed embankment reconstruction limits. In areas where the proposed new embankment limit lies beyond the existing inslope break point the area will require embankment widening. Earthen material removed from the modified areas along with Contractor Borrow will be used to widen the area at or below the existing mainline subgrade elevation to satisfy the necessary height of Base Course plus 2" Asphalt Concrete finished surface layer throughout the limits.

The embankment construction along with the finished slopes of the surface will be as per applicable Standard Plate(s) or as directed by the Engineer.

- Cold Milling Asphalt Concrete Transition (1" to 2" Depth)
- Cold Milling Asphalt Concrete Transition (2" to 6" Depth)
- Excavation (Existing Embankment Modification/Removal)
- Embankment Widening (Earthen material from modified areas & Contractor Borrow w/ 6" Base Course layer)
- Excavation (depth of 18" from top of bridge deck) (Refer to "Approach Roadway Reconstruction Section" for further details)
- Existing Embankment Inslope Break Point Limit
- Thickened Section Work Limits
- Existing Guardrail
- Type 2 Fence

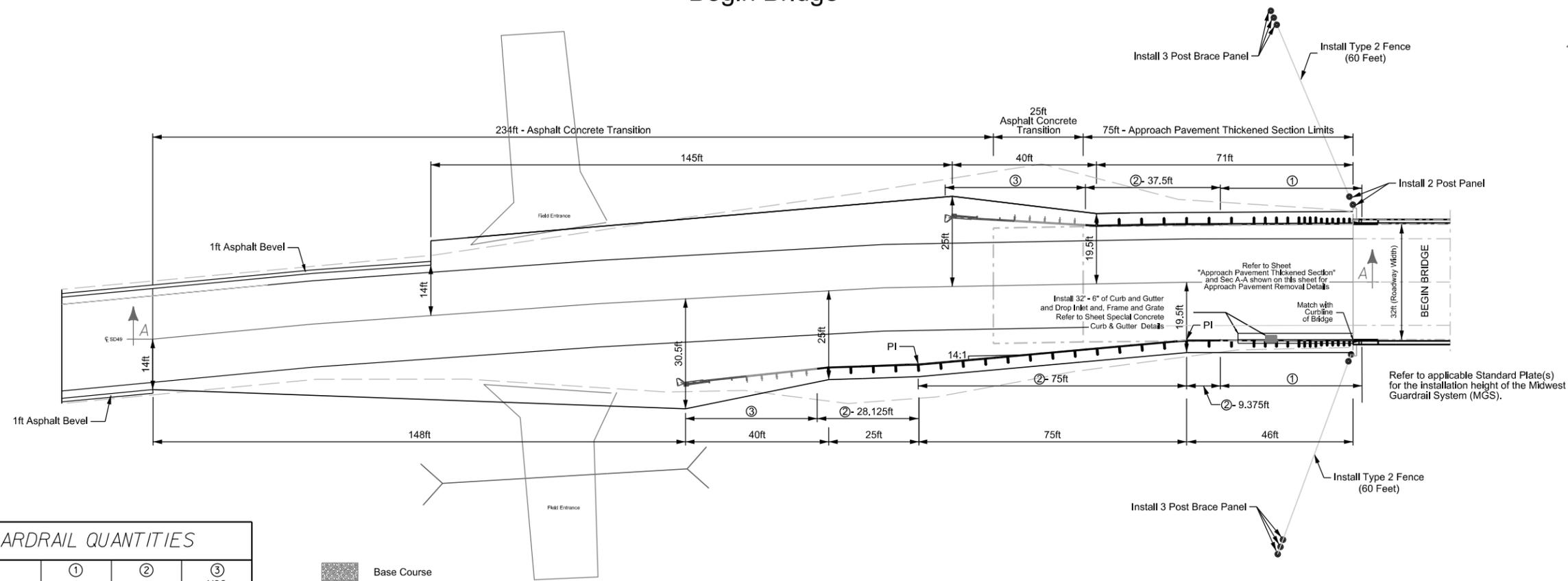
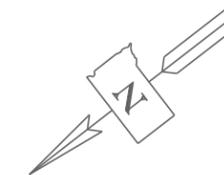
SEC. A-A (At Centerline of Roadway)



APPROACH GUARDRAIL & APPROACH PAVEMENT RECONSTRUCTION

Structure No. 62-283-191 on SD49 at MRM 35.32

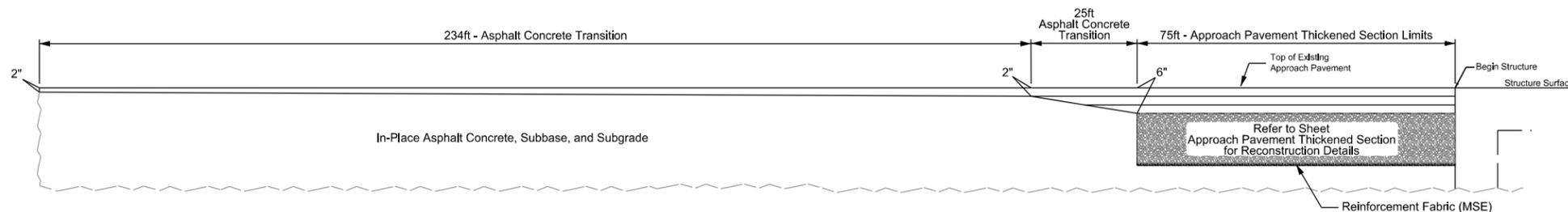
Begin Bridge



GUARDRAIL QUANTITIES			
LOCATION	① TYPE 1 GUARDRAIL TRANSITION (EACH)	② TYPE 1 MGS (FT)	③ MGS MASH FLARED END TERMINAL (EACH)
BEGIN BRIDGE	2	150.0	2

- Base Course
- Thickened Section Work Limits
- Type 2 Fence

SEC. A-A (At Centerline of Roadway)

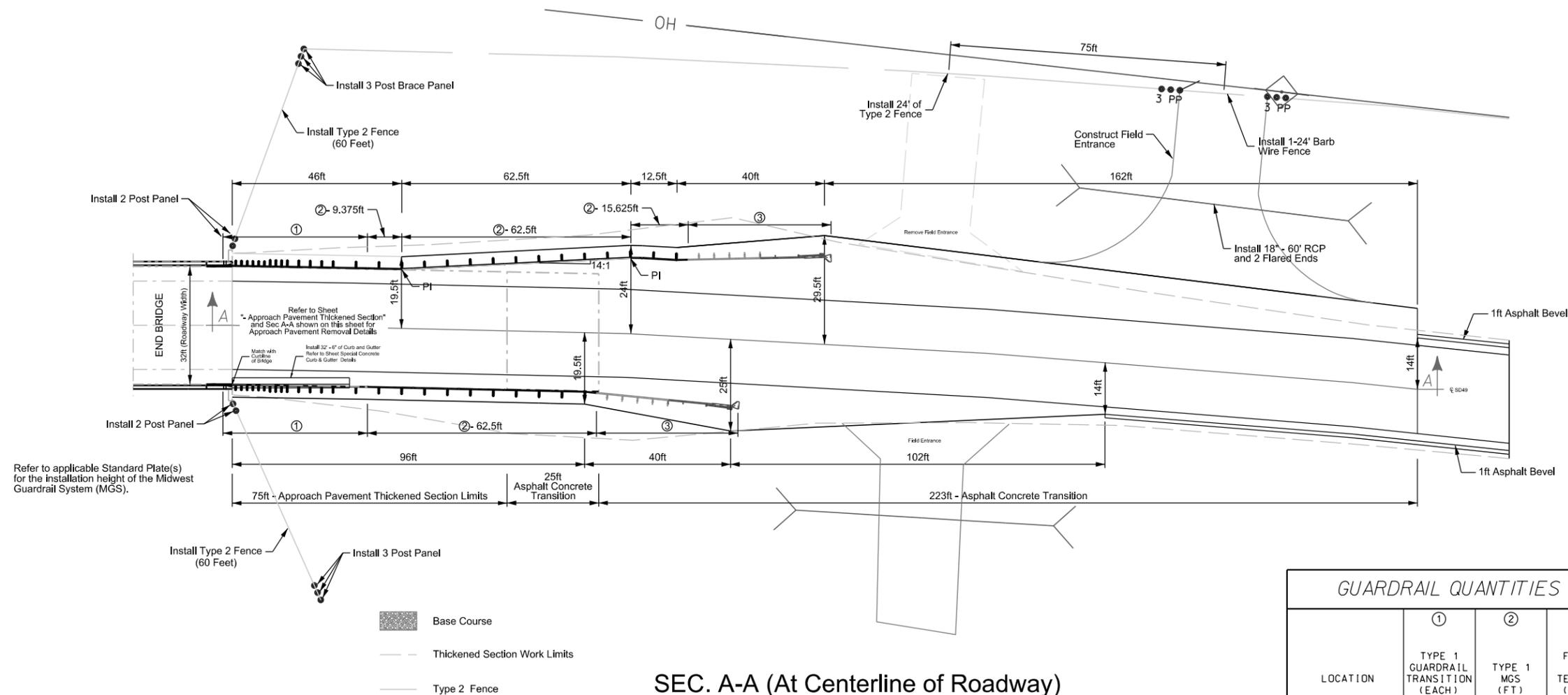
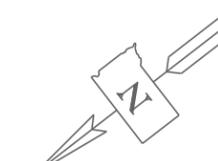


*Note: The top lift of asphalt concrete will be paved continuously from the structure throughout the entire length (334') of the construction limits

APPROACH GUARDRAIL & APPROACH PAVEMENT RECONSTRUCTION

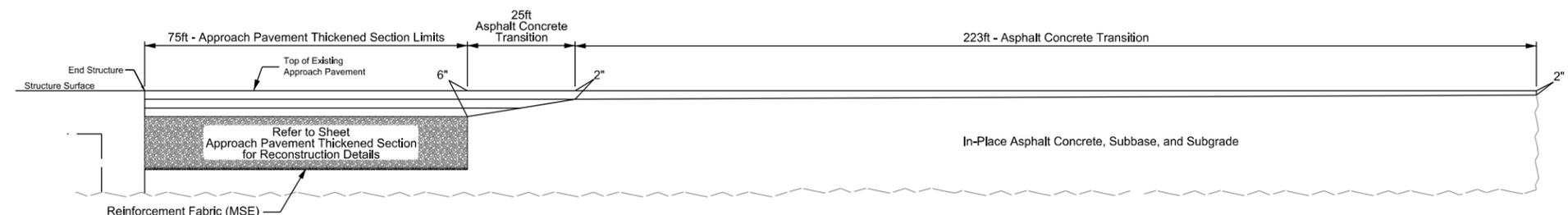
Structure No. 62-283-191 on SD49 at MRM 35.32

End Bridge



SEC. A-A (At Centerline of Roadway)

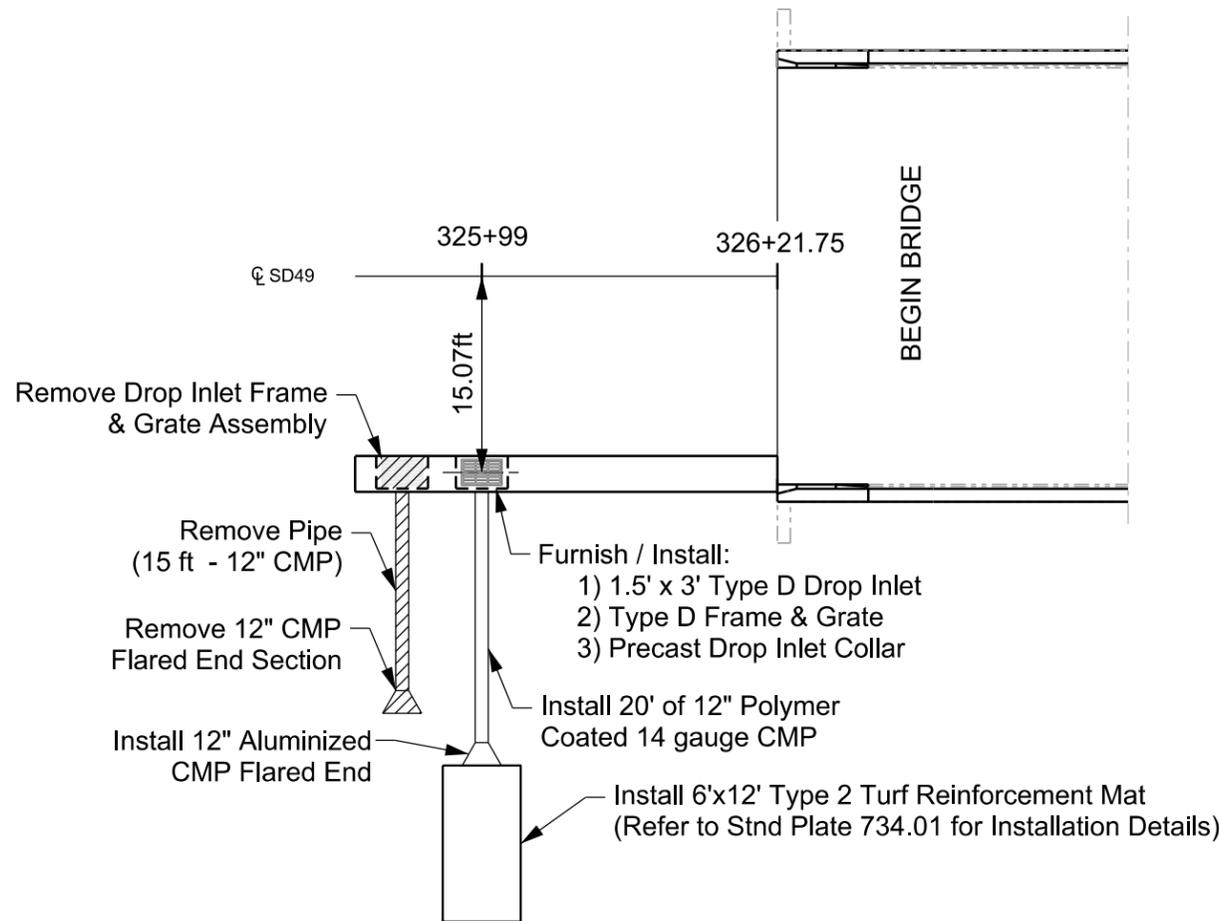
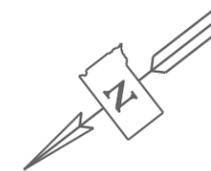
GUARDRAIL QUANTITIES			
LOCATION	① TYPE 1 GUARDRAIL TRANSITION (EACH)	② TYPE 1 MGS (FT)	③ MGS MASH FLARED END TERMINAL (EACH)
END BRIDGE	2	150.0	2



*Note: The top lift of asphalt concrete will be paved continuously from the structure throughout the entire length (323') of the construction limits

DROP INLET REMOVAL / INSTALLATION LAYOUT

Str No 62-283-191 on SD49 MRM 35.32

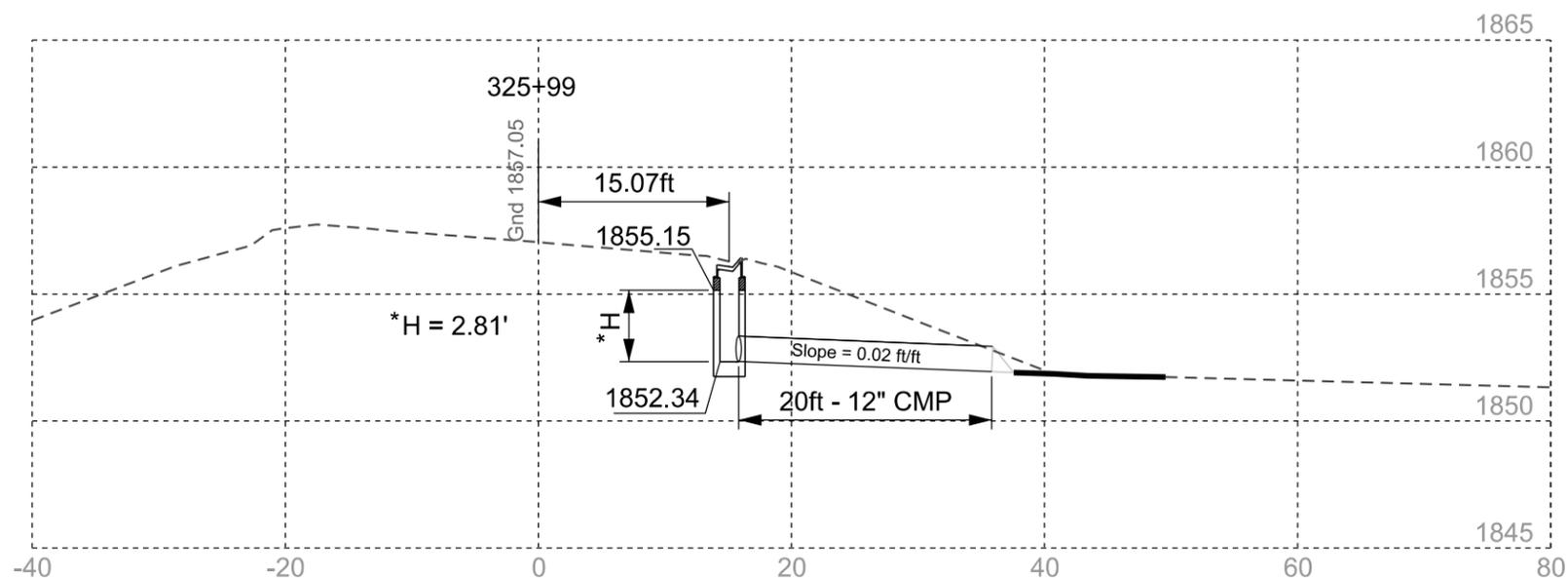


Notes:

Pipe quantities shown in the Estimate of Quantities are based on the shown dimensions. The quantities may need to be adjusted in the field at the time of construction as directed by the Engineer.

The offset was obtained from the most recent surveys. The offset may need to be adjusted in the field during construction as directed by the Engineer to arrive at the center point of the drop inlet as per Standard Plate 670.20.

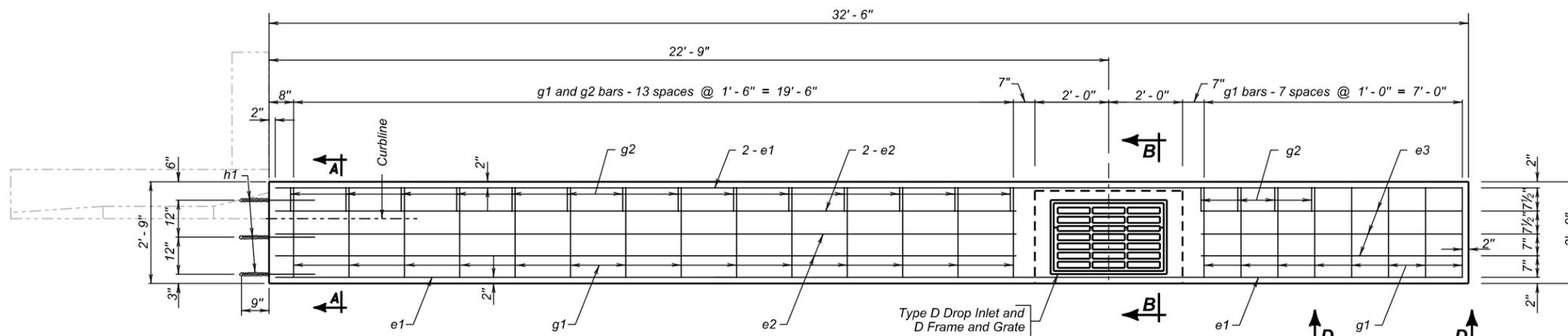
Where any of the natural ground is to be disturbed the Contractor will remove/replace 4" of topsoil prior to disturbing the area.



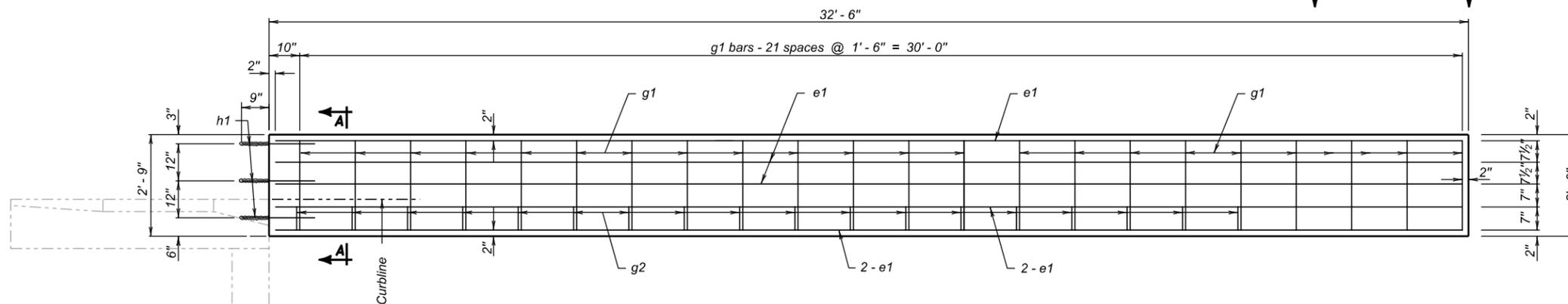
SPECIAL CONCRETE CURB & GUTTER DETAILS

Str No 62-283-191 (Begin/End Bridge - Right of Centerline)

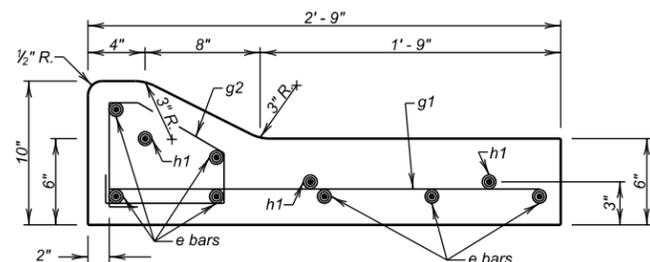
SD49 MRM 35.32



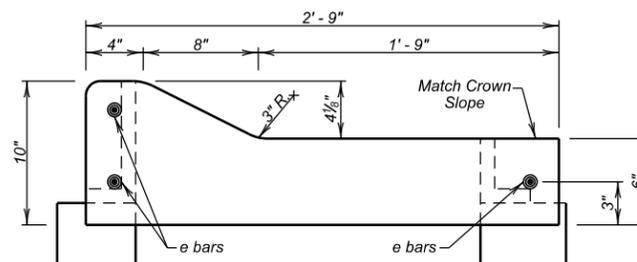
PLAN VIEW - Northwest Concrete End Block Shown



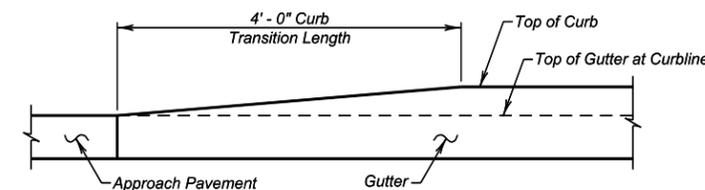
PLAN VIEW - Southwest Concrete End Block Shown



SECTION A - A



SECTION B - B



VIEW D - D

REINFORCING SCHEDULE				
Mk.	No.	Size	Length	Type
e1	10	4	32'-2"	Str.
e2	4	4	20'-1"	Str.
e3	4	4	7'-1"	Str.
g1	44	4	2'-5"	Str.
g2	36	4	3'-1"	T1
h1	6	4	2'-0"	Str.

Bending Details for g2	
	Type T1

NOTE:
 All dimensions are out to out of bars.
 All Bars to be Epoxy Coated.
 Δ Dowels

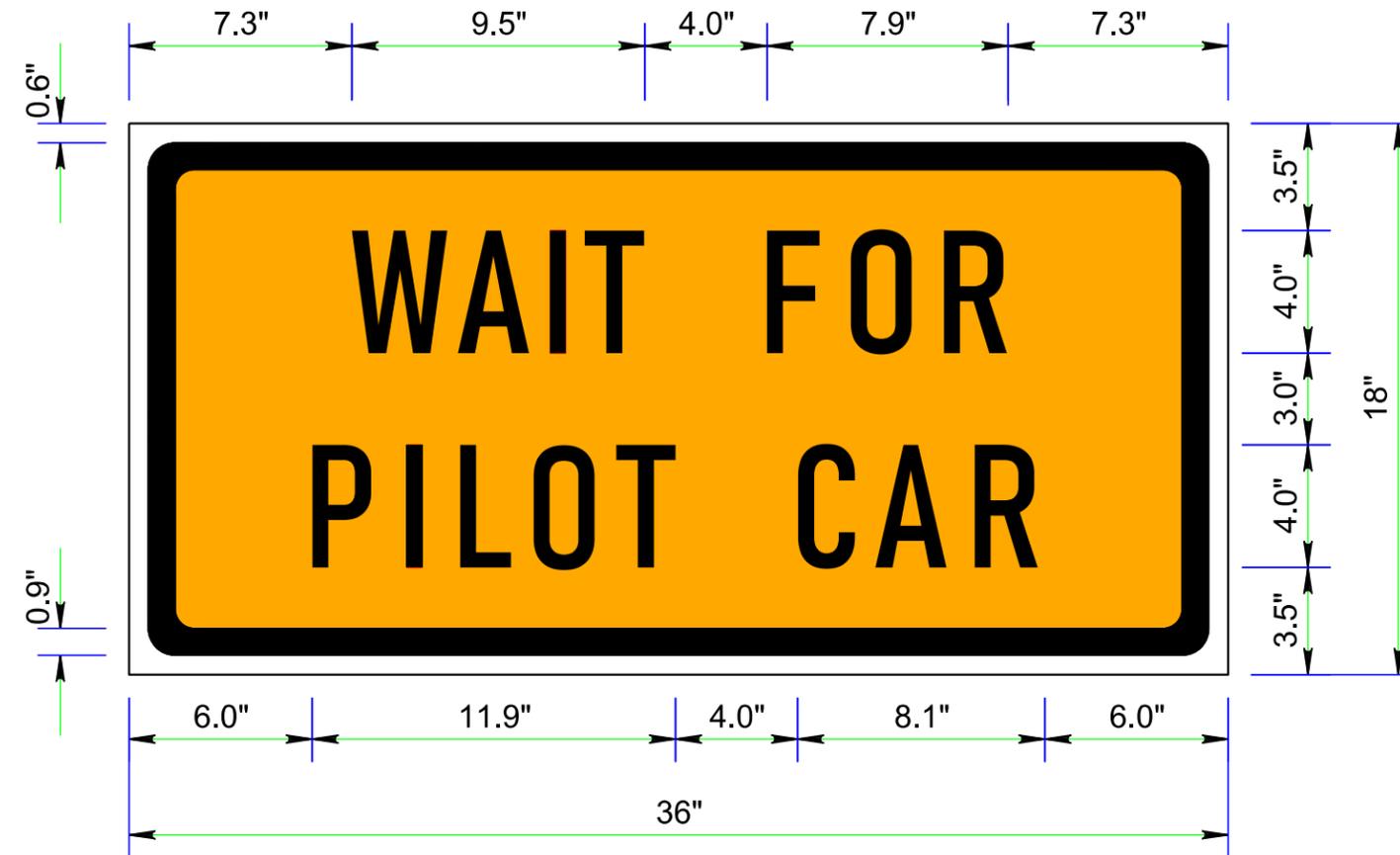
Δ To be paid for under the Bid Item "Install Dowel in Concrete"
 Reinforcing steel will conform to ASTM-A615, Grade 60.
 See Standard Plate " Joints in Concrete Curb and Gutter" for concrete and joint details.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Epoxy Coated Reinforcing Steel	Lb.	433
Install Dowel in Concrete	Each	6
Special Concrete Gutter	Ft.	65

Note: Refer to "Approach Guardrail and Approach Pavement Reconstruction" sheet for location of Special Concrete Curb & Gutter.

SPECIAL SIGN

Plotting Date: 03/08/2021



(Black Standard C 2K Highway Font with an Orange Background)

Table of Letter Spaces

		W		A		I		T		F		O		R		
	7.3	3.0	0.2	2.6	0.6	0.5	0.6	2.0	4.0	2.1	0.4	2.4	0.8	2.2	7.3	
	P		I		L		O		T		C		A		R	
6.0	2.3	0.8	0.5	0.9	2.0	0.5	2.4	0.5	2.0	4.0	2.2	0.5	2.6	0.5	2.3	6.0

OPTIONS FOR DEWATERING AND SEDIMENT COLLECTING

OPTIONS ARE NOT LIMITED TO WHAT IS SHOWN ON THIS SHEET

NO MATTER THE SYSTEM OR METHOD USED, THE CONTRACTOR MUST MEET THE TERMS OF THE TEMPORARY DISCHARGE PERMIT AND THE STORMWATER PERMIT FOR CONSTRUCTION ACTIVITIES.

Various systems, devices, and products are shown on this sheet to give the Contractor ideas of what may be used for water treatment. Other systems, devices, and products are available and can be used with approval from the Engineer.

The Contractor may elect to block a portion of storm sewer near the outfall with sand bags and pump the water out to be treated with a flocculent or allow the water to set in a lined dumpster until sediment to falls out of suspension before discharging the water. Drop inlet protection devices could also be used as part of a treatment train. The Contractor may pump dirty water into a hydroseeder and mix it with a flocculent, and spray the mixture back onto a sediment pond.

PURPOSE

The purpose of a dewatering and sediment collection system is to collect turbid storm water on the project, treat it with flocculents as needed, and capture the sediment that falls out of suspension before the water is discharged into "Waters of the US" or "Waters of the State". Refer to the Environmental Commitments for the specific requirements for each body of water on this project.

The Contractor will need to create a Pollution Prevention Plan (PPP) for dewatering and sediment collection if the Contractor chooses to discharge the water into "Waters of the US" or "Waters of the State" instead of disposing of the water off-site, using it for irrigation, or using it for hydroseeding. The Contractor will also need to obtain a Temporary Discharge Permit from the South Dakota Department of Environment & Natural Resources (DENR) on all projects outside of Indian Reservation boundaries.

Suggestions for dewatering and sediment collection may be shown on the plan sheets. It is the Contractor's responsibility to dewater and collect sediment. The Contractor will have to intercept and treat the stormwater before storm sewer outfalls into "Waters of the US" or "Waters of the State". The Contractor may need more than one dewatering and sediment collection system to capture and treat stormwater at multiple outfalls and/or locations simultaneously during each phase of the project.

PAYMENT

No additional payment will be made for Dewatering and Sediment Collecting. Dewatering and Sediment Collecting will be incidental to other items on the project.

DEWATERING BAGS AND SOCKS capture sediment and should be placed on pavement, vegetated areas, or gravel.

Dandy Dewatering Bag
Dandy Products, Inc.
Powell, OH
Phone: 1.800.591.2284
www.dandyproducts.com

Non-woven Sediment Filter Bags
Indian Valley Industries, Inc.
Johnson City, NY
Phone: 1.800.659.5111
www.iviindustries.com

Taurus Dewatering Bags/Socks
SolHuTec Group, Inc.
Sebastian, FL
Phone: 1.888.703.9889
www.solhutec.com

Ultra-Dewatering Bag
UltraTech International, Inc
Jacksonville, FL
Phone: 1.800.764.9563
www.spillcontainment.com

Heavy Duty Dirtbag 55
ACF Environmental
Richmond, VA
Phone: 1.800.223.9021
www.acfenvironmental.com

Pump-It Tube
Flo-Water, LLC
West Des Moines, IA
Phone: 1.515.577.6763
www.flo-water.net

FLOCCULENTS listed below are considered to be safe for the environment, if used as directed:

APS 700 Series Floc Logs
Applied Polymer Systems, Inc.
Woodstock, GA
Phone: 1.866.200.9868
http://www.siltstop.com

Floc, Floc Soc, Floc Bag
Innovative Turf Solutions Products
Cincinnati, OH
Phone: 1.513.317.8311
http://www.innovativeturf.com

Biostar CH
Hild & Associates, Inc.
Stillwater, MN
Phone: 1.715.426.5131
www.biostar-ch.com

Terra-Tubes
ACF Environmental
Buffalo Grove, IL
Phone: 1.800.366.1180
www.terratubes.com

FI-3500 Tablets
JRM Chemical, Inc.
Cleveland, OH
Phone: 1.216.475.8488
http://www.soilmoist.com

Tigerfloc
Floc Systems Inc.
Surrey, British Columbia
Phone: 1.604.343.2046
www.flocsystems.com

PORTABLE FLOCCULENT SYSTEMS

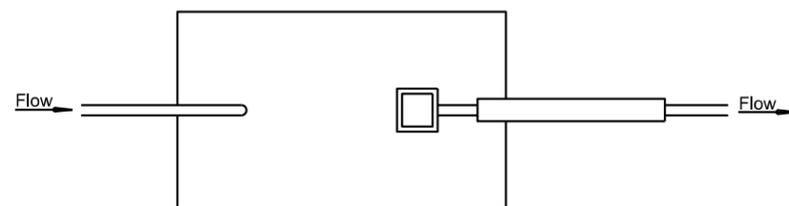
Eco Pond Rescue Water Wagon
Eco Pond Rescue LLC
Seminole, Florida
Phone: 1.727.412.4323
www.ecopondrescue.com

WTS2000 Portable Sediment Tank
Aqualet Industries, LLC
Ocean, New Jersey
Phone: 1.732.695.6336
http://aqualetindustries.com

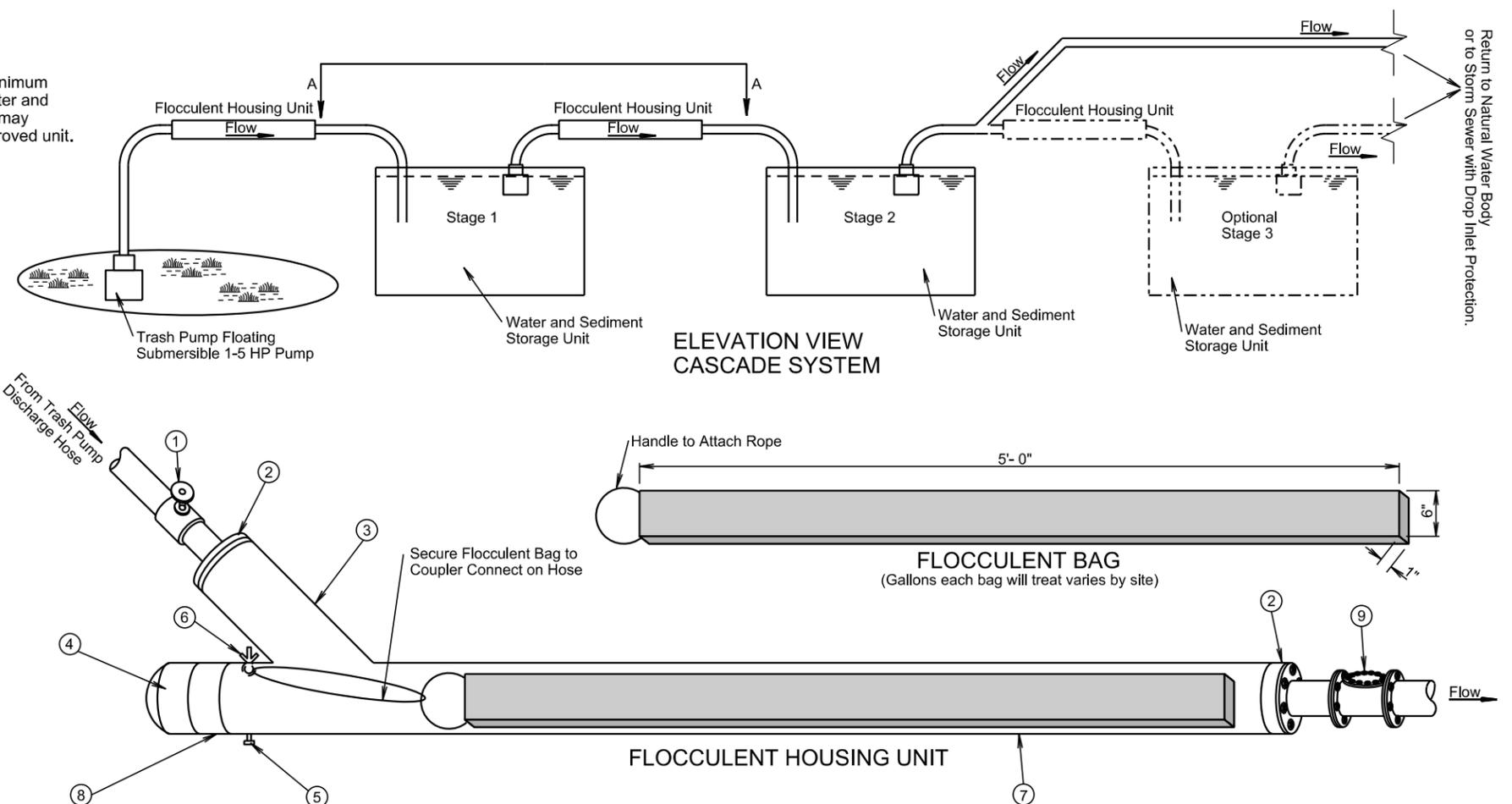
Dry Flocculent Mixing System
Innovative Equipment Solutions
Hot Springs, Arkansas
Phone: 1.501.525.8484
http://www.neptunewash.com

THE CASCADE SYSTEM

The cascade system is shown below and to the right for conceptual purposes only; however, the cascade system will at a minimum incorporate the use of 2 flocculent housing units and 2 water and sediment storage units. Design and construction of the water and sediment storage units are project site specific and will be the Contractor's responsibility. A water and sediment storage unit may consist of a storage bin lined with plastic, the bed of a dump truck lined with plastic, a sediment basin, or other Engineer approved unit. The treatment flocculent bag may be from the list or an approved equal.



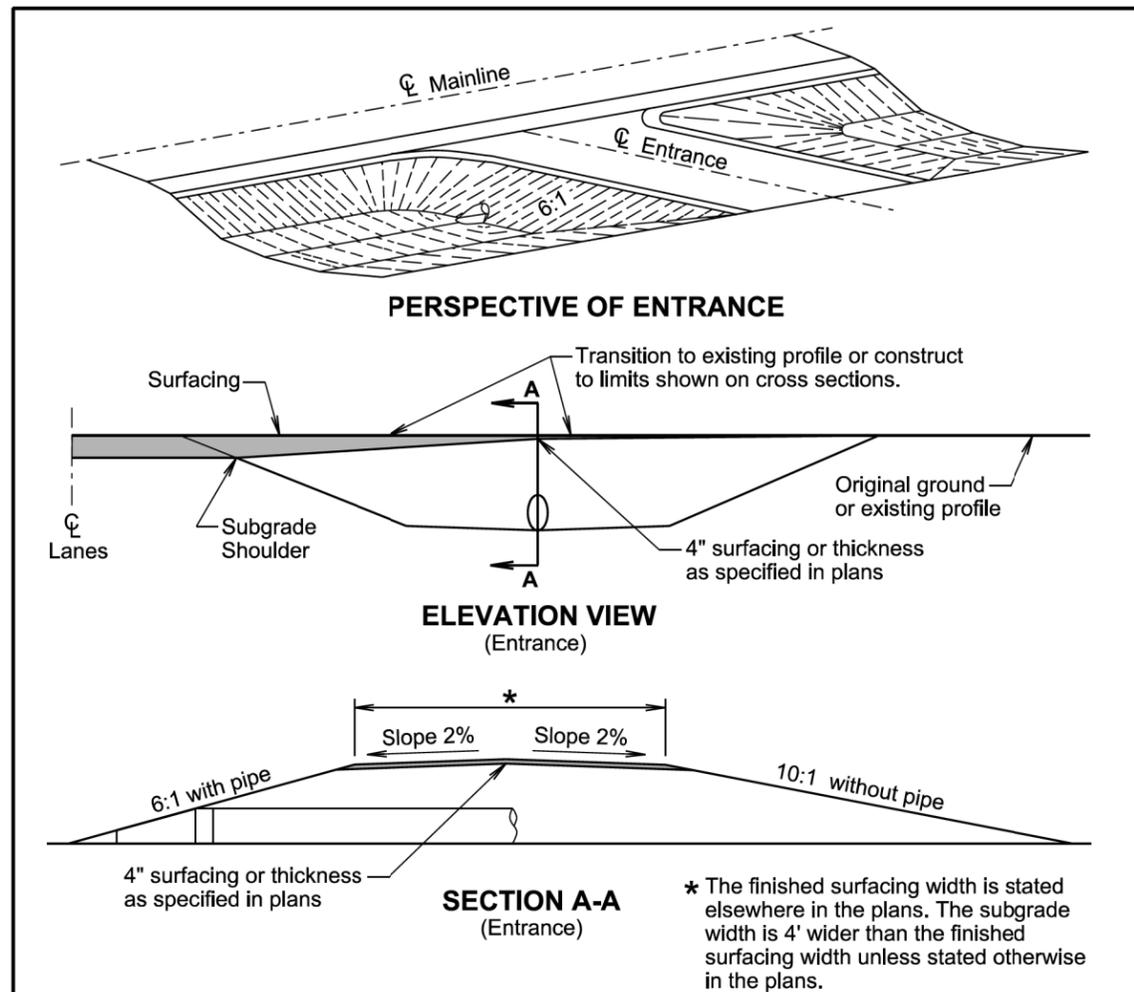
VIEW A-A



ELEVATION VIEW CASCADE SYSTEM

FLOCCULENT HOUSING UNIT (estimated quantities for information only)			
NO.	DESCRIPTION	QUANTITY	UNIT
1	4" or 6" Dia. Sch. 40 Gate Valve	1	Each
2	4" X 6" or 6" X 8" Sch. 40 PVC Bushing	2	Each
3	6" or 8" Dia. Sch. 40 PVC "Y"	1	Each
4	6" or 8" Dia. Sch. 40 PVC Female Threaded Cap	1	Each
5	1" Dia. Sch. 80 PVC Drain Valve	1	Each
6	1/2" Eye Bolt with Wing Nut and Rubber Gromets	1	Each
7	6" or 8" Dia. Sch. 40 PVC Pipe	10	Ft.
8	6" or 8" Dia. Sch. 40 PVC Male Adapter	1	Each
9	4" or 6" Dia. Sch. 40 PVC Swing Check Valve	1	Each

FLOW RATE ESTIMATE	
Pump Type	Flow Rate (gpm)
2"	50-250
3" Gas	250-350
4" Diesel	500-750
6" Diesel	750-1000



GENERAL NOTES:

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

A 6:1 inslope will be constructed for an entrance when a pipe is required. A 10:1 inslope will be constructed when a pipe is not required.

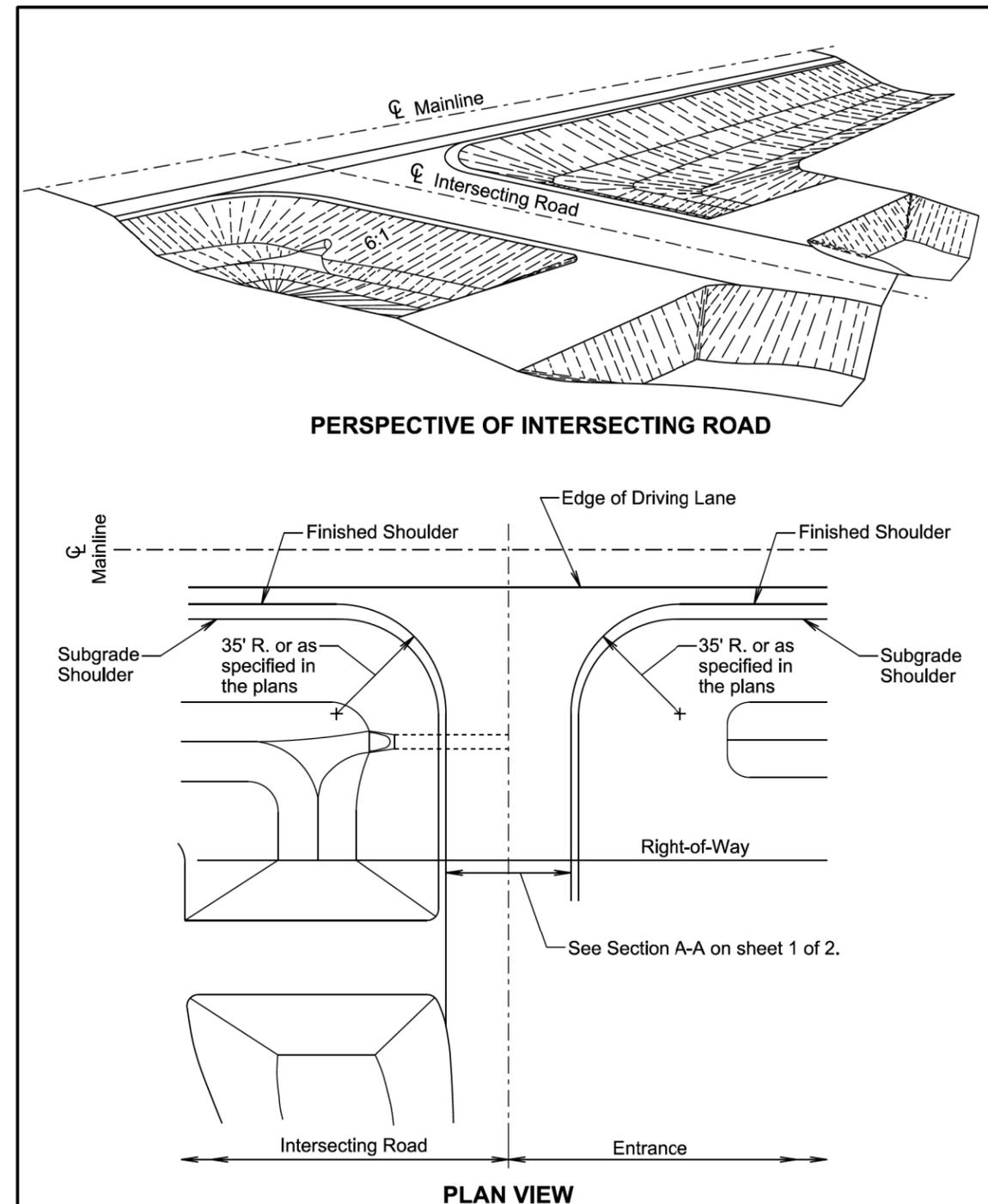
Pipe length will be adjusted if necessary during construction to obtain the 6:1 slope. For grading projects, the pipe length is estimated typically using a 4" thickness of surfacing directly over the subgrade above the pipe.

The transition area between the mainline inslope and the approach inslope for entrances will be rounded to eliminate an abrupt transition.

The turning radii will be 35' for intersecting roads and entrances unless stated otherwise in the plans.

September 14, 2018

Published Date: 2nd Qtr. 2021	S D D O T	INTERSECTING ROADS AND ENTRANCES	PLATE NUMBER
			120.01
			Sheet 1 of 2



September 14, 2018

Published Date: 2nd Qtr. 2021	S D D O T	INTERSECTING ROADS AND ENTRANCES	PLATE NUMBER
			120.01
			Sheet 2 of 2

Plotting Date: 04/23/2021

TYPE 1 INSLOPE TRANSITION

GENERAL NOTES:

This Type 1 Inslope Transition is used when the specified inslope at the drainage structure is flatter than the typical inslope and the inslope at the drainage structure is between a 4:1 slope and 6:1 slope.

Line B-B represents the clear zone line, the location where soil intercepts the parapet on an RCBC, the location where the soil intercepts the top of the pipe adjacent to the opening of the pipe end section, or may represent a change in slope.

* Transition from the typical inslope to the inslope at the drainage structure. Within the clear zone (area from edge of subgrade shoulder to line B-B) use 100' length for each 1:1 slope change. Example: transition from a 4:1 to a 6:1 would require a 200' length transition. The typical inslope outside of the clear zone will be transitioned gradually to the slope necessary adjacent to the RCBC wing wall or pipe culvert end section within the transition length necessary for the transition within the clear zone.

September 14, 2018

S D D O T	INSLOPE TRANSITIONS AT PIPE CULVERTS OR REINFORCED CONCRETE BOX CULVERTS	PLATE NUMBER 120.05
	Published Date: 2nd Qtr. 2021	Sheet 1 of 2

TYPE 2 INSLOPE TRANSITION

GENERAL NOTES:

This Type 2 Inslope Transition is used when the specified inslope at the pipe or RCBC is flatter than a 6:1 slope.

Line B-B represents the clear zone line, the location where soil intercepts the parapet on an RCBC, the location where the soil intercepts the top of the pipe adjacent to the opening of the pipe end section, or may represent a change in slope.

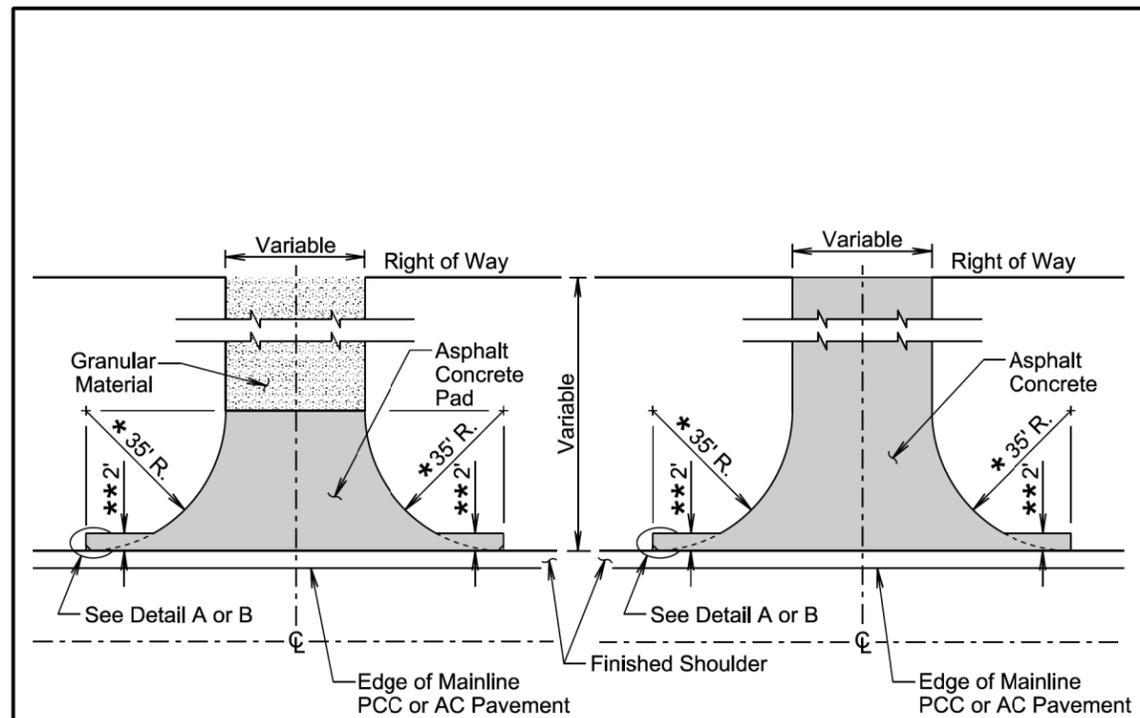
* Transition from Inslope at drainage structure to a 6 : 1 inslope and 3:1 inslope.

** Transition from typical inslope to the inslopes adjacent to the drainage structure. Within the clear zone (area from edge of subgrade shoulder to line B-B) use 100' length for each 1:1 slope change. Example: transition from a 4:1 to a 6:1 would require a 200' length transition. The typical inslope outside of the clear zone will be transitioned to a 3:1 inslope within the transition length necessary for the transition within the clear zone.

September 14, 2018

S D D O T	INSLOPE TRANSITIONS AT PIPE CULVERTS OR REINFORCED CONCRETE BOX CULVERTS	PLATE NUMBER 120.05
	Published Date: 2nd Qtr. 2021	Sheet 2 of 2

Plotting Date: 04/23/2021



PLAN VIEW
(Intersecting Road)
(No Asphalt Concrete Surfacing
Beyond Right of Way)

PLAN VIEW
(Intersecting Road)
(Asphalt Concrete Surfacing
Beyond Right of Way)

GENERAL NOTES:

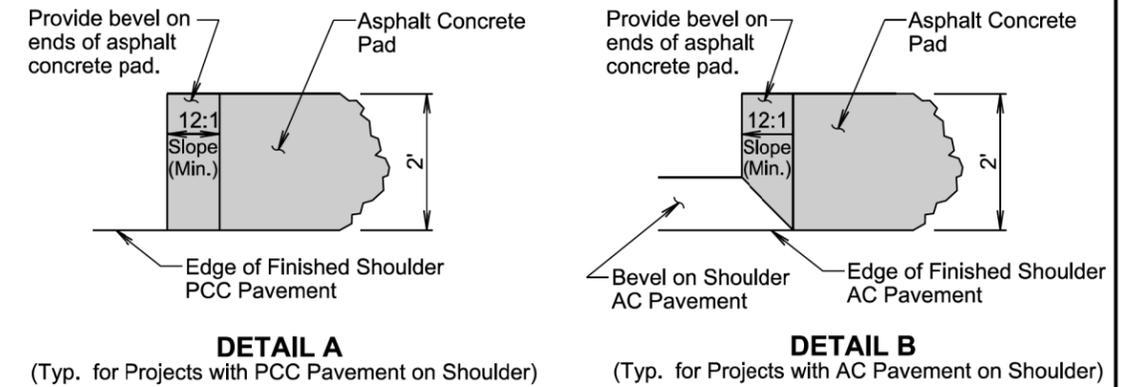
The precise construction limits for situations other than shown above will be determined by the Engineer during construction.

* For new construction, 35' radius typical or as specified in the plans. For resurfacing projects, radius is variable depending on existing conditions.

** The Contractor may adjust the screed of the paver during mainline paving operations to provide the 2-foot asphalt concrete pad or the Contractor may provide the 2-foot asphalt concrete pad during paving of the intersecting roads as shown above. The Engineer may eliminate the 2-foot asphalt concrete pads if the Engineer, in the Engineer's sole discretion, determines the pads are infeasible to construct due to site specific reasons including, but not limited to; existing inslope configuration, borrow and material availability, and right-of-way constraints.

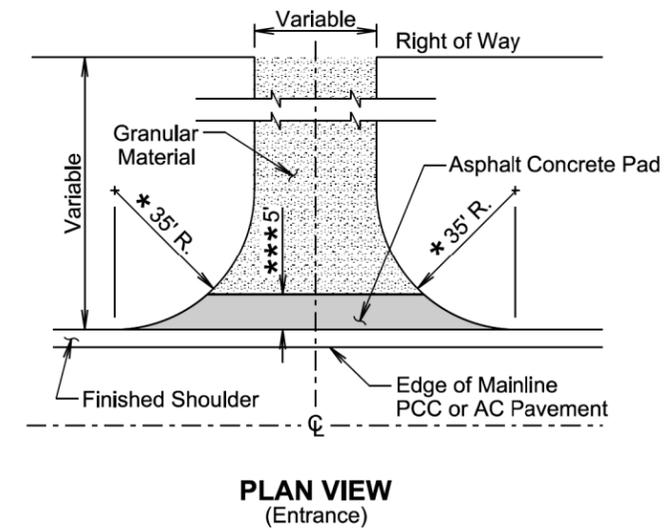
August 27, 2020

Published Date: 2nd Qtr. 2021	S D D O T	SURFACING OR RESURFACING OF INTERSECTING ROADS AND ENTRANCES (MAINLINE AND SHOULDERS: PCC OR AC PAVEMENT)	PLATE NUMBER
			320.04
			Sheet 1 of 2



DETAIL A
(Typ. for Projects with PCC Pavement on Shoulder)

DETAIL B
(Typ. for Projects with AC Pavement on Shoulder)

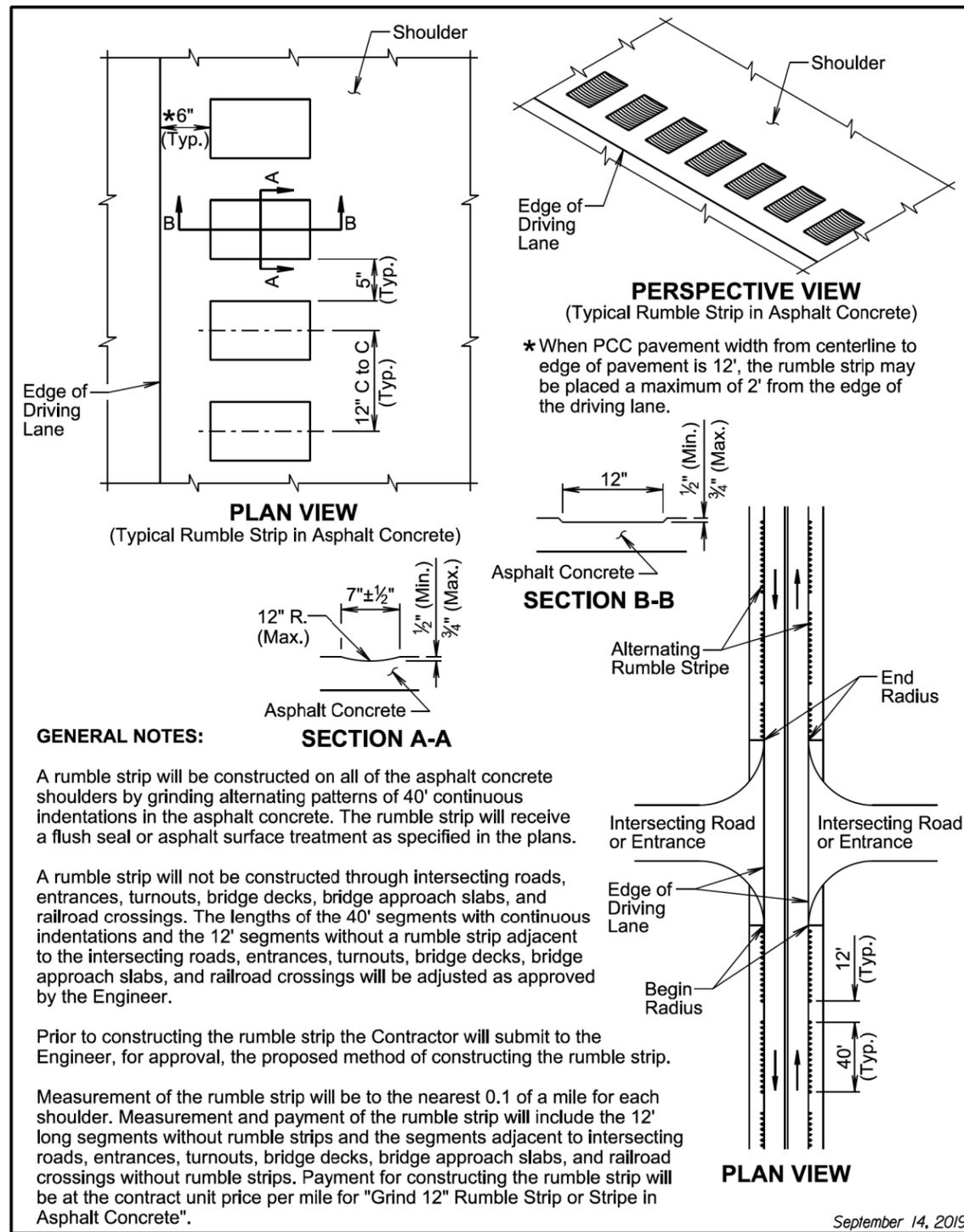


PLAN VIEW
(Entrance)

*** Not required if finished shoulder width is 4' or greater.

August 27, 2020

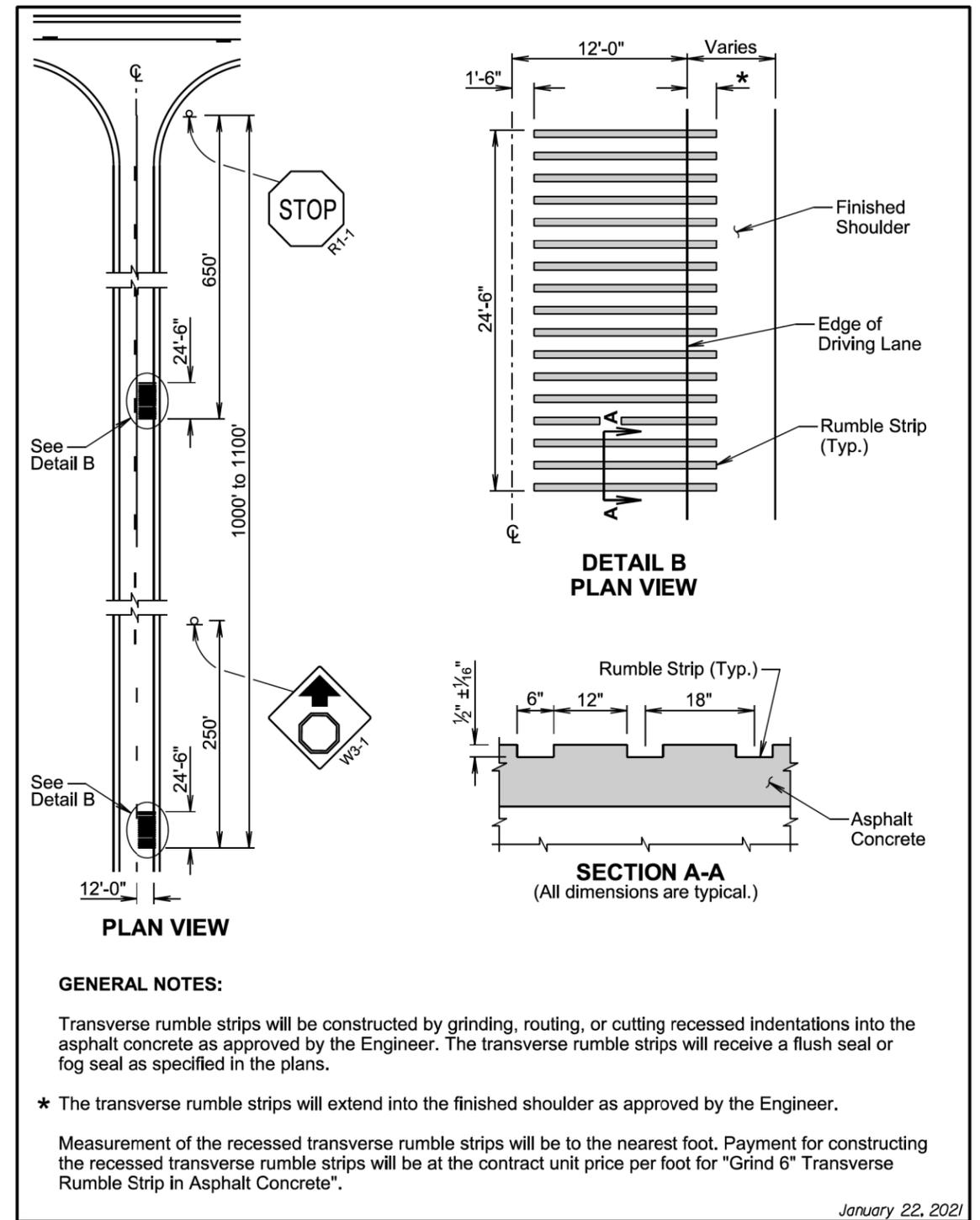
Published Date: 2nd Qtr. 2021	S D D O T	SURFACING OR RESURFACING OF INTERSECTING ROADS AND ENTRANCES (MAINLINE AND SHOULDERS: PCC OR AC PAVEMENT)	PLATE NUMBER
			320.04
			Sheet 2 of 2



September 14, 2019

S D D O T	12" RUMBLE STRIP IN ASPHALT CONCRETE ON NONDIVIDED HIGHWAY SHOULDERS	PLATE NUMBER 320.24
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021

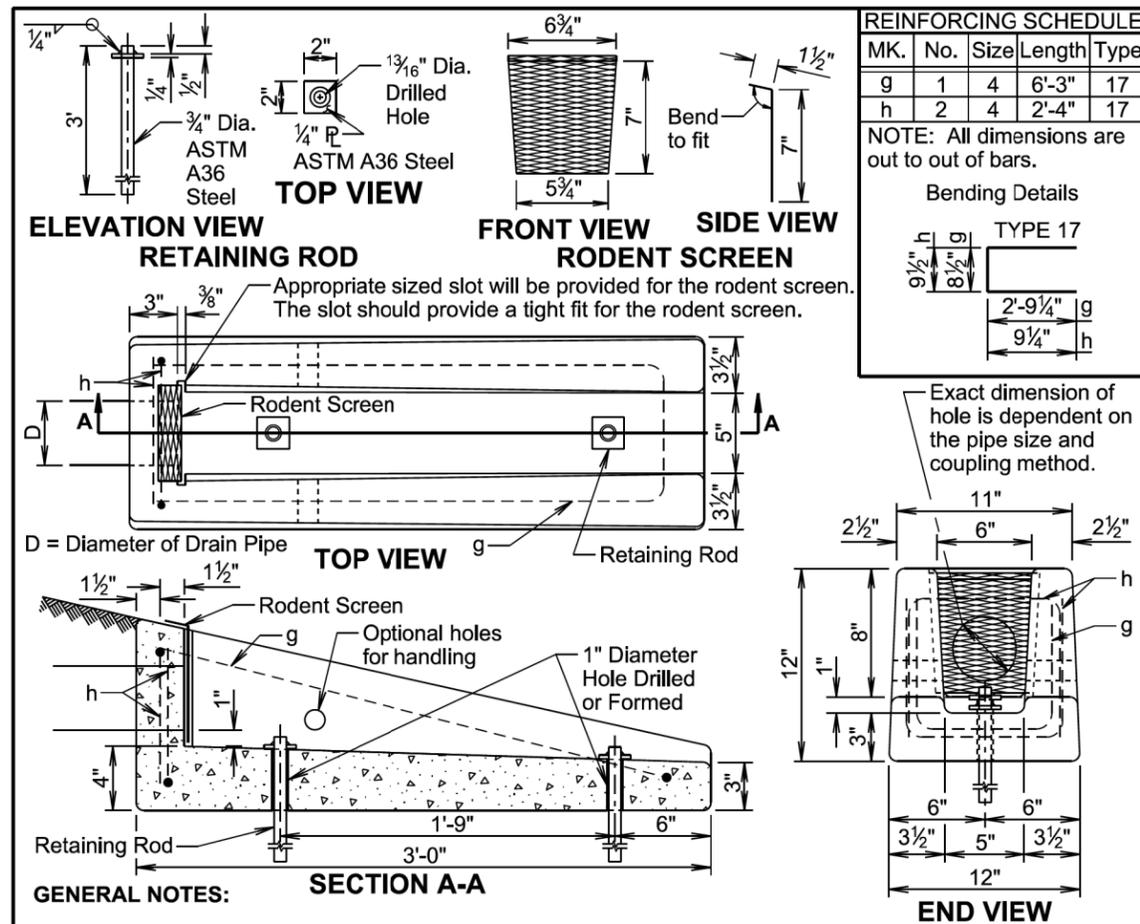


January 22, 2021

S D D O T	TRANSVERSE RUMBLE STRIP IN ASPHALT CONCRETE HIGHWAY ADJACENT TO STOP CONTROLLED INTERSECTION	PLATE NUMBER 320.45
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021

Plotting Date: 04/23/2021



MK.	No.	Size	Length	Type
g	1	4	6'-3"	17
h	2	4	2'-4"	17

NOTE: All dimensions are out to out of bars.

