PLOT SCALE - 1:200

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	1	25

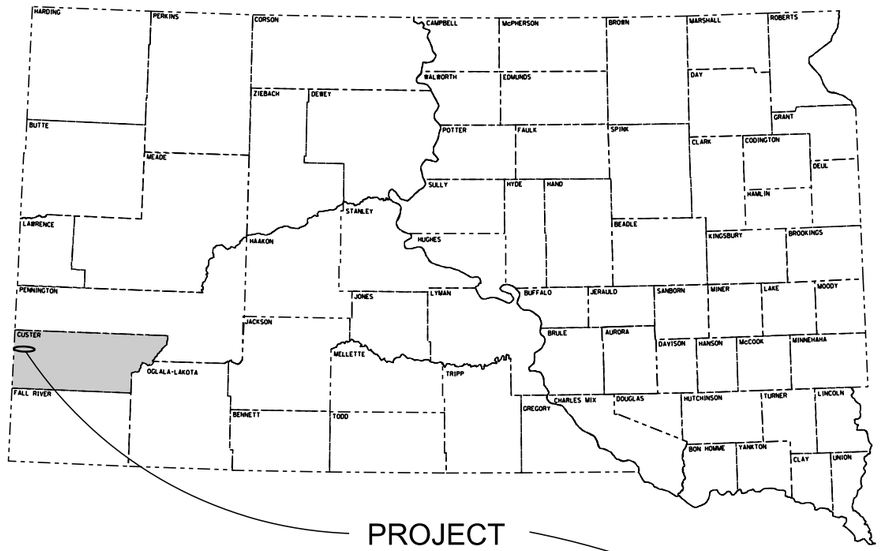
Plotting Date: 03/23/2020

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

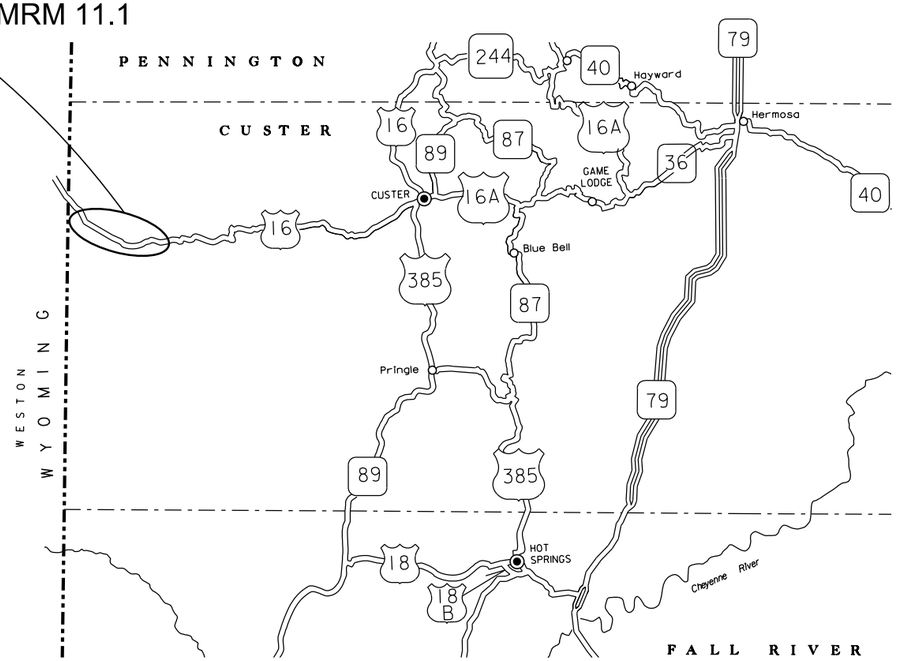
PROJECT 016-491
US HIGHWAY 16
CUSTER COUNTY

PCC PAVEMENT REPAIR
PCN i5L0



PROJECT

016-491
US Highay 16
MRM 0.0 TO MRM 11.1



INDEX OF SHEETS

016 - 491, PCN i5L0
MRM 0.0 to MRM 11.1
DESIGN DESIGNATION

ADT (2019)	1228
ADT (2039)	1492
DHV	373
D	51%
T DHV	8.5%
T ADT	29.3%
V	65 MPH

Storm Water Permit

No Permit Required

PLOTTED FROM - TRRC12608

PLOT NAME - 1

FILE - ...\2020 DESIGN\0_I5L0 TITLE.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	2	25

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E1010	Remove Asphalt Concrete Pavement	130.0	SqYd
120E0010	Unclassified Excavation	224	CuYd
260E2010	Gravel Cushion	78.0	Ton
260E5000	Shot Rock	235.0	Ton
320E1200	Asphalt Concrete Composite	17.0	Ton
380E5030	Nonreinforced PCC Pavement Repair	654.1	SqYd
380E6000	Dowel Bar	126	Each
380E6110	Insert Steel Bar in PCC Pavement	932	Each
380E6200	Tie Bar Retrofit, Stitching	439	Each
380E6310	Seal Random Cracks in PCC Pavement	4,930	Ft
390E0200	Repair Type A Spall	205.0	SqFt
633E0010	Cold Applied Plastic Pavement Marking, 4"	104	Ft
633E1220	High Build Waterborne Pavement Marking Paint, 4" White	371	Ft
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	104	Ft
633E5100	Grooving for Durable Pavement Marking, 4"	371	Ft
634E0010	Flagging	200.0	Hour
634E0020	Pilot Car	75.0	Hour
634E0110	Traffic Control Signs	1,479.9	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	12	Each
634E0420	Type C Advance Warning Arrow Board	2	Each
634E0600	4" Temporary Pavement Marking Tape Type I	1,872	Ft
634E0640	Temporary Pavement Marking	26,312	Ft
831E0300	Reinforcement Fabric (MSE)	1,210	SqYd

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. 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: http://www.sddot.com/resources/Manuals/EnvironProcManual.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 Office at 605-773-3098 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

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 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 E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

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

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) will be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) will not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Environmental Office and the Project Engineer.

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

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW with fences, gates, and placement of a sign or signs at the entrance to the site stating, "No Dumping Allowed".

2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period 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

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

Action Taken/Required:

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

The Contractor will arrange and pay for a record search and when necessary, a cultural resource survey. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review if the site was previously surveyed; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor will provide ARC with the following: a topographical map or aerial view 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.

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

COMMITMENT S: FIRE PREVENTION IN THE BLACK HILLS AREA

This project is located within the Black Hills Forest Fire Protection Boundary.

Action Taken/Required:

The Contractor will adhere to the "Special Provision for Fire Plan".

SUBGRADE REPAIR

Included in the Estimate of Quantities is Unclassified Excavation, for the necessary removal of unstable material.

Backfill will be Shot Rock and Gravel Cushion installed in accordance with the detail for Subgrade Repair.

The MSE fabric will be placed on the bottom and the sides of the excavated subgrade. Additional fabric will be provided to allow for wrapping the top of the shot rock backfill. MSE fabric will be overlapped a minimum of 2' where seams are required. Shot rock will be placed in lifts not to exceed 8 inches. The shot rock will be watered and compacted by at least 4 complete vibratory roller passes per lift or to the satisfaction of the Engineer.

When the shot rock backfill has reached a compacted depth of 1.5 feet, the shot rock will be covered with MSE fabric. Gravel Cushion will be placed on top of the MSE fabric.

The Contactor will saw cut the asphalt shoulder; at the lowest point of the area to be repaired, a minimum of 4' wide to provide positive daylighted drainage through the inslope. 6" of Gravel Cushion will be placed on top of the trench backfill. 3" of Asphalt Concrete Composite will be placed on top of the Gravel Cushion.

SHOT ROCK

Shot Rock will consist of broken or crushed ledge rock produced from blasting or quarrying operations. Shot Rock material utilized in subgrade stabilization will be less than 8" in diameter with a nominal size of 4". Gypsum may not be used as Shot Rock.

Compaction will be to the satisfaction of the Engineer. Acceptance of Shot Rock material will be visually inspected and may be used without further testing as directed by the Engineer.

EXISTING PCC PAVEMENT

The existing pavement US Hwy 16 is 8" Nonreinforced PCC Pavement with limestone aggregate. Longitudinal joints are reinforced with No. 5x30" deformed tie bars spaced 30" to 48" center to center. Transverse joints are reinforced with 1 ¼" steel dowel bars spaced 12" center to center.

ASPHALT CONCRETE COMPOSITE

Asphalt concrete repair may be required on shoulders adjacent to PCCP repair locations and/or on shoulders where subgrade repair is performed as per the Subgrade Repair Detail. These repair areas will have a repaired thickness of 4". Locations and quantities of asphalt repair are subject to change. The exact locations of replacement will be determined in the field by the Engineer. The Engineer reserves the right to adjust quantities and/or add locations at no additional cost to the state.

All costs to repair the asphalt concrete shoulders, labor, tools and equipment will be included in the contract unit price per ton for Asphalt Concrete Composite.

A Flush Seal will not be required on the asphalt concrete patching.

RESTORATION OF GRAVEL CUSHION

An inspection of the gravel cushion subgrade will be made after removing concrete from each pavement replacement area. Areas of excess moisture will be dried to the satisfaction of the Engineer. Loose and excess material will be removed. Each replacement area will be leveled and compacted to the satisfaction of the Engineer.
If additional gravel cushion material is required, the Contractor will furnish, place and compact gravel cushion to the satisfaction of the Engineer.

All costs associated with this work, except where Subgrade Repair is required, will be incidental to the contract unit price per square yard for "Nonreinforced PCC Pavement Repair".

NONREINFORCED PCC PAVEMENT REPAIR

Concrete will meet the requirements stated in Section 380 of the specifications, except as modified by the following notes:

The fine aggregate will be screened over a one-inch square-opening screen just prior to introduction into the concrete paving mix if required by the Engineer.

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete will contain 4.5% to 7.0% entrained air. The concrete will contain a minimum of 50% coarse aggregate by weight. Coarse aggregate will be crushed ledge rock, Size No. 1 unless an alternative gradation is approved by the Concrete Engineer as part of the mix design submittal. The mix design will contain at least 650 lbs of Type I or II cement or 600 lbs of Type III cement per cubic yard. The minimum 28-day compressive strength will be 4,000 psi. The Contractor is responsible for the mix design used. The Contractor will submit a mix design and supporting documentation for approval at least 2 weeks prior to use.

The use of a water reducer at manufacturer's recommended dosage will be required.

Concrete will be cured with white pigmented curing compound (AASHTO M148, Type 2) applied as soon as practical at a rate of 125 square feet per gallon. Concrete will be cured for a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60ºF or higher throughout the cure period. If the concrete temperature falls below 60ºF, the cure time will be extended, or other measures taken, at no additional cost to the State. A strength of 3,500 psi must be attained prior to opening to traffic.

Upon placement of the concrete, repair areas will be straight edged to ensure a smooth riding surface and will be textured longitudinally with the pavement by finishing with a stiff broom. Repair areas will then be checked with a 10' foot straight edge. The permissible longitudinal and transverse surface deviation will be 1/8" in 10'.

Concrete will be covered with suitable insulation blanket consisting of a layer of closed cell polystyrene foam protected by at least one layer of plastic. Insulation blanket will have an R-value of at least 0.5, as rated by the manufacturer. Insulation blanket will be left in place, except for joint sawing operations, until the 4,000 psi is attained. Insulation blanket will be overlapped on to the existing concrete by 4'. This requirement for covering repair areas with insulation blankets may be waived during periods of hot weather upon approval of the Engineer.

Cost for performing the aforementioned work including sawing and removing concrete, furnishing and placing concrete, #5 tie bars cast in place, curing, sawing and sealing joints, labor, tools and equipment will be included in the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

STEEL BAR INSERTION

The Contractor will insert the Steel Bars (No. _5_ x _30_ inch epoxy coated deformed tie bars) into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole.

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 48-inch centers in the longitudinal joint and will be placed a minimum of 15 inches from the existing transverse contraction joint.

Locations and quantities of concrete repair are subject to change in the field at the discretion of the Engineer. The Contractor will be responsible for ordering the actual quantity of steel bars necessary to complete the work.

A rigid frame or mechanical device will be required to guide the drill to ensure proper horizontal and vertical alignment of the steel bars in the drilled holes.

RUMBLE STRIPS

The Contractor will install shoulder rumble strips as necessary in locations of PCC Pavement Repair. See Standard Plate 380.15.

REPAIR TYPE A SPALL

Locations and size (length or width) of concrete spall repair areas are subject to change in the field, at the discretion of the Engineer, at no additional cost to the state. The minimum dimension of the repair area will be 6". Payment will be based on actual area replaced.

Concrete Patch Material will be Type III conforming to Section 390.2 B.3.

As an alternative, the Contractor may remove concrete by milling, provided it produces results similar to the sawing and chipping process described in the Specifications.

It is anticipated that several locations scheduled for Type A Spall Repair will have deteriorated to the point of needing full depth repair. Additional Quantities are included in the Table(s) for NRC Pavement Repair for this work. The Engineer will determine these locations on construction.

