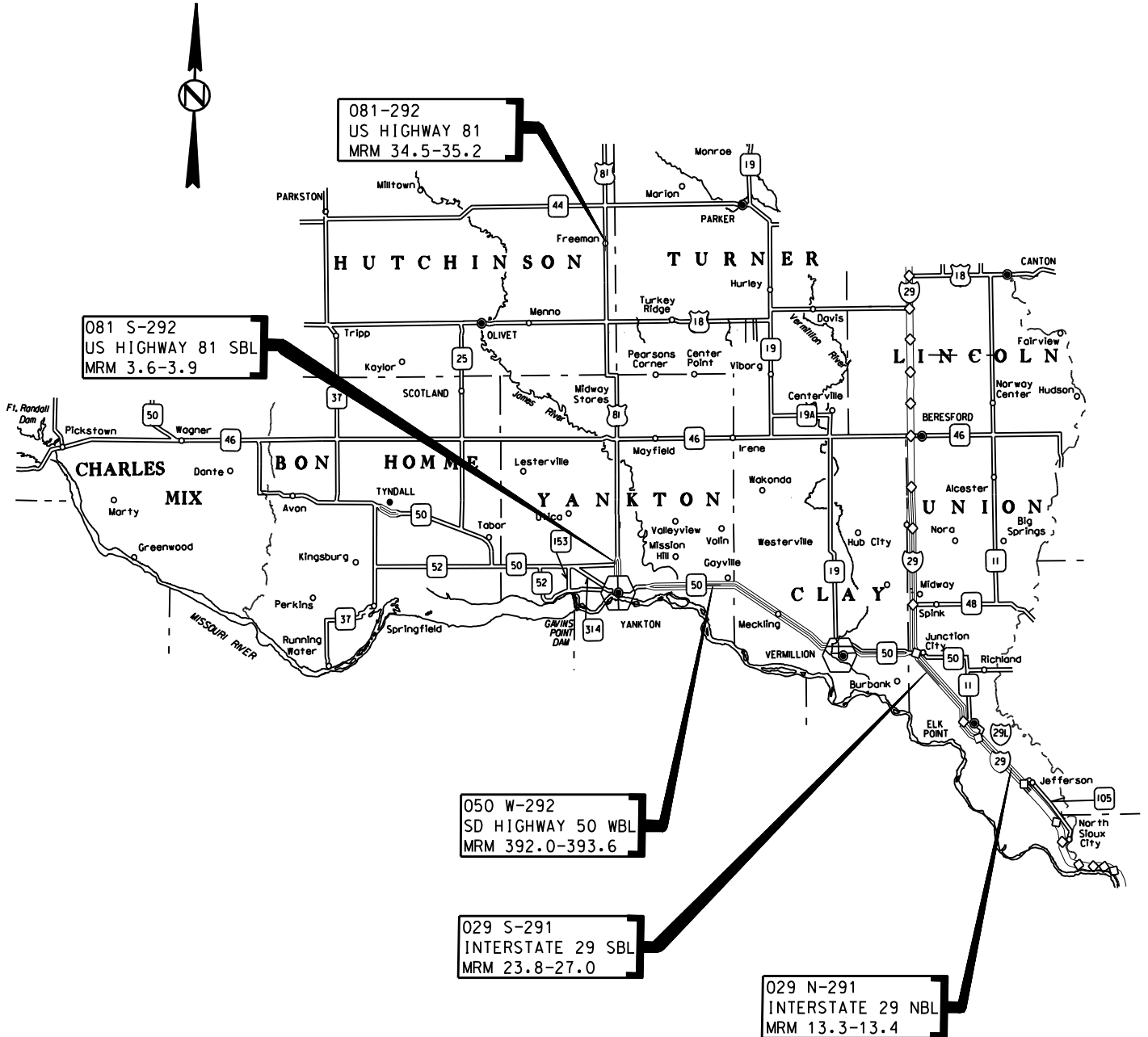


**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
 HUTCHINSON, UNION & YANKTON COUNTIES
 PCC PAVEMENT REPAIR
 PCN IOLD, IOLE, IOLEF, IOLG & IOLH**



**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**

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DESIGN DESIGNATION

PROJECT	029 S&N-291	081 S-292	081-292	050 W-292
ROUTE	I29	US81	US81	SD50
MRM-MRM	13.3-27.0	3.6-3.9	34.5-35.2	392.0-393.6
ADT(2004)	10520	6275	1975	4910
ADT(2024)	20850	7530	3030	6458
DHV	2960	1280	515	1105
D	50%	50%	50%	50%
T DHV	12.90%	2.7%	9.9%	6.9%
T ADT	28.4%	6.0%	21.7%	15.2%
V	75 MPH	45 MPH	65 MPH	65 MPH

**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	050 W-292				081 S-292				081-292				029 S-291				029 N-291				TOTAL	
		QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	QUANTITY	UNIT	UNIT
009E0010	Mobilization																					Lump Sum	LS
380E5020	Fast Track Concrete for PCC Pavement Repair	-	-	-	-	48.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48.1	SqYd	SqYd
380E5030	Nonreinforced PCC Pavement Repair	66.7	16.0	39.7	52.0	18.9	193.3															SqYd	SqYd
380E6000	Dowel Bar	30	-	42	-	-	72															Each	Each
380E6110	Insert Steel Bar in PCC Pavement	105	36	118	119	40	418															Each	Each
634E0010	Flagging	5	5	5	5	-	20															Hour	Hour
634E0100	Traffic Control	318	318	698	318	171	1823															Unit	Unit
634E0120	Traffic Control, Miscellaneous																					Lump Sum	LS
634E0310	Temporary Road Markers	900	600	200	900	-	2600															Ft	Ft
634E0420	Type C Advance Warning Arrow Panel			1			1															Each	Each
634E0610	4" Temporary Pavement Marking Tape Type 2	-	-	288	-	-	288															Ft	Ft

**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**

TABLE FOR PCC PAVEMENT REPAIR

**PROJECT 050 W-292
SD50: MRM 392.0-393.6**

SD50 MRM	LANE	LENGTH (Ft)	WIDTH (Ft)	PCCP (SqYd)	PCCP FAST	STEEL	DOWEL	REMARKS
					TRACK (SqYd)	BAR (Each)	BAR (Each)	
392.010	WBDL	6	6	4.0		10		
392.013	WBDL	6	6	4.0		10		
392.045	WBDL	6	6	4.0		10		
392.193	WBDL	14	12	18.7		21	12	
392.890	WBDL	18	6	12.0		15	6	
393.117	WBDL	6	12	8.0		18		
393.525	WBDL	12	12	16.0		21	12	
050 W-292 TOTALS				66.7	0.0	105	30	

**PROJECT 081 S-292
US81: MRM 3.6-3.9**

US81 MRM	LANE	LENGTH (Ft)	WIDTH (Ft)	PCCP (SqYd)	PCCP FAST	STEEL	DOWEL	REMARKS
					TRACK (SqYd)	BAR (Each)	BAR (Each)	
3.677	SBDL	6	12	8.0		18		
3.818	SBDL	6	12	8.0		18		
081 S-292 TOTALS				16.0	0.0	36	0	

**PROJECT 081-292
US81: MRM 34.5-35.2**

US81 MRM	LANE	LENGTH (Ft)	WIDTH (Ft)	PCCP (SqYd)	PCCP FAST	STEEL	DOWEL	REMARKS
					TRACK (SqYd)	BAR (Each)	BAR (Each)	
34.545	SB	34	7		26.4	23	12	
34.554	SB	6	14		9.3	20		
34.556	NB	8	14		12.4	21		
35.166	CTL	28	10.5	32.7		36	20	
35.173	CTL	6	10.5	7.0		18	10	
081-292 TOTALS				39.7	48.1	118	42	

**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**

TABLE FOR PCC PAVEMENT REPAIR CONTINUED

**PROJECT 029 S-291
I29: MRM 23.8-27.0**

I29 MRM	LANE	LENGTH (Ft)	WIDTH (Ft)	PCCP (SqYd)	PCCP FAST TRACK (SqYd)	STEEL BAR (Each)	DOWEL BAR (Each)	REMARKS
23.846	SBDL	6	6	4.0		10		
24.430	SBDL	6	6	4.0		10		
24.477	SBDL	6	6	4.0		10		
25.054	SBDL	6	12	8.0		18		
25.137	SBDL	6	12	8.0		18		
25.326	SBDL	6	6	4.0		10		
25.328	SBDL	6	6	4.0		10		
26.342	SBDL	6	6	4.0		10		
26.743	SBDL	6	6	4.0		10		
26.980	SBOR	12	6	8.0		13		Off Ramp
029 S-291 TOTALS				52.0	0.0	119	0	

