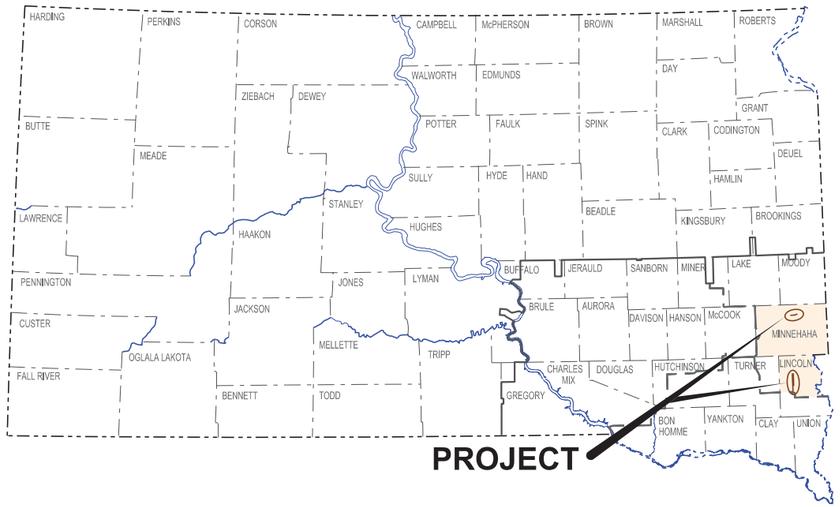
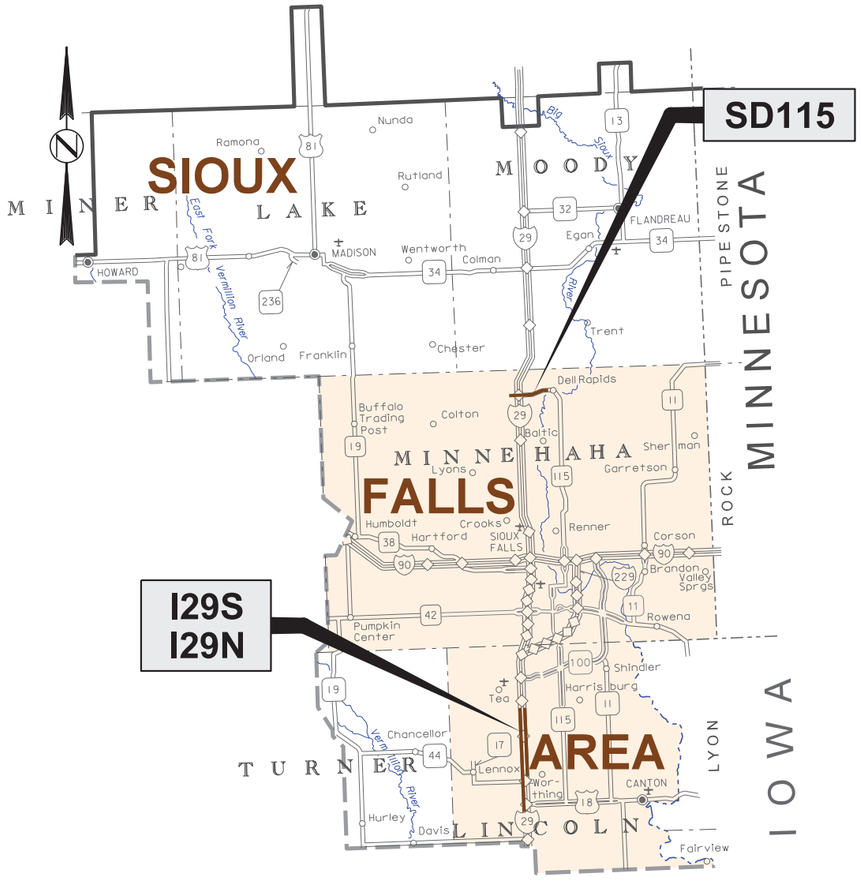


STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT IM–P 0022(103)
INTERSTATE 29 & SD HIGHWAY 115
LINCOLN & MINNEHAHA COUNTIES
CRC & NRC PAVEMENT REPAIR,
SPALL REPAIR, SEALING RANDOM CRACKS,
TIE BAR RETROFIT - STITCHING & RESEALING JOINTS
PCN 09X5



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	1	63

Plotting Date: 02/20/2026

INDEX OF SHEETS

STORM WATER PERMIT
(None required)

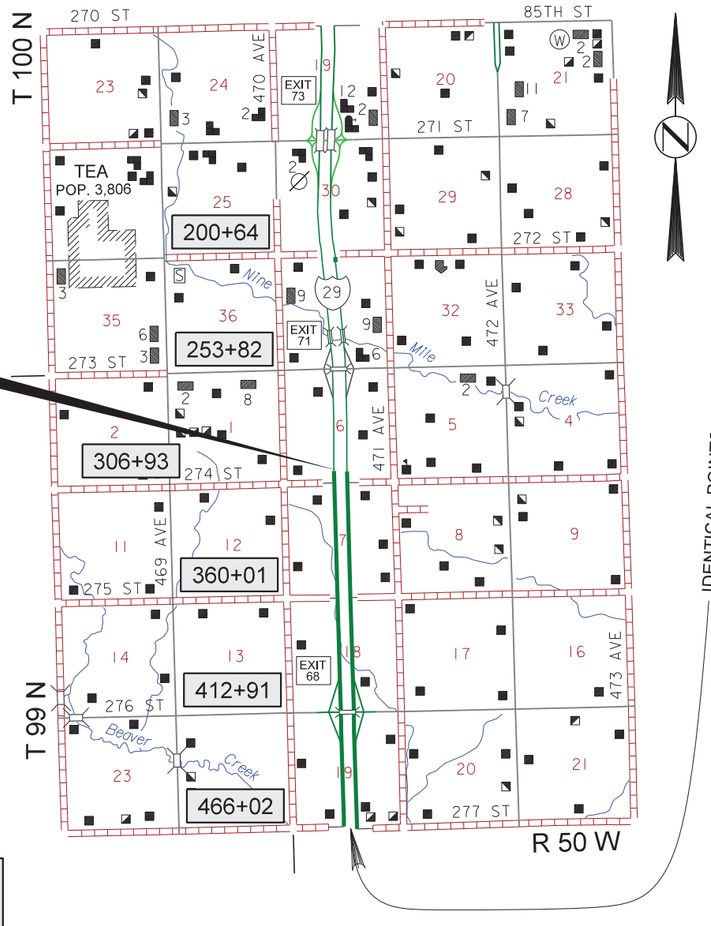
5
May 6, 2026

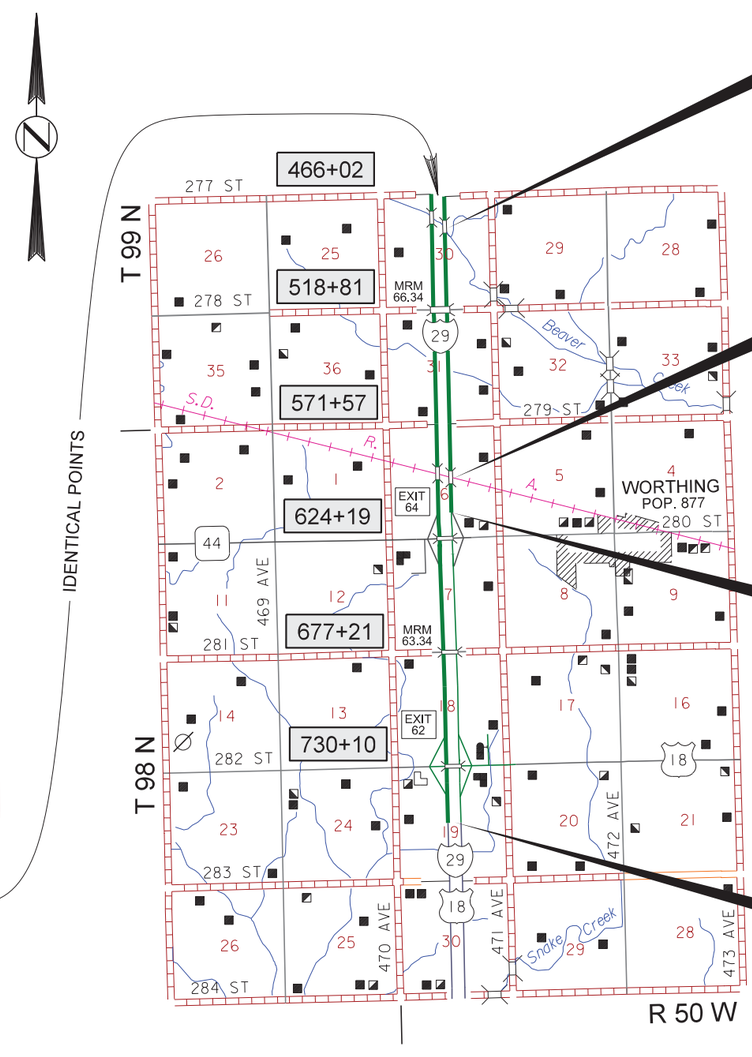
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	2	63

Plotting Date: 02/20/2026

INTERSTATE 29S
LINCOLN COUNTY
CRC & NRC PAVEMENT REPAIR,
SEALING RANDOM CRACKS,
SPALL REPAIR & RESEALING JOINTS
GROSS LENGTH: 8.625 MILES
BRIDGE & APPROACH SLABS LENGTH: 0.081 MILE
NET LENGTH: 8.544 MILES

INTERSTATE 29
LINCOLN COUNTY
CRC & NRC PAVEMENT REPAIR,
SEALING RANDOM CRACKS,
SPALL REPAIR & RESEALING JOINTS
GROSS LENGTH: 5.925 MILES
BRIDGE & APPROACH SLABS LENGTH: 0.081 MILE
NET LENGTH: 5.844 MILES





IDENTICAL POINTS

BEGIN I29 SB & NB
SB STA. 299+33
SB MRM 70.00 +0.500
(760' N of ℄ 274th St)
NB STA. 299+33
NB MRM 70.00 +0.500
(760' N of ℄ 274th St)

STR. NOS. 42-064/065-093
SB 477+14 to SB 479+06
NB 477+14 to NB 479+06
Twin Cont. Concrete Slab Bridges
192'-0"=0.0365 Mile MRM 67.13
Two Approach/Sleeper Slabs
2@22'=44' = 0.008 Mile

STR. NOS. 42-064/065-115
SB 594+66.38 to SB 596+11.46
NB 594+89.71 to NB 596+34.73
Twin Continuous Concrete Bridges
145'-7/8"=0.0275 Mile MRM 64.91
Two Approach/Sleeper Slabs
1@23', 1@24'=47' = 0.009 Mile

END I29 NB
NB STA. 612+18
NB MRM 64.34 +0.224
(1201' N of ℄ SD44)

END I29 SB
SB STA. 754+75
SB MRM 61.00 +0.887
(2465' S of ℄ 282nd St)

DESIGN DESIGNATION

ROUTE	I29 SBL	I29 NBL
ADT(2024)	12,175	12,891
ADT(2044)	19,553	20,703
DHV	2,178	2,306
D	50%	50%
T DHV	10.6%	10.4%
T ADT	23.3%	22.8%
V	80 MPH	80 MPH

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	3	63

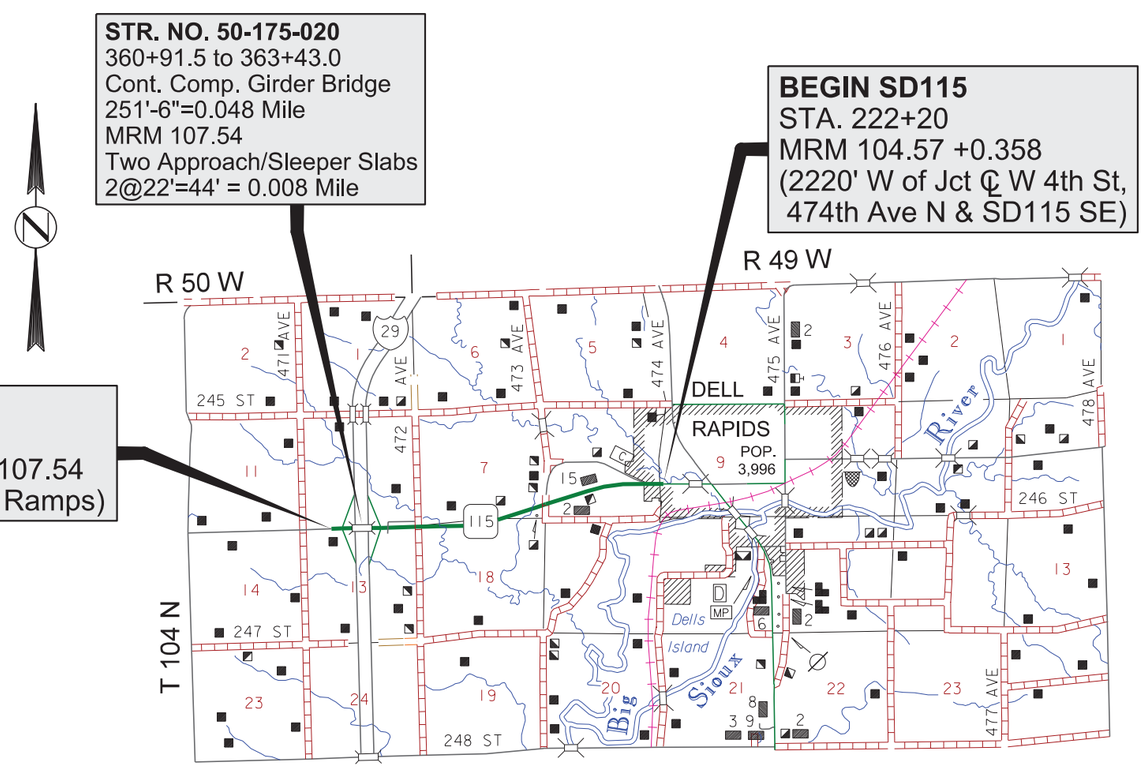
Plotting Date: 02/20/2026

SD HIGHWAY 115
MINNEHAHA COUNTY
NRC PAVEMENT REPAIR, TIE BAR RETROFIT - STITCHING, SPALL REPAIR, SEALING RANDOM CRACKS & RESEALING JOINTS
GROSS LENGTH: 2.840 MILES
BRIDGE & APPROACH SLABS LENGTH: 0.056 MILE
NET LENGTH: 2.784 MILES

STR. NO. 50-175-020
360+91.5 to 363+43.0
Cont. Comp. Girder Bridge
251'-6"=0.048 Mile
MRM 107.54
Two Approach/Sleeper Slabs
2@22'=44' = 0.008 Mile

BEGIN SD115
STA. 222+20
MRM 104.57 +0.358
(2220' W of Jct ℄ W 4th St,
474th Ave N & SD115 SE)

END SD115
STA. 372+13
875' W of MRM 107.54
(555' W of ℄ SB Ramps)



DESIGN DESIGNATION

SD115	
ADT(2024)	3,458
ADT(2044)	5,357
DHV	679
D	51%
T DHV	3.2%
T ADT	7.0%
V	35 - 65 MPH

PLOT SCALE - 1:7000
PLOTTED FROM - TRMIINT15
PLOT NAME - 3
FILE - ...\LINC09X5\TITL09X5.DGN

PCN 09X5

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E4100	Construction Schedule, Category I	Lump Sum	LS
320E1200	Asphalt Concrete Composite	500.0	Ton
380E5030	Nonreinforced PCC Pavement Repair	289.2	SqYd
380E5100	Continuously Reinforced PCC Pavement Repair	3,487.9	SqYd
380E6000	Dowel Bar	372	Each
380E6110	Insert Steel Bar in PCC Pavement	1,700	Each
380E6200	Tie Bar Retrofit, Stitching	1,300	Each
380E6302	Reseal PCC Pavement Joint - Hot Pour	90,968	Ft
380E6310	Seal Random Cracks in PCC Pavement	400	Ft
390E0200	Repair Type A Spall	300.0	SqFt
634E0010	Flagging	250.0	Hour
634E0020	Pilot Car	125.0	Hour
634E0110	Traffic Control Signs	1,180.4	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	20	Each
634E0330	Temporary Raised Pavement Markers	16,000	Ft
634E0420	Type C Advance Warning Arrow Board	2	Each
634E0600	4" Temporary Pavement Marking Tape Type I	288	Ft
634E0640	Temporary Pavement Marking	18,400	Ft
634E0900	Portable Temporary Traffic Control Signal	2	Unit
634E1215	Contractor Furnished Portable Changeable Message Sign	2	Each
634E1255	Contractor Furnished Vehicle Speed Feedback Sign	2	Each

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	5	63

ENVIRONMENTAL COMMITMENTS

ENVIRONMENTAL COMMITMENTS

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

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: https://dot.sd.gov/doing-business/environmental/about-environmental/

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

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

COMMITMENT C: WATER SOURCE

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

The Contractor will not withdraw water directly from streams of the James, Big Sioux, and Vermillion watersheds without prior approval from the SDDOT Environmental Office.

Action Taken/Required:

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

Temporary permit to use public waters for highway construction purposes application can be found on the SDDANR website:
https://danr.sd.gov/OfficeOfWater/WaterRights/PermitForms/default.aspx

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

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

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

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

COMMITMENT H: WASTE DISPOSAL SITE

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

Action Taken/Required:

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

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

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

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

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

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.
Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) will be incidental to the various contract items.

ENVIRONMENTAL COMMITMENTS (CONTINUED)

COMMITMENT I: HISTORIC PRESERVATION OFFICE CLEARANCES

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

Action Taken/Required:

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

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

The Contractor will provide ARC with the following: a topographical map or aerial view in which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

In the event of an inadvertent discovery of human remains, funerary objects, or if evidence of cultural resources is identified during project construction activities, then such activities within 150 feet of the inadvertent discovery will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office, who will contact the appropriate SHPO/THPO within 48 hours of the discovery to determine an appropriate course of action.

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

SCOPE OF WORK

This project consists of full depth replacement of Nonreinforced Concrete Pavement (NRCP) and Continuously Reinforced Concrete Pavement (CRCP) in areas where concrete pavement blowups or major failures have occurred. Numerous other forms of pavement repair are also contained herein.

Joints will be sawed and sealed where sealant has failed.

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.

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.

EXISTING NRC PAVEMENT

SD 115 west of Dell Rapids
The existing pavement is 8” NRC Pavement. Existing contraction joints are spaced at approximately 15’. Longitudinal joints are reinforced with No. 5 x 30” deformed tie bars spaced 48” center to center. Transverse joints are reinforced with 1¼” x 18” plain round dowel bars spaced 12” center to center.

The aggregate in the existing NRC Pavement is quartzite.

EXISTING CRC PAVEMENT

I29 NB
The existing pavement is 11” CRC Pavement. The longitudinal reinforcing steel consists of No. 6 deformed bars spaced 6” center to center, and the transverse reinforcing steel consists of No. 4 deformed bars spaced 48” center to center.

I29 SB
The existing pavement is 11” CRC Pavement. The longitudinal reinforcing steel consists of No. 6 deformed bars spaced 6.5” center to center, and the transverse reinforcing steel consists of No. 4 deformed bars spaced 48” center to center

The aggregate in the existing CRC Pavement is quartzite.

RESTORATION OF GRAVEL CUSHION

An inspection of the gravel cushion 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 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 at no additional cost to the State.

Cost for this work will be incidental to the contract unit prices per square yard for Nonreinforced PCC Pavement Repair and Continuously Reinforced PCC Pavement Repair.

GRAVEL CUSHION

If quarried ledge rock is used in the Gravel Cushion, a maximum blend of 40% quarried ledge rock will be allowed.

NONREINFORCED PCC PAVEMENT REPAIR - GENERAL

New pavement thickness will equal existing pavement thickness ($T_N = T$).

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

Existing concrete pavement will be sawed full depth at the beginning and end of the NRCP repair areas. When either the beginning or end of a NRCP repair area falls close to an existing joint or crack, the NRCP repair area will be extended to eliminate the existing joint or crack. Where possible, new working joints will be adjacent to existing working joints.

Saw cuts that extend beyond the repair area will be minimized and filled with a non-shrinkage mortar mix at the Contractor’s expense.

Existing concrete pavement in the replacement areas will be removed by the lift out method or by means that minimize damage to the base and sides of remaining in place concrete. Removed material will be removed from within the right-of-way by the end of the workday. Damage to adjacent concrete caused by the Contractor’s operations will be removed and replaced at the Contractor’s expense.

If the pavement replacement area is entirely on either side of the existing contraction joint, the location of one of the working joints will be at the original location. Any existing dowel bar assemblies/steel bars will be sawed off and removed.

At full roadway width repairs and when specified, a working joint will be reconstructed at both ends of each pavement replacement area as shown in these plans.

Concrete placed adjacent to gravel and asphalt concrete shoulders will be formed full depth to match the width of existing concrete pavement. Asphalt concrete shoulders adjacent to concrete pavement replacements will be repaired with new hot-mix asphalt concrete.

At repair locations where the new working joint is not opposite the existing working joint, the Contractor will place a ¼” preformed asphalt expansion joint material along the longitudinal joint from the existing working joint to the new working joint. The expansion joint material will meet the requirements of AASHTO M33. Cost for this material will be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

The initial contraction joint sawing will be performed as soon as practical after placement to avoid random cracking.

Joints (longitudinal and transverse) through and around the repair areas will be sawed and sealed in accordance with the details shown in these plans. Refer to Saw and Seal Joints notes.

NONREINFORCED PCC PAVEMENT REPAIR (NRCP)

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 (ASTM C309, 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 surface temperature falls below 60ºF, the cure time will be extended, or other measures taken, at no additional cost to the State. A strength of 2,500 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 2,500 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, sawing and sealing joints, repairing gravel and asphalt concrete shoulders, labor, tools and equipment will be included in the contract unit price per square yard for “Nonreinforced PCC Pavement Repair”.

STEEL BAR INSERTION (NRCP)

Steel bars will conform to Section 1010.

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.

For existing pavement thickness greater than or equal to 10.5" (T >= 10.5"):
The Contractor will insert the steel bars (1½" x 18" epoxy coated plain round dowel bars and No. 11 x 18" epoxy coated deformed tie bars for transverse joints and No. 5 x 24" epoxy coated deformed tie bars for longitudinal joints) into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole as per Section 380.3 C.1.

For existing pavement thickness greater than or equal to 8.5" and less than 10.5" (T >= 8.5" and T < 10.5"):
The Contractor will insert the steel bars (1¼" x 18" epoxy coated plain round dowel bars and No. 9 x 18" epoxy coated deformed tie bars for transverse joints and No. 5 x 24" epoxy coated deformed tie bars for longitudinal joints) into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole as per Section 380.3 C.1.

For existing pavement thickness less than 8.5" (T < 8.5"):
The Contractor will insert the steel bars (1" x 18" epoxy coated plain round dowel bars and No. 8 x 18" epoxy coated deformed tie bars for transverse joints and No. 5 x 24" epoxy coated deformed tie bars for longitudinal joints) into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole as per Section 380.3 C.1.

Steel bars will be inserted in the transverse joint on 18" centers. The first steel bar in the transverse joint will be placed 9" from the edge of the slab closest to centerline. Steel bars will be inserted in the longitudinal joint on 30" centers and will be a minimum of 15" from either transverse joint. A typical one-lane patch 12' wide and 6' long will require 18 steel bars (8 in each transverse joint and 2 in the longitudinal joint). It will be necessary to laterally adjust the location of some of the inserted steel bars when the dimensions above interfere with existing steel bar locations.

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.

SAW AND SEAL JOINTS (NRCP)

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 in urban sections will be sealed with Hot Poured Elastic Joint Sealer. Transverse joints in rural sections will be sealed with Low Modulus Silicone Sealant or the type of sealant directed by the Engineer. Longitudinal joints in rural sections may be sealed with either Hot Poured Elastic Joint Sealer or Low Modulus Silicone Sealant.

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 Repair.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CRCP)

New pavement thickness will equal existing pavement thickness (T_N = T).

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

The Engineer will mark the location of the area to be repaired on construction. Where repair crosses both lanes, the passing lane should be repaired first.

Full Lane Width Repair and Partial Lane Width Repair
The Contractor will saw the in place concrete transversely at four locations for each repair area. Two saw cuts will be full depth. The other two saw cuts will be partial depth saw cuts and will be made to a depth just above the in place reinforcing steel and be placed outside of the previous full depth saw cuts. The outside cuts will be a minimum of 6" from the nearest tight crack outside of the patch.

The Contractor will lift out or break out the center section (including reinforcing steel). In the salvaged rebar sections of the repair areas, the use of 30 or 60 pound hammers will be allowed outside of one foot from the newly created header joint. To prevent damage to the joint and surrounding concrete, only light chipping hammers (not exceeding 15 pounds) will be allowed within the last foot adjacent to the newly created header joint to remove the remaining concrete at each end of the repair area, leaving the reinforcing steel in place.

Small Repair – Existing Steel Retained
The Contractor will saw the in place concrete around the periphery of each repair area to a depth of 2" (above the in place reinforcing steel). The cuts will be a minimum of 6" from the nearest tight crack outside of the patch.

Light chipping hammers (not exceeding 15 pounds) will be used to remove the concrete from the repair area, leaving the reinforcing steel in place.

Saw cuts that extend beyond the repair area will be minimized and filled with a non-shrinkage mortar mix at the Contractor's expense.

Care will be taken not to cut, bend or otherwise damage the in place reinforcing steel. Damage to in place reinforcing steel or to in place concrete beyond the repair area will be replaced at the Contractor's expense, to the satisfaction of the Engineer.

The Contractor will remove and dispose of the in place concrete and in place asphalt concrete.

Existing exposed reinforcing steel and concrete faces will be cleaned by sandblasting and compressed air to remove dirt and debris prior to placement of concrete.

Place reinforcing steel according to the notes for REINFORCING STEEL (CRCP) and STEEL BAR INSERTION (CRCP).

Concrete placed adjacent to asphalt concrete shoulders will be formed full depth to match the width of existing concrete pavement. The excavated area of the asphalt concrete shoulder adjacent to repair areas will be filled with asphalt concrete.

Concrete will not be placed in the repair areas before 12:00pm and should be placed in the late afternoon. Temperature of the concrete at the time of placement will be between 50°F and 90°F. The temperature of the concrete will be maintained above 40°F during the curing period.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CRCP) (CONTINUED)

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 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 3,000 psi must be attained prior to opening to traffic.

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 3,000 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.

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'.

Cost for performing the aforementioned work including sawing, chipping and removing concrete, sandblasting, cleaning, furnishing and placing concrete and reinforcing steel, finishing and curing, replacing asphalt concrete shoulders, labor and equipment will be included in the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

SAW AND SEAL LONGITUDINAL JOINTS (CRCP)

Longitudinal joints (in line with existing longitudinal joints) at concrete repair areas will be sawed and sealed.

Joint sealing will conform to Section 380.3 P.

Longitudinal joints will be sealed with Low Modulus Silicone Sealant or Hot Poured Elastic Joint Sealer.

Acceptance of the Low Modulus Silicone Sealant and Hot Poured Elastic Joint Sealer will be based on visual inspection by the Engineer.

Cost for sawing and sealing of the longitudinal construction joint will be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

REINFORCING STEEL (CRCP)

Reinforcing steel will conform to Section 1010.

After removal of the in place concrete and repair of the gravel cushion, new reinforcing steel will be installed. Refer to the CRC Pavement Repair Area layouts for details.

At full lane and partial lane width repair areas:
New longitudinal bars will be lap spliced with the preserved in place longitudinal bars (New bar diameter to match in place bar diameter).

Additional transverse bars will be centered between the in place transverse bars throughout the length of the repair area. The spacing of transverse bars in the completed repair area should be half the spacing of the in place transverse reinforcing steel.

The additional transverse bars will be lap spliced with No. 5 x 24" epoxy coated deformed tie bars inserted 9" into the existing concrete. Drilled holes will be required. Tie bars will be inserted according to the notes for STEEL BAR INSERTION (CRCP).

At full lane width repair areas:
Additional longitudinal bars will be centered between every other set of two spliced longitudinal bars throughout the width of the repair area. These additional bars will extend 9" into the existing concrete on both sides of the repair area. Drilled holes will be required and the additional longitudinal bars will be inserted in accordance with the notes for STEEL BAR INSERTION (CRCP). The additional longitudinal bars will then be lap spliced.

Cost for this work, including reinforcing steel, ties, labor and equipment will be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

STEEL BAR INSERTION (CRCP)

Steel bars will conform to Section 1010.

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.

Longitudinal deformed tie bars will be inserted 9 inches into the in place concrete at the transverse joint and centered between every other set of two spliced longitudinal bars throughout the width of the repair area. Transverse deformed bars will be lap spliced with deformed tie bars which are inserted 9 inches into the in place concrete at the longitudinal joint throughout the length of the repair area. Refer to the notes for REINFORCING STEEL (CRCP). An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole as per Section 380.3 C.1.

STEEL BAR INSERTION (CRCP) (CONTINUED)

Holes drilled into the existing concrete pavement will be located at mid-depth of the slab and true and normal except that in transverse joints, the drilled in longitudinal steel bar angle will be slightly under 90° to allow for centering of the lap splice between existing longitudinal steel.

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.

Cost for reinforcing steel (except the inserted No. 5 x 24" epoxy coated deformed tie bars) will be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

Cost for drilling holes, furnishing and applying epoxy resin adhesive, furnishing and inserting No. 5 x 24" epoxy coated deformed tie bars into the drilled holes, inserting reinforcing steel bars into the drilled holes, and any incidentals necessary to complete the work will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

REPAIR TYPE A SPALLS

Spall repair work will be done prior to Grinding PCC Pavement.

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 a number of 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 respalling or cracking, will be repaired to the satisfaction of the Engineer at no additional cost to the State.

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 prior to Grinding PCC Pavement.

Tie Bar Retrofit, Stitching will be done on longitudinal joints 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.

TIE BAR RETROFIT, STITCHING (CONTINUED)

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 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.

REPAIR OF ASPHALT CONCRETE SHOULDERS

An estimated 500 tons of Asphalt Concrete Composite is included in the Estimate of Quantities for repairing the asphalt concrete shoulders due to damage caused by Interstate traffic during lane closures. Damaged areas that are four feet or greater in width and greater than 100 feet in length will be blade laid.

Removal of damaged asphalt concrete, as well as any necessary shaping and compaction of the underlying gravel base prior to paving, will be incidental to the Asphalt Concrete Composite. The Asphalt Concrete Composite shall be placed at a nominal compacted thickness of 3 inches.

Cost for asphalt concrete required on the shoulder adjacent to full depth pavement replacement sections that are not in areas where traffic has damaged the shoulder will be incidental to the contract unit prices per square yard for Nonreinforced PCC Pavement Repair and Continuously Reinforced PCC Pavement Repair.

RESEAL PCC PAVEMENT JOINT

Existing transverse joints will be cleaned and resealed for the full width of the joint (28’ to 36’ depending on number of lanes) with Hot Poured Elastic Joint Sealer.

Existing longitudinal joints will be cleaned and resealed with Hot Poured Elastic Joint Sealer.

Joints will not be sealed unless they are thoroughly clean and dry. Cleaning will be accomplished by sandblasting and other tools as necessary. Sand blasting of both sides of the vessel will be accomplished simultaneously with a mechanical device approved by the Engineer. Just prior to sealing, each joint will be blown out using a jet of compressed air to remove all traces of dust.

Final joint width is to be kept as narrow as possible and may only be widened to provide a clean surface. Each joint will not be widened more than 1/8 inch if sawing is utilized to prepare the joint for sealant. If sawing is used this may require 2 passes with the saw, one pass for each side of the joint.

In certain areas the joint may be wider than the original construction. It may be necessary to provide backer rod in the wide areas. Any additional cost to perform this work will be at no additional cost to the State. The Contractor will be responsible to verify joint widths prior to establishing the contract unit price.

It is not essential that all of the sealant be removed. Remaining sealant adhering to the sides may remain in place if the Engineer determines that it is not detrimental to the joint.

Cost for cleaning and resealing longitudinal joints will be included in the contract unit price per foot for Reseal PCC Pavement Joint – Hot Pour.

SEAL RANDOM CRACKS IN PCC PAVEMENT

Random cracks will be repaired in accordance with the detail for Sealing Random Cracks. Reservoir dimensions may vary slightly from the details, due to the nature of this operation. However, any variance due to Contractor negligence will be repaired at the Contractor’s expense.

Only those random cracks in the existing concrete pavement that are open and accept water and incompressible materials as selected by the Engineer will be prepared and sealed with Hot Poured Elastic Joint Sealer.

Prior to sealing, each random crack will be routed and thoroughly cleaned with compressed air or by other methods satisfactory to the Engineer. Routing will be performed with a saw designed for that purpose.

Random cracks narrower than ½ inch will be routed and sealed ½ inch wide by ½ inch deep.

Random cracks wider than ½ inch may require the placement of a backer rod prior to sealing. Use of backer rod should be limited to locations where, once placed, the top of the backer rod will be a minimum of 2¼ inches below the top surface of the pavement. The hot pour in cracks wider than ½” should be placed 2 inch thick with the final surface of the hot pour remaining recessed ¼ inch below the top surface of the pavement.