Spalls which are repaired according to plans and specifications and exhibit partial re-spalling or cracking, will be repaired to the satisfaction of the Engineer at no additional cost to the State.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	5	25

TABLE OF PCCP REPAIR

Table of Nonreinforced PCC Pavement Repair

HWY	MRM	Displacement	Location	Length Ft	Width Ft	8" Nonreinforced PCC Pavement Repair SqYd	No. 5 Deformed Tie Bar Each	No. 9 Deformed Tie Bar Each	1 ¼" Bar Each	Insert Steel Bar in PCC Pavement Each	Dowel Bar Each	Asphalt Concrete Composite Ton	Cold Applied Plastic Pavement Marking, 4" Ft	High Build Waterborne Pavement Marking Paint, 4" White Ft	Grooving for Cold Applied Plastic Pavement Marking, 4" Ft	Grooving for Durable Pavement Marking, 4" Ft
* 16	0.00	0.190	EBDL	20	14	31.1	8		28	36	14	1.0	5	20	5	20
* 16	0.00	0.190	WBDL	20	14	31.1	8		28	36	14	1.0	5	20	5	20
16	0.00	0.520	EBDL	7	14	10.9	2	14	14	30		0.3	2	7	2	7
16	0.00	0.520	WBDL	7	14	10.9		14	14	28		0.3	2	7	2	7
16	0.00	0.565	EBDL	20	14	31.1	8		28	36	14	1.0	5	20	5	20
16	0.00	0.565	WBDL	10	14	15.6	4		28	32		0.5	3	10	3	10
16	1.00	0.739	EBDL	6	6	4.0	4	6	6	16		0.3	2	6	2	6
16	1.00	0.739	WBDL	6	14	9.3	2	14	14	30		0.3	2	6	2	6
16	4.00	0.992	WBDL	6	14	9.3	2	14	14	30		0.3	2	6	2	6
16	4.00	0.992	EBDL	6	12	8.0	2	12	12	26		0.3	2	6	2	6
16	4.00	0.992	EBSL	6	12	8.0		12	12	24		0.3	2	6	2	6
16	6.00	0.239	WBDL	6	14	9.3		14	14	28		0.3	2	6	2	6
16	6.00	0.239	EBDL	36	14	56.0	14	14	14	42	28	1.8	9	36	9	36
16	7.00	0.658	WBDL	10	14	15.6	4	14	14	32		0.5	3	10	3	10
16	7.00	0.658	EBDL	10	14	15.6		14	14	28		0.5	3	10	3	10
16	7.00	0.691	EBDL	6	14	9.3	2	14	14	30		0.3	2	6	2	6
* 16	7.00	0.803	EBDL	6	14	9.3	2	14	14	30		0.3	2	6	2	6
* 16	7.00	0.803	WBDL	6	14	9.3		14	14	28		0.3	2	6	2	6
16	8.00	0.002	WBDL	6	14	9.3		14	14	28		0.3	2	6	2	6
16	8.00	0.002	EBDL	14	14	21.8	5	14	14	33		0.7	4	14	4	14
16	8.00	0.642	WBDL	66	14	102.7	26	14	14	54	42	3.3	17	66	17	66
16	9.00	0.838	WBDL	6	14	9.3	2	14	14	30		0.3	2	6	2	6
16	9.00	0.838	EBDL	6	14	9.3		14	14	28		0.3	2	6	2	6
16	10.00	0.213	EBSL	8	4	3.6	3	4	4	11			2	8	2	8
16	10.00	0.216	EBSL	7	4	3.1	2	4	4	10			2	7	2	7
16	10.00	0.219	EBSL	6	5	3.3	2	5	5	12			2	6	2	6
16	10.00	0.318	EBSL	6	12	8.0	2	12	12	26			2	6	2	6
16	10.00	0.614	WBDL	20	14	31.1	8		28	36	14	1.0	5	20	5	20
16	10.00	0.614	EBDL	6	14	9.3	2	12	12	26		0.3	2	6	2	6
16	10.00	0.614	EBSL	6	14	9.3		12	12	24		0.3	2	6	2	6
16	10.00	0.650	WBDL	20	14	31.1	8		28	36	14	1.0	5	20	5	20
20% Additional Quantity for Repairs Discovered in the Field						109.0	8	14	14	36						
			Total:			654.1	130	317	485	932	140	17	104	371	104	371

TABLE OF SUBGRADE REPAIR

Table of Subgrade Repair

HWY	MRM	Displacement	Location	Unclassified Excavation Cu. yds.	Gravel Cushion Ton	Shot Rock Ton	MSE Reinforcement Fabric Sq. Yd.
16	0.00	0.190	EBDL	23.7	8	25	140
16	0.00	0.190	WBDL	23.7	8	25	140
16	0.00	0.565	EBDL	23.7	8	25	140
16	6.00	0.239	EBDL	40.3	14	42	240
16	8.00	0.002	EBDL	17.5	6	18	110
16	8.00	0.642	WBDL	71.4	25	75	300
16	10.00	0.614	WBDL	23.7	8	25	140
			Totals:	**224.0**	**78**	**235**	**1210**

TABLE OF SPALL REPAIR

Table of Type A Spall Repair

MRM	to	MRM	Estimated Number of Locations Each	Repair Type A Spall SqFt
0	to	1	30	20.0
1	to	2	36	25.0
2	to	3	30	20.0
3	to	4	10	10.0
4	to	5	21	15.0
5	to	6	25	19.0
6	to	7	20	13.0
7	to	8	23	15.0
8	to	9	18	14.0
9	to	10	23	19.0
10	to	11	53	35.0
		Subtotal:		**205.0**

TABLE OF RETROFITTING TIE BARS & SEAL RANDOM CRACKS IN PCCP

Table of Retrofitting Tie Bars, Stitching & Seal Random Cracks in PCCP

MRM	to	MRM	Estimated Number of Locations Each	Tie Bar Retrofit, Stitching Each	Seal Random Cracks in PCC Pavement Ft
0	to	1	10	156	400
1	to	2	8	13	200
2	to	3	8	13	200
3	to	4	8	13	200
4	to	5	13	45	225
5	to	6	16	45	220
6	to	7	26	26	450
7	to	8	65	29	1000
8	to	9	41	15	220
9	to	10	9	39	215
10	to	11	56	45	1600
		Subtotals:		**439**	**4930**

TIE BAR RETROFIT, STITCHING

Drilling of holes and epoxy resin adhesive will conform to Section 380. Steel bars will conform to Section 1010.

Tie Bar Retrofit, Stitching will be done on and random cracks as marked out by the Engineer.

The Contractor will insert No. 5 epoxy coated deformed tie bars into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole. A rotary drill or other approved drill will be used that will not damage the concrete surface. The diameter of the disturbed surface from drilling will be less than 2 inches. A rigid frame or mechanical device will be required to guide the drill to ensure the proper angle of the steel bars in the drilled holes.

The diameter of the drilled holes in the existing concrete pavement for the steel bars will not be less than 1/8 inch nor more than 3/8 inch greater than the overall diameter of the steel bar. The holes will be drilled at an angle alternating from opposite sides of the joint to produce a cross-stitching pattern.

Fill the drilled holes sufficiently with epoxy prior to the insertion of the tie bar such that the epoxy will be level with the top of the concrete pavement after insertion of the tie bar. Rotate the steel bar during insertion to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed. The top of the drilled hole will be filled with epoxy or excess epoxy removed such that the epoxy is level with the existing pavement.

No bars will be inserted within 15” of an existing transverse contraction joint. Any bars not functioning or damaged will be repaired or replaced at the Contractor’s expense.

Cost for the epoxy resin adhesive, tie bars, drilling of holes, debris or loose material removal, applying the adhesive, inserting the tie bars into the drilled holes and incidentals necessary for the insertion of the tie bars will be included in the contract unit price per each for Tie Bar Retrofit, Stitching.

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 AW or an approved equal.

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

RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4” line = 22.5 Gals/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. All costs for removal of grinding and/or grooving residue will be included in the contract unit price per foot for Grooving for Cold Applied Plastic Pavement Marking contract items.

GROOVING FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

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. All costs for removal of grinding and/or grooving residue will be included in the contract unit price per foot for Grooving for Durable Pavement Marking contract item.

Unless otherwise specified in the plans, the Contractor will groove the surface for High Build Waterborne Pavement Marking Paint as specified in these plans and as per the manufacturer’s instructions.

The grooving will be completed within the following tolerances:

Description	Specification	Tolerance
Depth of Groove	Marking Thickness[1] + 15 mils	+ 5 mils
Width of Groove	5 to 6 inches	
Length of Skip Lines[2]	10 foot 6 inches	± 3 inch
Tapers at ends of lines	6 to 9 inches	
Between Double Lines	4 inches	± 1/2 inch

[1] Marking thickness will include the thickness of marking material and reflective media.
[2] Additional length may be required as specified in the plans.

The equipment will be capable of the following:

- Grooving the total width of the groove in one pass or uniform depths with multiple passes.
- Grooving without causing damage to the pavement joints or joint sealant material.
- Provide uniform alignment and depth.
- Moving continuously to permit a mobile traffic work operation.

If damage occurs, including, but not limited to, joints, joint sealant material, and backer rod, the grooving operation will be stopped, and modifications will be made to the grooving operation to prevent further damage. The Contractor may be required to use specially prepared circular diamond blade cutting heads to prevent damage at the joints. Damage caused will be repaired or replaced by the Contractor, as directed by the Engineer. No additional payment will be made for the repair work or any reapplication of the pavement marking in the area of the repair.

ROADWAY CLEANING

The Contractor will be responsible for removing the router tailings from the roadway surface, including shoulders, or as directed by the Engineer.

TEMPORARY PAVEMENT MARKING

Temporary pavement marking tape Type 1 will be used for the 24” white stop bars.

Temporary pavement marking for stop bars will consist of 4” temporary pavement marking tape type I. Placement of each 24” white stop bar will be accomplished by placing six pieces of 4” x 12’ tape adjacent to one another. Each workspace requires two stop bars which is an equivalent of approximately 144’ of 4” tape (13 workspaces at 144’ = 1872’). Temporary

Temporary pavement marking on centerline will consist of temporary flexible vertical markers (tabs) or temporary raised pavement markers and will be used as depicted on standard plate 634.25 when the stop condition must remain in place during nighttime hours, 9:00 pm to 6:00 am (Estimate 13 workspaces remaining during nighttime hours x 2,400’ per workspace = 26312).

All costs to furnish, install, maintain (including replacement as required by the Engineer at no added cost to the Department), and remove the temporary pavement marking tape type 1 will be included in the contract price per foot per 4” line or equivalent for 4” Temporary Pavement Marking Tape Type 1.

PCN	Highway	4" Temporary Pavement Marking Tape Type 1 (Ft.)	Temporary Pavement Marking (Ft)
i5L0	US 16	1872	26312

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	7	25

TRAFFIC CONTROL – GENERAL NOTES

No work will be allowed during hours of darkness as defined by the Specifications.

Existing guide, route, informational logo, regulatory, warning signs and delineation will be temporarily reset and maintained during construction as directed by the Engineer. Removing, relocating, salvaging and resetting of the above items will be the responsibility of the Contractor.

All materials and equipment will be stored a minimum distance of 30’ from the traveled way during nonworking hours.

All haul trucks will be equipped with a second 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 bid items.

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.

The Contractor will keep the portion of the project being used by public traffic in a condition that will adequately and safely accommodate traffic.

Routing traffic onto the mainline shoulders during any phase of the construction will not be allowed.

Damage to the shoulders, median, or ditch due to the Contractor's operations will be repaired by the Contractor to the satisfaction of the Engineer at no expense to the State. This includes the apparent routing of traffic onto the shoulders around the work zones.

Road Work Ahead (W20-1) signs will be placed at applicable intersecting roads and as directed by the Engineer.

A Type 3 Barricade will be installed as per the details in these plans and at a minimum spacing of 2000’ within the lane closure. Three drums will be placed across the lane closure in front of any open concrete panel repair area, as directed by the Engineer.

In the past this note has been problematic. Revise note to read:
Operations will be conducted so that the traveling public will not have to wait longer than 15 minutes at the flagger station.

A maximum of 4 overnight traffic control setups; inclusive of a State furnished portable traffic signal setup, will be allowed at one time. Locations will be chosen so spacing can be maximized between setups. Any one closure will not exceed 600’ as shown on Standard Plate 634.25 (or 1500’ within a portable traffic signal setup). Additional flagger setups may be used in addition to the 4 overnight setups for sawing if needed.

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.

STATE FURNISHED PORTABLE TRAFFIC SIGNALS

The State will furnish 2 Portable Traffic Signals (one set-up). Contractor will coordinate with the Engineer for location setups. The signals may be used for the duration of the project excluding July 20th through August 24th. Signal set up, timing and maintenance will be determined and managed by the Engineer.

The Contractor will be responsible for the transport of the State Furnished Traffic Control Signals.

The Contractor will coordinate with the Engineer for transport of the State Furnished Traffic Control Signals.

The cost for relocation of the State Furnished Traffic Control Signals will be incidental to the lump sum unit price for Traffic Control, Miscellaneous.

INVENTORY OF TRAFFIC CONTROL DEVICES

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	7	30"	5.2	36.4
R3-2	LEFT TURN PROHIBITION (symbol)	2	24" x 24"	4.0	8.0
R10-6	STOP HERE ON RED	2	24" x 36"	6.0	12.0
W1-4	REVERSE CURVE (L or R)	4	48" x 48"	16.0	64.0
W3-1	STOP AHEAD (symbol)	6	48" x 48"	16.0	96.0
W3-3	SIGNAL AHEAD (symbol)	2	48" x 48"	16.0	32.0
W3-4	BE PREPARED TO STOP	6	48" x 48"	16.0	96.0
W4-2	LEFT or RIGHT LANE ENDS (symbol)	6	48" x 48"	16.0	96.0
W9-3	CENTER LANE CLOSED AHEAD	2	48" x 48"	16.0	32.0
W13-1P	ADVISORY SPEED (plaque)	10	30" x 30"	6.3	63.0
W16-2P	___ FEET (supplemental distance plaque)	4	30" x 24"	5.0	20.0
W20-1	ROAD WORK AHEAD	28	48" x 48"	16.0	448.0
W20-4	ONE LANE ROAD AHEAD	8	48" x 48"	16.0	128.0
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	6	48" x 48"	16.0	96.0
W20-7	FLAGGER (symbol)	6	48" x 48"	16.0	96.0
W21-5	SHOULDER WORK	4	48" x 48"	16.0	64.0
G20-2	END ROAD WORK	19	36" x 18"	4.5	85.5
SPECIAL	WIDTH RESTRICTION 12 FT WIDE __ MILES AHEAD		96" x 84"	56.0	5.0
SPECIAL	WIDTH RESTRICTION 12 FT WIDE __ MILES AHEAD		96" x 48"	32.0	2.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			1479.9

SEQUENCE OF OPERATIONS

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.

1. Set up traffic control to close one lane.
2. Complete concrete repair.
3. Install Permanent Pavement Marking.
4. Remove traffic control.

OVERWIDTH TRAFFIC

The Contractor will maintain a minimum width of 12’ for the travel lanes at all times.

