

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	1	29

Plotting Date: 02/24/2014

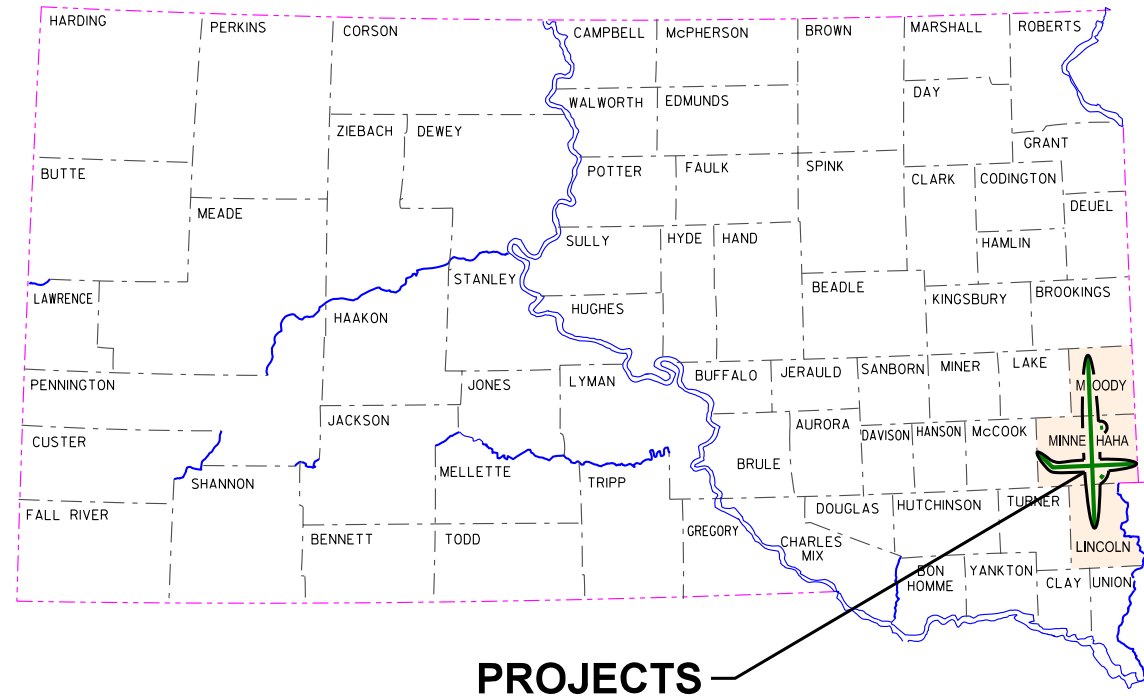
STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED
**029N-272, 029S-271, 029N-271,
029N-271, 090E-271, 229N-271,
229S-271 & 115-271**
**INTERSTATES 29, 90 & 229 &
SD HIGHWAY 115**
**MINNEHAHA, LINCOLN &
MOODY COUNTIES**

PCC & CRC PAVEMENT REPAIR - SIOUX FALLS AREAWIDE
PCN I38X, I38Y, I39A, I39C, I39D, I3AR, I3AT, & I3AU

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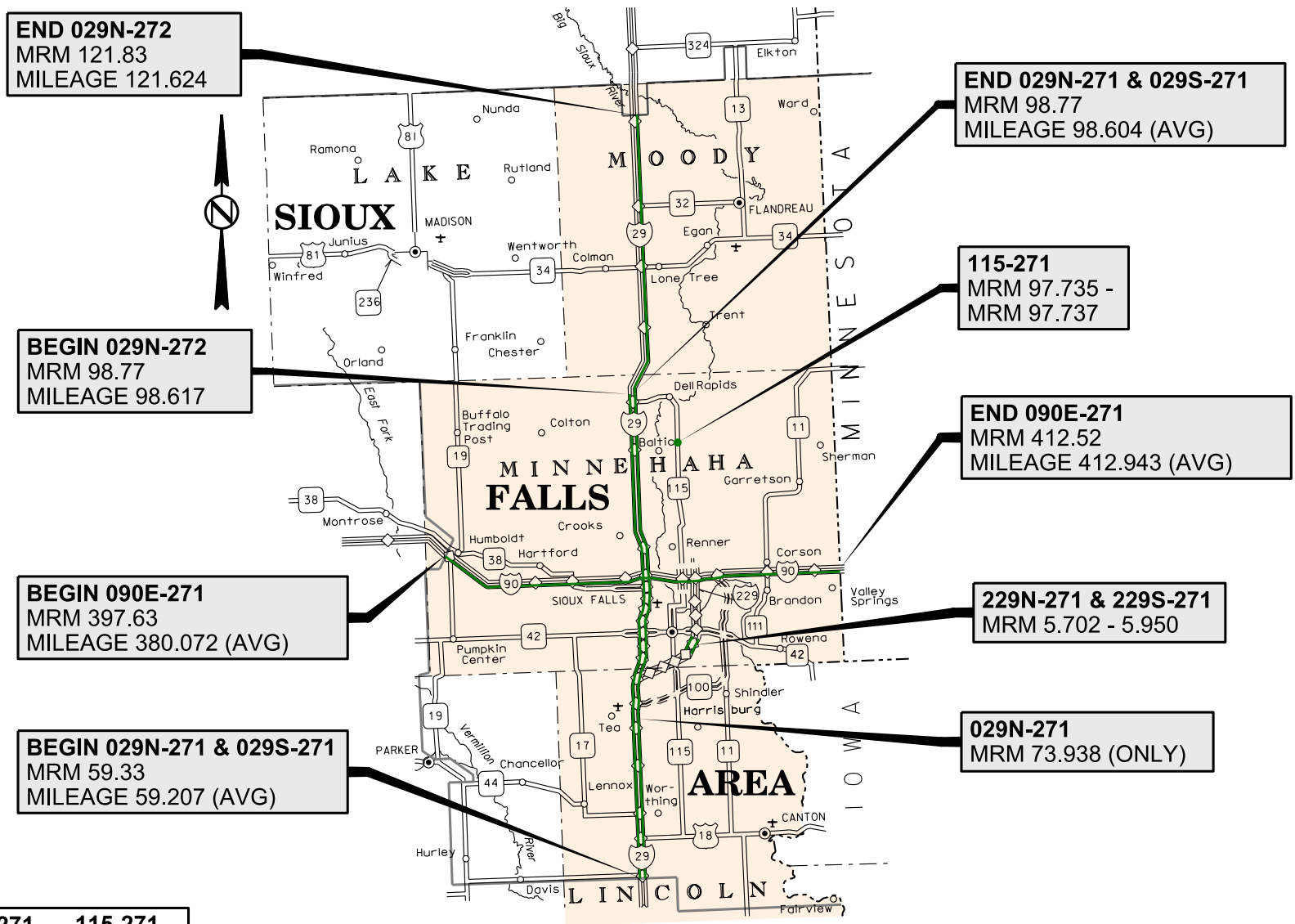
PROJECTS

PLOT SCALE - 1:60000

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STORM WATER PERMIT
(None required)

PROJECT	029N-272	029S-271	029N-271	090E-271	229N/S-271	115-271
ADT(2013)	6,699	13,440	13,397	7,745	33,680	4,161
ADT(2033)	7,771	22,640	22,521	11,728	51,934	6,350
DHV	894	2,594	2,580	1,407	5,972	717
D	51%	51%	51%	51%	100%	51%
T DHV	9.6%	8.9%	8.9%	7.5%	3.5%	2.5%
T ADT	21.1%	19.5%	19.5%	16.4%	7.8%	5.6%
V	75 MPH	65/75MPH	65/75 MPH	65/75 MPH	65 MPH	65 MPH