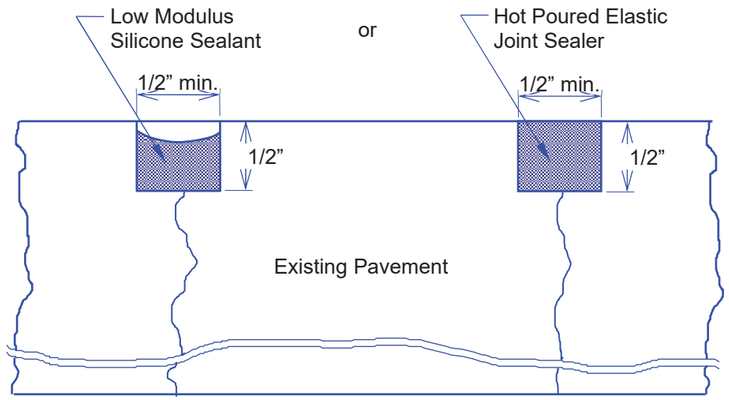
Sealant will be placed in the routed reservoir with equipment and by methods that insure complete and uniform filling. Hot Poured Elastic Joint Sealer will be placed level with the driving surface of the concrete for cracks ½” or narrower. Low Modulus Silicone Sealant will have a tooled surface with the top middle portion of the sealant recessed. Any excess or overrun of sealant will be removed by the Contractor at no additional cost to the State.

SEAL RANDOM CRACKS IN PCC PAVEMENT (CONTINUED)

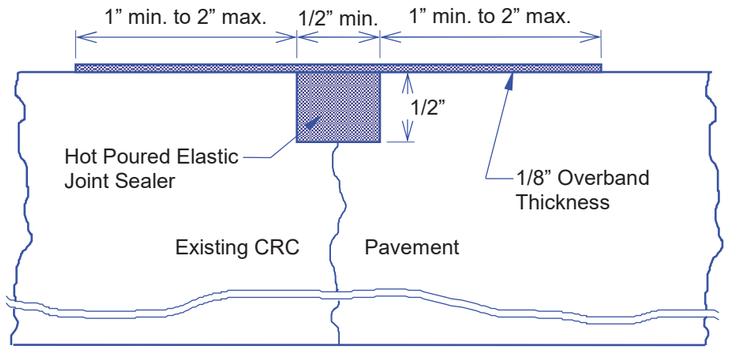
Acceptance of the Hot Poured Elastic Joint Sealer will be based on visual inspection by the Engineer.

Seal Random Cracks in PCC Pavement will be measured by the foot to the nearest 0.1 foot of random cracks sealed and accepted and will be paid for at the contract unit price per foot measured for payment. Payment will be full compensation for labor, equipment, material and incidentals required for crack routing, cleaning, furnishing and installing backer rod when necessary, furnishing and placing sealant and removing routed and foreign material from the roadway.

SEALING RANDOM CRACKS (NRCP)



SEALING RANDOM CRACKS (CRCP)



SUMMARY OF PCC PAVEMENT REPAIR

HWY	BEGIN MRM	DISP	END MRM	DISP	BEGIN DMI	END DMI	LENGTH (Miles)	CRCP REPAIR (SqYd)	NRCP REPAIR (SqYd)	NO. 8 X 18" EPOXY COATED DEFORMED TIE BARS (Each)	NO. 5 X 24" EPOXY COATED DEFORMED TIE BARS (Each)	INSERT STEEL BAR IN CONCRETE PAVEMENT (Each)	DOWEL BAR (Each)	REPAIR TYPE A SPALL (SqFt)	TIE BAR RETROFIT STITCHING (Each)	SEAL RANDOM CRACKS IN PCC PAVEMENT (Ft)	RESEAL PCC PAVEMENT LONGITUDINAL JOINTS HOT POUR (Ft)	RESEAL PCC PAVEMENT TRANSVERSE JOINTS HOT POUR (Ft)
SD 115	104.57	0.358	107.54	0.166	104.927	107.706	2.784		289.2	496	96	592	372	100	1,300	200	14,700	300
I29 SB	61	0.887	70	0.5	62.244	70.5	8.544	2270.7			936	936		100		100	45,112	
I29 NB	64.34	0.224	70.00	0.500	64.564	70.5	5.844	1217.2			172	172		100		100	30,856	
						GRAND TOTALS:	**17.172**	**3487.9**	**289.2**	**496**	**1,204**	**1,700**	**372**	**300**	**1,300**	**400**	**90,668**	**300**

SEQUENCE OF OPERATIONS

1. Install Traffic Control devices per the details in these plans.
2. Complete all concrete work.
3. Reseal joints.

The Contractor will submit a sequence of operations for approval two weeks prior to the preconstruction meeting. If changes to the sequence of operations are proposed during the project, these must be submitted for review a minimum of one week prior to potential implementation. Approval for changes to the 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.

GENERAL TRAFFIC CONTROL

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

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

All temporary speed limit signs will have a minimum mounting height of 5 feet in rural locations, even when mounted on portable supports.

Portable sign supports will not be located on sidewalks, bicycle facilities, or other areas designated for pedestrian or bicycle traffic.

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.

Unless otherwise stated in these plans, work will not be allowed during hours of darkness.

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.

Unless otherwise stated in these plans, work will not be allowed during hours of darkness.

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

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

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

GENERAL TRAFFIC CONTROL (CONTINUED)

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

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

A Type 3 Barricade will be installed at the end of a lane closure taper as detailed in these plans. Additional Type 3 Barricades will be installed facing traffic within the closed lane at a spacing of ¼ mile

Construction vehicles will exit or enter the construction work zone at locations identified by the Engineer. At no time will construction vehicles utilize the maintenance crossovers or the Interstate median to exit or enter Interstate traffic.

On Interstate projects with more than one construction site, slow moving equipment that operates at a speed less than 40 MPH may mobilize between sites if the equipment travels on the shoulder. The slow-moving equipment will also display a flashing amber light and a slow-moving sign.

LANE CLOSURES

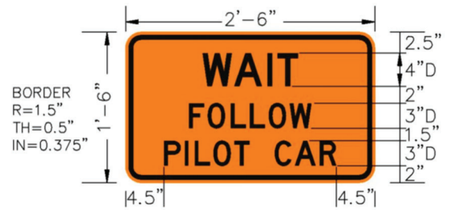
Interstate lane closures shorter than 2 miles will be used if 2 miles is greater than the length of work that can be accomplished in one day's production. More than one lane closure may be permitted; however, there will be a minimum of a three-mile section between lane closures, excluding the tapers.

Interstate lane closures will be removed when work will not be occurring for a period of 3 or more calendar days. Activities that do not involve workers being present, such as curing time for concrete, constitute work. Lane closures will not be set up on a Friday if no work will be occurring on Saturday or Sunday. In these cases, the lane closure will be installed on Monday.

FLAGGING

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

Additional flagger warning signs and flagger hours have been included in the Estimate of Quantities for use on intersecting roads. These flaggers will be used as directed by the Engineer and will be used primarily during daytime hours. Also included in the Estimate of Quantities are WAIT FOLLOW PILOT CAR signs for use on low volume intersecting roads as determined by the Engineer. WAIT FOLLOW PILOT CAR signs will not block the view of the stop sign.



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

WORK ZONE SPEED REDUCTION

The Department is required to obtain a speed reduction resolution prior to the installation of any SPEED LIMIT (R2-1) signs shown on standard plate 634.63 or as shown in the plans. To provide adequate time for the resolution to be enacted, the Contractor will inform the Engineer a minimum of 3 weeks prior to the scheduled installation of any work zone speed reduction signs on the project. The information provided by the Contractor will include the anticipated date of sign installation, the newly reduced speed limit, the location of the work zone, and the anticipated completion date of work requiring the speed reduction.

TEMPORARY PAVEMENT MARKING

Temporary flexible vertical markers (tabs) will be used to mark dashed centerline, No Passing Zones, and applicable lane lines. Tabs will be offset 6-inches from the location shown for permanent markings. Centerline will be double yellow lines with tabs spaced at 5' the entire project length.

Temporary flexible vertical markers (tabs) may be used as detailed in the specifications.

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

Full reflectivity of all temporary flexible vertical markers (tabs) is required at all times. The Contractor will be required to replace any missing or non-reflective tabs after each installation as detailed below at no additional cost to the State.

No adjustment in the contract unit price for "Temporary Pavement Marking" will be made because of a variation in quantities.

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

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

TEMPORARY PAVEMENT MARKING TAPE, TYPE I

Temporary pavement marking for stop lines will consist of 4" Temporary Pavement Marking Tape Type I. Placement of each 24" white stop line will be accomplished by placing six pieces of 4" x 12' tape adjacent to one another. Each workspace requires two stop lines which is an equivalent of approximately 144' of 4" tape. Temporary tape will be removed upon completion of the project.

TEMPORARY RAISED PAVEMENT MARKERS

Temporary raised pavement markers will be used for marking tapers for lane closures. Temporary raised pavement markers will be used on existing surfacing where temporary marking locations are different than existing marking locations, unless noted or as directed by the Engineer.

Temporary raised pavement markers will be attached to the roadway surface with a flexible non-permanent bituminous adhesive capable of being removed from the roadway surface or with an adhesive approved by the Engineer.

All costs to furnish, install, replace if necessary, and remove the markers will be incidental to the contract unit price per foot for "Temporary Raised Pavement Markers".

TRAFFIC CONTROL FOR PCCP REPAIR

Each mainline concrete repair location, from which the in-place concrete has been removed, will be marked with a minimum of two reflectorized drums. In areas containing numerous concrete repair locations, two reflectorized drums should be installed at a spacing of 660 feet alternating with the Type 3 Barricades.

Construction workspaces on divided roadways will be limited to 2 miles in length. Signalized construction workspaces on undivided roadways will be limited to 1,320 feet in length. The distance between the closest points of any two construction workspaces, including channeling devices, will not be less than 3 miles. Drivers in two-way traffic workspaces must be able to see approaching traffic through and beyond the work zone. Flagger controlled workspaces will be limited to 2 miles in length.

Construction workspaces in urban areas will be limited to 3 blocks in length. The minimum distance between workspaces will be 3 blocks.

Portable Temporary Traffic Control Signals or Lane Closures Using Stop Signs will be used as noted or as directed by the Engineer.

When work is in progress within an intersection, Flaggers will be required to direct traffic.

The Contractor will use Flaggers during peak traffic hours and at times specified by the Engineer to supplement the stop condition and signing shown on standard plate 634.25. Peak traffic hours are assumed to be 6:30 am to 8:30 am and 4:30 pm to 6:00 pm. It is possible that Flagging will be required during all daytime hours. Advance warning Flagger signs will be required when Flaggers are present and removed when no Flaggers are present.

Holes adjacent to centerline in the lane open to traffic created during removal and replacement of PCC pavement repair areas will be filled with gravel cushion material and cold-mix asphalt concrete prior to opening the lane to traffic. Gravel cushion material and cold-mix asphalt concrete will be furnished by the Contractor.

Holes in the gravel and asphalt concrete shoulders created during removal and replacement of PCC pavement repair areas will be filled with gravel cushion material and hot-mix asphalt concrete (to match the shoulder surfacing) prior to opening the lane to traffic. Gravel cushion material and hot-mix asphalt concrete will be furnished and installed by the Contractor at no additional cost to the State.

TRAFFIC CONTROL FOR PCCP REPAIR (CONTINUED)

All costs for furnishing, hauling, and placing gravel cushion material and asphalt concrete will be incidental to the contract unit price per square yard for "Nonreinforced PCC Pavement Repair" and "Continuously Reinforced PCC Pavement Repair".

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.

Extra care will be taken to protect the in place asphalt concrete shoulders Interstate 29. In all workspaces in these areas, flexible delineators will be required on the shoulders and will also be placed in locations to adequately keep traffic completely off the shoulders. Continuous maintenance will be required to keep them in place.

Type B warning lights may be placed on top of FLAGGER (W20-7) symbol signs as directed by the Engineer.

Joints in approaches to signalized intersections containing vehicle detector loops will not be sawed, sealed, or otherwise disturbed.

The Contractor will be required to contact the Engineer two weeks in advance so that the Region Traffic Engineer can arrange for signal timings to be adjusted to accommodate traffic when a lane is closed near a signalized intersection.

Reflectorized drums or Type 2 Barricades will be used to maintain a minimum of two-way traffic at intersecting roads or streets. The Contractor will mark and maintain alternating one-way access to businesses and residences along the project with cones, drums, or Type 1 Barricades. The Contractor will advise affected businesses before a restriction to the business is installed, as well as the anticipated duration of the restriction.

The Contractor will maintain pedestrian access at crosswalk locations. Additional traffic control devices will be used as necessary to accommodate the pedestrian traffic if work activities block an existing crosswalk.

PORTABLE TEMPORARY TRAFFIC CONTROL SIGNAL

The Contractor will furnish, install, operate, and maintain a portable temporary traffic control signal during construction phases as determined by the Engineer. There will be one controller and one slave unit per location.

The portable temporary traffic control signal will be set up to dwell in red. Detection will be video, microwave, or radar. The green time may be adjusted as needed. The Engineer will contact the Region Traffic Engineer one week prior to activation to obtain the appropriate signal timings The initial timings for the construction sites are given below:

Temporary Traffic Signal Timing Plans

PHASING AND SEQUENCING							
INTERVAL / SIGNAL HEADS	1	2	3	4	5	6	FLASH DISPLAY
SD115 NB ϕ A	G	Y	R	R	R	R	R
SD115 SB ϕ B	R	R	R	G	Y	R	R
TIMINGS BASED ON MAXIMUM 1320 FT* DISTANCE BETWEEN OPPOSING STOP LINES AND TRAFFIC SPEED OF 35 MPH.							FLASH TIME
CYCLE LENGTH = 102 Seconds							
PHASES	ϕ A		ϕ B				
MOVEMENTS	→		←				FAILURE OR EMERGENCY ONLY
MIN. GREEN (SEC)	8		8				
EXTENSION GREEN (SEC)	3		3				
MAX. GREEN(SEC)	19		19				
YELLOW (SEC)	6		6				
ALL RED (SEC)	26		26				

* - The timings may be adjusted if the length between the stop lines varies from the 1320 ft value used in calculations. The all red times may be recalculated as follows:

All vehicle signal heads will have backplates with retroreflective border. The vehicle signal head backplates will have a factory applied 3-inch wide yellow retroreflective border. Sheeting for the border will be Type IX or Type XI in conformance with ASTM D4956.

Signal backplates will be polycarbonate, aluminum, or aluminum-composite. Minimum material thicknesses are:

Polycarbonate, 0.10-inch
Aluminum, 0.06-inch
Aluminum-Composite, 0.08-inch

Signal backplates will extend not less than 5 inches from the edge of the signal head at the top, bottom, and sides.

All traffic signal equipment and materials will meet the requirements of Sections 635 and 985 of the Specifications except the controller requirements.

All costs involved with constructing the portable temporary traffic control signal as specified above and on the plans, will be included in the contract unit price per unit for “Portable Temporary Traffic Control Signal”.

CONTRACTOR FURNISHED VEHICLE SPEED FEEDBACK SIGN

The Contractor will provide 2 radar speed feedback trailers to monitor traffic speeds on designated routes at locations specified in the field by the Engineer.

The radar speed feedback sign assembly will include a speed limit sign mounted in conjunction with the radar speed feedback display. The speed display will not flash vehicle speeds exceeding the speed limit or any other messages.

All costs associated with furnishing, maintaining, transporting, relocating if necessary, and removing the radar speed feedback trailers from locations specified by the Engineer will be incidental to the contract unit price per each for “Contractor Furnished Vehicle Speed Feedback Sign”.

CONTRACTOR FURNISHED PORTABLE CHANGEABLE MESSAGE SIGN

One week prior to starting work affecting the traveling public, portable changeable message signs (PCMS) will be installed at locations detailed in the plans to notify drivers of the upcoming construction. The Contractor will program the portable changeable message signs with the following message:

ROAD WORK
STARTS
(DATE)

ONE LANE
AHEAD

REDUCE
SPEED

When work begins that will affect traffic patterns, the Contractor will re-program the PCMS with the messages as detailed in the plans. PCMS will be available for use for the duration of the project as directed by the Engineer.

INCIDENTS

An incident is an emergency road user occurrence, a natural disaster, or other unplanned event that affects or impedes the normal flow of traffic such as a crash, hazardous materials spill, or other event.

The Contractor will set up a meeting prior to start of work to plan and coordinate responses to an incident. The Contractor will invite the Department of Transportation, the South Dakota Highway Patrol, the Minnehaha County Sheriff and local emergency response entities to the meeting.

The Contractor will assist to maintain traffic as required by these plan notes and as agreed to at that meeting.

Emergency vehicle access through the project will be considered and discussed at the meeting.

The Contractor may be required to modify messages on portable changeable message signs or relocate portable changeable message signs, and to provide flaggers to direct or detour traffic. The Contractor should be prepared to relocate advance warning signs if determined to be necessary for a major traffic incident lasting more than two hours. Fixed location ground mounted signs may be covered and additional portable signs provided.

No additional payment will be made for the modification of portable changeable message sign messages or the relocation of portable changeable message signs. Cost for the relocation of an advance warning sign due to an incident will be 50% of the designated sign rate. Flaggers will be paid for at the contract unit price per hour for “Flagging”.

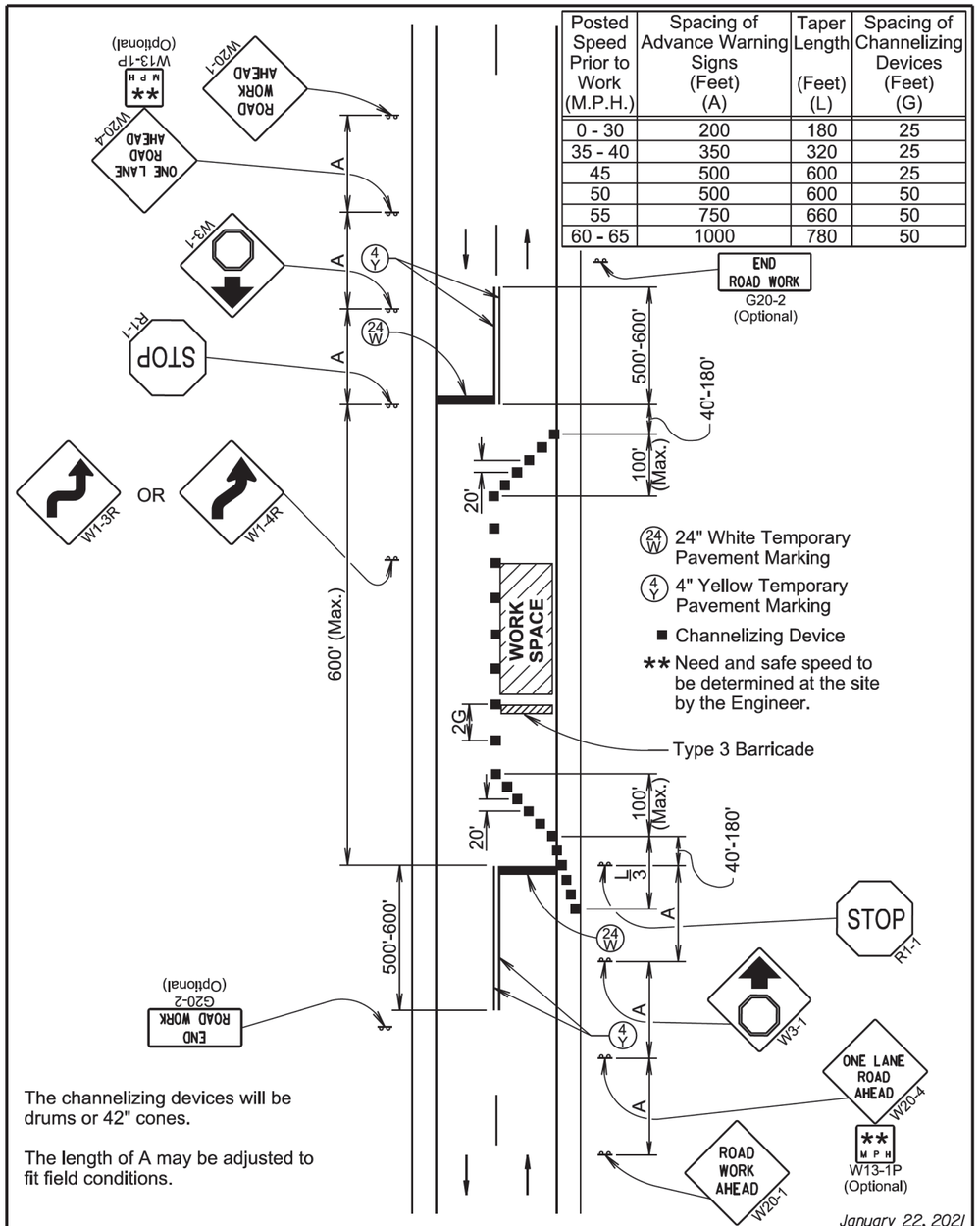
PRESS RELEASE ANNOUNCEMENTS

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 change that affects traffic flow.

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

		CONVENTIONAL ROAD				EXPRESSWAY / INTERSTATE			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	4	30"	5.2	20.8		36"	7.5	
R2-1	SPEED LIMIT 80		24" x 30"	5.0		2	36" x 48"	12.0	24.0
R2-1	SPEED LIMIT 65		24" x 30"	5.0		6	36" x 48"	12.0	72.0
R2-1	SPEED LIMIT 45		24" x 30"	5.0		4	36" x 48"	12.0	48.0
R2-6aP	FINES DOUBLE (plaque)		24" x 18"	3.0		2	36" x 24"	6.0	12.0
R3-2	LEFT TURN PROHIBITION (symbol)	1	24" x 24"	4.0	4.0		36" x 36"	9.0	
R4-7	KEEP RIGHT (symbol)	4	24" x 30"	5.0	20.0		36" x 48"	12.0	
R10-6	STOP HERE ON RED	2	24" x 36"	6.0	12.0				
W1-3	REVERSE TURN (L or R)	3	48" x 48"	16.0	48.0		48" x 48"	16.0	
W1-4	REVERSE CURVE (L or R)	3	48" x 48"	16.0	48.0		48" x 48"	16.0	
W3-1	STOP AHEAD (symbol)	4	48" x 48"	16.0	64.0		48" x 48"	16.0	
W3-3	SIGNAL AHEAD (symbol)	2	48" x 48"	16.0	32.0		48" x 48"	16.0	
W3-5	SPEED REDUCTION AHEAD (65 MPH)		48" x 48"	16.0		4	48" x 48"	16.0	64.0
W3-5	SPEED REDUCTION AHEAD (45 MPH)		48" x 48"	16.0		2	48" x 48"	16.0	32.0
W4-2	LEFT or RIGHT LANE ENDS (symbol)	3	48" x 48"	16.0	48.0	4	48" x 48"	16.0	64.0
W4-3	ADDED LANE (symbol)		48" x 48"	16.0		1	48" x 48"	16.0	16.0
W5-4	RAMP NARROWS		48" x 48"	16.0		1	48" x 48"	16.0	16.0
W7-3aP	NEXT __ MILES (plaque)	1	36" x 30"	7.5	7.5		36" x 30"	7.5	
W9-3	CENTER LANE CLOSED AHEAD	2	48" x 48"	16.0	32.0		48" x 48"	16.0	
W13-1P	ADVISORY SPEED (plaque)	6	30" x 30"	6.3	37.8	1	30" x 30"	6.3	6.3
W13-4P	ON RAMP (plaque)		36" x 36"	9.0		1	36" x 36"	9.0	9.0
W20-1	ROAD WORK AHEAD	6	48" x 48"	16.0	96.0	4	48" x 48"	16.0	64.0
W20-4	ONE LANE ROAD AHEAD	6	48" x 48"	16.0	96.0		48" x 48"	16.0	
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	3	48" x 48"	16.0	48.0	4	48" x 48"	16.0	64.0
W21-5a	LEFT or RIGHT SHOULDER CLOSED	1	48" x 48"	16.0	16.0		48" x 48"	16.0	
W21-5b	LEFT or RIGHT SHOULDER CLOSED AHEAD	1	48" x 48"	16.0	16.0		48" x 48"	16.0	
G20-2	END ROAD WORK	6	36" x 18"	4.5	27.0	2	48" x 24"	8.0	16.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			**673.1**	**EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT**			**507.3**

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



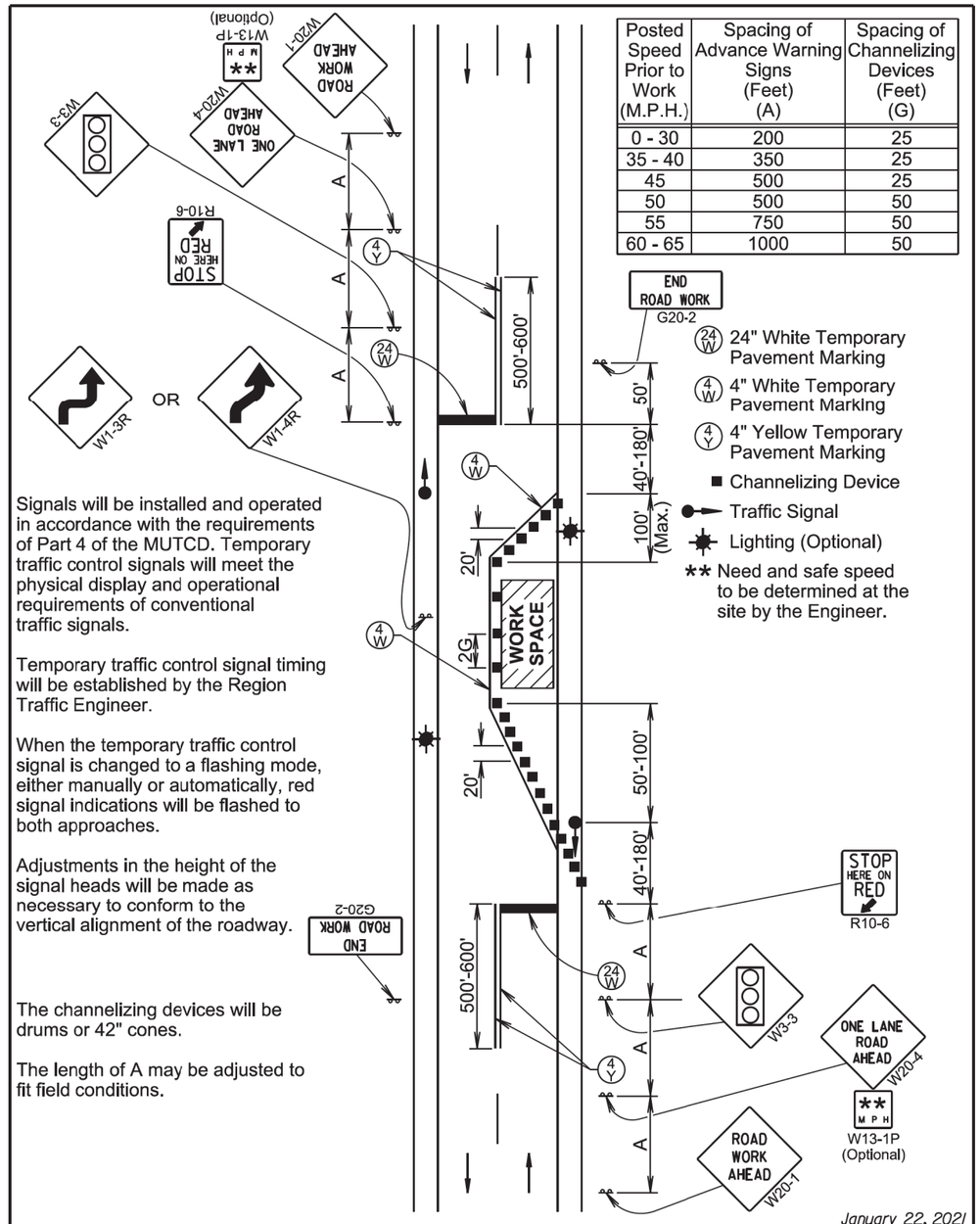
The channelizing devices will be drums or 42" cones.

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

January 22, 2021

Published Date: 2026	SDDOT	LANE CLOSURE USING STOP SIGNS	PLATE NUMBER 634.25
			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



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

Temporary traffic control signal timing will be established by the Region Traffic Engineer.

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

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

The channelizing devices will be drums or 42" cones.

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

January 22, 2021

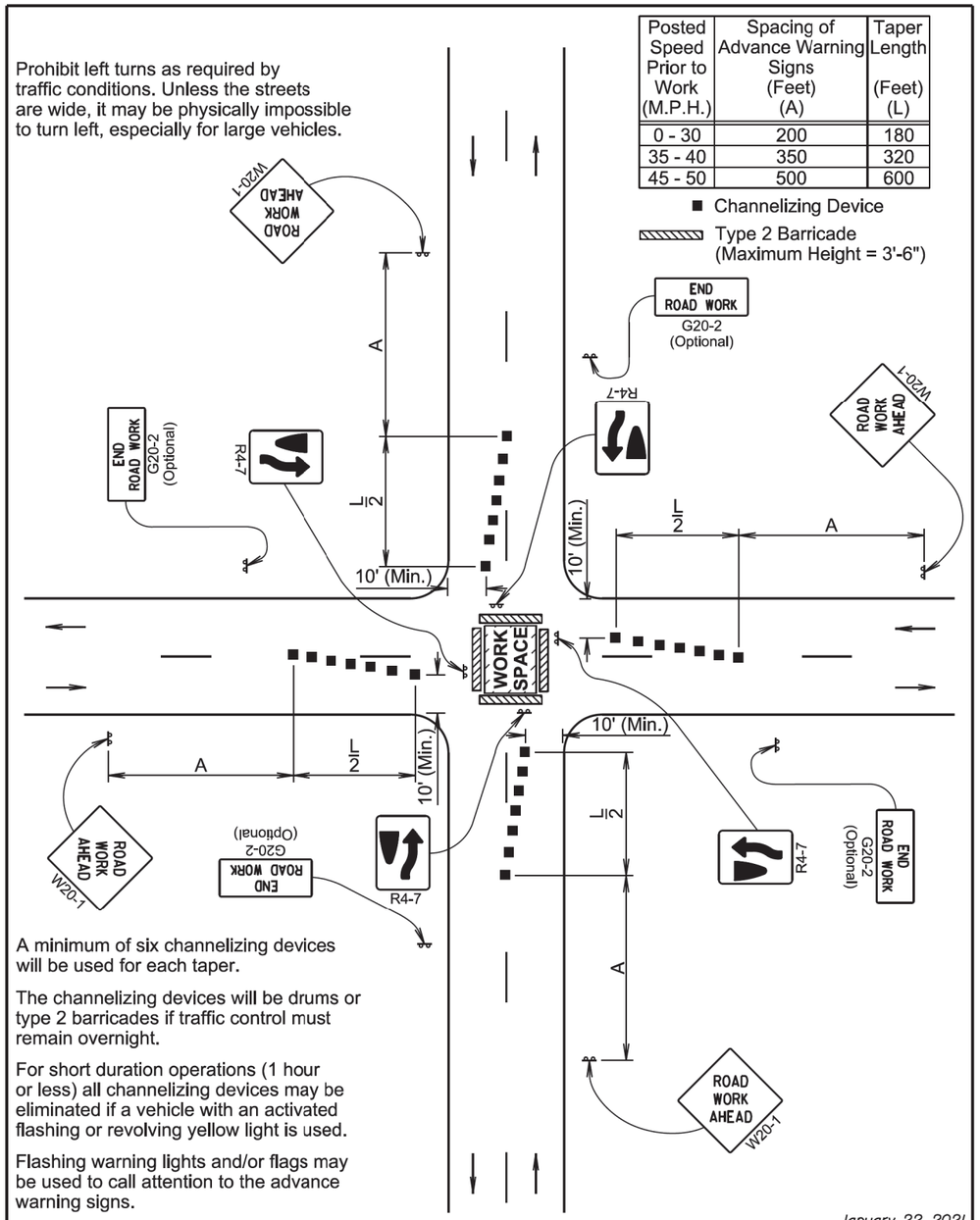
Published Date: 2026	SDDOT	LANE CLOSURE USING TRAFFIC SIGNALS	PLATE NUMBER 634.26
			Sheet 1 of 1

Prohibit left turns as required by traffic conditions. Unless the streets are wide, it may be physically impossible to turn left, especially for large vehicles.

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

■ Channelizing Device

Type 2 Barricade (Maximum Height = 3'-6")



A minimum of six channelizing devices will be used for each taper.

