

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

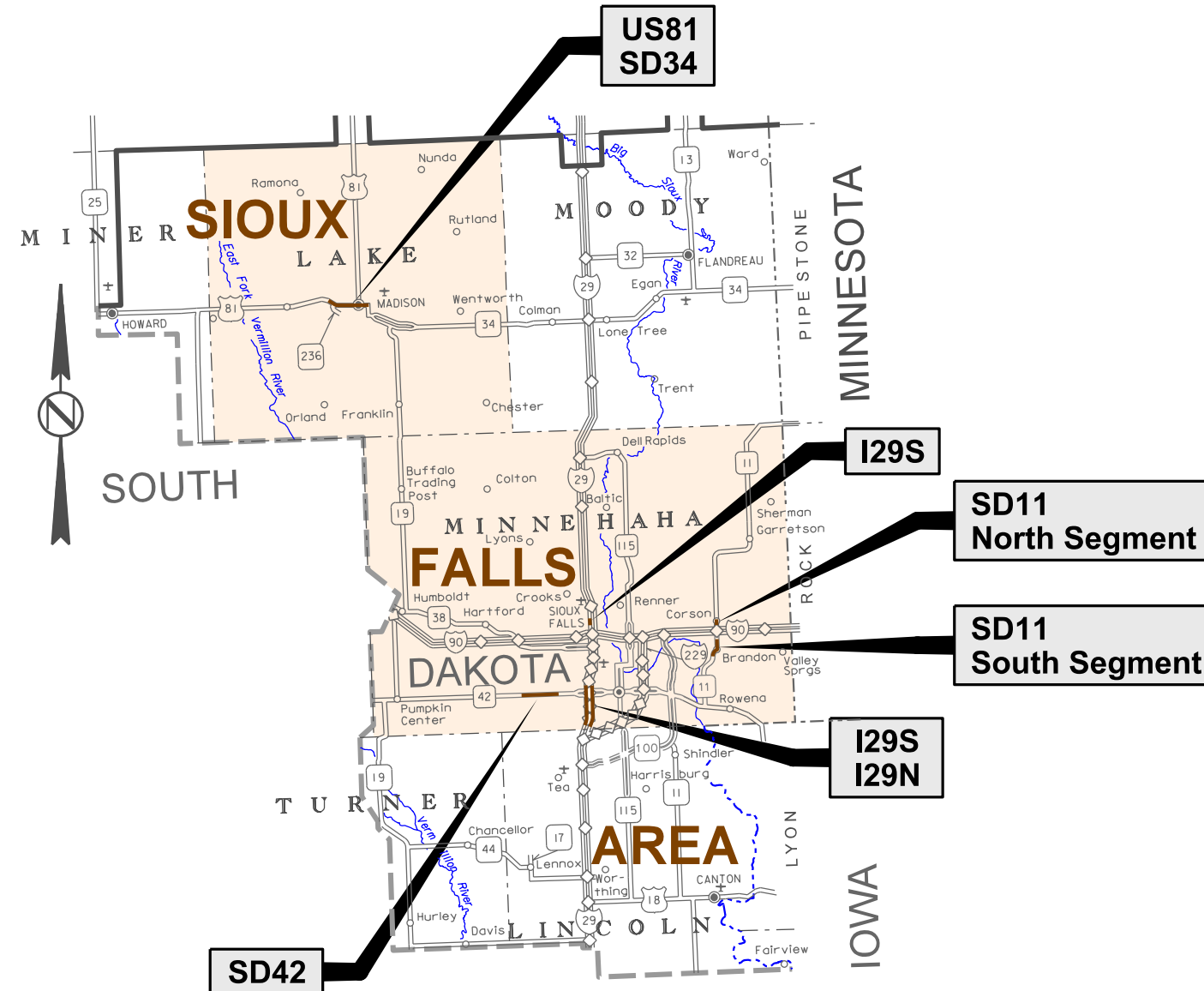
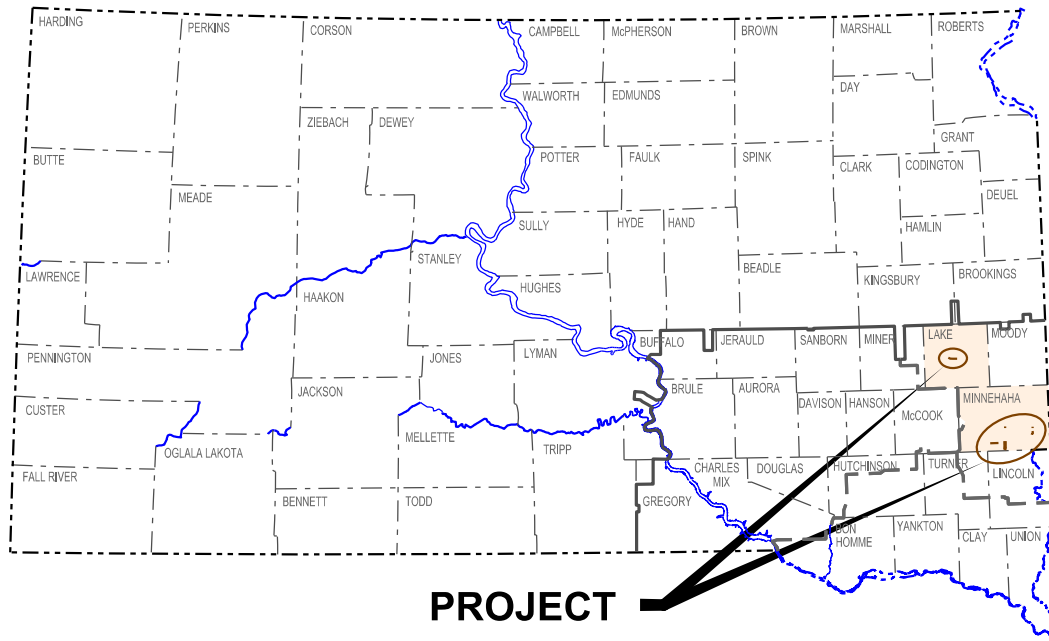
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	1	74

Plotting Date: 03/25/2024

PLANS FOR PROPOSED
PROJECT IM-NH-P 0022(89)
**INTERSTATE 29,
US HIGHWAY 81,
SD HIGHWAYS 11, 34 & 42**
LAKE & MINNEHAHA COUNTIES
**CRC & NRC PAVEMENT REPAIR, SPALL REPAIR,
GRINDING PCC PAVEMENT, SEALING RANDOM CRACKS,
TIE BAR RETROFIT - STITCHING, C&G REPAIR,
RESEALING JOINTS & PAVEMENT MARKING**
PCN 08RM

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STORM WATER PERMIT
(None required)

5

June 5, 2024

PLOT SCALE - 1:7000

PLOTTED FROM - TRSF12133

PLOT NAME - 1

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**SD HIGHWAY 42
MINNEHAHA COUNTY
NRC PAVEMENT REPAIR,
TIE BAR RETROFIT - STITCHING,
C&G REPAIR & RESEALING JOINTS
SD42 LENGTH: 3.015 MILES**

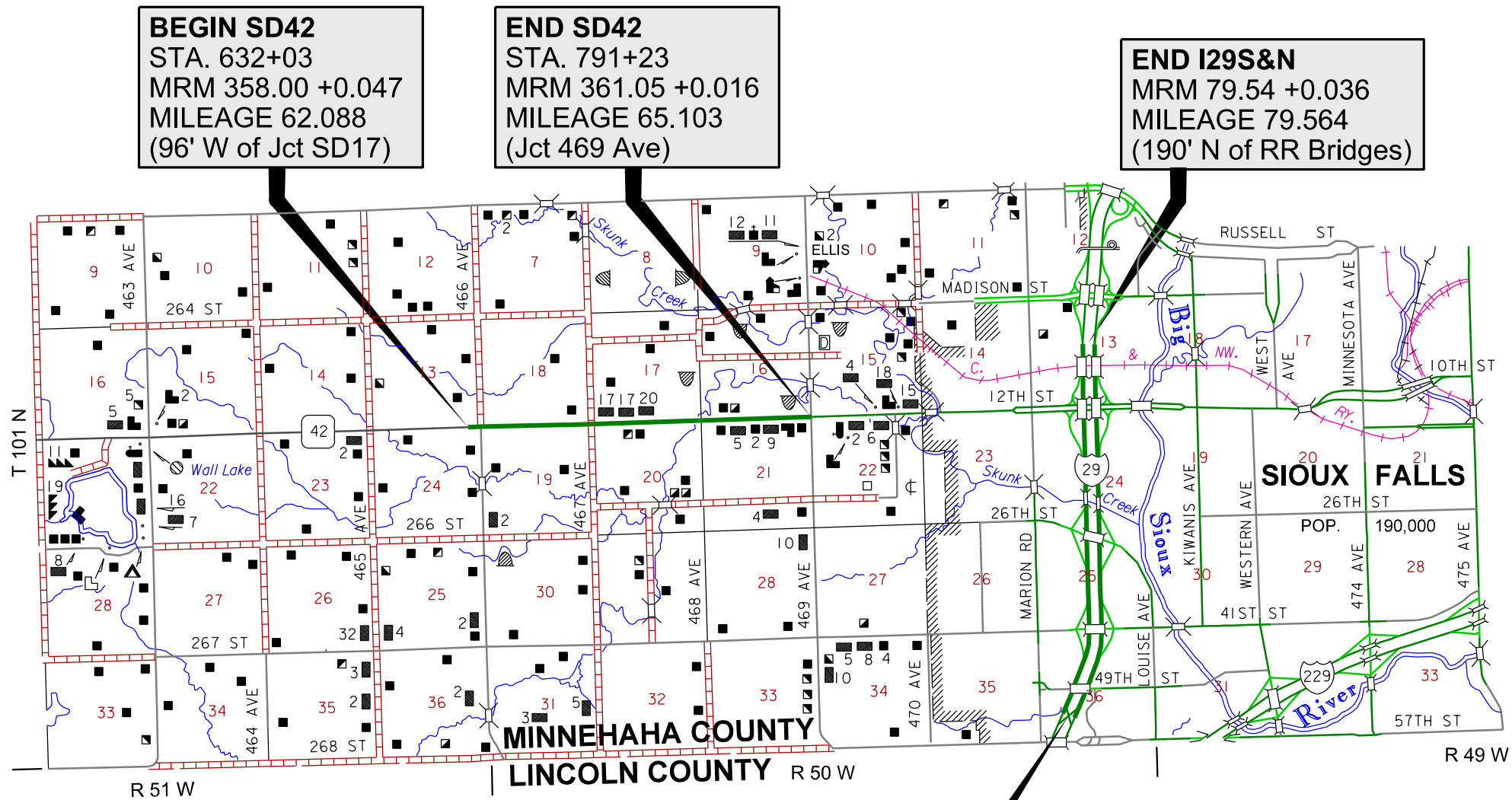
**INTERSTATE 29S&N
MINNEHAHA COUNTY
NRC PAVEMENT REPAIR,
SEALING RANDOM CRACKS &
RESEALING JOINTS
I29S LENGTH: 3.093 MILES
I29N LENGTH: 3.093 MILES**

STATE OF SOUTH DAKOTA	PROJECT IM-NH-P 0022(89)	SHEET 2	TOTAL SHEETS 74
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Plotting Date: 03/25/2024

PLOT SCALE - 1"=7000'

PLOT NAME - 2



BEGIN SD42
STA. 632+03
MRM 358.00 +0.047
MILEAGE 62.088
(96' W of Jct SD17)

END SD42
STA. 791+23
MRM 361.05 +0.016
MILEAGE 65.103
(Jct 469 Ave)

END I29S&N
MRM 79.54 +0.036
MILEAGE 79.564
(190' N of RR Bridges)

BEGIN I29S&N
MRM 76.19 +0.299
MILEAGE 76.471
(Center of Crossover)

	DESIGN DESIGNATION		
ROUTE	SD42	I29S	I29N
ADT(2022)	6,352	27,738	27,762
ADT(2042)	9,840	44,448	44,472
DHV	1,136	4,880	4,883
D	51%	100%	100%
T DHV	3.1%	6.5%	6.5%
T ADT	6.8%	14.3%	14.2%
V	65/55/45 MPH	65 MPH	65 MPH

PLOTTED FROM - TRSF12133

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PLOT SCALE - 1:7000

PLOTTED FROM - TRSF12133

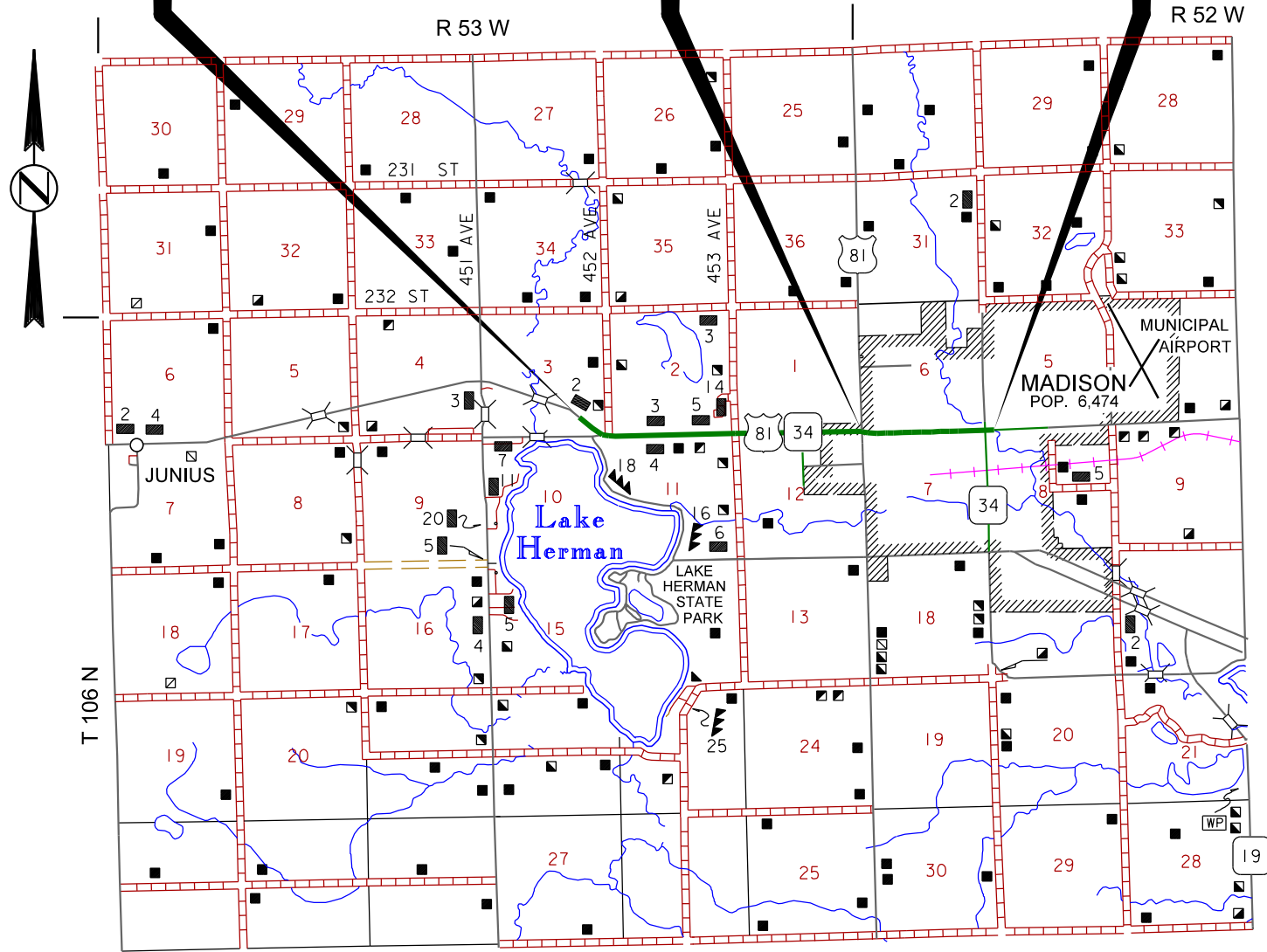
**US HIGHWAY 81
LAKE COUNTY
NRC PAVEMENT REPAIR,
GRINDING PCC PAVEMENT,
SEALING RANDOM CRACKS,
RESEALING JOINTS &
PAVEMENT MARKING
US81 LENGTH: 2.292 MILES**

**SD HIGHWAY 34
LAKE COUNTY
NRC PAVEMENT REPAIR,
SEALING RANDOM CRACKS,
C&G REPAIR & RESEALING JOINTS
SD34 LENGTH: 1.010 MILES**

STATE OF SOUTH DAKOTA	PROJECT IM-NH-P 0022(89)	SHEET 3	TOTAL SHEETS 74
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Plotting Date: 03/25/2024

BEGIN US81 STA. 33+39 MRM 92.00 +0.424 MILEAGE 87.575 (At Begin Concrete)	END US81 STA. 154+39 MRM 94.70 +0.009 MILEAGE 89.867 (At E Jct SD34)	BEGIN SD34 STA. 10+00 MRM 386.16 +0.000 MILEAGE 312.516 (At E Jct US81)	END SD34 STA. 63+31 MRM 387.00 +0.237 MILEAGE 313.526 (150' E of Jct Wash. Ave)
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DESIGN DESIGNATION		
ROUTE	US81	SD34
ADT(2022)	3,685	6,142
ADT(2042)	4,921	7,702
DHV	661	1,035
D	50%	50%
T DHV	4.0%	0.6%
T ADT	8.8%	1.3%
V	55/45/35 MPH	30 MPH

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PLOT NAME - 3

**INTERSTATE 29S (NORTH SEGMENT)
MINNEHAHA COUNTY
CRC & NRC PAVEMENT REPAIR,
SEALING RANDOM CRACKS,
TIE BAR RETROFIT - STITCHING &
RESEALING JOINTS
I29S LENGTH: 1.078 MILES**

**SD HIGHWAY 11
MINNEHAHA COUNTY
NRC PAVEMENT REPAIR,
TIE BAR RETROFIT - STITCHING,
C&G REPAIR & RESEALING JOINTS
SD11 NORTH SEGMENT LENGTH: 0.225 MILE
SD11 SOUTH SEGMENT LENGTH: 1.090 MILES**

STATE OF SOUTH DAKOTA	PROJECT IM-NH-P 0022(89)	SHEET 4	TOTAL SHEETS 74
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Plotting Date: 03/25/2024

BEGIN I29S
STA. 26+58
MRM 85.00 +0.505
MILEAGE 85.463
(2,820' N of RR Bridge)

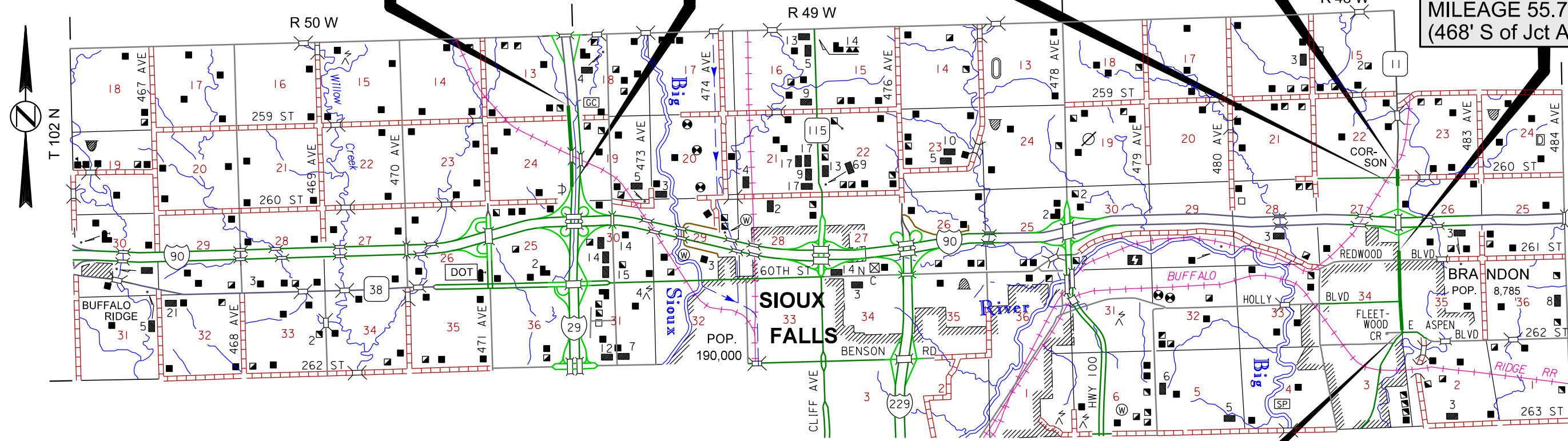
END I29S
STA. 83+15
MRM 84.17 +0.255
MILEAGE 84.385
(2,700' S of RR Bridge)

**BEGIN SD11
NORTH SEGMENT**
STA. 33+71
MRM 81.00 +0.033
MILEAGE 56.211
(540' S of Jct 260 St)

**END SD11
NORTH SEGMENT**
STA. 45+61
MRM 81.00 +0.258
MILEAGE 56.436
(650' N of Jct 260 St)

**END SD11
SOUTH SEGMENT**
STA. 517+46
MRM 80.00 +0.612
MILEAGE 55.768
(468' S of Jct Ash St)

**BEGIN SD11
SOUTH SEGMENT**
STA. 459+89
MRM 79.50 +0.000
MILEAGE 54.678
(Jct E Aspen Blvd)



DESIGN DESIGNATION		
ROUTE	I29S	SD11
ADT(2022)	10,965	9,381
ADT(2042)	17,281	14,532
DHV	1,984	1,707
D	100%	51%
T DHV	5.9%	2.9%
T ADT	13.0%	6.3%
V	80/65 MPH	30/35 MPH

PLOT SCALE - 1"=7000'

PLOTTED FROM - TRSF12133

PLOT NAME - 4

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ESTIMATE OF QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	5	74

Rev. 5/9/24 MR

PCN 08RM

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E7700	Remove Drop Inlet Frame and Grate Assembly for Reset	11	Each
110E7710	Remove Manhole Frame and Lid for Reset	1	Each
320E1200	Asphalt Concrete Composite	200.0	Ton
380E5030	Nonreinforced PCC Pavement Repair	2,591.6	SqYd
380E5100	Continuously Reinforced PCC Pavement Repair	46.5	SqYd
380E6000	Dowel Bar	3,928	Each
380E6110	Insert Steel Bar in PCC Pavement	7,145	Each
380E6200	Tie Bar Retrofit, Stitching	45	Each
380E6302	Reseal PCC Pavement Joint - Hot Pour	89,663	Ft
380E6310	Seal Random Cracks in PCC Pavement	1,600	Ft
380E6510	Grinding PCC Pavement	17,902.3	SqYd
390E0200	Repair Type A Spall	120.0	SqFt
633E1201	High Build Waterborne Pavement Marking Paint with Reflective Elements, White	99	Gal
633E1206	High Build Waterborne Pavement Marking Paint with Reflective Elements, Yellow	130	Gal
633E5100	Grooving for Durable Pavement Marking, 4"	18,101	Ft
633E5115	Grooving for Durable Pavement Marking, 24"	305	Ft
633E5120	Grooving for Durable Pavement Marking, Area	150	SqFt
633E5125	Grooving for Durable Pavement Marking, Arrow	9	Each
634E0010	Flagging	250.0	Hour
634E0020	Pilot Car	125.0	Hour
634E0110	Traffic Control Signs	772.7	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	10	Each
634E0330	Temporary Raised Pavement Markers	21,500	Ft
634E0380	Tubular Marker	500	Each
634E0390	Replace Tubular Marker	50	Each
634E0420	Type C Advance Warning Arrow Board	2	Each
634E0600	4" Temporary Pavement Marking Tape Type I	150	Ft
634E0630	Temporary Pavement Marking	3.0	Mile
634E0900	Portable Temporary Traffic Control Signal	2	Unit
634E1215	Contractor Furnished Portable Changeable Message Sign	4	Each
650E9000	Repair Concrete Curb and/or Gutter	227	Ft
670E7000	Reset Drop Inlet Frame and Grate Assembly	11	Each
671E7000	Reset Manhole Frame and Lid	1	Each

SPECIFICATIONS

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

ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	6	74

ENVIRONMENTAL COMMITMENTS

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

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: <https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.pdf>

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

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

COMMITMENT 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 (DANR) and the United States Army Corps of Engineers (USACE) prior to water extraction activities.

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.

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

COMMITMENT I: 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 100 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.

Grinding will be done on US81 at the locations specified in these plans.

Joints will be sawed and sealed where sealant has failed.

COORDINATION BETWEEN CONTRACTORS

A separate contract for Project IM 0293(106)76 PCN 03RA has been awarded to another Contractor for bridge reconstruction over I29 located at Exit 77.

A separate contract for Project IM-EM-NH-TA 0909(46)406 PCN 4433 has been awarded to another Contractor for bridge reconstruction over I90 at Exit 406.

The Contractor will schedule work so as not to interfere with or hinder the progress of the work performed by other Contractors on the projects listed above.

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 Project Engineer to determine if project changes are necessary to avoid utility impacts.

EXISTING NRC PAVEMENT

SD11 in Brandon

The existing pavement is 8.5" NRC Pavement. Existing contraction joints are spaced at approximately 20'. 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.

I29 NB and SB

The existing pavement is 12.5" NRC Pavement. Existing contraction joints are spaced at approximately 20'. 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.

SD34 in Madison

The existing pavement is 9.5" 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.

SD42 west of Sioux Falls

The existing pavement is 9" NRC Pavement. Existing contraction joints are spaced at approximately 20'. 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.

US81 west of Madison

The existing pavement is 9.5" NRC Pavement. Existing contraction joints are spaced at approximately 20'. 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 SB

The existing pavement is 10.5" 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.

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

NRC Pavement Repair on US81 will be done prior to Grinding PCC Pavement.

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.

NONREINFORCED PCC PAVEMENT REPAIR – GENERAL (CONTINUED)

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 (AASHTO M148, Type 2) applied as soon as practical at a rate of 125 square feet per gallon. Concrete will be cured for a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60°F or higher throughout the cure period. If the concrete temperature falls below 60°F, 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.

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 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.

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.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CRCP) (CONTINUED)

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.

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.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CRCP) (CONTINUED)

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 60°F or higher throughout the cure period. If the concrete temperature falls below 60°F, 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.

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. 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 200 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.

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.

PCC PAVEMENT REPAIR AROUND MANHOLES

PCC Pavement Repair will be done around existing manholes. Work will be done in accordance with the notes for NONREINFORCED PCC PAVEMENT REPAIR – GENERAL, NONREINFORCED PCC PAVEMENT REPAIR AND STEEL BAR INSERTION.

The manhole frame and lid will be removed. No. 5 x 18" epoxy coated deformed tie bars will be inserted into drilled holes in the existing concrete pavement. Refer to the layout for PCC PAVEMENT REPAIR AROUND MANHOLES. The steel bars may be bent as necessary to reset the manhole frame and lid as shown in the plans.

Cost for pavement repair will be included in the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

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.

Cost for removing and resetting manhole frame and lid will be included in the contract unit prices per each for Remove Manhole Frame and Lid and Reset Manhole Frame and Lid.

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 1/2 inch will be routed and sealed 1/2 inch wide by 1/2 inch deep.

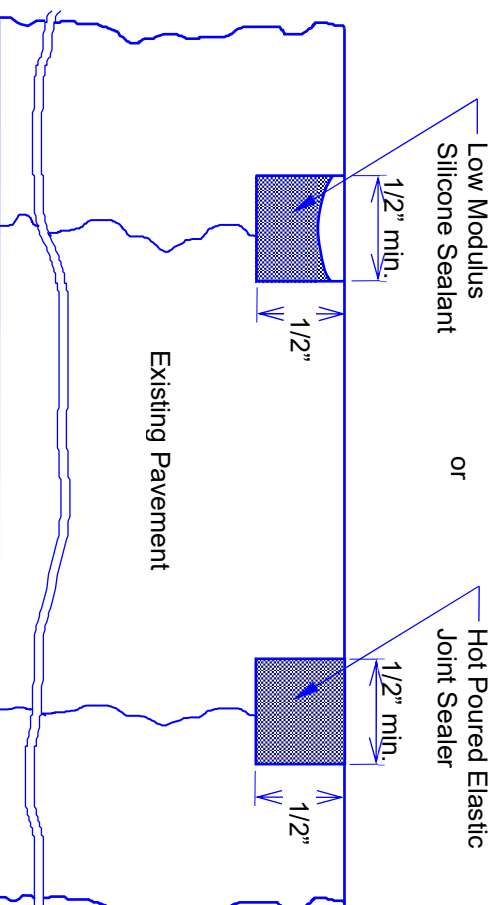
Random cracks wider than 1/2 inch may require the placement of a backer rod prior to sealing. Use of backer rod should be limited to locations where, once placed, the top of the backer rod will be a minimum of 2 1/4 inches below the top surface of the pavement. The hot pour in cracks wider than 1/2" should be placed 2 inch thick with the final surface of the hot pour remaining recessed 1/4 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 1/2" 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.

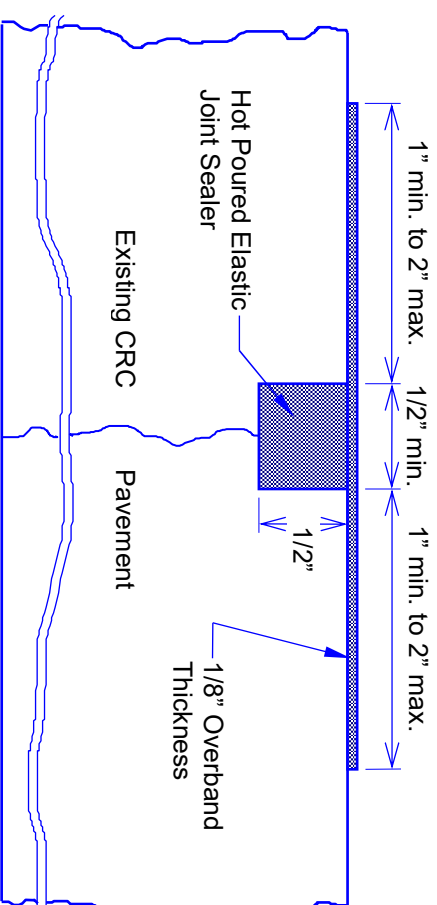
Acceptance of the Hot Poured Elastic Joint Sealer will be based on visual inspection by the Engineer.

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 (NRCPP)



SEALING RANDOM CRACKS (CRCP)



REPLACING CURB & GUTTER ADJACENT TO DROP INLETS

Damaged concrete curb and gutter around the following drop inlets will be sawed full depth and removed and replaced with concrete curb and gutter.

Lengths of curb and gutter removal will be as shown in these plans or as directed by the Engineer.

New concrete curb and gutter will be tied to adjacent PCC Pavement and existing concrete curb and gutter with deformed tie bars and reinforcing steel will be placed as shown on the Layout for Replacing Concrete Curb & Gutter Adjacent to Drop Inlet

Cost for performing this work will be included in the contract unit price for Repair Concrete Curb and/or Gutter or be incidental to the contract unit prices for the various repair items.

REPAIR CONCRETE CURB AND/OR GUTTER

The existing concrete curb and gutter is Type B67. New curb and/or gutter will match in place.

Refer to the repair tables and details for locations of removal and replacement. These locations will be designated by the Engineer on construction.

If the end of any section to be removed does not fall on an existing joint, a sawed joint (3" to 4" deep) must be made to provide a vertical face for the new joint.

Existing foundation material will be shaped and compacted to a firm, uniform bearing surface, conforming to the existing section or established grades as set by the Engineer. Unsuitable foundation material will be removed and replaced as directed.

Cost for labor, equipment, material and incidentals required for excavation and providing cushion material will be incidental to the contract unit prices for the various items.

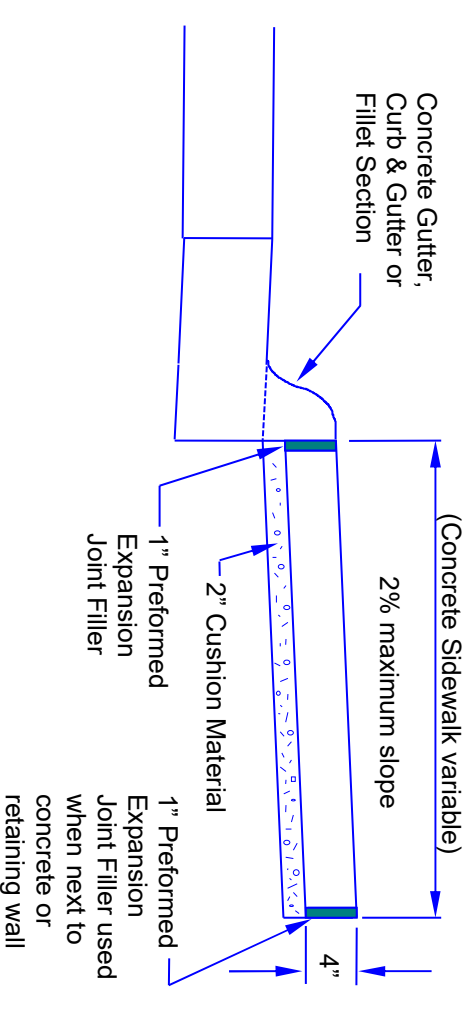
Curb and/or Gutter will be tied to existing PCC pavement with drilled in No. 5 x 24" epoxy coated deformed tie bars spaced 30" center to center or by salvaged in place tie bars. Also, two No. 5 x 24" epoxy coated deformed tie bar will be drilled into the existing curb and/or gutter at each end of the replacement area. Refer to the notes for STEEL BAR INSERTION.

Cost for this work will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

The Contractor will satisfactorily restore disturbed areas adjacent to the new concrete placement to the satisfaction of the Engineer. Cost for this restoration work will be incidental to the contract unit prices for the various items.

REPAIR CONCRETE CURB AND/OR GUTTER (CONTINUED)

Standard Specifications for sawing, removing and replacing concrete curb and/or gutter, and material composition will apply except that the cost for such will be included in the contract unit price per foot for Repair Concrete Curb and/or Gutter.



GRINDING PCC PAVEMENT (US81)

PCC Pavement repair will be done prior to Grinding PCC Pavement. Grinding PCC Pavement will be done prior to sawing and sealing joints.

Cross slope is 0.02%/ft. on PCC Pavement except through super-elevated curves and ramps.

The work will be performed only during daylight hours.

The Contractor will establish a positive means for the removal of the grinding residue. Solid residue will be removed from the pavement surfaces before being blown by traffic action or wind. Residue will not be permitted to flow across lanes used by public traffic or into gutters or drainage facilities. Residue will be disposed of in a manner that will prevent residue, whether in solid or slurry form, from entering any waterway in a concentrated state.

Residue will be collected by the Contractor during grinding to prevent slurry entering private property.

If the Engineer determines that the slurry may enter a waterway, drainage facility, or curb and gutter section, the slurry will be placed in storage tanks and deposited in settling basins, spread over flat vegetated areas, or filtered by other means approved by the Engineer at no additional cost.

Plans quantity will be the basis of payment and no further measurement will be made.

TABLE OF PCC PAVEMENT GRINDING ON US81					
MRM	MRM	LENGTH	WIDTH	GRINDING SQYD	LOCATION
92.411	92.479	359'	28'	1,116.90	West End of US81
92.479	92.903	2239'	40'	4,975.60	Three Lane w/ Turn Lanes
92.903	93.598	3796'	28'	11,809.80	East End at 453rd Ave
TOTAL:				17,902.30	

SUMMARY OF PCC PAVEMENT REPAIR

HWY	BEGIN MRM	DISP	END MRM	DISP	BEGIN DMI	END DMI	NRCP REPAIR (SqYd)	CRCP REPAIR (SqYd)	NO. 9 X 18" EPOXY COATED DEFORMED TIE BARS (Each)	NO. 11 X 18" EPOXY COATED DEFORMED TIE BARS (Each)	NO. 5 X 24" EPOXY COATED DEFORMED TIE BARS (Each)	INSERTION OF NO. 6 EPOXY COATED DEFORMED TIE BARS (Each)	INSERT STEEL BAR IN CONCRETE PAVEMENT (Each)	DOWEL BAR (Each)	REPAIR TYPE A SPALL (IN NRCP) (SqFt)	TIE BAR RETROFIT STITCHING (Each)	SEAL RANDOM CRACKS IN PCC PAVEMENT (Ft)	REPAIR CONCRETE CURB AND/OR GUTTER (Ft)	REMOVE & RESET FRAME & GRATE (Each)	REMOVE & RESET MANHOLE FRAME & LID (Each)
SD42	358.00	0.050	361.06	0.000	358.05	361.06	1,356.8		2,286		761		3,047	1,802	20		80			
I29 SB, N of I90	84.00	0.970	85.00	0.440	84.97	85.44	18.5	46.5		46	26	54	126	40		10	20			
I29 SB, S of Exit 79	76.19	0.290	79.54	0.020	76.48	79.56	126.0			168	142		310	143	20		290			
I29 NB, S of Exit 79	76.19	0.290	79.26	0.230	76.48	79.49	202.2			428	252		680	371	20		100			
US81	92.00	0.410	94.20	0.420	92.41	94.62	481.5		1,012		682		1,694	962	20		1,040			
SD34	386.16	0.000	387.14	0.030	386.16	387.17	128.7		280		132		412	239	20		70	35		1
SD11	79.50	0.000	81.00	0.258	79.53	80.43	277.9		438		438		876	371	20	35		192	11	
GRAND TOTALS:							2,591.6	46.5	4,016	642	2,433	54	7,145	3,928	120	45	1,600	227	11	1

TABLE FOR JOINT RESEALING

HWY	BEGIN MRM	DISP	END MRM	DISP	BEGIN DMI	END DMI	RESEAL PCC PAVEMENT LONGITUDUNAL JOINTS - HOT POUR (Ft)	RESEAL PCC PAVEMENT TRANSVERSE JOINTS - HOT POUR (Ft)
SD42	358.00	0.050	361.06	0.000	358.05	361.06	20,323'	24,865'
I29 SB, N of I90	84.00	0.970	85.00	0.440	84.97	85.44	300'	150'
I29 SB, S of Exit 79	76.19	0.290	79.54	0.020	76.48	79.56	300'	150'
I29 NB, S of Exit 79	76.19	0.290	79.26	0.230	76.48	79.49	300'	150'
US81	92.00	0.410	94.20	0.420	92.41	94.62	23,734'	18,491'
SD34	386.16	0.000	387.14	0.030	386.16	387.17	300'	150'
SD11	79.50	0.000	81.00	0.258	79.53	80.43	300'	150'
TOTALS:							45,557'	44,106'
RESEAL PCC PAVEMENT JOINT - HOT POUR TOTAL:							89,663'	

PERMANENT PAVEMENT MARKING

Permanent pavement marking will only be required on US81 from the Jct of US81 North at Madison west for 2.292 miles.

New permanent pavement marking will be placed in the same location as the existing pavement marking. The Contractor will inventory the existing pavement marking to make sure the new pavement marking will be installed at the existing location.

The Contractor will be required to repaint all existing pavement marking including centerline, edge line, lane lines, word messages, turn arrows, stop bars, railroad crossings, and pedestrian crossings. This list is approximate. The Contractor will be required to document and be able to relocate for replacement of the existing word messages, turn arrows, stop bars, railroad crossings, pedestrian crossings, etc. before the markings are obliterated. Additional quantities are included in the estimate of quantities to paint the additional pavement marking. Cost to duplicate the existing marking locations will be incidental to the contract unit prices for the various contract items.

HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

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

Reflective media consisting of glass beads as well as bonded core reflective elements will be adhered to the paint.

The bonded core reflective elements will contain either clear or yellow tinted microcrystalline ceramic beads bonded to the outer surface. The bonded core reflective elements will provide a 50/50 blend of dry to wet ratio of reflective element. All microcrystalline ceramic beads bonded to reflective elements will have a minimum index of refraction of 1.8 for dry retroreflectivity and 2.4 for wet retroreflectivity when tested using the liquid oil immersion method.

The Department will take retroreflectivity readings on the pavement marking lines no sooner than 3 days and no later than 30 days after the completion of all line applications required for an individual highway route using a portable retroreflectometer conforming to 30-meter geometry. Retroreflectivity readings will be taken on a test location with cleaning being limited to light hand brooming.

Pavement marking not conforming to the retroreflectivity requirements will be removed and replaced. If replacement of markings cannot be applied within the same year, the Contractor will schedule subject work to be completed no later than June 15th in the following year. Upon replacement, the retroreflectivity testing process will be done again requiring new readings.

The Department will randomly select one test location per mile of each edge line including ramps and one test location per mile of centerline (solid and/or skip line will be considered as one centerline). Three retroreflectivity readings will be taken at each test location. The three readings will be averaged and become the reading for that test location.

Initial readings:

Pavement Marking Color	Minimum Value
White	350 mc/m ² /lux
Yellow	275 mc/m ² /lux

HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT (CONTINUED)

All pavement marking not conforming to the requirements provided in these plans will be considered deficient and will be removed and replaced. Additional retroreflectivity readings will be taken by the Department to determine the limits of removal. The removal will be accomplished using suitable sand blasting or grinding equipment unless the Engineer authorizes other means. The removal process will remove at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width will be one inch wider all around the nominal width of the pavement marking to be removed. Removal and replacement of the pavement markings will be at the Contractor's expense, with no cost incurred by the State.

RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4" line = 27.8 Gals/Mile
Dashed 4" line = 7.6 Gal/Mile
Glass Beads = 5.3 Lbs/Gal.
Composite Reflective Elements = 2.1 Lbs/Gal.

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

GROOVING FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

The Contractor will establish a positive means for the removal of the grinding and/or grooving residue. Residue from dry grooving will be vacuumed. Solid residue will be removed from the pavement surfaces before being blown by traffic action or wind. The Contractor will conduct this work to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owners. Residue from wet grooving will not be permitted to flow across lanes being used by public traffic or into gutter or drainage facilities. Residue, whether in solid or slurry form, will be disposed of in a manner that will prevent it from reaching any waterway in a concentrated state.

Cost for removal of grinding and/or grooving residue will be included in the contract unit price per foot, square foot, and each for Grooving for Durable Pavement Marking contract items.

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

The grooving will be completed within the following tolerances:

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

¹ Marking thickness will include the thickness of marking material and reflective media.

² Additional length may be required as specified in the plans.