**PROJECT 029 N-291
I29: MRM 13.3-13.4**

I29 MRM	LANE	LENGTH (Ft)	WIDTH (Ft)	PCCP (SqYd)	PCCP FAST TRACK (SqYd)	STEEL BAR (Each)	DOWEL BAR (Each)	REMARKS
13.383	POE	6	25	16.7		32		Bypass Road
13.390	POE	4	5	2.2		8		Parking Lot
029 N-291 TOTALS				18.9	0.0	40	0	

TABLE OF STEEL BAR QUANTITIES

	EACH
No. 5 BARS	98
No. 8 BARS	100
No. 9 BARS	67
1" DOWEL BARS	86
1-1/4" DOWEL BARS	67
TOTAL	418
Dowel Bars for Dowel Bar Assembly	72

**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

SCOPE OF WORK

This project consists of:

- Full depth replacement of concrete pavement in areas where concrete pavement blowups or major failures have occurred. Full depth areas vary in length and width; however the minimum length is 6 feet.

COMPLETION DATE

All work shall be completed on or before September 28, 2007.

WASTE DISPOSAL SITE

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

Construction/demolition debris may not be disposed of within the State ROW.

All construction/demolition debris generated by this project shall be cleaned up and disposed of by the Contractor.

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

The waste disposal site(s) shall 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 Engineer.

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

1. Construction/demolition debris consisting of concrete, asphalt concrete or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction/demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the State ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. Seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the State ROW through the use of fences, gates and placement of a sign or signs at the entrance to the site stating No Dumping Allowed.
2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall 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 for furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates & signs) and reclamation of the waste disposal site(s) shall be incidental to the contract unit prices for the various items.

RESTORATION OF GRAVEL CUSHION

An inspection of the gravel cushion subgrade shall be made after removing concrete from each pavement replacement area. Areas of excess moisture shall be dried to the satisfaction of the Engineer. Loose material shall be removed. Each replacement area shall be leveled and compacted to the satisfaction of the Engineer.

If additional gravel cushion material is required, the Contractor shall furnish, place and compact gravel cushion to the satisfaction of the Engineer at no additional cost to the State. Additional gravel cushion can be obtained from the Department of Transportation Maintenance shops located in Junction City, Menno or Yankton.

Cost for this work shall be incidental to the contract unit prices per square yard for Nonreinforced PCC Pavement Repair and Fast Track Concrete for PCC Pavement Repair.

**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**

EXISTING PCC PAVEMENT

The existing 7", 7.5" and 8" PCC Pavement on SD50 and US81 is nonreinforced. The existing 10" PCC Pavement at the Port-Of-Entry is nonreinforced. The aggregate in the existing PCC pavement is quartzite, except for westbound SD50 in Yankton County, where the aggregate is natural rock.

The existing 9" PCC Pavement on Interstate 29 is reinforced with welded wire fabric. The welded wire fabric weighs not less than 60 pounds per 100 square feet, the longitudinal wires are No. 1 gauge and are spaced 6" center to center and the transverse wires are No. 4 gauge and are spaced 12" center to center.

The aggregate in the existing PCC pavement is quartzite.

NONREINFORCED PCC PAVEMENT REPAIR - GENERAL

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

Existing concrete pavement in the replacement areas shall be removed by the lift out method or by means that minimize damage to the base and sides of remaining in place concrete. All removed material shall be removed from within the right-of-way by the end of the workday. Damage to adjacent concrete caused by the Contractor's operations shall 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 shall be sawed off or removed.

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

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

All 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

New pavement thickness shall be a minimum thickness of 8" where the existing pavement thickness is 7" or 8".

New pavement thickness shall be a minimum thickness of 10" where the existing pavement thickness is 9".

Concrete for four-lane roadway repair shall meet the requirements of the Standard Specifications Section 380, except as modified by the following notes:

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air. Coarse aggregate shall be crushed ledge rock, Size No. 1. The Contractor is responsible for the mix design used. The Contractor shall submit a mix design and supporting documentation for approval at least 2 weeks prior to use. In lieu of submitting a mix design the contractor may use one of the following dependent upon type of cement to be used:

	<u>LB./CU.YD.</u>	<u>LB./CU.YD.</u>
CEMENT	800 (TYPE I or II)	710 (TYPE III)
WATER	282	300
FINE AGGREGATE	1039	1114
COARSE AGGREGATE	1726	1668

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

NONREINFORCED PCC PAVEMENT REPAIR (CONTINUED)

Concrete shall be cured for a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60 degrees Fahrenheit or higher throughout the cure period. If the concrete temperature falls below 60 degrees Fahrenheit, the cure time shall be extended or other measures shall be taken, at no additional cost to the State, to insure that strength of 4000 psi is attained prior to opening traffic.

Cost for performing the aforementioned work including sawing and removing concrete, furnishing and placing concrete, sawing and sealing joints, repairing asphalt and gravel shoulders, labor, tools and equipment shall be included in the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

FAST TRACK CONCRETE FOR PCC PAVEMENT REPAIR

New pavement thickness shall be a minimum thickness of 8" where the existing pavement thickness is 7" or 8".

Fast Track Concrete shall be used for two-lane roadway repair locations to ensure that the pavement repair area can be opened to traffic within 6 to 8 hours after placement.

The slump requirement prior to use of a set accelerator or super-plasticizer will be limited to 2" maximum and the concrete shall contain 4.5% to 7.0% entrained air. Coarse aggregate shall be crushed ledge rock, Size No. 1. The Contractor is responsible for the mix design used. The Contractor shall submit a mix design and supporting documentation for approval at least 2 weeks prior to use. In lieu of submitting a mix design the contractor may use the following:

	<u>LB./CU.YD.</u>
CEMENT (TYPE II or III)	784
FINE AGGREGATE	1162
COARSE AGGREGATE	1650

The use of a set accelerator and super-plasticizer at manufacturer's recommended dosage will be required. The super-plasticizer shall be added at the project site.

The special mix has been designed to produce a minimum compressive strength of 3800 psi in 6 to 8 hours of curing time.

Fast Track Concrete shall 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. In addition, the concrete shall be immediately covered with suitable insulation blanket consisting of a layer of closed cell polystyrene foam protected by at least one layer of plastic. The insulation blanket shall have an R value of at least 0.5, as rated by the manufacturer. The insulation blanket shall be left in place, except for joint sawing operations, until the 3800 psi strength is attained.

The contraction joint sawing shall be performed as soon as possible after placement of concrete to avoid random cracking. Contraction joints shall be initially sawed to the plans detailed depth and to a width of 1/8".

The concrete repair area shall be removed, replaced, and opened to traffic in the same day during daylight hours. If the repair cannot be accomplished within the same day the Contractor shall place and compact gravel cushion within the repair area prior to night fall and the roadway shall be open to normal traffic. The Contractor shall be responsible for the additional cost for providing, placing and compacting the gravel cushion.

Cost for performing the aforementioned work including sawing and removing concrete, furnishing and placing Fast Track Concrete, sawing and sealing joints, repairing asphalt and gravel shoulders, labor, tools and equipment shall be included in the contract unit price per square yard for Fast Track Concrete for PCC Pavement Repair.

STEEL BAR INSERTION

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.

On 8" concrete repair areas:

The Contractor shall 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.

On 10" concrete repair areas:

The Contractor shall 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.

Steel bars shall be cut to the specified length by sawing and shall be free from burring or other deformations. Shearing will not be permitted.

Epoxy resin adhesive shall be of the type intended for horizontal applications, and shall conform to the requirements of ASTM C 881, Type IV, Grade 3 (equivalent to AASHTO M235, Type IV, Grade 3).

Steel bars shall be inserted in the transverse joint on 18" centers. The first steel bar in the transverse joint shall be placed 9" from the outside edge of the slab. Steel bars shall be inserted in the longitudinal joint on 30" centers and shall 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).