Bending Details

Exact dimension of hole is dependent on the pipe size and coupling method.

GENERAL NOTES:

The concrete will be Class M6. The concrete will conform to the requirements of Section 462 of the Specifications. It is estimated that each unit weighs approximately 210 pounds.

All reinforcing steel will conform to ASTM A615, Grade 60 and will be epoxy coated. The reinforcing steel will be securely retained to prevent displacement during placement of concrete. It is estimated that 7.3 pounds of reinforcing steel is required for each unit.

The pipe will be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The rodent screen will be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size will be 1/2". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires.

The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

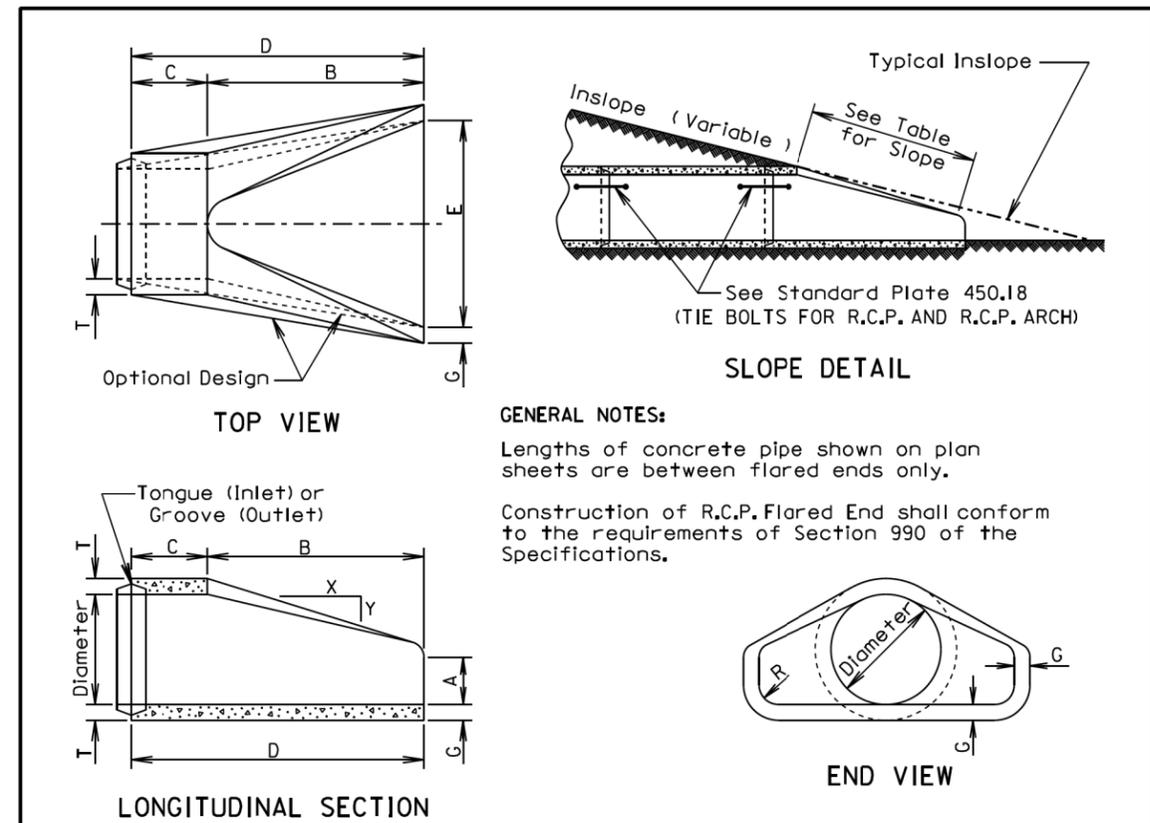
The drawing indicates using 1/2" fillets; however, 3/4" chamfers may be substituted for the 1/2" fillets.

All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, retaining rods, and rodent screen will be incidental to the contract unit price per each for "Precast Concrete Headwall for Drain".

June 26, 2019

S D D O T	PRECAST CONCRETE HEADWALL FOR DRAIN	PLATE NUMBER 430.50
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021



GENERAL NOTES:

Lengths of concrete pipe shown on plan sheets are between flared ends only.

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

Dia. (in.)	Approx. Wt. of Section (lbs.)	Approx. Slope (X to Y)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	G (in.)	R (in.)
12	530	2.4:1	2	4	24	48 7/8	72 7/8	24	2	1 1/2
15	740	2.4:1	2 1/4	6	27	46	73	30	2 1/4	1 1/2
18	990	2.3:1	2 1/2	9	27	46	73	36	2 1/2	1 1/2
21	1280	2.4:1	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	1 1/2
24	1520	2.5:1	3	9 1/2	43 1/2	30	73 1/2	48	3	1 1/2
27	1930	2.5:1	3 1/4	10 1/2	49 1/2	24	73 1/2	54	3 1/4	1 1/2
30	2190	2.5:1	3 1/2	12	54	19 3/4	73 3/4	60	3 1/2	1 1/2
36	4100	2.5:1	4	15	63	34 3/4	97 3/4	72	4	1 1/2
42	5380	2.5:1	4 1/2	21	63	35	98	78	4 1/2	1 1/2
48	6550	2.5:1	5	24	72	26	98	84	5	1 1/2
54	8240	2:1	5 1/2	27	65	33 1/4	98 1/4	90	5 1/2	1 1/2
60	8730	1.9:1	6	35	60	39	99	96	5	1 1/2
66	10710	1.7:1	6 1/2	30	72	27	99	102	5 1/2	1 1/2
72	12520	1.8:1	7	36	78	21	99	108	6	1 1/2
78	14770	1.8:1	7 1/2	36	90	21	111	114	6 1/2	1 1/2
84	18160	1.6:1	8	36	90 1/2	21	111 1/2	120	6 1/2	1 1/2
90	20900	1.5:1	8 1/2	41	87 1/2	24	111 1/2	132	6 1/2	6

June 26, 2015

S D D O T	R. C. P. FLARED ENDS	PLATE NUMBER 450.10
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021

Plotting Date: 04/23/2021

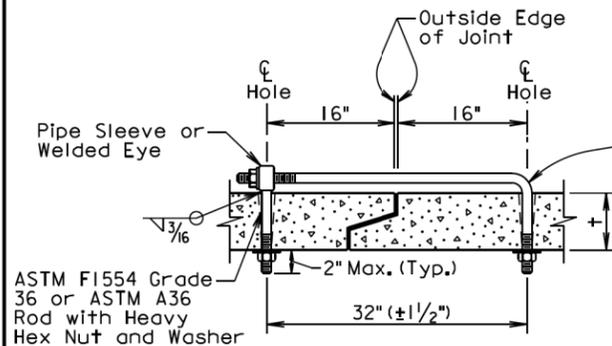
Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
< 3/4	5/8	3/4
3/2-6/2	3/4	1
≥ 7	1	1 1/4

GENERAL NOTES:

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

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

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



ADJUSTABLE EYE BOLT TIE

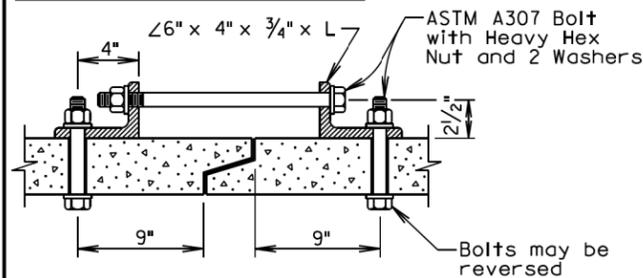
Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	3/4
> 48	6	1

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.



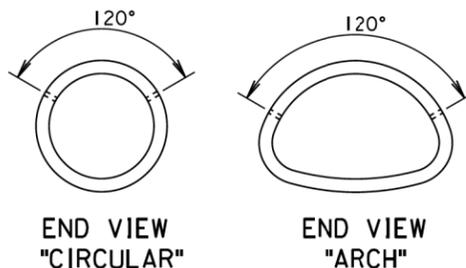
ANGLE AND BOLT TIE

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 be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. or R.C.P. Arch.



END VIEW "CIRCULAR"

END VIEW "ARCH"

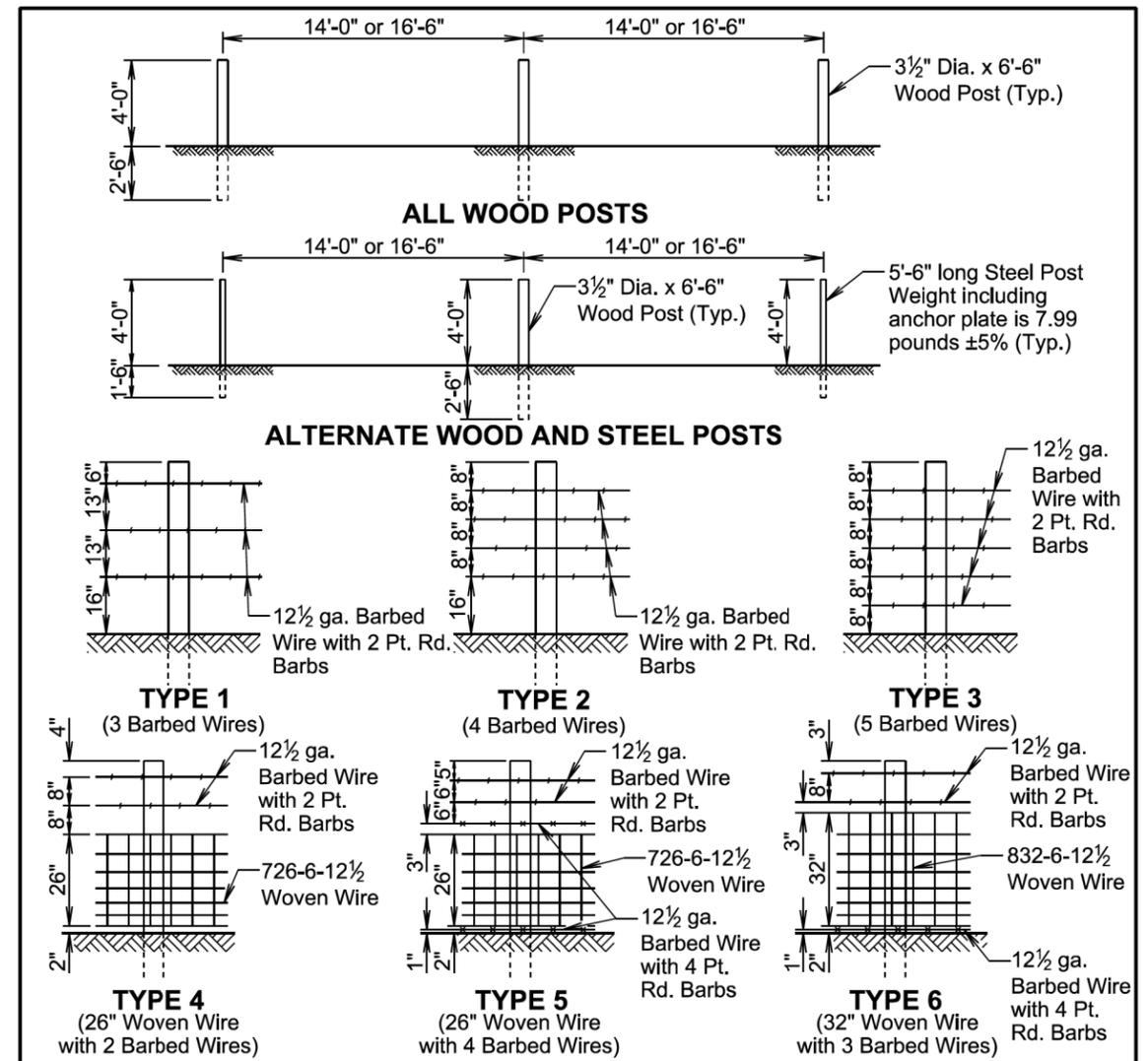
February 28, 2013

SDDOT
Published Date: 2nd Qtr. 2021

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

PLATE NUMBER
450.18

Sheet 1 of 1



TYPE OF FENCE		LINE POST SPACING	WIRE GAGE	BARBED WIRE		WOVEN WIRE
TYPE	DESCRIPTION			NUMBER AND SHAPE OF BARBS	STYLE OR DESIGN NO.	
1	3 Barbed Wires	16'-6"	12 1/2	2 Point Round	—	
2	4 Barbed Wires	16'-6"	12 1/2	2 Point Round	—	
3	5 Barbed Wires	16'-6"	12 1/2	2 Point Round	—	
4	26" Woven Wire with 2 Barbed Wires	14'-0"	12 1/2	2 Point Round	726-6-12 1/2	
5	26" Woven Wire with 4 Barbed Wires	14'-0"	12 1/2	2 wires with 2 Pt. Rd. 2 wires with 4 Pt. Rd.	726-6-12 1/2	
6	32" Woven Wire with 3 Barbed Wires	14'-0"	12 1/2	2 wires with 2 Pt. Rd. 1 wire with 4 Pt. Rd.	832-6-12 1/2	

GENERAL NOTES:

Fence types designated on the plans that are followed by the letter S will have smooth (barbless) wires.

When type 5S or 6S is designated the bottom wire may be barbed, smooth, or left off.

All degrees of curvature stated for fence are at centerline of roadway.

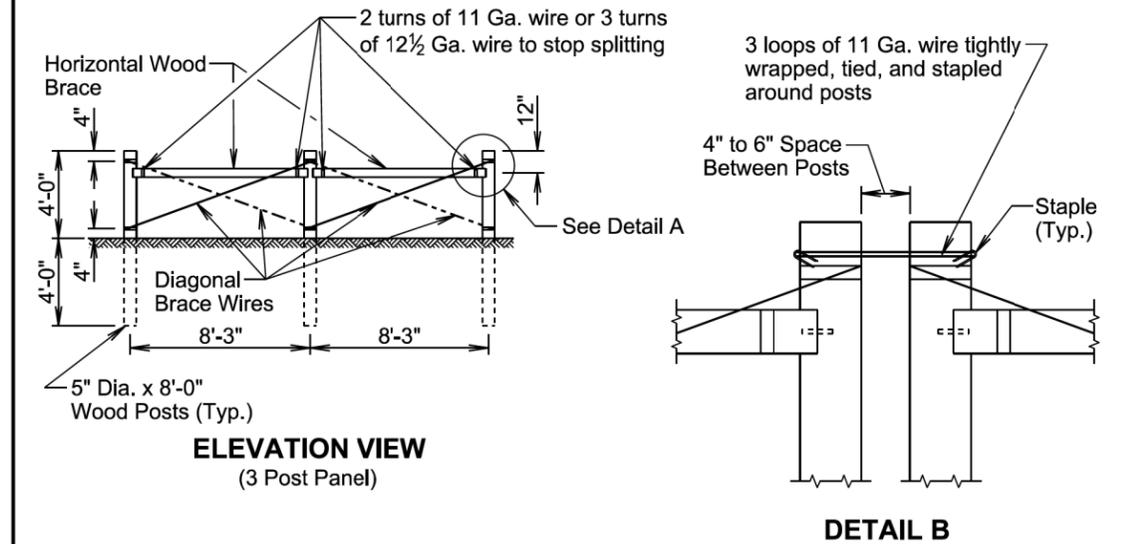
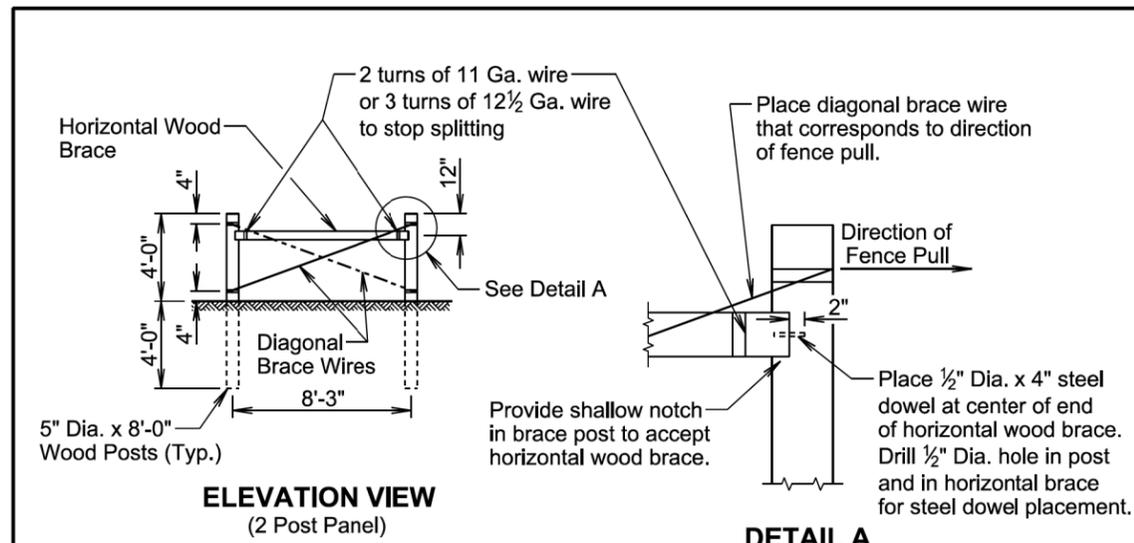
June 26, 2019

SDDOT
Published Date: 2nd Qtr. 2021

RIGHT-OF-WAY FENCE

PLATE NUMBER
620.01

Sheet 1 of 1



GENERAL NOTES:

- 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.

June 26, 2019

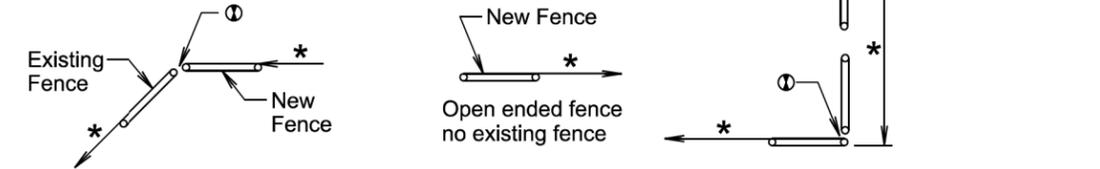
DEGREE OF CURVE	SPACING OF 2 POST PANEL
less than 3°15'	** 1320'
3°15' and greater	** At P.C., P.T., and at every 1320' between P.C. and P.T.

GENERAL NOTE:

All degrees of curvature stated for fence are at centerline of roadway.

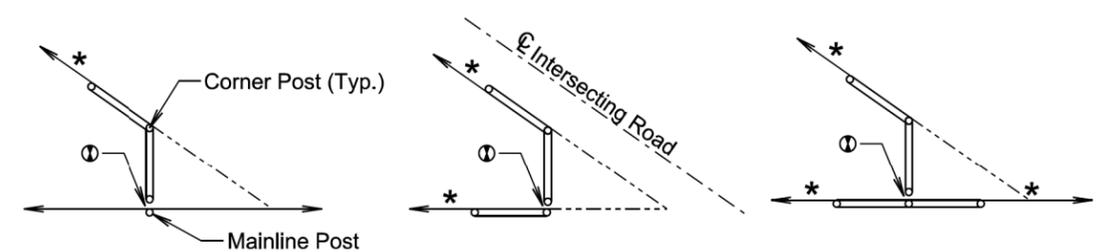
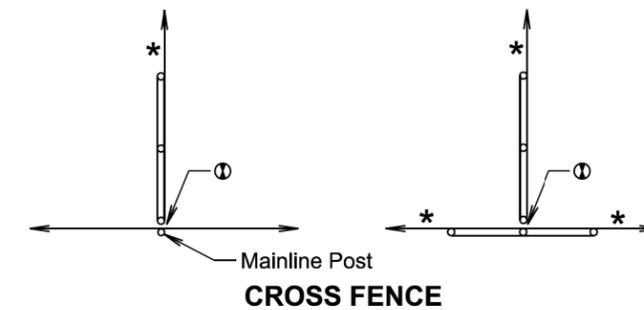
- * If fence length is less than 600' to next corner use a 2 post panel. If fence length is greater than 600' to next corner use a 3 post panel.
- ** Fence lengths greater than 1320' and less than 2640' place 2 Post Panel approximately at midpoint.

① See Detail B on Sheet 1 of 3.



BEGIN OR END FENCE
(Where new fence ties into existing fence)

SHORT JOGS IN FENCE



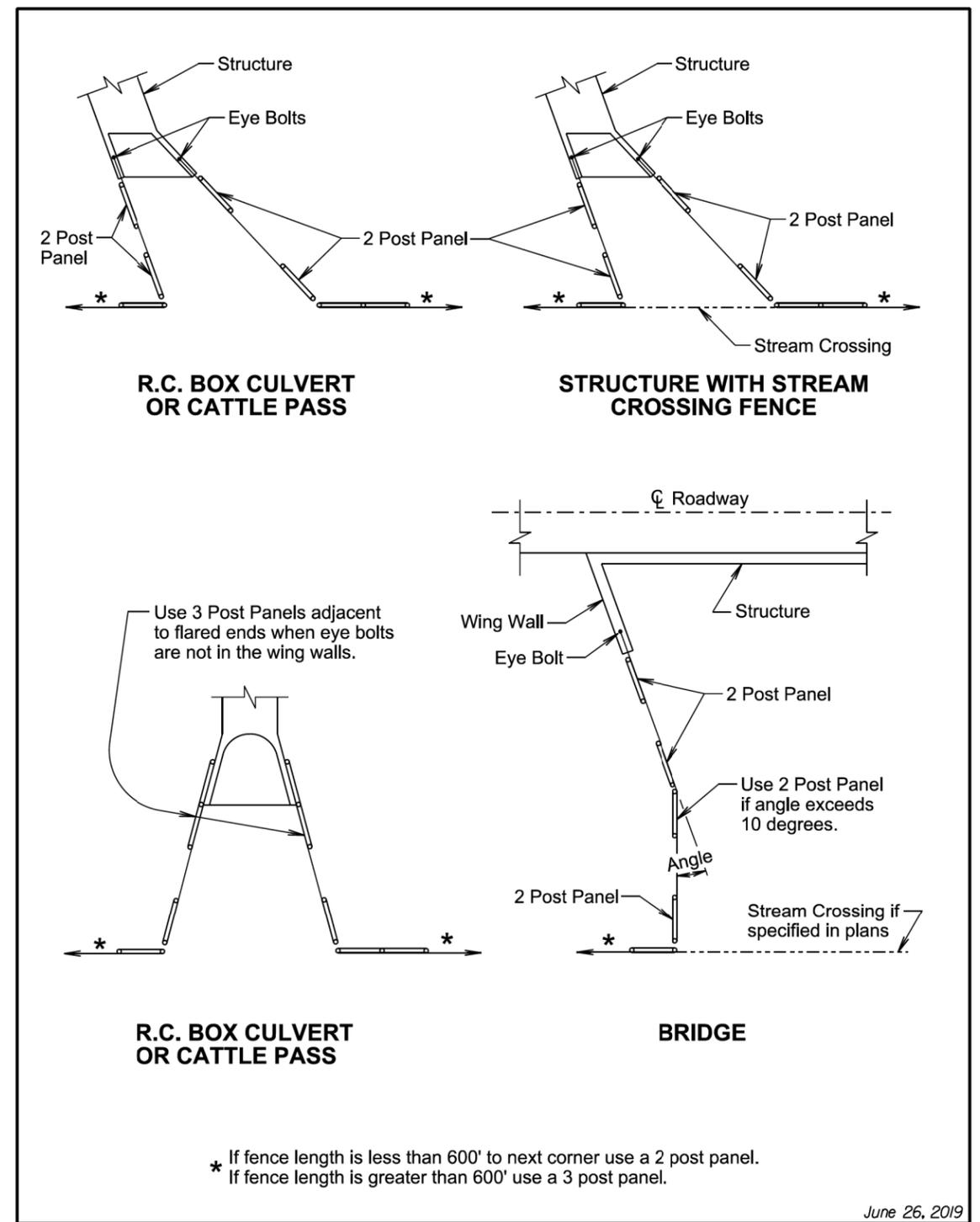
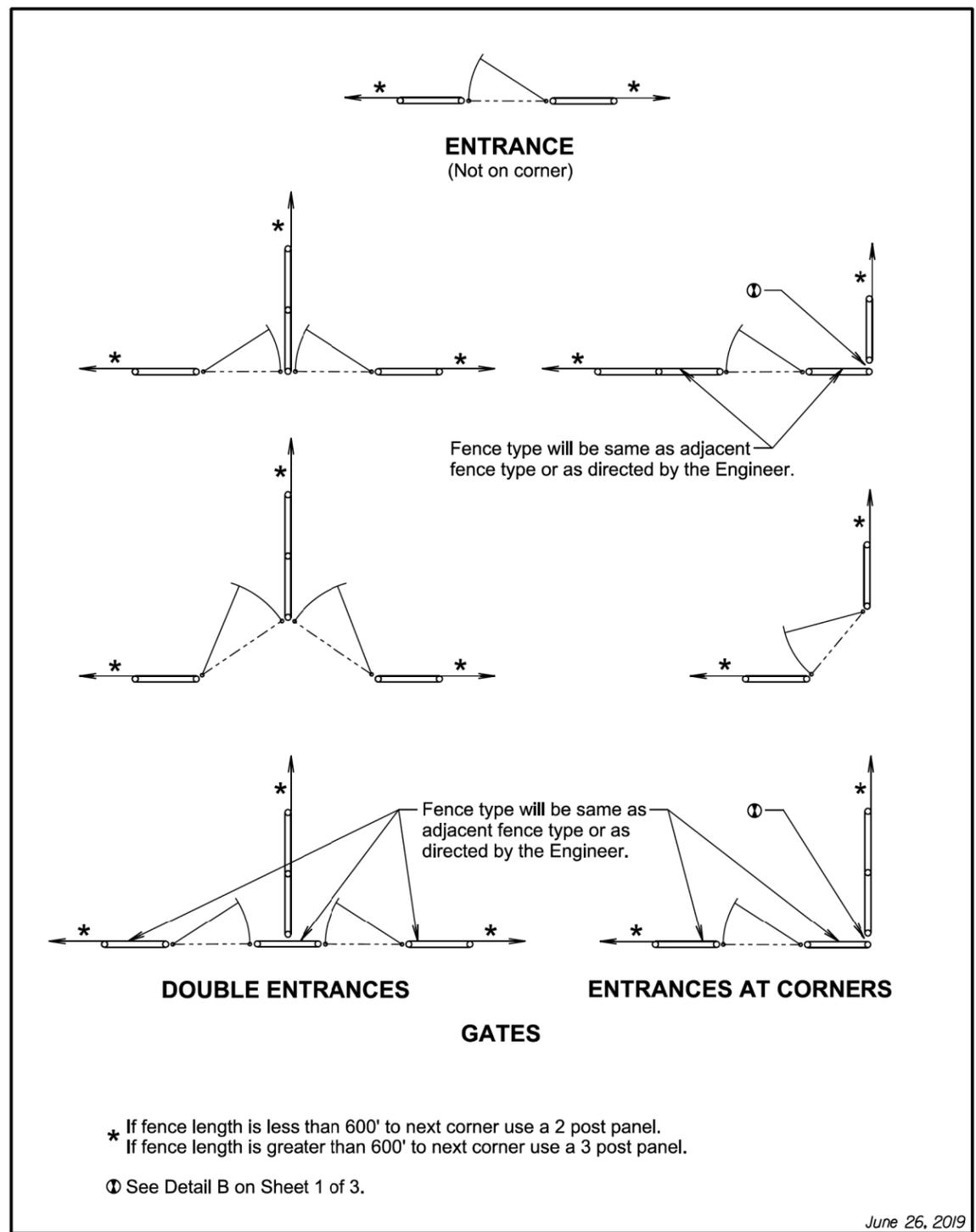
SHARP ANGLES IN CROSS FENCE

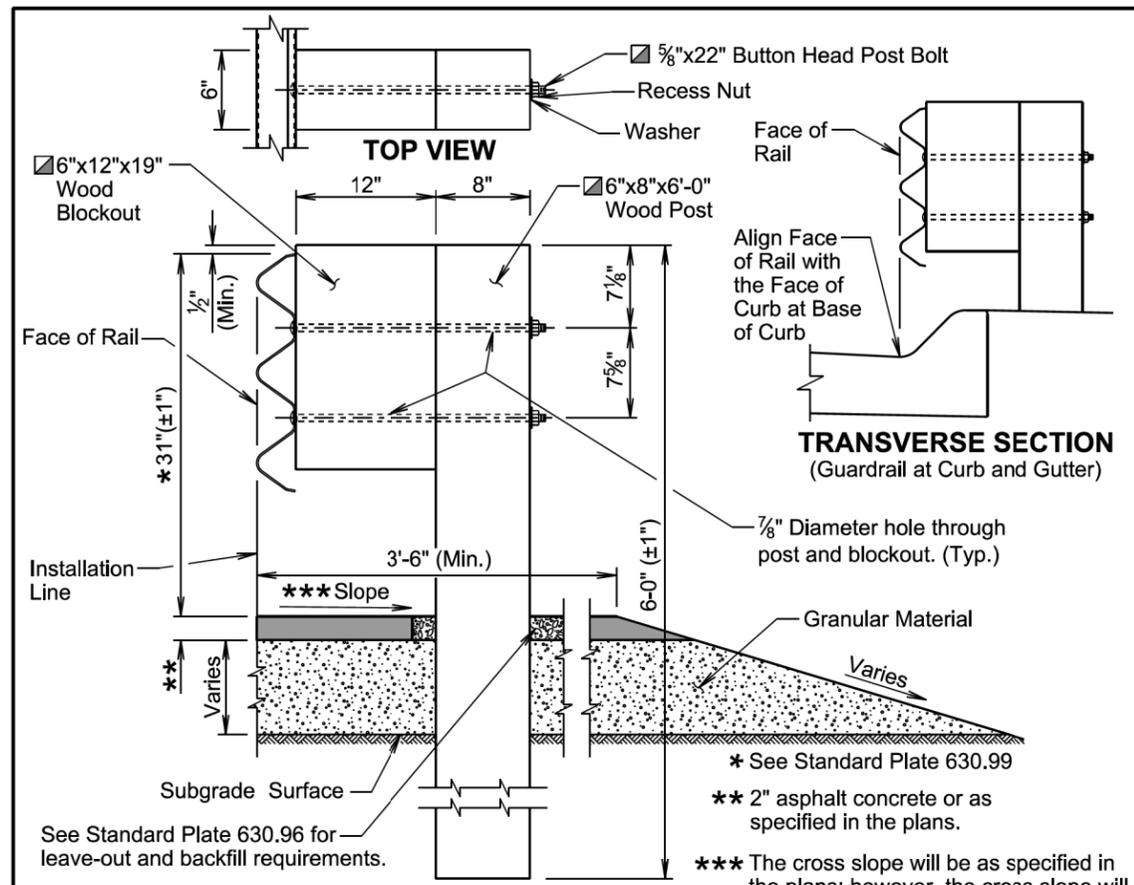


- Additional fence panel is NOT required when an angle in the mainline fence is 10° and less.
- Additional fence panel is required when an angle in the mainline fence is greater than 10°.

ANGLES IN MAINLINE FENCE

June 26, 2019





GENERAL NOTES: TRANSVERSE SECTION

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.

☑ The post and blockout illustrated above is typical for single thrie beam guardrail. When other variations of posts and blockouts are specified on other standard plates (e.g. transitions) then the posts and blockouts will be as specified on the other standard plates or as specified in the plans.

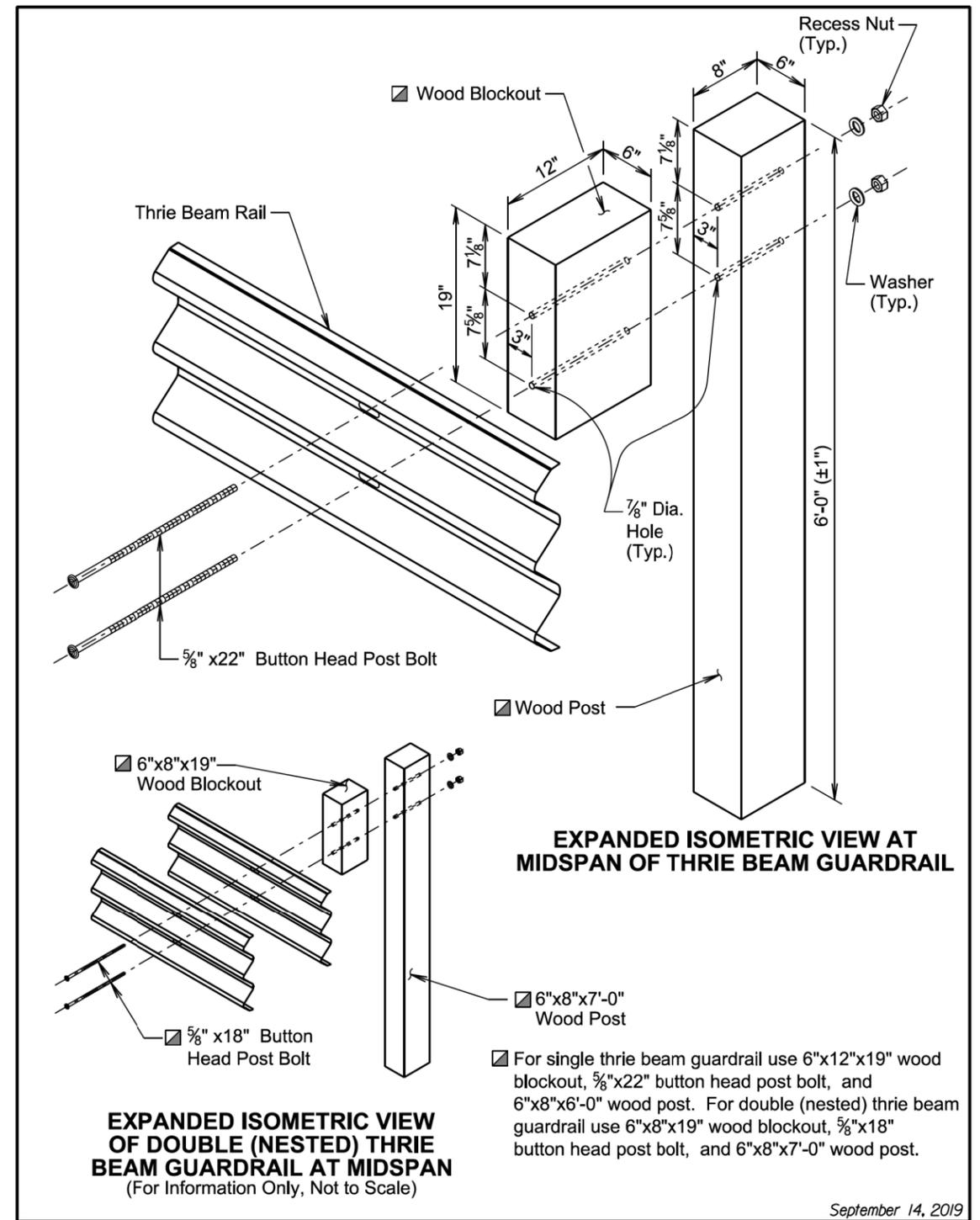
Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or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

The top of post and top of block will have a true square cut. The top of block will be a maximum of $\pm\frac{1}{2}$ inch from the top of the post.

September 14, 2019

S D D O T	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01
		Sheet 1 of 5

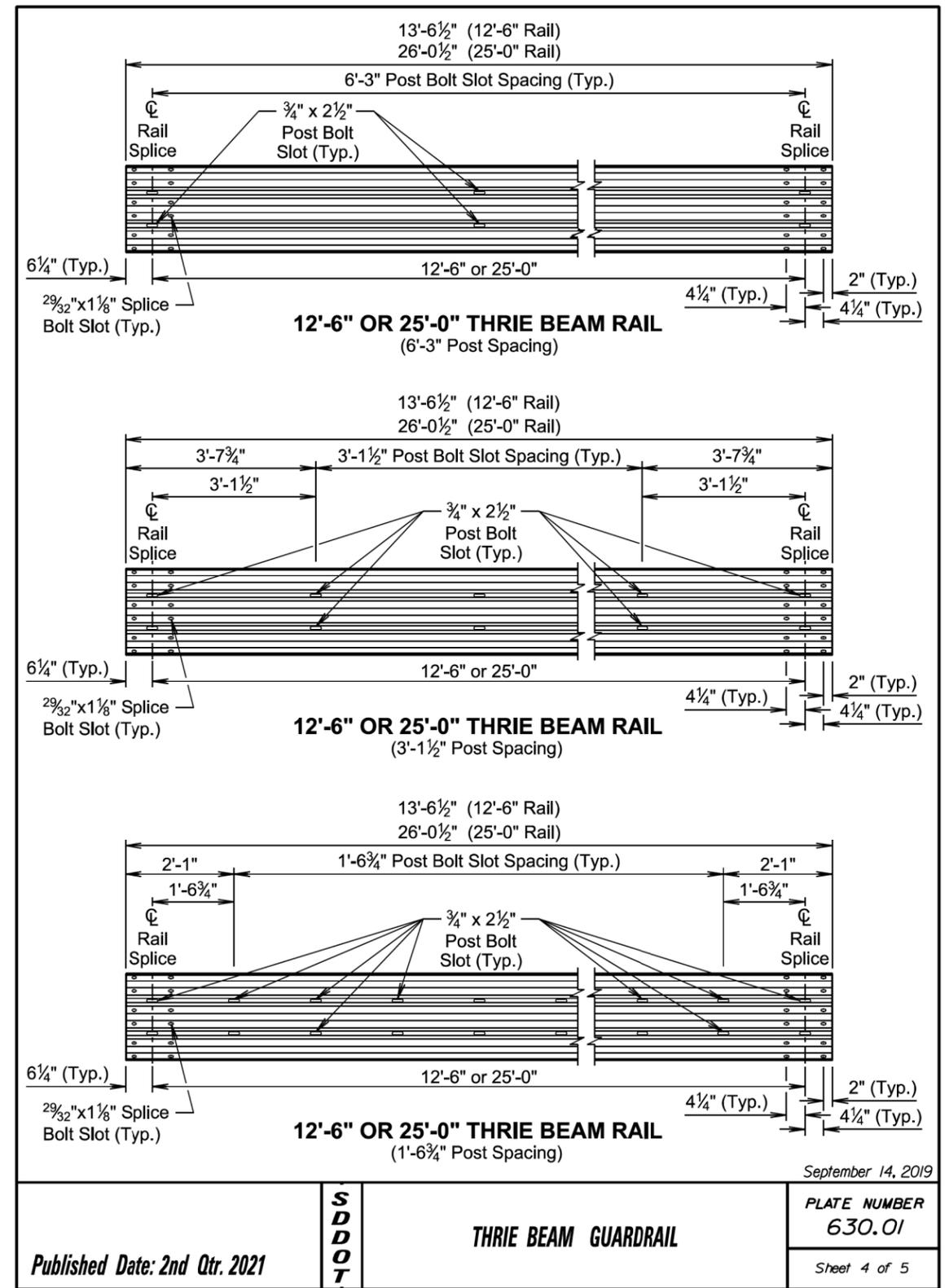
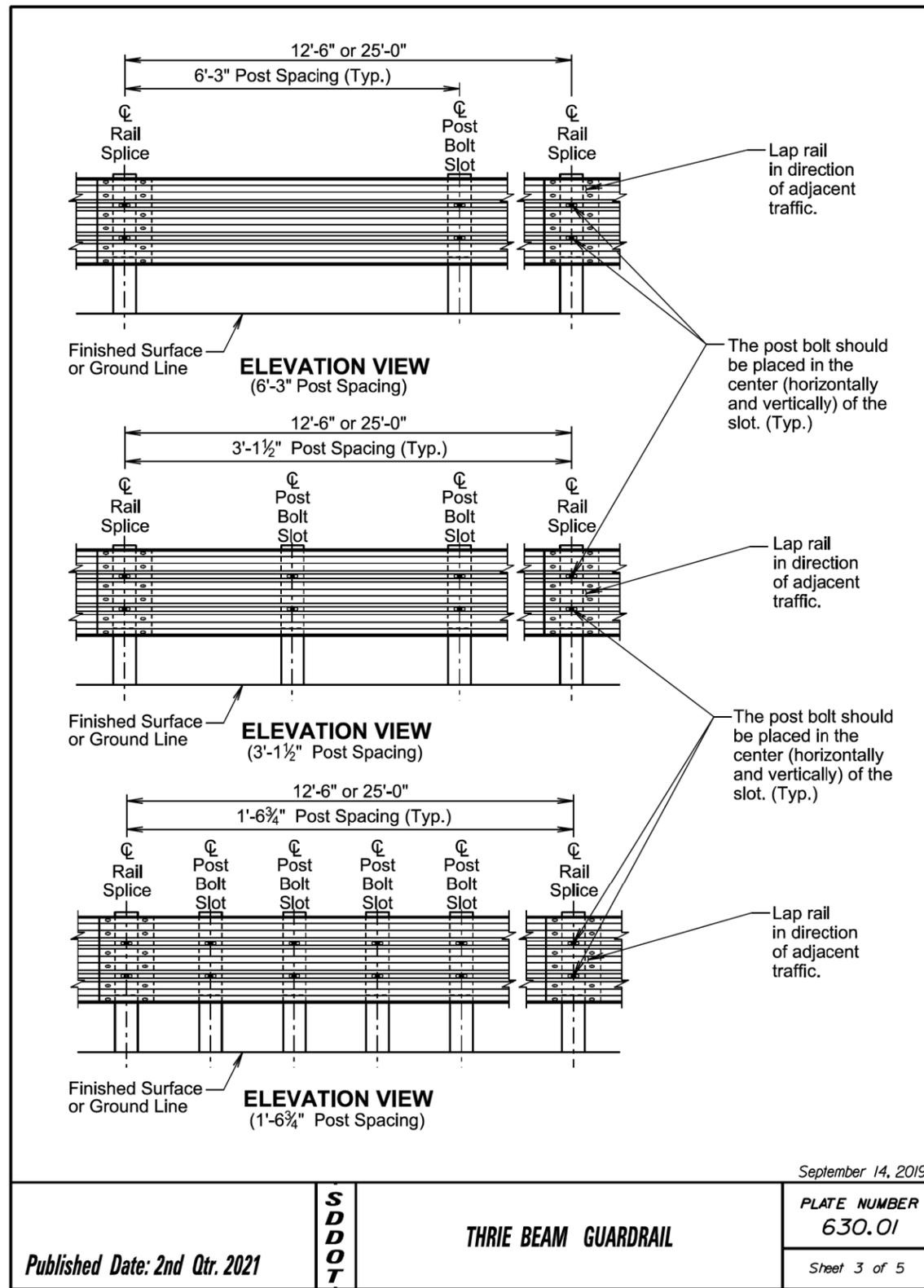
Published Date: 2nd Qtr. 2021

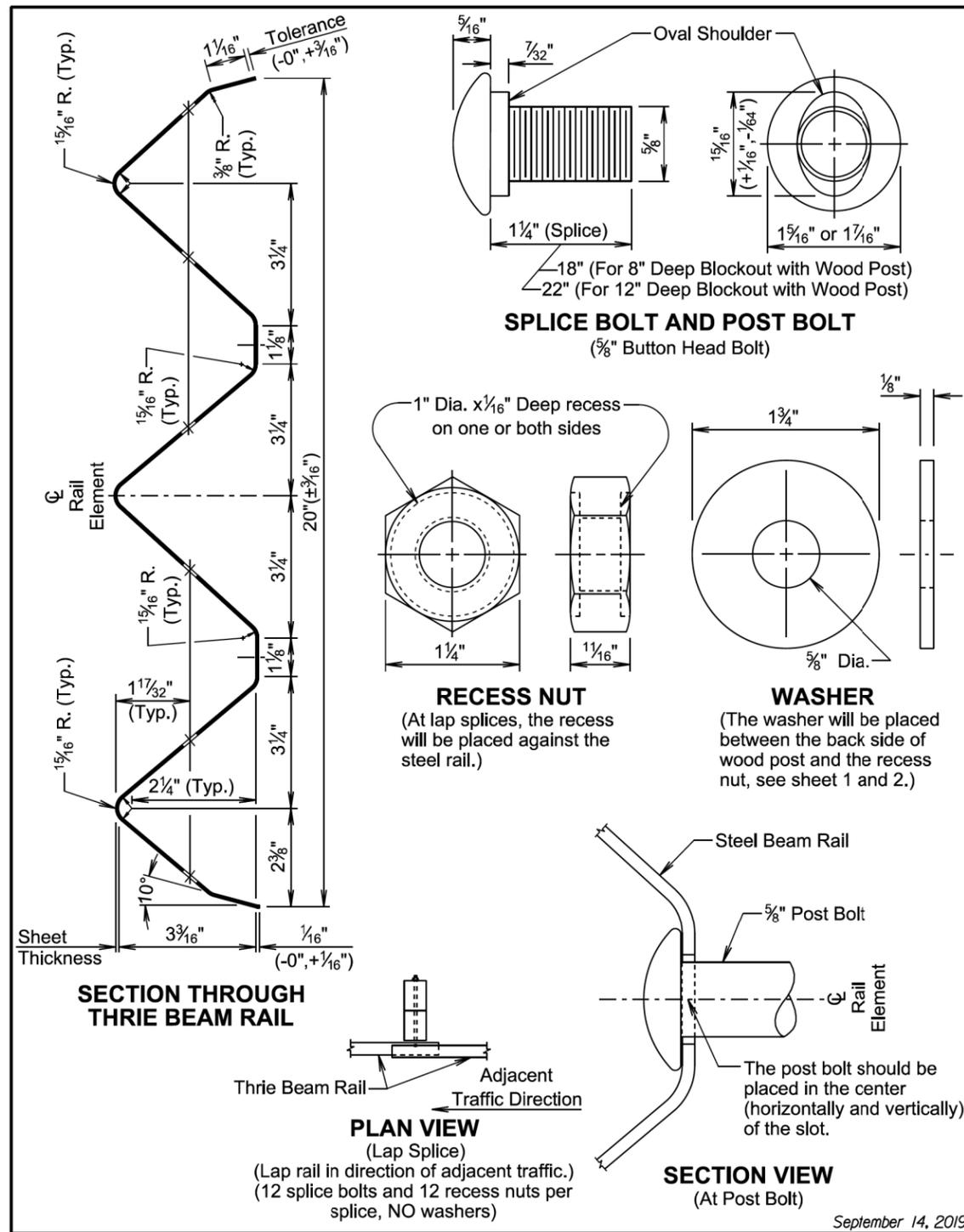


S D D O T	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01
		Sheet 2 of 5

Published Date: 2nd Qtr. 2021

September 14, 2019





September 14, 2019

Published Date: 2nd Qtr. 2021	S D D O T	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01
			Sheet 5 of 5

TYPE AND DETAILS OF MGS						
Type of MGS	W Beam Rail Single or Double (Nested)	Blockout Size	Blockout Material	Post Size	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'-1 1/2"
3	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	1'-6 3/4"
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.

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.

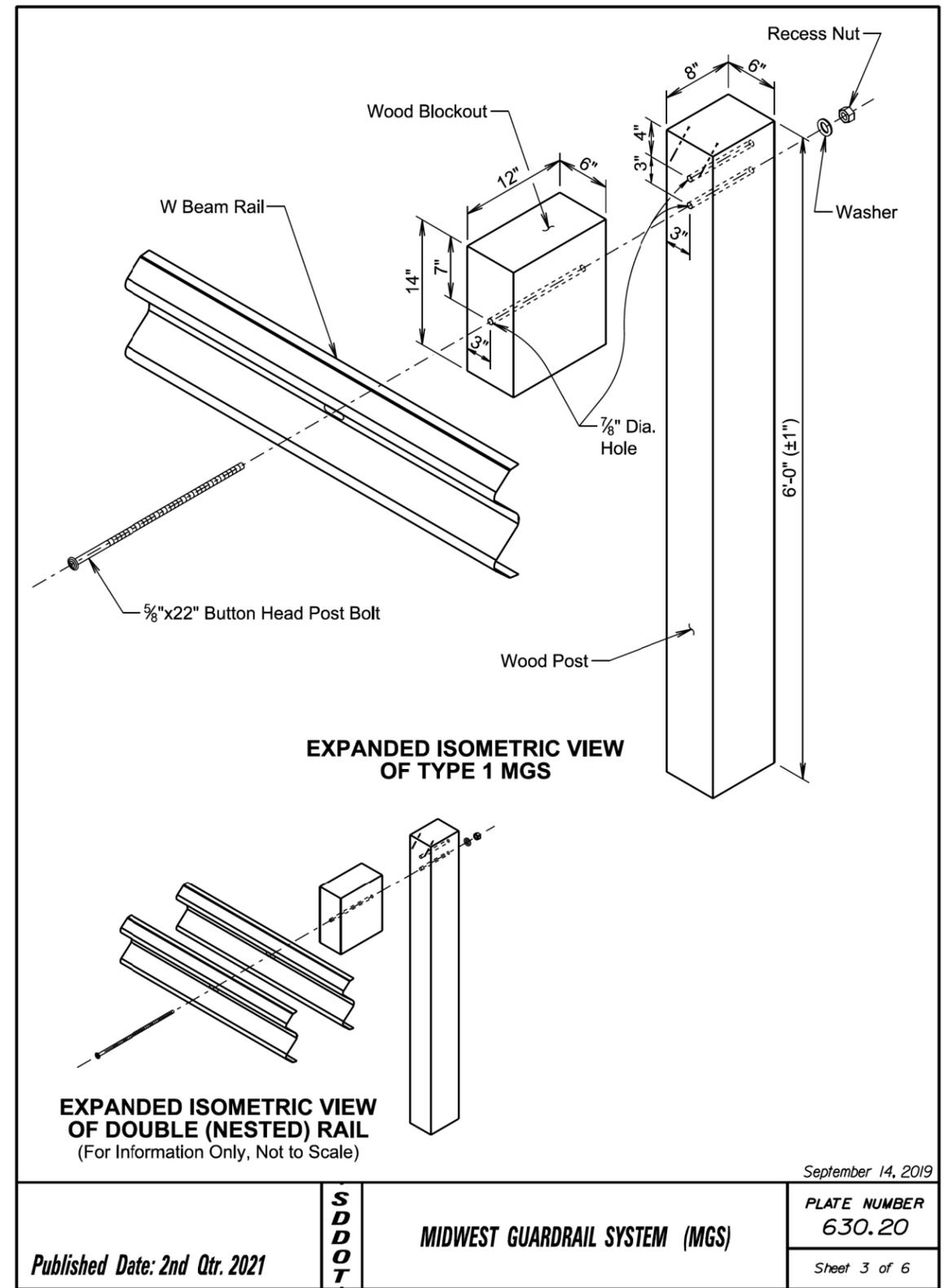
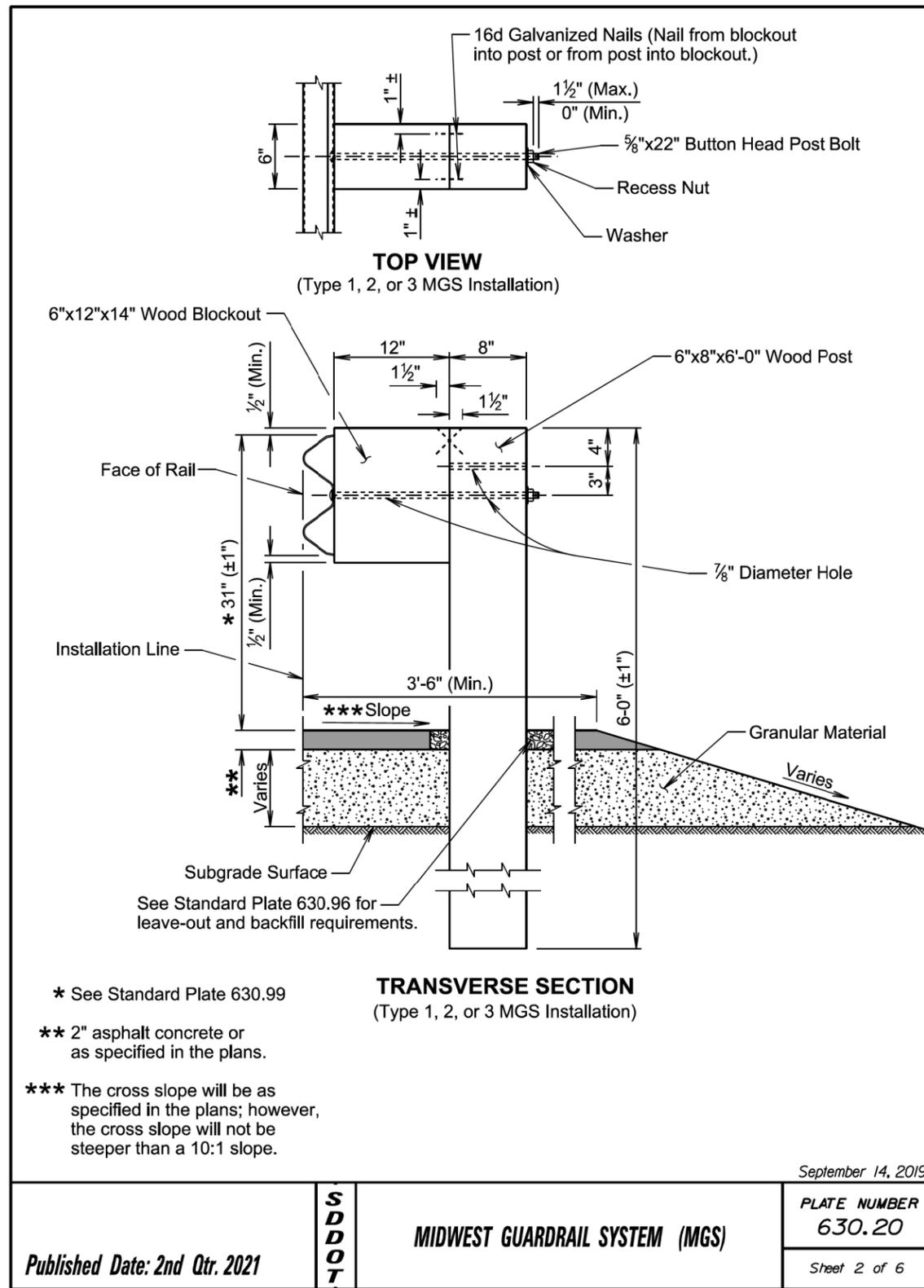
Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or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

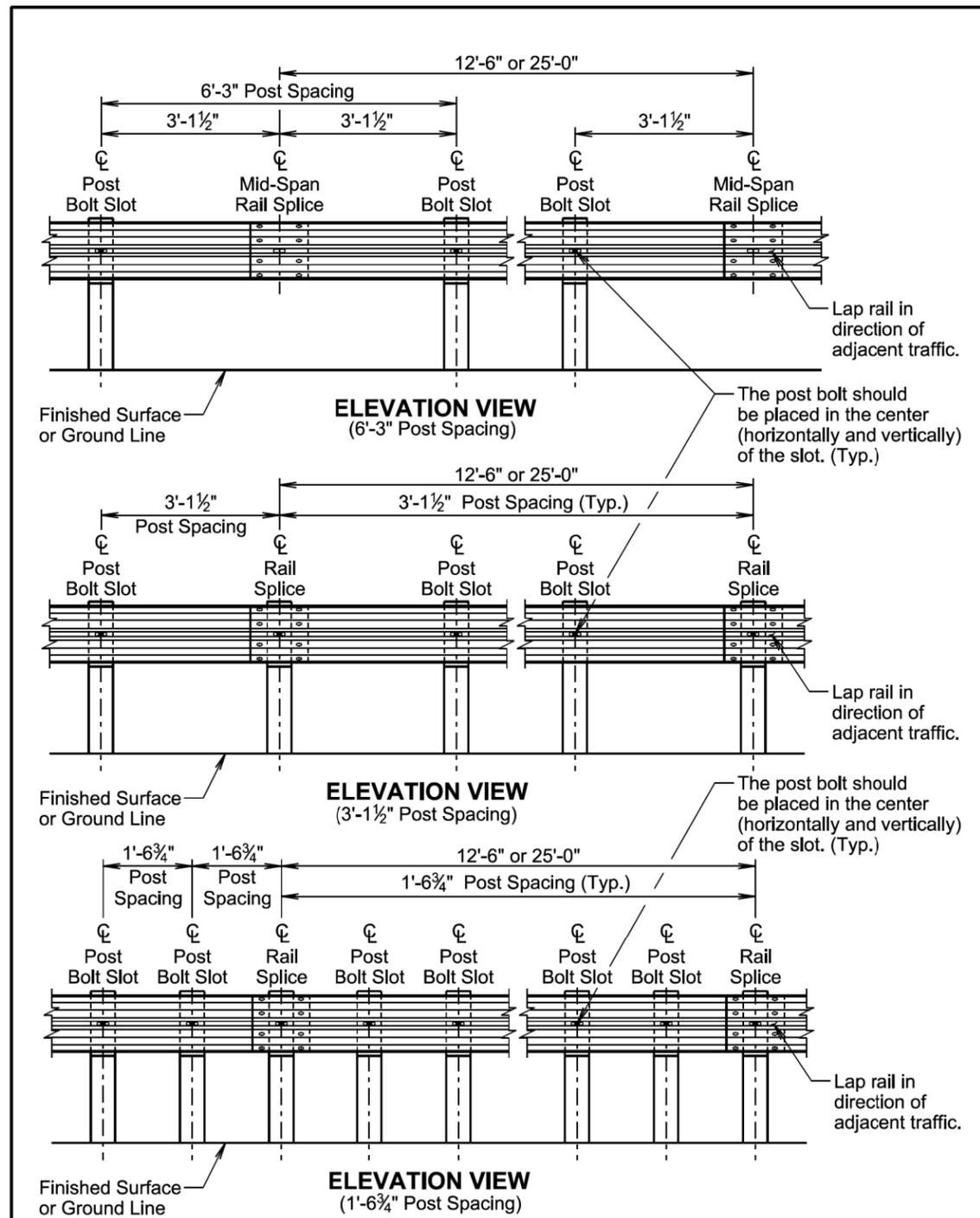
All costs for constructing the MGS including labor, equipment, and materials including all posts, blockouts, steel beam rail, and hardware will be incidental to the contract unit price per foot for the respective MGS contract item.