PROJECT LENGTHS	029N-272	029S-271 & 029N-271	090E-271	229N/S-271	115-271
Lengths:	23.007 Miles	39.397 Miles	32.871 Miles	0.241 Mile	0.002 Mile

ESTIMATE OF QUANTITIES

029N-272 PCN I38X

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	3.6	SqYd
380E5100	Continuously Reinforced PCC Pavement Repair	66.7	SqYd
380E6000	Dowel Bar	8	Each
380E6110	Insert Steel Bar in PCC Pavement	138	Each
633E1100	Epoxy Pavement Marking Paint, 4" White	6	Ft
633E1105	Epoxy Pavement Marking Paint, 4" Yellow	40	Ft
634E0010	Flagging	5	Hour
634E0100	Traffic Control	725	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	2,700	Ft

029S-271 PCN I38Y

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5100	Continuously Reinforced PCC Pavement Repair	94.0	SqYd
380E6110	Insert Steel Bar in PCC Pavement	130	Each
633E1100	Epoxy Pavement Marking Paint, 4" White	127	Ft
633E1105	Epoxy Pavement Marking Paint, 4" Yellow	8	Ft
634E0010	Flagging	5	Hour
634E0100	Traffic Control	1,230	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	4,500	Ft

029N-271 PCN I39A

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5100	Continuously Reinforced PCC Pavement Repair	8.1	SqYd
380E6110	Insert Steel Bar in PCC Pavement	6	Each
633E1100	Epoxy Pavement Marking Paint, 4" White	12	Ft
634E0010	Flagging	5	Hour
634E0100	Traffic Control	782	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	1,800	Ft

029N-271 PCN I39C

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	43.3	SqYd
380E5100	Continuously Reinforced PCC Pavement Repair	120.0	SqYd
380E6110	Insert Steel Bar in PCC Pavement	75	Each
633E1100	Epoxy Pavement Marking Paint, 4" White	113	Ft
634E0010	Flagging	5	Hour
634E0100	Traffic Control	647	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	900	Ft

ESTIMATE OF QUANTITIES (CONTINUED)

090E-271 PCN I39D

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	8.9	SqYd
380E5100	Continuously Reinforced PCC Pavement Repair	20.1	SqYd
380E6000	Dowel Bar	12	Each
380E6110	Insert Steel Bar in PCC Pavement	56	Each
633E1100	Epoxy Pavement Marking Paint, 4" White	30	Ft
634E0010	Flagging	5	Hour
634E0100	Traffic Control	1,319	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	1,800	Ft

229N-271 PCN I3AR

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	2.7	SqYd
380E6000	Dowel Bar	6	Each
380E6110	Insert Steel Bar in PCC Pavement	18	Each
380E6300	Reseal PCC Pavement Joint - Silicone	432	Ft
390E0200	Repair Type A Spall	8.0	SqFt
634E0010	Flagging	10	Hour
634E0100	Traffic Control	614	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	1,800	Ft

229S-271 PCN I3AT

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	48.0	SqYd
380E6000	Dowel Bar	36	Each
380E6110	Insert Steel Bar in PCC Pavement	160	Each
380E6300	Reseal PCC Pavement Joint - Silicone	360	Ft
634E0010	Flagging	10	Hour
634E0100	Traffic Control	614	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
634E0640	Temporary Pavement Marking	1,800	Ft

115-271 PCN I3AU

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	10.1	SqYd
380E6000	Dowel Bar	7	Each
380E6110	Insert Steel Bar in PCC Pavement	18	Each
634E0010	Flagging	10	Hour
634E0100	Traffic Control	428	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0640	Temporary Pavement Marking	2,144	Ft

SCOPE OF WORK

This project consists of full depth replacement of Nonreinforced and Continuously Reinforced Concrete (CRC) in areas where major failures have occurred. Full depth areas may vary in length and width, however the minimum length is 4 feet.

STURGIS MOTORCYCLE RALLY

Due to the Sturgis Motorcycle Rally, no lane closures will be allowed (except for emergency repair) in the:

- North or Westbound lanes from Wednesday, July 30 through Tuesday, August 5, 2014.
- South or Eastbound lanes from Thursday, August 7 through Monday, August 11, 2014.

TIMELY COMPLETION OF CONTRACT WORK

Upon installing a lane closure, the Contractor shall actively pursue completion without interruption or periods of downtime until all contract work within that lane closure has been completed.

HISTORICAL PRESERVATION OFFICE CLEARANCES

The following note must be included for all projects where there are earth disturbing activities at borrow sites, waste disposal sites, staging areas, or plant sites.

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 the DOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3268). 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.

GRAVEL CUSHION

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

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.

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

RESTORATION OF ASPHALT CONCRETE BOND BREAKER

An inspection of the asphalt concrete bond breaker is to 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 asphalt concrete material is required, the Contractor shall furnish, place and compact asphalt concrete to the satisfaction of the Engineer at no additional cost to the State.

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

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:

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. 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.

WASTE DISPOSAL SITE (CONTINUED)

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 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.

UTILITIES

The Contractor shall contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It shall be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

Utilities are not planned to be affected on this project. If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the Contractor shall contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

EXISTING PAVEMENT

The aggregate in the existing PCC Pavement is quartzite.

029 N-272 PCN I38X

The existing pavement is 8" continuously reinforced PCC Pavement. See CRC Detail sheets elsewhere in these plans for existing steel placement.

029 S-271 PCN I38Y

The existing pavement is 11" continuously reinforced PCC Pavement. See CRC Detail sheets elsewhere in these plans for existing steel placement.

029 N-271 PCN I39A & I39C

The existing pavement is 11" continuously reinforced PCC Pavement. See CRC Detail sheets elsewhere in these plans for existing steel placement.

090 E-271 PCN I39D

The existing pavement is 8" continuously reinforced PCC Pavement. See CRC Detail sheets elsewhere in these plans for existing steel placement.

A 1 to 3 inch layer of asphalt concrete bond breaker exists beneath the 8" CRC pavement. Beneath the bond breaker is 9" Nonreinforced PCC Pavement.

EXISTING PAVEMENT (CONTINUED)

229 N-271 PCN I3AR & 229 S-271 PCN I3AT

The existing pavement is 10" Nonreinforced PCC Pavement and 10.5" continuously reinforced PCC Pavement.

Existing contraction joints are spaced at approximately 20'. Longitudinal joints are reinforced with No. 5 x 30" deformed tie bars spaced 30" to 48" center to center. Transverse joints are reinforced with 1 1/4" x 18" plain round dowel bars spaced 12" center to center.

See CRC Detail sheets elsewhere in these plans for existing steel placement in the CRC pavement.

115-271 PCN I3AU

The existing pavement is 8" Nonreinforced PCC Pavement.

Existing contraction joints are spaced at approximately 20'. Longitudinal joints are reinforced with No. 5 x 30" deformed tie bars spaced 30" to 48" center to center. Transverse joints are reinforced with 1 1/4" x 18" plain round dowel bars spaced 12" center to center.

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. Where repair crosses both lanes, the passing lane should be repaired first.

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 and shall be made to a depth just above the in place reinforcing steel (4"+ in Lincoln County and 3"+ in Minnehaha and Moody Counties), and be placed outside of the previous full depth saw cuts. The outside cuts shall be a minimum of 6" from the nearest tight crack outside of the patch.

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 the 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.

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

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.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	4	29

**CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR
(CONTINUED)**

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 a non-shrinkage mortar mix at the Contractor's expense.

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

New pavement thickness shall be equal to existing pavement thickness (11" in Lincoln County and 8" in Minnehaha and Moody Counties).