The channelizing devices will be drums or type 2 barricades 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.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

January 22, 2021

Published Date: 2026

SDDOT

CLOSURE IN CENTER OF INTERSECTION

PLATE NUMBER 634.35

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

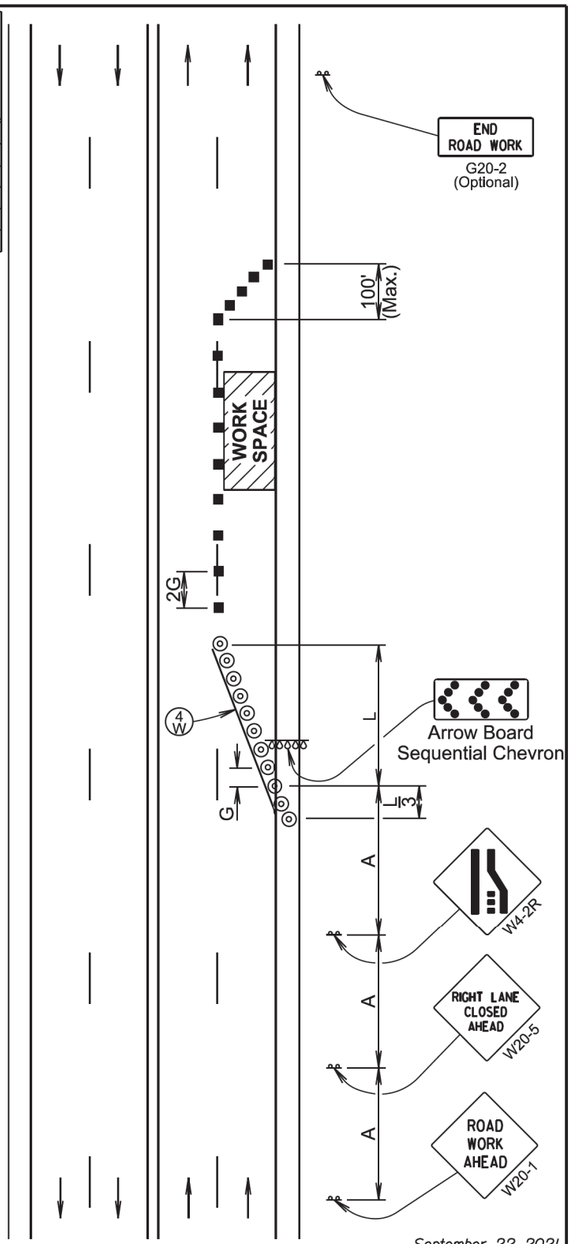
(4W) 4" White Temporary Pavement Marking

The channelizing devices will 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 will be used if traffic control must remain overnight.

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



September 22, 2021

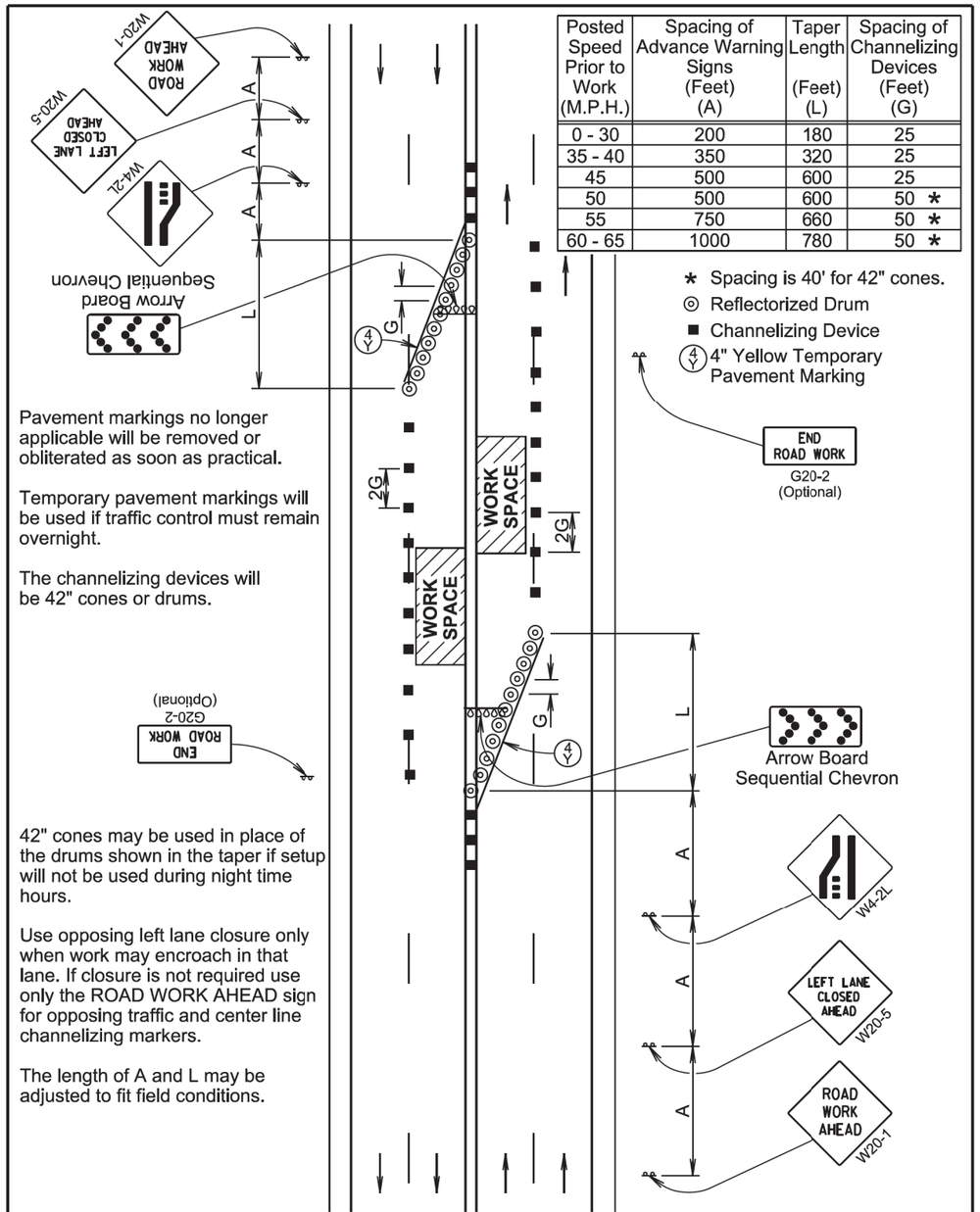
Published Date: 2026

SDDOT

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 will be removed or obliterated as soon as practical.

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

The channelizing devices will 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.

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.

August 31, 2022

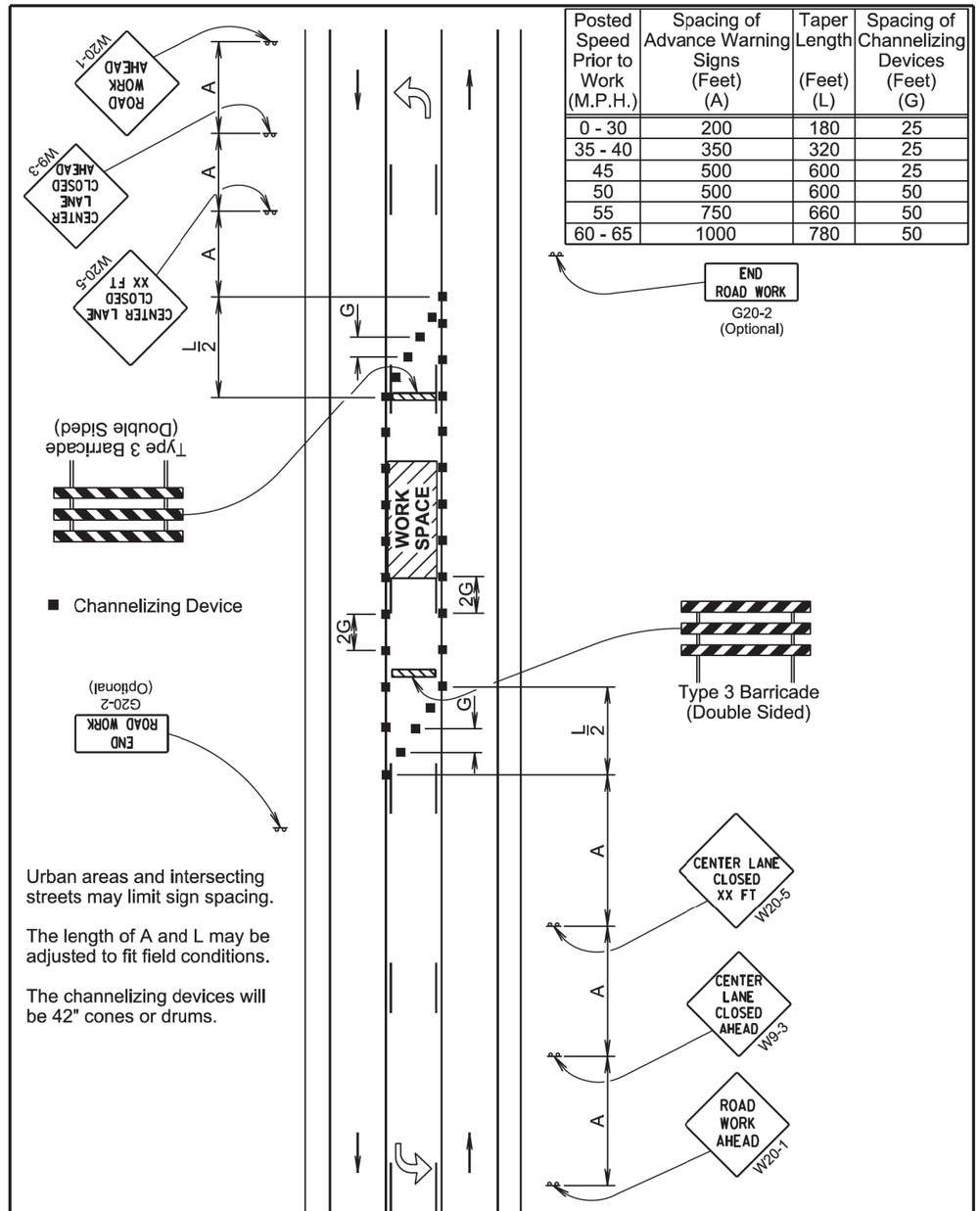
Published Date: 2026

SDDOT

4-LANE UNDIVIDED, LEFT LANE CLOSED

PLATE NUMBER 634.48

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

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 will be 42" cones or drums.

January 22, 2021

Published Date: 2026

SDDOT

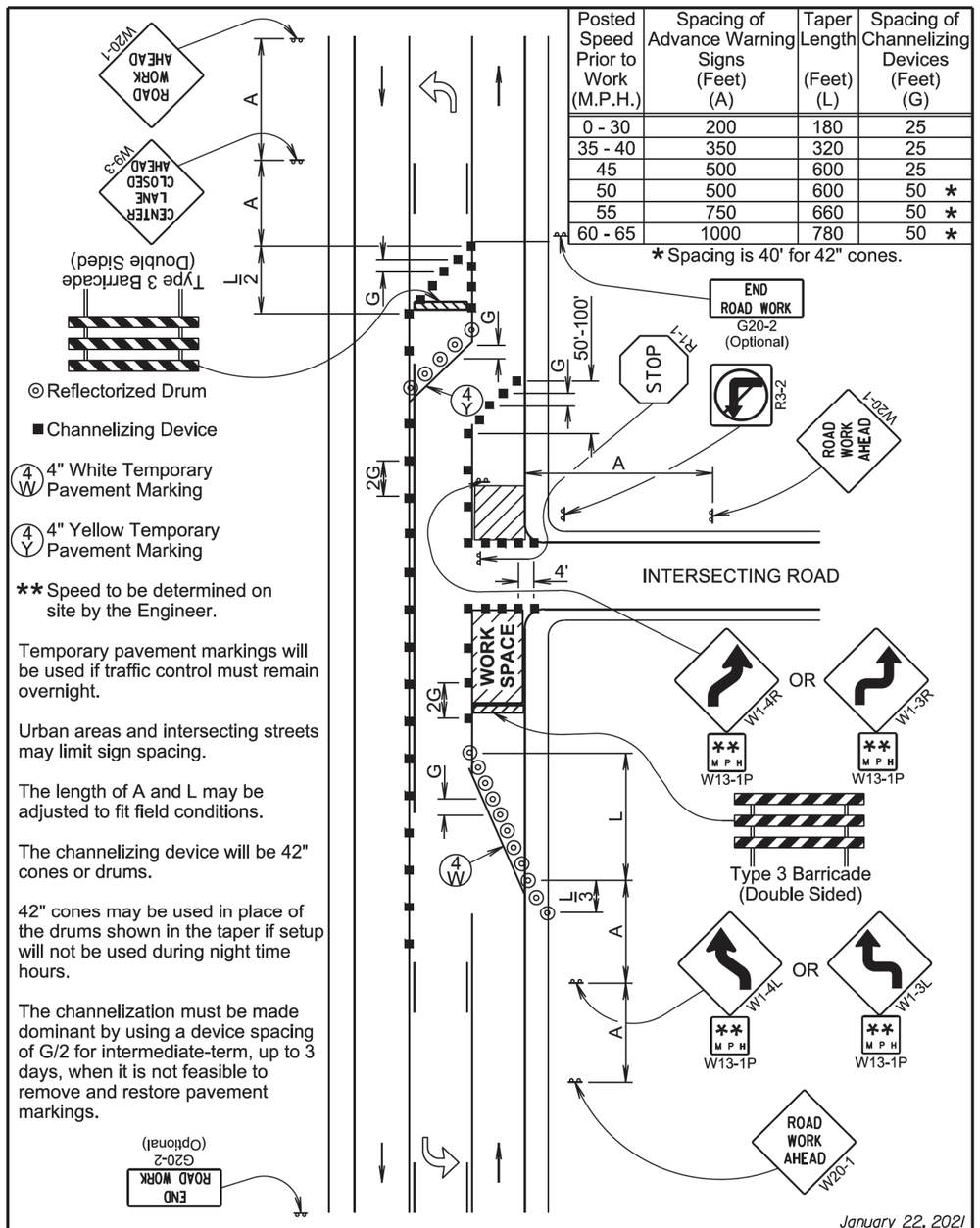
3-LANE, CENTER LANE CLOSED

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.



◎ Reflectorized Drum

■ Channelizing Device

(4W) 4" White Temporary Pavement Marking

(4Y) 4" Yellow Temporary Pavement Marking

** Speed to be determined on site by the Engineer.

Temporary pavement markings will 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 will 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.

January 22, 2021

Published Date: 2026	SDDOT	3-LANE, OUTSIDE LANE CLOSED	PLATE NUMBER 634.53 Sheet 1 of 1

◎ Reflectorized Drum

■ Channelizing Device

▭ Movable Concrete Barrier

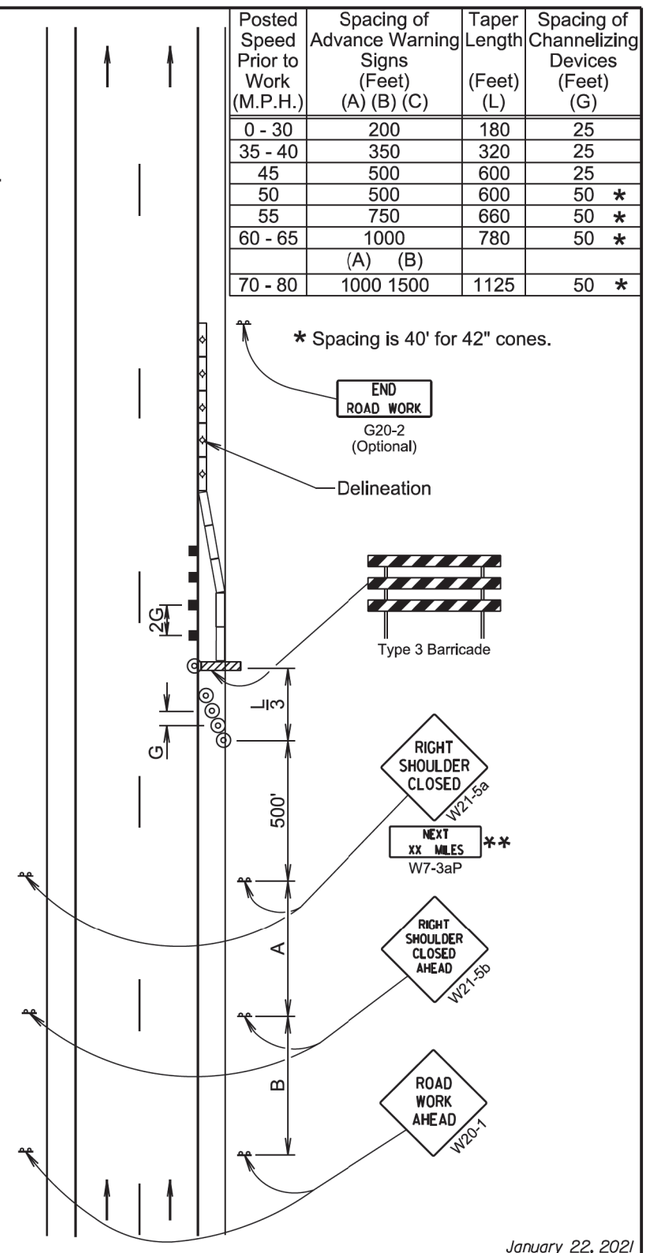
** For distances ½ mile or greater.

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

This standard plate shows one method which may be used to close a shoulder of a roadway for a long term project. The Engineer will determine if the use of barriers is required. If barriers are required, the layout details will be included elsewhere in the plans.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)	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 *
	(A) (B)		
70 - 80	1000 1500	1125	50 *

* Spacing is 40' for 42" cones.



January 22, 2021

Published Date: 2026	SDDOT	SHOULDER CLOSED	PLATE NUMBER 634.61 Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
	(A) (B) (C)
70 - 80	1000 1500 2640

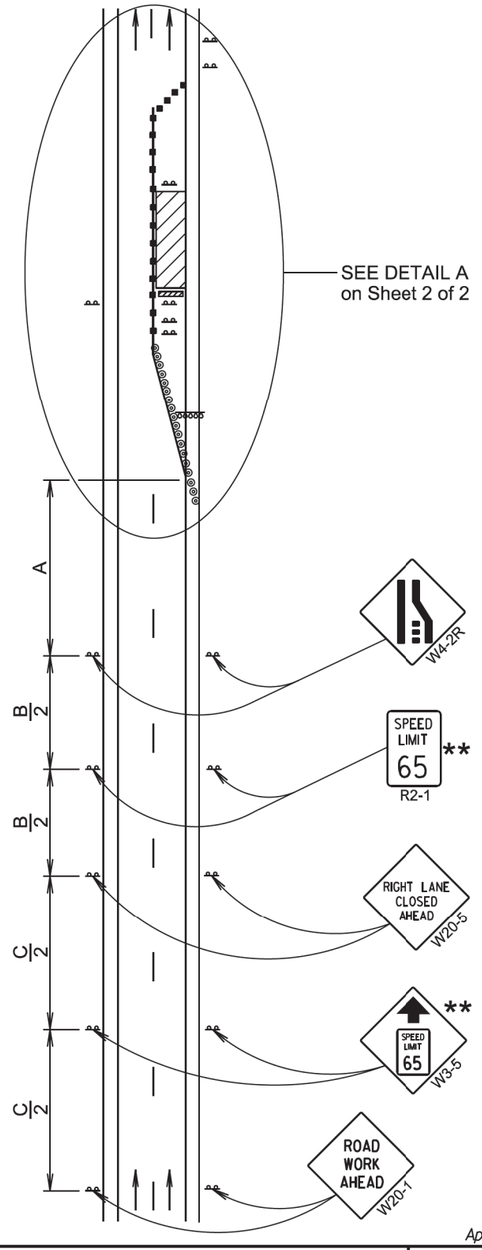
** Speed appropriate for location.

◎ Reflectorized Drum

■ Channelizing Device

ROAD WORK AHEAD sign is only required in advance of the first lane closure.

High speed is defined as having a posted speed limit greater than 45 mph.



April 8, 2025

Published Date: 2026	SDDOT	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
			Sheet 1 of 2

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)
0 -30	25	180
35 - 40	25	320
45	25	600
50	50 *	600
55	50 *	660
60 - 65	50 *	780
70 - 80	50 *	960

* Spacing is 40' for 42" cones.

** Speed appropriate for location.

*** Use speed limit designated for the condition when workers are present in the work space. Signs will be covered or removed when workers are not present.

◎ Reflectorized Drum

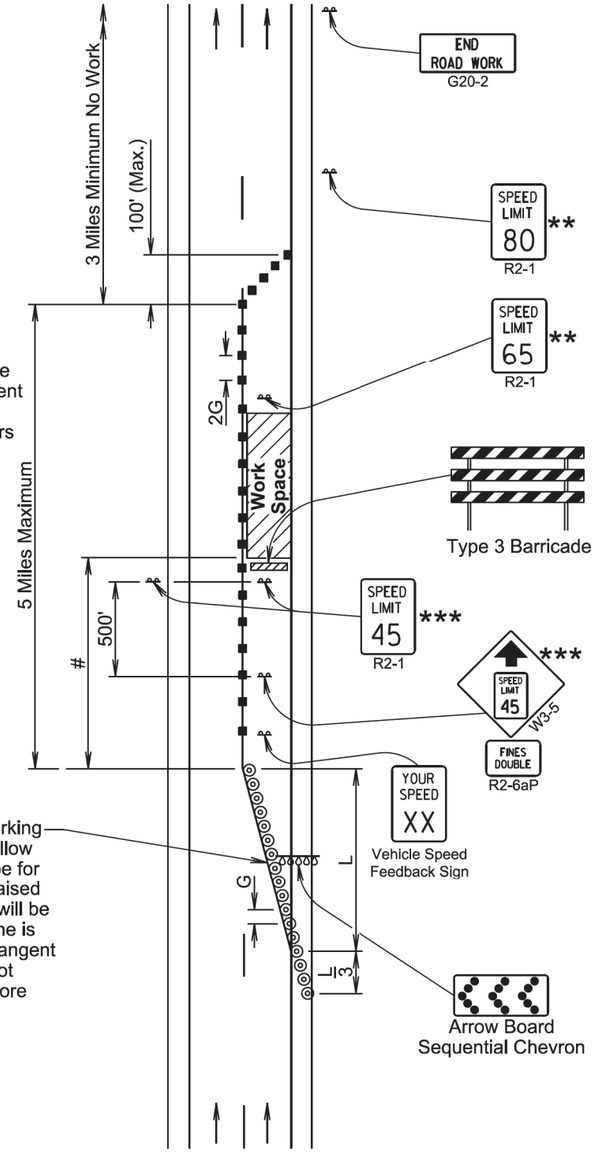
■ Channelizing Device

The Work Space will be a minimum of 500' from the end of the taper.

The channelizing devices will 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.

4" white temporary pavement marking tape for right lane closures, 4" yellow temporary pavement marking tape for left lane closures, or temporary raised pavement markers at 5' spacing will be installed in the taper when the lane is closed overnight, and along the tangent section where the skip lines do not exist and the lane is closed for more than 3 days.



DETAIL A

April 8, 2025

Published Date: 2026	SDDOT	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
			Sheet 2 of 2

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
70	730
75	820
80	910

◎ Reflectorized Drum

■ Channelizing Device

(4W) 4" White Temporary Pavement Marking

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

This procedure also applies when work is being performed in the lane adjacent to the median on a divided highway. Under these conditions, LEFT LANE CLOSED signs and the corresponding LANE REDUCTION symbol signs will be used.

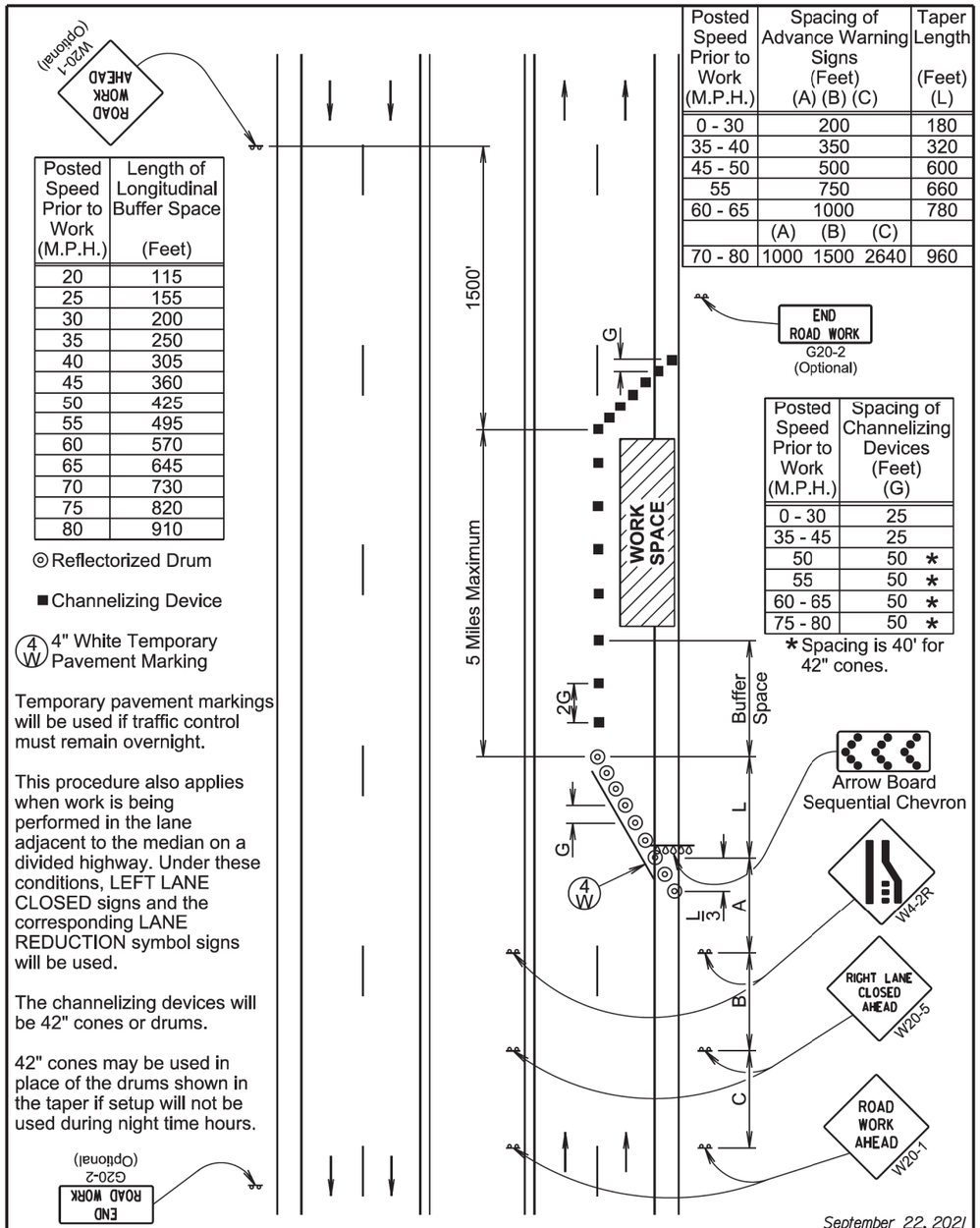
The channelizing devices will be 42" cones or drums.

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

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)	Taper Length (Feet) (L)
0 - 30	200	180
35 - 40	350	320
45 - 50	500	600
55	750	660
60 - 65	1000	780
	(A) (B) (C)	
70 - 80	1000 1500 2640	960

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 *
75 - 80	50 *

* Spacing is 40' for 42" cones.



September 22, 2021

Published Date: 2026

SDDOT

LANE CLOSURE WITHOUT BARRIER

PLATE NUMBER 634.64

Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B)	Taper Length (Feet) (L)
45 - 50	500	600
55	750	660
60 - 65	1000	780
	(A) (B)	
70 - 80	1000 1500	1125

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 - 80	50 *

* Spacing is 40' for 42" cones.

■ Channelizing Device

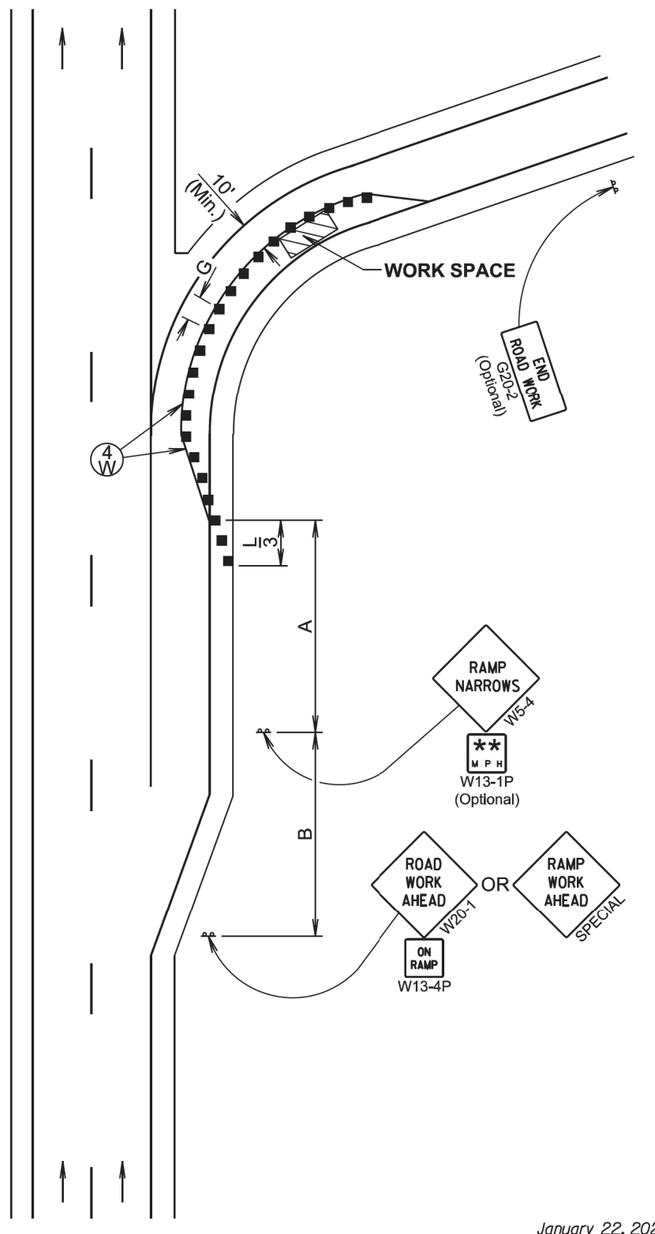
(4W) 4" White Temporary Pavement Marking

** Need and safe speed to be determined by the Engineer.

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

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

Truck off-tracking should be considered when determining whether the 10-foot minimum lane width is adequate.



January 22, 2021

Published Date: 2026

SDDOT

PARTIAL EXIT RAMP CLOSURE

PLATE NUMBER 634.69

Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)	Taper Length (Feet) (L)
0 - 30	200	180
35 - 40	350	320
45 - 50	500	600
55	750	660
60 - 65	1000	780
	(A) (B) (C)	
70 - 80	1000 1500 2640	1125

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 - 80	50 *

* Spacing is 40' for 42" cones.