The diameter of the drilled holes in the existing concrete pavement for the steel bars shall not be less than 1/8 inch nor more than 3/8 inch greater than the overall diameter of the steel bar. Holes drilled into the existing concrete pavement shall be located at mid-depth of the slab and true and normal. The drilled holes shall be blown out with compressed air using a device that will reach to the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.

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.

Mix the epoxy resin as recommended by the manufacturer and apply by an injection method approved by the Engineer. If an epoxy pump is utilized, it shall be capable of metering the components at the manufacturer's designated rate and be equipped with an automatic shut-off. The pump shall shut off when any of the components are not being metered at the designated rate.

Fill the drilled holes 1/3 to 1/2 full of epoxy, or as recommended by the manufacturer, prior to insertion of the steel bar. Care shall be taken to prevent epoxy from running out of the horizontal holes prior to steel bar insertion. Rotate the steel bar during insertion to eliminate voids and ensure complete bonding of the bar. Insertion by the dipping method will not be allowed.

Cost for the epoxy resin adhesive, steel bars, drilling of holes, inserting the steel bars into the drilled holes and all other items incidental to the insertion of the steel bars shall be included in the contract unit price per each for Insert Steel Bar In PCC Pavement.

SAW AND SEAL JOINTS

All longitudinal and transverse joints at concrete repair areas shall be sawed and sealed.

Joints shall not be sealed unless they are thoroughly clean and dry. Cleaning shall be accomplished by sand blasting and other tools as necessary. Just prior to sealing, each joint shall be blown out using a jet of compressed air to remove all trace of dust.

Transverse joints shall be sealed with Low Modulus Silicone Sealant. Longitudinal joints may be sealed with either Low Modulus Silicone Sealant or Hot Poured Elastic Joint Sealer.

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SAW AND SEAL JOINTS (CONTINUED)

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 and both transverse joints shall be incidental to the contract unit prices per square yard for Nonreinforced PCC Pavement Repair, Fast Track Concrete for PCC Pavement Repair.

TEMPORARY PAVEMENT MARKING

Temporary pavement marking (except stop bars) shall consist of Temporary Road Markers and shall be included in the contract unit price per foot for Temporary Road Markers (one workspace with 900' taper on I29, one workspace with 900' tapers on SD50 four-lane divided, one workspace with 600' tapers on US81 four-lane undivided, two workspaces with 100' tapers on US81 two-lane equals 2600').

Temporary pavement marking for 24" white stop bars shall consist of 4" Temporary Pavement Marking Tape – Type 2 and shall be included in the contract unit price per foot for 4" Temporary Pavement Marking Tape – Type 2 (Two workspaces at 144' =288').

029 N-291 TRAFFIC CONTROL

Project 029 N-291 consists of full depth replacement of two areas of delaminated concrete in the Port-Of-Entry located on the northbound lanes of I29 between Jefferson and Elk Point. The traffic control for this work will be as follows:

Bypass Road repair: Close the Bypass Road to traffic with 3 – Type III Barricades – 8 Ft Single Sided, 1 – R11-2 Road Closed sign mounted on the middle barricade and 1 – W1-6 Large Arrow mounted on the right barricade. This setup will be placed at the intersection of the Bypass Road and Loop 1.

Parking Lot repair: Protect the repair area with 2 traffic control drums placed one on each end of the repair area.

Costs for furnishing, installing, maintaining and removing the barricades and signs shall be included in the contract unit price per unit for Traffic Control. Cost for the traffic control drums shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

GENERAL MAINTENANCE OF TRAFFIC

Removing, relocating, covering, salvaging and resetting of permanent traffic control devices, including delineation, shall be the responsibility of the Contractor. Cost for this work shall be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

Storage of vehicles and equipment shall be outside the clear zone and as near as possible to the right-of-way line. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work.

Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP 350 crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

Sufficient traffic control devices have been included in these plans to sign one lane closure using stop signs, one lane closure for a 4-lane, one center turn lane closure and the 029 N-291 Traffic Control in the note above. If the Contractor elects to work on additional sites simultaneously, the cost for additional traffic control devices shall be incidental to the contract unit price per unit for Traffic Control.

MAINTENANCE OF TRAFFIC – PCC PAVEMENT REPAIR

A Type III Barricade shall be installed at the end of a lane closure taper as detailed in these plans. Additional Type III Barricades shall be installed facing traffic within the closed lane at a spacing of 1/4 mile. Each mainline concrete repair location from which the in place concrete has been removed shall be marked with a minimum of two drums. In areas containing numerous concrete repair locations, drums should be installed at a spacing of 660' alternating with the Type III Barricades.

Signs may be mounted on portable supports.

Construction workspaces on four-lane divided or four-lane undivided roadways shall be limited to 3 miles in length. Construction workspaces on two-lane undivided roadways shall be limited to 300 feet in length. The distance between the closest points of any two construction workspaces, including channeling devices, shall 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.

Holes adjacent to centerline in the lane open to traffic created during removal and replacement of PCC Pavement repair areas shall be filled with cold asphalt mix during the cure of concrete placed in a repair area, and until the lane open to traffic is closed. Cold asphalt mix can be obtained from the Department of Transportation Maintenance shops located at Beresford, Junction City, Menno or Yankton.

Holes in the gravel or asphalt concrete shoulders created during removal and replacement of PCC Pavement repair areas shall be filled with gravel or hot-mix asphalt concrete (to match the shoulder surfacing) prior to opening the lane to traffic. Gravel can be obtained from the Department of Transportation Maintenance shops located at Junction City, Menno or Yankton. Hot-mix asphalt concrete shall be furnished by the Contractor.

Cost for furnishing asphalt concrete, hauling and placing gravel and asphalt concrete shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair and Fast Track Concrete for PCC Pavement Repair.

Routing traffic onto the asphalt or gravel shoulders during any phase of the construction will not be allowed.

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

Extra care shall be taken to protect the in place asphalt shoulders on all routes of this project that have these type of shoulders. In all work zones in these areas, the same channelizing devices and spacing used on centerline will also be required on the shoulders. These channelizing devices shall be placed in locations to adequately keep traffic completely off these shoulders. Continuous maintenance of the shoulder devices will be required to keep them in place. Cost for these extra channelizing devices shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

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

Warning sign sequence in opposite direction same as below.

- Flagger
- Channelizing Device

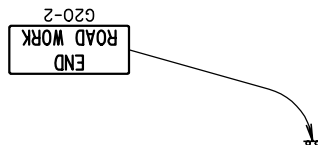
For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