September 14, 2019

Published Date: 2nd Qtr. 2021	S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 1 of 6

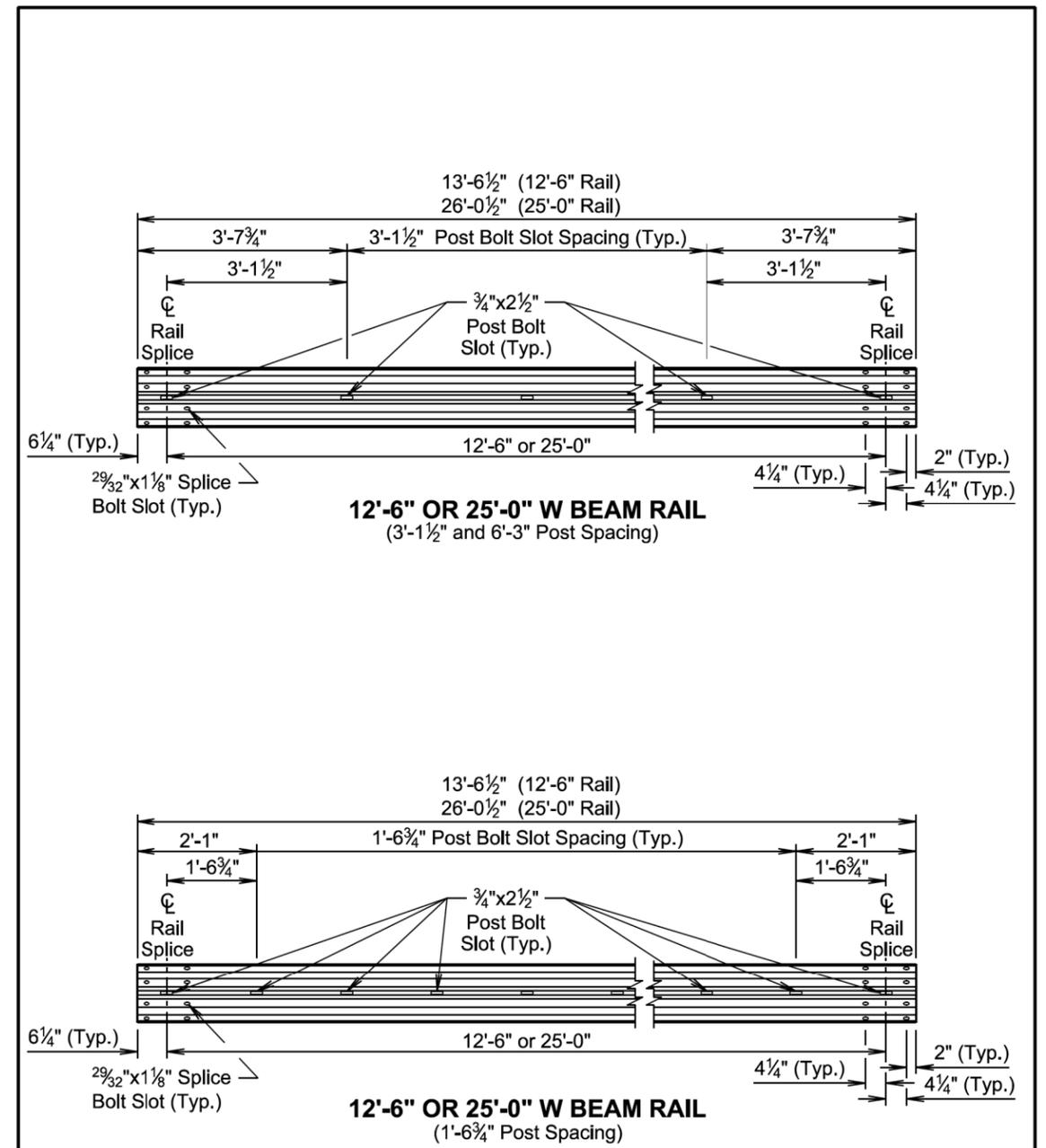
Plotting Date: 04/23/2021





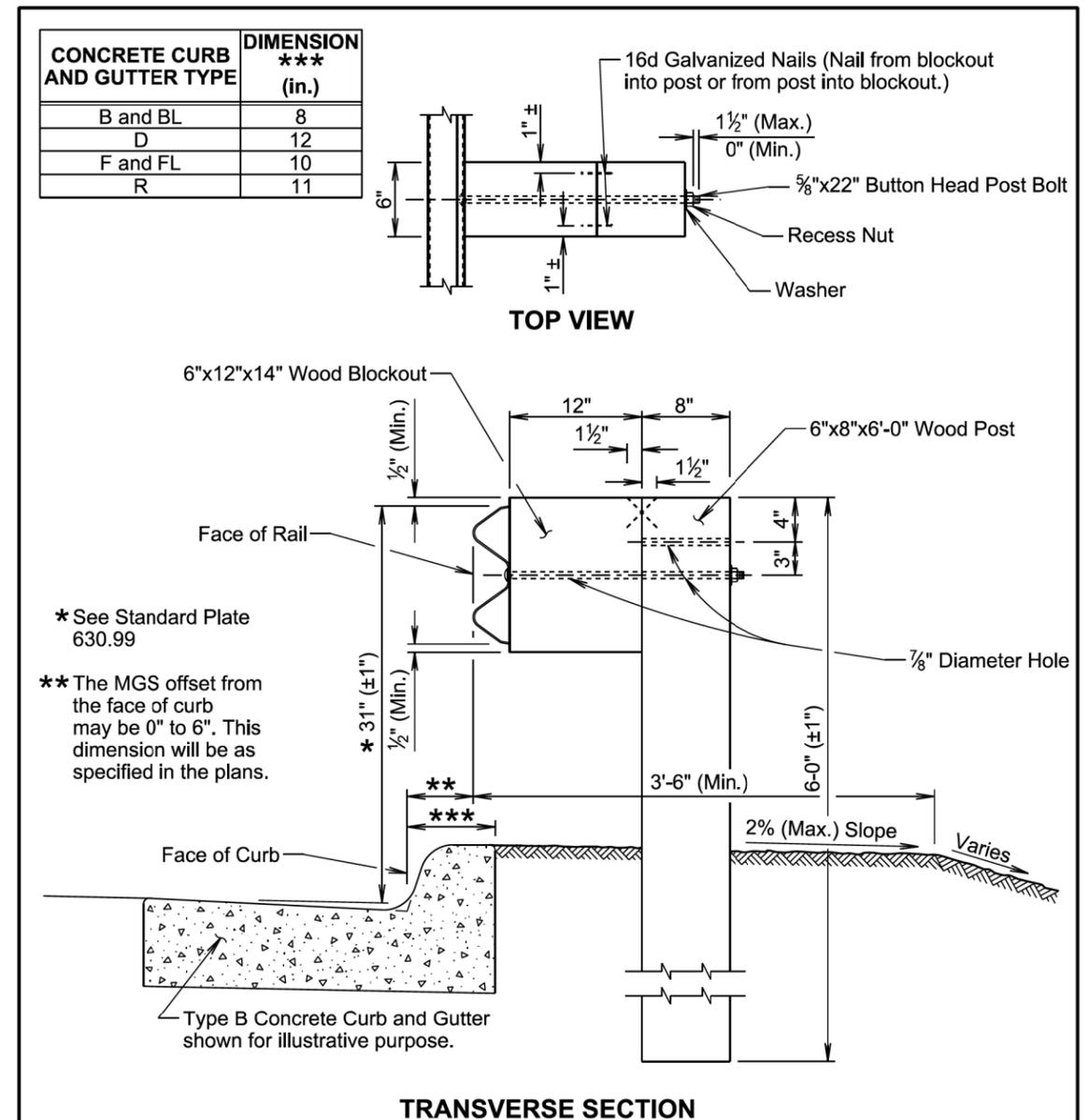
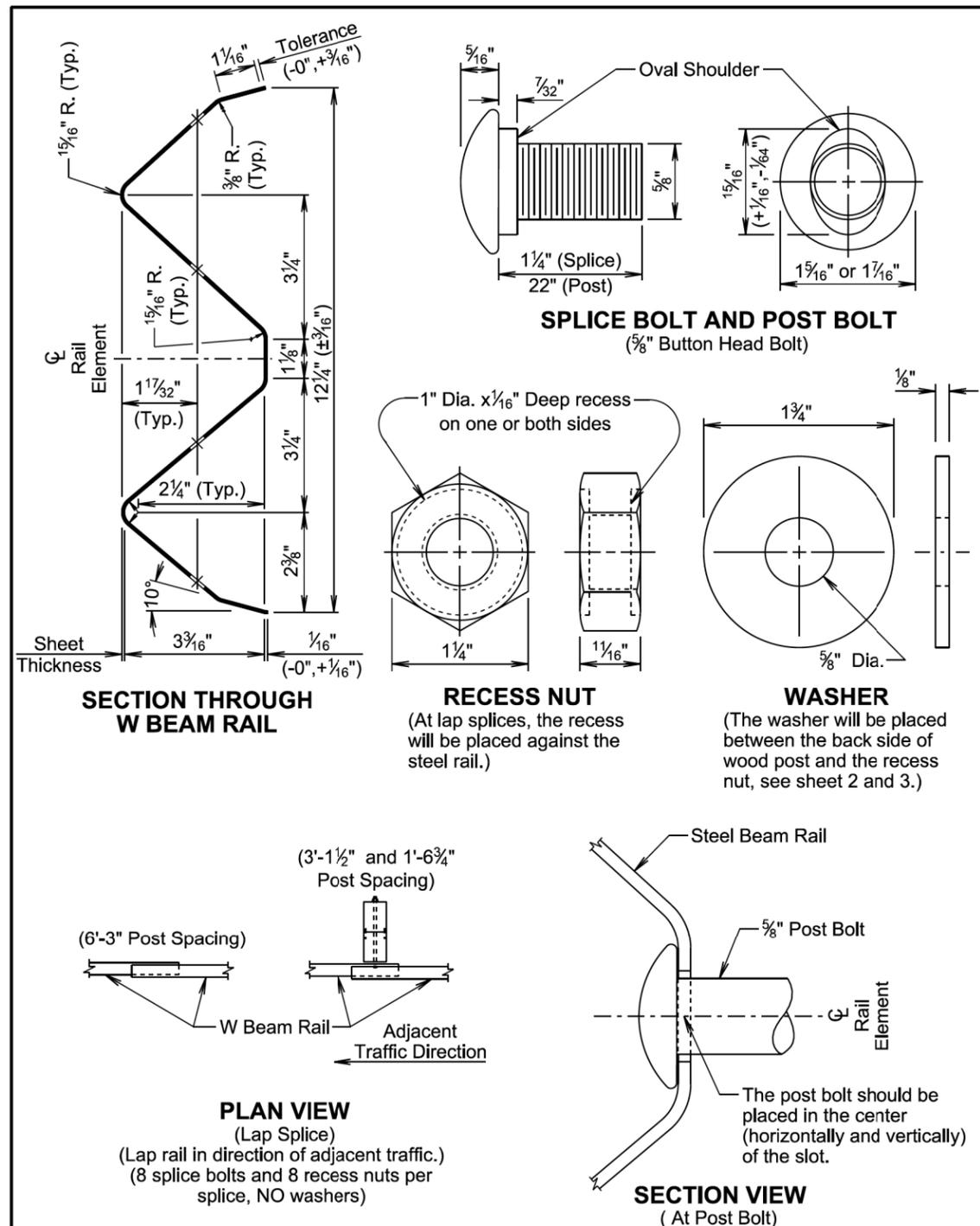
September 14, 2019

Published Date: 2nd Qtr. 2021	S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 4 of 6

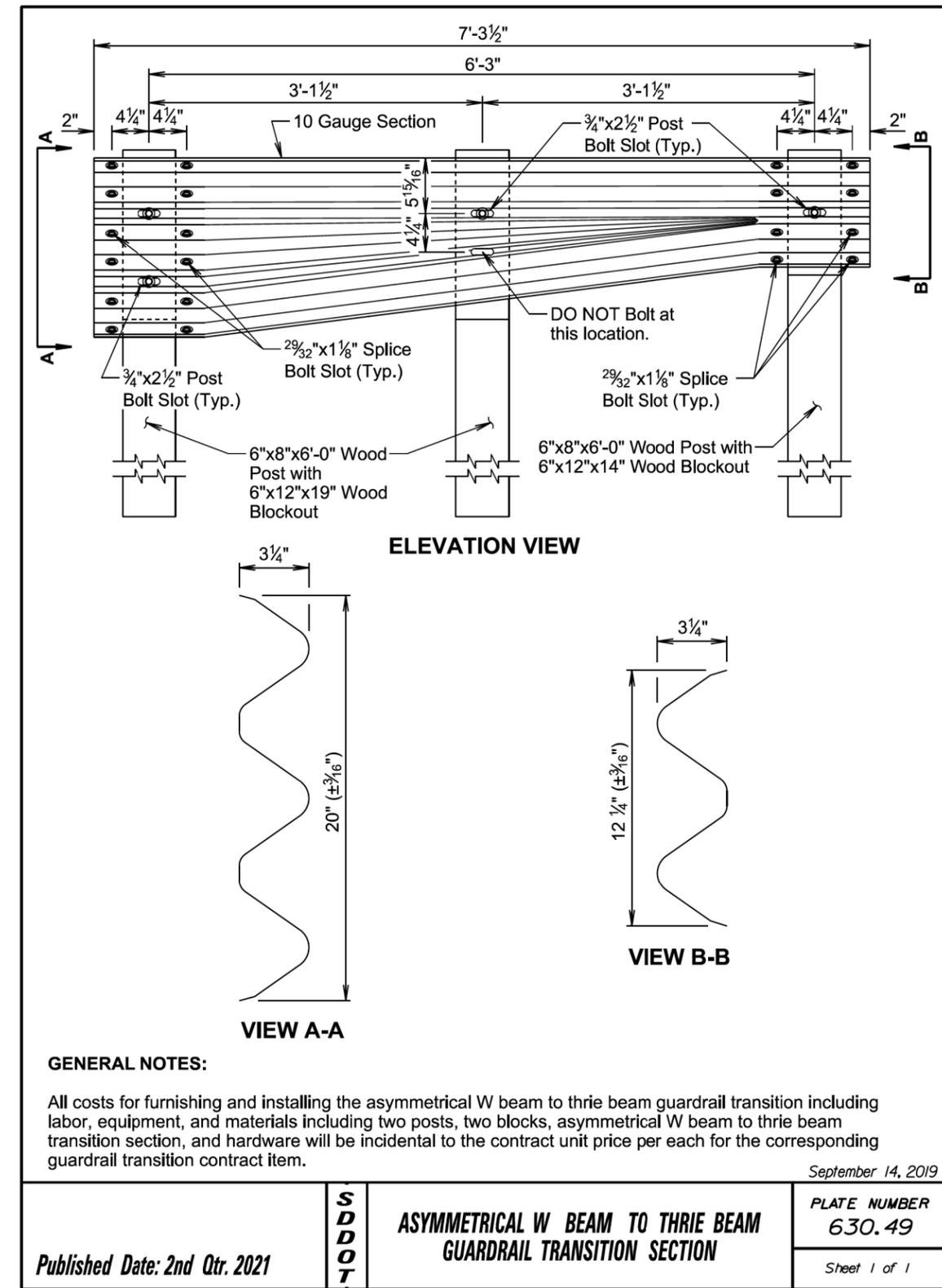
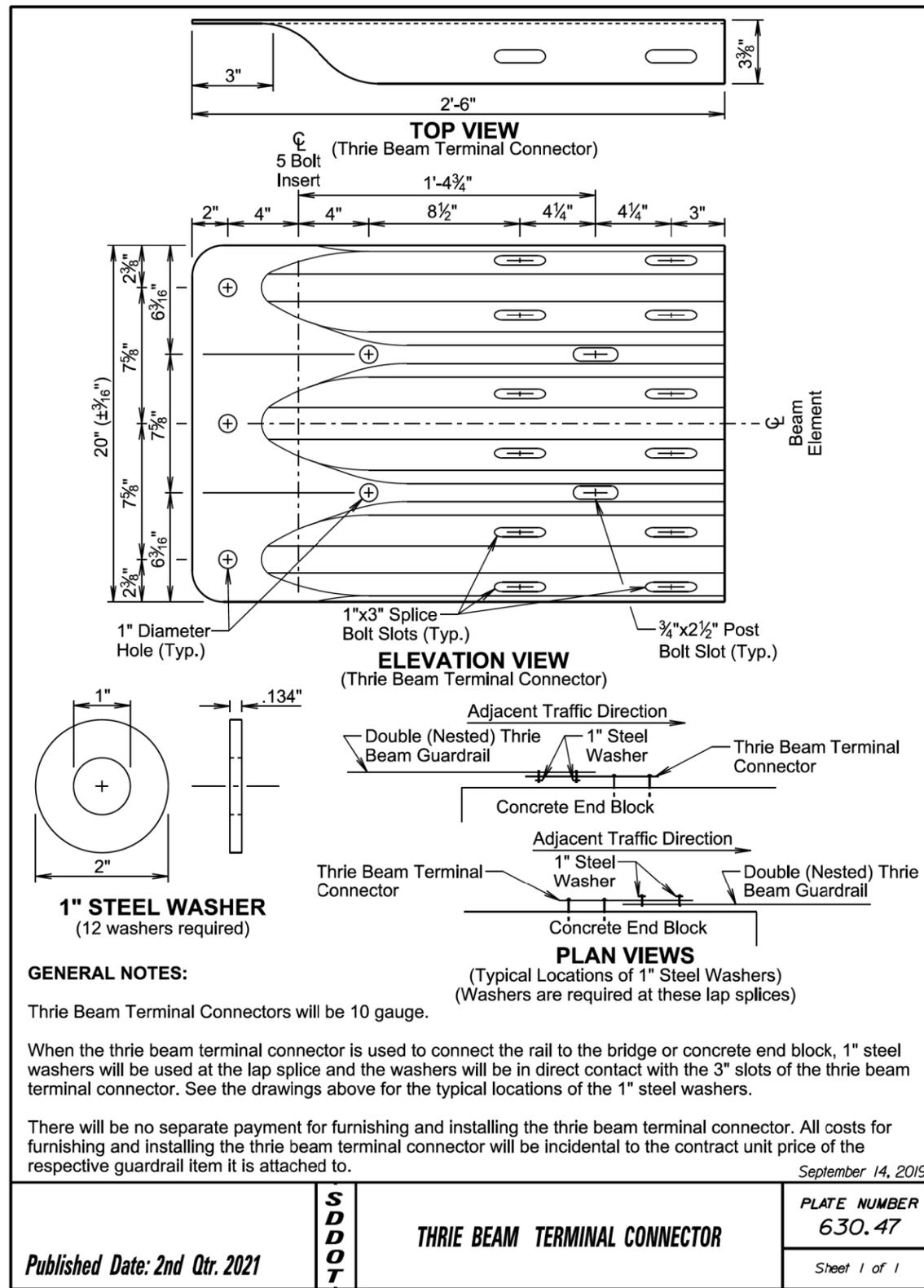


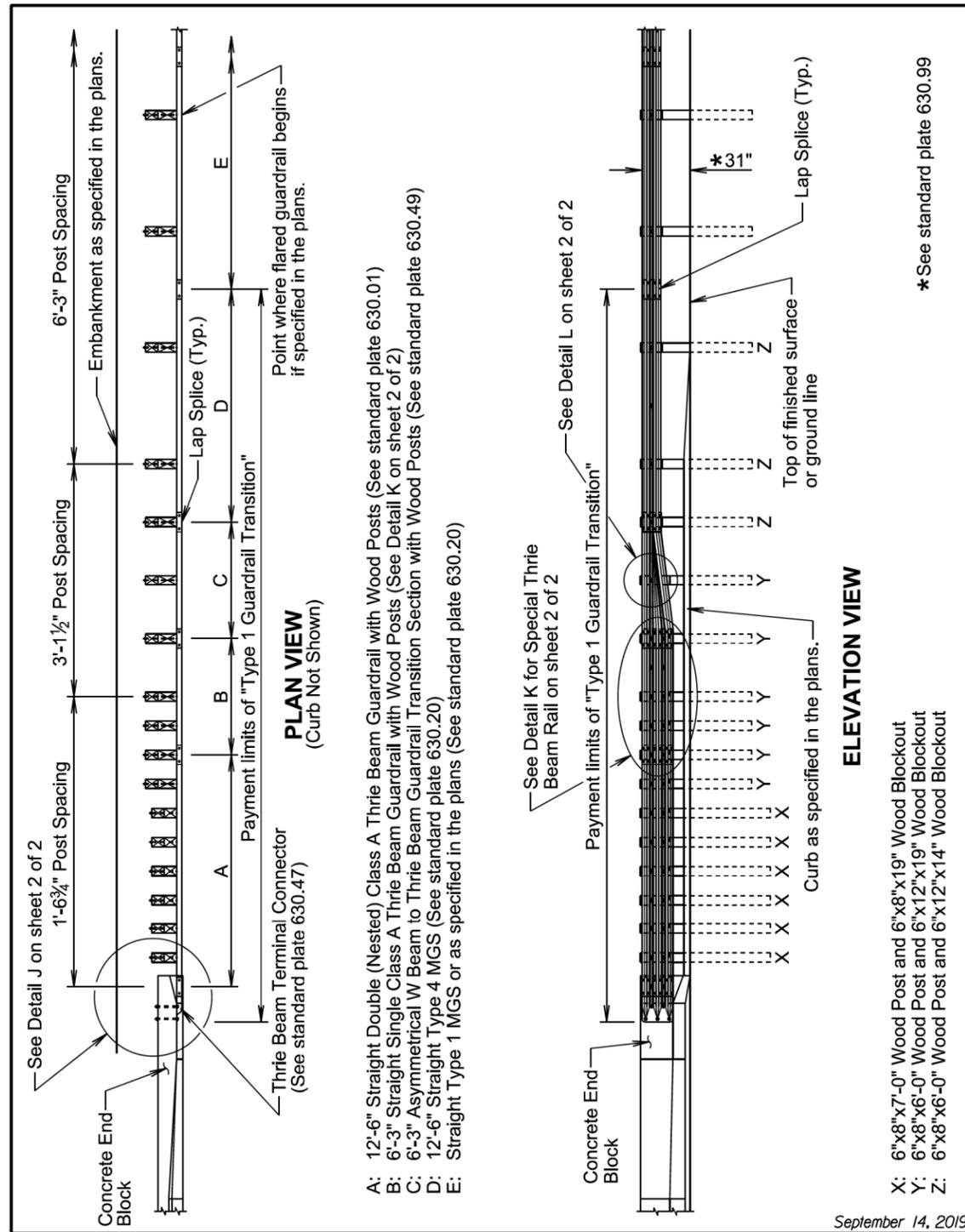
September 14, 2019

Published Date: 2nd Qtr. 2021	S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 5 of 6



Plotting Date: 04/23/2021



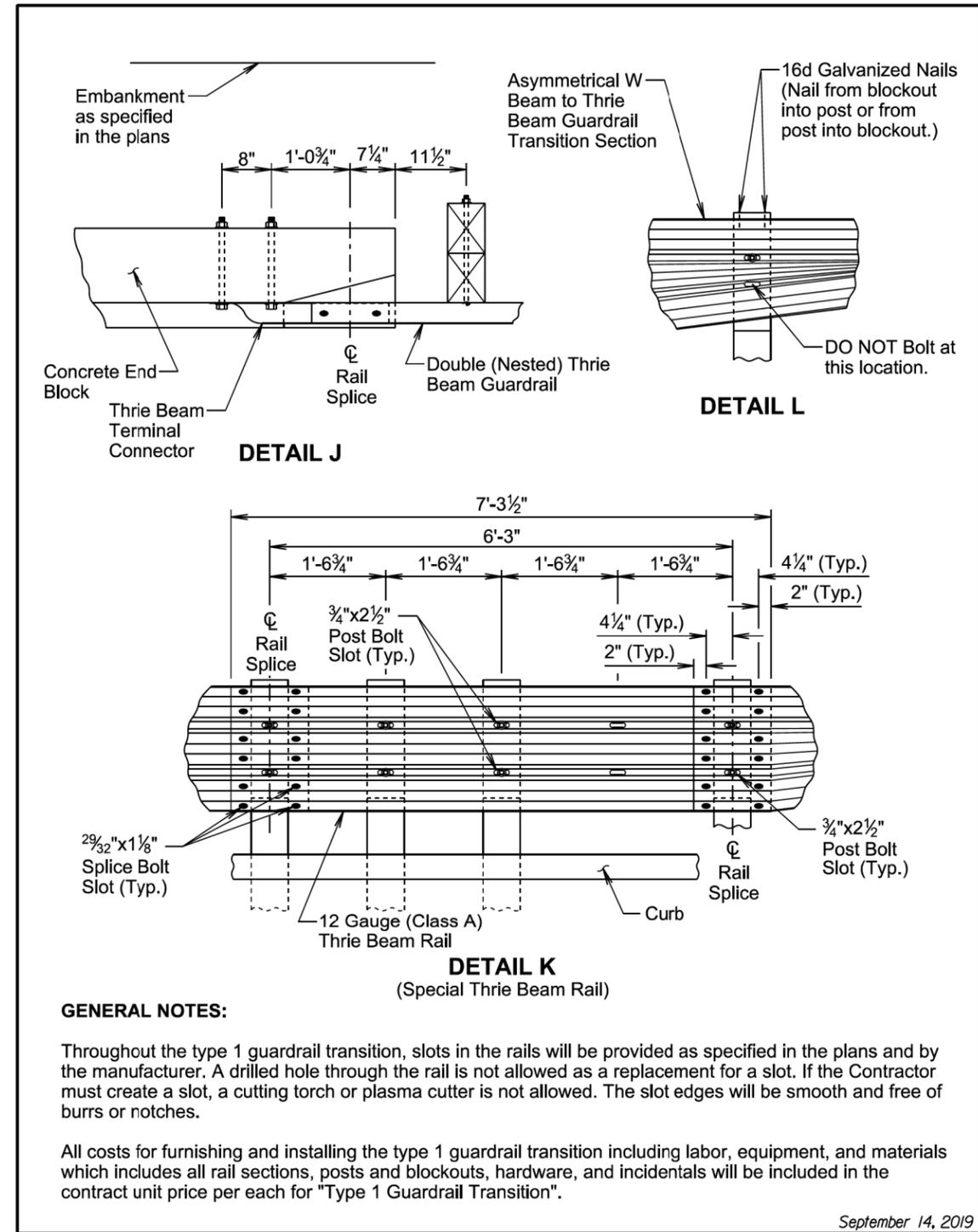


- A: 12'-6" Straight Double (Nested) Class A Thrie Beam Guardrail with Wood Posts (See standard plate 630.01)
- B: 6'-3" Straight Single Class A Thrie Beam Guardrail with Wood Posts (See Detail K on sheet 2 of 2)
- C: 6'-3" Asymmetrical W Beam to Thrie Beam Guardrail Transition Section with Wood Posts (See standard plate 630.49)
- D: 12'-6" Straight Type 4 MGS (See standard plate 630.20)
- E: Straight Type 1 MGS or as specified in the plans (See standard plate 630.20)

- X: 6"x8"x7'-0" Wood Post and 6"x8"x19" Wood Blockout
- Y: 6"x8"x6'-0" Wood Post and 6"x12"x19" Wood Blockout
- Z: 6"x8"x6'-0" Wood Post and 6"x12"x14" Wood Blockout

September 14, 2019

S D D O T	TYPE 1 GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))	PLATE NUMBER 630.50
	Published Date: 2nd Qtr. 2021	Sheet 1 of 2



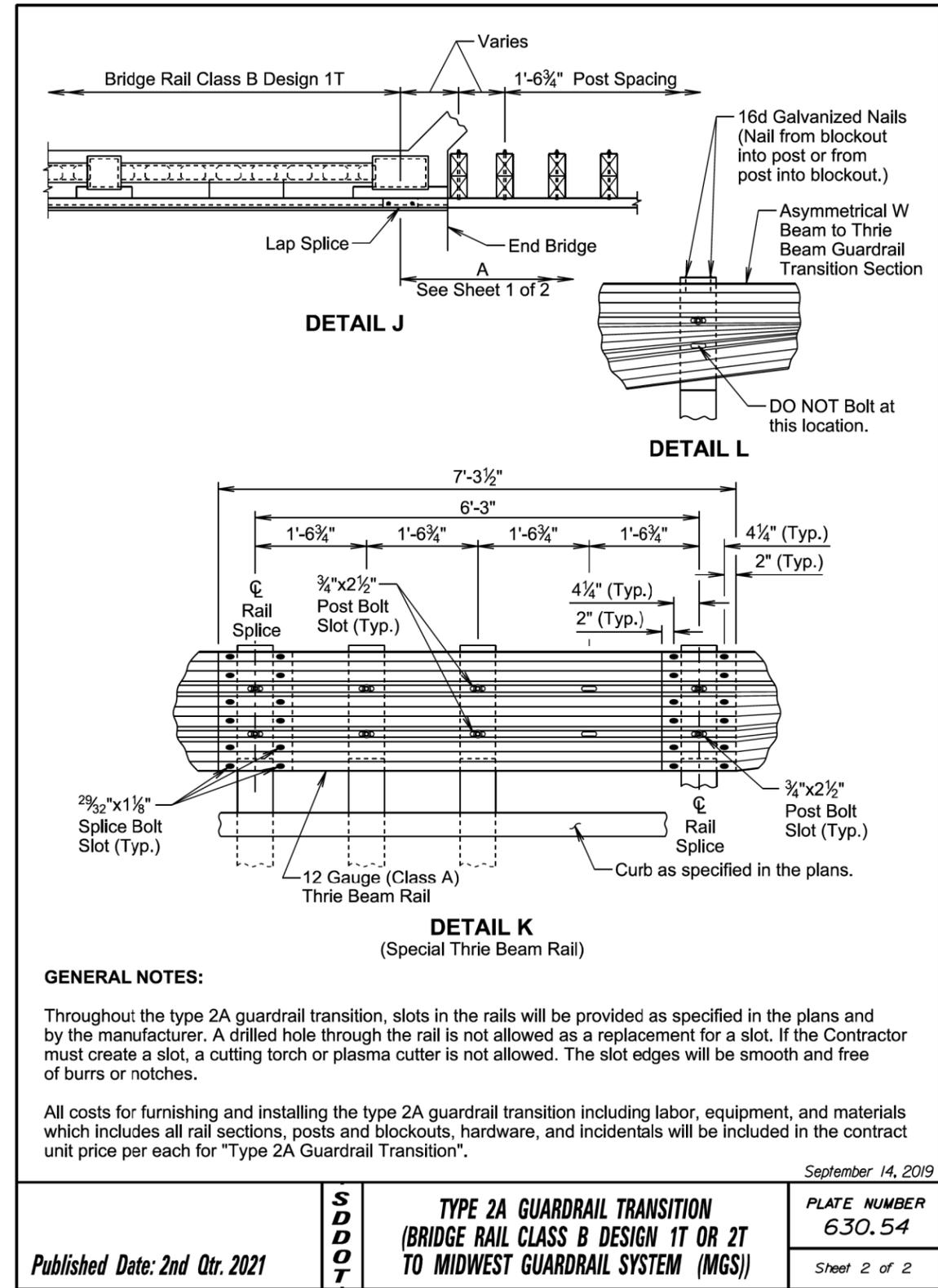
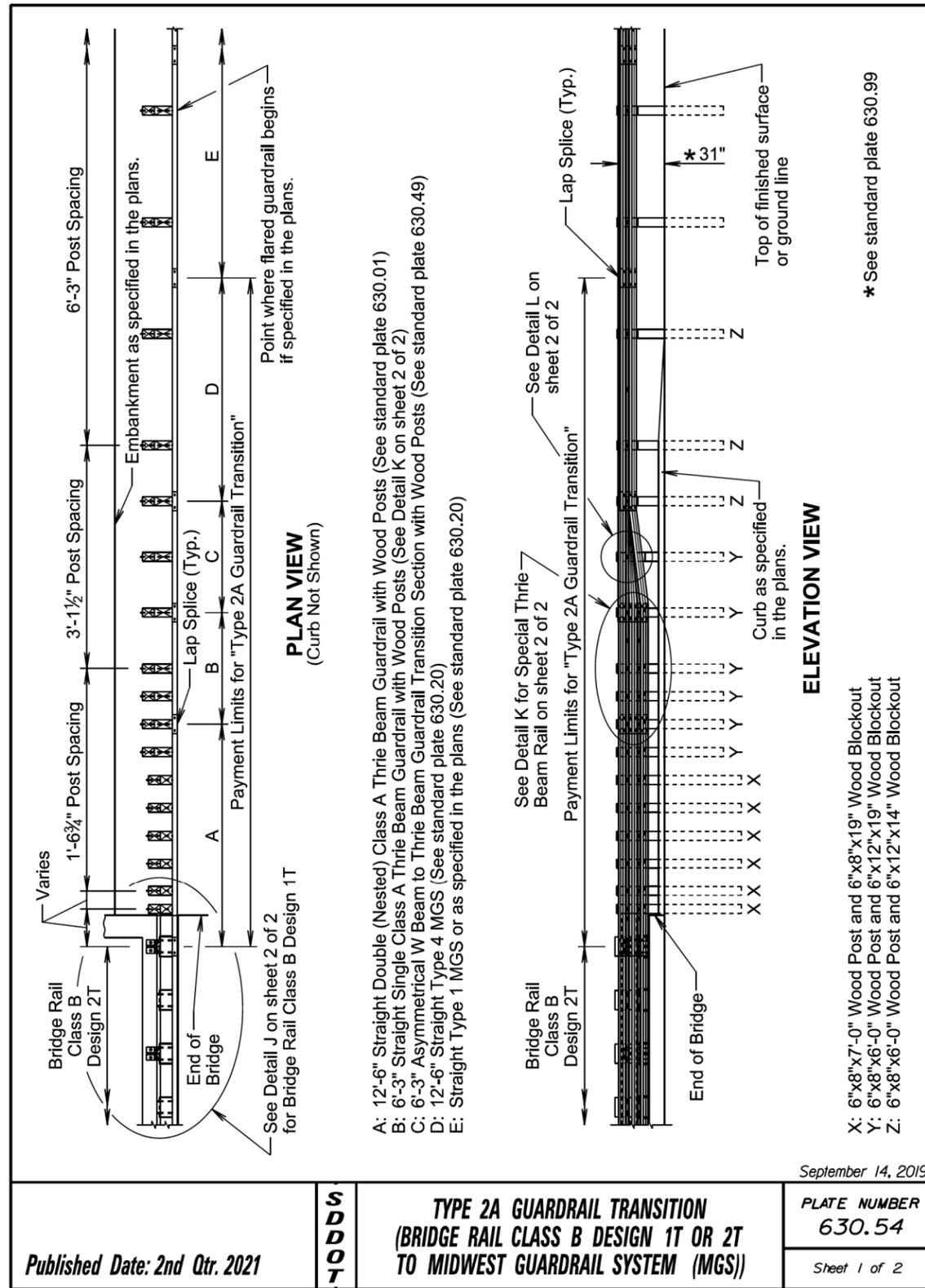
GENERAL NOTES:

Throughout the type 1 guardrail transition, 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 furnishing and installing the type 1 guardrail transition including labor, equipment, and materials which includes all rail sections, posts and blockouts, hardware, and incidentals will be included in the contract unit price per each for "Type 1 Guardrail Transition".

September 14, 2019

S D D O T	TYPE 1 GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))	PLATE NUMBER 630.50
	Published Date: 2nd Qtr. 2021	Sheet 2 of 2



Plotting Date: 04/23/2021

ELEVATION VIEW
(Guardrail Adjacent to Differential Slopes)

ELEVATION VIEW
(Guardrail on Constant Slope)

ELEVATION VIEW
(Guardrail Adjacent to Differential Surfacing Elevations)

ELEVATION VIEW
(Guardrail at Curb and Gutter)

DETAIL A
(3 Cable Guardrail (Low Tension))
(See General Notes for measurement of high tension cable guardrail/barrier)

GENERAL NOTES:

The W Beam guardrail shown is for illustrative purpose. The guardrail height for all types of guardrail systems except for high tension cable guardrail/barrier will be measured in accordance with this standard plate.

When measuring height of 3 cable guardrail (low tension) the height will be measured to the center of the top cable. See Detail A.

The height of high tension cable guardrail/barrier will be measured in accordance with the Manufacturer's installation instructions.

September 14, 2019

S D D O T	MEASURING GUARDRAIL HEIGHT	PLATE NUMBER 630.99
	Published Date: 2nd Qtr. 2021	Sheet 1 of 1

PLAN VIEW
(Type 2 Object Marker Details and Post Orientation)

ELEVATION VIEW
(Type 2 Object Marker Detail)
($\frac{7}{8}$ " to $1\frac{1}{8}$ " grip range
 $\frac{1}{4}$ " twin rivet (single and back to back))

TYPE 2 OBJECT MARKER POST LENGTHS

OFFSET (*)	1'	2'	3'	4'	5'	6'	7'	8'	Greater Than 8'	
POST LENGTH (L)										
SLOPE	3:1	8'-6"	8'-9"	9'-3"	9'-6"	9'-9"	10'-3"	10'-6"	10'-9"	8'-0"
	4:1	8'-6"	8'-9"	9'-0"	9'-3"	9'-9"	9'-9"	10'-0"	10'-3"	8'-0"
	5:1	8'-3"	8'-6"	8'-9"	9'-0"	9'-3"	9'-3"	9'-6"	9'-9"	8'-0"
	6:1	8'-3"	8'-6"	8'-9"	8'-9"	9'-0"	9'-3"	9'-3"	9'-6"	8'-0"

GENERAL NOTES:

*** The type 2 object marker may be installed back to back when specified in the plans.
Post Length L was calculated based on a shoulder width of 6 feet at a crossslope of 4 percent and L was rounded up to the nearest 3 inches.

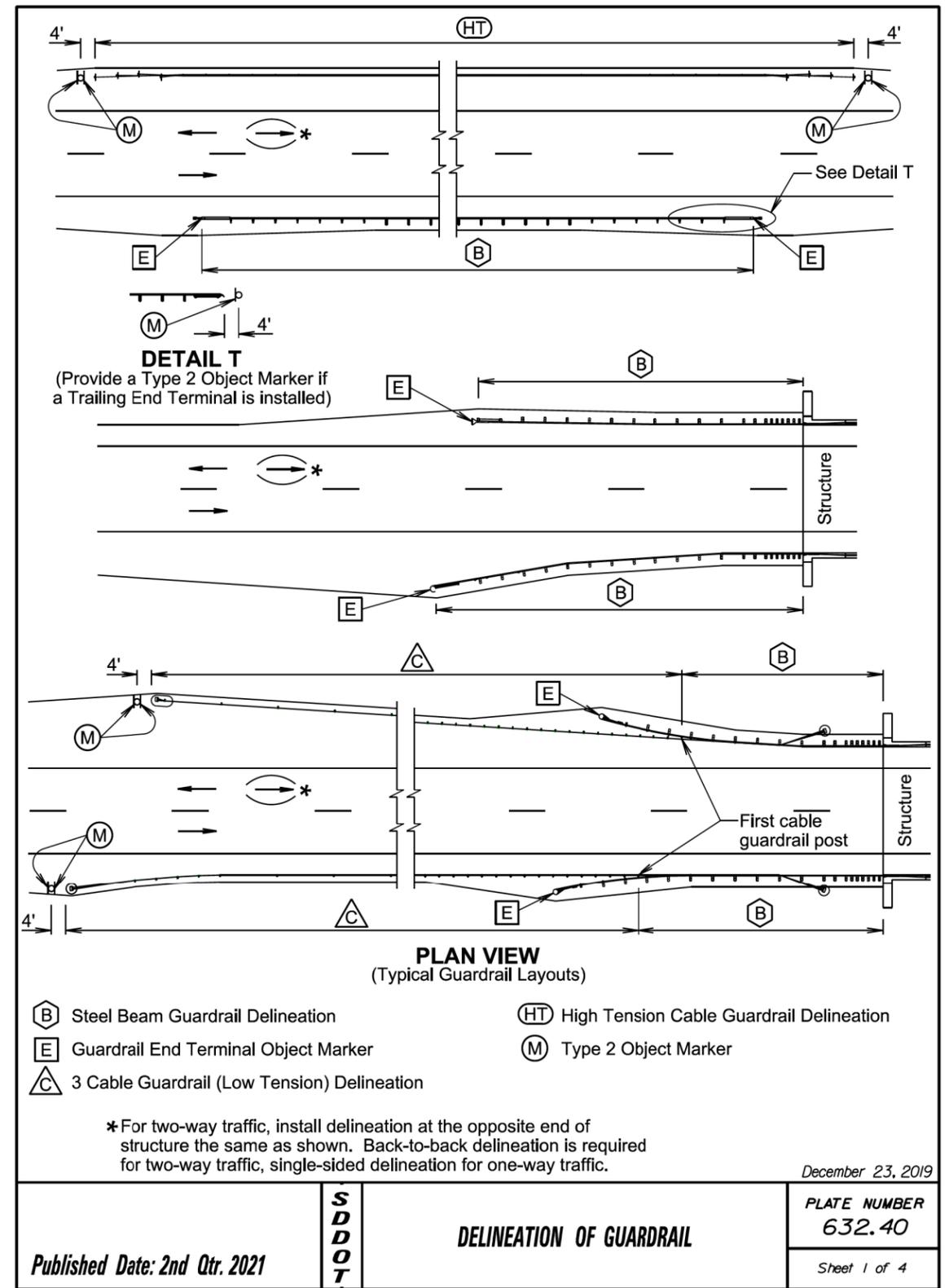
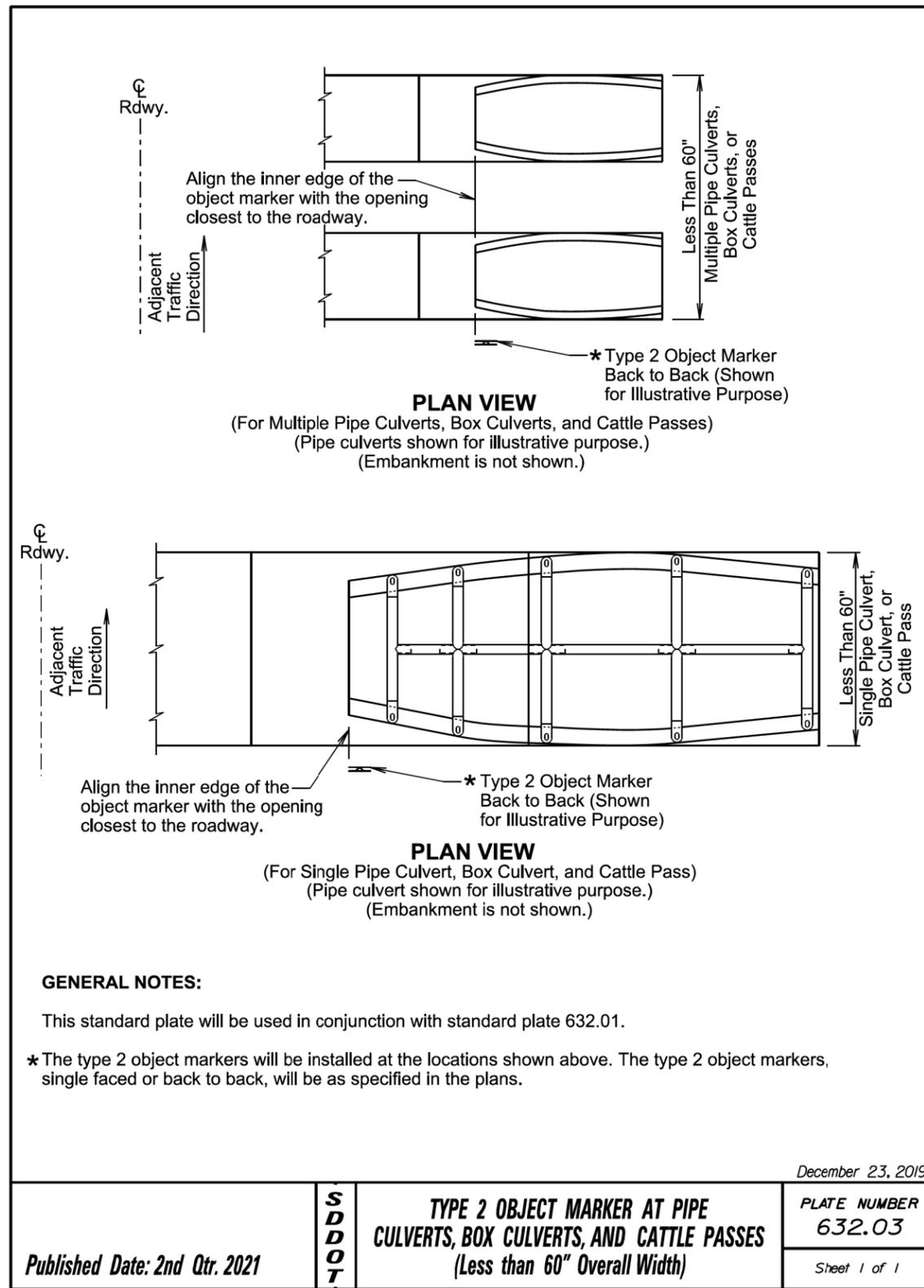
** Dimension A is 4 feet when the Offset * is 8 feet and less. Dimension B is 4 feet when Offset * is greater than 8 feet.

The type 2 object marker and the 1.12 lb/ft flanged channel steel post will be in conformance with Specifications Section 982.2 J.

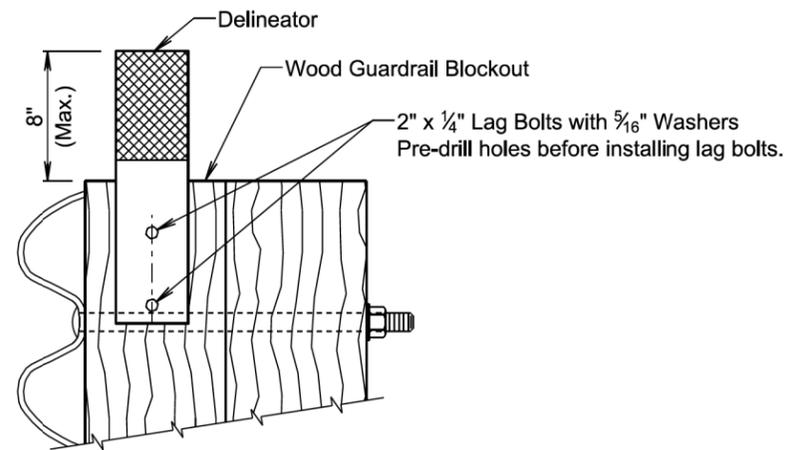
Payment for the type 2 object marker will be in conformance with Specification Section 632.5 B.

December 23, 2019

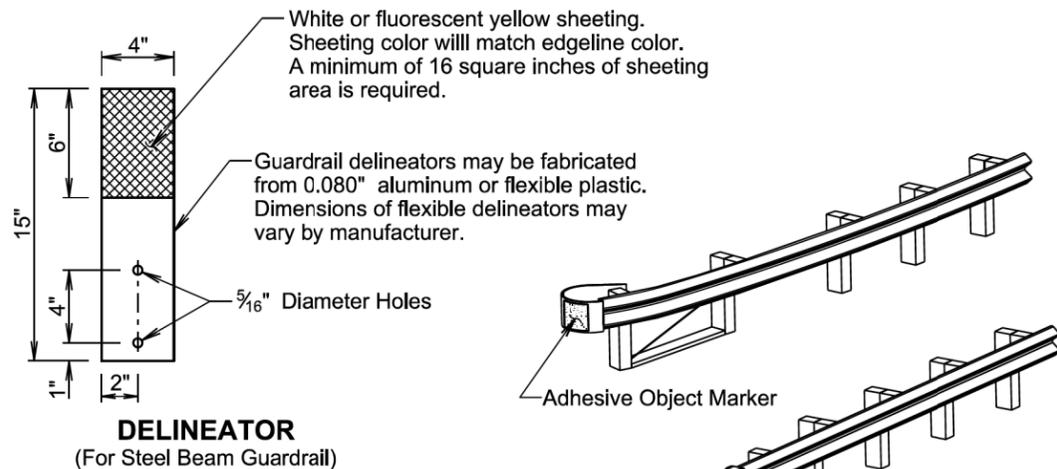
S D D O T	TYPE 2 OBJECT MARKER (DIRECT DRIVE)	PLATE NUMBER 632.01
	Published Date: 2nd Qtr. 2021	Sheet 1 of 1



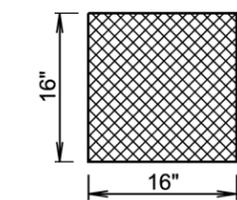
Plotting Date: 04/23/2021



(B) STEEL BEAM GUARDRAIL DELINEATION



DELINEATOR
(For Steel Beam Guardrail)



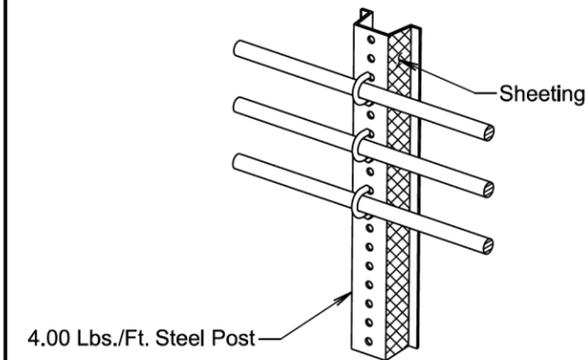
ADHESIVE OBJECT MARKER

(E) GUARDRAIL END TERMINAL OBJECT MARKER

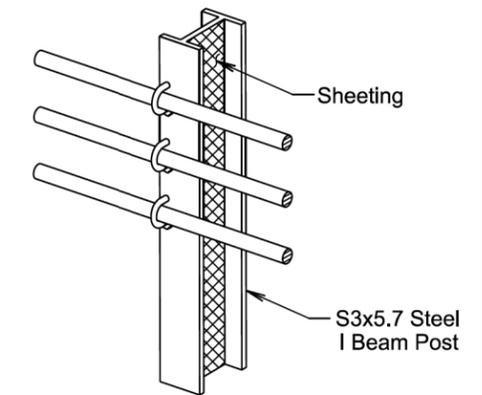
Adhesive object marker dimensions may vary due to shape of terminal end. A minimum of 256 square inches of object marker sheeting area is required. The sheeting will be fluorescent yellow.

December 23, 2019

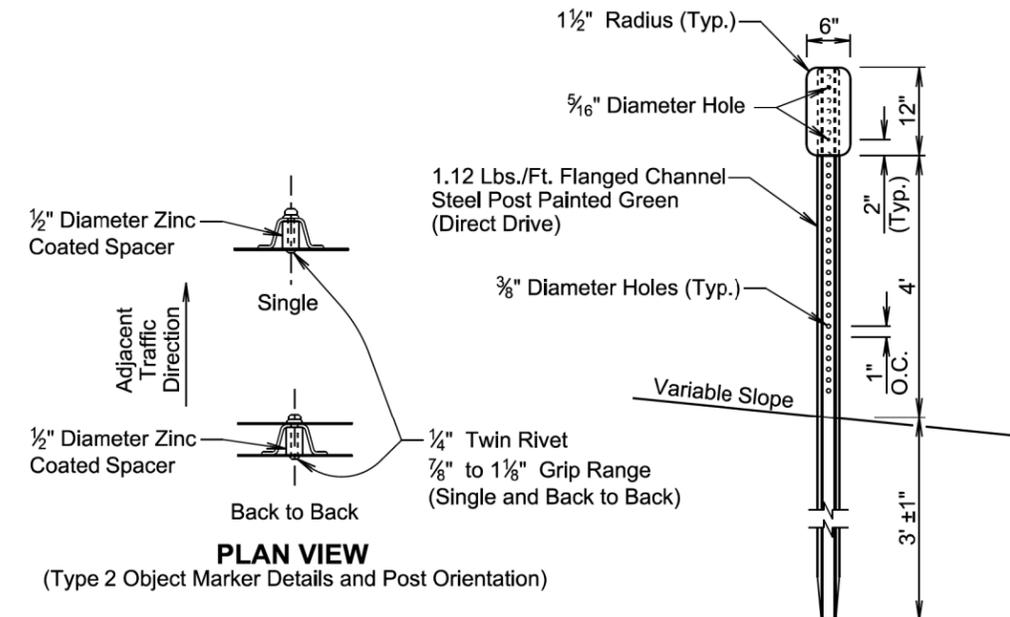
Published Date: 2nd Qtr. 2021	S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
			Sheet 2 of 4



(C) 3 CABLE GUARDRAIL (LOW TENSION) DELINEATION



(C) 3 CABLE GUARDRAIL (LOW TENSION) DELINEATION



PLAN VIEW
(Type 2 Object Marker Details and Post Orientation)

ELEVATION VIEW

(M) (Type 2 Object Marker)
(For Marking 3 Cable Guardrail (Low Tension) Anchor, High Tension Cable Guardrail Anchor, and Trailing End Terminal)

December 23, 2019

Published Date: 2nd Qtr. 2021	S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
			Sheet 3 of 4

GENERAL NOTES:

The delineation of high tension cable guardrail will be reflective sheeting placed back to back on every other post cap or cable spacer. The sheeting will be type XI in conformance with ASTM D4956. The color of the reflective sheeting shall be the same as the nearest pavement marking.

The delineators for steel beam guardrail and sheeting on 3 cable guardrail (low tension) posts will be covered with a minimum of 16 square inches of reflective sheeting. The reflective sheeting will be type XI in conformance with ASTM D4956. Along two-way roadways the sheeting will be on both sides of the delineators and guardrail posts and will be white in color. For one-way roadways the sheeting will only be required on the side facing traffic and the color will be the same as the nearest pavement marking, yellow on the left side of the roadway and white on the right side.

When steel beam guardrail is attached to a bridge the first delineator will be attached to the post nearest the bridge.

At bridges with guardrail less than 200 feet in length, a minimum of 4 delineators will be placed in addition to the end terminal yellow object marker. The spacing between the delineators will be approximately one third of the length of the guardrail.

At bridges with guardrail 200 feet and greater in length, including bridges that have steel beam guardrail transitioning to 3 cable guardrail (low tension), the delineators will be placed at a spacing of approximately 50 feet. Delineation will extend throughout the length of the guardrail system.

Steel beam guardrail that is not attached to a bridge and is less than 200 feet in length, a minimum of 4 delineators will be placed in addition to the end terminal yellow object markers. The spacing between the delineators will be approximately one third of the length of the guardrail.

Steel beam guardrail that is not attached to a bridge and is 200 feet and greater in length, including steel beam guardrail transitioning to 3 cable guardrail (low tension), the delineators will be placed at a spacing of approximately 50 feet. Delineation will extend throughout the length of the guardrail system.

All costs for furnishing and installing single or back to back guardrail delineation on 3 cable guardrail and steel beam guardrail will be included in the contract unit price per each for "Guardrail Delineator".

All costs for furnishing and installing the reflective sheeting on the cable spacers or post caps for the high tension cable guardrail will be incidental to the respective high tension cable guardrail contract item.

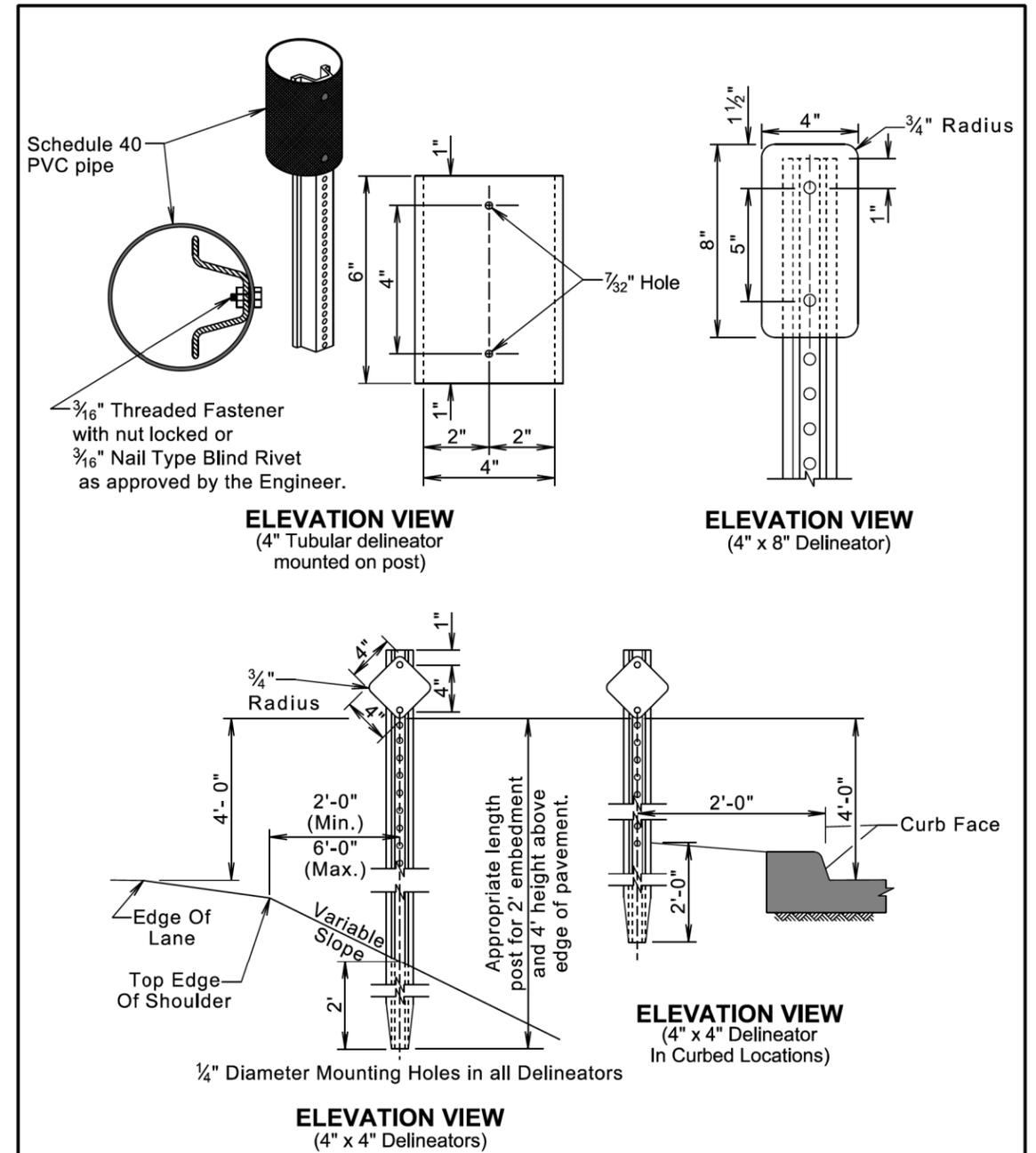
An adhesive object marker will be placed on the end of the W beam guardrail or MGS end terminal. The adhesive object marker dimensions may vary due to the shape of the terminal end. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting will be fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the adhesive object marker will be incidental to various contract items.

A type 2 object marker will be placed adjacent to the 3 cable guardrail (low tension) anchor, high tension cable guardrail anchor, and trailing end terminal at the location noted on sheet 1 of this standard plate. The type 2 object marker (6" x 12") will have fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the type 2 object marker including the steel post, 6" x 12" reflective panel, and hardware will be included in the contract unit price per each for "Type 2 Object Marker" for single-sided and "Type 2 Object Marker Back to Back" for back to back type 2 object markers.

December 23, 2019

S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
		Sheet 4 of 4

Published Date: 2nd Qtr. 2021



ELEVATION VIEW
(4" Tubular delineator mounted on post)

ELEVATION VIEW
(4" x 8" Delineator)

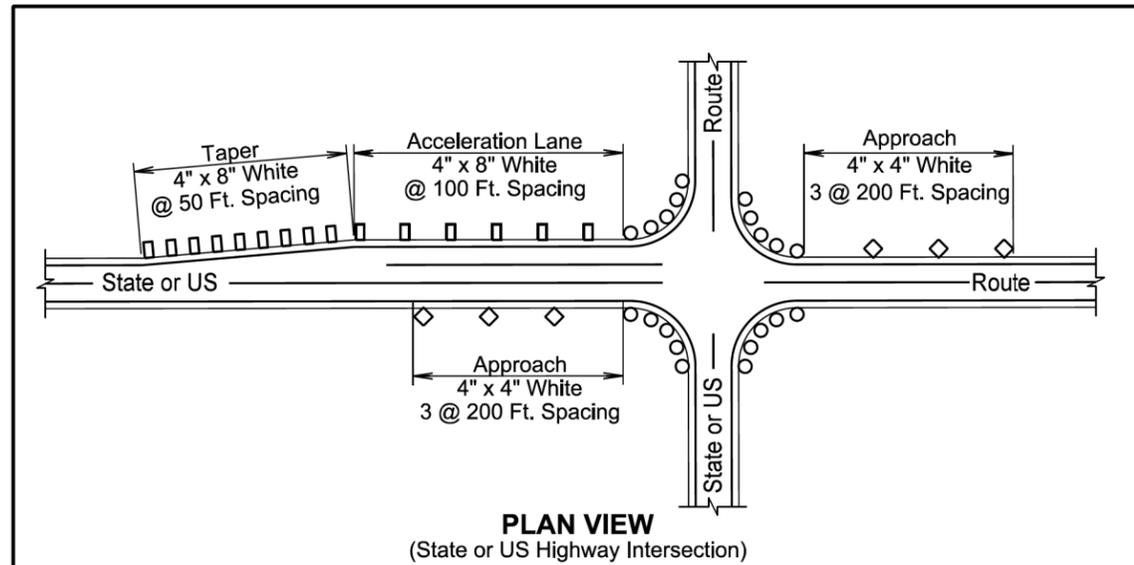
ELEVATION VIEW
(4" x 4" Delineator In Curbed Locations)

ELEVATION VIEW
(4" x 4" Delineators)

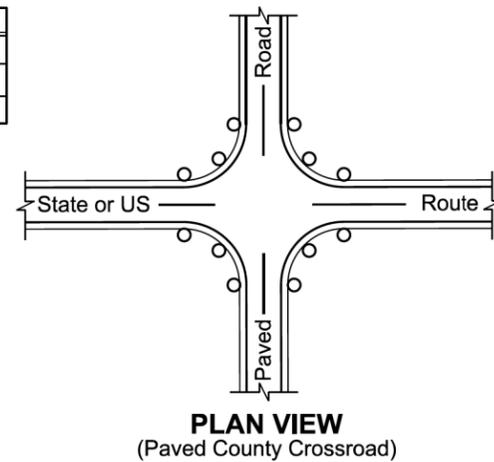
November 19, 2020

S D D O T	DELINEATOR INSTALLATION DETAIL	PLATE NUMBER 632.42
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021



LEGEND	
◇	4" x 4" White Delineator
▭	4" x 8" White Delineator
○	4" x 6" White Tubular Delineator



GENERAL NOTES:

At all intersections with State or US highways and paved county roads:

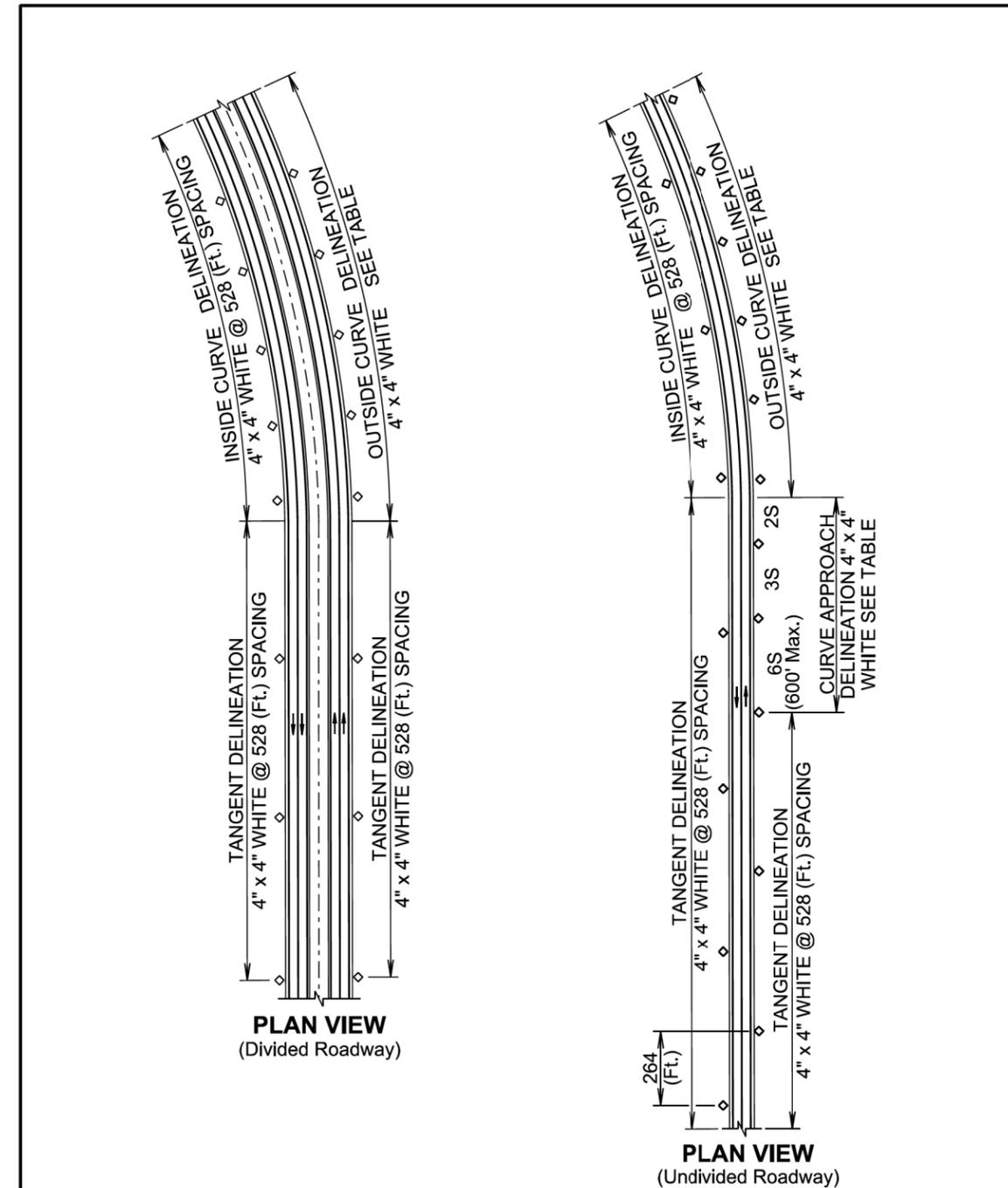
For radii greater than 100 feet, place 5 tubular white delineators on equally spaced posts around the turning radius.

For radii greater than 50 feet up to 100 feet, place 4 tubular white delineators on equally spaced posts around the turning radius.

For radii of 50 feet or less, place 3 tubular white delineators on equally spaced posts around the turning radius.

November 19, 2020

Published Date: 2nd Qtr. 2021	S D D O T	DELINEATOR AT INTERSECTIONS	PLATE NUMBER 632.44
			Sheet 1 of 1



November 19, 2020

Published Date: 2nd Qtr. 2021	S D D O T	DELINEATOR INSTALLATION SPACING	PLATE NUMBER 632.46
			Sheet 1 of 2

GENERAL NOTES:

Delineators will be located 8 feet outside the outer edge of shoulder. When a roadside barrier or other obstruction intrudes into the space between the pavement edge and the extension of the line of delineators, the delineators should be in line with the barrier or in line with the innermost edge of the obstruction.

When normal spacing is interrupted by driveways, crossroads, or approaches, delineators falling within such areas may be moved in either direction a distance not exceeding one-quarter of the standard spacing. Delineators still falling within such areas should be eliminated.

The spacing for specific radii may be interpolated from the table. The minimum spacing should be 200 feet. The spacing on curves should not exceed 300 feet. In advance of or beyond a curve, and proceeding away from the end of the curve, the spacing of the first delineator is 2S, the second 3S, and the third 6S, but not to exceed 300 feet. S refers to the delineator spacing for specific radii computed from the formula $S = 3\sqrt{R - 50}$. The distances for S shown in the table were rounded to the nearest 5 feet.

Curve approach delineation is not required if curve delineation spacing exceeds 100 ft.

DELINEATOR SPACING OUTSIDE CURVE				
Radius of Curve (Ft.)	Curve Delineator Spacing (Ft.)	Curve Approach Spacing (Ft.)		
		A	B	C
50	20	40	65	125
115	25	50	75	150
150	30	60	90	180
180	35	70	110	215
250	40	85	125	250
300	50	110	170	300
400	55	110	170	300
500	65	125	190	300
600	70	140	210	300
700	75	150	230	300
800	80	165	245	300
900	85	175	260	300
1000	90	185	275	300

November 19, 2020

S D D O T	DELINEATOR INSTALLATION SPACING	PLATE NUMBER 632.46
		Sheet 2 of 2

Published Date: 2nd Qtr. 2021

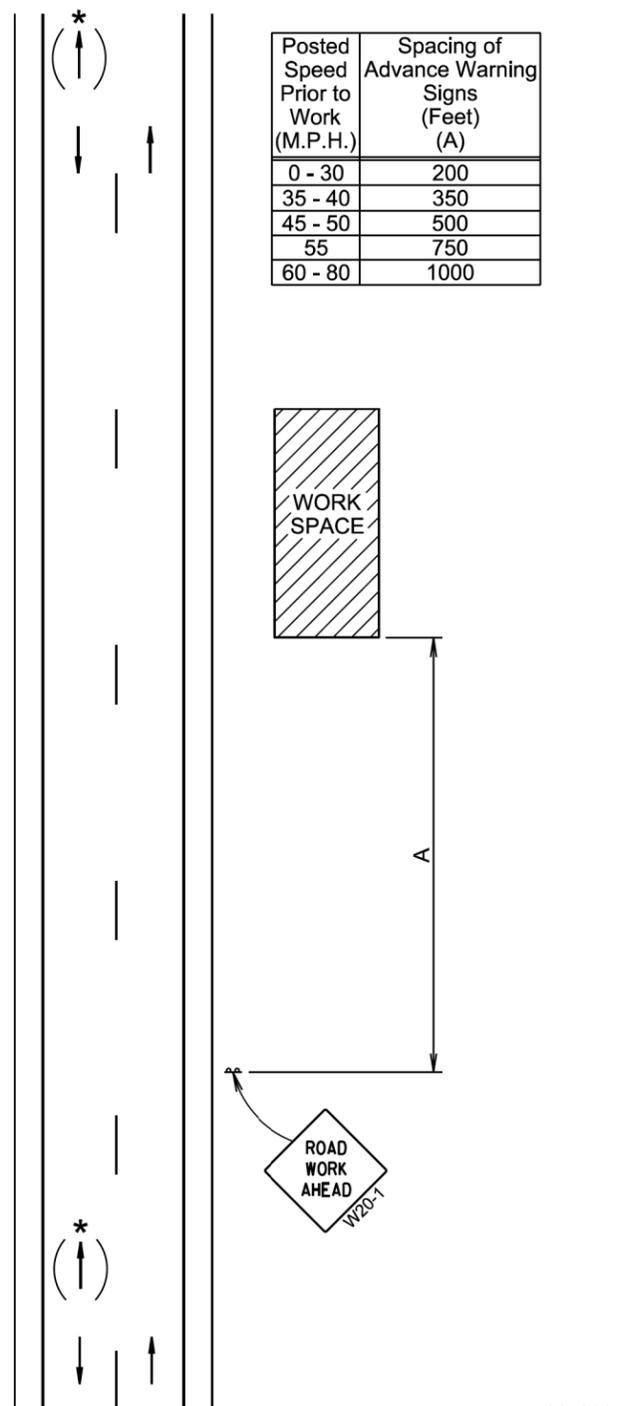
The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

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

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

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

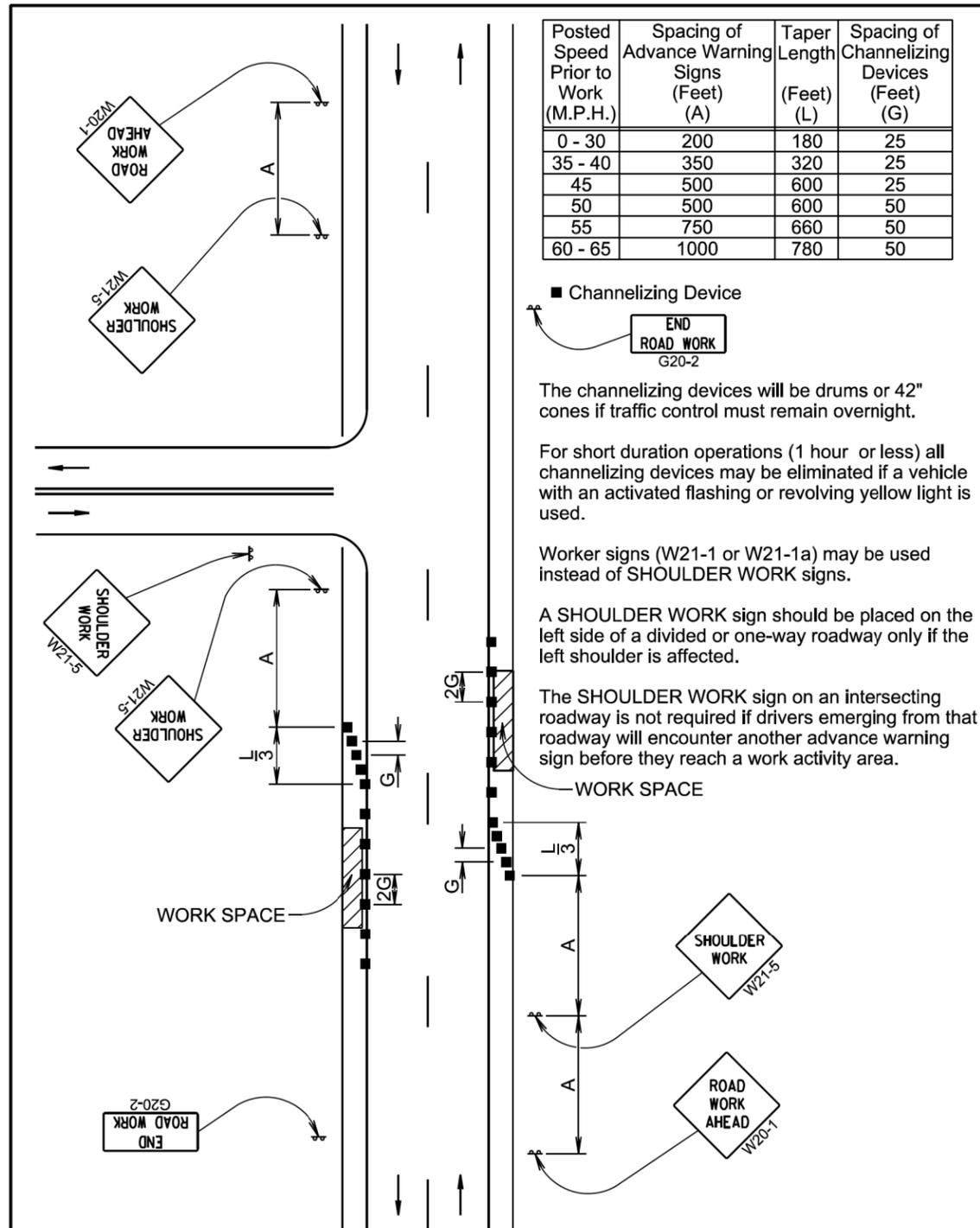
For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.