◎ Reflectorized Drum

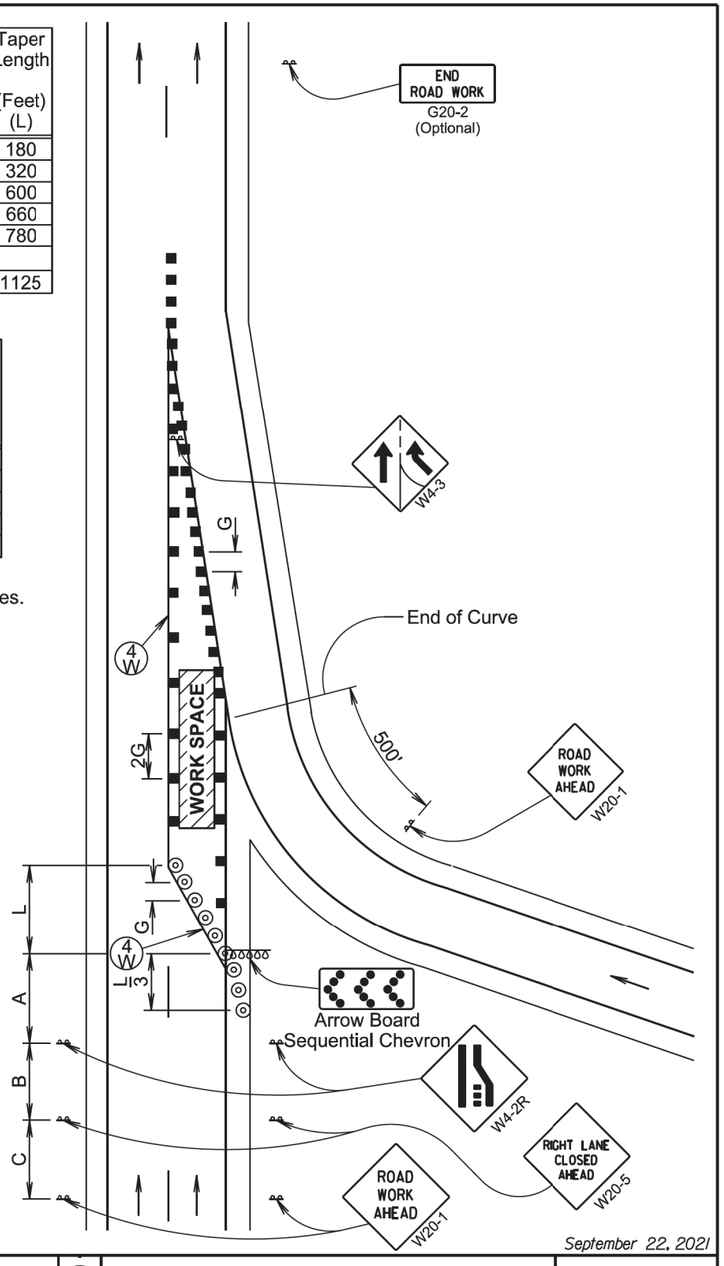
■ Channelizing Device

(4W) 4" White Temporary Pavement Marking

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

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

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



September 22, 2021

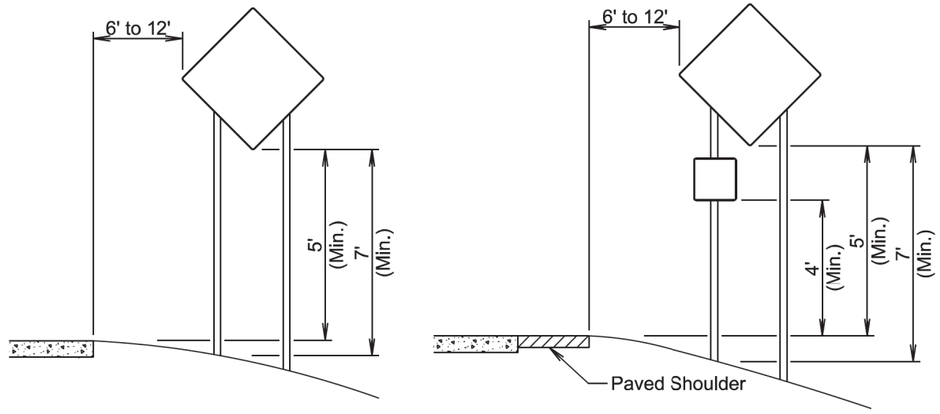
Published Date: 2026

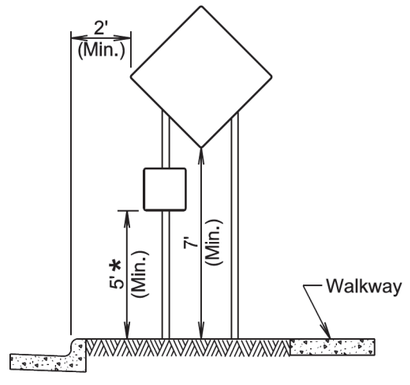
SDDOT

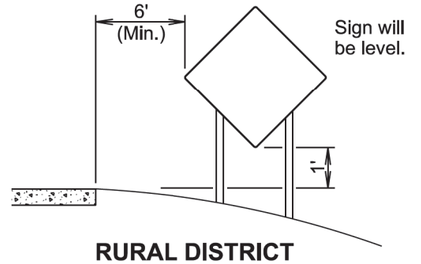
WORK IN VICINITY OF ENTRANCE RAMP

PLATE NUMBER 634.70

Sheet 1 of 1







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

January 22, 2021

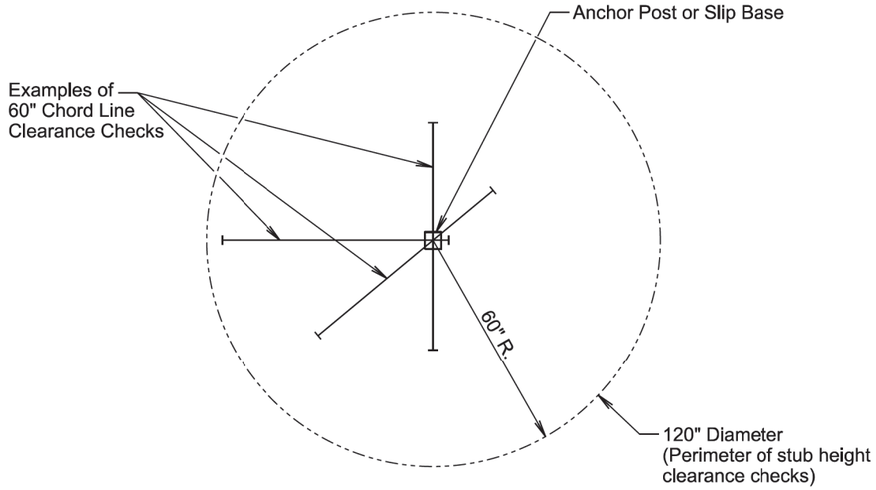
Published Date: 2026

SDDOT

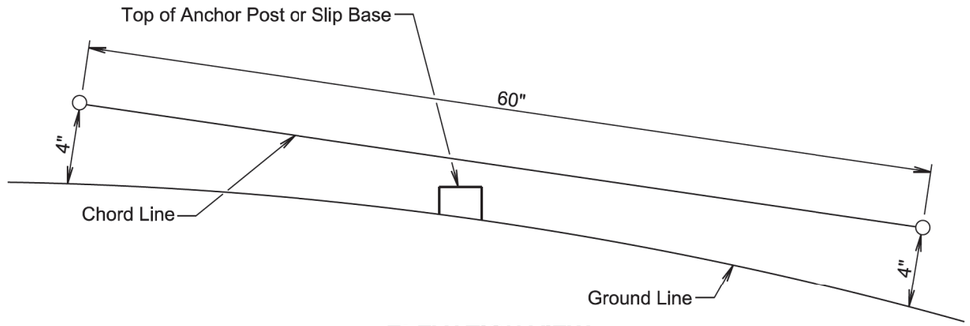
CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)

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 WILL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height will be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

January 22, 2021

Published Date: 2026	SDDOT	***BREAKAWAY SUPPORT STUB CLEARANCE***	*PLATE NUMBER* 634.99
			Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	24	63

TABLE FOR NRC PAVEMENT REPAIR ON SD115 - PCN 09X5 WB & EB

DMI	WB DRIVING LANE L Ft	WB DRIVING LANE W Ft	CENTER TURN LANE L Ft	CENTER TURN LANE W Ft	EB DRIVING LANE L Ft	EB DRIVING LANE W Ft	NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	INSERT STEEL BAR IN PCC PAVEMENT (NRCP) No. 8 x 18" DEFORMED TIE BARS Each	INSERT STEEL BAR IN PCC PAVEMENT (NRCP) No. 5 x 24" DEFORMED TIE BARS Each	INSERT STEEL BAR IN NRCP TOTAL Each	DOWEL BAR Each	TIE BAR RETROFIT STITCHING Each	COMMENTS
105.005													24	WB Stitching
105.062													32	WB Stitching
105.093	6	14					9.3	R	16	2	18	12		
105.107													8	WB Stitching
105.130			6	12			8.0	R	16	4	20	12		
105.147					6	14	9.3	R	16	4	20	12		
105.172	6	14					9.3	R	16	2	18	12		
105.360	6	14					9.3	R	16	2	18	12		
105.414	6	14	6	12			17.3	R	32	2	34	24		
105.422					6	14	9.3	R	16	4	20	12		
105.428	6	14					9.3	R	16	2	18	12		
105.516					6	14	9.3	R	16	4	20	12		
105.522	6	14					9.3	R	16	2	18	12	16	WB Stitching
105.672					6	14	9.3	R	16	4	20	12		
105.732													16	WB Stitching
105.837													16	EB Stitching
105.937													32	WB Stitching
106.010	6	14					9.3	R	16	2	18	12		
106.019													32	EB Stitching
106.039	6	14					9.3	R	16	2	18	12		
106.059	6	14					9.3	R	16	2	18	12	24	WB Stitching
106.073					6	14	9.3	R	16	4	20	12		
106.084													16	EB Stitching
106.090													32	WB Stitching
106.124	6	14					9.3	R	16	2	18	12	16	WB Stitching
106.138													24	WB Stitching
106.147					6	14	9.3	R	16	4	20	12	32	EB Stitching
106.158					6	14	9.3	R	16	4	20	12		
106.195					6	14	9.3	R	16	4	20	12		
106.240	6	14					9.3	R	16	2	18	12		
106.266													8	WB Stitching
106.283													24	WB Stitching
106.289					6	14	9.3	R	16	4	20	12		
106.309													24	WB Stitching
106.402					6	14	9.3	R	16	4	20	12		
106.417													24	EB Stitching
106.425													16	WB Stitching
106.439													16	EB Stitching
106.451													16	EB Stitching
106.465													32	WB Stitching
106.468					6	14	9.3	R	16	4	20	12		
106.505													16	WB Stitching
106.508													16	EB Stitching
106.613													16	EB Stitching
106.630													16	EB Stitching
106.650													16	EB Stitching
106.675													24	EB Stitching
106.689													16	EB Stitching
106.698													16	WB Stitching
106.718													16	WB Stitching
106.740													40	EB Stitching
106.743													16	WB Stitching
106.755													16	WB Stitching
106.806													24	EB Stitching
106.897					6	14	9.3	R	16	4	20	12	16	WB Stitching
106.900													32	EB Stitching
106.962													24	WB Stitching
106.985													8	WB Stitching
107.050													8	WB Stitching
107.101	6	14					9.3	R	16	2	18	12		
107.201													32	EB Stitching
107.252													72	EB Stitching
107.255													24	EB Stitching
107.275													16	EB Stitching
107.468													8	EB Stitching
107.556													16	WB Stitching
107.562													48	EB and CL Stitching
107.573													48	EB Stitching
TOTALS:							**239.2**		**416**	**76**	**492**	**312**	**1080**	
ADDITIONAL QUANTITIES:							**50.0**		**80**	**20**	**100**	**60**	**220**	
GRAND TOTALS:							**289.2**		**496**	**96**	**592**	**372**	**1300**	

NRC PAVEMENT REPAIR AREA TYPES

W = Two Working Joints (Use only if repair is full roadway width and uniform length (across all lanes))
T = Two Tied Joints
B = One Working & One Tied Joint
R = Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	25	63

TABLE FOR CRC PAVEMENT REPAIR I29 - PCN 09X5 SB

	SB PASSING LANE		SB DRIVING LANE		
DMI	L Ft	W Ft	L Ft	W Ft	CRCP REPAIR SqYds
70.436			4	8	3.6
70.407			4	8	3.6
70.388	4	8	4	8	7.1
70.379	6	8			5.3
70.364	6	8	6	8	10.7
70.341			6	8	5.3
70.339			6	8	5.3
70.330			4	4	1.8
70.231	4	4	4	4	3.6
70.227			4	4	1.8
70.218	15	4	15	4	13.3
70.191			6	6	4.0
70.182	4	4	4	4	3.6
70.150	6	4			2.7
70.144			6	4	2.7
70.121	15	4	15	4	13.3
70.116	10	4			4.4
69.987	4	4	4	4	3.6
69.953	4	6			2.7
69.951	20	4	20	4	17.8
69.934	4	6			2.7
69.894	4	4	4	4	3.6
69.884	4	8			3.6
69.835			4	4	1.8
69.708			14	6	9.3
69.691			8	14	12.4
69.686			15	14	23.3
69.665			4	4	1.8
69.661	4	4			1.8
69.657			20	4	8.9
69.650			6	4	2.7
69.642	4	4	8	4	5.3
69.634	10	4	10	4	8.9
69.629	10	4			4.4
69.621			8	4	3.6
69.608	10	6			6.7
69.589			4	4	1.8
69.545			25	4	11.1
69.538			30	8	26.7
69.528			4	8	3.6
69.494			4	4	1.8
69.430			8	4	3.6
69.386	8	4			3.6
69.384			8	4	3.6
69.330			15	14	23.3
69.318			4	4	1.8
69.309	4	4			1.8
69.242	4	4			1.8
69.172	6	4			2.7
69.163			14	4	6.2
69.159			4	4	1.8
69.150			4	4	1.8
69.116	4	4	4	4	3.6
69.108			8	8	7.1
69.095			10	4	4.4
69.032	4	4			1.8
68.964	4	4			1.8
68.905			4	4	1.8
68.830	20	6			13.3
68.788	6	4			2.7
68.786			15	14	23.3
68.777			6	4	2.7
68.761			20	6	13.3
TOTALS:					**389.8**
ADDITIONAL QUANTITIES:					**80.0**
GRAND TOTALS:					**469.8**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 SB

	REINFORCING STEEL (CRCP) FOR SB PASSING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)								INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB PASSING LANE		REINFORCING STEEL (CRCP) FOR SB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)														INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB DRIVING LANE			
	No. 6 Longitudinal Bars to be lap spliced with existing bars		Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars		New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	No. 6 Longitudinal Bars to be lap spliced with existing bars		Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar		Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar		Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars		New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	INSERT STEEL BAR IN CRCP TOTAL Each
DMI	# bars @ length	Length			# bars @ length	Length					# bars @ length	Length			# bars @ length	Length			# bars @ length	Length			# bars @ length	Length						
70.436											15 bars @ 0" =	0.00'	30"	-									2 bars @ 90" =	15.00'	2'	10.020		4	4	4
70.407											15 bars @ 0" =	0.00'	30"	-									2 bars @ 90" =	15.00'	2'	10.020		4	4	4
70.388	15 bars @ 0" =	0.00'	30"	-	2 bars @ 90" =	15.00'	2'	10.020	4	4	15 bars @ 0" =	0.00'	30"	-									2 bars @ 90" =	15.00'	2'	10.020		4	4	8
70.379	15 bars @ 62" =	77.50'	19"	-	3 bars @ 90" =	22.50'	2'	131.435	6	6																				6
70.364	15 bars @ 62" =	77.50'	19"	-	3 bars @ 90" =	22.50'	2'	131.435	6	6	15 bars @ 62" =	77.50'	19"	-									3 bars @ 90" =	22.50'	2'	131.435		6	6	12
70.341											15 bars @ 62" =	77.50'	19"	-									3 bars @ 90" =	22.50'	2'	131.435		6	6	6
70.339											15 bars @ 62" =	77.50'	19"	-									3 bars @ 90" =	22.50'	2'	131.435		6	6	6
70.191											11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'	96.381		6	6	6
69.953	11 bars @ 0" =	0.00'	30"	-	2 bars @ 66" =	11.00'	2'	7.348	4	4																				4
69.951																														
69.934	11 bars @ 0" =	0.00'	30"	-	2 bars @ 66" =	11.00'	2'	7.348	4	4																				4
69.884	15 bars @ 0" =	0.00'	30"	-	2 bars @ 90" =	15.00'	2'	10.020	4	4																				4
69.708											11 bars @ 146" =	133.83'	30"	14"									5 bars @ 66" =	27.50'	2'	219.383		10	10	10
69.691											26 bars @ 84" =	182.00'	26"	-	13 bars @ 70" =	75.83'	26"	-	13 bars @ 70" =	75.83'	26"	-	3 bars @ 162" =	40.50'	2'	528.211	26	6	32	32
69.686											26 bars @ 158" =	342.33'	30"	14"	13 bars @ 90" =	97.50'	30"	14"	13 bars @ 138" =	149.50'	30"	14"	6 bars @ 162" =	81.00'	2'	939.282	26	12	38	38
69.608	11 bars @ 106" =	97.17'	30"	6"	4 bars @ 66" =	22.00'	2'	160.645	8	8																				8
69.538											15 bars @ 338" =	422.50'	30"	14"									13 bars @ 90" =	97.50'	2'	699.725		26	26	26
69.528											15 bars @ 0" =	0.00'	30"	-									2 bars @ 90" =	15.00'	2'	10.020		4	4	4
69.330											26 bars @ 158" =	342.33'	30"	14"	13 bars @ 90" =	97.50'	30"	14"	13 bars @ 138" =	149.50'	30"	14"	6 bars @ 162" =	81.00'	2'	939.282	26	12	38	38
69.108											15 bars @ 84" =	105.00'	26"	-									3 bars @ 90" =	22.50'	2'	172.740		6	6	6
68.830	11 bars @ 218" =	199.83'	30"	14"	8 bars @ 66" =	44.00'	2'	329.537	16	16																				16
68.786											26 bars @ 158" =	342.33'	30"	14"	13 bars @ 90" =	97.50'	30"	14"	13 bars @ 138" =	149.50'	30"	14"	6 bars @ 162" =	81.00'	2'	939.282	26	12	38	38
68.761											11 bars @ 218" =	199.83'	30"	14"									8 bars @ 66" =	44.00'	2'	329.537		16	16	16
TOTALS:	**104 bars**	**452'**			**26 bars**	**163'**		**788 Lbs**	**52**	**52**	**272 bars**	**2359'**			**52 bars**	**368'**			**52 bars**	**524'**			**70 bars**	**619'**		**5298 Lbs**	**104**	**140**	**244**	**296**
ADDITIONAL QUANTITIES:	**20 bars**	**90'**			**10 bars**	**30'**		**160 Lbs**	**10**	**10**	**50 bars**	**470'**			**10 bars**	**70'**			**10 bars**	**100'**			**10 bars**	**120'**		**1060 Lbs**	**20**	**30**	**50**	**60**
GRAND TOTALS:	**124 bars**	**542'**			**36 bars**	**193'**		**948 Lbs**	**62**	**62**	**322 bars**	**2829'**			**62 bars**	**438'**			**62 bars**	**624'**			**80 bars**	**739'**		**6358 Lbs**	**124**	**170**	**294**	**356**

TABLE FOR CRC PAVEMENT REPAIR I29 - PCN 09X5 SB

DMI	SB PASSING LANE L Ft	SB PASSING LANE W Ft	SB DRIVING LANE L Ft	SB DRIVING LANE W Ft	CRCP REPAIR SqYds
68.700			4	6	2.7
68.681			6	4	2.7
68.619	20	4			8.9
68.605			4	4	1.8
68.588			4	4	1.8
68.577			8	4	3.6
68.556			20	8	17.8
68.554			4	4	1.8
68.545			15	14	23.3
68.543	4	4			1.8
68.541			8	6	5.3
68.524	10	4			4.4
68.488	6	4			2.7
68.456	8	6			5.3
68.386	4	4			1.8
68.348			6	4	2.7
68.331	4	4			1.8
68.302			4	4	1.8
68.298			8	4	3.6
68.289			4	4	1.8
68.278	8	4			3.6
68.228			4	4	1.8
68.189	6	4			2.7
68.162	4	4	8	4	5.3
68.153	6	4			2.7
68.141	6	6			4.0
68.139			6	4	2.7
68.119			20	14	31.1
68.100			15	4	6.7
68.071			6	6	4.0
68.060			6	6	4.0
68.050			6	6	4.0
68.045			20	6	13.3
68.037	8	6			5.3
68.022			6	4	2.7
68.007			4	4	1.8
68.001			6	6	4.0
67.961			4	4	1.8
67.903	4	4			1.8
67.880			6	4	2.7
67.840			18	14	28.0
67.797	4	4			1.8
67.734	8	4			3.6
67.672	6	4			2.7
67.647	4	4			1.8
67.518	6	4			2.7
67.509	4	4			1.8
67.494	4	4			1.8
67.456	8	4			3.6
67.439	6	4			2.7
67.406	4	4			1.8
67.357	6	6			4.0
67.300	6	6			4.0
67.255			4	4	1.8
67.084	6	4			2.7
66.980	4	4			1.8
TOTALS:					**270.0**
ADDITIONAL QUANTITIES:					**50.0**
GRAND TOTALS:					**320.0**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 SB

	REINFORCING STEEL (CRCP) FOR SB PASSING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)								INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB PASSING LANE		REINFORCING STEEL (CRCP) FOR SB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)																INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB DRIVING LANE				INSERT STEEL BAR IN CRCP TOTAL Each
	No. 6 Longitudinal Bars to be lap spliced with existing bars		Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars		New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	No. 6 Longitudinal Bars to be lap spliced with existing bars		Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar		Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar		Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars		New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	
DMI	# bars @ length	Length			# bars @ length	Length					# bars @ length	Length			# bars @ length	Length			# bars @ length	Length			# bars @ length	Length							
68.700											11 bars @ 0" =	0.00'	30"	-									2 bars @ 66" =	11.00'	2'	7.348		4	4	4
68.556											15 bars @ 218" =	272.50'	30"	14"									8 bars @ 90" =	60.00'	2'	449.375		16	16	16
68.545											26 bars @ 158" =	342.33'	30"	14"	13 bars @ 90" =	97.50'	30"	14"	13 bars @ 138" =	149.50'	30"	14"	6 bars @ 162" =	81.00'	2'	939.282	26	12	38	38
68.541											11 bars @ 84" =	77.00'	26"	-									3 bars @ 66" =	16.50'	2'	126.676		6	6	6
68.456	11 bars @ 84" =	77.00'	26"	-	3 bars @ 66" =	16.50'	2'	126.676	6	6																						6
68.141	11 bars @ 62" =	56.83'	19"	-	3 bars @ 66" =	16.50'	2'	96.381	6	6																						6
68.119											26 bars @ 218" =	472.33'	30"	14"	13 bars @ 144" *=	156.00'	30"	Var.	13 bars @ 144" *=	156.00'	30"	Var.	8 bars @ 162" =	108.00'	2'	1250.208	26	16	42	42
68.088											11 bars @ 0" =	0.00'	30"	-									2 bars @ 66" =	11.00'	2'	7.348		4	4	4
68.071											11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'	96.381		6	6	6
68.060											11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'	96.381		6	6	6
68.050											11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'	96.381		6	6	6
68.045											11 bars @ 218" =	199.83'	30"	14"									8 bars @ 66" =	44.00'	2'	329.537		16	16	16
68.037	11 bars @ 84" =	77.00'	26"	-	3 bars @ 66" =	16.50'	2'	126.676	6	6																						6
68.001											11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'	96.381		6	6	6
67.840											26 bars @ 194" =	420.33'	30"	14"	13 bars @ 132" *=	143.00'	30"	Var.	13 bars @ 132" *=	143.00'	30"	Var.	7 bars @ 162" =	94.50'	2'	1124.034	26	14	40	40
67.357	11 bars @ 62" =	56.83'	19"	-	3 bars @ 66" =	16.50'	2'	96.381	6	6																						6
67.300	11 bars @ 62" =	56.83'	19"	-	3 bars @ 66" =	16.50'	2'	96.381	6	6																						6
TOTALS:	**55 bars**	**324'**			**15 bars**	**83'**		**542 Lbs**	**30**	**30**	**181 bars**	**2012'**			**39 bars**	**397'**			**39 bars**	**449'**			**56 bars**	**492'**		**4619 Lbs**	**78**	**112**	**190**	**220**
ADDITIONAL QUANTITIES:	**10 bars**	**60'**			**-**	**20'**		**110 Lbs**	**10**	**10**	**40 bars**	**400'**			**10 bars**	**80'**			**10 bars**	**90'**			**10 bars**	**100'**		**920 Lbs**	**20**	**20**	**40**	**50**
GRAND TOTALS:	**65 bars**	**384'**			**15 bars**	**103'**		**652 Lbs**	**40**	**40**	**221 bars**	**2412'**			**49 bars**	**477'**			**49 bars**	**539'**			**66 bars**	**592'**		**5539 Lbs**	**98**	**132**	**230**	**270**

NOTES

* In Full Width CRCP Repair Areas, where the repair area length L is greater than or equal to 16', the inserted longitudinal bars shall be of variable length to facilitate random staggering of the lap splices.
The length given here is an average and does not represent the actual bar length (it is used only for establishing the total bar length needed) . Refer to the details for CRC PAVEMENT REPAIR for actual bar lengths.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	29	63

TABLE FOR CRC PAVEMENT REPAIR I29 - PCN 09X5 SB

DMI	SB PASSING LANE L Ft	SB PASSING LANE W Ft	SB DRIVING LANE L Ft	SB DRIVING LANE W Ft	CRCP REPAIR SqYds
66.867	10	4			4.4
66.863			6	4	2.7
66.854	6	4			2.7
66.839			6	4	2.7
66.746			8	6	5.3
66.733			4	4	1.8
66.625	4	4			1.8
66.615	4	4			1.8
66.598			12	4	5.3
66.583	6	12			8.0
66.577	4	4			1.8
66.574	12	8			10.7
66.564	8	4			3.6
66.560	8	4	8	4	7.1
66.521	4	4			1.8
66.479			4	4	1.8
66.460			4	4	1.8
66.431	20	6			13.3
66.426			4	4	1.8
66.418	16	4	4	4	8.9
66.407	4	4	6	4	4.4
66.403	4	12	4	4	7.1
66.392	4	4			1.8
66.335	4	4			1.8
66.299			6	6	4.0
66.274	4	4			1.8
66.236			4	4	1.8
66.229			6	4	2.7
66.214			4	4	1.8
66.166			4	4	1.8
66.151			8	4	3.6
66.146			4	4	1.8
66.128	4	4			1.8
65.899			6	6	4.0
65.888			12	4	5.3
65.880	4	4	4	4	3.6
65.878			15	4	6.7
65.875	4	4	4	4	3.6
65.871	4	4			1.8
65.829	4	4			1.8
65.812			8	4	3.6
65.810			6	4	2.7
65.803	12	6	4	4	9.8
65.801	6	4			2.7
65.795			4	4	1.8
65.784	10	4			4.4
65.776	4	4			1.8
65.759	8	4			3.6
65.740	4	4	4	4	3.6
65.731	4	4			1.8
65.710	4	4			1.8
65.691			4	6	2.7
65.685			8	4	3.6
65.681			8	4	3.6
65.668	8	4			3.6
65.661	4	4			1.8
65.625	4	4	8	4	5.3
65.617	10	4			4.4
65.613	4	4			1.8
65.583	4	4			1.8
65.545			8	4	3.6
65.541			4	4	1.8
65.538			4	4	1.8
65.530			4	4	1.8
65.522			20	4	8.9
65.496			12	4	5.3
65.460	4	4	4	4	3.6
65.452	4	4	4	14	8.0
65.449	8	4	8	4	7.1
65.441			8	4	3.6
65.439	4	4			1.8
65.424			8	4	3.6
65.418	8	4			3.6
65.411			8	4	3.6
65.401			6	6	4.0
65.392	12	4	4	4	7.1
65.377	4	4	4	4	3.6
65.352			8	4	3.6
65.348	6	4			2.7
65.331			6	6	4.0
65.312	4	4			1.8
65.280			4	8	3.6
65.250	4	4			1.8
65.238	4	4			1.8
65.233	4	4			1.8
65.216			4	4	1.8
65.206			6	4	2.7
65.202			10	4	4.4
65.180			8	4	3.6
65.172	8	4			3.6
TOTALS:					**328.3**
ADDITIONAL QUANTITIES:					**70.0**
GRAND TOTALS:					**398.3**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 SB

	REINFORCING STEEL (CRCP) FOR SB PASSING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)														INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB PASSING LANE			REINFORCING STEEL (CRCP) FOR SB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)							INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB DRIVING LANE		
DMI	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	INSERT STEEL BAR IN CRCP TOTAL Each
66.746																				11 bars @ 84" =	77.00'	26"	-	3 bars @ 66" =	16.50'	2'	126.676	6	6	6
66.583	22 bars @ 62" =	113.67'	19"	-	11 bars @ 55" =	50.42'	19"	-	11 bars @ 55" =	50.42'	19"	-	3 bars @ 138" =	34.50'	2'	345.240	22	6	28										28
66.574	15 bars @ 122" =	152.50'	30"	14"									4 bars @ 90" =	30.00'	2'	249.095		8	8										8
66.431	11 bars @ 218" =	199.83'	30"	14"									8 bars @ 66" =	44.00'	2'	329.537		16	16										16
66.403	22 bars @ 0" =	0.00'	30"	-									2 bars @ 138" =	23.00'	2'	15.364		4	4										4
66.299																				11 bars @ 62" =	56.83'	19"	-	3 bars @ 66" =	16.50'	2'	96.381	6	6	6
65.899																				11 bars @ 62" =	56.83'	19"	-	3 bars @ 66" =	16.50'	2'	96.381	6	6	6
65.803	11 bars @ 122" =	111.83'	30"	14"									4 bars @ 66" =	22.00'	2'	182.665		8	8										8
65.691																				11 bars @ 0" =	0.00'	30"	-	2 bars @ 66" =	11.00'	2'	7.348	4	4	4
65.452																				26 bars @ 0" =	0.00'	30"	-	2 bars @ 162" =	27.00'	2'	18.036	4	4	4
65.401																				11 bars @ 62" =	56.83'	19"	-	3 bars @ 66" =	16.50'	2'	96.381	6	6	6
65.331																				11 bars @ 62" =	56.83'	19"	-	3 bars @ 66" =	16.50'	2'	96.381	6	6	6
65.280																				15 bars @ 0" =	0.00'	30"	-	2 bars @ 90" =	15.00'	2'	10.020	4	4	4
TOTALS:	**81 bars**	**578'**			**11 bars**	**50'**			**11 bars**	**50'**			**21 bars**	**154'**		**1122 Lbs**	**22**	**42**	**64**	**107 bars**	**304'**			**21 bars**	**136'**		**548 Lbs**	**42**	**42**	**106**
ADDITIONAL QUANTITIES:	**20 bars**	**120'**			**-**	**10'**			**-**	**10'**			**-**	**30'**		**220 Lbs**	**-**	**10**	**10**	**20 bars**	**60'**			**-**	**30'**		**110 Lbs**	**10**	**10**	**20**
GRAND TOTALS:	**101 bars**	**698'**			**11 bars**	**60'**			**11 bars**	**60'**			**21 bars**	**184'**		**1342 Lbs**	**22**	**52**	**74**	**127 bars**	**364'**			**21 bars**	**166'**		**658 Lbs**	**52**	**52**	**126**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	31	63

TABLE FOR CRC PAVEMENT REPAIR I29 - PCN 09X5 SB

DMI	SB PASSING LANE L Ft	SB PASSING LANE W Ft	SB DRIVING LANE L Ft	SB DRIVING LANE W Ft	CRCP REPAIR SqYds
65.012			4	4	1.8
65.010	8	4			3.6
65.005			10	4	4.4
65.003	10	4			4.4
65.001			30	14	46.7
64.999	8	4			3.6
64.991	20	12			26.7
64.989	4	4			1.8
64.984			25	14	38.9
64.980			15	8	13.3
64.978	4	4	4	4	3.6
64.976	4	4			1.8
64.972	12	6	10	14	23.6
64.967			6	6	4.0
64.963	8	4			3.6
64.961			8	14	12.4
64.948			8	4	3.6
64.944			4	4	1.8
64.942			4	4	1.8
64.940			4	14	6.2
64.936			6	14	9.3
64.916	4	4			1.8
64.819	12	4			5.3
64.798	4	4	6	6	5.8
64.796			12	14	18.7
64.793	4	4			1.8
64.789	4	4	4	4	3.6
64.785	8	4	6	14	12.9
64.783			4	4	1.8
64.774			4	4	1.8
64.766			4	4	1.8
64.764	20	4			8.9
64.762			12	4	5.3
64.760			4	8	3.6
64.747	6	12			8.0
64.741	12	4			5.3
64.736	4	4	4	4	3.6
64.724	20	4			8.9
64.717	10	4			4.4
64.711	20	4	4	4	10.7
64.707			8	4	3.6
64.705	4	4			1.8
64.698			6	4	2.7
64.692			8	4	3.6
64.690			6	4	2.7
64.685			4	4	1.8
64.681	12	4			5.3
64.673	10	4	10	14	20.0
64.656			4	4	1.8
64.643	4	4	4	4	3.6
64.637	6	6			4.0
64.630	4	4	4	4	3.6
64.628			4	4	1.8
64.620	4	4			1.8
64.618			4	6	2.7
64.609	20	12			26.7
64.605			6	14	9.3
64.599			18	6	12.0
64.592			4	4	1.8
64.588	8	4	6	4	6.2
64.580			4	4	1.8
64.571			15	6	10.0
64.565			10	10	11.1
64.556			6	6	4.0
64.552			8	4	3.6
TOTALS:					**478.2**
ADDITIONAL QUANTITIES:					**100.0**
GRAND TOTALS:					**578.2**

NOTES

* In Full Width CRCP Repair Areas, where the repair area length L is greater than or equal to 16', the inserted longitudinal bars shall be of variable length to facilitate random staggering of the lap splices. The length given here is an average and does not represent the actual bar length (it is used only for establishing the total bar length needed) . Refer to the details for CRC PAVEMENT REPAIR for actual bar lengths.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	32	63

