

PLOT SCALE - 1:200

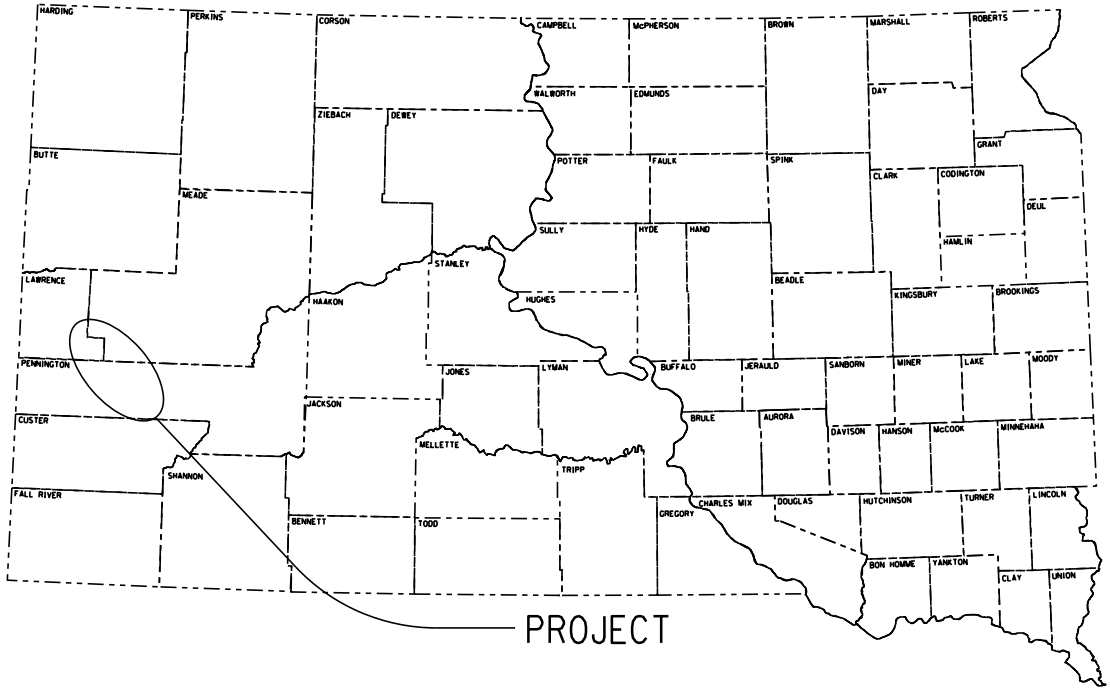
PLOTTED FROM - TRR011951

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-451, 090W-451, & etc.	1	21

Plotting Date: 05/14/2012

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

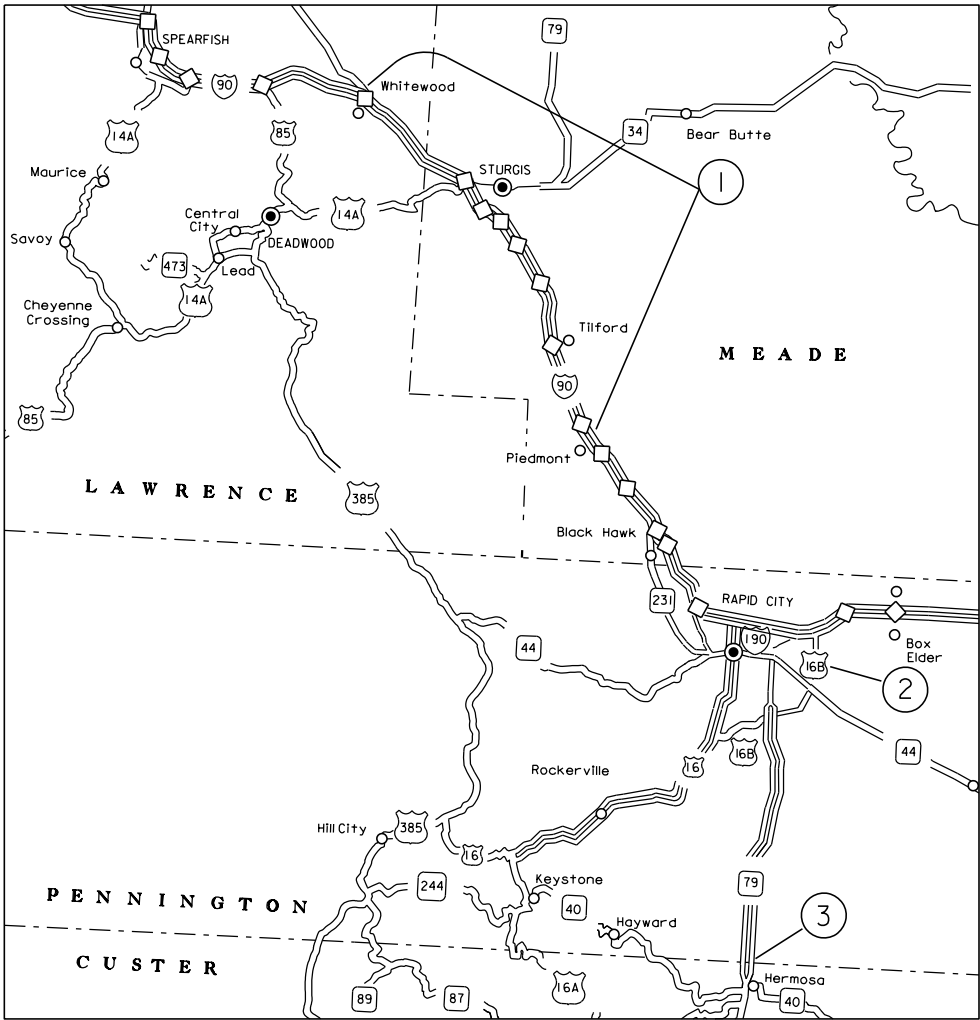
PROJECTs 090E-451, 090W-451, 016EB-452,
& 079N-452
HIGHWAYs I-90, US16B, & SD79
LAWRENCE, MEADE
& PENNINGTON
PCC PAVEMENT REPAIR AND
ASPHALT SHOULDER RESURFACING
PCNs i2K8, i2K9, i2LY, & i2LX



PROJECT

- 1 I-90, MRM 26.7 to MRM 45.0
090E-451, i2k8
090W-451, i2k9
- 2 US 16B E, MRM 71.6
016EB-452, i2LY
- 3 SD 79N, MRM 61.13
079N-452, i2LX

Storm Water Permit
No Permit Required



INDEX OF SHEETS

- Sheet 1: Title Sheet
- Sheets 2-9: Estimate of Quantities
& Plan Notes
- Sheet 10: Asphalt Resurfacing Typical Section
- Sheets 11-16: PCCP Repair Details
- Sheets 17-21: Standard Plates



PLOT NAME - 8

FILE - ... \RCCONCRETEPAIR\I2K8\TITLE.DGN

ESTIMATE OF QUANTITIES (I-90 E, PCN i2k8)

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
320E1200	Asphalt Concrete Composite	899.5	Ton
320E7012	Grind 12" Rumble Strip or Stripe in Asphalt Concrete	3.2	Mile
332E0010	Cold Milling Asphalt Concrete	8,096	SqYd
380E5030	Nonreinforced PCC Pavement Repair	122.7	SqYd
380E5100	Continuously Reinforced PCC Pavement Repair	74.8	SqYd
380E6110	Insert Steel Bar in PCC Pavement	345	Each
390E0200	Repair Type A Spall	104.5	SqFt
410E2600	Membrane Sealant Expansion Joint	26.0	Ft
633E1300	Pavement Marking Paint, White	26.0	Gal
633E1305	Pavement Marking Paint, Yellow	26.0	Gal
634E0010	Flagging	200	Hour
634E0100	Traffic Control	856	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0630	Temporary Pavement Marking	1.550	Mile

ESTIMATE OF QUANTITIES (I-90 W, PCN i2k9)

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	256.0	SqYd
380E5100	Continuously Reinforced PCC Pavement Repair	56.0	SqYd
380E6110	Insert Steel Bar in PCC Pavement	682	Each
390E0200	Repair Type A Spall	81.0	SqFt
633E1400	Pavement Marking Paint, 4" White	122	Ft
633E1405	Pavement Marking Paint, 4" Yellow	122	Ft
634E0010	Flagging	200	Hour
634E0100	Traffic Control	856	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	122	Ft

ESTIMATE OF QUANTITIES (SD 79N, PCN i2LX)

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	173.3	SqYd
380E6000	Dowel Bar	48	Each
380E6110	Insert Steel Bar in PCC Pavement	72	Each
633E1400	Pavement Marking Paint, 4" White	60	Ft
633E1405	Pavement Marking Paint, 4" Yellow	60	Ft
634E0100	Traffic Control	856	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	60	Ft

ESTIMATE OF QUANTITIES (US 16B E, i2LY)

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	142.2	SqYd
380E6000	Dowel Bar	36	Each
380E6110	Insert Steel Bar in PCC Pavement	72	Each
633E1400	Pavement Marking Paint, 4" White	100	Ft
633E1405	Pavement Marking Paint, 4" Yellow	100	Ft
634E0100	Traffic Control	856	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	100	Ft

SPECIFICATIONS

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

HISTORICAL PRESERVATION OFFICE CLEARANCES

To obtain State Historical Preservation Office (SHPO) clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. In lieu of a cultural resources survey, the Contractor could request a records search from Jim Donohue, State Archaeological Research Center (SARC). Provide SARC with the following: a topographical map or aerial view on 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 no artifacts have been found on the site. The Contractor shall arrange and pay for the cultural resource survey and/or records search.

If any earth disturbing activities occur within the current geographical or historic boundaries of any South Dakota reservation, the Contractor shall obtain Tribal Historical Preservation Office (THPO) clearance. If no THPO exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

To facilitate SHPO or THPO responses, the Contractor should submit a records search or cultural resources survey report to Tom Lehmkuhl, DOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). Allow 30 days from the date this information is submitted to the Environmental Engineer for SHPO/THPO approval. The Contractor is responsible for obtaining all required permits and clearances for staging areas, borrow sites, waste disposal sites, and all material processing sites. The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

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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.

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:

- 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. The 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”.
- 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.

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

EXISTING PCC PAVEMENT

The existing pavement from MRM 23.0 to MRM 26.8, is 10” Continuously Reinforced PCC Pavement with limestone aggregate. The longitudinal steel is a #6 deformed steel bar spaced 6” center to center. The transverse steel is a #4 deformed steel bar spaced 48” center to center.

The existing pavement from MRM 34.5 to MRM 38.5, westbound is 10” Nonreinforced PCC Pavement with limestone aggregate.

The existing pavement from MRM 40.34 to MRM 44.93 is 9” PCC Pavement 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. 6 gauge and are spaced 12” center to center. Existing contraction joints are spaced at approximately 46.5’. Longitudinal joints are reinforced with No. 5x24” deformed tie bars spaced 30” to 48” center to center. Transverse joints are reinforced with 1 ¼” x 18” plain round dowel bars.

The existing pavement on SD 79 & US 16B is 9.5” Nonreinforced PCC Pavement with limestone aggregate.

CONCRETE REMOVAL ADJACENT TO TERMINAL ANCHORS I-90 MRM 26.7, EASTBOUND

The Contractor shall use light chipping hammers (not exceeding 15 pounds) to remove concrete around the in place steel at the steel terminal anchors, located at MRM 26.7, eastbound. Care shall be taken not to cut, bend or otherwise damage the in place steel anchors and expansion joint. 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. All costs associated with the concrete breakout shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

REMOVE POLYMER MODIFIED ASPHALT GROWTH JOINT, MRM 26.7, EASTBOUND

All costs to remove the polymer modified asphalt growth joint at MRM 26.7, eastbound shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

MEMBRANE SEALANT EXPANSION JOINT, MRM 26.7, EASTBOUND

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

2. The Membrane Sealant is a foam sealant consisting of an open-cell high density polyurethane foam impregnated with either a polymer modified bitumen or a neoprene rubber suspended in chlorinated hydrocarbons. The Membrane Sealant shall be supplied by one the following companies:

Wabo HSeal
Watson Bowman Acme Corp.
95 Pineview Drive, Amherst NY 14228
Phone: 716-691-7566
Fax: 716-691-9239
Web site: <http://www.wbacorp.com>

Sealtite 50N
Schul International Company, LLC
One Industrial Drive
Pelham, NH 03076
Phone: 800-848-1120
Fax: 800-998-9105
Web site: <http://www.sealtiteusa.com>

Polytite N
Sunshine Industrial
5051 Merriam Drive
Merriam, KS 66203
Phone: 913-362-6300

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

4. The membrane sealant shall be supplied in pieces 5 feet in length or longer. Miter the ends of each piece for ease of joining to the adjacent pieces. The membrane sealant shall have a minimum depth of 4 inches. The foam sealant shall be ultra-violet and ozone resistant.