GROOVING FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT (CONTINUED)

The equipment will be capable of the following:

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

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

PAVEMENT MARKING

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

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

Application rates will be as follows:

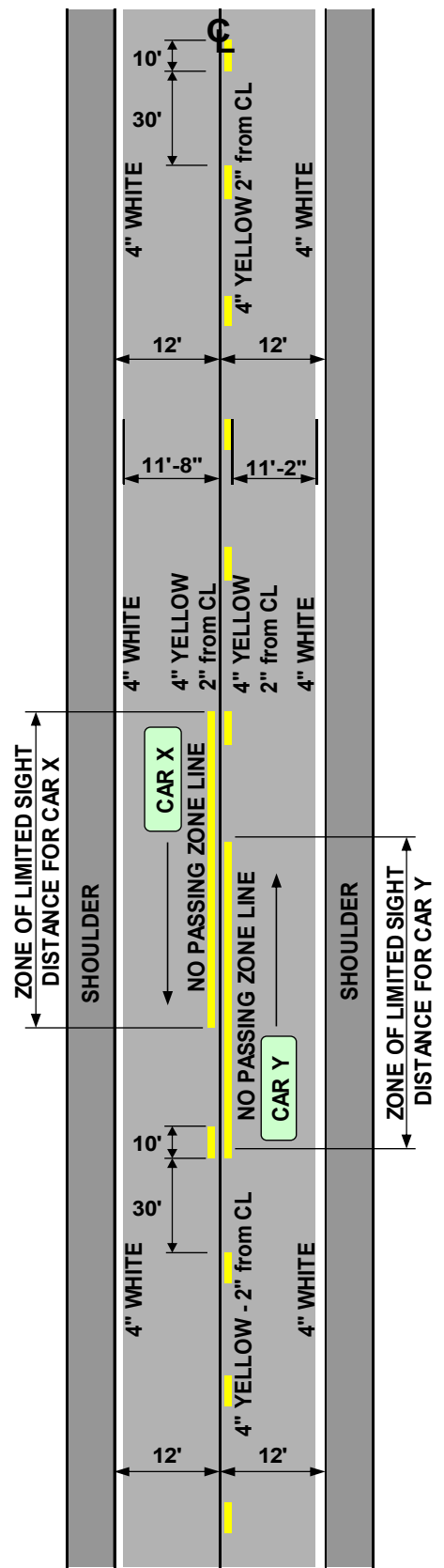
Four Lane Roadway (Rates for one line)	
Solid Yellow Centerline	Rate = 27.8 Gals./Pass-Mile
Dashed White Laneline	Rate = 7.6 Gals./Pass-Mile
Solid White Edgeline (Not applicable in curb and gutter)	Rate = 27.8 Gals./Pass-Mile

ESTIMATED QUANTITIES (BASED ON ONE APPLICATION)	
HIGH BUILD WITH REFLECTIVE ELEMENTS	QUANTITY
WHITE	99 GALLONS
YELLOW	130 GALLONS

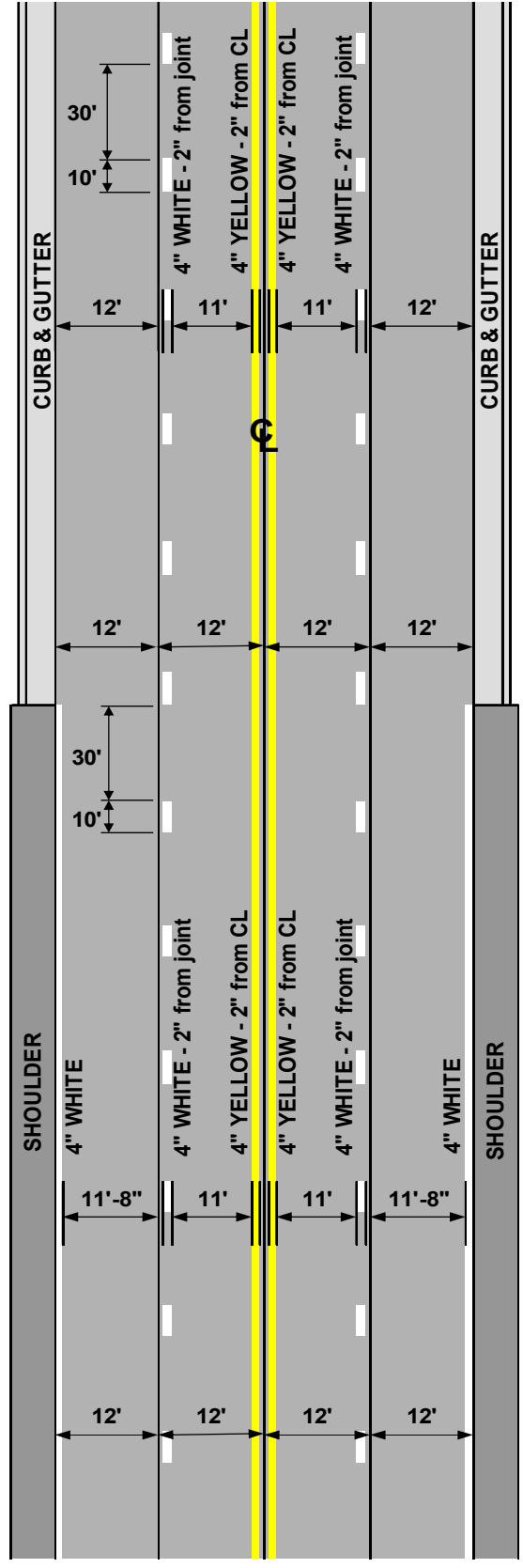
Included in the above quantities are:			
Additional White (1 Application)		Additional Yellow (1 Application)	
Description	Gallons	Description	Gallons
4" Lines	550'	4 Transitions 4.6 Ea	3588'
8" Lines	-	4" Skip Lines	-
12" Gore Lines	-	8" Lines	-
Crosswalks	-	12" Lines	-
24" Stop Lines	-	24" Hatches	343'
24" Hatches	-	Solid Areas	175sf
Solid Areas	-	Additional Yellow:	56
Arrows			
Left Arrows	9 Ea	8 Additional Quantities	
Right Arrows	-	<u>Rates of Coverage:</u>	<u>SqFt/Gal</u>
Straight Arrows	-	4", 8" & 12" Lines	50
Combo Arrows	-	24" Lines & Hatches	30
Lane Drop Arrows	-	Arrows, Messages and Solid Areas	20
Messages			
STOP	-		
STOP AHEAD	-		
R X R w/ Stop Lines	-		
SCHOOL X-ING	-		
Additional White:	12		

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

TWO LANE ROADWAY



FOUR LANE ROADWAY



Plotting Date: 03/18/2024

PAVEMENT MARKING LAYOUT

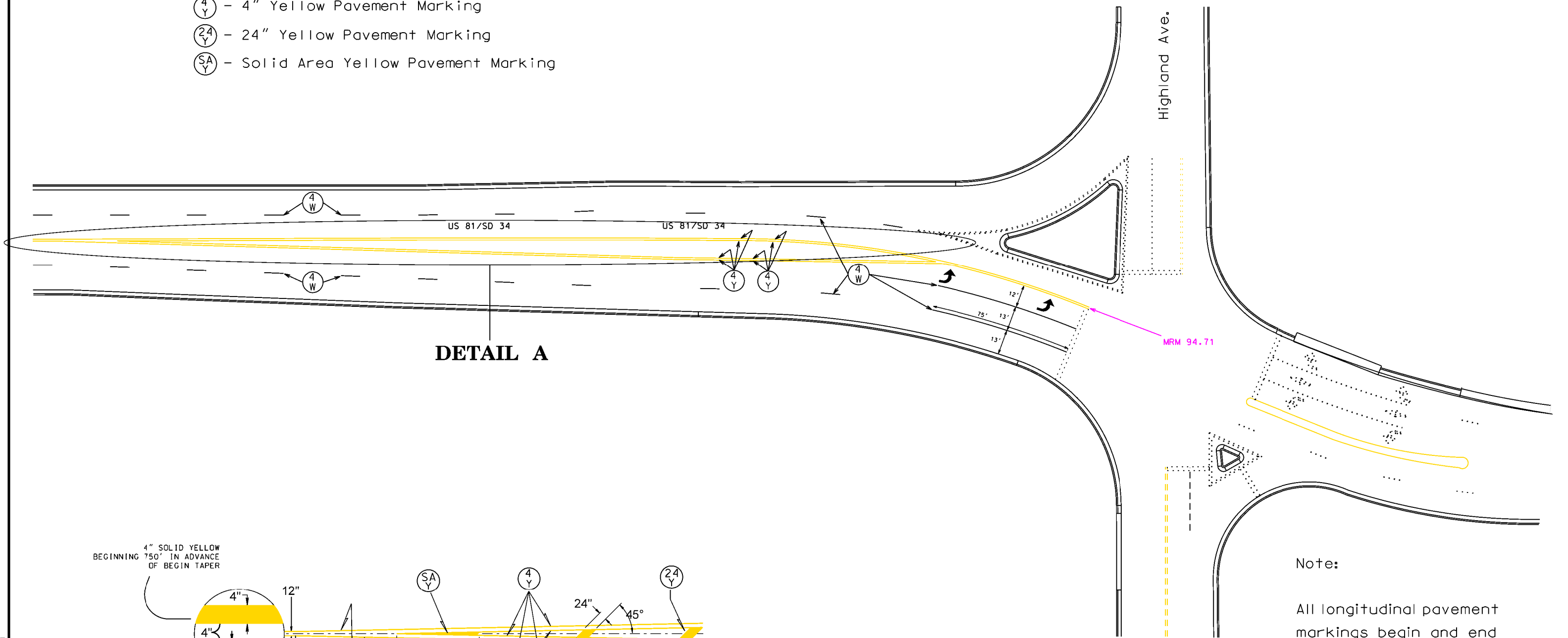
US 81/SD 34 JCT WITH 2ND STREET N.W.



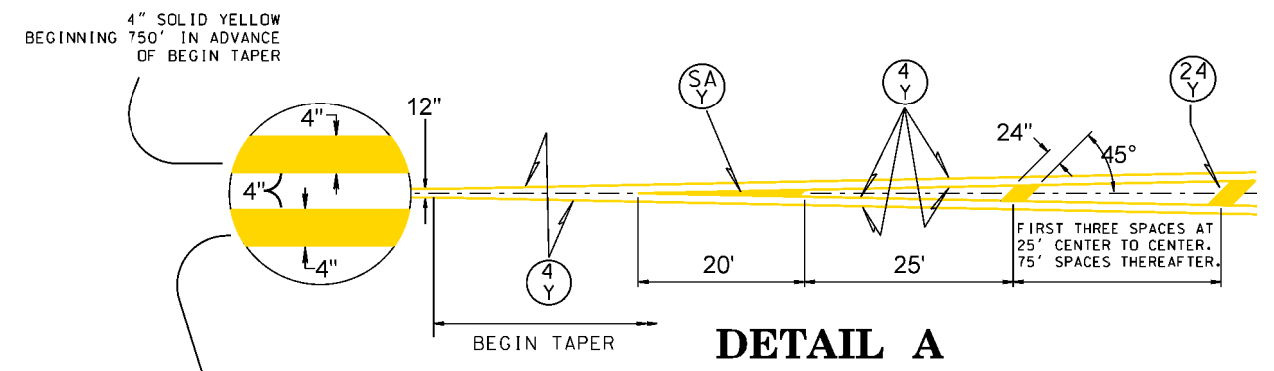
- 4" White Pavement Marking
- 4" Yellow Pavement Marking
- 24" Yellow Pavement Marking
- Solid Area Yellow Pavement Marking

PLOT SCALE - 1:49,3727

PLOT NAME - 1



DETAIL A



DETAIL A

WITH NO SIGHT RESTRICTION COMING OUT OF TAPER THIS LINE IS 10'-30' SKIP.
WITH SIGHT RESTRICTION COMING OUT OF TAPER THIS LINE IS 4" SOLID YELLOW.

Note:
All longitudinal pavement markings begin and end at radius of side street.

..... Markings not to be replaced

PLOTTED FROM - TRW11119

FILE - ... \MARKING\MADISONLANE.DGN

SEQUENCE OF OPERATIONS

1. Install Traffic Control devices per the details in these plans
2. Complete all concrete repair work
3. Grind areas listed in the plans
4. Reseal joints
5. Install permanent pavement marking

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.

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

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

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.

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.

GENERAL TRAFFIC CONTROL (CONTINUED)

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 5 miles will be used if 5 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. Paint will not be allowed for temporary pavement marking on the asphalt concrete wear course or after application of the flush seal.

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.

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.

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 5 miles in length. Construction workspaces on undivided roadways will be limited to a maximum of 1320 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.

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, 11:30 am to 1:00 pm 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.

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 on I29. 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.

TRAFFIC CONTROL FOR PCCP REPAIR (CONTINUED)

Type B warning lights will be placed on top of FLAGGER (W20-7) symbol signs.

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.

TRAFFIC CONTROL PLAN SHEET LAYOUTS

The traffic control layouts provided as part of these plans are intended to be used in conjunction with all applicable standard plates. Any details provided as sheets in this section (e.g. taper lengths, advance signing details, and centerline delineation details) are intended to replace the details shown in the corresponding standard plates. All other details in the standard plates which are not in conflict with the plan sheets provided shall be used as detailed in the standard plates.

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 initial timings for the construction sites are given:

SD Highway 42 - Temporary Signal Timing Plans

PHASING AND SEQUENCING								
SIGNAL HEADS	INTERVAL	1	2	3	4	5	6	FLASH DISPLAY
Eastbound SD42		G	Y	R	R	R	R	R
Westbound SD42		R	R	R	G	Y	R	R
TIMINGS BASE ON MAXIMUM 1320' DISTANCE BETWEEN OPPOSING STOP LINE AND TRAFFIC SPEED OF 35MPH THRU WORK ZONE								FLASH TIME
PHASES		φ A		φ B				FAILURE OR EMERGENCY ONLY
CYCLE LENGTH 120 SEC. MOVEMENTS								
MIN. GREEN (SEC)		10		10				
EXTENSION GREEN (SEC)		5		5				
MAX. GREEN(SEC)		30		30				
YELLOW (SEC)		4		4				
ALL RED (SEC)		26		26				

US Highway 81 - Temporary Signal Timing Plans

PHASING AND SEQUENCING								
SIGNAL HEADS	INTERVAL	1	2	3	4	5	6	FLASH DISPLAY
Northbound US81		G	Y	R	R	R	R	R
SouthBound US81		R	R	R	G	Y	R	R
TIMINGS BASE ON MAXIMUM 1320' DISTANCE BETWEEN OPPOSING STOP LINE AND TRAFFIC SPEED OF 35MPH THRU WORK ZONE								FLASH TIME
PHASES		φ A		φ B				FAILURE OR EMERGENCY ONLY
CYCLE LENGTH 98 SEC. MOVEMENTS								
MIN. GREEN (SEC)		8		8				
EXTENSION GREEN (SEC)		4		4				
MAX. GREEN(SEC)		19		19				
YELLOW (SEC)		3		3				
ALL RED (SEC)		27		27				

* - 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 (Intervals 3 & 6) may be recalculated as follows:

$$\text{All Red} = 2.84 + \frac{W}{36.67} + 20 - 4.0$$

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.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	18	74

PORTABLE TEMPORARY TRAFFIC CONTROL SIGNAL (CONTINUED)

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 PORTABLE CHANGEABLE MESSAGE SIGN

One week prior to starting work affecting the traveling public, portable changeable message signs (PCMS) will be installed at locations as directed by the Engineer. PCMS will be used in conjunction with temporary signals to inform traffic of wait times. The Contractor will program the portable changeable message signs with the following message:

ROAD WORK
STARTS (Date)

When work begins that will affect traffic patterns, the Contractor will re-program the PCMS with the messages as detailed in the plans.

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

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD				EXPRESSWAY / INTERSTATE					
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT		
R1-1	STOP	1	30"	5.2	5.2		36"	7.5			
R1-2	YIELD		36"	3.9		1	36"	3.9	3.9		
R2-1	SPEED LIMIT 45		24" x 30"	5.0		2	36" x 48"	12.0	24.0		
R2-1	SPEED LIMIT 55		24" x 30"	5.0		4	36" x 48"	12.0	48.0		
R2-1	SPEED LIMIT 65		24" x 30"	5.0		2	36" x 48"	12.0	24.0		
R2-1	SPEED LIMIT 80		24" x 30"	5.0		2	36" x 48"	12.0	24.0		
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			
R3-7R	RIGHT LANE MUST TURN RIGHT	2	30" x 30"	6.3	12.6						
R4-7	KEEP RIGHT (symbol)	4	24" x 30"	5.0	20.0		36" x 48"	12.0			
R4-9	STAY IN LANE		24" x 24"	4.0		2	36" x 48"	12.0	24.0		
R10-6	STOP HERE ON RED	2	24" x 36"	6.0	12.0						
W1-4	REVERSE CURVE (L or R)		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
W1-4b	REVERSE CURVE (two lanes shift) (L or R)		48" x 48"	16.0		4	48" x 48"	16.0	64.0		
W3-3	SIGNAL AHEAD (symbol)	2	48" x 48"	16.0	32.0		48" x 48"	16.0			
W3-5	SPEED REDUCTION AHEAD (45 MPH)		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
W3-5	SPEED REDUCTION AHEAD (55 MPH)		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
W4-1	MERGE (symbol)		48" x 48"	16.0		1	48" x 48"	16.0	16.0		
W4-2	LEFT or RIGHT LANE ENDS (symbol)		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
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)		36" x 30"	7.5		2	36" x 30"	7.5	15.0		
W9-2	LANE ENDS MERGE LEFT	1	48" x 48"	16.0	16.0		48" x 48"	16.0			
W9-3L	CENTER LANE CLOSED AHEAD		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
W12-1	DOUBLE ARROW		30" x 30"	6.3		1	48" x 48"	16.0	16.0		
W20-1	ROAD WORK AHEAD		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0		48" x 48"	16.0			
W20-5	LEFT or RIGHT LANE CLOSED AHEAD		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
W20-7	FLAGGER (symbol)		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
W21-5a	LEFT or RIGHT SHOULDER CLOSED		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
W21-5b	LEFT or RIGHT SHOULDER CLOSED AHEAD		48" x 48"	16.0		2	48" x 48"	16.0	32.0		
G20-2	END ROAD WORK		36" x 18"	4.5		2	48" x 24"	8.0	16.0		
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT				133.8	EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT				638.9

SPECIAL DETAIL FOR WORK IN LANE 2 (3-LANE SECTION) (TYPICAL)

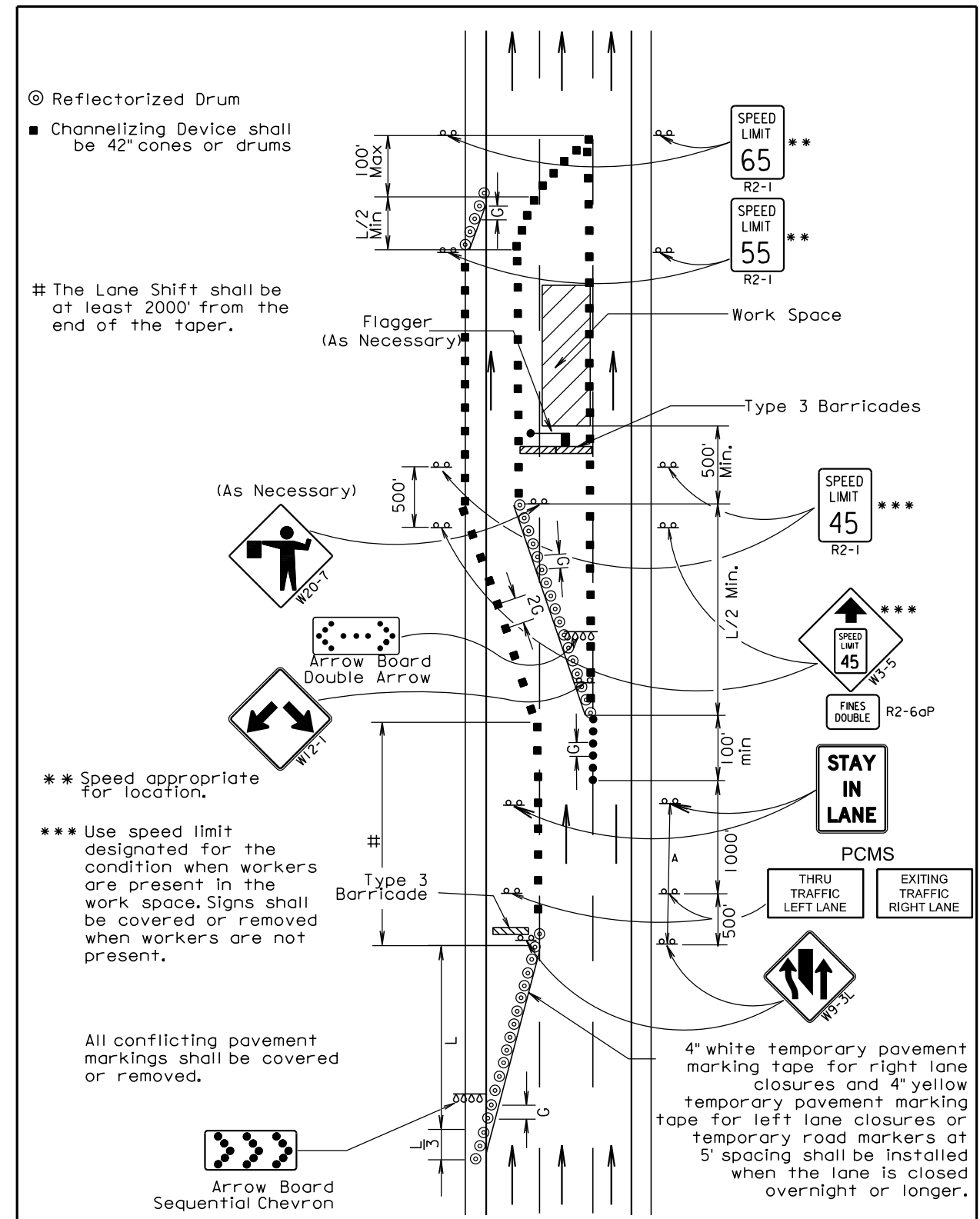
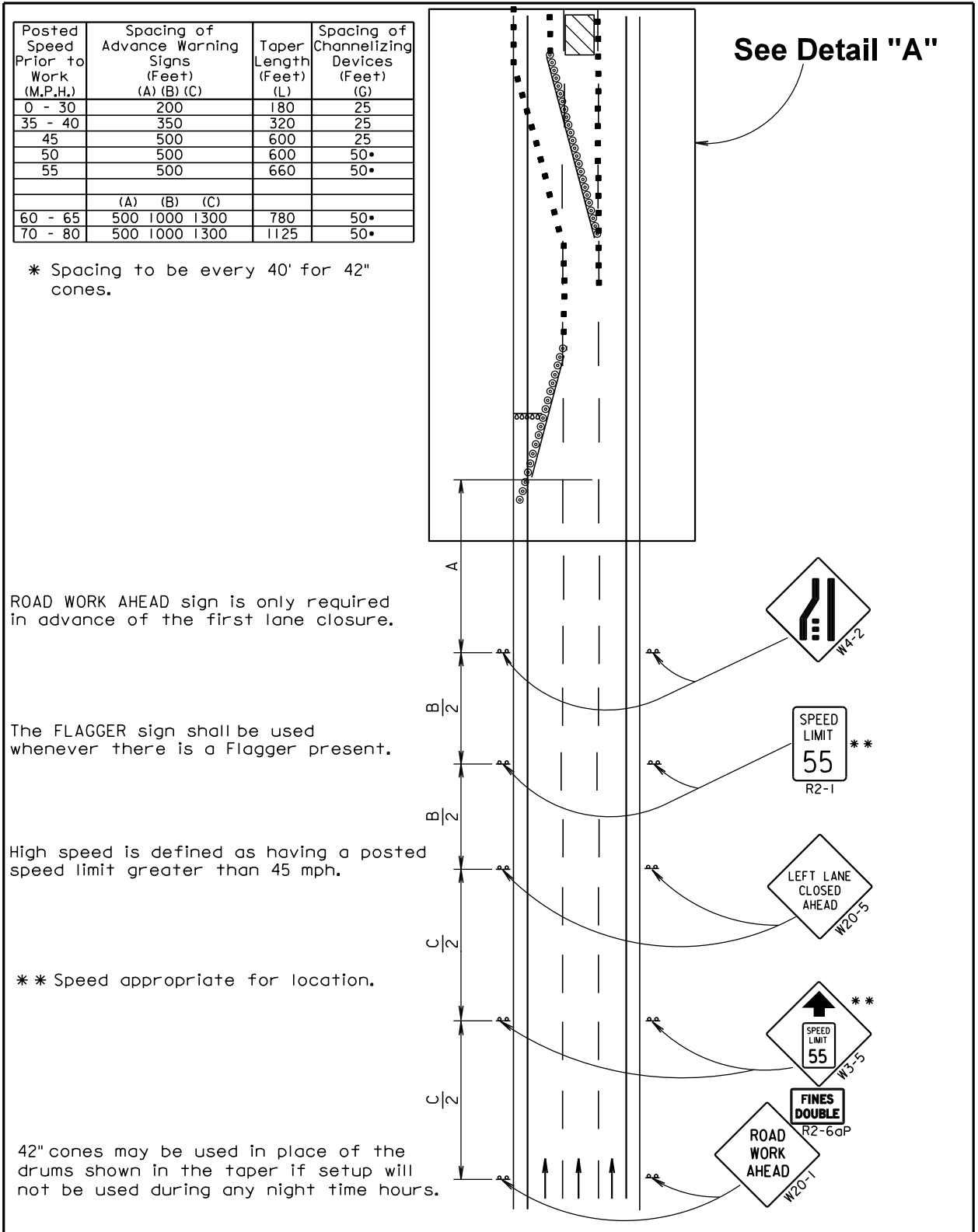
Plotting Date: 03/25/2024

PLOT SCALE - 1:200

PLOT NAME - 3

FILE - ... \TC\MIDDLE LANE CLOSURE2D.DGN

Detail "A"

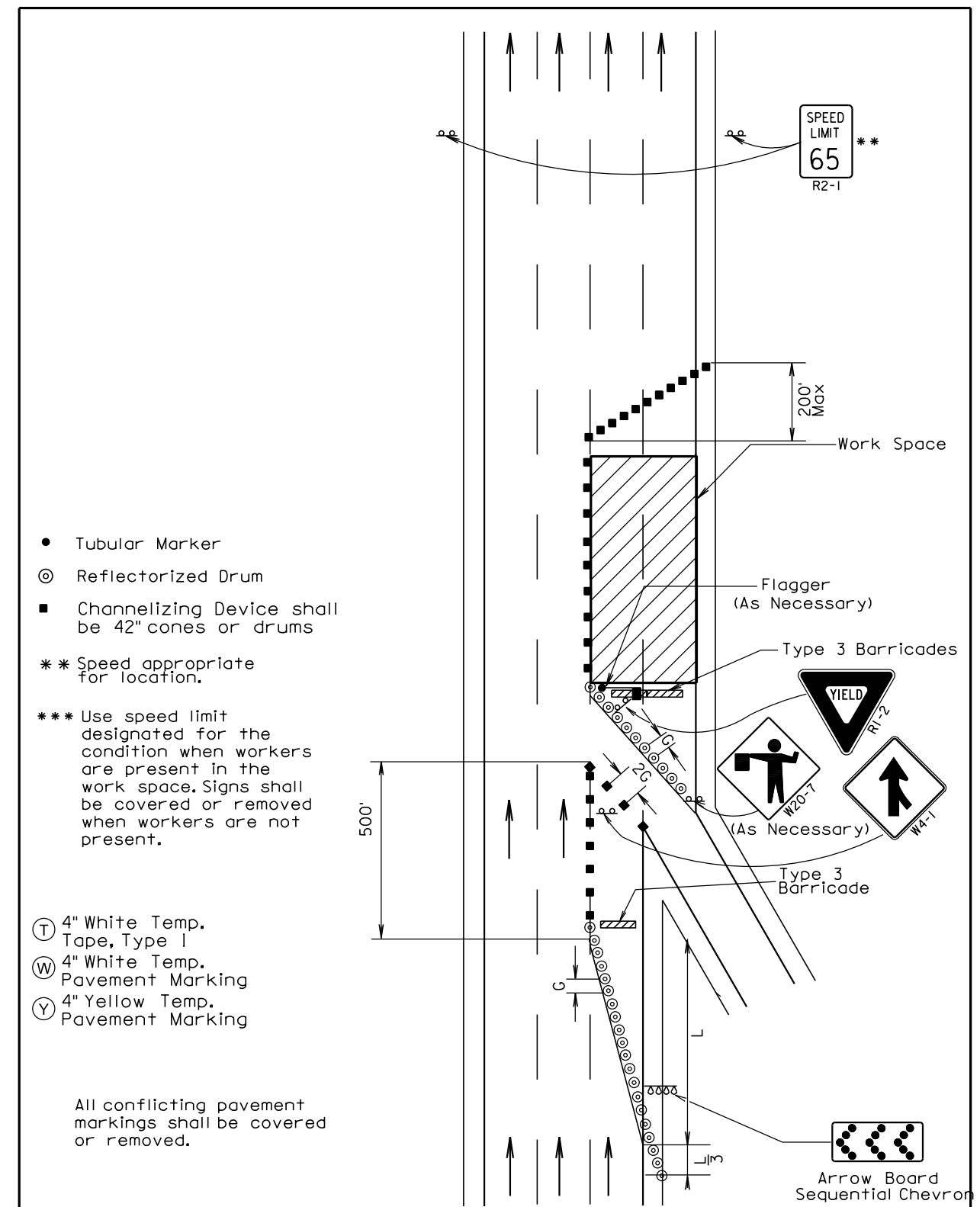
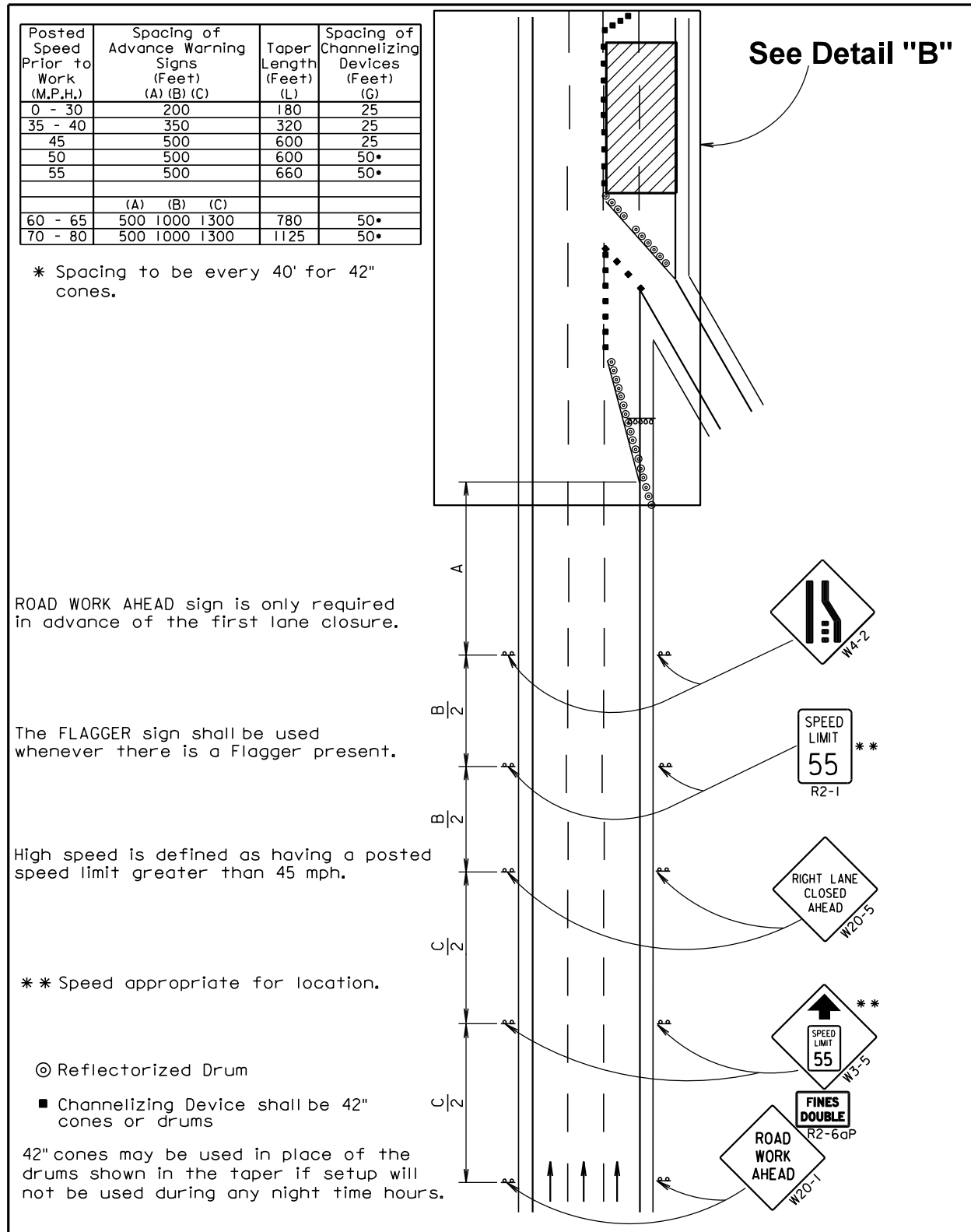


PLOTTED FROM - IRSE12133

SPECIAL DETAIL FOR WORK IN LANE 3 AND 4 NEAR ON RAMP (TYPICAL)

PLOT SCALE - 1:200

Detail "B"

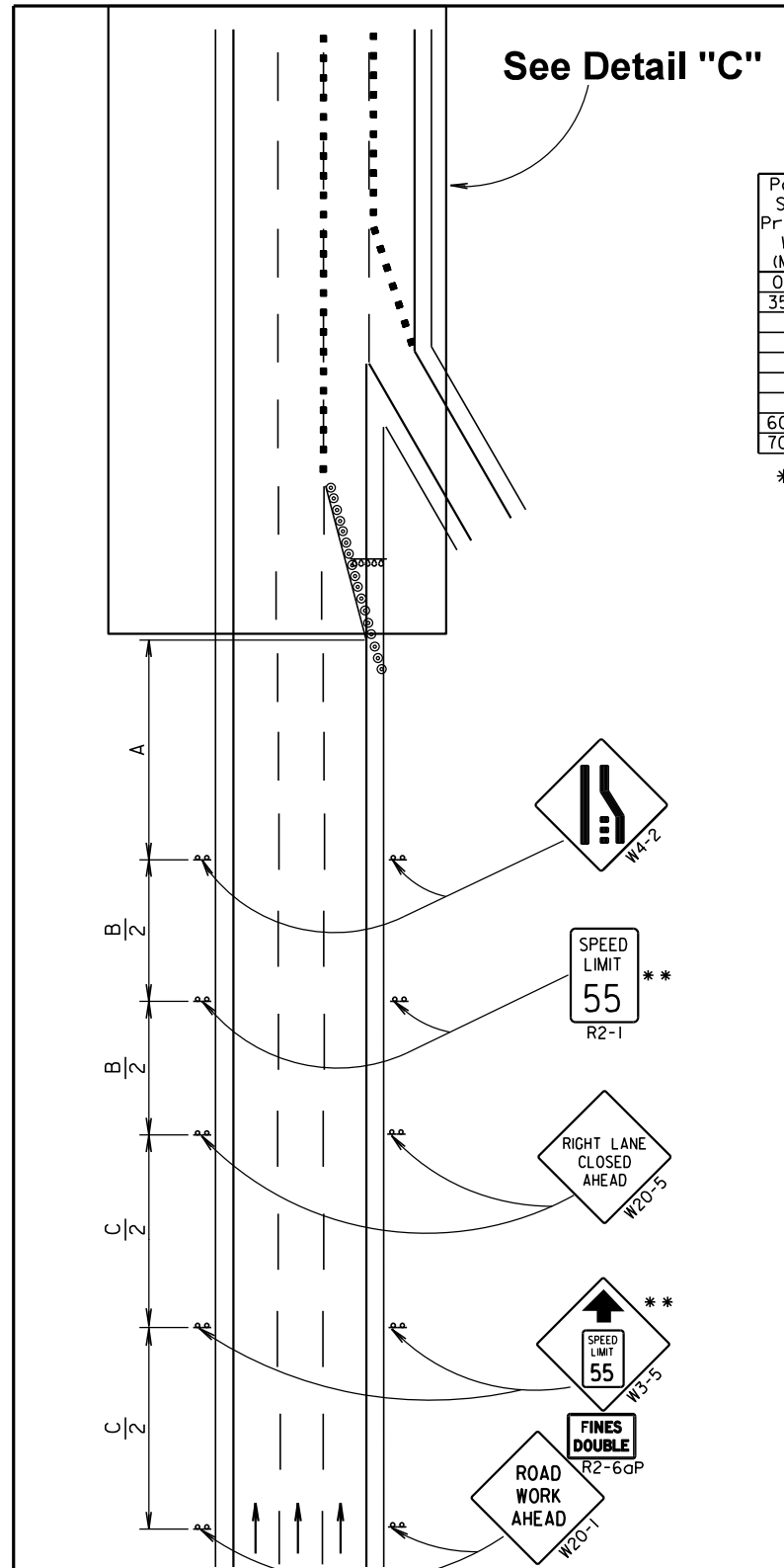


PLOTTED FROM - IRSE12133

FILE - ... \TC\MIDDLE LANE CLOSURE2.DGN

SPECIAL DETAIL FOR WORK IN LANE 3 AND 4 NEAR OFF RAMP (TYPICAL)

Detail "C"



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)			Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
	(A)	(B)	(C)		
0 - 30	200			180	25
35 - 40	350			320	25
45	500			600	25
50	500			600	50*
55	500			660	50*
	(A)	(B)	(C)		
60 - 65	500	1000	1300	780	50*
70 - 80	500	1000	1300	1125	50*

* Spacing to be every 40' for 42" cones.

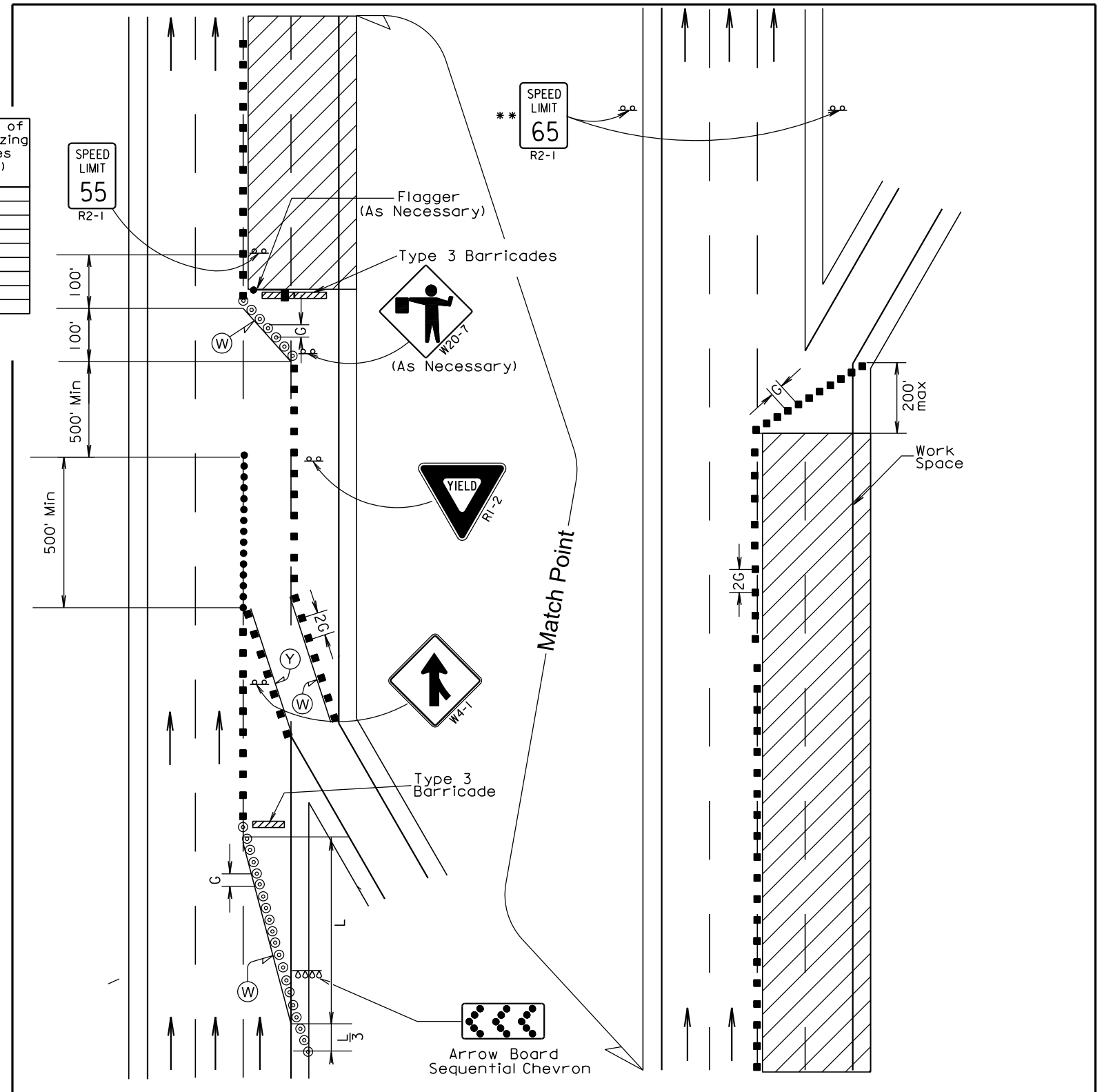
- Tubular Marker
- ⊙ Reflectorized Drum
- Channelizing Device shall be 42" cones or drums

** Speed appropriate for location.

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

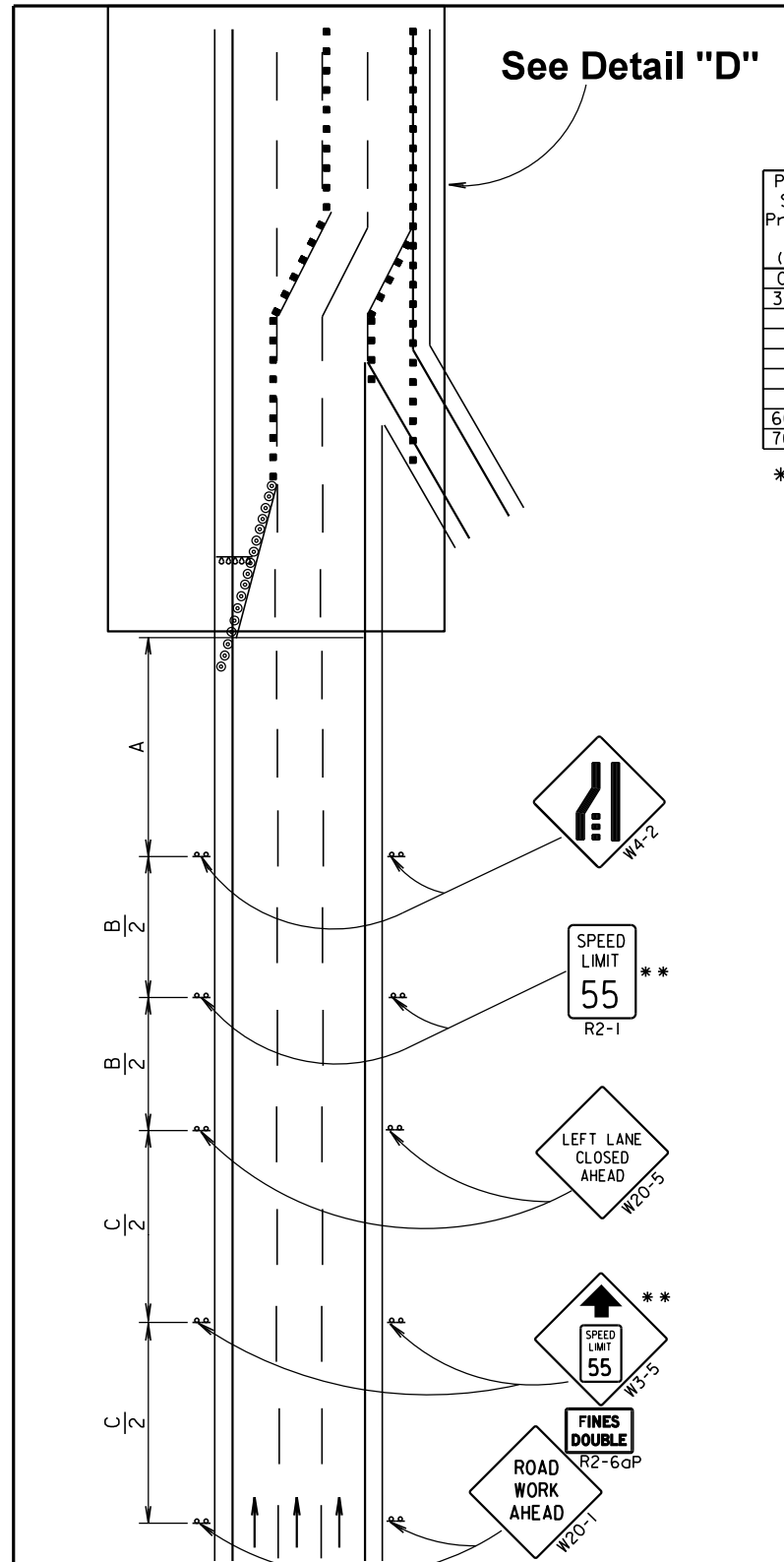
- Ⓣ 4" White Temp. Tape, Type I
- Ⓦ 4" White Temp. Pavement Marking
- Ⓨ 4" Yellow Temp. Pavement Marking

All conflicting pavement markings shall be covered or removed.



SPECIAL DETAIL FOR WORK IN LANE 1 AND 2 BETWEEN EXITS (TYPICAL)

Detail "D"



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)			Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
	(A)	(B)	(C)		
0 - 30	200			180	25
35 - 40	350			320	25
45	500			600	25
50	500			600	50*
55	500			660	50*
	(A)	(B)	(C)		
60 - 65	500	1000	1300	780	50*
70 - 80	500	1000	1300	1125	50*

* Spacing to be every 40' for 42" cones.