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 SB

	REINFORCING STEEL (CRCP) FOR SB PASSING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)														INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB PASSING LANE			REINFORCING STEEL (CRCP) FOR SB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)														INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB DRIVING LANE			
DMI	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	INSERT STEEL BAR IN CRCP TOTAL Each
65.001																				26 bars @ 338" =	732.33'	30"	14"	13 bars @ 204" *=	221.00'	30"	Var.	13 bars @ 204" *=	221.00'	30"	Var.	13 bars @ 162" =	175.50'	2'	1881.078	26	26	52	52
64.991	22 bars @ 218" =	399.67'	30"	14"	11 bars @ 144" *=	132.00'	30"	Var.	11 bars @ 144" *=	132.00'	30"	Var.	8 bars @ 138" =	92.00'	2'	1058.288	22	16	38																					38
64.984																				26 bars @ 278" =	602.33'	30"	14"	13 bars @ 174" *=	188.50'	30"	Var.	13 bars @ 174" *=	188.50'	30"	Var.	11 bars @ 162" =	148.50'	2'	1570.152	26	22	48	48
64.980																				15 bars @ 158" =	197.50'	30"	14"																	6 bars @ 90" =	45.00'	2'	326.705		12	12	12
64.972	11 bars @ 122" =	111.83'	30"	14"									4 bars @ 66" =	22.00'	2'	182.665		8	8	26 bars @ 106" =	229.67'	30"	6"	13 bars @ 82" =	88.83'	30"	7"	13 bars @ 86" =	93.17'	30"	7"	4 bars @ 162" =	54.00'	2'	654.400	26	8	34	42
64.967																				11 bars @ 62" =	56.83'	19"	-																	3 bars @ 66" =	16.50'	2'	96.381		6	6	6
64.961																				26 bars @ 84" =	182.00'	26"	-	13 bars @ 70" =	75.83'	26"	-	13 bars @ 70" =	75.83'	26"	-	3 bars @ 162" =	40.50'	2'	528.211	26	6	32	32
64.940																				26 bars @ 0" =	0.00'	30"	-																	2 bars @ 162" =	27.00'	2'	18.036		4	4	4
64.936																				26 bars @ 62" =	134.33'	19"	-	13 bars @ 55" =	59.58'	19"	-	13 bars @ 55" =	59.58'	19"	-	3 bars @ 162" =	40.50'	2'	407.796	26	6	32	32
64.798																				11 bars @ 62" =	56.83'	19"	-																	3 bars @ 66" =	16.50'	2'	96.381		6	6	6
64.796																				26 bars @ 122" =	264.33'	30"	14"	13 bars @ 90" =	97.50'	30"	14"	13 bars @ 102" =	110.50'	30"	14"	4 bars @ 162" =	54.00'	2'	745.512	26	8	34	34
64.785																				26 bars @ 62" =	134.33'	19"	-	13 bars @ 55" =	59.58'	19"	-	13 bars @ 55" =	59.58'	19"	-	3 bars @ 162" =	40.50'	2'	407.796	26	6	32	32
64.760																				15 bars @ 0" =	0.00'	30"	-																	2 bars @ 90" =	15.00'	2'	10.020		4	4	4
64.747	22 bars @ 62" =	113.67'	19"	-	11 bars @ 55" =	50.42'	19"	-	11 bars @ 55" =	50.42'	19"	-	3 bars @ 138" =	34.50'	2'	345.240	22	6	28																					28
64.673																				26 bars @ 106" =	229.67'	30"	6"	13 bars @ 82" =	88.83'	30"	7"	13 bars @ 86" =	93.17'	30"	7"	4 bars @ 162" =	54.00'	2'	654.400	26	8	34	34
64.637	11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'	96.381		6	6																					6
64.618																				11 bars @ 0" =	0.00'	30"	-																	2 bars @ 66" =	11.00'	2'	7.348		4	4	4
64.609	22 bars @ 218" =	399.67'	30"	14"	11 bars @ 144" *=	132.00'	30"	Var.	11 bars @ 144" *=	132.00'	30"	Var.	8 bars @ 138" =	92.00'	2'	1058.288	22	16	38																					38
64.605																				26 bars @ 62" =	134.33'	19"	-	13 bars @ 55" =	59.58'	19"	-	13 bars @ 55" =	59.58'	19"	-	3 bars @ 162" =	40.50'	2'	407.796	26	6	32	32
64.599																				11 bars @ 194" =	177.83'	30"	14"																	7 bars @ 66" =	38.50'	2'	292.819		14	14	14
64.571																				11 bars @ 158" =	144.83'	30"	14"																	6 bars @ 66" =	33.00'	2'	239.579		12	12	12
64.565																				18 bars @ 106" =	159.00'	30"	6"																	4 bars @ 114" =	38.00'	2'	264.202		8	8	8
64.556																				11 bars @ 62" =	56.83'	19"	-																	3 bars @ 66" =	16.50'	2'	96.381		6	6	6
TOTALS:	**88 bars**	**1082'**			**33 bars**	**314'**			**33 bars**	**314'**			**26 bars**	**257'**		**2741 Lbs**	**66**	**52**	**118**	**374 bars**	**3493'**			**117 bars**	**939'**			**117 bars**	**961'**			**86 bars**	**905'**		**8705 Lbs**	**234**	**172**	**406**	**524**
ADDITIONAL QUANTITIES:	**20 bars**	**220'**			**10 bars**	**60'**			**10 bars**	**60'**			**10 bars**	**50'**		**550 Lbs**	**10**	**10**	**20**	**70 bars**	**700'**			**20 bars**	**190'**			**20 bars**	**190'**			**20 bars**	**180'**		**1740 Lbs**	**50**	**30**	**80**	**100**
GRAND TOTALS:	**108 bars**	**1302'**			**43 bars**	**374'**			**43 bars**	**374'**			**36 bars**	**307'**		**3291 Lbs**	**76**	**62**	**138**	**444 bars**	**4193'**			**137 bars**	**1129'**			**137 bars**	**1151'**			**106 bars**	**1085'**		**10445 Lbs**	**284**	**202**	**486**	**624**

NOTES

* In Full Width CRCP Repair Areas, where the repair area length L is greater than or equal to 16', the inserted longitudinal bars shall be of variable length to facilitate random staggering of the lap splices.
The length given here is an average and does not represent the actual bar length (it is used only for establishing the total bar length needed) . Refer to the details for CRC PAVEMENT REPAIR for actual bar lengths.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	33	63

TABLE FOR CRC PAVEMENT REPAIR I29 - PCN 09X5 SB

	SB PASSING LANE		SB DRIVING LANE		
DMI	L Ft	W Ft	L Ft	W Ft	CRCP REPAIR SqYds
64.548	10	4			4.4
64.537			40	6	26.7
64.484	12	6			8.0
64.471			12	4	5.3
64.465	4	4	4	4	3.6
64.408			10	4	4.4
64.404			12	6	8.0
64.374			4	4	1.8
64.368			8	4	3.6
64.311	4	4			1.8
64.291			4	4	1.8
64.283	30	6			20.0
64.279	6	4			2.7
64.257			4	4	1.8
64.245			8	4	3.6
64.203	4	4			1.8
64.137			4	4	1.8
64.130			8	6	5.3
64.113			12	4	5.3
64.109			6	4	2.7
64.090			4	4	1.8
64.058	4	4			1.8
64.048			6	4	2.7
64.029	4	4			1.8
64.005	4	4			1.8
63.950	10	4			4.4
63.942	8	4			3.6
63.887	4	4	4	4	3.6
63.866	6	4	6	4	5.3
63.838			10	6	6.7
63.834			4	4	1.8
63.823	8	4			3.6
63.764	4	4			1.8
63.747	10	4			4.4
63.728	15	4	15	4	13.3
63.721	4	4			1.8
63.719	14	4	4	4	8.0
63.711	10	4			4.4
63.702			8	4	3.6
63.696	4	4	4	4	3.6
63.688	4	4			1.8
63.681	4	4			1.8
63.677	15	4	4	4	8.4
63.654			4	4	1.8
63.650			6	4	2.7
63.647	8	4	4	4	5.3
63.643	4	4			1.8
63.596			4	4	1.8
63.571	8	4			3.6
63.539	4	4	4	4	3.6
63.520	4	4			1.8
63.486	20	4			8.9
63.461	10	4	4	4	6.2
63.453			4	4	1.8
63.450	8	4			3.6
63.446	4	4	4	4	3.6
63.423			4	6	2.7
63.416			8	4	3.6
63.393	6	4			2.7
63.382	4	4			1.8
63.327	10	4			4.4
63.321	8	4	4	4	5.3
63.317			6	4	2.7
63.304	12	4			5.3
63.296	6	10			6.7
TOTALS:					**287.9**
ADDITIONAL QUANTITIES:					**60.0**
GRAND TOTALS:					**347.9**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 SB

	REINFORCING STEEL (CRCP) FOR SB PASSING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)								INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB PASSING LANE		REINFORCING STEEL (CRCP) FOR SB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)								INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB DRIVING LANE		
DMI	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	INSERT STEEL BAR IN CRCP TOTAL Each
64.537											11 bars @ 458" =	419.83'	30"	14"	18 bars @ 66" =	99.00'	2'	696.717	36	36	36
64.484	11 bars @ 122" =	111.83'	30"	14"	4 bars @ 66" =	22.00'	2'	182.665	8	8											8
64.404											11 bars @ 122" =	111.83'	30"	14"	4 bars @ 66" =	22.00'	2'	182.665	8	8	8
64.283	11 bars @ 338" =	309.83'	30"	14"	13 bars @ 66" =	71.50'	2'	513.127	26	26											26
64.129											11 bars @ 84" =	77.00'	26"	-	3 bars @ 66" =	16.50'	2'	126.676	6	6	6
63.838											11 bars @ 106" =	97.17'	30"	6"	4 bars @ 66" =	22.00'	2'	160.645	8	8	8
63.423											11 bars @ 0" =	0.00'	30"	-	2 bars @ 66" =	11.00'	2'	7.348	4	4	4
63.296	18 bars @ 62" =	93.00'	19"	-	3 bars @ 114" =	28.50'	2'	158.724	6	6											6
TOTALS:	**40 bars**	**515'**			**20 bars**	**122'**		**855 Lbs**	**40**	**40**	**55 bars**	**706'**			**31 bars**	**171'**		**1174 Lbs**	**62**	**62**	**102**
ADDITIONAL QUANTITIES:	**10 bars**	**100'**			**-**	**20'**		**170 Lbs**	**10**	**10**	**10 bars**	**140'**			**10 bars**	**30'**		**230 Lbs**	**10**	**10**	**20**
GRAND TOTALS:	**50 bars**	**615'**			**20 bars**	**142'**		**1025 Lbs**	**50**	**50**	**65 bars**	**846'**			**41 bars**	**201'**		**1404 Lbs**	**72**	**72**	**122**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	35	63

TABLE FOR CRC PAVEMENT REPAIR I29 - PCN 09X5 SB

DMI	SB PASSING LANE L Ft	SB PASSING LANE W Ft	SB DRIVING LANE L Ft	SB DRIVING LANE W Ft	CRCP REPAIR SqYds
63.242	6	4			2.7
63.225	4	4			1.8
63.172			4	4	1.8
63.136	8	4	8	4	7.1
63.128	4	4	4	4	3.6
63.119	4	4	4	4	3.6
63.111	6	4			2.7
63.102			8	4	3.6
63.026			4	4	1.8
62.975	4	4			1.8
62.950			4	4	1.8
62.856			4	4	1.8
62.822			8	4	3.6
62.808			4	4	1.8
62.789	4	4			1.8
62.761	4	4	4	4	3.6
62.755	6	4			2.7
62.740	4	4			1.8
62.733			4	4	1.8
62.717	6	4	4	6	5.3
62.651			4	4	1.8
62.640	4	4			1.8
62.625	4	4	4	4	3.6
62.606			4	4	1.8
62.560			6	6	4.0
62.549			10	14	15.6
62.530			6	14	9.3
62.519			10	6	6.7
62.320	6	4	10	4	7.1
62.297	8	4			3.6
62.255			10	4	4.4
62.233			15	4	6.7
62.215			8	4	3.6
TOTALS:					**126.5**
ADDITIONAL QUANTITIES:					**30.0**
GRAND TOTALS:					**156.5**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 SB

	REINFORCING STEEL (CRCP) FOR SB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)														INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB DRIVING LANE			
DMI	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	INSERT STEEL BAR IN CRCP TOTAL Each
62.717	11 bars @ 0" =	0.00'	30"	-									2 bars @ 66" =	11.00'	2'	7.348		4	4	4
62.560	11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'	96.381		6	6	6
62.549	26 bars @ 106" =	229.67'	30"	6"	13 bars @ 82" =	88.83'	30"	7"	13 bars @ 86" =	93.17'	30"	7"	4 bars @ 162" =	54.00'	2'	654.400	26	8	34	34
62.530	26 bars @ 62" =	134.33'	19"	-	13 bars @ 55" =	59.58'	19"	-	13 bars @ 55" =	59.58'	19"	-	3 bars @ 162" =	40.50'	2'	407.796	26	6	32	32
62.519	11 bars @ 106" =	97.17'	30"	6"									4 bars @ 66" =	22.00'	2'	160.645		8	8	8
TOTALS:	**85 bars**	**518'**			**26 bars**	**148'**			**26 bars**	**153'**			**16 bars**	**144'**		**1327 Lbs**	**52**	**32**	**84**	**84**
ADDITIONAL QUANTITIES:	**20 bars**	**100'**			**10 bars**	**30'**			**10 bars**	**30'**			**-**	**30'**		**270 Lbs**	**10**	**10**	**20**	**20**
GRAND TOTALS:	**105 bars**	**618'**			**36 bars**	**178'**			**36 bars**	**183'**			**16 bars**	**174'**		**1597 Lbs**	**62**	**42**	**104**	**104**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 NB

DMI	NB PASSING LANE L Ft	NB PASSING LANE W Ft	NB DRIVING LANE L Ft	NB DRIVING LANE W Ft	CRCP REPAIR SqYds
64.564			4	4	1.8
64.816			4	4	1.8
64.935			4	4	1.8
64.939	6	4			2.7
64.950	4	4			1.8
64.979			4	4	1.8
64.986	25	4			11.1
64.988	8	4	10	4	8.0
64.998			10	4	4.4
65.037			20	4	8.9
65.039	20	4			8.9
65.066	10	4	10	4	8.9
65.070			12	4	5.3
65.108	6	4	6	4	5.3
65.197	8	4			3.6
65.210	4	4			1.8
65.216	4	4			1.8
65.238			10	4	4.4
65.600			8	4	3.6
65.606			15	4	6.7
65.619	10	4	10	4	8.9
65.716	4	4			1.8
65.725	10	4			4.4
65.736			10	4	4.4
65.746	4	4			1.8
65.784	4	4			1.8
65.791	6	4			2.7
65.803	4	4			1.8
65.816	15	4			6.7
65.848			4	4	1.8
65.856	4	4	6	4	4.4
65.966	8	4			3.6
66.062	6	4	4	4	4.4
66.128	16	4			7.1
66.225	10	4			4.4
TOTALS:					**154.4**
ADDITIONAL QUANTITIES:					**30.0**
GRAND TOTALS:					**184.4**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	38	63

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 NB

	NB PASSING LANE		NB DRIVING LANE		
DMI	L Ft	W Ft	L Ft	W Ft	CRCP REPAIR SqYds
66.415			4	4	1.8
66.436	6	4			2.7
66.446	6	4			2.7
66.459	4	4	8	4	5.3
66.506			4	4	1.8
66.519	4	4			1.8
66.529	4	4			1.8
66.571			4	4	1.8
66.580			10	4	4.4
66.703	4	4			1.8
66.728	8	4			3.6
66.788	10	4			4.4
66.796			20	4	8.9
66.925	30	4			13.3
66.932			8	4	3.6
66.959			15	4	6.7
66.968			4	4	1.8
66.974			4	4	1.8
67.004			28	4	12.4
67.016			12	14	18.7
67.021			4	4	1.8
67.023	25	4			11.1
67.029	30	4	6	14	22.7
67.033			15	4	6.7
67.161			60	4	26.7
67.173			40	4	17.8
67.182	30	4			13.3
67.199	50	4			22.2
67.209			6	8	5.3
67.211	20	4	4	4	10.7
67.214			10	8	8.9
67.224	40	4	8	8	24.9
67.245			4	4	1.8
67.264	20	4			8.9
67.269	15	4	4	4	8.4
67.275	4	4	15	4	8.4
67.290			14	4	6.2
67.303			16	4	7.1
67.315	4	4	4	4	3.6
67.322	20	4			8.9
67.343			6	4	2.7
67.396	4	4			1.8
67.400	4	4			1.8
67.536			15	4	6.7
67.544			10	4	4.4
67.571			4	4	1.8
67.576			10	4	4.4
67.591	6	4	8	4	6.2
67.631			6	4	2.7
67.635			4	4	1.8
67.646	4	4			1.8
67.673	8	4	14	4	9.8
67.686	4	4	10	4	6.2
67.747			10	4	4.4
67.752			8	4	3.6
67.760			8	4	3.6
67.766			10	10	11.1
67.769			20	6	13.3
67.781			20	6	13.3
67.790			10	4	4.4
67.798			6	4	2.7
67.813			14	4	6.2
67.841			20	4	8.9
67.853			8	6	5.3
67.858			4	14	6.2
67.862	8	4			3.6
67.870			6	6	4.0
67.875	20	4			8.9
67.883			10	4	4.4
67.911	8	4	20	4	12.4
67.942			20	4	8.9
67.949			20	4	8.9
68.000			8	4	3.6
68.002			10	4	4.4
68.029			45	4	20.0
68.040			18	4	8.0
TOTALS:					**548.7**
ADDITIONAL QUANTITIES:					**110.0**
GRAND TOTALS:					**658.7**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 NB

	REINFORCING STEEL (CRCP) FOR NB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)														INSERT STEEL BAR IN PCC PAVEMENT (CRCP) NB DRIVING LANE			
DMI	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	INSERT STEEL BAR IN CRCP TOTAL Each
67.016	28 bars @ 122" =	284.67'	30"	14"	14 bars @ 90" =	105.00'	30"	14"	14 bars @ 102" =	119.00'	30"	14"	4 bars @ 162" =	54.00'	2'	800.094	28	8	36	36
67.029	28 bars @ 62" =	144.67'	19"	-	14 bars @ 55" =	64.17'	19"	-	14 bars @ 55" =	64.17'	19"	-	3 bars @ 162" =	40.50'	2'	437.115	28	6	34	34
67.209	16 bars @ 62" =	82.67'	19"	-									3 bars @ 90" =	22.50'	2'	139.200		6	6	6
67.214	16 bars @ 106" =	141.33'	30"	6"									4 bars @ 90" =	30.00'	2'	232.318		8	8	8
67.224	16 bars @ 84" =	112.00'	26"	-									3 bars @ 90" =	22.50'	2'	183.254		6	6	6
67.766	20 bars @ 106" =	176.67'	30"	6"									4 bars @ 114" =	38.00'	2'	290.742		8	8	8
67.769	12 bars @ 218" =	218.00'	30"	14"									8 bars @ 66" =	44.00'	2'	356.828		16	16	16
67.781	12 bars @ 218" =	218.00'	30"	14"									8 bars @ 66" =	44.00'	2'	356.828		16	16	16
67.853	12 bars @ 84" =	84.00'	26"	-									3 bars @ 66" =	16.50'	2'	137.190		6	6	6
67.858	28 bars @ 0" =	0.00'	30"	-									2 bars @ 162" =	27.00'	2'	18.036		4	4	4
67.870	12 bars @ 62" =	62.00'	19"	-									3 bars @ 66" =	16.50'	2'	104.146		6	6	6
TOTALS:	**200 bars**	**1524'**			**28 bars**	**169'**			**28 bars**	**183'**			**45 bars**	**356'**		**3056 Lbs**	**56**	**90**	**146**	**146**
ADDITIONAL QUANTITIES:	**40 bars**	**300'**			**10 bars**	**30'**			**10 bars**	**40'**			**10 bars**	**70'**		**610 Lbs**	**10**	**20**	**30**	**30**
GRAND TOTALS:	**240 bars**	**1824'**			**38 bars**	**199'**			**38 bars**	**223'**			**55 bars**	**426'**		**3666 Lbs**	**66**	**110**	**176**	**176**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	40	63

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 NB

DMI	NB PASSING LANE L Ft	NB PASSING LANE W Ft	NB DRIVING LANE L Ft	NB DRIVING LANE W Ft	CRCP REPAIR SqYds
68.275			8	14	12.4
68.305			6	8	5.3
68.584			8	4	3.6
68.709			6	4	2.7
68.722			12	4	5.3
68.804			14	4	6.2
68.832			8	4	3.6
68.855	4	4			1.8
68.862	40	4			17.8
69.063	6	4			2.7
69.177	6	4			2.7
69.192	12	4			5.3
69.216			15	4	6.7
69.305	4	4			1.8
69.332	15	6	25	6	26.7
69.341	12	4			5.3
69.383	10	4			4.4
69.387	4	4			1.8
69.393			8	4	3.6
69.400	10	4			4.4
69.410	4	4			1.8
69.417	8	4	15	4	10.2
69.440	6	4			2.7
69.447			4	4	1.8
69.463	20	4	4	4	10.7
69.470	20	4	20	4	17.8
69.489	16	4			7.1
69.518			50	4	22.2
69.567	10	4	10	4	8.9
69.599	10	4			4.4
69.607	10	4			4.4
69.612	10	4			4.4
69.635	8	4			3.6
69.652	30	4			13.3
69.709	6	4			2.7
69.911	15	4			6.7
70.014			4	4	1.8
TOTALS:					**248.6**
ADDITIONAL QUANTITIES:					**50.0**
GRAND TOTALS:					**298.6**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 NB

	REINFORCING STEEL (CRCP) FOR NB PASSING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)								INSERT STEEL BAR IN PCC PAVEMENT (CRCP) NB PASSING LANE		REINFORCING STEEL (CRCP) FOR NB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)													INSERT STEEL BAR IN PCC PAVEMENT (CRCP) NB DRIVING LANE			
DMI	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	INSERT STEEL BAR IN CRCP TOTAL Each
68.275											28 bars @ 84" =	196.00'	26"	-	14 bars @ 70" =	81.67'	26"	-	14 bars @ 70" =	81.67'	26"	-	3 bars @ 162" =	40.50'	2'	566.783	28	6	34	34
68.305											16 bars @ 62" =	82.67'	19"	-									3 bars @ 90" =	22.50'	2'	139.200		6	6	6
69.332	12 bars @ 158" =	158.00'	30"	14"	6 bars @ 66" =	33.00'	2'	259.360	12	12	12 bars @ 278" =	278.00'	30"	14"									11 bars @ 66" =	60.50'	2'	457.970		22	22	34
TOTALS:	**12 bars**	**158'**			**6 bars**	**33'**		**259 Lbs**	**12**	**12**	**56 bars**	**557'**			**14 bars**	**82'**			**14 bars**	**82'**			**17 bars**	**124'**		**1164 Lbs**	**28**	**34**	**62**	**74**
ADDITIONAL QUANTITIES:	**-**	**30'**			**-**	**10'**		**50 Lbs**	**-**	**-**	**10 bars**	**110'**			**-**	**20'**			**-**	**20'**			**-**	**20'**		**230 Lbs**	**10**	**10**	**20**	**20**
GRAND TOTALS:	**12 bars**	**188'**			**6 bars**	**43'**		**309 Lbs**	**12**	**12**	**66 bars**	**667'**			**14 bars**	**102'**			**14 bars**	**102'**			**17 bars**	**144'**		**1394 Lbs**	**38**	**44**	**82**	**94**

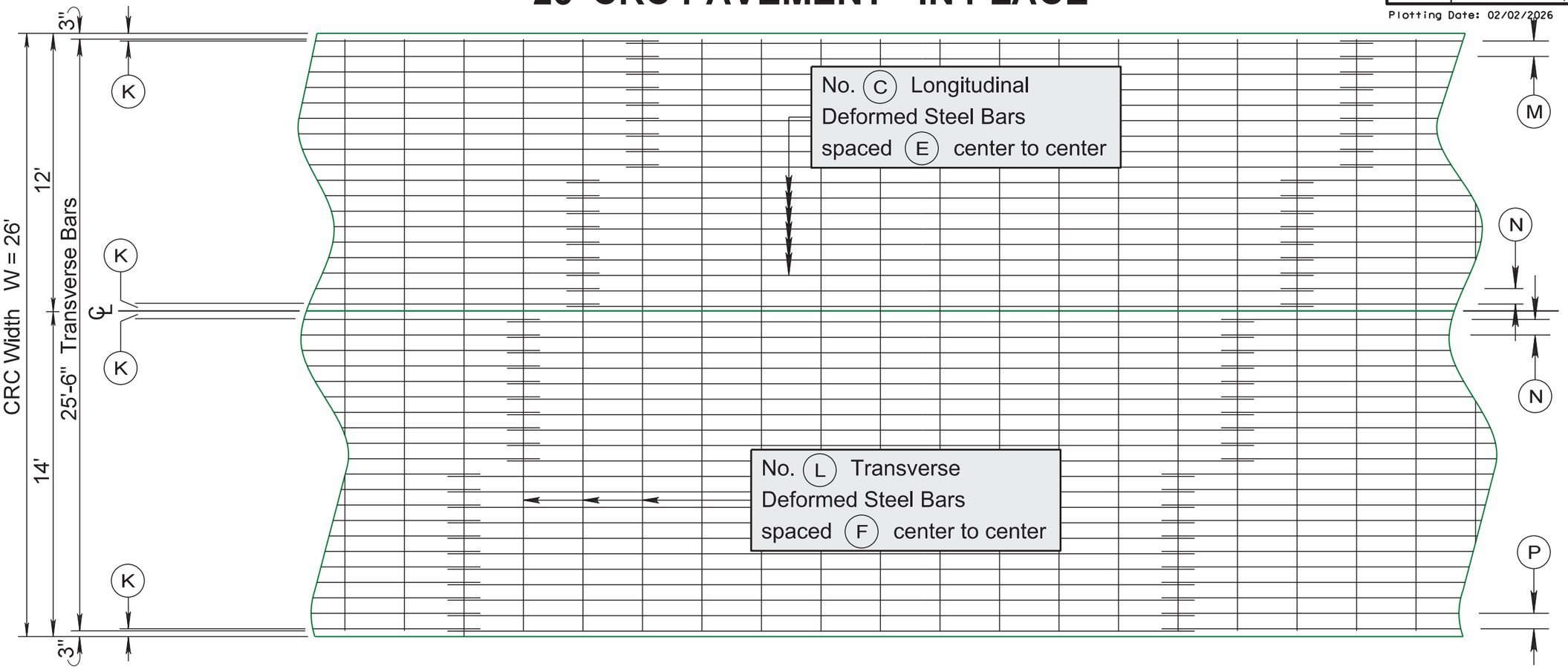
TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 NB

DMI	NB PASSING LANE L Ft	NB PASSING LANE W Ft	NB DRIVING LANE L Ft	NB DRIVING LANE W Ft	CRCP REPAIR SqYds
70.099			4	4	1.8
70.118	4	4			1.8
70.127	6	4	6	6	6.7
70.158			8	4	3.6
70.169			25	4	11.1
70.213			15	4	6.7
70.266	10	4			4.4
70.324			10	4	4.4
70.368	30	4			13.3
70.391			15	4	6.7
70.423			4	4	1.8
70.482	4	4			1.8
70.487			4	4	1.8
TOTALS:					**65.9**
ADDITIONAL QUANTITIES:					**10.0**
GRAND TOTALS:					**75.9**

TABLE FOR CRC PAVEMENT REPAIR ON I29 - PCN 09X5 NB

	REINFORCING STEEL (CRCP) FOR NB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)								INSERT STEEL BAR IN PCC PAVEMENT (CRCP) NB DRIVING LANE		
DMI	No. 6 Longitudinal Bars to be lap spliced with existing bars # bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars # bars @ length	Length	New Trans Bar Spacing	Reinforcing Steel Lbs	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	INSERT STEEL BAR IN CRCP TOTAL Each
70.127	12 bars @ 62" =	62.00'	19"	-	3 bars @ 66" =	16.50'	2'	104.146	6	6	6
TOTALS:	**12 bars**	**62'**			**3 bars**	**17'**		**104 Lbs**	**6**	**6**	**6**
ADDITIONAL QUANTITIES:	**-**	**10'**			**-**	**-**		**20 Lbs**	**-**	**-**	**-**
GRAND TOTALS:	**12 bars**	**72'**			**3 bars**	**17'**		**124 Lbs**	**6**	**6**	**6**

26' CRC PAVEMENT - IN PLACE

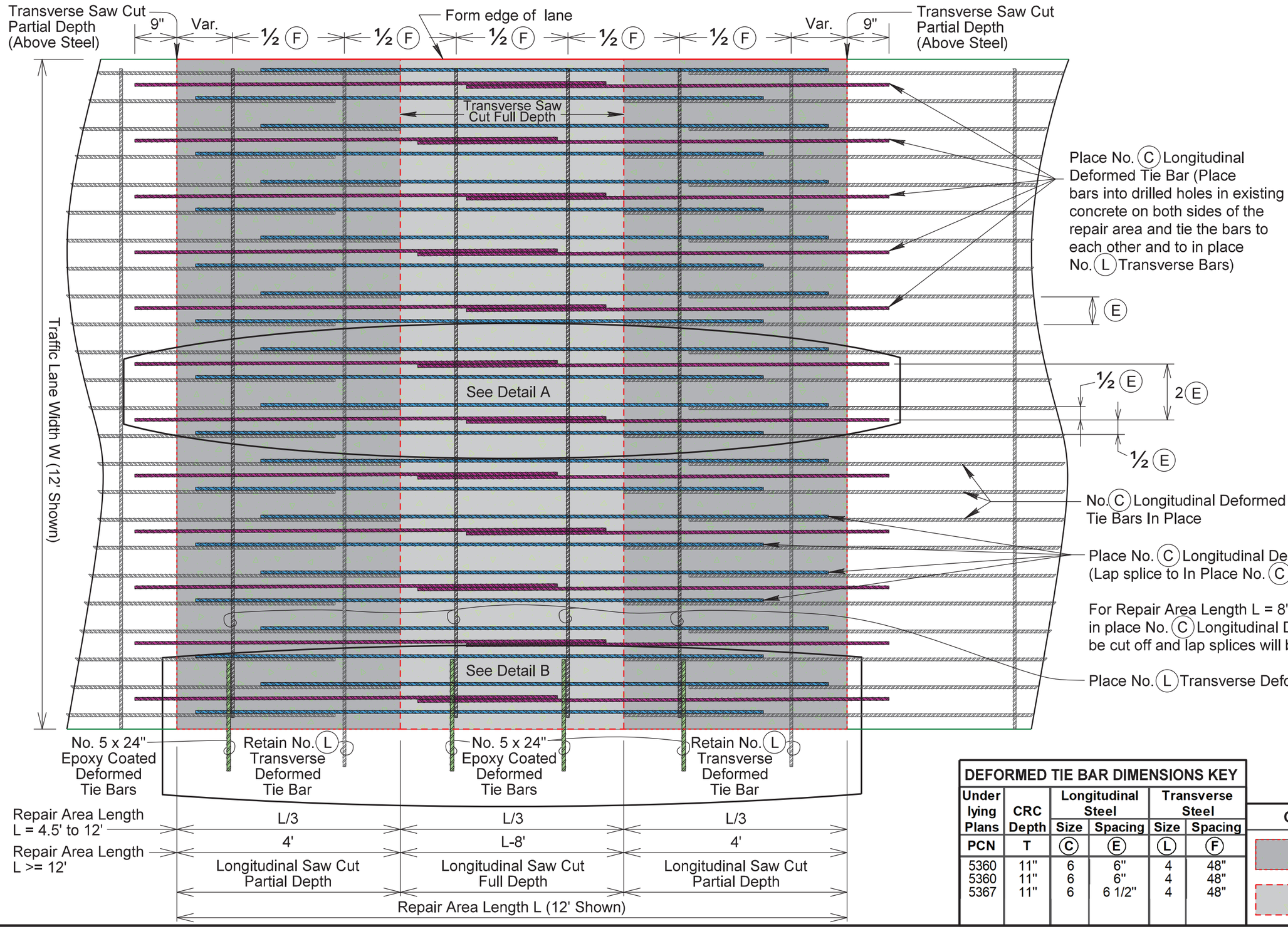


MITCHELL REGION INTERSTATE CRC PAVEMENT KEY & DIMENSIONS	Underlying Plans	CRC Depth	CRC Width	Longitudinal Steel Size	Longitudinal Steel Spacing	Transverse Steel Size	Transverse Steel Spacing	Perimeter Bar Spacing			
Location	PCN	T	W	C	E	L	F	K	M	N	P
I29N MRM 61.00 +0.888 to 72.00 +0.866 & I29S MRM 61.00 +0.888 to 62.00 +0.443	5360	11"	26'	6	6"	4	48"	4"	5"	5"	5"
I29S MRM 62.00 +0.443 to MRM 72.00 +0.875	5367	11"	26'	6	6½"	4	48"	3¾"	6½"	6½"	4½"

CRC PAVEMENT REPAIR (FULL LANE WIDTH) - TYPICAL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	45	63

Plotting Date: 01/21/2026



DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	C	E	L	F
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"
5367	11"	6	6 1/2"	4	48"

CRC REPAIR AREA KEY

- Remove Concrete Retain Reinforcing Steel
- Remove Concrete Remove Reinforcing Steel

PLOT SCALE - 1:1.7

PLOTTED FROM - TRSF12133

PLOT NAME - 1

FILE - ...\CRC FULL WIDTH REPAIR.DGN

CRC PAVEMENT REPAIR (FULL LANE WIDTH)

Detail A

Composite bar length will be 18" longer than the length of the repair area and centered into the drilled holes.