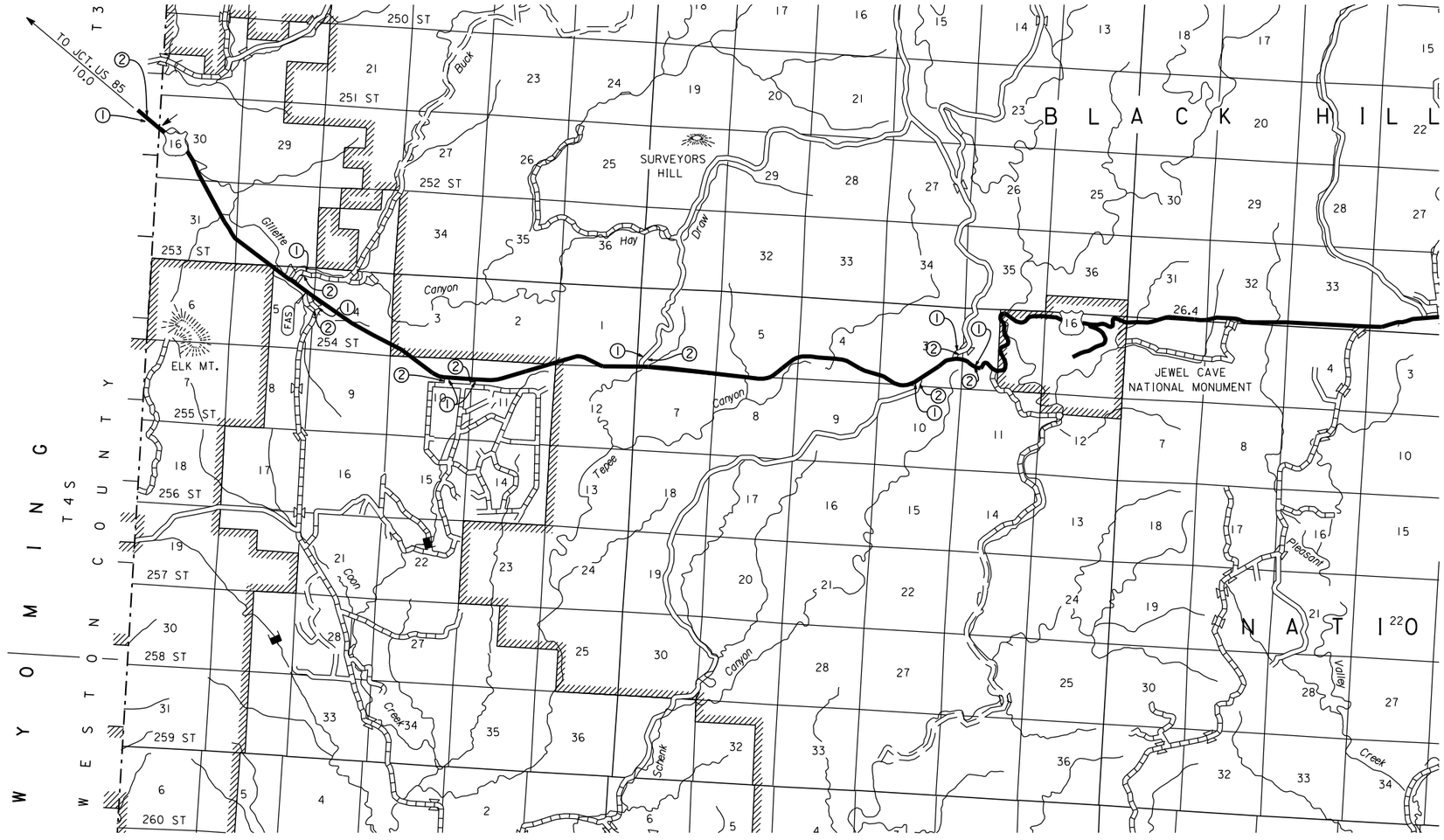
PRESS RELEASE ANNOUNCEMENTS

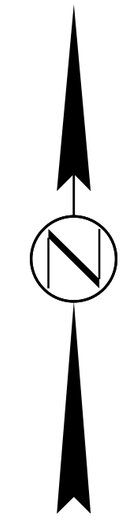
The SDDOT will prepare a Press Release to be released 5 days prior to any phase change or any other major change that affects traffic flow. The SDDOT will be responsible to keep law enforcement, emergency services, and the traveling public notified of changes in project access. The Contractor will provide the Engineer with pertinent information 7 days prior to any phase change or any other major changes that affect traffic flow.

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	016-491	8	25

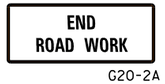
Plotting Date: 03/23/2020

Fixed Location Signs





①



②

PLOT SCALE - 1:214

PLOT NAME - 2

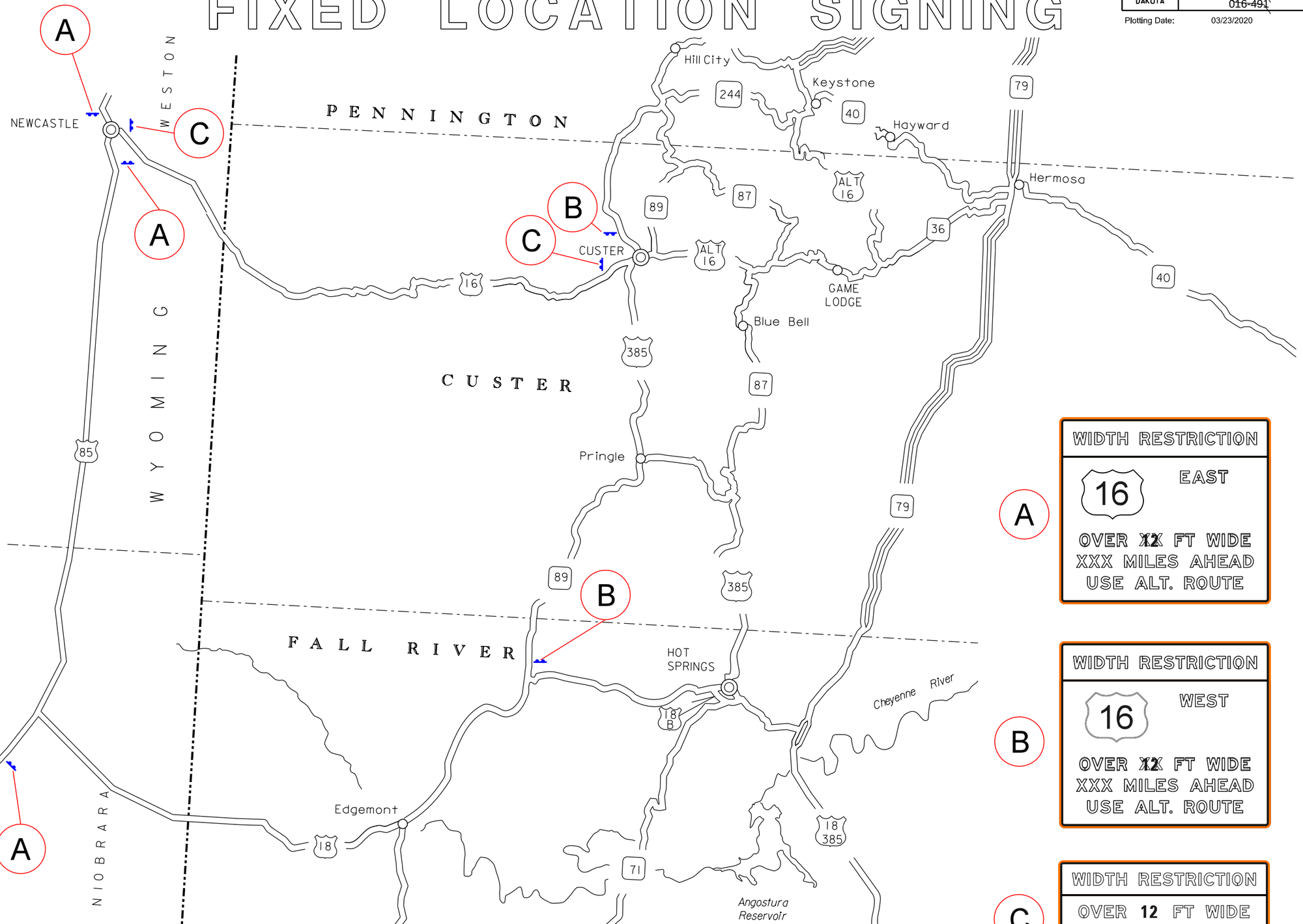
FILE - ...\1_15L0 FIXED LOCATION SIGNS.DGN

PLOTTED FROM - TRRC12608

FIXED LOCATION SIGNING

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	~~016-491~~	9	25

Plotting Date: 03/23/2020



A

WIDTH RESTRICTION

16 EAST

OVER ~~12~~ 12 FT WIDE
XXX MILES AHEAD
USE ALT. ROUTE

B

WIDTH RESTRICTION

16 WEST

OVER ~~12~~ 12 FT WIDE
XXX MILES AHEAD
USE ALT. ROUTE

C

WIDTH RESTRICTION

OVER 12 FT WIDE
XXX MILES AHEAD
USE ALT. ROUTE

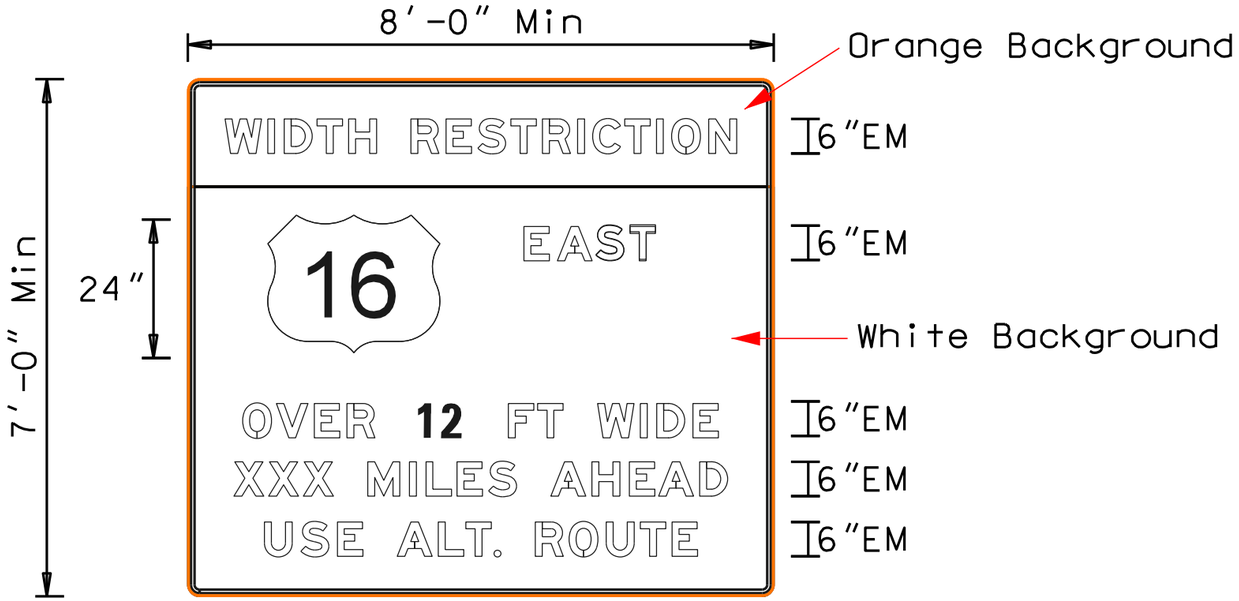
Plot Scale - 1:200

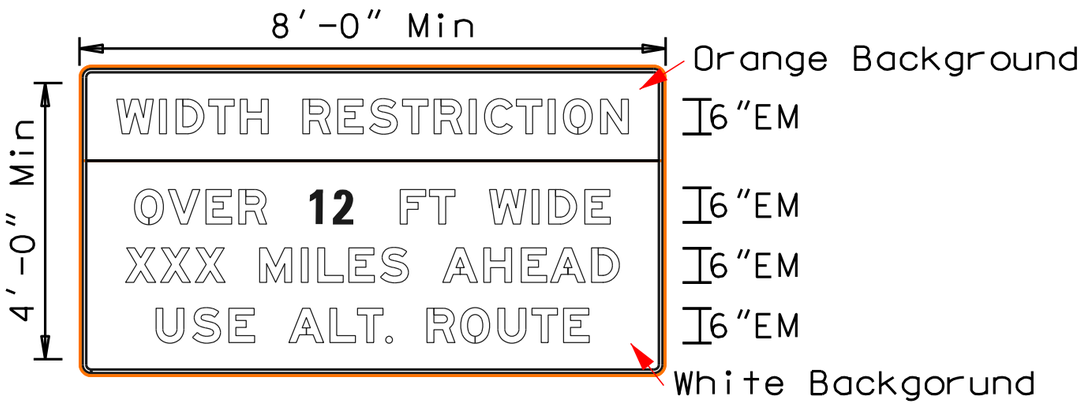
Plotted From - TRRC12608

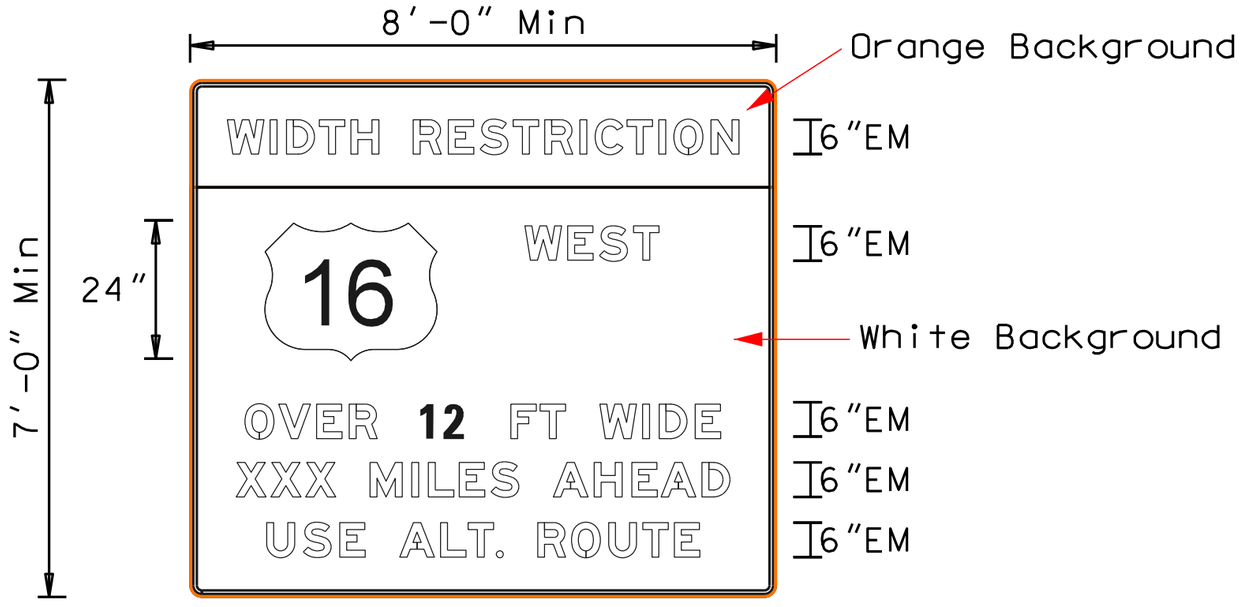
File - ...\2020 Design\Detour Map.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	10	25