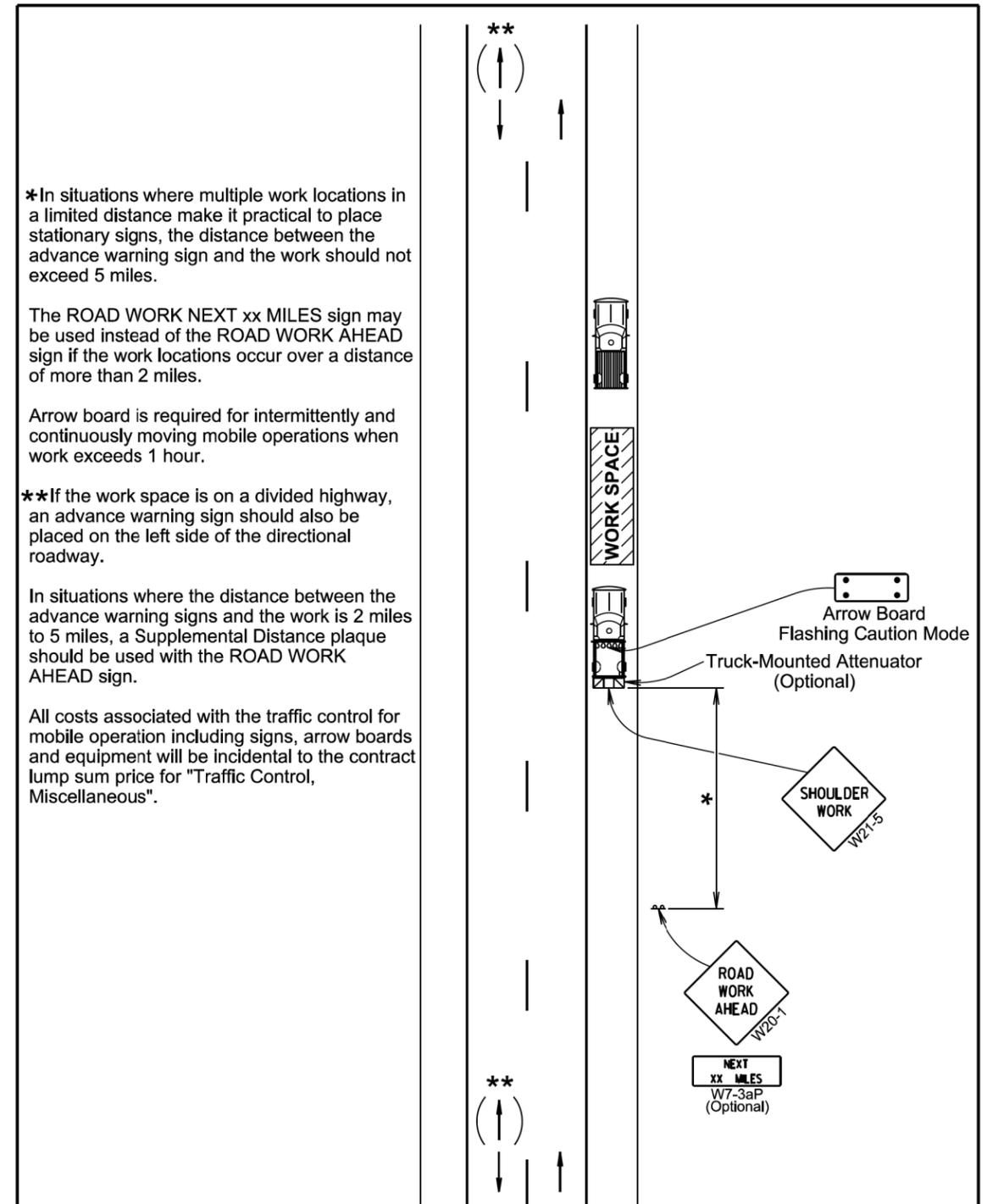
January 22, 2021

S D D O T	WORK BEYOND THE SHOULDER	PLATE NUMBER 634.01
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021

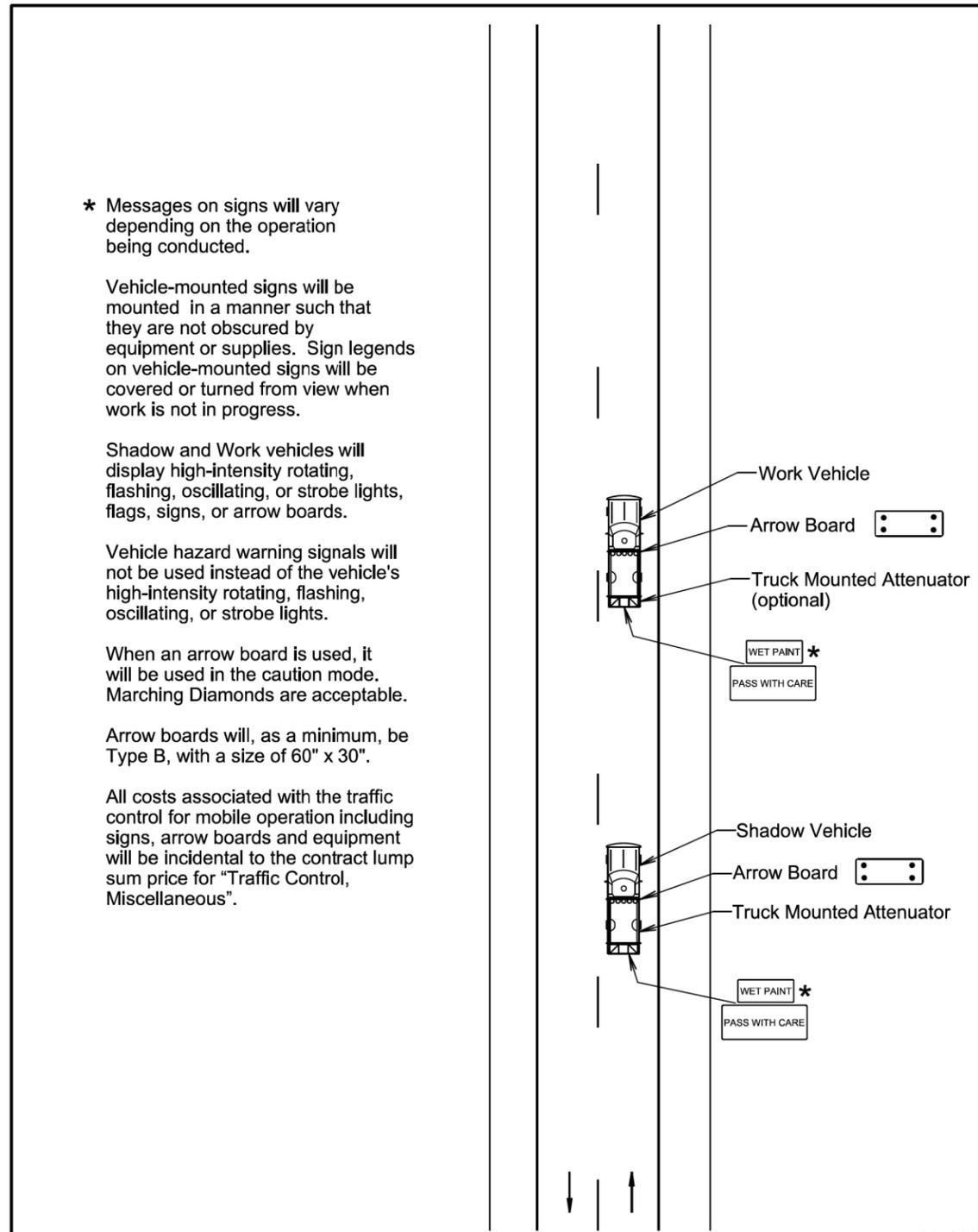


January 22, 2021



January 22, 2021

Plotting Date: 04/23/2021



* Messages on signs will vary depending on the operation being conducted.

Vehicle-mounted signs will be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs will be covered or turned from view when work is not in progress.

Shadow and Work vehicles will display high-intensity rotating, flashing, oscillating, or strobe lights, flags, signs, or arrow boards.

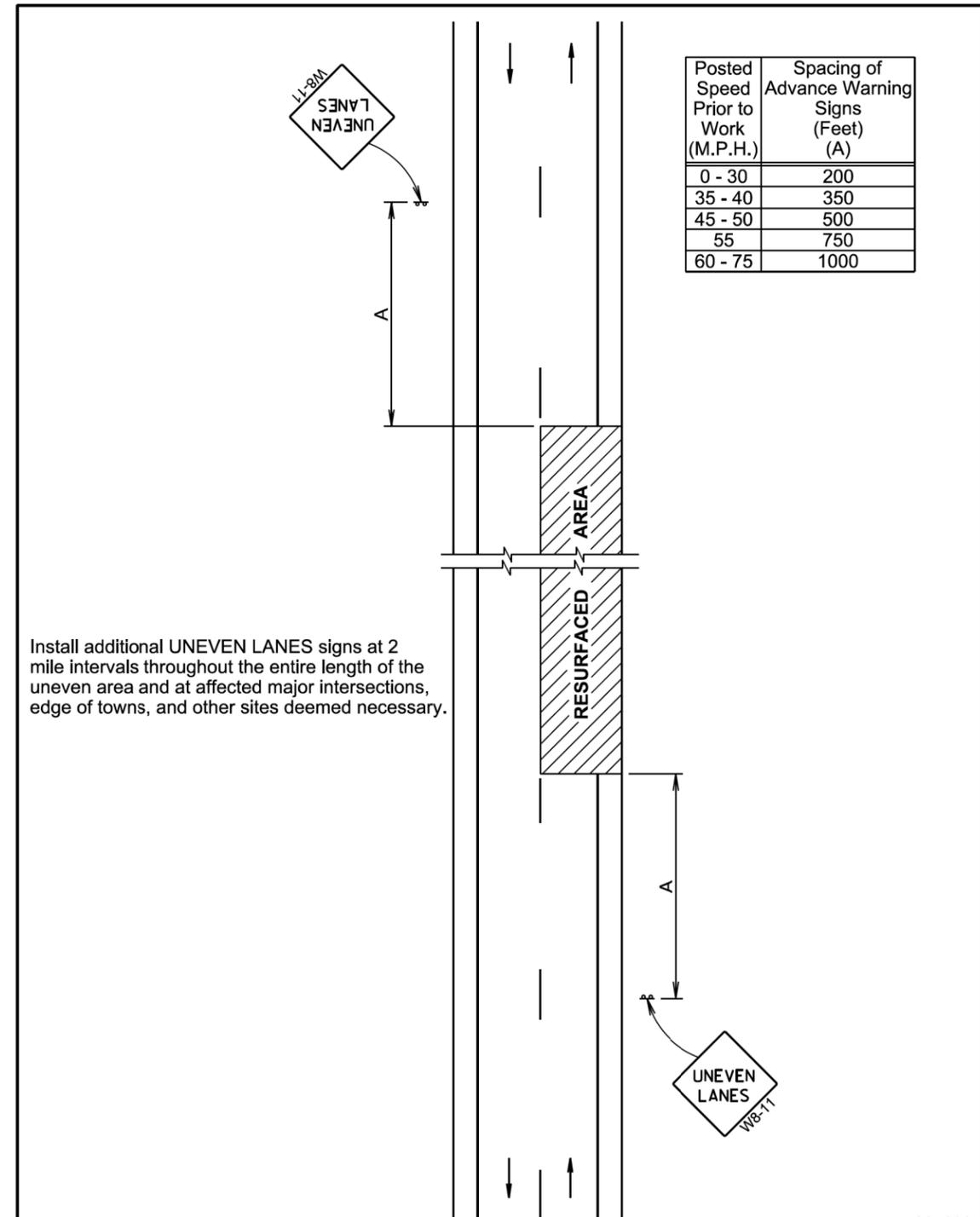
Vehicle hazard warning signals will not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.

When an arrow board is used, it will be used in the caution mode. Marching Diamonds are acceptable.

Arrow boards will, as a minimum, be Type B, with a size of 60" x 30".

All costs associated with the traffic control for mobile operation including signs, arrow boards and equipment will be incidental to the contract lump sum price for "Traffic Control, Miscellaneous".

January 22, 2021



Install additional UNEVEN LANS signs at 2 mile intervals throughout the entire length of the uneven area and at affected major intersections, edge of towns, and other sites deemed necessary.

January 22, 2021

Plotting Date: 04/23/2021

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.

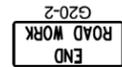
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

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.

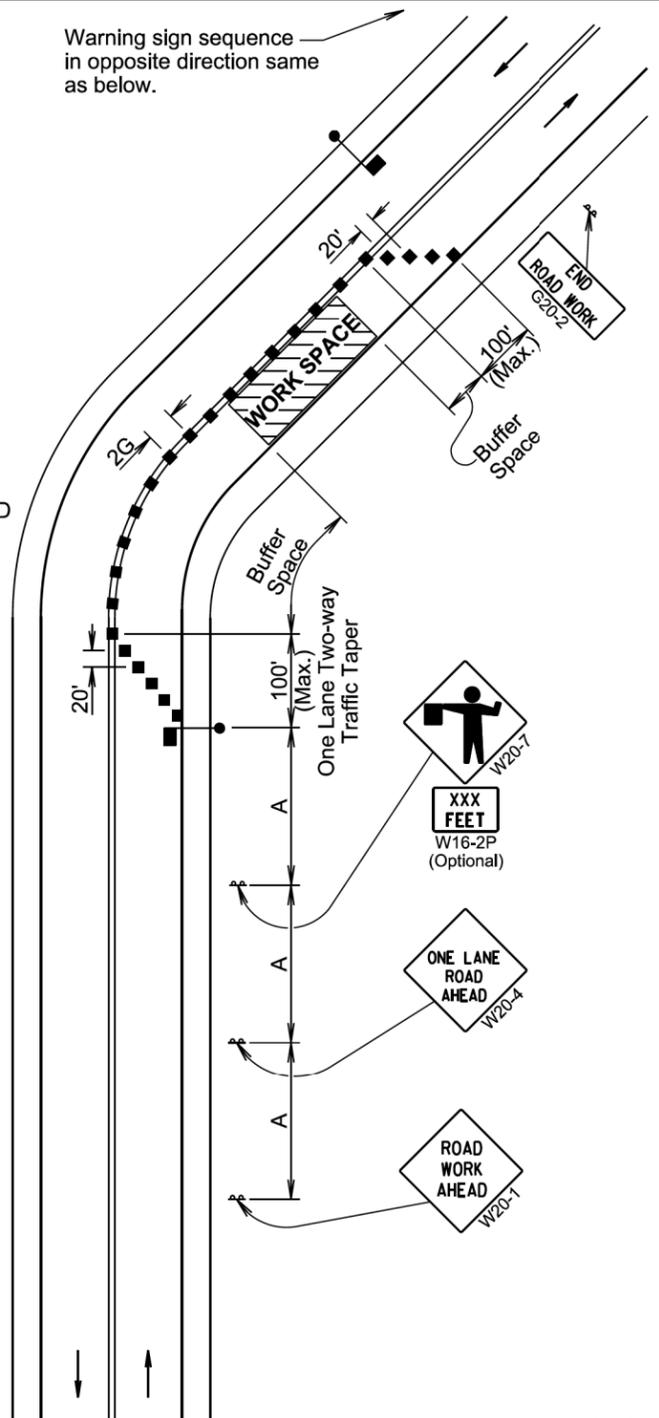


Channelizing devices and flaggers will be used at intersecting roads to control intersecting road traffic as required.

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.

Warning sign sequence in opposite direction same as below.

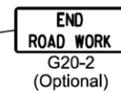


January 22, 2021

S D D O T	LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
	Published Date: 2nd Qtr. 2021	Sheet 1 of 1

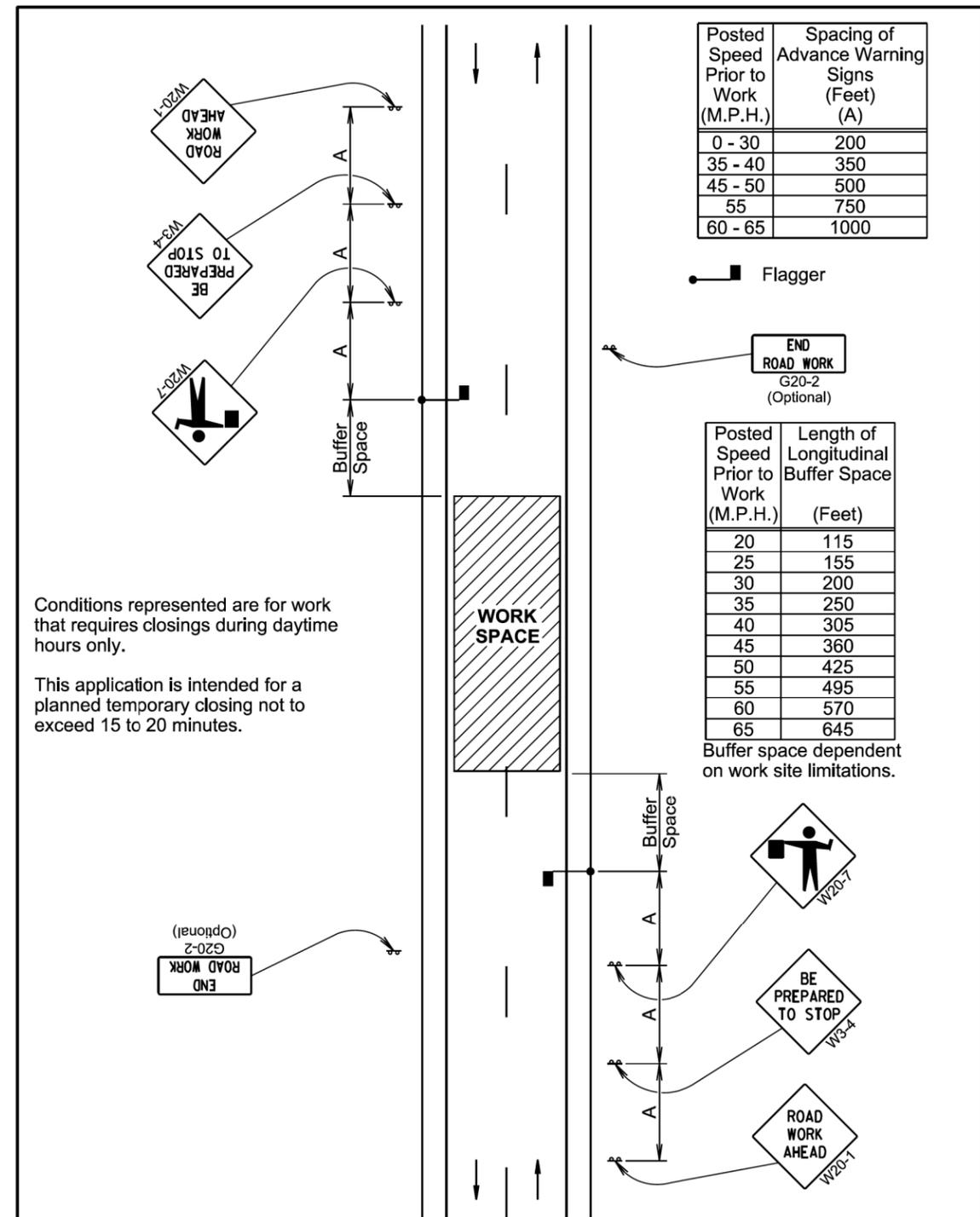
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000

- Flagger



Posted Speed Prior to Work (M.P.H.)	Length of Longitudinal Buffer Space (Feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

Buffer space dependent on work site limitations.



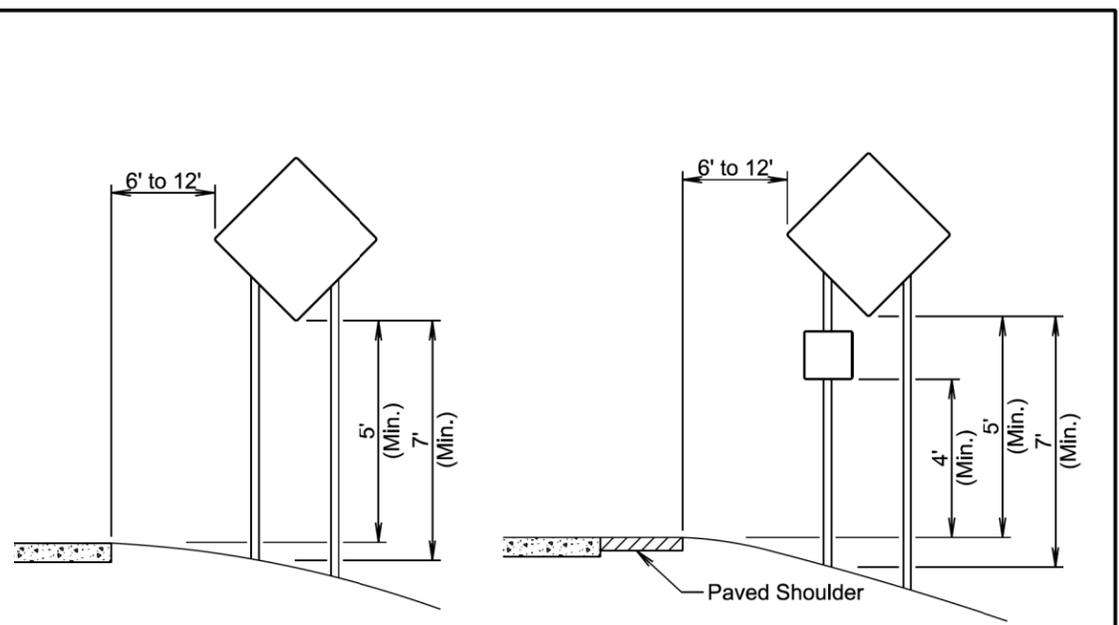
Conditions represented are for work that requires closings during daytime hours only.

This application is intended for a planned temporary closing not to exceed 15 to 20 minutes.

January 22, 2021

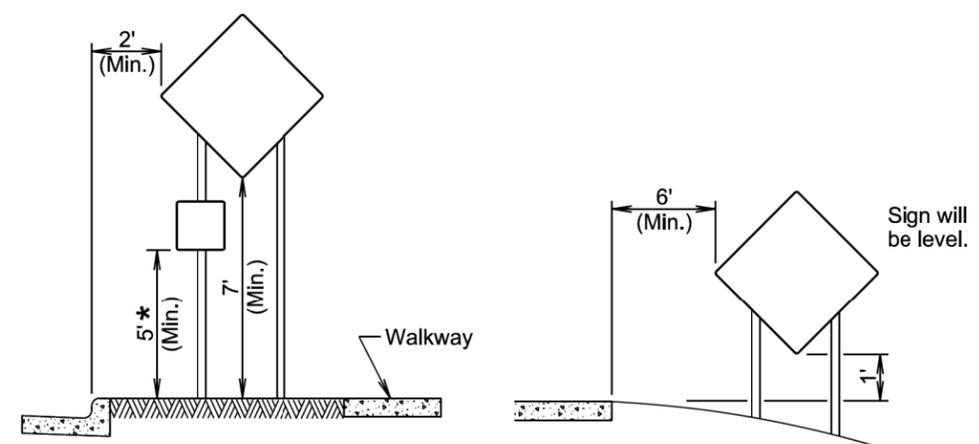
S D D O T	TEMPORARY ROAD WORK	PLATE NUMBER 634.30
	Published Date: 2nd Qtr. 2021	Sheet 1 of 1

Plotting Date: 04/23/2021



RURAL DISTRICT

RURAL DISTRICT WITH SUPPLEMENTAL PLATE



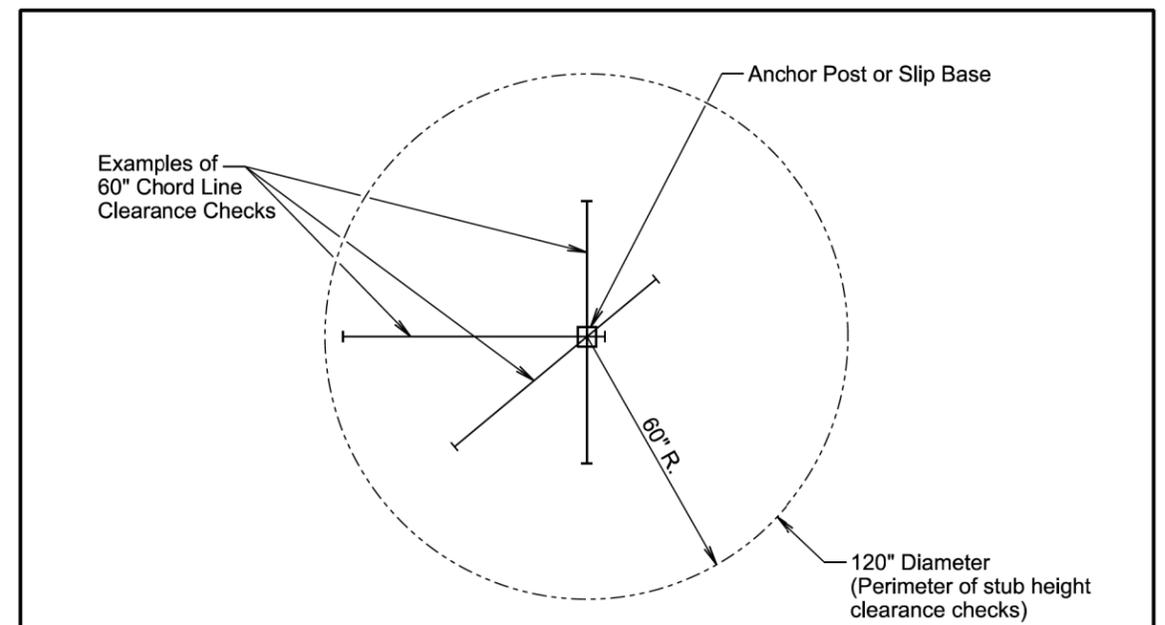
URBAN DISTRICT

RURAL DISTRICT 3 DAY MAXIMUM
(Not applicable to regulatory signs)

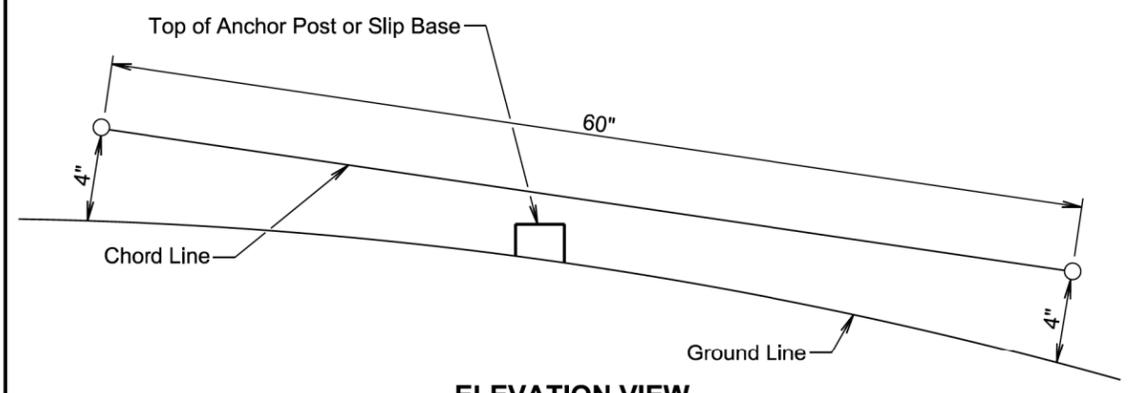
* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.

January 22, 2021

Published Date: 2nd Qtr. 2021	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



PLAN VIEW
(Examples of stub height clearance checks)



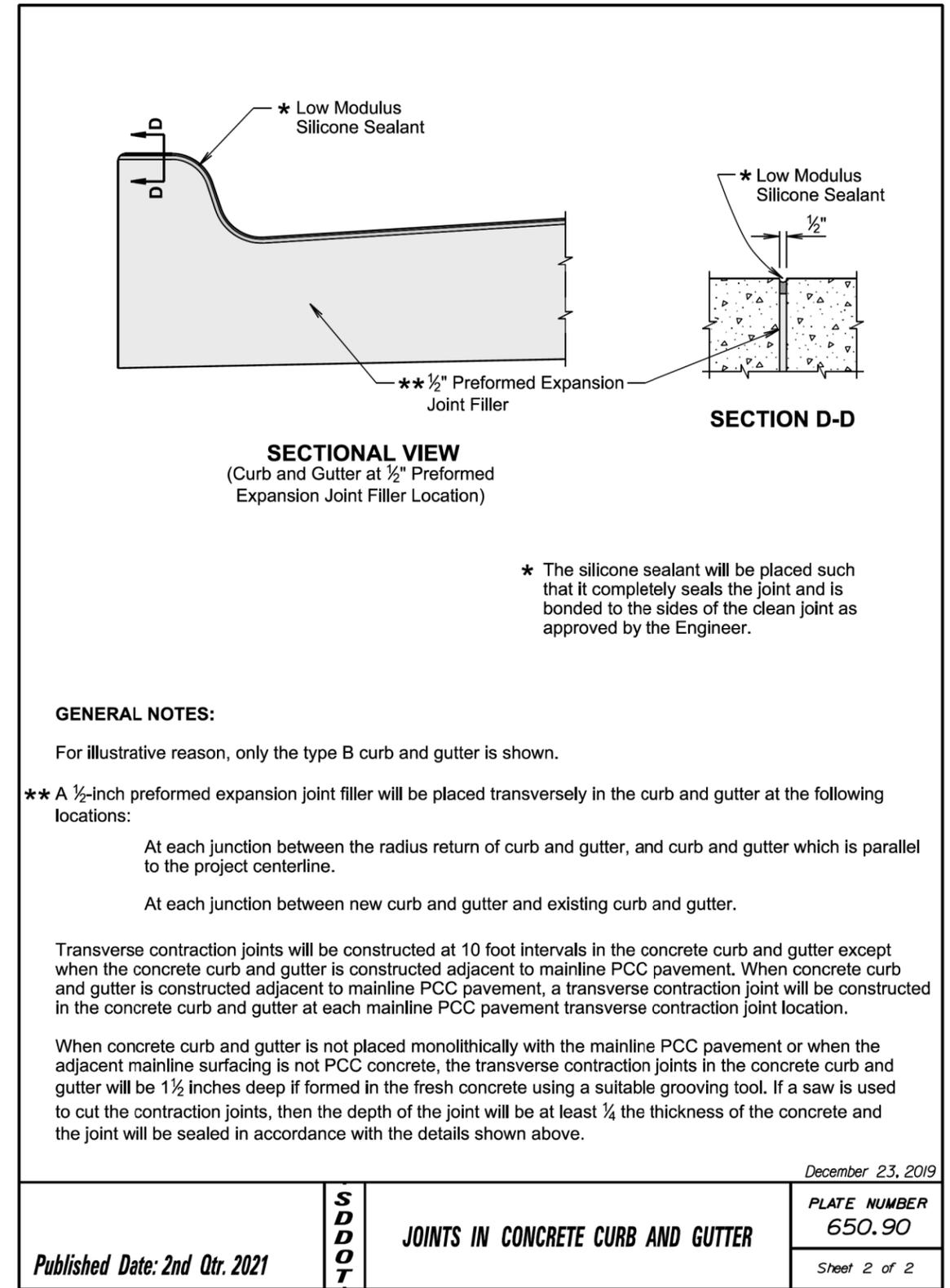
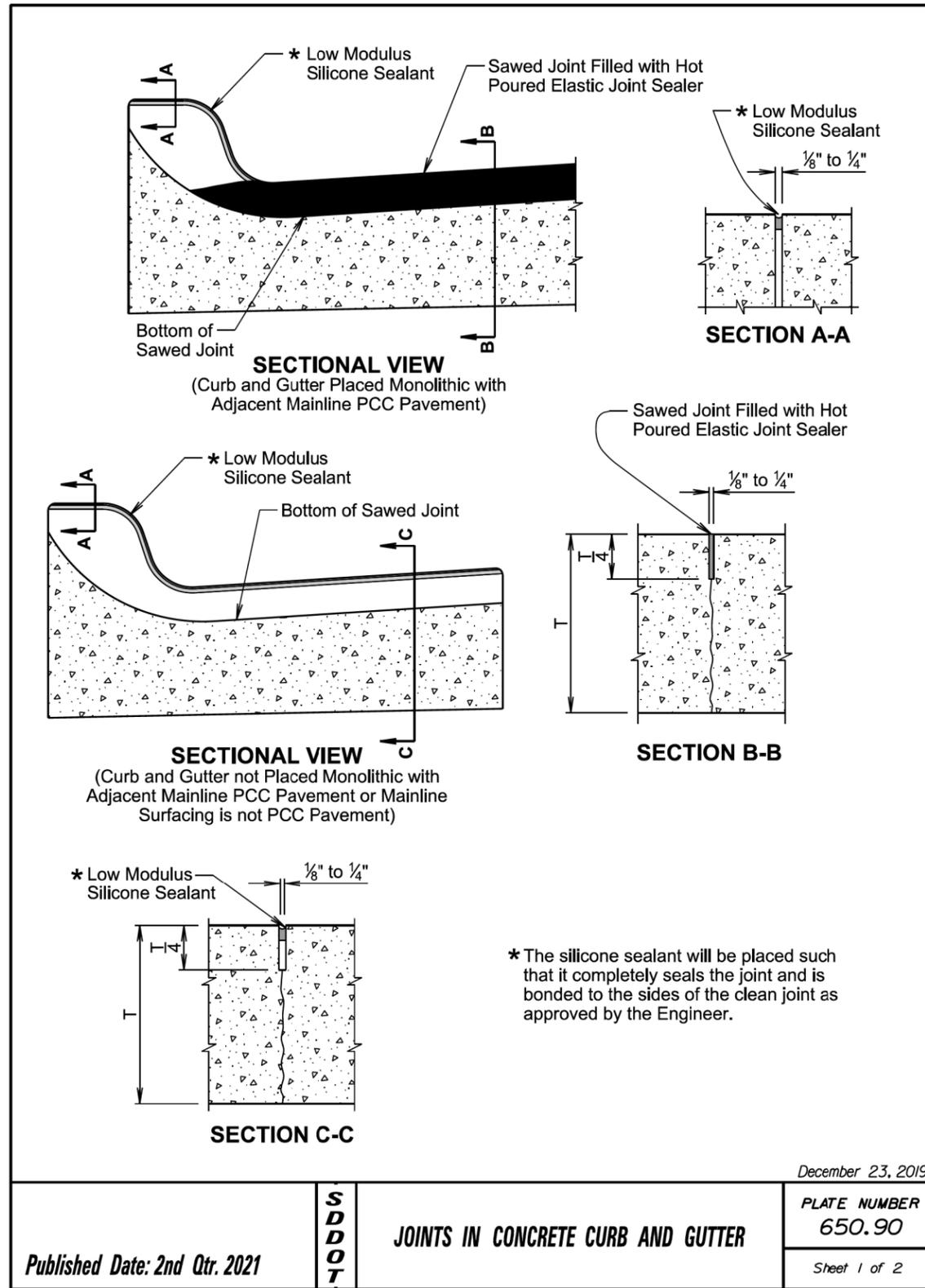
ELEVATION VIEW

GENERAL NOTES:

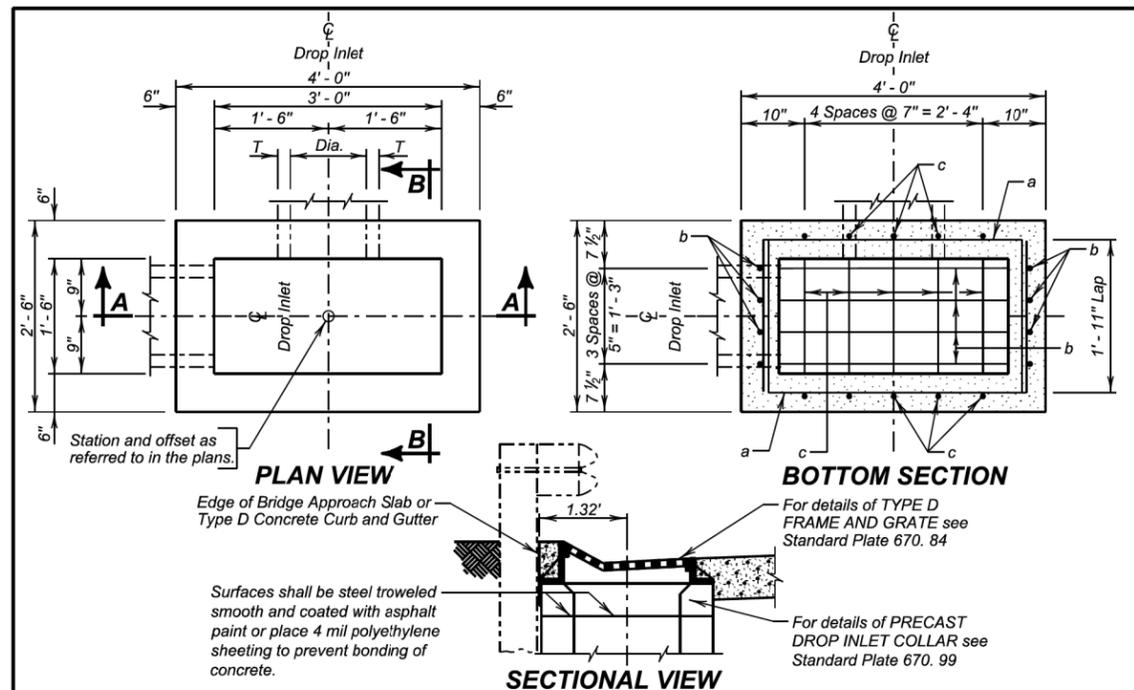
- The top of anchor posts and slip bases WILL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.
- At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height will be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.
- The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

January 22, 2021

Published Date: 2nd Qtr. 2021	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1



Plotting Date: 04/28/2021



DROP INLETS FOR 12" TO 24" DIAMETER PIPE

ESTIMATED QUANTITIES			
ITEM	UNIT	CONSTANT QUANTITY	VARIABLE QUANTITY
* Class M6 Concrete	Cu. Yd.	0.22	0.20H
Reinforcing Steel	Lb.	39.95	25.40H
Frame and Grate Assembly	Each	1	

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 shall conform to ASTM A615 grade 60. The d bars shall 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.

Drop inlet may be precast. If precast drop inlet 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 shall be computed to the nearest hundredth of a cubic yard. The total quantity of reinforcing steel shall be computed to the nearest pound.

Drop inlet shown may be modified by the addition or omission of connecting pipes as noted elsewhere in the plans. All pipes entering drop inlet must fit between the inside face of walls and shall not enter through the corners.

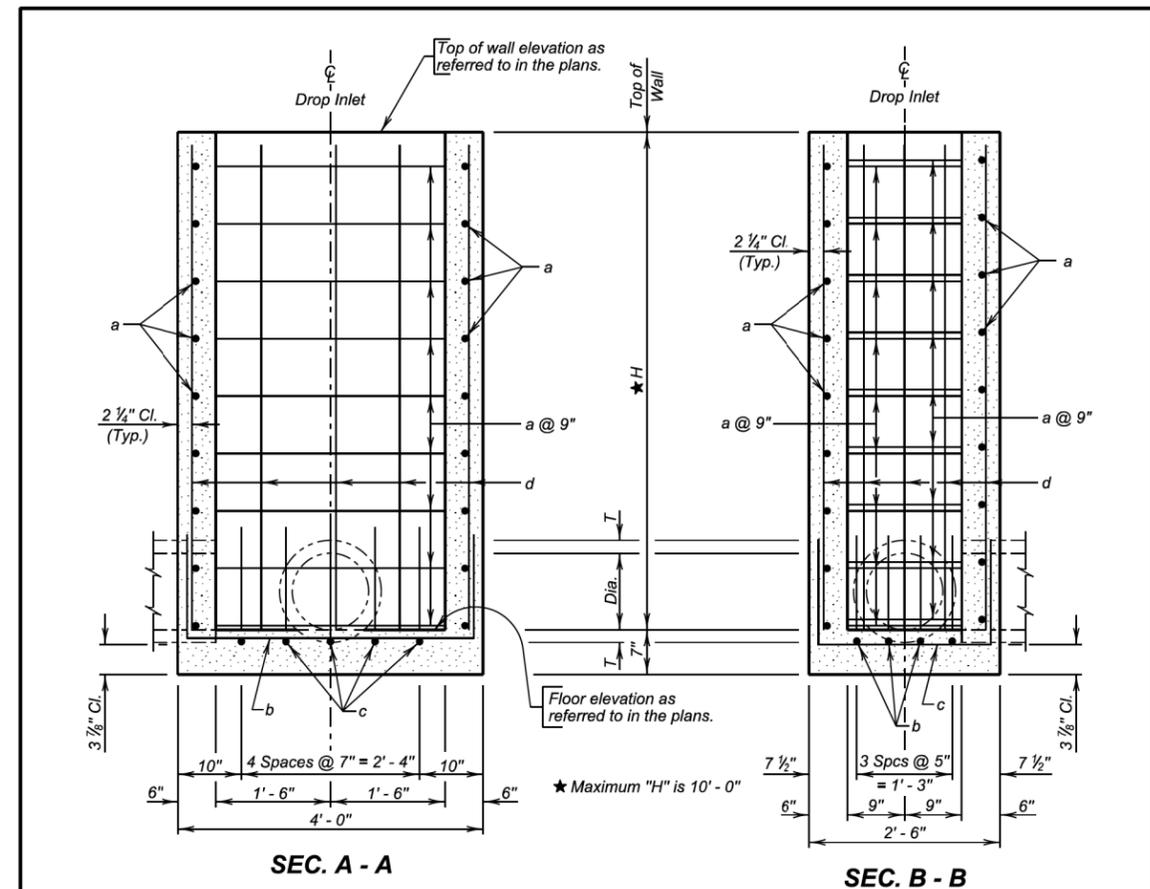
Maximum R.C.P. diameter shall not exceed 12 inches (No R. C. arch) on the 1-foot 6-inch wide side and shall not exceed 24 inches (24 inches for R. C. arch) on the 3-foot wide side of the drop inlet.

The dimension of H is in feet. Maximum H is 10 feet.

PIPE DISPLACEMENT REDUCTIONS		
Diameter (Inches)	Wall T (Inches)	Class M6 Concrete (Cu. Yd.)
12	2	0.03
15	2 1/4	0.04
18	2 1/2	0.05
24	3	0.09
18	2 1/2	0.05
24	3 1/2	0.09

December 16, 2015

S D D O T	1.5' X 3' TYPE D REINFORCED CONCRETE DROP INLET	PLATE NUMBER 670.20
	Published Date: 2nd Qtr. 2021	Sheet 1 of 2



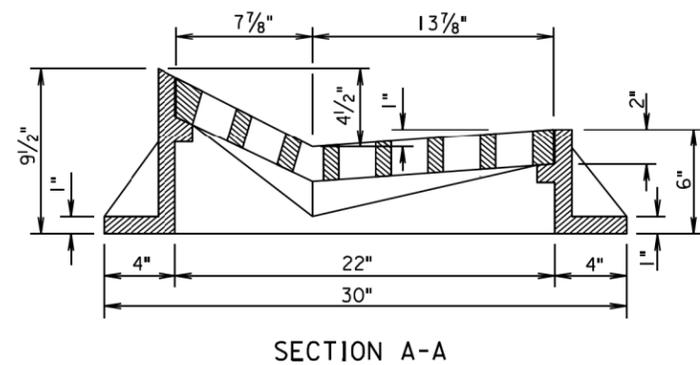
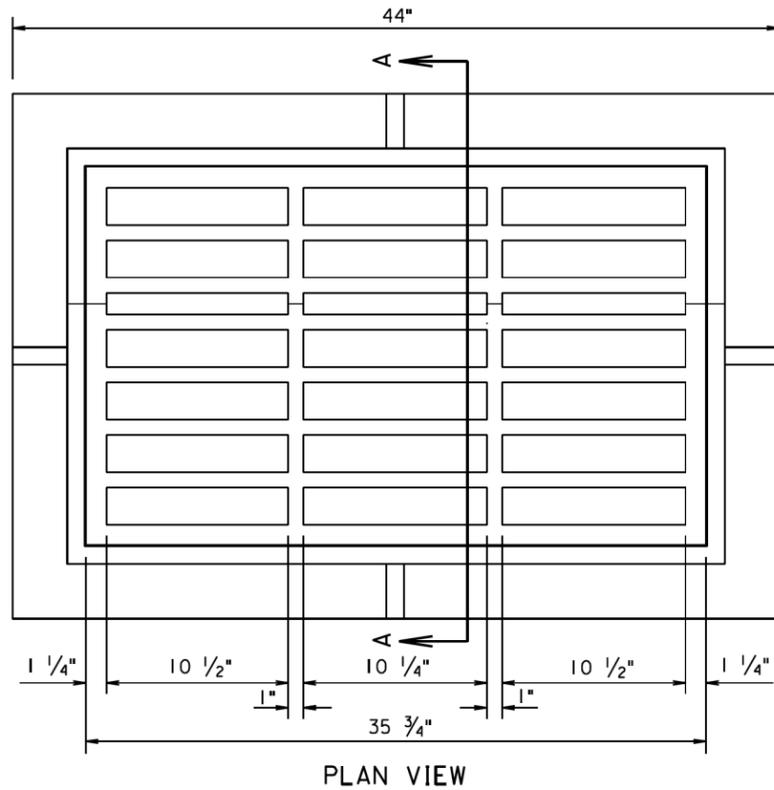
REINFORCING SCHEDULE				
Mk.	No.	Size	Length	Type
a	2.67H	4	7' - 6"	17
b	4	5	6' - 3"	17
c	5	4	4' - 9"	17
d	18	4	H - 2"	Str.

NOTE: All dimensions are out to out of bars.

Type 17

December 16, 2015

S D D O T	1.5' X 3' TYPE D REINFORCED CONCRETE DROP INLET	PLATE NUMBER 670.20
	Published Date: 2nd Qtr. 2021	Sheet 2 of 2



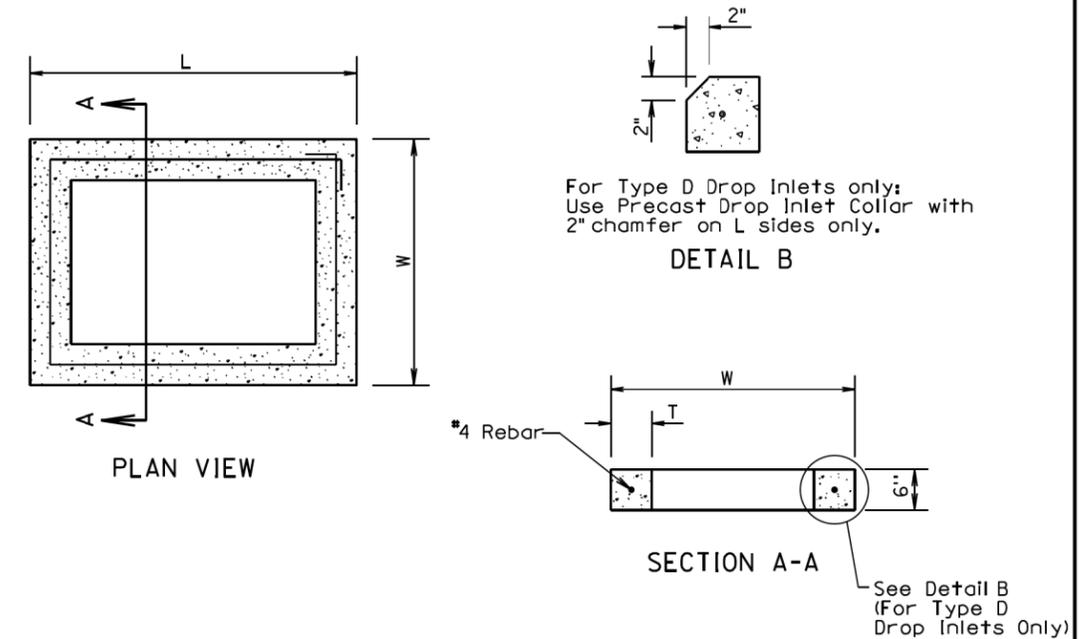
GENERAL NOTE:

The total weight of the frame and grate shall be 620 pounds minimum.

March 31, 2000

S D D O T	TYPE D FRAME AND GRATE	PLATE NUMBER 670.84
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021



INFORMATIONAL QUANTITIES

FRAME AND GRATE TYPE	L Ft-In	W Ft-In	T In	CLASS M6 CONCRETE CuYd	REINFORCING STEEL Lb
TYPE B	4'-0"	3'-0"	6	0.11	9
TYPE C	5'-0"	4'-0"	6	0.15	11
TYPE D	4'-0"	2'-6"	6	0.10	8

GENERAL NOTES:

All reinforcing steel shall conform to ASTM A615, Grade 60.

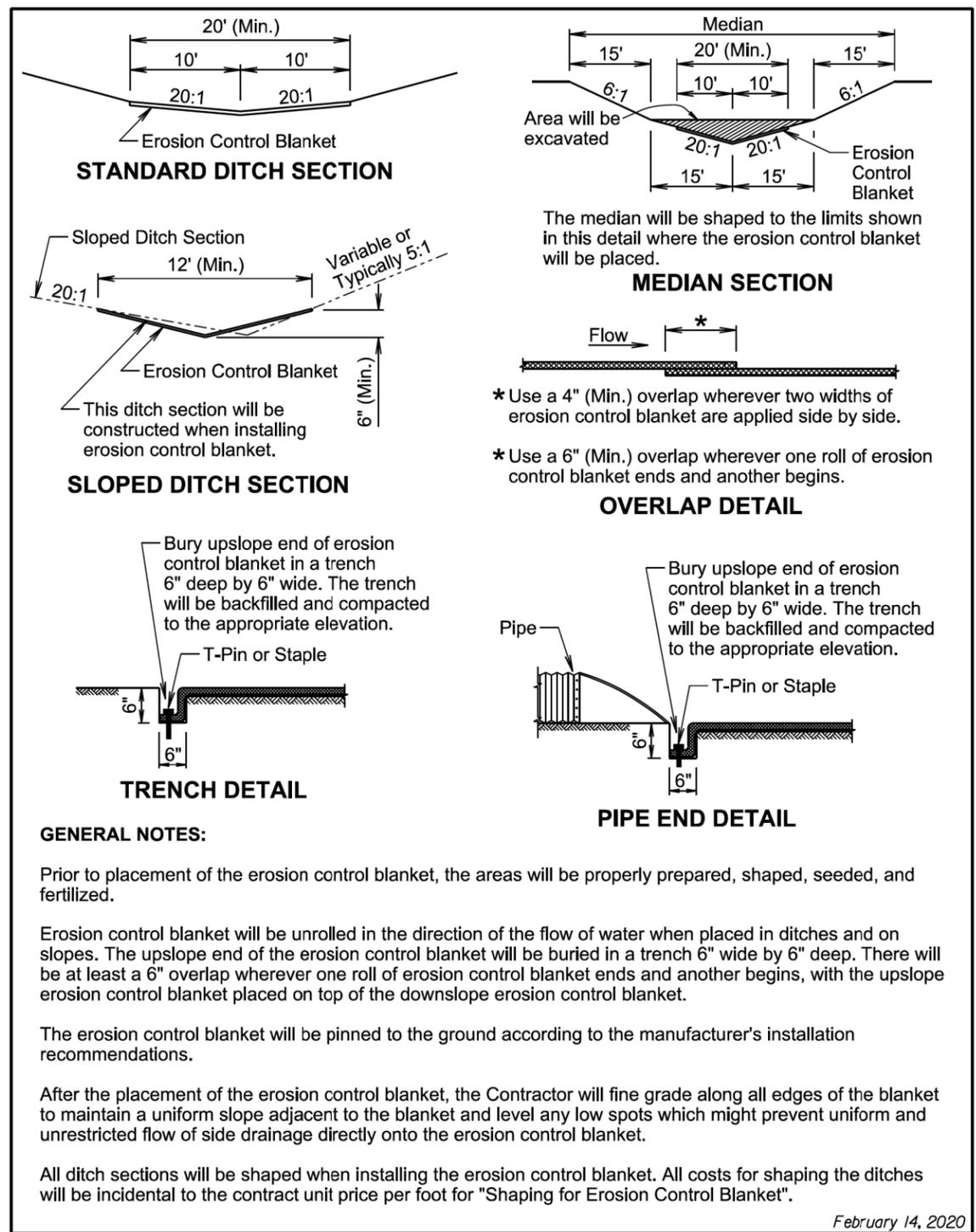
The 1/2" diameter bar shall lap 6"± and shall be centered in the concrete.

The cost of furnishing and installing Precast Drop Inlet Collars, including labor, materials, and incidentals shall be incidental to the contract unit price per Each for "Precast Drop Inlet Collar".

March 31, 2000

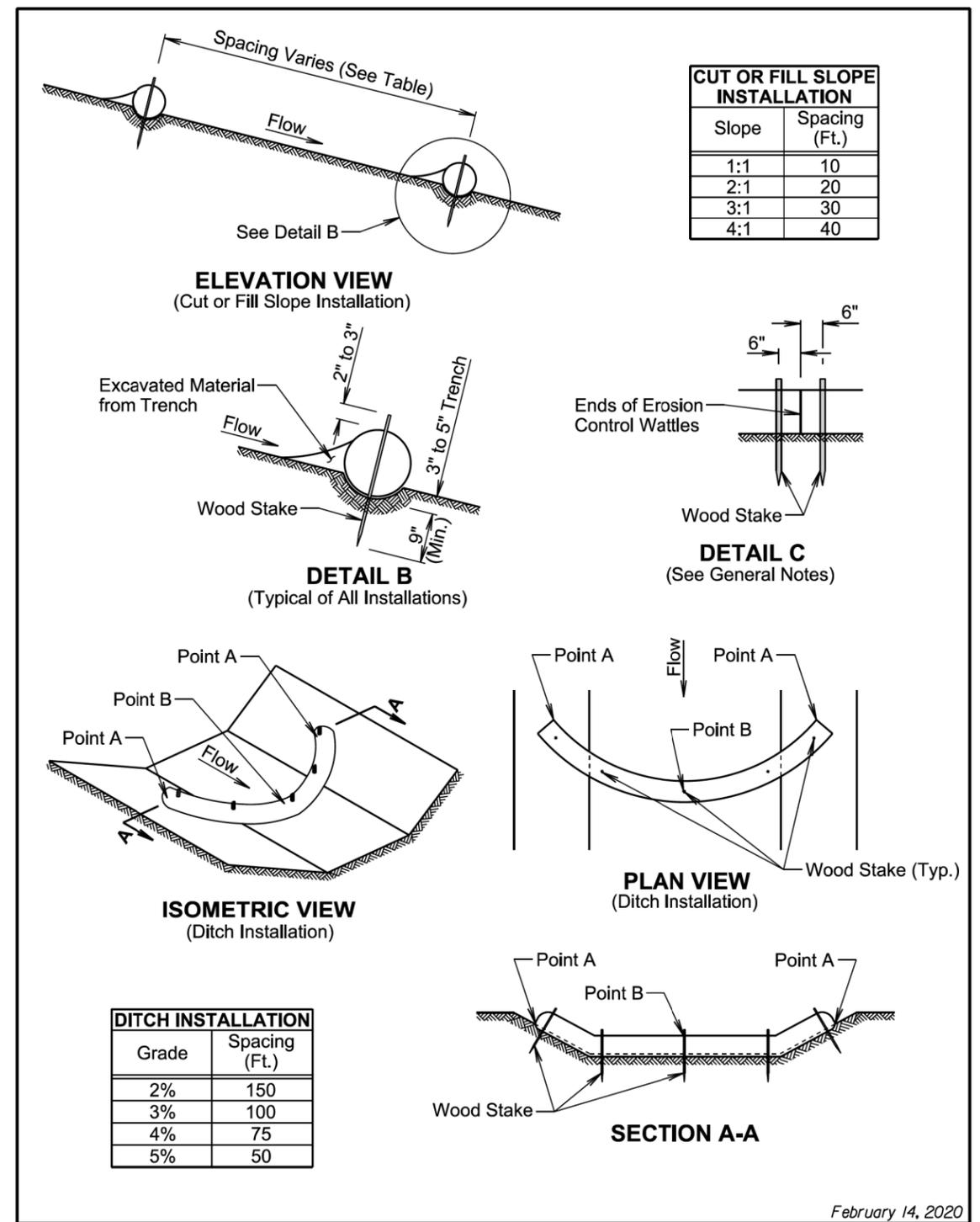
S D D O T	PRECAST DROP INLET COLLAR	PLATE NUMBER 670.99
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021



February 14, 2020

Published Date: 2nd Qtr. 2021	S D D O T	EROSION CONTROL BLANKET	PLATE NUMBER 734.01
			Sheet 1 of 1



CUT OR FILL SLOPE INSTALLATION

Slope	Spacing (Ft.)
1:1	10
2:1	20
3:1	30
4:1	40

February 14, 2020

Published Date: 2nd Qtr. 2021	S D D O T	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.

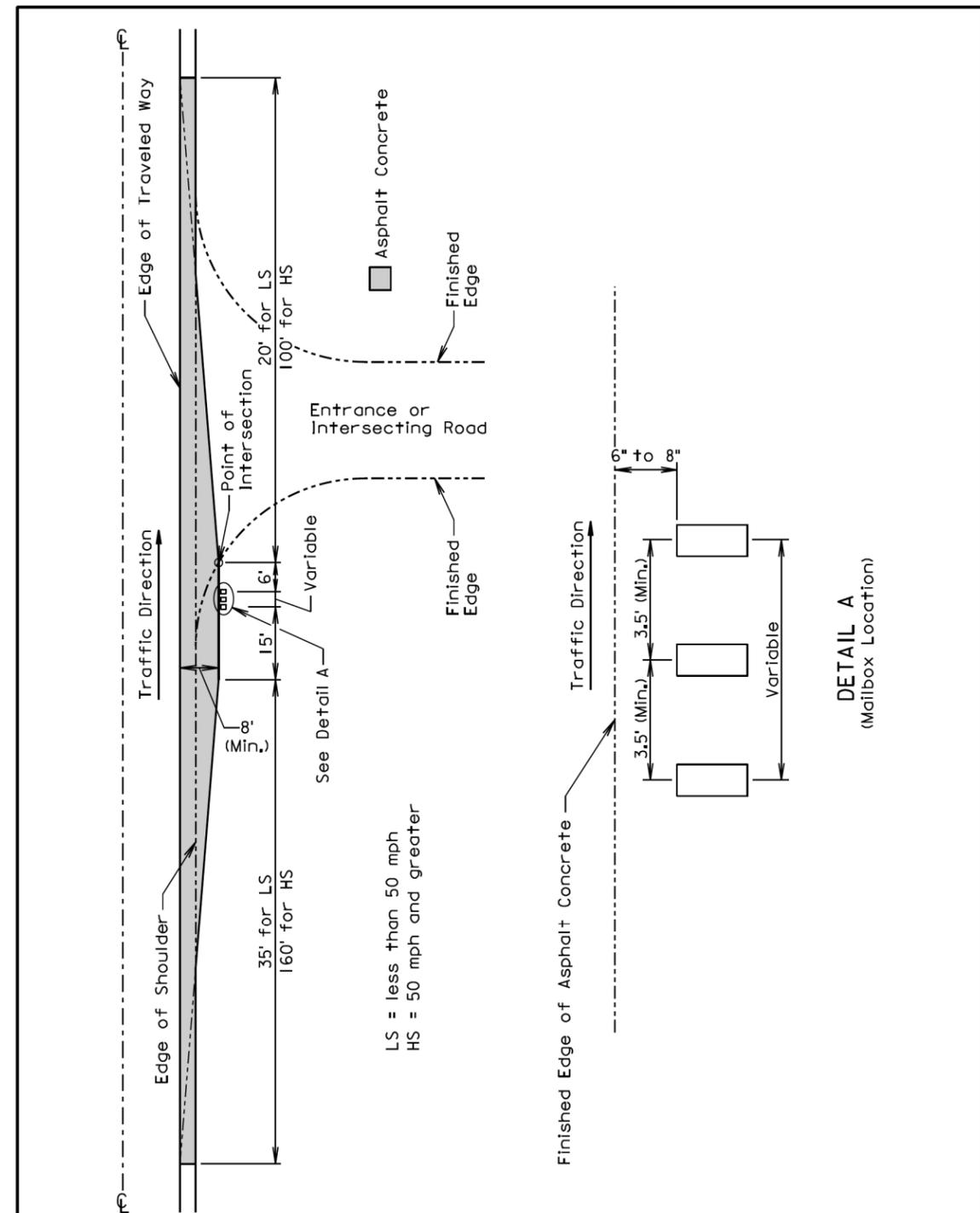
Sediment removal, disposal, or necessary shaping will be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping will be incidental to the contract unit price per cubic yard for "Remove Sediment".

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

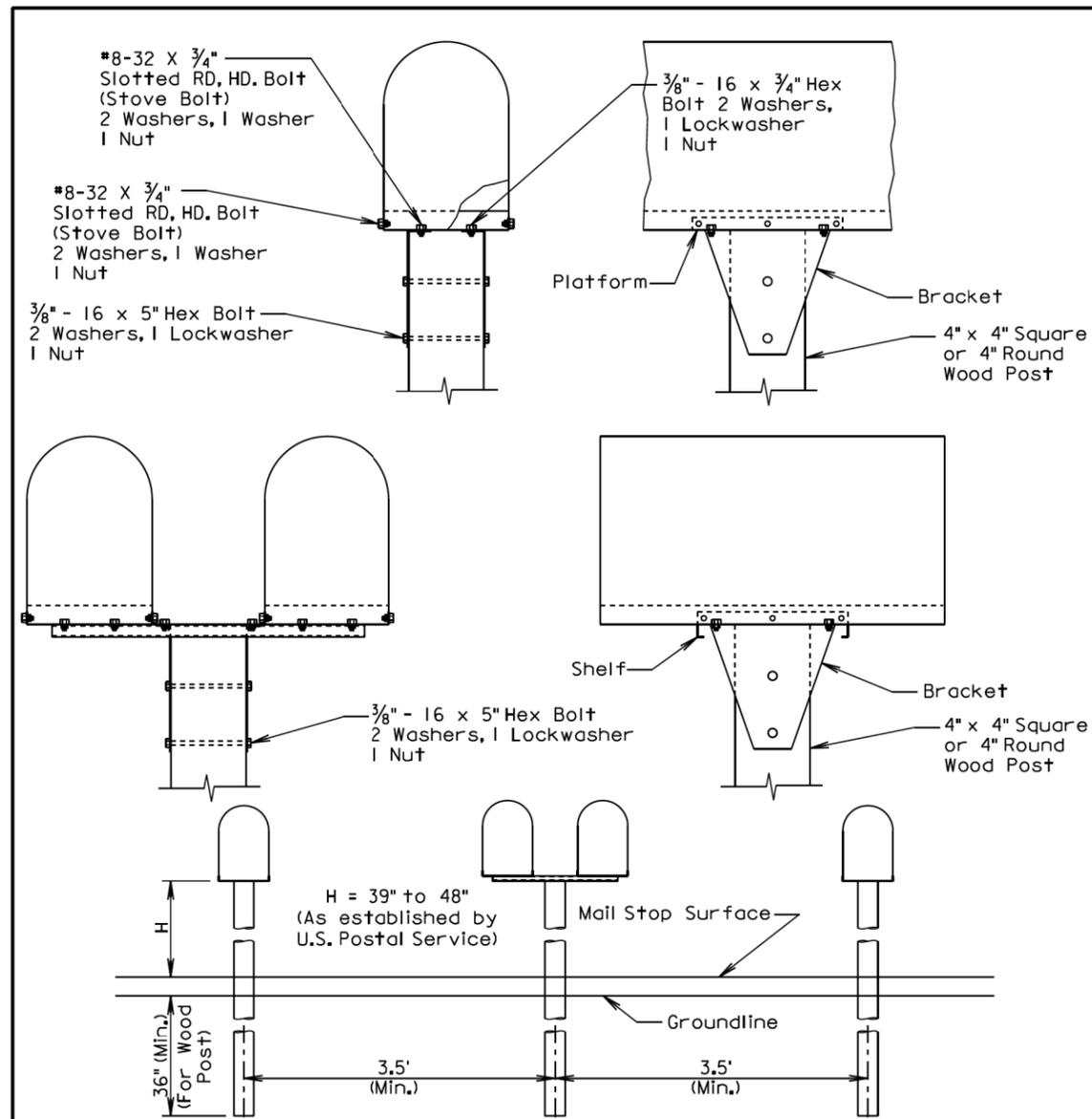
Published Date: 2nd Qtr. 2021	S D D O T	EROSION CONTROL WATTLE	PLATE NUMBER
			734.06
			Sheet 2 of 2



September 6, 2015

Published Date: 2nd Qtr. 2021	S D D O T	MAILBOX TURNOUT	PLATE NUMBER
			900.01
			Sheet 1 of 1

Plotting Date: 06/14/2021



GENERAL NOTES: **SPACING FOR MULTIPLE POST INSTALLATION**

The post support assemblies provided should be consistent throughout the project. Single and double mailboxes may be in any sequence.