Concrete shall meet the requirements of the Standard Specifications Section 380, except as modified by the following notes:

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

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air. The concrete mix shall contain a minimum of 50% coarse aggregate by weight. Coarse aggregate shall be crushed ledge rock, Size No. 1 unless an alternative gradation is approved by the Concrete Engineer. The concrete mix shall contain at least 650 lbs. of Type I or II cement or 600 lbs. of Type III cement per cubic yard. The minimum 28 day compressive strength 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.

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 a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60° F or higher throughout the cure period. If the concrete temperature falls below 60° F, the cure time 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 4,000 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. Insulation blanket shall be overlapped on to the existing concrete by 4'.

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

EXISTING PCC PAVEMENT

Existing contraction joints are 20'. Longitudinal joints are reinforced with No. 5 x 30" deformed tie bars spaced 48" center to center. Transverse joints are reinforced with 1¼" x 18" plain round dowel bars spaced 12" center to center.

The aggregate in the existing 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.

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

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/steel bars shall be sawed off and removed.

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

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

At repair locations where the new working joint is not opposite the existing working joint, the Contractor shall place a ¼" preformed asphalt expansion joint material along the longitudinal joint from the existing working joint to the new working joint. The expansion joint material 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

For existing pavement thickness greater than or equal to 8.5" (T >= 8.5"):
New pavement thickness shall equal existing pavement thickness (T_N = T).

For existing pavement thickness less than 8.5" (T < 8.5"):
New pavement thickness shall equal existing pavement thickness + 1" (T_N = T+1").

Concrete shall meet the requirements of the Standard Specifications Section 380, except as modified by the following notes:

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

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air. The concrete mix shall contain a minimum of 50% coarse aggregate by weight. Coarse aggregate shall be crushed ledge rock, Size No. 1 unless an alternative gradation is approved by the Concrete Engineer. The concrete mix shall contain at least 650 lbs. of Type I or II cement or 600 lbs. of Type III cement per cubic yard. The minimum 28 day compressive strength 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.

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 a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60° F or higher throughout the cure period. If the concrete temperature falls below 60° F, the cure time 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 4,000 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. Insulation blanket shall be overlapped on to the existing concrete by 4'.

NONREINFORCED PCC PAVEMENT REPAIR (CONTINUED)

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

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 4000 psi is attained. Insulation blanket shall be overlapped on to the existing concrete by 4'. The initial contraction joint sawing shall be performed as soon as practical after placement to avoid random cracking.

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

REINFORCING STEEL

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

1. New No. 6 longitudinal bars shall be lap spliced with the preserved in place longitudinal bars.
2. At full lane width repair areas, additional No. 6 longitudinal bars shall be centered between every other set of two spliced longitudinal bars throughout the width of the repair area. The additional longitudinal bars shall overlap into the existing concrete 9" on both sides of the repair area. Drilled holes will be required and the additional longitudinal bars shall be inserted in accordance with the notes for STEEL BAR INSERTION. The additional longitudinal bars shall then be lap spliced.
3. Additional No. 4 transverse bars shall be centered between the in place transverse bars throughout the length of the repair area. The spacing of transverse bars in the completed repair area should be half the spacing of the in place transverse reinforcing steel (New spacing will be 1.5' or 2').
 - For less than full lane width repair areas and repair areas adjacent to tied longitudinal joints, the additional transverse bars shall overlap into the existing concrete 9". Drilled holes will be required and the additional transverse bars shall be inserted according to the notes for STEEL BAR INSERTION.
 - For full roadway width repair areas, a keyway with factory bent No. 4 lap spliced transverse bars shall be constructed in the longitudinal joint to tie to the transverse bars that will be placed in the adjacent lane.

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

STEEL BAR INSERTION - CONTINUOUSLY REINFORCED PCC PAVEMENT (CRCP)

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

Longitudinal deformed tie bars shall be inserted 9 inches into the in place concrete at the transverse joint and centered between every other set of two spliced longitudinal bars throughout the width of the repair area. Transverse deformed tie bars shall be inserted 9 inches into the in place concrete at the longitudinal joint throughout the length of the repair area. Refer to the notes for REINFORCING STEEL. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole.

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).

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 (Exception: In the transverse joints, the drilled in longitudinal steel bar angle will be slightly under 90° to allow for centering of the lap splice between existing longitudinal steel).

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 steel bar insertion. 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 of the bars by the dipping method will not be allowed. The epoxy shall start to gel before placing fresh concrete or as per manufacturer's recommendations if given.

Cost for steel bars shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

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

SAW AND SEAL LONGITUDINAL JOINTS (CRCP)

Longitudinal joints (in line with existing longitudinal 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 traces of dust.

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

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

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

STEEL BAR INSERTION – NONREINFORCED PCC PAVEMENT (NRCP)

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

For existing pavement thickness greater than or equal to 10.5" (T >= 10.5"):

The Contractor shall insert the steel bars (1½" x 18" epoxy coated plain round dowel bars and No. 11 x 18" epoxy coated deformed tie bars for transverse joints and No. 5 x 24" epoxy coated deformed tie bars for longitudinal joints) into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole.

For existing pavement thickness greater than or equal to 8.5" and & less than 10.5" (T >= 8.5" and T < 10.5"):

The Contractor 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.

For existing pavement thickness less than 8.5" (T < 8.5"):

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.

Plain round dowel 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 edge of the slab closest to centerline. 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). It will be necessary to laterally adjust the location of some of the inserted steel bars when the dimensions above interfere with existing steel bar locations.

STEEL BAR INSERTION – (NRCP) (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. The epoxy shall start to gel before placing fresh concrete or as per manufacturer's recommendations if given.

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 – (NRCP)

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 traces of dust.

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

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 price per square yard for Nonreinforced PCC Pavement Repair.

TEMPORARY PAVEMENT MARKING

Temporary pavement marking on lane closure tapers shall consist of Raised Pavement Markers. (Estimate 13 workspaces with 900' tapers on Interstates 29 and 90.)

Temporary pavement marking on centerline shall consist of Raised Pavement Markers.

Cost shall be included in the contract unit price per foot for Temporary Pavement Marking.

PERMANENT PAVEMENT MARKING

The Contractor shall apply all epoxy pavement markings upon completion of all pavement repairs in accordance with the special provision for epoxy pavement markings.

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 or MASH 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 two workspaces on a four-lane highway. 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 reflectorized cones (42" minimum height) or two reflectorized drums. In areas containing numerous concrete repair locations, two reflectorized drums should be installed at a spacing of 660' alternating with the Type III Barricades.

Signs may be mounted on portable supports.

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

Holes in the gravel and asphalt concrete shoulders created during removal and replacement of PCC Pavement Repair areas shall be filled with gravel and hot-mix asphalt concrete (to match the shoulder surfacing) prior to opening the lane to traffic.

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

Routing traffic onto the 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 apparent routing of traffic onto these shoulders around the work zones.

Extra care shall be taken to protect the in place asphalt concrete shoulders. In all workspaces 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.

Lane closures shall be limited to 3 miles in length. The distance between the closest points of any two-lane closures, excluding taper, shall not be less than 3 miles.

Work activities shall not be conducted simultaneously on the median and outside shoulders of the same directional set of lanes.

The use of interstate maintenance crossovers will not be permitted.

Traffic will be permitted on the ramp shoulders when necessary to allow traffic around a workspace.