Sign Detail



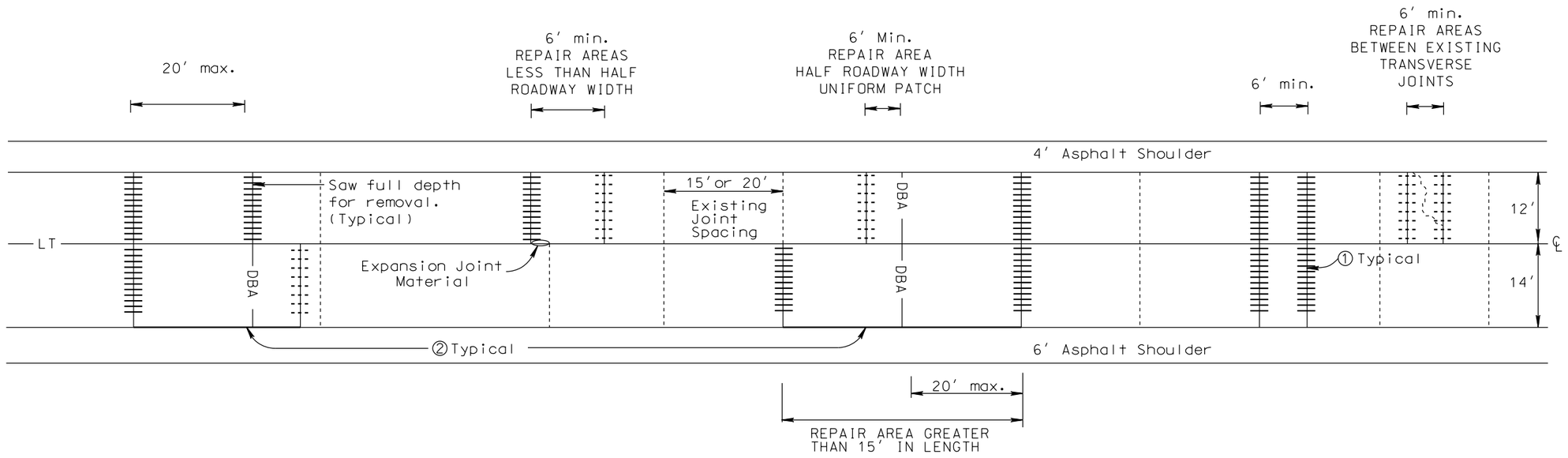




STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	016-491	11	25

NONREINFORCED PCC PAVEMENT REPAIR

TYPICAL REPAIR AREAS



NOTES:

① Where possible, transverse joints shall be constructed full roadway width.

② All edges of repair areas that are adjacent to asphalt concrete shall be formed to match the depth of the existing concrete pavement and replaced with new asphalt.

Legend:

— Drilled in 1 1/4 ″ x 18″ epoxy coated plain round dowel bar

--- Drilled in No. 9 x 18″ epoxy coated deformed tie bars

DBA Dowel Bar Assembly (for repair areas greater than 20′ in length)

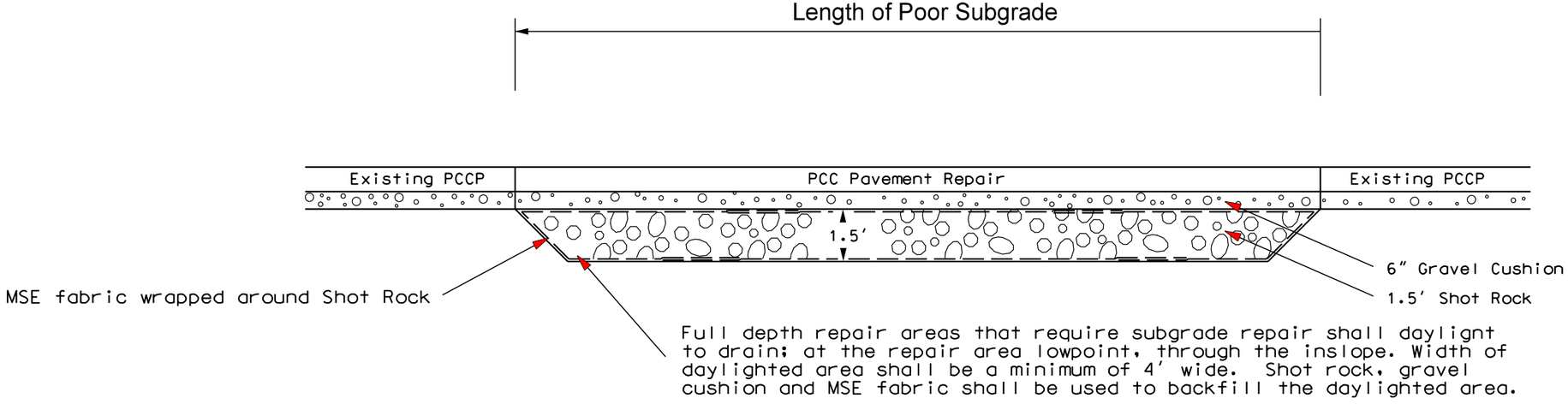
—— L —— Longitudinal Construction Joint Without Tie Bars (Keyway Joint)

—— LT —— Longitudinal Construction Joint With Tie Bars
(Do not tie more than 48′ width of pavement)

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	016-491	12	25

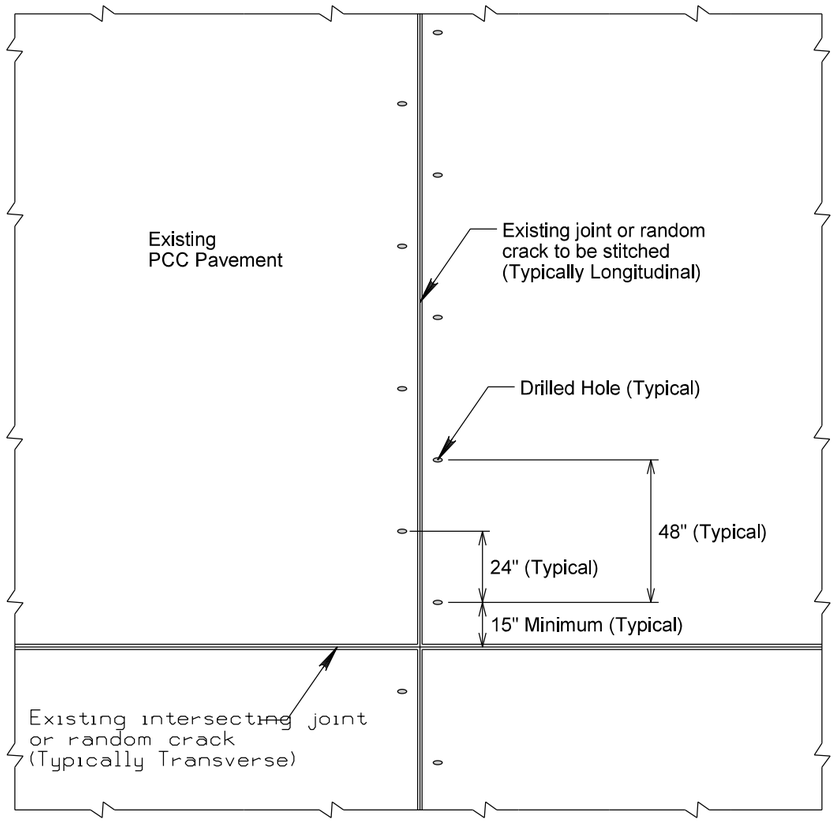
Subgrade Repair Detail

LONGITUDINAL SECTION ALONG CENTERLINE



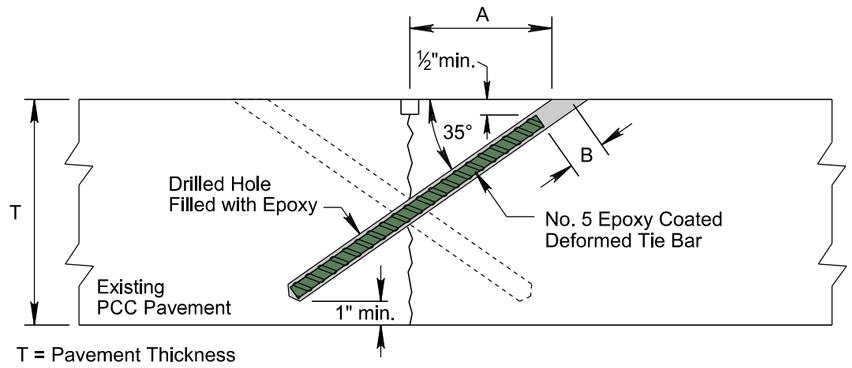
Full depth repair areas that require subgrade repair shall daylight to drain; at the repair area lowpoint, through the inslope. Width of daylighted area shall be a minimum of 4' wide. Shot rock, gravel cushion and MSE fabric shall be used to backfill the daylighted area.

TIE BAR RETROFIT (STITCHING)



PLAN VIEW

TIE BAR RETROFIT (STITCHING)



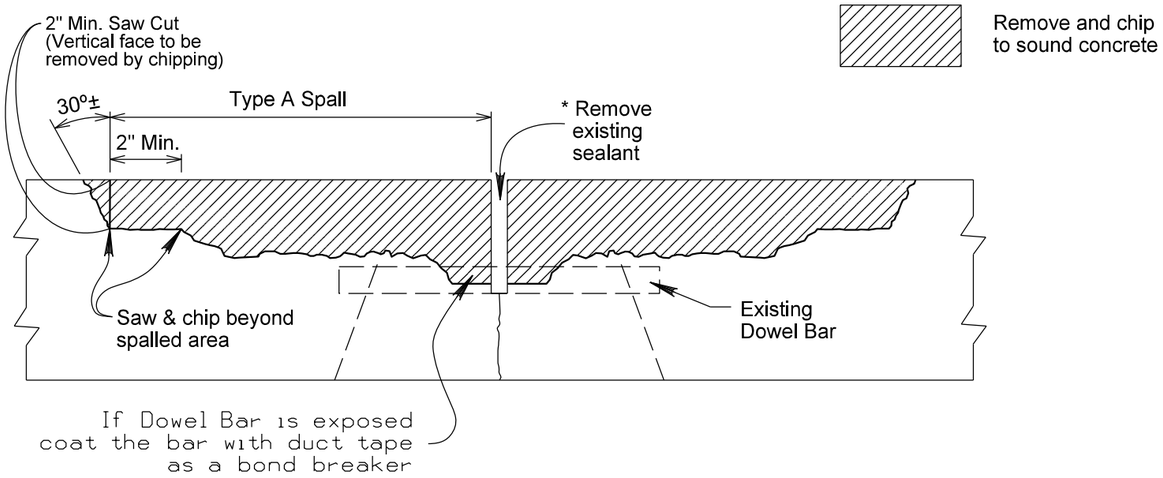
ELEVATION VIEW

TABLE OF STITCHING DIMENSIONS

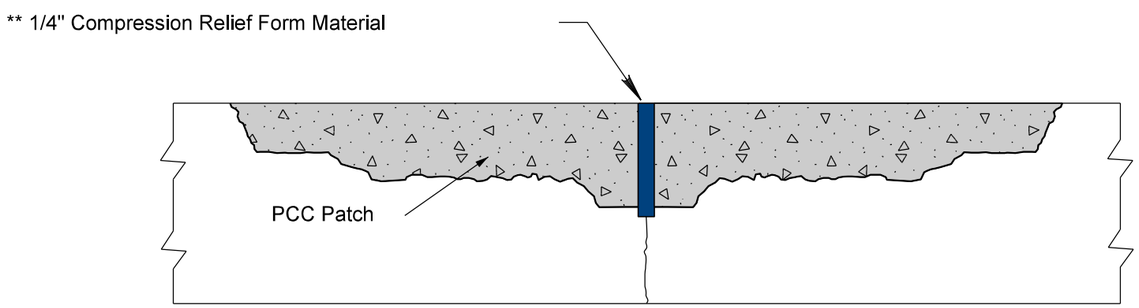
T	A	B	Length of Tie Bar
8"	5"	1½"±	10"
8½"	5¼"	1⅜"±	11"
9"	5⅝"	1¼"±	12"
9½"	6"	1⅝"±	12½"
10"	6⅜"	1½"±	13½"
10½"	6¾"	1⅜"±	14½"
11"	7"	1¼"±	15½"
11½"	7⅜"	1⅜"±	16"
12"	7¾"	1⅜"±	16½"
12½"	8⅛"	1¼"±	17½"

REPAIR OF TYPE A SPALLS

SPALL REMOVAL



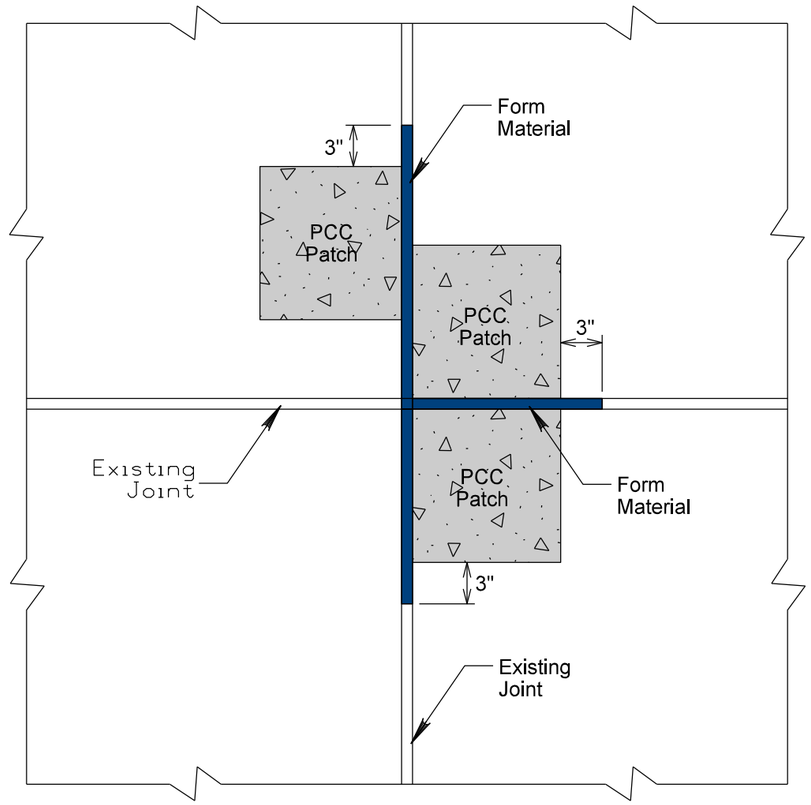
SPALL PATCH



** Compression Relief Form Material shall be removed by sawing or other means approved by the Engineer. Spall repaired joints shall then be sealed with Hot Poured Elastic Joint Sealer.