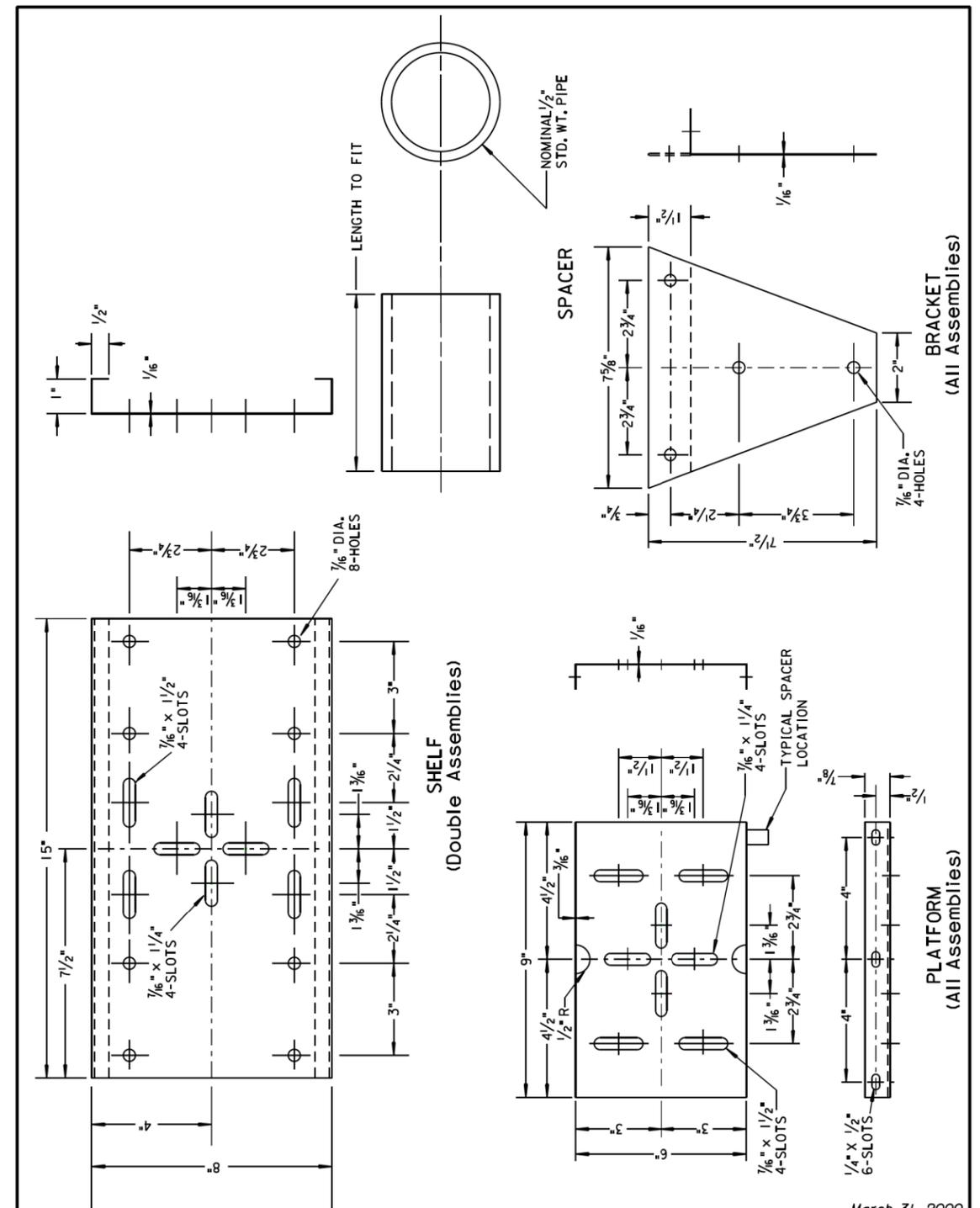
Post support assemblies shall be one from the approved products list, a 4"x4" or 4" round wood post, or an alternate post support assembly that meets the test level 3 crash testing requirements of NCHRP 350 or MASH.

Alternate mailbox support assemblies shall be approved by the Engineer prior to installation. The Contractor shall provide the Engineer written certification that the mailbox support assembly has met the crash testing requirements and will be installed in accordance with the manufacturer's installation instructions.

September 6, 2013

S D D O T	SINGLE AND DOUBLE MAILBOX ASSEMBLIES	PLATE NUMBER 900.02
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021

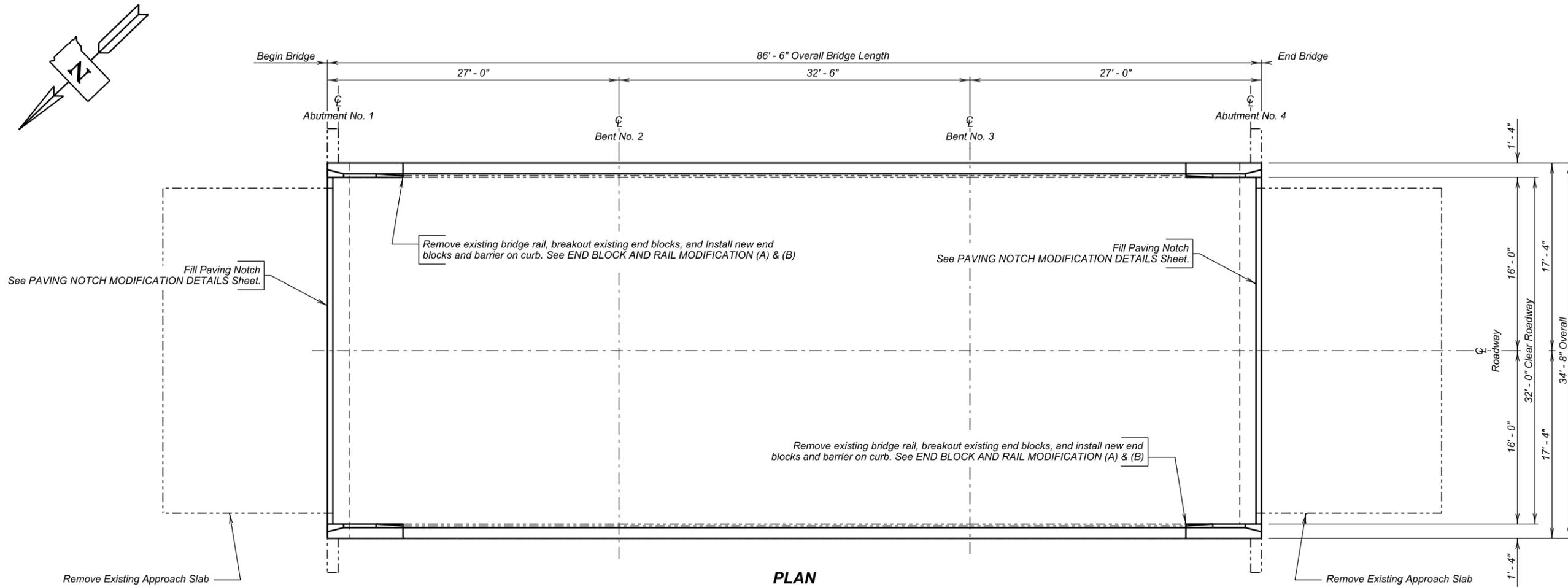


March 31, 2000

S D D O T	MAILBOX SUPPORT HARDWARE	PLATE NUMBER 900.03
		Sheet 1 of 1

Published Date: 2nd Qtr. 2021

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0049(05)27	107	164



PLAN

INDEX OF BRIDGE SHEETS -

- Sheet No. 1 - Layout for Upgrade
- Sheet No. 2 - Estimate of Structure Quantities and Notes
- Sheet No. 3 - Notes (Continued)
- Sheet No. 4 - End Block and Rail Modification (A)
- Sheet No. 5 - End Block and Rail Modification (B)
- Sheet No. 6 - Paving Notch Modification Details
- Sheet No. 7 - Details of Standard Plate Nos. 460.03 & 630.92
- Sheet No. 8 thru 13 - Original Construction Plans

LAYOUT FOR UPGRADE

FOR

86' - 6" CONTINUOUS CONCRETE BRIDGE

32' - 0" ROADWAY 0° SKEW
 OVER CREEK SEC. 11-T100N-R75W
 STR. NO. 62-283-191 P 0049(05)27
 PCN 04F4

TRIPP COUNTY

S. D. DEPT. OF TRANSPORTATION

NOVEMBER 2020

PLANS BY:
 OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY SMV TRIP04F4	CK. DES. BY TJM 04F4RA01	DRAFTED BY KR/TJM	<i>Steve A. Johnson</i> BRIDGE ENGINEER
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ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
110E0010	Remove Concrete Bridge Approach Slab	206.0	SqYd
110E0020	Remove Bridge Railing	160	Ft
460E0070	Class A45 Concrete, Bridge Repair	15.2	CuYd
460E0300	Breakout Structural Concrete	2.8	CuYd
460E0380	Install Dowel in Concrete	180	Each
480E0200	Epoxy Coated Reinforcing Steel	1042	Lb
480E5000	Galvanic Anode	24	Each

SPECIFICATIONS

- Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans and are provided as information only. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure will be accomplished with the traffic control shown in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer a minimum of two weeks prior to the pre-construction meeting.

- Remove the existing bridge railing and end blocks for the first phase of construction.
- Remove existing approach slabs for the first phase of construction.
- Fill in the paving notch with concrete.
- Place a new concrete bridge rail on top of the existing curb with end blocks that accept thrie beam for the first phase of construction.
- Switch traffic and repeat steps 1 thru 4 for the second phase of construction.

GENERAL CONSTRUCTION NOTES

- All reinforcing steel will conform to ASTM A615, Grade 60.
- All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise in the plans. Match existing chamfer if the existing chamfer differs.
- Use 2-inch clear cover on all reinforcing steel except as shown otherwise.
- The Contractor will imprint two year-plates on the structure. The plates will consist of the year of the existing bridge construction and the year of the new construction and will be located as specified and detailed on Standard Plate No. 460.03.
- Barrier curbs and end blocks will be built perpendicular to the grade.
- Requests for construction joints or reinforcing steel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.
- Snap ties, if used in the barrier curb formwork, will be corrosion resistant. The corrosion resistant ties will be inert in concrete and compatible with reinforcing steel.
- All lap splices are contact lap splices unless noted otherwise.

NOTICE - LEAD BASED PAINT

Be advised that the paint on the steel surfaces of the existing structure is a paint containing lead. The Contractor should plan his/her operations accordingly and inform his/her employees of the hazards of lead exposure

REMOVAL OF EXISTING BRIDGE RAIL

- The existing rail and rail posts will be completely removed by the Contractor and disposed of in accordance with the Environmental Commitments. If the Contractor elects to salvage the rail and rail posts for his own use, they must be removed from view of the ROW to the satisfaction of the Engineer prior to project completion.
- The existing rail anchor bolts protruding from the concrete will be cut off and ground flush with the concrete surface as approved by the Engineer. The exposed ends will be coated with a zinc-rich galvanizing paint in conformance with ASTM A780.
- The bridge railing to be removed consists of the steel rail and any hardware attaching the railing to the bridge. The cost of all labor, tools, materials, and incidentals necessary to cut and remove the steel rail, cut off the anchor bolts, and paint their exposed ends will be incidental to the contract price per foot for Remove Bridge Railing.

CONCRETE BREAKOUT

- The existing end blocks and curb portion indicated will be broken out to the limits shown on the plans. Breakout limits will be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. Reinforcing steel that is exposed and is scheduled for use in the new construction will be cleaned and straightened to the satisfaction of the Engineer. Care will be taken not to damage the existing reinforcing steel that is to be reused in the new construction during concrete breakout. Any reinforcing steel that is damaged during concrete breakout will be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department.
- All broken out concrete and discarded reinforcing bars will be disposed of by the Contractor. Any disposal of discarded material will be in accordance with the Environmental Commitments.
- During concrete removal operations, no broken-out concrete will be allowed to fall into the creek.
- The contract unit price per cubic yard for Breakout Structural Concrete will include breaking out concrete, cleaning, straightening existing reinforcing steel, and disposal of all broken out material.

REMOVAL OF CONCRETE BRIDGE APPROACH SLAB

- The existing concrete approach with asphalt overlay adjacent to the structure will be completely removed by the Contractor.
- The concrete, asphalt material, and reinforcing steel from the removal will be disposed of by the Contractor at an approved site. An appropriate site will be as described in the Environmental Commitment notes in this set of plans.
- The quantity provided for Remove Concrete Bridge Approach Slab is based on the quantity listed in the original construction plans as a detail showing the length of the slabs could not be located.
- All labor, tools, equipment, and any incidentals necessary for removal and disposal of the existing approach slabs will be incidental to the contract unit price per square yard for Remove Concrete Bridge Approach Slab.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES FOR 86' - 6" CONTINUOUS CONCRETE BRIDGE

STR. NO. 62-283-191
NOVEMBER 2020

2 OF 13

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0049(05)27	109	164

INSTALLING DOWELS IN CONCRETE

- Holes drilled in the existing concrete will be true and normal or as shown in the plans. Drilling holes using a core drill will not be allowed. Care will be taken not to damage the existing reinforcing steel. It is likely that some of the existing reinforcing steel shown in the original construction plans may have been placed out of position during original construction. Therefore, prior to the start of drilling any holes in the concrete, an effort will be made by Department forces to mark on the concrete surface where practical any locations of the in-place reinforcing steel. In spite of this precaution, the Contractor can still expect to encounter and have to drill through reinforcing steel or shift the dowel spacing as approved by the Engineer to miss the existing reinforcing steel. If the Contractor shifts the dowel spacing, the unused drill holes will be filled with epoxy resin as approved by the Engineer.
- The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3). Grade 1, 2 or 3 may be used for vertical dowels.
- The diameter of the drilled holes will not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. The drilled holes will be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Care will be taken to prevent epoxy from running out of the horizontal holes prior to steel bar insertion. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping or painting method will not be allowed.
- No loads will be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- Dowel bars will be deformed bars conforming to ASTM A615 Grade 60.
- The cost of epoxy resin, dowels, installation and other incidental items will be incidental to the contract unit price per each for Install Dowel in Concrete.

SURFACE FINISH

- All of the surfaces visible to the traveling public on the new concrete barrier on curbs and end blocks will be given a Class B Commercial Texture Finish in accordance with Section 460.3 L.1.c. of the Construction Specifications. Visible surfaces include the front face and top of the barrier on curb and all faces of the end blocks.

- The concrete surfaces requiring the application of the Commercial Texture Finish will be prepared in accordance with the manufacturer's recommendations. The Contractor will submit a product data sheet, or an approved equal, documenting all pertinent information with regard to preparation of the concrete surfaces, materials and equipment required, mixing requirements, and application procedures to the Engineer in advance of the application of the Commercial Texture Finish for review and approval.
- For informational purposes the amount of surface area requiring the Class B Commercial Texture Finish is 210 square feet for Phase 1 and 210 square feet for Phase 2.
- Any damage to the commercial texture finish during the construction including abrasion from traffic due to the traffic control will be repaired by the Contractor, as approved by the Engineer, at no expense to the Department.
- The cost of the commercial texture finish will be included in the contract unit price per cubic yard for Class A45 Concrete, Bridge Repair. This payment will be full compensation for furnishing all materials, labor, tools and equipment necessary or incidental to the application of this finish.

GALVANIC ANODE

- The Contractor will furnish and place galvanic anodes in the concrete repair areas specified in this plan set.
- The galvanic anodes will be supplied as one of the following:
 - Galvashield XP2
Vector Corrosion Technologies
65114 140th Ave.
Wabasha, MN 55981
Phone: (507) 259-2481
Website: www.vector-corrosion.com
 - Sentinel Silver
Euclid Chemical Company
19218 Redwood Road
Cleveland, OH 44110
Phone: (800) 321-7628
Website: www.euclidchemical.com
 - Sika FerroGard 670
Sika Corporation US
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: (800) 933-7452
Website: <http://usa.sika.com>

- The anodes will be placed in accordance with manufacturer's recommendations and as approved by the Engineer. The anodes have not been shown on the drawings. The Contractor will provide shop drawings of the galvanic anode installation including locations of the individual anodes to the Office of Bridge Design.

- The anodes will be placed with a minimum 3/4" cover and will be set in embedding mortar per the manufacturer's recommendations. The anodes will be fully encased in the concrete repair material. Where adequate cover does not exist, a concrete pocket will be chipped out behind the anode to provide minimum cover. The Contractor may need to chip around the reinforcing bar locally at the anode installation to make the electrical connection. The reinforcing steel at the connection location will be cleaned per the manufacturer's recommendations to provide electrical connection and mechanical bond.
- The electrical continuity of the connections and reinforcing steel will be confirmed per the manufacturer's recommendations.
- In area of concrete repair where anodes are placed, the epoxy coating on the reinforcing steel will not require touch up.
- The Contractor will provide manufacturer's product literature and installation instructions to the Engineer 10 days prior to installation.
- All costs associated with placing anodes including labor, equipment, materials and incidentals will be included in the contract unit price per each for Galvanic Anode.

PAVING NOTCH

- This work will consist of removing material from the existing paving notch and filling the notch with reinforced concrete.
- All broken out material will be disposed of by the Contractor. Disposal of discarded material will be in accordance with the Environmental Commitments shown elsewhere in the plans.
- Class A45 Concrete, Bridge Repair will meet the requirements specified for Class A45 concrete for bridge decks.
- The cost of removing and disposing of the existing paving notch material will be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge Repair.

NOTES (CONTINUED)

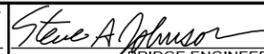
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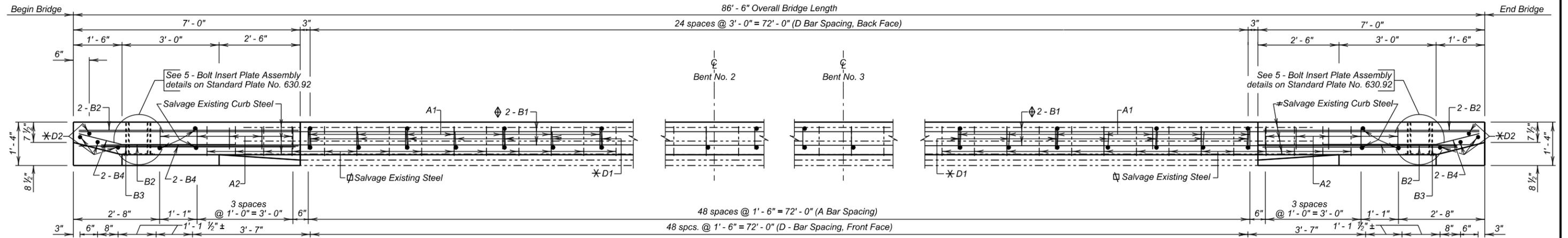
86' - 6" CONTINUOUS CONCRETE BRIDGE

STR. NO. 62-283-191

NOVEMBER 2020

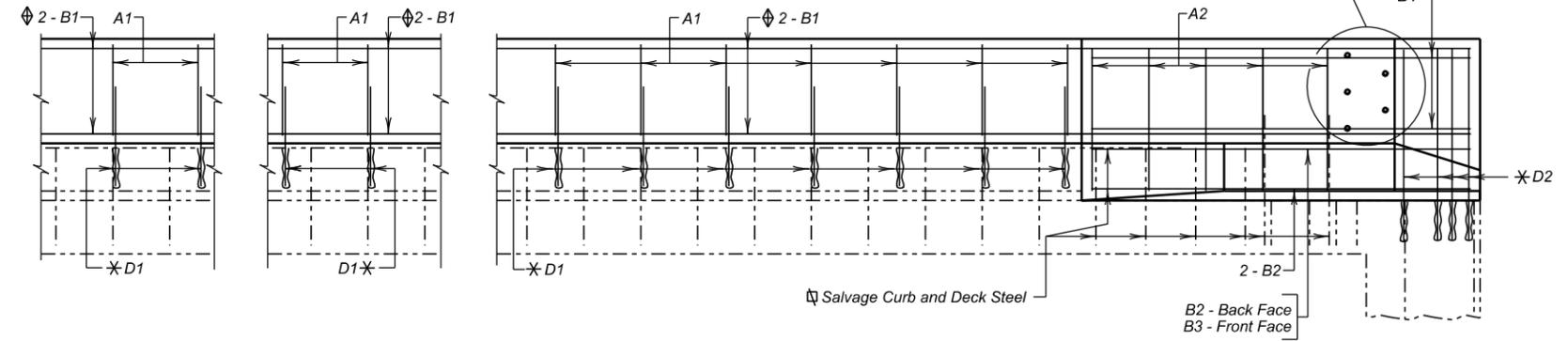
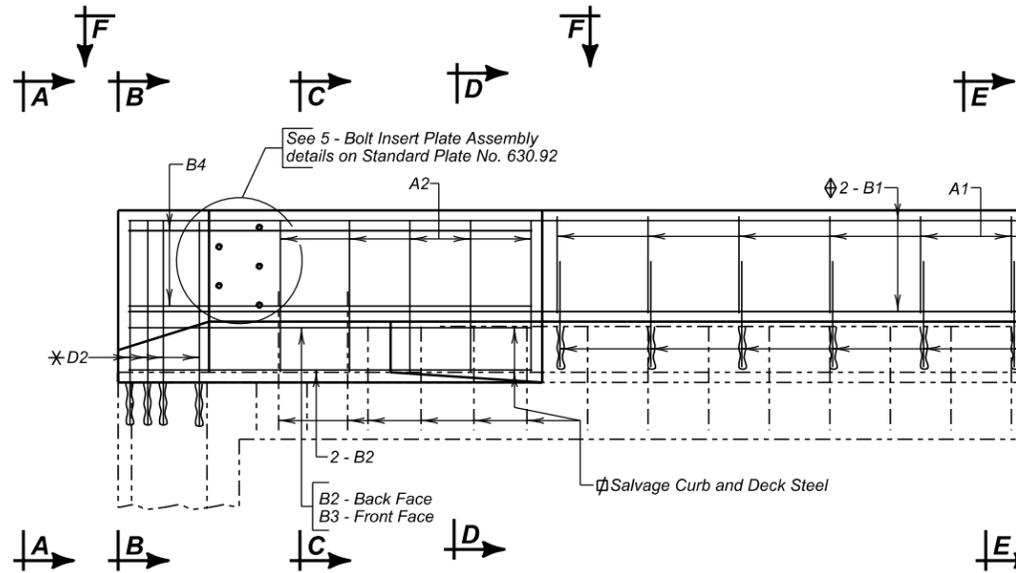
3 OF 13

DESIGNED BY SMV TRIP04F4	CK. DES. BY TJM 04F4RA03	DRAFTED BY KR	 BRIDGE ENGINEER
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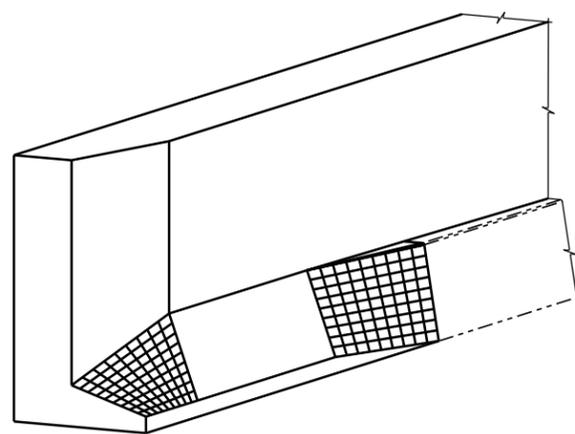


PLAN

(Phase 1 shown, Phase 2 similar by opposite hand)
 (Some of the longitudinal bars are located vertically in the same plane but are shown offset for labeling, see cross sections for details.)

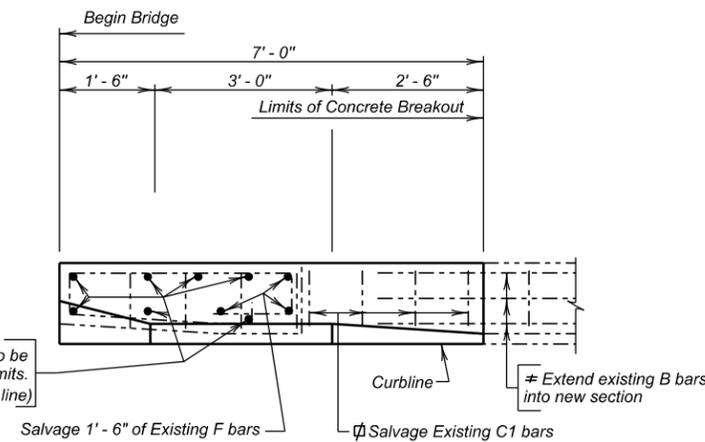


- ∅ Bend existing bars where necessary to maintain 2" clear cover.
- * D1 and D2 Dowels are to be drilled in and grouted with epoxy.
- ≠ Extend existing B bars into new section (1'-6")
- ◇ Min. Lap = 1'-6"



ISOMETRIC VIEW
 (Existing overlay not shown)

These are the only Existing bars to be cutoff within the concrete breakout limits. (Cut these bars at Concrete Breakout line)

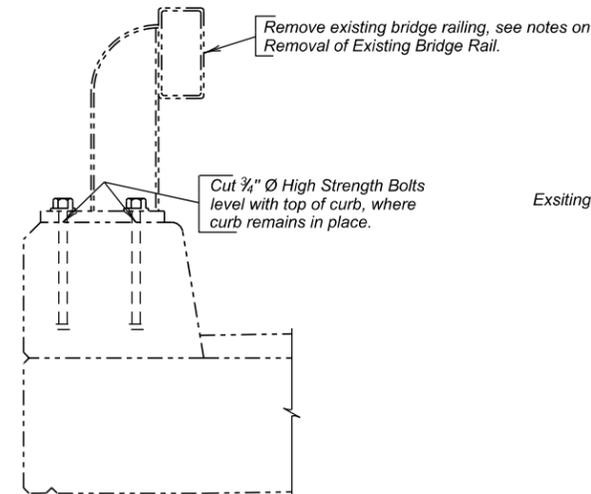


VIEW F - F
 (1 location shown others similar by mirror or opposite hand)
 (New reinforcing steel not shown)

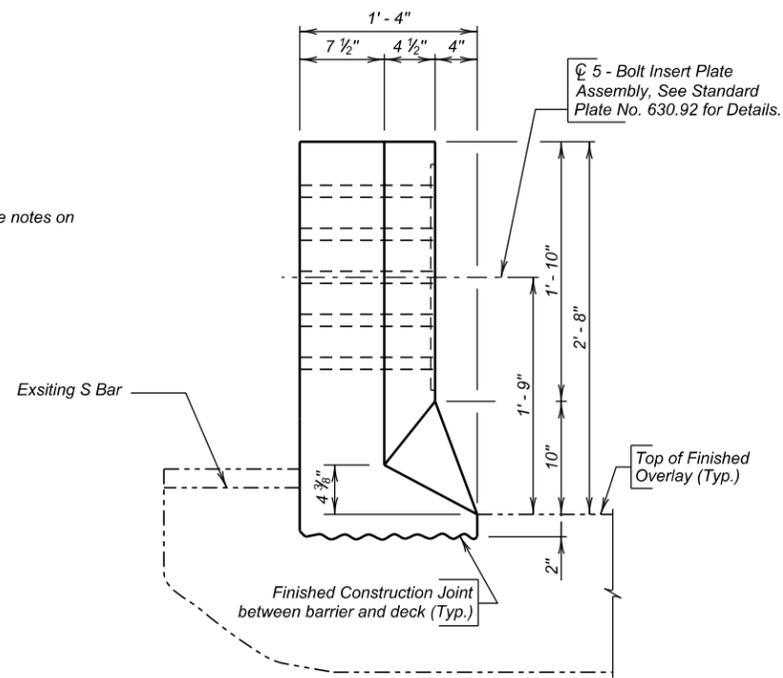
END BLOCK AND RAIL MODIFICATION (A)
 FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
 32' - 0" ROADWAY
 OVER CREEK
 STR. NO. 62-283-191

0° SKEW
 SEC. 11-T100N-R75W
 P 0049(05)27

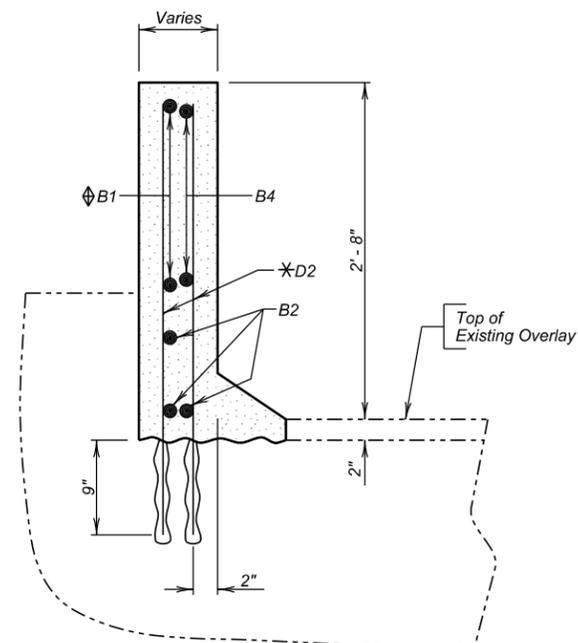
TRIPP COUNTY
 S. D. DEPT. OF TRANSPORTATION
 NOVEMBER 2020



EXISTING CURB & RAIL

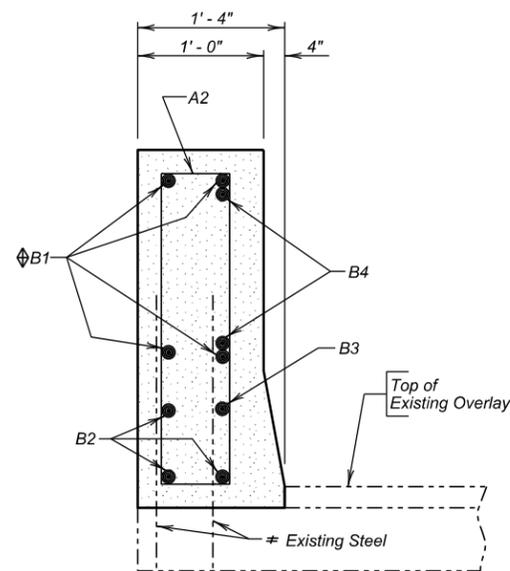


VIEW A - A

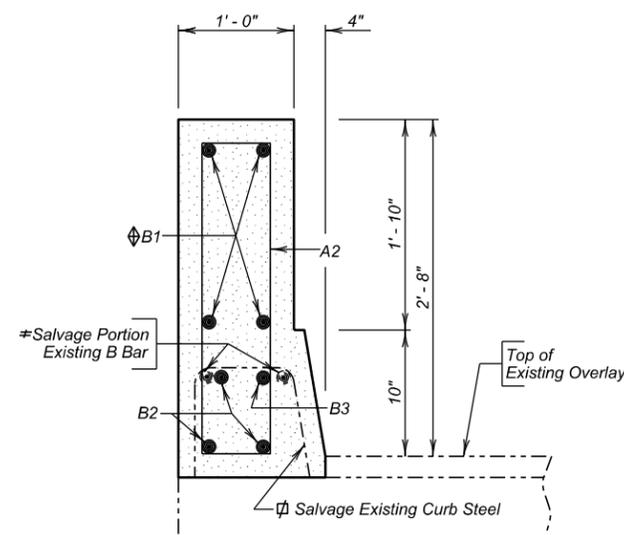


SECTION B - B

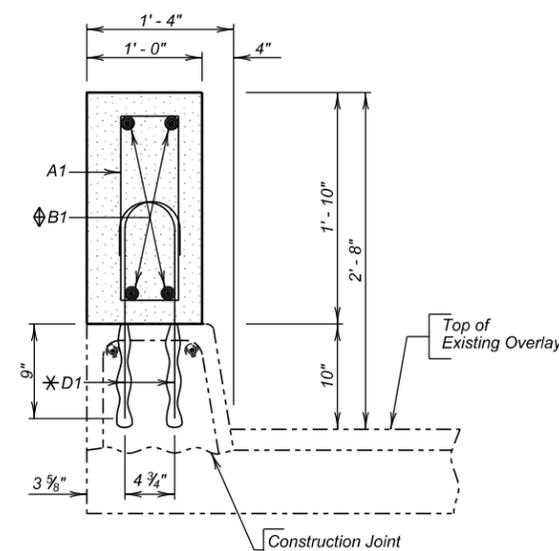
- ∅ Bend existing bars where necessary to maintain 2" clear cover.
- * D1 and D2 Dowels are to be drilled in and grouted with epoxy.
- ≠ Extend existing B bars into new section (1' - 6")
- ∅ Min. Lap = 1' - 6"



SECTION C - C



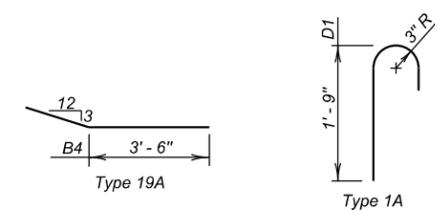
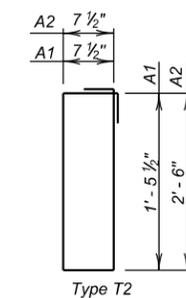
SECTION D - D



SECTION E - E

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details	
					PHASE 1	PHASE 2
A1	49	4	4' - 11"	T2		
A2	10	4	7' - 0"	T2		
B1	8	4	43' - 10"	Str.		
B2	6	4	6' - 8"	Str.		
B3	2	4	6' - 0"	Str.		
B4	4	4	4' - 10"	19A		
Δ D1	74	6	2' - 6"	1A		
Δ D2	8	6	3' - 5"	Str.		



NOTES:

- Δ Dowels
- All bars are epoxy coated.
- All dimensions are out to out of bars.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		PHASE 1	PHASE 2
Remove Bridge Railing	Ft	80	80
Class A45 Concrete, Bridge Repair	CuYd	6.5	6.5
Breakout Structural Concrete	CuYd	1.4	1.4
Install Dowel in Concrete	Each	82	82
* Epoxy Coated Reinforcing Steel	Lb	490	490
Galvanic Anode	Each	12	12

* Does not include the following quantities for D1 & D2 bars as these are incidental to the contract unit price per each for Install Dowel in Concrete.

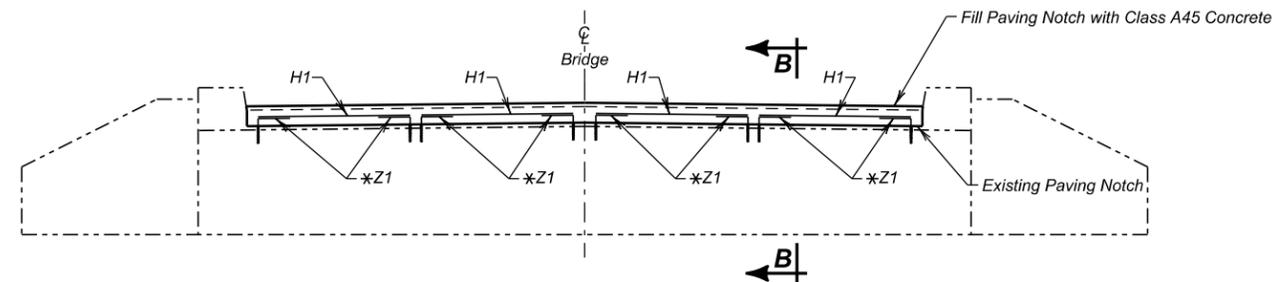
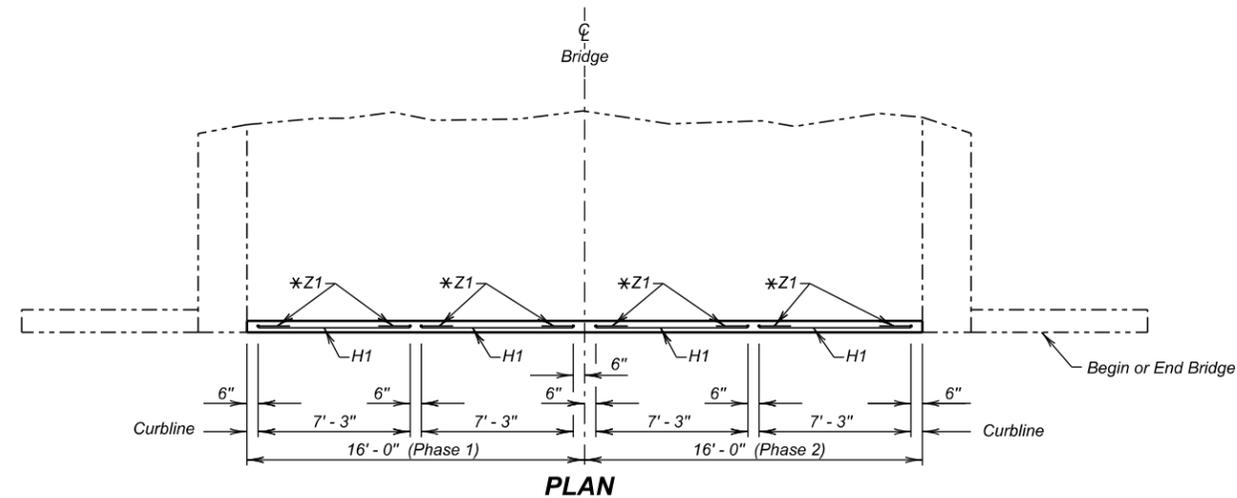
	PHASE 1	PHASE 2
	319 Lb	319 Lb

END BLOCK AND RAIL MODIFICATION (B)

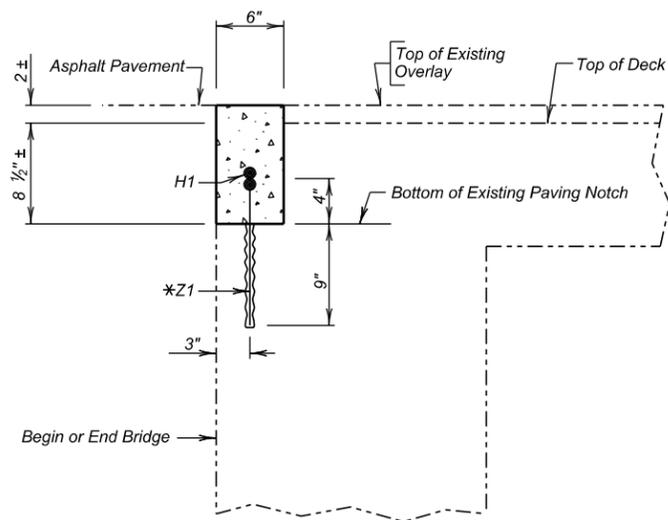
FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
 32' - 0" ROADWAY
 OVER CREEK
 STR. NO. 62-283-191

0° SKEW
 SEC. 11-T100N-R75W
 P 0049(05)27

TRIPP COUNTY
 S. D. DEPT. OF TRANSPORTATION
 NOVEMBER 2020



* Z1 Dowels are to be drilled in and grouted with epoxy.



REINFORCING SCHEDULE (For Both Ends of Bridge)						
Mk.	No.	Size	Length	Type	Bending Details	
Phase 1	ΔZ1	8	5	2' - 6"	17A	<p style="text-align: center;">13" Z1 Type 17A</p>
	H1	4	5	7' - 3"	Str.	
Phase 2	ΔZ1	8	5	2' - 6"	17A	
	H1	4	5	7' - 3"	Str.	

NOTES:
 All Dimensions are out to out of bars.
 All Bars to be Epoxy Coated.
 Δ Dowels

ESTIMATED QUANTITIES				
ITEM	UNIT	QUANTITY		
		Phase 1	Phase 2	
Class A45 Concrete, Bridge Repair	CuYd	1.1	1.1	
Install Dowel in Concrete	Each	8	8	
Epoxy Coated Reinforcing Steel	Lb	31	21	

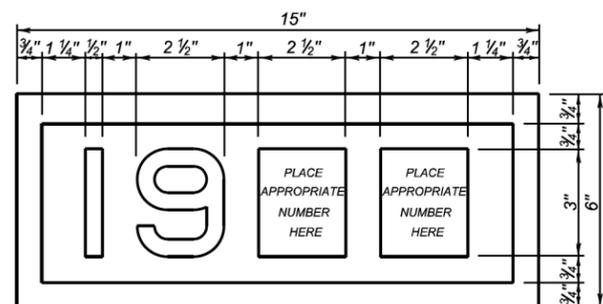
⊗ Does not include the following quantity for Z1 bars as these are incidental to the contract unit price per each for Install Dowel in Concrete.

PHASE 1	PHASE 2
21 Lb.	21 Lb.

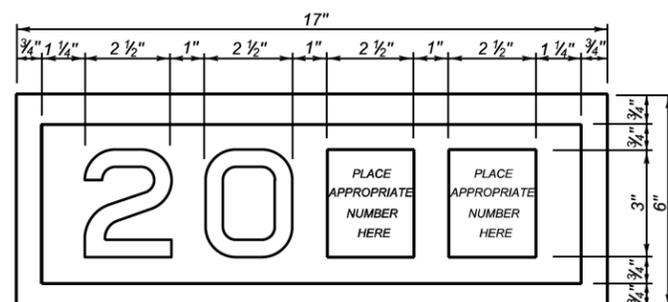
PAVING NOTCH MODIFICATION DETAILS
 FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
 32' - 0" ROADWAY 0° SKEW
 OVER CREEK SEC. 11-T100N-R75W
 STR. NO. 62-283-191 P 0049(05)27

TRIPP COUNTY
 S. D. DEPT. OF TRANSPORTATION
 NOVEMBER 2020

**YEAR PLATE
DETAILS FOR
ORIGINAL CONSTRUCTION**

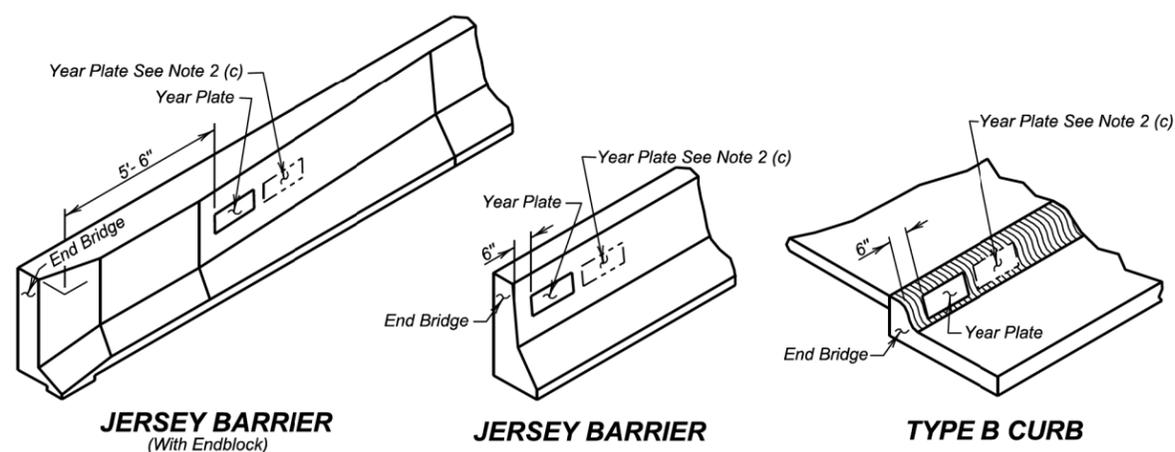


**YEAR PLATE
DETAILS FOR
NEW CONSTRUCTION**



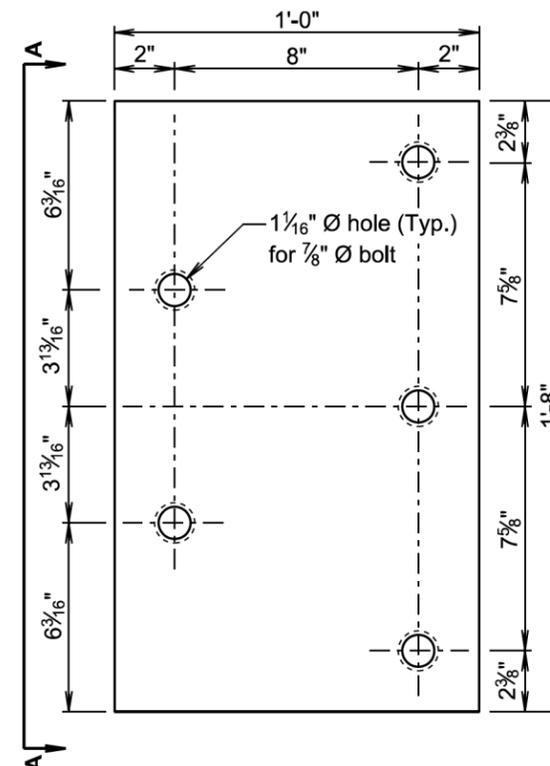
GENERAL NOTES:

- Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2) inch in depth.
- Year plates shall be located on structure(s) as follows:
 - On cast-in-place box culverts the year plates shall be four and one-half (4 1/2) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.
 - On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'-6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.
 - When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.
- There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.

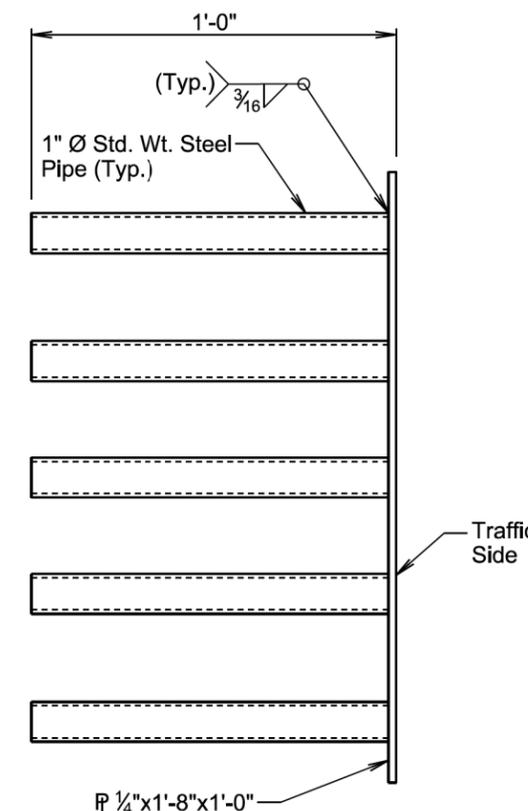


June 26, 2012

S D D O T	DUAL DATE YEAR PLATE DETAILS	PLATE NUMBER 460.03
	Published Date: 2nd Qtr. 2021	Sheet 1 of 1



ELEVATION VIEW



VIEW A - A

GENERAL NOTES:

Steel plate for the insert assembly will conform to ASTM A709, Grade 36. The steel pipes will conform to ASTM A53 or ASTM A500, Grade B.

Welding and weld inspection will be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.

After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).

Bolts, nuts, and washers will be provided with each assembly. Bolts will be galvanized and conform to the requirements of ASTM A307, F-1554 Grade A325, or A449. Plain washers will be galvanized and conform to ASTM F844.

Bolt heads will be placed on the traffic side of the endblock. Bolt projection at the back side of the insert will not exceed 1 inch beyond the nut.

The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing will be incidental to the contract unit price per cubic yard for "Class A45 Concrete, Miscellaneous", "Class A45 Concrete, Bridge Deck", or "Class A45 Concrete, Bridge Repair", as applicable.

August 27, 2020

S D D O T	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
	Published Date: 2nd Qtr. 2021	Sheet 1 of 1

86' - 6" CONTINUOUS CONCRETE BRIDGE

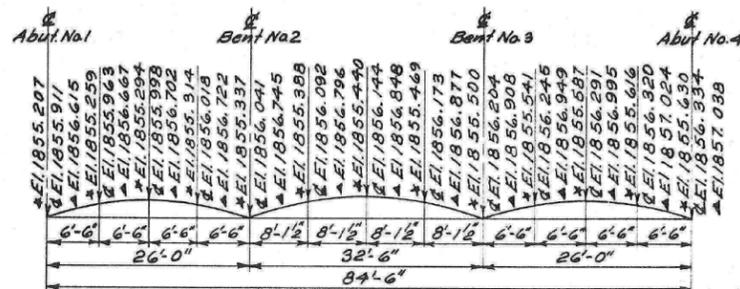
STR. NO. 62-283-191
NOVEMBER 2020

-X020-

INDEX OF BRIDGE SHEETS

- Sheet No. 1-General Drawing and Quantities.
- Sheet No. 2-Subsurface Investigations.
- Sheet No. 3-Superstructure Details.
- Sheet No. 4-Abutment Details.
- Sheet No. 5-Armored Timber Pile Bent Details.
- Sheet No. 6-Type RT-3A Steel Railing, Drain and Curb Details.
- Sheet No. 7-End Block Details.
- Sheet No. 8-Details of Bridge End Back-Fill-(Plan "A")
- Sheet No. 9-Standard Plates No. 301 and No. 303.1.
- Sheet No. 10-Standard Plate No. 305.

NOTE:
T.S. @ C.E.I. = Top of Slab at Centerline Roadway Elevation.
T.S. @ C.E.I. = Top of Slab at Curb Elevation.

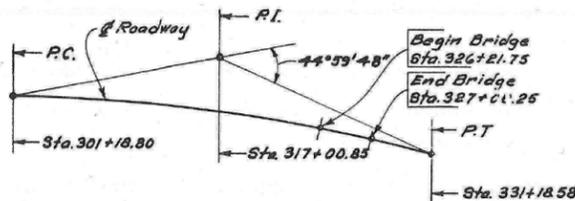


CURB AND ELEVATIONS

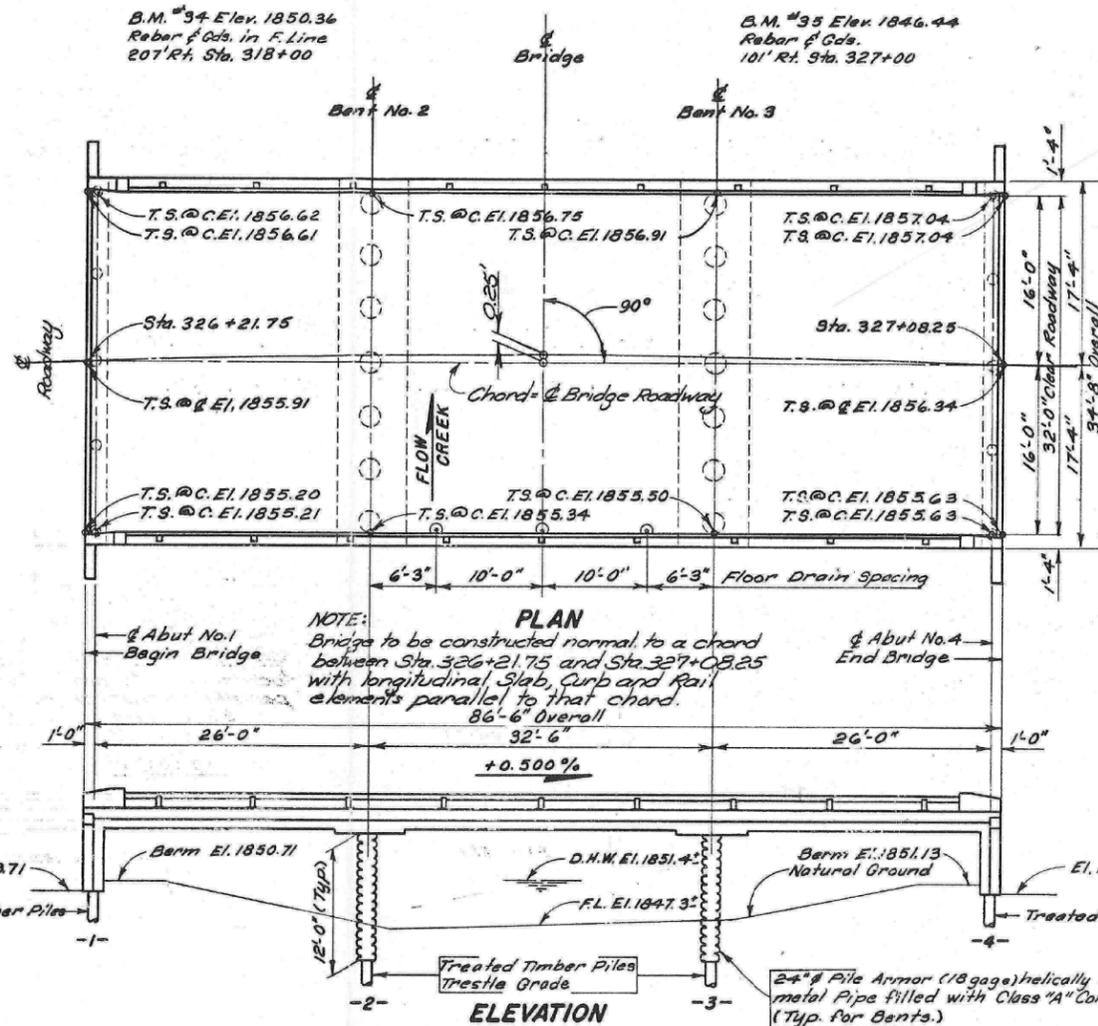
Elevations indicated with Δ are top of finished slab at left curb and with \ast are top of finished slab at right curb and with $\&$ are top of finished at centerline of roadway. Camber for Dead Load Deflection Plus Plastic Flow, shown on Sheet No. 3 of Bridge Plans, have been included in the elevations shown above.

Q25	860 c.f.s.
A	240 sq. ft.
V	3.6 f.p.s.

Survey Curve
P.C. Sta. 301+18.80
P.T. Sta. 317+00.85
R.T. Sta. 331+18.58
 Δ 44° 59' 48"
D = 1° 30'
T = 1582.05'
L = 2999.78'
R = 3819.72'



HORIZONTAL CURVE DATA



NOTE:
Bridge to be constructed normal to a chord between Sta. 326+21.75 and Sta. 327+08.25 with longitudinal Slab, Curb and Rail elements parallel to that chord.
86'-6" Overall
32'-6" Overall

ESTIMATED QUANTITIES

ITEM	Class "A" Concrete	Reinforcement Concrete	Structural Steel	Steel Railing	Timber	* Timber	Timber Pile	Structure	Unclassified	* Bridge
UNIT	Cu. Yd.	Lb.	Lb.	L.F.	L.F.	L.F.	L.F.	Cu. Yd.	Cu. Yd.	L.S.
Superstructure	120.8	31,495	140	1597	5 @ 25" x 125	1 @ 30" x 30		10		
Abutment No. 1	15.0	1,995			7 @ 30" x 210	1 @ 35" x 35	34	20		
Bent No. 2	7.3	1,015			7 @ 30" x 210	1 @ 35" x 35	34	20		
Bent No. 3	7.3	1,015			7 @ 30" x 210	1 @ 35" x 35	34	20		
Abutment No. 4	15.0	1,995			5 @ 25" x 125	1 @ 30" x 30		10		
Totals	165.4	37,515	140	1597	270	4	130	60		* Lump Sum

* Unclassified Excavation to be done by Grading Contractor.
* One Treated Timber Test Pile shall be driven at Abutment No. 1 and No. 4 and at Bents No. 2 and No. 3 before remaining piles are ordered.
* Includes End Block Quantities. For End Block Quantities See Sheet No. 8 of 10.
* For information only - The approximate amount of granular backfill required will be 165 cu. yds. and the length of 6" ϕ perforated metal pipe will be 132 feet, total for both Abutments. See NOTES on sheet 8 of 10.

SPECIFICATION NOTE
Use South Dakota Standard Specifications for Roads and Bridges, 1969 Edition, and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

DESIGN MIX OF CONCRETE
Substructure: 4,000 p.s.i. Compressive.
Superstructure: 4,500 p.s.i. Compressive.
Type II Cement is required.

- GENERAL NOTES**
- Design Specifications: A.A.S.H.O. Specifications for Highway Bridges 1969, with interim Specifications for 1970 and 1971.
 - See Notes on Sheet No. 1 thru No. 10.
 - Place floor drains as shown in plan (3 required).
 - Rail Post and End Blocks shall be built normal to grade.
 - All Reinforcing Steel shall conform to A.S.T.M. Specifications as shown on plans here in.
 - Design Loading: HS 20-44 A.A.S.H.O.
 - The Contractor shall have sufficient pile splice material on hand before pile driving is started. See Standard Plate No. 303.1 for splice details.
 - In the event pile shoes are used, See Standard Plate No. 301 for details.
 - Furnish and install inserts and eyebolts as shown on Standard Plate No. 305.
 - Standard Plates referred to in these plans are the plates printed on Sheets No. 9 and No. 10 of 10 of these plans and are not intended to be referred to the Standard Plates Manual.
 - Elevation Top of Slab at centerline is 0.6667 above centerline subgrade elevation.
 - The Contractor shall imprint on the structure the date of construction as specified and detailed on Standard Plate No. 308, which is on file with the ENGINEER.
 - Preboring Piling is not required.

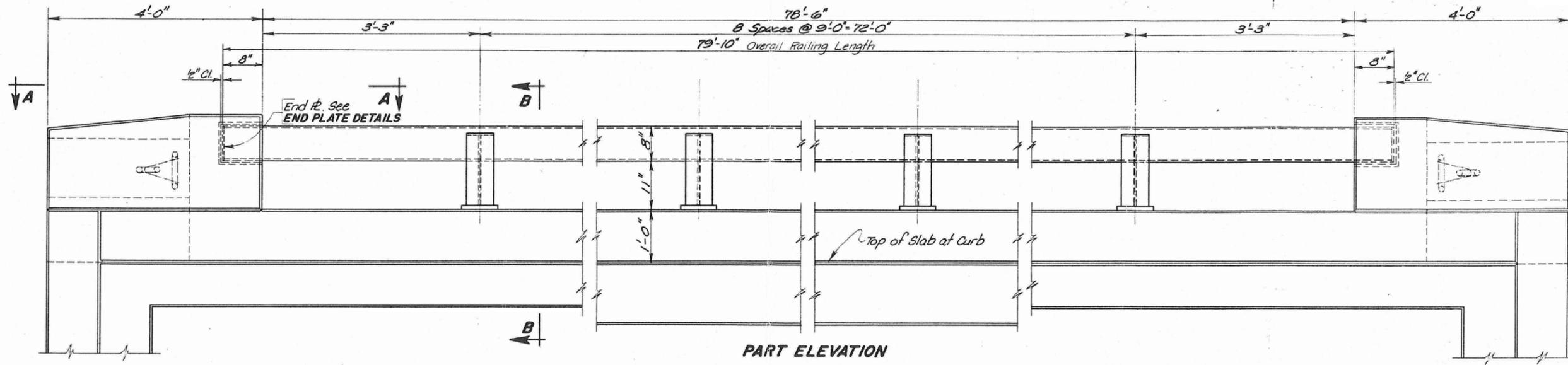
ORIGINAL CONSTRUCTION PLANS

GENERAL DRAWING AND QUANTITIES
FOR
86'-6" CONTINUOUS CONCRETE BRIDGE
32'-0" ROADWAY
OVER CREEK SEC. II-T100N-R7E W
STA. 326+21.75 TO 327+08.25 S1411
STR. NO. 62-283-191 TRIPP COUNTY
SOUTH DAKOTA HS 20-44
DEPARTMENT OF HIGHWAYS
DEC. 1971

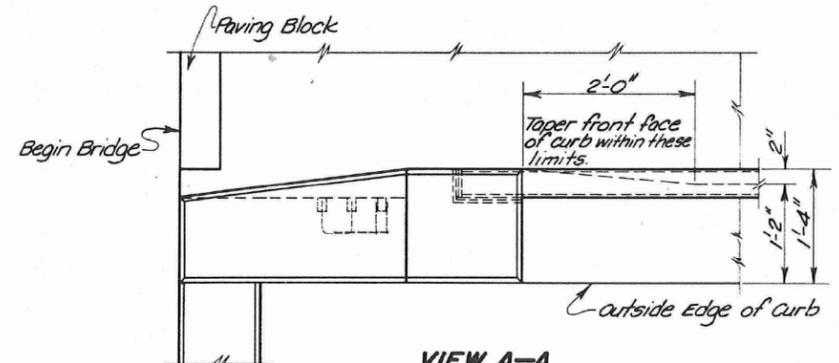
-X020-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	Ed. L.	GA	<i>[Signature]</i> BRIDGE ENGINEER

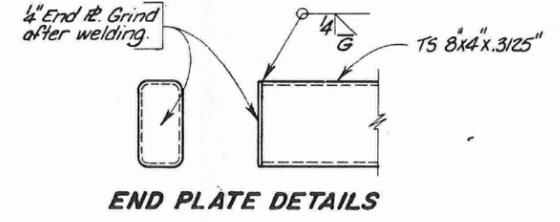
PLANS BY:
BRIDGE SEC. S. DAK. DEPT. OF HWYS.



