

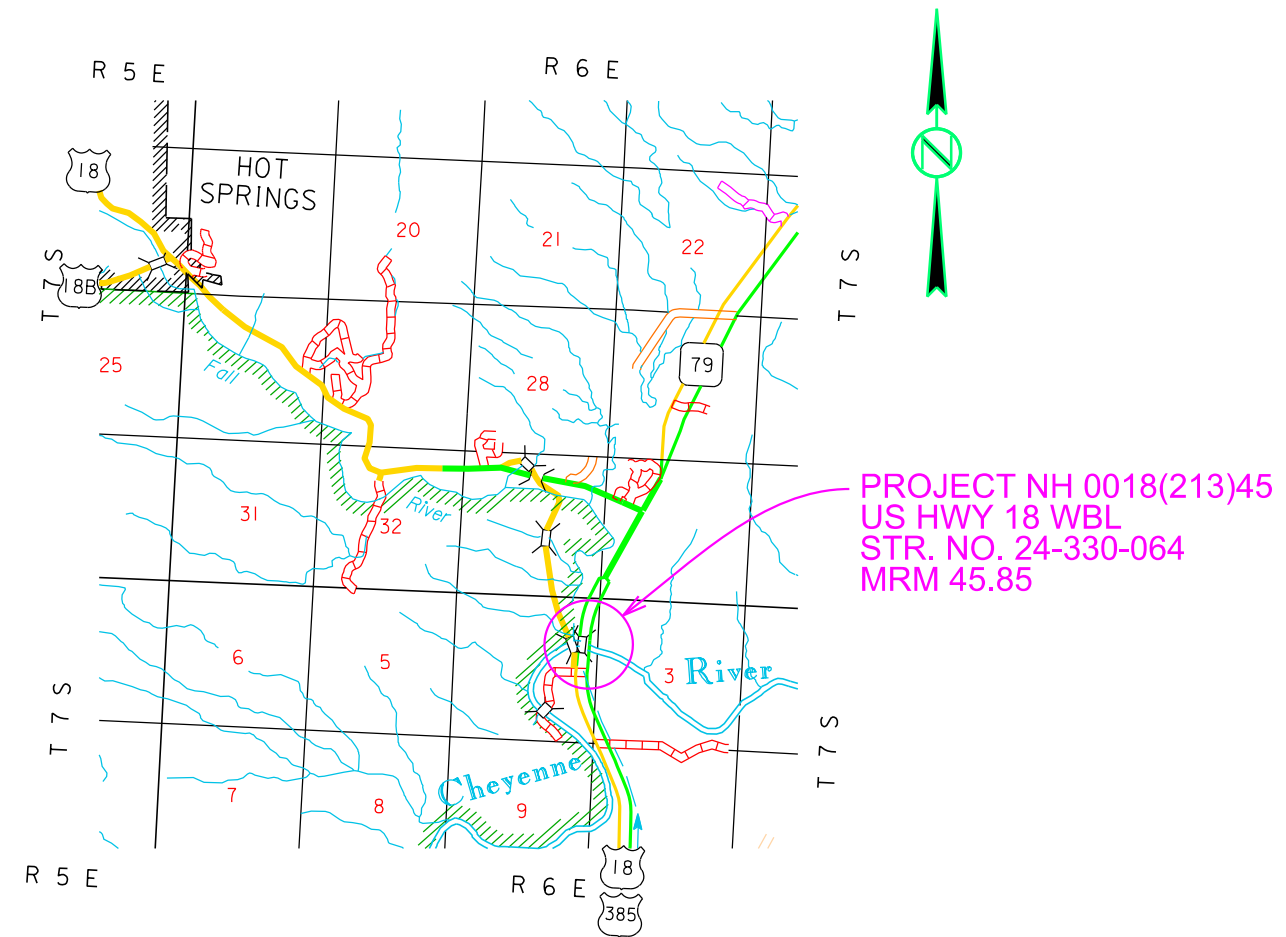
SECTION F: SURFACING PLANS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(213)45	F1	F32

Plotting Date: 06/08/2023

INDEX OF SHEETS

F1	General Layout with Index
F2-F5	Estimate with General Notes & Tables
F6	Typical Surfacing Section
F7	Horizontal Alignment Data
F8	Control Data
F9	Legend
F10	Guardrail Layout
F11	Plan and Profile Sheet
F12	PCC Pavement Joint Layout
F13-F14	Median Crossover Layout & Typicals
F15	Membrane Sealant Expansion Joint Details
F16-F17	Typical Cutoff Drain Details
F18-F32	Standard Plates



SECTION F – ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E1100	Remove Concrete Pavement	236.6	SqYd
110E4290	Salvage Beam Guardrail	328.0	Ft
120E0010	Unclassified Excavation	1,265	CuYd
120E6200	Water for Granular Material	44.3	MGal
120E9000	Pit Run	2,650.8	Ton
260E1010	Base Course	30.8	Ton
260E2010	Gravel Cushion	1,012.7	Ton
320E1200	Asphalt Concrete Composite	444.5	Ton
380E0060	8.5" Nonreinforced PCC Pavement	300.0	SqYd
380E6000	Dowel Bar	96	Each
380E6110	Insert Steel Bar in PCC Pavement	24	Each
410E2600	Membrane Sealant Expansion Joint	37.9	Ft
430E0700	Precast Concrete Headwall for Drain	2	Each
451E0514	4" PVC Pipe	30	Ft
629E9000	Crossover Closure	212	Ft
630E0500	Type 1 MGS	125.0	Ft
630E1501	Type 1 Retrofit Guardrail Transition	2	Each
630E2019	MGS Tangent End Terminal	2	Each
632E2220	Guardrail Delineator	10	Each
633E0010	Cold Applied Plastic Pavement Marking, 4"	760	Ft
633E0040	Cold Applied Plastic Pavement Marking, Arrow	4	Each
633E1222	High Build Waterborne Pavement Marking Paint, 4" Yellow	9,120	Ft
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	760	Ft
633E5025	Grooving for Cold Applied Plastic Pavement Marking, Arrow	4	Each
634E0560	Remove Pavement Marking, 4" or Equivalent	6,970	Ft
680E0204	4" Perforated PVC Drain Pipe with Sleeve	50	Ft
680E2500	Porous Backfill	21.0	Ton
831E0210	Non-woven Separator Fabric	1,516	SqYd
831E0400	Impermeable Plastic Membrane	29	SqYd

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

**REMOVAL OF EXISTING CONCRETE PAVEMENT
STA. 400+50 to STA. 401+25**

Existing asphalt concrete and/or existing asphalt concrete patch work that was placed above the existing concrete pavement is included in the quantity for "Remove Concrete Pavement". The Contractor will dispose of the concrete pavement and asphalt concrete at a site approved by the Engineer.

The existing 8.5-inch P.C.C. Pavement is typically 26 feet wide (14' driving lane and 12' passing lane) with asphalt shoulders (4' inside and 6' outside).

The existing contraction joints are spaced at approximately 20 feet.

CUTOFF DRAIN

A cutoff drain will be installed in conjunction with the proposed resurfacing. The existing approach pavement will be replaced near the bridge end from Station 400+50± to Station 401+25±. After the base course has been prepared for surfacing, a cutoff drain will be installed perpendicular to centerline across all lanes at Station 401+19.

The cutoff drain will be installed prior to the placement of the concrete and asphalt surfacing. The cutoff drains will be installed in a trench 2 feet wide by 3 feet deep. The trench will be graded to maintain a minimum of .01ft/ft. or 1% drop from centerline to the outlet headwall. 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 a SDR solvent weld PVC coupling, connect 4-inch PVC Outlet Pipe to the outlet ends of the Perforated PVC Drain Pipe and place in the center of the unlined outlet trench. The outlet pipe will daylight at a headwall placed 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 5" of base course. The remainder of the trench containing the solid 4-inch PVC Outlet Pipe will be backfilled with compacted soil.

The estimated quantities for the cutoff drain system are as follows:

Impermeable Plastic Membrane	29	SqYd
4" Perforated PVC Drain Pipe with Filter Fabric Drain Sleeve	50	Ft
4" PVC Outlet Pipe	30	Ft
Porous Backfill	21	Tons
Precast Concrete Headwall for Drain (Standard Plate 430.50)	2	Each

UNDERDRAIN CONSTRUCTION

Revised 6/20/2023 NJF

The Perforated PVC Drainpipe will be SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 with perforations in accordance with ASTM F758. The 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 Drain Sleeve will conform to ASTM D6707.

All labor, tools, equipment, and incidentals necessary for the installation of the PVC Pipe will be incidental to the contract unit price per foot for each pipe type.

Care will be taken to ensure that the cutoff drain and outlet pipe are not damaged during construction. Sufficient cover material is to be placed over the pipe before compaction equipment is allowed over the drain system. Damaged pipe will be replaced by the Contractor at no additional cost to the Department.

The cutoff drain locations given are based on the best information available to the Geotechnical Engineering Activity. Actual field conditions may require that adjustments be made by the Engineer during construction to provide for sufficient drainage. The Geotechnical Engineering Activity will be available for onsite assistance if necessary.

Cutoff drain trenches will be graded to maintain a minimum of .01ft/ft. or 1% drop from beginning to outlet. The Contractor will ensure all segments of outlet pipe are positively connected and remain soil tight during installation of the drain system. The outlet headwall will be placed to blend in with the surrounding topography with the outlet pipe placed above the bottom of the drainage to permit proper flow from the outlet.

Outlet headwalls will be cleared of topsoil, straw, or other debris after seeding operations have been completed. The as built headwall location 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 Custer Area office for reference in post construction maintenance.

SURFACING THICKNESS DIMENSIONS

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

UNCLASSIFIED EXCAVATION

Unclassified Excavation is provided on the project for removing asphalt concrete and base course shoulders adjacent to the PCC pavement to allow for placement of the new surfacing and installing guardrail and the median crossover for traffic control. This excess material will be handled as waste. The estimate of quantities provides 1265 cubic yards of Unclassified Excavation for performing this work.

Payment will be based on plans quantity. Further measurements will not be made unless there is a change made in the limits of work.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(213)45	F2	F32

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 or Gravel Cushion 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, gravel cushion, 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.

PIT RUN MATERIAL

Pit Run material will be obtained from a granular source conforming to Section 120 of the Specifications.

Minimum compaction testing requirements will be one test per crossover location.

Non-woven Separator Fabric has been included in the Estimate of Quantities. This fabric is to be used as a separator between the Pit Run and the Gravel Cushion to prevent migration of fines from the Gravel Cushion into the Pit Run. If the Pit Run Material contains enough fines as placed to prevent the loss of material from the Gravel Cushion, the separator fabric may be eliminated by CCO. Non-woven Separator Fabric will conform to Section 831 of the Specifications.

NON-WOVEN SEPARATOR FABRIC

Non-woven Separator Fabric has been included in the Estimate of Quantities for the median crossover. This fabric is to be used as a separator between the Pit Run material and the Gravel Cushion to prevent migration of fines from the Gravel Cushion into the Pit Run material. If the Pit Run material contains enough fines as placed to prevent the loss of material from the Gravel Cushion, the separator fabric may be eliminated by CCO.

Table of Non-Woven Separator Fabric provided below:

Location	Non-woven Separator Fabric
	SqYds
Median Crossover	
Sta. 370+93 (NB Lanes)	1,516
Total	1,516

Non-woven Separator Fabric will be paid for at the contract unit price per square yard of fabric placed. Payment for this item will be full payment for furnishing all equipment, labor and incidentals required to furnish and install the fabric.

TABLE OF SURFACING QUANTITIES

Location	Length Ft	Unclassified Excavation CuYd	Membrane Sealant Expansion Joint Ft	Base Course Ton	Gravel Cushion Ton	Pit Run Material Ton	Water for Granular Mgal	Asphalt Concrete Composite Ton	Remove Concrete Pavement SqYd	8.5" Nonreinforced PCC Pavement SqYd
										300.0
Str. No. 24-330-064 400+50 to 401+25	75	24	37.9	30.8			0.4		236.6	300.0
Median Crossover Sta. 370+93 NBL	727	1,241			1,012.7	2,650.8	44.0	444.5		
Str. No. 24-329-064 Guardrail for Traffic Control		21						43.3		
Totals:		1,265	37.9	30.8	1,012.7	2,650.8	44.3	444.5	236.6	300.0

8.5" NONREINFORCED PCC PAVEMENT

The fine aggregate will be screened over a 1-inch square opening screen just prior to introduction into the concrete paving mix. The Contractor will screen all of the aggregate to prevent the incorporation of foreign materials (i.e. mud balls) into the concrete mix.

The concrete mix will conform to the special provision for Contractor Furnished Mix Design for PCC Pavement.

Unless specified otherwise in the PCC Pavement Joint Layout Sheets or elsewhere in the plans, the typical joint spacing for 8.5" Nonreinforced PCC Pavement will be 15'. Joint spacing in the PCC Shoulder Pavement will match adjacent mainline pavement.

See Standard Plate 380.01 for placement of Dowel Bars. The transverse construction joints will be handled in accordance with Standard Plate 380.08.

The transverse contraction joints will be perpendicular to the centerline. In multilane areas the transverse contraction joints will be perpendicular to the centerline and be in a straight line across the entire width of the pavement. In special situations the Engineer may pre-approve transverse contraction joints that do not meet these requirements. All nonconforming transverse contraction joints will be removed at the Contractor's expense. Any method of placement that cannot produce these requirements will not be allowed.

The location of joints, as shown and designated on the PCC Pavement Joint Layout(s) are only approximate locations to be used as a guide and to afford bidders a basis for estimating the construction cost of the joints. The final locations of the joints are to be designated by the Engineer during construction.

STEEL BAR INSERTION

The Contractor will insert the Steel Bars (No. 9 x 1 ¼ inch epoxy coated deformed tie bars) into drilled holes in the existing concrete pavement. Anchoring of the steel bars in the drilled holes will conform to the Specifications.

The steel bars will be cut to the specified length by sawing or shearing and will be free from burring or other deformations.

Epoxy coated plain round steel bars will be inserted on 12-inch centers in the transverse joint. The first steel bar will be placed a minimum of 3 inches and a maximum of 6 inches from the outside edge of the slab.

Epoxy coated deformed steel bars will be inserted on 18-inch centers in the transverse joint. The first steel bar will be placed a minimum of 3 inches and a maximum of 9 inches from the outside edge of the slab.

Epoxy coated deformed steel bars will be inserted on 30-inch centers in the longitudinal joint and will be placed a minimum of 15 inches from the existing transverse contraction joint.

TABLE OF STEEL BAR INSERTION

LOCATION	No. 9 Epoxy Coated Deformed Tie Bars (Each)
Sta. 401+25	24
Totals:	24

TABLE OF DOWEL BARS

LOCATION	Dowel Bars 1 ¼" Bars (Each)
Bars in Driving Lane – 12 bar	48
Bars in Passing Lane – 12 bar	48
Totals:	96

SAW AND SEAL JOINTS

Longitudinal and transverse joints at concrete repair areas will be sawed and sealed.

Joint sealing will conform to Section 380.3 P.

Longitudinal and transverse joints will be sealed with Hot Poured Elastic Joint Sealer.

Acceptance of the Hot Poured Elastic Joint Sealer will be based on visual inspection by the Engineer.

Cost for sawing and sealing of the longitudinal construction joint and both transverse joints will be incidental to the contract unit prices per square yard for Nonreinforced PCC Pavement.

MEMBRANE SEALANT EXPANSION JOINT

Install all membrane sealant expansion joints at the plan shown locations in conformance to the following notes.

The Membrane Sealant will be one of membrane sealant types from the approved product list for Membrane Sealant Expansion Joints.

The manufacturer will supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension will be as recommended by the sealant manufacturer to provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension. In no case will the precompressed dimension exceed 75% of the joint opening width. The foam sealant will be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.

The membrane sealant will be supplied in pieces 5 feet in length or longer. The foam sealant will be ultra-violet and ozone resistant.

The bonding adhesive used to attach the membrane sealant to the adjacent concrete will be approved by the membrane sealant manufacturer.

Adhesive used to join adjacent pieces of the membrane sealant will be as recommended by the manufacturer.

If Styrofoam filler material is used in the construction, it will be closed cell and water-tight as approved by the Engineer.

Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spall areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.

The minimum ambient air temperature at the time of joint installation and adhesive curing will be 40° F.

A technical representative of the membrane sealant manufacturer will be present at the jobsite during installation. The technical representative will be knowledgeable in the correct procedures for the preparation and installation of the joint material to insure the Contractor installs the joint to the Manufacturers recommendations.

The joint opening will be constant width and will have smooth vertical sides. Surfaces of material adjacent to the joint will be at the correct grade and crown as approved by the Engineer.

Concrete surfaces that will be in contact with the membrane sealant will be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the concrete surface. At a minimum two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the a concrete surface will be required. Cleaning of the concrete surfaces with solvents, wire brushing, or grinding will not be permitted.

After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface will be air blasted. The air compressor used for joint cleaning will be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent concrete surfaces must be dry and clean. The contact surfaces for the joint will be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.

Individual spliced sections will be installed as per the manufacturers' recommendations. The membrane joint sealant manufacturer will submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.

Traffic will not be allowed on the joint for a minimum 3 hours unless otherwise directed by the Engineer.

Forms for the joint will be left in place for a minimum of 7 days. No construction equipment or traffic will be allowed on the joint until the concrete has reached design strength. The joint edges will be protected from damage by equipment and traffic.

The Membrane Sealant Expansion Joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Membrane Sealant Expansion Joint will be paid for at the contract unit price per foot complete in place. Payment for this item will be full compensation for furnishing all the required materials in place, inclusive of labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.

TABLE OF GUARDRAIL

Location		Type 1 MSG Ft	Type 1 Retrofit Guardrail Transition Each	MGS Tangent End Terminal Each	Salvage Beam Guardrail Ft	Guardrail Delineator Each
24-329-064	L	62.5	1	1	164	5
(South End of Bridge)	R	62.5	1	1	164	5
TOTALS		125	2	2	328	10

SALVAGE BEAM GUARDRAIL

Steel beam rail, end terminals, posts, blocks, and hardware items will become the property of the State and will be removed, hauled, and neatly stacked at the SDDOT Maintenance Shop at Maverick Junction, 27660 US Hwy 385, as approved by the Engineer.

Payment for removing, hauling, and stacking the guardrail items will be incidental to the contract unit price per foot for "Salvage Beam Guardrail".

COLD APPLIED PLASTIC PAVEMENT MARKING

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

Cold Applied Plastic Pavement Markings will be 3M Series 380 IES or an approved equal.

HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

All materials will be applied as per manufacturer's recommendations. High build waterborne pavement marking paint will conform to the supplemental specifications for Section 980.1 B.

Reflective media will consist of glass beads.

High Build Waterborne Pavement Marking Paint applied after October 15 must be formulated as cold-weather waterborne paint. Cold weather waterborne paint will meet the requirements of Section 980.1 C.

RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4" line = 27.8 Gals/Mile
Dashed 4" line = 7.6 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.

GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING

The Contractor will establish a positive means for the removal of the grinding and/or grooving residue. Residue from dry grooving will be vacuumed. Solid residue will be removed from the pavement surfaces before being blown by traffic action or wind. The Contractor will conduct this work to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owners. Residue from wet grooving will not be permitted to flow across lanes being used by public traffic or into gutter or drainage facilities. Residue, whether in solid or slurry form, will be disposed of in a manner that will prevent it from reaching any waterway in a concentrated state. The cleaning of the residue for grooving will be to the satisfaction of the Engineer and may require more than one pass to adequately remove material. All costs for removal of grinding and/or grooving residue will be included in the contract unit price per foot or each for "Grooving for Cold Applied Plastic Pavement Marking" contract 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.