5. The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be a waterproof epoxy adhesive that adheres to concrete surfaces and is approved by the membrane sealant supplier.

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

7. The Styrofoam filler material shall be closed cell and water-tight as approved by the Engineer.

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

9. A technical representative of the membrane sealant supplier shall be present at the jobsite during installation.

MEMBRANE SEALANT EXPANSION JOINT (CONTINUED)

10. The joint opening shall be formed during the concrete placement by Styrofoam block out material. The Styrofoam block out material shall remain in-place until the adjacent concrete has cured for a minimum of 28 days. After curing the 28 days the Styrofoam shall be removed to the plan specified depth to allow for placement of the membrane sealant material.

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

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

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 and excess 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.

Cost for this work shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair or Continuously Reinforced PCC Pavement Repair.

NONREINFORCED PCC PAVEMENT REPAIR, I-90 MRM 34.5, 35.0 AND 36.5.

The Nonreinforced PCC Pavement Repair located at MRM 34.5, 35.0 and 36.5 is for the removal of asphalt joints that are approximately 5” wide. This joint shall be removed and replaced with Nonreinforced PCC Pavement.

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NONREINFORCED PCC PAVEMENT REPAIR

Locations and size (length or width) of concrete repair areas are subject to change in the field, at the discretion of the Engineer. There will be no increase in the contract unit price bid for these changes. Payment will be based on the 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.

Upon removal of the concrete, the Engineer shall inspect for existing tie bars along longitudinal joint to determine if tie bar installation will be required.

Concrete placed adjacent to 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 Asphalt Concrete Composite.

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 shall be sawed and sealed with Hot Poured Elastic Joint Sealer.

New pavement thickness shall match existing pavement thickness.

NONREINFORCED PCC PAVEMENT REPAIR (CONTINUED)

The slump requirement will be limited to 4" 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, unless an alternative gradation is approved by the concrete engineer as part of the mix design submittal. The concrete mixture shall contain a minimum of 50% coarse aggregate by weight. The concrete mix shall contain at least 600 lbs. of type I, II or III cement per cubic yard. The minimum 28 day compressive strength shall be 4,000 psi. 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.

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

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. 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. In addition to the curing requirements, strength of 3,800 psi must be obtained prior to opening to traffic.

Concrete shall 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 shall have an R-value of at least 0.5, as rated by the manufacturer. Insulation blanket shall be left in place until the concrete has obtained strength of 3,800 psi, except for joint sawing operations. Insulation blanket shall be overlapped on to the existing concrete.

All costs for performing this work including sawing and removing concrete, furnishing and placing concrete, #5 tie bars cast in place, curing, sawing and sealing joints, repairing asphalt shoulders, labor, tools and equipment shall be incidental to the contract unit price per square yard for Nonreinforced 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.

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).

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STEEL BAR INSERTION (CONTINUED)

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.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

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

The Engineer will mark the location of the area to be repaired on construction.

The Contractor shall saw the in place concrete transversely at four locations for each repair area. Two saw cuts shall be full depth. The other two saw cuts shall be partial depth saw cuts 2" deep and 2' away from the full depth saw cuts. The outside partial depth cuts shall be a minimum of 6" from the nearest crack outside of the patch.

The Contractor may use Mechanical Bar Splices as per section 480 of the Standard Specifications instead of lap splicing to reduce the amount of concrete removal required around the existing steel. All costs associated with installing Mechanical Bar Splices shall be incidental to the contract unit price per square yard "Continuously Reinforced PCC Pavement Repair".

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CONTINUED)

The Contractor shall lift out or break out the center section (including reinforcing steel) and then use light chipping hammers (not exceeding 15 pounds) to remove the remaining concrete at each end of the repair area, leaving 2' of the existing reinforcing steel in place. Care shall 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.

Existing exposed reinforcing steel and concrete faces shall 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 and Steel Bar Insertion.

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

Concrete shall 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 shall be between 50°F and 90°F. The temperature of the concrete shall be maintained above 40°F during the curing period.

Saw cuts that extend beyond the repair area shall be minimized and filled with Hot Pour Elastic Joint Sealant at the Contractor's expense.

New pavement thickness shall be equal to existing pavement thickness.

The slump requirement will be limited to 4" 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, unless an alternative gradation is approved by the concrete engineer as part of the mix design submittal. The concrete mixture shall contain a minimum of 50% coarse aggregate by weight. The concrete mix shall contain at least 600 lbs. of type I, II or III cement per cubic yard. The minimum 28 day compressive strength shall be 4,000 psi. 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.

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

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CONTINUED)

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. 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. In addition to the curing requirements, a strength of 3,800 psi must be obtained prior to opening to traffic.

Concrete shall 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 shall have an R-value of at least 0.5, as rated by the manufacturer. Insulation blanket shall be left in place, except for joint sawing operations, until the 3,800 psi is attained. Insulation blanket shall be overlapped on to the existing concrete. During warmer periods of weather the use of insulation blankets maybe eliminated if the concrete temperature and strength requirements can be met.

All costs associated with this 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 shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

REINFORCING STEEL

After removal of the in place concrete and any needed repair to the base material, new reinforcing steel shall be installed as per the CRC Pavement Repair details provided in these plans Area layouts for details. All costs associated with this work, furnishing reinforcing steel, ties, labor and equipment shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

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TABLE OF REPAIR PCCP REPAIR (PCN i2k8)

MRM	Direction	Lane	Width	Length	Continuously Reinforced PCC Pavement Repair	Nonreinforced PCC Pavement Repair	1 1/4" Bar	#9 Bar	#5 Bar	Insert Steel Bar in PCC Pavement
I-90			Ft	Ft	SqYd	SqYd	Each	Each	Each	Each
23.0	EB	DL	10	14	15.6				4	4
26.7	EB	DL & PL	26	20.5	59.2				5	5
MRM 26.7, EB Insert Longintudinal Steel Bar for CRC										52
34.50	EB	DL & PL	24	6		16.0	24	16	2	42
35.00	EB	DL & PL	24	6		16.0	24	16	2	42
36.50	EB	DL & PL	24	6		16.0	24	16	2	42
38.50	EB	PL	12	20		26.7	24		8	32
41.85	EB	DL & PL	24	6		16.0	24	16	2	42
43.60	EB	DL & PL	24	6		16.0	24	16	2	42
43.7	EB	DL & PL	24	6		16.0	24	16	2	42
				Totals	74.8	122.7	168	96	31	345

TABLE OF REPAIR PCCP REPAIR (PCN i2k9)

MRM	Direction	Lane	Width	Length	Continuously Reinforced PCC Pavement Repair	Nonreinforced PCC Pavement Repair	1 1/4" Bar	#9 Bar	#5 Bar	Insert Steel Bar in PCC Pavement
I-90			Ft	Ft	SqYd	SqYd	Each	Each	Each	Each
24.0	WB	DL	14	10	15.6				3	3
26.8	WB	DL	14	26	40.4				7	7
40.34	WB	DL & PL	24	6		16.0	24	16	2	42
42.12	WB	DL & PL	24	6		16.0	24	16	2	42
42.38	WB	DL & PL	24	6		16.0	24	16	2	42
42.5	WB	DL & PL	24	6		16.0	24	16	2	42
42.56	WB	DL & PL	24	6		16.0	24	16	2	42
42.98	WB	DL & PL	24	6		16.0	24	16	2	42
43.46	WB	DL & PL	24	6		16.0	24	16	2	42
43.5	WB	DL & PL	24	6		16.0	24	16	2	42
43.69	WB	DL & PL	24	6		16.0	24	16	2	42
43.7	WB	DL & PL	24	6		16.0	24	16	2	42
44.09	WB	DL & PL	24	6		16.0	24	16	2	42
44.11	WB	DL & PL	24	6		16.0	24	16	2	42
44.13	WB	DL & PL	24	6		16.0	24	16	2	42
44.35	WB	DL & PL	24	6		16.0	24	16	2	42
44.5	WB	DL & PL	24	6		16.0	24	16	2	42
44.93	WB	DL & PL	24	6		16.0	24	16	2	42
				Totals	56.0	256.0	384	256	45	682

TABLE OF REPAIR PCCP REPAIR (PCN i2LX)

MRM	Direction	Lane	Width	Length	Nonreinforced PCC Pavement Repair	1 1/4" Bar	#5 Bar	Insert Steel Bar in PCC Pavement	Dowel Bar Assemblies
SD 79			Ft	Ft	SqYd	Each	Each	Each	Each
61.13	NB	DL & PL	26	60	173.3	48	24	72	48

TABLE OF REPAIR PCCP REPAIR (PCN i2LY)

MRM	Direction	Lane	Width	Length	Nonreinforced PCC Pavement Repair	1 1/4" Bar	#5 Bar	Insert Steel Bar in PCC Pavement	Dowel Bar Assemblies
US 16B			Ft	Ft	SqYd	Each	Each	Each	Each
71.60	EB	PL	12	60	80.0	24	24	48	24
71.60	EB	DL	14	40	62.2	24		24	12
				Totals	142.2	48	24	72	36

REPAIR TYPE A SPALL

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

The concrete patching material shall be packaged, dry, rapid-hardening cementitious mortar or concrete materials conforming to the requirements of ASTM C 928, Type R-3 and shall contain no chloride ions. Concrete patching material as per Section 390.2.B.3 of the Supplemental Specifications will not be allowed.

Grout for bonding the concrete patching material to the existing concrete shall consist of equal parts by weight of Portland Cement and sand, mixed with sufficient water to form a thick slurry. A grout admixture shall be added to the grout mixture in accordance with the manufacturer's recommendations. Grout admixture shall be a one component acrylic bonding additive. The additive shall be one of the grout admixtures from the Approved Products List, or an approved equal.

Grout shall be applied on all of the existing concrete surfaces within the removal area immediately prior to placement of the concrete patching material. The grout shall be scrubbed into the surface with a stiff bristle brush in a thin and uniform coat. Care shall be taken to ensure that excess grout does not collect in low areas, that the grout is confined only to the immediate area in which concrete patching material is to be placed, and that the rate of application is limited to an amount such that the grout will be covered with concrete patching material before the grout dries.

The patching product may be extended with aggregate as recommended by the manufacturer. The aggregate extender shall meet the requirements of Section 820 of the Standard Specifications. Section 820.2 D shall not apply to the aggregate extender. The Contractor's supplier of the patching product shall provide a concrete mix design, including all additives, to meet a minimum compressive strength of 4000 psi in six hours. This mix design shall be performed with the materials that will be used on the project.

The spall repair locations may be opened to traffic once the patch material has obtained a compressive strength of 4000 psi.

The Contractor shall provide test results to the Engineer to verify that the suppliers mix design is acceptable prior to beginning work. If the suppliers mix design is not satisfactory, the Contractor shall provide the Department with a mix design that meets the requirement prior to beginning work.