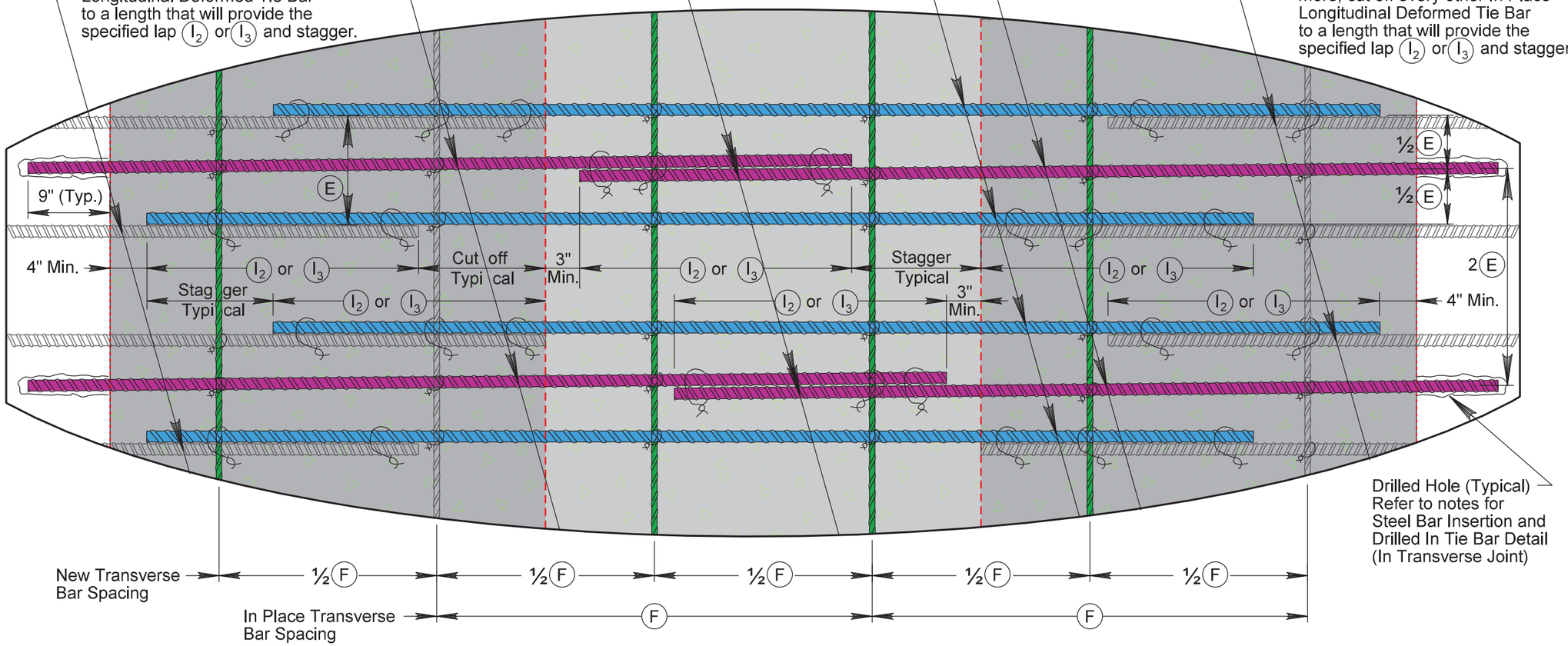
Place (G) No. (C) Longitudinal Deformed Tie Bars spaced (E) center to center. Bars will be staggered as shown. Lap new bars with in place bars.

Place (H_1) No. (C) Longitudinal Deformed Tie Bars spaced 2 (E) center to center. Bars will be inserted 9" into drilled holes in the existing concrete. Lap (H_1) bars with (H_2) bars.

Place (H_2) No. (C) Longitudinal Deformed Tie Bars spaced 2 (E) center to center. Bars will be inserted 9" into drilled holes in the existing concrete. Lap (H_2) bars with (H_1) bars.

For Repair Area Length L = 8' or more, cut off every other In Place Longitudinal Deformed Tie Bar to a length that will provide the specified lap (l_2) or (l_3) and stagger.

For Repair Area Length L = 8' or more, cut off every other In Place Longitudinal Deformed Tie Bar to a length that will provide the specified lap (l_2) or (l_3) and stagger.



DEFORMED TIE BAR KEY

- No. (C) Longitudinal Deformed Tie Bar In Place (Retain)
- Place No. (C) Longitudinal Deformed Tie Bar (Tie to In Place No. (C) Longitudinal Bars)
- Place No. (C) Longitudinal Deformed Tie Bar (Place bars into drilled holes in existing concrete on both sides of the repair area and tie the bars to each other and to No. (L) Transverse Bars)
- No. (L) Transverse Deformed Tie Bar In Place (Retain)
- Place No. (L) Transverse Deformed Tie Bar (Tie to No. (C) Longitudinal Bars)

Note: All lapped bars will have a minimum of two ties per lap.

DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"
5367	11"	6	6 1/2"	4	48"

LAP SPLICE LENGTH KEY

- (l_1) Lap Splice length for Repair Area Length L < 4.5' (Not Available).
- (l_2) Lap Splice length for Repair Area Length L = 4.5' to 8'.
- (l_3) Lap Splice length for Repair Area Length L > 8'.

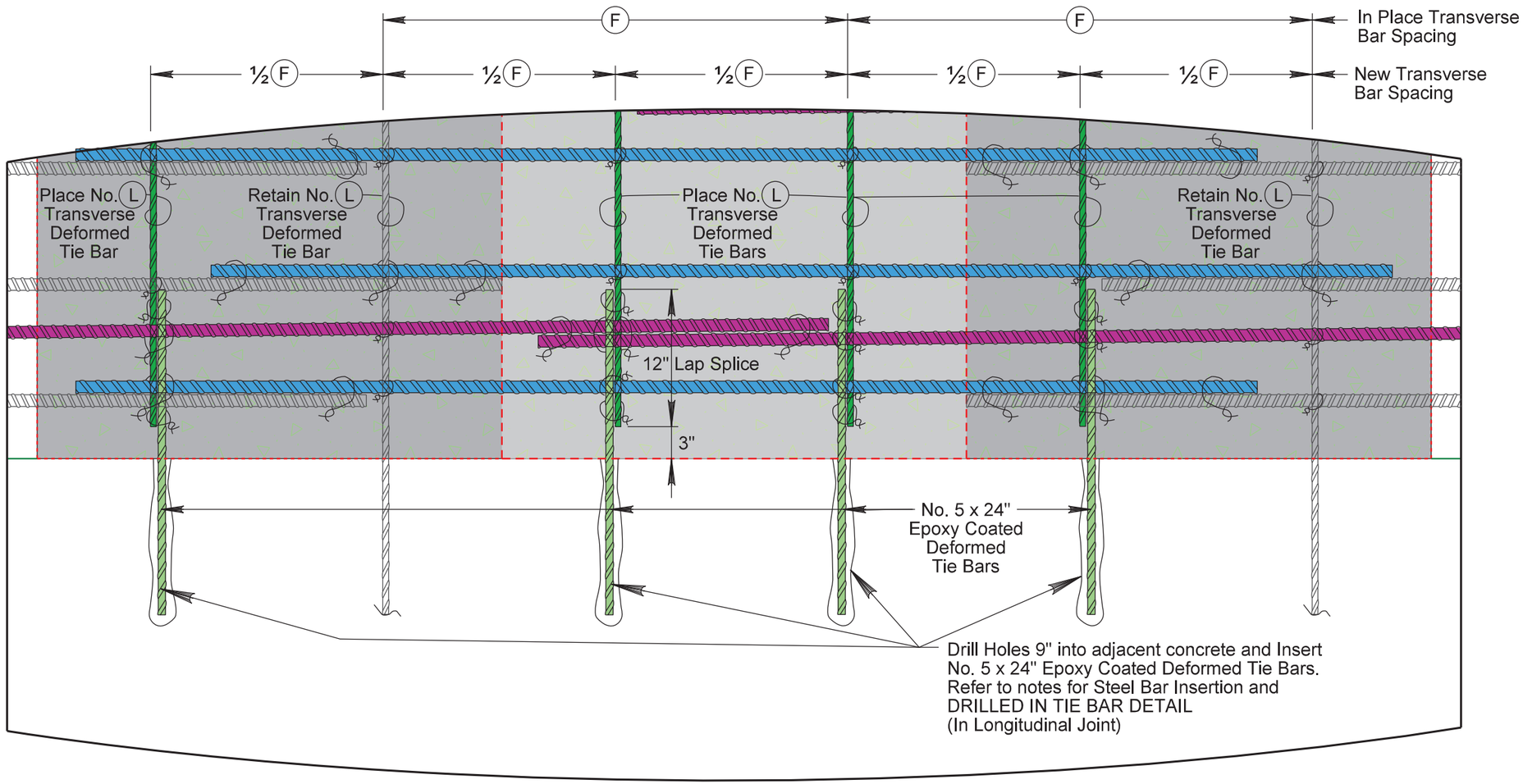
See CRC Pavement Repair - Reinforcing Steel Details for Longitudinal Bar Counts: (G), (H_1) & (H_2)

CRC REPAIR AREA KEY

- Remove Concrete Retain Reinforcing Steel
- Remove Concrete Remove Reinforcing Steel

CRC PAVEMENT REPAIR (FULL LANE WIDTH)

Detail B



DEFORMED TIE BAR KEY

- No. (C) Longitudinal Deformed Tie Bar In Place (Retain)
- Place No. (C) Longitudinal Deformed Tie Bar (Tie to In Place No. (C) Longitudinal Bars)
- Place No. (C) Longitudinal Deformed Tie Bar (Place bars into drilled holes in existing concrete on both sides of the repair area and tie the bars to each other and to No. (L) Transverse Bars)
- No. (L) Transverse Deformed Tie Bar In Place (Retain)
- Place No. (L) Transverse Deformed Tie Bar (Tie to No. (C) Longitudinal Bars)

DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"
5367	11"	6	6 1/2"	4	48"

Note: All lapped bars will have a minimum of two ties per lap.

CRC REPAIR AREA KEY

- Remove Concrete Retain Reinforcing Steel
- Remove Concrete Remove Reinforcing Steel

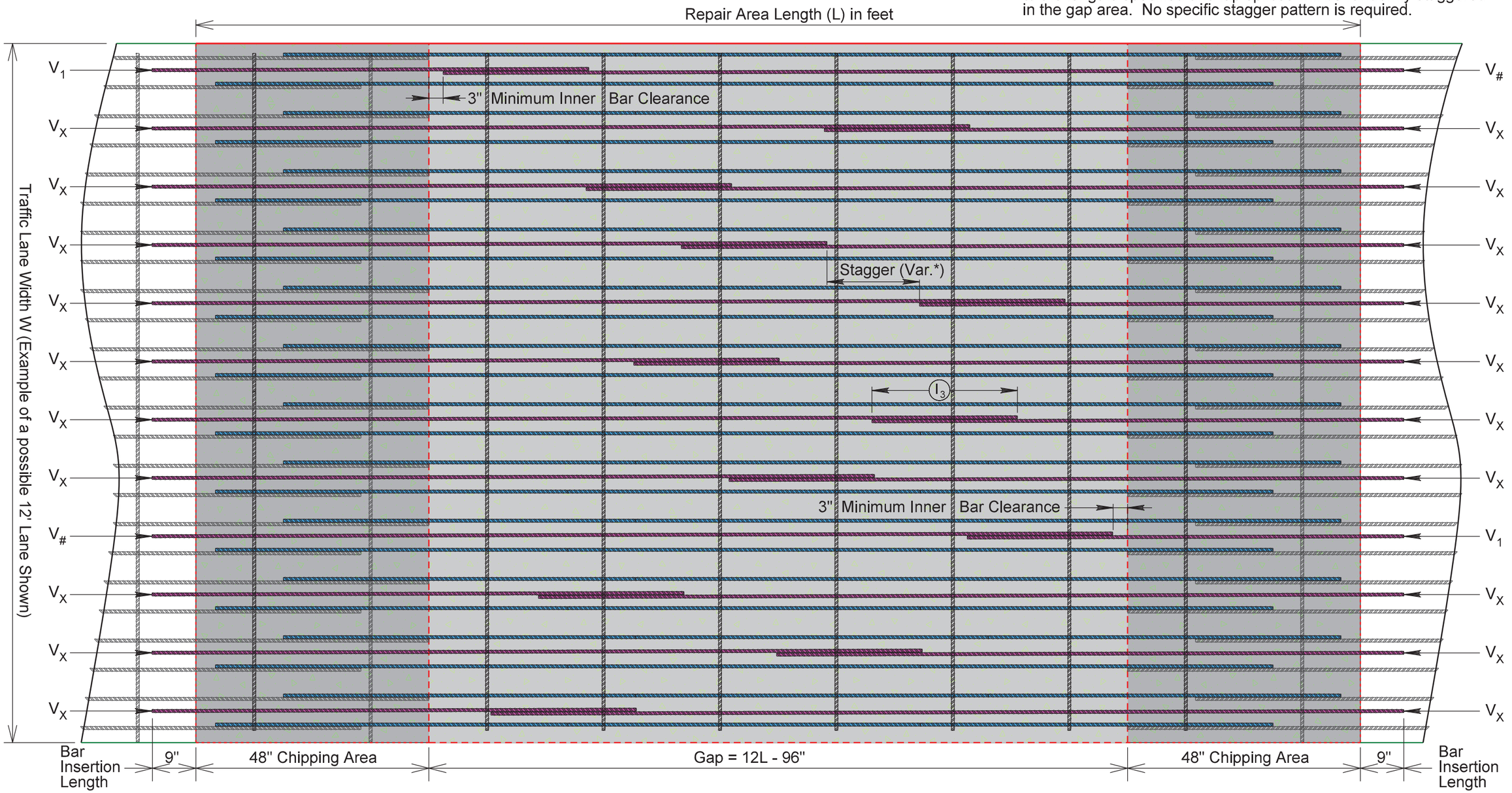
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	48	63

Plotting Date: 01/13/2026

CRC PAVEMENT REPAIR - INSERTED LONGITUDINAL BAR LENGTHS

(For Full Width Repair Area Length L >= 16') - TYPICAL

* In order to minimize concentration of steel, bar lengths will be cut to the lengths specified and lap splices will be randomly staggered in the gap area. No specific stagger pattern is required.

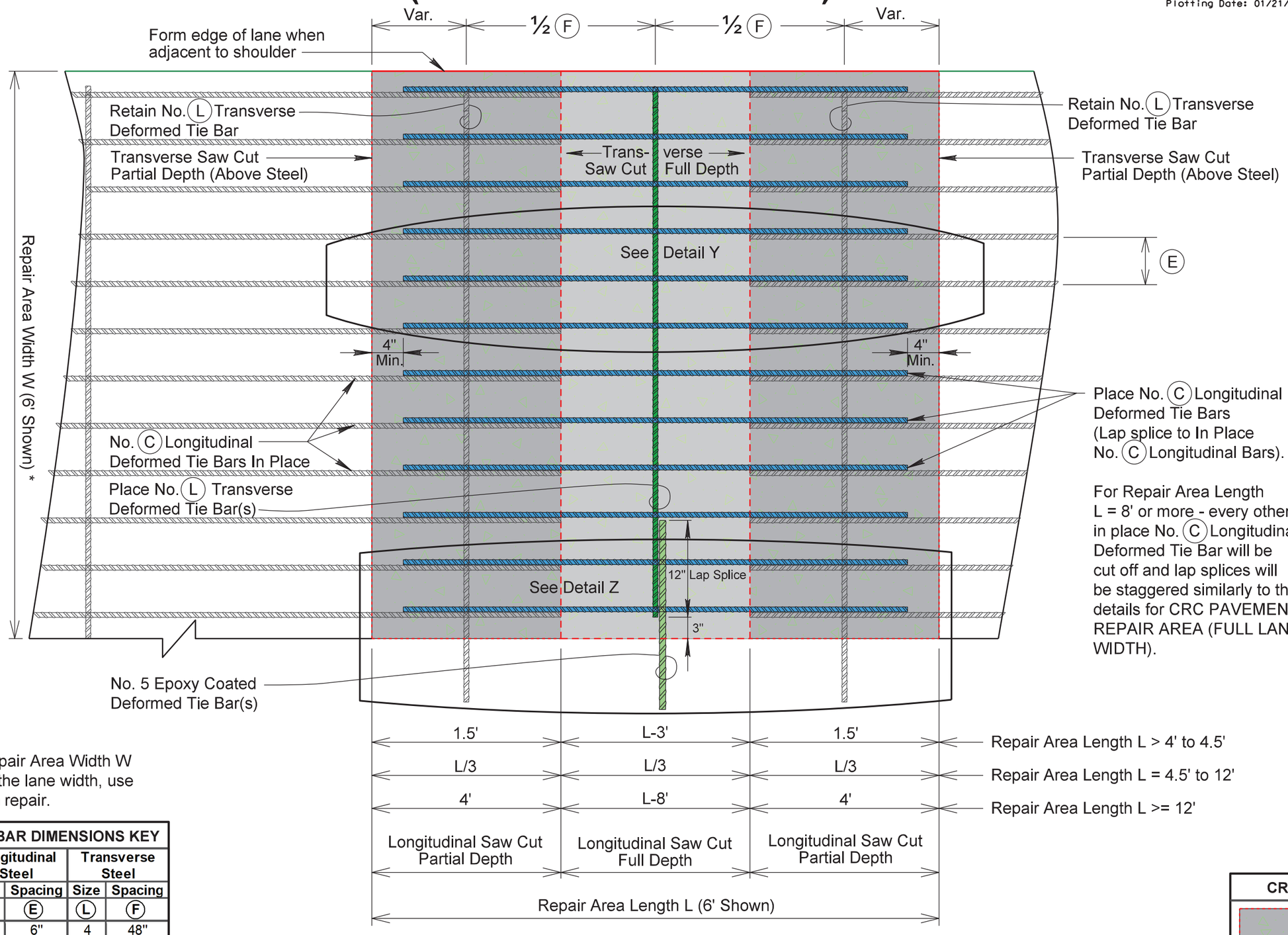


V_1 = Shortest Bar Length	$V_\#$ = Longest Bar Length	V_X = Any Other Inserted Longitudinal Bar Length	LAP SPLICE LENGTH KEY	CRC REPAIR AREA KEY
V_1 = Bar Insertion Length 9" + Chipping Area +48" + Inner Bar Clearance +3" + Lap Splice Length +I_3	$V_\#$ = Bar Insertion Length +9" + Chipping Area +48" + Gap +12L - 96" - Inner Bar Clearance - 3"	$V_X = V_1 + \frac{(X-1) \times (V_\# - V_1)}{(\# - 1)}$ where X is the number of any bar from the shortest to the longest, and where # is the number of bars required on each side of the repair area.	I_3 Lap Splice Length For CRC Depth < 11" I_3 = 25" For CRC Depth >= 11" I_3 = 30"	Remove Concrete Retain Reinforcing Steel Remove Concrete Remove Reinforcing Steel
V_1 = 60" + I_3	$V_\#$ = 12L - 42"			

CRC PAVEMENT REPAIR (PARTIAL LANE WIDTH) - TYPICAL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	49	63

Plotting Date: 01/21/2026



* When the Repair Area Width W exceeds half the lane width, use full lane width repair.

DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"
5367	11"	6	6 1/2"	4	48"

CRC REPAIR AREA KEY

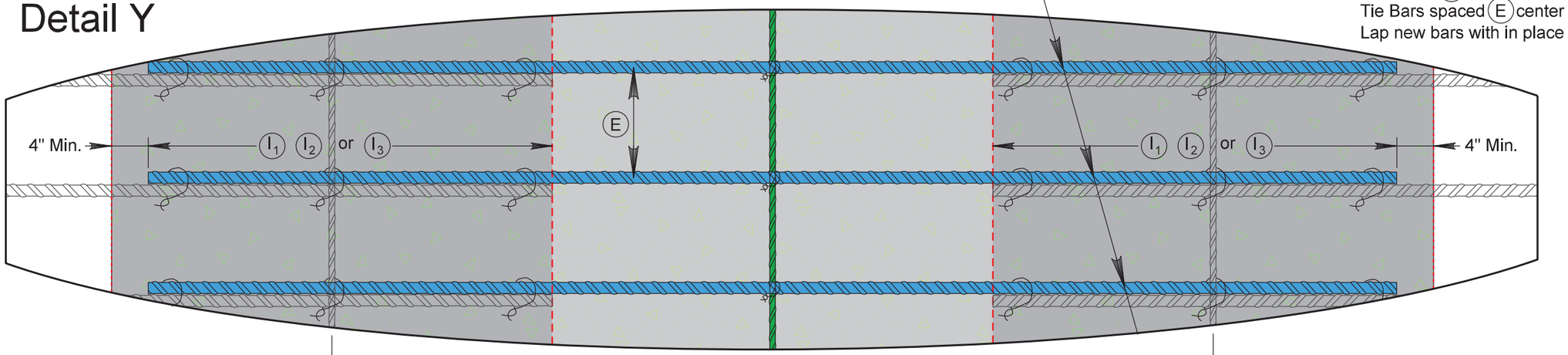
- Remove Concrete Retain Reinforcing Steel
- Remove Concrete Remove Reinforcing Steel

CRC PAVEMENT REPAIR (PARTIAL LANE WIDTH)

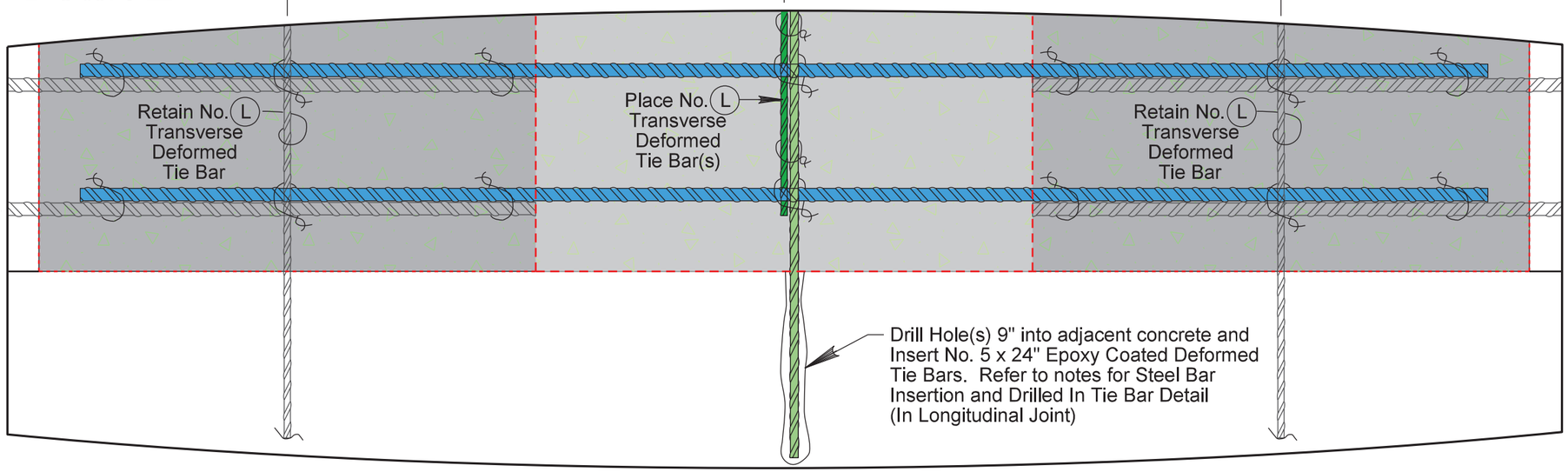
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	50	63

Plotting Date: 01/21/2026

Detail Y



Detail Z



For Repair Area Length L = 8' or more - every other in place No. C Longitudinal Deformed Tie Bar will be cut off and lap splices will be staggered similarly to the details for CRC PAVEMENT REPAIR AREA (FULL LANE WIDTH).

DEFORMED TIE BAR DIMENSIONS KEY

- No. L Transverse Deformed Tie Bar In Place (Retain)
- Place No. L Transverse Deformed Tie Bar (Tie to No. C Longitudinal Bars)
- No. C Longitudinal Deformed Tie Bar In Place (Retain)
- Place No. C Longitudinal Deformed Tie Bar (Tie to In Place No. C Longitudinal Bars)

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	C	E	L	F
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"
5367	11"	6	6 1/2"	4	48"

LAP SPLICE LENGTH KEY

- l_1 Lap Splice length for Repair Area Length L = 4' to 4.5'.
- l_2 Lap Splice length for Repair Area Length L = 4.5' to 8'.
- l_3 Lap Splice length for Repair Area Length L > 8'.

Note: All lapped bars will have a minimum of two ties per lap.

CRC REPAIR AREA KEY

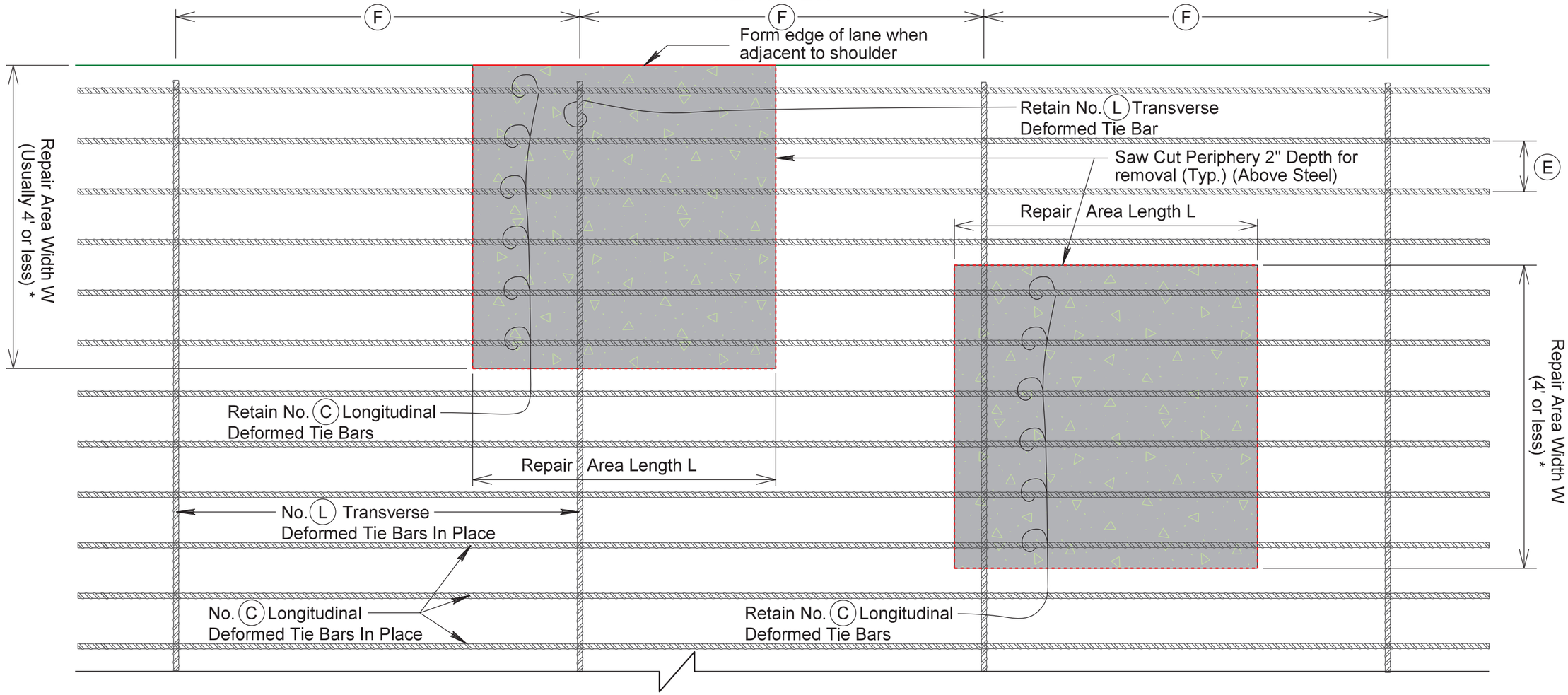
- Remove Concrete Retain Reinforcing Steel
- Remove Concrete Remove Reinforcing Steel

CRC PAVEMENT REPAIR - EXISTING STEEL RETAINED (TYPICAL)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	51	63

Plotting Date: 01/21/2026

PLAN VIEW



* When Repair Width W exceeds 4', usually use partial lane width repair.
When Repair Width W exceeds half the lane width, usually use full lane width repair.

However, a Repair Width W exceeding 4' might be used when doing a small repair adjacent to an existing repair, in order to match the width of the existing repair.

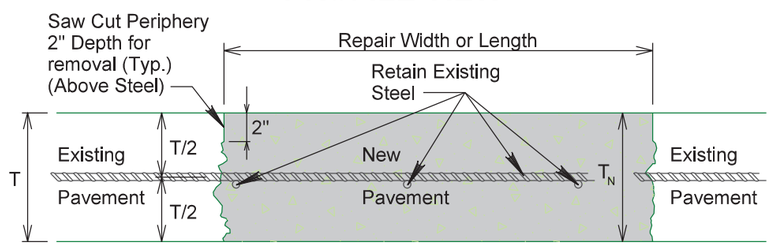
DEFORMED TIE BAR DIMENSIONS KEY

No. L Transverse Deformed Tie Bar In Place (Retain)

No. C Longitudinal Deformed Tie Bar In Place (Retain)

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	C	E	L	F
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"
5367	11"	6	6 1/2"	4	48"

PROFILE VIEW



T = Existing pavement thickness.
T_N = New pavement thickness.

CRC REPAIR AREA KEY

Remove Concrete
Retain Reinforcing Steel

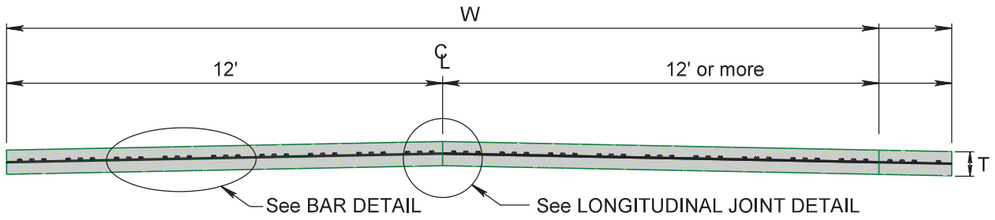
PLOT SCALE - 1:1.06
PLOTTED FROM - TRSF12133
PLOT NAME - 1
FILE - ...\CRC SMALL REPAIR.DGN

CRC PAVEMENT REPAIR - REINFORCING STEEL DETAILS

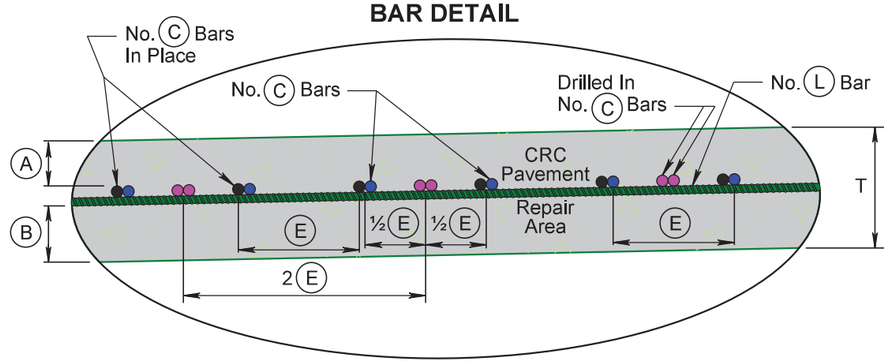
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	52	63

Plotting Date: 01/13/2026

TRANSVERSE SECTION SHOWING STEEL PLACEMENT



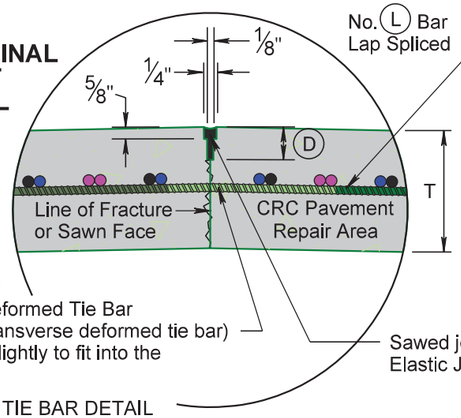
BAR DETAIL



Placement of longitudinal steel bars may vary from +1/2" to -1/2" vertically and 3/4" horizontally.
Placement of transverse steel bars may vary from +1/2" to -1/2" vertically and 2" horizontally.

The transverse deformed steel bars will be positioned on acceptable chairs.

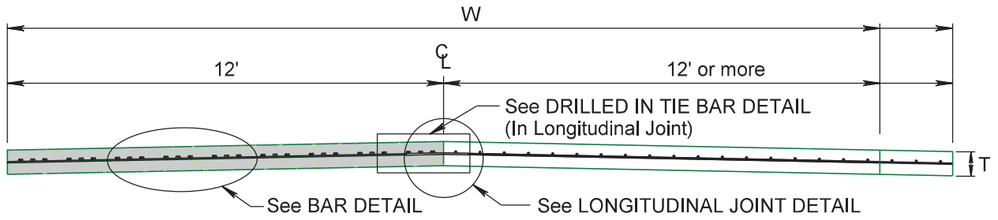
LONGITUDINAL JOINT DETAIL



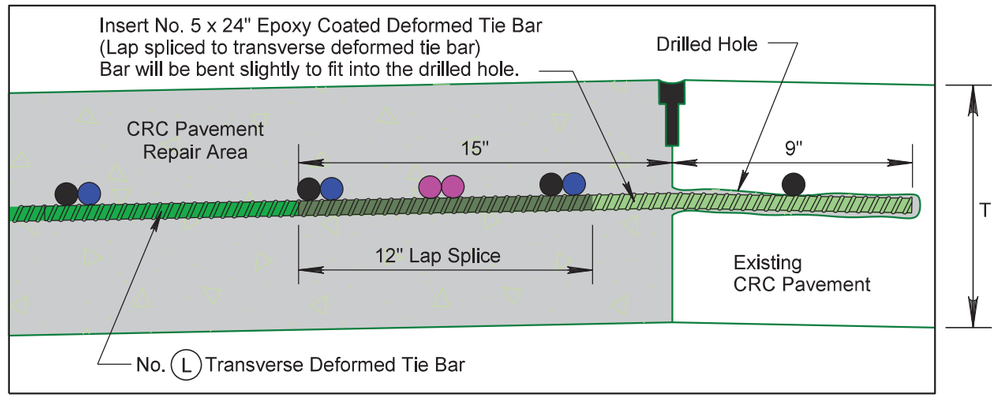
NOTE:

Steel bars for concrete reinforcement will conform to the requirements of Specification M31 (Grade 60) of the AASHTO Standard Specifications for Deformed Billet Steel Bars for Concrete Reinforcement.