ITEMIZED LIST OF TRAFFIC CONTROL

029 N-272 PCN I38X

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	48" x 24"	END ROAD WORK	1	24	24
R2-1	48" x 60"	SPEED LIMIT 45	2	38	76
R2-1	48" x 60"	SPEED LIMIT 75	1	38	38
W3-5	48" x 48"	SPEED REDUCTION (45 MPH)	2	34	68
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W5-4	48" x 48"	RAMP NARROWS	1	34	34
W13-1P	30" x 30"	ADVISORY SPEED PLAQUE	1	21	21
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
W20-7	48" x 48"	FLAGGER	1	34	34
R2-6aP	48" x 36"	FINES DOUBLE PLAQUE	2	29	58
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	3	56	168
TOTAL UNITS					725

029 N-271 PCN I39C

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	48" x 24"	END ROAD WORK	1	24	24
R2-1	48" x 60"	SPEED LIMIT 45	2	38	76
R2-1	48" x 60"	SPEED LIMIT 75	1	38	38
W3-5	48" x 48"	SPEED REDUCTION (45 MPH)	2	34	68
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W5-4	48" x 48"	RAMP NARROWS	1	34	34
W13-1P	30" x 30"	ADVISORY SPEED PLAQUE	1	21	21
W20-1	48" x 48"	ROAD WORK AHEAD	3	34	102
W20-5	48" x 48"	LT. OR RT. LANE CLOSED AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	1	34	34
R2-6aP	48" x 36"	FINES DOUBLE PLAQUE	2	29	58
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	1	56	56
TOTAL UNITS					647

029 S-271 PCN I38Y

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	48" x 24"	END ROAD WORK	1	24	24
R2-1	48" x 60"	SPEED LIMIT 45	2	38	76
R2-1	48" x 60"	SPEED LIMIT 75	1	38	38
W3-5	48" x 48"	SPEED REDUCTION (45 MPH)	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
W20-7	48" x 48"	FLAGGER	1	34	34
R2-6aP	48" x 36"	FINES DOUBLE PLAQUE	2	29	58
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	13	56	728
TOTAL UNITS					1230

090 E-271 PCN I39D

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	48" x 24"	END ROAD WORK	1	24	24
R2-1	48" x 60"	SPEED LIMIT 45	2	38	76
R2-1	48" x 60"	SPEED LIMIT 75	1	38	38
W3-5	48" x 48"	SPEED REDUCTION (45 MPH)	2	34	68
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W5-4	48" x 48"	RAMP NARROWS	1	34	34
W13-1P	30" x 30"	ADVISORY SPEED PLAQUE	1	21	21
W20-1	48" x 48"	ROAD WORK AHEAD	3	34	102
W20-5	48" x 48"	LT. OR RT. LANE CLOSED AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	1	34	34
R2-6aP	48" x 36"	FINES DOUBLE PLAQUE	2	29	58
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	13	56	728
TOTAL UNITS					1319

029 N-271 PCN I39A

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	48" x 24"	END ROAD WORK	1	24	24
R2-1	48" x 60"	SPEED LIMIT 45	2	38	76
R2-1	48" x 60"	SPEED LIMIT 75	1	38	38
W3-5	48" x 48"	SPEED REDUCTION (45 MPH)	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
R2-6aP	48" x 36"	FINES DOUBLE PLAQUE	2	29	58
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	5	56	280
TOTAL UNITS					782

ITEMIZED LIST OF TRAFFIC CONTROL (CONTINUED)

229 N-271 PCN I3AR

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	48" x 24"	END ROAD WORK	1	24	24
R2-1	48" x 60"	SPEED LIMIT 45	2	38	76
R2-1	48" x 60"	SPEED LIMIT 65	1	38	38
W3-5	48" x 48"	SPEED REDUCTION (45 MPH)	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
W20-7	48" x 48"	FLAGGER	1	34	34
R2-6aP	48" x 36"	FINES DOUBLE PLAQUE	2	29	58
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	2	56	112
TOTAL UNITS					614

229 S-271 PCN I3AT

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	48" x 24"	END ROAD WORK	1	24	24
R2-1	48" x 60"	SPEED LIMIT 45	2	38	76
R2-1	48" x 60"	SPEED LIMIT 65	1	38	38
W3-5	48" x 48"	SPEED REDUCTION (45 MPH)	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
W20-7	48" x 48"	FLAGGER	1	34	34
R2-6aP	48" x 36"	FINES DOUBLE PLAQUE	2	29	58
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	2	56	112
TOTAL UNITS					614

115-271 PCN I3AU

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2a	36" x 18"	END ROAD WORK	2	17	34
R1-1	48" x 48"	STOP	2	34	68
W1-4a	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)	1	34	34
W3-1a	48" x 48"	STOP AHEAD (SYMBOL)	2	34	68
W13-1	24" x 24"	ADVISORY SPEED PLATE	2	16	32
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	1	56	56
TOTAL UNITS					428

**TABLE FOR I29 CRC PAVEMENT REPAIR
029 N-272 MRM 98.77 TO MRM 121.83 PCN I38X**

LOCATION		CRC PAVEMENT				INSERT STEEL BAR IN PCC PAVEMENT		
		PASSING LANE LENGTH	DRIVING LANE LENGTH	WIDTH	REPAIR	NO. 6 LONGI-TUDINAL DEFORMED TIE BAR	NO. 4 TRANS-VERSE DEFORMED TIE BAR	
MRM	LANE	Ft	Ft	Ft	SqYds	EACH	EACH	
102.78	NB	6		14	9.3	22	3	
102.88	NB	6	6	26	34.7	40	3	
104.03	NB	6		14	9.3	22	3	
104.45	NB	6		12	8.0	22	3	
104.45	NB	4		4	1.8		2	
104.49	NB	4		4	1.8		2	
104.50	NB	4		4	1.8		2	
104.50	NB	RAMP REPAIR. SEE PCC REPAIR TABLE FOR QUANTITY FOR SIZE						
TOTALS					66.7	106	18	

**TABLE FOR I29 CRC PAVEMENT REPAIR
029 S-271 MRM 59.33 TO MRM 98.77 PCN I38Y**

LOCATION		CRC PAVEMENT				INSERT STEEL BAR IN PCC PAVEMENT	
		PASSING LANE LENGTH	DRIVING LANE LENGTH	WIDTH	REPAIR	NO. 6 LONGI-TUDINAL DEFORMED TIE BAR	NO. 4 TRANS-VERSE DEFORMED TIE BAR
MRM	LANE	Ft	Ft	Ft	SqYds	EACH	EACH
64.76	SB		4	6	2.7		2
64.78	SB		4	4	1.8		2
64.99	SB		6	6	4.0		3
67.86	SB		4	6	2.7		3
67.99	SB		4	4	1.8		2
68.29	SB		6	8	5.3		3
68.59	SB		10	4	4.4		2
68.59	SB		5	4	2.2		2
68.60	SB		6	6	4.0		3
69.04	SB		4	5	2.2		2
69.52	SB		4	6	2.7		2
69.57	SB	4		10	4.4		2
69.64	SB	4		4	1.8		2
69.66	SB		4	4	1.8		2
69.69	SB		4	4	1.8		2
86.44	SB		4	14	6.2	22	2
87.00	SB		4	6	2.7		2
87.96	SB		4	4	1.8		2
88.37	SB		6	6	4.0		2
88.95	SB		4	4	1.8		2
89.30	SB		4	4	1.8		2
90.13	SB		4	6	2.7		2
90.25	SB		4	14	6.2	22	2
90.27	SB		4	4	1.8		2
90.75*	SB		6	14	9.3	22	3
90.77*	SB		4	6	2.7		2
91.90*	SB		4	6	2.7		2
91.98*	SB		6	6	4.0		3
91.99*	SB		4	6	2.7		2
TOTALS					94.0	66	64

* Trial maintenance patch material exists in these locations. If the patch material is stable, these repairs should not be disturbed. If at all possible, any repairs required in these locations should be made adjacent to the existing trial maintenance patch material.