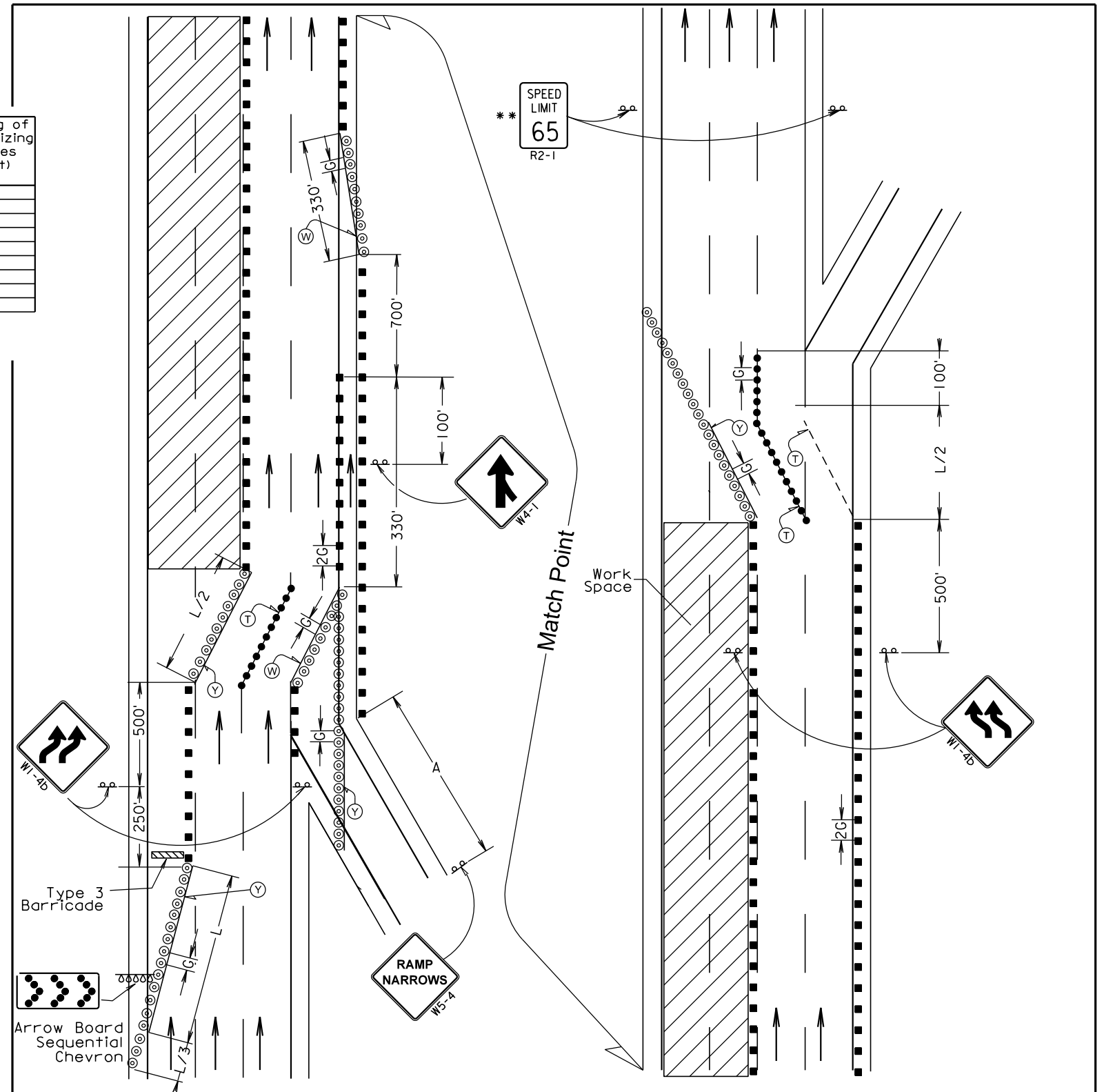
- Tubular Marker
- ⊙ Reflectorized Drum
- Channelizing Device shall be 42" cones or drums

** Speed appropriate for location.

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

- Ⓣ 4" White Temp. Tape, Type I
- Ⓦ 4" White Temp. Pavement Marking
- Ⓨ 4" Yellow Temp. Pavement Marking

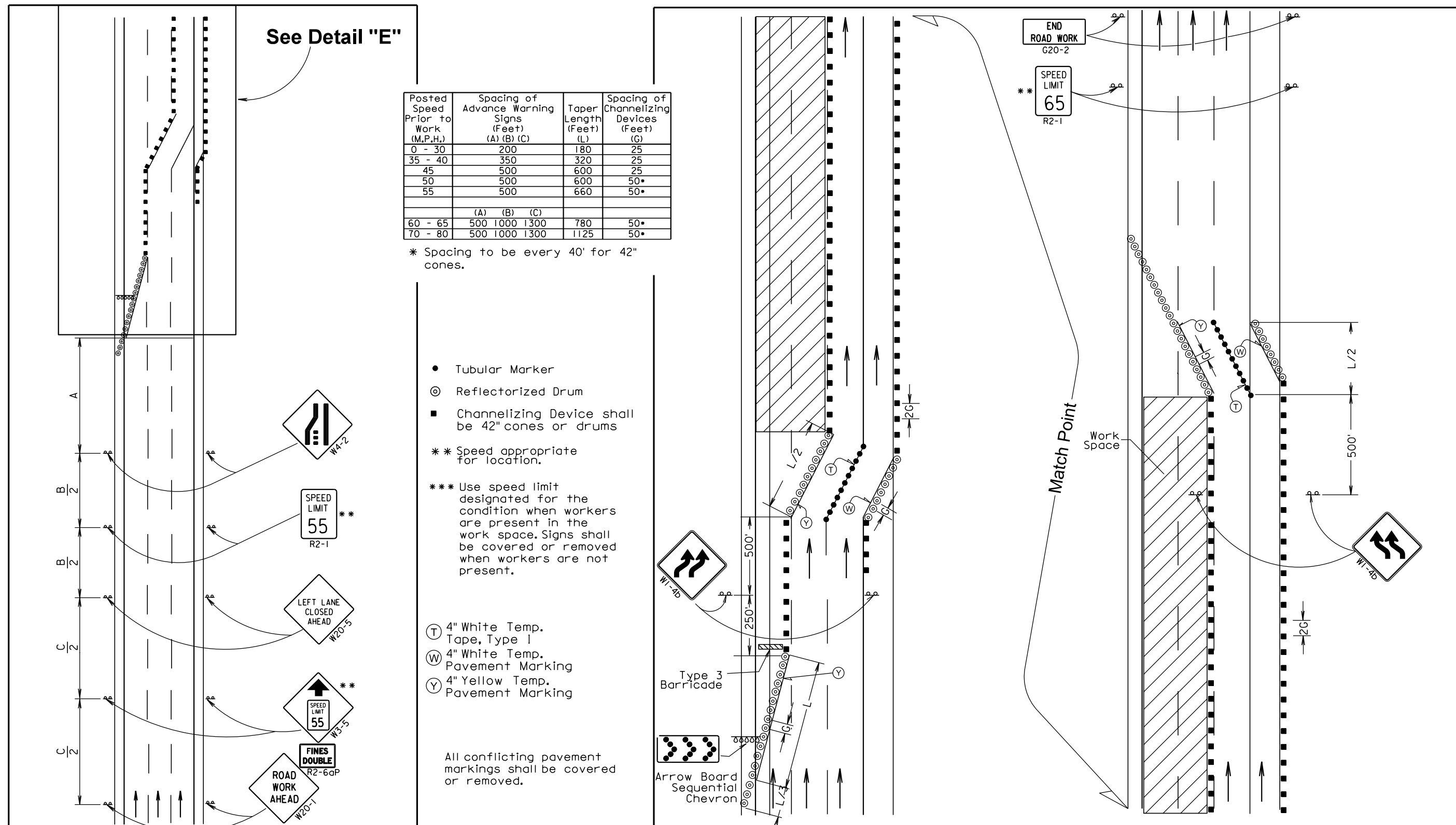
All conflicting pavement markings shall be covered or removed.



SPECIAL DETAIL FOR WORK IN LANE 1 AND 2 (3-LANE SECTION) (TYPICAL)

Plotting Date: 03/25/2024

Detail "E"



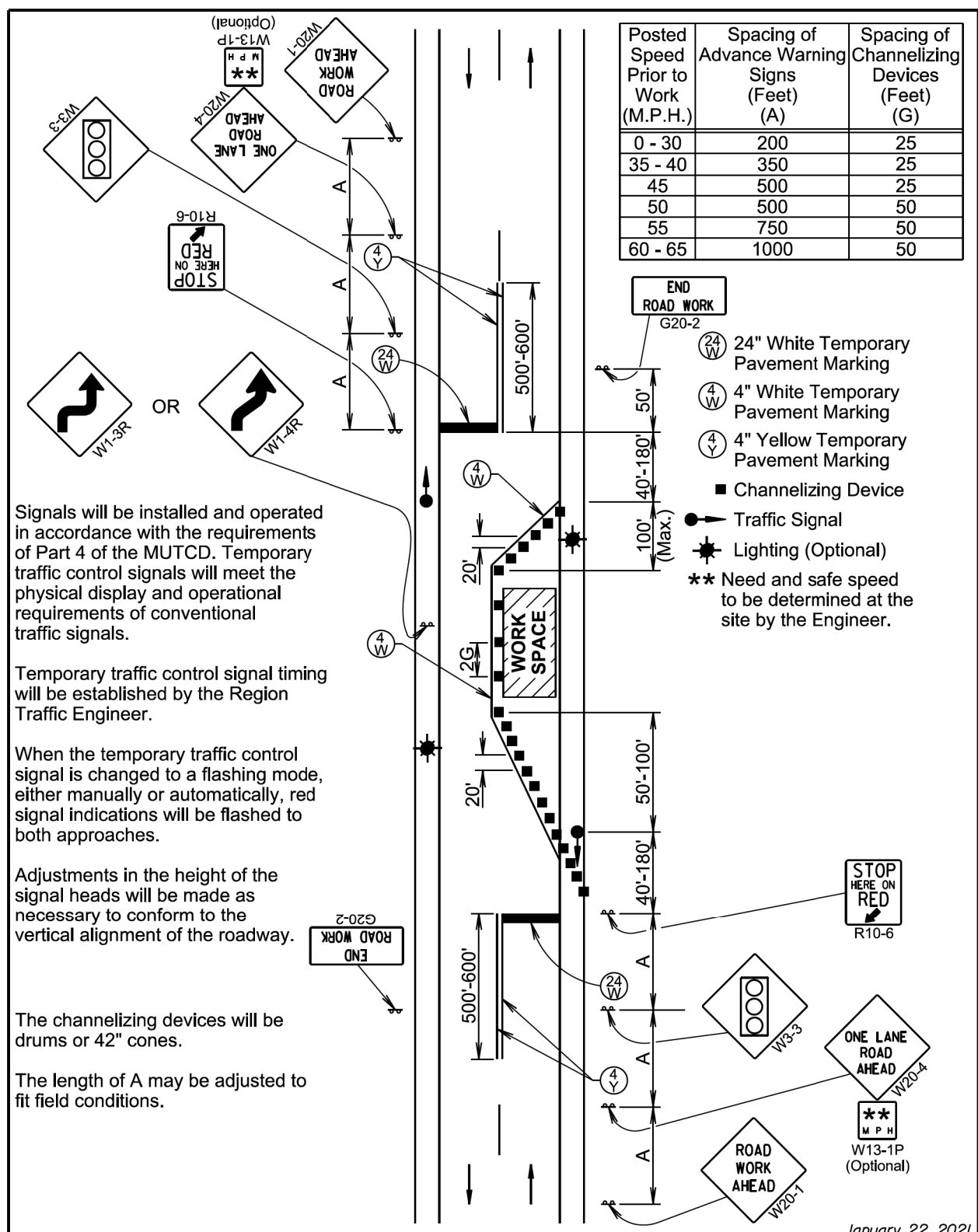
PLOT SCALE - 1:200

PLOTTED FROM - IRSE12133

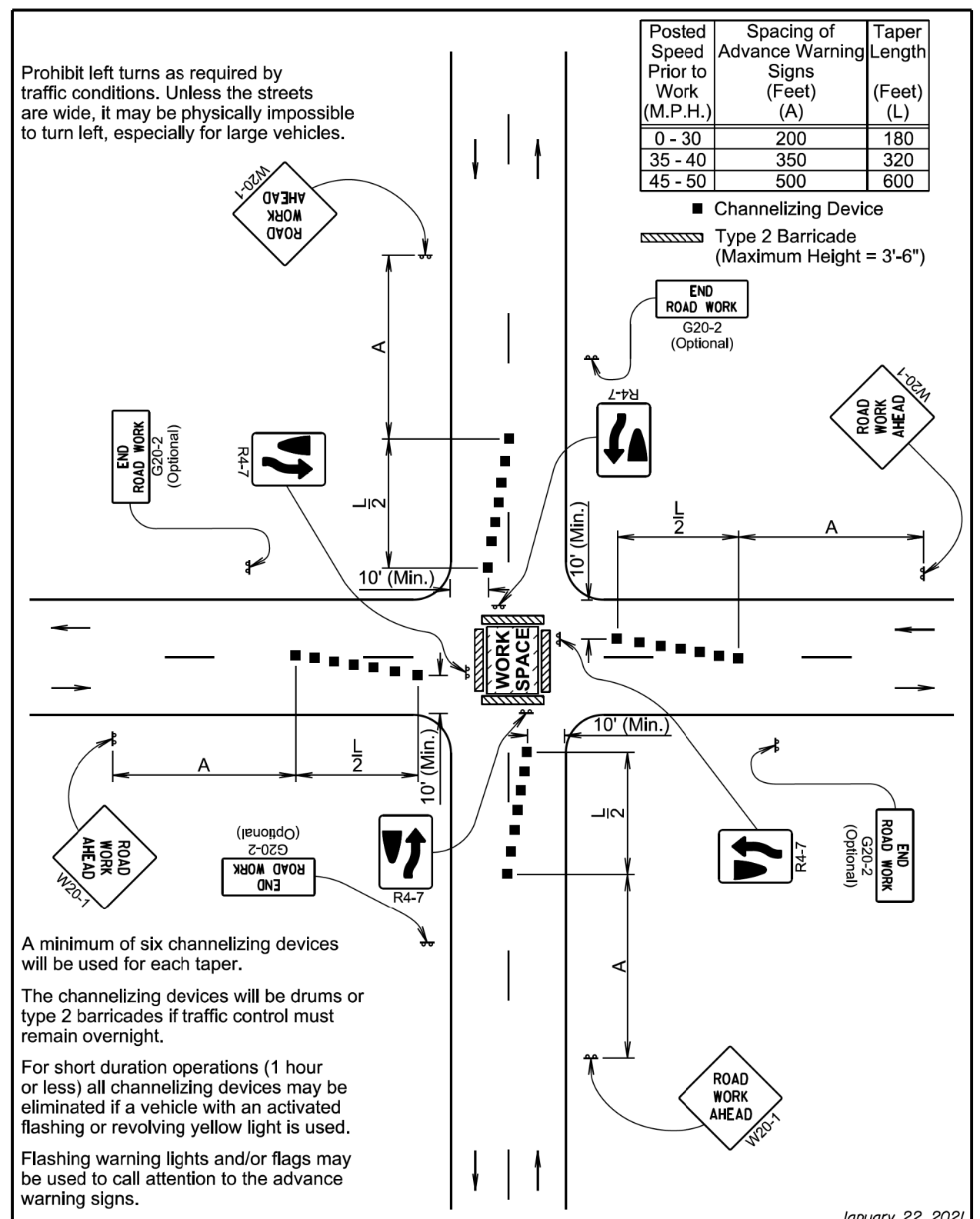
PLOT NAME - 6

FILE - ... \TC\MIDDLE LANE CLOSURE2.DGN

PLOT SCALE - 1:199,992



S D D O T	LANE CLOSURE USING TRAFFIC SIGNALS	PLATE NUMBER 634.26
	Published Date: 2024	Sheet 1 of 1



S D D O T	CLOSURE IN CENTER OF INTERSECTION	PLATE NUMBER 634.35
	Published Date: 2024	Sheet 1 of 1

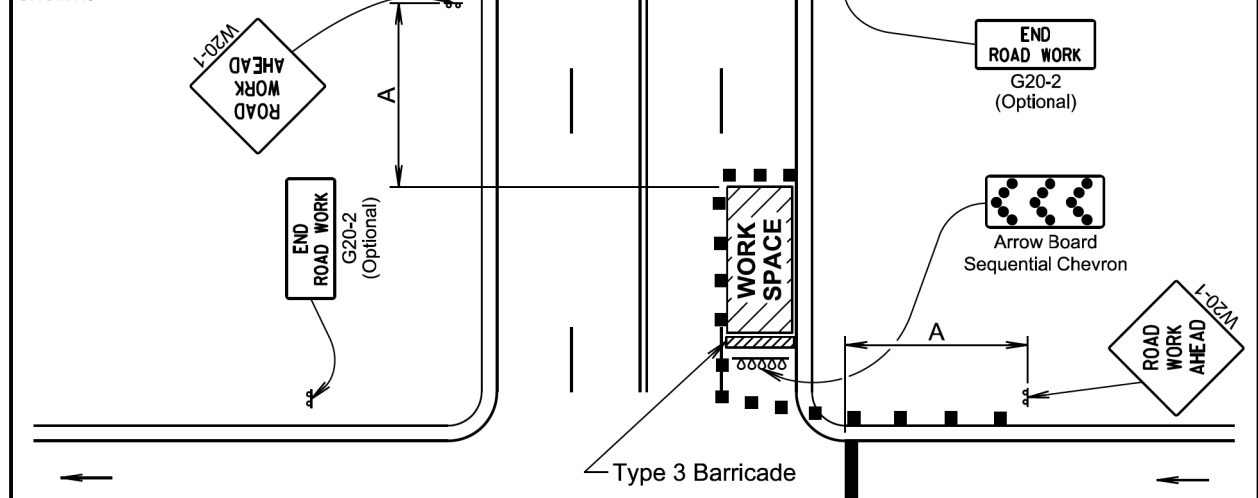
FILE - ... \MINNIGUL-177\NSTD PLATES.DGN

PLOT FROM - TRSF12133

Plotting Date: 02/14/2024

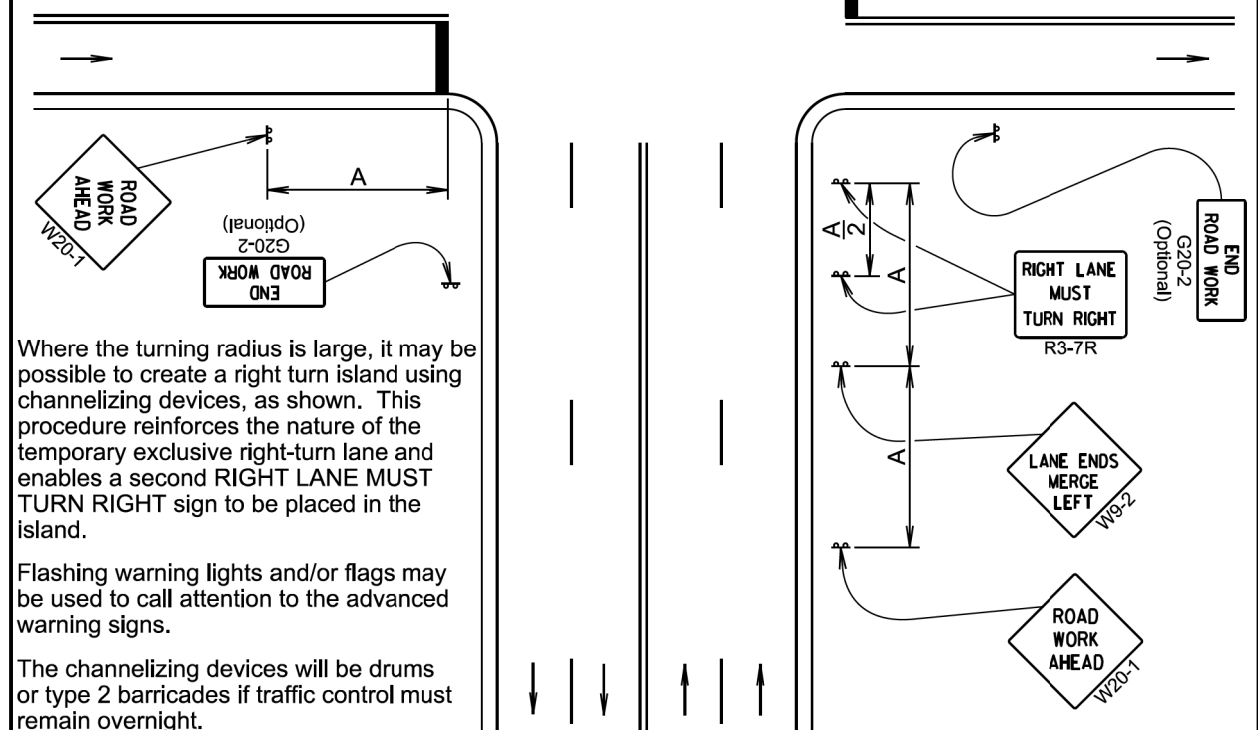
For intersection approaches reduced to a single lane, left-turning movements may be prohibited to maintain capacity for through traffic.

The standard procedure is to close on near side of the intersection any lane that is not carried through the intersection. However, when this results in the closing of a right lane having significant right-turning movements, then the right lane may be restricted to right turns only, as shown.



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)
0 - 30	200
35 - 40	350
45 - 50	500

- Channelizing Device
- END ROAD WORK G20-2 (Optional)
- Arrow Board Sequential Chevron
- Reflectorized Drum
- Channelizing Device
- ④ 4" White Temporary Pavement Marking
- ④ 4" Yellow Temporary Pavement Marking



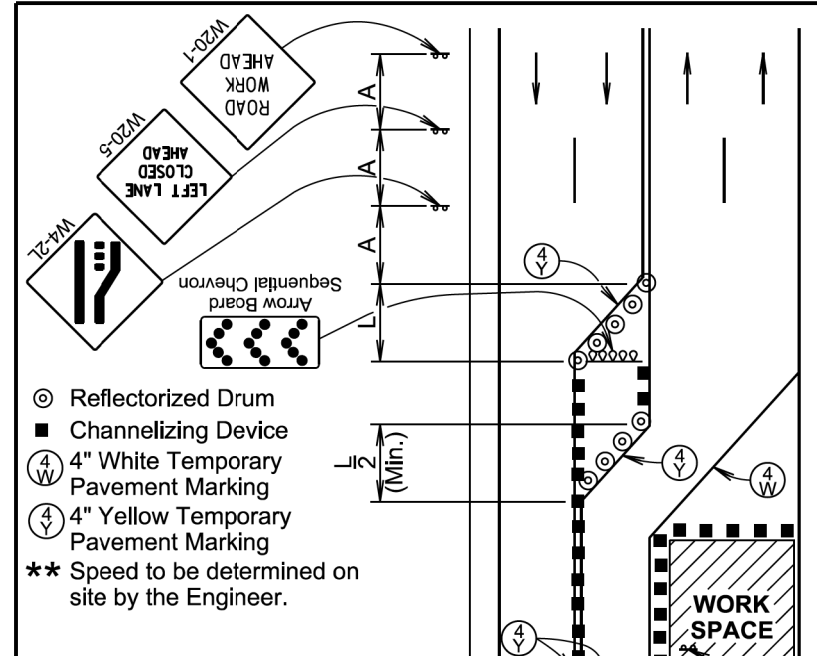
Where the turning radius is large, it may be possible to create a right turn island using channelizing devices, as shown. This procedure reinforces the nature of the temporary exclusive right-turn lane and enables a second RIGHT LANE MUST TURN RIGHT sign to be placed in the island.

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

The channelizing devices will be drums or type 2 barricades if traffic control must remain overnight.

S D D O T	RIGHT LANE CLOSURE FAR SIDE OF INTERSECTION	PLATE NUMBER 634.42
	Published Date: 2024	Sheet 1 of 1

January 22, 2021



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

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.

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.



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



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

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

* Spacing is 40' for 42" cones.

S D D O T	HALF ROAD CLOSURE ON MULTILANE HIGHWAY	PLATE NUMBER 634.46
	Published Date: 2024	Sheet 1 of 1

September 22, 2021

PLOT SCALE - 1:199,992

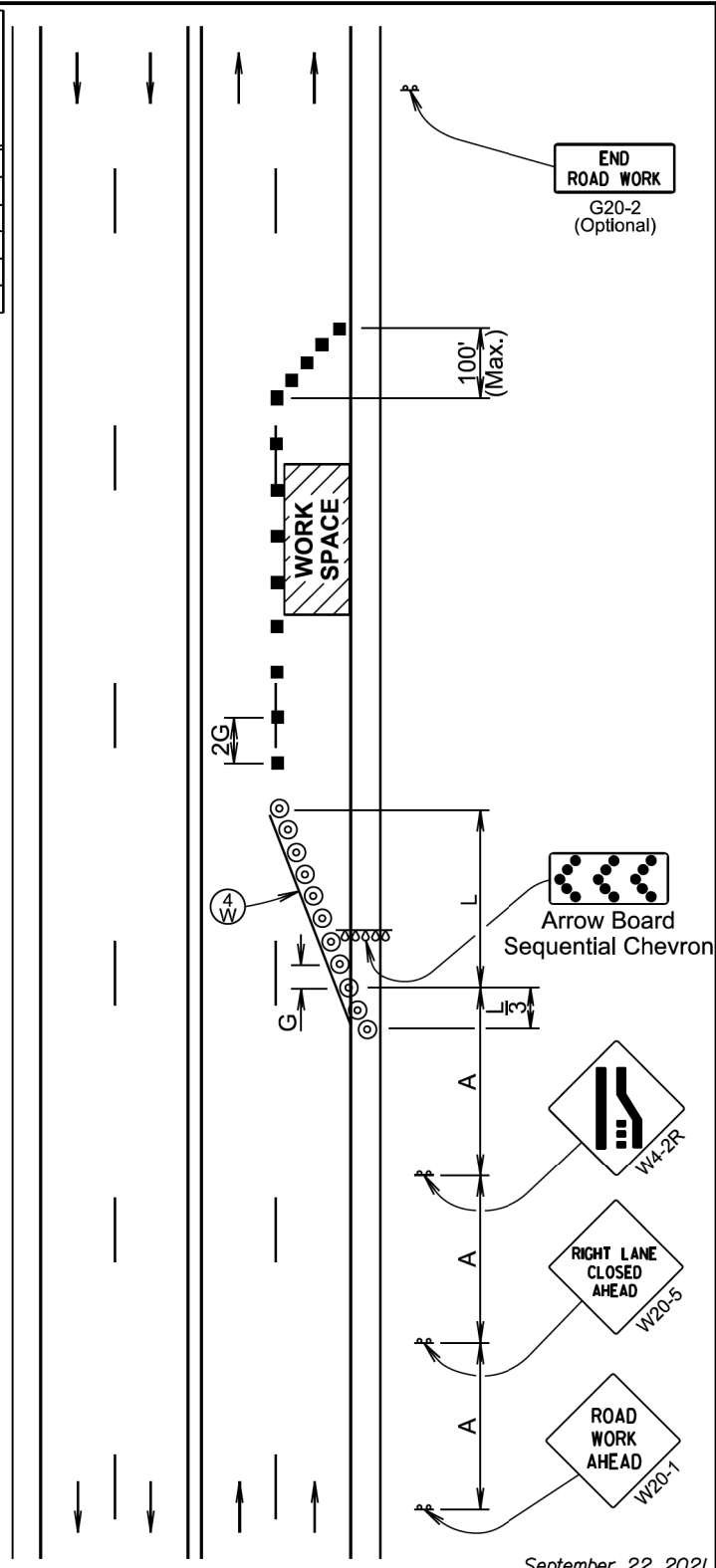
PLOTTED FROM - IRSE12133

PLOT NAME - 2

FILE - ... \MINN16XU-177W\STD PLATES.DGN

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
 - Ⓞ 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.



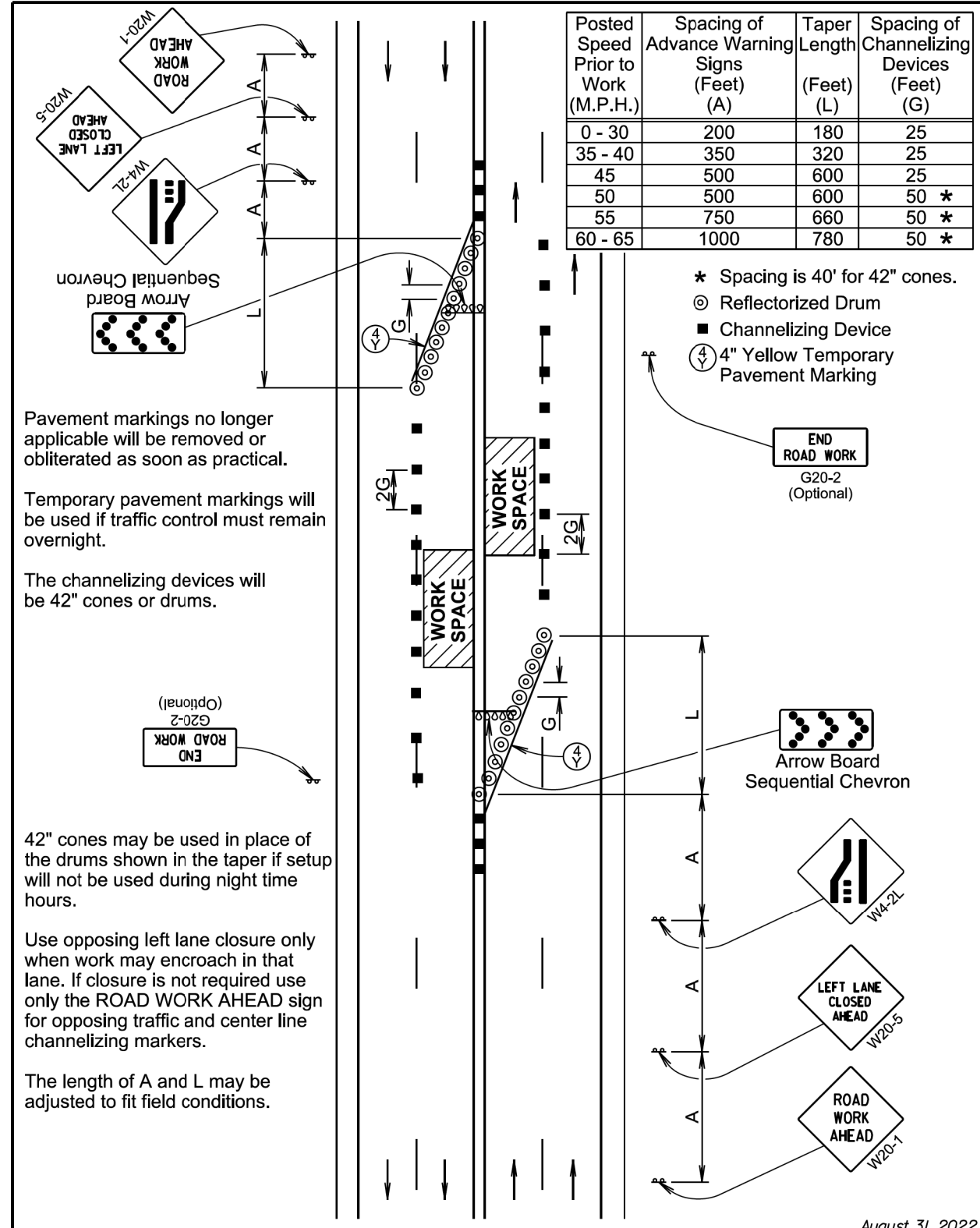
September 22, 2021

S D D O T	4-LANE UNDIVIDED, RIGHT LANE CLOSED	PLATE NUMBER 634.47
		Sheet 1 of 1

Published Date: 2024

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
- Ⓞ 4" Yellow Temporary Pavement Marking



August 31, 2022

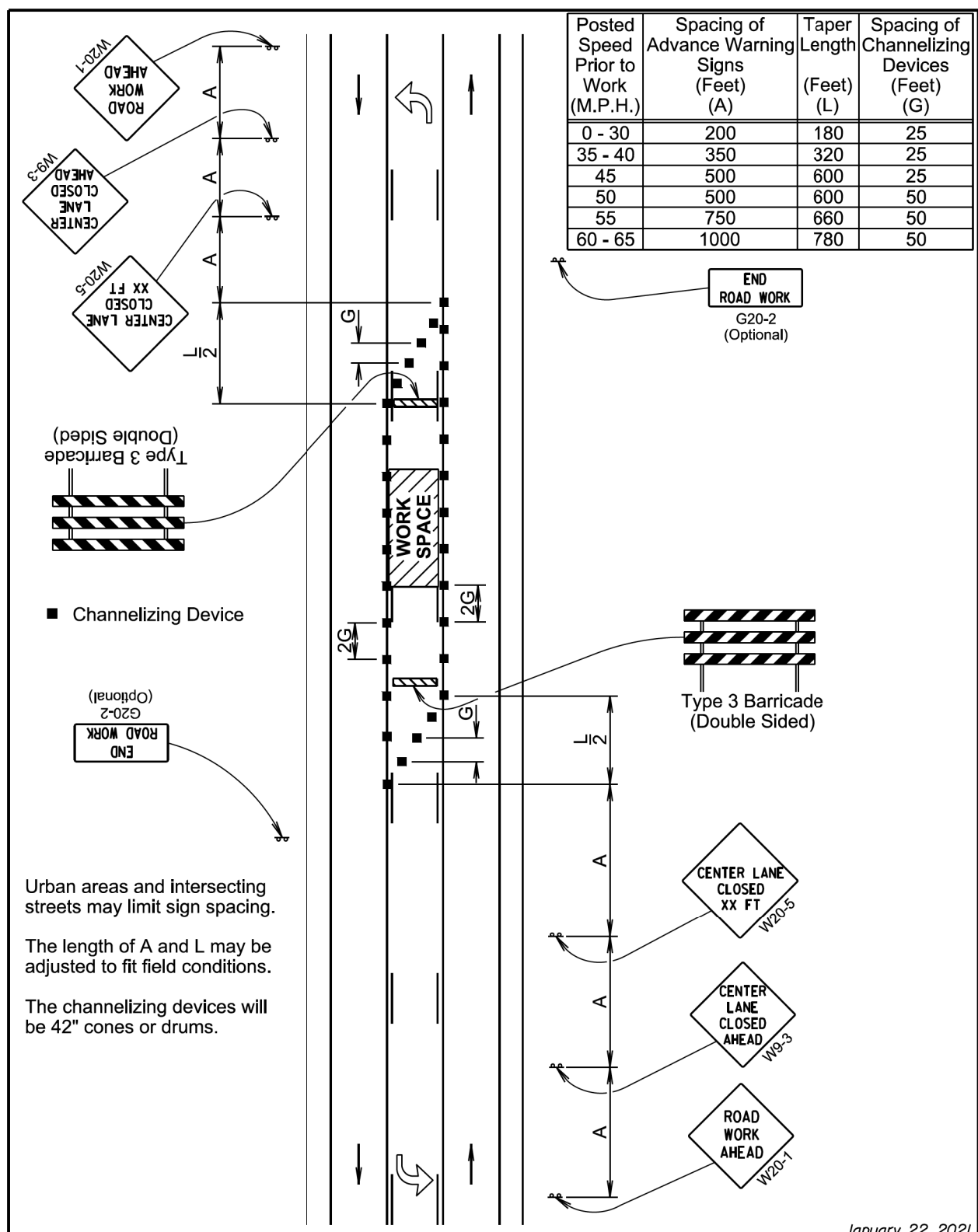
S D D O T	4-LANE UNDIVIDED, LEFT LANE CLOSED	PLATE NUMBER 634.48
		Sheet 1 of 1

Published Date: 2024

Plotting Date: 02/14/2024

PLOT SCALE - 1" = 199.992'

PLOT NAME - 4



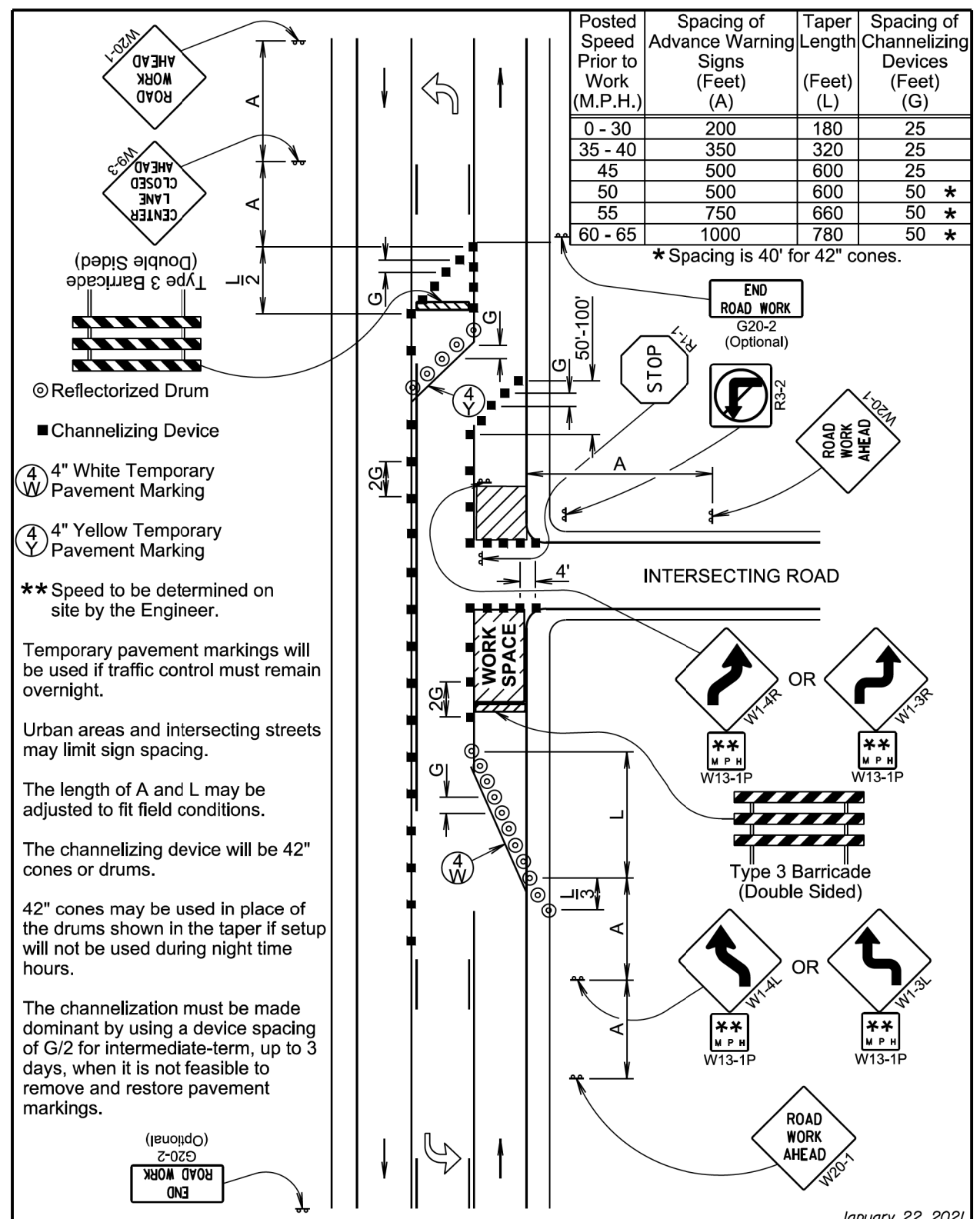
Urban areas and intersecting streets may limit sign spacing.

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

S D D O T	3-LANE, CENTER LANE CLOSED	PLATE NUMBER 634.52
	Published Date: 2024	Sheet 1 of 1



** 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

S D D O T	3-LANE, OUTSIDE LANE CLOSED	PLATE NUMBER 634.53
	Published Date: 2024	Sheet 1 of 1

PLOTTED FROM - IRSE12133

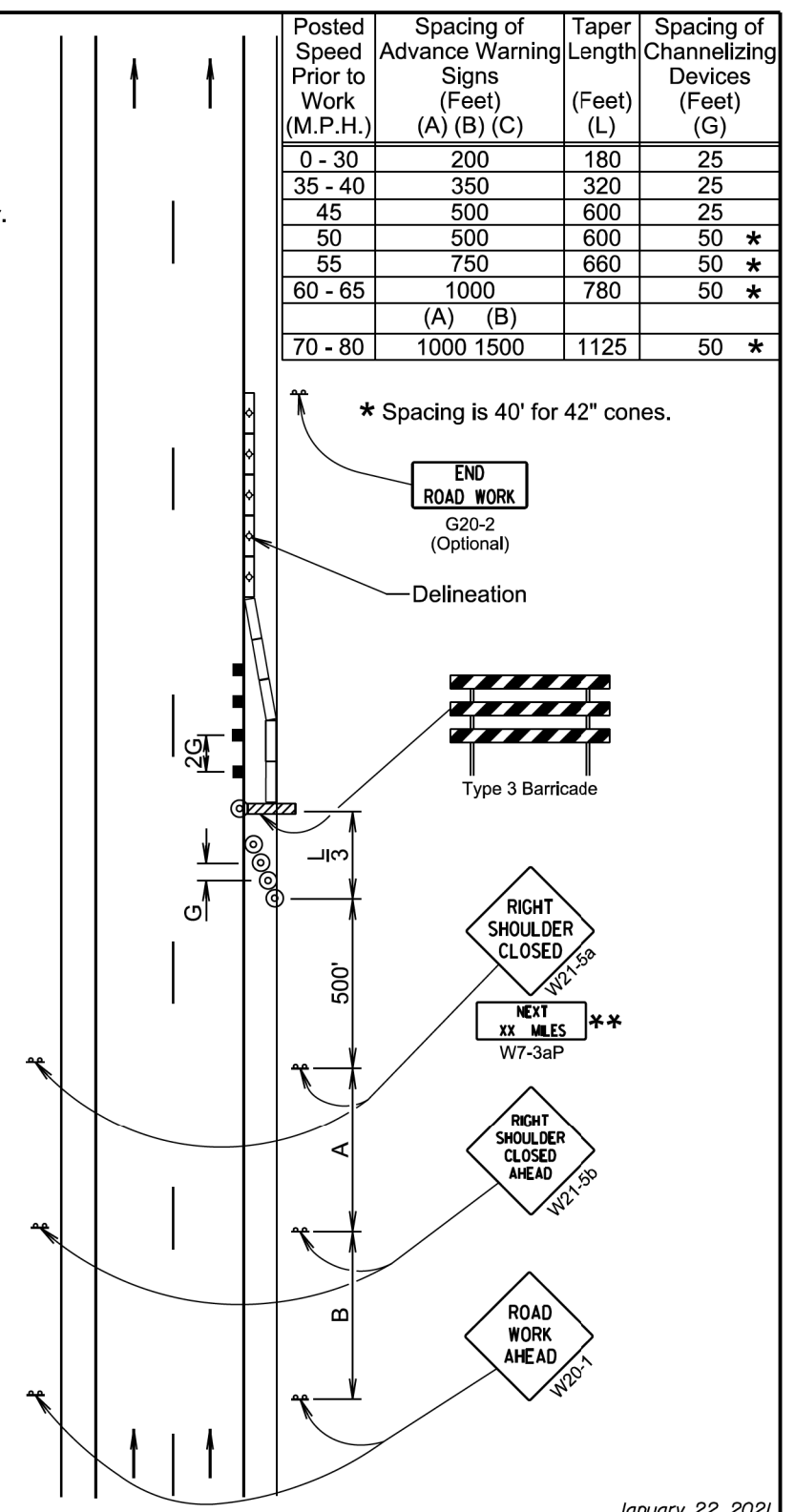
FILE - ... \MINNIGUL177\NSTD PLATES.DGN

PLOT SCALE - 1:199,992

- ⊙ Reflectorized Drum
- Channelizing Device
- ▭ Movable Concrete Barrier
- ** For distances 1/2 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.



January 22, 2021

S D D O T	SHOULDER CLOSED	PLATE NUMBER 634.61
	Published Date: 2024	Sheet 1 of 1

PLOT NAME - 5

FILE - ... \MINNIGXUL177\NSTD PLATES.DGN

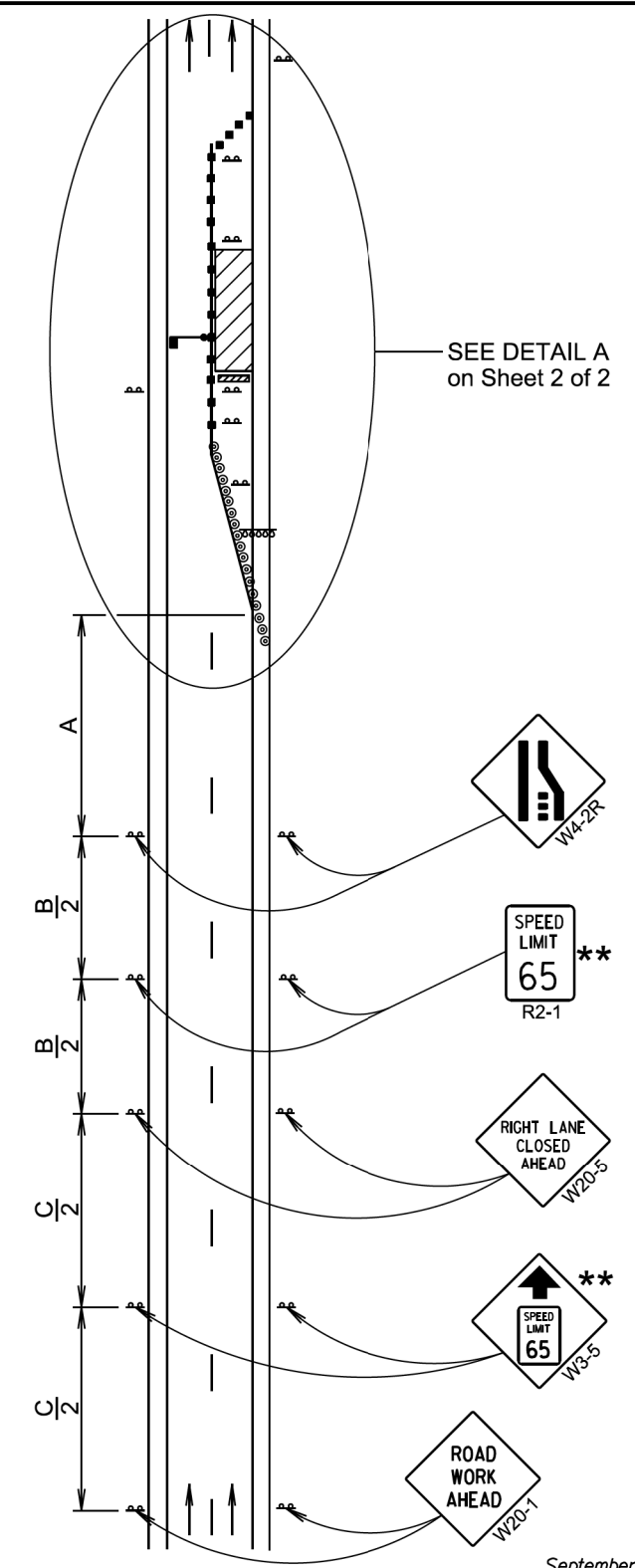
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)		
	(A)	(B)	(C)
0 - 30	200		
35 - 40	350		
45 - 50	500		
55	750		
60 - 65	1000		
	(A)	(B)	(C)
70 - 80	1000	1500	2640

** 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.



September 22, 2021

S D D O T	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
	Published Date: 2024	Sheet 1 of 2

Plotting Date: 02/14/2024

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.