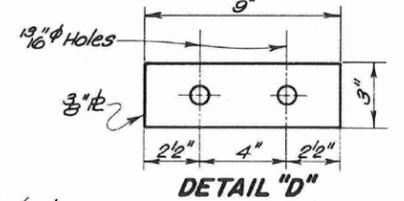
PART ELEVATION



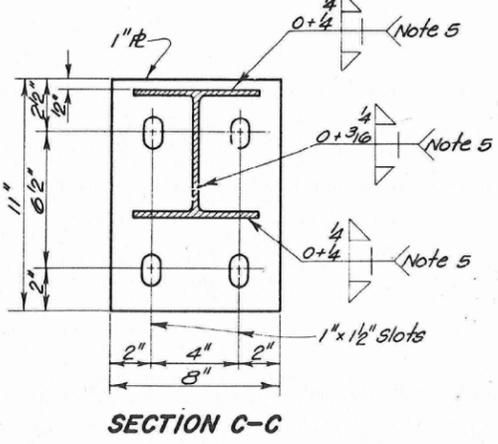
VIEW A-A



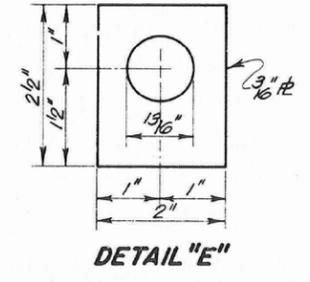
END PLATE DETAILS



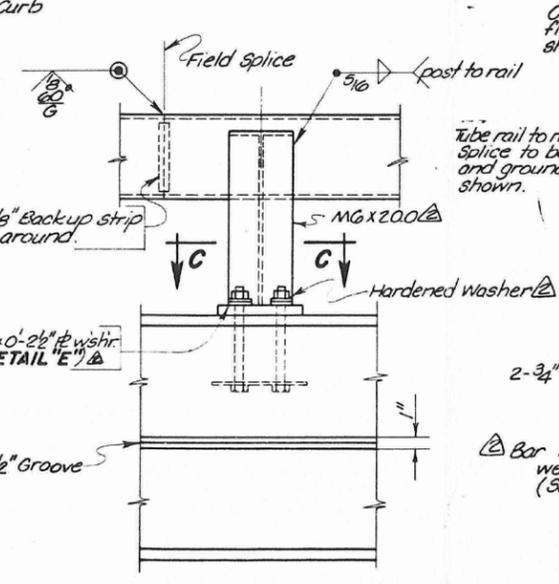
DETAIL "D"



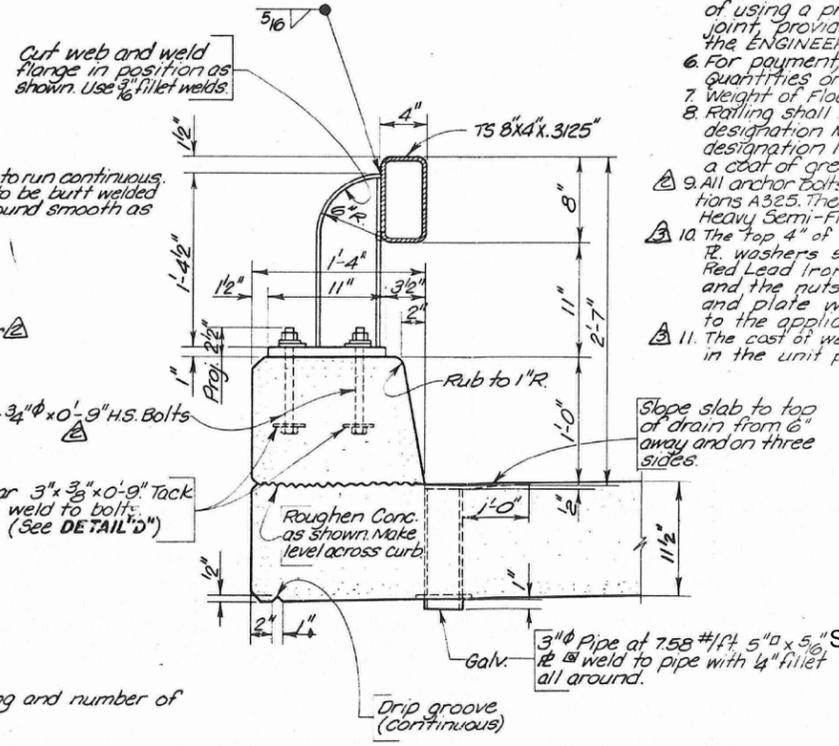
SECTION C-C



DETAIL "E"



SECTION B-B (Curb reinforcing not shown)



SECTION B-B (Curb reinforcing not shown)

GENERAL NOTES—

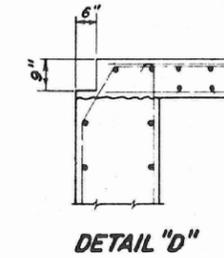
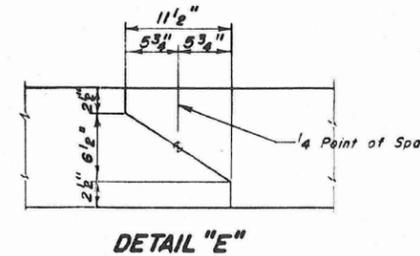
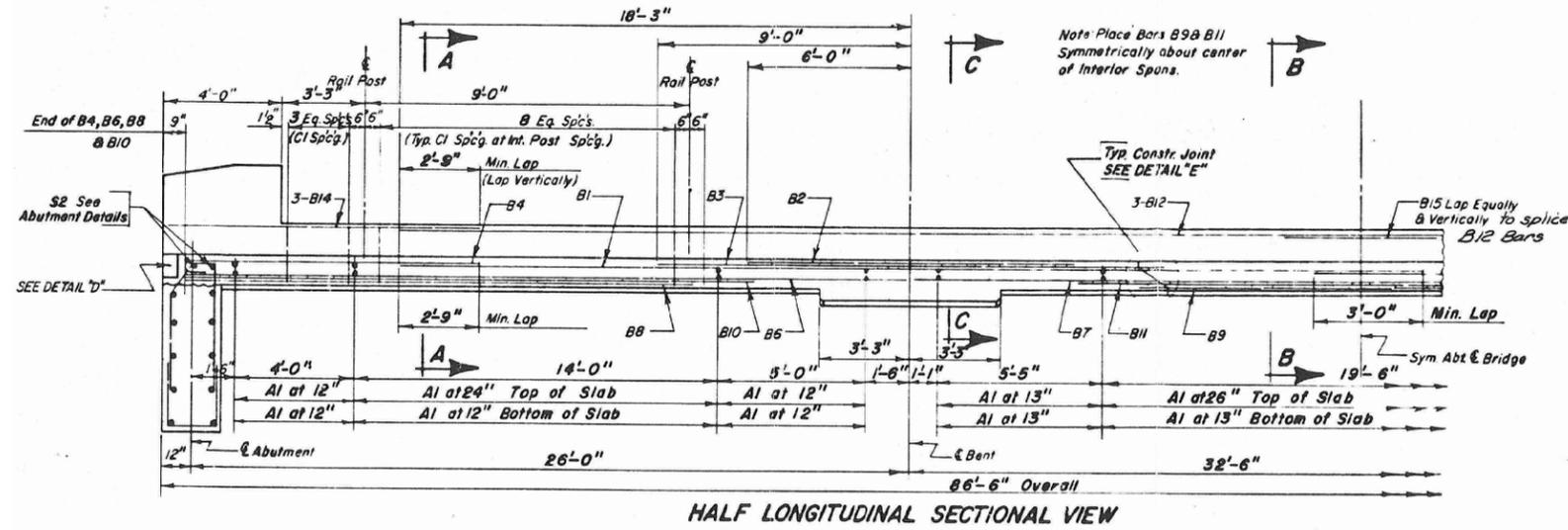
- All rail posts and end blocks shall be built normal to grade.
- All structural steel parts for railing shall conform to A.S.T.M. Specifications A36. Tubes shall conform to A.S.T.M. Specifications A500 or A501.
- All anchor bolts shall be tightened to a minimum torque of 120 ft lbs. (Approximated without the use of a calibrated torque wrench).
- Cost of welding and painting shall be included in the unit price bid for railing.
- Use manual submerged arc process welding procedures shall be in accordance with paragraph 414 of A.W.S. Fabricator has the option of using a prequalified manual shielded metal-arc welded joint, provided it is shown on the shop plan and approved by the ENGINEER.
- For payment, the length of rail shall be as shown in the Estimated quantities on General Drawing.
- Weight of Floor Drains is included in the weight of structural steel.
- Railing shall be painted with one shop coat of Red Lead Paint (A.A.S.H.O. designation M72 Type I) or Red Lead Iron Oxide Paint (A.A.S.H.O. designation M72 Type III) and one field coat of gray paint followed by a coat of green paint.
- All anchor bolts, nuts, and washers for railing shall conform to A.S.T.M. Specifications A325. The bolts shall be the Heavy Hex Head "Structural" type with Heavy Semi-Finished Hex Nut and Hardened Round Washer.
- The top 4" of the rail post anchor bolts and the 2" x 3/8" x 0'-2 1/2" washers shall each receive a shop coat of Red Lead Paint or Red Lead Iron Oxide Paint. After the posts have been installed, and the nuts tightened, the projecting bolts, nuts, round washers and plate washers shall receive a prime coat of paint prior to the application of the prescribed field coats of paint.
- The cost of welding and galvanizing Floor Drains shall be included in the unit price bid for structural steel.

ORIGINAL CONSTRUCTION PLANS

TYPE RT-3A STEEL RAILING AND CURB DETAILS
 FOR
86'-6" CONTINUOUS CONCRETE BRIDGE
 32'-0" ROADWAY
 OVER CREEK SEC. 11-T100N-R75W
 STA. 326+21.75 TO 327+08.25 S1411
 STR. NO. 62-283-191 TRIPP COUNTY
 SOUTH DAKOTA HS20-44
 DEPARTMENT OF HIGHWAYS
 DEC. 1971

Rev. 12-2-70 (D.P.)
 Rev. 10/11/70 (R.L.B.)
 Rev. 7-7-70 (S.L.R.)

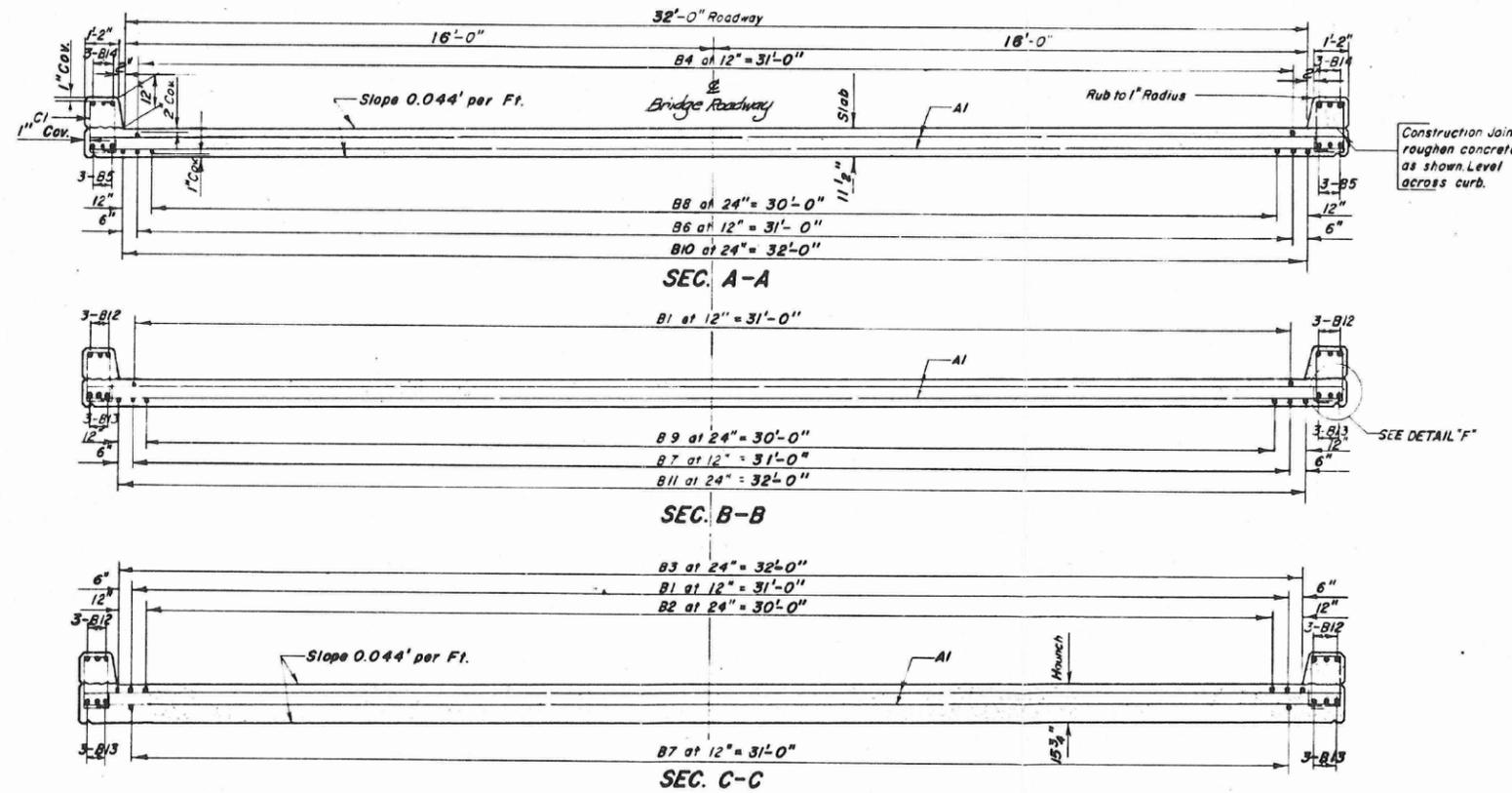
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	GA		<i>[Signature]</i>



REINFORCING SCHEDULE						
MK	NO.	SIZE	LENGTH	TYPE	BENDING DETAILS	
A1	131	5	34'-4"	Str.		
A2	(See Bent Details)					
B1	64	8	36'-0"	Str.		
B2	32	9	12'-0"	Str.		
B3	34	9	18'-0"	Str.		
B4	64	7	11'-9"	1A		
B5	12	7	26'-9"	Str.		
B6	64	8	26'-3"	Str.		
B7	32	8	32'-6"	Str.		
B8	32	8	18'-0"	Str.		
B9	16	8	15'-0"	Str.		
B10	34	8	21'-0"	Str.		
B11	17	8	20'-0"	Str.		
B12	12	8	34'-6"	Str.		
B13	6	7	32'-6"	Str.		
B14	12	7	11'-3"	Str.		
B15	6	6	5'-0"	Str.		
CI	160	4	6'-1"	T2		

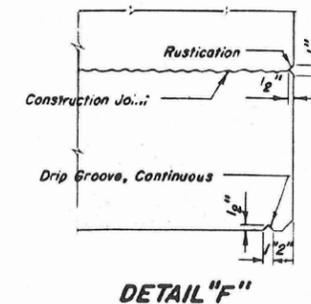
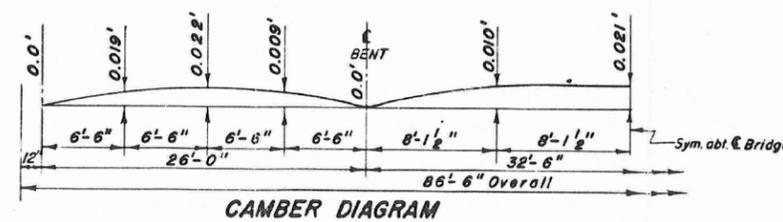
NOTE: All dimensions are out to out of bars.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class "A" Concrete, Bridge	Cu. Yd.	119.6
Reinforcement, Conc. Masonry	Lb.	31,155
Structural Steel	Lb.	30
Type RT-3 Steel Rolling	Lm. Ft.	159.7



NOTES—

1. Design Specifications: AASHTO Specifications for Highway Bridges, 1969, with interim Specifications for 1970 & 1971.
2. All Concrete shall be Class "A".
3. Curbs shall be poured after slab has been poured.
4. All reinforcing steel shall conform to A.S.T.M. A615, Grade 60, except CI bars may be Grade 40.
5. All exposed concrete corners and edges shall be chamfered 3/4" unless noted otherwise.
6. Transverse slab construction joints may be used as provided in the "Special Provisions for Concrete Bridges," dated June 18, 1969.
7. Design Loading: HS20-44 AASHTO.
8. Design Unit Stresses: Concrete $f_c = 1,800$ p.s.i. $f_c = 4,500$ p.s.i. Rein. Steel $f_s = 24,000$ p.s.i. for Grade 60 $f_s = 20,000$ p.s.i. for Grade 40.

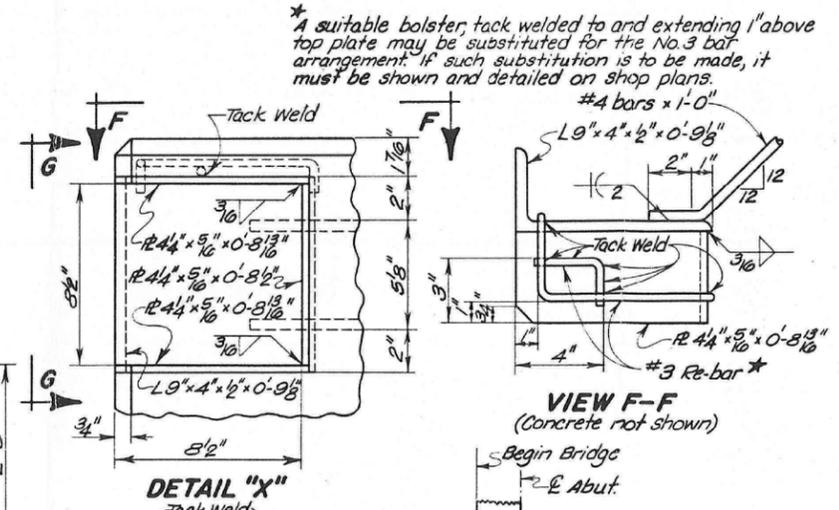
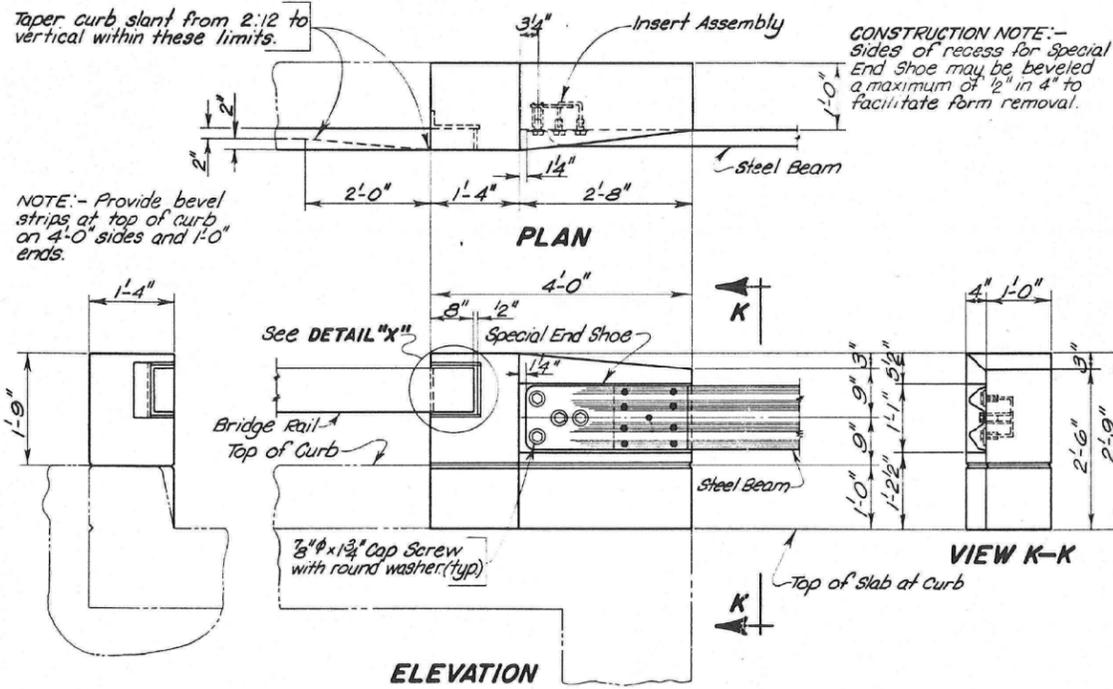


ORIGINAL CONSTRUCTION PLANS

SUPERSTRUCTURE DETAILS
FOR
86'-6" CONTINUOUS CONCRETE BRIDGE
32'-0" ROADWAY
OVER CREEK SEC. II-T100N-R7SW
STA. 326+21.75 TO 327+08.25 S1411
STR. NO. 62-283-191 TRIPP COUNTY
SOUTH DAKOTA HS20-44
DEPARTMENT OF HIGHWAYS
NOV. 1971

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	WCP & M.V.W.	D.R. B. CA	

BRIDGE ENGINEER



REINFORCING SCHEDULE
(For one End Block)

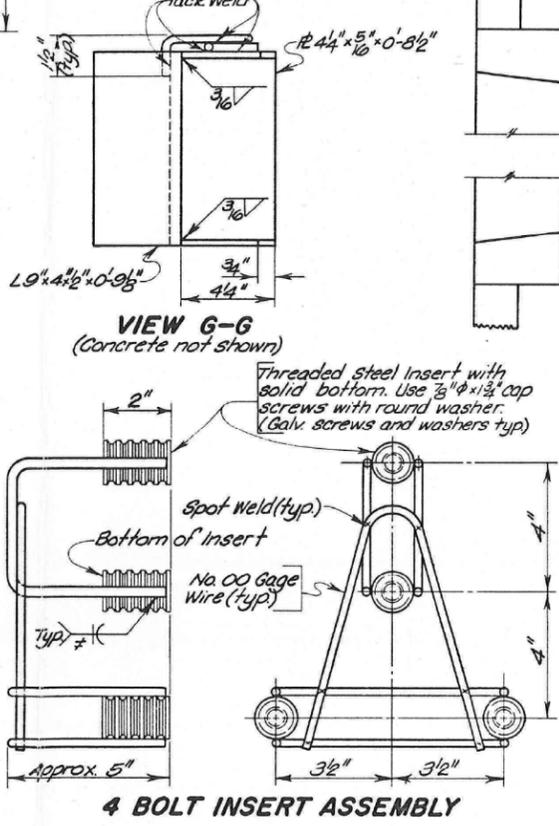
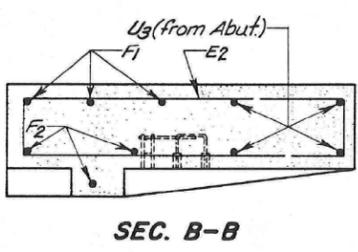
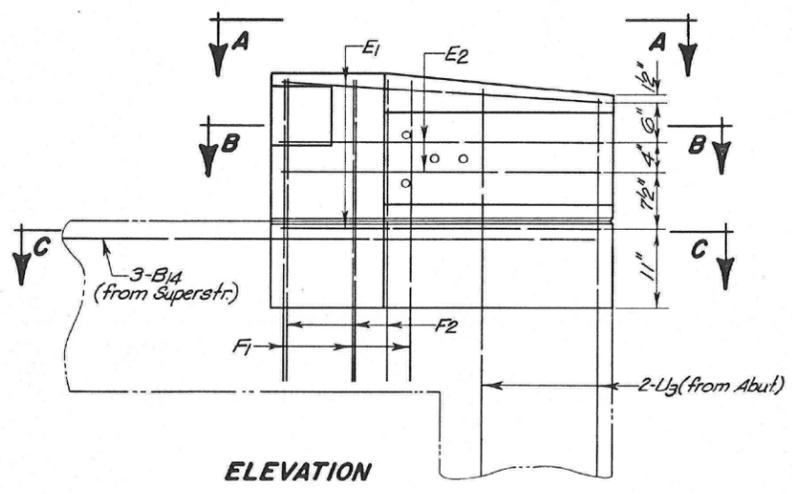
MK	No.	Size	Length	Type	Bending Details
E1	2	4	10'-7"	T12A	Type T2
E2	2	4	9'-8"	T2	
F1	3	4	3'-10"	17A	Type T12A
F2	3	9	4'-9"	17A	

Note: All dimensions are cut to out of bars.

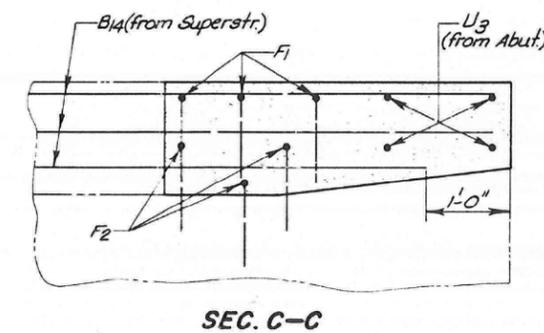
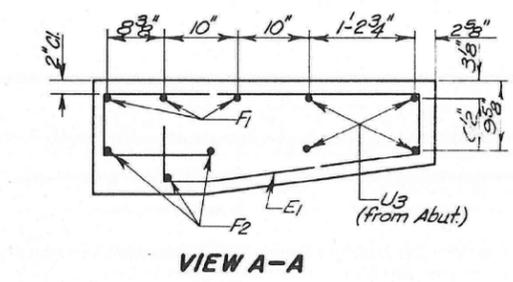
ESTIMATED QUANTITIES
(For one End Block)

ITEM	UNIT	QUANTITY
Class "A" Concrete - Bridge	Cu Yd	0.3
Reinforcement Conc. Masonry	Lb.	65
Structural Steel	Lb.	428

Cost of 4-Bolt Insert Assembly including Cap Screws and Washers shall be included in the unit price bid for Class "A" Concrete.



- GENERAL NOTES—**
- Use 1/2" clear cover on all bars, except as shown.
 - Structural Steel shall conform to A.S.T.M. requirements for A36 Steel.
 - All steel in Bridge Rail Recess Assembly and Cap Screws and Washers in Insert Assembly shall be galvanized in accordance with A.S.H.C. Specifications Mill. Cost of galvanizing Bridge Rail Recess Assembly shall be included in the unit price bid for structural steel.
 - End Block shall be built normal to grade.
 - All exposed edges shall be chamfered 3/4".
 - Steel Beam and Special End Shoes shall be furnished and installed by others.
 - All wires shown are minimum allowable size and shall conform to the current standard specification for Cold-Drawn Steel Wire A.S.T.M. designation A-32.
 - The size of wire shown shall conform to the United States Steel Wire Gage Standard.
 - The 4-Bolt Insert Assembly shall include Cap Screws and Washers.



ORIGINAL CONSTRUCTION PLANS

END BLOCK DETAILS
FOR
86'-6" CONTINUOUS CONCRETE BRIDGE
32'-0" ROADWAY
OVER CREEK SEC. 11-TIOON-R75W
STA. 326+21.75 TO 327+08.25 S1411
STR. NO. 62-283-19 TRIPP COUNTY
SOUTH DAKOTA HS20-44
DEPARTMENT OF HIGHWAYS 11 OF 13
DEC. 1971

Rev. 3-4-71 (GA)

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	GA	OC	<i>R. Volkert</i>

NOTE REGARDING WORK TO BE DONE BY STRUCTURE CONTRACTOR

Station 21+40.50 to 22+58.50 - Construct 118' 0" (32' Rdwy.) Continuous Concrete Bridge and install 128 lineal feet of Type "D" Gutter, 206 square yards of Approach Slab, 2 - Type "B" Drop Inlets with Type "B" Drop Inlets with Type "B" Frame and Grates, 86 lineal feet of 12" C.M. Pipe and 1 - 12" C.M. Flared End.

Construction of Channel Change and Detour, removal of existing timber bridge, construction of berms and installation of Steel Seam Guide Rail to be done by the Grading Contractor. [See Sheets 43 and 73 to 82 Incl.]

Station 326+21.75 to 327+08.25 - Construct 86' 5" (32' Rdwy.) Continuous Concrete Bridge and install 128 lineal feet of Type "D" Gutter, 206 square yards of Approach Slab, 1 - Type "B" Drop Inlet with Type "D" Frame and Grate, 14 lineal feet of 12" C. M. Pipe and 1 - C. M. Flared End.

Construction of berms and installation of Steel Seam Guide Rail to be done by the Grading Contractor. [See Sheets 55 and 83 to 92 Incl.]

MAINTENANCE OF TRAFFIC AND SEQUENCE OF OPERATION

The Grading Contractor will be required to maintain traffic through the project in accordance with Section 4.4 of the Special Provisions for General Requirements except for that portion of the project from Station 20+00 to 25+00.

Included in the Estimate of Grading Quantities is the item "Maintenance of Detours" which will apply to the Stations 20+00 to 25+00.

Construction Signing will be the responsibility of the Grading Contractor throughout the Project.

The Grading Contractor will be required, unless otherwise directed by the Engineer, to complete the following work before beginning any other grading operations:

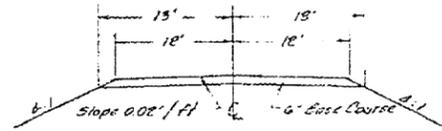
- (1) Station 326+65 - Construct the bridge berms
- (2) Station 22+00 - Construct the channel change, build the detour, remove existing structure and build the bridge berms.

NOTE REGARDING DROP INLETS

Type "B" Drop Inlets including Type "D9" Frames and Grates for this project are to be bid on a per each basis in accordance with the Standard Specifications. The following quantities for each Drop Inlet are extracted for informational purposes.

Class "A" Conc.	0.93	Cu. Yds.
Reinf. Steel	80	Lbs.
Grate Assembly	1	Each

TYPICAL DETOUR SECTION



SPECIFICATIONS TO BE USED ARE:

Standard Specifications for Roads and Bridges, 1959 Edition, and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the proposal.

ORIGINAL CONSTRUCTION PLANS

ESTIMATE OF STRUCTURE QUANTITIES

SPECIFICATION	REFERENCES	360	420	SPECIAL PROVISION	450	460	470	480	500	SPECIAL PROVISION	510	510	650	670	SPECIAL PROVISION	680					
ITEM NUMBERS		380.0000	420.0000	420.0000	450.0433 450.0433	460.0001	470.0001	480.0001	500.0001	510.0003	510.0007	510.0008	620.0078	670.0050	609.0001	600.0001					
SECTION	LOCATION	PORTLAND CEMENT CONCRETE PAVEMENT 9" IN REINFORCED	STRUCTURE EXCAVATION	BRIDGE END BACKFILL	12" CIRCULAR C.M. PIPE 10 GA. (INCL. ELBOWS)	12" CIRCULAR C.M. FLARED ENDS	CLASS "A" CONCRETE (BRIDGE)	STEEL RAILING TYPE RT-3A	REINFORCEMENT FOR CONCRETE MASONRY	STRUCTURAL STEEL	TIMBER PILE ARMOR 24" NB-GA.	TIMBER BEARING PILES	TIMBER TEST PILES	CONCRETE GUTTER TYPE "D9" STR.	TYPE "B" DROP INLET WITH TYPE "D9" FRAME & GRATE ASSEMBLY	LABORATORY	FIELD LABORATORY				
	34+40.50 to 22+58.50 Rdwy. in 118' 0" 32' Rdwy. Cont. Concrete Bridge	205.2	137.2	4.8	34	1	2826	236.7	35,885	557			23	8							
	326+21.75 to 327+08.25 Rdwy. in 86' 5" 32' Rdwy. Cont. Concrete Bridge	205.2	158	4.8	14	1	1523	158.7	37,615	191			23								
	TOTALS	410.4	295.2	9.6	48	2	4349	395.4	73,499	748			46	8							

STR. NO. 62-283-191

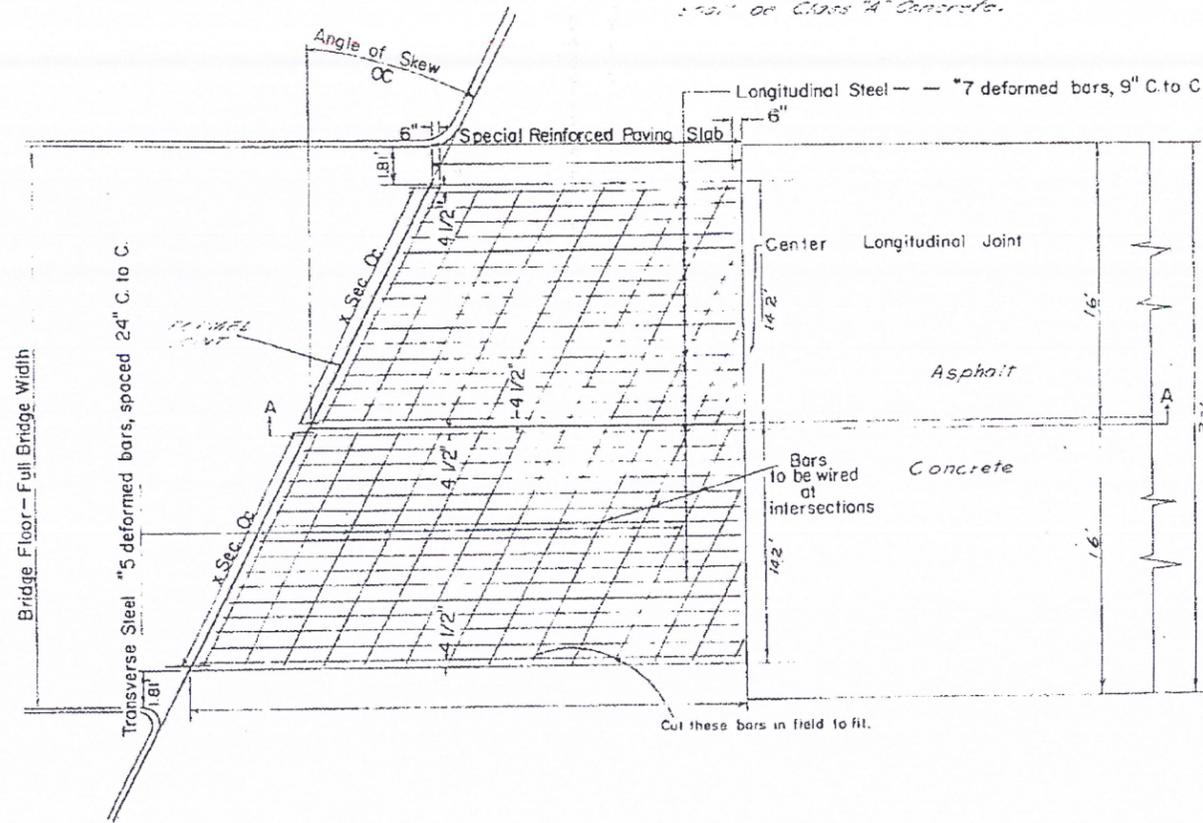
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	P 0049(05)27	119	164

Note: Special Reinforced Paving Slabs adjacent to bridges shall be measured and paid for as "Portland Cement Concrete Pavement," the additional cost of furnishing and placing steel reinforcement and other incidentals being absorbed in the unit price bid per square yard for Portland Cement Concrete Pavement."

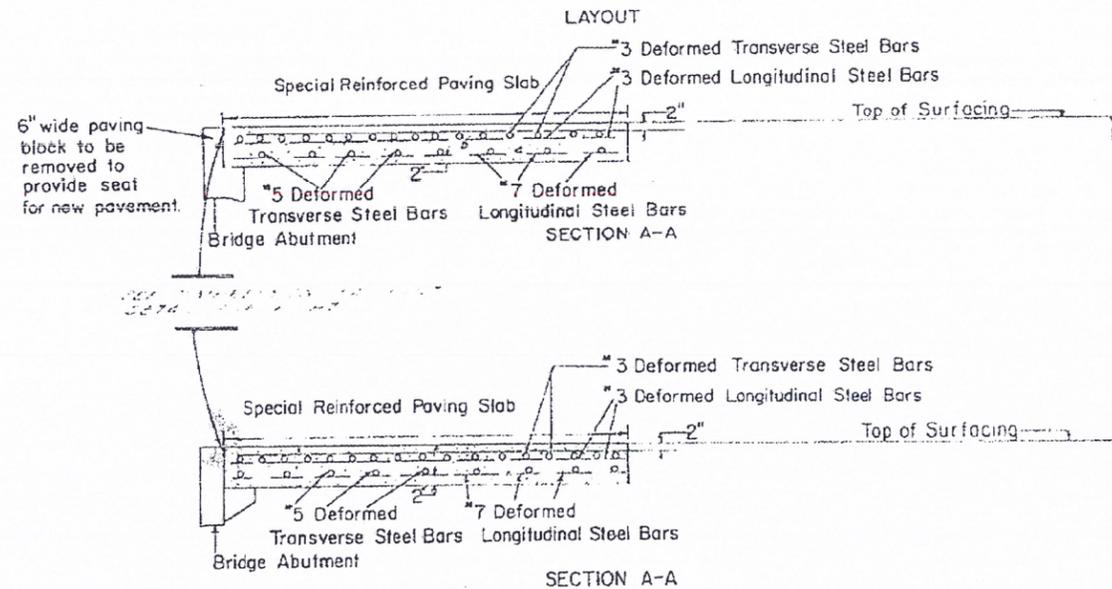
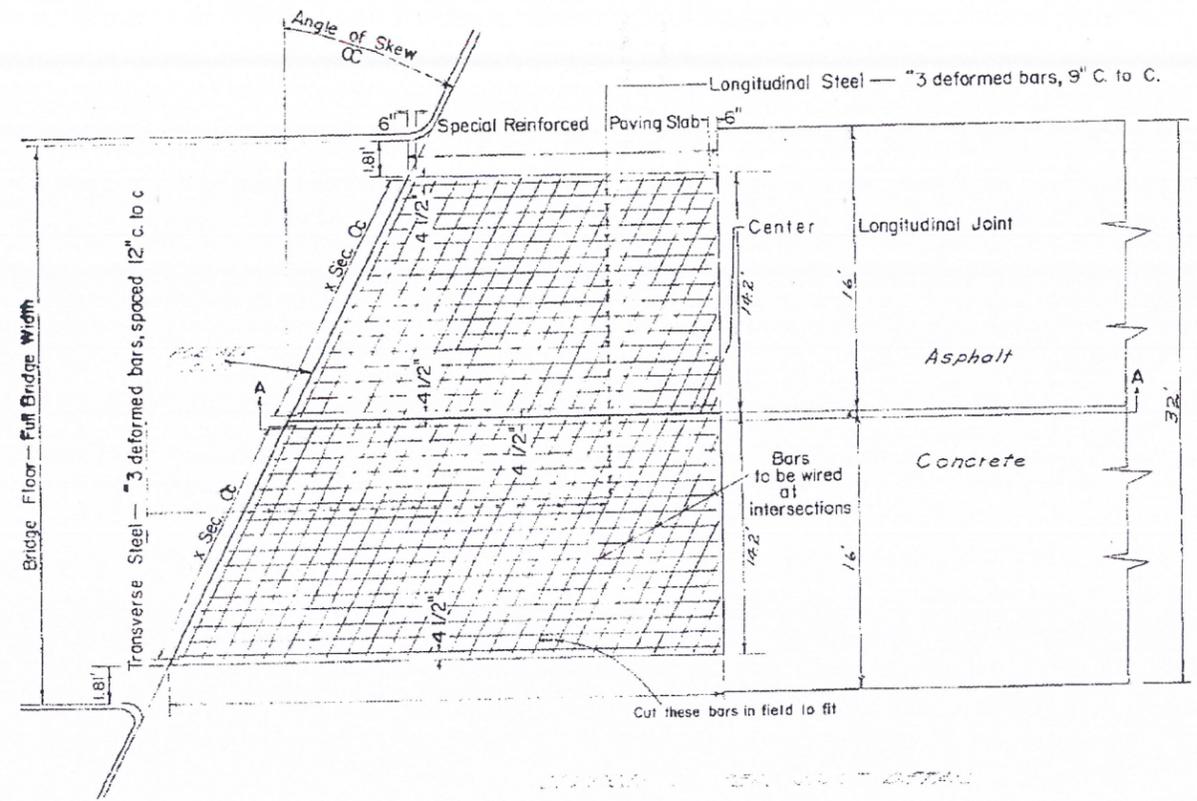
The concrete used for the approach shall be of Class "A" Concrete.

All construction to be done to a minimum of 1/2" tolerance. All work to be done in accordance with the specifications for the project.

BOTTOM REINFORCING



TOP REINFORCING



CENTER LONGITUDINAL JOINT



The center longitudinal joint shall be sawed 1/8 inch and filled with hot formed plastic joint water. The joint shall be 10 inches wide and 10 inches deep. The center longitudinal joint shall be cut and sawed without the use of the bars.

CONCRETE SHALL BE PLACED

CONCRETE SHALL BE PLACED

1-50'	20
1-100'	200
1-150'	250
1-200'	300
1-250'	350

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND STRUCTURES UNDER THE BRIDGE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE PROTECTION OF ALL UTILITIES AND STRUCTURES UNDER THE BRIDGE.

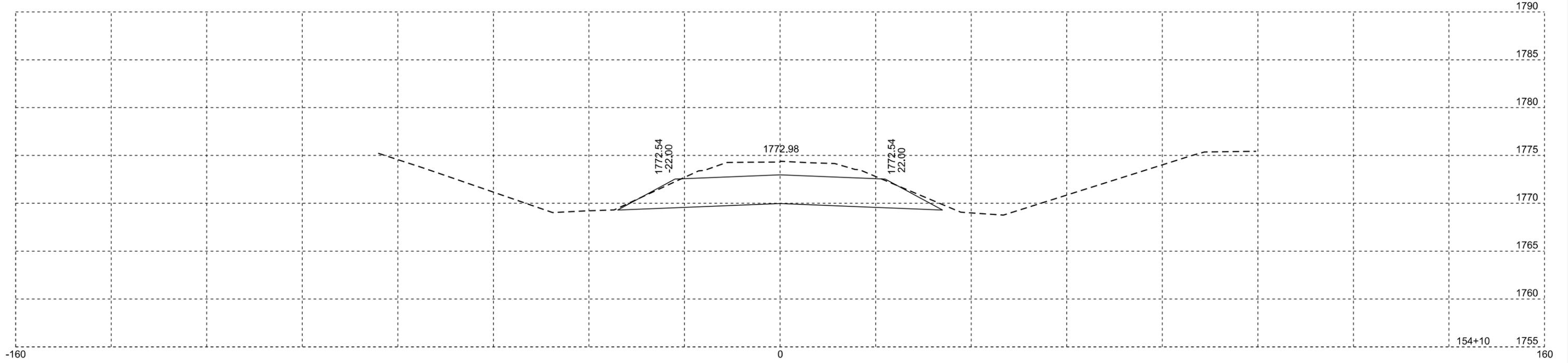
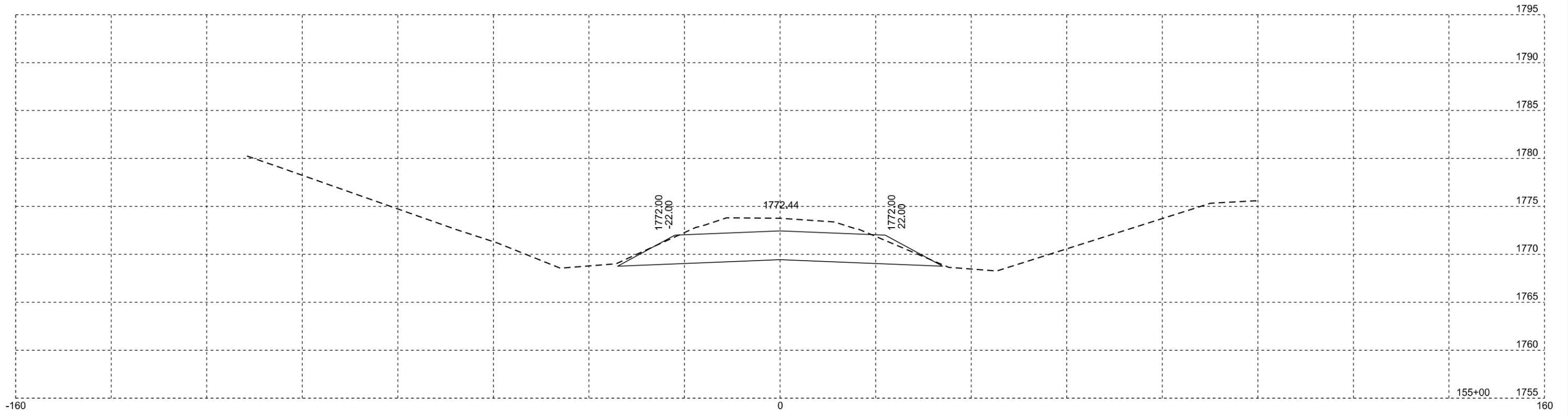
ORIGINAL CONSTRUCTION PLANS

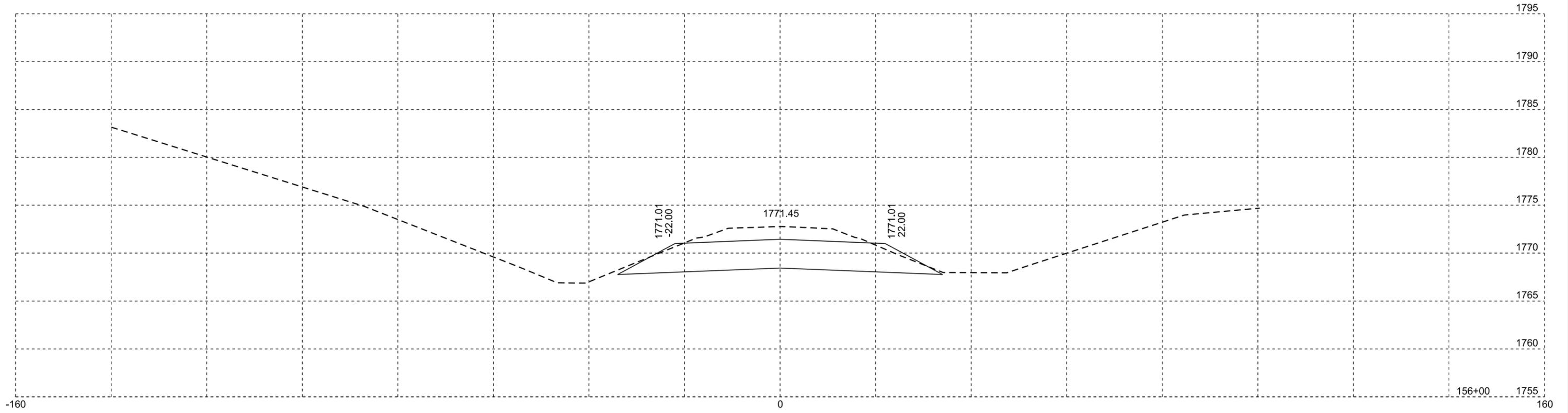
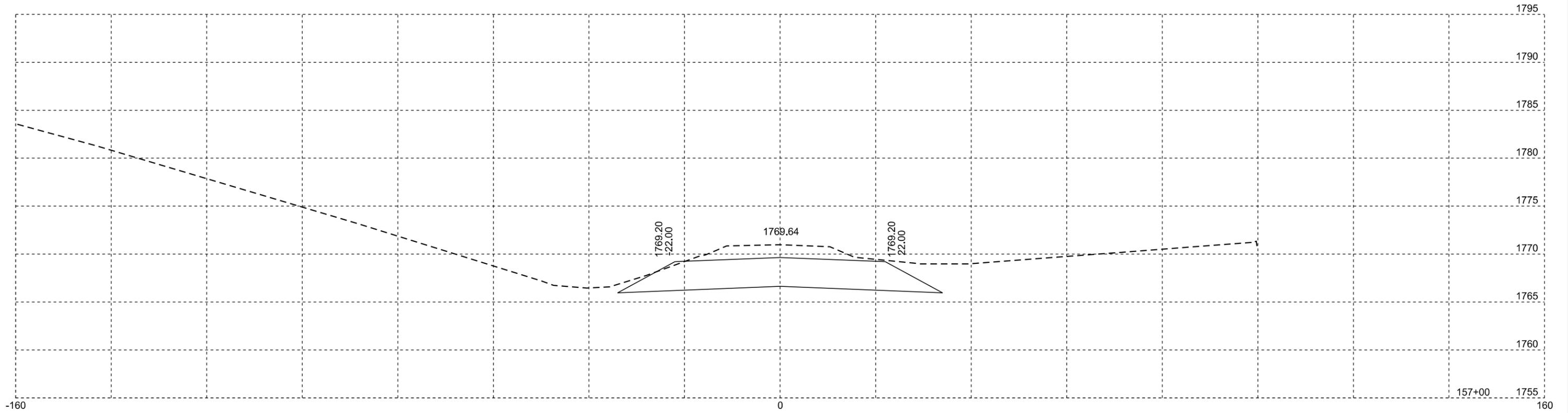
Revised Aug. 2, 1971 L.C. Peto

DETAILS FOR SPECIAL REINFORCED PAVING SLAB ADJACENT TO BRIDGES PREPARED IN PLANS SECTION SOUTH DAKOTA DEPARTMENT OF HIGHWAYS AUGUST 1969

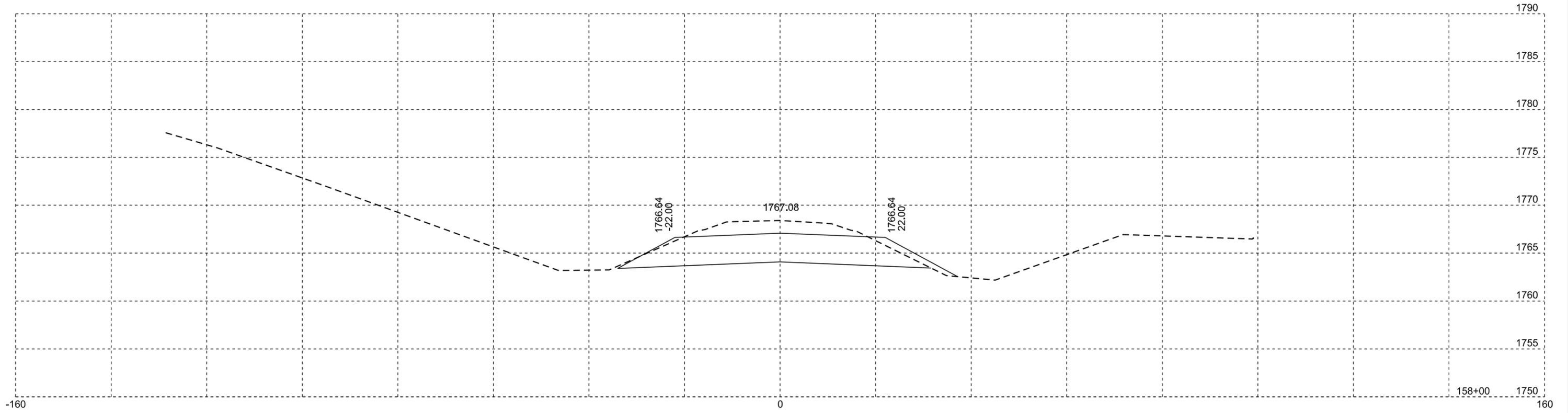
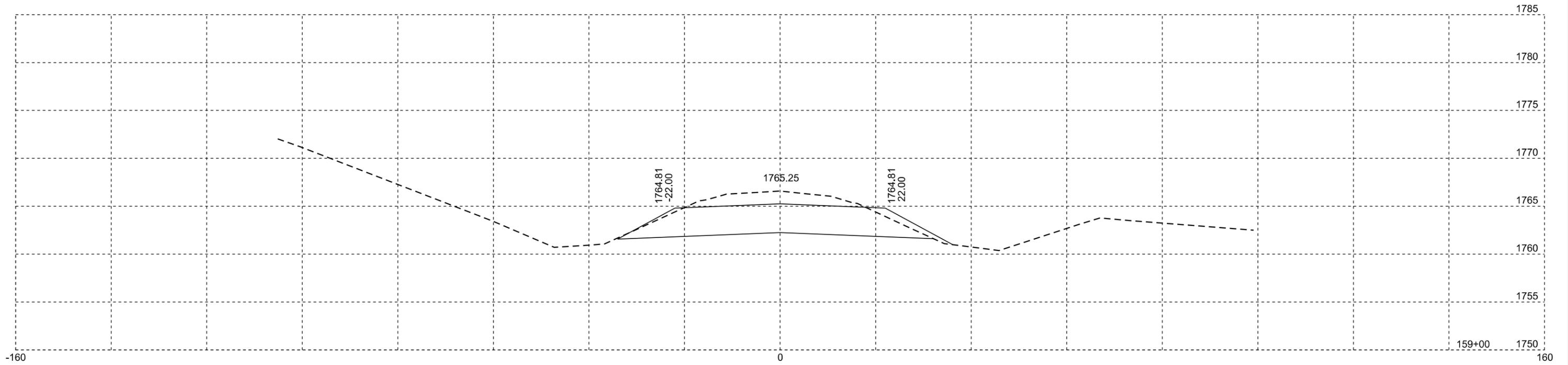
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STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	120	164

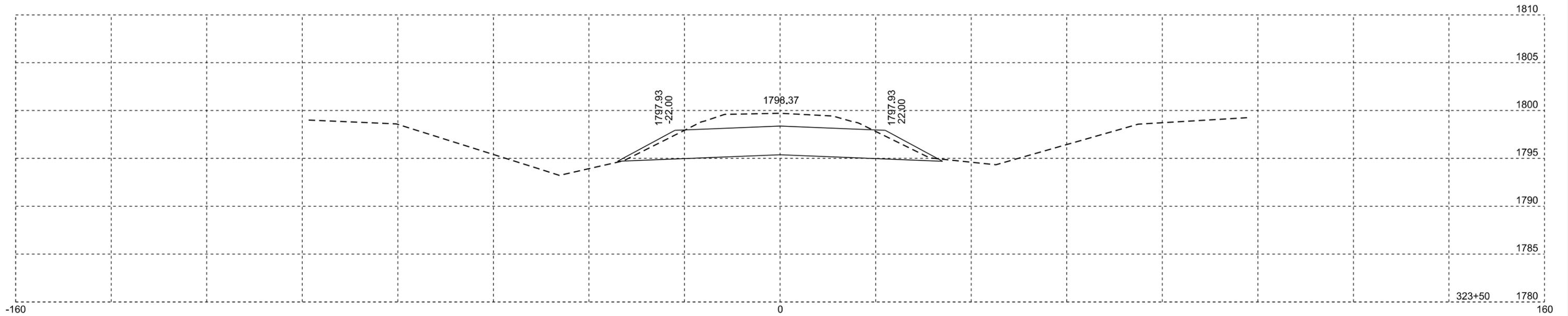
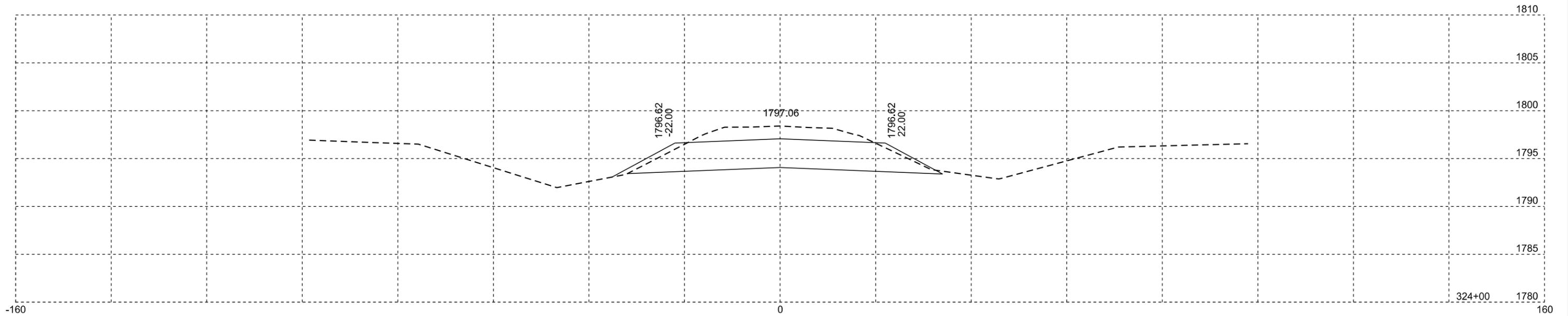




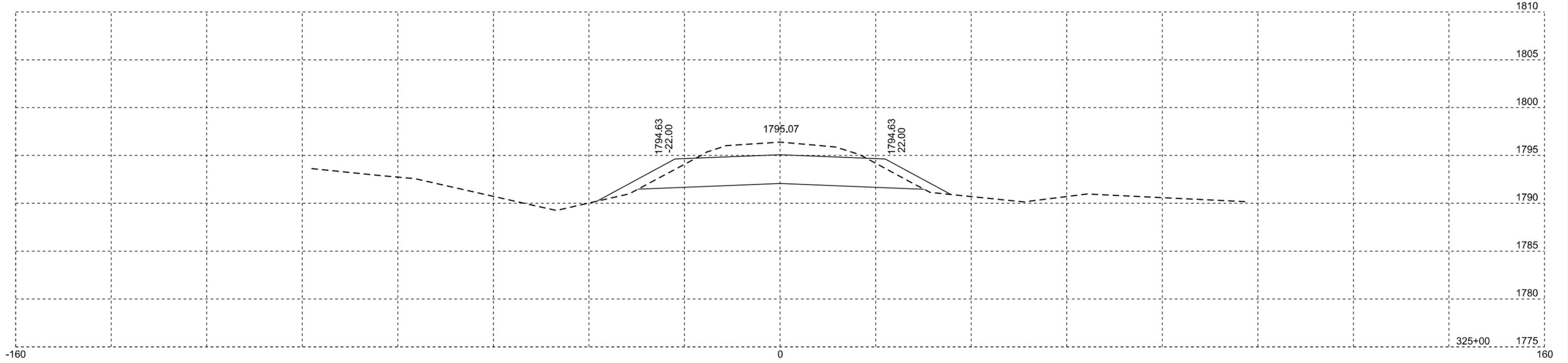
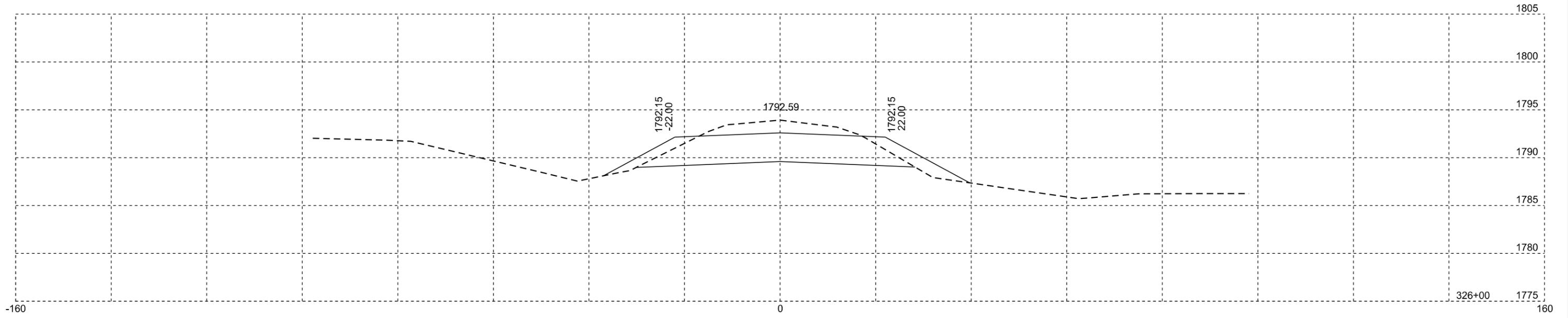
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	122	164



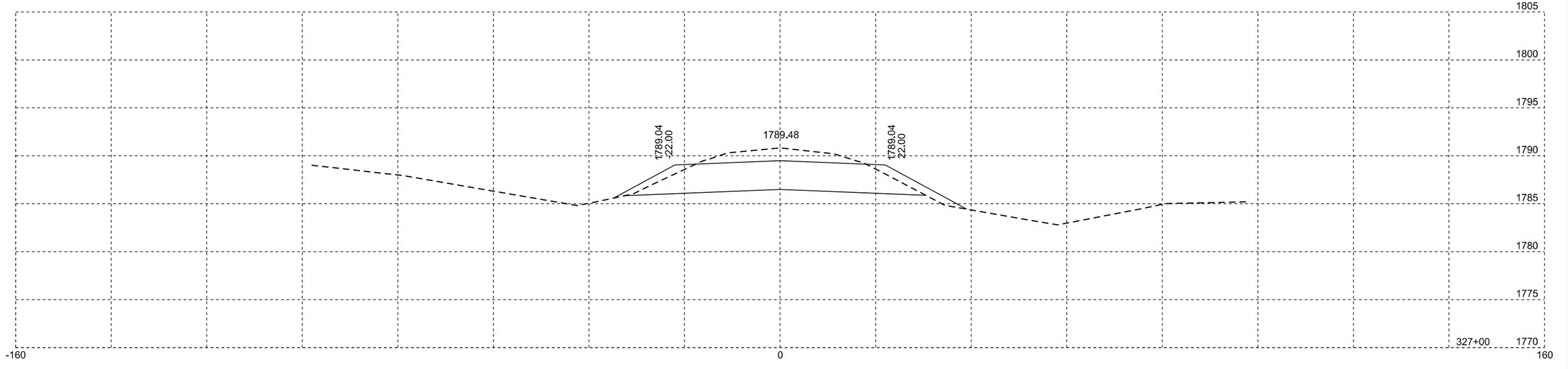
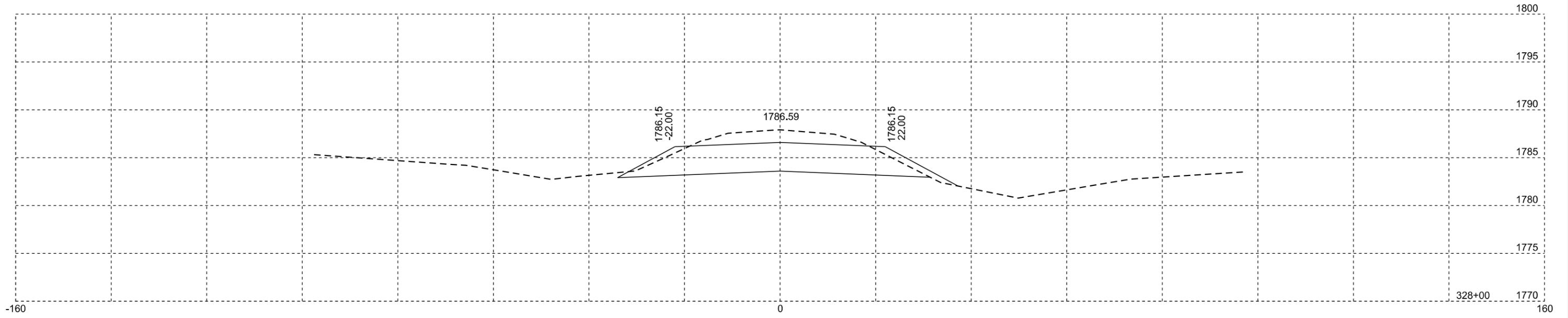
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	P 0049(5)27	123	164



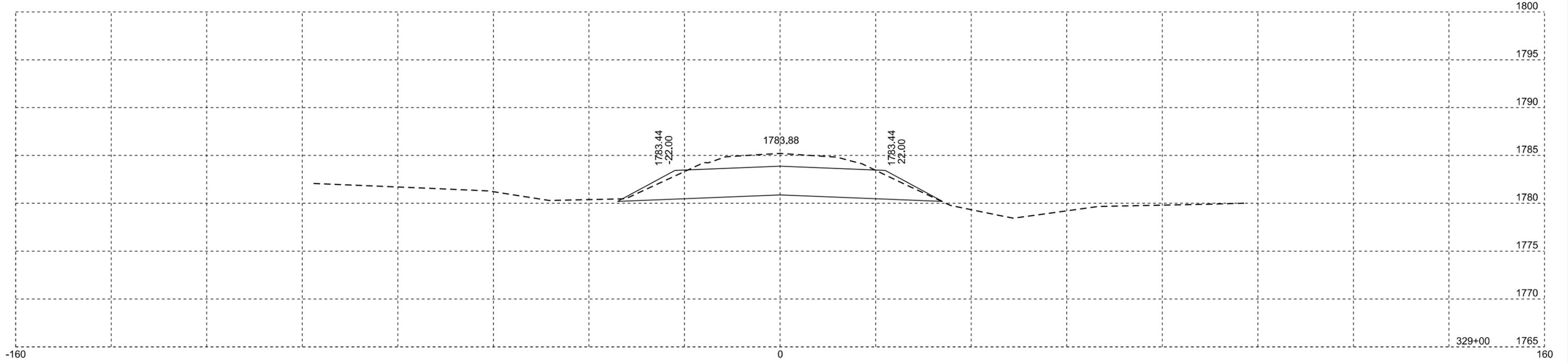
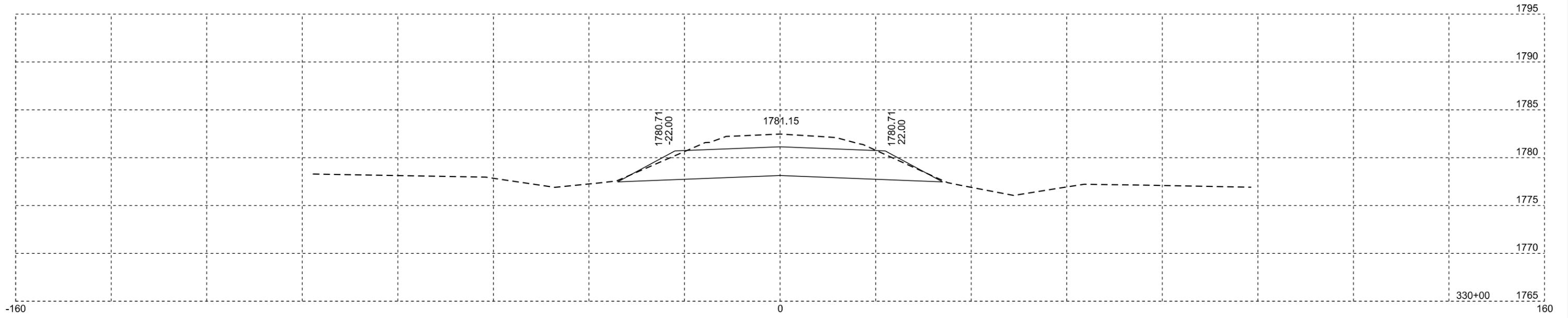
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	P 0049(5)27	124	164

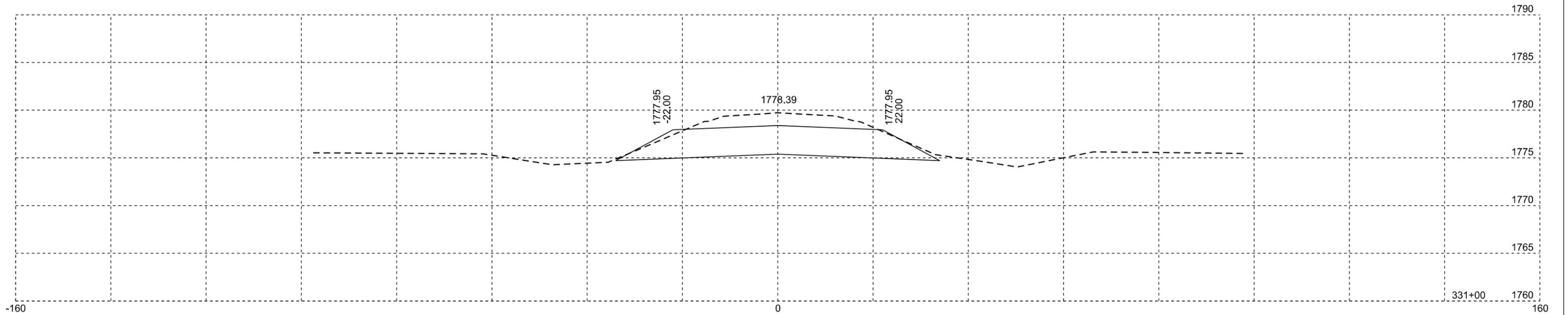
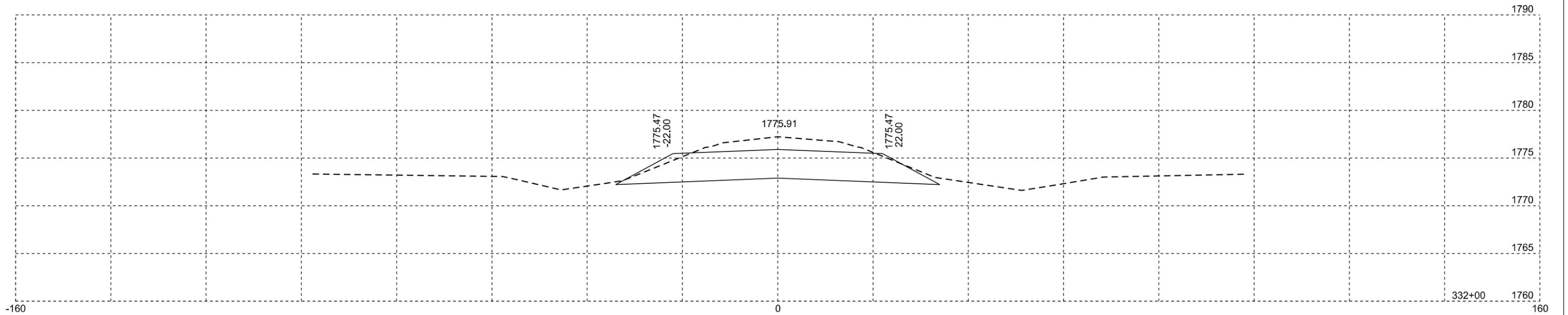
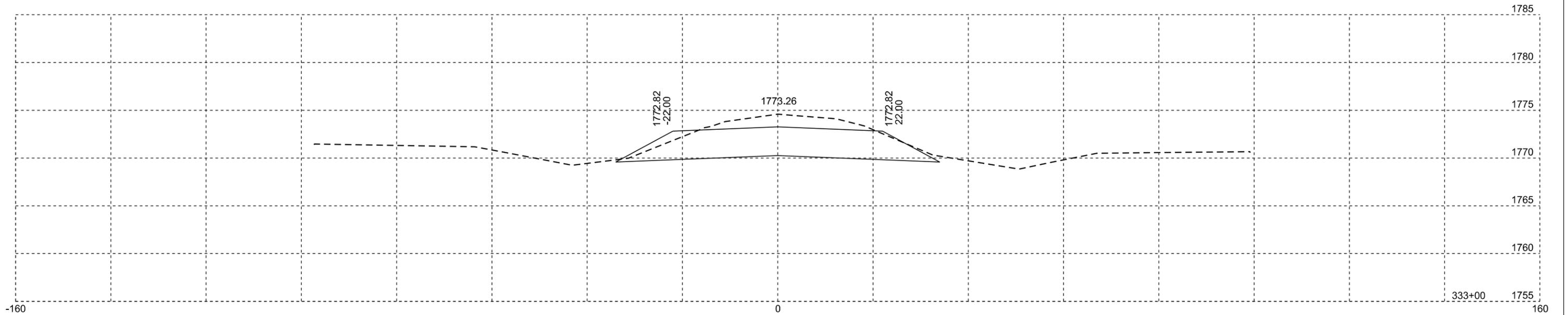