**TABLE FOR I29 CRC PAVEMENT REPAIR
029 N-271 MRM 59.33 TO MRM 98.77 PCN I39A**

LOCATION		CRC PAVEMENT				INSERT STEEL BAR IN PCC PAVEMENT	
		PASSING LANE LENGTH	DRIVING LANE LENGTH	WIDTH	REPAIR	NO. 6 LONGI-TUDINAL DEFORMED TIE BAR	NO. 4 TRANS-VERSE DEFORMED TIE BAR
MRM	LANE	Ft	Ft	Ft	SqYds	EACH	EACH
65.00	NB		4	6	2.7		2
66.04	NB		4	6	2.7		2
69.46	NB		4	6	2.7		2
TOTALS					8.1	0	6

**TABLE FOR I29 CRC PAVEMENT REPAIR
029 N-271 MRM 73.938 PCN I39C**

LOCATION		CRC PAVEMENT				INSERT STEEL BAR IN PCC PAVEMENT		
		PASSING LANE LENGTH	DRIVING LANE LENGTH	WIDTH	REPAIR	NO. 7 LONGI-TUDINAL DEFORMED TIE BAR	NO. 4 TRANS-VERSE DEFORMED TIE BAR	
MRM	LANE	Ft	Ft	Ft	SqYds	EACH	EACH	
73.94	NB		90	12	120.0	21	30	
73.94	NB	SHOULDER REPAIR - SEE PCC REPAIR TABLE FOR QUANTITY FOR SIZE						
TOTALS					120.0	21	30	

**TABLE FOR I90 CRC PAVEMENT REPAIR
090 E-271 MRM 379.63 TO MRM 412.52 PCN I39D**

LOCATION		CRC PAVEMENT				INSERT STEEL BAR IN PCC PAVEMENT		
		PASSING LANE LENGTH	DRIVING LANE LENGTH	WIDTH	REPAIR	NO. 6 LONGI-TUDINAL DEFORMED TIE BAR	NO. 4 TRANS-VERSE DEFORMED TIE BAR	
MRM	LANE	Ft	Ft	Ft	SqYds	EACH	EACH	
404.25	EB		6	6	4.0		4	
406.75	EB		4	14	6.2	22	2	
406.75	EB	RAMP REPAIR - SEE PCC REPAIR TABLE FOR QUANTITY FOR SIZE						
407.72	EB		4	6	2.7		2	
409.64	EB		4	6	2.7		2	
410.01	EB		4	6	2.7		2	
410.83	EB		4	4	1.8		2	
TOTALS					20.1	22	14	

TABLE FOR PCC PAVEMENT REPAIR PCN I38X

MRM	LANE	NB OFF RAMP LANE		PCCP SqYds	NEW JOINT CON- FIG.	INSERT STEEL BAR IN PCC PAVEMENT		
		L Ft	W Ft			No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each	DOWEL BAR Each
104.500		4	8	3.6	R	10	4	8
TOTALS:				3.6		10	4	8

PCC PAVEMENT REPAIR AREA TYPES

R = Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

TABLE FOR PCC PAVEMENT REPAIR PCN I39D

MRM	LANE	EB ON RAMP LANE		PCCP SqYds	NEW JOINT CON- FIG.	INSERT STEEL BAR IN PCC PAVEMENT		
		L Ft	W Ft			No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each	DOWEL BAR Each
406.754		4	20	8.9	R	16	4	12
TOTALS:				8.9		16	4	12

PCC PAVEMENT REPAIR AREA TYPES

R = Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

TABLE FOR PCC PAVEMENT REPAIR PCN I39C

MRM	LANE	SHOULDER (CONCRETE)		PCCP SqYds	NEW JOINT CON- FIG.	No. 5 x 24" DEFORMED TIE BARS Each
		L Ft	W Ft			
73.936		30	10	33.3	R	24
TOTALS:				33.3		24
ADDITIONAL QUANTITIES:				10.0		0
GRAND TOTALS:				43.3		24

PCC PAVEMENT REPAIR AREA TYPES

R = Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

TABLE FOR PCC PAVEMENT REPAIR SD-115 PCN I3AU

MRM	LANE	NB DRIVING LANE		PCCP SqYds	NEW JOINT CON- FIG.	INSERT STEEL BAR IN PCC PAVEMENT		
		L Ft	W Ft			No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each	DOWEL BAR Each
97.736		13	7	10.1	R	8	10	7
TOTALS:				10.1		8	10	7

PCC PAVEMENT REPAIR AREA TYPES

R = Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

TABLE FOR PCC PAVEMENT REPAIR I229 PCN I3AR

MRM	LANE	NB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	COMMENTS	INSERT STEEL BAR IN PCC PAVEMENT			TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt
		L Ft	W Ft				No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each	DOWEL BAR Each	L	W	
5.706						End of Bridge NorthBound						
5.766		4	6	2.7	R		8	4	6			
5.775						CRC Side of NB Terminal Anchor				48"	24"	8.00
5.950						End of Curve - MRM @ Guardrail						
TOTALS:				2.7			8	4	6			8.0
ADDITIONAL QUANTITIES:				0.0			0	0	0			1.6
GRAND TOTALS:				2.7			8	4	6			9.6

PCC PAVEMENT REPAIR AREA TYPES

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

T = Two Tied Joints

B = One Working & One Tied Joint

R = Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

TABLE FOR PCC PAVEMENT REPAIR I229 PCN I3AT

MRM	LANE	SB PASSING LANE		SB DRIVING LANE		PCCP SqYds	NEW JOINT CON-FIG.	COMMENTS	INSERT STEEL BAR IN PCC PAVEMENT				
		L Ft	W Ft	L Ft	W Ft				1 1/4" x 18" PLAIN ROUND DOWEL BARS Each	No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each	DOWEL BAR Each	
5.716								End of Bridge SouthBound					
5.718		4	12	4	12	10.7	W		32		4		
5.721		4	4			1.8	R			4	4		4
5.723		4	4			1.8	T			4	4		
5.727		4	4			1.8	R			4	4		4
5.727		4	4			1.8	R			4	4		4
5.759		4	4			1.8	R			4	4		4
5.763		4	4			1.8	R			4	4		4
5.770		4	4			1.8			4	4	4		
5.773				4	6	2.7	R			8	4		6
5.773M				18	6	12.0	W		8		14		
5.777								SB Terminal Anchor					
5.950								End of Curve - MRM @ Guardrail					
TOTALS:						38.0			44	36	50		26
ADDITIONAL QUANTITIES:						10.0			10	10	10		10
GRAND TOTALS:						48.0			54	46	60		36