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

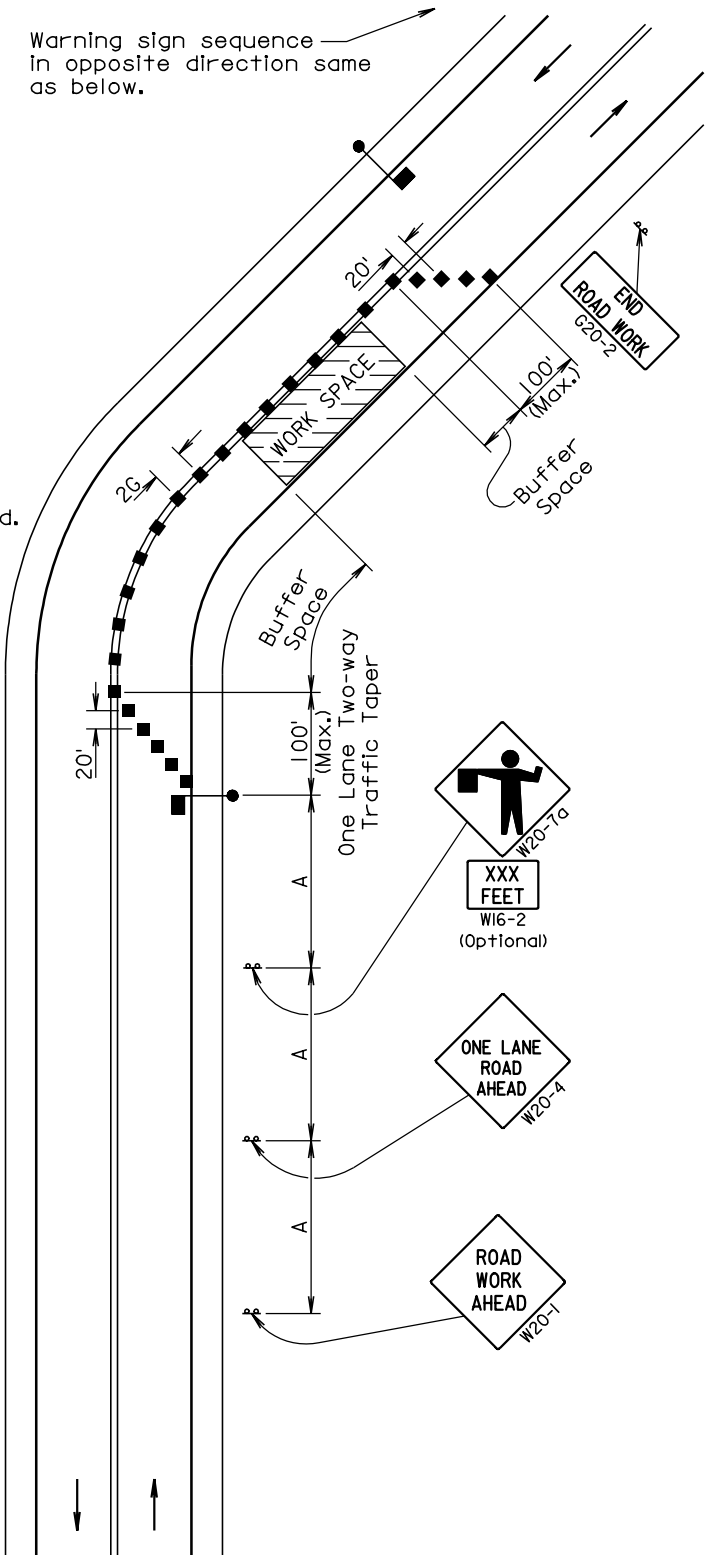
The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. During daylight hours, 42" cones may be used in lieu of drums or type II barricades along the centerline.



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

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

The buffer space shall be a sufficient length so that the channelizing devices are visible to approaching traffic.

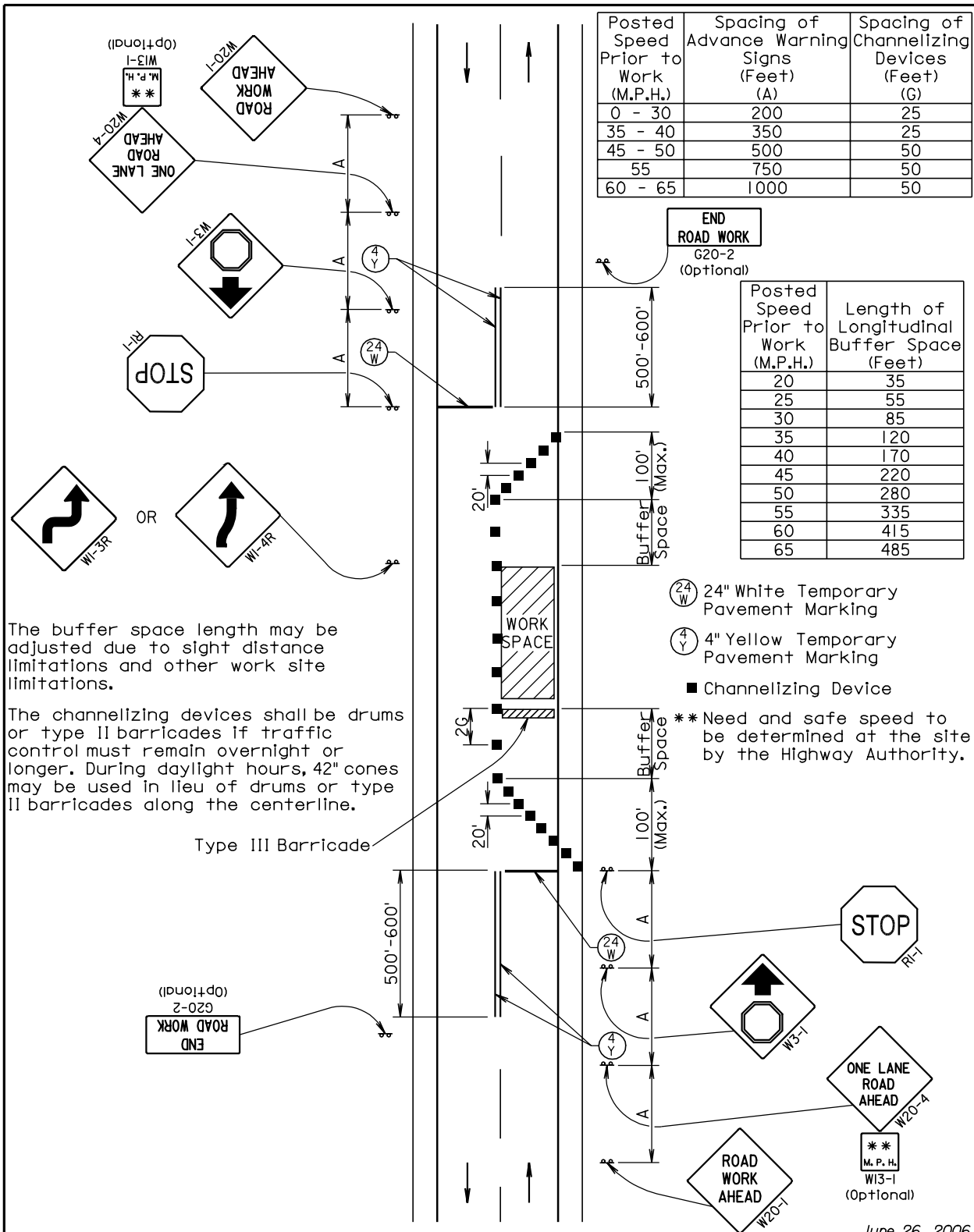


June 26, 2006


SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
		Sheet 1 of 1

Plotting Date: 26-JAN-2007

**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**



Username - tryaint46

	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING STOP SIGNS		PLATE NUMBER 634.25
	Published Date: 1st Qtr. 2007		Sheet 1 of 1

Plotting Date: 26-JAN-2007

**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**

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 - 50	50	600
55	50	660
60 - 65	50	780
70 - 75	50	900

■ Channelizing Device

* Speed appropriate for location.

4" white temporary pavement marking tape for right lane closures and 4" yellow temporary pavement marking tape for left lane closures or temporary road markers at 5' spacing shall be installed when the lane is closed for a period of 24 hours or more.