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	P 0049(5)27	125	164

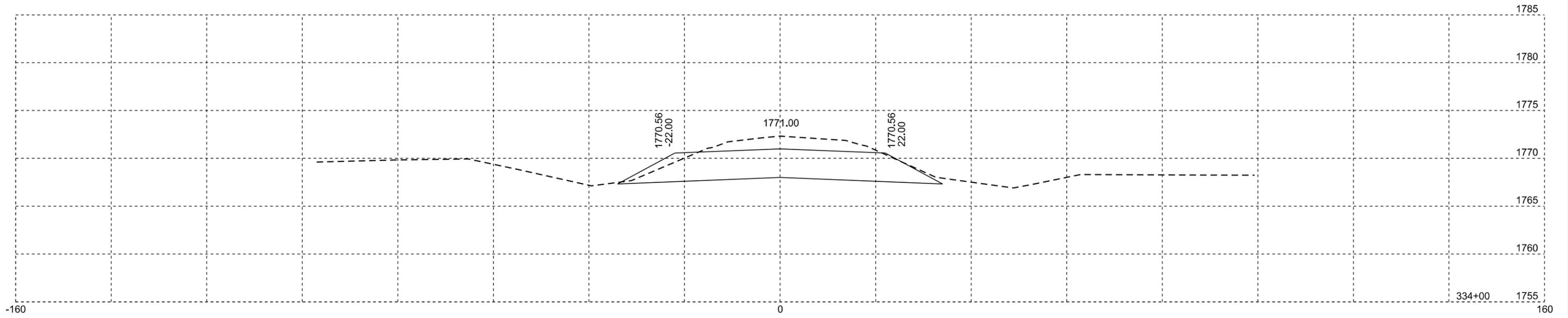
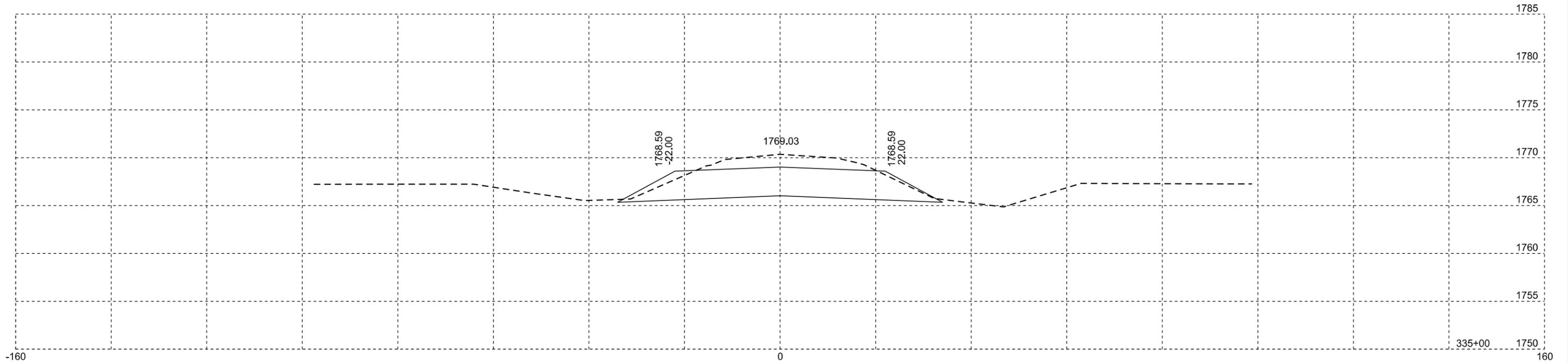


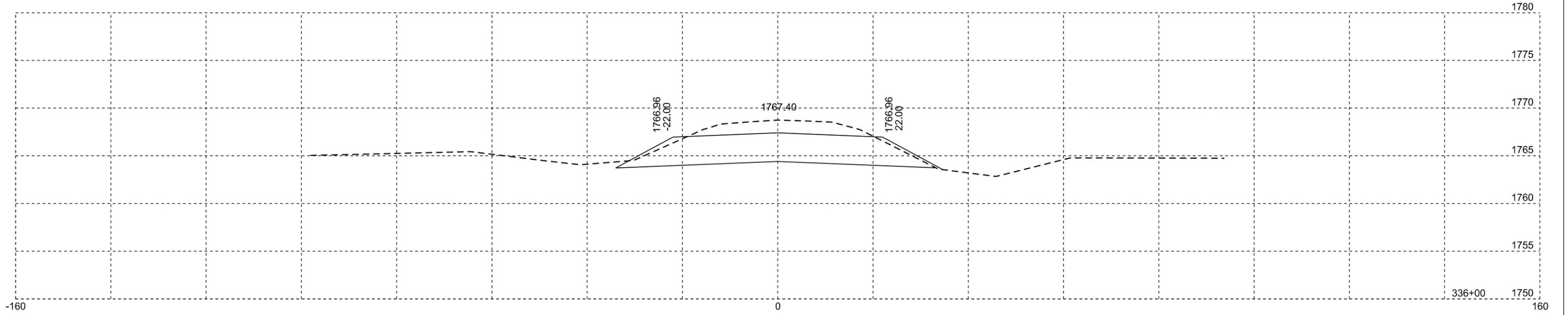
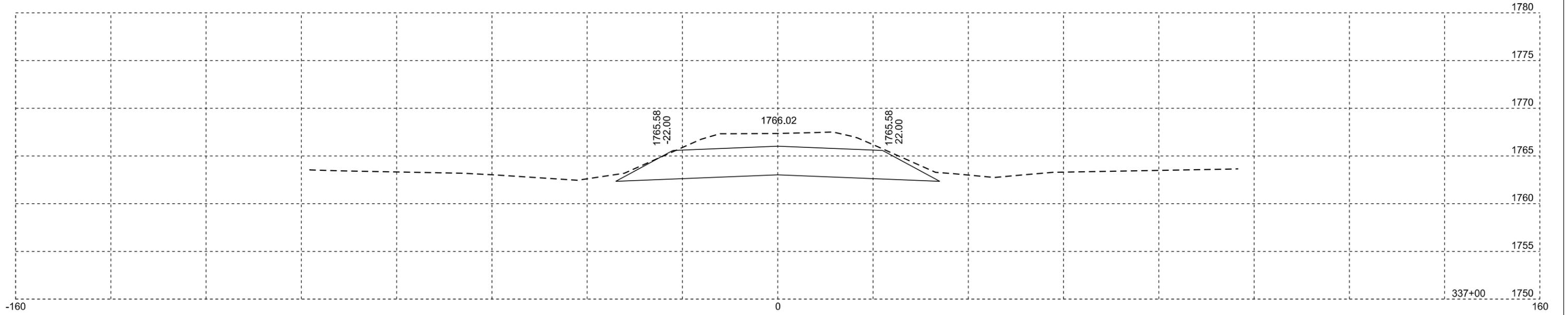
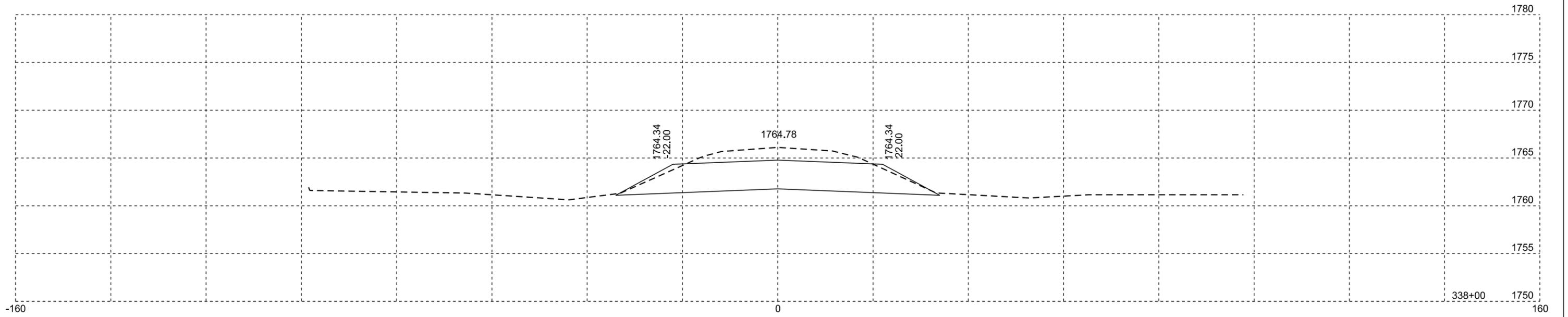
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	126	164

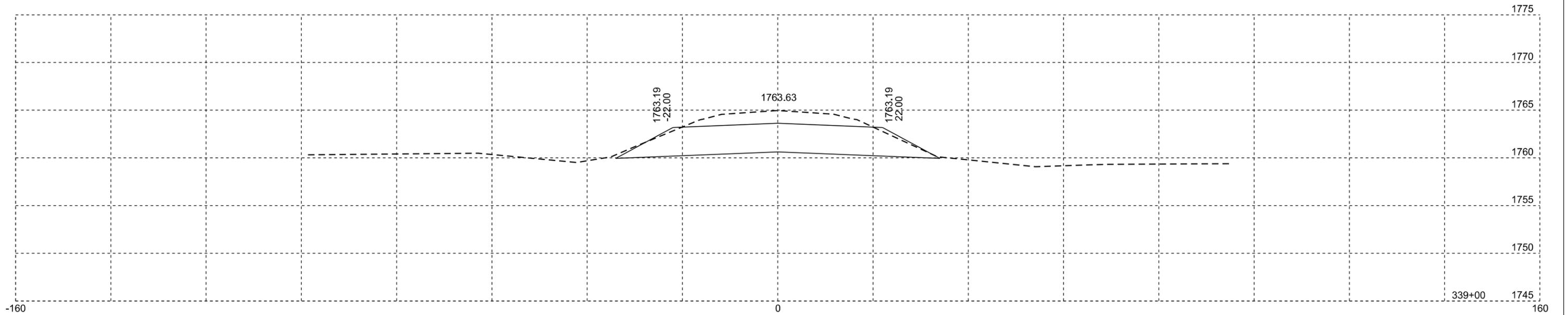
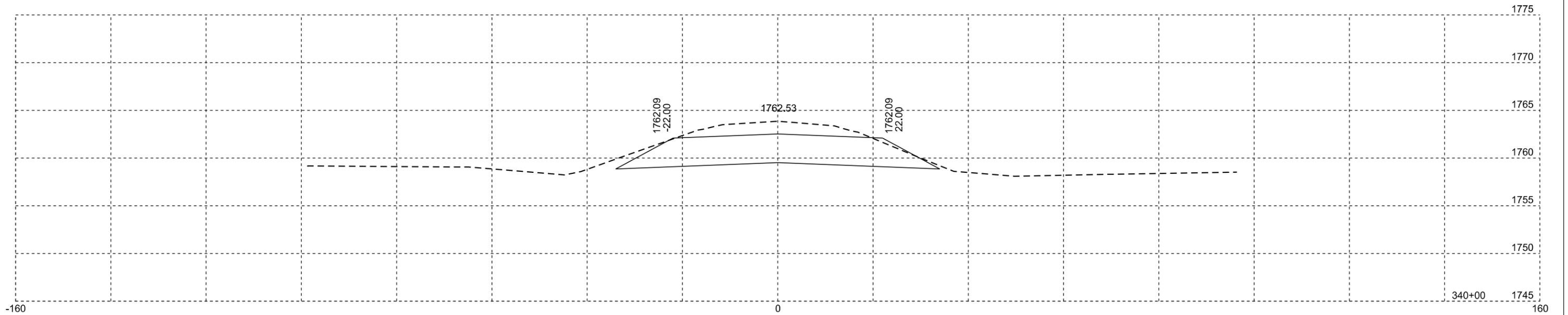
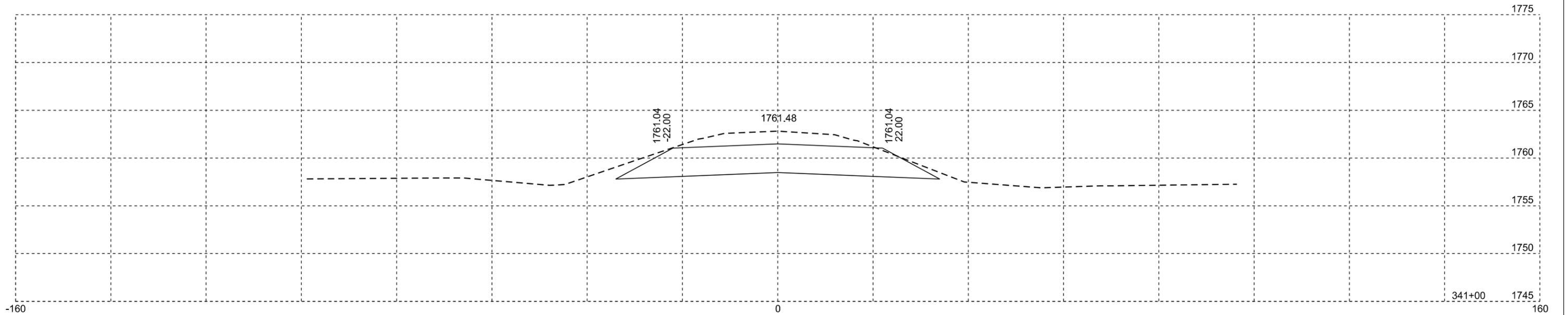




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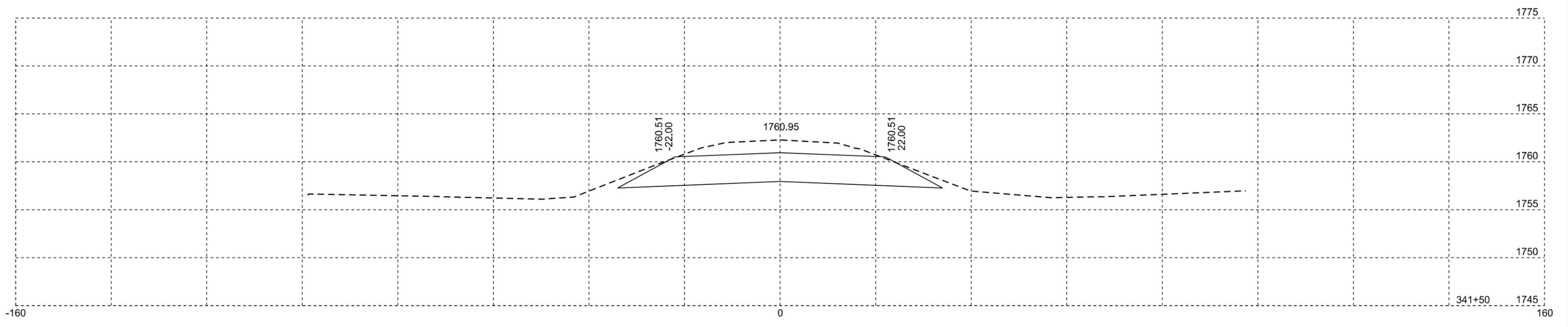


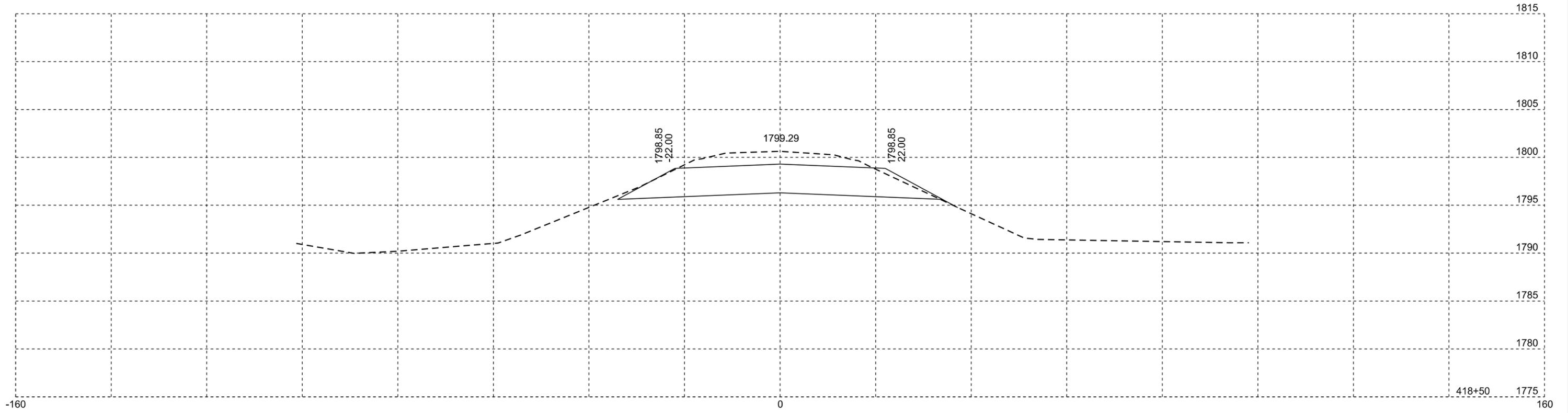
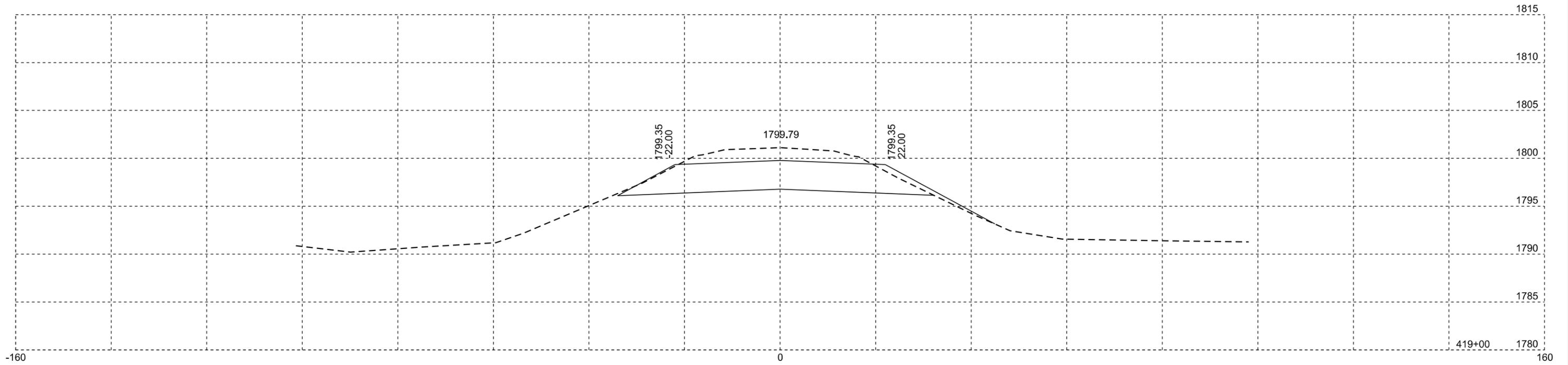


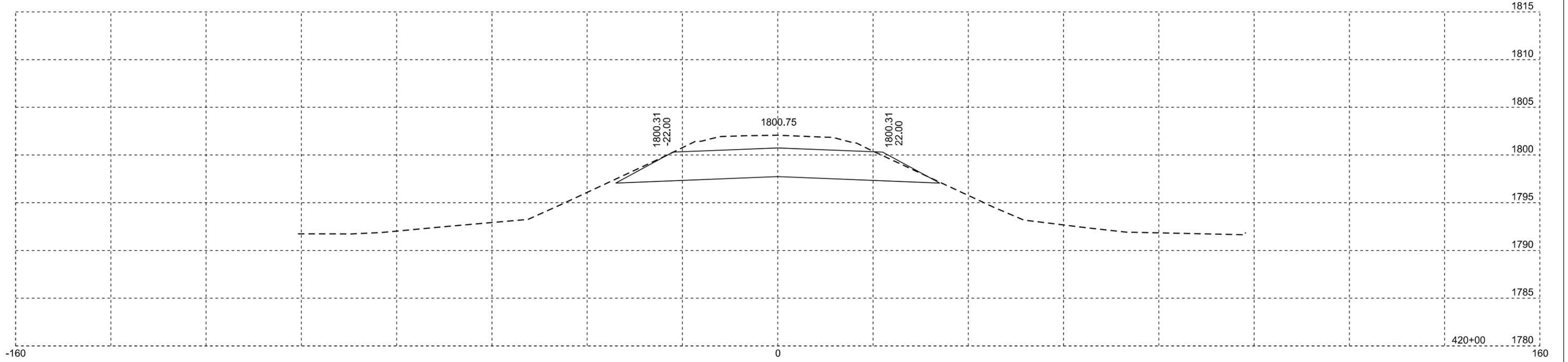
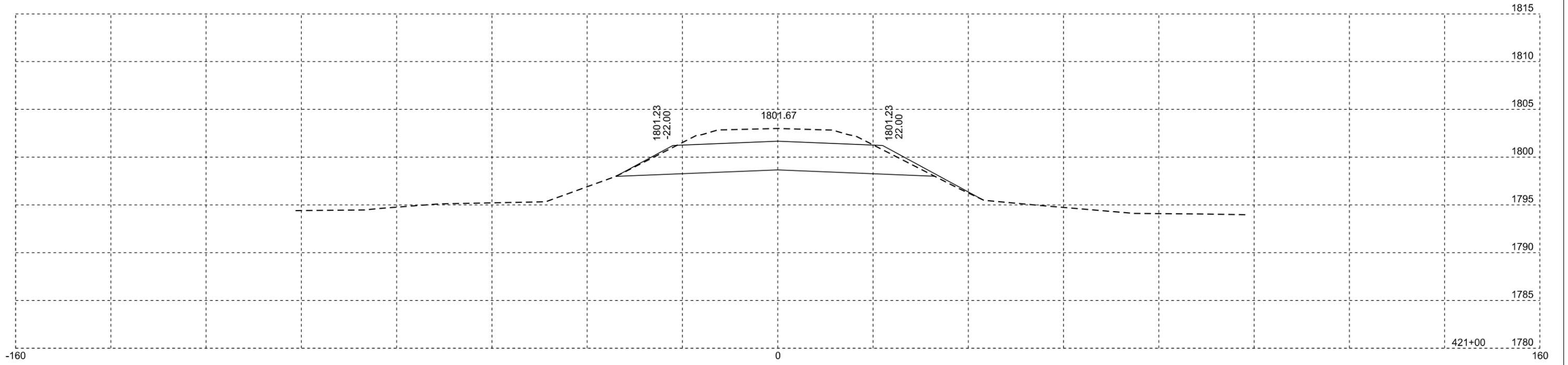


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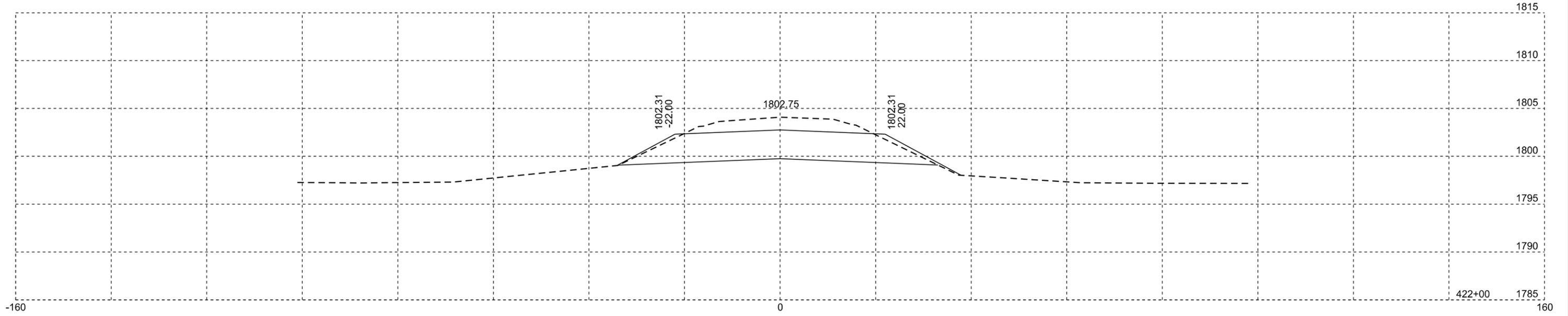
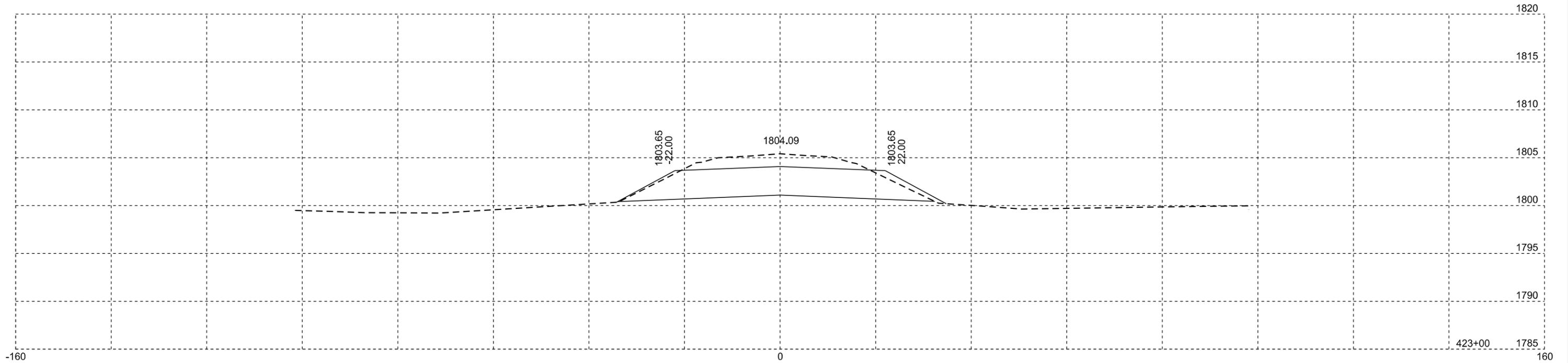
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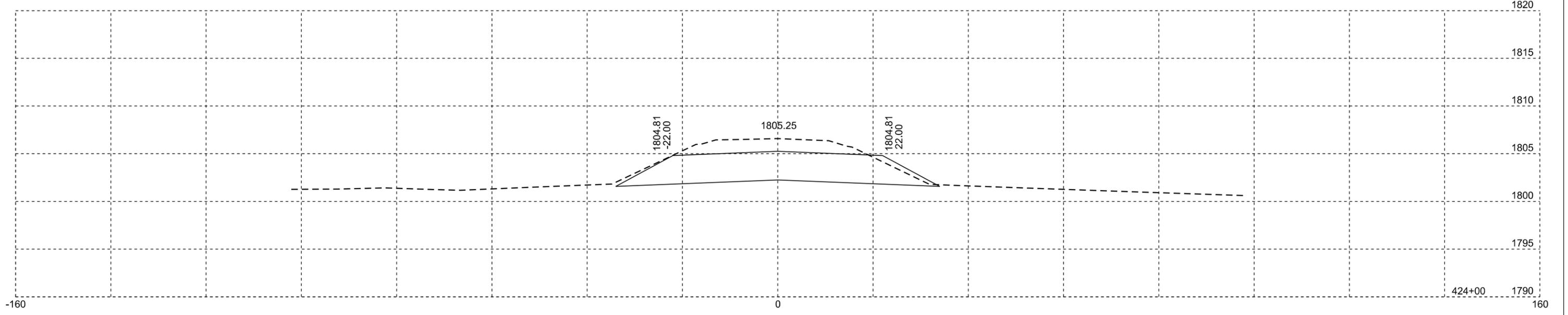
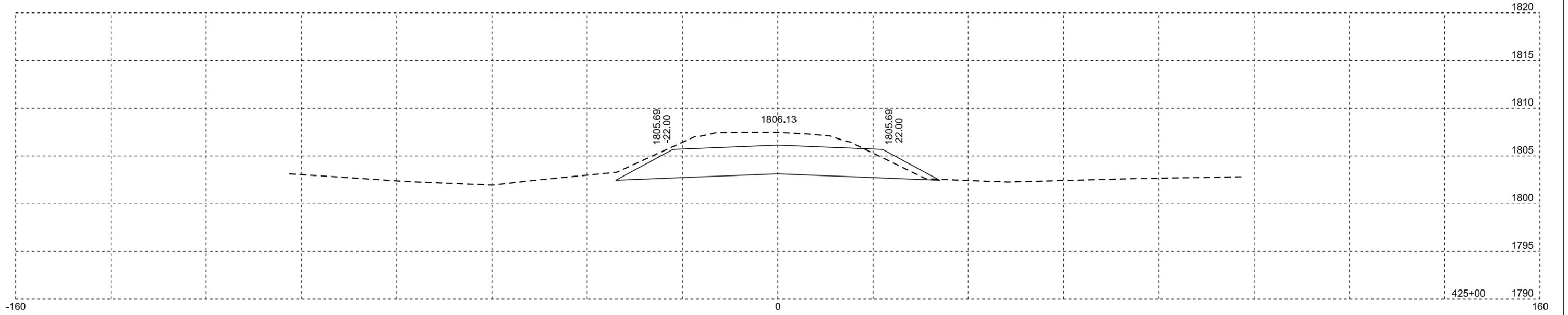
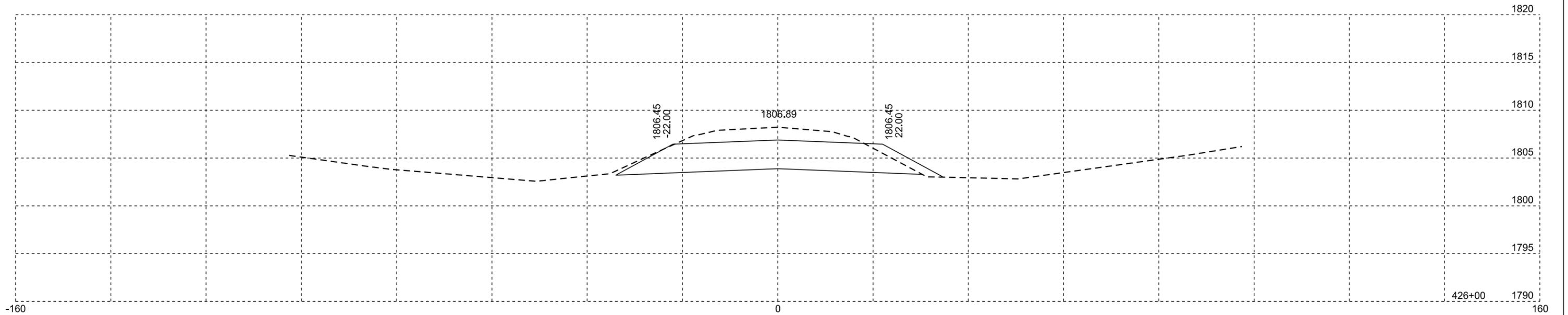




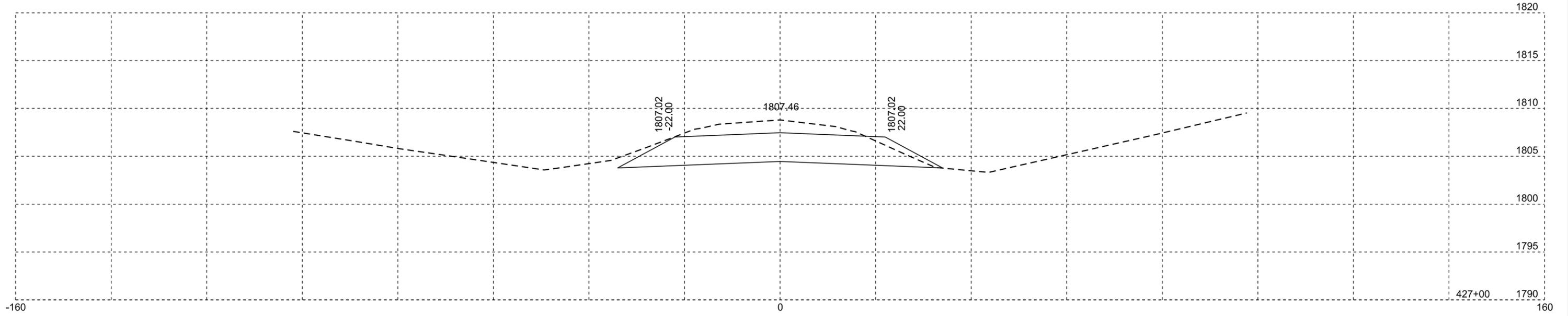
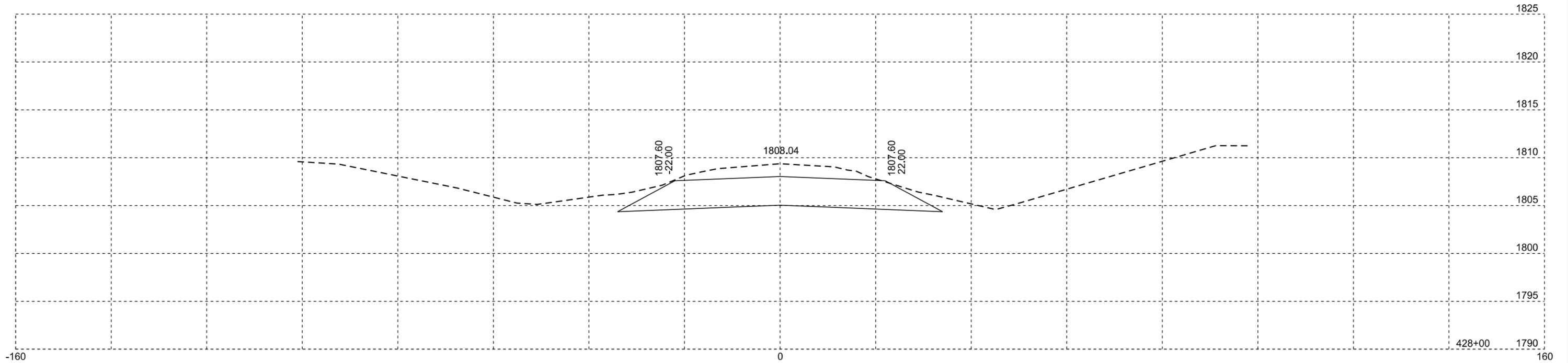


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	P 0049(5)27	134	164



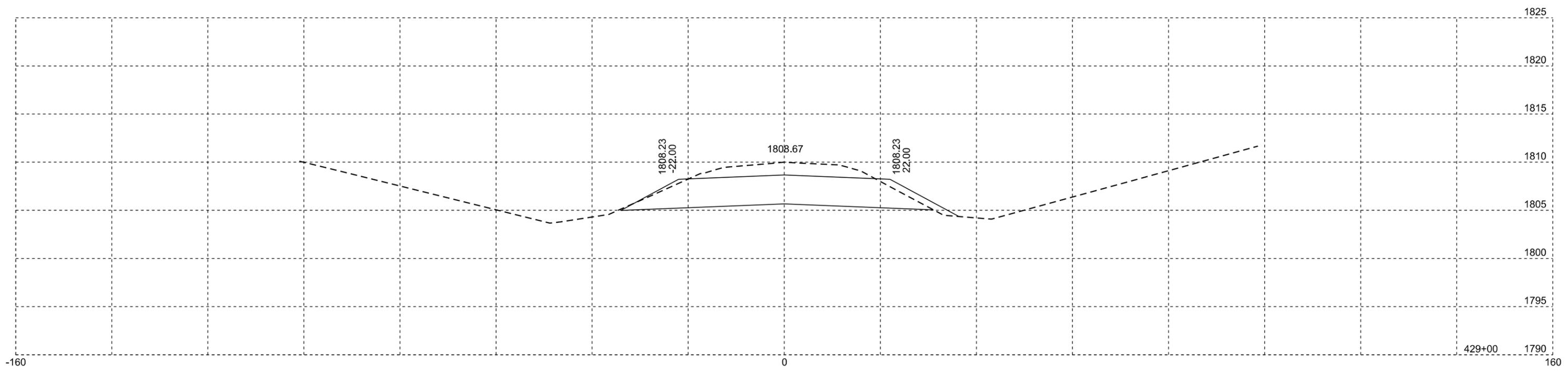


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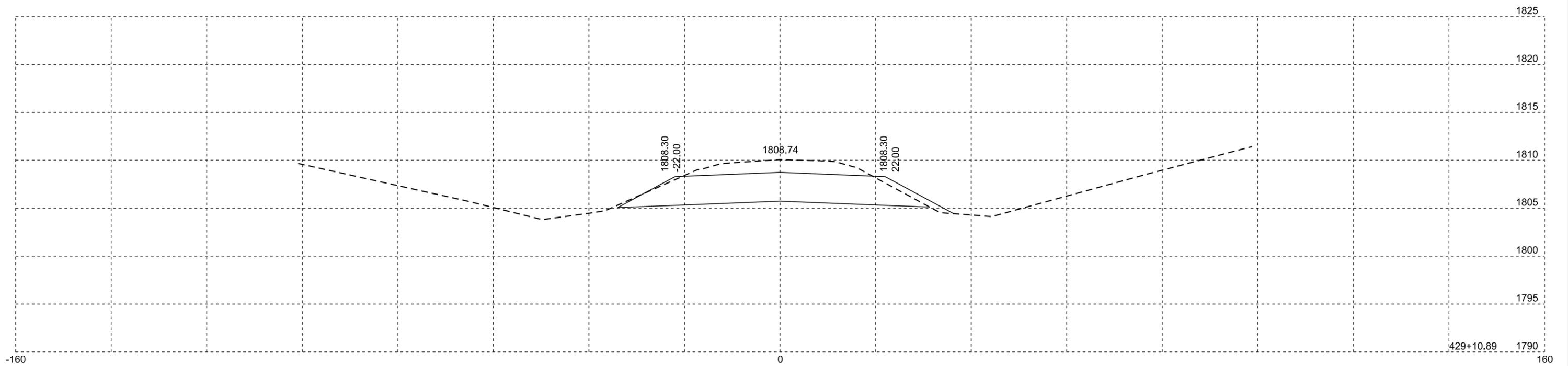
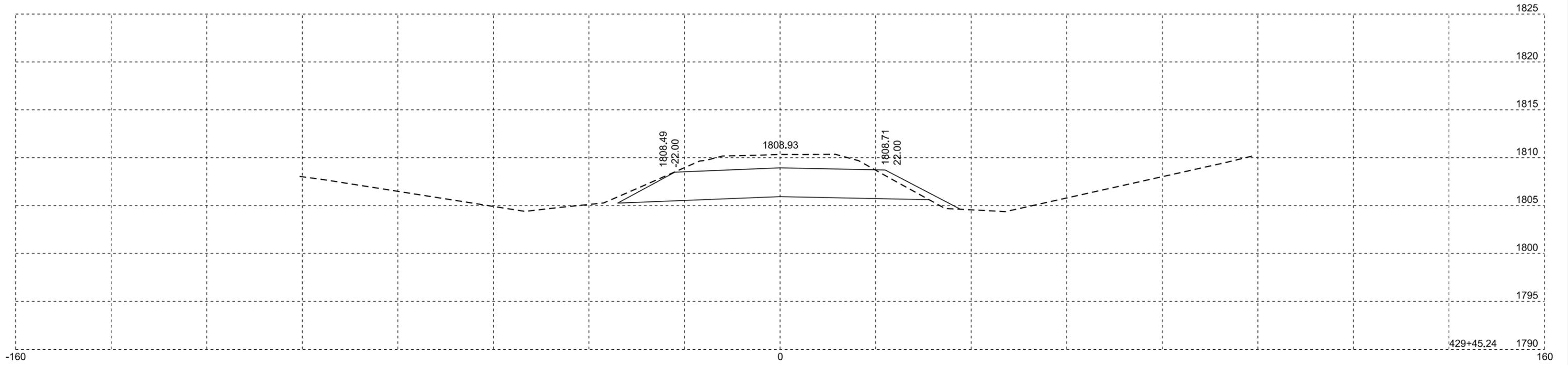


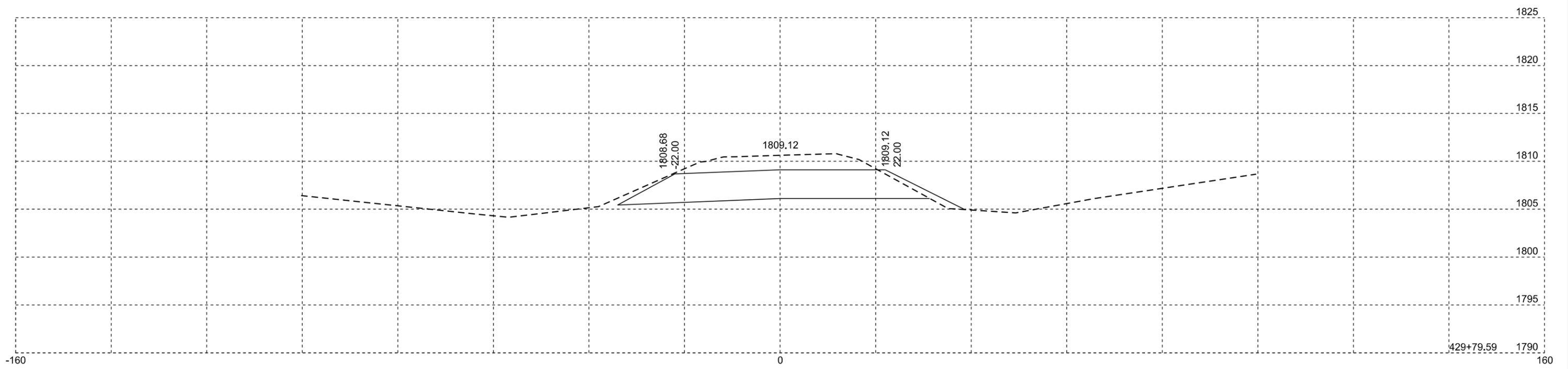
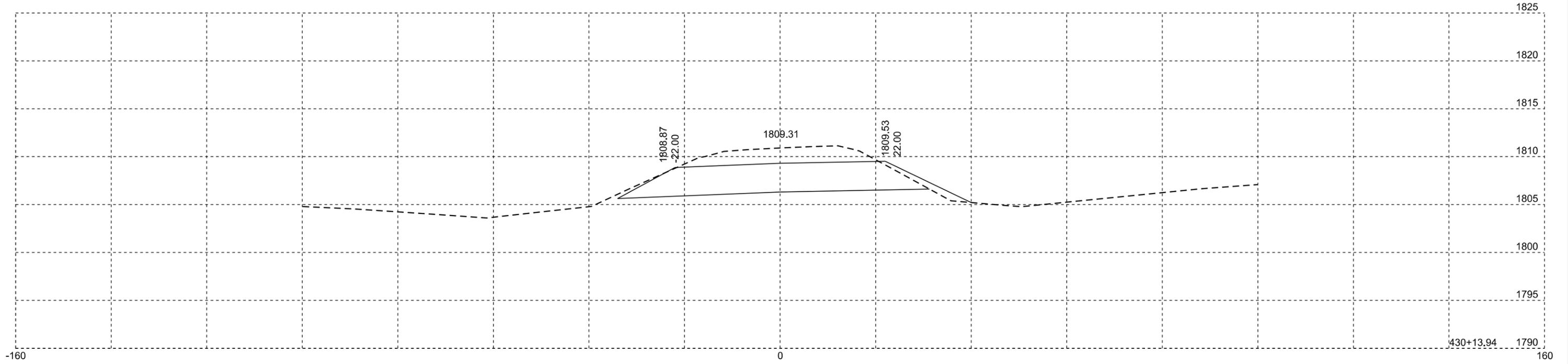
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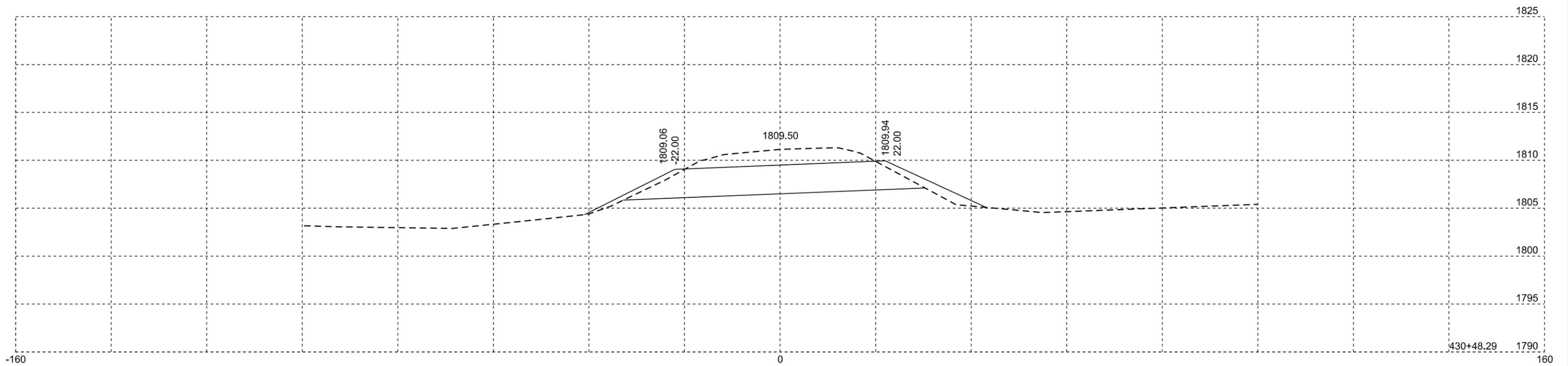
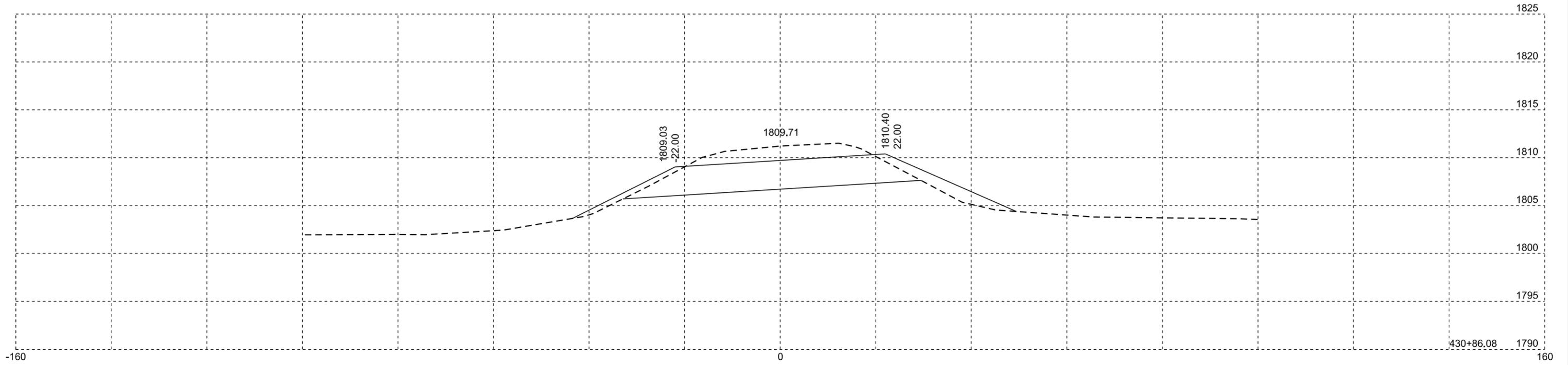


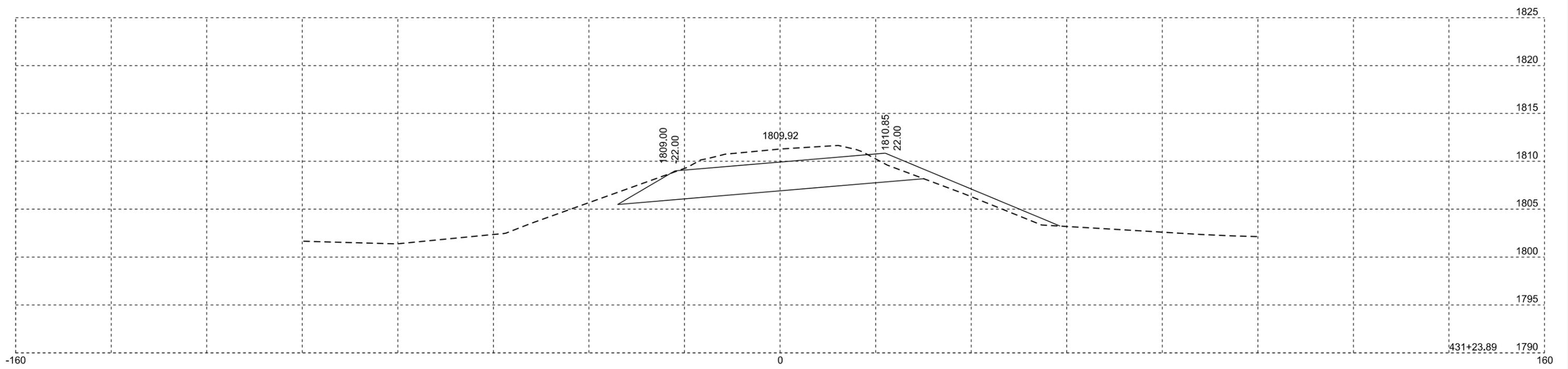
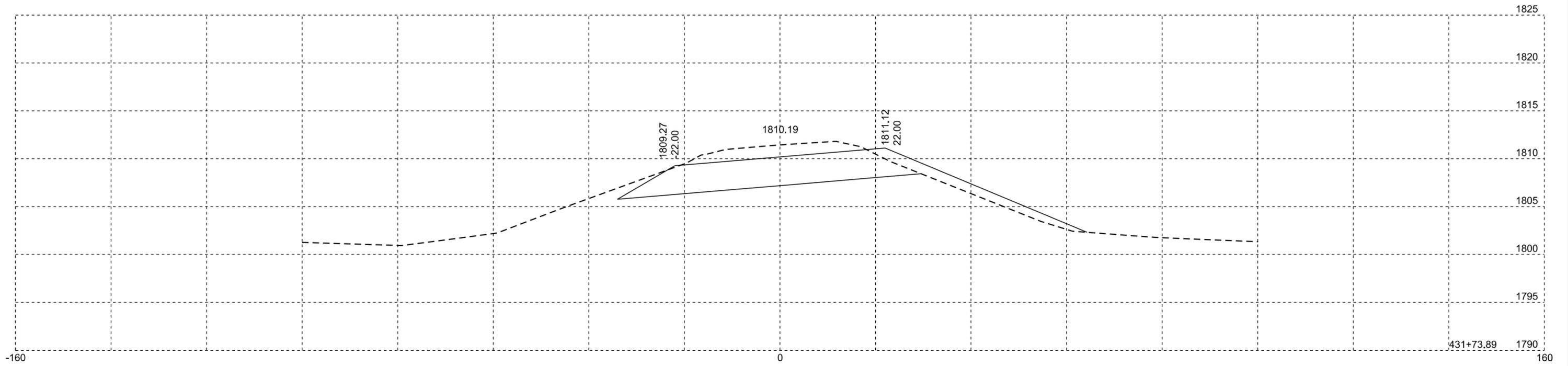
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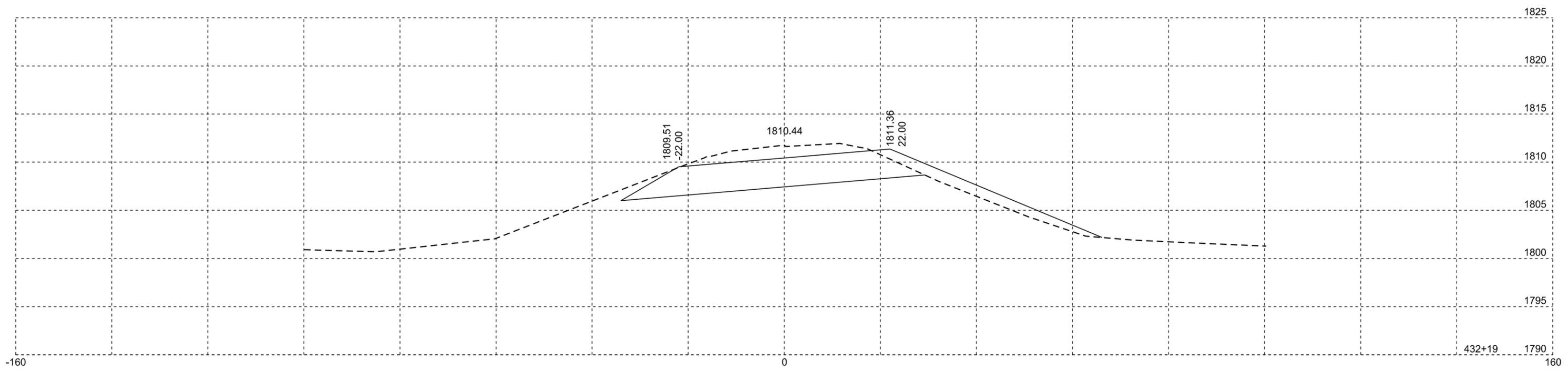


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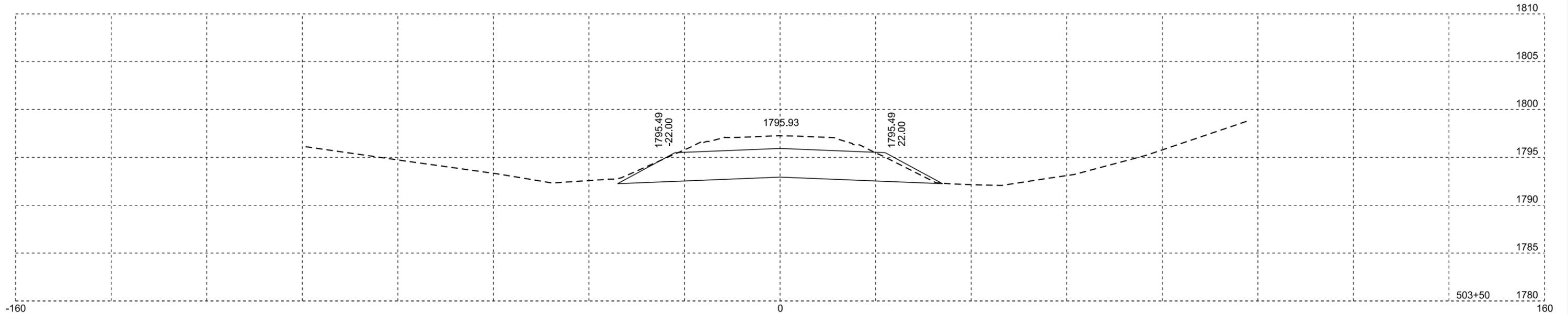
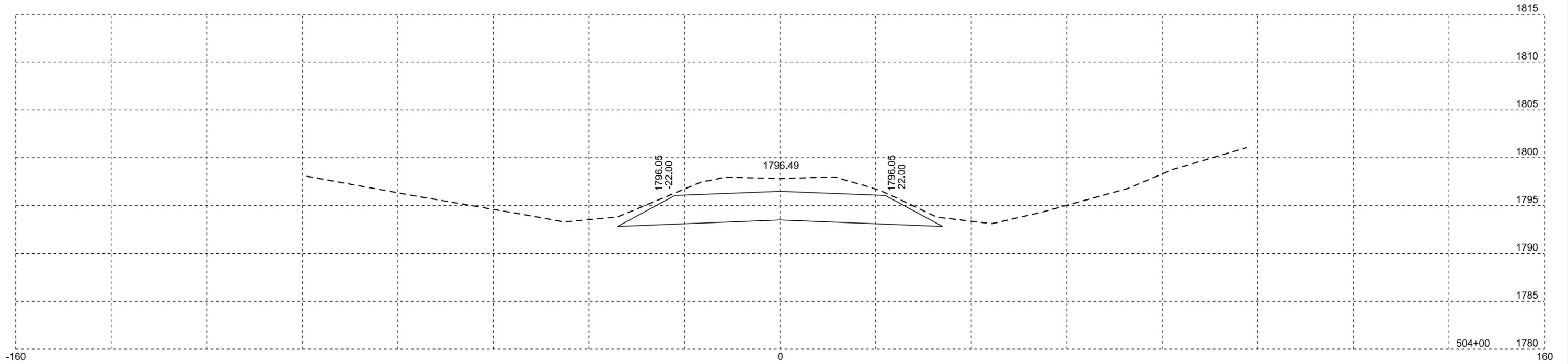


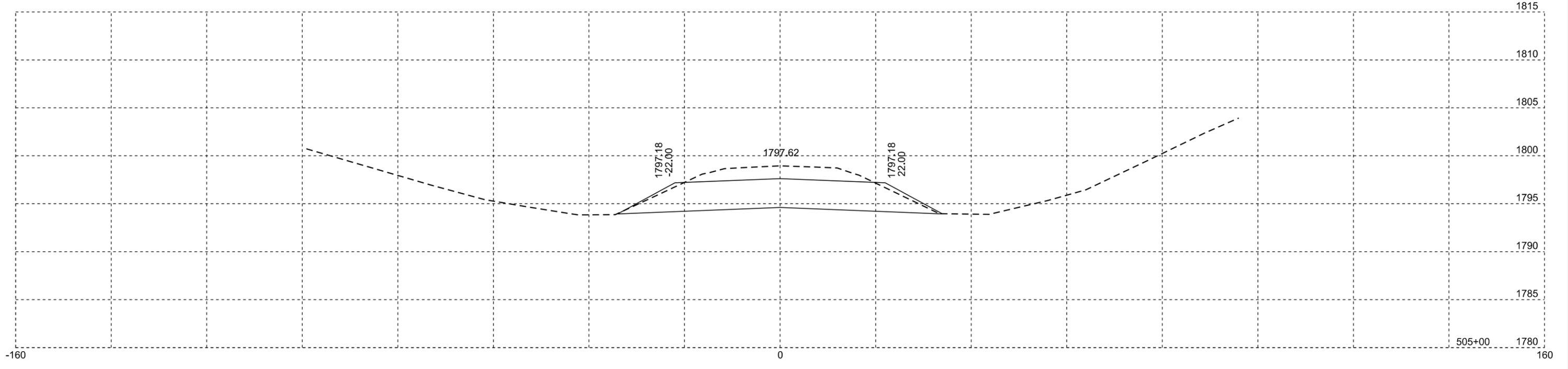
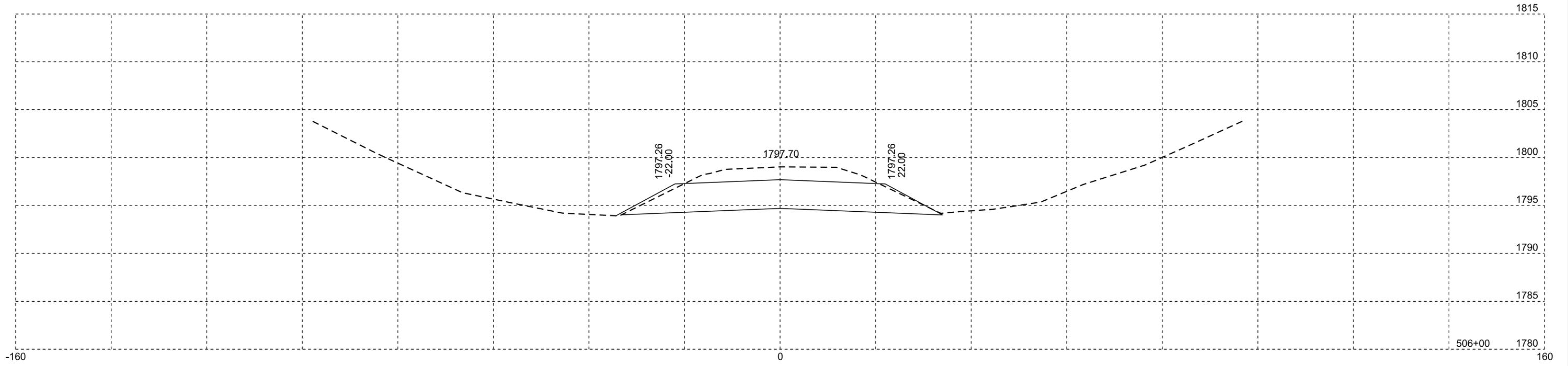


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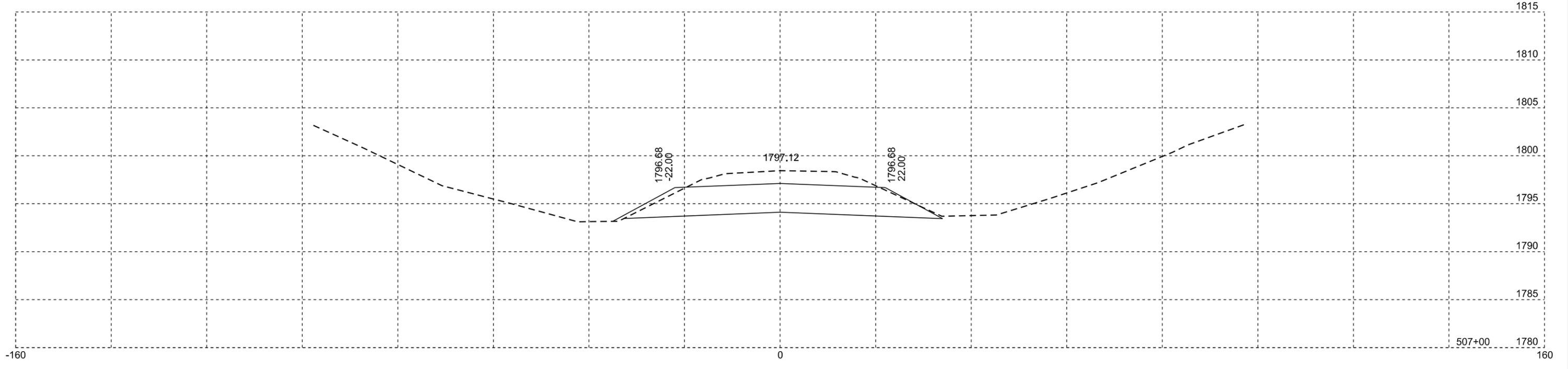
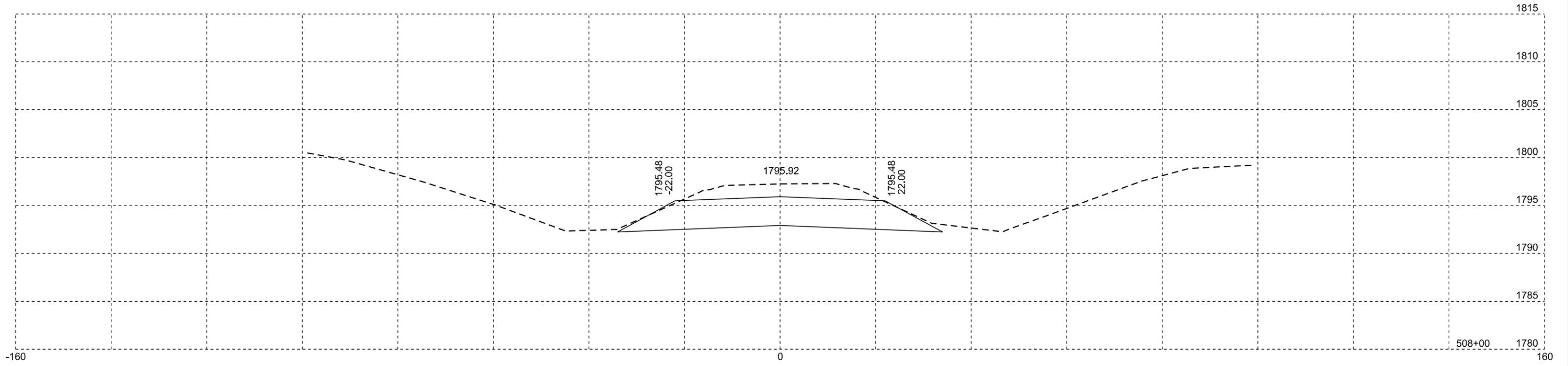