TABLE OF REPAIR TYPE A SPALL (I-90, PCN i2k8)

MRM to	MRM	Direction	#	Width	Length	Repair Type A Spall
				Ft	Ft	SqFt
40.3	40.4	EB	4	0.5	1.0	2.0
40.4	40.5	EB	1	0.5	1.0	0.5
40.5	40.6	EB	7	0.5	1.0	3.5
40.6	40.7	EB	6	0.5	1.0	3.0
40.7	40.8	EB	2	0.5	1.0	1.0
40.8	40.9	EB	4	0.5	1.0	2.0
40.9	41.0	EB	5	0.5	1.0	2.5
41.0	41.1	EB	5	0.5	1.0	2.5
41.1	41.2	EB	2	0.5	1.0	1.0
41.2	41.3	EB	5	0.5	1.0	2.5
41.3	41.4	EB	3	0.5	1.0	1.5
41.4	41.5	EB	3	0.5	1.0	1.5
41.5	41.6	EB	4	0.5	1.0	2.0
41.6	41.7	EB	4	0.5	1.0	2.0
41.7	41.8	EB	2	0.5	1.0	1.0
41.8	41.9	EB	4	0.5	1.0	2.0
41.9	42.0	EB	5	0.5	1.0	2.5
42.0	42.1	EB	4	0.5	1.0	2.0
42.1	42.2	EB	4	0.5	1.0	2.0
42.2	42.3	EB	6	0.5	1.0	3.0
42.3	42.4	EB	8	0.5	1.0	4.0
42.4	42.5	EB	4	0.5	1.0	2.0
42.5	42.6	EB	5	0.5	1.0	2.5
42.6	42.7	EB	4	0.5	1.0	2.0
42.7	42.8	EB	4	0.5	1.0	2.0
42.8	42.9	EB	2	0.5	1.0	1.0
42.9	43.0	EB	10	0.5	1.0	5.0
43.0	43.1	EB	4	0.5	1.0	2.0
43.1	43.2	EB	3	0.5	1.0	1.5
43.2	43.3	EB	2	0.5	1.0	1.0
43.3	43.4	EB	5	0.5	1.0	2.5
43.4	43.5	EB	3	0.5	1.0	1.5
43.5	43.6	EB	6	0.5	1.0	3.0
43.6	43.7	EB	3	0.5	1.0	1.5
43.7	43.8	EB	5	0.5	1.0	2.5
43.8	43.9	EB	4	0.5	1.0	2.0
43.9	44.0	EB	4	0.5	1.0	2.0
44.0	44.1	EB	4	0.5	1.0	2.0
44.1	44.2	EB	2	0.5	1.0	1.0
44.2	44.3	EB	6	0.5	1.0	3.0
44.3	44.4	EB	7	0.5	1.0	3.5
44.4	44.5	EB	4	0.5	1.0	2.0
44.5	44.6	EB	8	0.5	1.0	4.0
44.6	44.7	EB	3	0.5	1.0	1.5
44.7	44.8	EB	7	0.5	1.0	3.5
44.8	44.9	EB	7	0.5	1.0	3.5
44.9	45.0	EB	5	0.5	1.0	2.5
					Total	104.5

TABLE OF REPAIR TYPE A SPALL (I-90 PCN i2k9)

MRM to	MRM	Direction	#	Width	Length	Repair Type A Spall
				Ft	Ft	SqFt
26.7		WB	1	1.0	2.0	2.0
40.3	40.4	WB	1	0.5	1.0	0.5
40.4	40.5	WB	3	0.5	1.0	1.5
40.5	40.6	WB	2	0.5	1.0	1.0
40.6	40.7	WB	2	0.5	1.0	1.0
40.7	40.8	WB	3	0.5	1.0	1.5
40.8	40.9	WB	3	0.5	1.0	1.5
40.9	41.0	WB	2	0.5	1.0	1.0
41.0	41.1	WB	5	0.5	1.0	2.5
41.1	41.2	WB	3	0.5	1.0	1.5
41.2	41.3	WB	4	0.5	1.0	2.0
41.3	41.4	WB	3	0.5	1.0	1.5
41.4	41.5	WB	3	0.5	1.0	1.5
41.5	41.6	WB	3	0.5	1.0	1.5
41.6	41.7	WB	4	0.5	1.0	2.0
41.7	41.8	WB	6	0.5	1.0	3.0
41.8	41.9	WB	5	0.5	1.0	2.5
41.9	42.0	WB	3	0.5	1.0	1.5
42.0	42.1	WB	5	0.5	1.0	2.5
42.1	42.2	WB	5	0.5	1.0	2.5
42.2	42.3	WB	3	0.5	1.0	1.5
42.3	42.4	WB	6	0.5	1.0	3.0
42.4	42.5	WB	6	0.5	1.0	3.0
42.5	42.6	WB	3	0.5	1.0	1.5
42.6	42.7	WB	5	0.5	1.0	2.5
42.7	42.8	WB	4	0.5	1.0	2.0
42.8	42.9	WB	5	0.5	1.0	2.5
42.9	43.0	WB	11	0.5	1.0	5.5
43.0	43.1	WB	4	0.5	1.0	2.0
43.1	43.2	WB	3	0.5	1.0	1.5
43.2	43.3	WB	1	0.5	1.0	0.5
43.3	43.4	WB	4	0.5	1.0	2.0
43.4	43.5	WB	2	0.5	1.0	1.0
43.5	43.6	WB	5	0.5	1.0	2.5
43.6	43.7	WB	3	0.5	1.0	1.5
43.7	43.8	WB	5	0.5	1.0	2.5
43.8	43.9	WB	2	0.5	1.0	1.0
43.9	44.0	WB	2	0.5	1.0	1.0
44.0	44.1	WB	2	0.5	1.0	1.0
44.1	44.2	WB	3	0.5	1.0	1.5
44.2	44.3	WB	2	0.5	1.0	1.0
44.3	44.4	WB	2	0.5	1.0	1.0
44.4	44.5	WB	1	0.5	1.0	0.5
44.5	44.6	WB	1	0.5	1.0	0.5
44.6	44.7	WB	1	0.5	1.0	0.5
44.7	44.8	WB	3	0.5	1.0	1.5
44.8	44.9	WB	2	0.5	1.0	1.0
44.9	45.0	WB	2	0.5	1.0	1.0
					Total	81.0

SURFACING THICKNESS DIMENSIONS

Plans tonnage will be applied even though the thickness may vary from that shown in the plans. At those locations where material must be placed to achieve a required elevation, plans tonnage may be varied to achieve the required elevation.

SAWING IN EXISTING SURFACING

Where new asphalt or PCCP is placed adjacent to existing asphalt concrete or existing PCC Pavement, the existing asphalt concrete or PCC Pavement shall be sawed full depth to a true line with a vertical face. No separate payment shall be made for sawing.

ASPHALT CONCRETE COMPOSITE

Mineral aggregate for the Asphalt Concrete Composite shall conform to the requirements of the Standard Specifications for Class E, Type 1.

The Asphalt Concrete Composite may include up to 30 percent salvaged asphalt concrete (RAP) in the mixture.

RAP if used in the mixture shall be obtained from the cold milled material produced on this project, may be used without further quality testing and shall meet the following requirements:

Job mix formula tolerances for the RAP shall be ± 5% from the target value.

RAP shall be introduced into the drum and combined with the virgin aggregate so that the RAP does not come into direct contact with the burner flame. Asphalt binder shall be added to the mixture in the drum after the aggregates have been combined.

The RAP shall be crushed to provide a homogenous mixture of material so that the maximum particle size in the cold feed will not exceed 1 1/2 Inches (37.5mm).

The asphalt binder used in the mixture shall be PG 58-28, PG 64-22, or PG 64-28 or 64-34 Asphalt Binder.

SS-1h or CSS-1h Emulsified Asphalt for Tack and Flush Seal shall be applied at the rate of 0.05 gallons per square yard. The Flush Seal shall be 10' wide and cover the entire outside shoulder.

Sand for Flush Seal applied at the rate of 8 pounds per square yard.

All other requirements in the Standard Specifications for Asphalt Concrete Composite shall apply.

COLD MILLING ASPHALT CONCRETE

Cold Milling is estimated to produce 899.5 tons of salvaged asphalt concrete material. An estimated 269.9 tons of salvaged asphalt concrete may be used on this project in the Asphalt Concrete Composite mix. The remainder of the salvaged asphalt concrete material shall become the property of the Contractor.

TABLE OF ASPHALT SHOLDER RESURFACING (PCN i2K8)

MRM to	MRM	Shoulder	W	L	Cold Mill Asph. Conc.	Asph. Conc. Comp.
I-90, Eastbound			Ft	Ft	SqYd	Ton
37.063	37.228	Outside	4	871.2	387	43.0
37.486	38.711	Outside	4	6468.0	2875	319.4
37.063	38.711	Median	5	8701.4	4834	537.1
				Totals	8096	899.5

MAINTENANCE OF TRAFFIC

Traffic control shall be in accordance with MUTCD Standards, Standard Specifications and these plans.

Traffic shall 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 shall be repaired at no expense to the State.

Work activities shall only be during daylight hours. Daylight hours are considered to be ½ hour before sunrise until ½ hour after sunset.

Indiscriminate driving 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.

A maximum of 1 work zone in each direction shall be allowed.

The quantity of traffic control units paid shall be for the greatest number of signs in place at any one time per project (PCN), regardless of the number of set-ups on the project.

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

The bottom of all signs on portable or temporary supports shall not be less than seven feet above the pavement in urban areas and one foot above the pavement in rural areas. Portable sign supports may be used as long as the duration is less than 3 days. If the duration is more than 3 days, the signs shall be mounted on fixed supports during the time of initial installation, except portable sign supports will be allowed where surfacing prohibits installation.

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.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-451, 090W-451, & etc.	8	21

MAINTENANCE OF TRAFFIC (CONTINUED)

Storage of materials, vehicles and equipment shall be stored a minimum distance of 30' from the traveled way and preferable along the right of way line during nonworking hours. Contractor's employees should mobilize to the work site in a minimized number of vehicles. Parking for employees should be located outside the right-of-way.

All vehicles entering and exiting closed lanes of traffic shall display a flashing amber light visible from all directions at a minimum distance of ¼ mile.

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

When Standard Plate 634.63 is used Speed Limit 65 signs shall be installed after the ROAD WORK AHEAD signs at a distance of B/2, immediately after the manned work space, and as applicable on Interstate On Ramps. The FINES DOUBLED, SPEED ZONE AHEAD, and the SPEED LIMIT 45 signs shall be posted only during the hours when the associated work is actually being performed. The removal or covering of the signs is required when related work activity is curtailed for whatever reason. If the work activity is periodically moved or relocated within the project, the speed zone shall be moved with the related activity.

Temporary Pavement Marking (including taper and tangent) shown in the standard plates, and removal of the temporary pavement marking, shall be incidental to the contract unit price per lump sum for "Traffic Control Miscellaneous". Paint will not be allowed for Temporary Pavement Marking, and removal of the materials used for Temporary Pavement Marking shall be done in such a way as to not damage the surface of the concrete.

The Contractor shall have a traffic control person available 24 hours/day, 7 days/week to maintain traffic control devices. The name and cellular telephone number of this individual shall be given to the Engineer at the preconstruction meeting. All costs associated with this work shall be incidental to the contract unit price per lump sum for "Traffic Control, Miscellaneous".

The contractor or designated traffic control subcontractor shall make night inspections at the initial set up of traffic control and every week thereafter to ensure the adequacy, legibility and reflectivity of each sign and device. A written summary of each inspection shall be given to the Engineer within 24 hours after completion of the inspection. The cost for the nighttime inspection work shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

PRESS RELEASE ANNOUNCEMENTS

The DOT will prepare a Press Release to be released 48 hours prior to any work that affects traffic flow. The DOT will be responsible to keep law enforcement, emergency services, and the traveling public notified of changes in project access. The Contractor shall provide the Engineer with pertinent information 96 hours prior to any phase change or any other major change that affects traffic flow.

TABLE OF TRAFFIC CONTROL (I-90 E, PCN i2k8)

SIGN CODE	SIGN SIZE	DESCRIPTION	#	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
R2-1	24" x 30"	SPEED LIMIT ##	3	18	54
R2-6aP	24" x 18"	FINES DOUBLE	2	7	14
W3-5	48" x 48"	REDUCED SPEED LIMIT AHEAD	2	34	68
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W20-1	48" x 48"	ROAD WORK 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
*****		TYPE III BARRICADE - 8 FT. DOUBLE SIDED	8	56	448
TOTAL UNITS					856

TABLE OF TRAFFIC CONTROL (I-90 W, PCN i2k9)

SIGN CODE	SIGN SIZE	DESCRIPTION	#	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
R2-1	24" x 30"	SPEED LIMIT ##	3	18	54
R2-6aP	24" x 18"	FINES DOUBLE	2	7	14
W3-5	48" x 48"	REDUCED SPEED LIMIT AHEAD	2	34	68
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W20-1	48" x 48"	ROAD WORK 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
*****		TYPE III BARRICADE - 8 FT. DOUBLE SIDED	8	56	448
TOTAL UNITS					856

TABLE OF TRAFFIC CONTROL (US16B E, PCN i2LY)

SIGN CODE	SIGN SIZE	DESCRIPTION	#	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
R2-1	24" x 30"	SPEED LIMIT ##	3	18	54
R2-6aP	24" x 18"	FINES DOUBLE	2	7	14
W3-5	48" x 48"	REDUCED SPEED LIMIT AHEAD	2	34	68
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W20-1	48" x 48"	ROAD WORK 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
*****		TYPE III BARRICADE - 8 FT. DOUBLE SIDED	8	56	448
TOTAL UNITS					856

TABLE OF TRAFFIC CONTROL (SD79N, PCN i2LX)

SIGN CODE	SIGN SIZE	DESCRIPTION	#	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
R2-1	24" x 30"	SPEED LIMIT ##	3	18	54
R2-6aP	24" x 18"	FINES DOUBLE	2	7	14
W3-5	48" x 48"	REDUCED SPEED LIMIT AHEAD	2	34	68
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W20-1	48" x 48"	ROAD WORK 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
*****		TYPE III BARRICADE - 8 FT. DOUBLE SIDED	8	56	448
TOTAL UNITS					856

TEMPORARY PAVEMENT MARKING

Temporary pavement marking paint shall be used on the PCN i2k8 project. Temporary Road Markers shall be used for the temporary pavement markings on the other projects. Two tabs of appropriate color shall be used to mark the centerline and skip lines. The tabs shall be placed at the beginning of the skip line followed by another four feet into the skip line. The skip line shall match the existing 40 ft interval. A solid stripe will be represented by tabs at 5’ spacing. Temporary Road Markers shall be installed prior to opening completed sections to traffic.