- Flagger (As Necessary)
- ⊙ Reflectorized Drum
- Channelizing Device

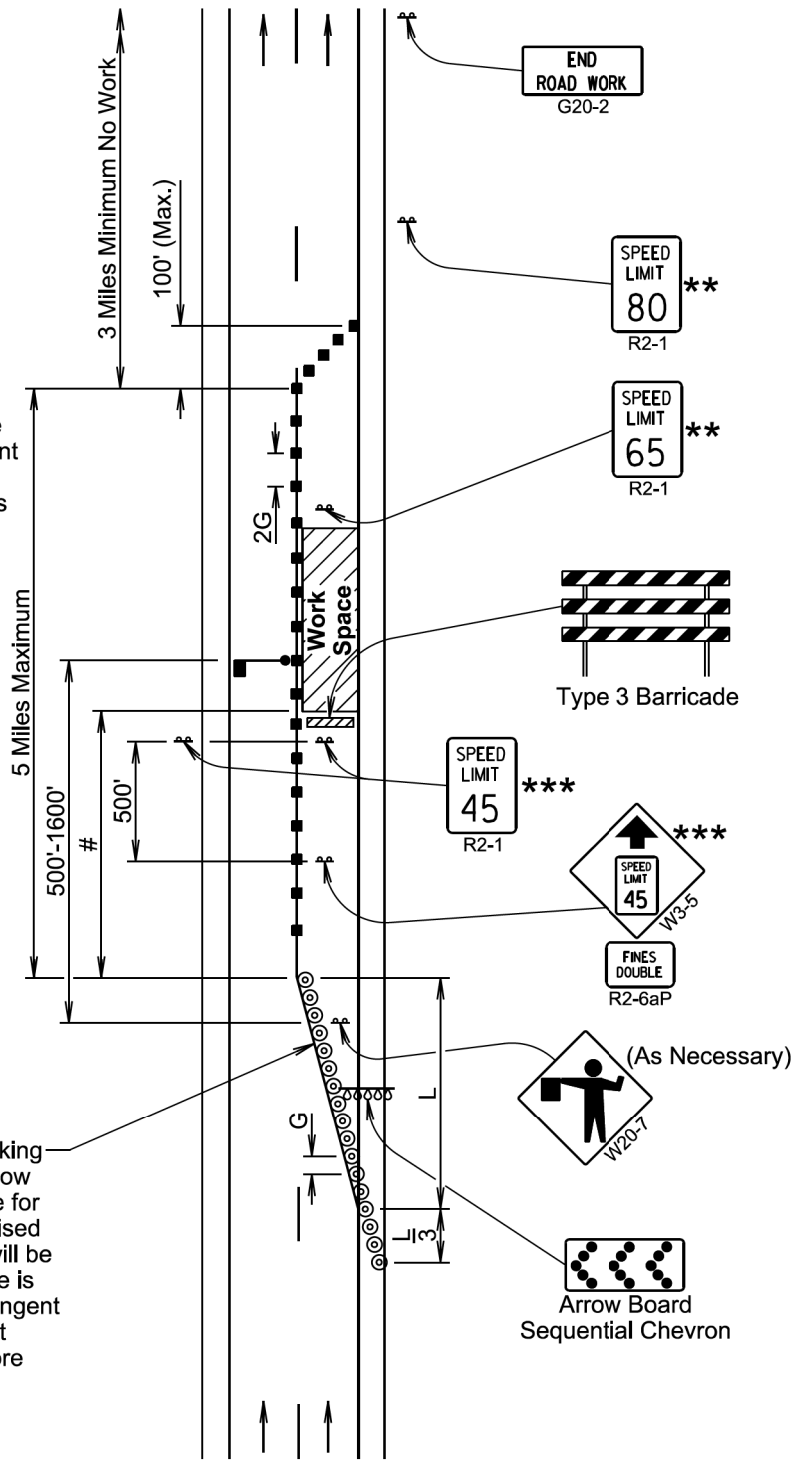
The Work Space will be a minimum of 500' from the end of the taper.

The FLAGGER sign will be used whenever there is a Flagger present.

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

September 22, 2021

S D D O T	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
	Published Date: 2024	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

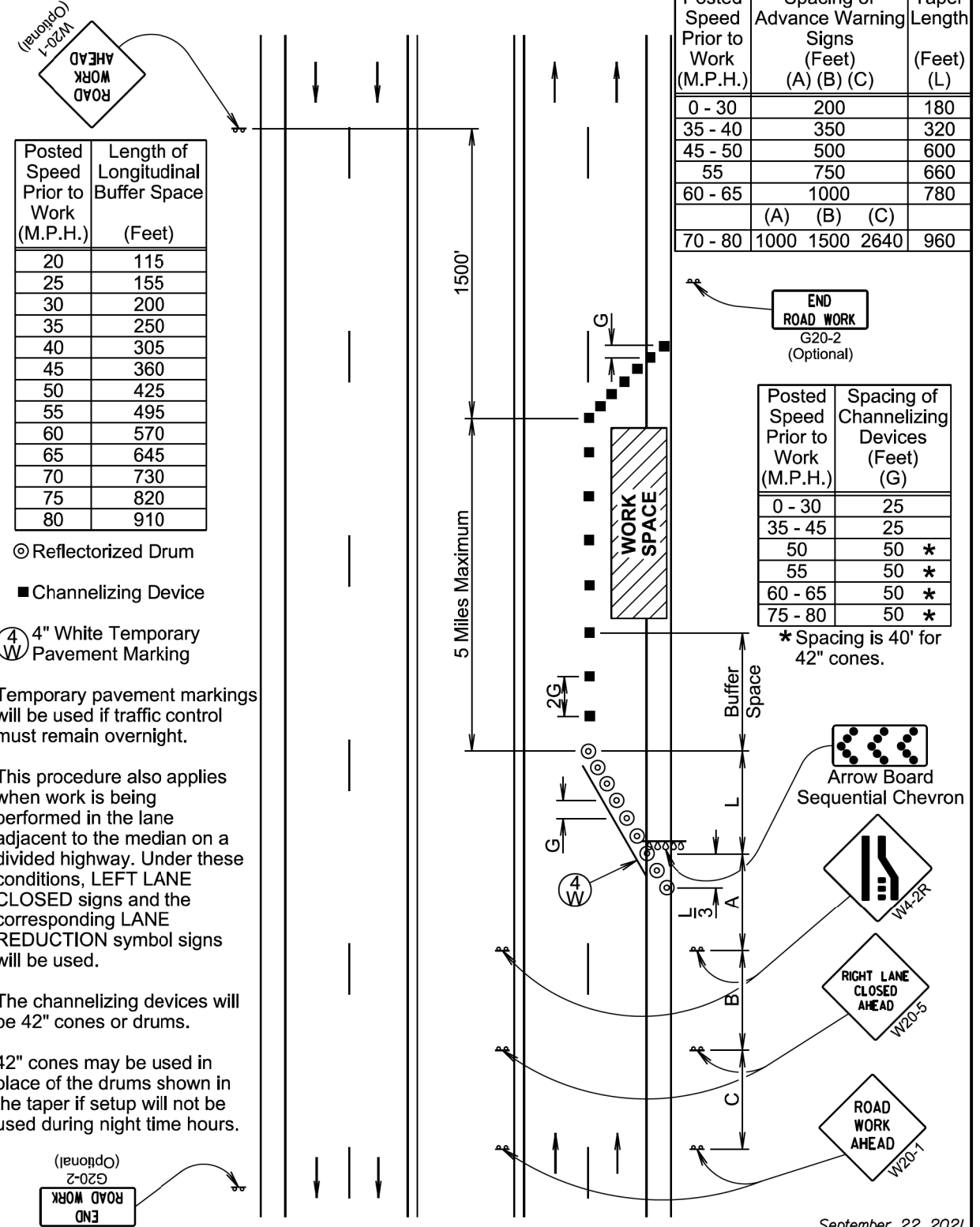
- ⊙ Reflectorized Drum
- Channelizing Device
- ④ 4" White Temporary Pavement Marking

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.



September 22, 2021

S D D O T	LANE CLOSURE WITHOUT BARRIER	PLATE NUMBER 634.64
	Published Date: 2024	Sheet 1 of 1

PLOT SCALE - 1:199,992

PLOT FROM - TRSF12133

PLOT NAME - 1

FILE - ... \MINNIGUL-177\NSTD PLATES.DGN

PLOT SCALE - 1:199,992

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)		Taper Length (Feet) (L)
	(A)	(B)	
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

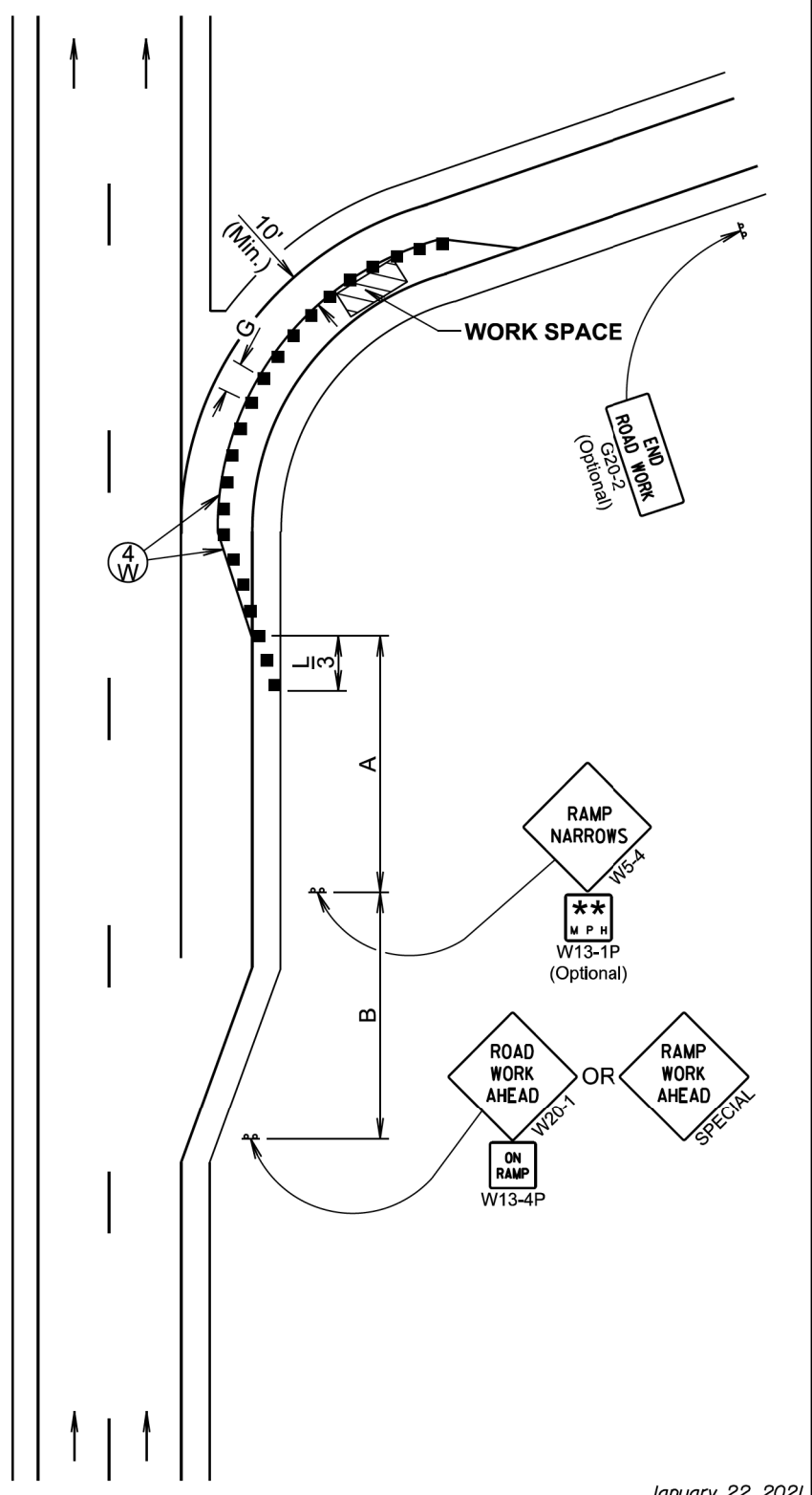
⊙ 4" White Temporary Pavement Marking

** 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

S D D O T	PARTIAL EXIT RAMP CLOSURE	PLATE NUMBER 634.69
		Sheet 1 of 1

Published Date: 2024

PLOTTED FROM - TRSF12133

PLOT NAME - 2

FILE - ... \MINNIGUL177\STD PLATES.DGN

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)			Taper Length (Feet) (L)
	(A)	(B)	(C)	
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

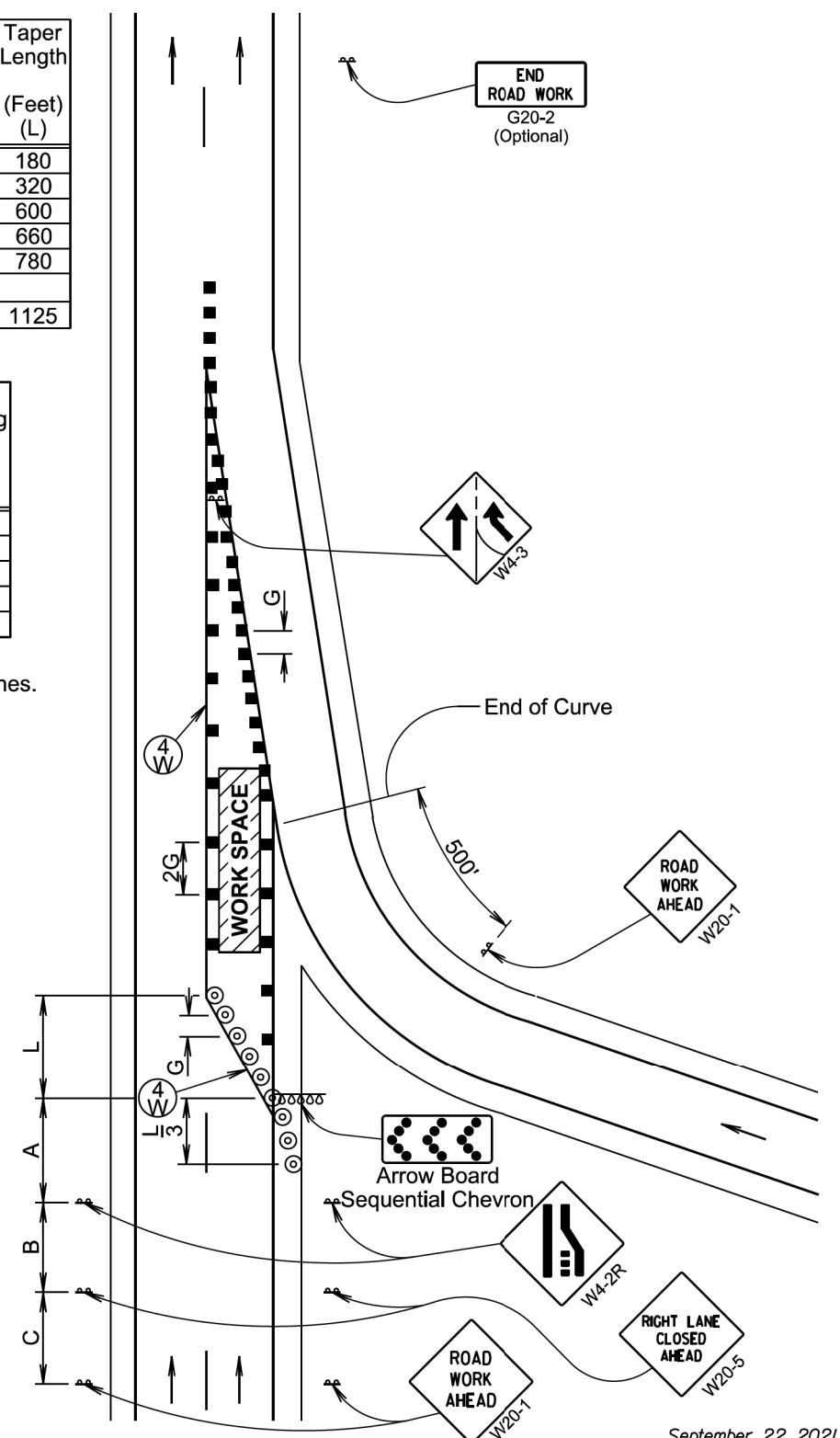
■ Channelizing Device

⊙ 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

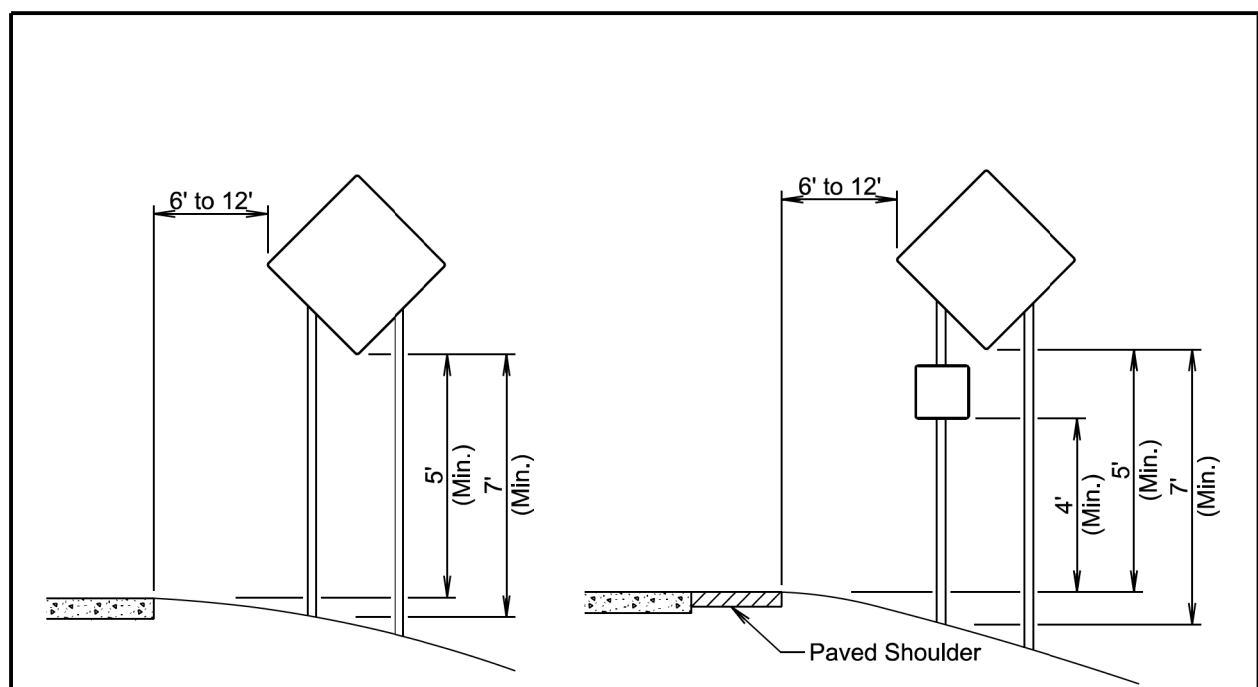
S D D O T	WORK IN VICINITY OF ENTRANCE RAMP	PLATE NUMBER 634.70
		Sheet 1 of 1

Published Date: 2024

PLOT SCALE - 1:199,992

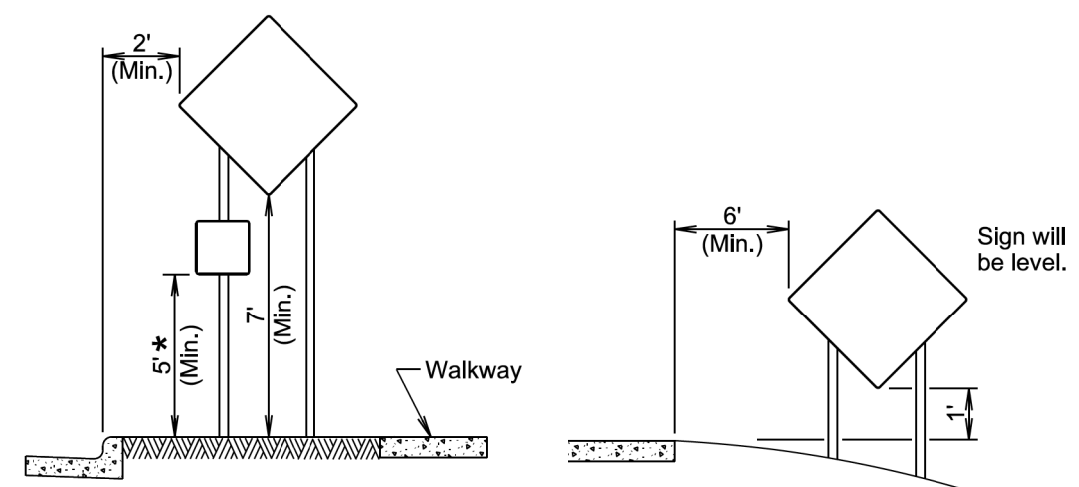
PLOT NAME - 3

FILE - ... \MINNIGUL177\NSTD PLATES.DGN



RURAL DISTRICT

RURAL DISTRICT WITH SUPPLEMENTAL PLATE



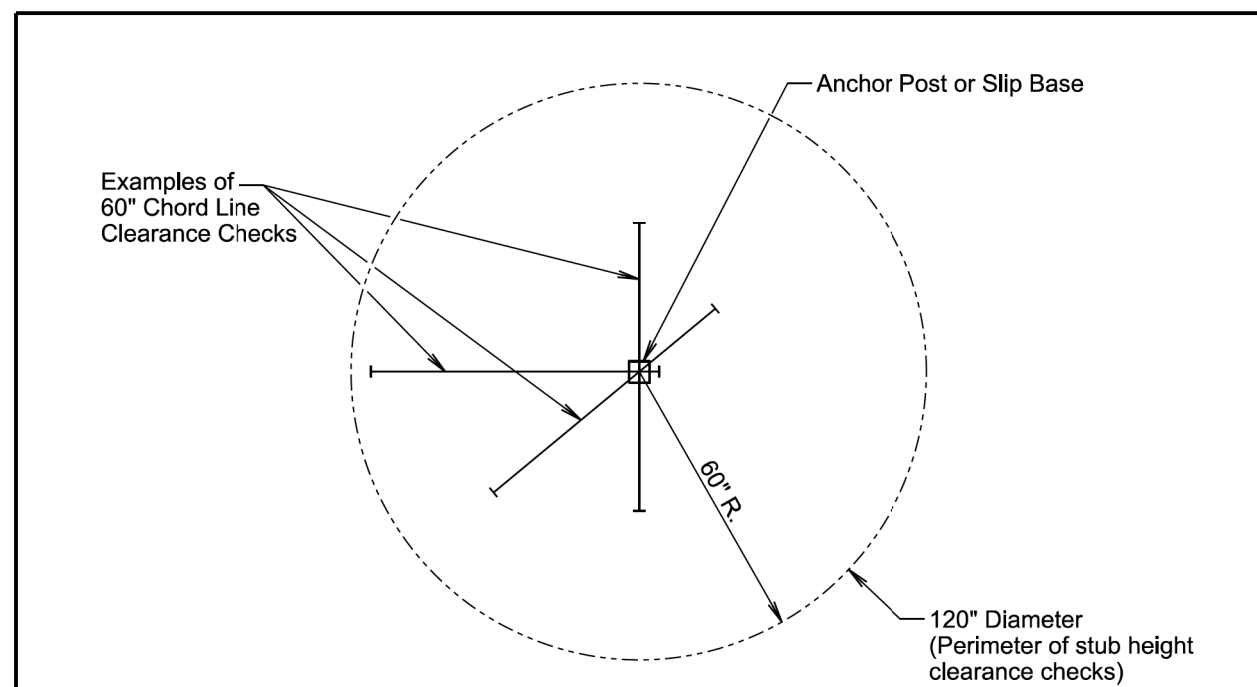
URBAN DISTRICT

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

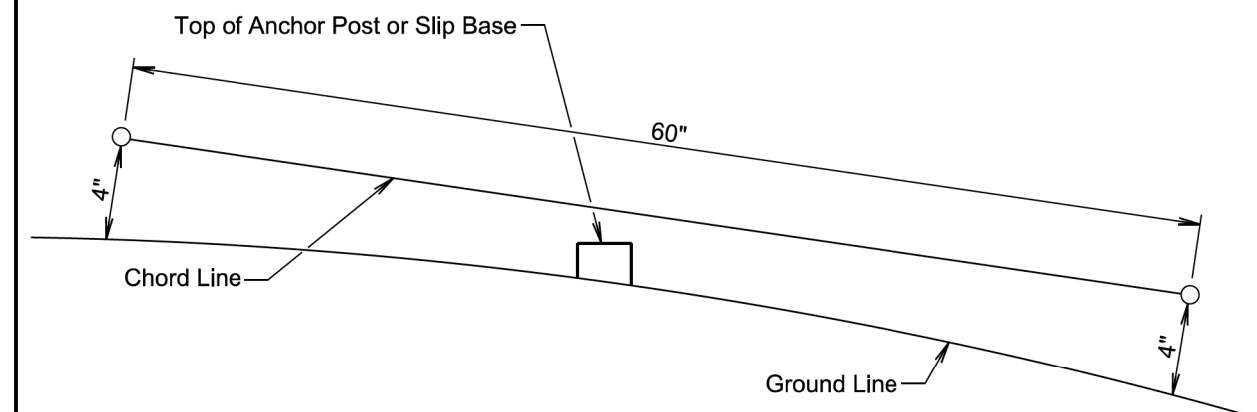
* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.

January 22, 2021

Published Date: 2024	S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

- The top of anchor posts and slip bases WILL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.
- At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height will be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.
- The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

January 22, 2021

Published Date: 2024	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

PLOTTED FROM - TRSF12133

TABLE FOR NRC PAVEMENT REPAIR ON SD 42

MRM	DISP	DMI	WB DRIVING LANE		CENTER TURN LANE		EB DRIVING LANE		NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)		DOWEL BAR Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS	
			L	W	L	W	L	W			No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each				INSERT STEEL BAR IN NRCP TOTAL Each
			Ft	Ft	Ft	Ft	Ft	Ft								
358.00	0.091	358.091			4	4			1.8	R	4	4	8	4		
358.00	0.095	358.095			4	4			1.8	R	4	4	8	4		
358.00	0.140	358.140			6	6			4.0	R	8	4	12	6		
358.00	0.182	358.182	6	10					6.7	R	12	2	14	10		
358.00	0.201	358.201					6	14	9.3	R	16	4	20	12		
358.00	0.212	358.212					6	14	9.3	R	16	4	20	12		
358.00	0.216	358.216	4	4					1.8	R	4	2	6	4		
358.00	0.242	358.242	6	6					4.0	R	8	2	10	6		
358.00	0.246	358.246					4	4	1.8	R	4	4	8	4		
358.00	0.261	358.261					4	4	1.8	R	4	4	8	4		
358.00	0.269	358.269					4	4	1.8	R	4	4	8	4		
358.00	0.273	358.273					6	14	9.3	R	16	4	20	12		
358.00	0.299	358.299	4	4			8	14	14.2	R	20	8	28	16		
358.00	0.322	358.322	4	4					1.8	R	4	2	6	4		
358.00	0.326	358.326					4	8	3.6	R	10	4	14	8		
358.00	0.379	358.379	6	14			6	14	18.7	R	32	6	38	24		
358.00	0.394	358.394					6	14	9.3	R	16	4	20	12		
358.00	0.398	358.398					6	14	9.3	R	16	4	20	12		
358.00	0.402	358.402	5	5			5	5	5.6	R	12	6	18	10		
358.00	0.413	358.413					4	4	1.8	R	4	4	8	4		
358.00	0.439	358.439					20	14	31.1	R	16	16	32	12		
358.00	0.443	358.443	8	14					12.4	R	16	3	19	12		
358.00	0.447	358.447	4	4					1.8	R	4	2	6	4		
358.00	0.481	358.481					6	14	9.3	R	16	4	20	12		
358.00	0.500	358.500	4	4					1.8	R	4	2	6	4		
358.00	0.519	358.519	12	14			12	14	37.3	R	32	12	44	24		
358.00	0.538	358.538	5	5					2.8	R	6	2	8	5		
358.00	0.572	358.572	5	5					2.8	R	6	2	8	5		
358.00	0.591	358.591	5	5			5	5	5.6	R	12	6	18	10		
358.00	0.667	358.667	12	14			12	14	37.3	R	32	12	44	24		
358.00	0.731	358.731	6	14					9.3	R	16	2	18	12		
358.00	0.761	358.761					6	14	9.3	R	16	4	20	12		
358.00	0.780	358.780					6	14	9.3	R	16	4	20	12		
358.00	0.799	358.799	4	4					1.8	R	4	2	6	4		
358.00	0.811	358.811					4	6	2.7	R	8	4	12	6		
358.00	0.830	358.830					5	5	2.8	R	6	4	10	5		
358.00	0.833	358.833	5	8					4.4	R	10	2	12	8		
358.00	0.841	358.841					6	8	5.3	R	10	4	14	8		
358.00	0.860	358.860	6	6			6	6	8.0	R	16	6	22	12		
358.00	0.890	358.890					6	14	9.3	R	16	4	20	12		
358.00	0.894	358.894	6	6					4.0	R	8	2	10	6		
358.00	0.909	358.909					6	14	9.3	R	16	4	20	12		
358.00	0.951	358.951	6	6					4.0	R	8	2	10	6		
358.00	0.958	358.958					6	14	9.3	R	16	4	20	12		
358.00	0.970	358.970	6	14			6	14	18.7	R	32	6	38	24		
358.00	0.981	358.981	6	14					9.3	R	16	2	18	12		
358.00	0.989	358.989	6	14			6	14	18.7	R	32	6	38	24		
359.00	0.019	359.019	6	14			6	14	18.7	R	32	6	38	24		
359.00	0.030	359.030	6	8					5.3	R	10	2	12	8		
359.00	0.034	359.034	4	6					2.7	R	8	2	10	6		
359.00	0.038	359.038	6	14					9.3	R	16	2	18	12		
359.00	0.049	359.049	6	14					9.3	R	16	2	18	12		
359.00	0.061	359.061	6	6					4.0	R	8	2	10	6		
359.00	0.072	359.072	6	14			6	14	18.7	R	32	6	38	24	40 Seal Random Crack WBL	
359.00	0.080	359.080					4	8	3.6	R	10	4	14	8		
359.00	0.083	359.083	4	4					1.8	R	4	2	6	4		

TABLE FOR NRC PAVEMENT REPAIR ON SD 42

MRM	DISP	DMI	WB DRIVING LANE		CENTER TURN LANE		EB DRIVING LANE		NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)		INSERT STEEL BAR IN NRCP TOTAL Each	DOWEL BAR Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
			L	W	L	W	L	W			No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each				
			Ft	Ft	Ft	Ft	Ft	Ft								
359.00	0.087	359.087					6	14	9.3	R	16	4	20	12		
359.00	0.091	359.091	4	14					6.2	R	16	2	18	12		
359.00	0.095	359.095					6	14	9.3	R	16	4	20	12		
359.00	0.098	359.098	6	14					9.3	R	16	2	18	12		
359.00	0.110	359.110					8	14	12.4	R	16	6	22	12		
359.00	0.170	359.170					6	14	9.3	R	16	4	20	12		
359.00	0.212	359.212					4	4	1.8	R	4	4	8	4		
359.00	0.220	359.220	6	6					4.0	R	8	2	10	6		
359.00	0.239	359.239					4	8	3.6	R	10	4	14	8		
359.00	0.280	359.280					6	14	9.3	R	16	4	20	12		
359.00	0.299	359.299	4	4					1.8	R	4	2	6	4		
359.00	0.303	359.303	4	4					1.8	R	4	2	6	4		
359.00	0.307	359.307					6	14	9.3	R	16	4	20	12		
359.00	0.314	359.314					6	14	9.3	R	16	4	20	12		
359.00	0.348	359.348					4	4	1.8	R	4	4	8	4		
359.00	0.371	359.371	5	5					2.8	R	6	2	8	5		
359.00	0.379	359.379					6	14	9.3	R	16	4	20	12		
359.00	0.398	359.398					6	14	9.3	R	16	4	20	12		
359.00	0.402	359.402					4	4	1.8	R	4	4	8	4		
359.00	0.420	359.420	4	8					3.6	R	10	2	12	8		
359.00	0.451	359.451					6	14	9.3	R	16	4	20	12		
359.00	0.489	359.489					4	4	1.8	R	4	4	8	4		
359.00	0.511	359.511					6	14	9.3	R	16	4	20	12		
359.00	0.523	359.523	4	4					1.8	R	4	2	6	4		
359.00	0.527	359.527	6	14			6	8	14.7	R	26	6	32	20		
359.00	0.530	359.530	4	4					1.8	R	4	2	6	4	10	Seal Random Crack EBL
359.00	0.534	359.534	6	14			6	14	18.7	R	32	6	38	24		
359.00	0.538	359.538	4	4					1.8	R	4	2	6	4		
359.00	0.542	359.542					6	14	9.3	R	16	4	20	12		
359.00	0.561	359.561	4	4					1.8	R	4	2	6	4		
359.00	0.591	359.591					6	14	9.3	R	16	4	20	12		
359.00	0.610	359.610					4	6	2.7	R	8	4	12	6		
359.00	0.614	359.614	4	8					3.6	R	10	2	12	8		
359.00	0.621	359.621					4	4	1.8	R	4	4	8	4		
359.00	0.640	359.640					6	14	9.3	R	16	4	20	12		
359.00	0.769	359.769	4	4					1.8	R	4	2	6	4		
359.00	0.852	359.852					10	14	15.6	R	16	8	24	12		
359.00	0.951	359.951	6	14					9.3	R	16	2	18	12	20	Seal Random Crack EBL
359.00	0.958	359.958					5	5	2.8	R	6	4	10	5		
360.00	0.061	360.061					4	4	1.8	R	4	4	8	4		
360.00	0.080	360.080	4	4					1.8	R	4	2	6	4		
360.00	0.110	360.110					6	14	9.3	R	16	4	20	12		
360.00	0.121	360.121					4	8	3.6	R	10	4	14	8		
360.00	0.152	360.152	4	4					1.8	R	4	2	6	4		
360.00	0.159	360.159	20	14					31.1	R	16	8	24	12		
360.00	0.170	360.170	4	4					1.8	R	4	2	6	4		
360.00	0.189	360.189	4	4					1.8	R	4	2	6	4		
360.00	0.201	360.201	4	8					3.6	R	10	2	12	8		
360.00	0.231	360.231	4	8					3.6	R	10	2	12	8		
360.00	0.235	360.235					4	4	1.8	R	4	4	8	4		
360.00	0.239	360.239					4	4	1.8	R	4	4	8	4		
360.00	0.242	360.242	6	14					9.3	R	16	2	18	12		
360.00	0.254	360.254			4	4			1.8	R	4	4	8	4		
360.00	0.261	360.261					4	4	1.8	R	4	4	8	4		
360.00	0.269	360.269					5	5	2.8	R	6	4	10	5		
360.00	0.273	360.273					8	14	12.4	R	16	6	22	12		

TABLE FOR NRC PAVEMENT REPAIR ON SD 42

MRM	DISP	DMI	WB DRIVING LANE		CENTER TURN LANE		EB DRIVING LANE		NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)		DOWEL BAR Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS	
			L	W	L	W	L	W			No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each				INSERT STEEL BAR IN NRCP TOTAL Each
			Ft	Ft	Ft	Ft	Ft	Ft								
360.00	0.280	360.280					4	4	1.8	R	4	4	8	4		
360.00	0.284	360.284					4	6	2.7	R	8	4	12	6		
360.00	0.288	360.288					4	6	2.7	R	8	4	12	6		
360.00	0.292	360.292	4	4					1.8	R	4	2	6	4		
360.00	0.303	360.303	4	4					1.8	R	4	2	6	4		
360.00	0.307	360.307					8	14	12.4	R	16	6	22	12		
360.00	0.311	360.311					8	14	12.4	R	16	6	22	12		
360.00	0.314	360.314	6	14					9.3	R	16	2	18	12		
360.00	0.318	360.318	5	8					4.4	R	10	2	12	8		
360.00	0.322	360.322	6	14			5	5	12.1	R	22	6	28	17		
360.00	0.326	360.326	4	4					1.8	R	4	2	6	4		
360.00	0.330	360.330	4	4					1.8	R	4	2	6	4		
360.00	0.341	360.341	4	8					3.6	R	10	2	12	8		
360.00	0.345	360.345			4	4			1.8	R	4	4	8	4		
360.00	0.356	360.356			4	4			1.8	R	4	4	8	4		
360.00	0.371	360.371			4	4			1.8	R	4	4	8	4		
360.00	0.375	360.375			4	4			1.8	R	4	4	8	4		
360.00	0.379	360.379					4	4	1.8	R	4	4	8	4		
360.00	0.383	360.383					4	4	1.8	R	4	4	8	4		
360.00	0.402	360.402	5	5					2.8	R	6	2	8	5		
360.00	0.409	360.409					4	4	1.8	R	4	4	8	4		
360.00	0.432	360.432	4	4					1.8	R	4	2	6	4		
360.00	0.439	360.439	4	4					1.8	R	4	2	6	4		
360.00	0.451	360.451	6	14					9.3	R	16	2	18	12		
360.00	0.455	360.455			4	4			1.8	R	4	4	8	4		
360.00	0.458	360.458					4	4	1.8	R	4	4	8	4		
360.00	0.470	360.470			6	12			8.0	R	16	4	20	12		
360.00	0.489	360.489	4	4					1.8	R	4	2	6	4		
360.00	0.511	360.511			6	12			8.0	R	16	4	20	12		
360.00	0.515	360.515					4	4	1.8	R	4	4	8	4		
360.00	0.568	360.568					4	6	2.7	R	8	4	12	6		
360.00	0.580	360.580			4	4			1.8	R	4	4	8	4		
360.00	0.598	360.598			4	4			1.8	R	4	4	8	4		
360.00	0.602	360.602	6	14					9.3	R	16	2	18	12		
360.00	0.621	360.621	8	14					12.4	R	16	3	19	12		
360.00	0.625	360.625			8	12			10.7	R	16	6	22	12		
360.00	0.629	360.629					8	14	12.4	R	16	6	22	12		
360.00	0.640	360.640					6	14	9.3	R	16	4	20	12		
360.00	0.652	360.652	4	4					1.8	R	4	2	6	4		
360.00	0.655	360.655	6	14					9.3	R	16	2	18	12		
360.00	0.689	360.689					6	14	9.3	R	16	4	20	12		
360.00	0.693	360.693	8	14					12.4	R	16	3	19	12		
360.00	0.697	360.697			8	12			10.7	R	16	6	22	12		
360.00	0.720	360.720			4	6			2.7	R	8	4	12	6		
360.00	0.731	360.731	6	14					9.3	R	16	2	18	12		
360.00	0.735	360.735	4	4					1.8	R	4	2	6	4		
360.00	0.750	360.750	4	8					3.6	R	10	2	12	8		
360.00	0.758	360.758	6	14					9.3	R	16	2	18	12		
360.00	0.761	360.761			4	6			2.7	R	8	4	12	6		
360.00	0.788	360.788	4	6					2.7	R	8	2	10	6		
360.00	0.799	360.799			4	6			2.7	R	8	4	12	6		
360.00	0.822	360.822	6	14					9.3	R	16	2	18	12		
360.00	0.841	360.841					6	14	9.3	R	16	4	20	12		
360.00	0.852	360.852	4	6					2.7	R	8	2	10	6		
360.00	0.856	360.856			4	4			1.8	R	4	4	8	4		
360.00	0.860	360.860	4	4					1.8	R	4	2	6	4		

TABLE FOR NRC PAVEMENT REPAIR ON SD 42

MRM	DISP	DMI	WB DRIVING LANE		CENTER TURN LANE		EB DRIVING LANE		NRC REPAIR SqYds	NEW JOINT CON- FIG. (NRC)	INSERT STEEL BAR IN PCC PAVEMENT (NRC)		DOWEL BAR Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
			L Ft	W Ft	L Ft	W Ft	L Ft	W Ft			No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each			
360.00	0.864	360.864	6	14					9.3	R	16	2	18	12	
360.00	0.867	360.867					4	6	2.7	R	8	4	12	6	
360.00	0.871	360.871			6	14			9.3	R	16	4	20	12	
360.00	0.962	360.962					6	14	9.3	R	16	4	20	12	
TOTALS:									1126.8		1906	631	2537	1502	70
ADDITIONAL QUANTITIES:									230.0		380	130	510	300	10
GRAND TOTALS									1356.8		2286	761	3047	1802	80

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

TABLE FOR NRC PAVEMENT REPAIR ON I29 SB

MRM	DISP	DMI	SB PASSING LANE		SB DRIVING LANE		NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)		INSERT STEEL BAR IN NRCP TOTAL Each	DOWEL BAR Each	TIE BAR RETROFIT STITCHING Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
			L Ft	W Ft	L Ft	W Ft			No. 11 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each					
85.00	0.471	85.471											10		Stitching DL
85.00	0.456	85.456			4	4	1.8	R	4	4	8	4			
85.00	0.365	85.365			6	14	9.3	R	16	2	18	12			
85.00	0.361	85.361												20	Seal Random Crack DL
85.00	0.350	85.350			5	5	2.8	R	6	4	10	5			
85.00	0.259	85.259	4	4			1.8	R	4	2	6	4			
85.00	0.115	85.115			5	5	2.8	R	6	4	10	5			
TOTALS:							18.5		36	16	52	30	10	20	
ADDITIONAL QUANTITIES:							-		10	-	10	10	-	-	
GRAND TOTALS							18.5		46	16	62	40	10	20	

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

TABLE FOR CRC PAVEMENT REPAIR ON I29 SB

MRM	DISP	DMI	SB DRIVING LANE		CRCP REPAIR SqYds
			L Ft	W Ft	
84.00	0.603	84.603	10	14	15.6
84.00	0.596	84.596	10	14	15.6
84.00	0.418	84.418	8	6	5.3
TOTALS:					36.5
ADDITIONAL QUANTITIES:					10.0
GRAND TOTALS					46.5

TABLE FOR CRC PAVEMENT REPAIR ON I29 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					
MRM	DISP	DMI	No. 6 Longitudinal Bars to be lap spliced with existing bars				No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar				No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar				No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars		New Trans Bar	Reinforcing Steel Lbs	INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB DRIVING LANE			INSERT STEEL BAR IN CRCP TOTAL
			# bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	# bars @ length	Length	Lap Splice Length	Lap Stagger & Cutoff	# bars @ length	Length	Length	Spacing	Each	Each			Each			
84.00	0.603	84.603	21 bars @ 101" =	176.75'	25"	11"	11 bars @ 77" =	70.58'	25"	12"	11 bars @ 86" =	78.83'	25"	12"	5 bars @ 162" =	67.50'	1.5'	534.982	22	5	27	27
84.00	0.596	84.596	21 bars @ 101" =	176.75'	25"	11"	11 bars @ 77" =	70.58'	25"	12"	11 bars @ 86" =	78.83'	25"	12"	5 bars @ 162" =	67.50'	1.5'	534.982	22	5	27	27
84.00	0.418	84.418	9 bars @ 85" =	63.75'	25"	3"								3 bars @ 66" =	16.50'	1.5'	106.775					
TOTALS:			51 bars	417'			22 bars	141'			22 bars	158'			13 bars	152'		1177 Lbs	44	10	54	54
ADDITIONAL QUANTITIES:			10 bars	80'			-	30'			-	30'			-	30'		240 Lbs	10	-	10	10
GRAND TOTALS			61 bars	497'			22 bars	171'			22 bars	188'			13 bars	182'		1417 Lbs	54	10	64	64

TABLE FOR NRC PAVEMENT REPAIR ON I29 SB

MRM	DISP	DMI	SB MEDIAN SHOULDER		SB PASSING LANE 2		SB PASSING LANE 1		SB DRIVING LANE		SB OUTSIDE SHOULDER		NRC REPAIR SqYds	NEW JOINT CON- FIG. (NRC)	INSERT STEEL BAR IN PCC PAVEMENT (NRC)		DOWEL BAR Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS		
			L	W	L	W	L	W	L	W	L	W			No. 11 x 18"	No. 5 x 24"				INSERT STEEL BAR IN NRC	TOTAL
			Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft	Ft			TIE BARS Each	TIE BARS Each				Each	
79.00	0.396	79.396																40	Seal Random Crack DL Shoulder		
79.00	0.301	79.301																50	Seal Random Crack DL Shoulder		
79.00	0.161	79.161					4	4					1.8	R	4	4	8	4			
79.00	0.101	79.101									4	4	1.8	R		4	4	4			
79.00	0.070	79.070					4	4					1.8	R	4	4	8	4			
78.00	0.991	78.991																40	Seal Random Crack DL Shoulder		
78.00	0.972	78.972																30	Seal Random Crack DL Shoulder		
78.00	0.949	78.949							4	4			1.8	R	4	4	8	4			
78.00	0.919	78.919									17	5	9.4	R		12	12				
78.00	0.835	78.835									6	6	4.0	R		4	4				
78.00	0.779	78.779					4	4	8	12			12.4	R	20	10	30	16			
78.00	0.453	78.453									4	4	1.8	R		4	4				
78.00	0.180	78.180																50	Seal Random Crack DL Shoulder		
78.00	0.010	78.010									6	10	6.7	R		2	2				
77.00	0.991	77.991									4	4	1.8	R		4	4				
77.00	0.987	77.987																30	Seal Random Crack DL Shoulder		
77.00	0.979	77.979							4	4			1.8	R	4	4	8	4			
77.00	0.942	77.942					4	4					1.8	R	4	4	8	4			
77.00	0.938	77.938									4	4	1.8	R		4	4	4			
77.00	0.790	77.790									6	10	6.7	R		2	2				
77.00	0.779	77.779	4	4			4	4					3.6	R	4	6	10	4			
77.00	0.680	77.680							4	4			1.8	R	4	4	8	4			
77.00	0.650	77.650	6	10	4	4							8.4	R	4	4	8	4			
77.00	0.631	77.631							4	4			1.8	R	4	4	8	4			
77.00	0.620	77.620							4	4			1.8	R	4	4	8	4			
77.00	0.612	77.612							4	6			2.7	R	8	4	12	6			
77.00	0.570	77.570			4	4							1.8	R	4	2	6	4			
77.00	0.532	77.532			4	4							1.8	R	4	2	6	4			
77.00	0.381	77.381					4	6	4	6			5.3	R	16	8	24	12			
77.00	0.085	77.085			4	4							1.8	R	4	2	6	4			
76.00	0.809	76.809			4	4							1.8	R	4	2	6	4			
76.00	0.771	76.771							4	4			1.8	R	4	4	8	4			
76.00	0.680	76.680			4	4							1.8	R	4	2	6	4			
76.00	0.460	76.460			5	5							2.8	R	6	2	8	5			
76.00	0.388	76.388			4	4							1.8	R	4	2	6	4			
76.00	0.370	76.370			4	4							1.8	R	4	2	6	4			
76.00	0.362	76.362			6	12							8.0	R	16	2	18	12			
TOTALS:													106.0		138	122	260	123	240		
ADDITIONAL QUANTITIES:													20.0		30	20	50	20	50		
GRAND TOTALS													126.0		168	142	310	143	290		