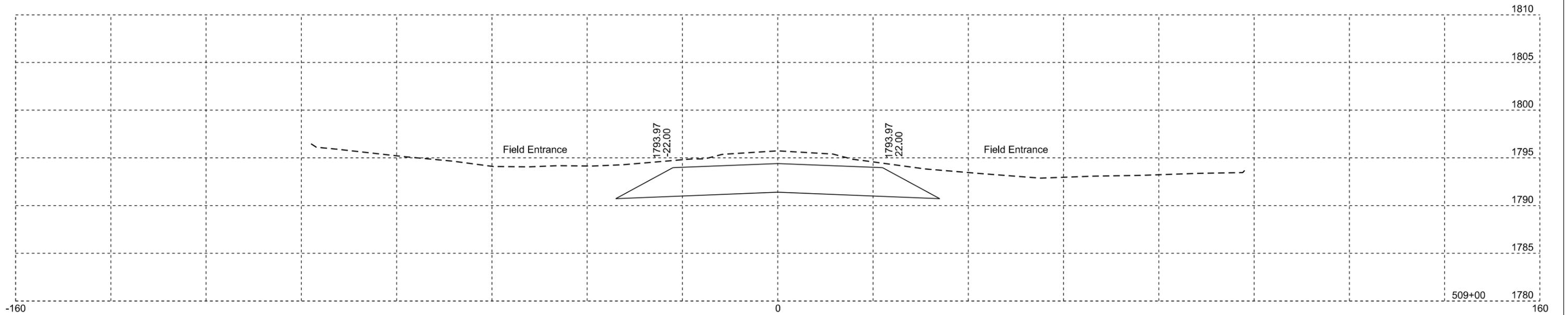
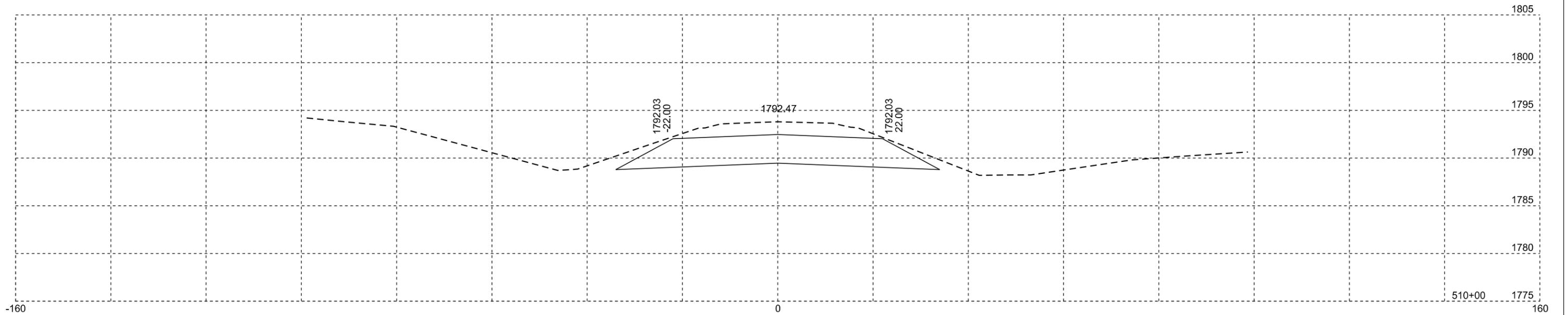
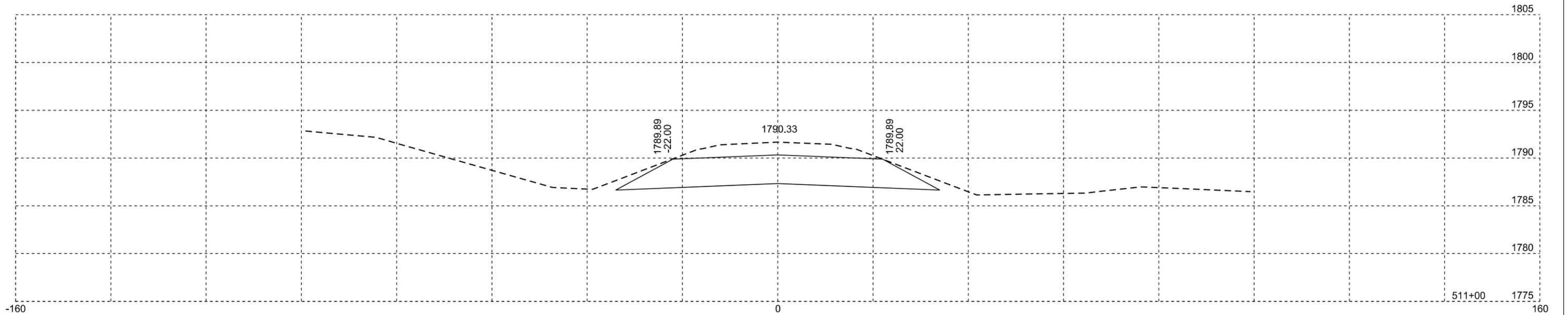
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	143	164



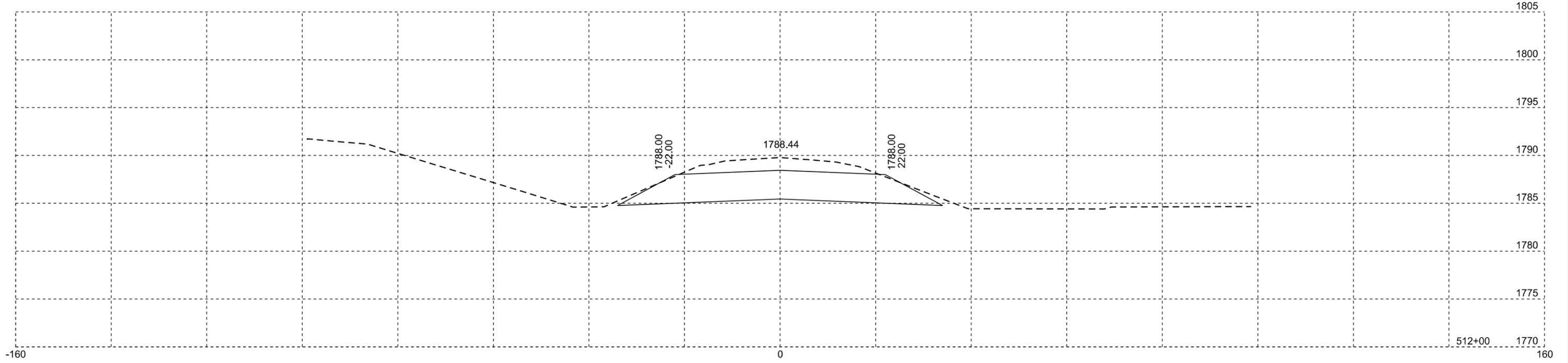
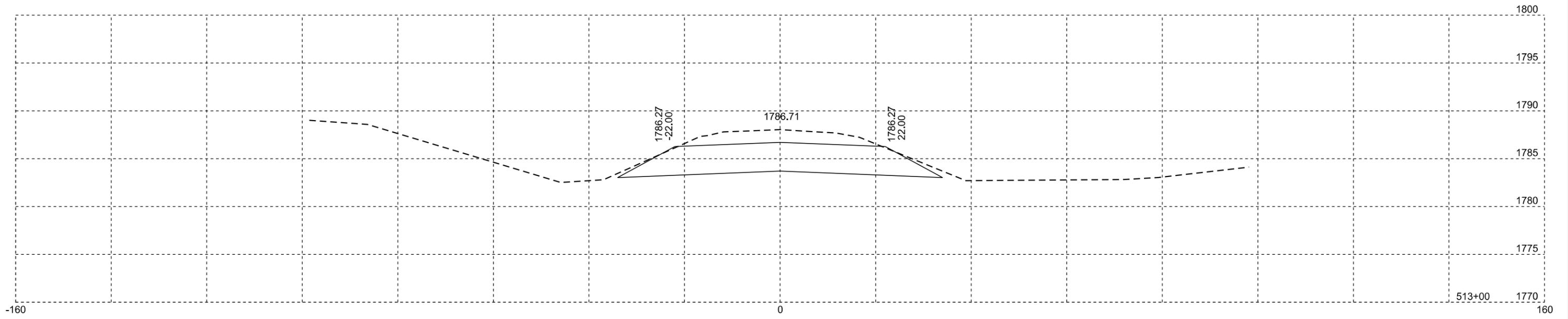


STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	145	164



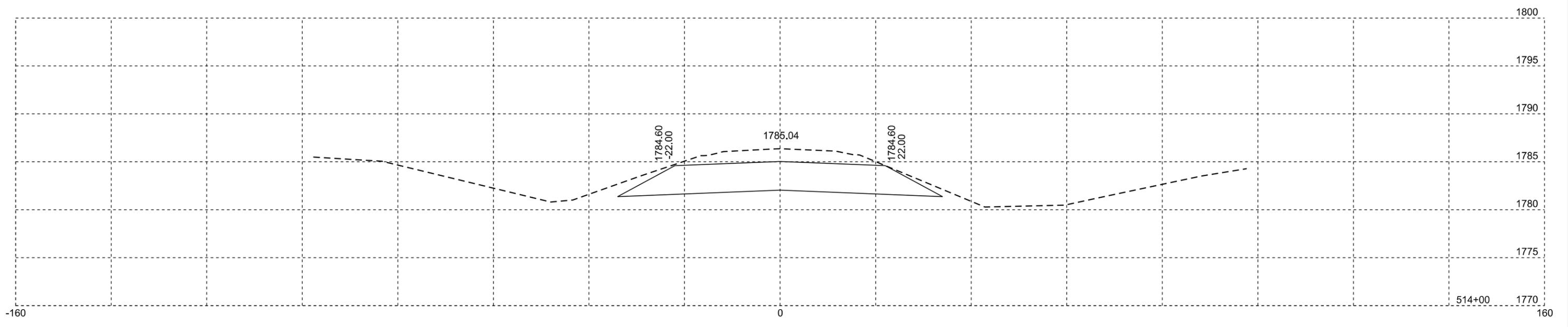


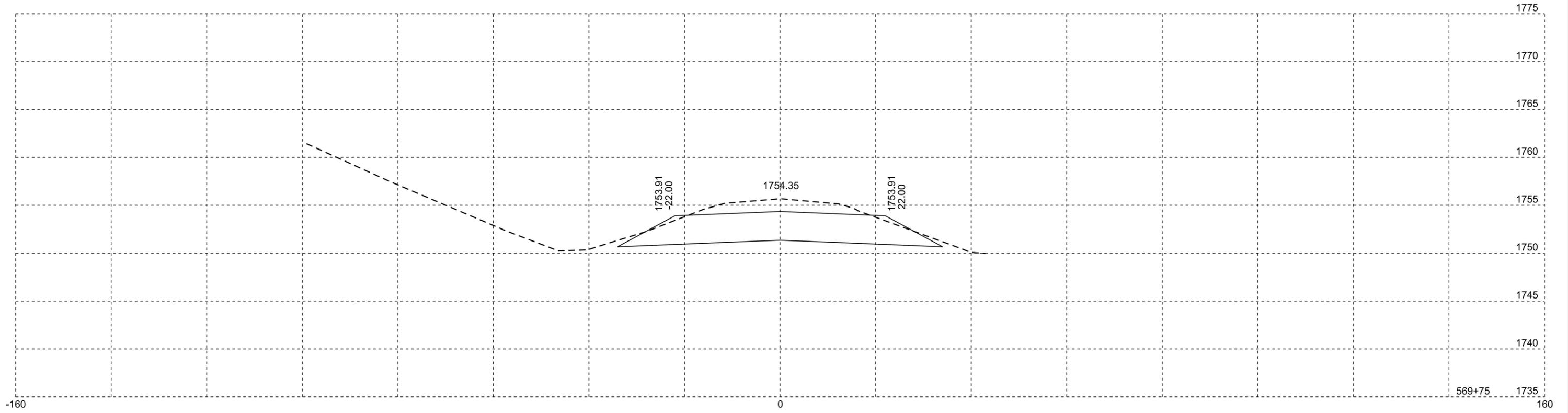
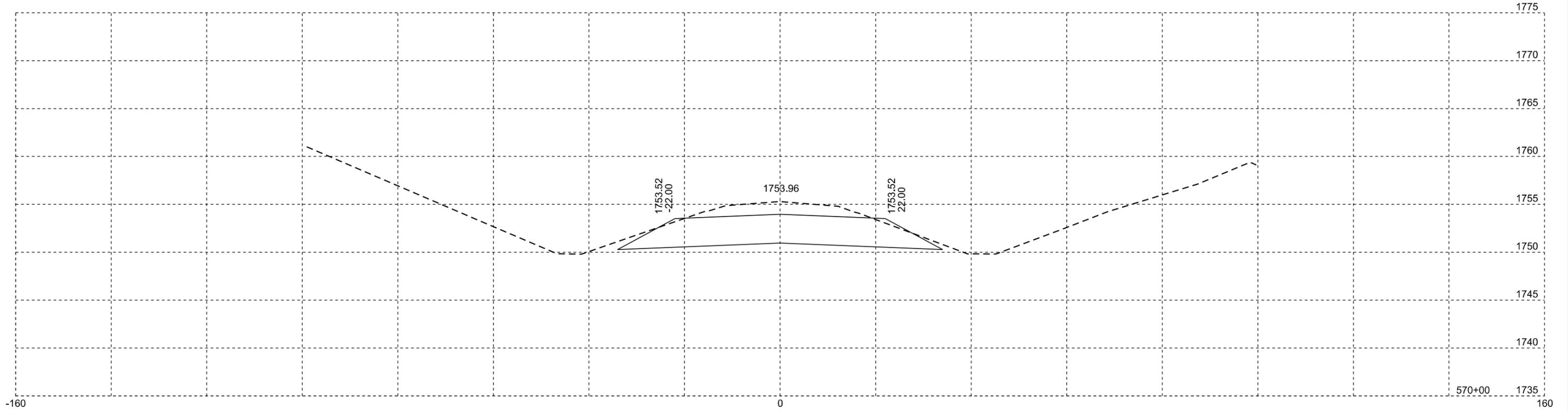
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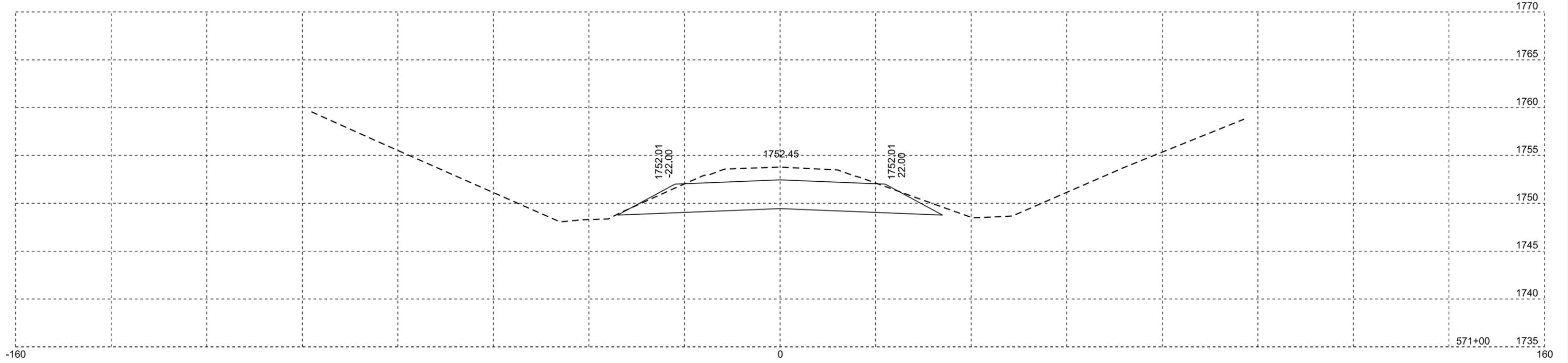
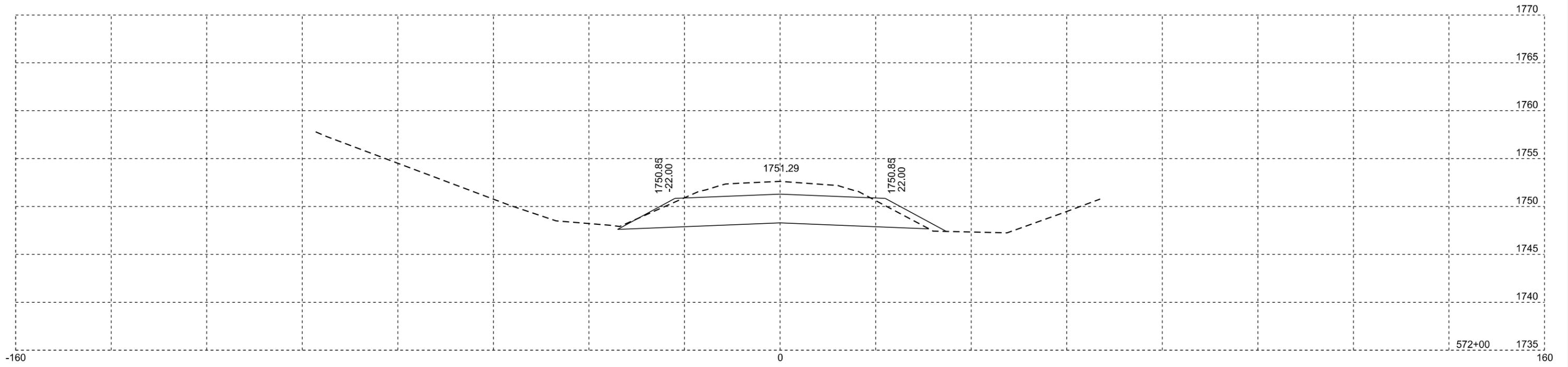
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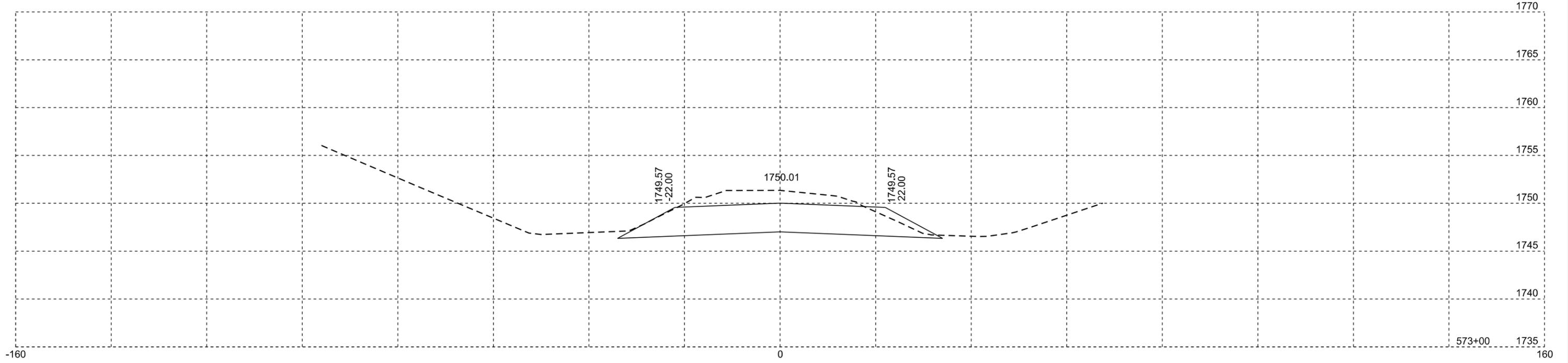
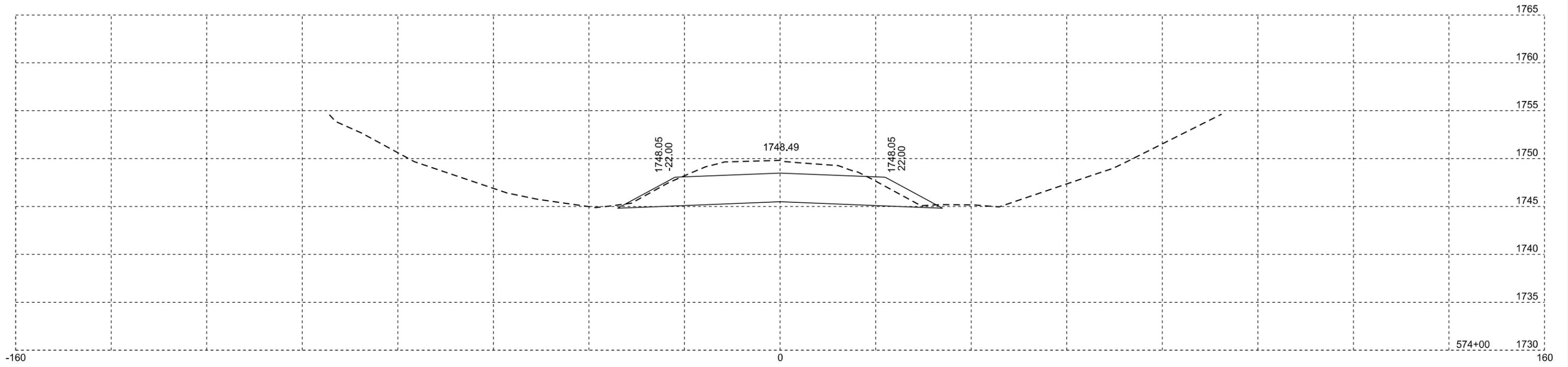




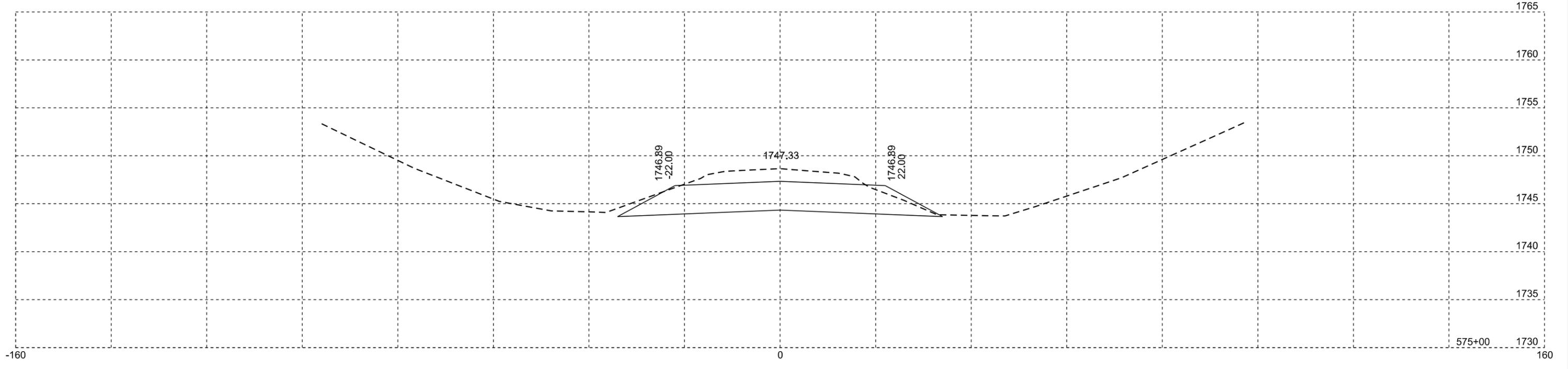
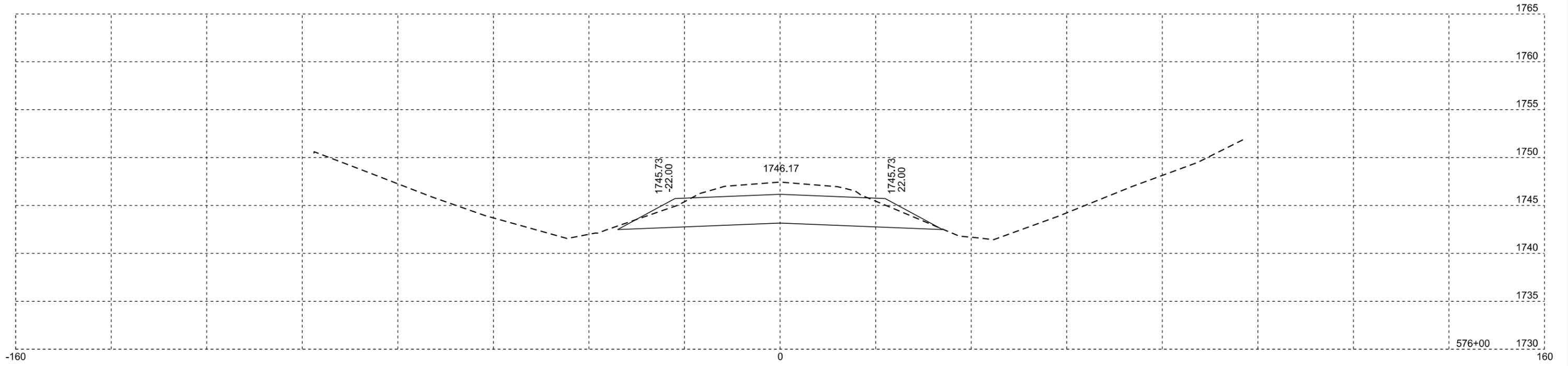
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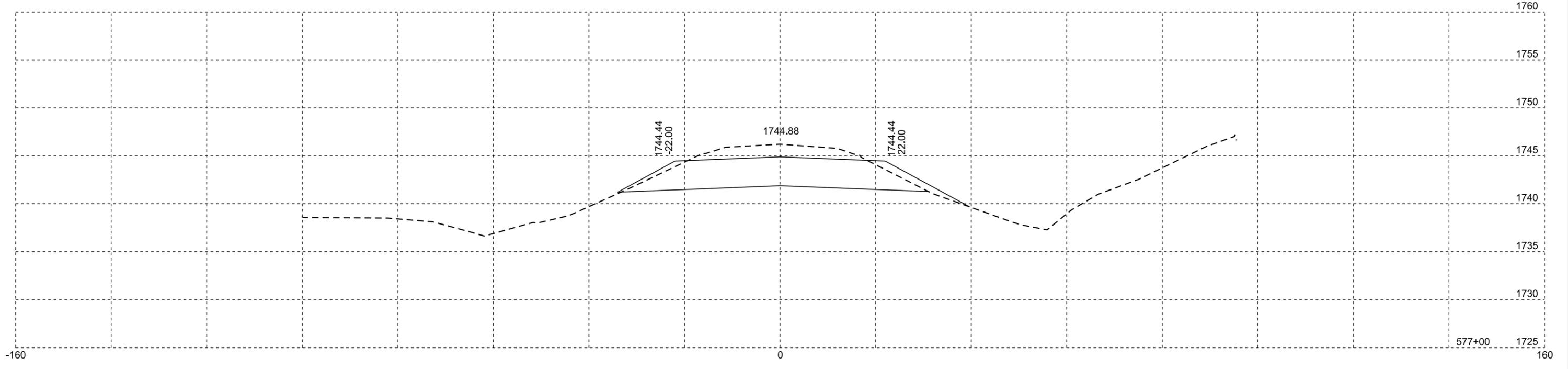
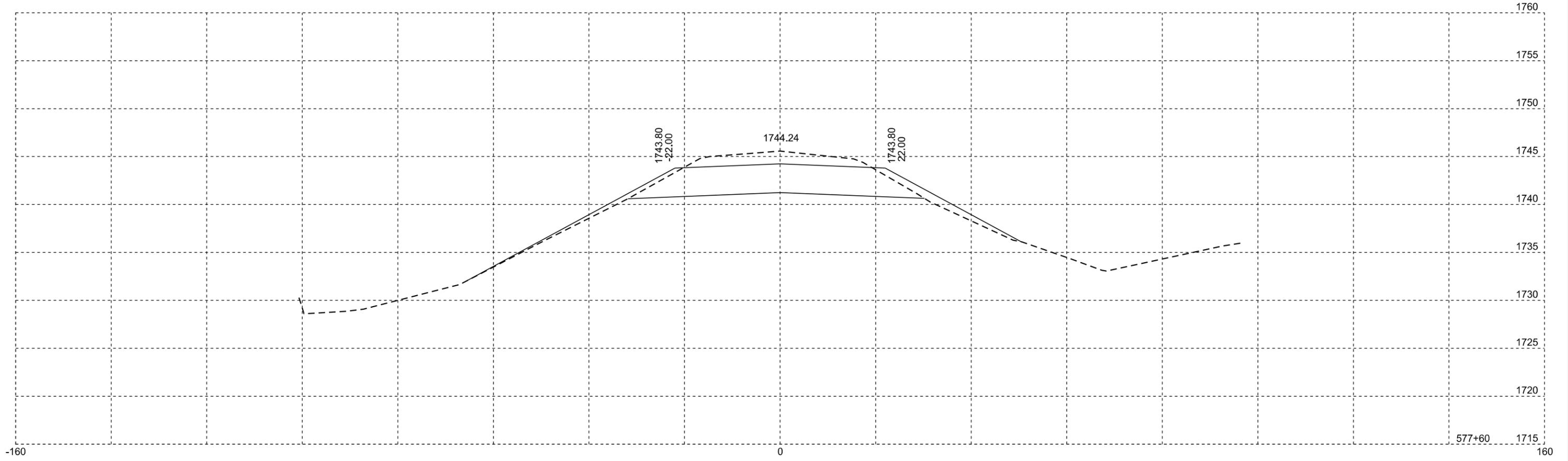
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	151	164

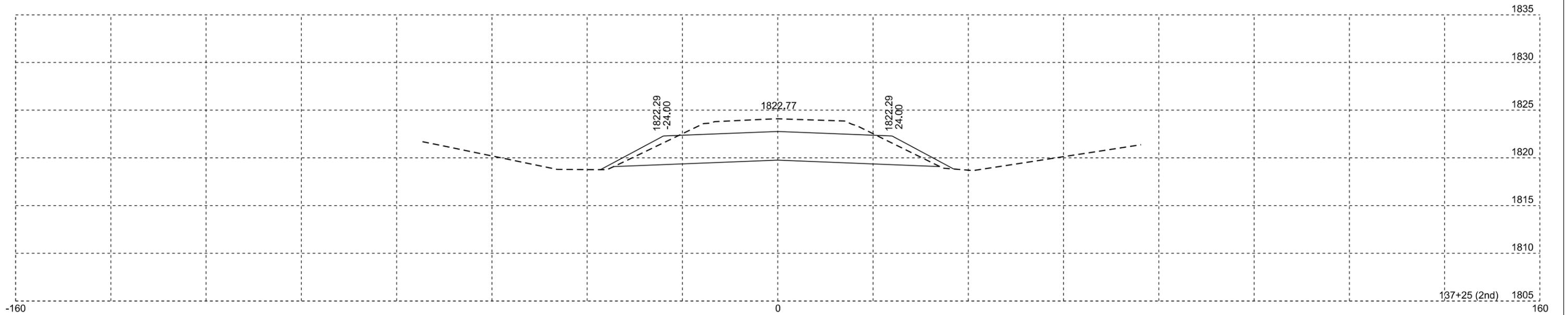
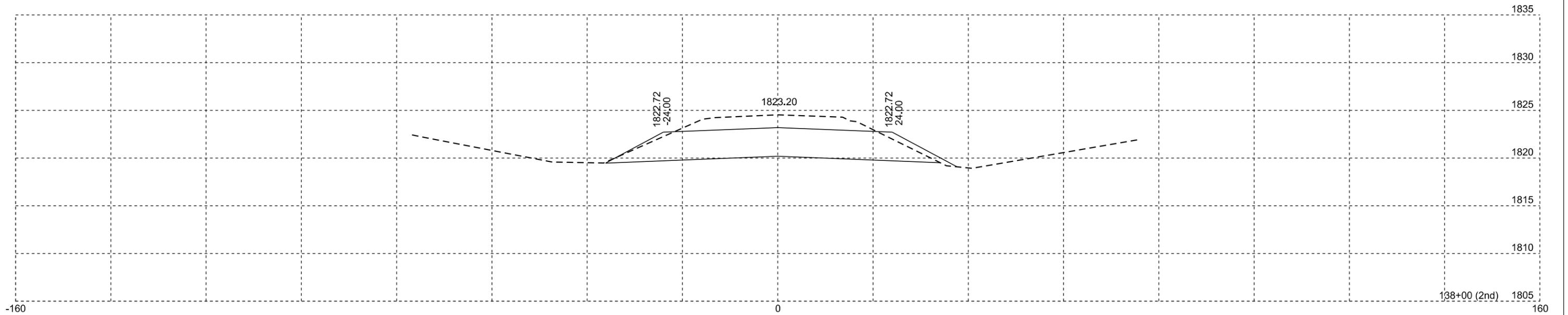
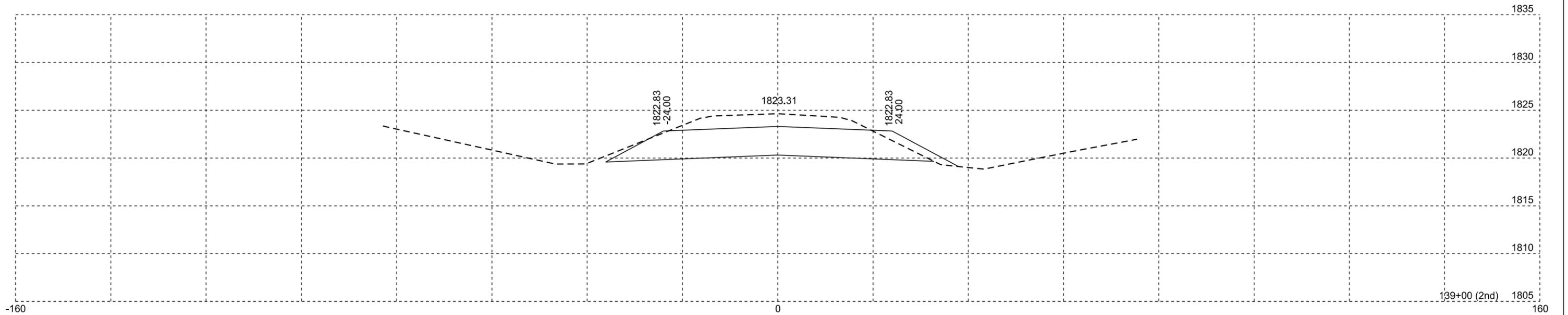


STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	152	164

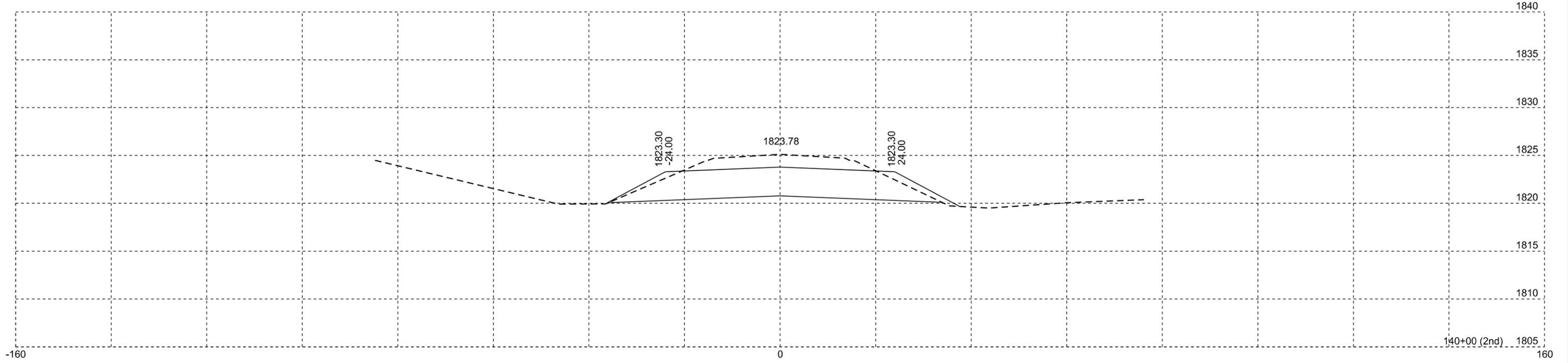
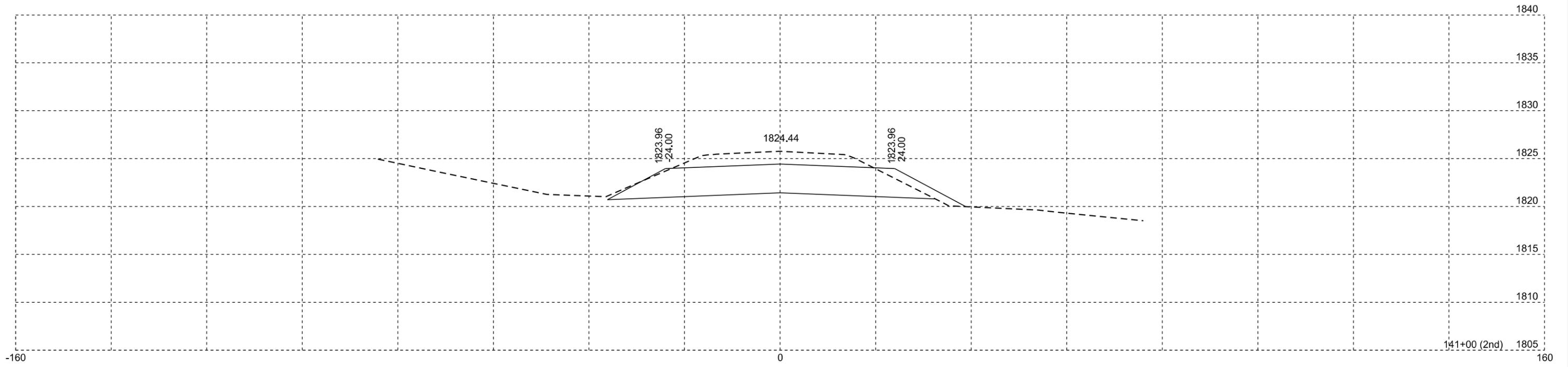


STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	153	164

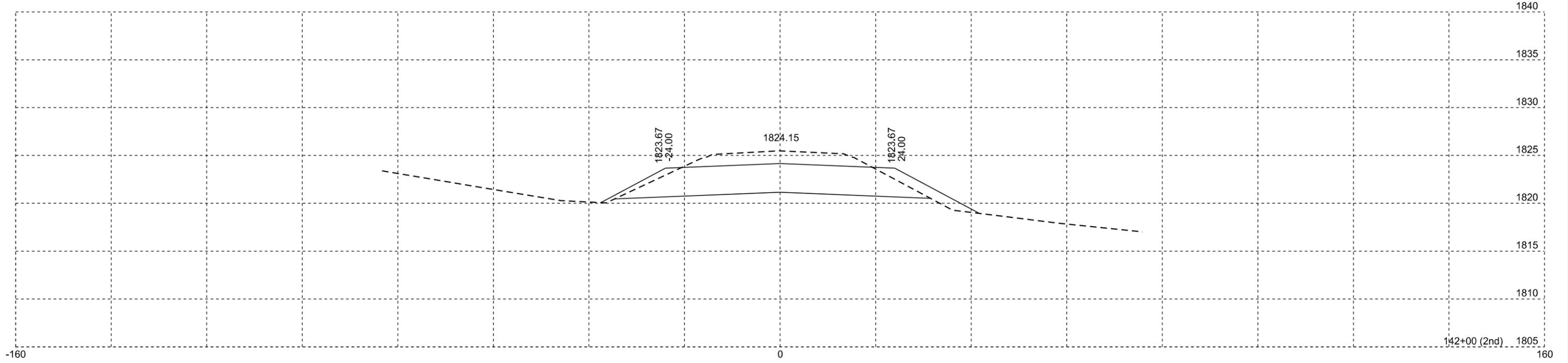
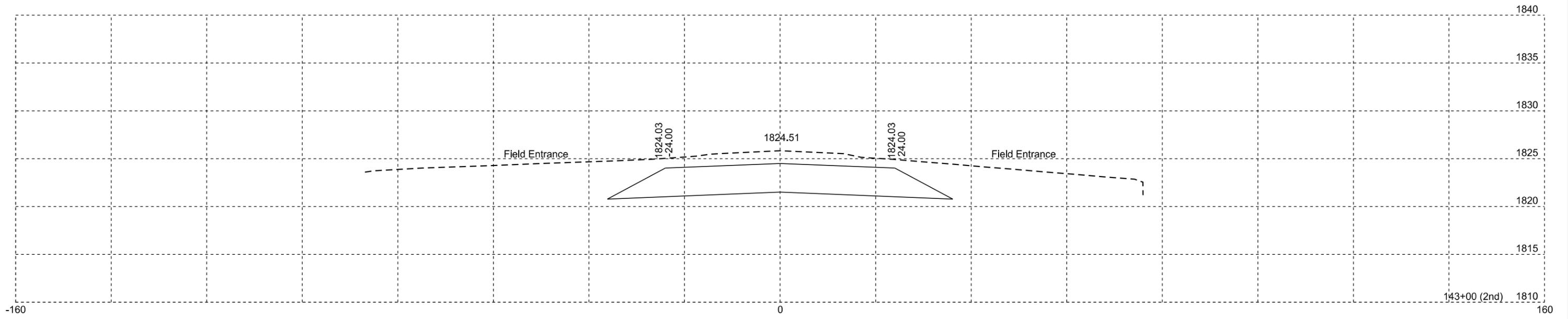




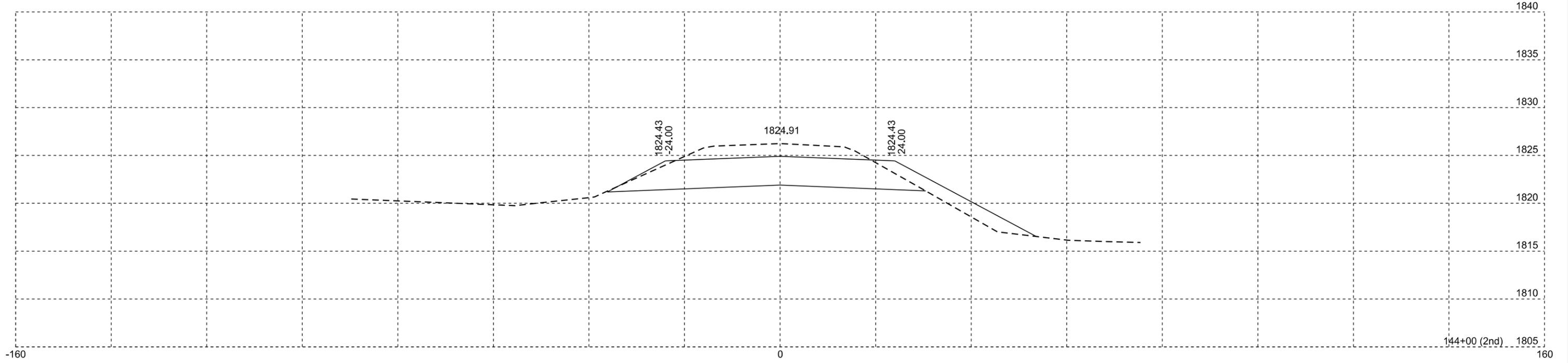
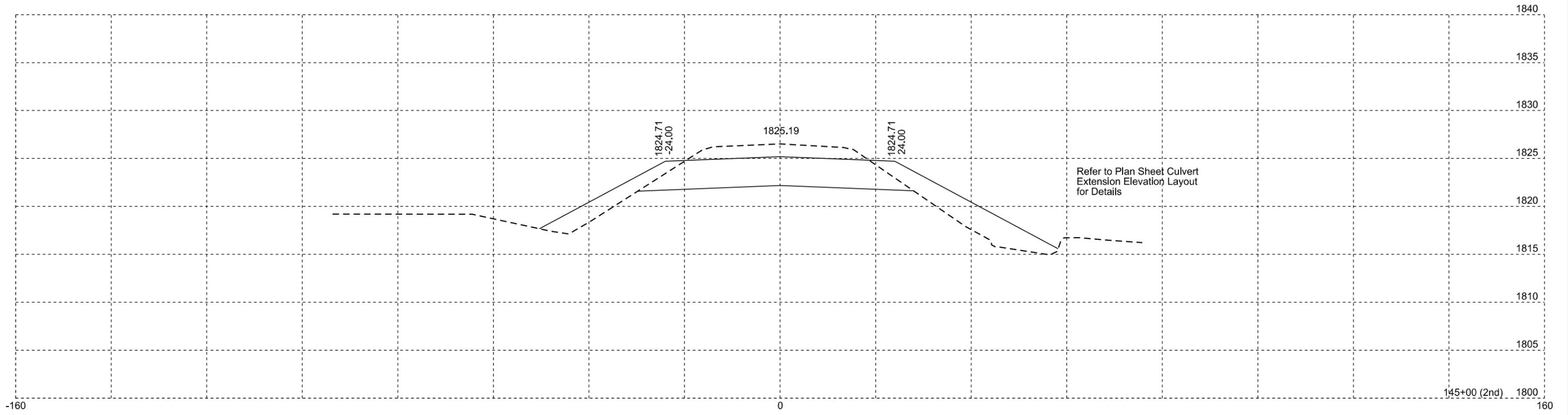
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	155	164



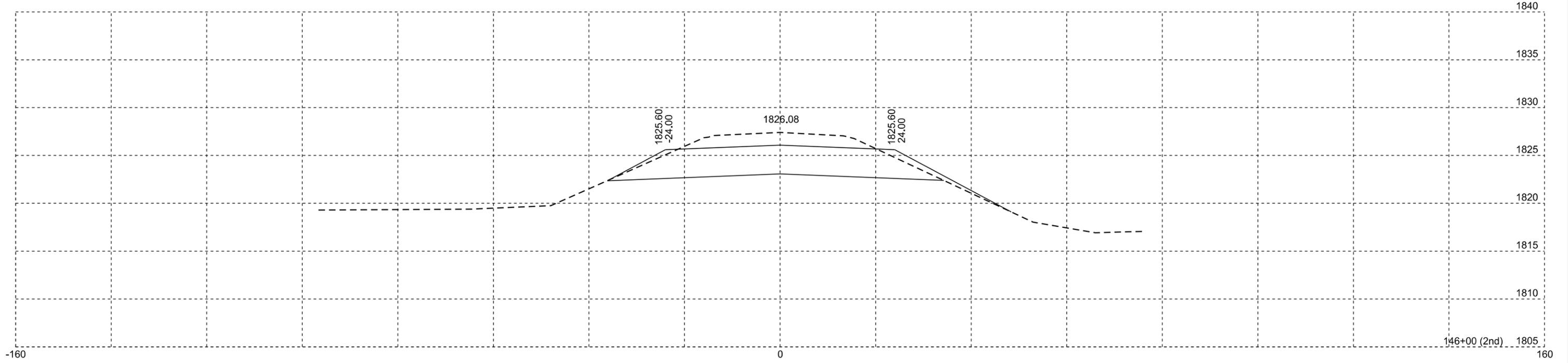
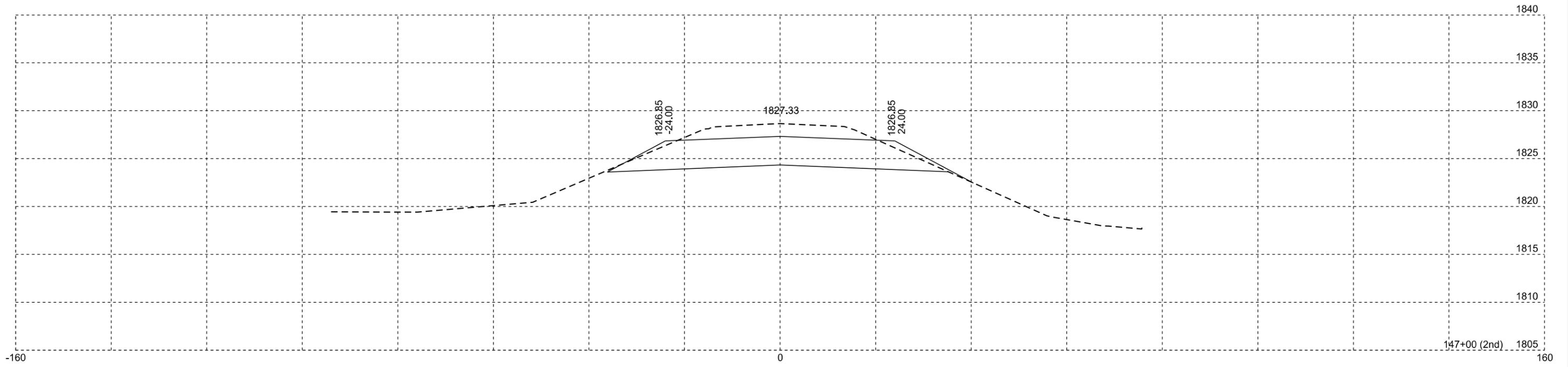
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	156	164



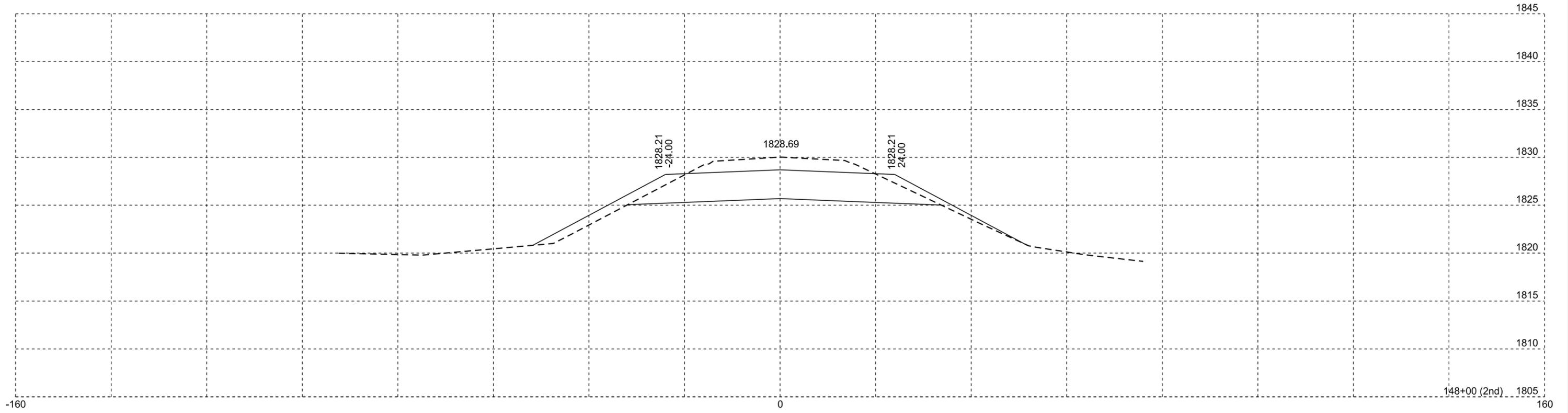
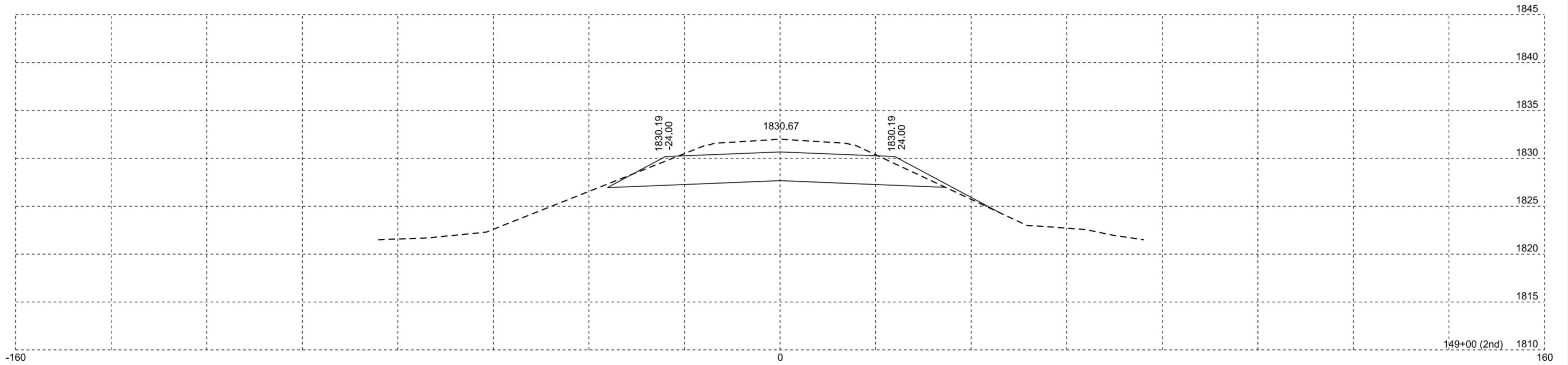
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	157	164



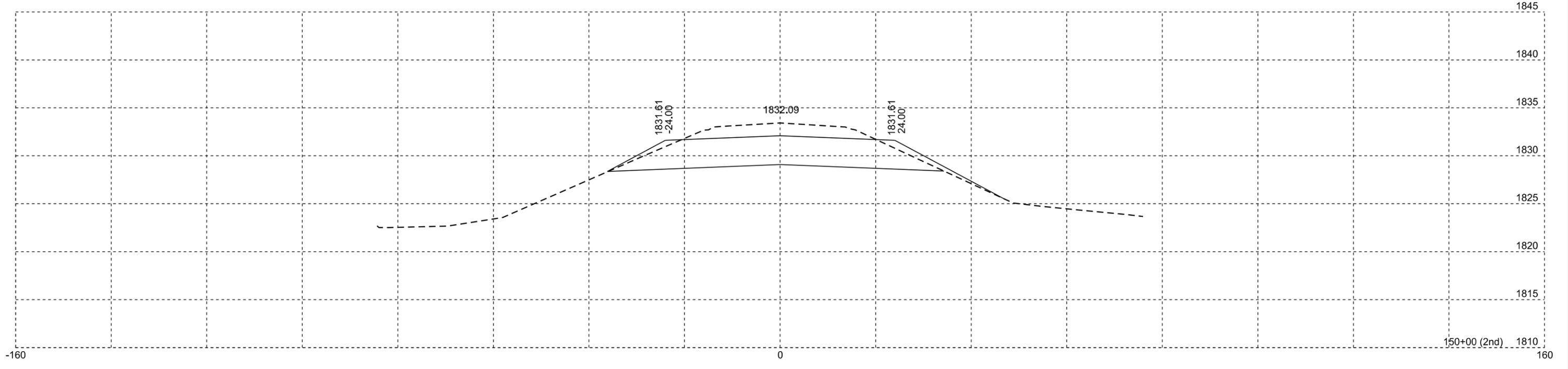
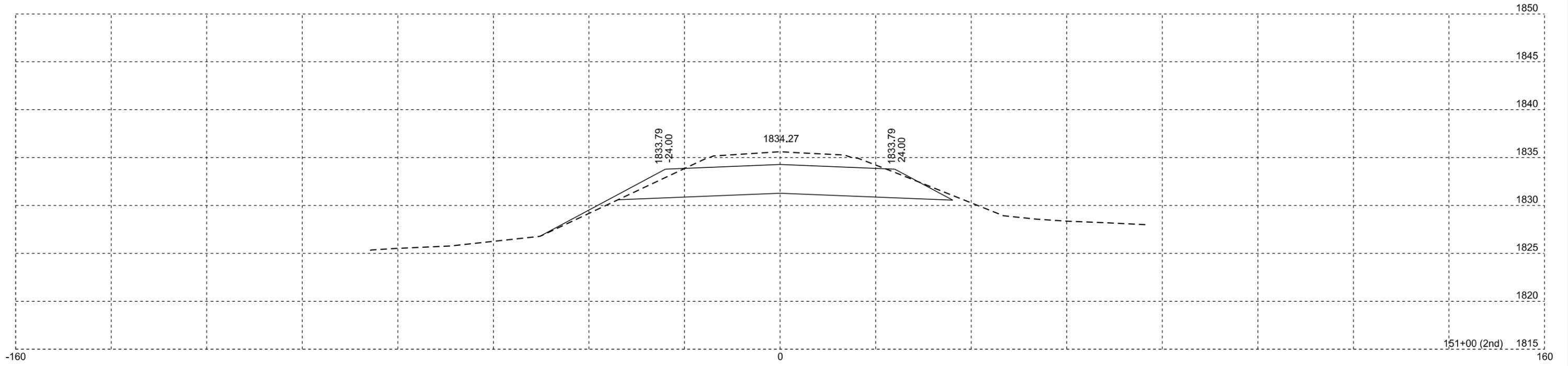
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	158	164



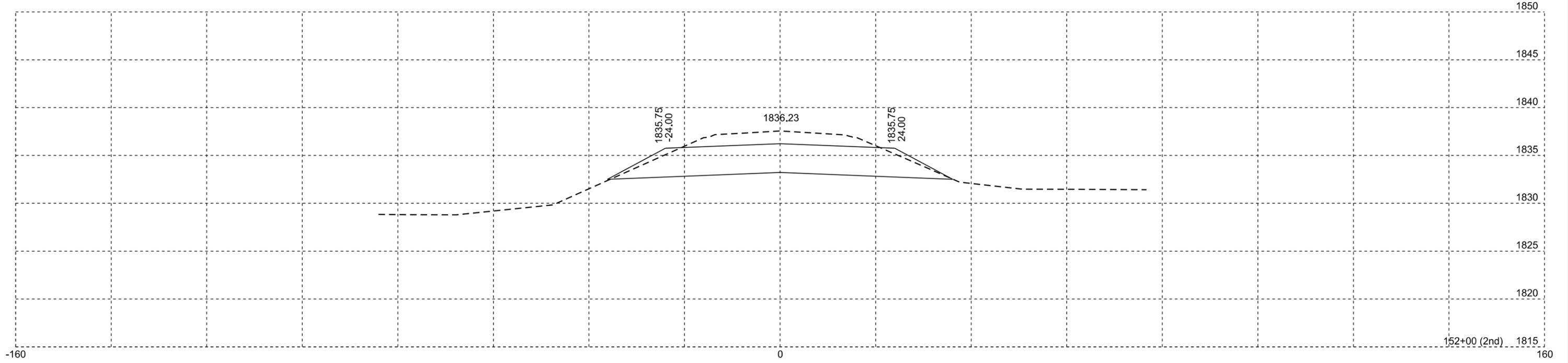
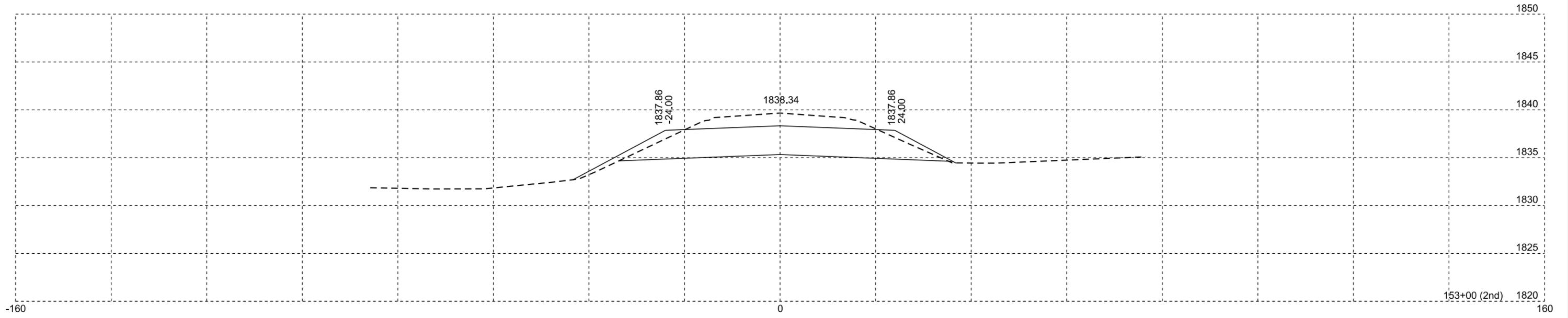
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	159	164



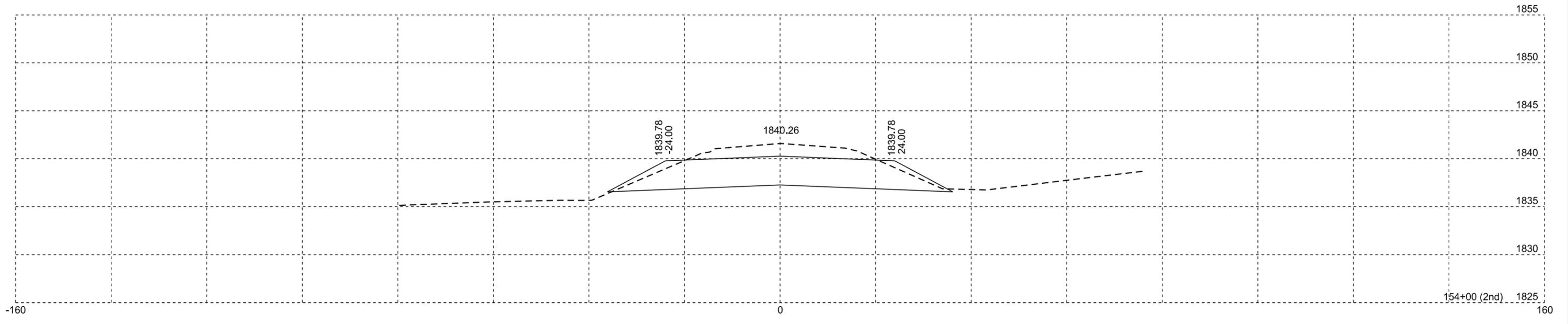
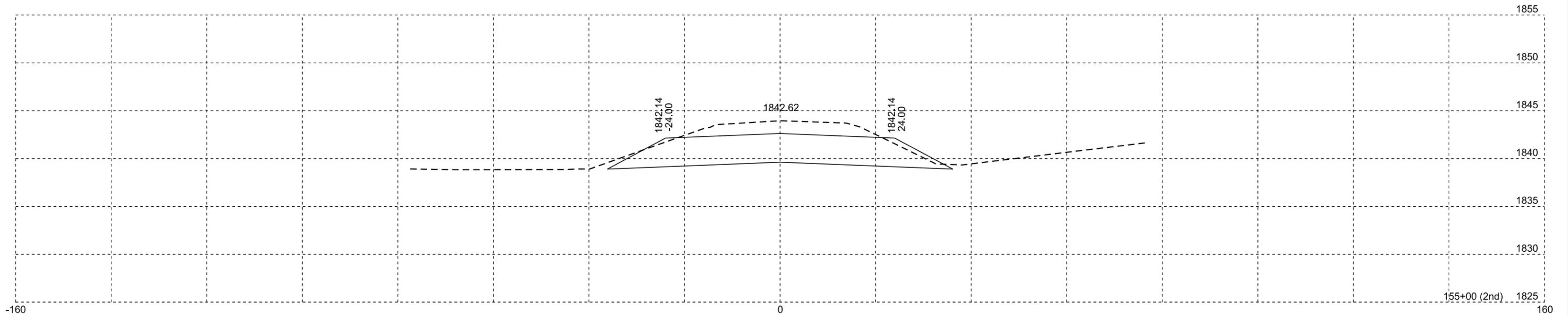
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	160	164



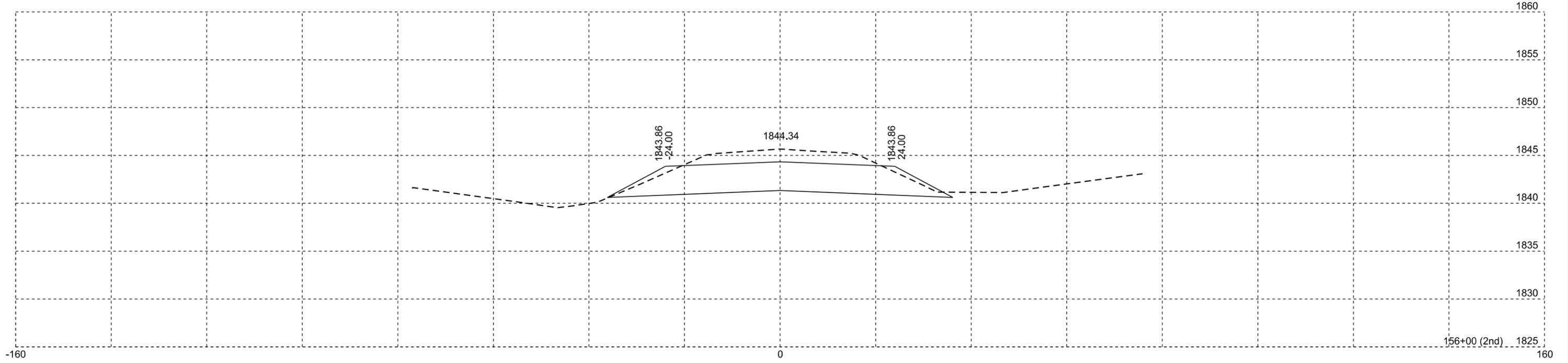
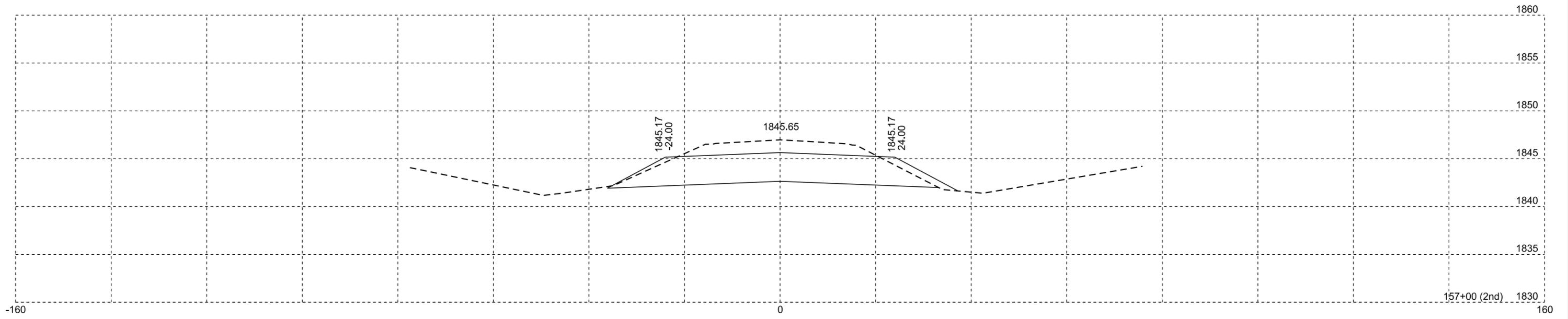
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	161	164



STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	162	164



STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	163	164



Plotting Date: 05/20/2021

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	P 0049(5)27	164	164