REPAIR OF TYPE A SPALLS

SPALL PATCHES (PLAN VIEW)



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	15	25

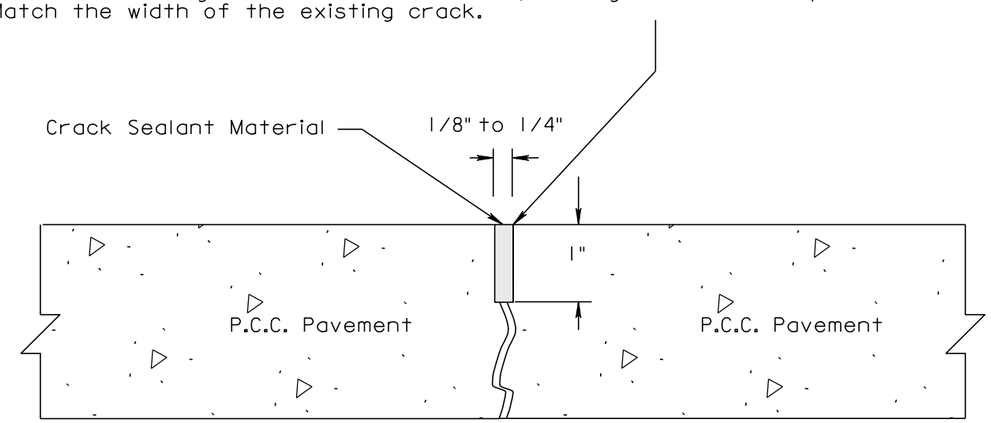
Plotting Date: 03/23/2020

SEAL RANDOM CRACKS IN PCC PAVEMENT

Routing will be required to widen and cleanout the crack. Section 350 of the Standard Specifications will be used for installation requirements. The use of a squeegee will not be required and the sealant will be left flush with the top of the pavement.

If excessive spalling of the PCC Pavement occurs, the Contractor will switch to sawing.

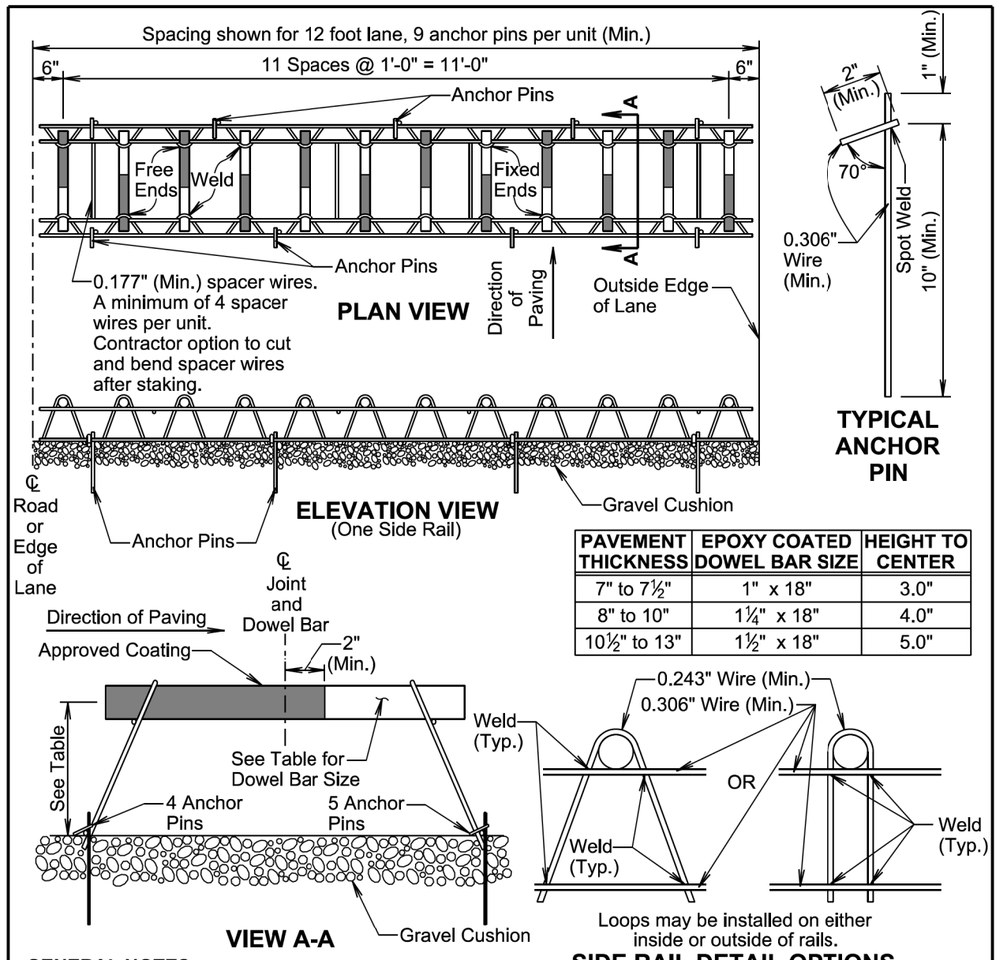
If the crack is greater than 1/4" in width, routing will not be required.
Match the width of the existing crack.



Plot Scale - 1:200

- Plotted From - TRRC12608

File - ...\PCCP Seal Random Cracks.dgn



PAVEMENT THICKNESS	EPOXY COATED DOWEL BAR SIZE	HEIGHT TO CENTER
7" to 7½"	1" x 18"	3.0"
8" to 10"	1¼" x 18"	4.0"
10½" to 13"	1½" x 18"	5.0"

GENERAL NOTES:

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

Centerline of individual dowel bars will be parallel to top of subgrade ±1/8 inch in 18 inches and to all other dowel bars in the assembly ±1/16 inch in 18 inches.

Centerline of individual dowel bars will be parallel to the centerline of the roadway ±1/2 inch in 18 inches.

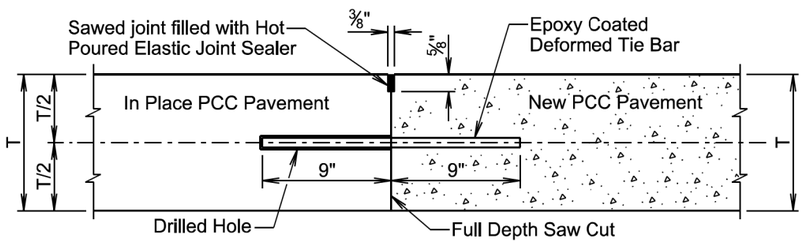
The transverse contraction joints will be sawed perpendicular to the centerline of the roadway and the dowel bars will be centered on the sawed joint ±1 inch.

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.

June 26, 2019

Published Date: 1st Qtr. 2020	SDDOT	PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS 12 Bar Assembly on Granular Base Material	PLATE NUMBER 380.01 Sheet 1 of 1

DETAIL A
TRANSVERSE CONSTRUCTION JOINT WITH TIE BARS



T = In Place PCC Pavement and New PCC Pavement Thickness

GENERAL NOTES:

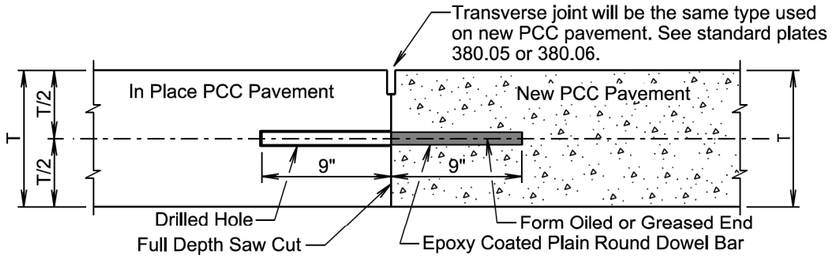
The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.

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.

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



GENERAL NOTES: T = In Place PCC Pavement and New PCC Pavement Thickness

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.

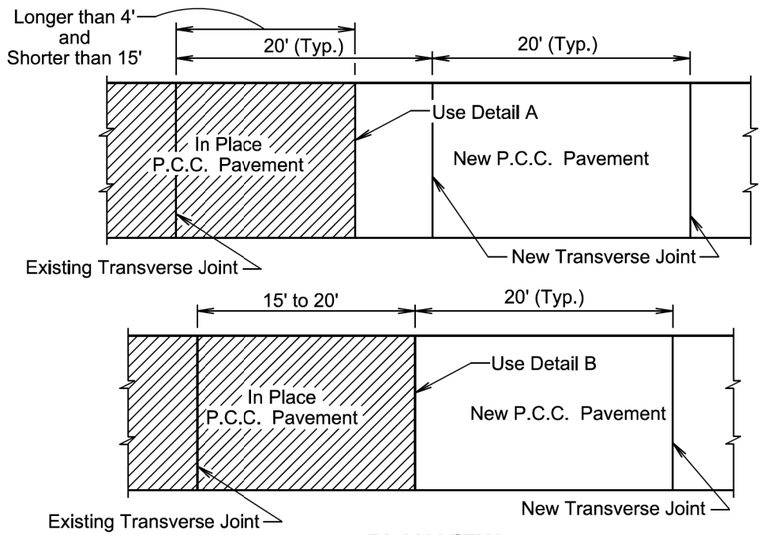
See sheet 2 of 2 of this standard plate to determine if Detail B will be used.

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.

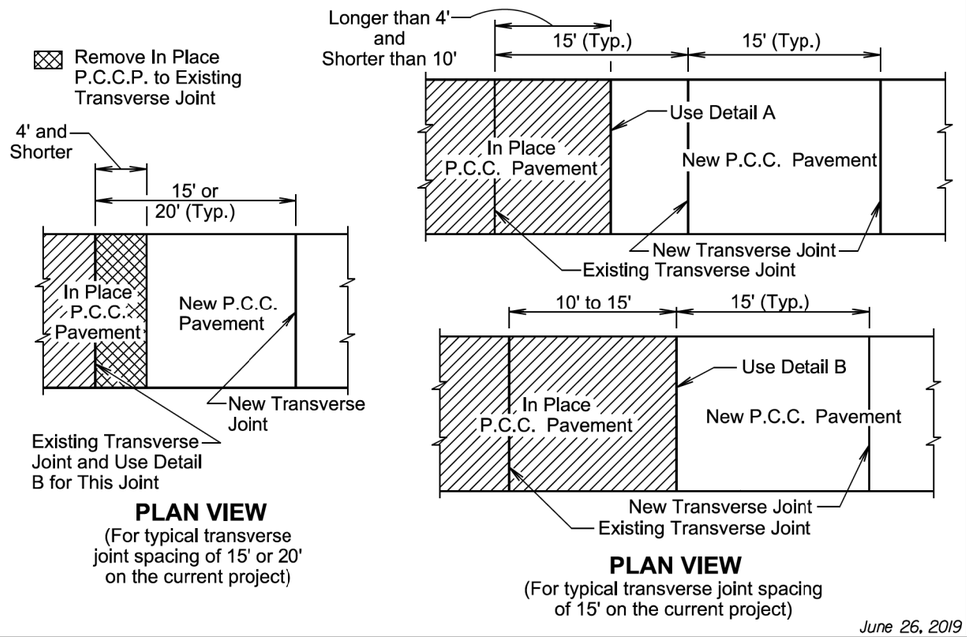
The epoxy coated plain round dowel bar size, number, and spacing will be the same as detailed on the corresponding dowel bar assembly standard plate (380.01, 380.02, 380.03, or 380.04). The epoxy coated plain round dowel bars will be a minimum of 3 inches and a maximum of 6 inches from the pavement edges.

June 26, 2019

Published Date: 1st Qtr. 2020	SDDOT	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.08 Sheet 1 of 2



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



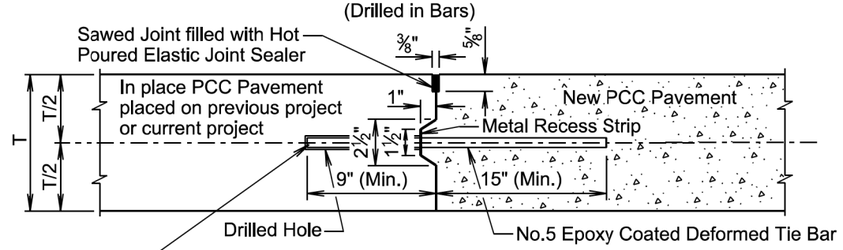
PLAN VIEW
(For typical transverse joint spacing of 15' or 20' on the current project)

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

June 26, 2019

Published Date: 1st Qtr. 2020	SDDOT	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.08
			Sheet 2 of 2

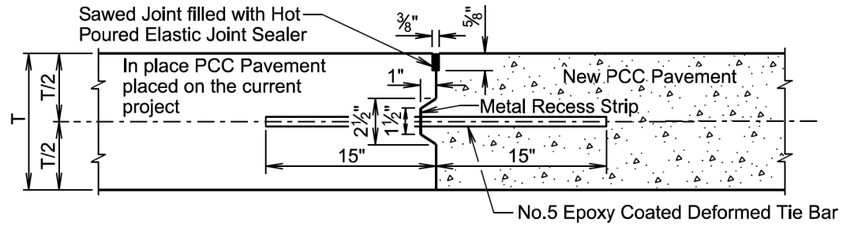
LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS
(Drilled in Bars)



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.

T = Pavement Thickness

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.

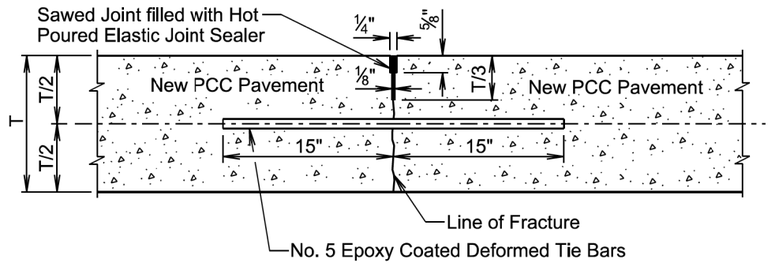
The keyway is optional and is not required. When concrete pavement is formed and a keyway is provided, a metal recess strip will be used. When concrete pavement is slip formed, a metal recess strip is not required.