PCC PAVEMENT REPAIR AREA TYPES

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

T = Two Tied Joints

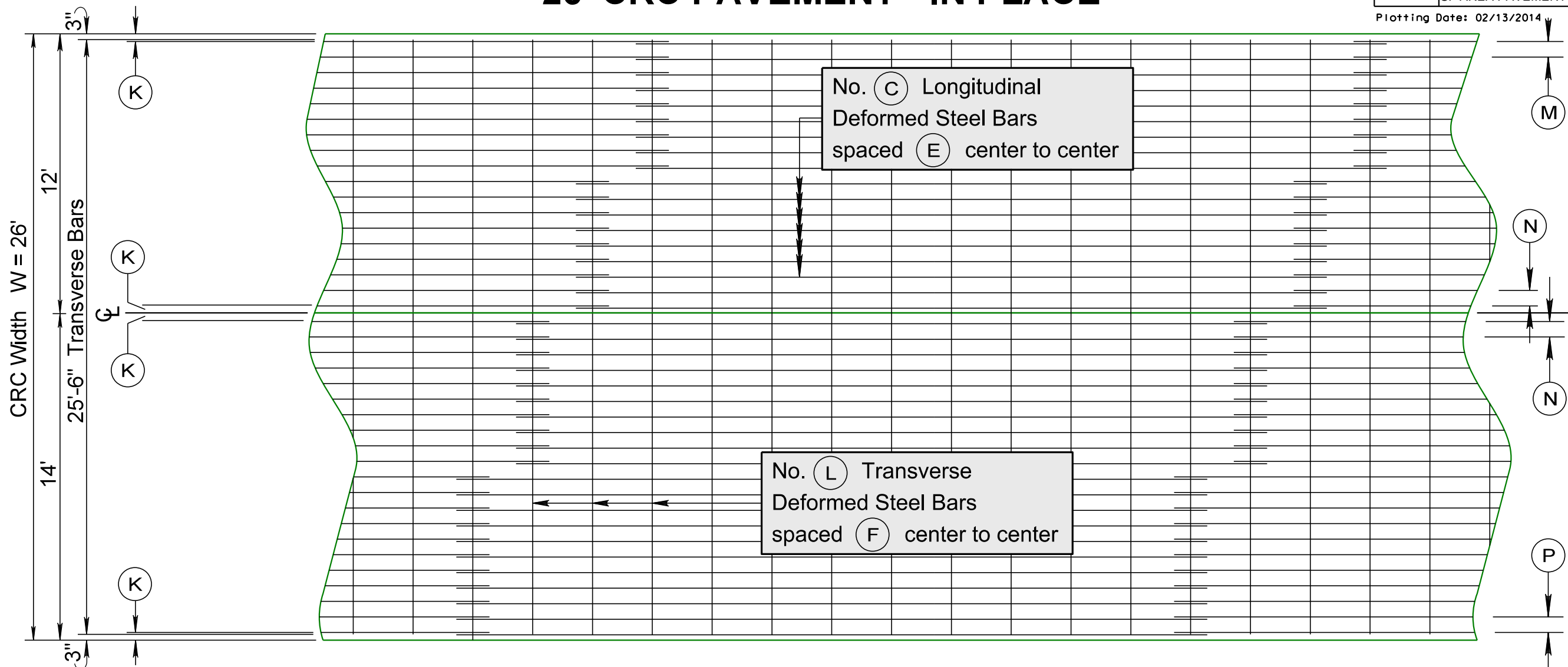
B = One Working & One Tied Joint

R = Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

26' CRC PAVEMENT - IN PLACE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	12	29

Plotting Date: 02/13/2014



MITCHELL REGION INTERSTATE CRC PAVEMENT KEY & DIMENSIONS

Location	Underlying Plans	CRC Depth	CRC Width	Longitudinal Steel		Transverse Steel		Perimeter Bar Spacing			
				Size	Spacing	Size	Spacing	K	M	N	P
I29N MRM 85.00 +0.405 to 110.00 +0.225 & I29S MRM 85.00 +0.435 to 110.00 +0.206 I90E MRM 401.61 +0.124 to 412.52 & I90W MRM 401.61 +0.123 to 412.52	3784, 3785, 203P, 4428, 3945 & 3467	8"	26'	6	8"	4	36"	4"	8"	8"	8"
I29N MRM 61.00 +0.888 to 72.00 +0.866 & I29S MRM 61.00 +0.888 to 62.00 +0.443	5360	11"	26'	6	6"	4	48"	4"	5"	5"	5"
I29N MRM 72.00 +0.866 to 73.38 & I29S MRM 72.00 +0.875 to 73.38	1948	11"	26'	7	7"	4	36"	6"	6"	7"	9"

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

PLOTTED FROM - IRSE12105

PLOT NAME - 2

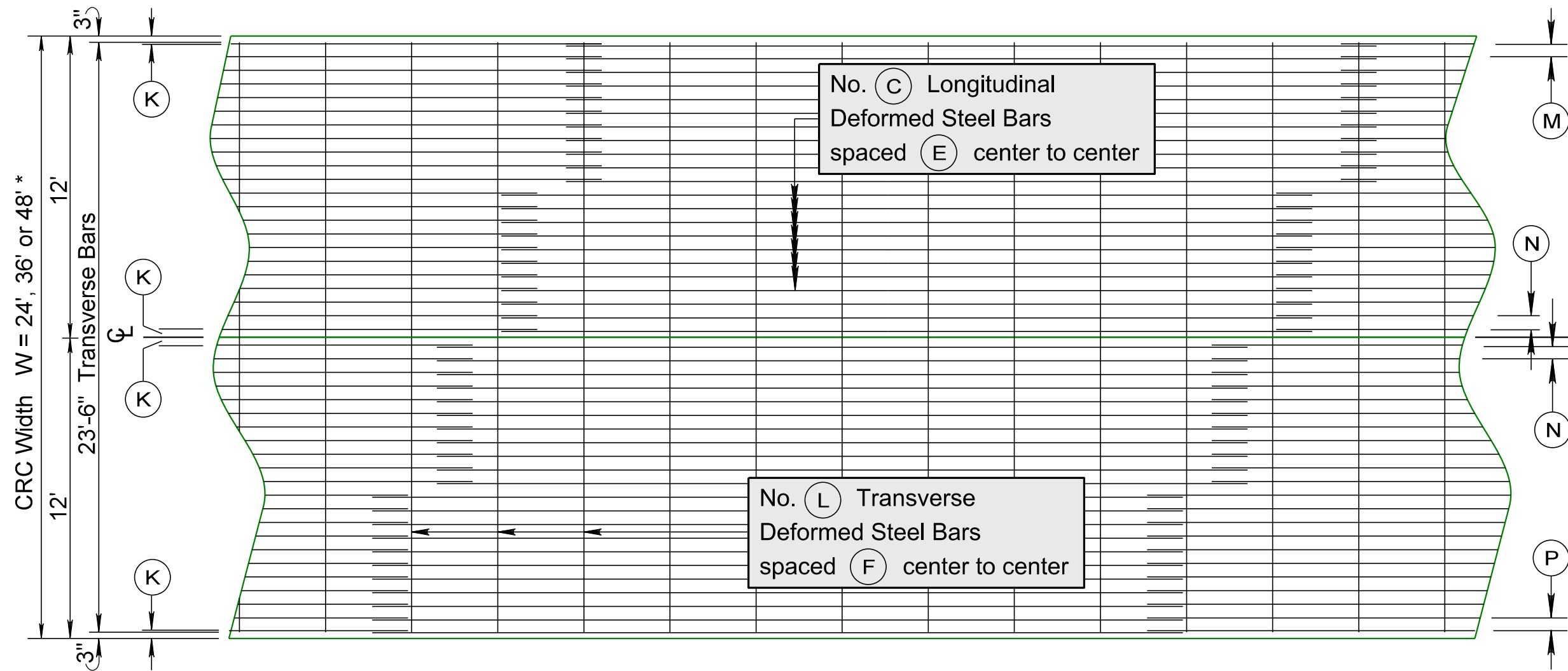
FILE - ... \MICROSTATION\CRC EXISTING.DGN

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

* And other miscellaneous widths (may include CRC shoulders)

STATE OF SOUTH DAKOTA	PROJECT SF AREA PAVEMENT REPAIR	SHEET 13	TOTAL SHEETS 29
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Plotting Date: 02/13/2014



MITCHELL REGION INTERSTATE CRC PAVEMENT KEY & DIMENSIONS

Location	Underlying Plans	CRC Depth	CRC Width	Longitudinal Steel		Transverse Steel		Perimeter Bar Spacing			
				Size	Spacing	Size	Spacing	K	M	N	P
I29N&S MRM 73.38 to MRM 73.38 +0.634	1948	11"	34'/36'	7	7"	4	36"	6"	6"	7"	6"
I229N&S MRM 2.08 to 5.32 +0.067 & MRM 5.68 +0.090 to 8.28 +0.687	1231	10.5"	24'/36'	6	6"	4	48"	4"	5"	5"	5"