TABLE OF PERMANENT PAVEMENT MARKINGS

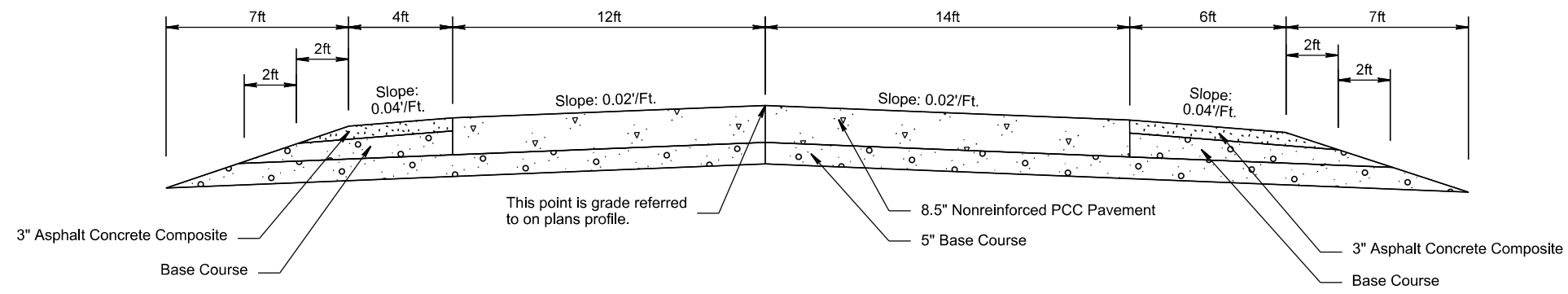
LOCATION	Cold Applied Plastic Pavement Marking, 4" Yellow	Cold Applied Plastic Pavement Marking, Arrow	Remove Pavement Marking, 4" or Equivalent	High Build Waterborne Pavement Marking Paint, 4" Yellow	Grooving for Cold Applied Plastic Pavement Marking, 4"	Grooving for Cold Applied Plastic Pavement Marking, Arrow
	Ft	Each	Ft	Ft	Ft	Each
EB Passing Lane Edge Line (WB Edge Line in the Two-Way Segment)			6,970	6,970		
EB Passing Lane Edge Line (South Traffic Crossover)				400		
WB Passing Lane Edge Line (South Traffic Crossover)				300		
EB Center Lane Skips (Existing 5-Lane Undivided Section)				450		
Center Lane at North Traffic Crossover		4		1,000		4
Center Lane Gore at North Traffic Crossover	760				760	
Total:	760	4	6,970	9,120	760	4

TYPICAL SURFACING SECTION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(213)45	F6	F32

Plotting Date: 06/08/2023

Sta. 400+49.9 to Sta. 401+25 NBL



Plot Scale - 1:6

Plotted From - TRRC11626

File - ...Ifriv06DQ\Design\06dq typ.dgn

HORIZONTAL ALIGNMENT DATA

US18 Northbound										
Type	Station			Northing	Easting	Type	Station		Northing	Easting
PI	358+53.02	R = 14100.00	Delta = 3°01'06" L	394740.411	1153367.988	PI	401+97.99		398884.762	1152493.006
PT	362+24.33			395074.133	1153204.802			TL= 46.76	N 4°46'31" E	
		TL= 318.85	N 26°03'29" W			PI	402+44.75		398931.364	1152496.899
PC	365+43.18			395360.571	1153064.737			TL= 39.23	N 4°45'41" E	
PI	368+71.41	R = 14100.00	Delta = 2°40'01" R	395655.437	1152920.552	PI	402+83.98		398970.455	1152500.155
PT	371+99.52			395956.692	1152790.243			TL= 33.10	N 4°40'56" E	
		TL= 393.65	N 23°23'27" W			PI	403+17.08		399003.446	1152502.857
PC	375+93.17			396317.989	1152633.964			TL= 37.83	N 4°59'05" E	
PI	383+47.10	R = 3000.00	Delta = 28°12'49" R	397009.960	1152334.651	PI	403+54.91		399041.132	1152506.144
PT	390+70.44			397761.221	1152398.037			TL= 49.47	N 4°42'52" E	
		TL= 1495.39	N 4°49'22" E			PI	404+04.38		399090.435	1152510.210
POB	398+34.19			398522.273	1152462.182			TL= 48.63	N 4°54'11" E	
		TL= 40.61	N 4°58'21" E			PI	404+53.01		399138.883	1152514.366
PI	398+74.80			398562.730	1152465.702			TL= 47.00	N 4°44'23" E	
		TL= 46.36	N 4°49'49" E			PI	405+00.01		399185.726	1152518.250
PI	399+21.16			398608.929	1152469.606			TL= 29.82	N 5°06'54" E	
		TL= 15.60	N 4°40'34" E			PI	405+29.84		399215.432	1152520.909
PI	399+36.77			398624.480	1152470.878			TL= 35.80	N 4°50'31" E	
		TL= 25.87	N 5°01'05" E			PI	405+65.64		399251.107	1152523.931
PI	399+62.64			398650.252	1152473.141			TL= 47.81	N 5°18'11" E	
		TL= 23.03	N 4°28'37" E			PI	406+13.45		399298.716	1152528.350
PI	399+85.67			398673.216	1152474.939			TL= 47.74	N 5°55'12" E	
		TL= 25.76	N 5°09'35" E			PI	406+61.19		399346.202	1152533.274
PI	400+11.44			398698.876	1152477.256			TL= 47.98	N 6°57'26" E	
		TL= 15.95	N 4°11'10" E			PI	407+09.18		399393.831	1152539.086
PI	400+27.38			398714.779	1152478.420			TL= 49.49	N 7°22'44" E	
		TL= 20.00	N 5°08'26" E			PI	407+58.67		399442.912	1152545.442
PI	400+47.38			398734.699	1152480.212			TL= 47.60	N 8°36'11" E	
		TL= 2.66	N 5°16'07" E			PI	408+06.27		399489.981	1152552.563
PI	400+50.04			398737.345	1152480.456			TL= 50.35	N 9°05'15" E	
		TL= 14.75	N 5°02'59" E			PI	408+56.63		399539.703	1152560.516
PI	400+64.79			398752.034	1152481.754			TL= 47.58	N 10°04'52" E	
		TL= 41.87	N 4°42'41" E			PI	409+04.20		399586.546	1152568.844
PI	401+06.66			398793.762	1152485.193			TL= 49.23	N 10°34'24" E	
		TL= 43.78	N 5°04'51" E			PI	409+53.44		399634.943	1152577.878
PI	401+50.43			398837.368	1152489.070			TL= 48.23	N 11°44'43" E	
		TL= 47.56	N 4°44'51" E			POE	410+01.66		399682.159	1152587.695

CONTROL DATA

POINT	DESCRIPTION	NORTHING	EASTING	ELEVATION
REFMRK	HARN point. NGS survey marker. PID OT0653. Stainless steel rod under cover.	403645.586	1154113.307	3203.544
REFMRK	NGS survey marker. PID OT0653. Steel pipe with a cap in a PVC sleeve.	399008.441	1152303.914	3079.611
REFMRK	Spike with feather chaser.	398733.136	1152458.779	3076.142
REFMRK	Spike with feather chaser.	398672.731	1152447.422	3057.392

LEGEND

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(213)45	F9	F32

Plotting Date: 06/08/2023

Plot Scale - 1:200

Plotted From - TRR011626

Anchor		Hedge		Septic Tank		State and National Line	
Antenna		Highway ROW Marker		Shrub Tree		County Line	
Approach		Interstate Close Gate		Sidewalk		Section Line	
Assumed Corner		Iron Pin		Sign Face		Quarter Line	
Azimuth Marker		Irrigation Ditch		Sign Post		Sixteenth Line	
BBQ Grill/ Fireplace		Lake Edge		Slough Or Marsh		Property Line	
Bearing Tree		Lawn Sprinkler		Spring		Construction Line	
Bench Mark		Mailbox		Stream Gauge		ROW Line	
Box Culvert		Manhole Electric		Street Marker		New ROW Line	
Bridge		Manhole Gas		Subsurface Utility Exploration Test Hole		Cut and Fill Limits	
Brush		Manhole Miscellaneous		Telephone Fiber Optics		Control of Access	
Buildings		Manhole Sanitary Sewer		Telephone Junction Box		New Control of Access	
Bulk Tank		Manhole Storm Sewer		Telephone Pole		Proposed ROW	
Cattle Guard		Manhole Telephone		Television Cable Jct Box		(After Property Disposal)	
Cemetery		Manhole Water		Television Tower			
Centerline		Merry-Go-Round		Test Wells/Bore Holes			
Cistern		Microwave Radio Tower		Traffic Signal		Drainage Arrow	
Clothes Line		Miscellaneous Line		Trash Barrel			
Commercial Sign Double Face		Miscellaneous Property Corner		Tree Belt			
Commercial Sign One Post		Miscellaneous Post		Tree Coniferous		Remove Concrete Pavement	
Commercial Sign Overhead		Overhang Or Encroachment		Tree Deciduous		Remove Concrete Driveway Pavement	
Commercial Sign Two Post		Overhead Utility Line		Tree Stumps		Remove Asphalt Concrete Pavement	
Concrete Symbol		Parking Meter		Triangulation Station		Remove Concrete Sidewalk	
Control Point		Pedestrian Push Button Pole		Underground Electric Line		Remove Concrete Median Pavement	
Creek Edge		Pipe With End Section		Underground Gas Line		Remove Concrete Curb and/or Gutter	
Curb/Gutter		Pipe With Headwall		Underground High Pressure Gas Line			
Curb		Pipe Without End Section		Underground Sanitary Sewer			
Dam Grade/Dike/Levee		Playground Slide		Underground Storm Sewer			
Deck Edge		Playground Swing		Underground Tank			
Ditch Block		Power And Light Pole		Underground Telephone Line			
Doorway Threshold		Power And Telephone Pole		Underground Television Cable			
Drainage Profile		Power Meter		Underground Water Line			
Drop Inlet		Power Pole		Warning Sign One Post			
Edge Of Asphalt		Power Pole And Transformer		Warning Sign Two Post			
Edge Of Concrete		Power Tower Structure		Water Fountain			
Edge Of Gravel		Propane Tank		Water Hydrant		Detectable Warning	
Edge Of Other		Property Pipe		Water Meter		Pedestrian Push Button Pole	
Edge Of Shoulder		Property Pipe With Cap		Water Tower		and 30" x 48" Clear Space	
Electric Transformer/Power Junction Box		Property Stone		Water Valve		with 1.5% slope	
Fence Barbwire		Public Telephone		Water Well			
Fence Chainlink		Railroad Crossing Signal		Weir Rock			
Fence Electric		Railroad Milepost Marker		Windmill			
Fence Miscellaneous		Railroad Profile		Wingwall			
Fence Rock		Railroad ROW Marker		Witness Corner			
Fence Snow		Railroad Signs					
Fence Wood		Railroad Switch					
Fence Woven		Railroad Track					
Fire Hydrant		Railroad Trestle					
Flag Pole		Rebar					
Flower Bed		Rebar With Cap					
Gas Valve Or Meter		Reference Mark					
Gas Pump Island		Regulatory Sign One Post					
Grain Bin		Regulatory Sign Two Post					
Guardrail		Retaining Wall					
Guide Sign One Post		Riprap					
Guide Sign Two Post		River Edge					
Gutter		Rock And Wire Baskets					
Guy Pole		Rockpiles					
Haystack		Satellite Dish					

File - ...\\pjr\rv\060\Design\Legend.dgn

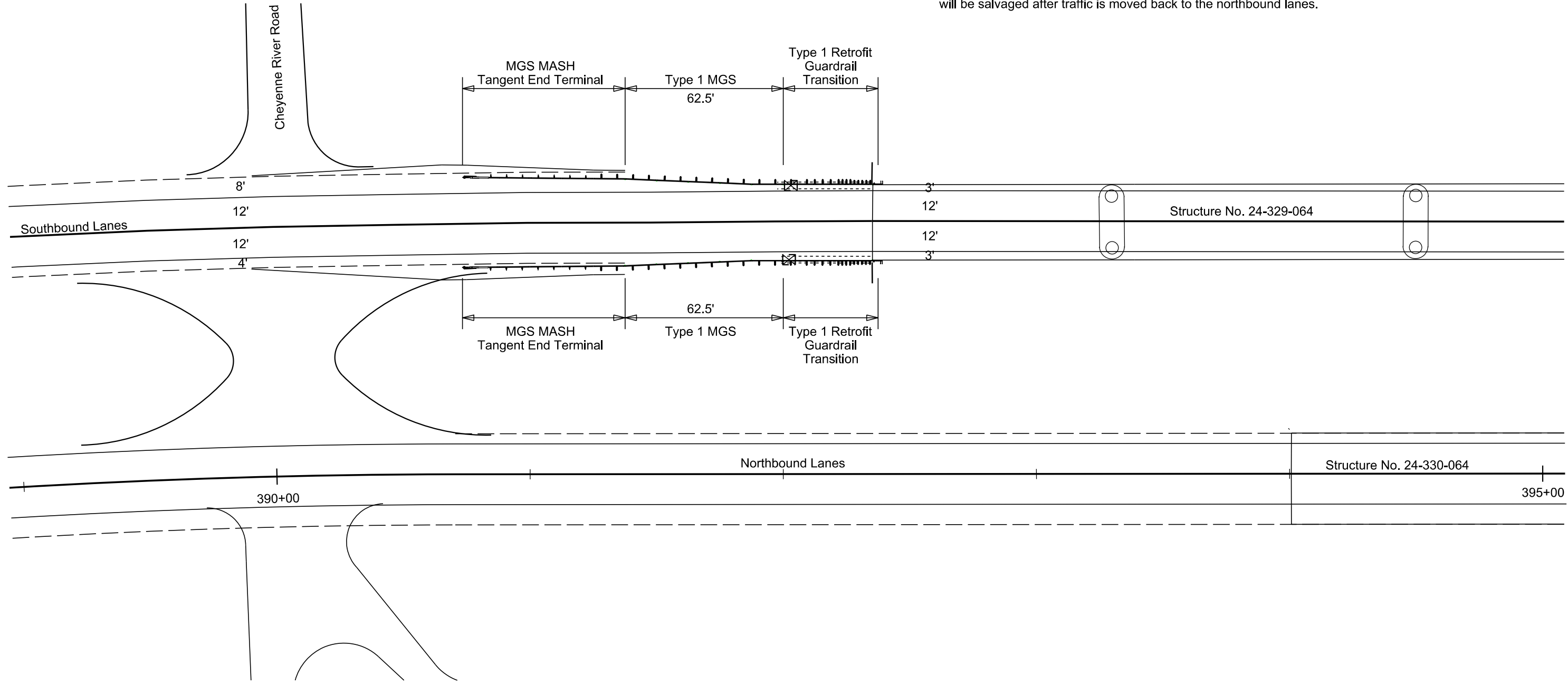
GUARDRAIL LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(213)45	F10	F32

Plotting Date: 06/08/2023



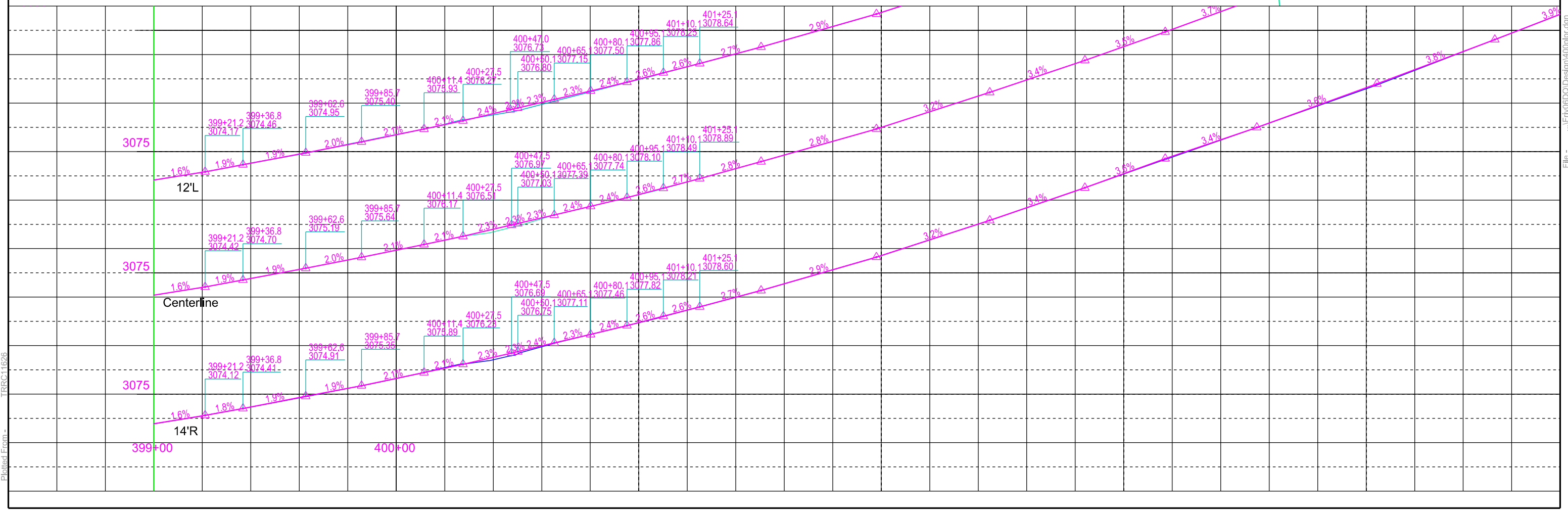
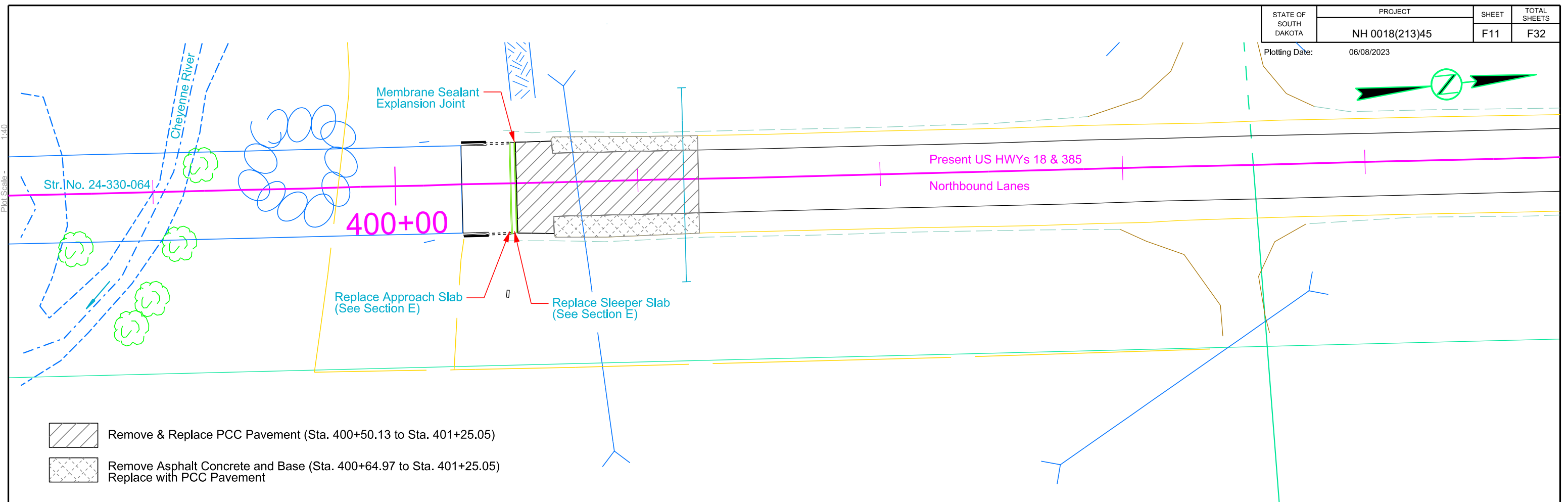
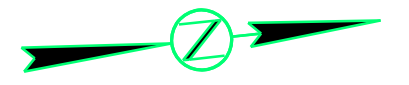
Note: Guardrail installed at the south end of Structure 24-329-064 is temporary for two-way traffic during construction. This guardrail will be salvaged after traffic is moved back to the northbound lanes.



Plot Scale - 1:40

Plotted From - TRRC11626

File - ...:\p1\Fr\06DQ\Design\06DQgr.dgn



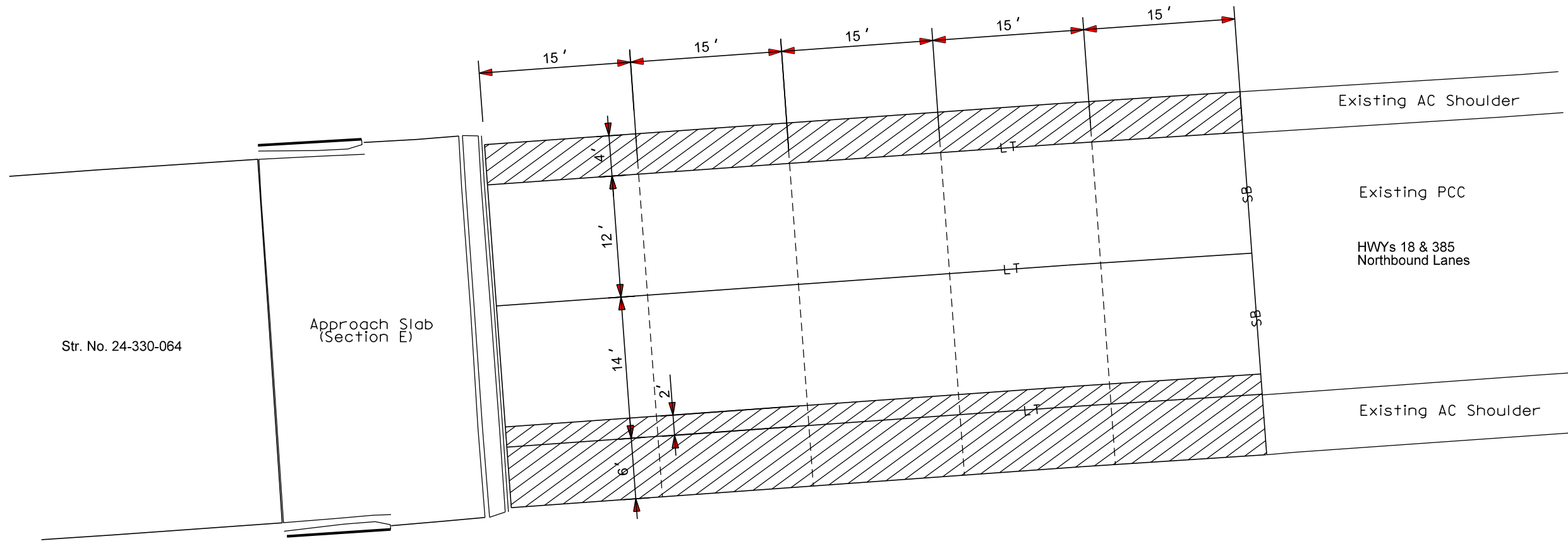
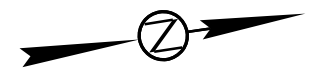
Plot Scale - 1"=40'

Plotted From - TRR011626


File - ...:\Frriv06\DA\Design\400\papr.dgn

PCC PAVEMENT JOINT LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(213)45	F12	F32
Plotting Date:		06/08/2023	



LEGEND:
 Transverse Joint spacing = Match existing
 Longitudinal Joint With Tie Bars (Construction or Sawed) ————LT———LT———
 Transverse Contraction Joint ————LT———LT———
 Steel Bar Installation in Longitudinal or Transverse Joint ————SB———SB———

 Transverse contraction joints within these areas will not have dowel bar assemblies. All other transverse contraction joints will have dowel bar assemblies.

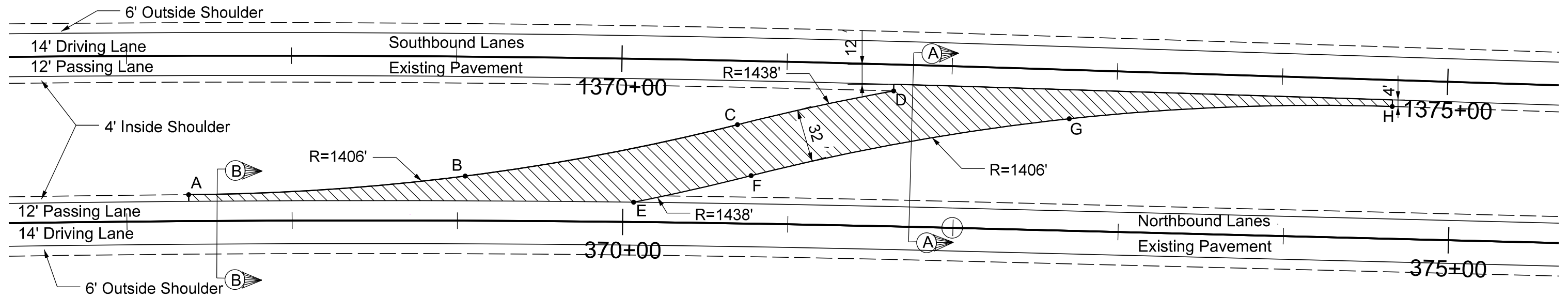
Plot Scale - 1:12

Plotted From - TRRC11626

File - ...IPCC Pavement Joint Layout.dgn

MEDIAN CROSSOVER LAYOUT

Sta. 370+93 NBL



GENERAL NOTES:

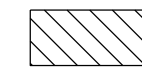
The intent of this plan is to show the construction requirements for this median crossover.