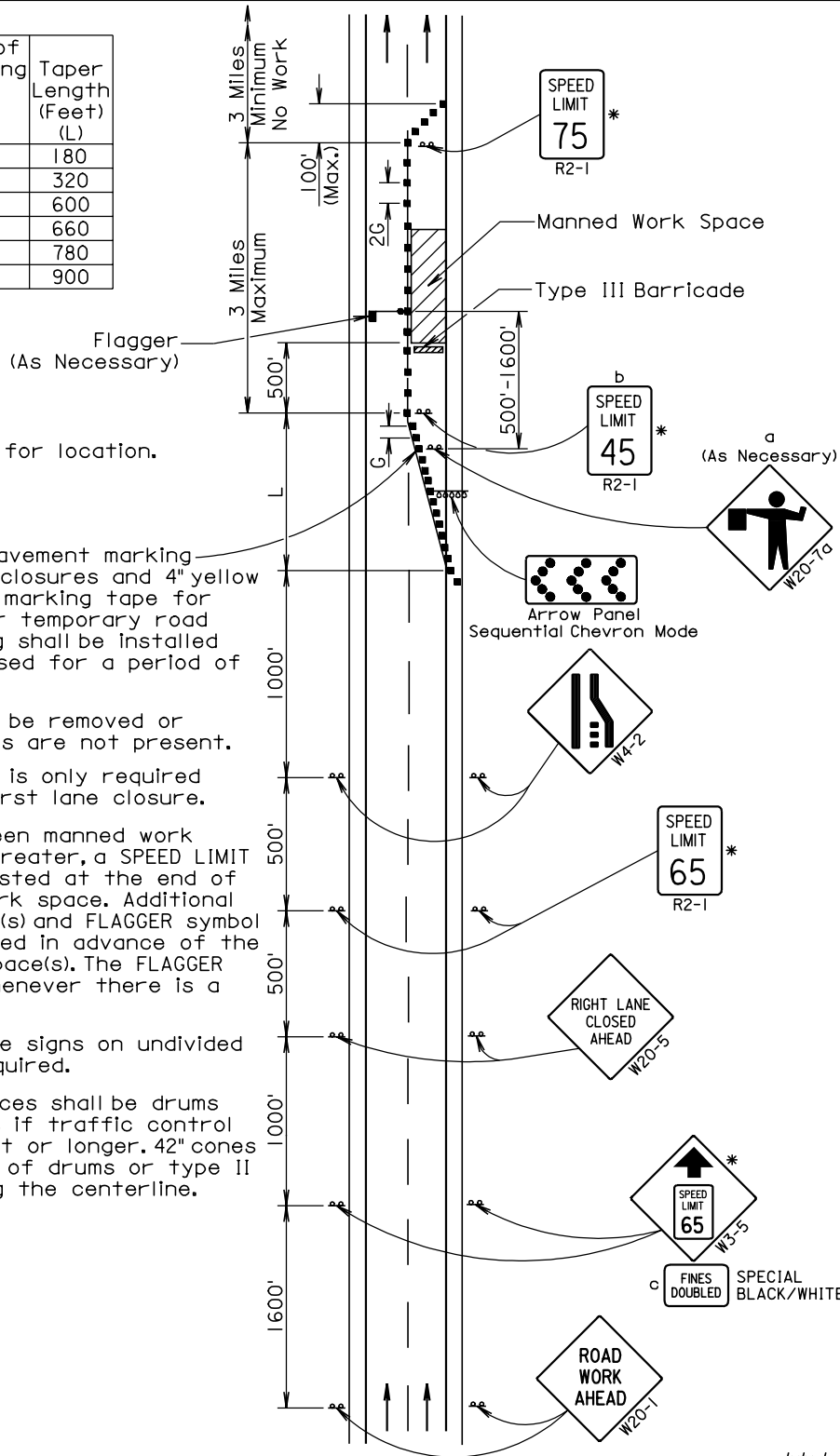
Signs a, b, and c shall be removed or covered when workers are not present.

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

If the spacing between manned work spaces is 1 mile or greater, a SPEED LIMIT 65(*) sign shall be posted at the end of the first manned work space. Additional SPEED LIMIT 45(*) sign(s) and FLAGGER symbol sign(s) shall be installed in advance of the next manned work space(s). The FLAGGER sign shall be used whenever there is a flagger present.

Left mounted advance signs on undivided highways are not required.

The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. 42" cones may be used in lieu of drums or type II barricades only along the centerline.

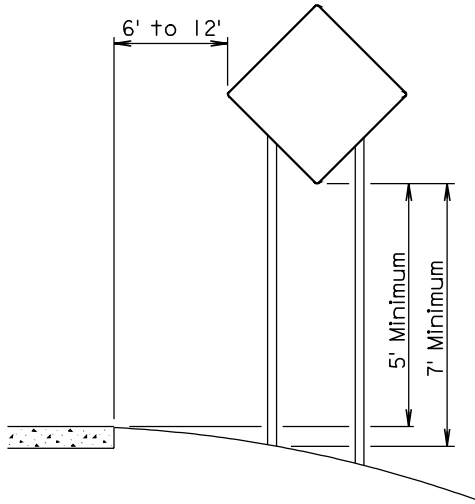


July 1, 2005

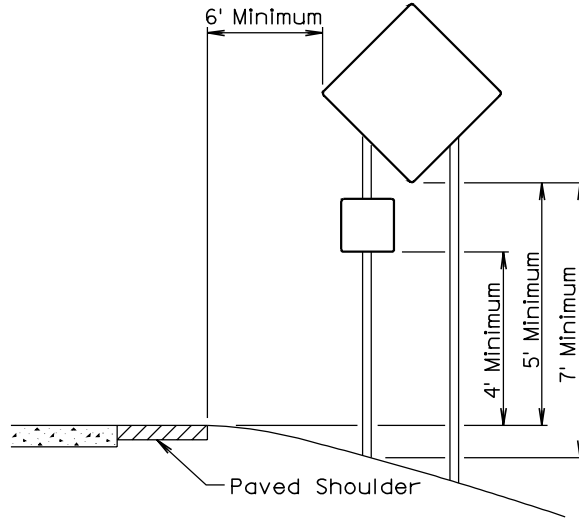
	<p>MANNED WORK SPACE SIGNING FOR DIVIDED AND UNDIVIDED HIGHWAYS</p>	<p>PLATE NUMBER 634.63</p>
		<p>Sheet 1 of 1</p>

Plotting Date: 26-JAN-2007

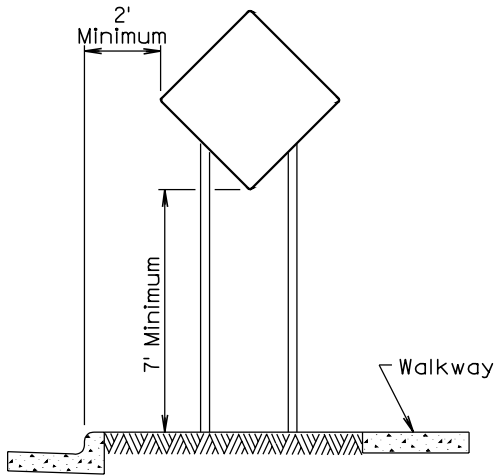
050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
 HUTCHINSON, UNION & YANKTON COUNTIES



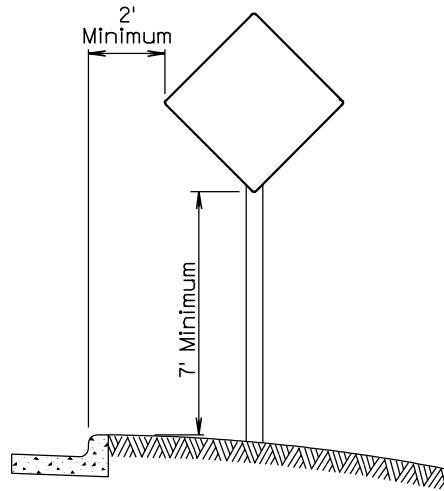
RURAL DISTRICT



RURAL DISTRICT WITH
 SUPPLEMENTAL PLATE



URBAN DISTRICT



URBAN DISTRICT

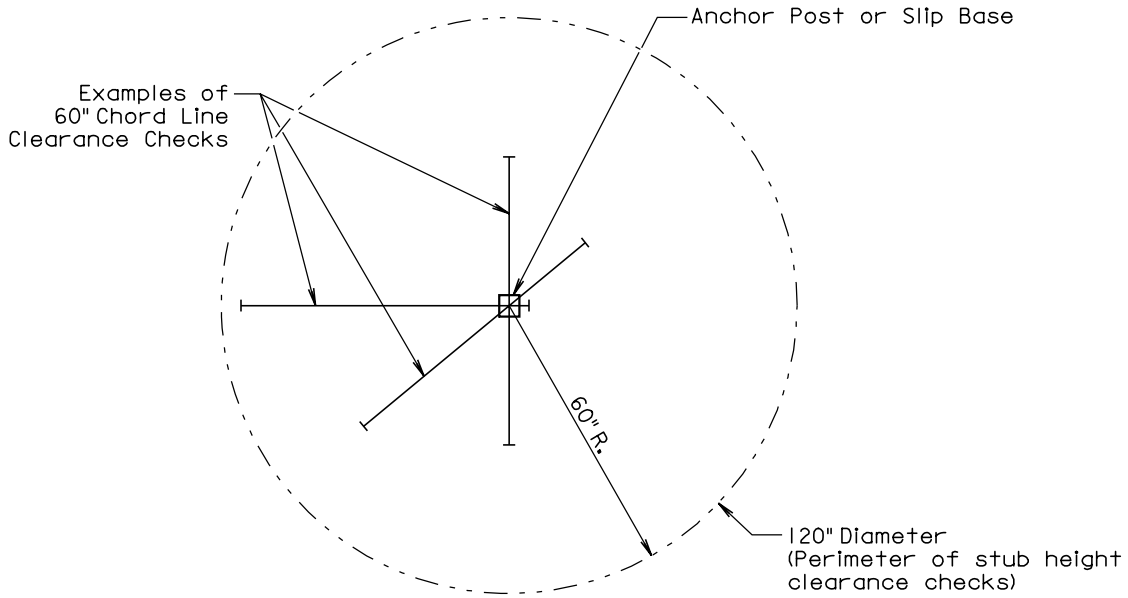
December 23, 2003

<p><i>Published Date: 1st Qtr. 2007</i></p>	<p>S D D O T</p>	<p>BREAKAWAY SIGN SUPPORTS (Typical Construction Signing)</p>	<p>PLATE NUMBER 634.85</p>
			<p>Sheet 1 of 1</p>