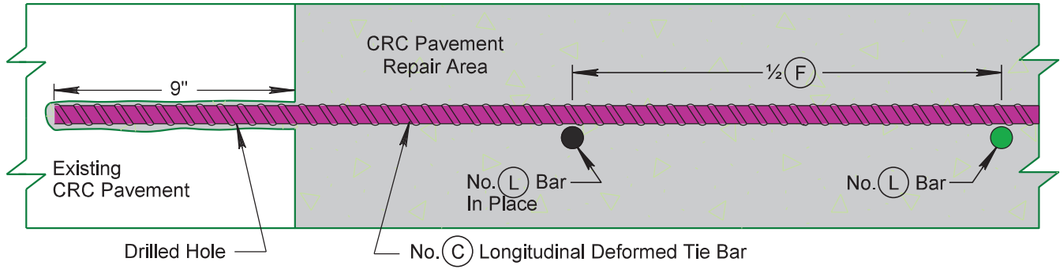
TRANSVERSE SECTION SHOWING STEEL PLACEMENT



DRILLED IN TIE BAR DETAIL (In Longitudinal Joint)



LONGITUDINAL SECTION SHOWING STEEL PLACEMENT
DRILLED IN TIE BAR DETAIL (In Transverse Joint)



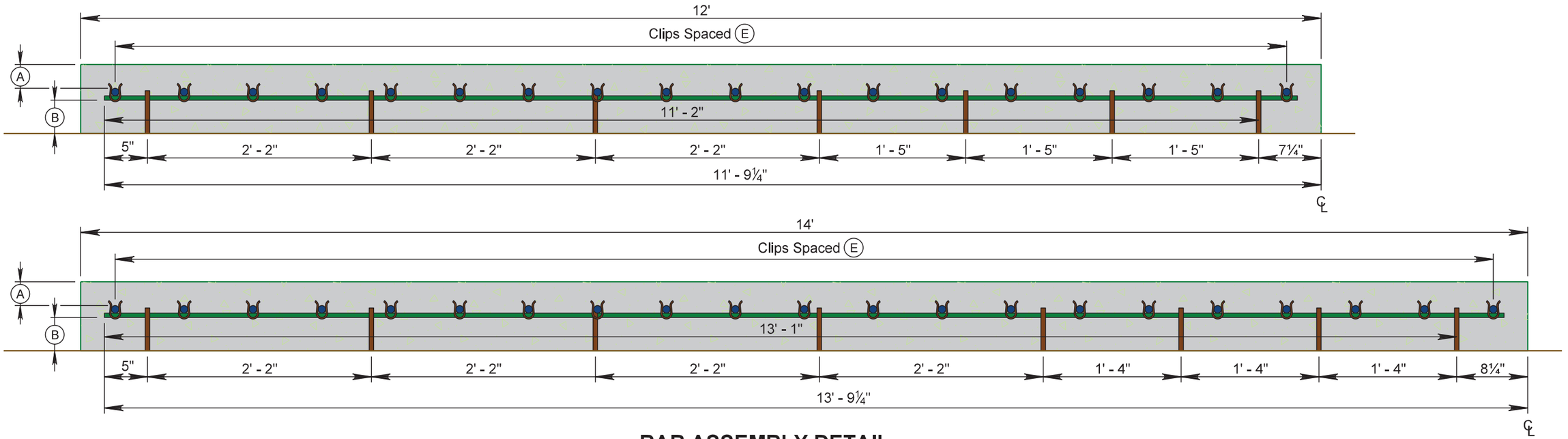
CRC PAVEMENT IN PLACE & CRC PAVEMENT REPAIR KEY & DIMENSIONS

Location	Underlying Plans PCN	CRC Depth T	CRC Width W	Clearance Top A	Clearance Bottom B	Longitudinal Steel Size C	Longitudinal Steel Spacing E	Saw Cut Depth D	Transverse Steel Size L	Transverse Steel Spacing F	Longitudinal Bar Count (full lane width repair) 12' Wide Slab G	12' Wide Slab H_1	12' Wide Slab H_2	14' Wide Slab G	14' Wide Slab H_1	14' Wide Slab H_2	Lap Splice Length (for Repair Length L) L<4.5' l_1	L= 4.5' to 8'/9' l_2	L>=8'/9' l_3	Not Assigned -	Perimeter Bar Spacing K	M	N	P	Chair Width R
I29N MRM 61.00 +0.888 to MRM 72.00 +0.866	5360	11"	26'	4"	5 3/4"	6	6"	2 3/4"	4	48"	24	12	12	28	14	14	14"	14" to 30"	30"	-	4"	5"	5"	5"	5"
I29S MRM 61.00 +0.888 to MRM 62.00 +0.443	5360	11"	26'	4"	5 3/4"	6	6"	2 3/4"	4	48"	24	12	12	28	14	14	14"	14" to 30"	30"	-	4"	5"	5"	5"	5"
I29S MRM 62.00 +0.443 to MRM 72.00 +0.875	5367	11"	26'	4"	5 3/4"	6	6 1/2"	2 3/4"	4	48"	22	11	11	26	13	13	14"	14" to 30"	30"	-	3 3/4"	6 1/2"	6 1/2"	4 1/2"	5"

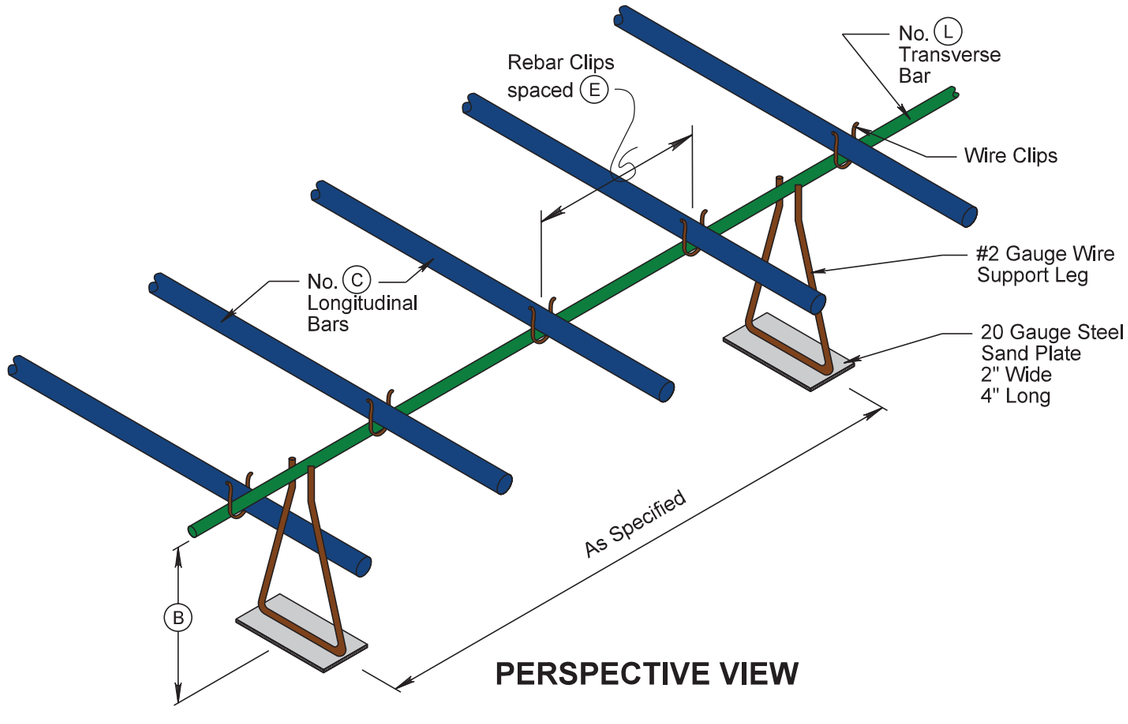
CRC PAVEMENT CHAIR DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	53	63

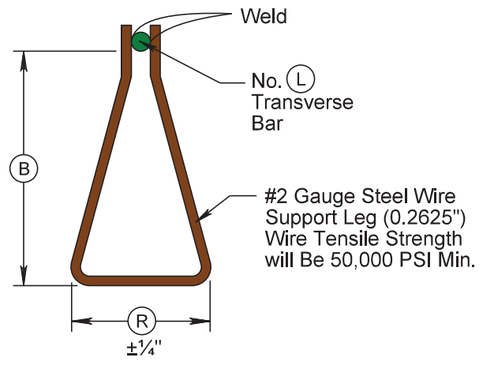
Plotting Date: 01/13/2026



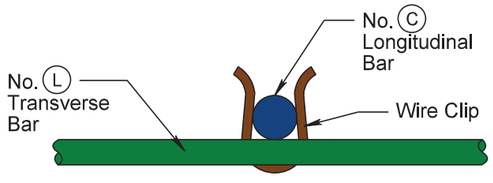
BAR ASSEMBLY DETAIL



PERSPECTIVE VIEW



CHAIR DETAIL



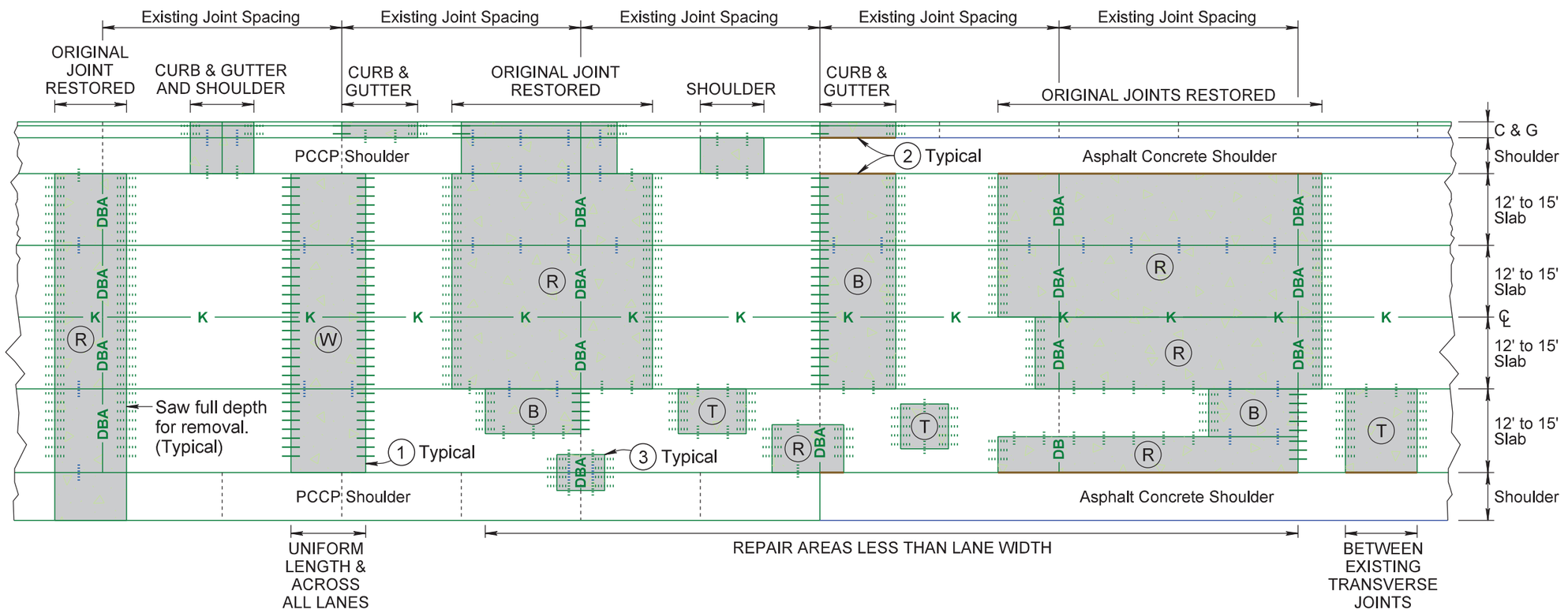
CLIP DETAIL

DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	CRC Width	Clearance		Longitudinal Steel		Saw Cut Depth	Transverse Steel		Chair Width
			Top	Bottom	Size	Spacing		Size	Spacing	
PCN	T	W	A	B	C	E	D	L	F	R
5360	11"	26'	4"	5 3/4"	6	6"	2 3/4"	4	48"	5"
5360	11"	26'	4"	5 3/4"	6	6"	2 3/4"	4	48"	5"
5367	11"	26'	4"	5 3/4"	6	6 1/2"	2 3/4"	4	48"	5"

NONREINFORCED PCC PAVEMENT REPAIR

UP TO FOUR LANE ROADWAY OR UP TO EIGHT LANE DIVIDED ROADWAY
TYPICAL REPAIR AREAS



KEY:

PCC Pavement Repair Area

PCC PAVEMENT REPAIR AREA TYPES:

(W) Two Working Joints (Use only if repair is full roadway width and uniform length (across all lanes))

(T) Two Tied Joints

(B) One Working & One Tied Joint

(R) Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

Longitudinal Keyway Joints Without Bars

— K — Where a repair area intersects an existing longitudinal keyway joint without tie bars, the newly constructed joint should also be a keyway without tie bars.

Steel Bars for Transverse Joints

Pavement Thickness >= 10.5"

— Drilled in 1½" x 18" epoxy coated plain round dowel bars spaced 18" center to center.

..... Drilled in No. 11 x 18" epoxy coated deformed tie bars spaced 18" center to center.

Pavement Thickness >= 8.5" and < 10.5"

— Drilled in 1¼" x 18" epoxy coated plain round dowel bars spaced 18" center to center.

..... Drilled in No. 9 x 18" epoxy coated deformed tie bars spaced 18" center to center.

Pavement Thickness < 8.5"

— Drilled in 1" x 18" epoxy coated plain round dowel bars spaced 18" center to center.

..... Drilled in No. 8 x 18" epoxy coated deformed tie bars spaced 18" center to center.

DBA Dowel Bar Assembly

Steel Bars for Longitudinal Joints

No. 5 x 30" epoxy coated deformed tie bars.
Sawed Joint - spaced 48" center to center.
Construction Joint - spaced 48" center to center.

No. 5 x 24" epoxy coated deformed tie bars.
Drilled In - spaced 30" center to center.

NOTES: Saw around repair areas full depth for removal.

(1) Where possible, transverse joints will be constructed/maintained full roadway width.

(2) Edges of repair areas will be formed to match the width of the existing concrete pavement.

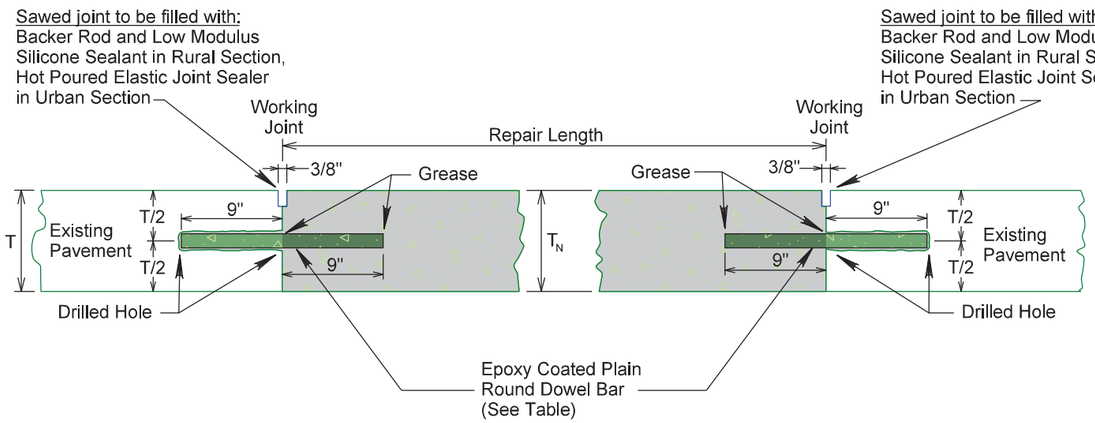
(3) Need for bars in small repair areas on/near the shoulder to be determined on a case-by-case basis, on construction by the Engineer.

NONREINFORCED PCC PAVEMENT REPAIR

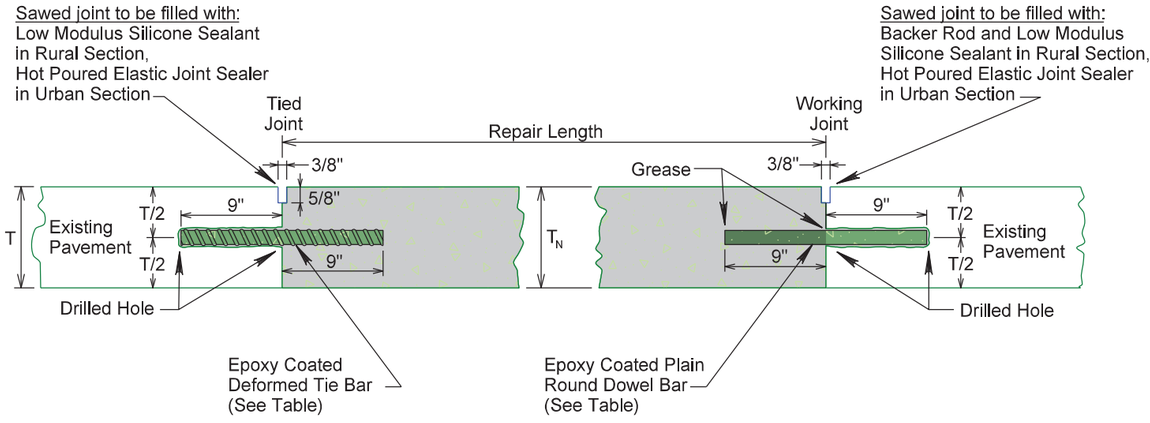
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	55	63

Plotting Date: 01/13/2026

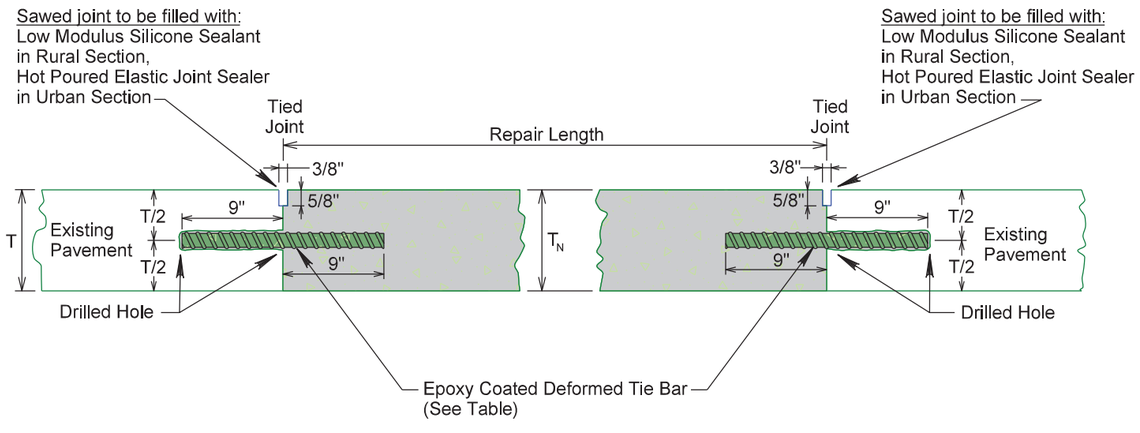
PLAIN ROUND DOWEL BAR INSERTION
TYPE W - (TWO WORKING JOINTS)



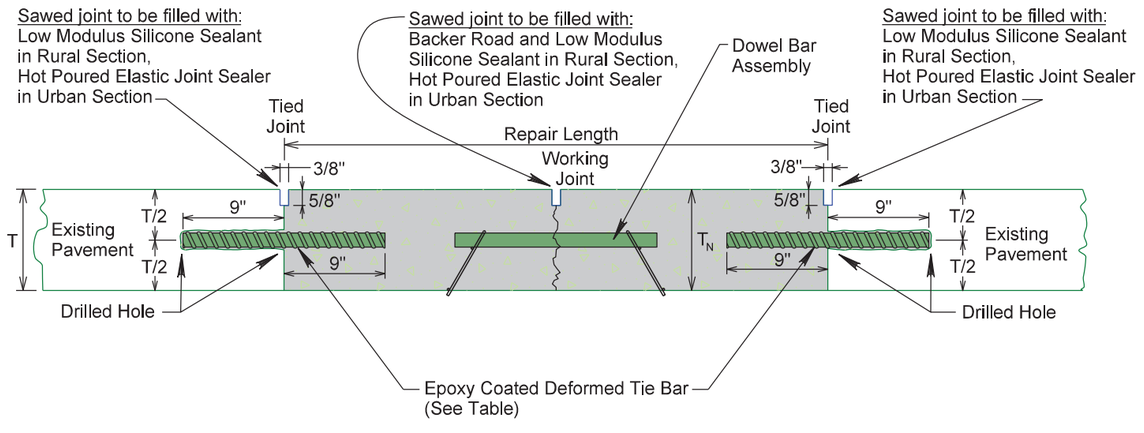
DEFORMED TIE BAR AND PLAIN ROUND DOWEL BAR INSERTION
TYPE B - (ONE TIED JOINT AND ONE WORKING JOINT)



DEFORMED TIE BAR INSERTION
TYPE T - (TWO TIED JOINTS)



DEFORMED TIE BAR INSERTION WITH DOWEL BAR ASSEMBLY
TYPE R - (TWO TIED JOINTS AND ONE WORKING JOINT - ORIGINAL JOINT RESTORED)



Existing Pavement Thickness	Epoxy Coated Deformed Tie Bar Size	Epoxy Coated Plain Round Dowel Bar Size
T >= 10.5"	No. 11 x 18"	1½" x 18"
T >= 8.5" & T < 10.5"	No. 9 x 18"	1¼" x 18"
T < 8.5"	No. 8 x 18"	1" x 18"

T = Existing pavement thickness.
T_N = New pavement thickness.

Bar embedded to a minimum depth of 9 inches into the existing pavement by utilizing an epoxy resin adhesive.

Cost for furnishing and inserting steel bars (deformed tie and plain round dowel) will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

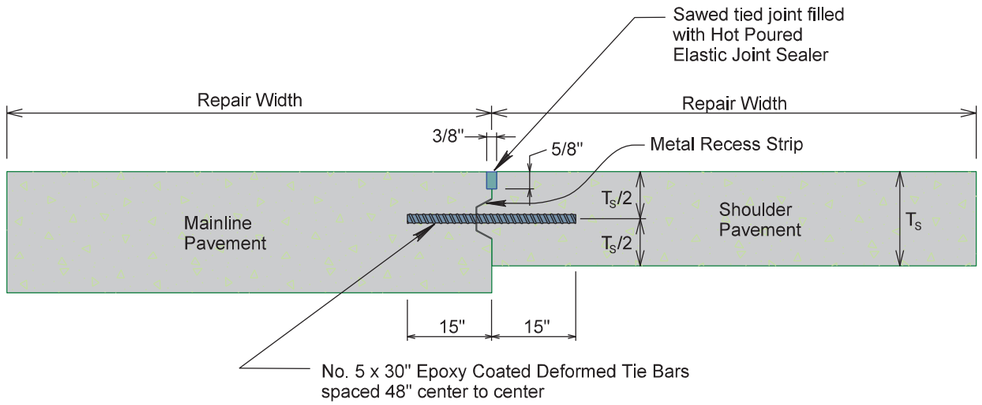
Cost for furnishing and installing dowel bar assembly will be included in the contract unit price per each for Dowel Bar.

T_N = T

(top of new pavement will be flush with top of existing pavement)

NONREINFORCED PCC PAVEMENT REPAIR

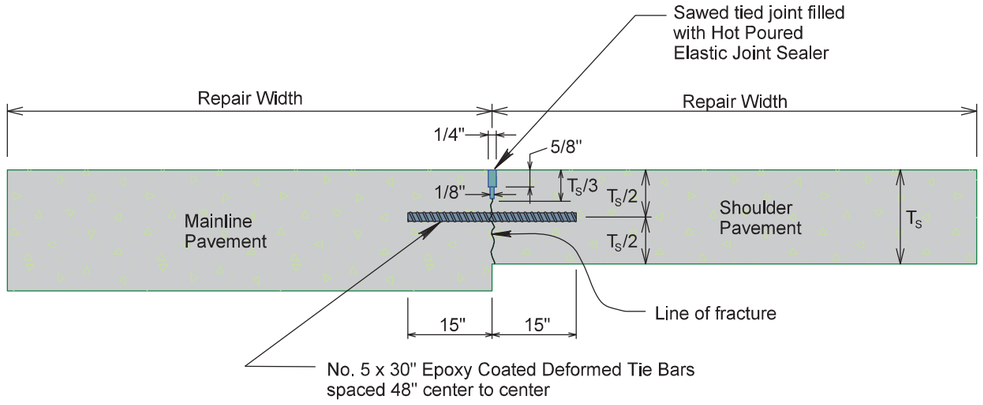
LONGITUDINAL SHOULDER CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



T_S = New shoulder pavement thickness.

Cost for furnishing and inserting tie bars will be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

SAWED LONGITUDINAL SHOULDER JOINT

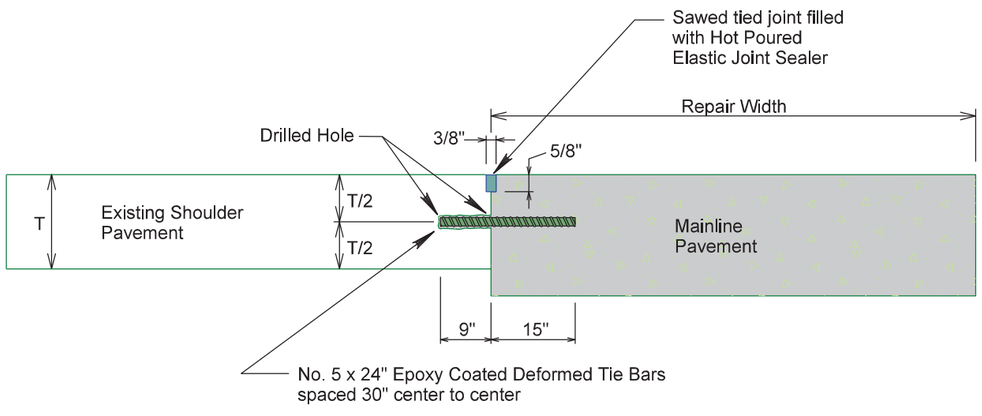


T_S= New shoulder pavement thickness.

The first saw cut to control cracking will be a minimum of 1/3 the depth of the pavement. Additional sawing for widening the saw cut will be necessary.

Cost for furnishing and inserting tie bars will be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

LONGITUDINAL SHOULDER JOINT WITH DRILLED IN TIE BARS



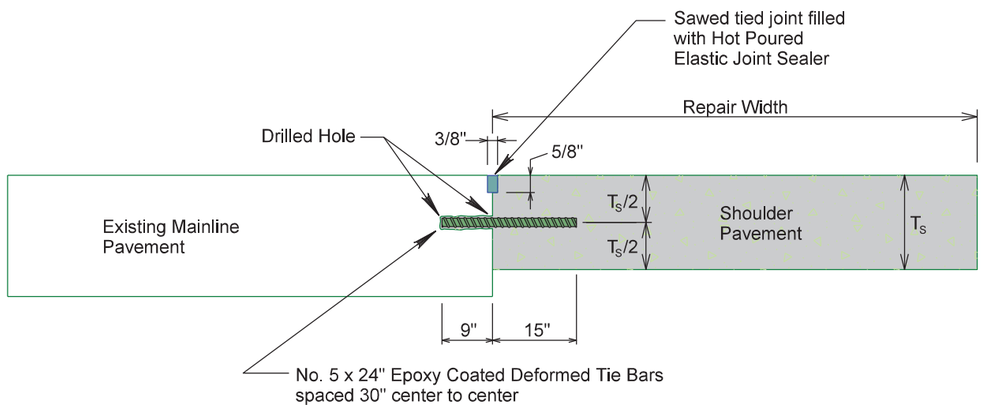
T = Existing shoulder pavement thickness.

Bar embedded a minimum depth of 9 inches into the existing pavement by utilizing an epoxy resin adhesive.

Bars will be placed a minimum of 15 inches from existing transverse contraction joints.

Cost for furnishing and inserting drilled in tie bars will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

LONGITUDINAL SHOULDER JOINT WITH DRILLED IN TIE BARS



T_S = New shoulder pavement thickness.

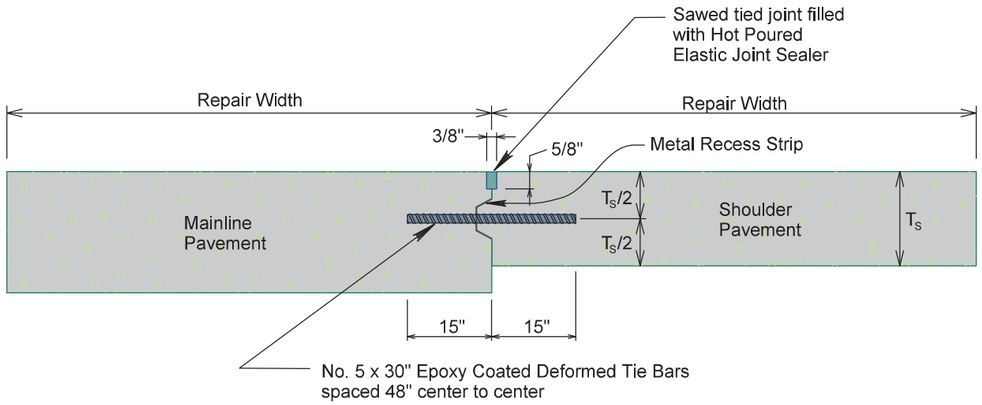
Bar embedded a minimum depth of 9 inches into the existing pavement by utilizing an epoxy resin adhesive.

Bars will be placed a minimum of 15 inches from existing transverse contraction joints.

Cost for furnishing and inserting drilled in tie bars will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

NONREINFORCED PCC PAVEMENT REPAIR

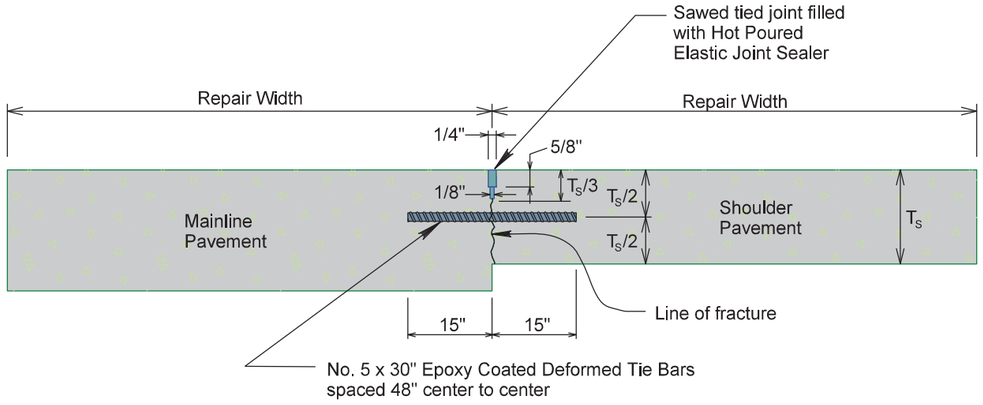
LONGITUDINAL SHOULDER CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



T_S = New shoulder pavement thickness.

Cost for furnishing and inserting tie bars will be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

SAWED LONGITUDINAL SHOULDER JOINT

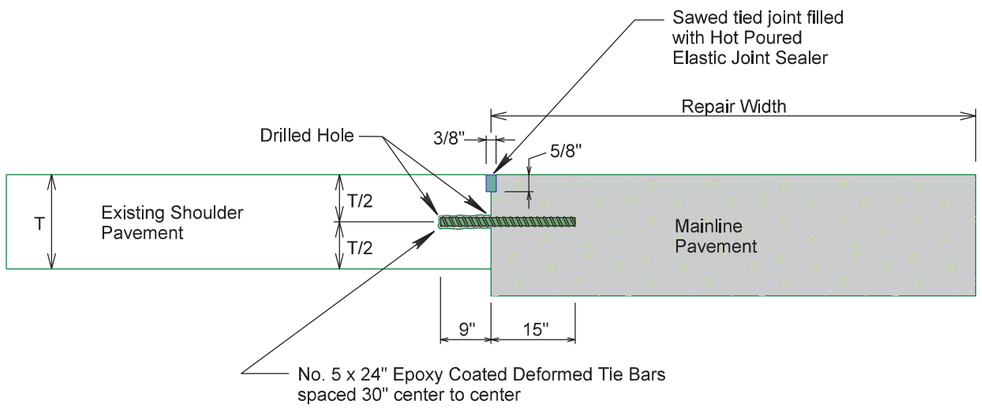


T_S= New shoulder pavement thickness.

The first saw cut to control cracking will be a minimum of 1/3 the depth of the pavement. Additional sawing for widening the saw cut will be necessary.