Construction of median crossover shall conform to the requirement of Current Standard Specifications.

Sections A-A & B-B depict the surfacing requirements.

Point	MEDIAN	
	Station	* Offset
A	367+37.5	16.0' Lt.
B	369+04.6	27.0' Lt.
C	370+68.6	59.8' Lt.
D	371+62.2	82.0' Lt.
E	370+06.5	12.0' Lt.
F	370+76.9	28.9' Lt.
G	372+68.7	67.8' Lt.
H	374+63.9	80.1' Lt.

(*) Offset distance from NB centerline



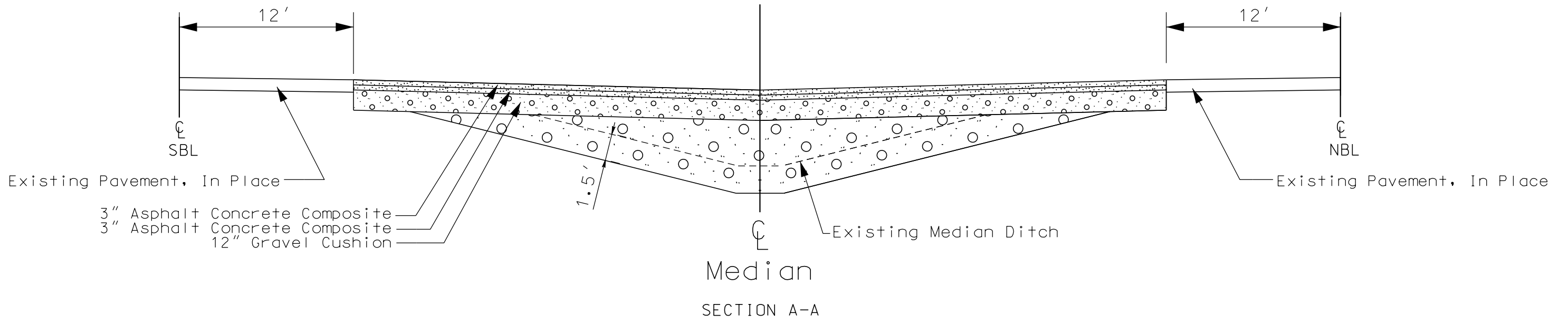
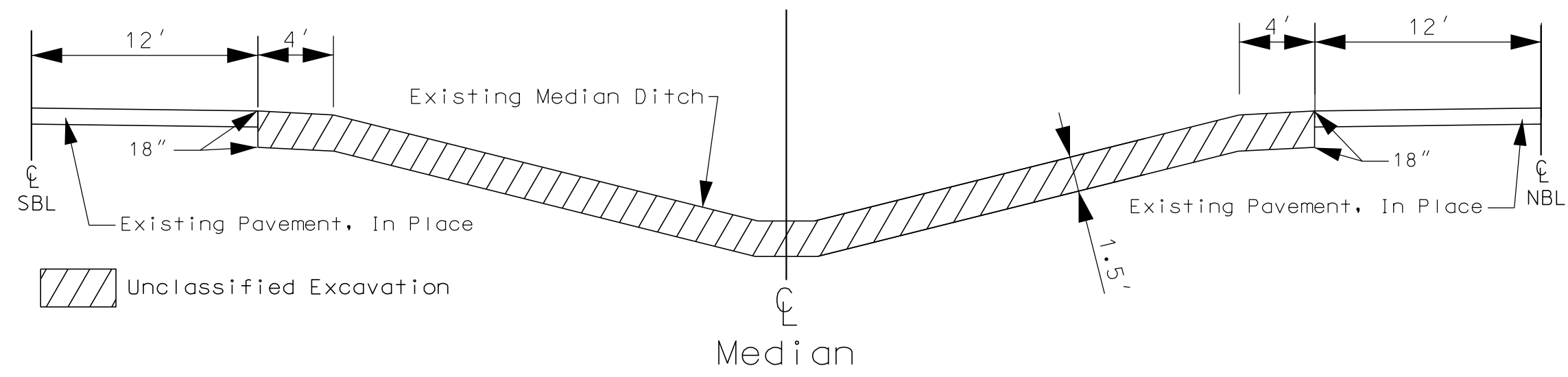
6" Asphalt Concrete Composite,
12" Gravel Cushion, and Variable
Depth Pit Run Material

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(213)45	F14	F32

Plotting Date: 06/08/2023

MEDIAN CROSSOVER TYPICAL

Sta. 370+93 NBL



Plot Scale - 1:60

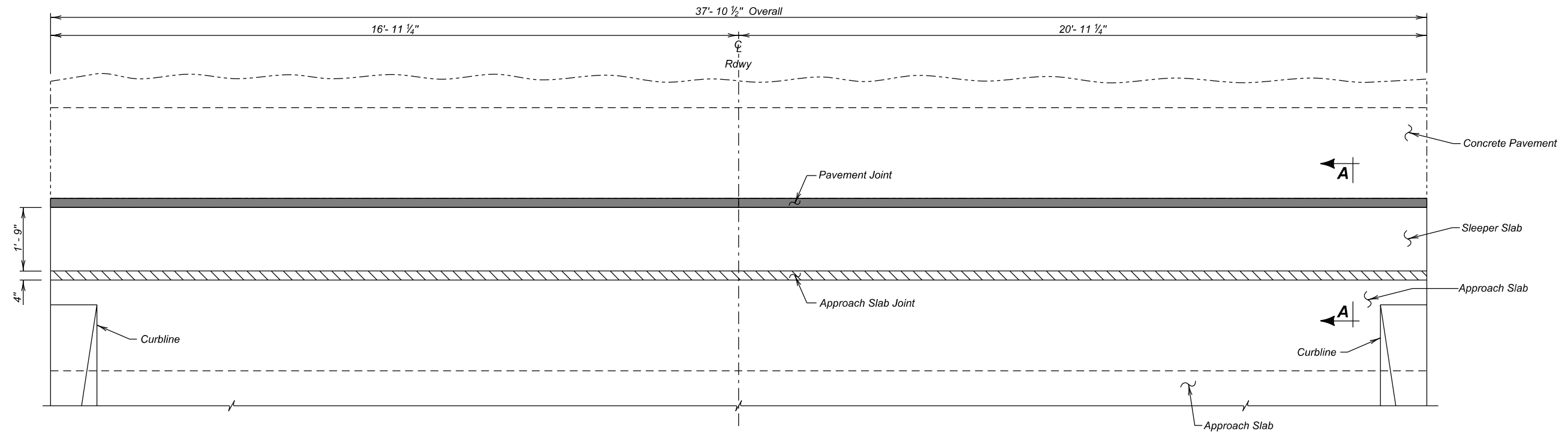
Plotted From - TRRC11626

File - ...IDesign\Median Xover Layout.dgn

Membrane Sealant Expansion Joint Details

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(213)45	F15	F32

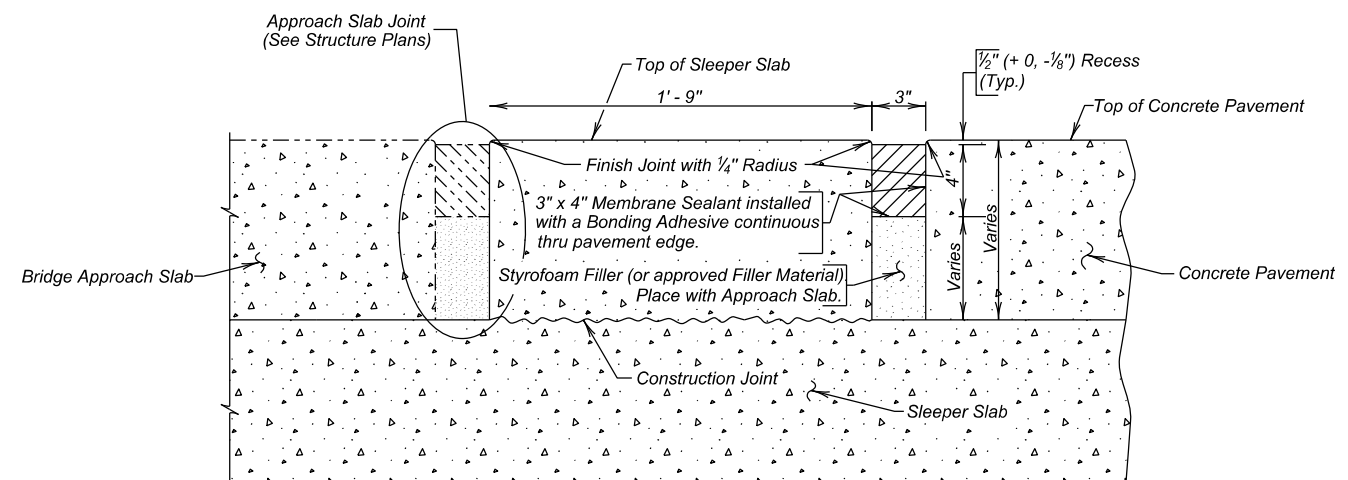
Plotting Date: 06/08/2023



PLAN

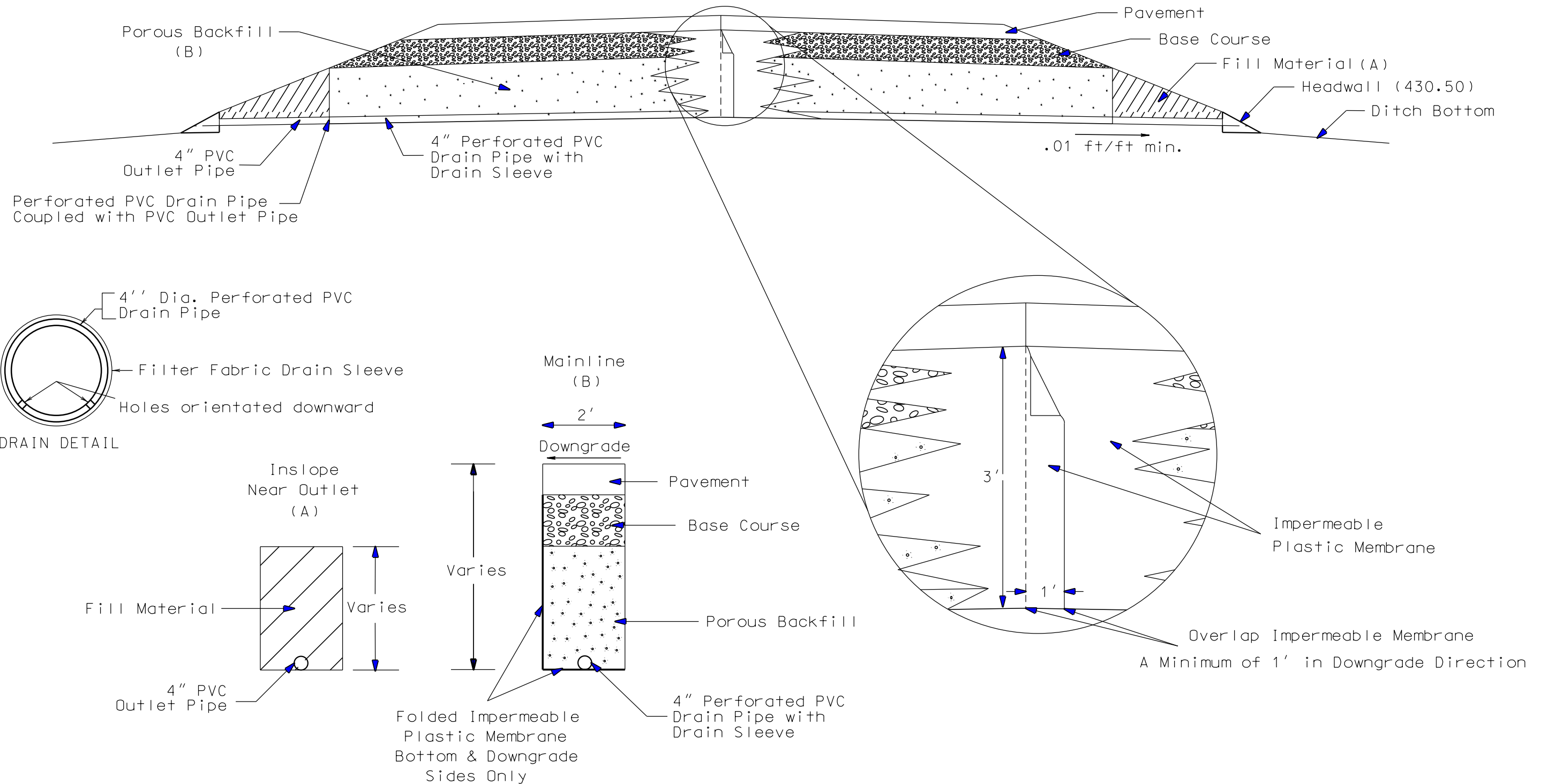
GENERAL NOTES

- The membrane sealant will be on the approved product list for membrane sealant expansion joints.
- The manufacturer will supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension will be as recommended by the sealant manufacturer to provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension. In no case will the precompressed dimension exceed 75% of the joint opening width. The foam sealant will be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.
- The membrane sealant will be supplied in pieces 5 feet in length or longer. The foam sealant will be ultra-violet and ozone resistant.
- The bonding adhesive used to attach the membrane sealant to the adjacent concrete will be approved by the membrane sealant manufacturer.
- Adhesive used to join adjacent pieces of the membrane sealant will be as recommended by the manufacturer.
- If styrofoam filler material is used in the construction, it will be closed cell and water-tight as approved by the Engineer.
- The minimum ambient air temperature at the time of joint installation and adhesive curing will be 40° F.
- A technical representative of the membrane sealant manufacturer will be present at the jobsite during installation. The technical representative will be knowledgeable in the correct procedures for the preparation and installation of the joint material to insure the Contractor installs the joint to the Manufacturers recommendations.
- Concrete surfaces that will be in contact with the membrane sealant will be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the concrete surface. At a minimum two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the concrete surface will be required. Cleaning of the concrete surfaces with solvents, wire brushing, or grinding will not be permitted.
- After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface will be air blasted. The air compressor used for joint cleaning will be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent concrete surfaces must be dry and clean. The contact surfaces for the joint will be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.
- Individual spliced sections will be installed as per the manufacturers' recommendations. The membrane joint sealant manufacturer will submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.
- Traffic will not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
- Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spall areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.
- The membrane sealant expansion joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The membrane sealant expansion joint will be paid for at the contract unit price per foot complete in place. Payment for this item will be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.



SECTION A - A

Typical Cutoff Drain Installation



Plot Scale - 1:5

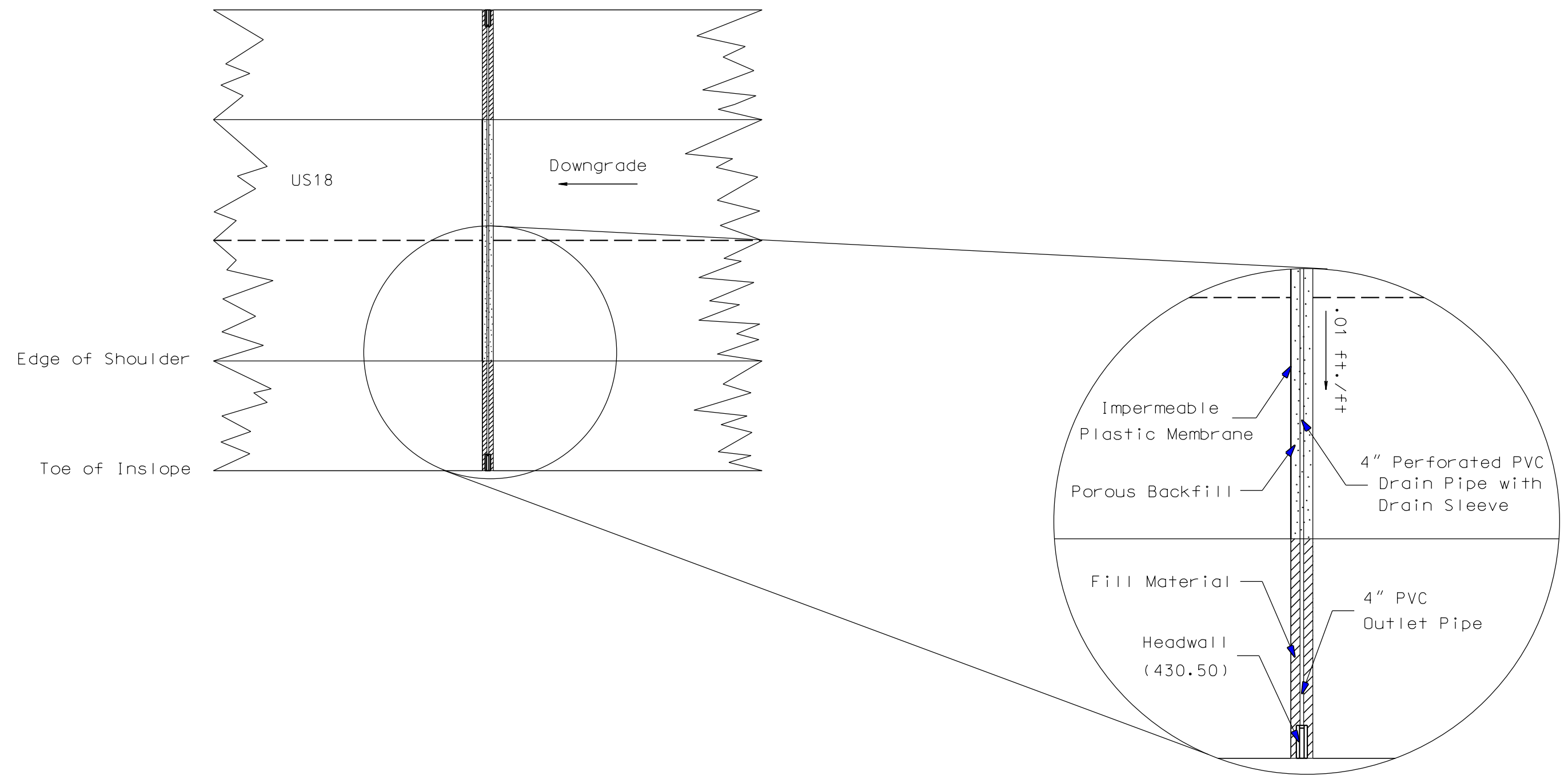
Plotted From - TRRC11626

Plotted From -

File - ...IDesign\PVC Cutoff Drain.dgn

Typical Cutoff Drain Installation

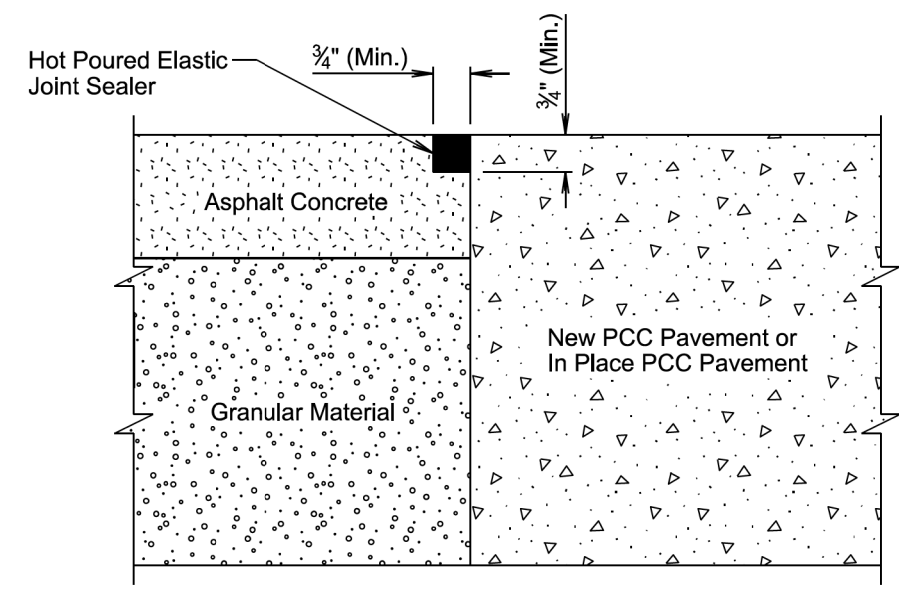
Plot Scale - 1:5



Plotted From - TRRC11626

File - ...IDesignPVC Cutoff Drain.dgn

Plot Scale - 1:200

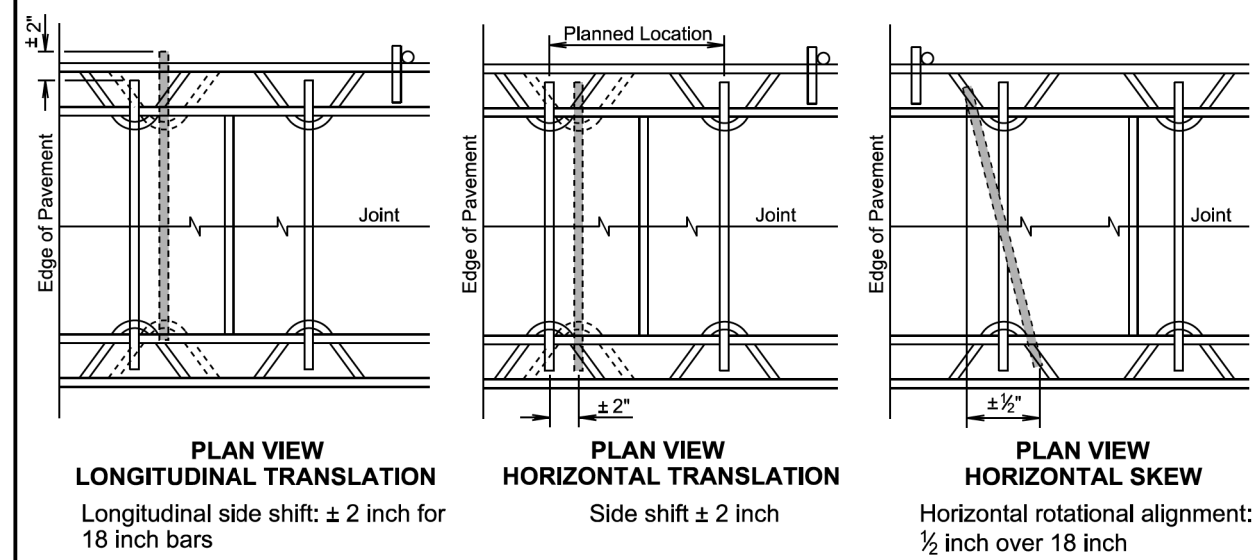
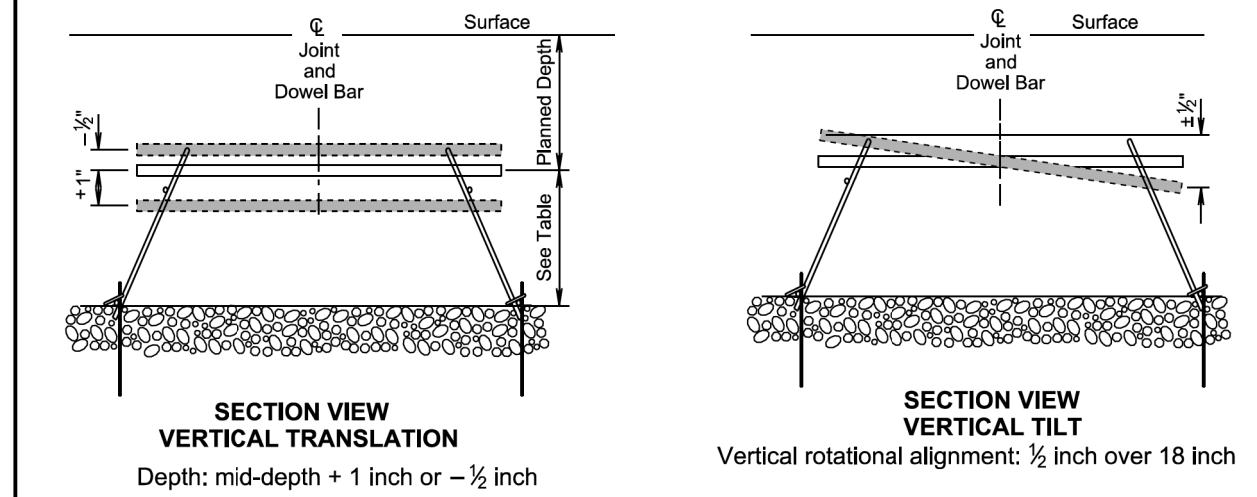


TRANSVERSE SECTION
(Asphalt Concrete Shoulder Joint)

September 14, 2019

S D D O T	ASPHALT CONCRETE SHOULDER JOINT ADJACENT TO PCC PAVEMENT	PLATE NUMBER 320.15
		Sheet 1 of 1

Published Date: 2024



PAVEMENT THICKNESS	EPOXY COATED DOWEL BAR SIZE	HEIGHT TO CENTER
7" to 7 1/2"	1" x 18"	3.0"
8" to 10"	1 1/4" x 18"	4.0"
10 1/2" to 13"	1 1/2" x 18"	5.0"

GENERAL NOTE:

The tolerances shown above represent the maximum deviation for acceptance of dowel bar placement.