The Contractor shall be responsible for maintaining visible and reflective lane lines throughout the project. Any marking covered or damaged shall be replaced prior to nightfall.

It is estimated that 1.55 miles (PCN i2k8), 122 feet (PCN i2k9), 60 feet (PCN i2LX) and 100 feet (PCN i2LY) of Temporary Pavement Marking will be required on the projects.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-451, 090W-451, & etc.	9	21

PERMANENT PAVEMENT MARKINGS

The location of the existing pavement marking shall be documented prior to removal, so that replacement can be at the existing location.

Application of permanent pavement marking shall be completed within 14 calendar days following completion of the pavement repair.

It is estimated that 1.55 miles (PCN i2k8), 122’ (PCN i2k9), 60’ (PCN i2LX), 100 feet (PCN i2LY) of 4” white and yellow pavement marking will be required on the projects.

RATES OF APPLICATION

- *Edgeline striping – 16.9 gallons per mile
- Glass beads – 8.0 pounds per gallon

*Rate is the Region average and is for one 4” edgeline.

PLOT SCALE - 1:150


PLOTTED FROM - TRRC11951

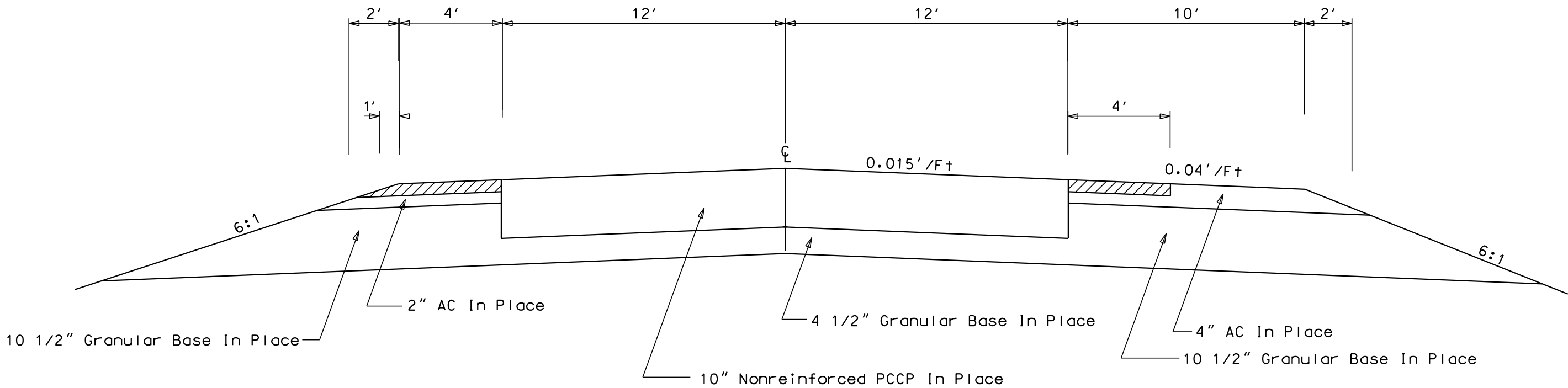
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-451, 090W-451, & etc.	10	21

Plotting Date: 05/14/2012

TYPICAL ASPHALT SHOULDER RESURFACING SECTION

I-90 Eastbound, MRM 37.06 to MRM 38.71

 2" Cold Milling
and Asphalt Concrete
Composite



PLOT NAME - 5

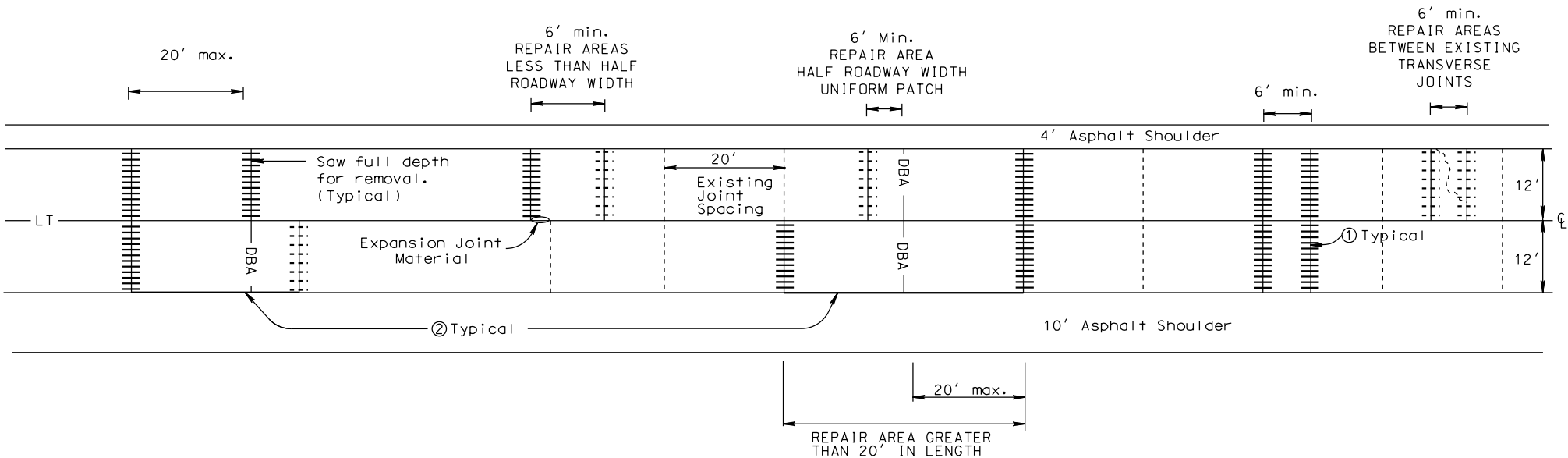
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STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-451, 090W-451, & etc.	11	21

Plotting Date: 04/24/2012

NONREINFORCED PCC PAVEMENT REPAIR

TYPICAL REPAIR AREAS



NOTES:

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

Legend:

- Drilled in 1 1/4 " x 18" epoxy coated plain round dowel bar
- - - Drilled in No. 9 x 18" epoxy coated deformed tie bars
- DBA Dowel Bar Assembly (for repair areas greater than 20' in length)
- L — Longitudinal Construction Joint Without Tie Bars (Keyway Joint)
- LT — Longitudinal Construction Joint With Tie Bars (Do not tie more than 48' width of pavement)

PLOT SCALE - 1:5

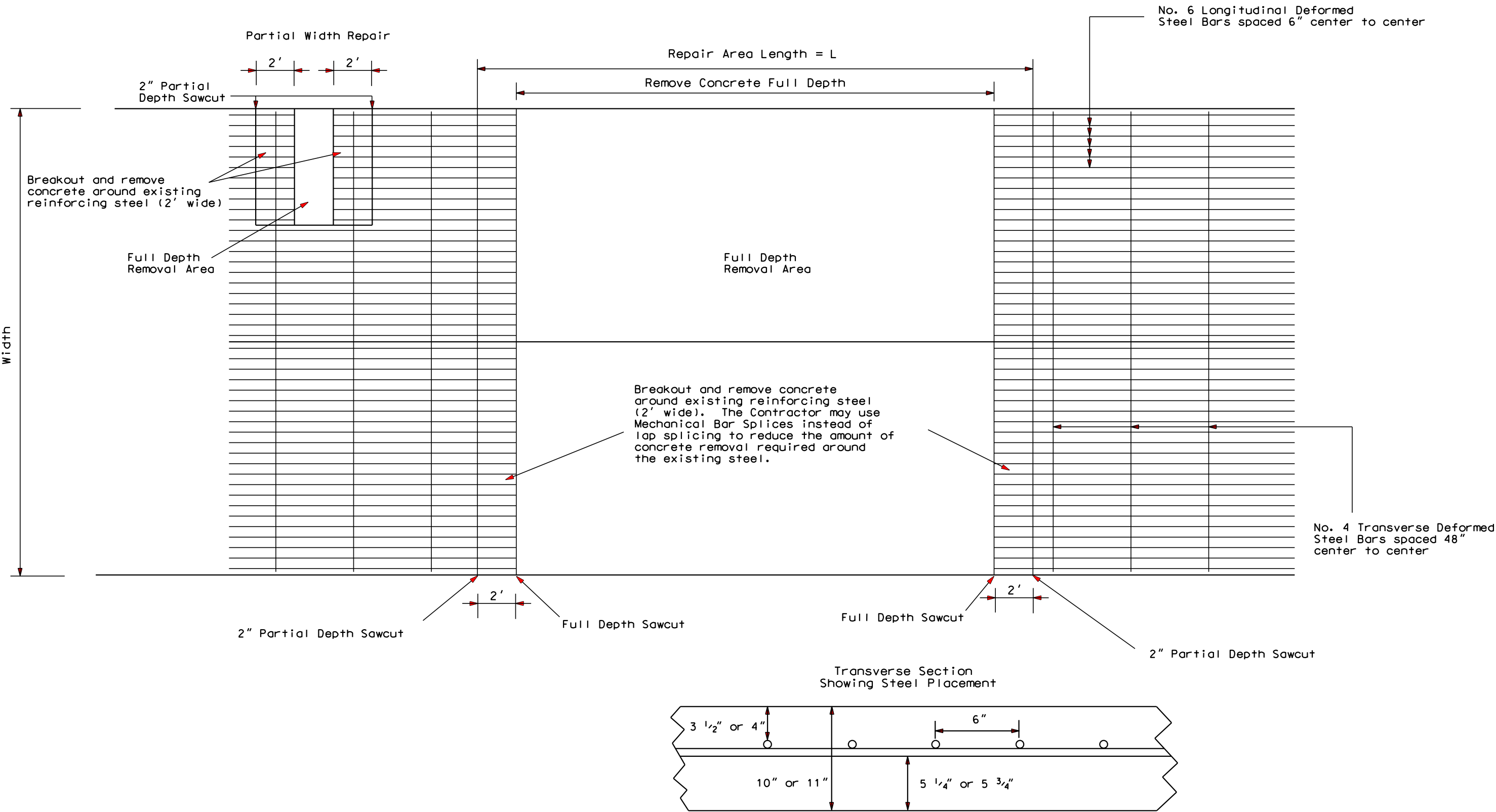
PLOTTED FROM - TRRC11951

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	090E-451, 090W-451, & etc.	12	21