Plotting Date: 26-JAN-2007

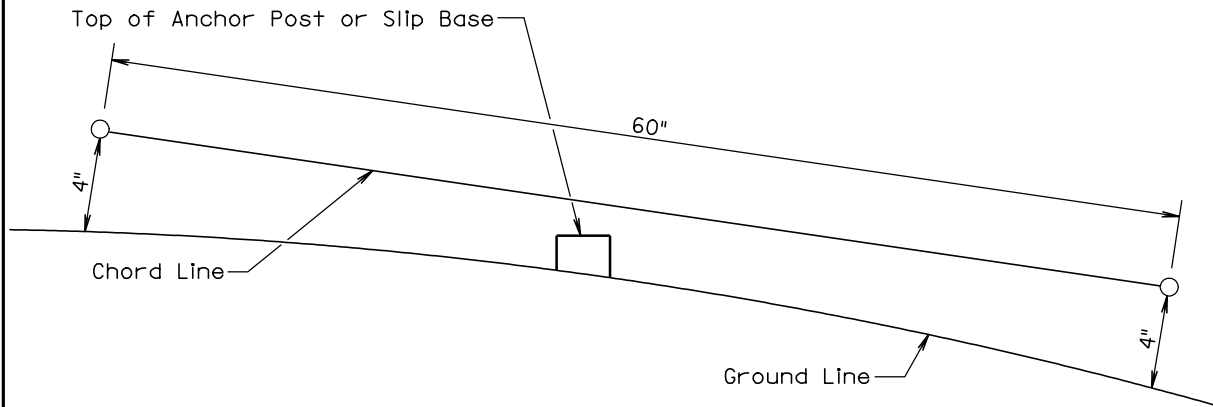
Username - tryaint46

**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**



PLAN VIEW

(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

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

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

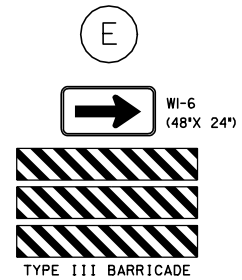
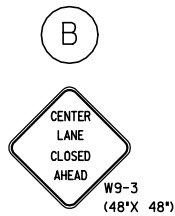
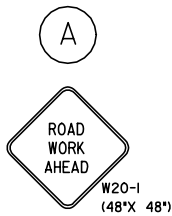
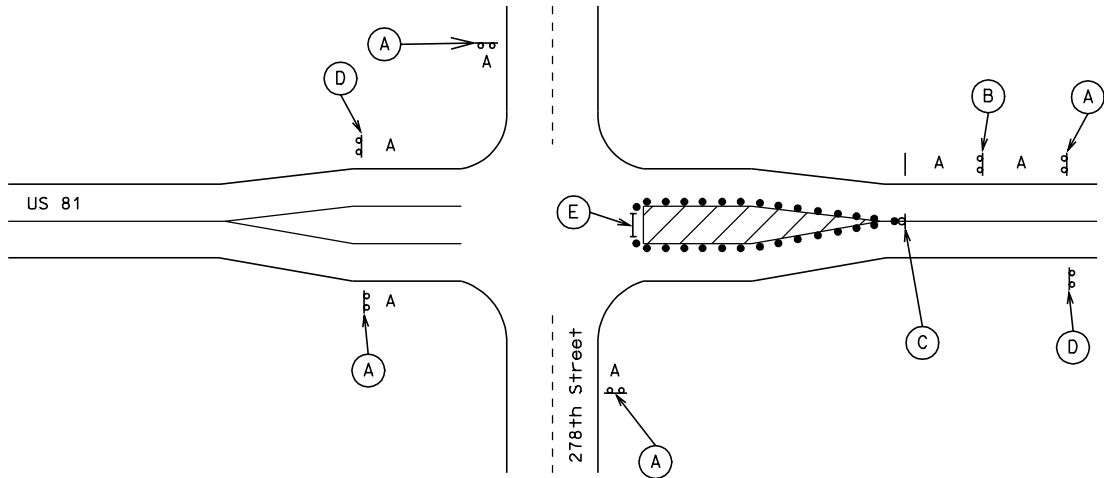
July 1, 2005

<i>Published Date: 1st Qtr. 2007</i>	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

Plotting Date: 26-JAN-2007

050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
 HUTCHINSON, UNION & YANKTON COUNTIES

081-292 PCN iOLF
 TRAFFIC CONTROL
 CENTER TURN LANE REPAIR



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)	
	(A)	(B)
0 - 30	200	200
35 - 40	200	200
45 - 50	350	350
55	500	500
60 - 65	500	1000
75	500	2600



● REFLECTORIZED DRUMS

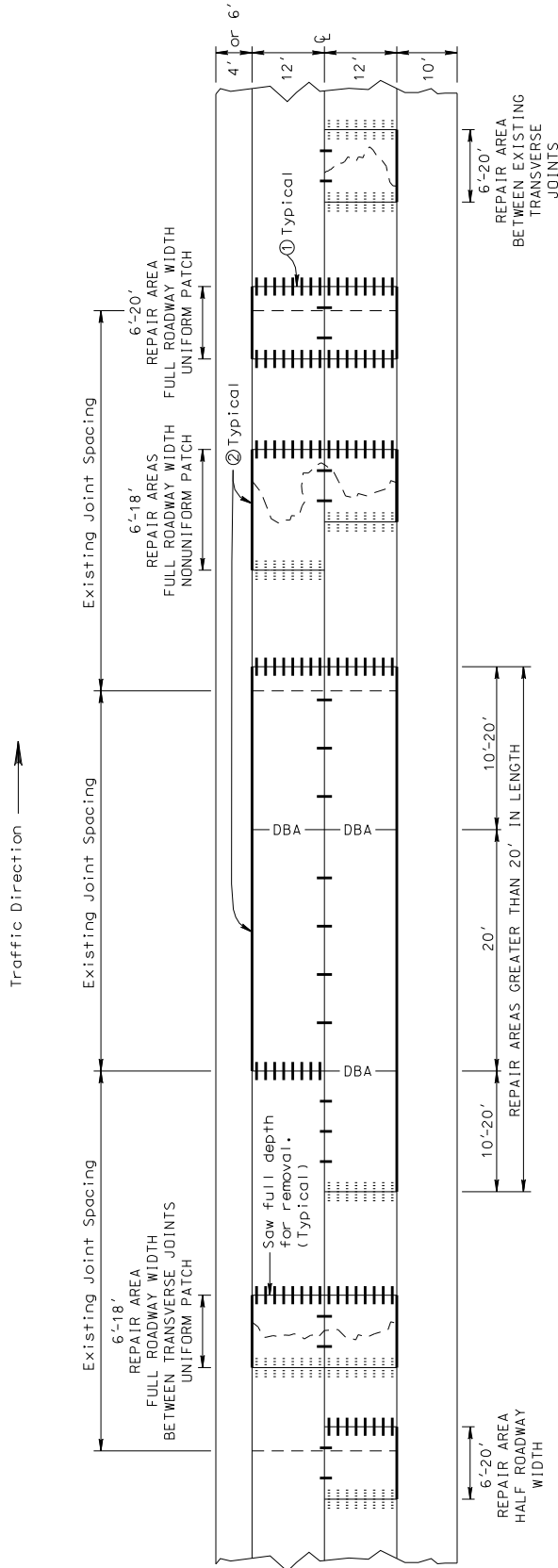
**050 W-292, 081 S-292, 081-292, 029 S-291 & 029 N-291
HUTCHINSON, UNION & YANKTON COUNTIES**