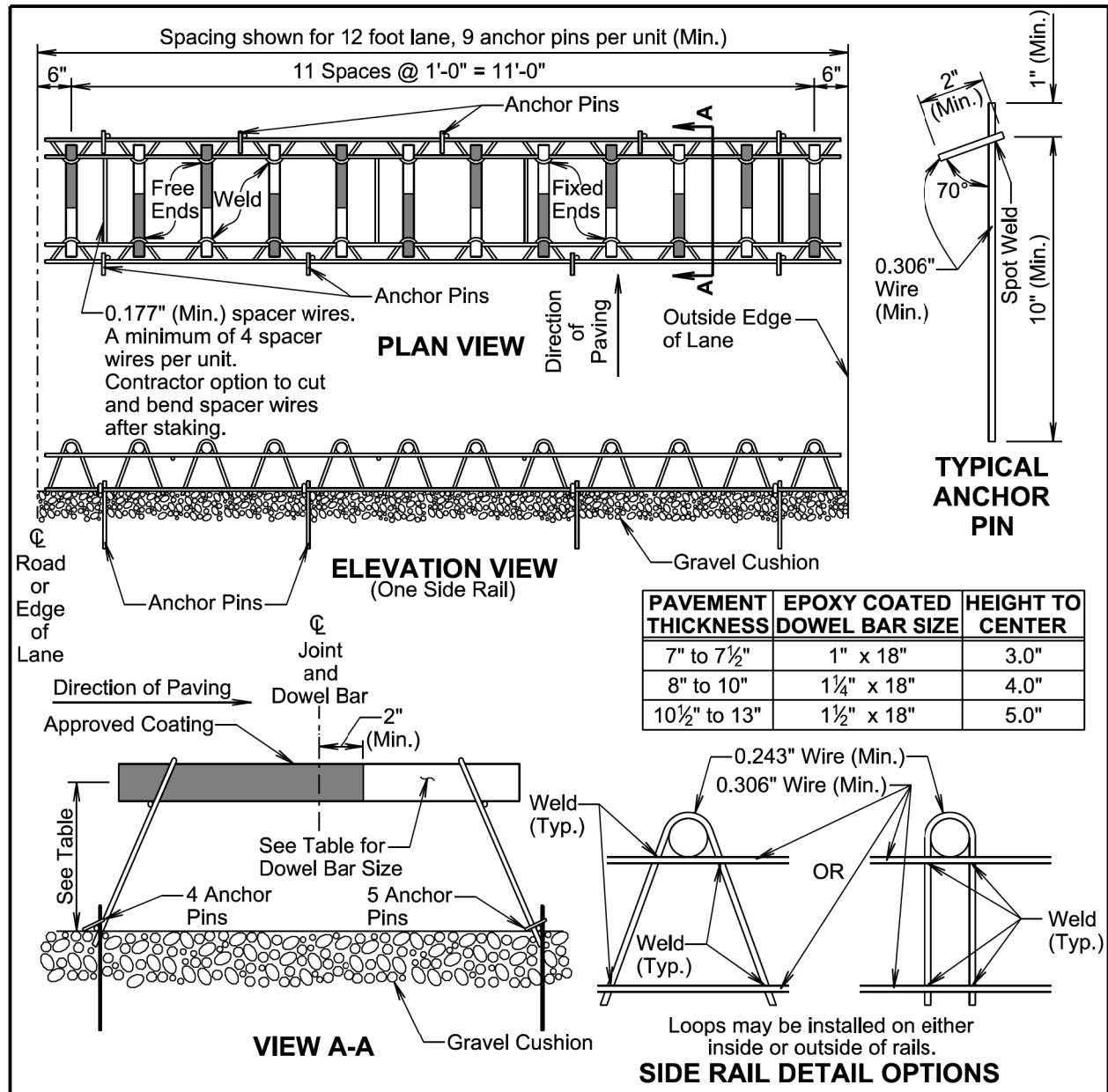
November 19, 2022

S D D O T	PCC PAVEMENT DOWEL BAR ALIGNMENT TOLERANCES	PLATE NUMBER 380.01
		Sheet 1 of 1

Published Date: 2024

Plotted From - TRRC11626

File - ...I:\design\SecF_Standard\Plates.dgn



GENERAL NOTES:

Longitudinal joint tie bars will be placed a minimum of 15 inches from the transverse contraction joint.

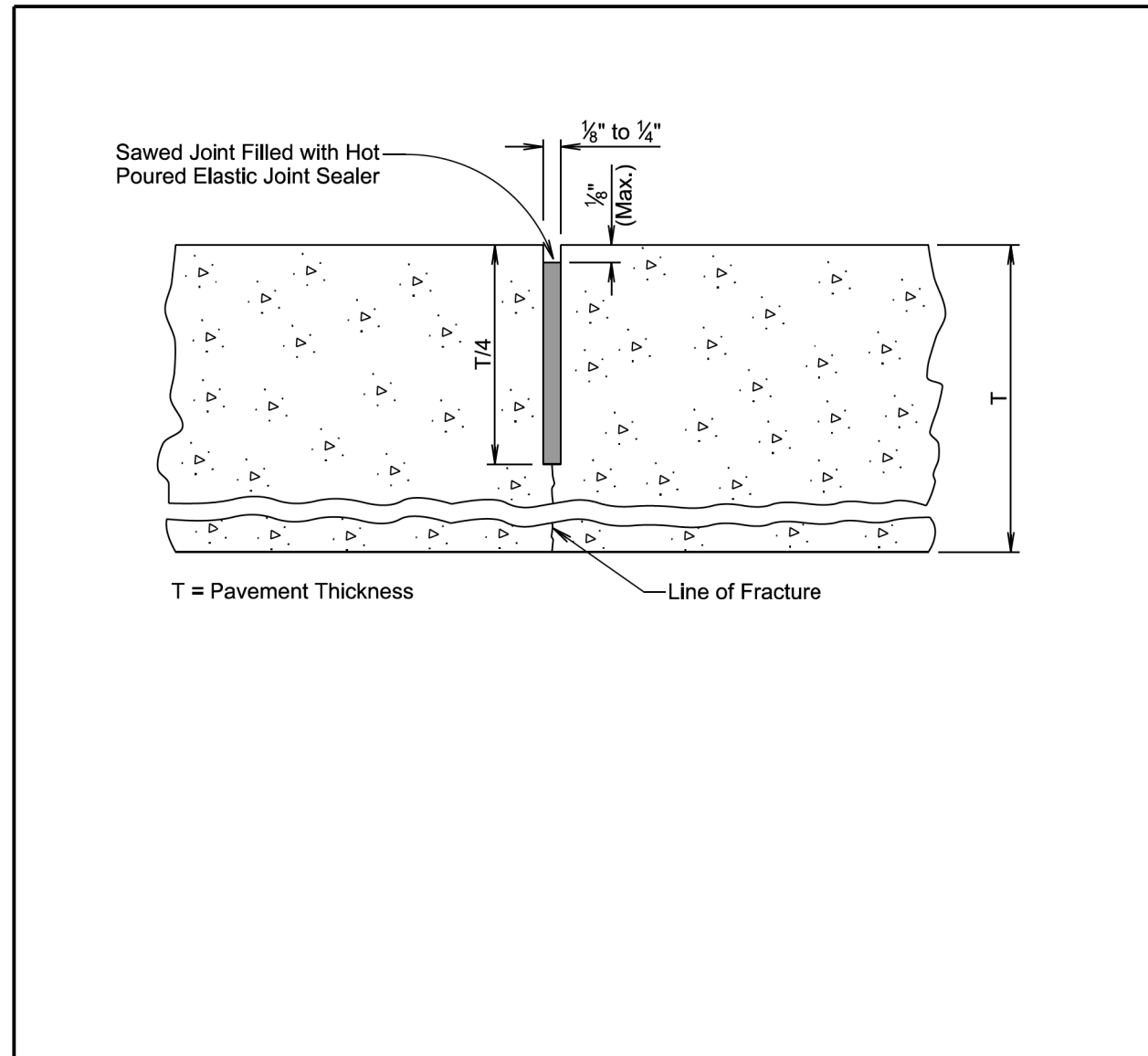
The transverse contraction joints will be sawed perpendicular to the centerline of the roadway. The transverse sawed joint will be centered over the dowel bars.

Supporting devices as shown on this sheet, or equivalent as approved by the Engineer, will be used to maintain proper horizontal and vertical alignment of the dowel bars.

All dowel bar alignment tolerances will be as shown in the PCC Pavement Dowel Bar Alignment Tolerances standard plate.

November 19, 2022

Published Date: 2024	S D D O T	PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS	PLATE NUMBER 380.04
		12 Bar Assembly on Granular Base Material	Sheet 1 of 1



GENERAL NOTES:

If an early entrance saw cut does not develop the full transverse crack, then the saw cut to control cracking will be a minimum ¼ of the thickness of the pavement.

All hot poured elastic joint sealer material spilled on the surface of the concrete pavement will be removed as soon as the material has cooled. The extent of removal of material will be to the satisfaction of the Engineer. All costs for removal of the spilled joint sealer material will be borne by the Contractor.

November 19, 2022

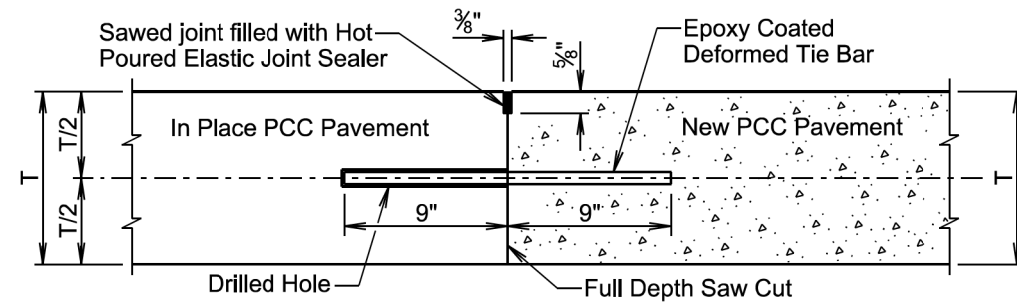
Published Date: 2024	S D D O T	PCC PAVEMENT TRANSVERSE CONTRACTION JOINT WITH OR WITHOUT DOWEL BAR ASSEMBLY	PLATE NUMBER 380.12
			Sheet 1 of 1

Plot Scale - 1:200

Plotted From - TRRC11626

File - ...I:\design\SecF_StandardPlates.dgn

DETAIL A TRANSVERSE CONSTRUCTION JOINT WITH TIE BARS



T = In Place PCC Pavement and New PCC Pavement Thickness

GENERAL NOTES:

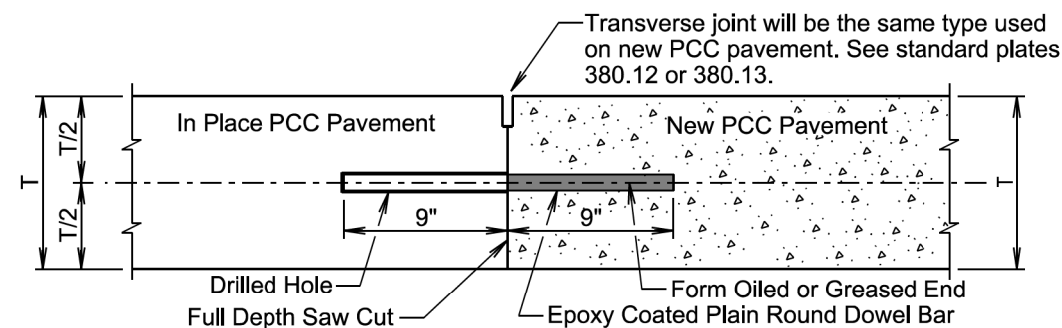
The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.

See sheet 2 of 2 of this standard plate to determine if Detail A will be used.

The tie bars will be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive or a non-shrink grout.

No. 9 epoxy coated deformed tie bars will be used in 10 inch thickness and less PCC Pavement and No. 11 epoxy coated deformed tie bars will be used in 10.5 inch thickness and greater PCC Pavement. The tie bar spacing will be 18 inches center to center and will be a minimum of 3 inches and a maximum of 9 inches from the pavement edges.

DETAIL B TRANSVERSE CONSTRUCTION JOINT WITH DOWEL BARS



T = In Place PCC Pavement and New PCC Pavement Thickness

GENERAL NOTES:

The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project or current project.

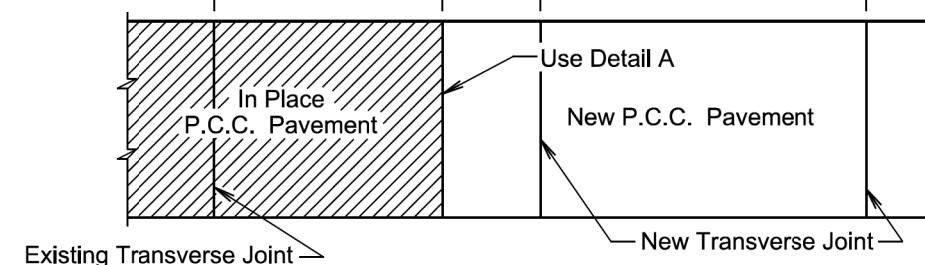
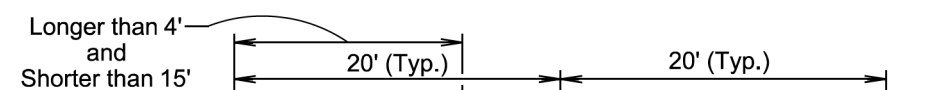
See sheet 2 of 2 of this standard plate to determine if Detail B will be used.

The plain round dowel bars will be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive or a non-shrink grout.

The epoxy coated plain round dowel bar size, number, and spacing will be the same as detailed on the corresponding dowel bar assembly standard plate (380.04, 380.05, 380.06, or 380.07). The epoxy coated plain round dowel bars will be a minimum of 3 inches and a maximum of 6 inches from the pavement edges.

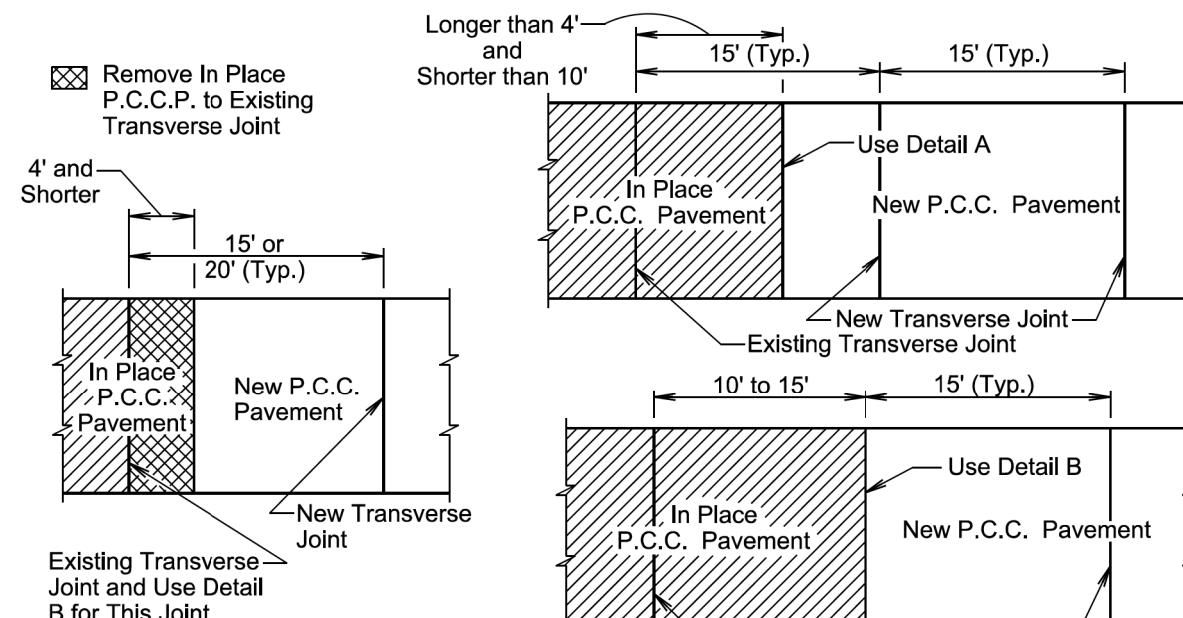
January 22, 2023

Published Date: 2024	S D D O T	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.15
			Sheet 1 of 2



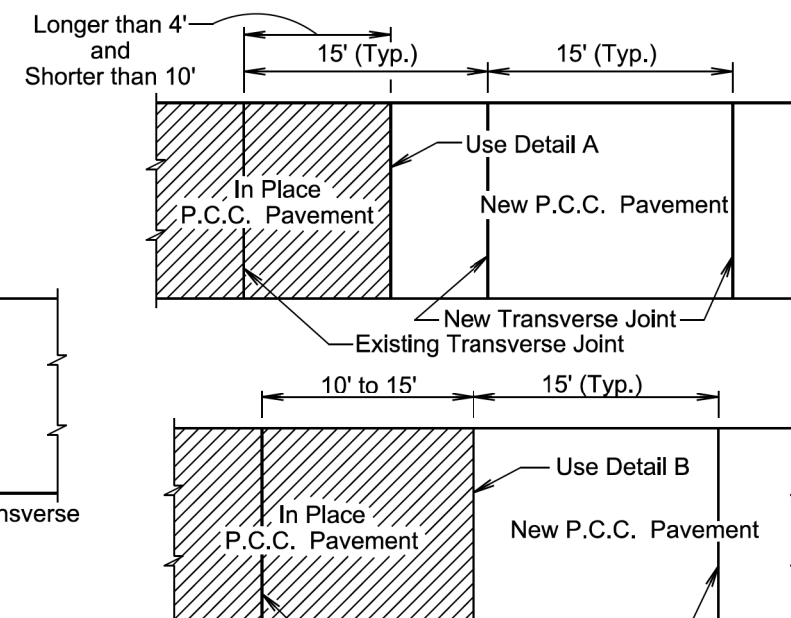
PLAN VIEW

(For typical transverse joint spacing of 20' on the current project)



PLAN VIEW

(For typical transverse joint spacing of 15' or 20' on the current project)



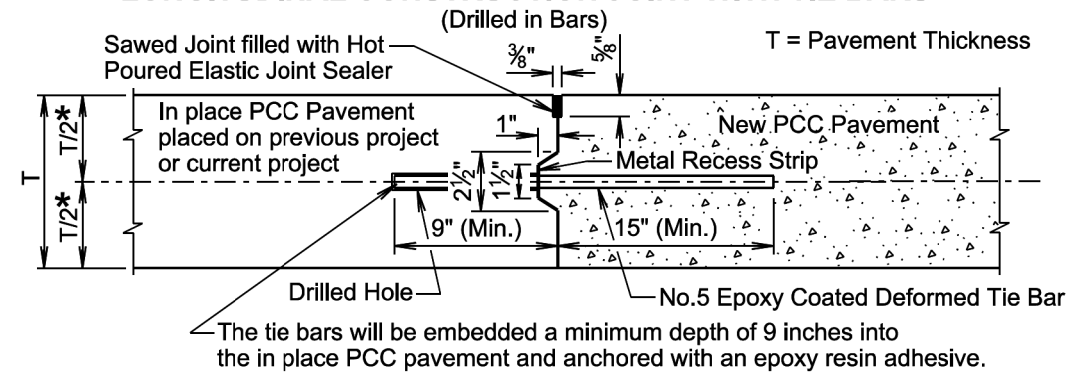
PLAN VIEW

(For typical transverse joint spacing of 15' on the current project)

January 22, 2023

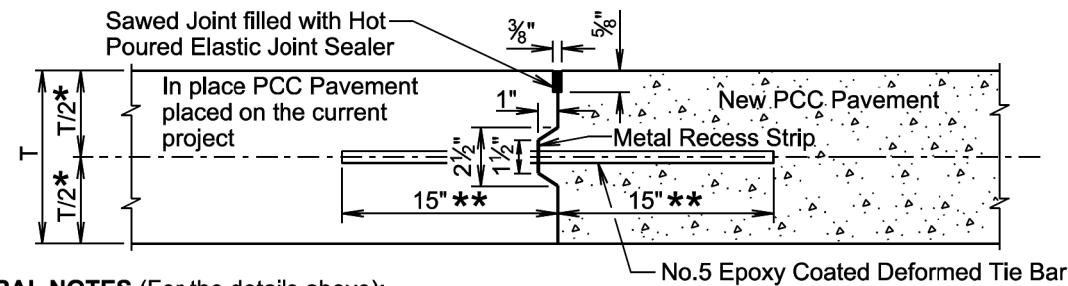
Published Date: 2024	S D D O T	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.15
			Sheet 2 of 2

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS



LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS

(Inserted or Formed in Bars)



GENERAL NOTES (For the details above):

The epoxy coated deformed tie bars will be spaced in accordance with the following tables:

TIE BAR SPACING 48" MAXIMUM	
Transverse Contraction Joint Spacing	Number of Tie Bars
6.5' to 10'	2
10.5' to 14'	3
14.5' to 18'	4
18.5' to 22'	5

TIE BAR SPACING 30" MAXIMUM	
Transverse Contraction Joint Spacing	Number of Tie Bars
5' to 7'	2
7.5' to 9.5'	3
10' to 12'	4
12.5' to 14.5'	5
15' to 17'	6
17.5' to 19.5'	7
20' to 22'	8

The tie bars will be placed a minimum of 15 inches from transverse contraction joints.