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

PLOTTED FROM - IRSE12105

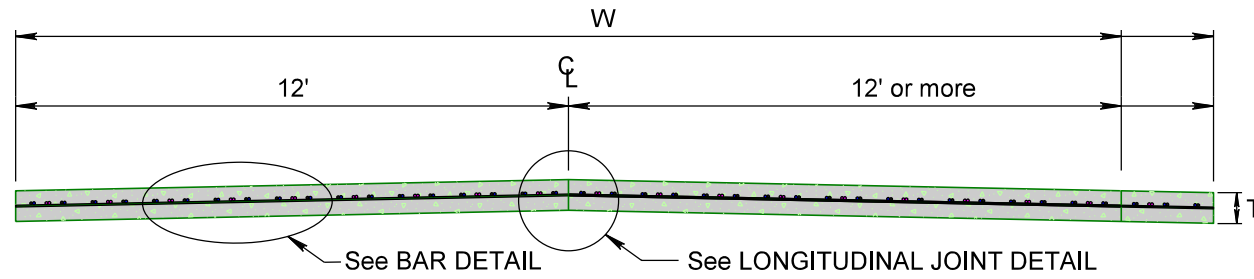
PLOT NAME - 3

FILE - ... \MICROSTATION\CRC EXISTING.DGN

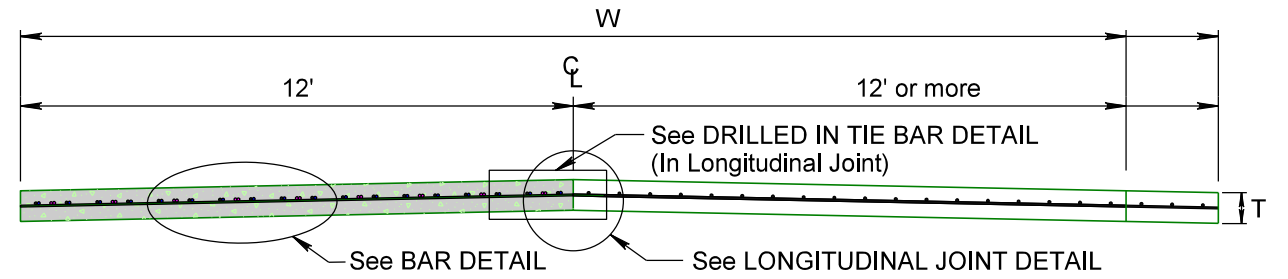
CRC PAVEMENT REPAIR - REINFORCING STEEL DETAILS

Plotting Date: 02/13/2014

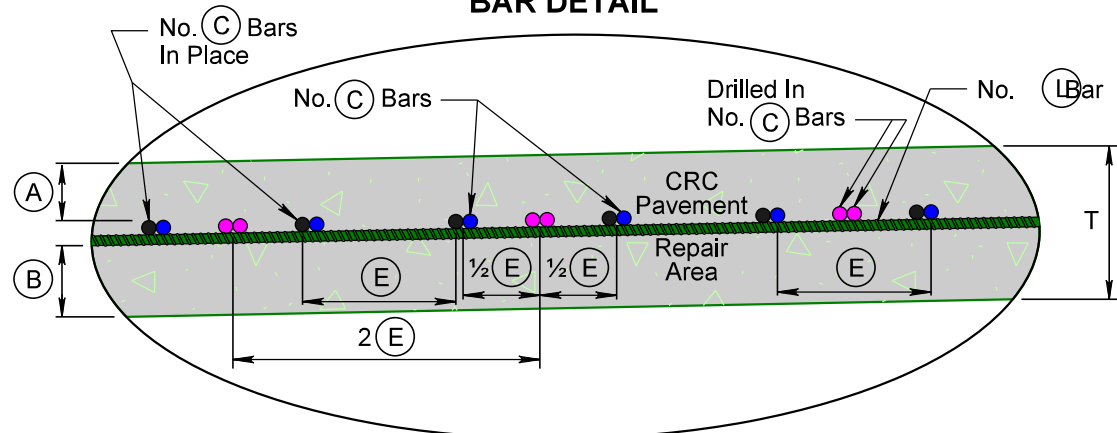
TRANSVERSE SECTION SHOWING STEEL PLACEMENT



TRANSVERSE SECTION SHOWING STEEL PLACEMENT



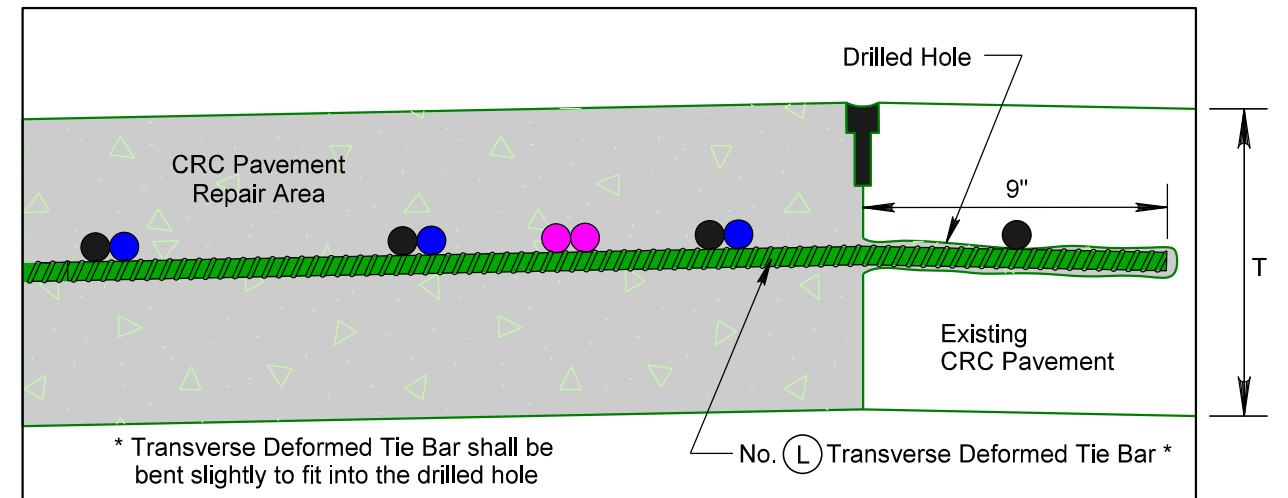
BAR DETAIL



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

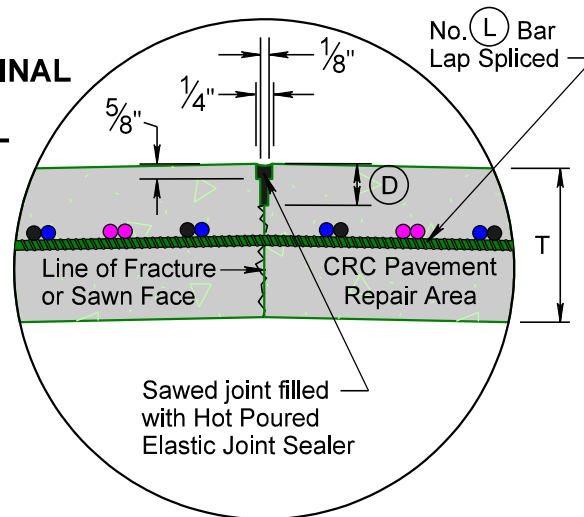
The transverse deformed steel bars will be positioned on acceptable chairs.