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

TABLE FOR NRC PAVEMENT REPAIR ON I29 NB

MRM	DISP	DMI	NB MEDIAN SHOULDER		NB PASSING LANE 2		NB PASSING LANE 1		NB DRIVING LANE		NB OUTSIDE SHOULDER		NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)		INSERT STEEL BAR IN NRCP TOTAL	DOWEL BAR	SEAL RANDOM CRACKS IN PCC PAVEMENT	COMMENTS
			L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft			No. 11 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each				
76.00	0.569	76.569							4	4			1.8	R	4	4	8	4		
76.00	0.622	76.622							4	4			1.8	R	4	4	8	4		
77.00	0.470	77.470	4	4	4	4			4	4			5.3	R	8	8	16	8		
77.00	0.512	77.512							6	12			8.0	R	16	4	20	12		
77.00	0.516	77.516					4	4					1.8	R	4	4	8	4		
77.00	0.520	77.520					4	4	4	4			3.6	R	8	8	16	8		
77.00	0.523	77.523							6	12			8.0	R	16	4	20	12		
77.00	0.527	77.527					4	8	4	6			6.2	R	18	8	26	14		
77.00	0.531	77.531					4	4					1.8	R	4	4	8	4		
77.00	0.569	77.569							4	4			1.8	R	4	4	8	4		
77.00	0.573	77.573			4	4	4	4					3.6	R	8	6	14	8		
77.00	0.580	77.580			6	6							4.0	R	8	2	10	6		
77.00	0.592	77.592							4	4			1.8	R	4	4	8	4		
77.00	0.595	77.595							4	4			1.8	R	4	4	8	4		
77.00	0.599	77.599							4	4			1.8	R	4	4	8	4		
77.00	0.603	77.603							4	4			1.8	R	4	4	8	4		
77.00	0.622	77.622					4	4					1.8	R	4	4	8	4		
77.00	0.679	77.679							4	4			1.8	R	4	4	8	4		
77.00	0.720	77.720			4	4							1.8	R	4	2	6	4		
77.00	0.770	77.770							4	4			1.8	R	4	4	8	4		
77.00	0.849	77.849			4	4							1.8	R	4	2	6	4		
77.00	0.860	77.860			4	6							2.7	R	8	2	10	6		
77.00	0.864	77.864			4	6							2.7	R	8	2	10	6		
77.00	0.879	77.879			4	4							1.8	R	4	2	6	4		
77.00	0.883	77.883			4	4							1.8	R	4	2	6	4		
77.00	0.887	77.887			6	12							8.0	R	16	2	18	12		
77.00	0.891	77.891			4	4							1.8	R	4	2	6	4		
77.00	0.898	77.898			4	4							1.8	R	4	2	6	4		
78.00	0.001	78.001			4	4							1.8	R	4	2	6	4		
78.00	0.004	78.004			4	4							1.8	R	4	2	6	4		
78.00	0.042	78.042	4	4	4	6			4	4			6.2	R	12	8	20	10		
78.00	0.061	78.061	4	4	4	8							5.3	R	10	4	14	8		
78.00	0.122	78.122							6	6			4.0	R	8	4	12	6		
78.00	0.129	78.129							6	6			4.0	R	8	4	12	6		
78.00	0.141	78.141			4	4			4	4			3.6	R	8	6	14	8		
78.00	0.148	78.148					4	4					1.8	R	4	4	8	4		
78.00	0.160	78.160							4	4			1.8	R	4	4	8	4		
78.00	0.179	78.179							4	4			1.8	R	4	4	8	4		
78.00	0.201	78.201																	30	Seal Random Crack DL Shoulder
78.00	0.220	78.220																	20	Seal Random Crack DL Shoulder
78.00	0.232	78.232																	30	Seal Random Crack DL Shoulder
78.00	0.300	78.300					6	12					8.0	R	16	4	20	12		
78.00	0.550	78.550							4	4			1.8	R	4	4	8	4		
78.00	0.671	78.671							4	4			1.8	R	4	4	8	4		
78.00	0.675	78.675							4	4			1.8	R	4	4	8	4		
78.00	0.682	78.682							6	12			8.0	R	16	4	20	12		
78.00	0.701	78.701									5	5	2.8	R		4	4			
78.00	0.739	78.739					4	4					1.8	R	4	4	8	4		
78.00	0.811	78.811					4	4	4	4			3.6	R	8	8	16	8		
78.00	0.823	78.823							6	12			8.0	R	16	4	20	12		
78.00	0.879	78.879					6	12			4	4	9.8	R	16	8	24	12		
78.00	0.902	78.902					5	5					2.8	R	6	4	10	5		
79.00	0.061	79.061							4	4			1.8	R	4	4	8	4		
79.00	0.069	79.069							4	4			1.8	R	4	4	8	4		
79.00	0.073	79.073							4	4			1.8	R	4	4	8	4		

TABLE FOR NRC PAVEMENT REPAIR ON I29 NB

MRM	DISP	DMI	NB MEDIAN SHOULDER		NB PASSING LANE 2		NB PASSING LANE 1		NB DRIVING LANE		NB OUTSIDE SHOULDER		NRCP REPAIR SqYds	NEW JOINT CON- FIG. (NRCP)	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)		INSERT STEEL BAR IN NRCP TOTAL Each	DOWEL BAR Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
			L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft			No. 11 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each				
TOTALS:													172.2		358	212	570	311	80	
ADDITIONAL QUANTITIES:													30.0		70	40	110	60	20	
GRAND TOTALS													202.2		428	252	680	371	100	

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

TABLE FOR NRC PAVEMENT REPAIR ON US 81 WB & EB

MRM	DISP	DMI	WB OUTSIDE SHOULDER		WB DRIVING LANE		WB PASSING LANE		EB PASSING LANE		EB DRIVING LANE		NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)		DOWEL BAR Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS	
			L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft			No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each				INSERT STEEL BAR IN NRCP TOTAL Each
94.00	0.032	94.032					4	4					1.8	R	4	4	8	4		
94.00	0.036	94.036							4	4			1.8	R	4	4	8	4		
94.00	0.059	94.059					4	4					1.8	R	4	4	8	4		
94.00	0.063	94.063			4	4							1.8	R	4	2	6	4		
94.00	0.066	94.066							6	6			4.0	R	8	4	12	6		
94.00	0.070	94.070					4	4					1.8	R	4	4	8	4		
94.00	0.074	94.074					4	4					1.8	R	4	4	8	4		
94.00	0.078	94.078					4	4					1.8	R	4	4	8	4		
94.00	0.081	94.081							4	4			1.8	R	4	4	8	4		
94.00	0.089	94.089					4	4					1.8	R	4	4	8	4		
94.00	0.093	94.093					4	4					1.8	R	4	4	8	4		
94.00	0.112	94.112							4	4			1.8	R	4	4	8	4		
94.00	0.116	94.116					4	4					1.8	R	4	4	8	4		
94.00	0.138	94.138					4	4					1.8	R	4	4	8	4		
94.00	0.142	94.142							4	4			1.8	R	4	4	8	4		
94.00	0.146	94.146					6	6					4.0	R	8	4	12	6		
94.00	0.150	94.150					4	4					1.8	R	4	4	8	4		
94.00	0.153	94.153			4	4							1.8	R	4	2	6	4		
94.00	0.161	94.161					4	4					1.8	R	4	4	8	4		
94.00	0.165	94.165			4	4							1.8	R	4	2	6	4		
94.00	0.169	94.169					4	4					1.8	R	4	4	8	4		
94.00	0.176	94.176					4	4					1.8	R	4	4	8	4		
94.00	0.180	94.180					6	6					4.0	R	8	4	12	6		
94.00	0.184	94.184					6	6					4.0	R	8	4	12	6		
94.00	0.188	94.188							4	4			1.8	R	4	4	8	4		
94.00	0.191	94.191					4	4					1.8	R	4	4	8	4		
TOTALS:													401.5		842	572	1414	802	870	
ADDITIONAL QUANTITIES:													80.0		170	110	280	160	170	
GRAND TOTALS													481.5		1012	682	1694	962	1040	

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

TABLE FOR NRC PAVEMENT REPAIR ON SD34

MRM	DISP	DMI	WB DRIVING LANE		WB PASSING LANE		CENTER TURN LANE		EB PASSING LANE		EB DRIVING LANE		NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	COMMENTS	* REMOVE CONCRETE CURB &/OR GUTTER Ft	* TYPE CONCRETE C&G BY WB DRIVING LANE Ft	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)			DOWEL BAR Each	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS										
			L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft						No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each	INSERT STEEL BAR IN NRCP TOTAL Each													
386.00	0.169	386.169			4	4							1.8	R				4	4	8	4												
386.00	0.200	386.200			4	4							1.8	R				4	4	8	4												
386.00	0.211	386.211			4	4							1.8	R				4	4	8	4												
386.00	0.214	386.214			4	4							1.8	R				4	4	8	4												
386.00	0.220	386.220			4	4							1.8	R				4	4	8	4												
386.00	0.251	386.251			4	4							1.8	R				4	4	8	4												
386.00	0.311	386.311			4	4							1.8	R				4	4	8	4												
386.00	0.396	386.396			4	6							2.7	R				8	4	12	6												
386.00	0.450	386.450	4	6									2.7	R				8	2	10	6												
386.00	0.461	386.461			4	4							1.8	R				4	4	8	4												
386.00	0.470	386.470			4	8							3.6	R				10	4	14	8												
386.00	0.538	386.538	4	4									1.8	R				4	2	6	4												
386.00	0.561	386.561									4	4	1.8	R				4	4	8	4												
386.00	0.580	386.580					4	4					1.8	R				4	4	8	4												
386.00	0.640	386.640	6	11	6	11							14.7	R				28	2	30	22	30	Seal Random Crack EBDL										
386.00	0.680	386.680					4	4					1.8	R				4	4	8	4												
386.00	0.708	386.708	4	4									1.8	R				4	2	6	4												
386.00	0.720	386.720			4	4							1.8	R				4	4	8	4												
386.00	0.731	386.731			4	4							1.8	R				4	4	8	4												
386.00	0.734	386.734					4	4					1.8	R				4	4	8	4												
386.00	0.740	386.740			4	4							1.8	R				4	4	8	4												
386.00	0.759	386.759									6	11	7.3	R				14	2	16	11												
386.00	0.799	386.799													Repair WB Curb and Gutter	10	10																
386.00	0.811	386.811			6	11							7.3	R	Repair WB Curb and Gutter	15	15	14	4	18	11												
386.00	0.813	386.813	4	4									1.8	R				4	2	6	4												
386.00	0.850	386.850	4	4									1.8	R				4	2	6	4												
386.00	0.879	386.879																				30	Seal Random Crack EBPL										
386.00	0.890	386.890							6	11	6	11	14.7	R				28	2	30	22												
386.00	0.899	386.899					6	10.5					7.0	R				14	4	18	10												
386.00	0.910	386.910							6	11			7.3	R	Reset Manhole			14	4	18	11												
386.00	0.941	386.941			4	4							1.8	R				4	4	8	4												
386.00	0.981	386.981			4	4							1.8	R				4	4	8	4												
386.00	0.990	386.990			4	4							1.8	R				4	4	8	4												
387.00	0.012	387.012			4	4							1.8	R				4	4	8	4												
TOTALS:													108.7			25	25	230	112	342	199	60											
ADDITIONAL QUANTITIES:													20.0			10	10	50	20	70	40	10											
GRAND TOTALS													128.7			35	35	280	132	412	239	70											

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

* Cost for this work will be included in the contract unit price per foot for Repair Concrete Curb and/or Gutter.

TABLE FOR NRC PAVEMENT REPAIR ON SD11

MRM	DISP	DMI	SB DRIVING LANE		SB PASSING LANE		CENTER TURN LANE		NB PASSING LANE		NB DRIVING LANE		NRCP REPAIR SqYds	NEW JOINT CON-FIG. (NRCP)	COMMENTS	*	* TYPE B68.5 CONCRETE C&G BY SB OUTSIDE SHOULDER	* TYPE B68.5 CONCRETE C&G BY NB OUTSIDE SHOULDER	INSERT STEEL BAR IN PCC PAVEMENT (NRCP)		INSERT STEEL BAR IN NRCP TOTAL	DOWEL BAR	TIE BAR RETROFIT STITCHING
			L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	L Ft	W Ft	No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each											
ADDITIONAL QUANTITIES:																30	10	20	70	70	140	60	10
GRAND TOTALS																192	50	142	438	438	876	371	35

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

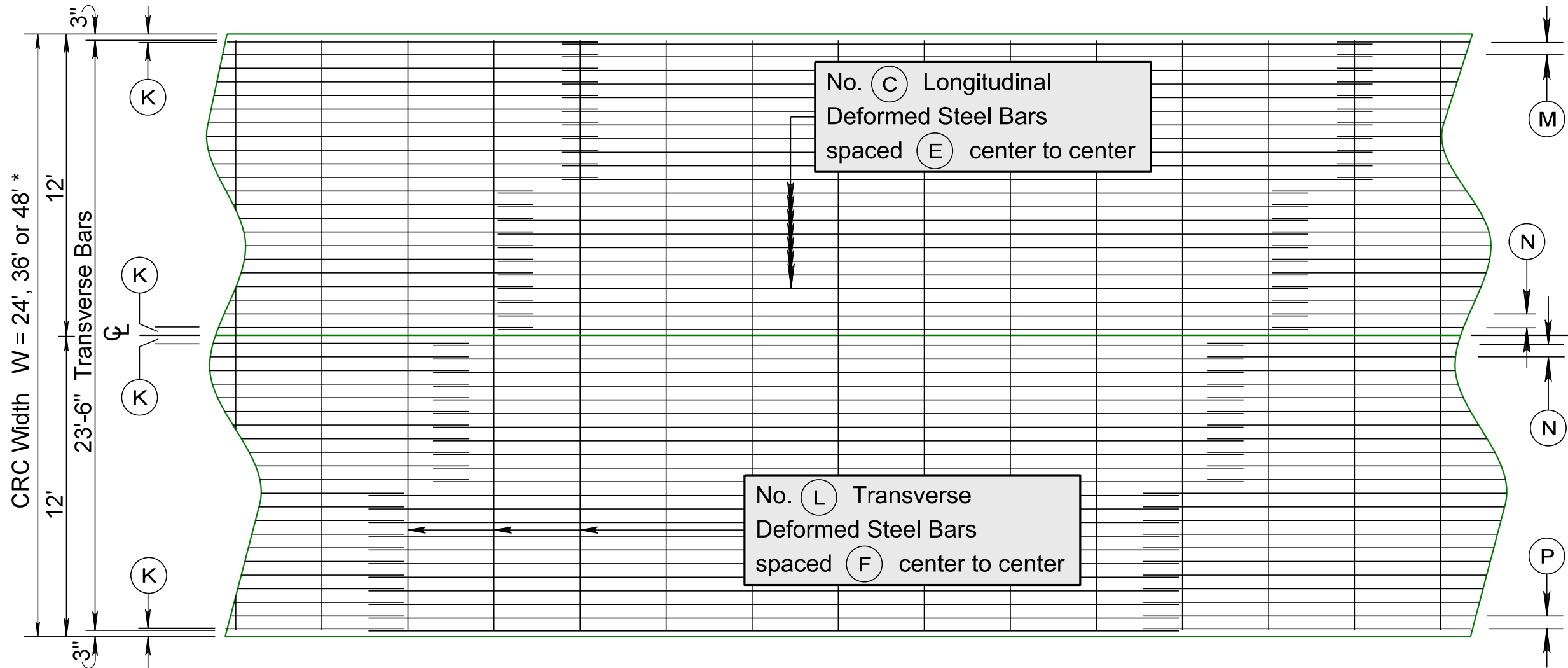
* Cost for this work will be included in the contract unit price per foot for Repair Concrete Curb and/or Gutter.

24', 36' & 48' * CRC PAVEMENT - IN PLACE

* And other miscellaneous widths (may include CRC shoulders)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	49	74

Plotting Date: 02/14/2024



PLOT SCALE - 1:500

PLOT NAME - 1

FILE - ... \CRC REPAIR\CRC EXISTING.DGN

PLOTTED FROM - TRSF12133

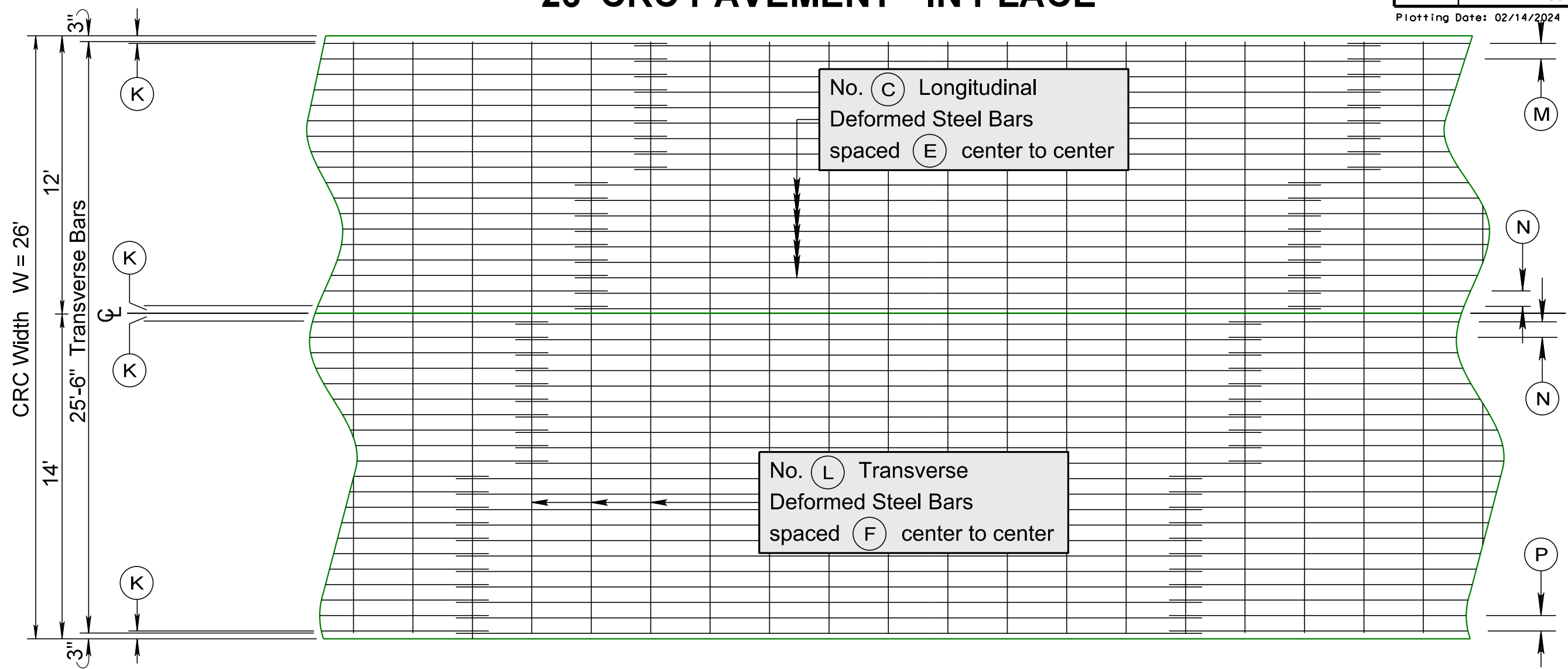
MITCHELL REGION INTERSTATE CRC PAVEMENT KEY & DIMENSIONS	Underlying Plans	CRC Depth	CRC Width	Longitudinal Steel		Transverse Steel		Perimeter Bar Spacing			
				Size	Spacing	Size	Spacing	(K)	(M)	(N)	(P)
Location	PCN	T	W	(C)	(E)	(L)	(F)	(K)	(M)	(N)	(P)
I90E/W MRM 263.53 +0.010 to 265.00 +0.428	3781	9.5"	24'/36'	6	6½"	6	48"	3¾"	6½"	6½"	6½"
I90E MRM 251.09 +0.506 to 259.52 & MRM 259.60 to 259.90	3028	10"	24'	6	6½"	6	48"	3¾"	6½"	6½"	6½"
I90W MRM 251.09 +0.509 to 259.52 & MRM 259.60 to 259.88	4766	10"	24'	6	6½"	4	48"	3¾"	6½"	6½"	6½"
I229N/S Approach Slabs for 57th St Tunnel (Double Matte Steel)	0549	10"	52'	4&8	18"&6"	4&6	18"&12"	3"	6"	6"	6"
I229N/S Approach Pavement and Pavement over 57th St Tunnel	0549	10"	52'	7	6"	4	16"	3"	6"	6"	6"
I229N/S MRM 2.08 to 5.32 +0.067 & MRM 5.68 +0.090 to 8.28 +0.687	1231	10.5"	24'/36'	6	6"	4	48"	4"	5"	5"	5"
I29S MRM 83.00 +0.790 to 84.39	3785	10.5"	40'/42'	6	6"	4	48"	4"	5"	5"	5"
I29N/S MRM 73.38 to MRM 73.38 +0.634	1948	11"	34'/36'	7	7"	4	36"	6"	6"	7"	6"
I29N MRM 79.26 +0.246 to 80.29 +0.246 & I29S MRM 79.26 +0.246 to 80.29 +0.251	A443 & 02P3	12"	36'/48'	7	6½"	4	36"	4"	6"	6½"	6"
I29N MRM 80.29 +0.246 to 83.00 +0.790 & I29S MRM 80.29 +0.251 to 83.00 +0.790	1177 & 02P3	12"	36'/48'	7	6½"	4	36"	4"	6"	6½"	6"

26' CRC PAVEMENT - IN PLACE

Plotting Date: 02/14/2024

PLOT SCALE - 1:500

PLOT NAME - 2



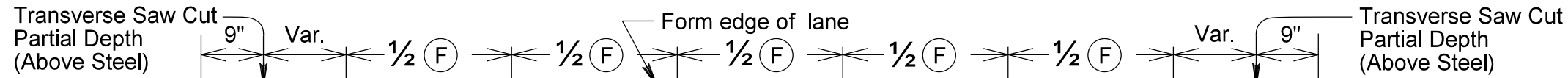
PLOTTED FROM - TRSF12133

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MITCHELL REGION INTERSTATE CRC PAVEMENT KEY & DIMENSIONS	Underlying Plans	CRC Depth	CRC Width	Longitudinal Steel		Transverse Steel		Perimeter Bar Spacing			
				Size	Spacing	Size	Spacing	(K)	(M)	(N)	(P)
Location	PCN	T	W	(C)	(E)	(L)	(F)	(K)	(M)	(N)	(P)
I29N MRM 85.00 +0.405 to 110.10 +0.123 & I29S MRM 85.00 +0.435 to 110.11 +0.093 I90E MRM 401.61 +0.124 to 412.52 & I90W MRM 401.61 +0.123 to 412.52	3784, 3785, 203P, 4428, 3945 & 3467	8"	26'	6	8"	4	36"	4"	8"	8"	8"
I90E MRM 353.07 +0.006 to 362.00 +0.040	3944	10"	26'	6	6 1/4"	4	42"	3"	6 3/4"	6 1/4"	5 3/4"
I29N MRM 27.00 + 0.041 to 37.32 +0.144	5587	10"	26'	6	6 1/2"	4	42"	3 3/4"	6 1/2"	6 1/2"	4 1/2"
I29S MRM 27.00 + 0.058 to 37.32 +0.138 & I90W MRM 353.07 +0.006 to 362.00 +0.045	5886 & 5359	10"	26'	6	6 1/2"	4	48"	3 3/4"	6 1/2"	6 1/2"	4 1/2"
I90E/W MRM 334.54 +0.004 to 353.07 +0.006	5363, 4431, 5365 & 5364	10.5"	26'	6	6"	4	42"	3"	6"	6"	6"
I29S MRM 84.39 to 84.00 +0.910	3785	10.5"	26'	6	6"	4	48"	4"	5"	5"	5"
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	6 1/2"	4	48"	3 3/4"	6 1/2"	6 1/2"	4 1/2"
I29N MRM 72.00 +0.866 to 73.38 & I29S MRM 72.00 +0.875 to 73.38	1948	11"	26'	7	7"	4	36"	6"	6"	7"	9"
I29N MRM 4.35 +0.463 to 17.00 +0.406 & I29S MRM 37.32 +0.138 to 46.31 +0.600	6176 & 6181	11.5"	26'	5	4 1/2"	4	42"	3"	3"	4 1/2"	4 1/2"

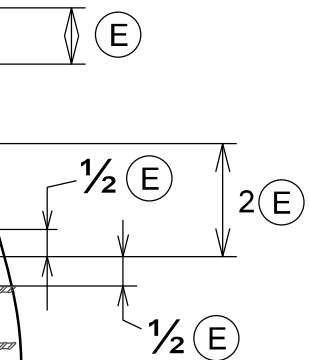
CRC PAVEMENT REPAIR (FULL LANE WIDTH) - TYPICAL

Plotting Date: 02/14/2024



Traffic Lane Width W (12' Shown)

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 in place No. (L) Transverse Bars)

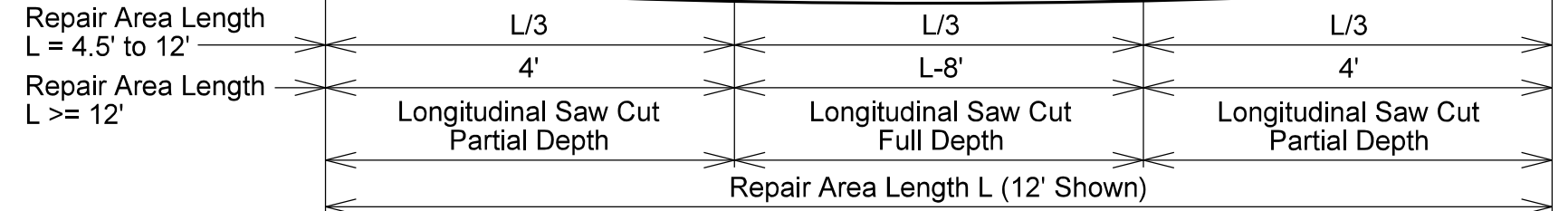
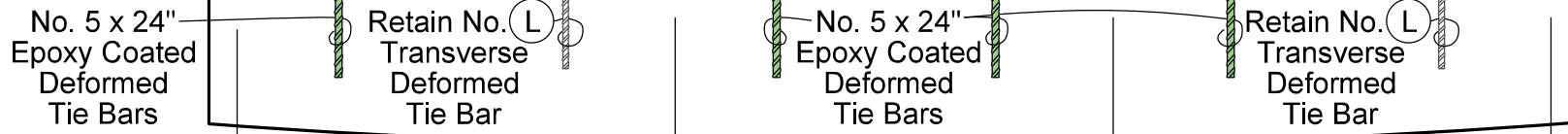


No. (C) Longitudinal Deformed Tie Bars In Place

Place No. (C) Longitudinal Deformed Tie Bars (Lap splice to In Place No. (C) Longitudinal Bars).

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.

Place No. (L) Transverse Deformed Tie Bars



DEFORMED TIE BAR DIMENSIONS KEY					
Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
3785	8"	6	8"	4	36"

CRC REPAIR AREA KEY	
	Remove Concrete Retain Reinforcing Steel
	Remove Concrete Remove Reinforcing Steel

PLOT SCALE - 1:1.7

PLOTTED FROM - TRSF12133

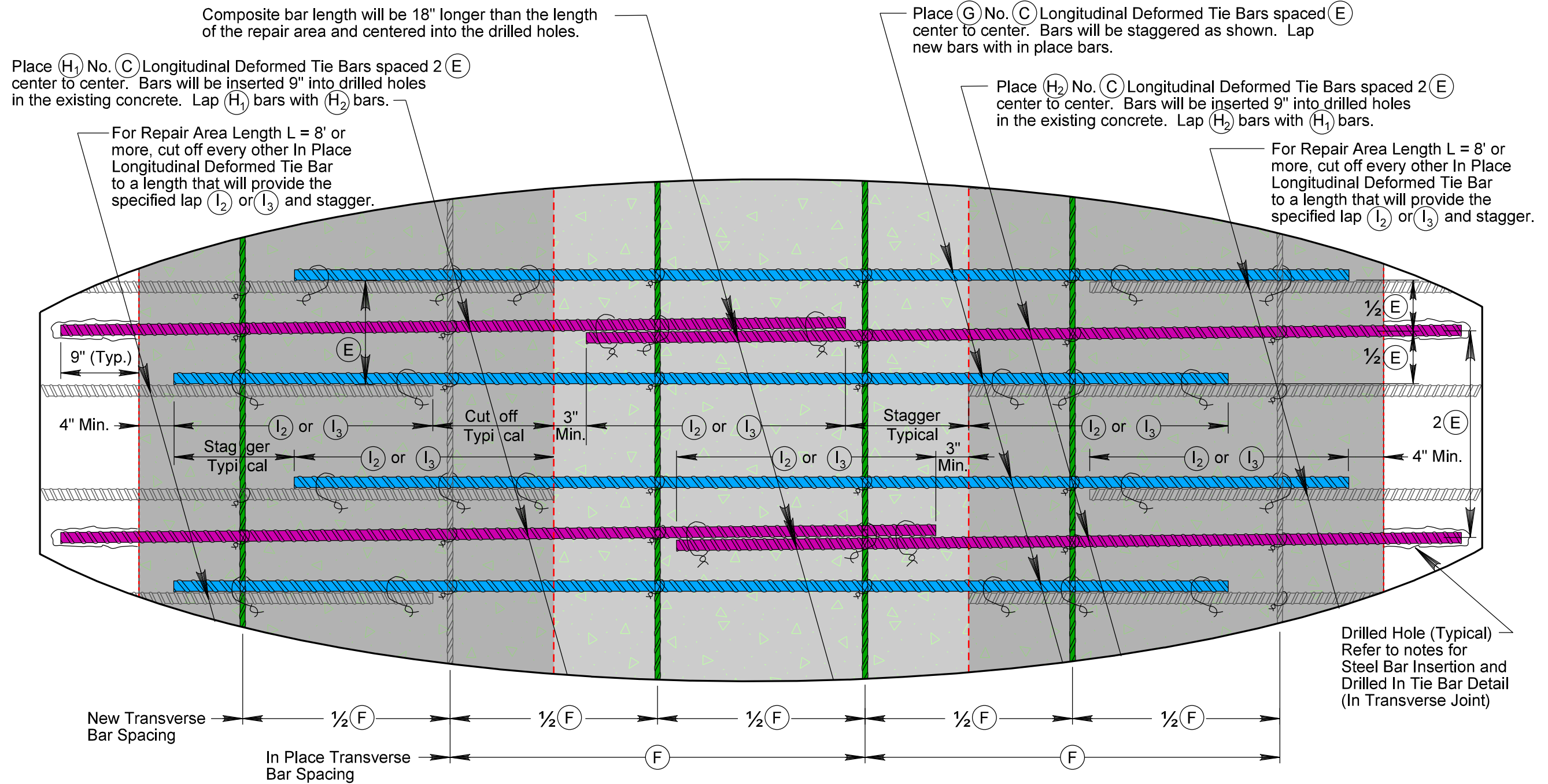
PLOT NAME - 1

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

CRC PAVEMENT REPAIR (FULL LANE WIDTH)

Detail A

Plotting Date: 02/14/2024



DEFORMED TIE BAR KEY

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

DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
3785	8"	6	8"	4	36"

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

LAP SPLICE LENGTH KEY

- (I_1) Lap Splice length for Repair Area Length $L < 4.5'$ (Not Available).
- (I_2) Lap Splice length for Repair Area Length $L = 4.5'$ to $8'$.
- (I_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

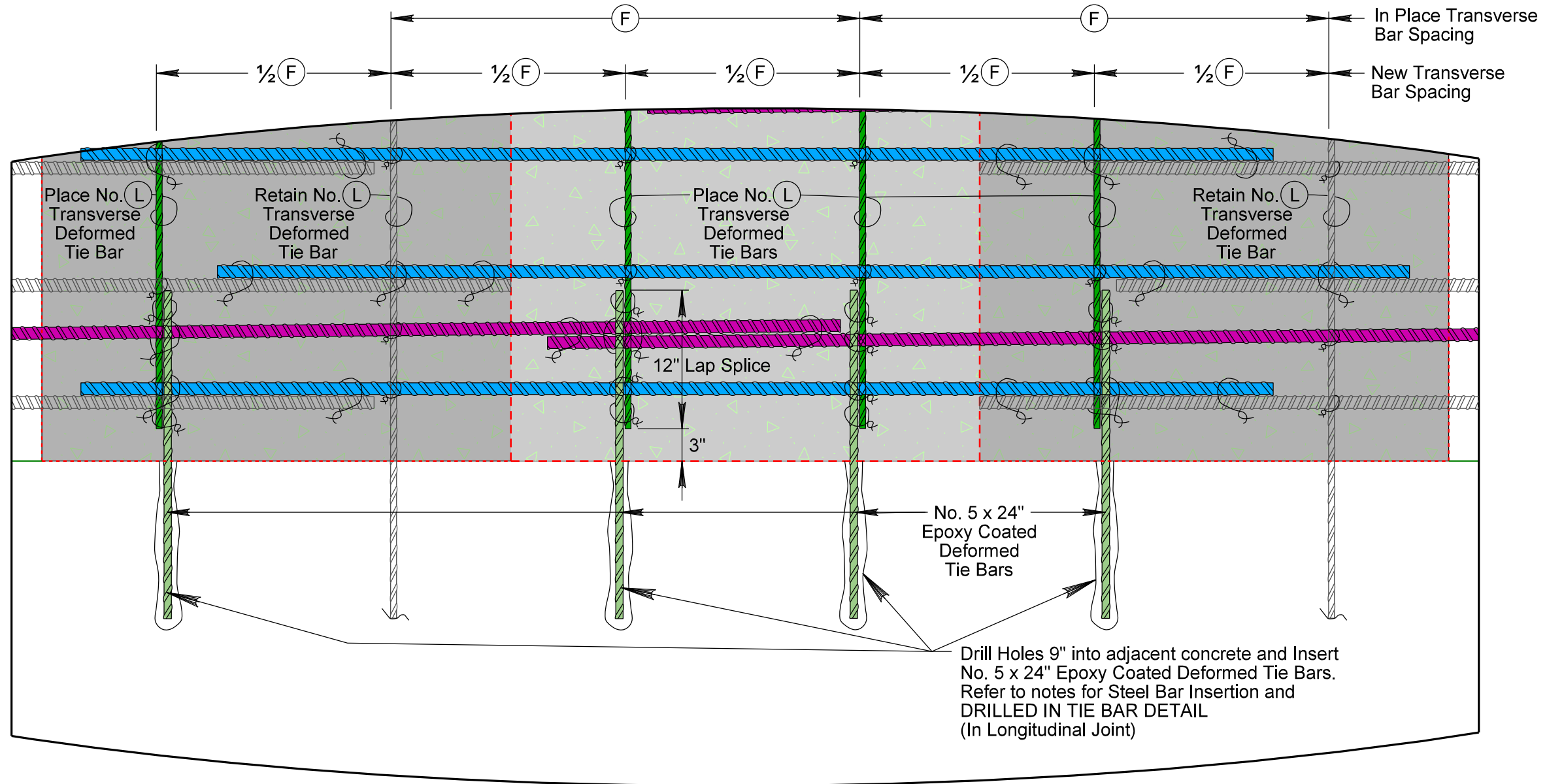
- Remove Concrete Retain Reinforcing Steel
- Remove Concrete Remove Reinforcing Steel

CRC PAVEMENT REPAIR (FULL LANE WIDTH)

Detail B

STATE OF SOUTH DAKOTA	PROJECT IM-NH-P 0022(89)	SHEET 53	TOTAL SHEETS 74
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Plotting Date: 02/14/2024



DEFORMED TIE BAR KEY

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

DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
3785	8"	6	8"	4	36"

CRC REPAIR AREA KEY

	Remove Concrete Retain Reinforcing Steel
	Remove Concrete Remove Reinforcing Steel

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

PLOT SCALE - 1:1.07

PLOTTED FROM - TRSF12133

PLOT NAME - 3

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

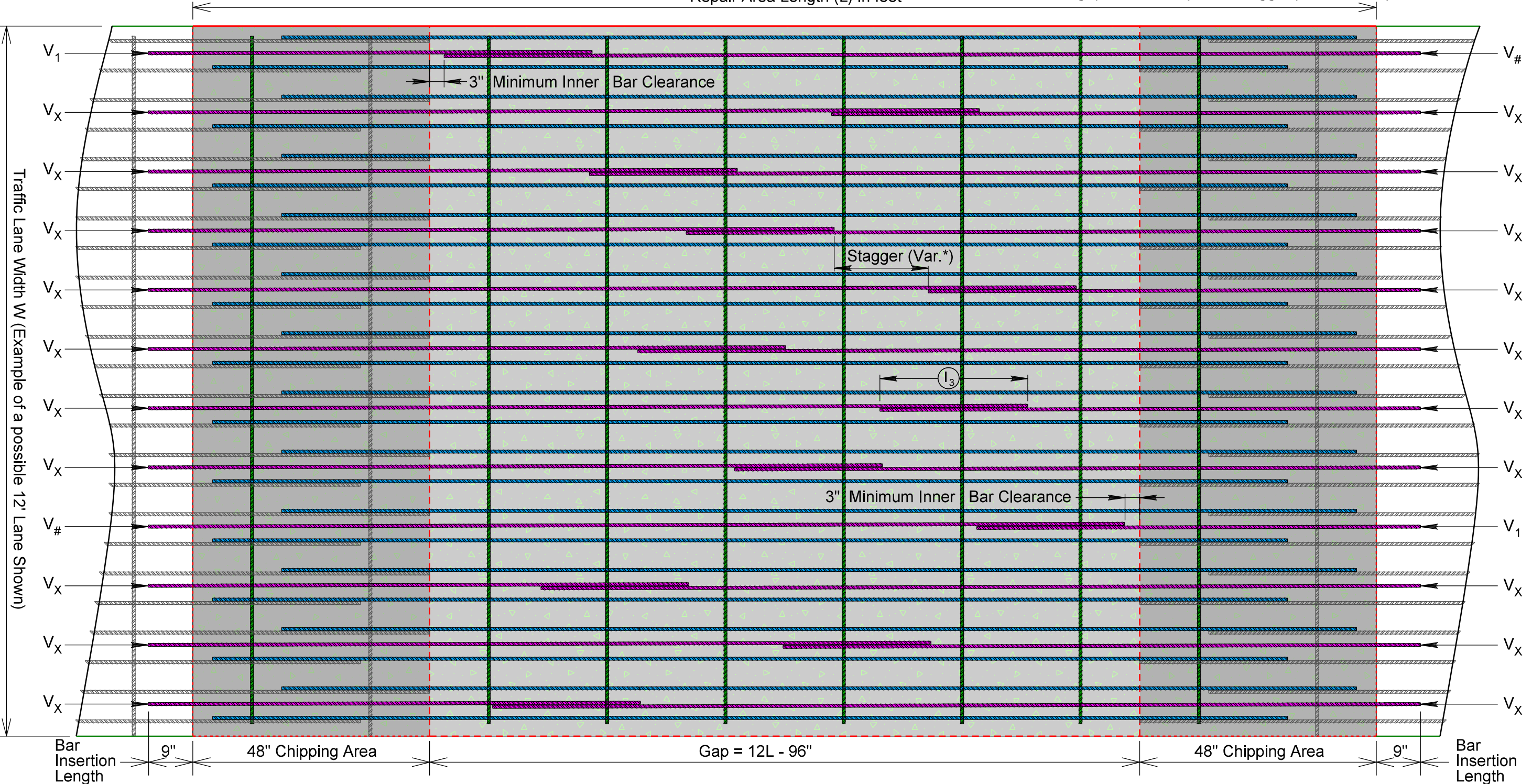
CRC PAVEMENT REPAIR - INSERTED LONGITUDINAL BAR LENGTHS

(For Full Width Repair Area Length $L \geq 16'$) - TYPICAL

Plotting Date: 02/14/2024

* 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.

Repair Area Length (L) in feet



PLOT SCALE - 1:1.7

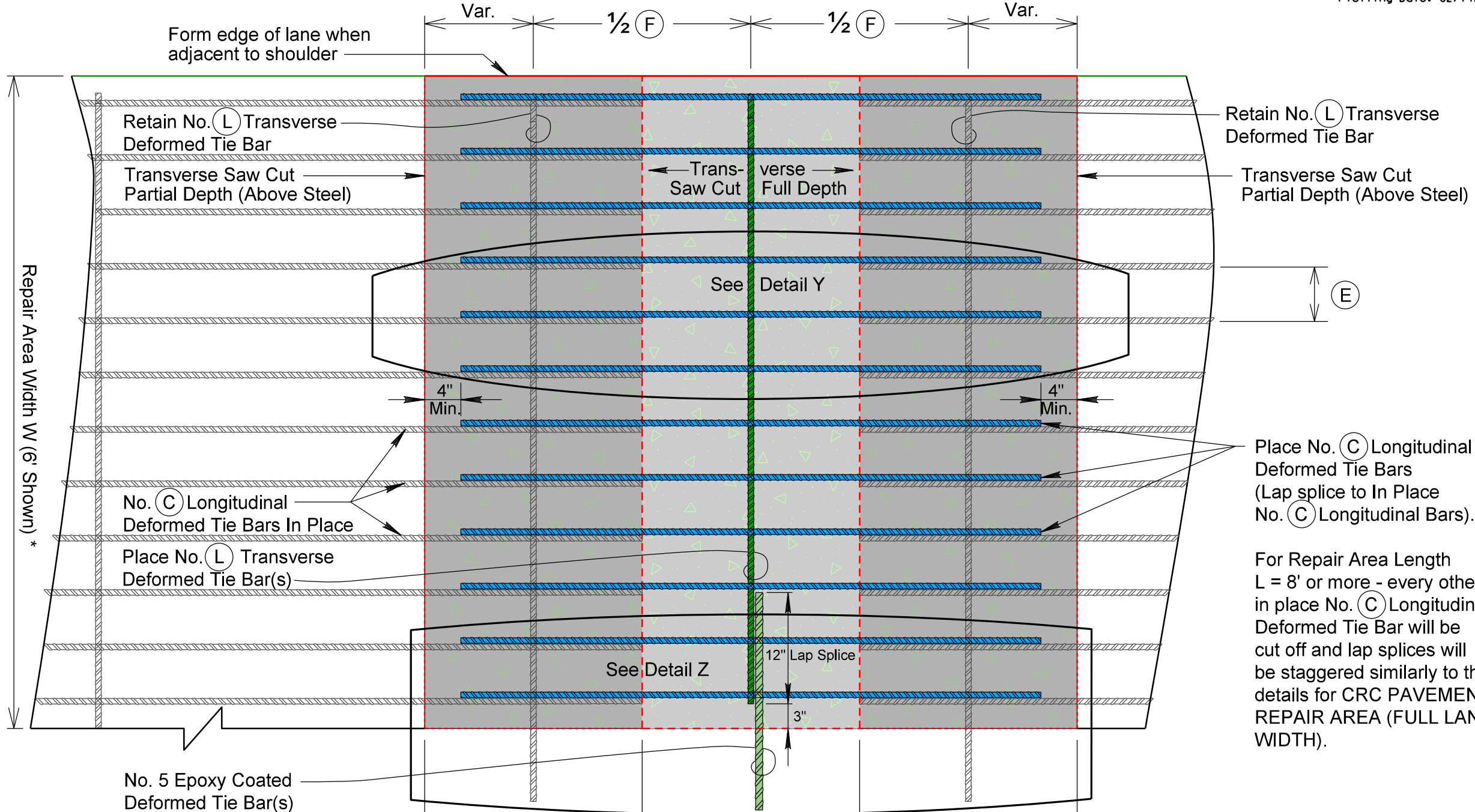
PLOT NAME - 1

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

PLOTTED FROM - TRSF12133

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 $V_1 = 60" + I_3$	$V_{\#}$ = Bar Insertion Length +9" + Chipping Area +48" + Gap +12L - 96" - Inner Bar Clearance - 3" $V_{\#} = 12L - 42"$	$V_x = V_1 + \frac{(X - 1) \times (V_{\#} - V_1)}{(\# - 1)}$ 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 $\geq 11"$ $I_3 = 30"$	Remove Concrete Retain Reinforcing Steel Remove Concrete Remove Reinforcing Steel

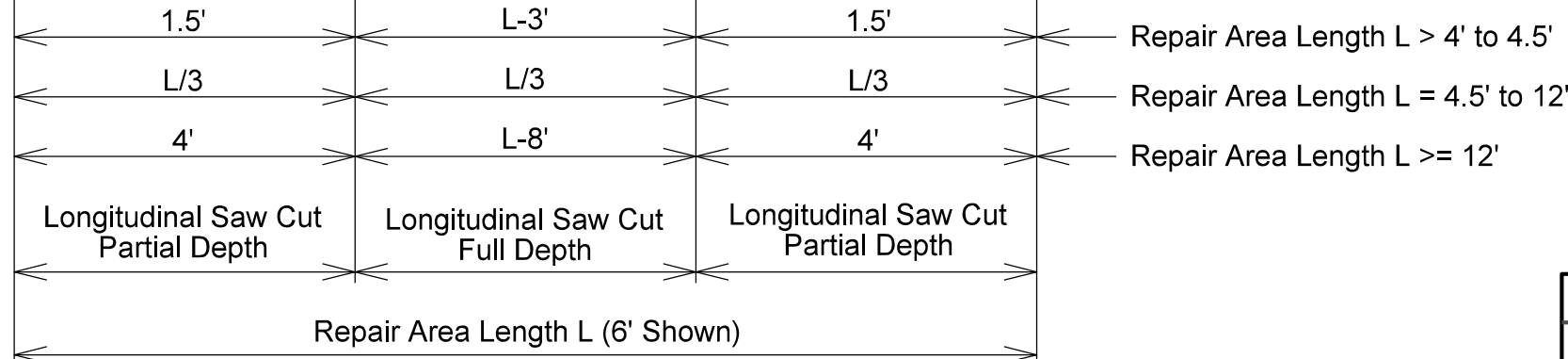
CRC PAVEMENT REPAIR (PARTIAL LANE WIDTH) - TYPICAL



Place No. (C) Longitudinal Deformed Tie Bars (Lap splice to In Place No. (C) Longitudinal Bars).