June 26, 2019

Published Date: 1st Qtr. 2020	SDDOT	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.10
			Sheet 1 of 2

SAWED LONGITUDINAL JOINT WITH TIE BARS

(Poured Monolithically)



T = Pavement Thickness

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

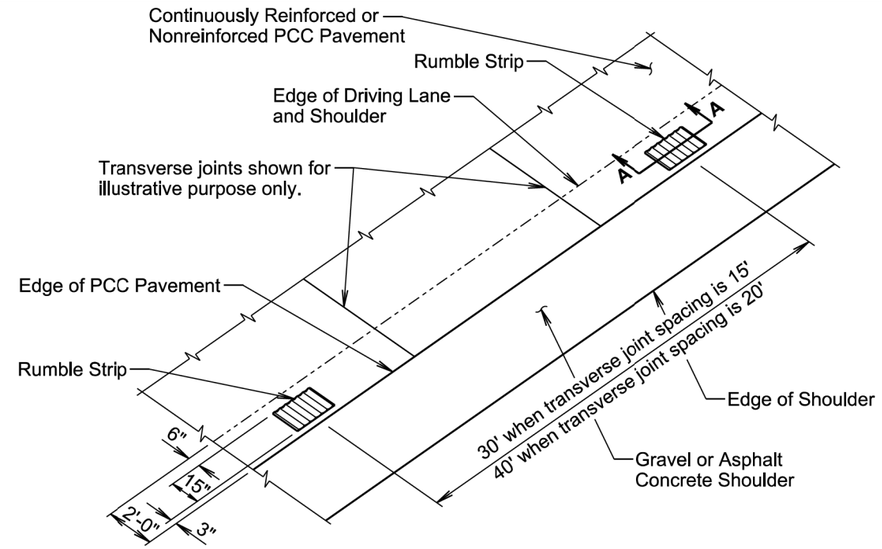
The tie bars will be placed a minimum of 15 inches from the transverse contraction joints.

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.

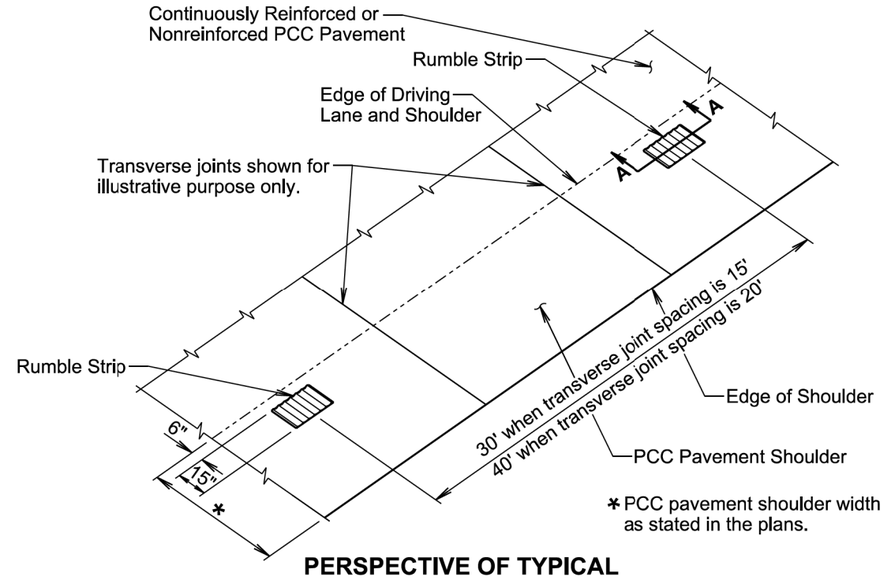
The first saw cut to control cracking will be a minimum of 1/3 the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the hot poured elastic joint sealer is necessary.

June 26, 2019

Published Date: 1st Qtr. 2020	SDDOT	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.10
			Sheet 2 of 2



PERSPECTIVE OF TYPICAL RUMBLE STRIPS ON PCC PAVEMENT SHOULDER ADJACENT TO GRAVEL OR ASPHALT CONCRETE SHOULDER



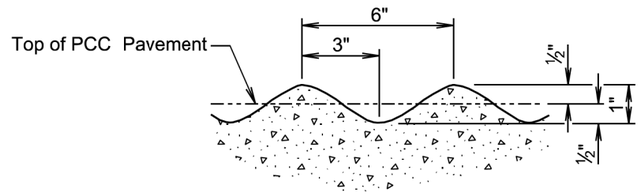
PERSPECTIVE OF TYPICAL RUMBLE STRIPS ON PCC PAVEMENT SHOULDER

June 26, 2019

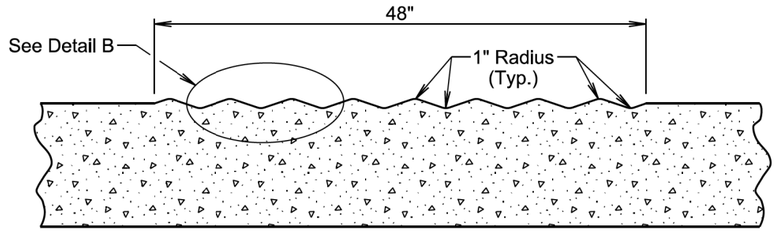
Published Date: 1st Qtr. 2020	SDDOT	RUMBLE STRIP ON PCC PAVEMENT SHOULDER	PLATE NUMBER 380.15
			Sheet 1 of 2

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	19	25

Plotting Date: 03/23/2020



DETAIL B



SECTION A-A

GENERAL NOTES:

The rumble strips will be evenly spaced and will not coincide with any transverse contraction joints.

The rumble strips will NOT be placed along areas adjacent to entrance ramps, exit ramps, and gore areas.

Payment for constructing the PCC Pavement Rumble Strips will be incidental to the contract unit price per square yard for the corresponding PCC Pavement contract item.

June 26, 2019

Published Date: 1st Qtr. 2020	SDDOT	*RUMBLE STRIP ON PCC PAVEMENT SHOULDER*	*PLATE NUMBER* 380.15
			Sheet 2 of 2

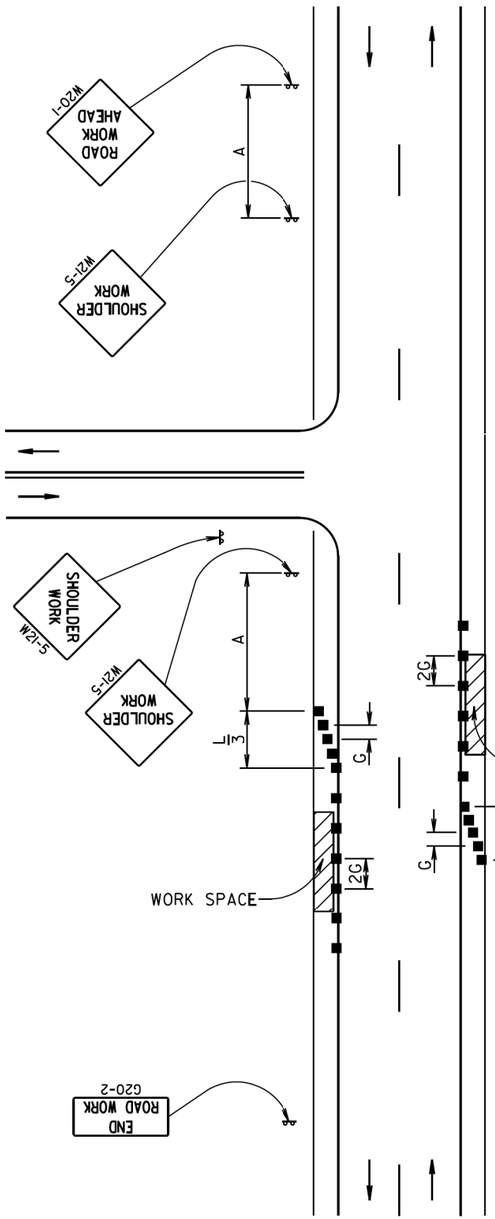
Plot Scale - 1:200

- Plotted From - TRRC12608

File - ...\2020 Design\380_4.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	20	25

Plotting Date: 03/23/2020



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

■ Channelizing Device

END ROAD WORK G20-2

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

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

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

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

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

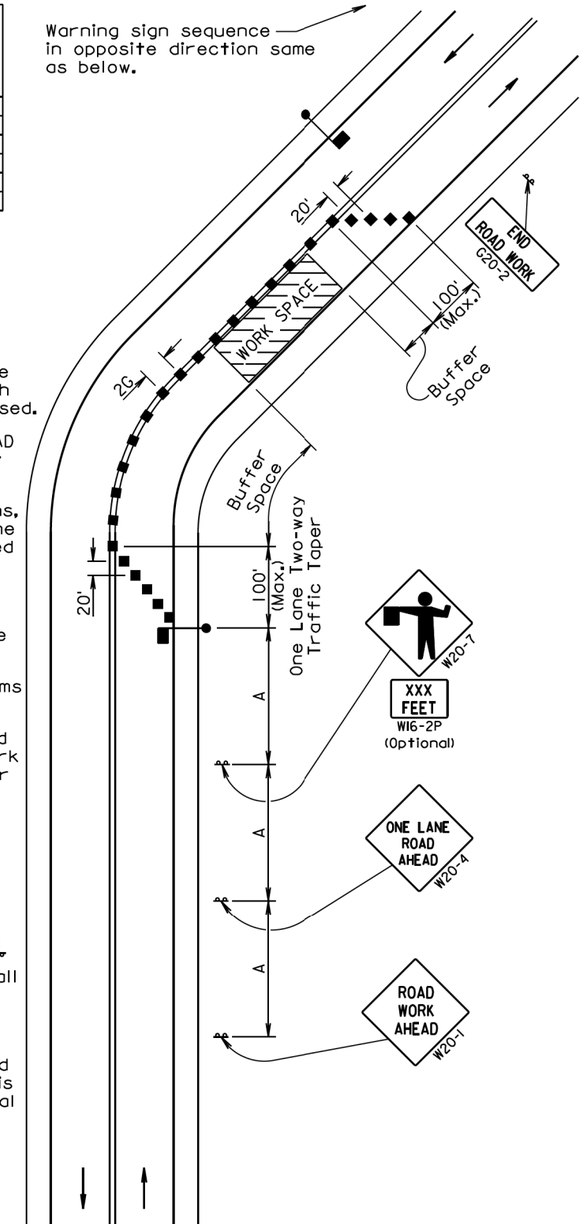
END ROAD WORK G20-2

June 3, 2016

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES WORK ON SHOULDERS	PLATE NUMBER 634.03
			Sheet 1 of 1

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

Warning sign sequence in opposite direction same as below.



■ 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) shall 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 shall be drums or 42" cones.

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

END ROAD WORK G20-2

Channelizing devices and flaggers shall 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.

June 3, 2016

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1

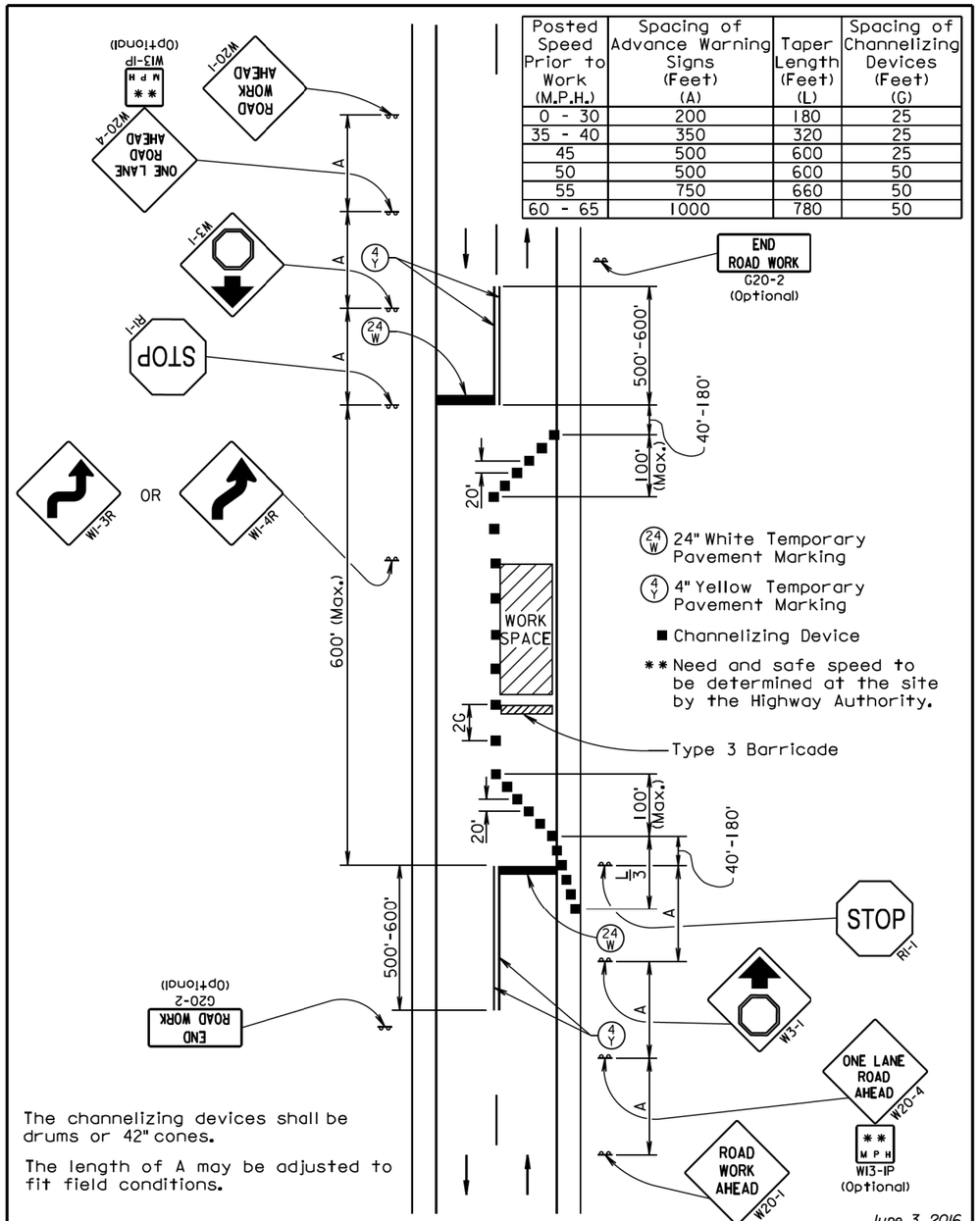
Plot Scale - 1:200

- Plotted From - TRRC12608

File - ...\2019 Design\634_1.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	21	25