The required number of tie bars as shown in the table will be uniformly spaced within each panel. The uniformly spaced tie bars will be spaced a maximum of 48 inches center to center for a female keyway and will be spaced a maximum of 30 inches center to center for a vertical face and male keyway. The maximum tie bar spacing will apply to tie bars within each panel.

The keyway illustrated in the above details depict a female keyway.

The keyway is optional and is not required. When concrete pavement is formed and a keyway is provided, a metal recess strip will be used. When concrete pavement is slip formed, a metal recess strip is not required.

- * The vertical placement tolerance for any part of the tie bar will be $\pm T/6$.
- ** The transverse placement (side shift) tolerance will be ± 3 inches when measured perpendicular to the longitudinal joint line.

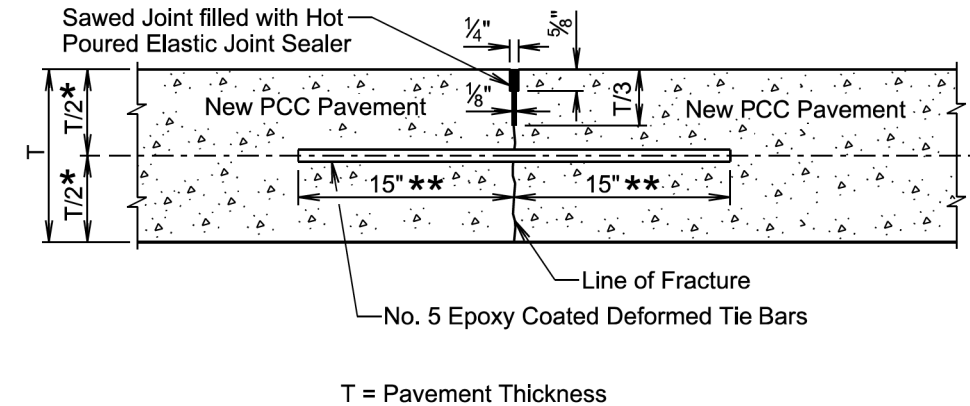
November 19, 2022

S D D O T	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.20
		Sheet 1 of 2

Published Date: 2024

SAWED LONGITUDINAL JOINT WITH TIE BARS

(Poured Monolithically)



GENERAL NOTES (For the detail above):

The epoxy coated deformed tie bars will be spaced in accordance with the following table:

TIE BAR SPACING 48" MAXIMUM	
Transverse Contraction Joint Spacing	Number of Tie Bars
6.5' to 10'	2
10.5' to 14'	3
14.5' to 18'	4
18.5' to 22'	5

The tie bars will be placed a minimum of 15 inches from the transverse contraction joints.

The required number of tie bars as shown in the table will be uniformly spaced within each panel with a maximum space of 48 inches center to center. The maximum tie bar spacing will apply to tie bars within each panel.

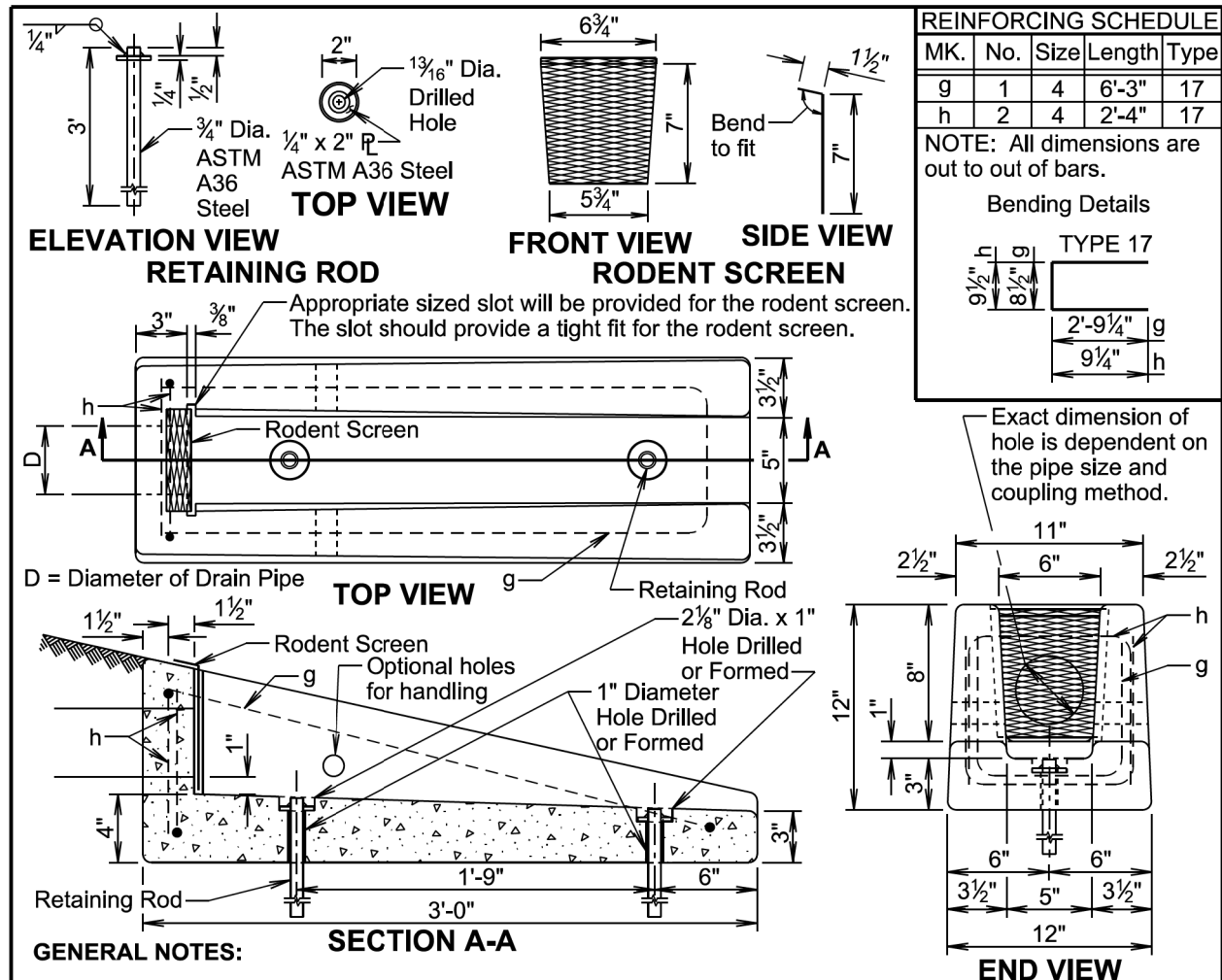
The first saw cut to control cracking will be a minimum of 1/3 the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the hot poured elastic joint sealer is necessary.

- * The vertical placement tolerance for any part of the tie bar will be $\pm T/6$.
- ** The transverse placement (side shift) tolerance will be ± 3 inches when measured perpendicular to the longitudinal joint line.

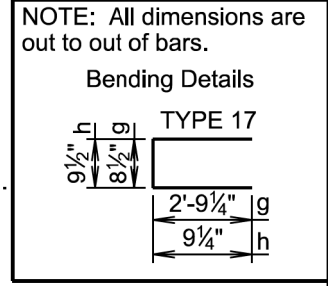
November 19, 2022

S D D O T	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.20
		Sheet 2 of 2

Published Date: 2024



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



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.

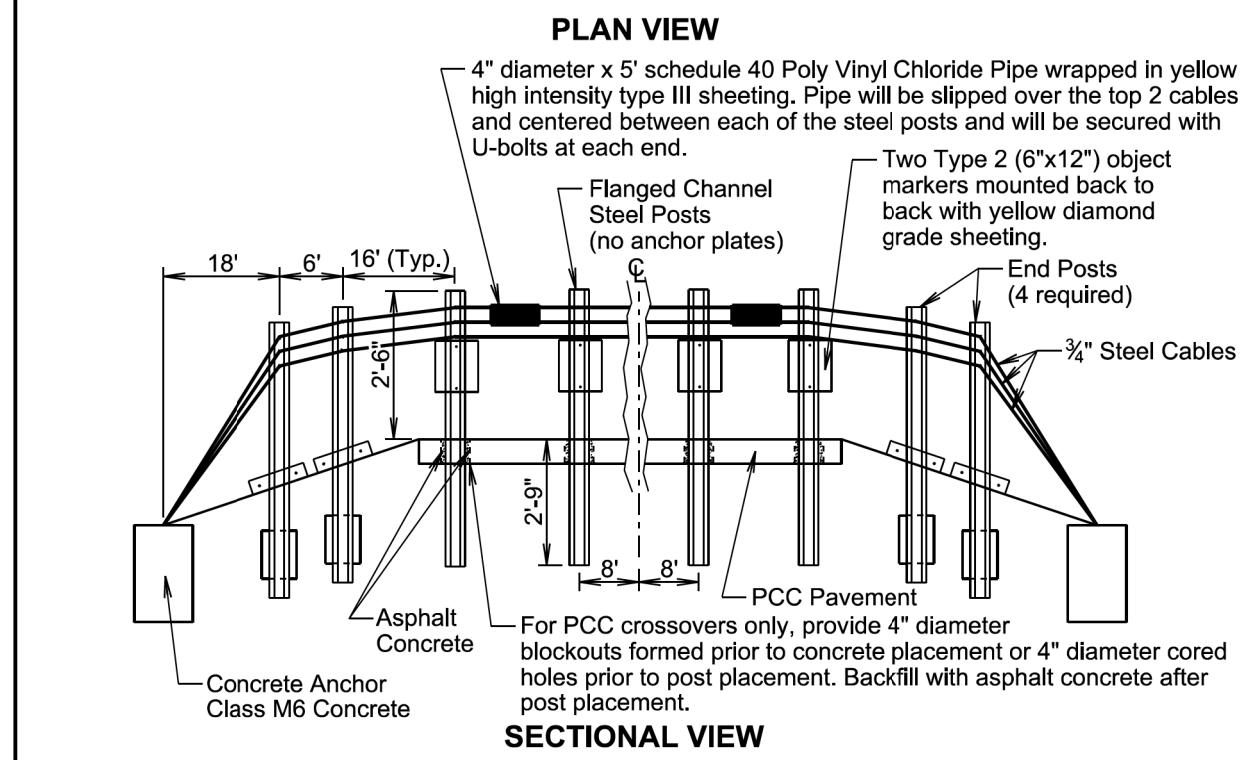
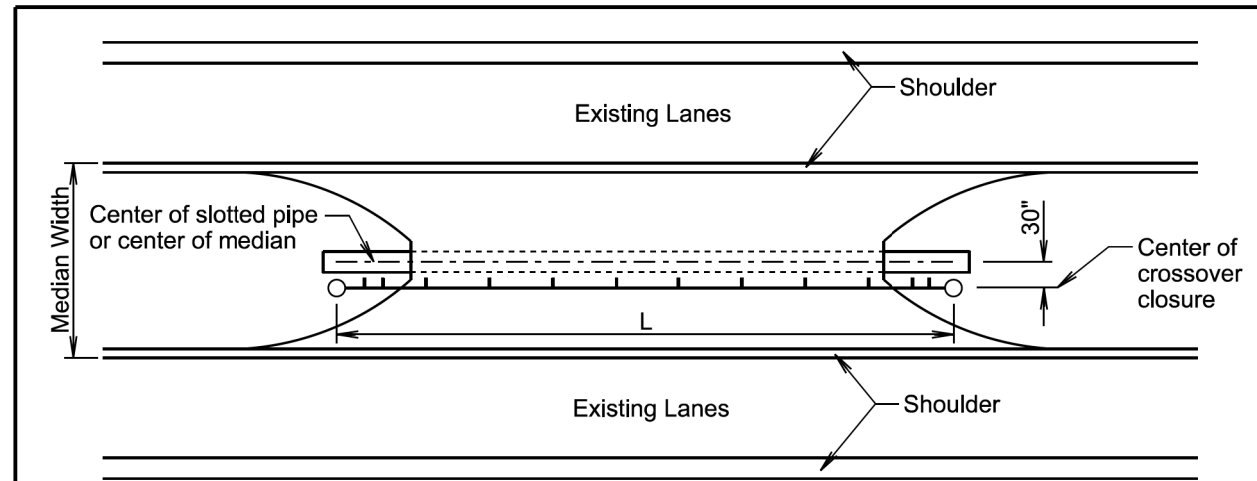
The retaining rod will be galvanized in accordance with ASTM A123 after all shop welding has been completed.

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".

November 19, 2021

S D D O T	PRECAST CONCRETE HEADWALL FOR DRAIN	PLATE NUMBER 430.50
	Published Date: 2024	Sheet 1 of 1



MEDIAN WIDTH	NO. OF PVC PIPES	NO. OF U-BOLTS	NO. OF FLANGED CHANNEL STEEL POSTS	NO. OF TYPE 2 OBJECT MARKERS	NO. OF BLOCKOUTS OR CORED HOLES (PCC CROSSOVERS)	PAY LENGTH L
60' and 66'	9	18	10	20	10	224'
80'	7	14	8	16	8	192'

GENERAL NOTES:

All costs for materials, backfilling holes with asphalt concrete, labor, equipment, and incidentals necessary to construct the crossover closure will be incidental to the contract unit price per foot for "Crossover Closure". The costs of coring holes or providing blockouts in the surfacing will be incidental to the surfacing bid item(s).

The Crossover Closure will be constructed using 3 cable guardrail hardware. For specific details of the 3 cable guardrail hardware and installation see standard plate 629.01.

September 14, 2018

S D D O T	CROSSOVER CLOSURE	PLATE NUMBER 629.40
	Published Date: 2024	Sheet 1 of 1

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'-1½"
3	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	1'-6¾"
4	Double	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"

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

GENERAL NOTES:

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

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

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

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

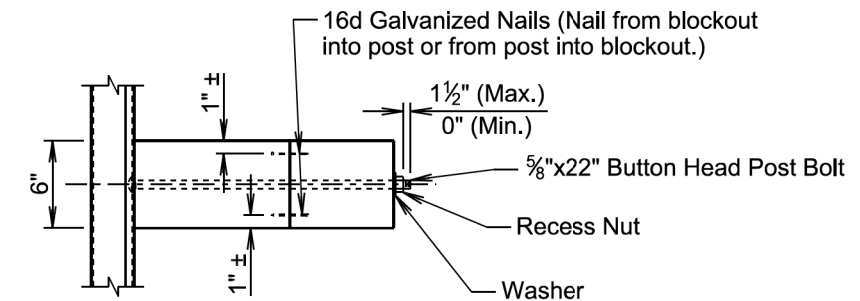
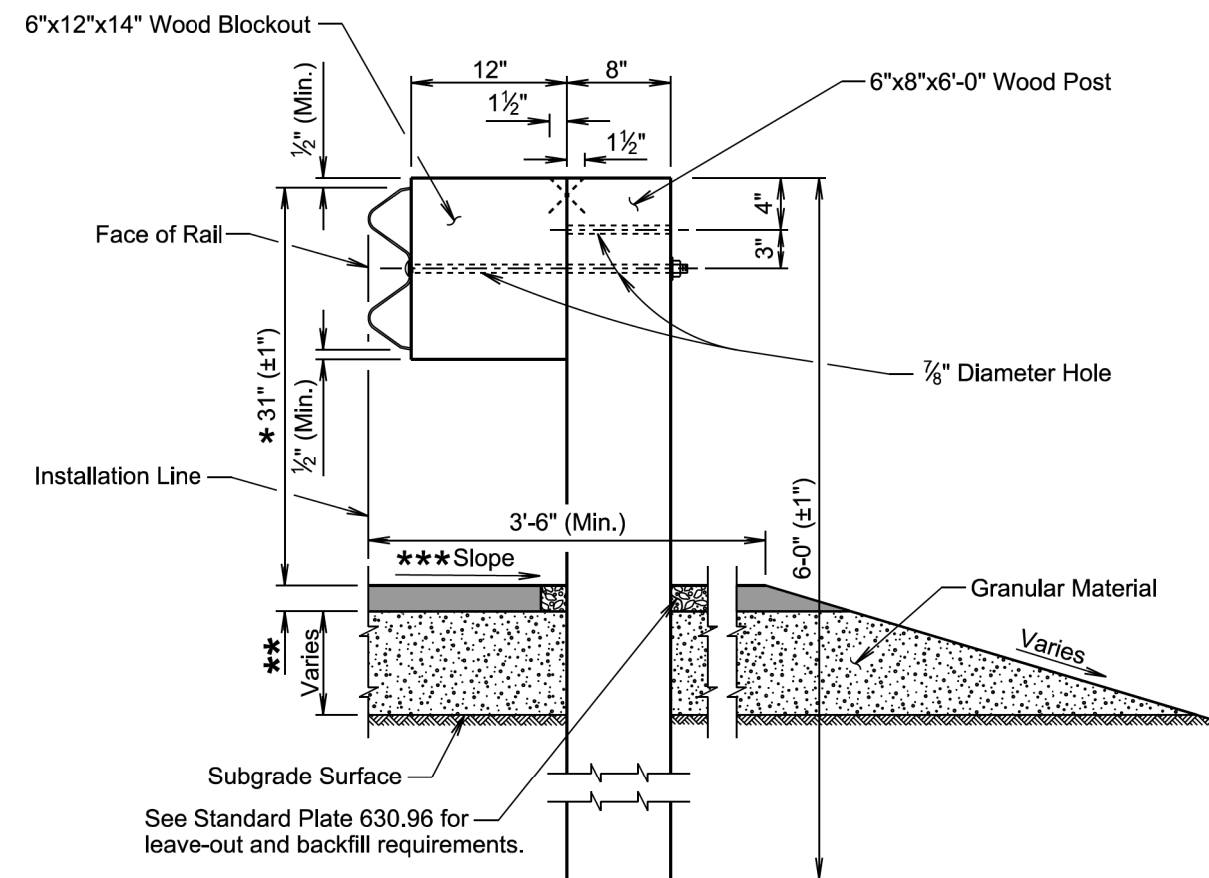
W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used will be compatible with the total length of rail per site as shown in the plans.

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: 2024	S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 1 of 6


TOP VIEW
(Type 1, 2, or 3 MGS Installation)

TRANSVERSE SECTION
(Type 1, 2, or 3 MGS Installation)

* See Standard Plate 630.99

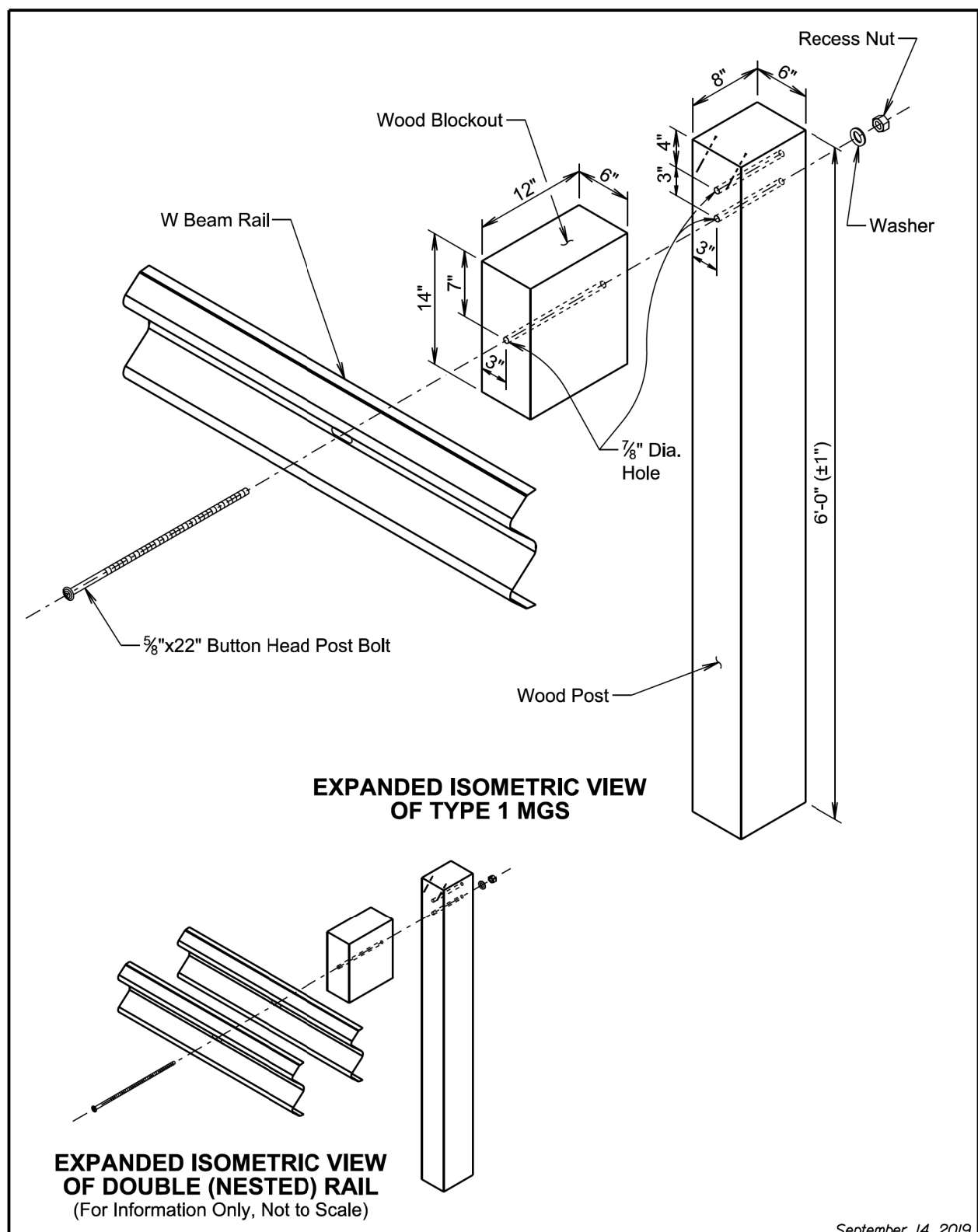
** 2" asphalt concrete or as specified in the plans.