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).

* 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)
3785	8"	6	8"	4	36"

CRC REPAIR AREA KEY	
	Remove Concrete Retain Reinforcing Steel
	Remove Concrete Remove Reinforcing Steel

PLOT SCALE - 1:1.06

PLOT NAME - 1

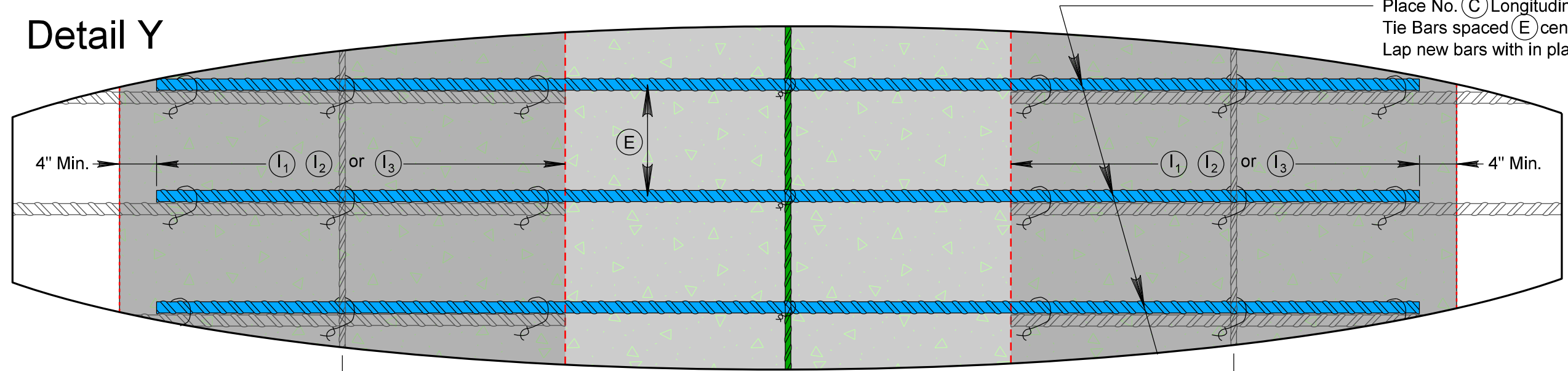
FILE - ... \CRC PARTIAL WIDTH REPAIR.DGN

CRC PAVEMENT REPAIR (PARTIAL LANE WIDTH)

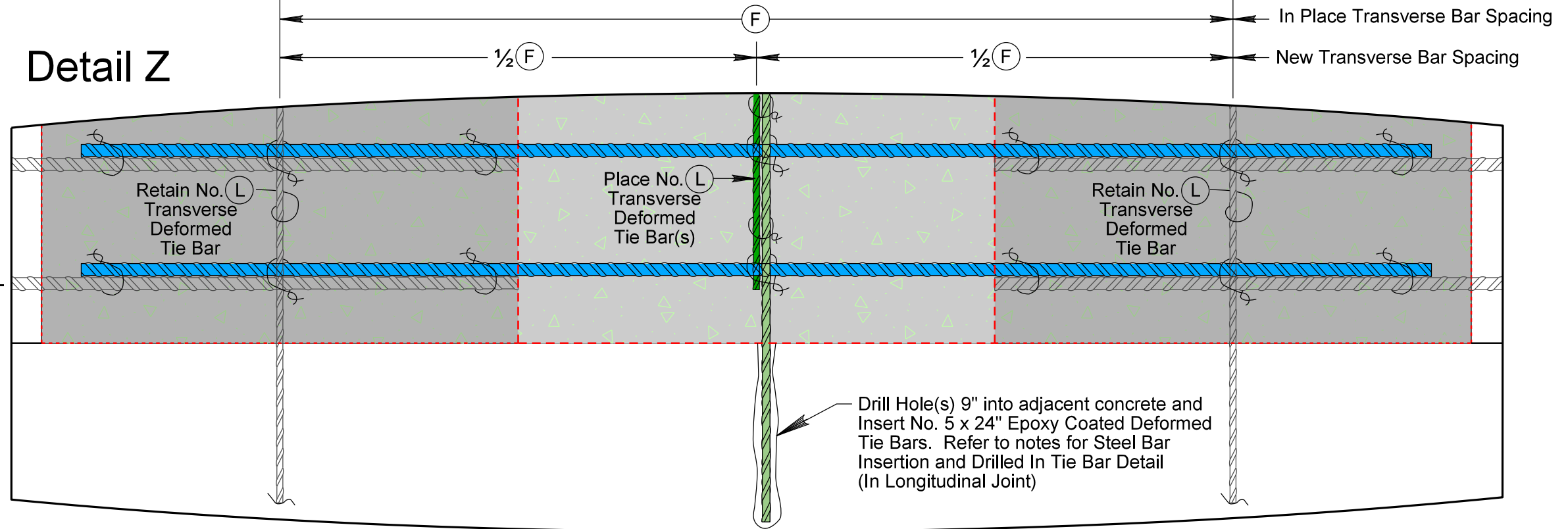
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	56	74

Plotting Date: 02/14/2024

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. C Longitudinal Deformed Tie Bar In Place (Retain)
Place No. L Transverse Deformed Tie Bar (Tie to No. C Longitudinal Bars)	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
3785	8"	6	8"	4	36"

LAP SPLICE LENGTH KEY

I ₁	Lap Splice length for Repair Area Length L = 4' to 4.5'.
I ₂	Lap Splice length for Repair Area Length L = 4.5' to 8'.
I 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

PLOT SCALE - 1:1.06

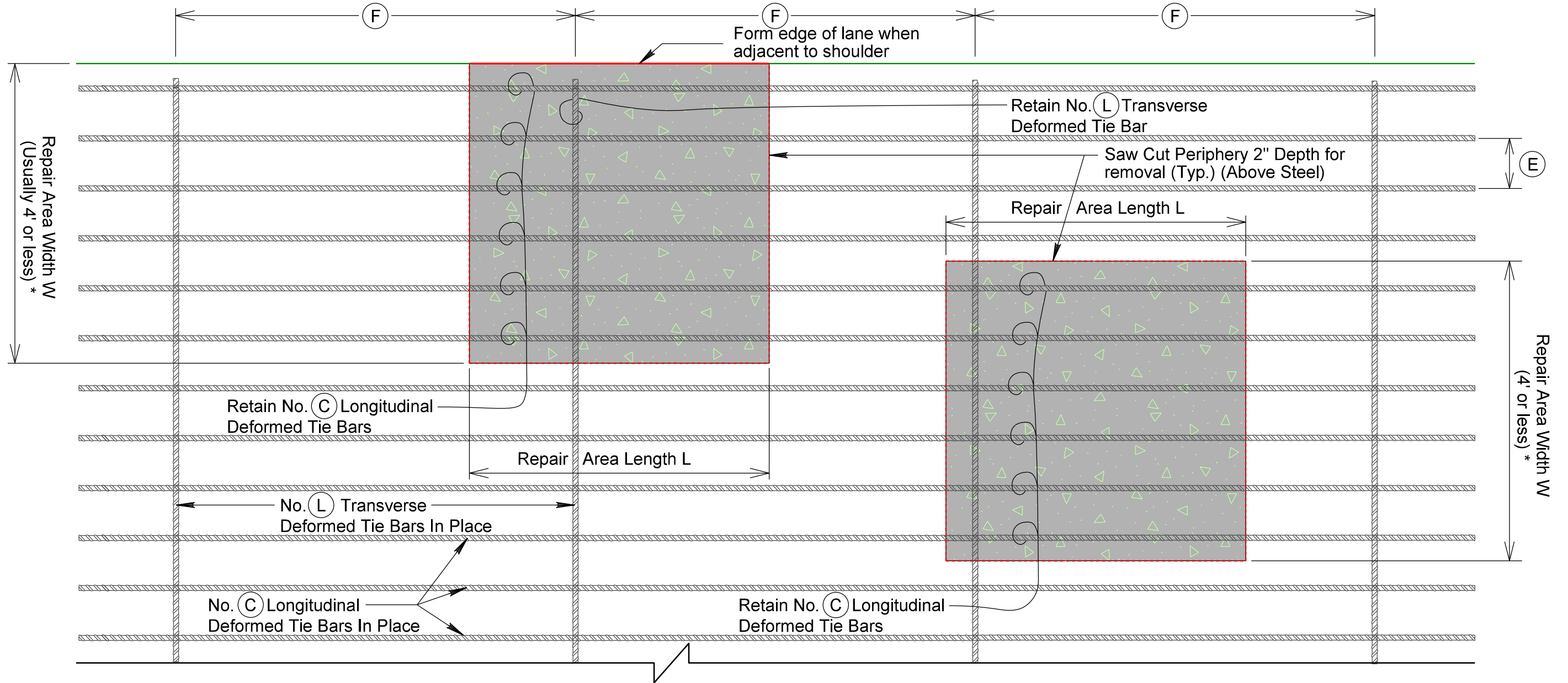
PLOT NAME - 2

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

PLOTTED FROM - TRSF12133

CRC PAVEMENT REPAIR - EXISTING STEEL RETAINED (TYPICAL)

PLAN VIEW



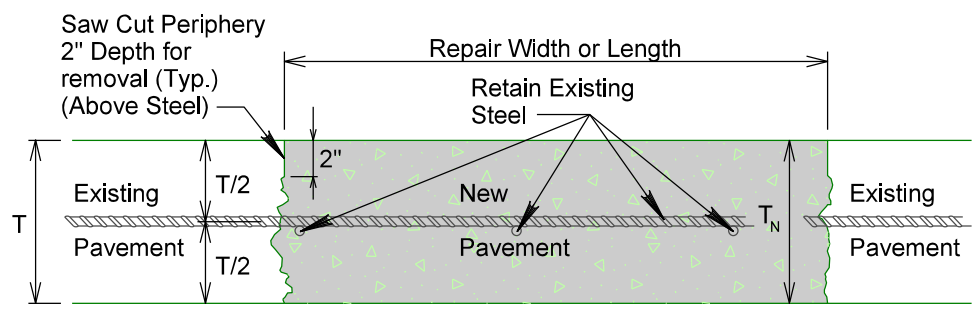
* When Repair Width W exceeds 4', usually use partial lane width repair.
 When Repair Width W exceeds half the lane width, usually use full lane width repair.

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

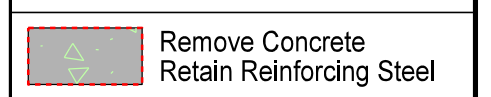
	Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
			Size	Spacing	Size	Spacing
No. L Transverse Deformed Tie Bar In Place (Retain)	PCN	T	C	E	L	F
	3785	8"	6	8"	4	36"
No. C Longitudinal Deformed Tie Bar In Place (Retain)						

PROFILE VIEW



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

CRC REPAIR AREA KEY



PLOT SCALE - 1:1.06

PLOTTED FROM - TRSF12133

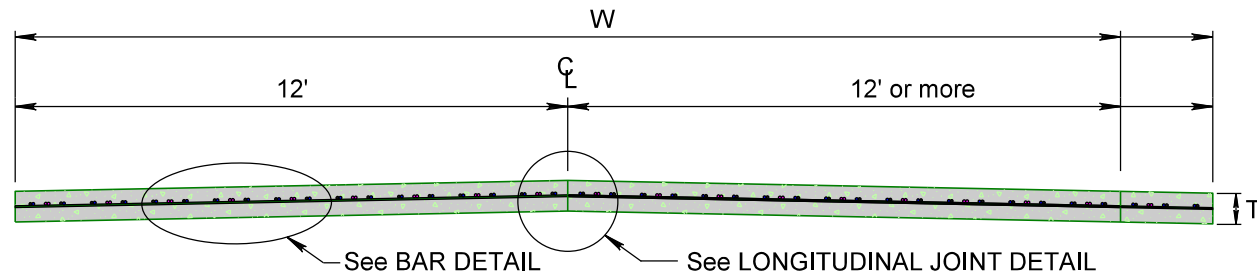
PLOT NAME - 1

FILE - ... \CRC SMALL REPAIR.DGN

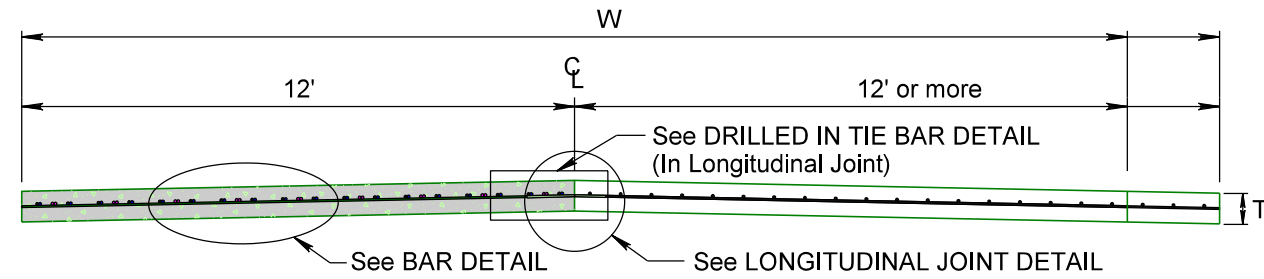
CRC PAVEMENT REPAIR - REINFORCING STEEL DETAILS

Plotting Date: 02/14/2024

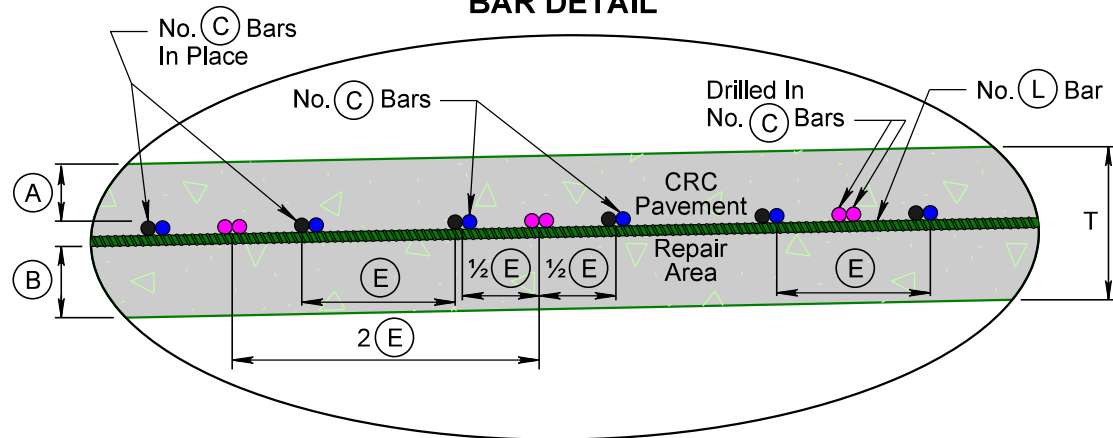
TRANSVERSE SECTION SHOWING STEEL PLACEMENT



TRANSVERSE SECTION SHOWING STEEL PLACEMENT



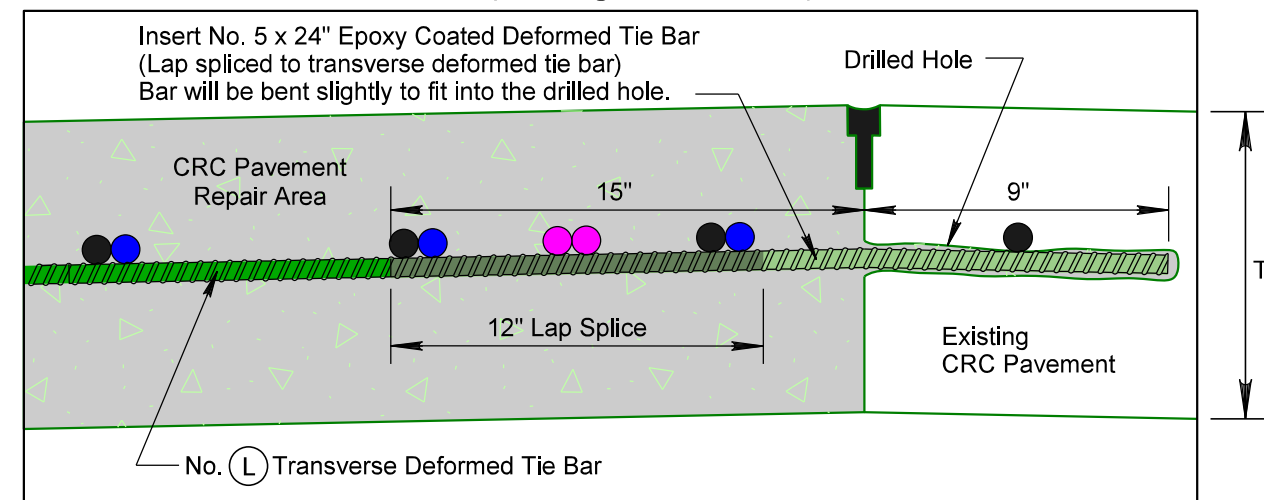
BAR DETAIL



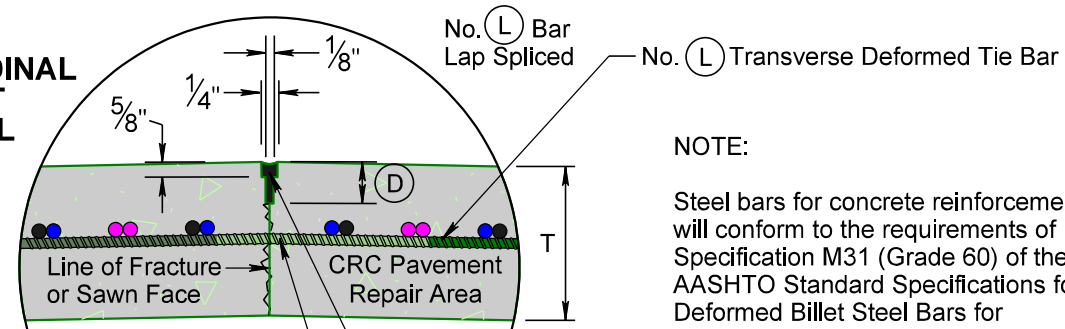
Placement of longitudinal steel bars may vary from +1/2" to -1/2" vertically and 3/4" horizontally. Placement of transverse steel bars may vary from +1/2" to -1/2" vertically and 2" horizontally.

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

DRILLED IN TIE BAR DETAIL (In Longitudinal Joint)



LONGITUDINAL JOINT DETAIL



NOTE:

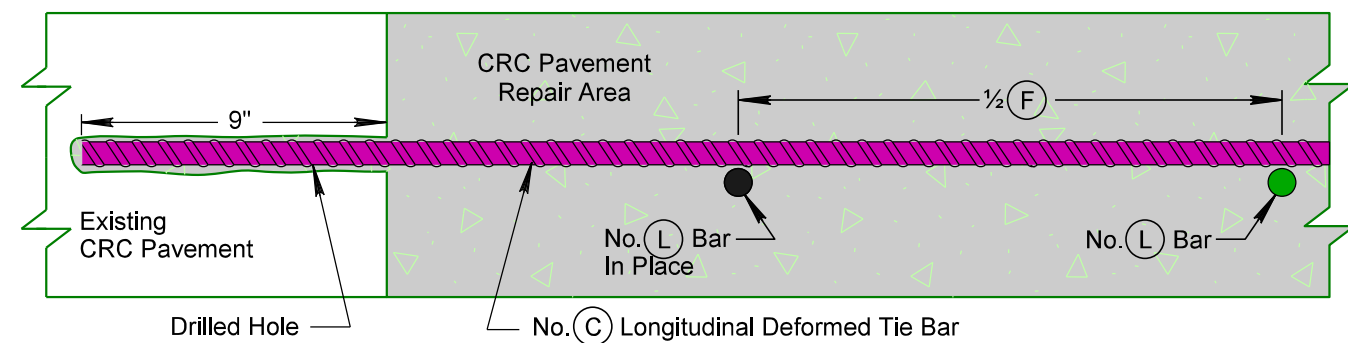
Steel bars for concrete reinforcement will conform to the requirements of Specification M31 (Grade 60) of the AASHTO Standard Specifications for Deformed Billet Steel Bars for Concrete Reinforcement.

Insert No. 5 x 24" Epoxy Coated Deformed Tie Bar (Lap spliced to transverse deformed tie bar) Bar will be bent slightly to fit into the drilled hole.

Sawed joint filled with Hot Poured Elastic Joint Sealer

See 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	CRC Depth	CRC Width	Clearance		Longitudinal Steel		Saw Cut Depth	Transverse Steel		Longitudinal Bar Count (full lane width repair)						Lap Splice Length (for Repair Length L)			Not Assigned	Perimeter Bar Spacing				Chair Width
				Top	Bottom	Size	Spacing		Size	Spacing	12' Wide Slab			14' Wide Slab			L < 4.5'	L = 4.5' to 8'9"	L >= 8'9"		K	M	N	P	
				(A)	(B)	(C)	(E)		(D)	(L)	(F)	(G)	(H ₁)	(H ₂)	(G)	(H ₁)	(H ₂)	(I ₁)	(I ₂)		(I ₃)	(K)	(M)	(N)	
I29S MRM 85.00 +0.435 to MRM 97.00 +0.766	3785	8"	26'	3 1/4"	3 1/2"	6	8"	2"	4	36"	18	9	9	21	10	10	14"	14" to 25"	25"	-	4"	8"	8"	8"	5"

PLOT SCALE - 1/8"=33.3333

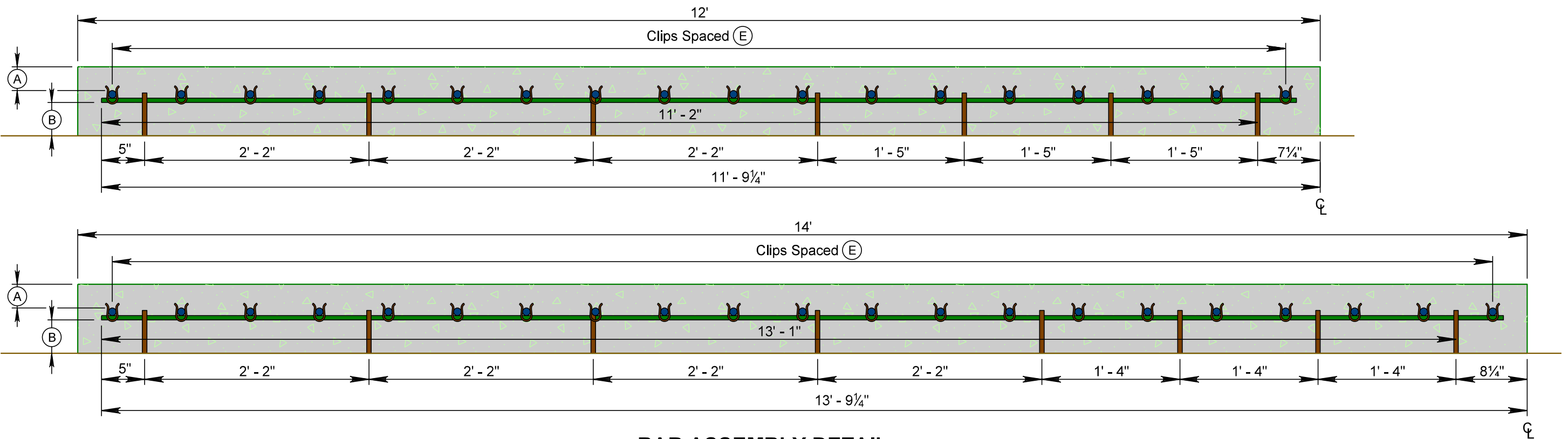
PLOTTED FROM - TRSF12133

PLOT NAME - 1

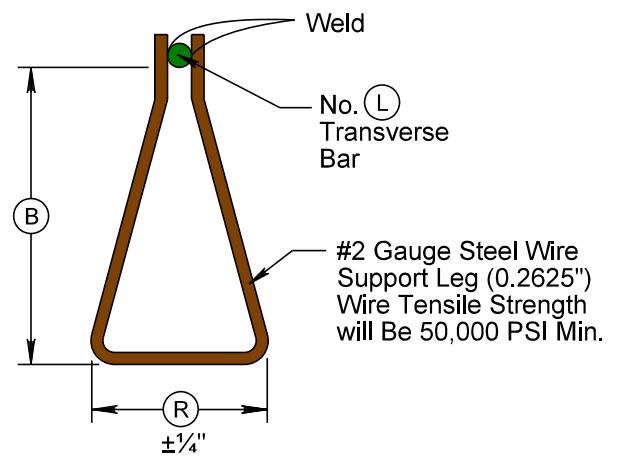
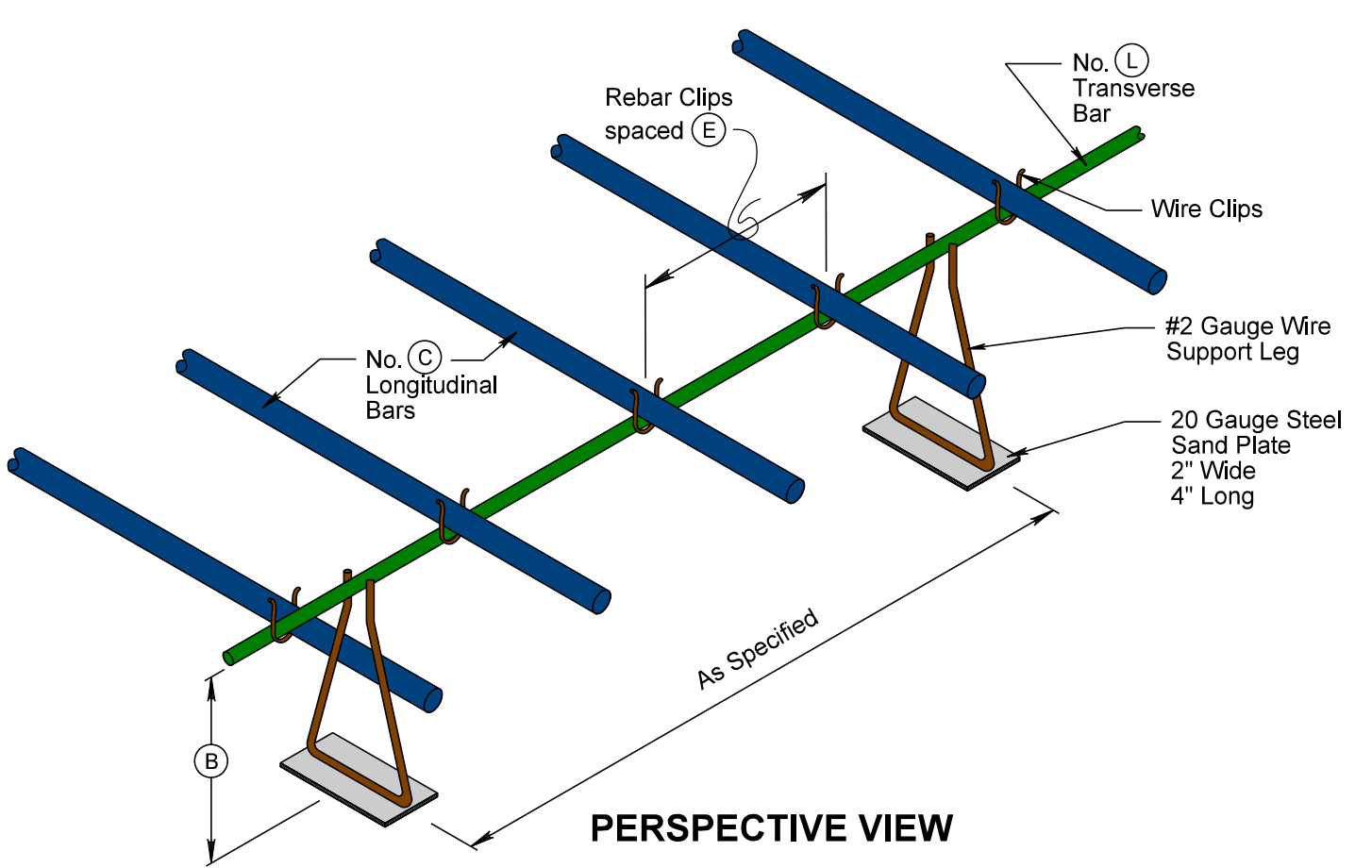
FILE - ... \CRC REPAIR\CRC BARS.DGN

CRC PAVEMENT CHAIR DETAILS

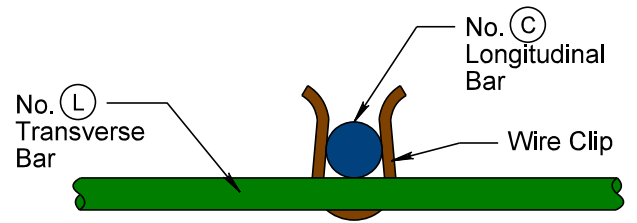
Plotting Date: 02/14/2024



BAR ASSEMBLY DETAIL



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)
3785	8"	26'	3 1/4"	3 1/2"	6	8"	2"	4	36"	5"

PLOT SCALE - 1:1

PLOTTED FROM - TRSF12133

PLOT NAME - 1

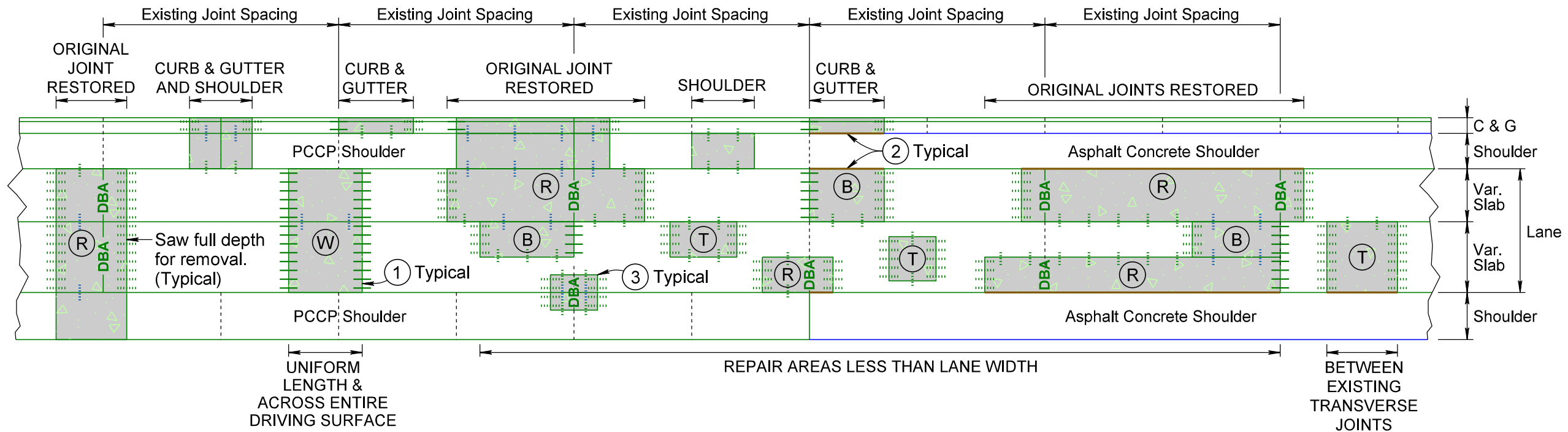
FILE - ... \CRC CHAIR DETAILS.DGN

NONREINFORCED PCC PAVEMENT REPAIR

ANY SINGLE LANE ROADWAY (RAMPS, ETC.) TYPICAL REPAIR AREAS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	60	74

Plotting Date: 02/14/2024



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 entire driving surface))
- (T)** Two Tied Joints
- (B)** One Working & One Tied Joint
- (R)** Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

Steel Bars for Transverse Joints

Pavement Thickness $\geq 10.5"$

— Drilled in $1\frac{1}{2}" \times 18"$ 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 $\geq 8.5"$ and $< 10.5"$

— Drilled in $1\frac{1}{4}" \times 18"$ 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 $1" \times 18"$ 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. Sawn 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.

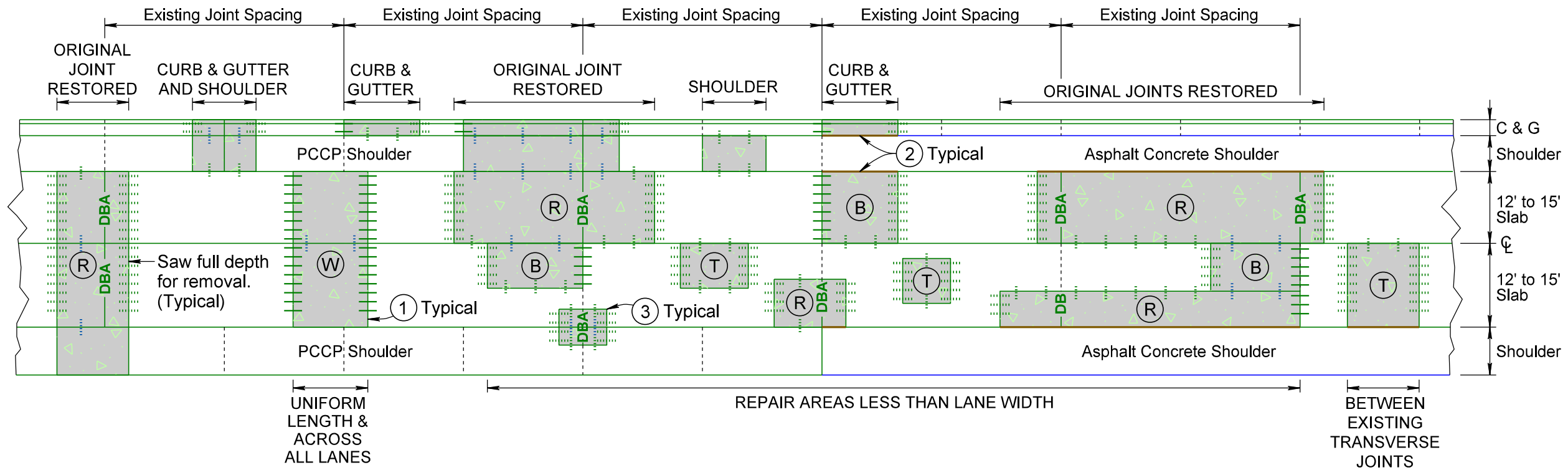
NONREINFORCED PCC PAVEMENT REPAIR

UP TO TWO LANE ROADWAY OR UP TO FOUR LANE DIVIDED ROADWAY

TYPICAL REPAIR AREAS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	61	74

Plotting Date: 02/14/2024



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

Steel Bars for Transverse Joints

- Pavement Thickness ≥ 10.5 "
- Drilled in $1\frac{1}{2}$ " 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 $1\frac{1}{4}$ " 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. Sawn 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.

PLOT SCALE - 1:10

PLOT NAME - 9

FILE - ... \PCCREPAIR\PATCH2.DGN

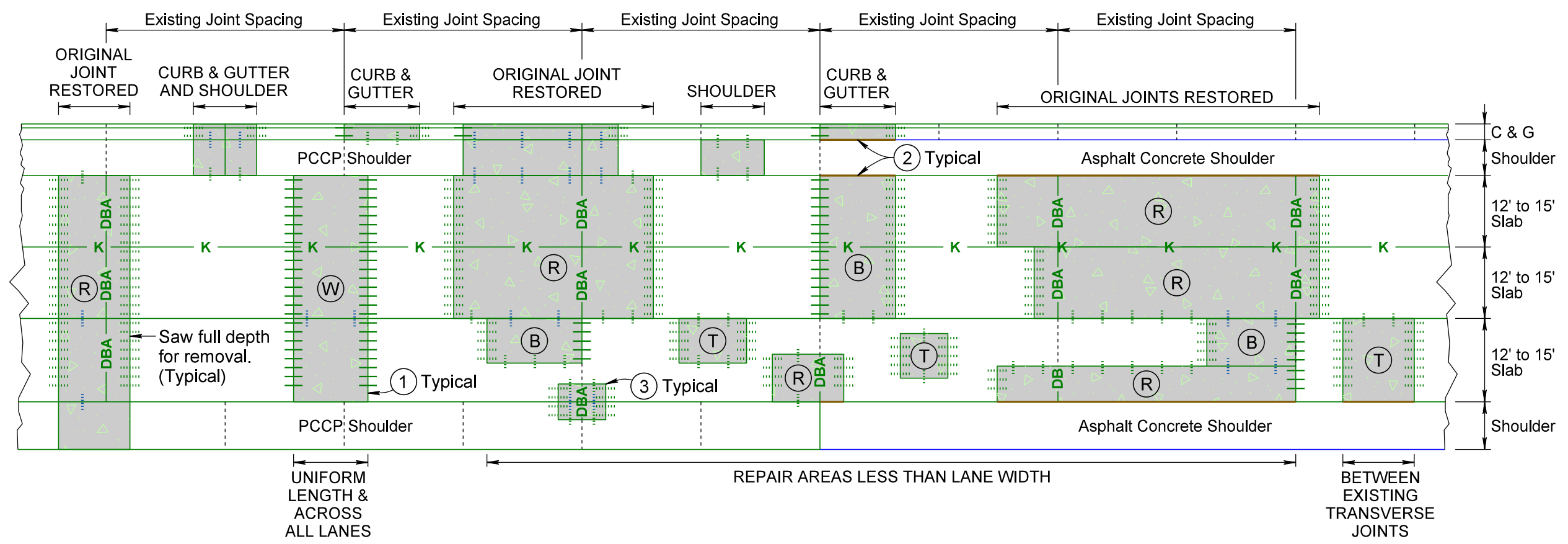
PLOTTED FROM - TRSF12133

NONREINFORCED PCC PAVEMENT REPAIR

UP TO TWO LANE ROADWAY WITH CENTER LANE OR UP TO SIX LANE DIVIDED ROADWAY
TYPICAL REPAIR AREAS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	62	74

Plotting Date: 02/14/2024



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 $1\frac{1}{2}$ " 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 $1\frac{1}{4}$ " 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. Sawn 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.

PLOT SCALE - 1:10

PLOTTED FROM - TRSF12133

PLOT NAME - 1

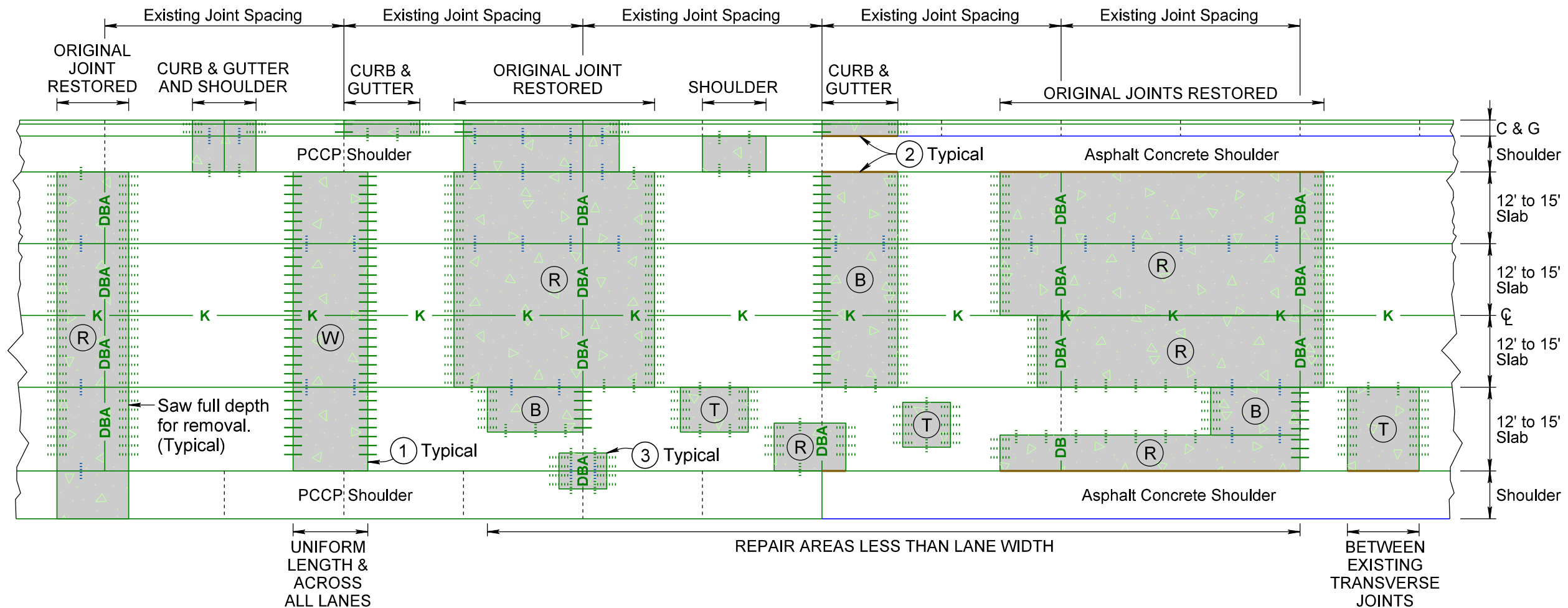
FILE - ... \PCCREPAIR\PATCH3.DGN

NONREINFORCED PCC PAVEMENT REPAIR

UP TO FOUR LANE ROADWAY OR UP TO EIGHT LANE DIVIDED ROADWAY

TYPICAL REPAIR AREAS

Plotting Date: 02/14/2024



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 $1\frac{1}{2}$ " 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 $1\frac{1}{4}$ " 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. Sawn 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.