Plotting Date: 04/24/2012

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

Existing Pavement and Removal Limits



PLOT NAME - 1

FILE - ... \RCCONCRETEPAV\RCREPAIR.DGN

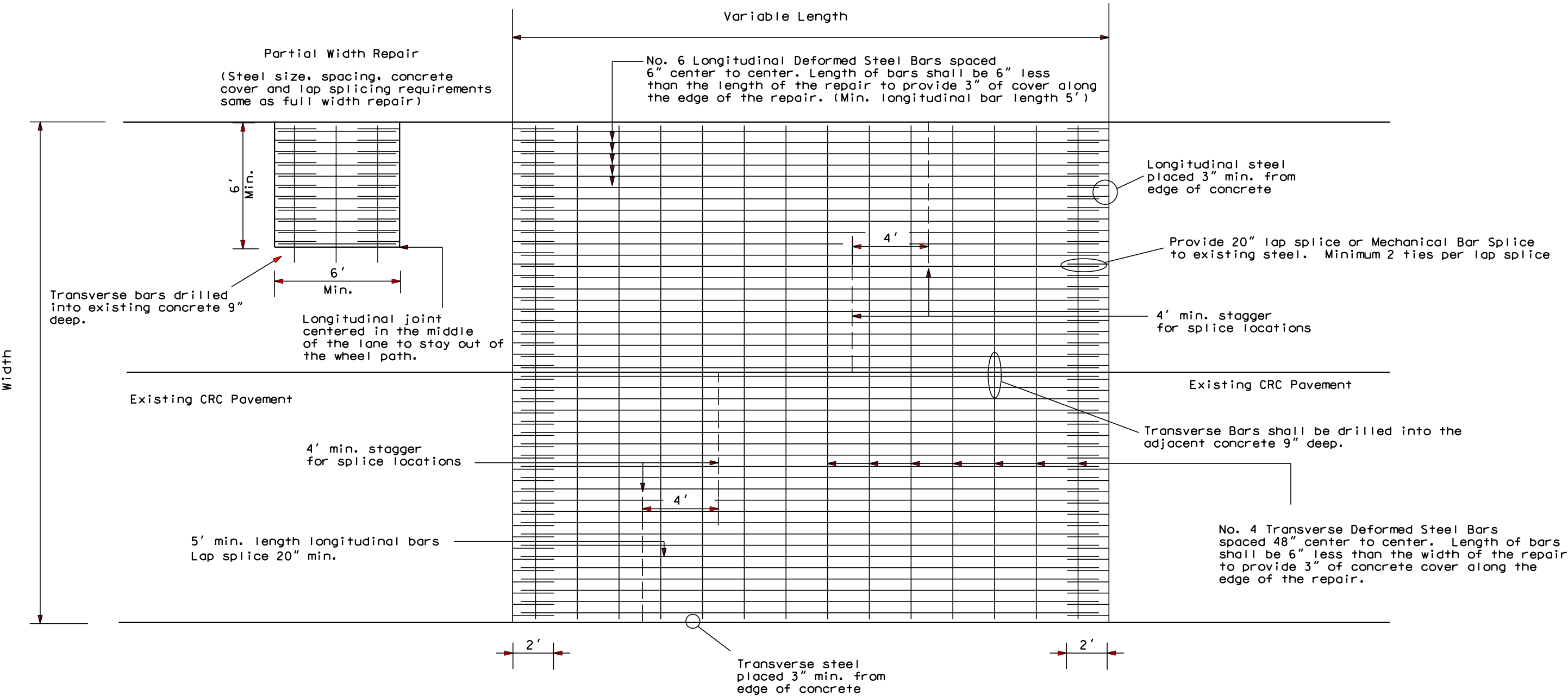
PLOT SCALE - 1+5

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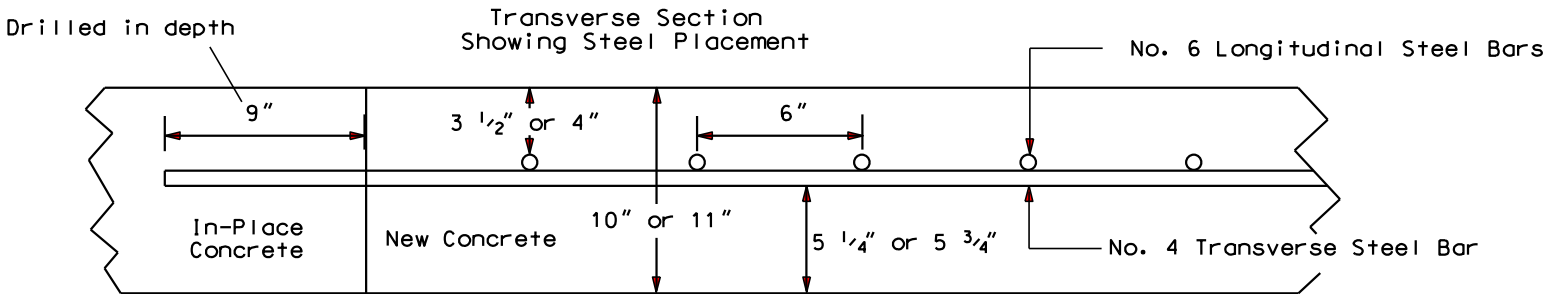
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	090E-451, 090W-451, & etc.	13	21

Plotting Date: 04/24/2012

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR



The transverse deformed steel bars shall be positioned on acceptable chairs.
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
Steel bars for concrete reinforcement shall meet the minimum requirements of Section 1010.1A of the Standard Specifications for Roads and Bridges.

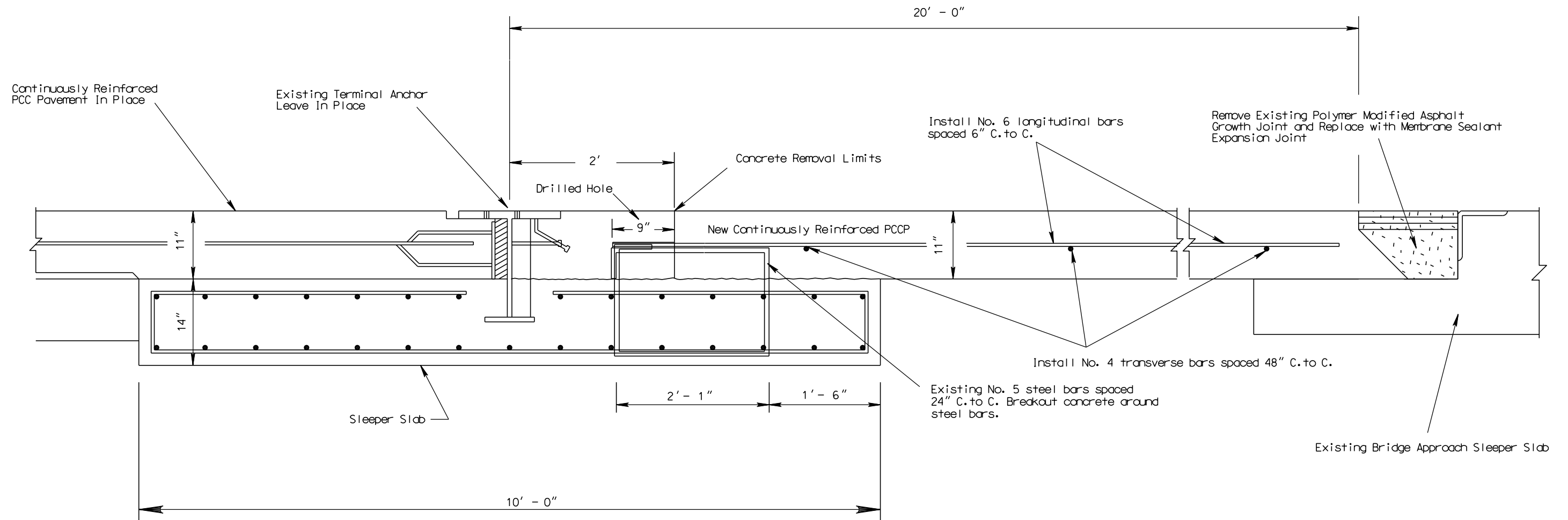


PLOT NAME - 2

FILE - ... \RCCONCRETE REPAIR\CRCREPAIR.DGN

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR ADJACENT TO TERMINAL ANCHOR

(I-90, MRM 26.7, Eastbound)



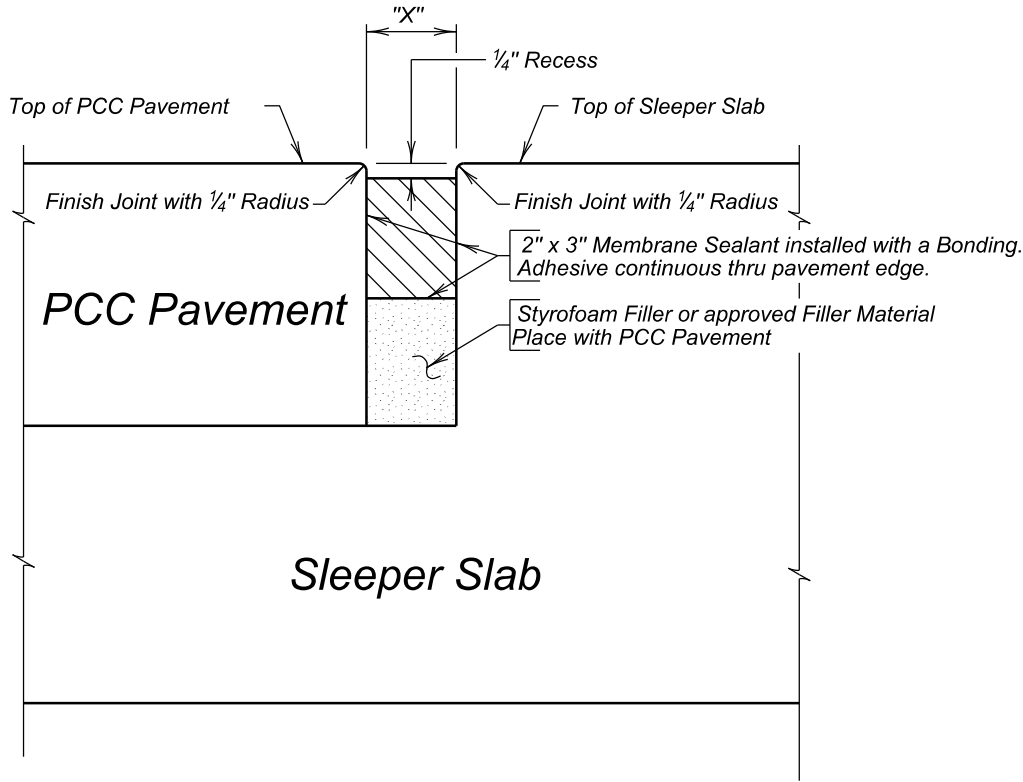
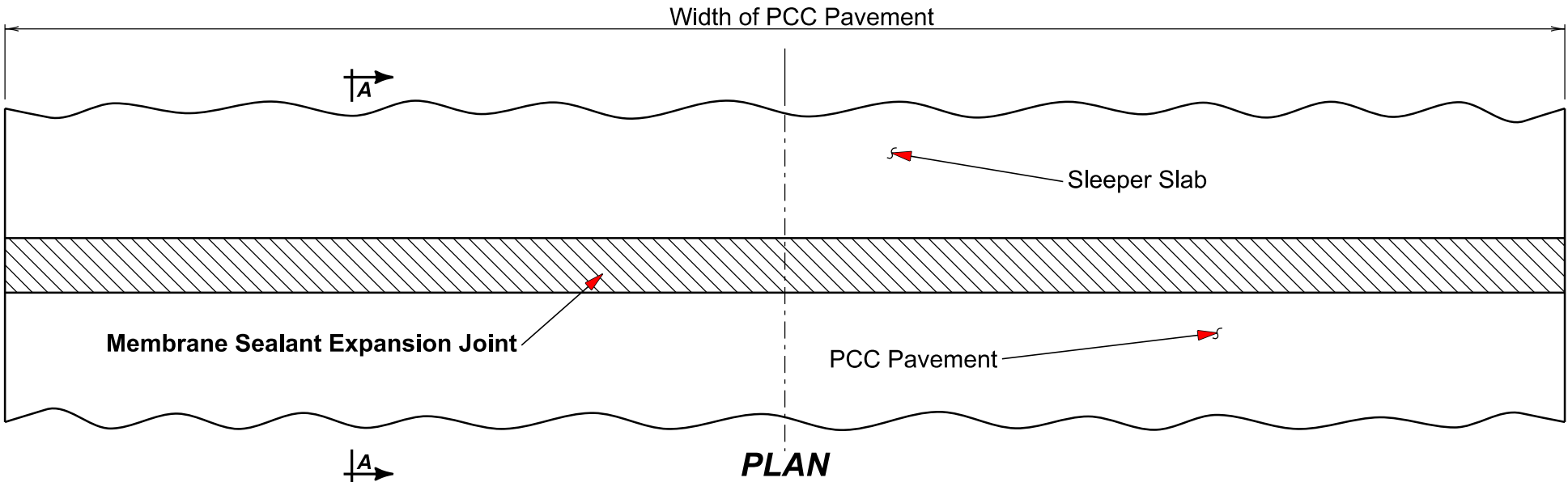
PLOT SCALE - 1:0.2

PLOTTED FROM - TRRC11951

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-451, 090W-451, & etc.	15	21

Plotting Date: 04/24/2012

MEMBRANE SEALANT EXPANSION JOINT
BETWEEN SLEEPER SLAB AND PCC PAVEMENT



TEMP.	DIMENSION "X"
40°	2
50°	1 7/8"
60°	1 13/16"
70°	1 3/4"
80°	1 5/8"
90°	1 9/16"
100°	1 7/16"