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

September 14, 2019

Published Date: 2024	S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 2 of 6

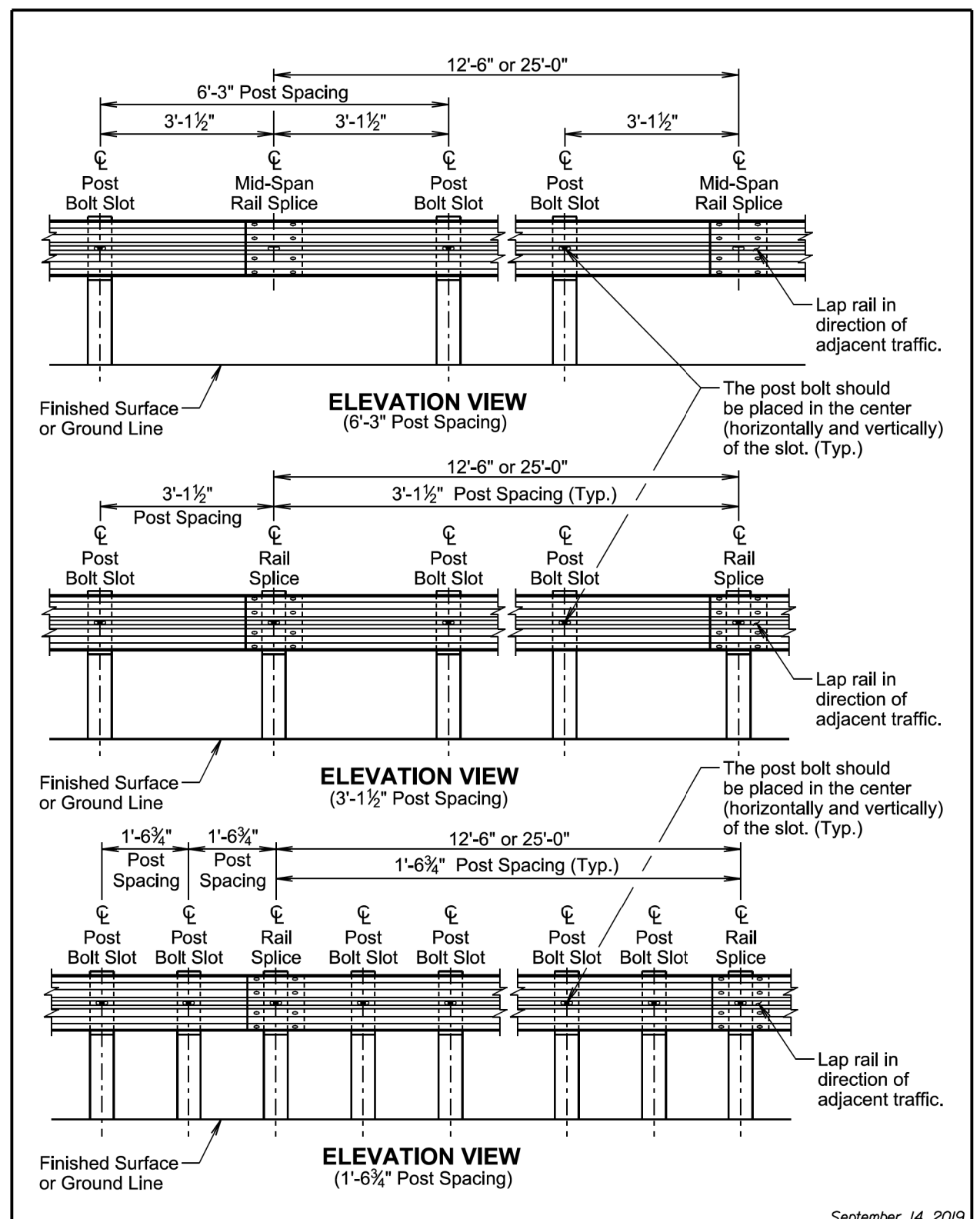
Plot Scale - 1:200



September 14, 2019

SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
		Sheet 3 of 6

Published Date: 2024



September 14, 2019

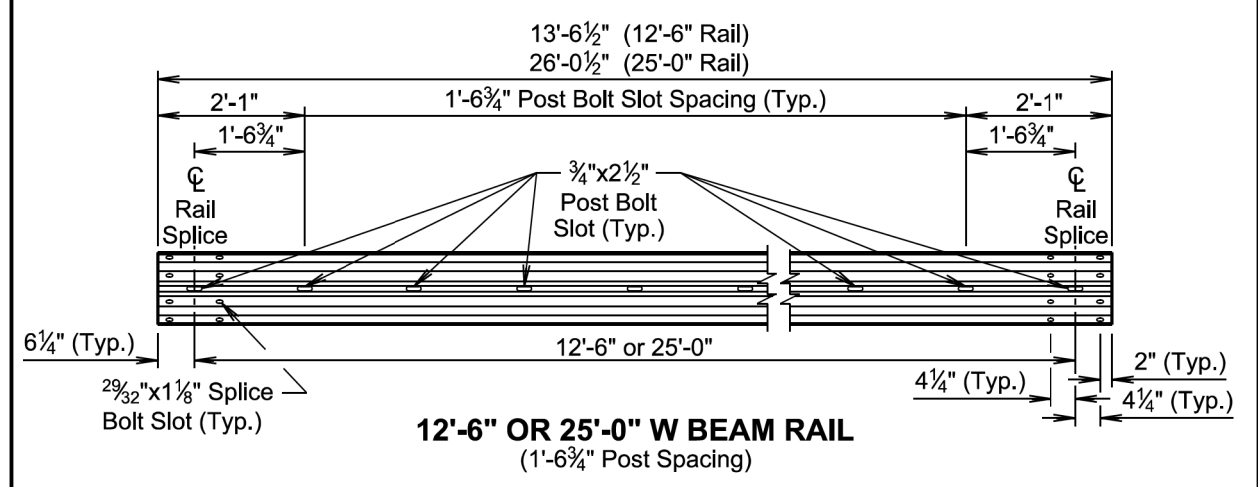
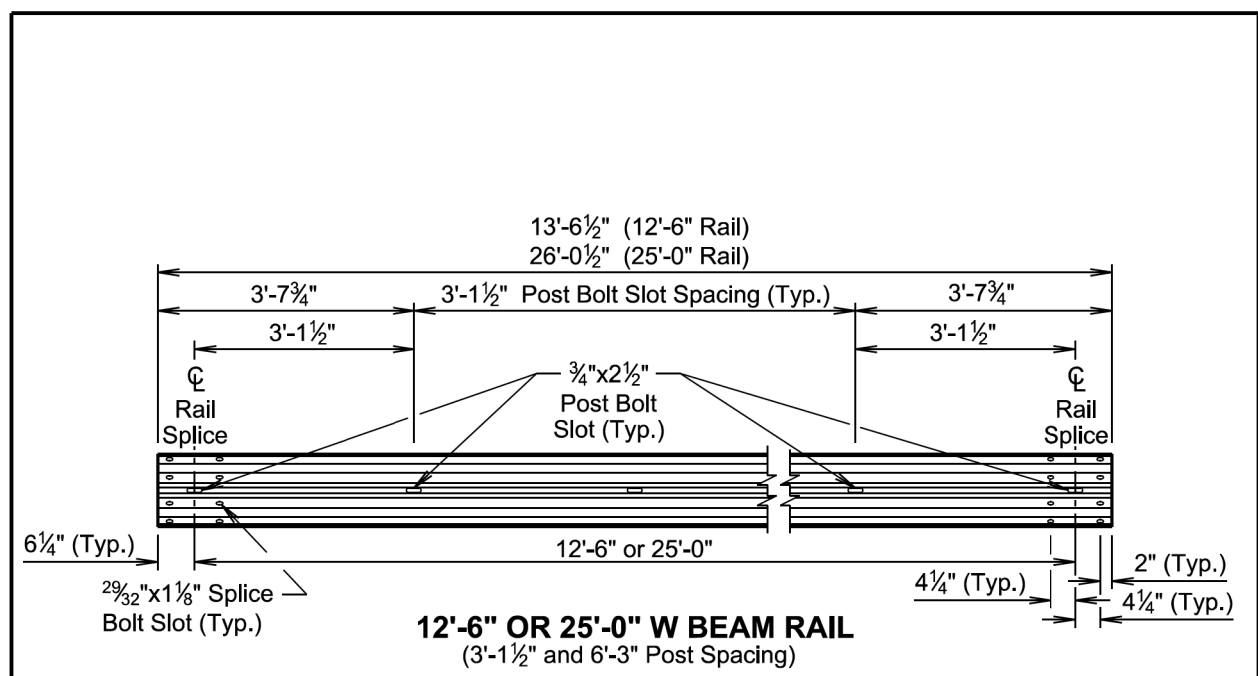
SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
		Sheet 4 of 6

Published Date: 2024

Plotted From - TRRC11626

File - ...I:\design\SecF_StandardPlates.dgn

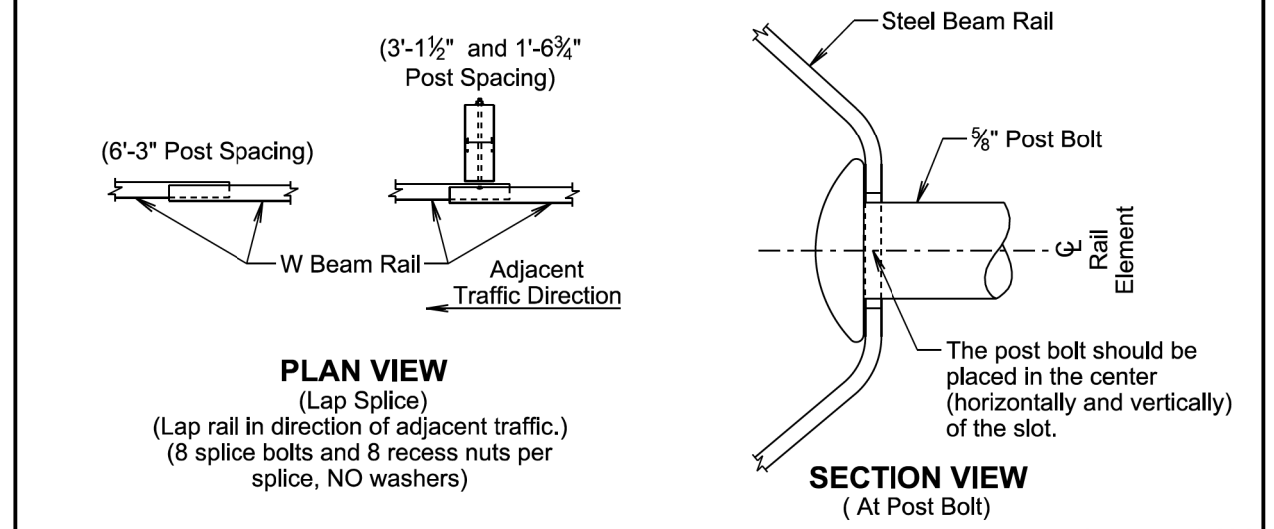
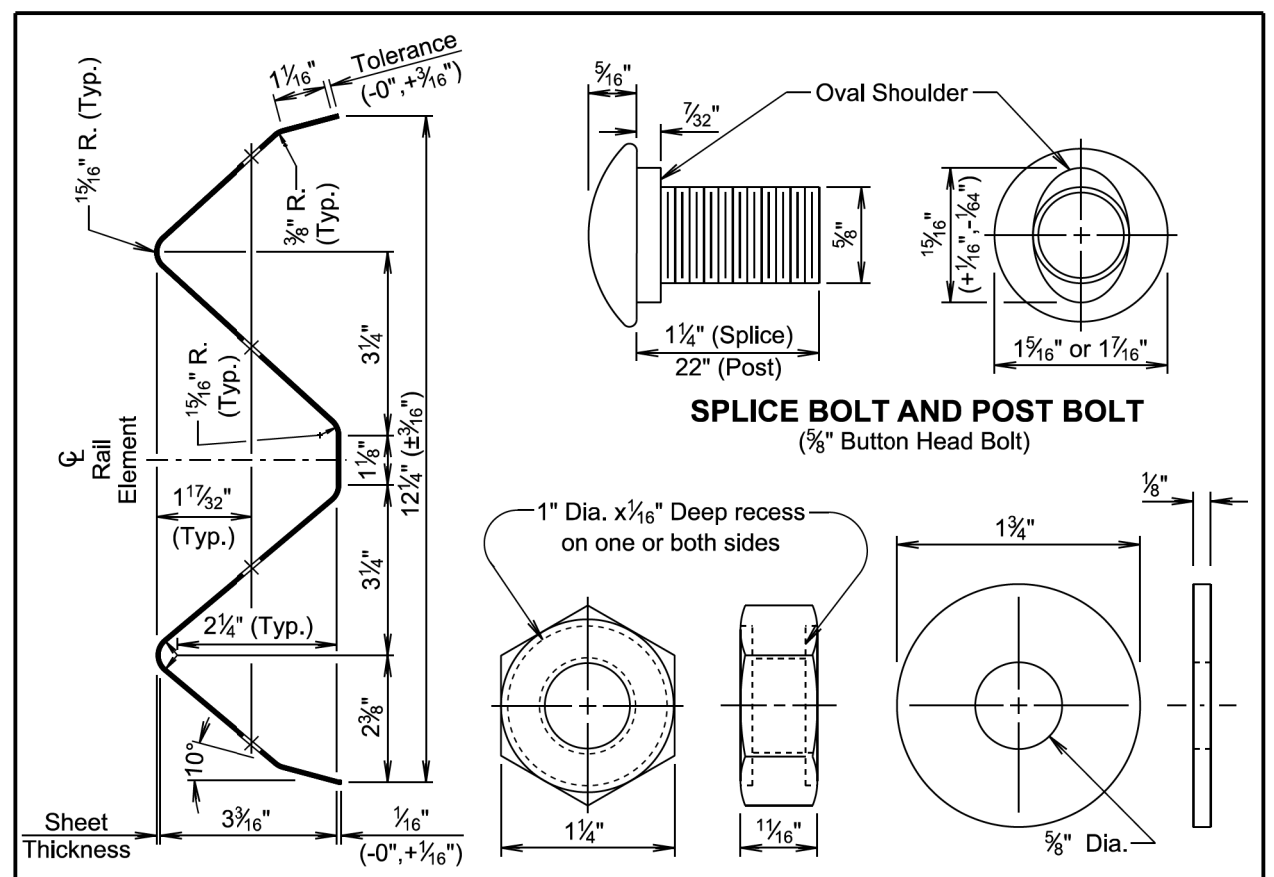
Plot Scale - 1:200



September 14, 2019

SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
		Sheet 5 of 6

Published Date: 2024



September 14, 2019

SDDOT	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
		Sheet 6 of 6

Published Date: 2024

Plotted From - TRRC11626

File - ...I:\design\SecF_StandardPlates.dgn

Plot Scale - 1:200

CONCRETE CURB AND GUTTER TYPE	DIMENSION *** (in.)
B and BL	8
D	12
F and FL	10
R	11

TOP VIEW

TRANSVERSE SECTION

GENERAL NOTES:

The guardrail on this standard plate is Type 1 MGS. See standard plate 630.20 for specifications regarding Type 1 MGS.

When PCC pavement or asphalt concrete pavement is adjacent to the post, see standard plate 630.96 for leave-out and backfill requirements.

September 14, 2019

S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS) AT CURB AND GUTTER	PLATE NUMBER 630.22
	Published Date: 2024	Sheet 1 of 1

PLAN VIEW
(Curb Not Shown)

ELEVATION VIEW

GENERAL NOTES:

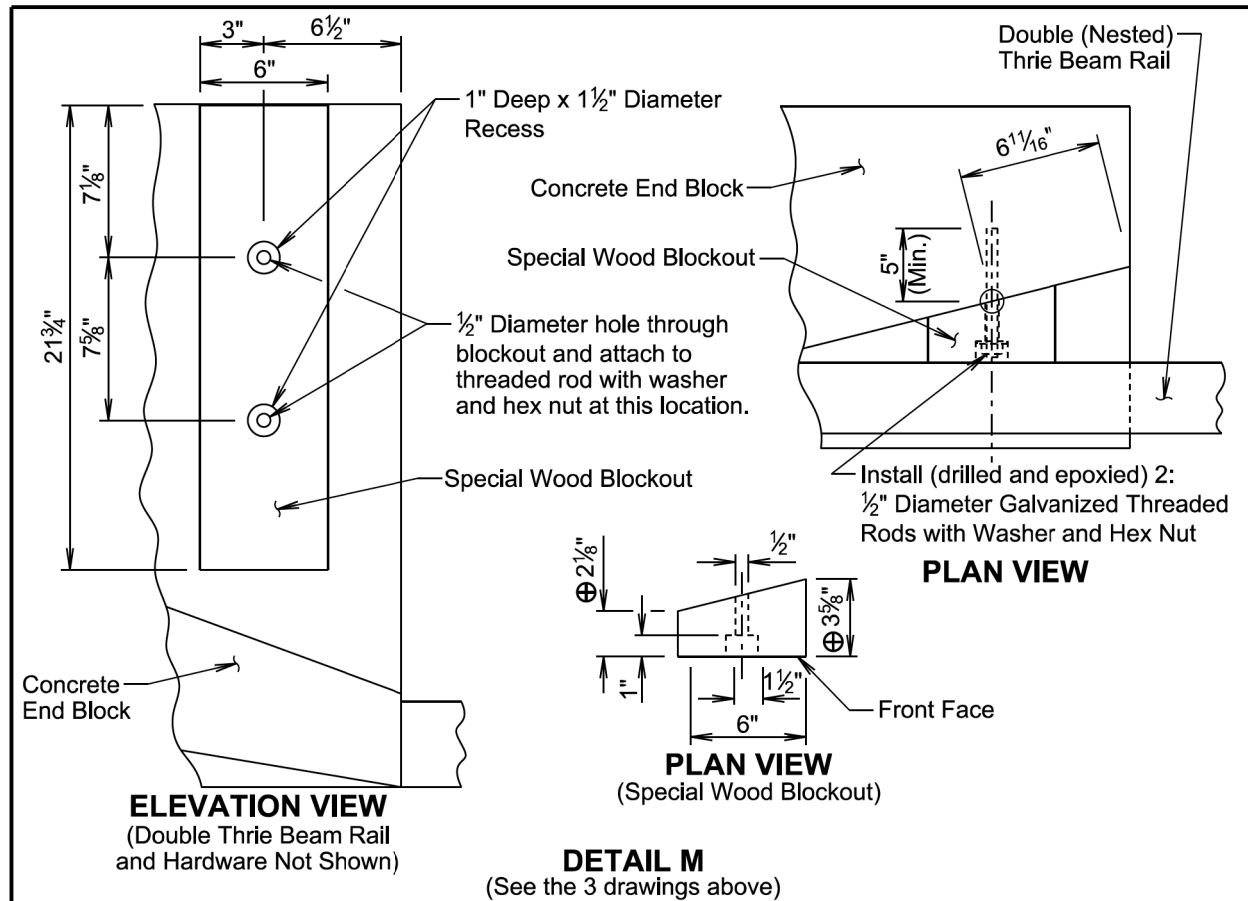
A: 12'-6" Straight Double (Nested) Class A Thrir Beam Guardrail with Wood Posts (See standard plate 630.01)
 B: 6'-3" Straight Single Class A Thrir Beam Guardrail with Wood Posts (See Detail K on sheet 3 of 3)
 C: 6'-3" Asymmetrical W Beam to Thrir Beam Guardrail Transition Section with Wood Posts (See 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)

September 14, 2019

S D D O T	TYPE 1 RETROFIT GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))	PLATE NUMBER 630.51
	Published Date: 2024	Sheet 1 of 3

Plotted From - TRRC11626

File - ...Design\SecF_StandardPlates.dgn



GENERAL NOTES FOR INSTALLING THREADED RODS INTO CONCRETE:

⊕ The dimensions shown are estimated based on original construction plans of the concrete end block. The special wood blockout will be cut as necessary such that the front face of the special wood blockout will align with the vertical front face of the concrete end block ± 1/2".

The threaded rods will be 1/2" diameter and conform to ASTM F1554, Grade 55. The threaded rods will be embedded a minimum of 5" into the concrete.

The diameter of the drilled holes will not be less than 1/8" greater or more than 3/8" greater than the diameter of the threaded rods or as per the Manufacturer's recommendations. The holes will not be drilled using core bits. 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 the epoxy injection.