ITEMIZED LIST FOR TRAFFIC CONTROL

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
E5-1	36" x 32"	EXIT GORE SIGN		24	
G20-2a	36" x 18"	END ROAD WORK	4	17	68
R1-1	48" x 48"	STOP	2	34	68
R1-2	48" x 48"	YIELD		34	
R2-1	30" x 36"	SPEED LIMIT	4	23	92
R2-5a	30" x 36"	REDUCED SPEED AHEAD		23	
R4-7	24" x 30"	KEEP RIGHT (SYMBOL)	1	18	18
R5-1	48" x 48"	DO NOT ENTER		34	
R5-1a	48" x 36"	WRONG WAY		29	
R10-6	24" x 36"	STOP HERE ON RED		20	
R11-2	48" x 30"	ROAD CLOSED	1	27	27
R11-3a	60" x 30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		30	
R11-4	60" x 30"	ROAD CLOSED TO THRU TRAFFIC		30	
SW12-1b	120" x 60"	HIGHWAY WORKERS GIVE'EM A BRAKE		80	
W1-1	48" x 48"	LEFT OR RIGHT TURN ARROW		34	
W1-2	48" x 48"	LEFT OR RIGHT CURVE ARROW		34	
W1-3	48" x 48"	REVERSE TURN SIGN (LEFT OR RIGHT)	1	34	34
W1-4a	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)		34	
W1-6	48" x 24"	LARGE ARROW	2	24	48
W3-1a	48" x 48"	STOP AHEAD (SYMBOL)	2	34	68
W3-2a	48" x 48"	YIELD AHEAD (SYMBOL)		34	
W3-3	48" x 48"	SIGNAL AHEAD (SYMBOL)		34	
W3-5	48" x 48"	SPEED LIMIT __ AHEAD (SYMBOL)	2	34	68
W4-1	48" x 48"	MERGE (SYMBOL)		34	
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W5-2	48" x 48"	NARROW BRIDGE		34	
W5-3	48" x 48"	ONE LANE BRIDGE		34	
W7-3a	30" x 24"	NEXT __ MILES		18	
W8-1	36" x 36"	BUMP		27	
W8-6	48" x 48"	TRUCK CROSSING		34	
W8-7	36" x 36"	LOOSE GRAVEL		27	
W8-9a	48" x 48"	SHOULDER DROP-OFF		34	
W8-11	48" x 48"	UNEVEN LANES		34	
W13-1	24" x 24"	ADVISORY SPEED PLATE	2	16	32
W20-1	48" x 48"	ROAD WORK AHEAD	8	34	272
W20-2	48" x 48"	DETOUR AHEAD		34	
W20-3	48" x 48"	ROAD CLOSED AHEAD		34	
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-5	48" x 48"	LT. OR RT. LANE CLOSED AHEAD	2	34	68
W20-7a	48" x 48"	FLAGGER	1	34	34
W20-7b	48" x 48"	BE PREPARED TO STOP		34	
W21-1a	48" x 48"	WORKERS (SYMBOL)		34	
W21-2	36" x 36"	FRESH OIL		27	
W21-3	48" x 48"	ROAD MACHINERY AHEAD		34	
W21-5	48" x 48"	SHOULDER WORK		34	
W21-5a	48" x 48"	RIGHT SHOULDER CLOSED		34	
W21-5b	48" x 48"	RIGHT SHOULDER CLOSED AHEAD		34	
SPECIAL	30" x 24"	FINES DOUBLED	2	18	36
W9-3	48" x 48"	CENTER LANE CLOSED AHEAD	1	34	34
*****	12" x 36"	TYPE III OBJECT MARKER		15	
*****	*****	TYPE III BARRICADE - 8 FT. SINGLE SIDED	18	40	720
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED		56	
TOTAL UNITS					1,823

NONREINFORCED PCC PAVEMENT REPAIR

FOUR LANE DIVIDED - TYPICAL REPAIR AREAS



KEY:

- Steel Bars for Longitudinal Joints**
- ① No. 5 x 30" epoxy coated deformed tie bars. Sawed Joint - spaced 48" center to center. Construction Joint - spaced 48" center to center.
 - ② No. 5 x 24" epoxy coated deformed tie bars. Drilled In - spaced 30" center to center.
- Steel Bars for Transverse Joints**
- Drilled in 1" or 1 1/4" x 18" epoxy coated plain round dowel bars spaced 18" center to center.
 - Drilled in No. 8 or No. 9 x 18" epoxy coated deformed tie bars spaced 18" center to center.

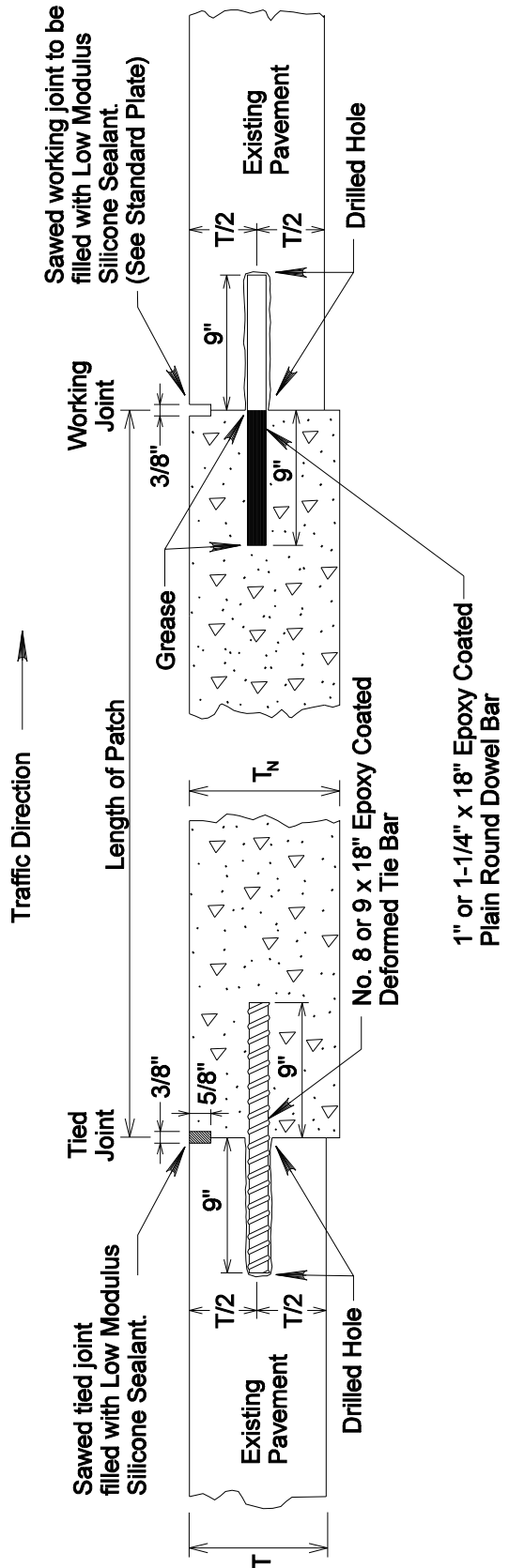
NOTES:

- ① Where possible, transverse joints shall be constructed full roadway width.
- ② All edges of repair areas that are adjacent to asphalt concrete shall be formed to match the width of the existing concrete pavement.