SECTION A - A

PLOT NAME - 4

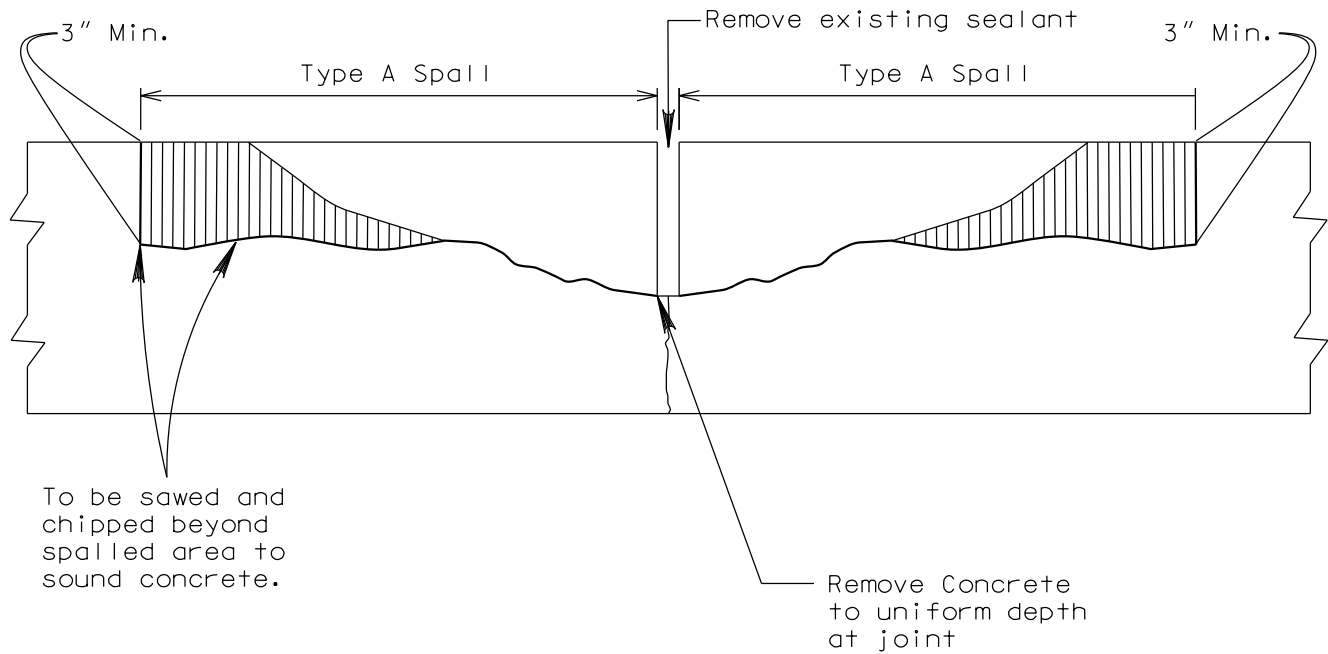
FILE - ... MEMBRANE SEALANT JOINT DETAILS.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	090E-451, 090W-451, & etc.	16	21

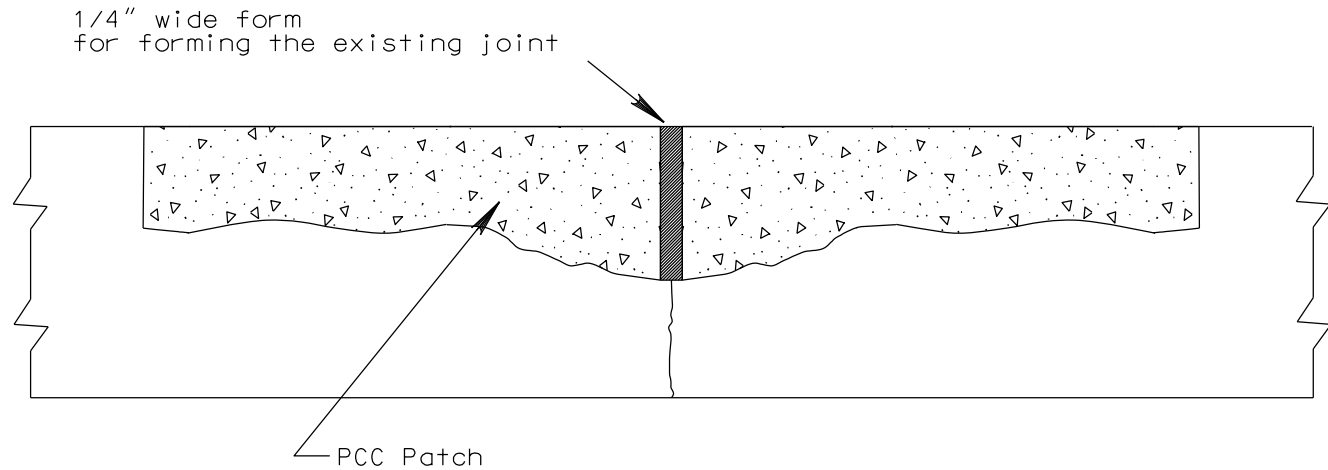
Plotting Date: 04/25/2012

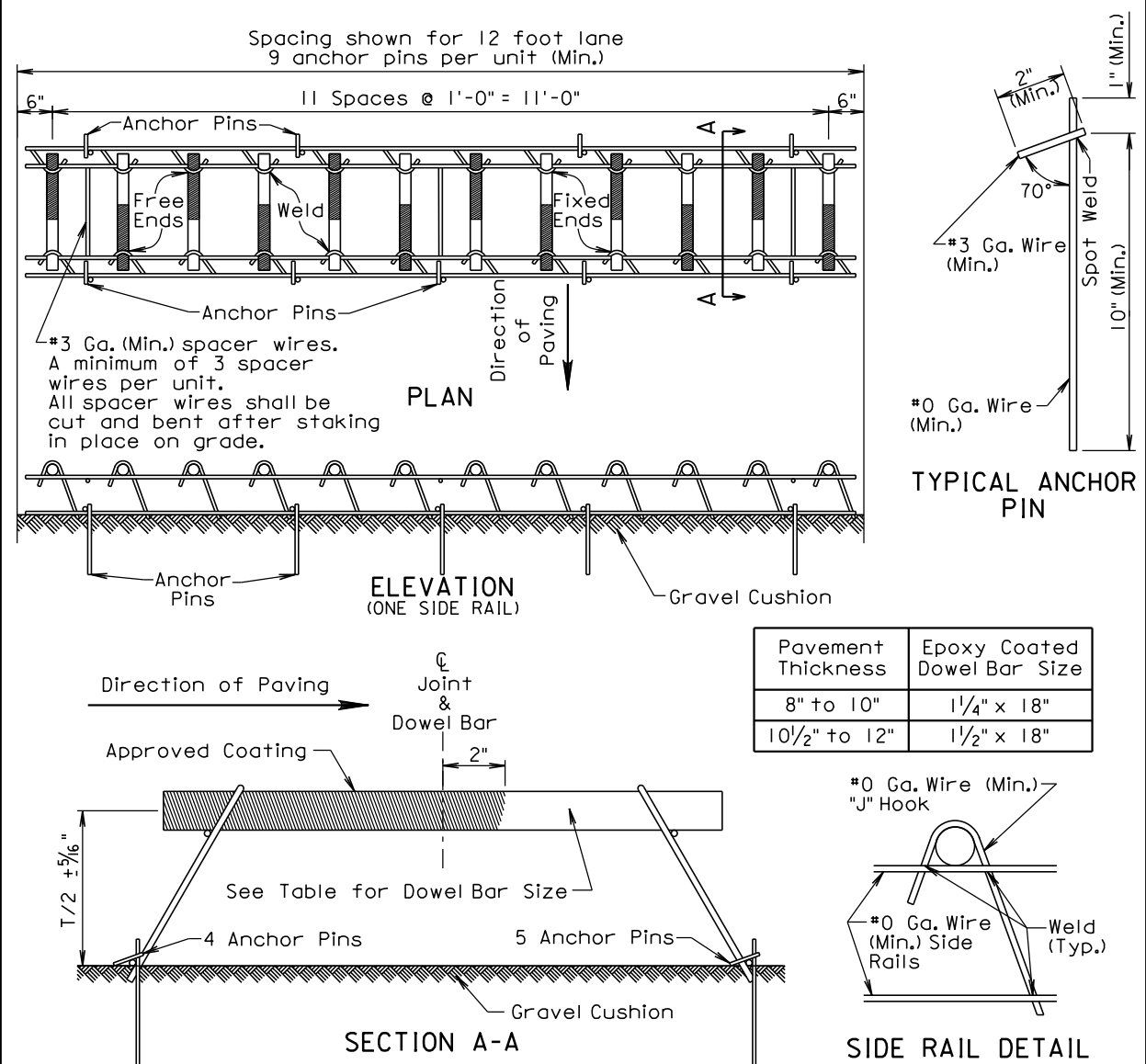
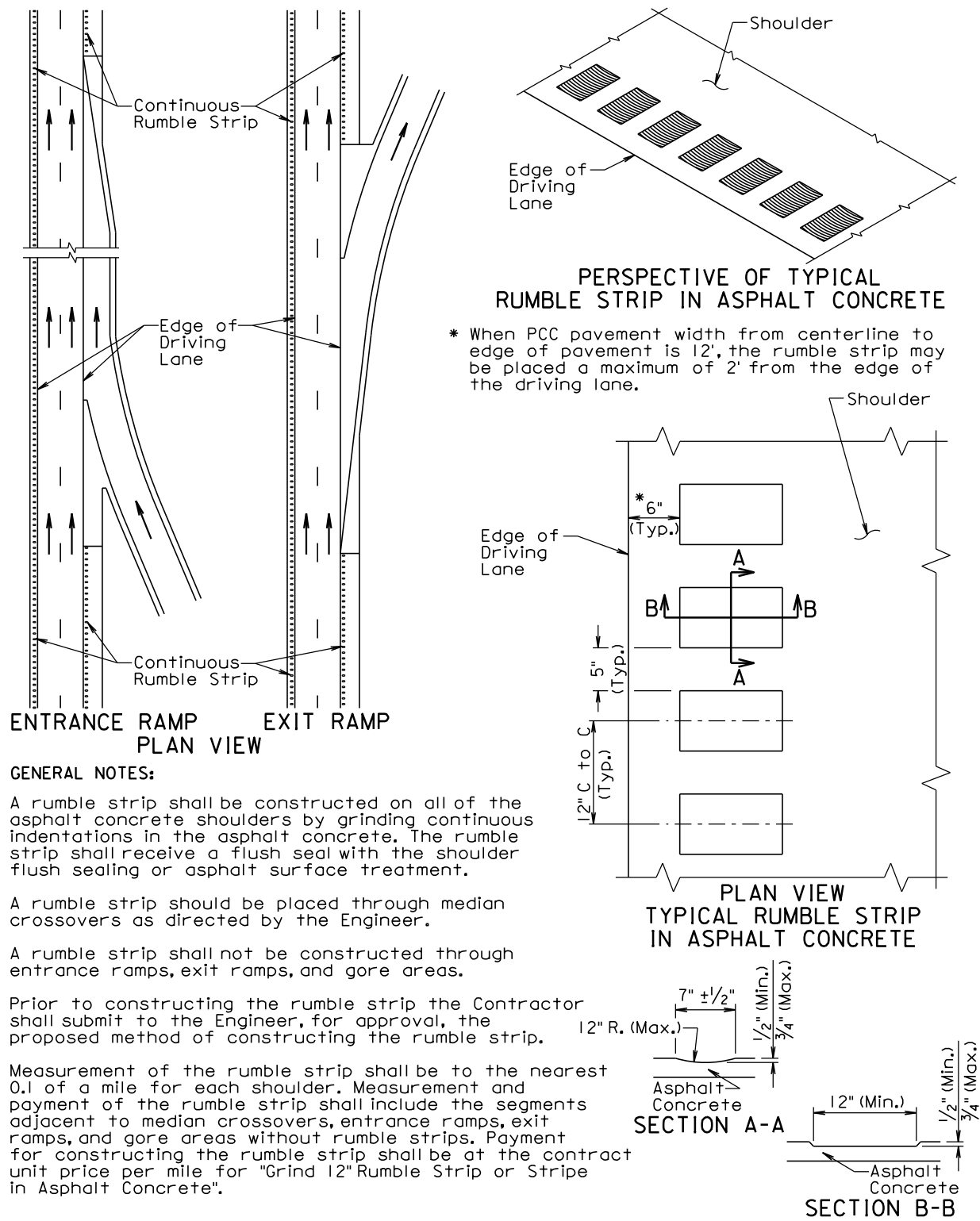
REPAIR OF TYPE A SPALLS

SPALL REMOVAL



SPALL PATCH





GENERAL NOTES:

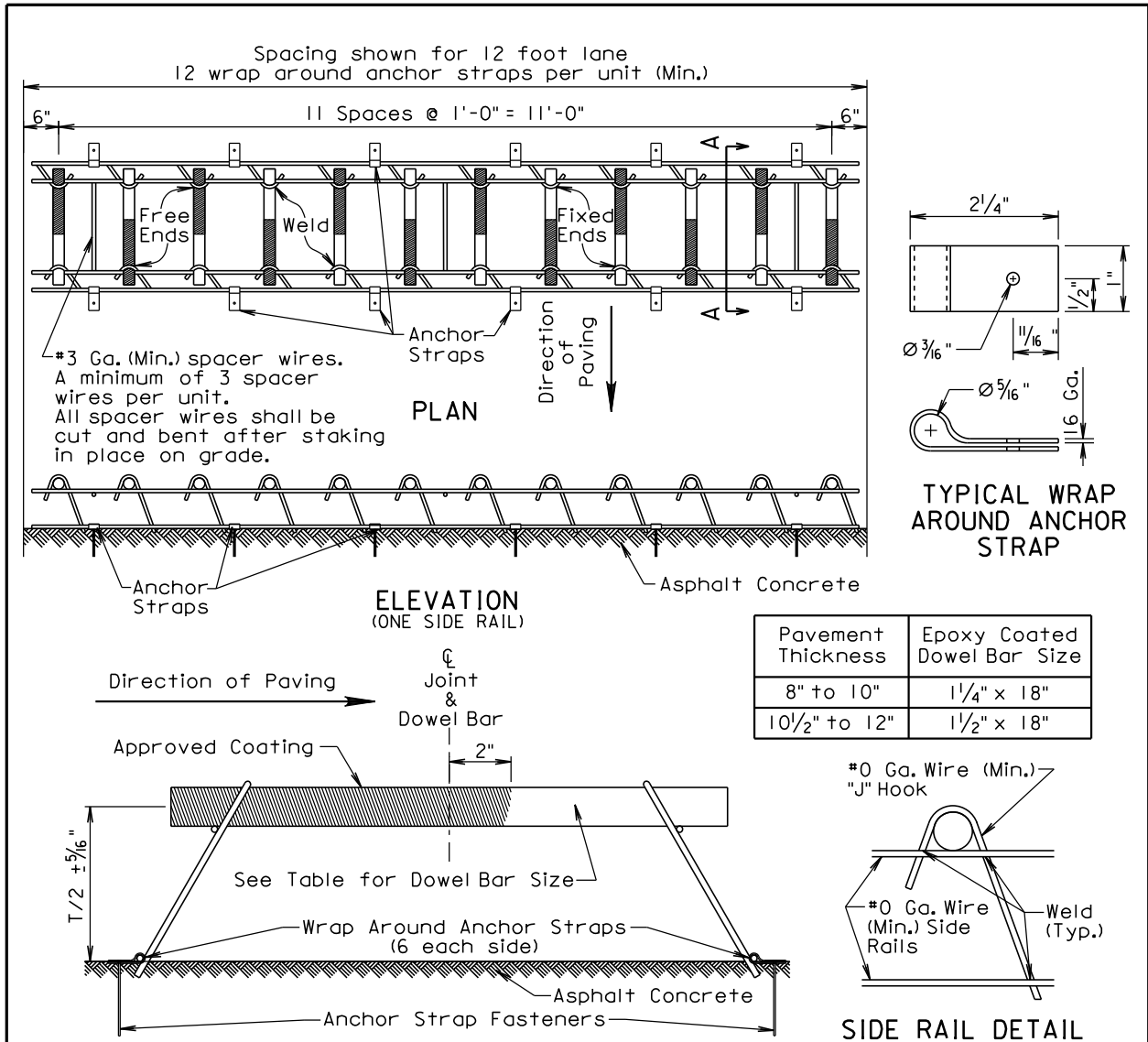
Longitudinal construction joint tie bars shall be placed a minimum of 15 inches from the transverse contraction joint.

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

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

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

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



GENERAL NOTES:

SECTION A-A

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

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

Centerline of individual dowel bars shall be parallel to the centerline of the roadway $\pm 1/2$ inch in 18 inches.

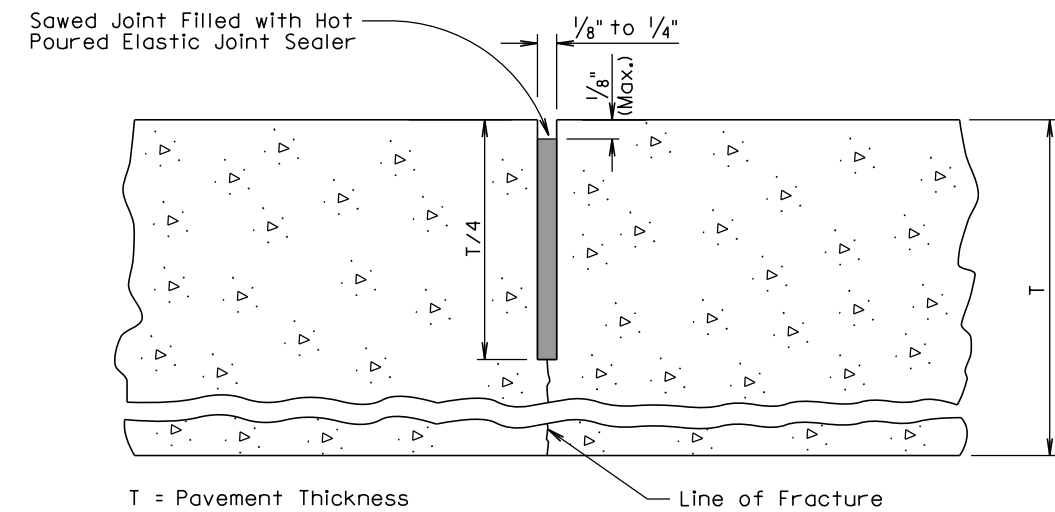
The transverse contraction joints shall be sawed perpendicular to the centerline of the roadway and the dowel bars shall be centered on the sawed joint ± 1 inch.

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

Appropriate strap fasteners shall be used to prevent movement of the dowel bar assemblies during the paving operation.

December 23, 2007

Published Date: 2nd Qtr. 2012	S D D O T	PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS	PLATE NUMBER 380.02
			Sheet 1 of 1



GENERAL NOTES:

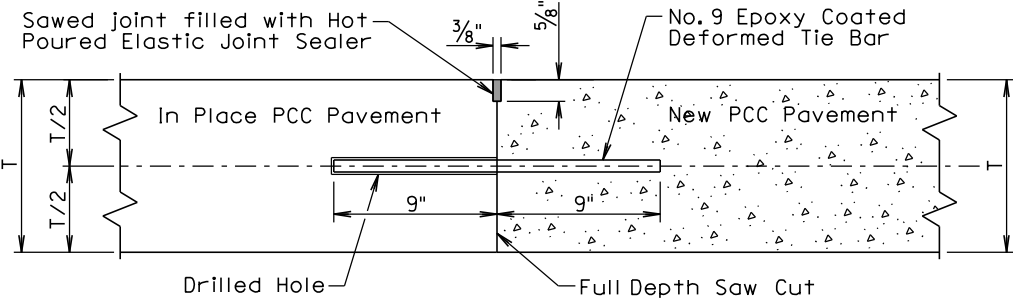
The saw cut to control cracking shall be a minimum of $1/4$ the thickness of the pavement.

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

December 23, 2007

Published Date: 2nd Qtr. 2012	S D D O T	PCC PAVEMENT TRANSVERSE CONTRACTION JOINT WITH OR WITHOUT DOWEL BAR ASSEMBLY	PLATE NUMBER 380.03
			Sheet 1 of 1

TRANSVERSE CONSTRUCTION JOINT WITH TIE BARS

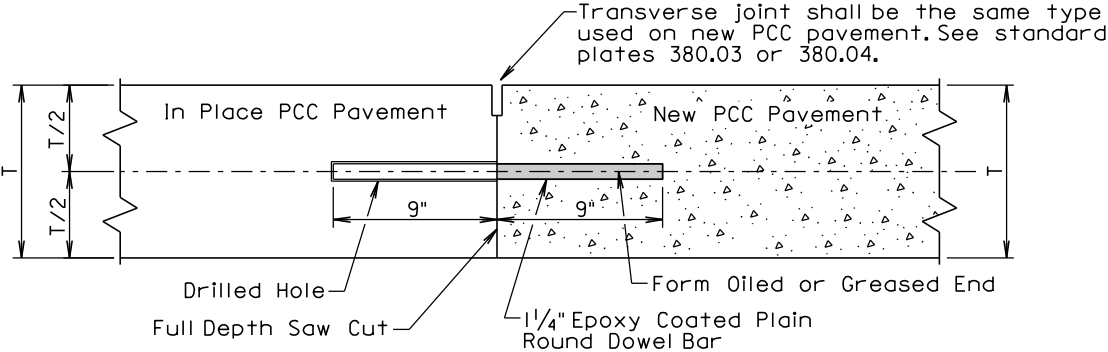


T = In Place PCC Pavement and New PCC Pavement Thickness

GENERAL NOTES:

- This detail shall be used when the transverse joint is less than 15 feet from the existing transverse contraction joint.
- The tie bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.
- No.9 epoxy coated deformed tie bars shall be spaced 18 inches center to center and shall be a minimum of 3 inches and a maximum of 9 inches from the pavement edges.
- The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.

TRANSVERSE CONSTRUCTION JOINT WITH DOWEL BARS



T = In Place PCC Pavement and New PCC Pavement Thickness

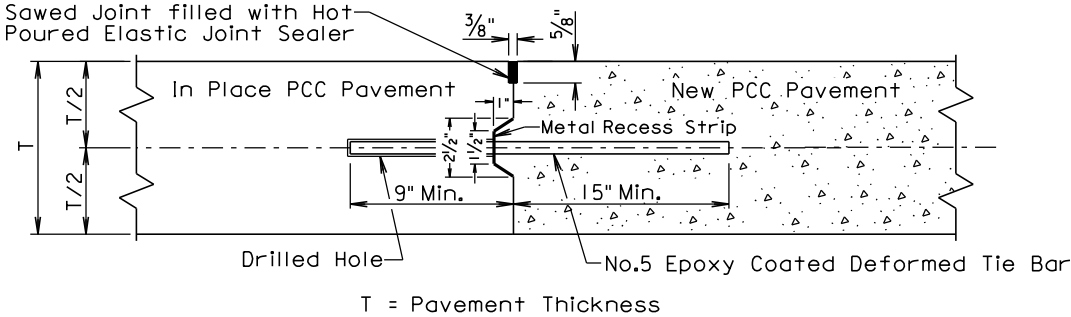
GENERAL NOTES:

- This detail shall be used when the transverse joint is 15 feet or greater from the existing transverse contraction joint.
- The plain round dowel bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.
- The 1 1/4 inch epoxy coated plain round dowel bars shall be spaced 12 inches center to center and shall be a minimum of 3 inches and a maximum of 6 inches from the pavement edges.
- The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project or current project.

September 6, 2006

Published Date: 2nd Qtr. 2012	S D D O T	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.06
			Sheet 1 of 1

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS
(DRILLED IN BARS)

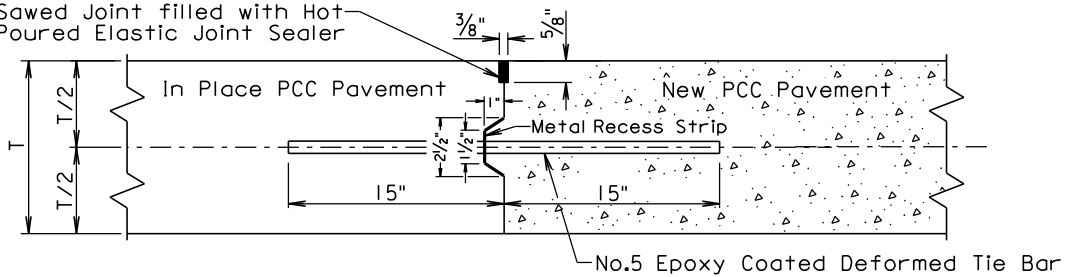


T = Pavement Thickness

GENERAL NOTES:

- The tie bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.
- No.5 epoxy coated deformed tie bars shall be spaced 48" center to center for a female keyway or 30" center to center for a vertical face and male keyway. The keyway shown above is a female keyway.
- The tie bars shall be placed a minimum of 15 inches from existing transverse contraction joints.
- The keyway is optional and is not required. When concrete pavement is formed and a keyway is provided, a metal recess strip shall be used. When concrete pavement is slip formed, a metal recess strip is not required.
- The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project or current project.

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS
(INSERTED OR FORMED IN BARS)



T = Pavement Thickness

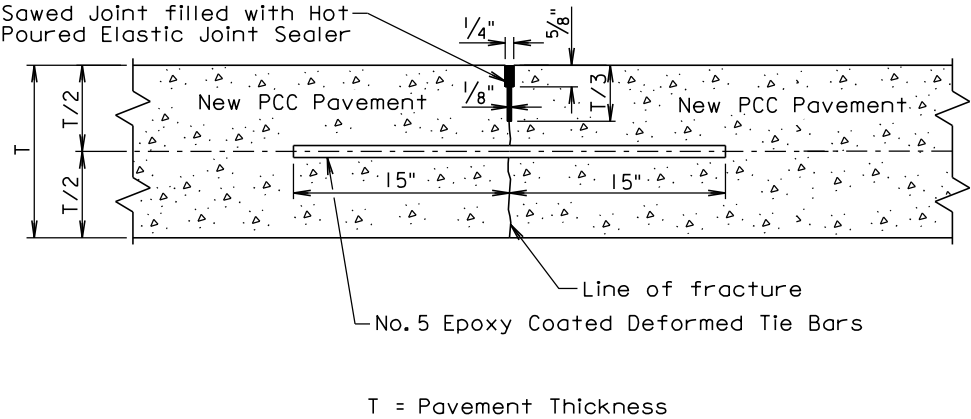
GENERAL NOTES:

- No.5 epoxy coated deformed tie bars shall be spaced 48" center to center for a female keyway or 30" center to center for a vertical face and male keyway. The keyway shown above is a female keyway.
- The tie bars shall be placed a minimum of 15 inches from existing transverse contraction joints.
- The keyway is optional and is not required. When concrete pavement is formed and a keyway is provided, a metal recess strip shall be used. When concrete pavement is slip formed, a metal recess strip is not required.
- The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on the current project.