PLOT SCALE - 1:10

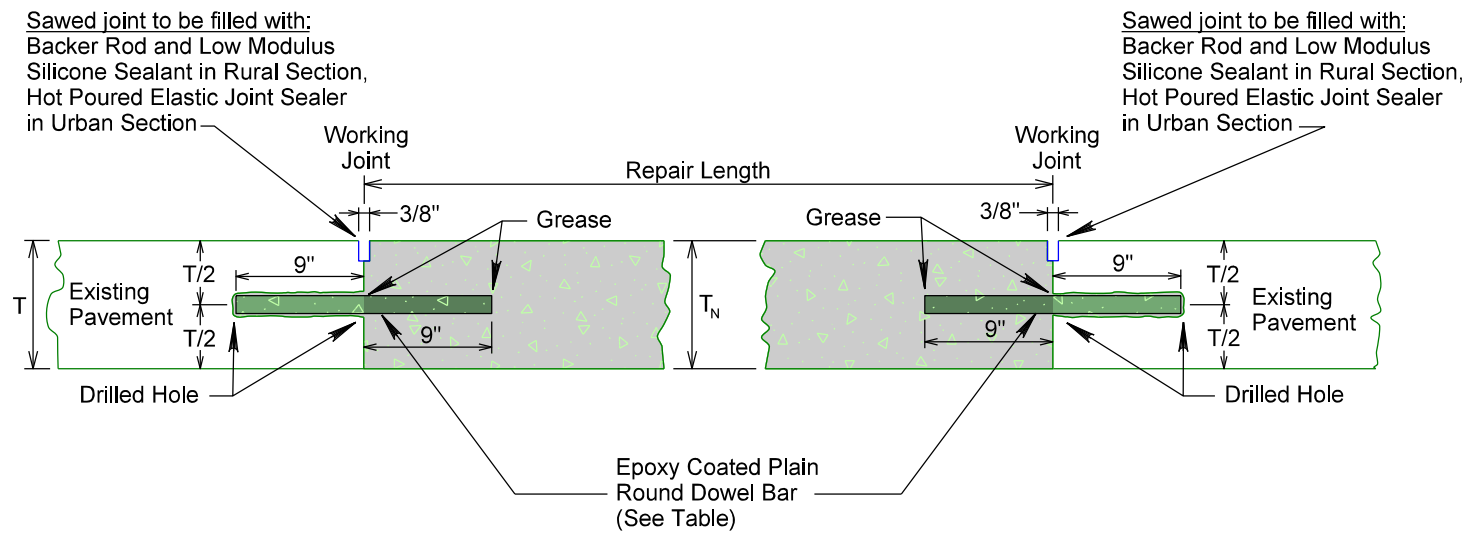
PLOTTED FROM - TRSF12133

PLOT NAME - 1
FILE - ... \PCCREPAIR\PATCH4.DGN

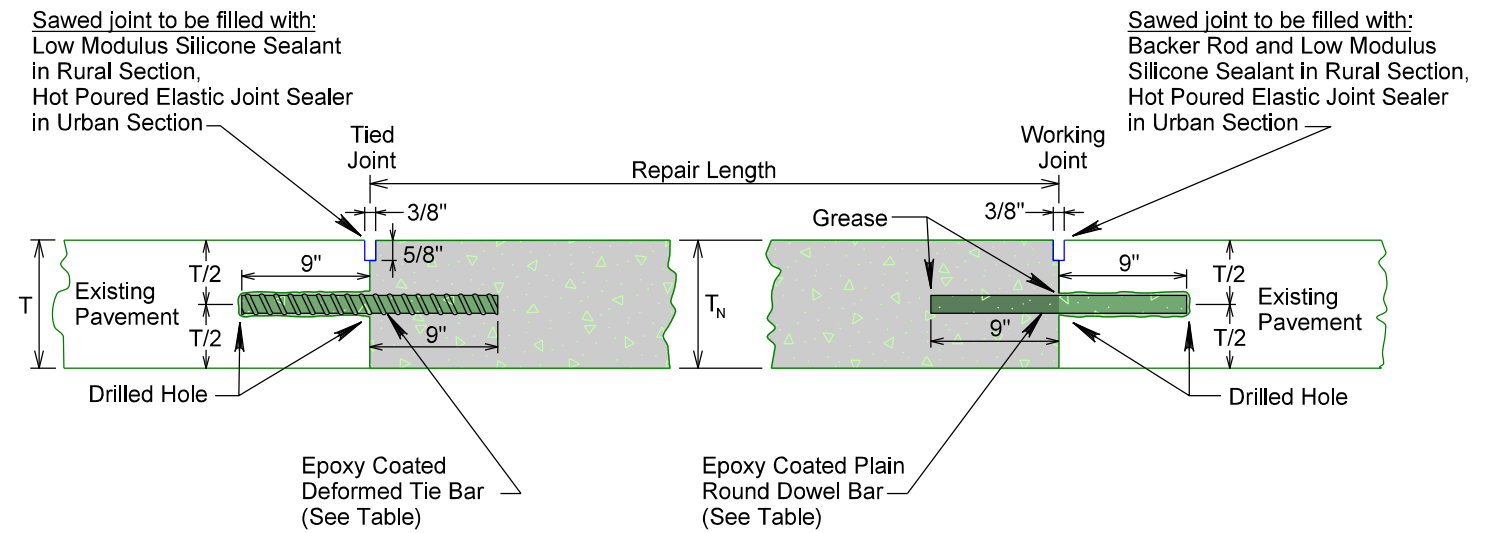
NONREINFORCED PCC PAVEMENT REPAIR

Plotting Date: 02/14/2024

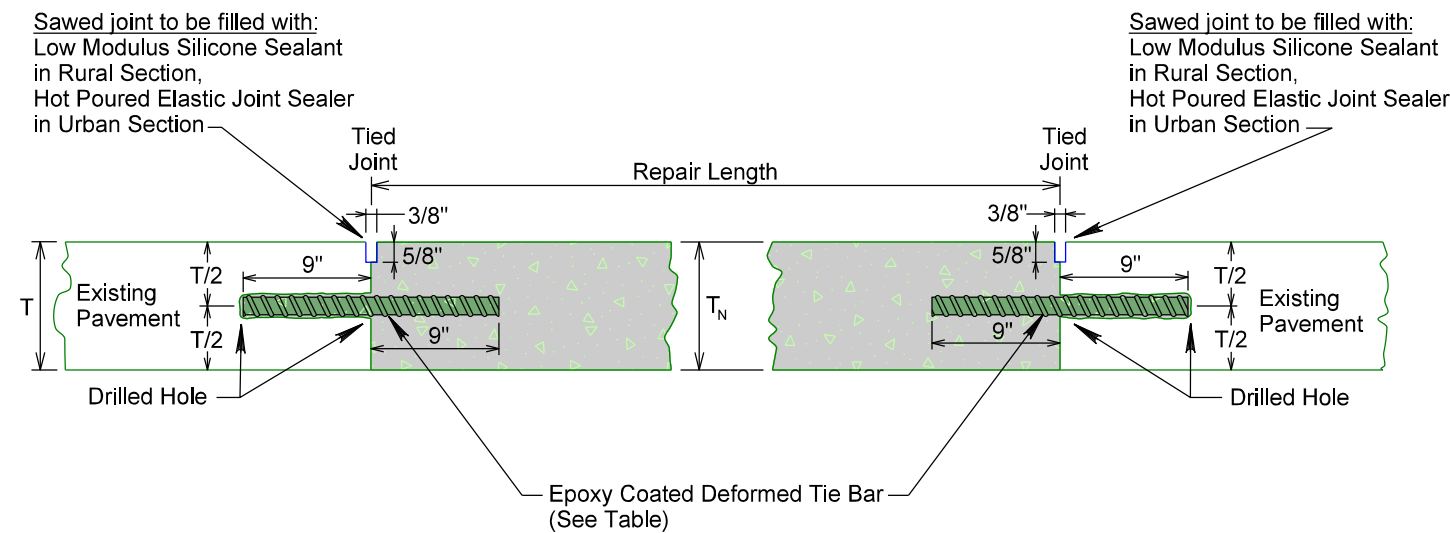
**PLAIN ROUND DOWEL BAR INSERTION
TYPE W - (TWO WORKING JOINTS)**



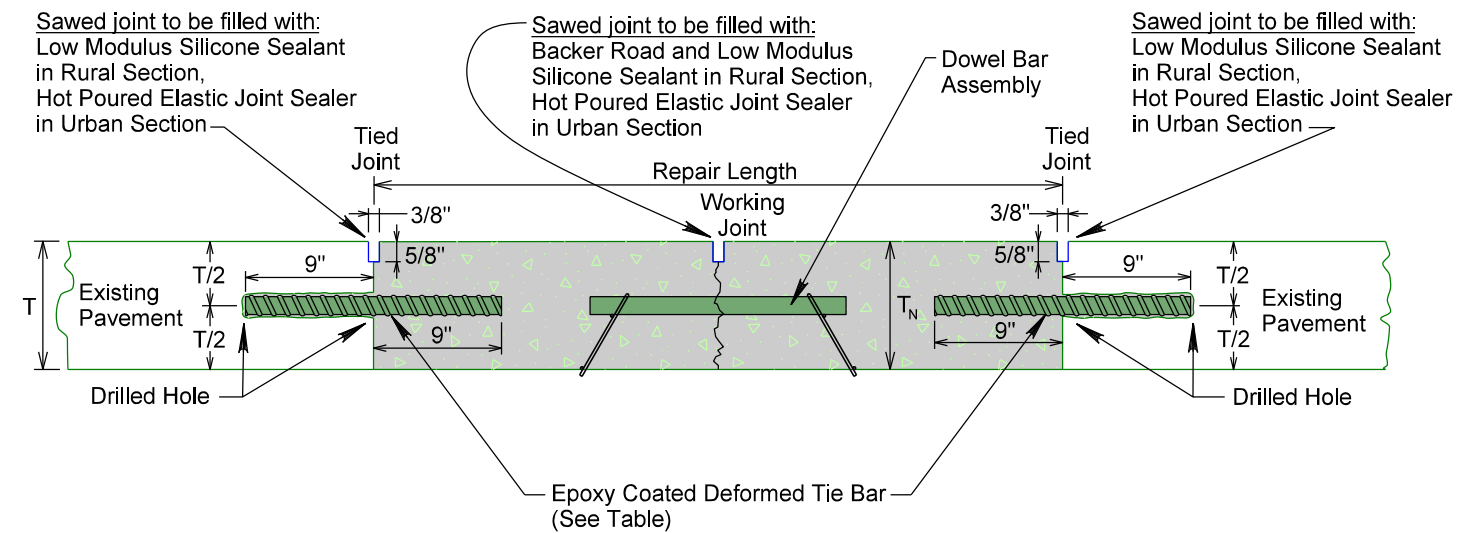
**DEFORMED TIE BAR AND PLAIN ROUND DOWEL BAR INSERTION
TYPE B - (ONE TIED JOINT AND ONE WORKING JOINT)**



**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
$T \geq 10.5"$	No. 11 x 18"	1½" x 18"
$T \geq 8.5"$ & $T < 10.5"$	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)

PLOT SCALE - 1/4"=1'-0"

PLOTTED FROM - TRSF12133

PLOT NAME -

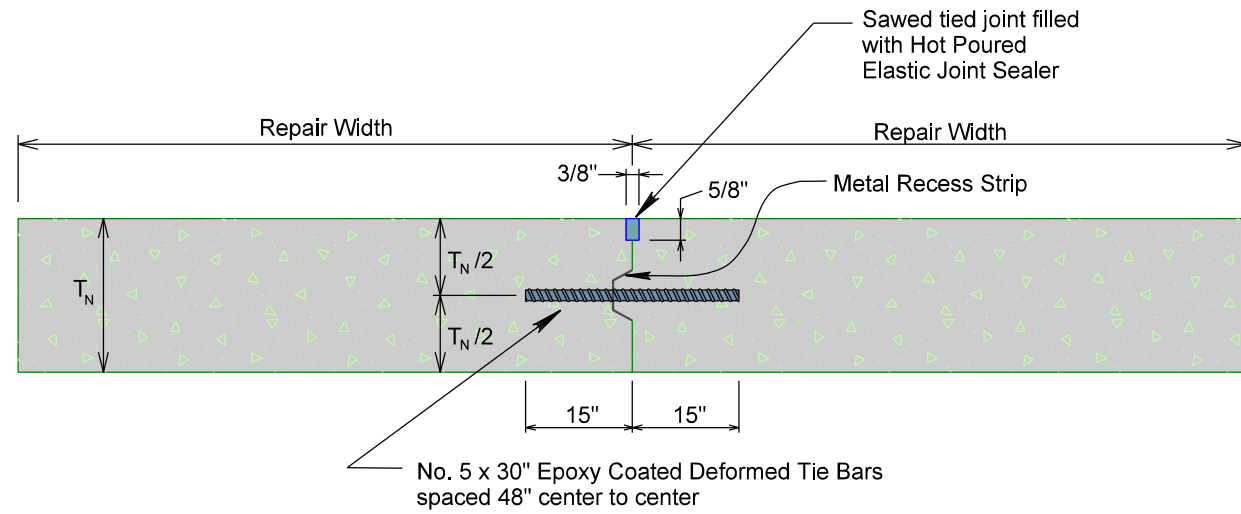
FILE - ... \PCCREPAIR\VBARS.DGN

NONREINFORCED PCC PAVEMENT REPAIR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	65	74

Plotting Date: 02/14/2024

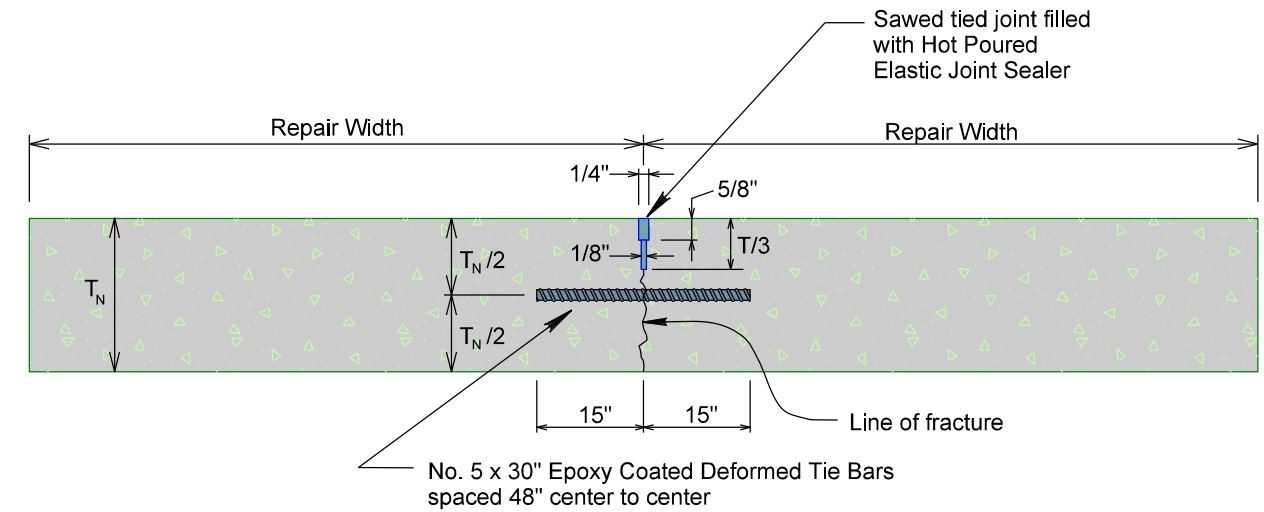
LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



T_N = New 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 JOINT

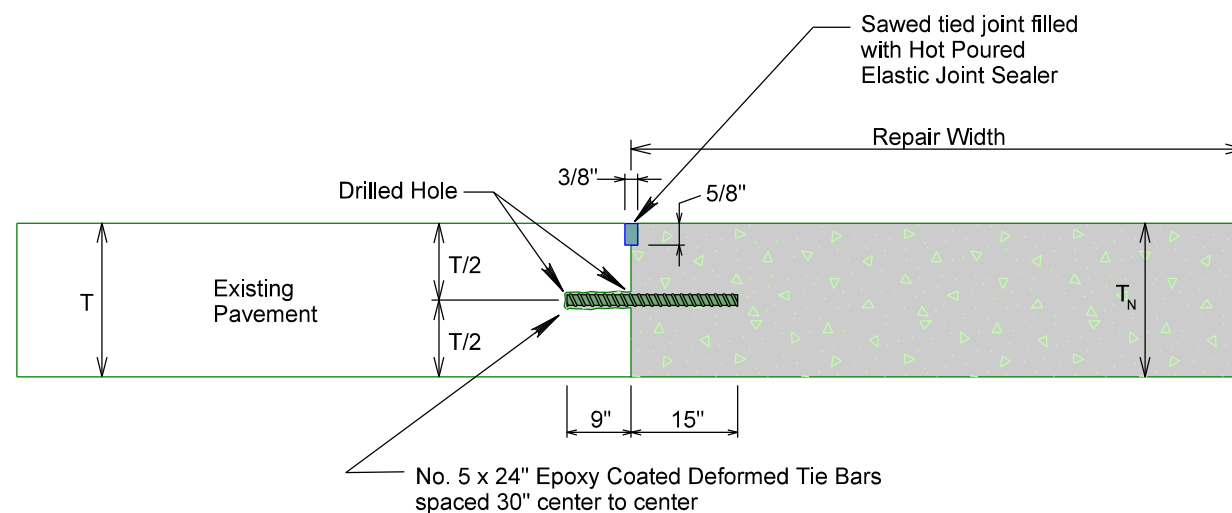


T_N = New pavement thickness.

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 CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



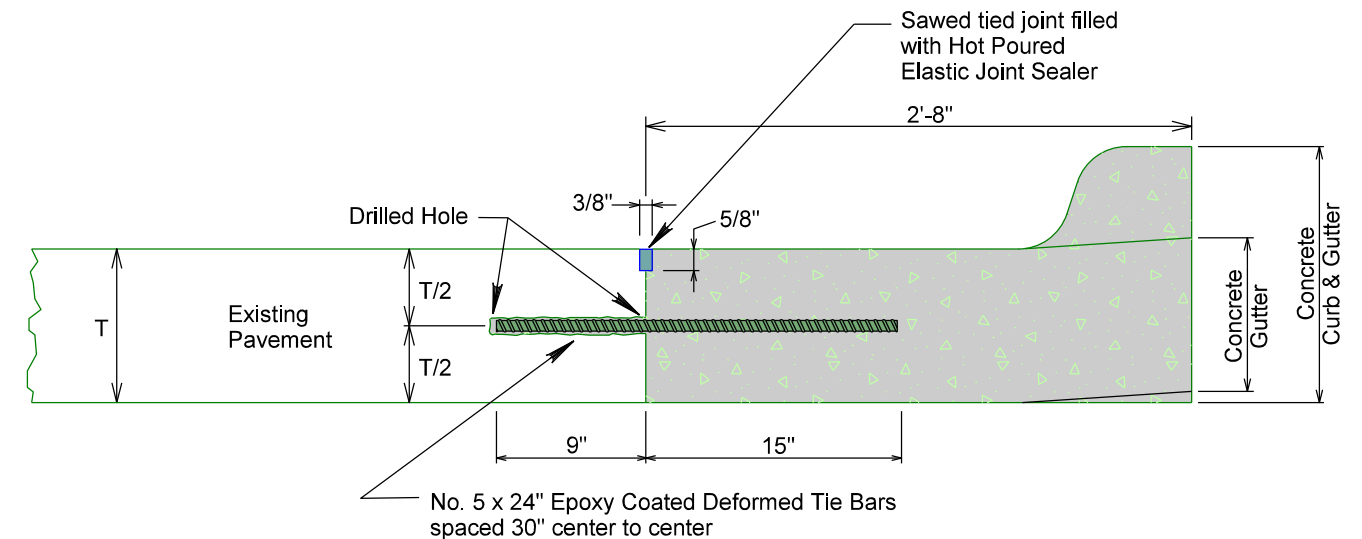
T = Existing pavement thickness.
 T_N = New pavement thickness.

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 CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



T = Existing 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.

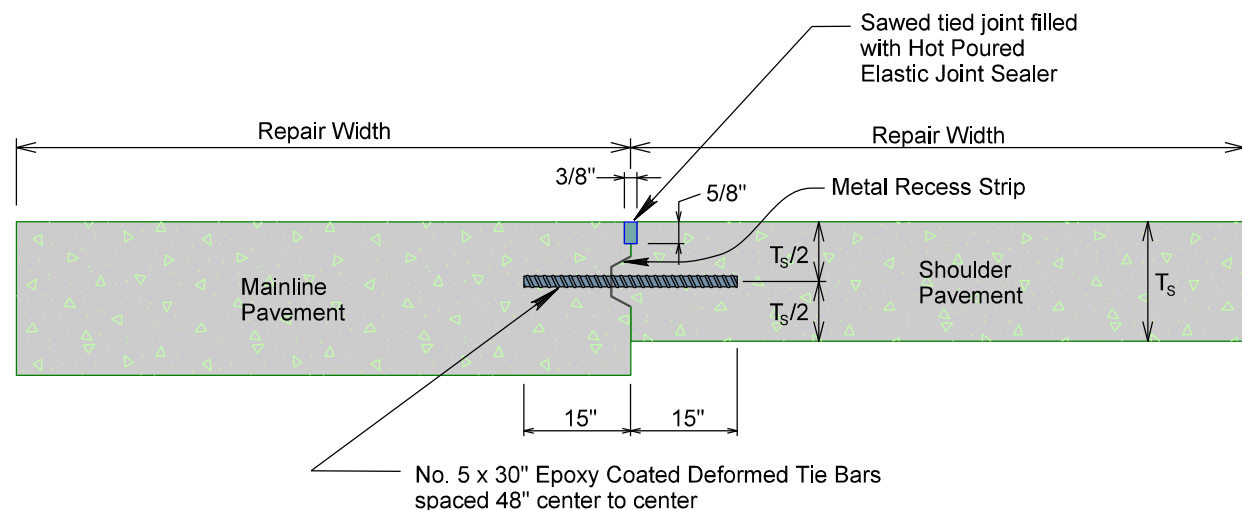
Cost for furnishing and inserting drilled in tie bars will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

NONREINFORCED PCC PAVEMENT REPAIR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	66	74

Plotting Date: 02/14/2024

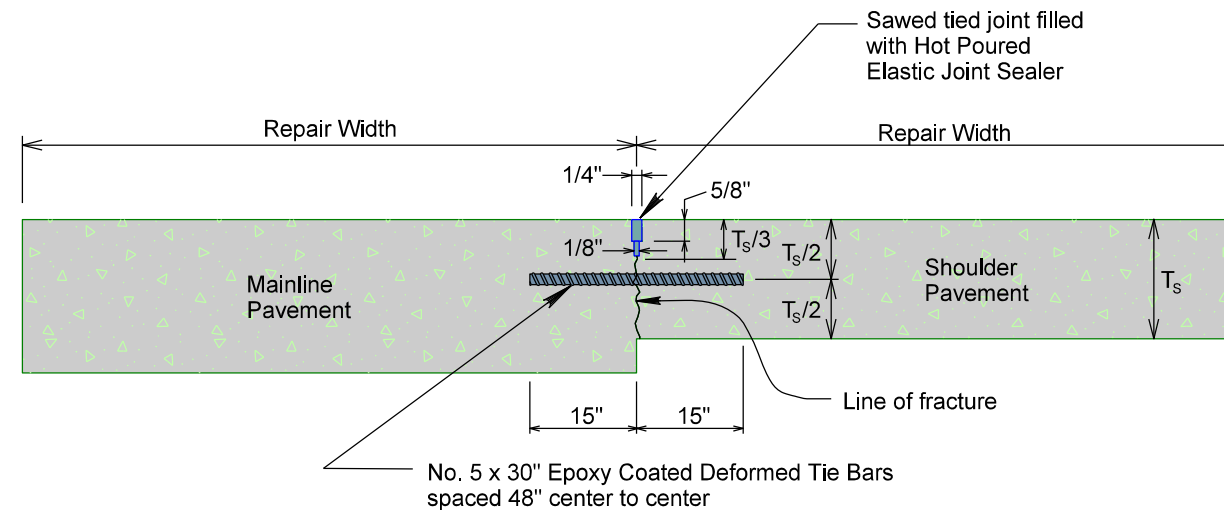
LONGITUDINAL SHOULDER CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



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

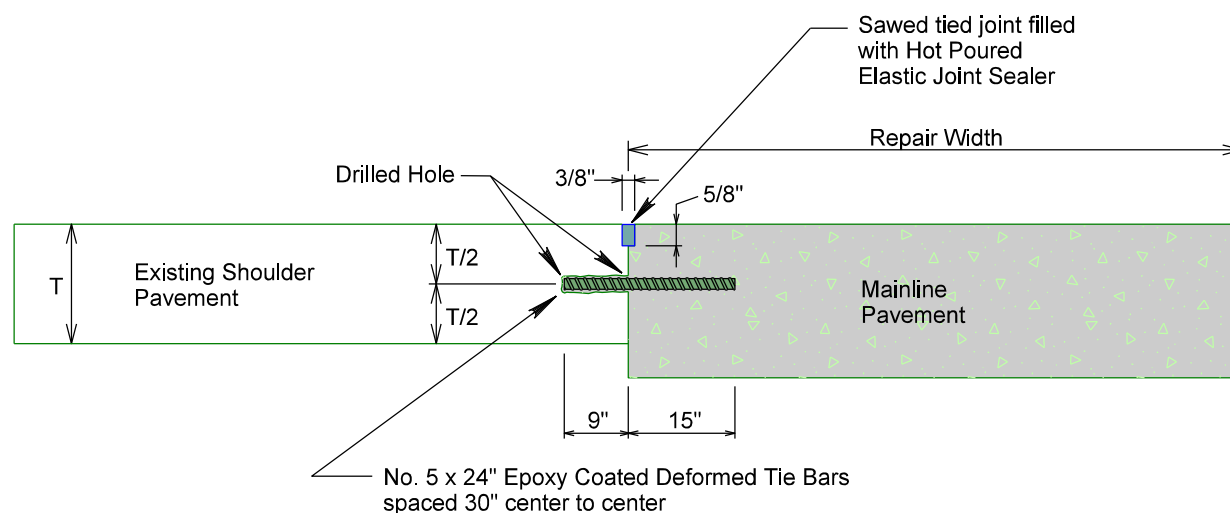


T_s = New shoulder pavement thickness.

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



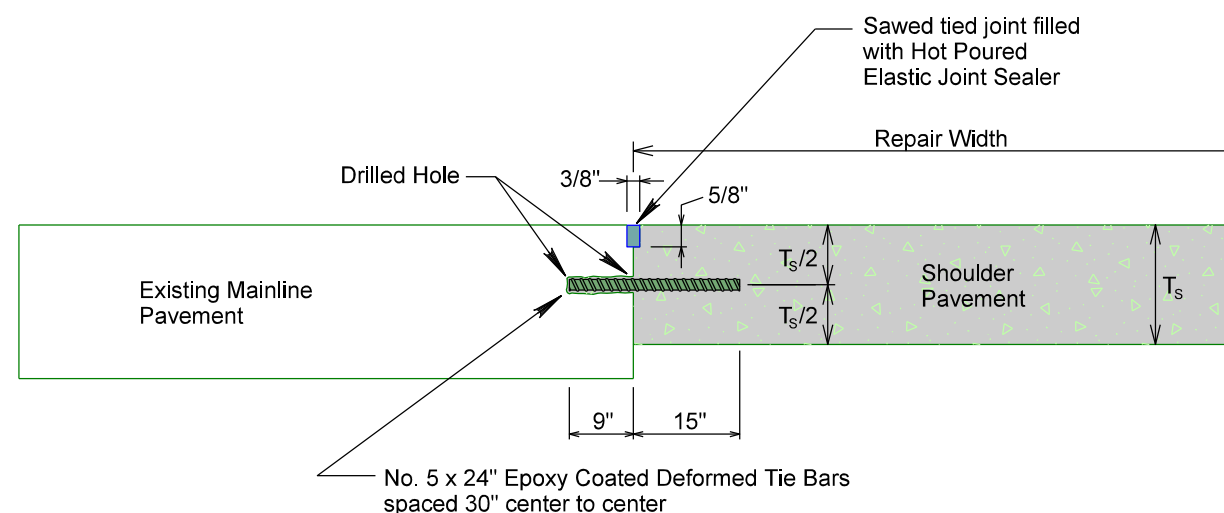
T = Existing shoulder pavement thickness.

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.

PLOT SCALE - 1:11.25

PLOTTED FROM - TRSF12133

PLOT NAME - 14

FILE - ... \PCCREPAIR\BARS.DGN

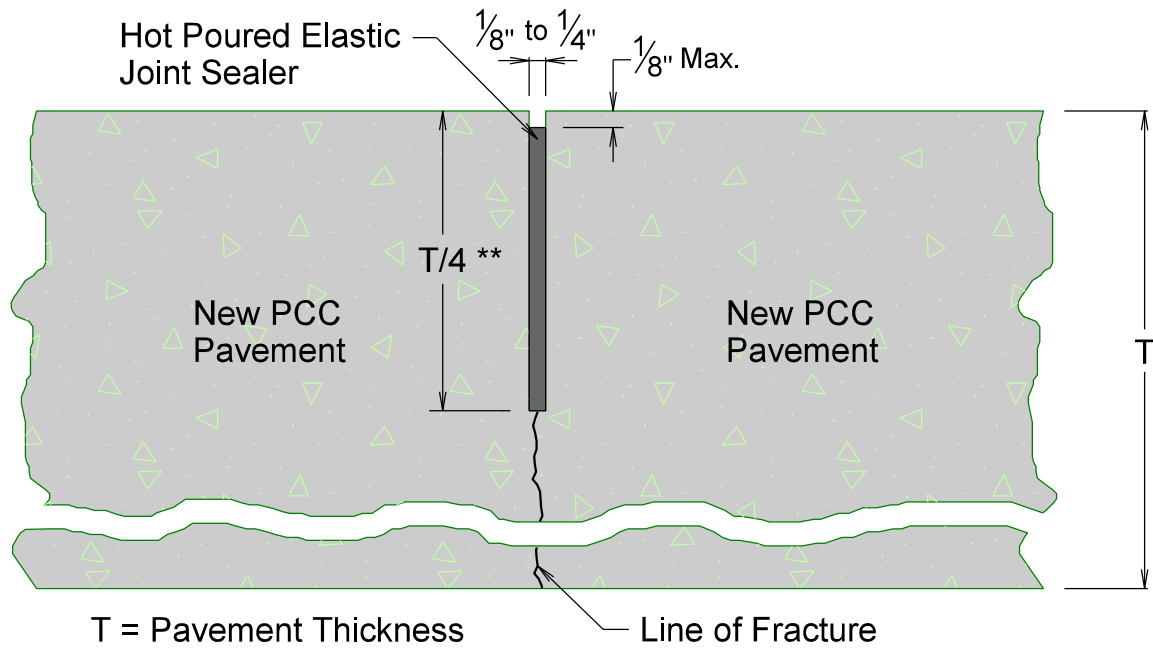
NONREINFORCED PCC PAVEMENT REPAIR

SAW & SEAL TRANSVERSE JOINTS

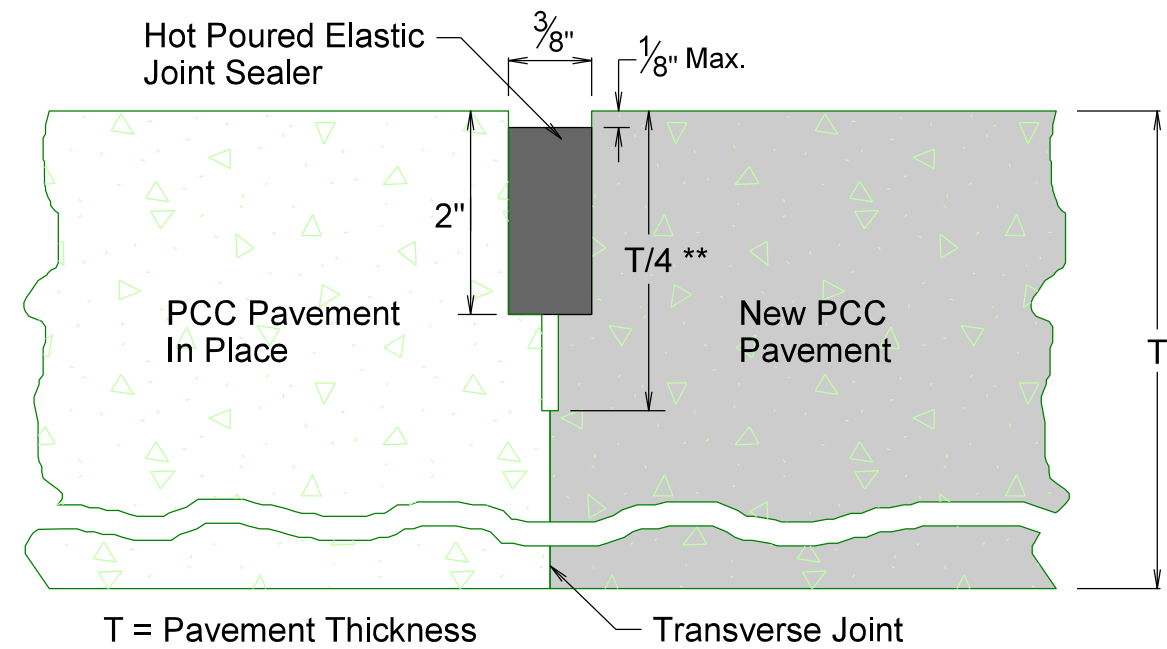
STATE OF SOUTH DAKOTA	PROJECT IM-NH-P 0022(89)	SHEET 67	TOTAL SHEETS 74
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Plotting Date: 02/14/2024

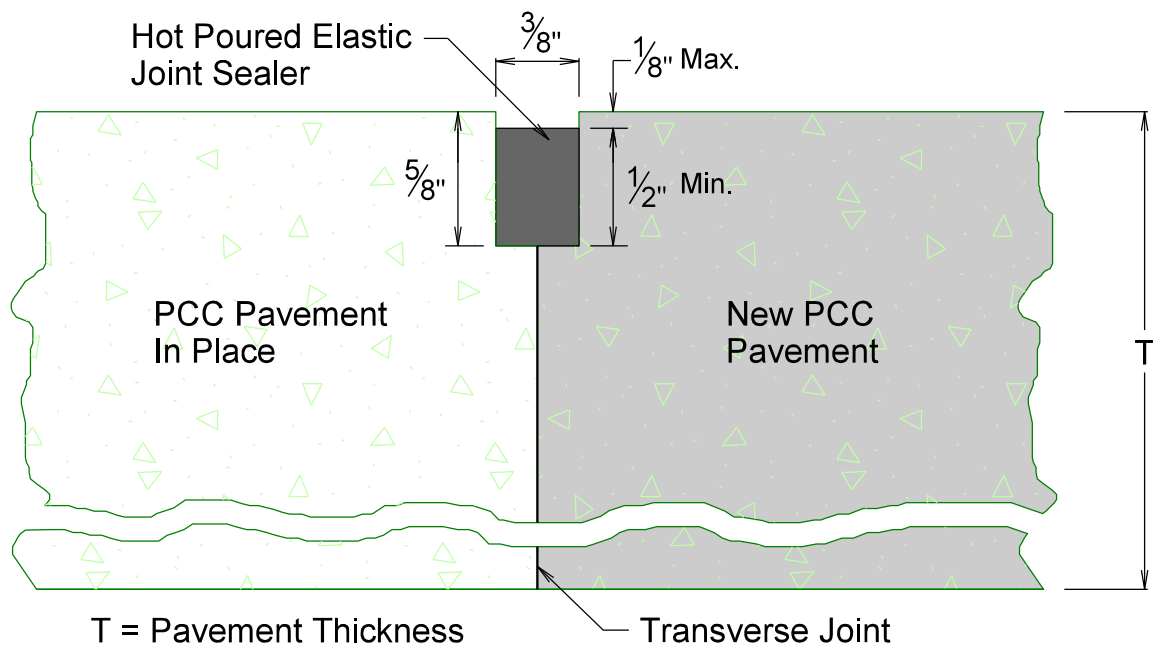
WITH HOT POURED ELASTIC JOINT SEALER AT WORKING JOINTS ENTIRELY WITHIN REPAIR AREAS



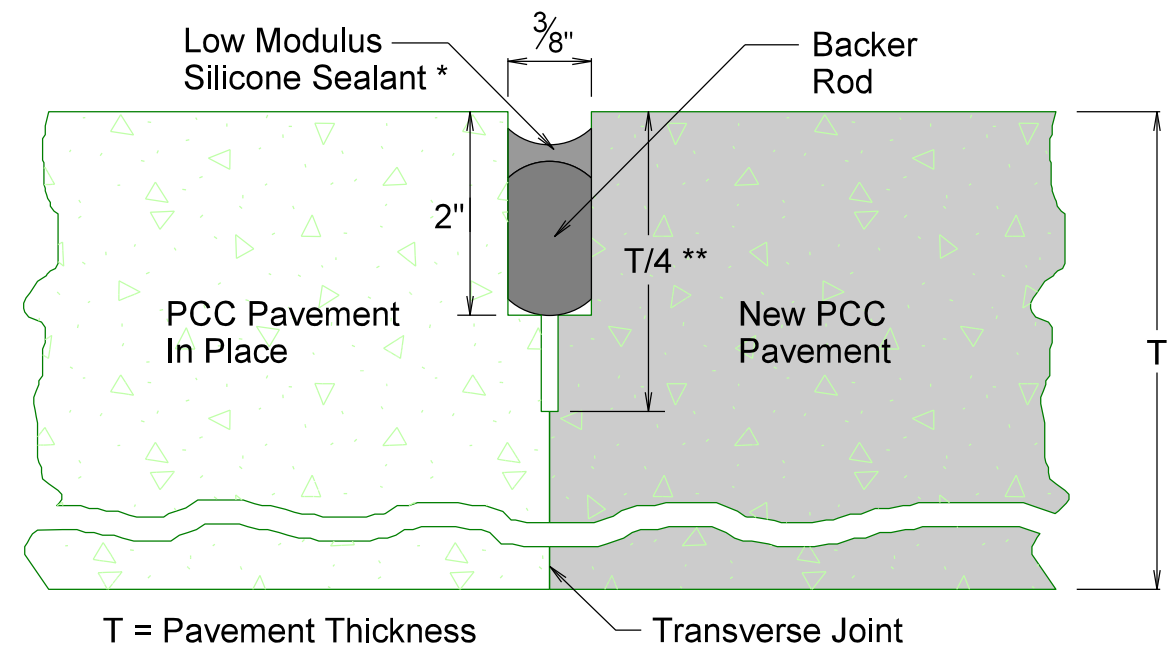
WITH HOT POURED ELASTIC JOINT SEALER AT WORKING JOINTS (TYPICALLY URBAN)



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.

PLOT SCALE - 1:0.12

PLOTTED FROM - TRSF12133

FILE - ... \REPAIR AREA - TRANSVERSE JOINT DETAILS.DGN

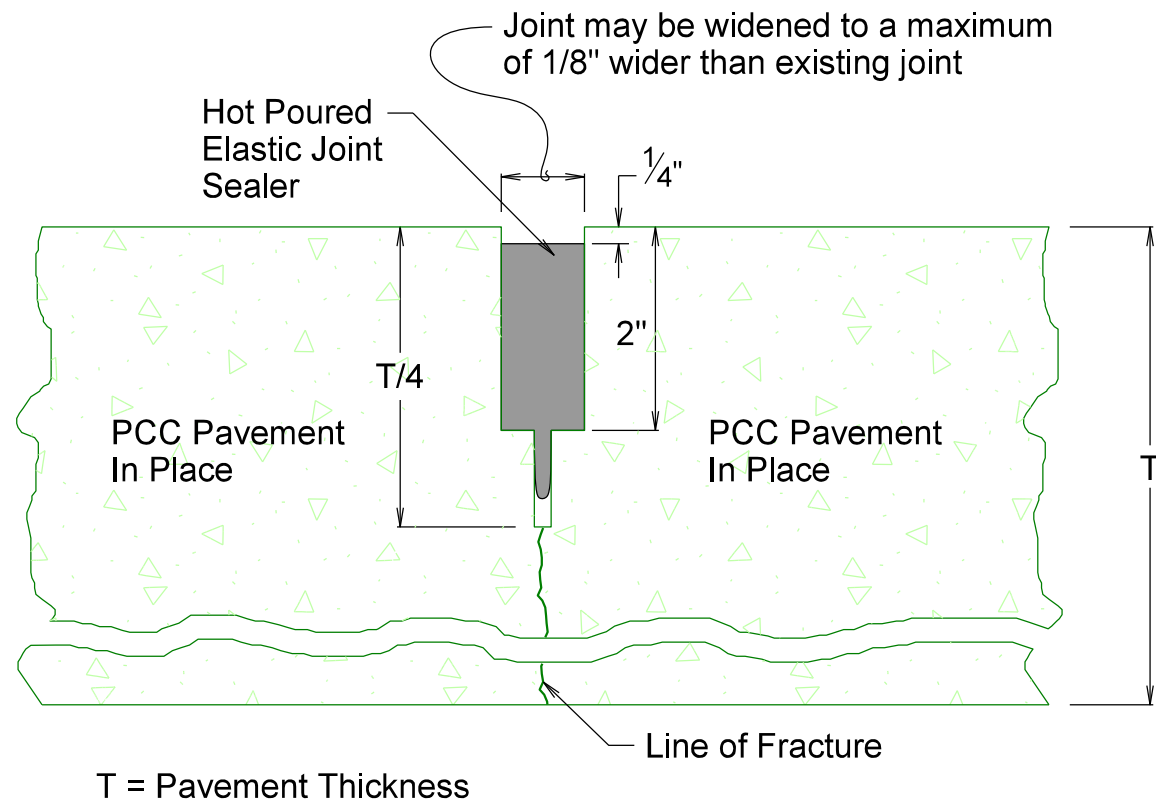
PLOT NAME - 1

RESEAL PCC PAVEMENT JOINTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	68	74

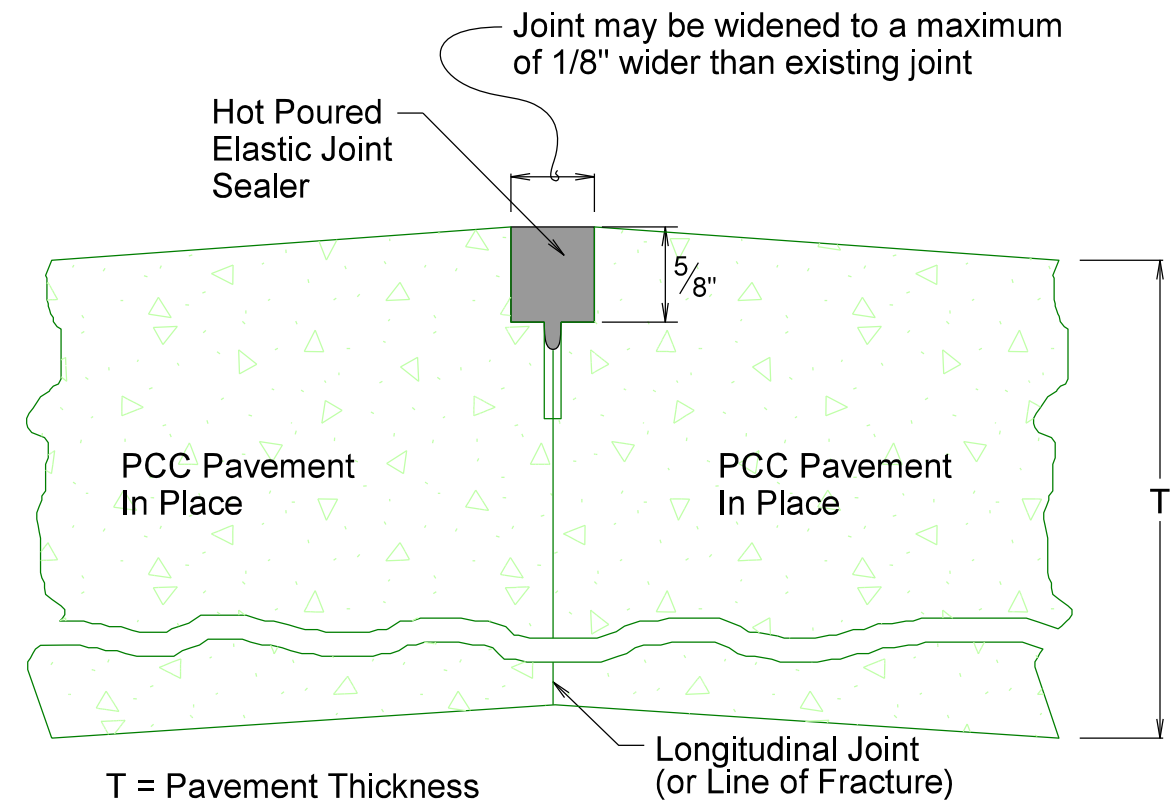
Plotting Date: 02/20/2024

RESEAL TRANSVERSE JOINT WITH HOT POURED ELASTIC JOINT SEALER



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



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

PLOT SCALE - 1:0.12

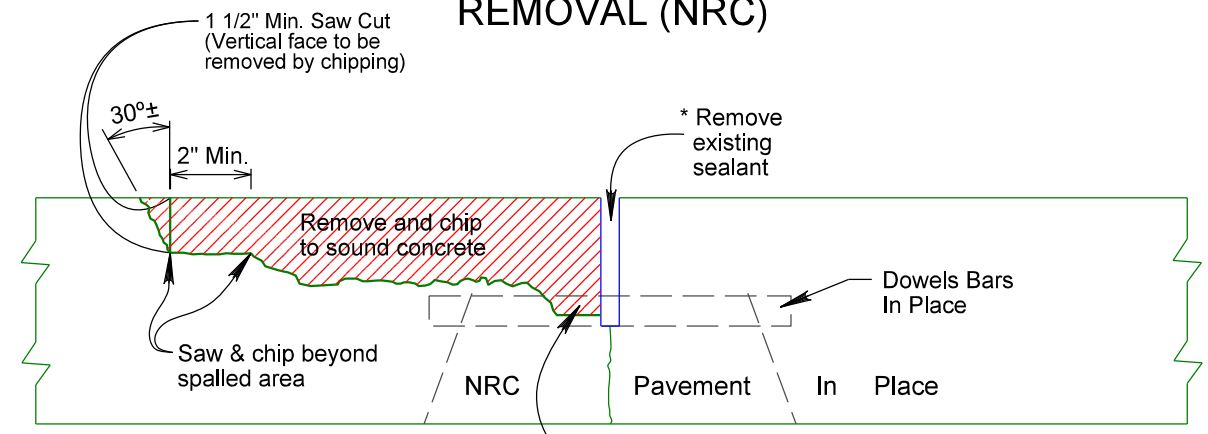
PLOTTED FROM - TRSF12133

PLOT NAME - 2

FILE - ... \PCCREPAIR\JOINT RESEALING.DGN

REPAIR OF TYPE A SPALLS

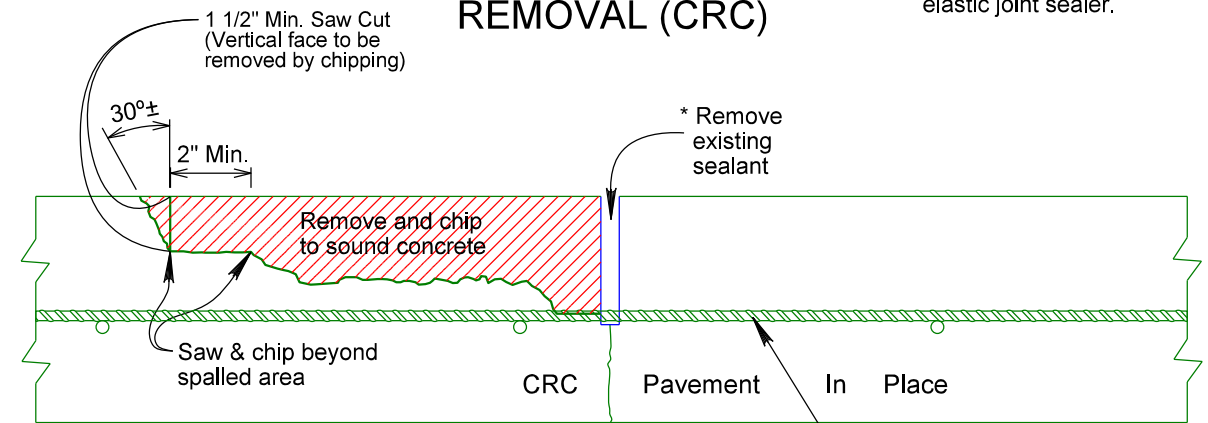
REMOVAL (NRC)



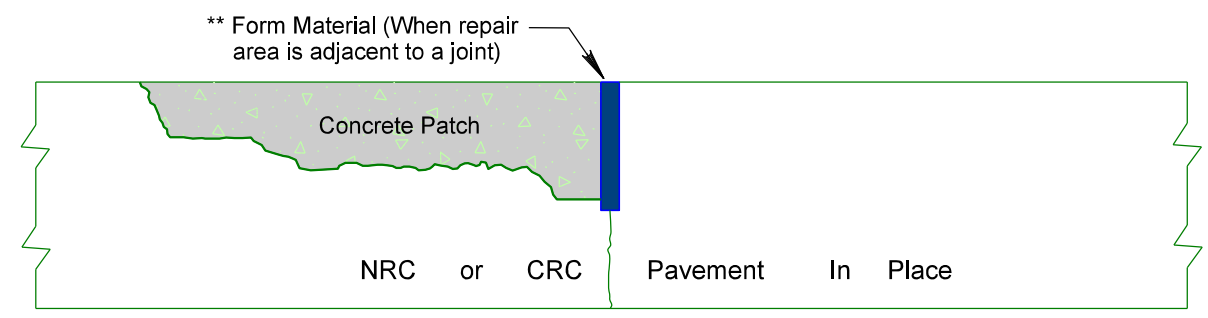
If Dowel Bar is exposed coat the bar with duct tape as a bond breaker

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

REMOVAL (CRC)



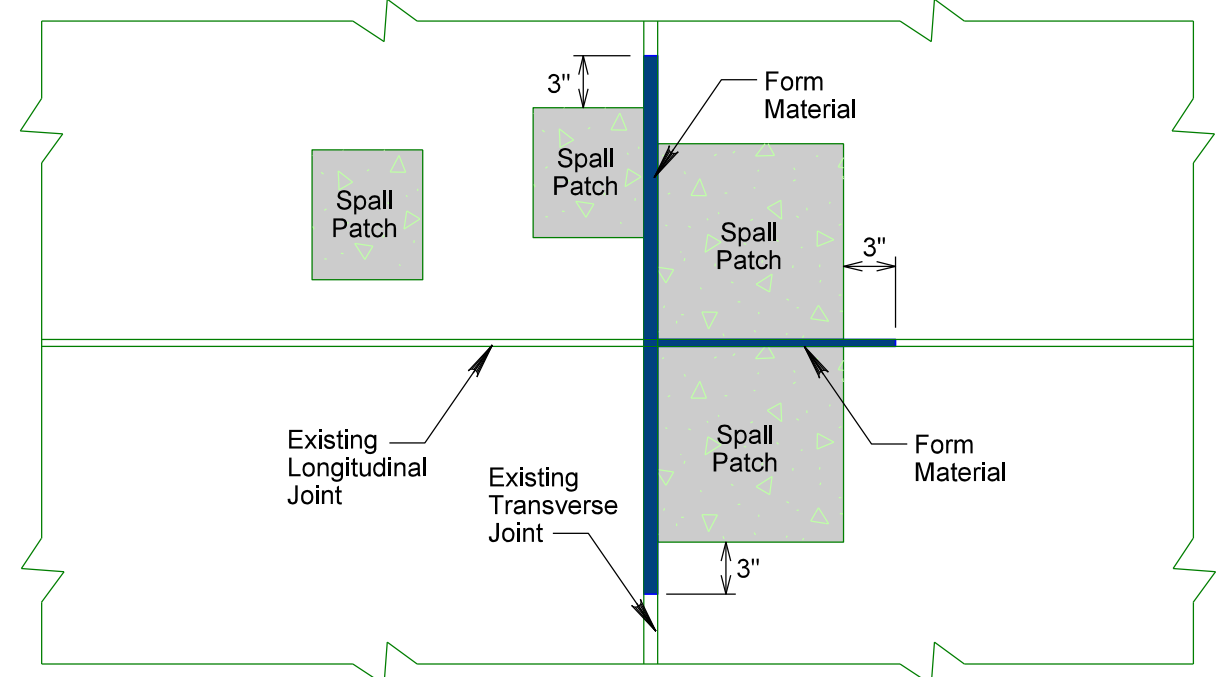
PATCHING



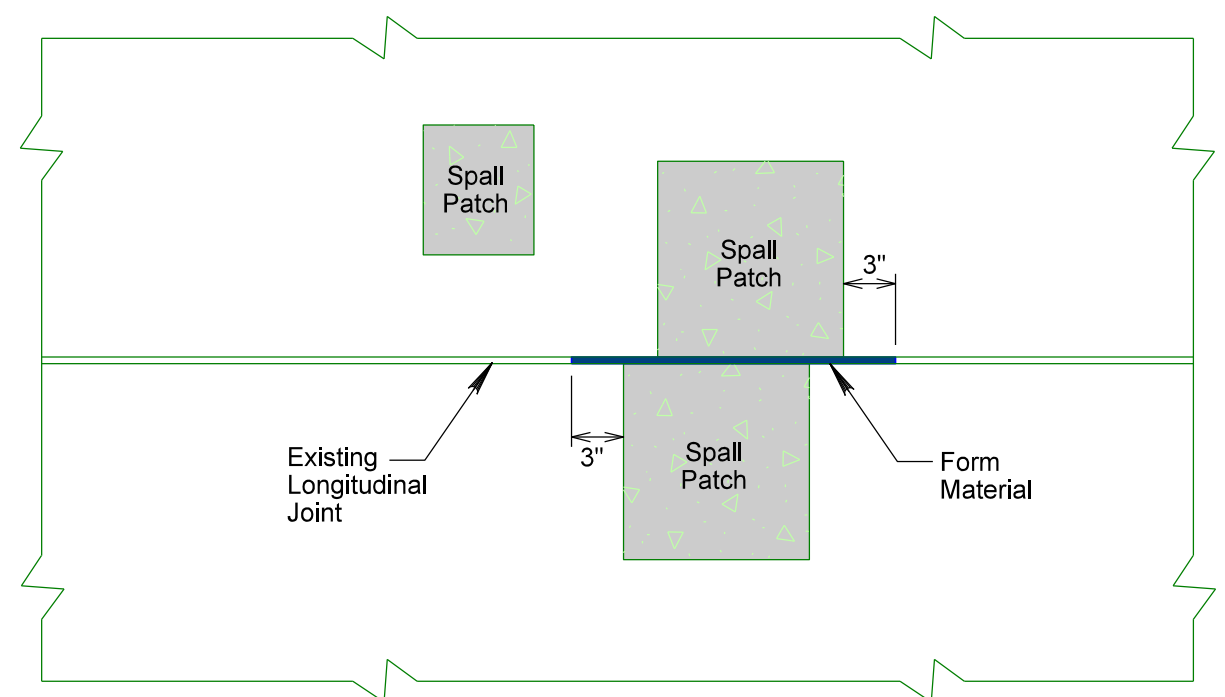
** Form Material will be removed by sawing or other means approved by the Engineer. Spall repaired joints will then be sealed with Backer Rod and Low Modulus Silicone Sealant.