Plotting Date: 03/23/2020

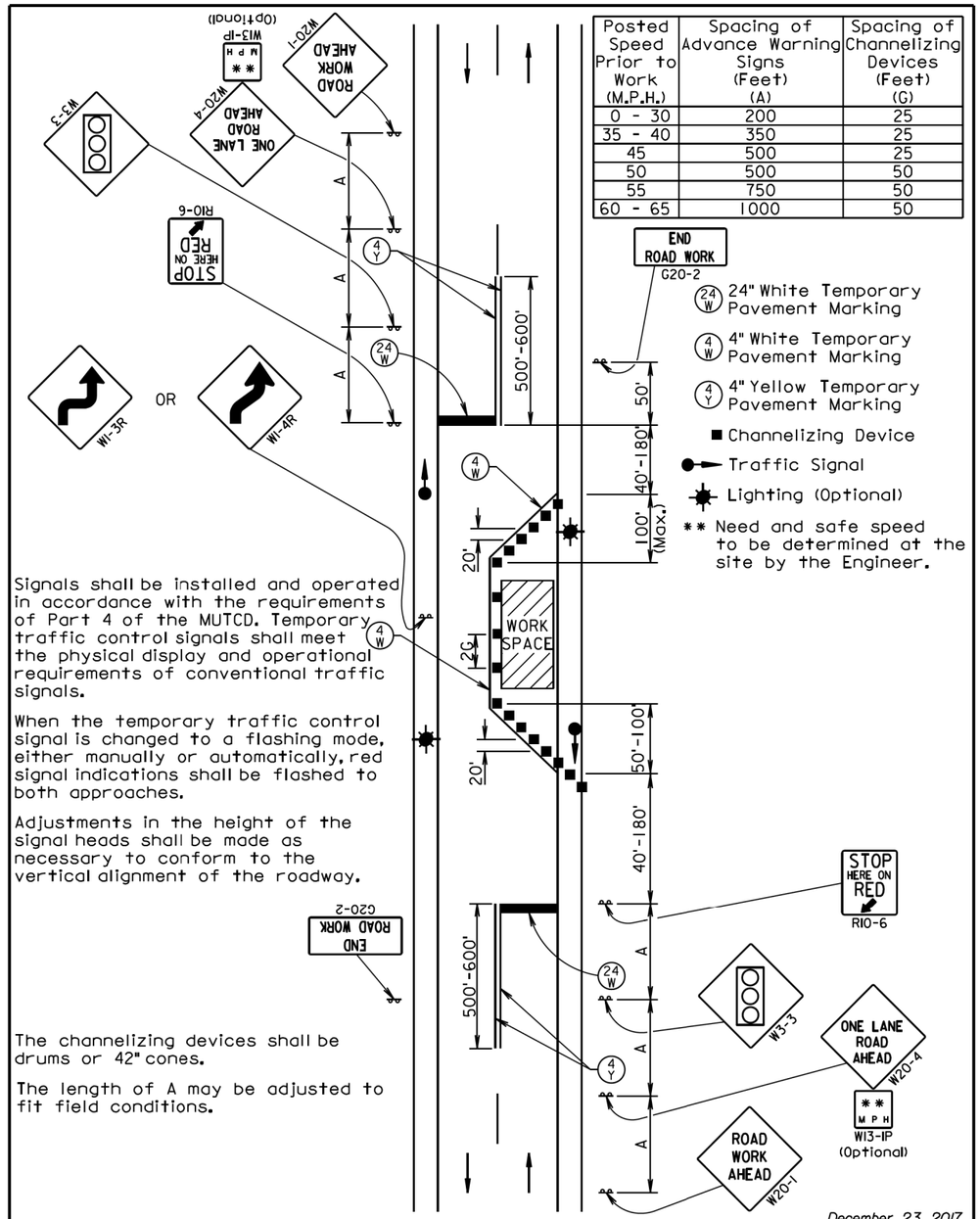


The channelizing devices shall be drums or 42" cones.

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

June 3, 2016

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING STOP SIGNS	PLATE NUMBER 634.25
			Sheet 1 of 1



Signals shall be installed and operated in accordance with the requirements of Part 4 of the MUTCD. Temporary traffic control signals shall meet the physical display and operational requirements of conventional traffic signals.

When the temporary traffic control signal is changed to a flashing mode, either manually or automatically, red signal indications shall be flashed to both approaches.

Adjustments in the height of the signal heads shall be made as necessary to conform to the vertical alignment of the roadway.

The channelizing devices shall be drums or 42" cones.

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

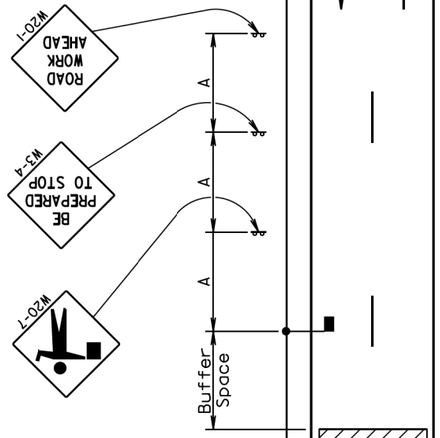
December 23, 2017

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING TRAFFIC SIGNALS	PLATE NUMBER 634.26
			Sheet 1 of 1

Plot Scale = 1:200

- Plotted From - TRRC12608

File - ...\2019 Design\634_2.dgn



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

END ROAD WORK
G20-2
(Optional)

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.

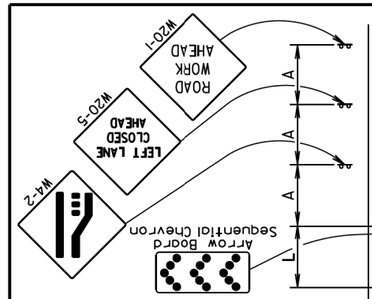
Conditions represented are for work that requires closings during daytime hours only.

This application is intended for a planned temporary closing not to exceed 15 to 20 minutes.

END ROAD WORK (Optional) G20-2

September 6, 2015

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES TEMPORARY ROAD WORK	PLATE NUMBER 634.30 Sheet 1 of 1



◎ Reflectorized Drum
■ Channelizing Device
(4W) 4" White Temporary Pavement Marking
(4Y) 4" Yellow Temporary Pavement Marking

** Speed to be determined on site by the Highway Authority.

The traffic control devices shown are appropriate for high-speed highway.

Pavement markings no longer applicable shall be removed or obliterated as soon as practical.

Temporary pavement markings shall be used if traffic control must remain overnight.

The channelizing devices shall be 42" cones or drums.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

The channelization must be made dominant by using a device spacing of G/2 for intermediate-term, up to 3 days, when it is not feasible to remove and restore pavement markings.

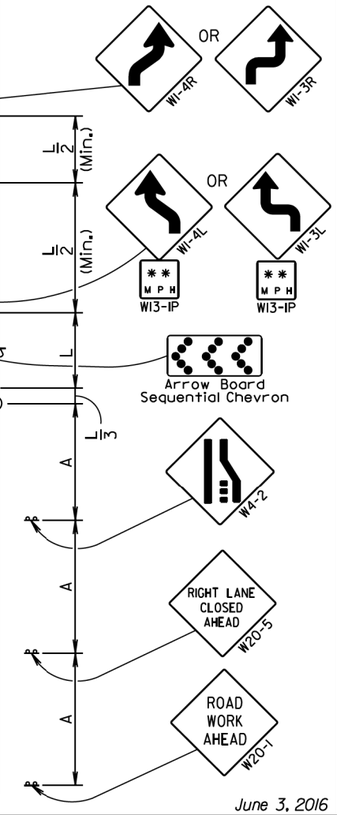
END ROAD WORK G20-2

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

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

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	25
35 - 45	25
50	50 *
55	50 *
60 - 65	50 *

* Spacing is 40' for 42" cones.



June 3, 2016

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES HALF ROAD CLOSURE ON MULTILANE HIGHWAY	PLATE NUMBER 634.46 Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	23	25

Plotting Date: 03/23/2020

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

* Spacing is 40' for 42" cones.

◎ Reflectorized Drum

■ Channelizing Device

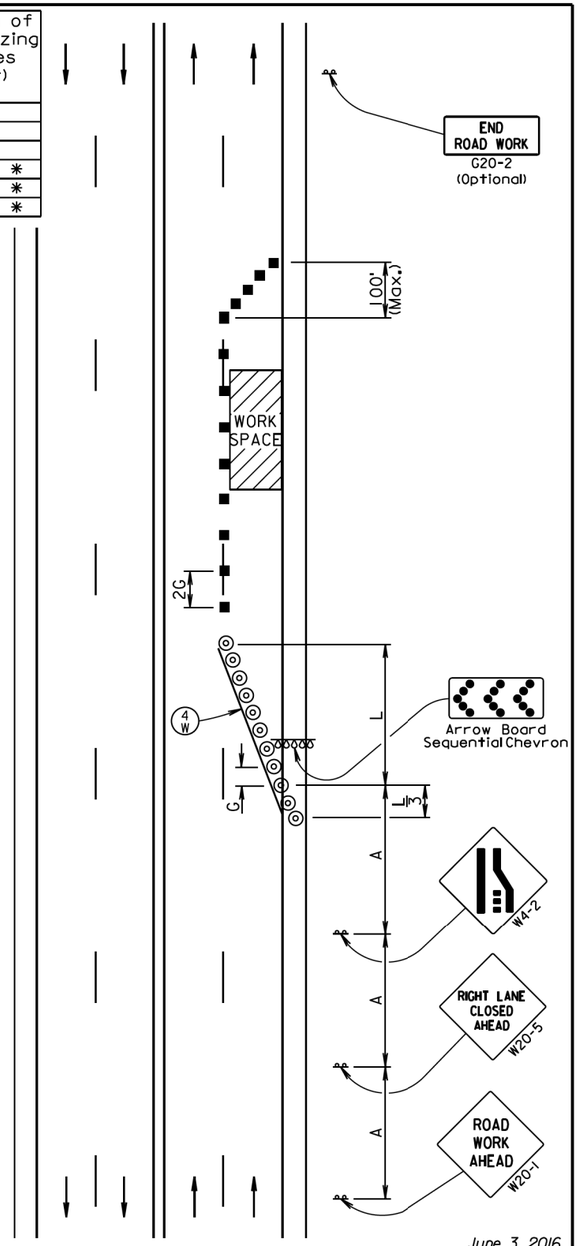
(4W) 4" White Temporary Pavement Marking

The channelizing devices shall be 42" cones or drums.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

Temporary pavement markings shall be used if traffic control must remain overnight.

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



June 3, 2016

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 4-LANE UNDIVIDED, RIGHT LANE CLOSED	PLATE NUMBER 634.47 Sheet 1 of 1

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

* Spacing is 40' for 42" cones.

◎ Reflectorized Drum

■ Channelizing Device

(4Y) 4" Yellow Temporary Pavement Marking

Pavement markings no longer applicable shall be removed or obliterated as soon as practical.

Temporary pavement markings shall be used if traffic control must remain overnight.

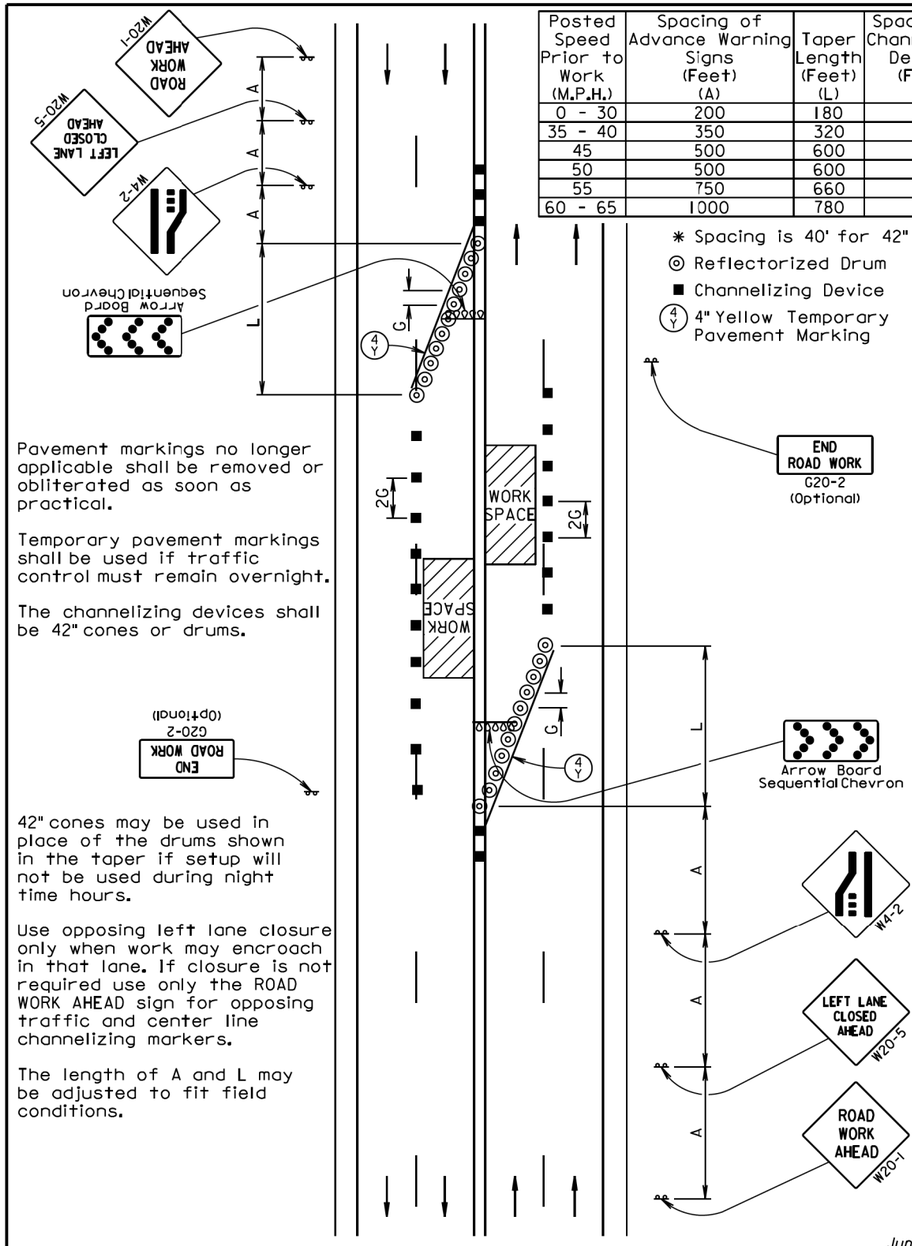
The channelizing devices shall be 42" cones or drums.