Cost for furnishing and inserting tie bars will be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

LONGITUDINAL SHOULDER JOINT WITH DRILLED IN TIE BARS



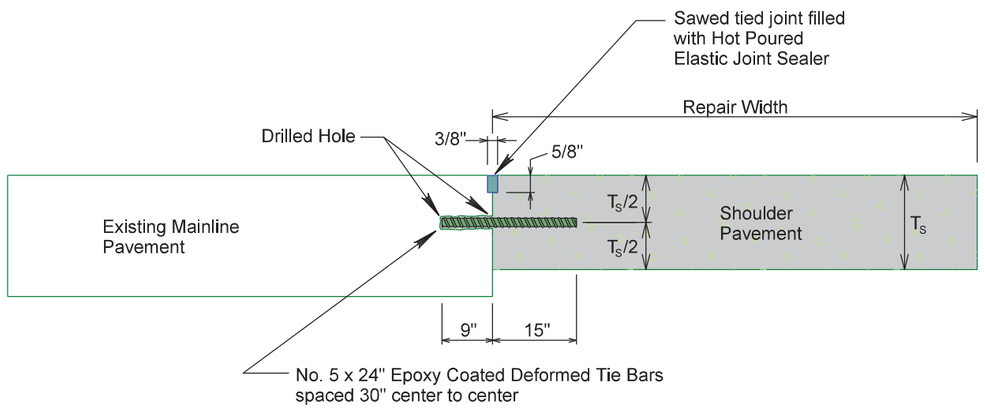
T = Existing shoulder pavement thickness.

Bar embedded a minimum depth of 9 inches into the existing pavement by utilizing an epoxy resin adhesive.

Bars will be placed a minimum of 15 inches from existing transverse contraction joints.

Cost for furnishing and inserting drilled in tie bars will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

LONGITUDINAL SHOULDER JOINT WITH DRILLED IN TIE BARS



T_S = New shoulder pavement thickness.

Bar embedded a minimum depth of 9 inches into the existing pavement by utilizing an epoxy resin adhesive.

Bars will be placed a minimum of 15 inches from existing transverse contraction joints.

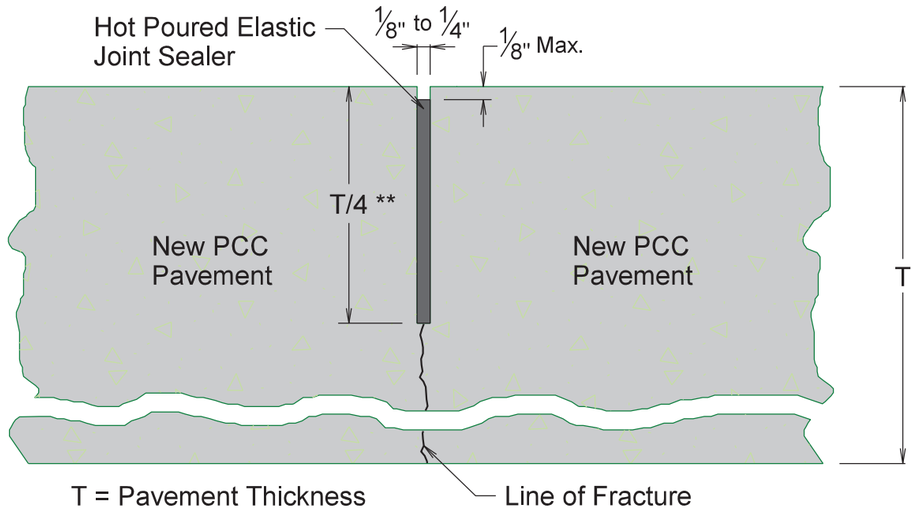
Cost for furnishing and inserting drilled in tie bars will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

NONREINFORCED PCC PAVEMENT REPAIR
SAW & SEAL TRANSVERSE JOINTS

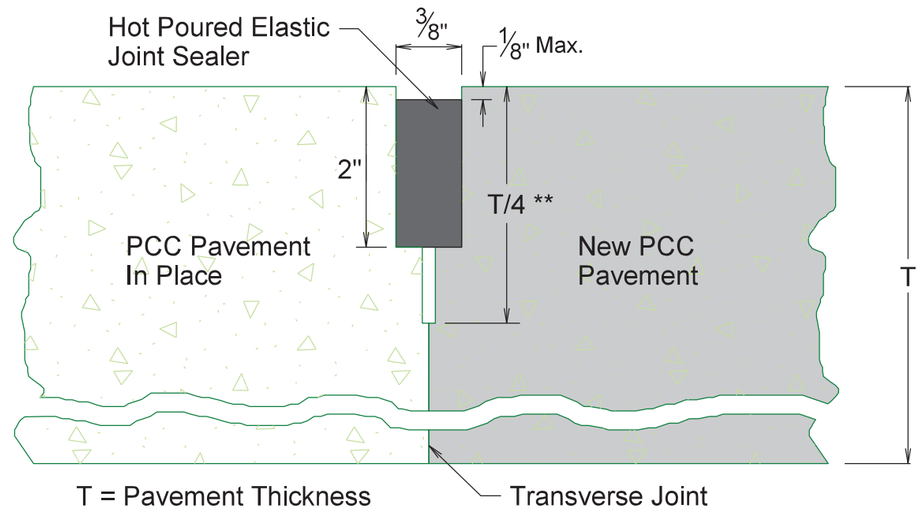
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-P 0022(103)	58	63

Plotting Date: 01/13/2026

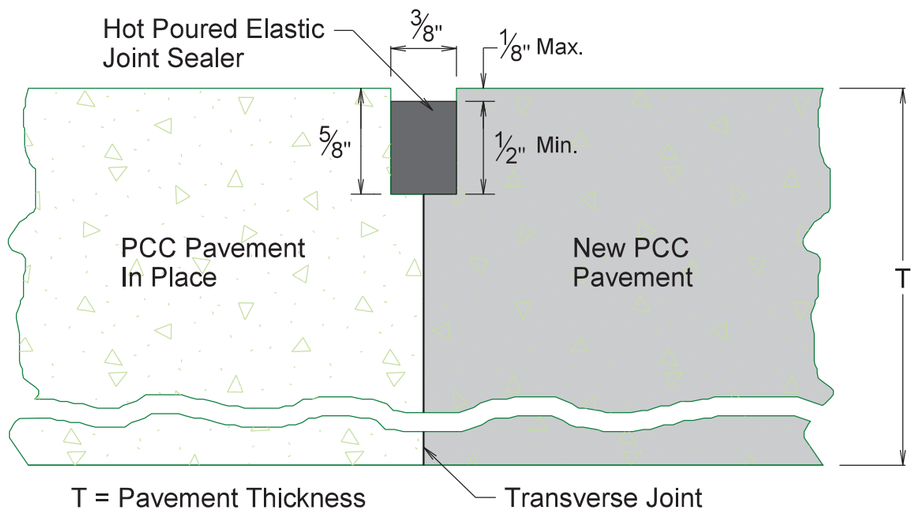
WITH HOT POURED ELASTIC JOINT SEALER AT WORKING JOINTS ENTIRELY WITHIN REPAIR AREAS



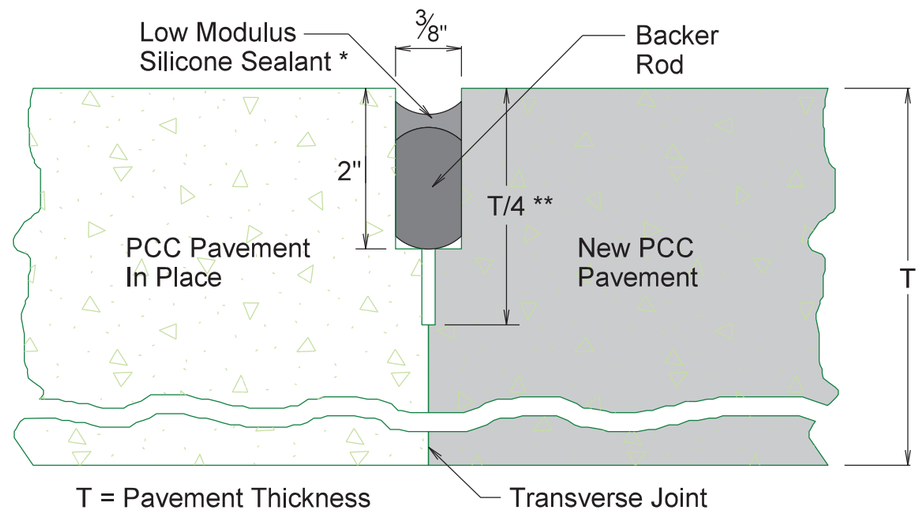
WITH HOT POURED ELASTIC JOINT SEALER AT WORKING JOINTS (TYPICALLY URBAN)



WITH HOT POURED ELASTIC JOINT SEALER AT TIED JOINTS



WITH LOW MODULUS SILICONE SEALANT AT WORKING JOINTS (TYPICALLY RURAL)

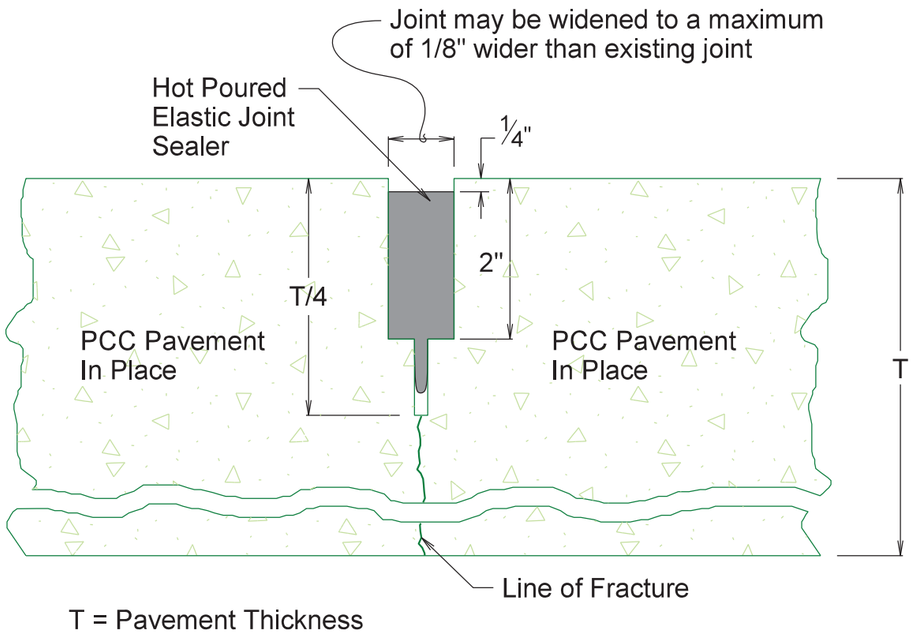


* Refer to Standard Plate 380.16 for installation details using Joint Width J=3/8".

** The saw cut to control cracking will be a minimum of 1/4 the thickness of the pavement.

RESEAL PCC PAVEMENT JOINTS

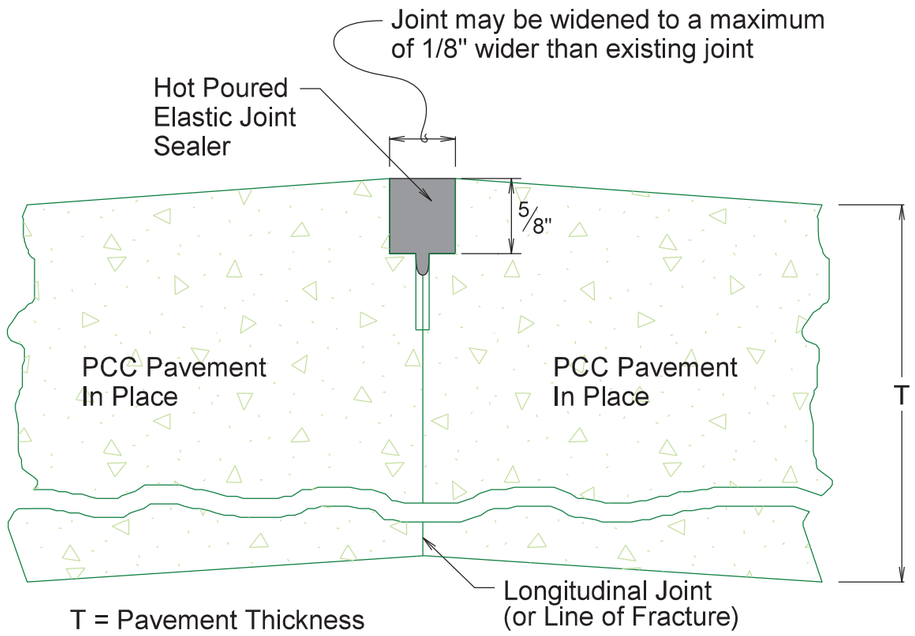
RESEAL TRANSVERSE JOINT WITH HOT POURED ELASTIC JOINT SEALER



T = Pavement Thickness

Additional sawing for widening the saw cut to provide the width for the installation of the Hot Poured Elastic Joint Sealer will be necessary.

RESEAL LONGITUDINAL JOINT WITH HOT POURED ELASTIC JOINT SEALER

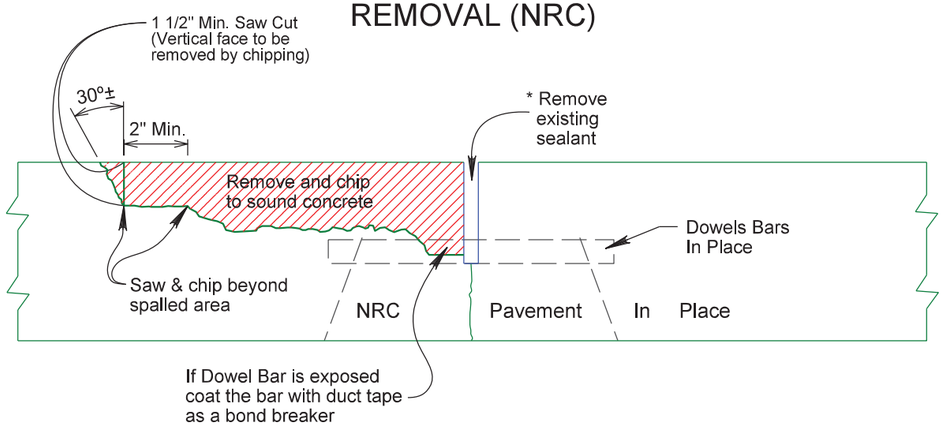


T = Pavement Thickness

Additional sawing for widening the saw cut to provide the width for the installation of the Hot Poured Elastic Joint Sealer will be necessary.

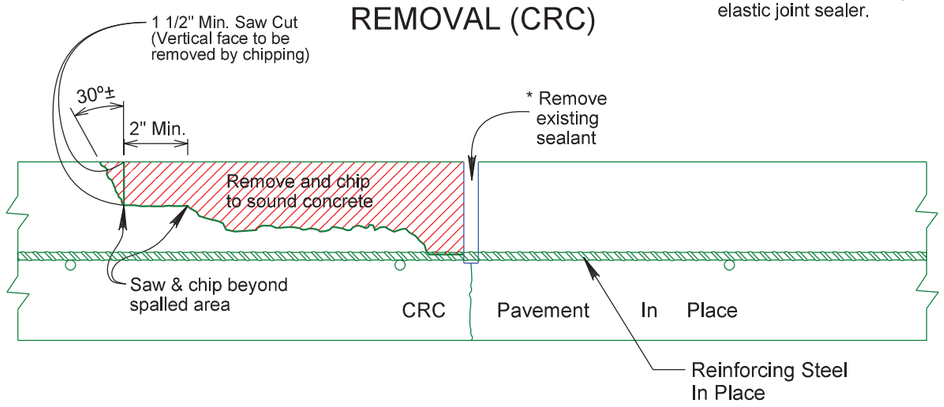
REPAIR OF TYPE A SPALLS

REMOVAL (NRC)

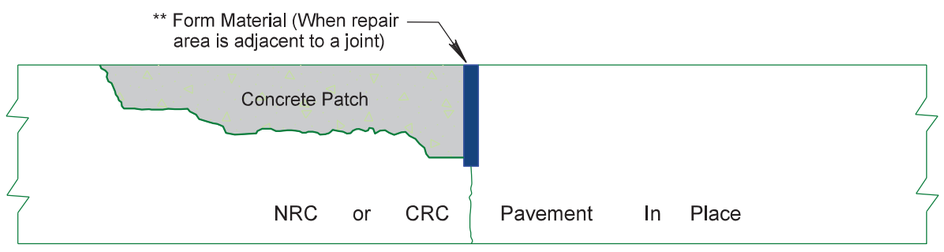


* Existing Sealant to be removed is low modulus silicone sealant with backer rod or hot poured elastic joint sealer.

REMOVAL (CRC)



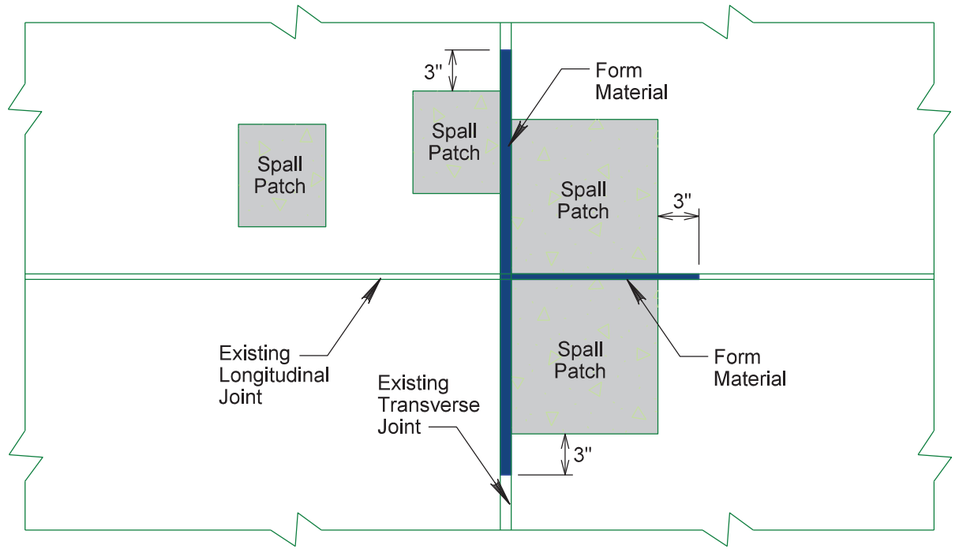
PATCHING



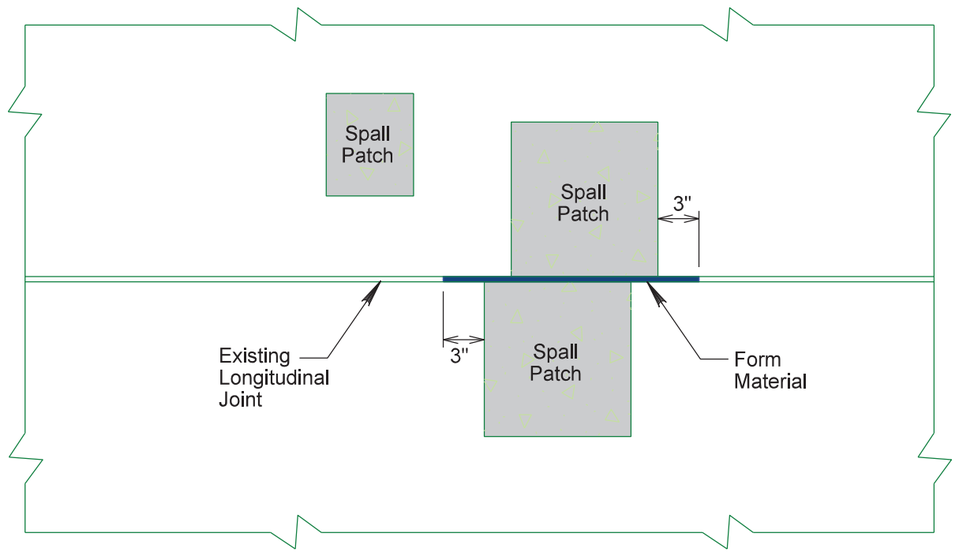
** Form Material will be removed by sawing or other means approved by the Engineer. Spall repaired joints will then be sealed with Backer Rod and Low Modulus Silicone Sealant.

REPAIR OF TYPE A SPALLS

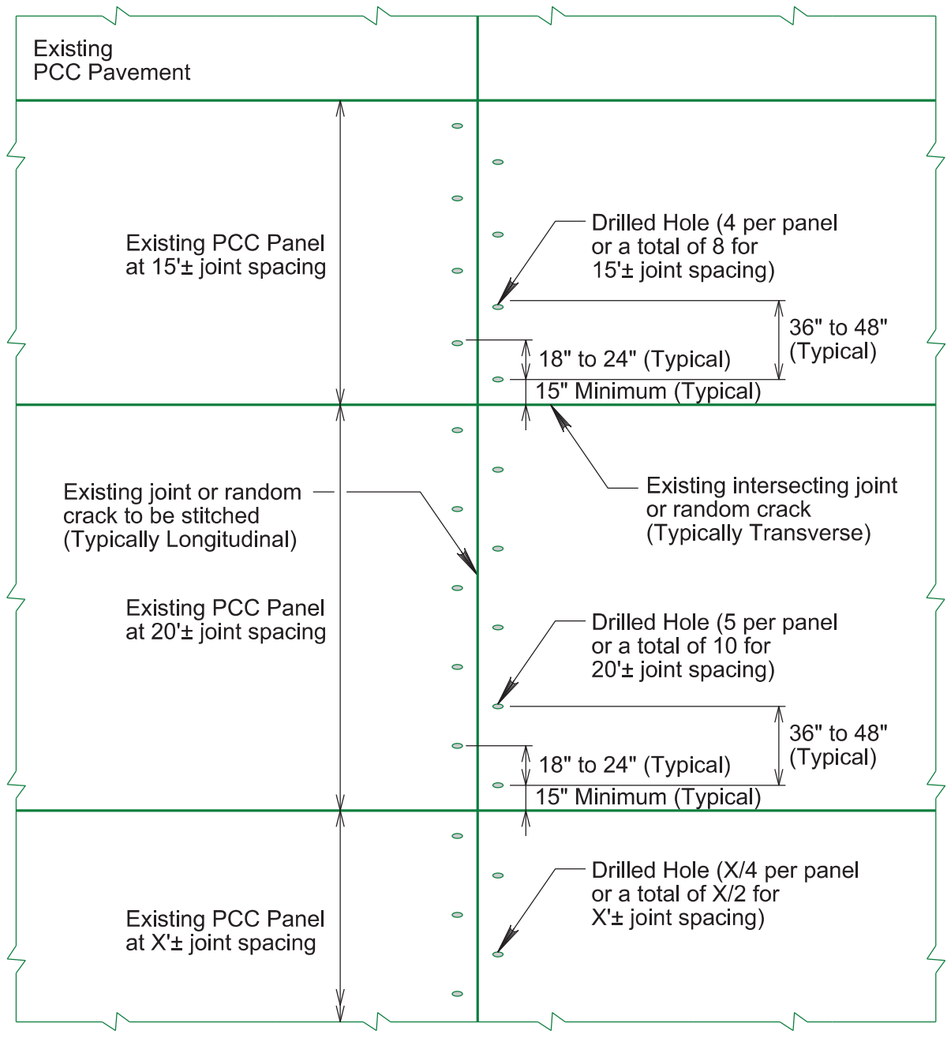
NRC SPALL PATCHES (PLAN VIEW)



CRC SPALL PATCHES (PLAN VIEW)

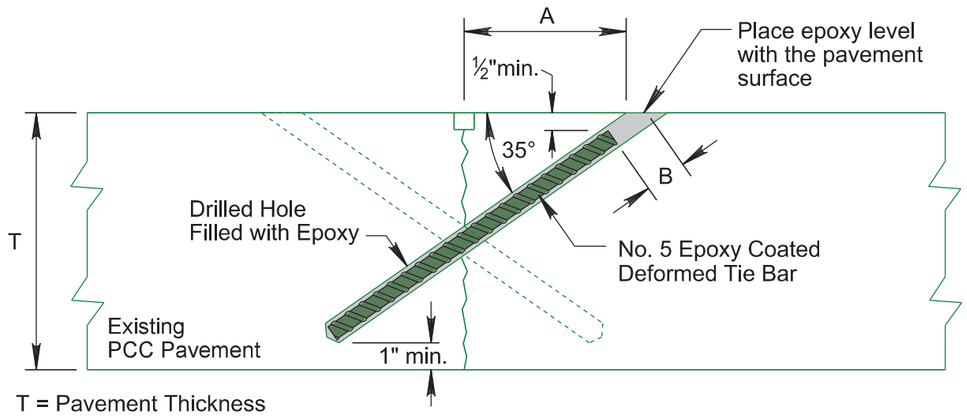


TIE BAR RETROFIT (STITCHING)



PLAN VIEW

TIE BAR RETROFIT (STITCHING)



T = Pavement Thickness

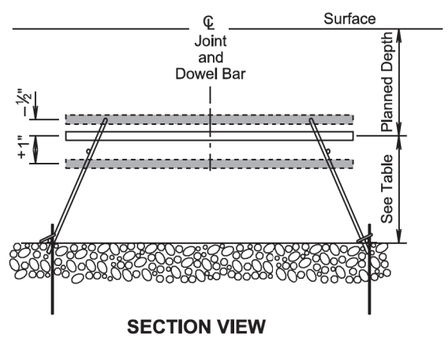
ELEVATION VIEW

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"

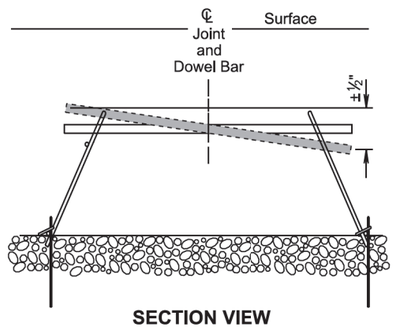
Stitch Bar Spacing 24" Max.

Joint Spacing	Number of Bars
3' to 4.5'	2
5' to 6.5'	3
7' to 8.5'	4
9' to 10.5'	5
11' to 12.5'	6
13' to 14.5'	7
15' to 16.5'	8
17' to 18.5'	9
19' to 20.5'	10
21 to 22.5'	11
23' to 24.5'	12
25' to 26.5'	13
27' to 28.5'	14
29' to 30.5'	15



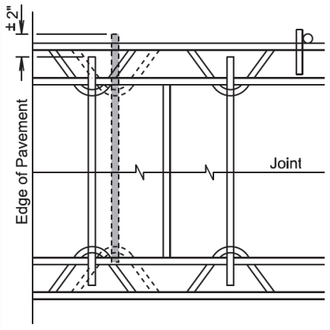
SECTION VIEW
VERTICAL TRANSLATION

Depth: mid-depth + 1 inch or − ½ inch



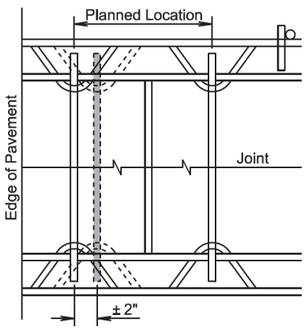
SECTION VIEW
VERTICAL TILT

Vertical rotational alignment: ½ inch over 18 inch



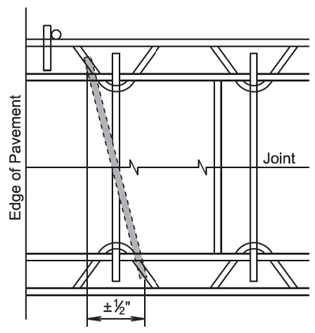
PLAN VIEW
LONGITUDINAL TRANSLATION

Longitudinal side shift: ± 2 inch for 18 inch bars



PLAN VIEW
HORIZONTAL TRANSLATION

Side shift ± 2 inch



PLAN VIEW
HORIZONTAL SKEW

Horizontal rotational alignment: ½ inch over 18 inch

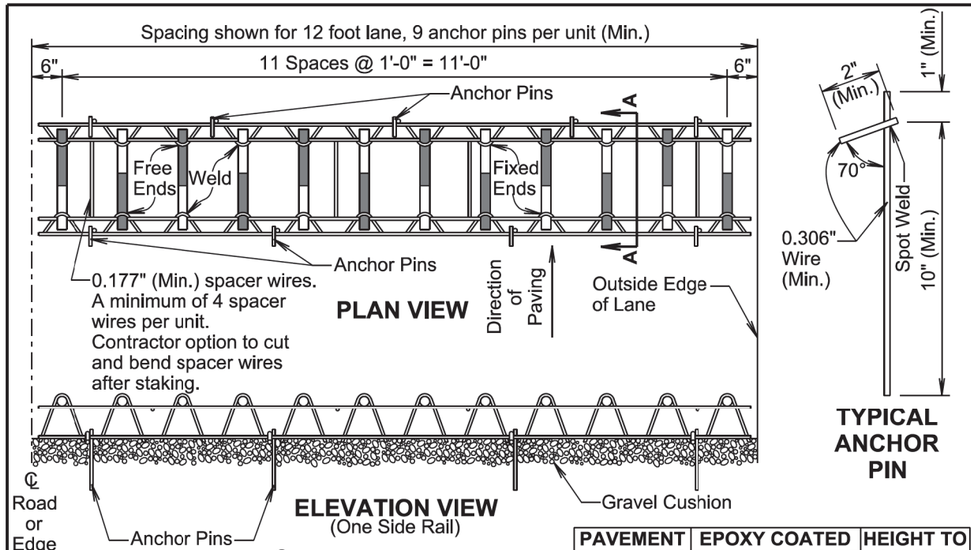
PAVEMENT THICKNESS	EPOXY COATED DOWEL BAR SIZE	HEIGHT TO CENTER
7" to 7½"	1" x 18"	3.0"
8" to 10"	1¼" x 18"	4.0"
10½" to 13"	1½" x 18"	5.0"

GENERAL NOTE:

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

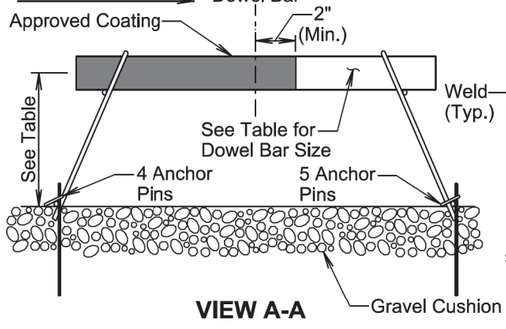
November 19, 2022

Published Date: 2026	SDDOT	**PCC PAVEMENT DOWEL BAR ALIGNMENT TOLERANCES**	PLATE NUMBER 380.01 Sheet 1 of 1

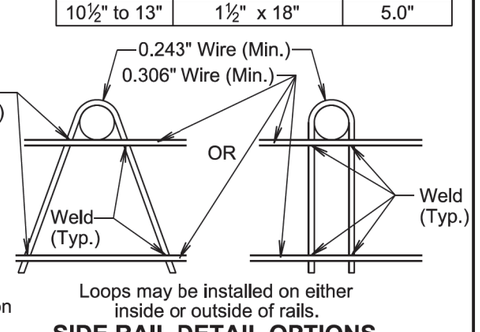


TYPICAL ANCHOR PIN

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"



VIEW A-A



Loops may be installed on either inside or outside of rails.

SIDE RAIL DETAIL OPTIONS

GENERAL NOTES:

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

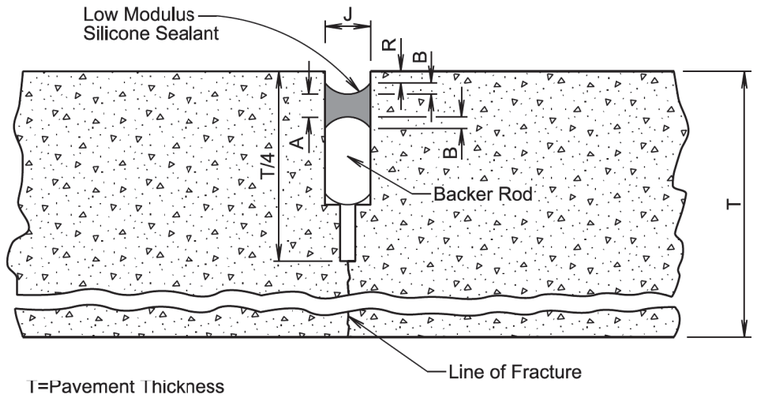
The transverse contraction joints will be sawed perpendicular to the centerline of the roadway. The transverse sawed joint will be centered over the dowel bars.

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: 2026	SDDOT	**PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS 12 Bar Assembly on Granular Base Material**	PLATE NUMBER 380.04 Sheet 1 of 1



T=Pavement Thickness

LOW MODULUS SILICONE SEALANT ALLOWABLE CONSTRUCTION TOLERANCES

J=3/8"				
A (Min.) (in.)	A (Max.) (in.)	B (Min.) (in.)	B (Max.) (in.)	R (in.)
3/16	5/16	1/8	1/4	1/4
J=1/2"				
A (Min.) (in.)	A (Max.) (in.)	B (Min.) (in.)	B (Max.) (in.)	R (in.)
3/16	3/8	1/8	1/4	1/4
J=5/8"				
A (Min.) (in.)	A (Max.) (in.)	B (Min.) (in.)	B (Max.) (in.)	R (in.)
1/4	7/16	1/8	5/16	1/4
J=3/4"				
A (Min.) (in.)	A (Max.) (in.)	B (Min.) (in.)	B (Max.) (in.)	R (in.)
5/16	1/2	3/16	3/8	5/16
J=1"				
A (Min.) (in.)	A (Max.) (in.)	B (Min.) (in.)	B (Max.) (in.)	R (in.)
3/8	5/8	3/16	1/2	5/16

GENERAL NOTE:

The backer rod will be a nonmoisture absorbing resilient material approximately 25% larger in diameter than the width of the joint to be sealed.

November 19, 2022

Published Date: 2026	SDDOT	RESEAL PCC PAVEMENT JOINT (SILICONE)	PLATE NUMBER 380.16
			Sheet 1 of 1