REPAIR OF TYPE A SPALLS

NRC SPALL PATCHES (PLAN VIEW)



CRC SPALL PATCHES (PLAN VIEW)



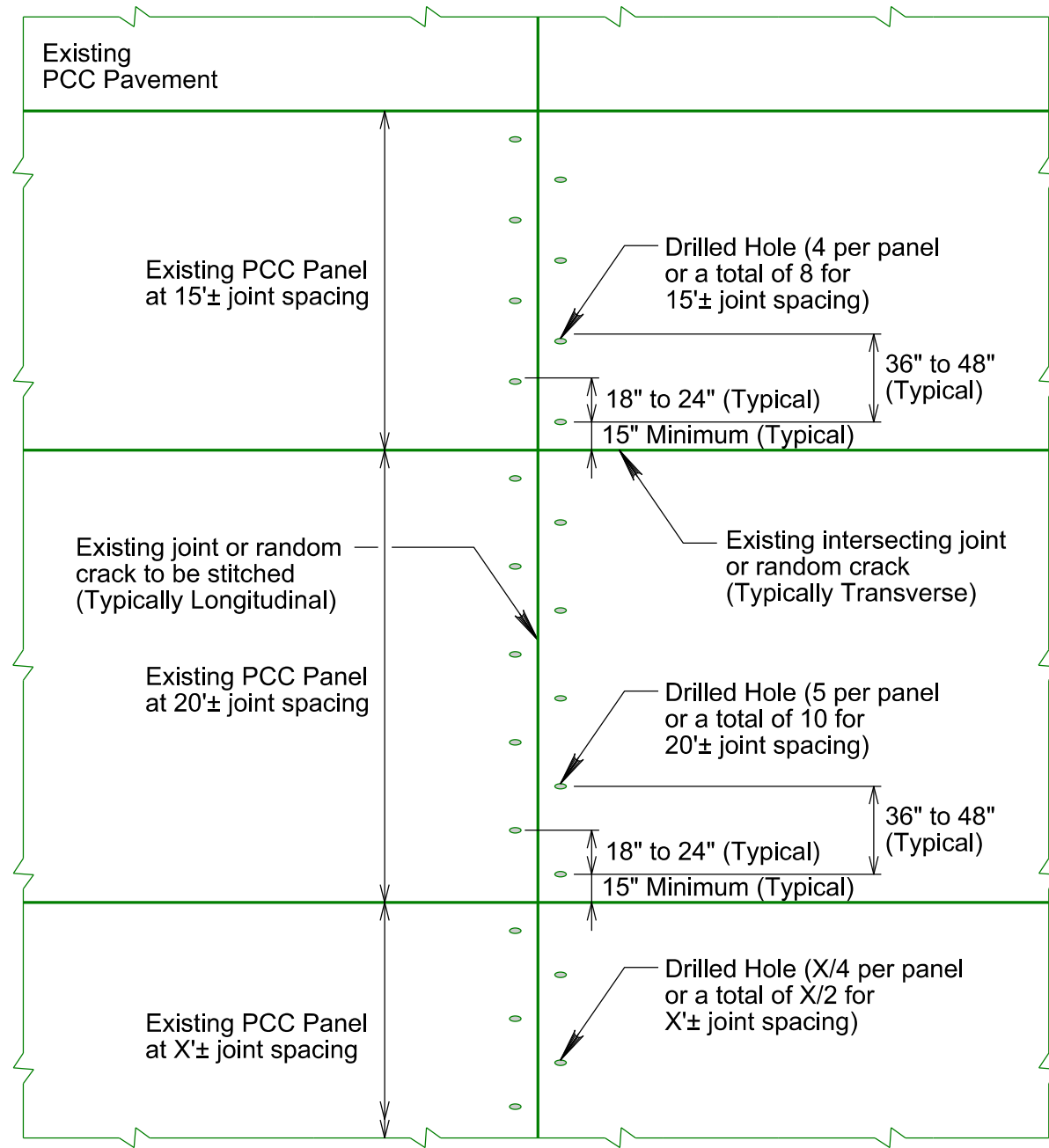
PLOT SCALE - 1:10

PLOTTED FROM - IRSE12133

PLOT NAME - 3

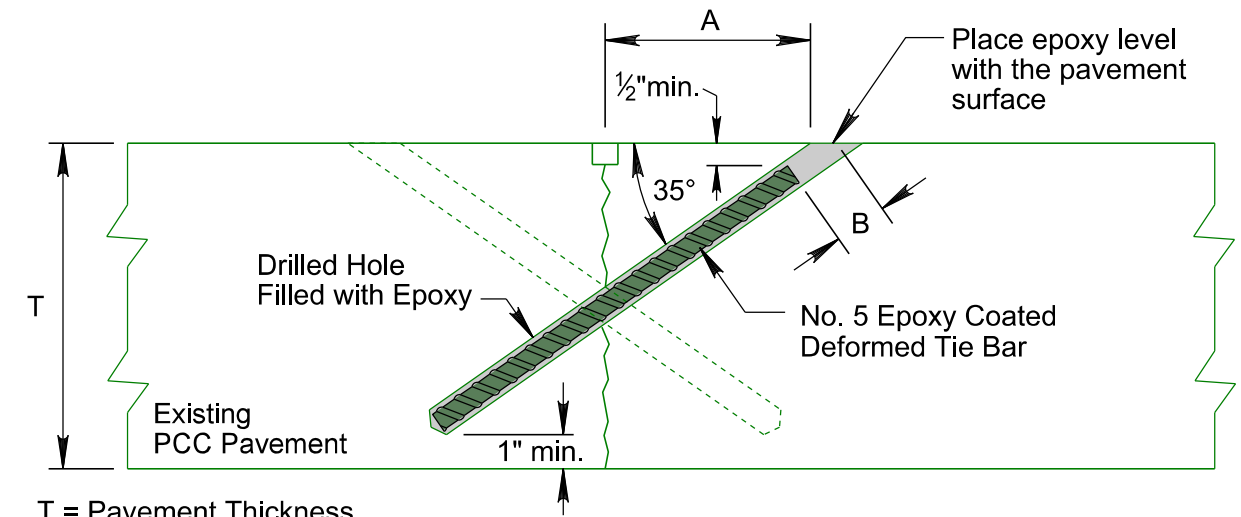
FILE - ... \PCCREPAIR\SPALL.DGN

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"	1 1/2"±	10"
8 1/2"	5 1/4"	1 3/8"±	11"
9"	5 5/8"	1 1/4"±	12"
9 1/2"	6"	1 5/8"±	12 1/2"
10"	6 3/8"	1 1/2"±	13 1/2"
10 1/2"	6 3/4"	1 3/8"±	14 1/2"
11"	7"	1 1/4"±	15 1/2"
11 1/2"	7 3/8"	1 3/8"±	16"
12"	7 3/4"	1 3/8"±	16 1/2"
12 1/2"	8 1/8"	1 1/4"±	17 1/2"

Stitch Bar Spacing 24" Max.

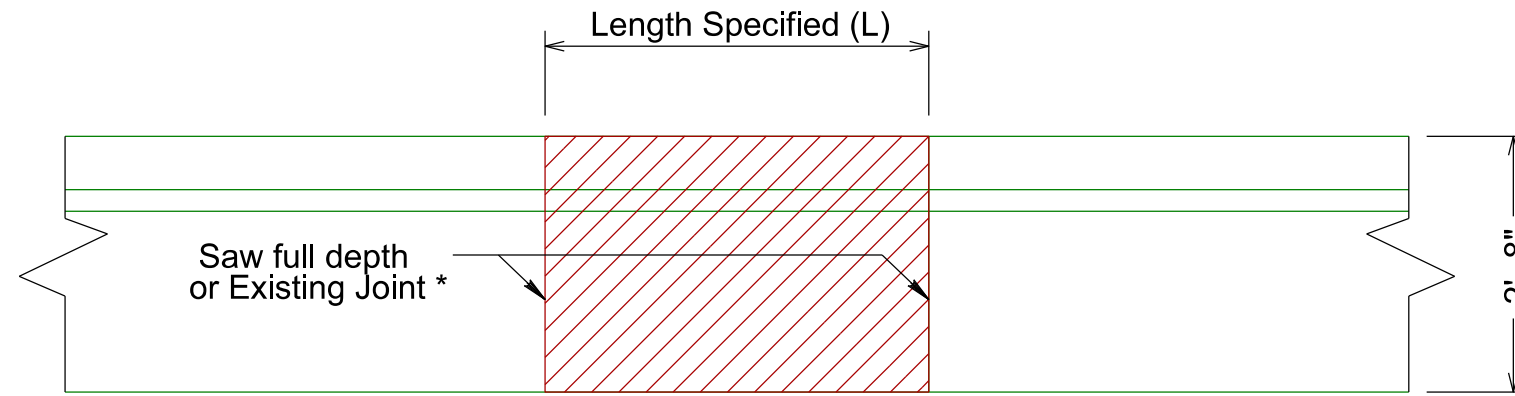
Joint Spacing	Number of Bars
3' to 4.5'	2
5' to 6.5'	3
7' to 8.5'	4
9' to 10.5'	5
11' to 12.5'	6
13' to 14.5'	7
15' to 16.5'	8
17' to 18.5'	9
19' to 20.5'	10
21 to 22.5'	11
23' to 24.5'	12
25' to 26.5'	13
27' to 28.5'	14
29' to 30.5'	15

REPAIR CONCRETE CURB AND/OR GUTTER

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	71	74

Plotting Date: 02/14/2024

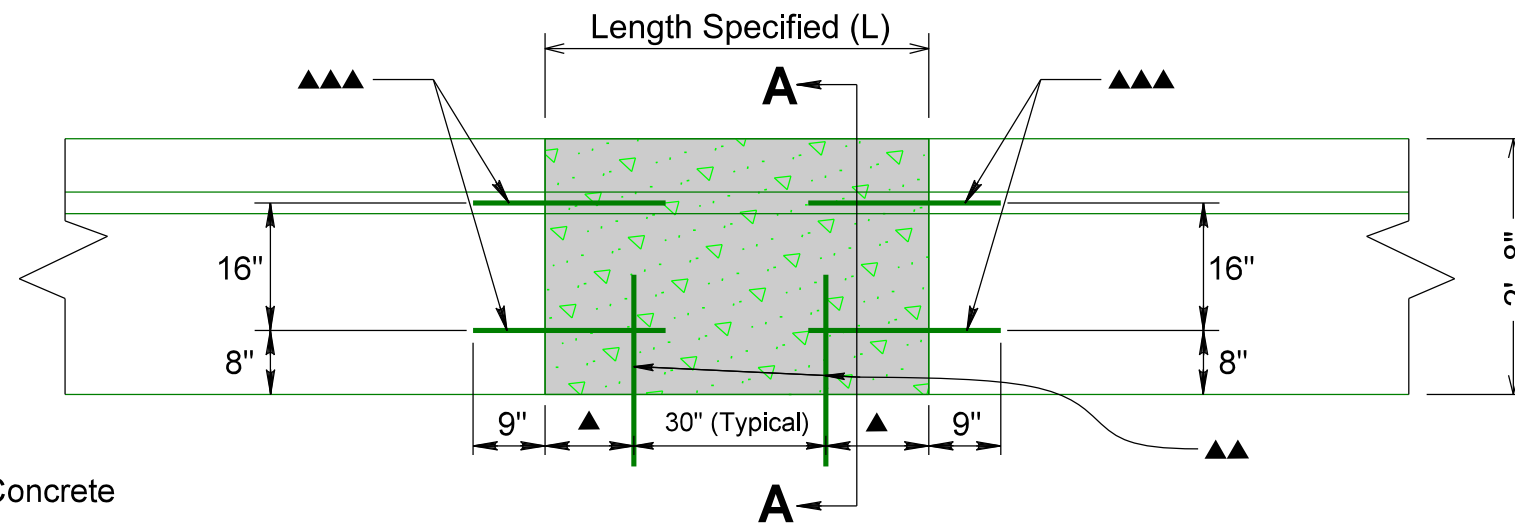
REMOVAL




 Remove Concrete Curb and/or Gutter

* If sawing is required, the cost will be incidental to the contract unit price per foot for Repair Concrete Curb and/or Gutter.

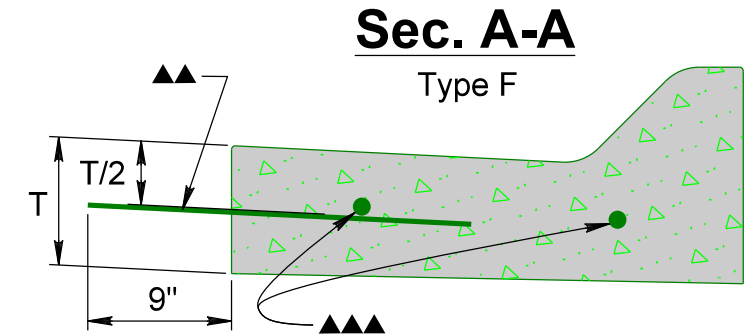
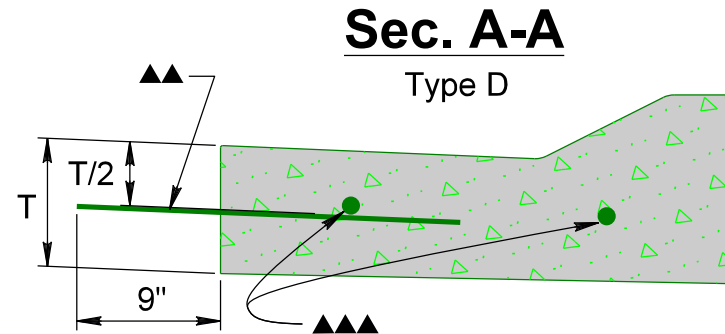
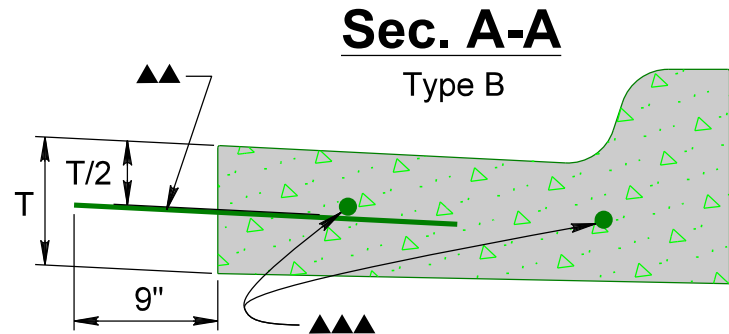
INSTALLATION



 Class M6 Concrete

- ▲ 9" Minimum
23" Maximum
- ▲▲ No. 5 x 24" Epoxy Coated Deformed Tie Bar Drilled 9" into in place pavement **
- ▲▲▲ No. 5 x 24" Epoxy Coated Deformed Tie Bar Drilled 9" into in place curb & gutter **

See standard plate(s) for Type B, D and F Concrete Curb and Gutter and Type P Concrete Gutter for construction and forming details.



** Cost for this work will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

Maintain 2" clear cover on all rebar.

PLOT SCALE - 1:2

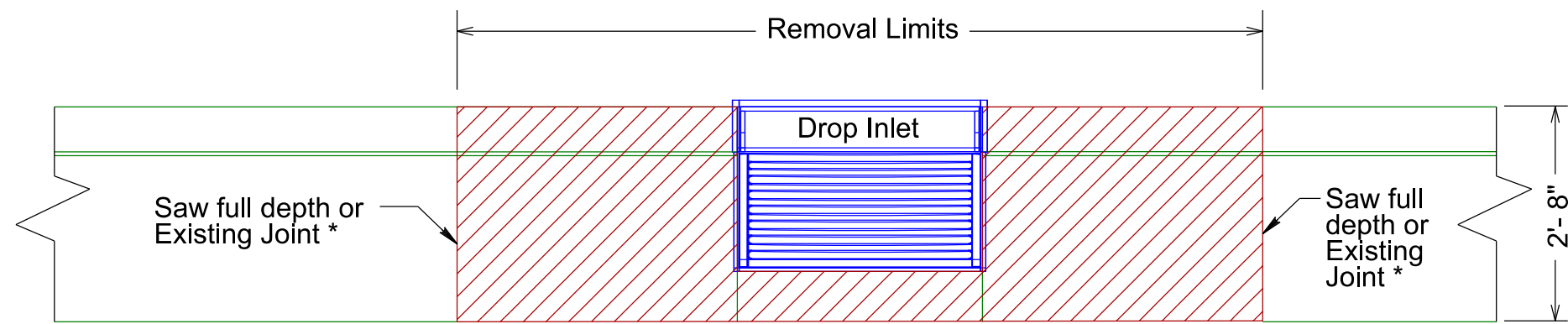
PLOTTED FROM - TRSF12133

PLOT NAME - 1

FILE - ... \PCCREPAIR\CURB & GUTTER.DGN

LAYOUT FOR REPAIR CONCRETE CURB AND/OR GUTTER ADJACENT TO DROP INLET

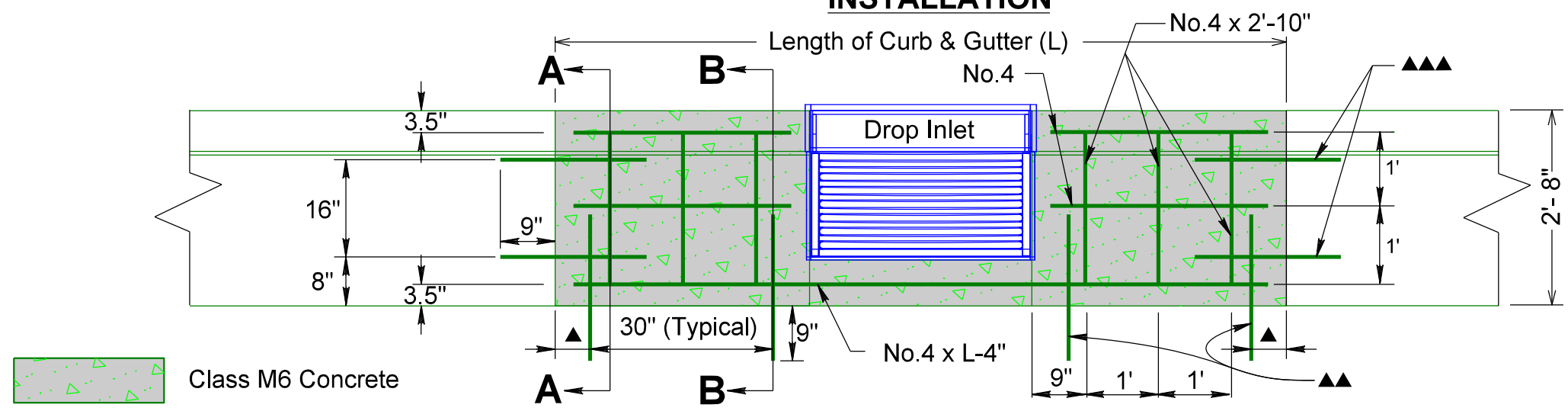
REMOVAL



 Remove Concrete Curb and/or Gutter

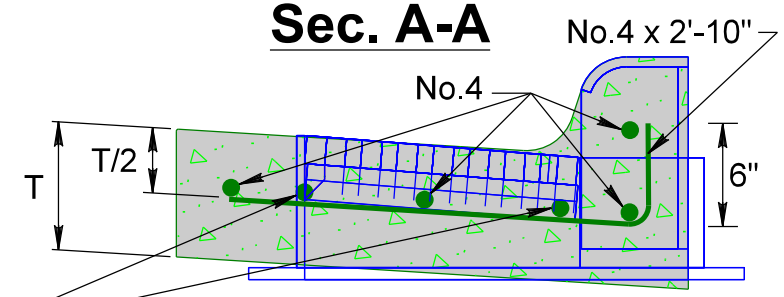
* If sawing is required, the cost will be incidental to the contract unit price per foot for Repair Concrete Curb and/or Gutter.

INSTALLATION

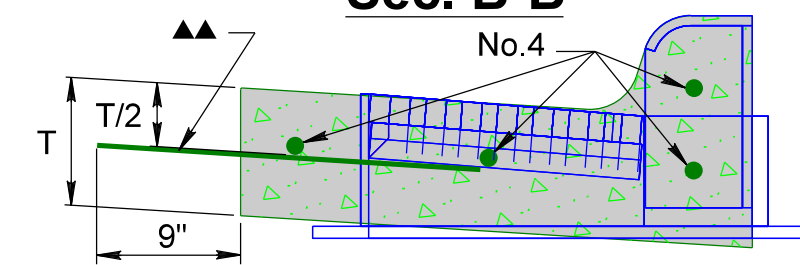


- ▲ 9" Minimum
23" Maximum
- ▲▲ No. 5 x 24" Epoxy Coated Deformed Tie Bar Drilled 9" into in place pavement **
- ▲▲▲ No. 5 x 24" Epoxy Coated Deformed Tie Bar Drilled 9" into in place curb & gutter **

Sec. A-A



Sec. B-B



Maintain 2" clear cover on all rebar.

See standard plate for Type B Concrete Curb and Gutter for forming details.

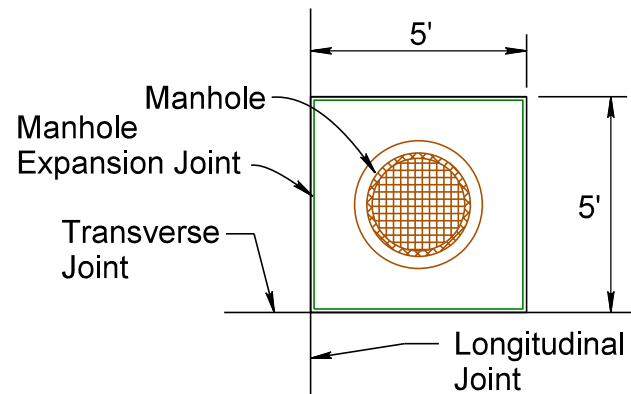
** Cost for this work will be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

TYPICAL PCC PAVEMENT REPAIR AROUND MANHOLES

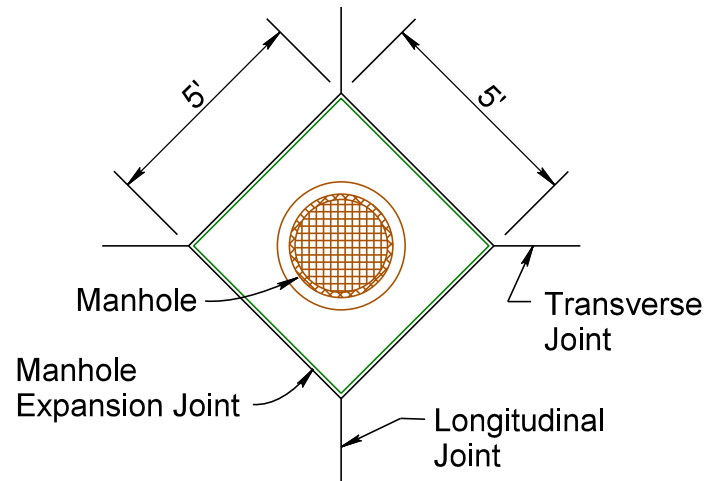
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0022(89)	73	74

Plotting Date: 02/14/2024

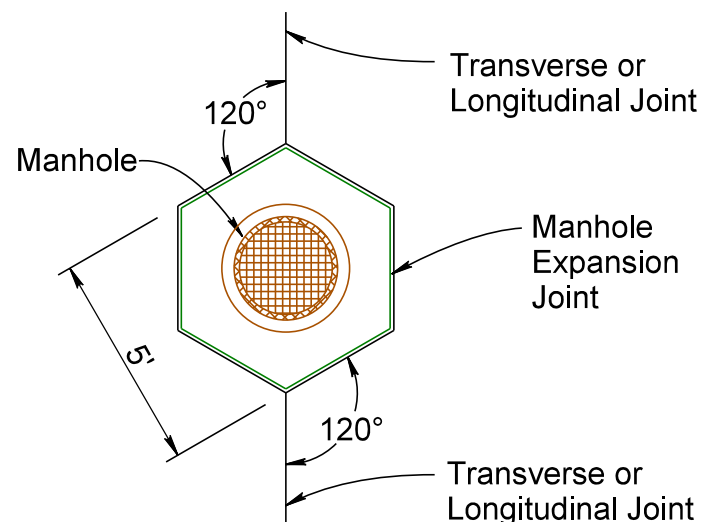
BOX-OUT DETAIL IN PCC PAVEMENT



Where the utility access is offset from the longitudinal and transverse joints

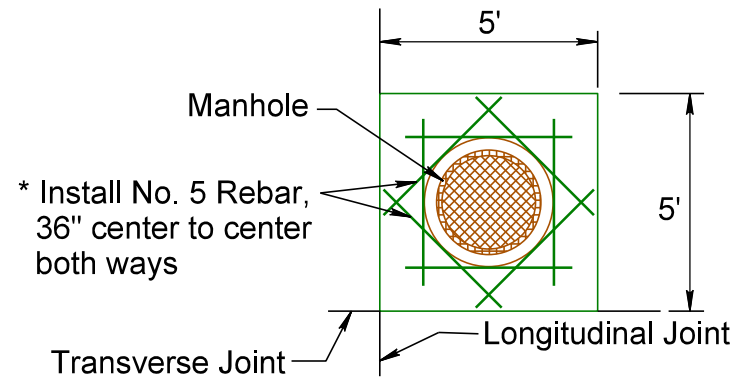


Where the utility access is intersected by the longitudinal and transverse joints

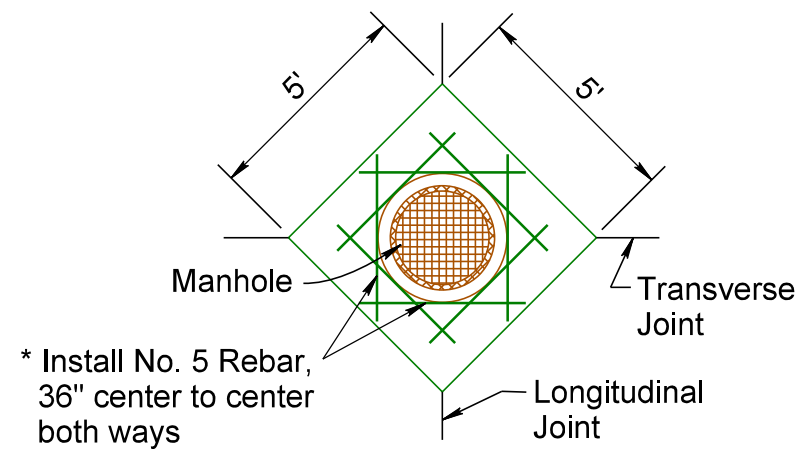


Where no Longitudinal or Transverse joints are present or at Longitudinal or Transverse joint.

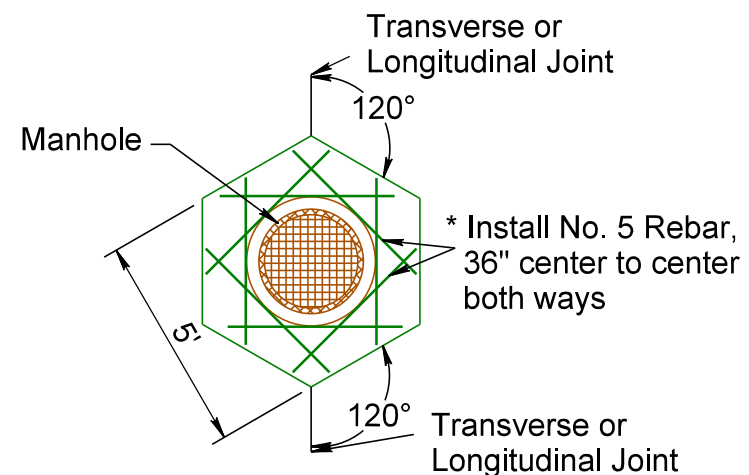
REBAR LAYOUTS IN PCC PAVEMENT WITH BOX-OUT



Where the utility access is offset from the longitudinal and transverse joints

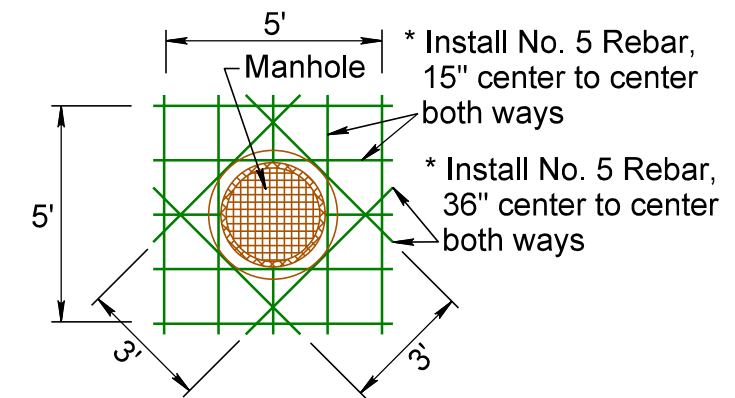


Where the utility access is intersected by the longitudinal and transverse joints



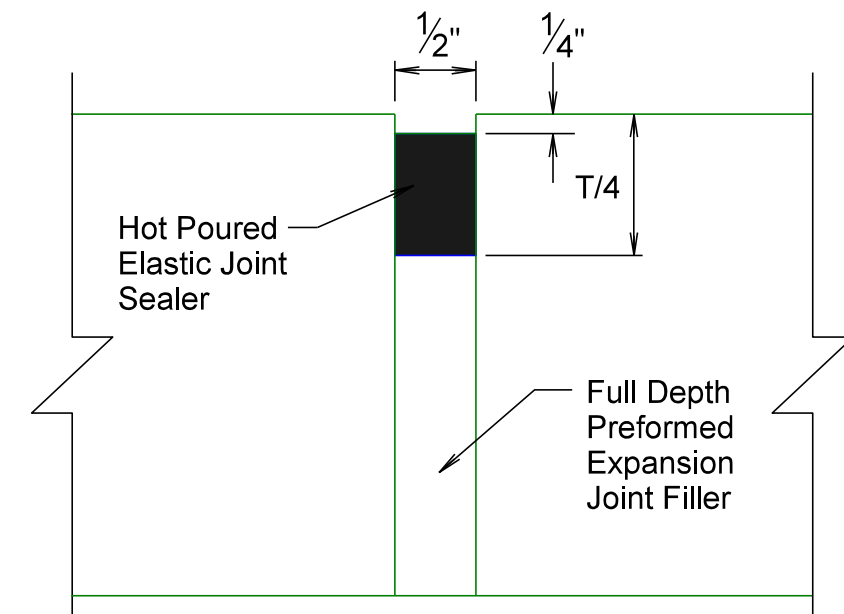
Where no Longitudinal or Transverse joints are present or at Longitudinal or Transverse joint.

REBAR LAYOUT IN PCC PAVEMENT WITHOUT BOX-OUT

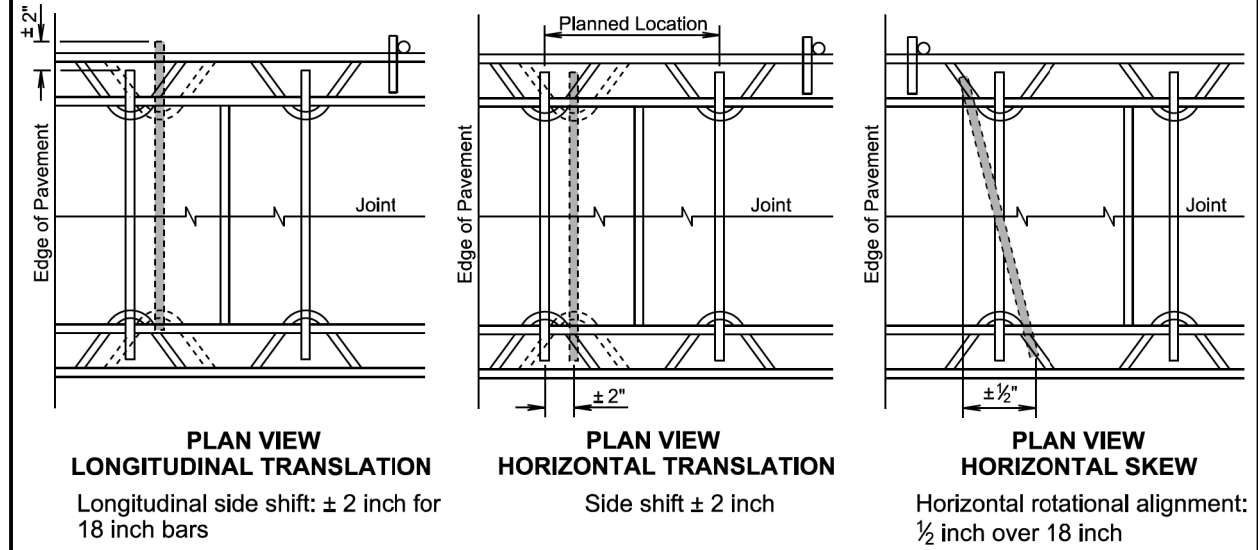
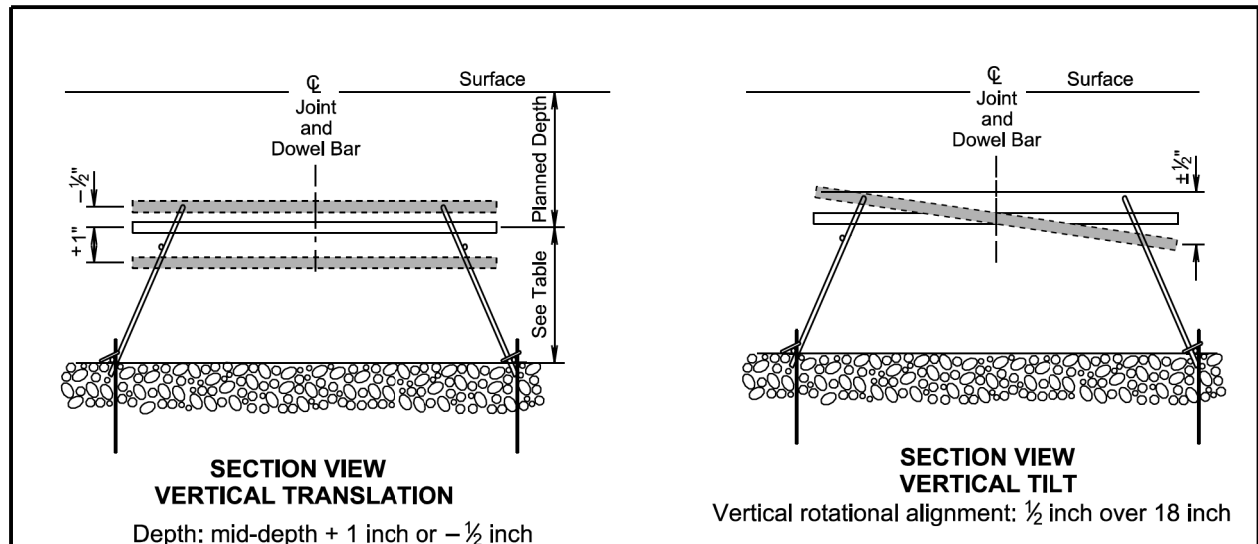


The rebar will not cross any joint in the concrete pavement. If manhole is next to a joint in the concrete pavement the Engineer will approve a revised layout of the rebar.

MANHOLE EXPANSION JOINT DETAIL



* Rebar will be placed at the midpoint depth of the PCC Pavement. Cost for furnishing & installing rebar and constructing box-outs will be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair and/or Fast Track Concrete for PCC Pavement Repair.



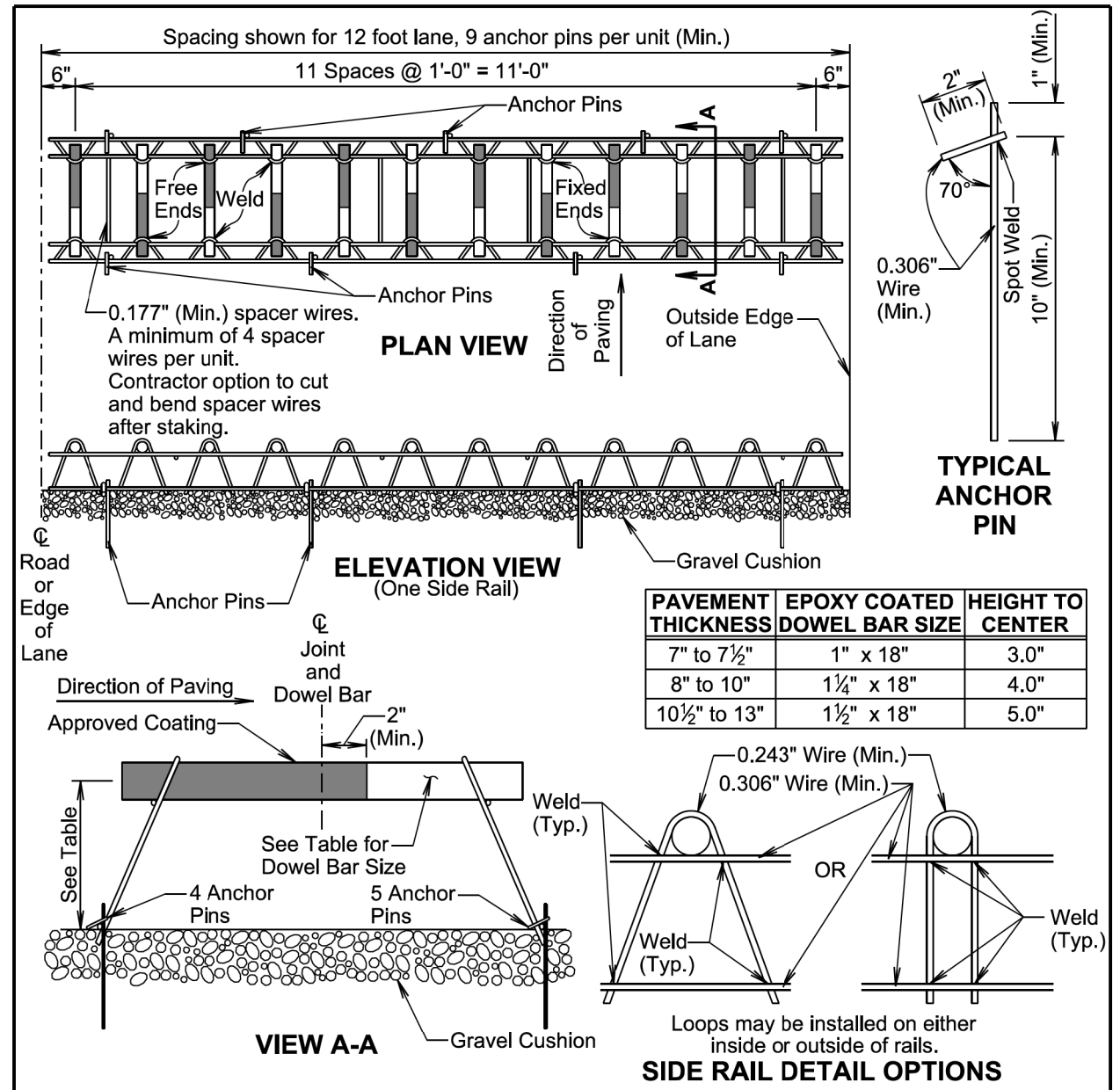
PAVEMENT THICKNESS	EPOXY COATED DOWEL BAR SIZE	HEIGHT TO CENTER
7" to 7 1/2"	1" x 18"	3.0"
8" to 10"	1 1/4" x 18"	4.0"
10 1/2" to 13"	1 1/2" x 18"	5.0"

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

November 19, 2022

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

Published Date: 2024



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

GENERAL 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

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

Published Date: 2024

PLOT SCALE: 1/4" = 1'-0"

PLOTTED FROM: IRSE12133

PLOT NAME: 1

FILE: \\MINNIE\KUL-177\W\STD PLATES.DGN