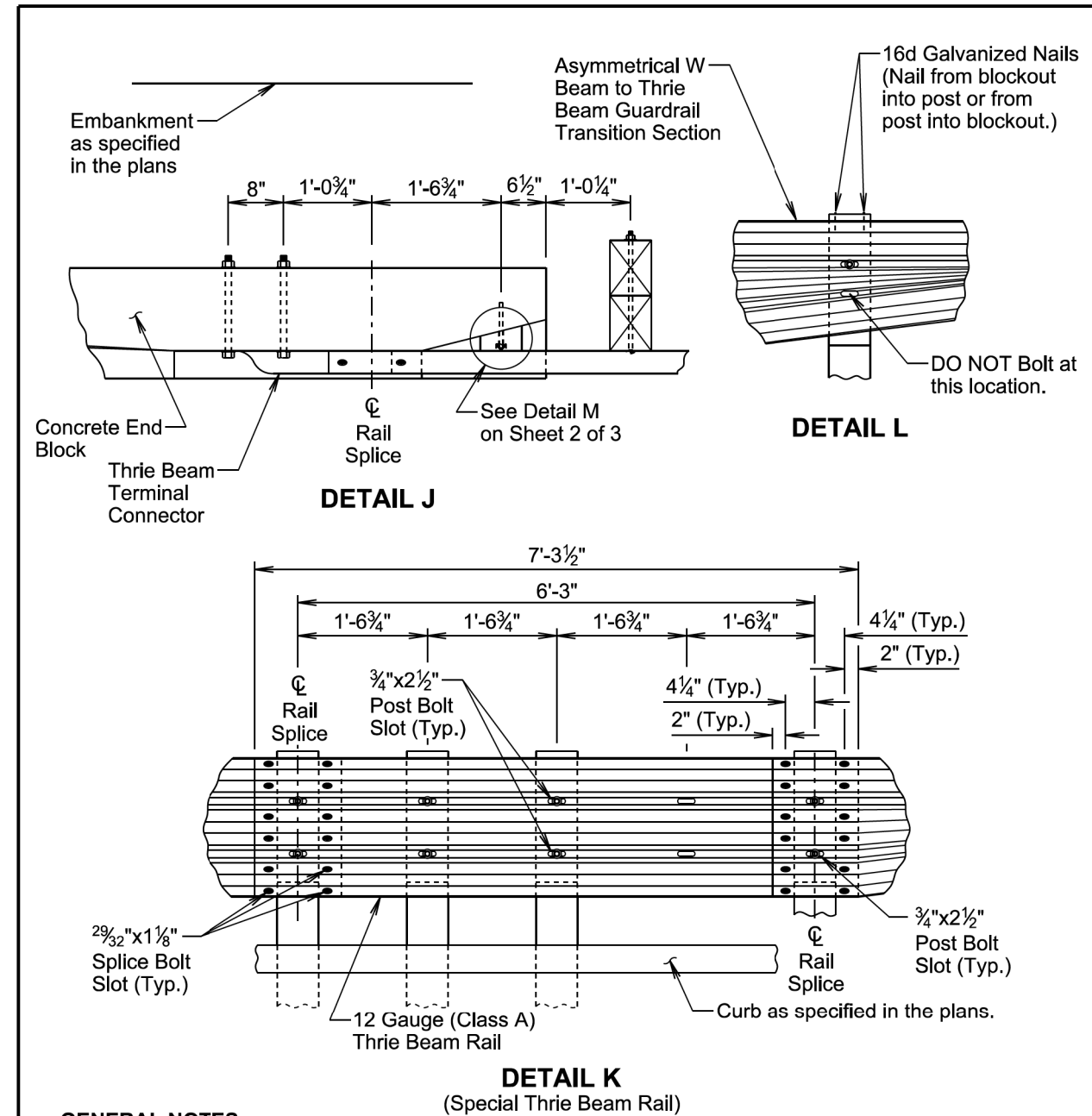
The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).

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 rod. Rotate the steel rod during installation to eliminate voids and ensure complete bonding of the rod. Insertion of the rods by the dipping or painting methods will not be allowed.

Loads will not be applied to the epoxy grouted threaded rods until the epoxy resin has had sufficient time to cure as specified by the epoxy resin Manufacturer.

September 14, 2019

S D D O T	TYPE 1 RETROFIT GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))	PLATE NUMBER 630.51
	Published Date: 2024	Sheet 2 of 3



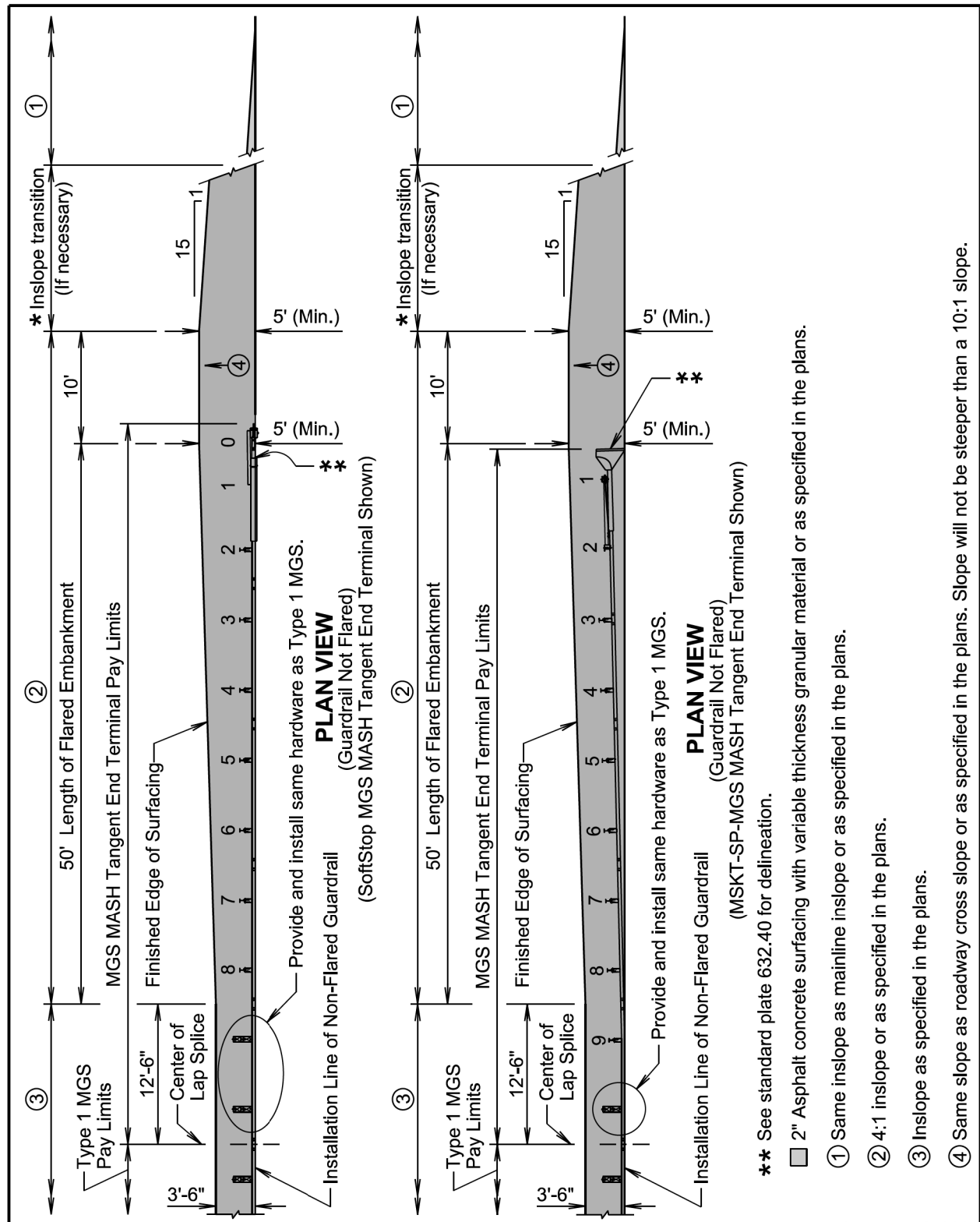
GENERAL NOTES:

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

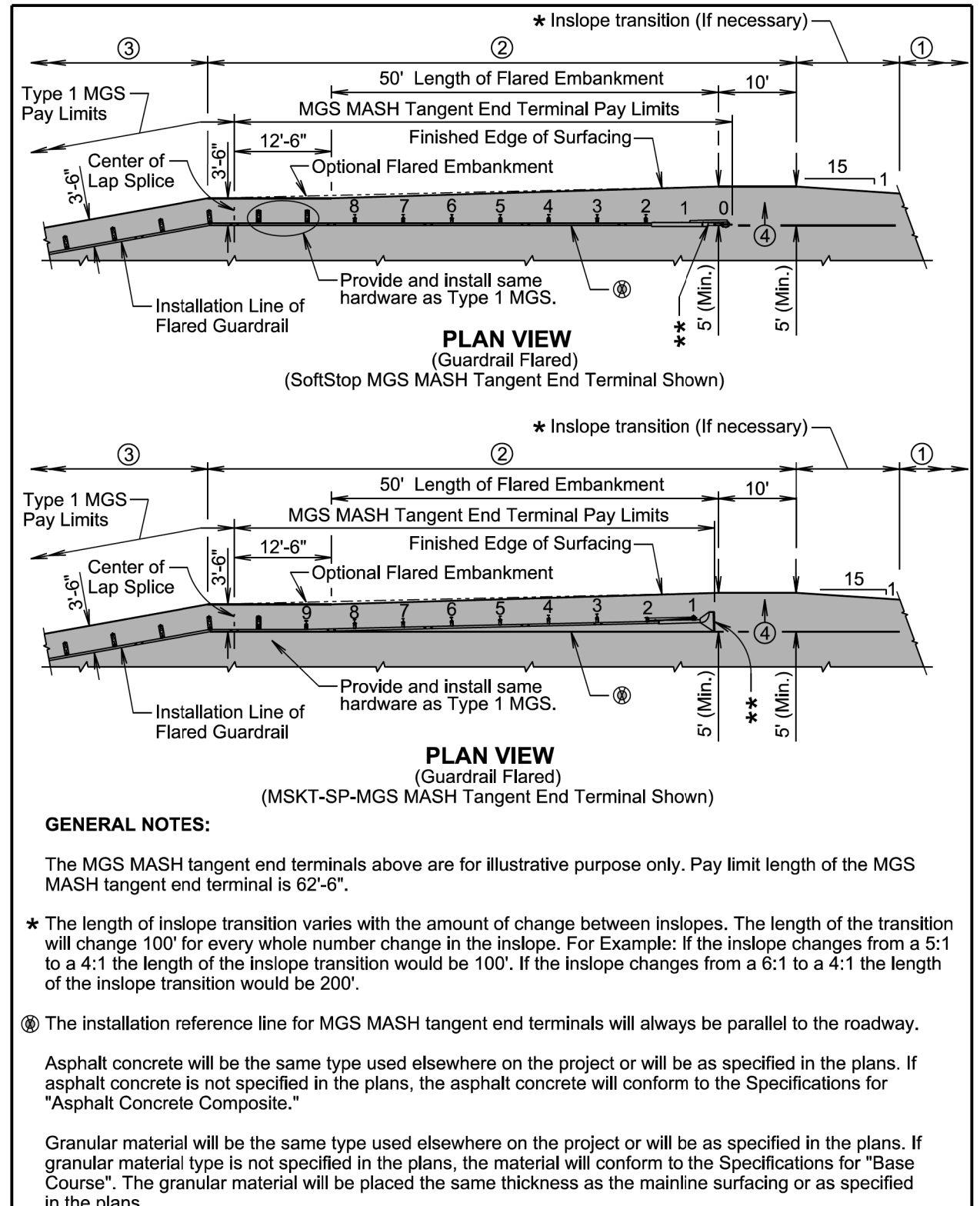
September 14, 2019

S D D O T	TYPE 1 RETROFIT GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))	PLATE NUMBER 630.51
	Published Date: 2024	Sheet 3 of 3



November 19, 2021

Published Date: 2024	SDDOT	EMBAKMENT, SURFACING, AND PAYMENT LIMITS FOR MGS MASH TANGENT END TERMINAL	PLATE NUMBER 630.89
			Sheet 1 of 2



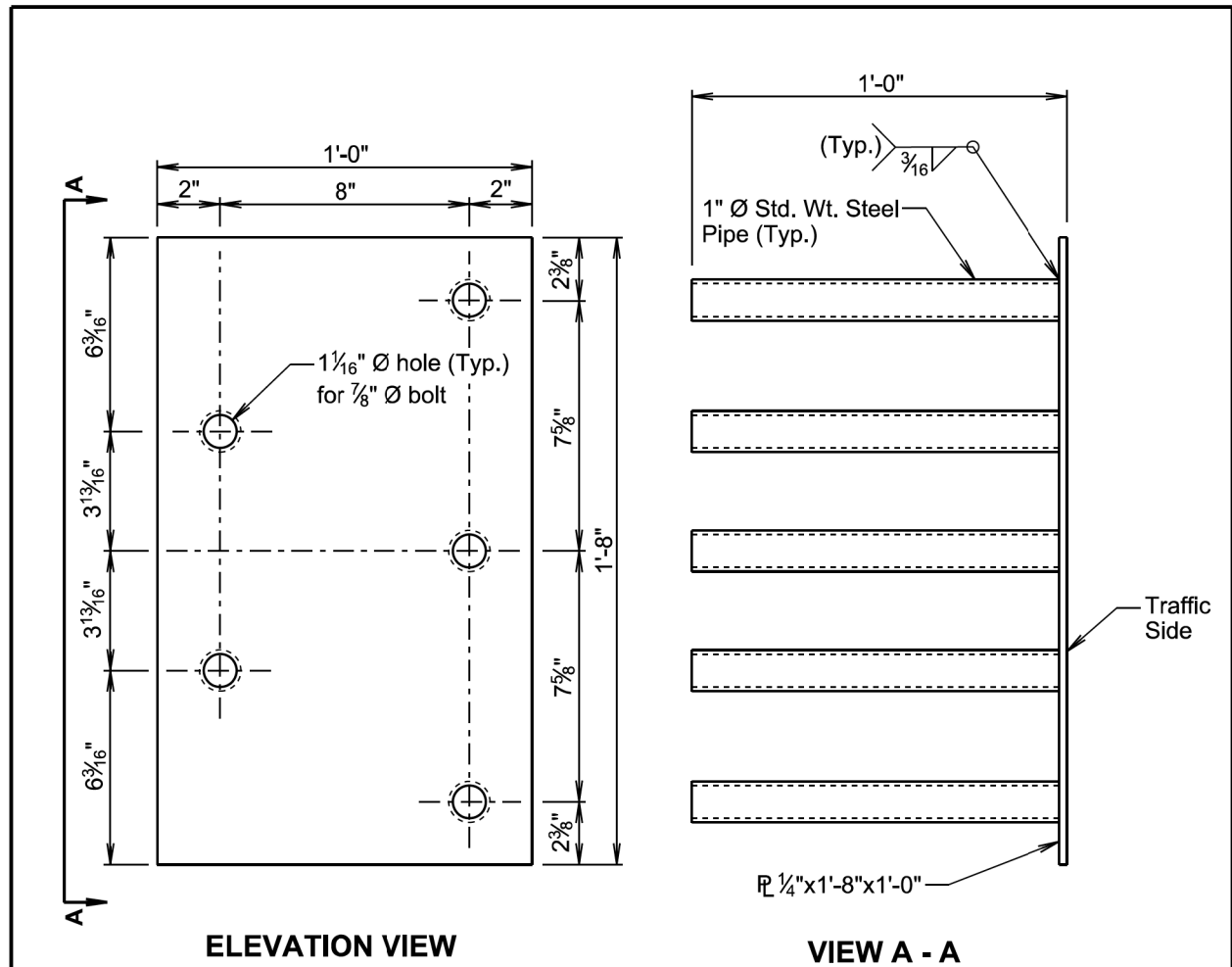
November 19, 2021

Published Date: 2024	SDDOT	EMBAKMENT, SURFACING, AND PAYMENT LIMITS FOR MGS MASH TANGENT END TERMINAL	PLATE NUMBER 630.89
			Sheet 2 of 2

- ** See standard plate 632.40 for delineation.
- 2" Asphalt concrete surfacing with variable thickness granular material or as specified in the plans.
 - ① Same inslope as mainline inslope or as specified in the plans.
 - ② 4:1 inslope or as specified in the plans.
 - ③ Inslope as specified in the plans.
 - ④ Same slope as roadway cross slope or as specified in the plans. Slope will not be steeper than a 10:1 slope.

- GENERAL NOTES:**
- The MGS MASH tangent end terminals above are for illustrative purpose only. Pay limit length of the MGS MASH tangent end terminal is 62'-6".
- * The length of inslope transition varies with the amount of change between inslopes. The length of the transition will change 100' for every whole number change in the inslope. For Example: If the inslope changes from a 5:1 to a 4:1 the length of the inslope transition would be 100'. If the inslope changes from a 6:1 to a 4:1 the length of the inslope transition would be 200'.
- Ⓢ The installation reference line for MGS MASH tangent end terminals will always be parallel to the roadway.
- 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.

Plot Scale - 1:200



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.

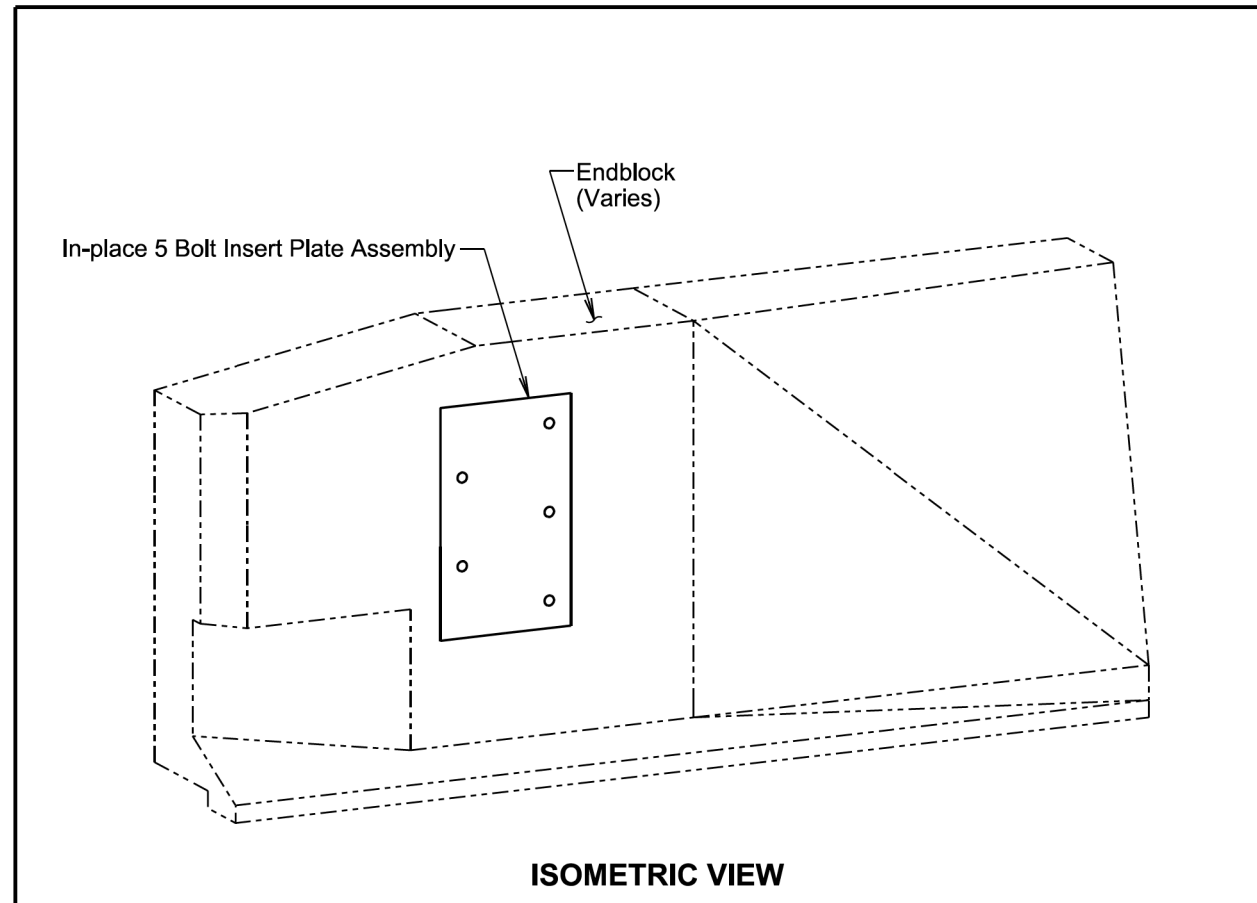
Bolt heads will be placed on the traffic side of the endblock. Bolt projection at the back side of the insert will not exceed 1 inch beyond the nut.

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
		Sheet 1 of 1

Published Date: 2024



ISOMETRIC VIEW

GENERAL NOTES:

Bolts, nuts, and washers are furnished with each new assembly. Where guardrail is to be reset, bolts will be salvaged and reset for guardrail installation. Any hardware damaged or lost from the Contractor's operation will be replaced at no additional cost to the State.

New bolts, if required, 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.

All costs for salvaging, resetting, and refurbishing lost hardware will be incidental to the contract unit price for the respective guardrail contract item.