END ROAD WORK G20-2 (Optional)

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

Use opposing left lane closure only when work may encroach in that lane. If closure is not required use only the ROAD WORK AHEAD sign for opposing traffic and center line channelizing markers.

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



June 3, 2016

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 4-LANE UNDIVIDED, LEFT LANE CLOSED	PLATE NUMBER 634.48 Sheet 1 of 1

Plot Scale - 1:200

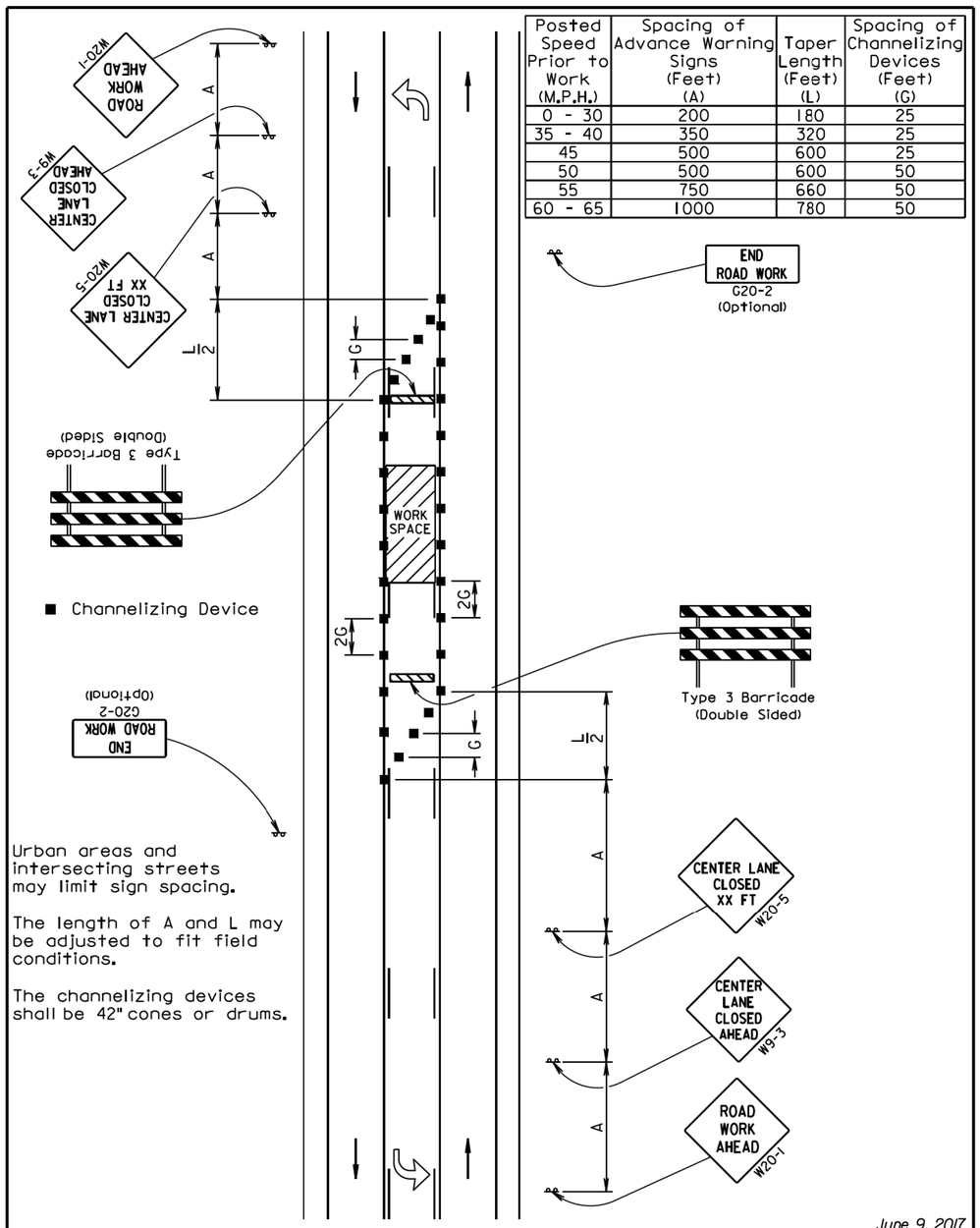
- Plotted From - TRRC12608

File - ...\2019 Design\634_4.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	24	25

Plotting Date: 03/23/2020

Plot Scale - 1:200



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

Urban areas and intersecting streets may limit sign spacing.

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

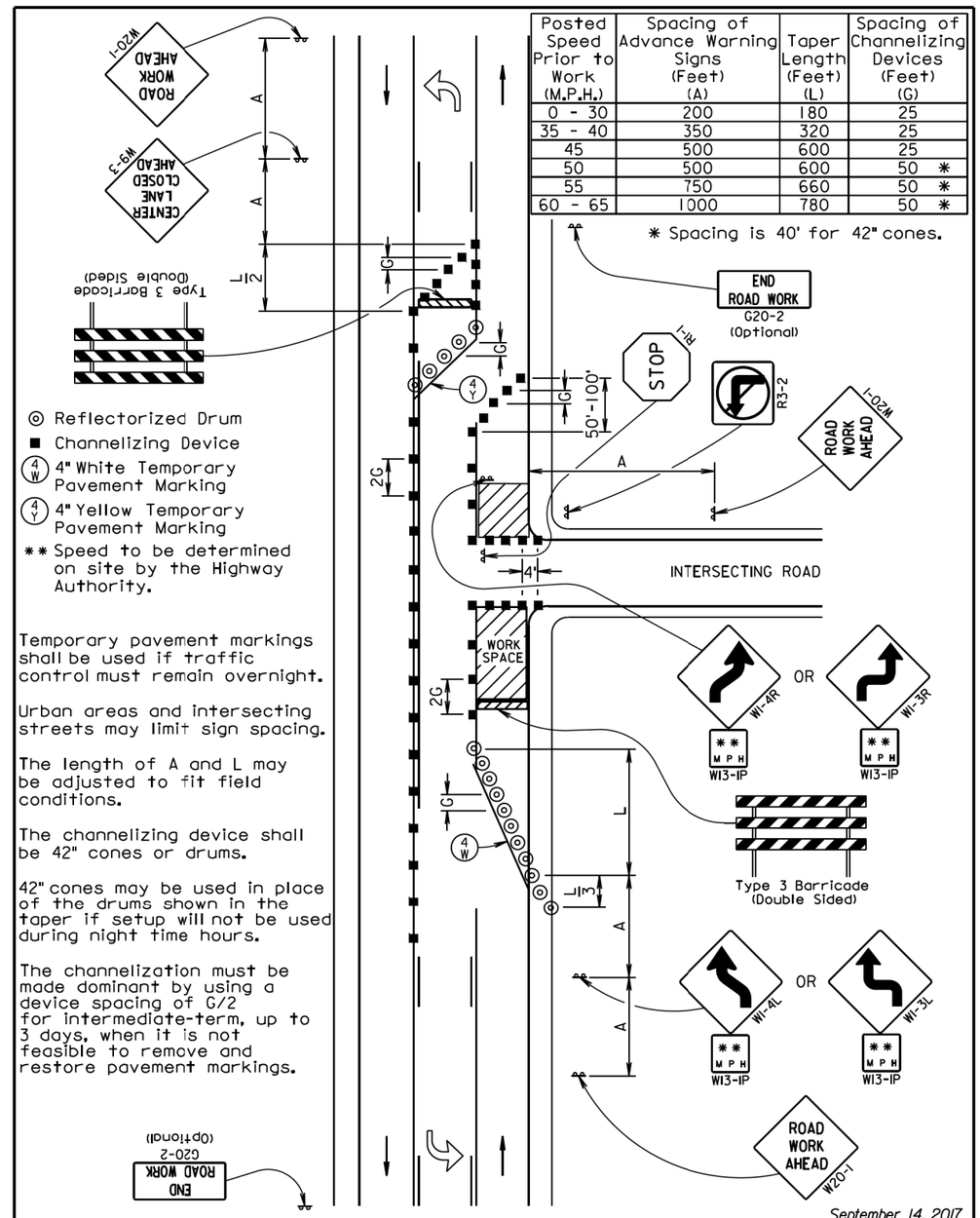
The channelizing devices shall be 42" cones or drums.

June 9, 2017

Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 3-LANE, CENTER LANE CLOSED

PLATE NUMBER 634.52

Sheet 1 of 1



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

* Spacing is 40' for 42" cones.

Temporary pavement markings shall be used if traffic control must remain overnight.

Urban areas and intersecting streets may limit sign spacing.

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

The channelizing device shall be 42" cones or drums.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

The channelization must be made dominant by using a device spacing of G/2 for intermediate-term, up to 3 days, when it is not feasible to remove and restore pavement markings.

September 14, 2017

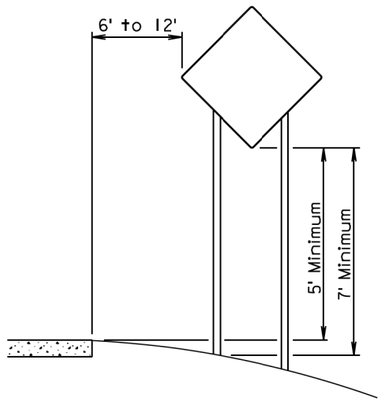
Published Date: 1st Qtr. 2020	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 3-LANE, OUTSIDE LANE CLOSED

PLATE NUMBER 634.53

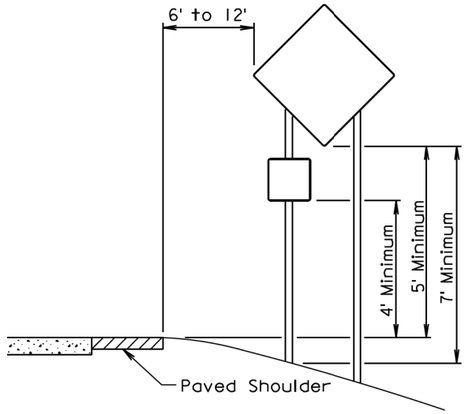
Sheet 1 of 1

- Plotted From - TRRC12608

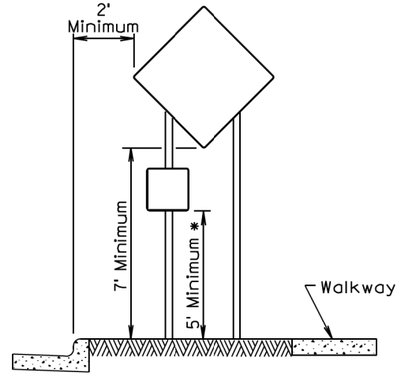
File - ...\2020 Design\634_5.dgn



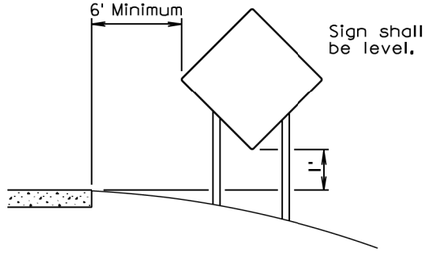
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT

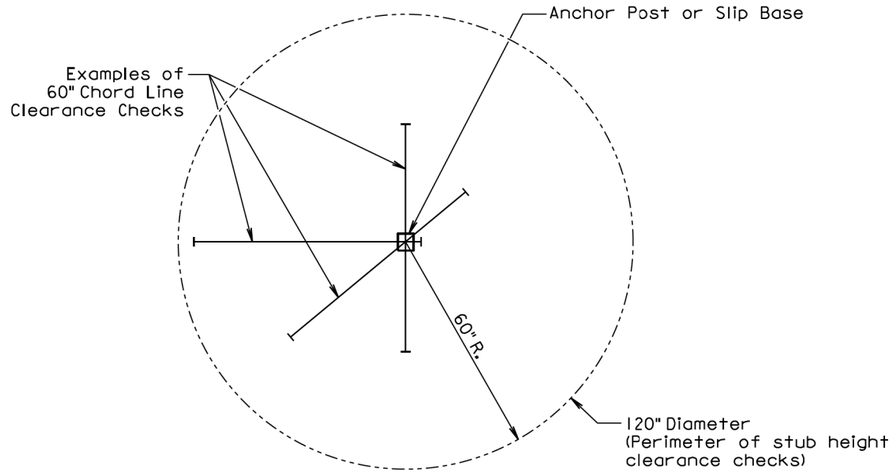


RURAL DISTRICT
3 DAY MAXIMUM
(Not applicable to regulatory signs)

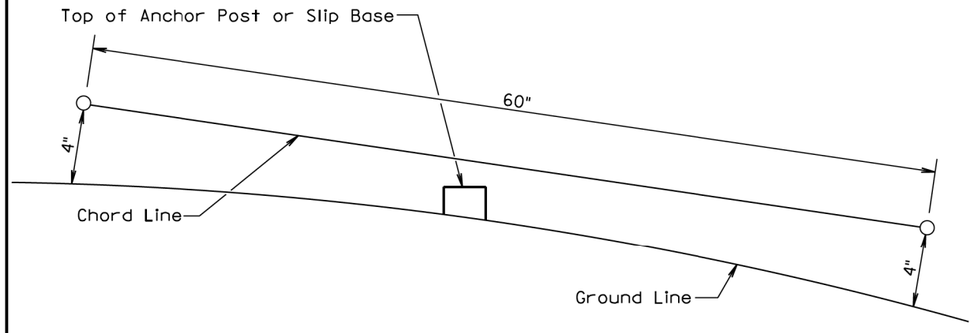
* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.

September 22, 2014

Published Date: 1st Qtr. 2020	SDDOT	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 SHALL 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 shall 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.

July 1, 2005

Published Date: 1st Qtr. 2020	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1