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

NONREINFORCED PCC PAVEMENT REPAIR

STEEL BAR INSERTION
 (ONE TIED JOINT AND ONE WORKING JOINT)



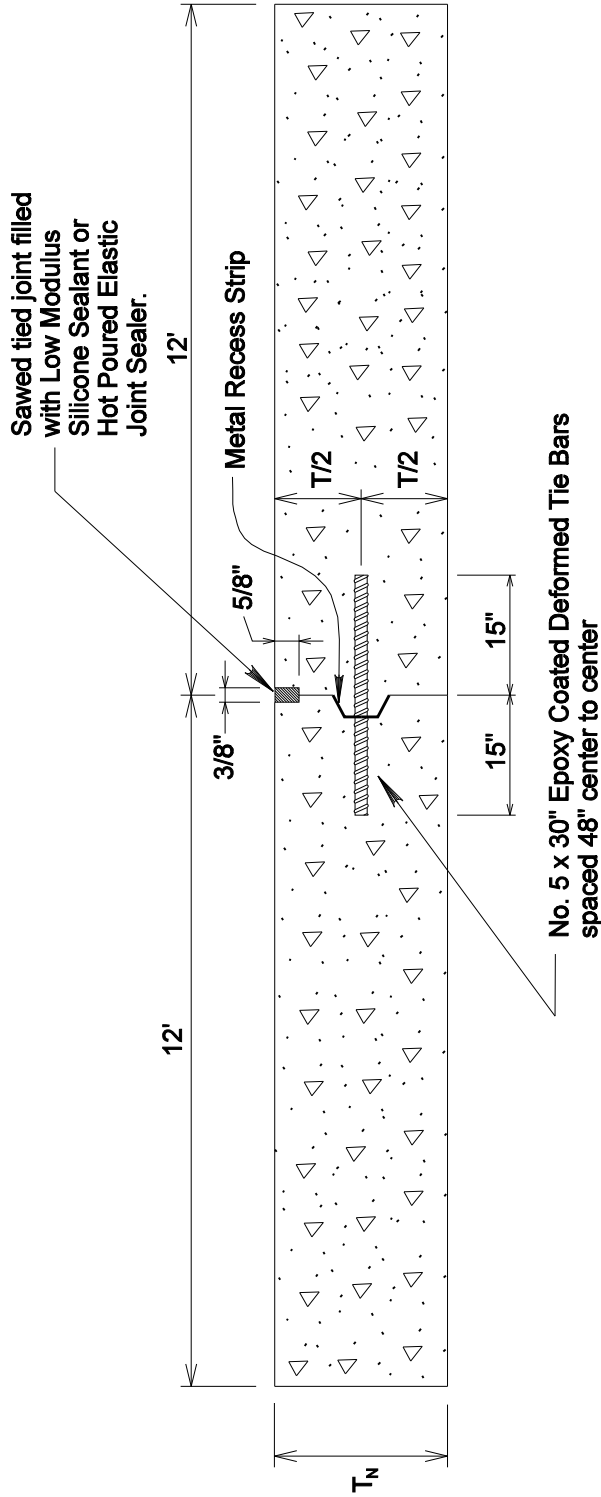
T = Existing pavement thickness (7"-9")
 T_N = New pavement thickness (8" or 10").

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) shall be included in the contract unit price per each for Insert Steel Bar in Concrete Pavement.

NONREINFORCED PCC PAVEMENT REPAIR

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



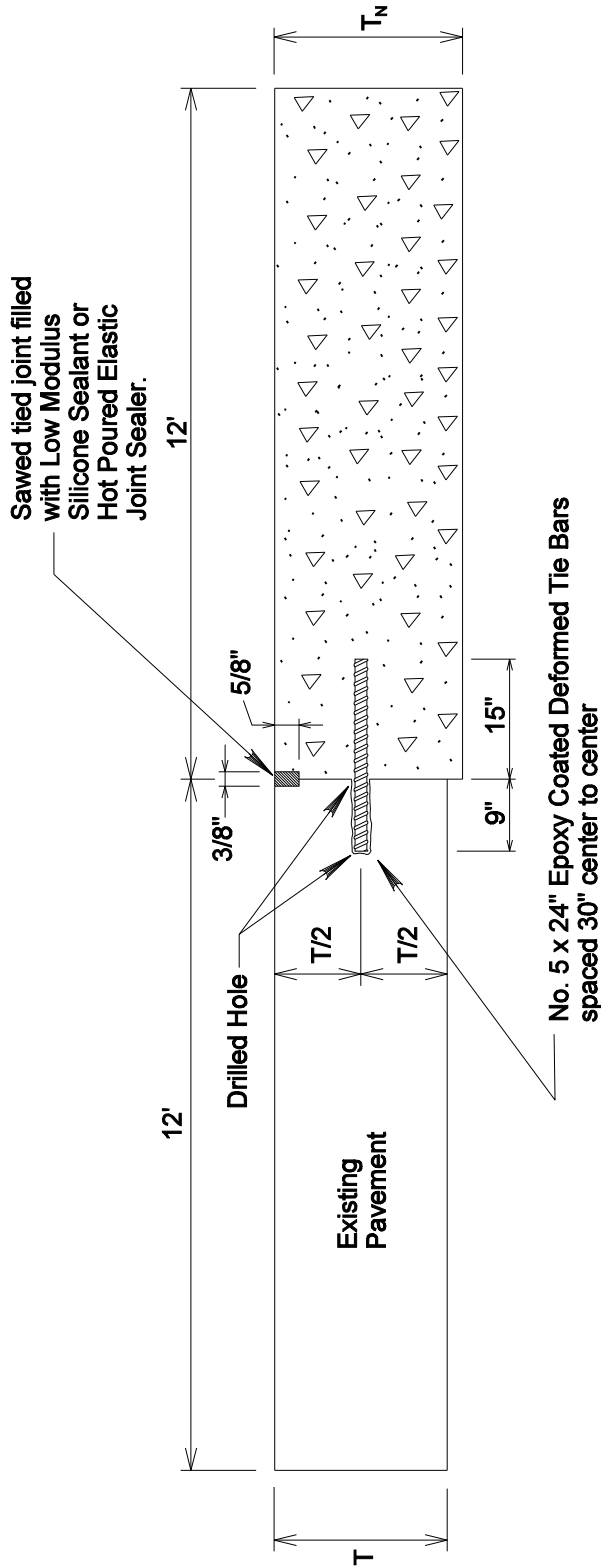
T_N = New pavement thickness.

Deformed tie bars will only be inserted on centerline when there is full width pavement removal.

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

NONREINFORCED PCC PAVEMENT REPAIR

LONGITUDINAL CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



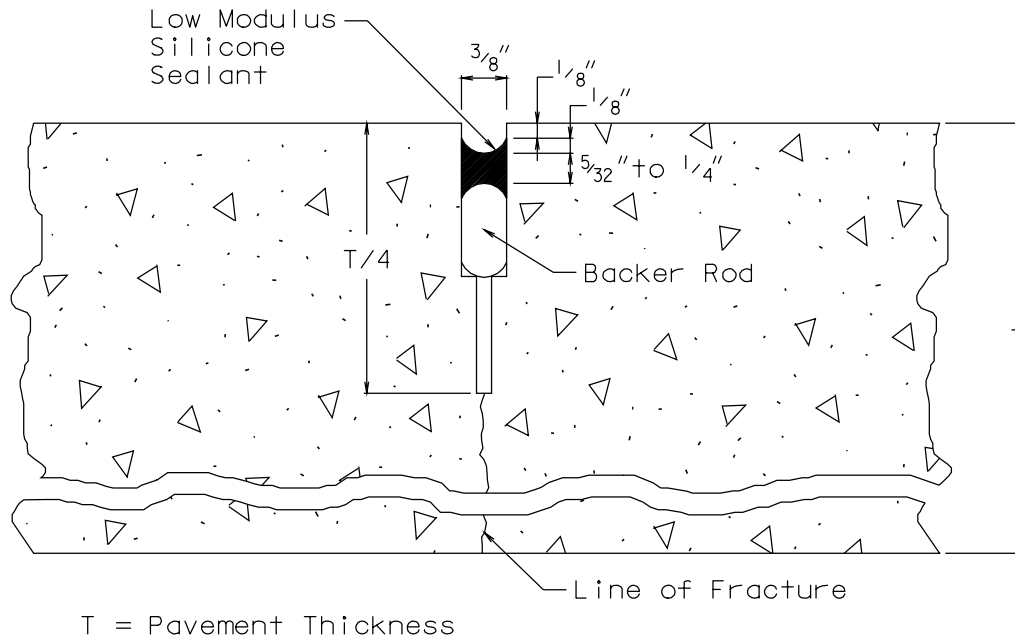
T = Existing pavement thickness.
 T_N = New pavement thickness.

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

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

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

DETAILS FOR PCCP TRANSVERSE CONTRACTION JOINT



GENERAL NOTES:

The first saw cut to control cracking shall 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 Low Modulus Silicone Joint Sealant will be necessary.

Backer Rod shall be of nonmoisture absorbing resilient material approximately 25% larger in diameter than the width of the joint to be sealed.