November 19, 2022

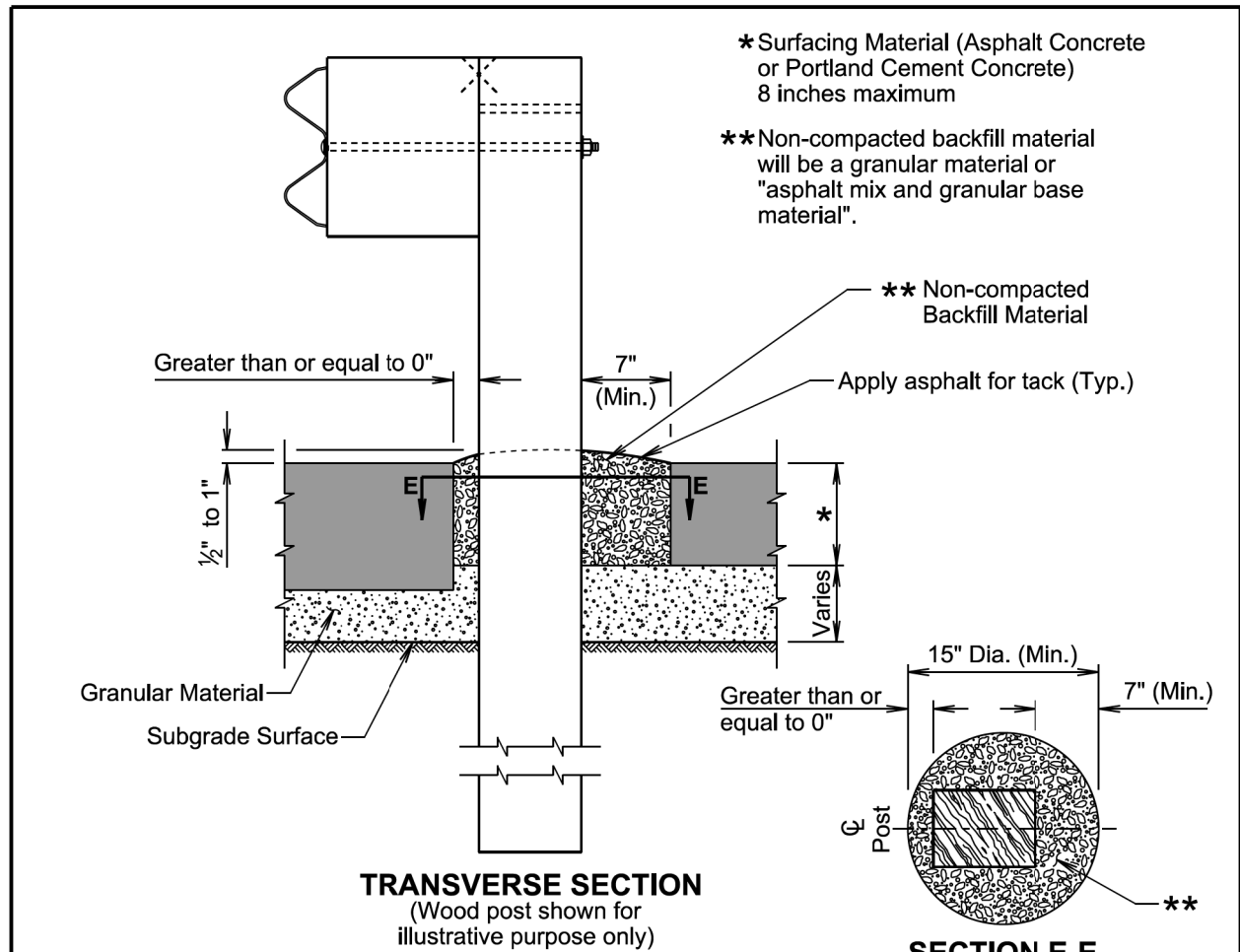
S D D O T	GUARDRAIL ATTACHMENT TO BRIDGE ENDBLOCKS	PLATE NUMBER 630.93
		Sheet 1 of 1

Published Date: 2024

Plotted From - TRRC11626

File - ...Design\SecF_StandardPlates.dgn

Plot Scale - 1:200



GENERAL NOTES:

The leave-out limits may be increased to accommodate construction equipment and tolerances.

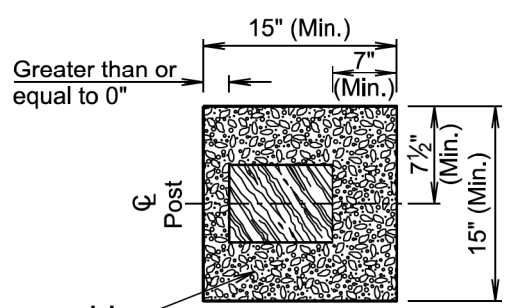
When posts are installed in augured or dug holes, the backfill material will be compacted to the bottom of the pavement surfacing material to the satisfaction of the Engineer. The backfill material for the thickness of the pavement surfacing material will be non-compacted.

The backfill material will be mounded 1/2 inch to 1 inch above the top of the adjacent surfacing as illustrated above.

Asphalt for tack will be applied to the surface of the backfill material at the rate of 0.15 to 0.20 gallons per square yard.

All costs for constructing the leave-out including labor, equipment, and materials which includes the backfill material and tack coat will be incidental to the contract unit price for the respective guardrail contract item.

SECTION E-E
(Round option for leave-out and backfill limits)
(Wood post shown for illustrative purpose only)

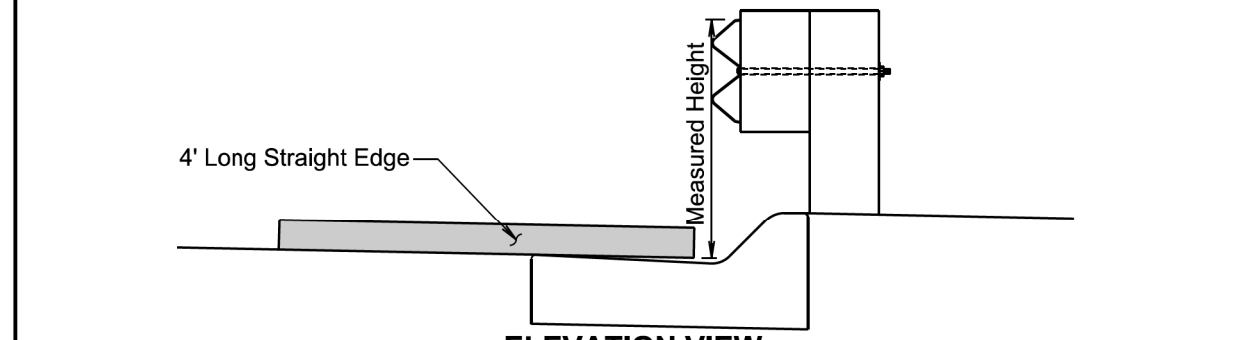
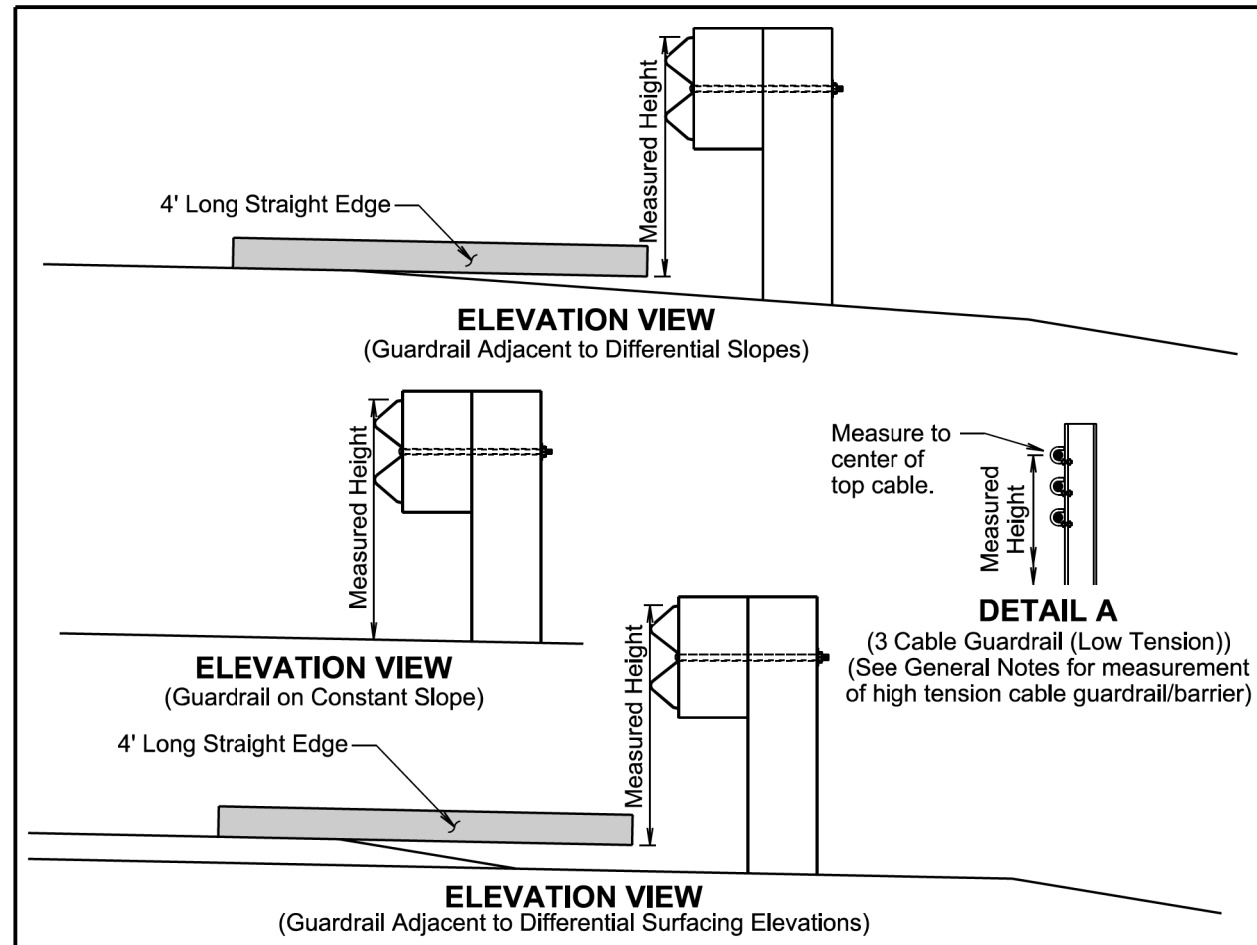


SECTION E-E
(Square option for leave-out and backfill limits)
(Wood post shown for illustrative purpose only)

November 19, 2021

S D D O T	GUARDRAIL POST INSTALLED IN ASPHALT CONCRETE OR PORTLAND CEMENT CONCRETE	PLATE NUMBER 630.96
		Sheet 1 of 1

Published Date: 2024



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

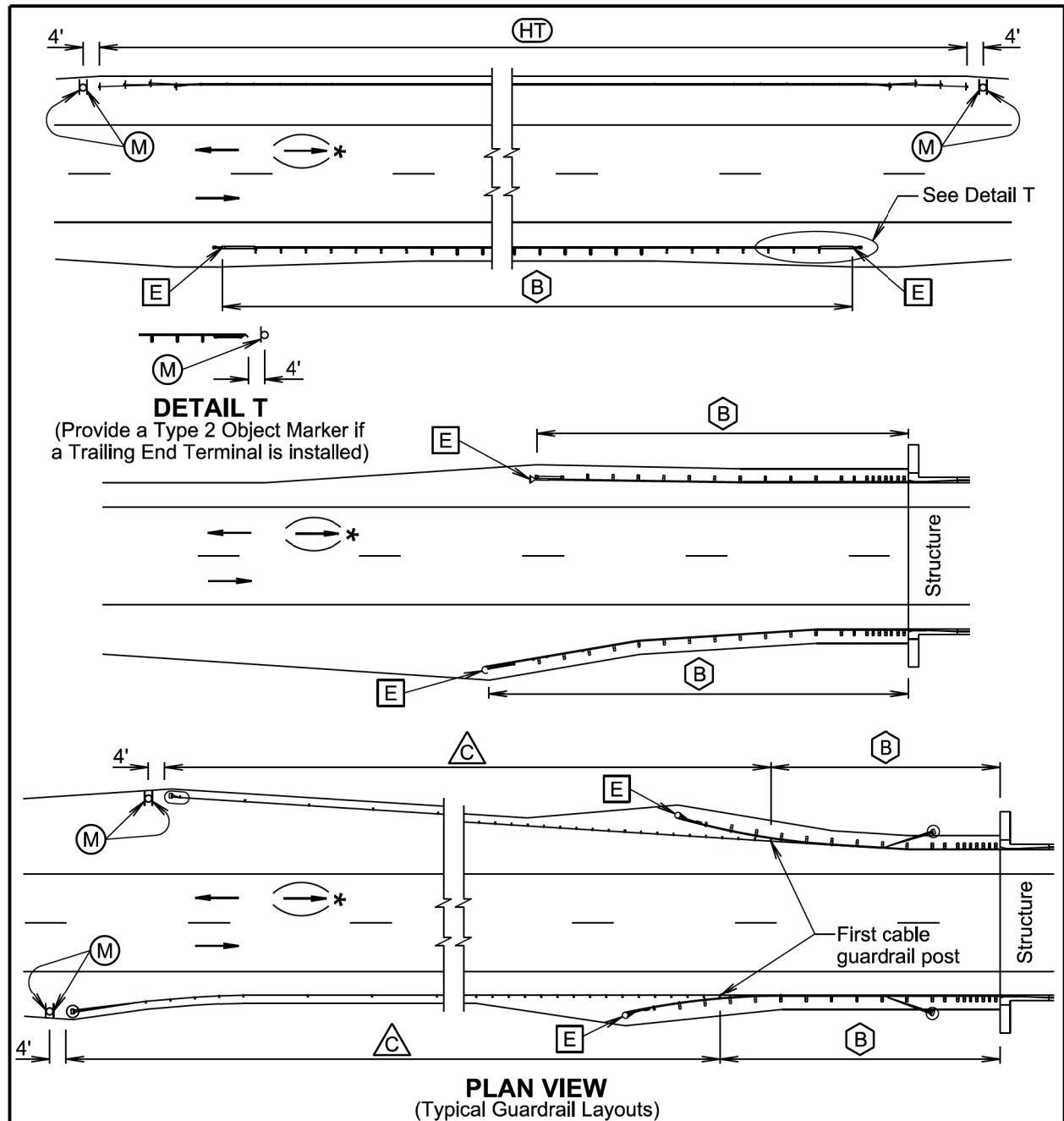
S D D O T	MEASURING GUARDRAIL HEIGHT	PLATE NUMBER 630.99
		Sheet 1 of 1

Published Date: 2024

Plotted From: TRRC11626

File: ...I:\design\SecF_StandardPlates.dgn

Plot Scale - 1:200



PLAN VIEW
(Typical Guardrail Layouts)

- B Steel Beam Guardrail Delineation
- E Guardrail End Terminal Object Marker
- C 3 Cable Guardrail (Low Tension) Delineation
- HT High Tension Cable Guardrail Delineation
- M Type 2 Object Marker

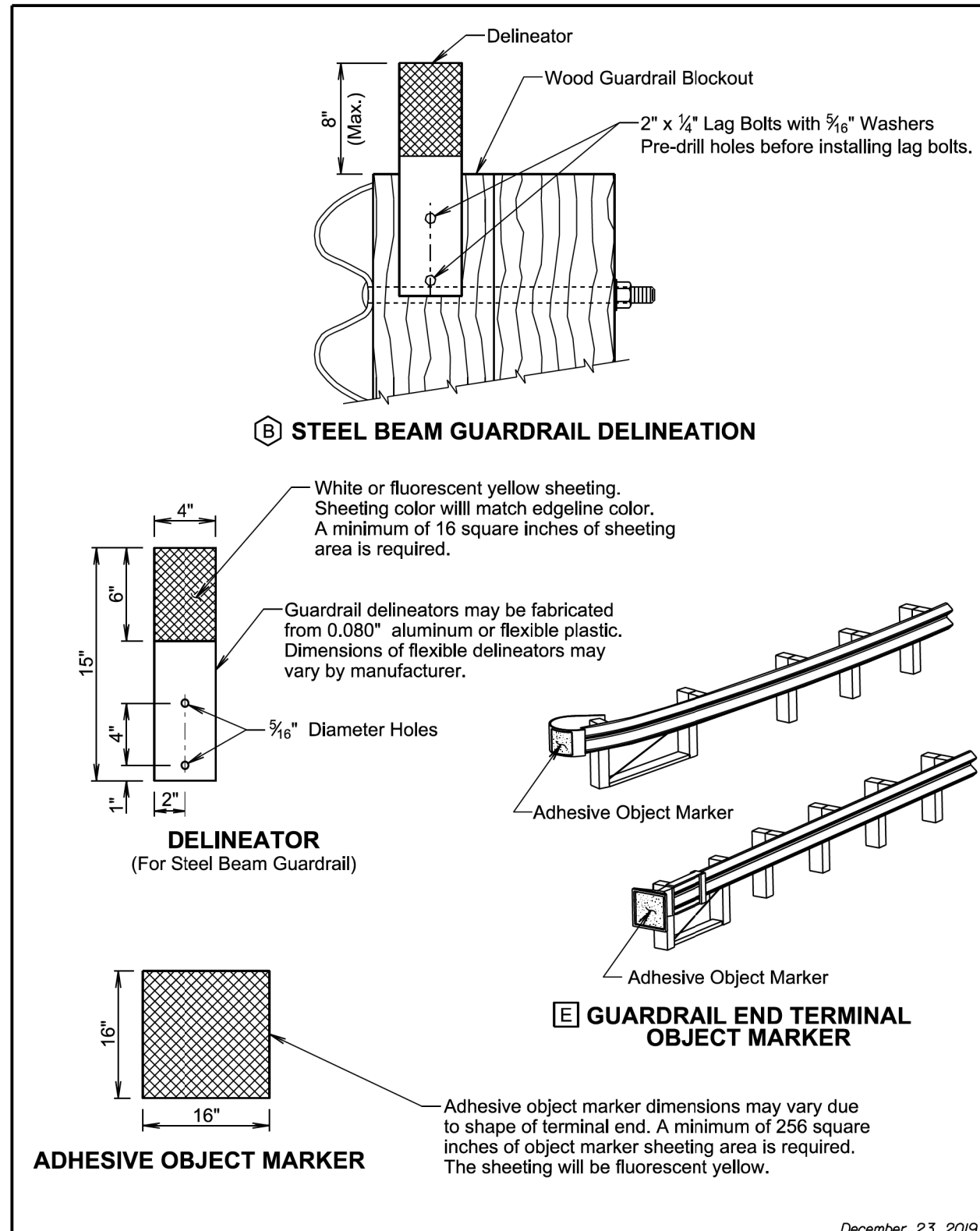
*For two-way traffic, install delineation at the opposite end of structure the same as shown. Back-to-back delineation is required for two-way traffic, single-sided delineation for one-way traffic.

December 23, 2019

S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40	
		Sheet 1 of 4	

Published Date: 2024

Plotted From - TRRC11626



B STEEL BEAM GUARDRAIL DELINEATION

DELINEATOR
(For Steel Beam Guardrail)

ADHESIVE OBJECT MARKER

E GUARDRAIL END TERMINAL OBJECT MARKER

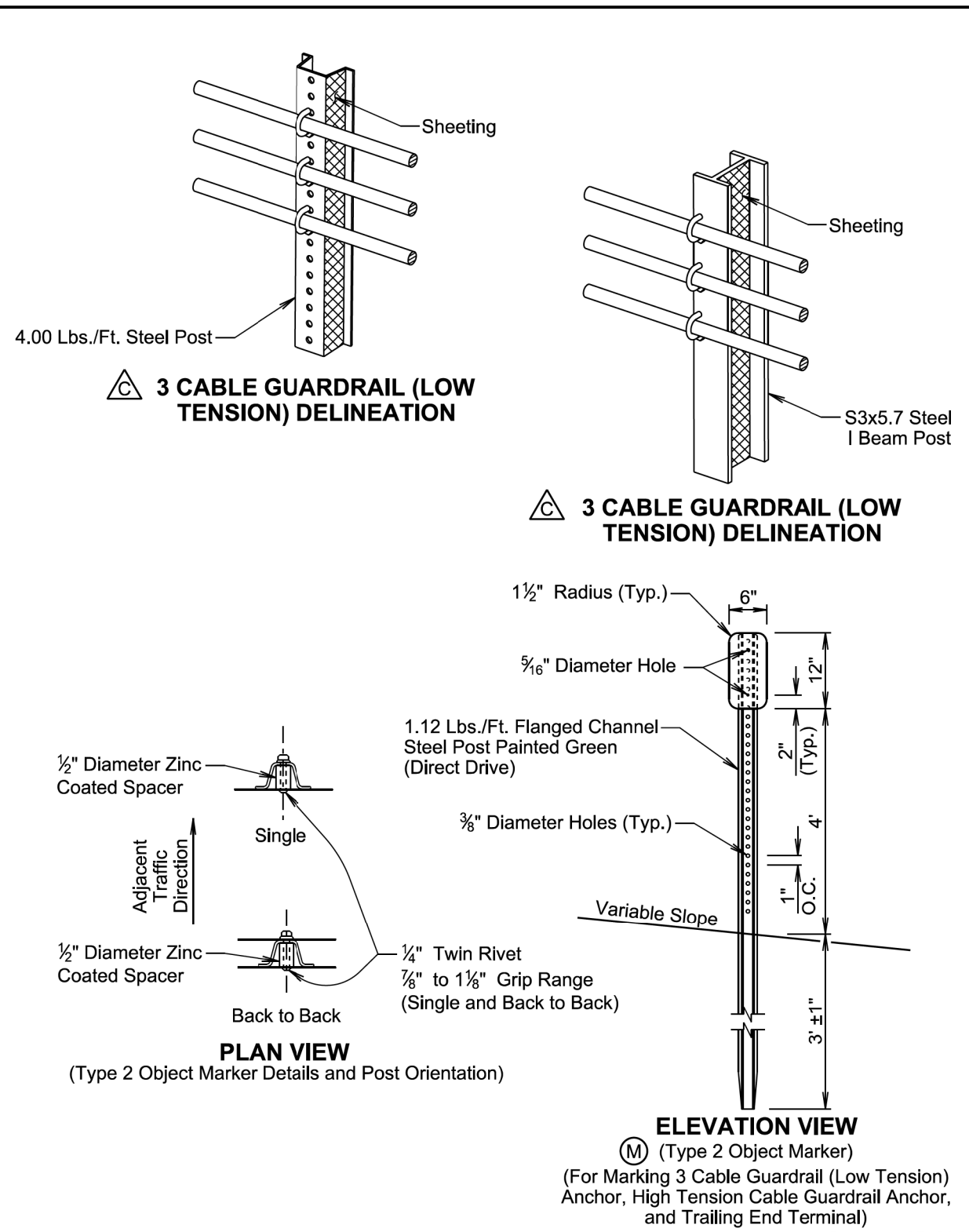
December 23, 2019

S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40	
		Sheet 2 of 4	

Published Date: 2024

File - ...I:\design\SecF_StandardPlates.dgn

Plot Scale - 1:200



December 23, 2019

S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
		Sheet 3 of 4

Published Date: 2024

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: 2024

Plotted From - TRRC11626

File - ...I:\design\SecF_StandardPlates.dgn