September 14, 2001

Published Date: 2nd Qtr. 2012	S D D O T	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.10
			Sheet 1 of 2

SAWED LONGITUDINAL JOINT WITH TIE BARS
(POURED MONOLITHICALLY)



GENERAL NOTES:

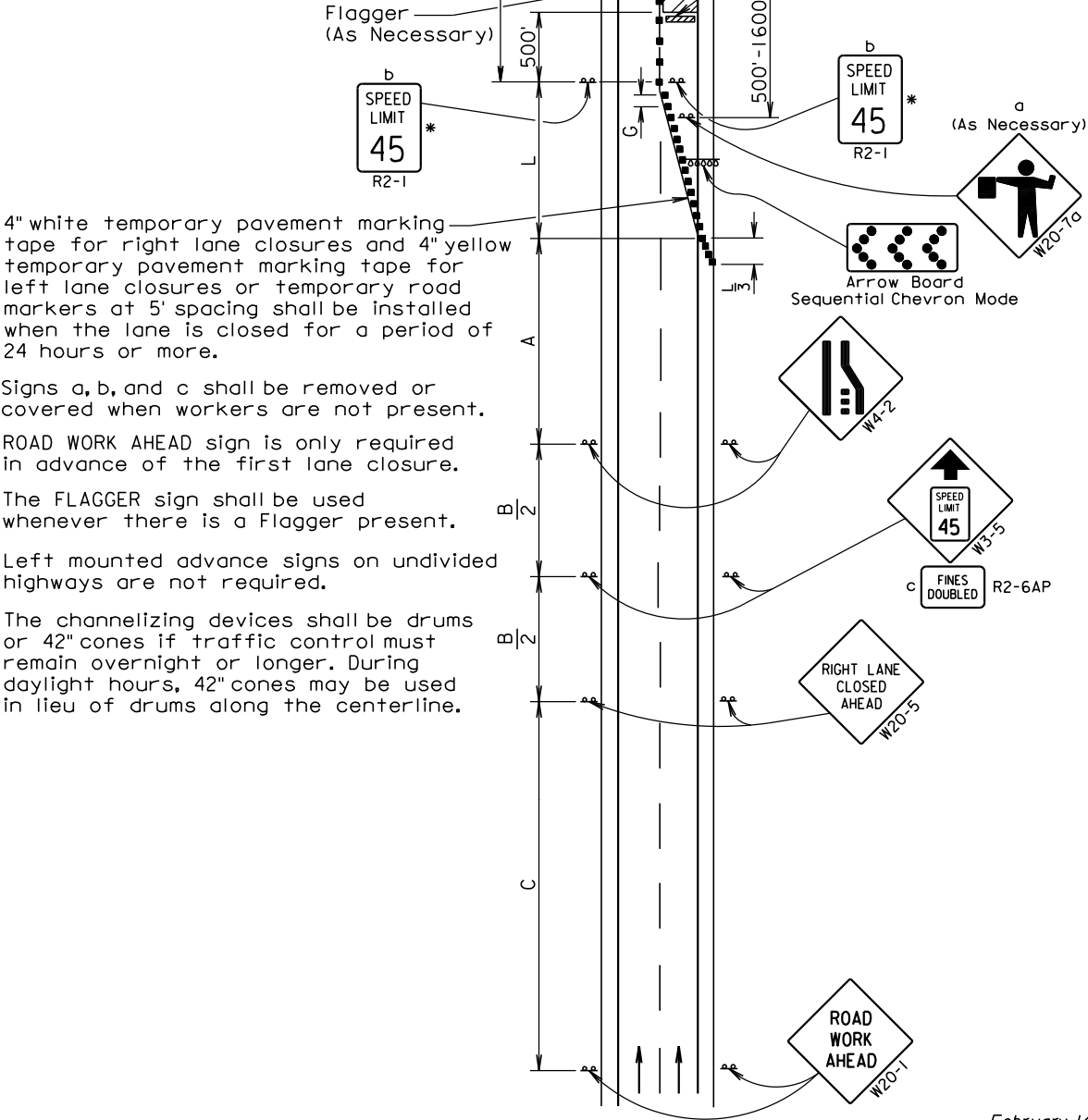
- No. 5 epoxy coated deformed tie bars shall be spaced 48 inches center to center.
- The tie bars shall be placed a minimum of 15 inches from the existing transverse contraction joints.
- The first saw cut to control cracking shall be a minimum of 1/3 the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the hot poured elastic joint sealer will be necessary.

September 14, 2001

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)	Spacing of Advanced Warning Signs (Feet) (ABC)
0 - 30	25	180	200
35 - 40	25	320	350
45 - 50	50	600	500
55	50	660	750
60 - 65	50	780	1000
70 - 75	50	900	1000 1500 2640

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.

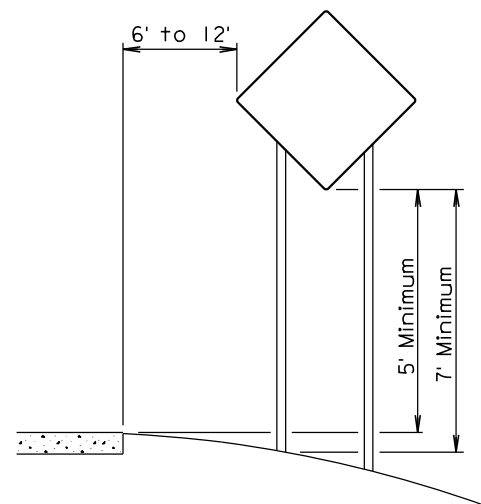
ROAD WORK AHEAD sign is only required in advance of the first lane closure.

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

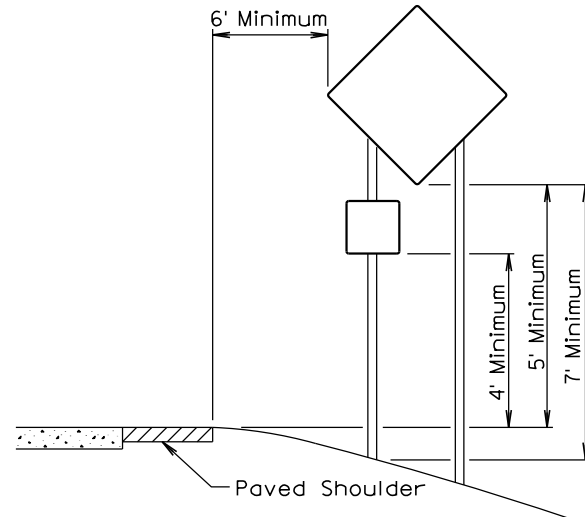
Left mounted advance signs on undivided highways are not required.

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

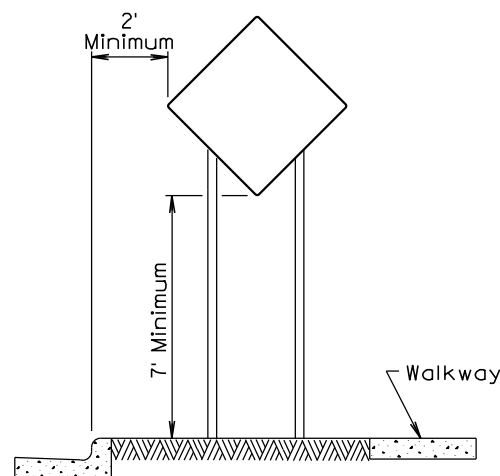
February 14, 2011



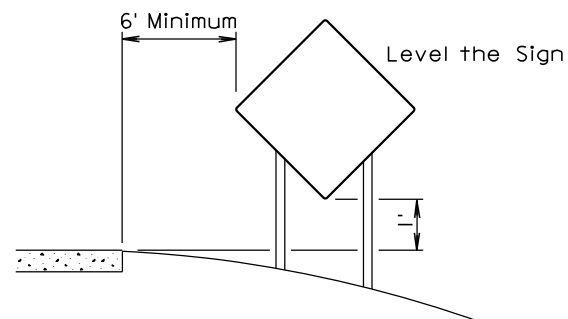
RURAL DISTRICT



RURAL DISTRICT WITH
SUPPLEMENTAL PLATE



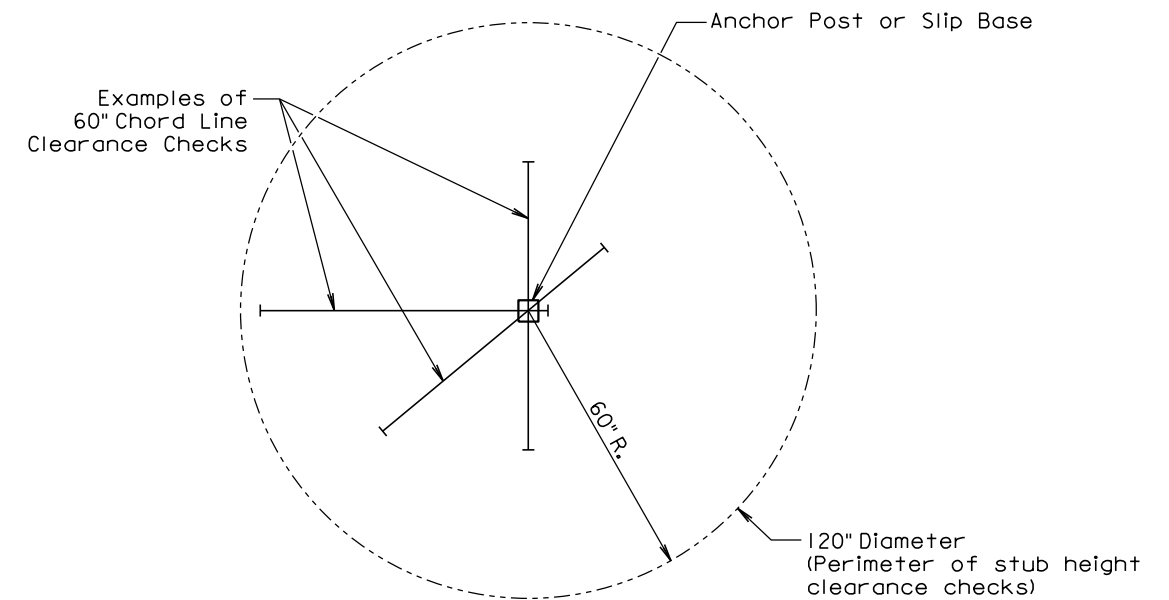
URBAN DISTRICT



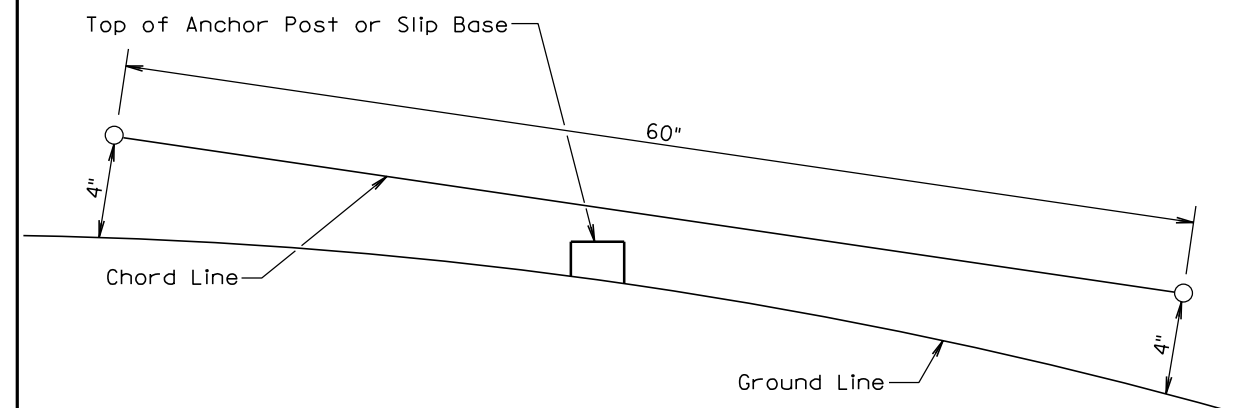
RURAL DISTRICT
3 DAY MAXIMUM

February 14, 2011

Published Date: 2nd Qtr. 2012	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 SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

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

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

July 1, 2005

Published Date: 2nd Qtr. 2012	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1