DRILLED IN TIE BAR DETAIL (In Longitudinal Joint)



* Transverse Deformed Tie Bar shall be bent slightly to fit into the drilled hole

LONGITUDINAL JOINT DETAIL

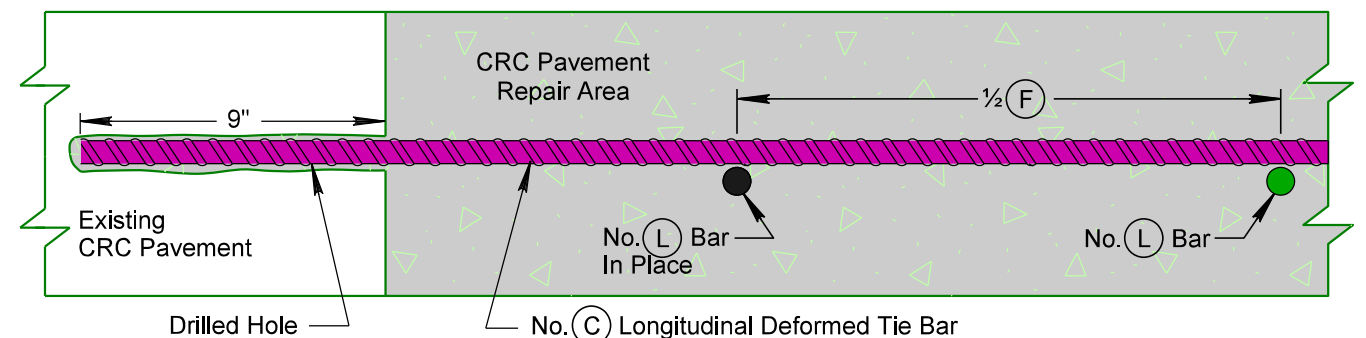


NOTE:

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

LONGITUDINAL SECTION SHOWING STEEL PLACEMENT

DRILLED IN TIE BAR DETAIL (In Transverse Joint)



CRC PAVEMENT IN PLACE & CRC PAVEMENT REPAIR KEY & DIMENSIONS	Underlying Plans	CRC Depth	CRC Width	Clearance		Longitudinal Steel		Saw Cut Depth	Transverse Steel		Longitudinal Bar Count (full lane width repair)						Lap Splice Length (for Repair Length L)			Not Assigned	Perimeter Bar Spacing				Chair Width
				Top	Bottom	Size	Spacing		Size	Spacing	12' Wide Slab			14' Wide Slab			L < 6'	L = 6' to 8'	L > 8'		(K)	(M)	(N)	(P)	
				(A)	(B)	(C)	(E)		(D)	(L)	(F)	(G)	(H ₁)	(H ₂)	(G)	(H ₁)	(H ₂)	(I ₁)	(I ₂)		(I ₃)	(-)	(K)	(M)	
I29N MRM 85.00 +0.405 to MRM 97.00 +0.766	3784	8"	26'	3"	3 3/4"	6	8"	2"	4	36"	18	9	9	21	10	10	14"	20" to 25"	25"	-	4"	8"	8"	8"	5"
I90E MRM 401.61 +0.124 to MRM 412.52	3945	8"	26'	3"	3 3/4"	6	8"	2"	4	36"	18	9	9	21	10	10	14"	20" to 25"	25"	-	4"	8"	8"	8"	5"
I29N MRM 61.00 +0.888 to MRM 72.00 +0.866	5360	11"	26'	4"	5 3/4"	6	6"	2 3/4"	4	48"	24	12	12	28	14	14	14"	20" to 28"	30"	-	4"	5"	5"	5"	5"
I29S MRM 61.00 +0.888 to MRM 62.00 +0.443	5360	11"	26'	4"	5 3/4"	6	6"	2 3/4"	4	48"	24	12	12	28	14	14	14"	20" to 28"	30"	-	4"	5"	5"	5"	5"

PLOT SCALE - 1/8" = 36"

PLOTTED FROM - IRSE12105

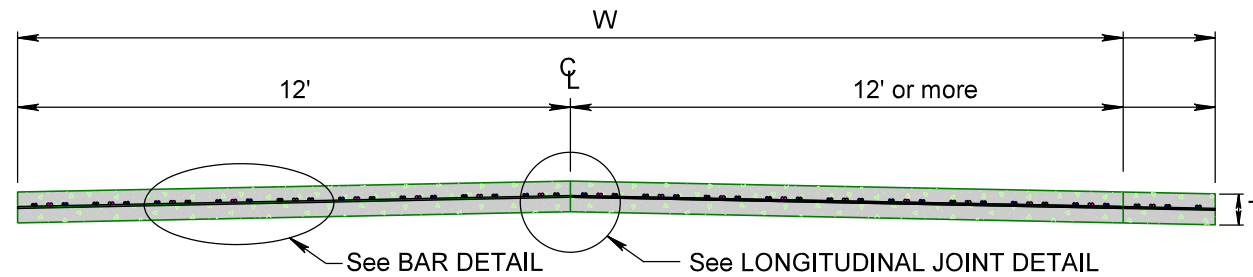
PLOT NAME - 4

FILE - ... \MICROSTAT\ON\CRC BARS.DGN

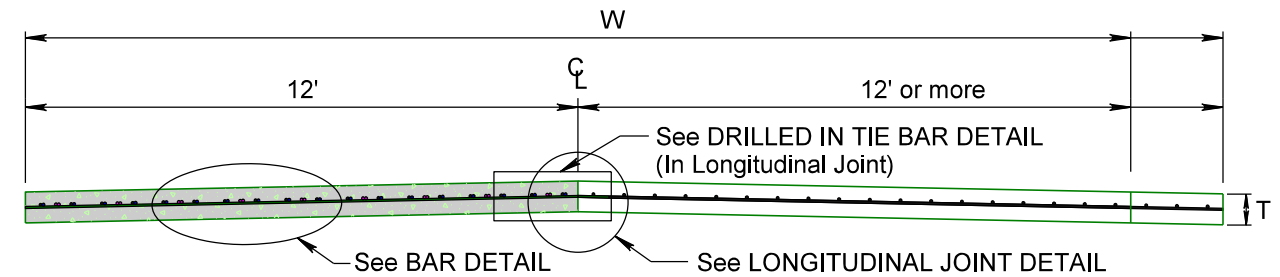
CRC PAVEMENT REPAIR - REINFORCING STEEL DETAILS

Plotting Date: 02/13/2014

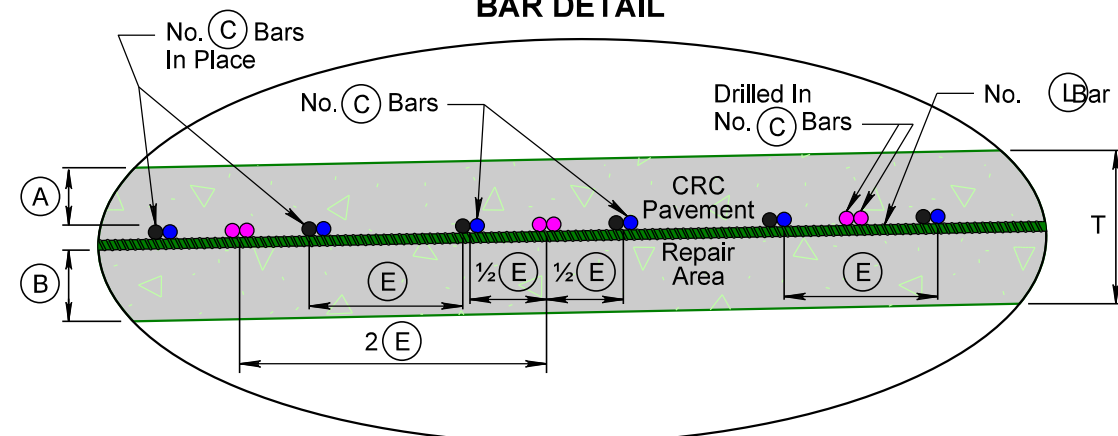
TRANSVERSE SECTION SHOWING STEEL PLACEMENT



TRANSVERSE SECTION SHOWING STEEL PLACEMENT



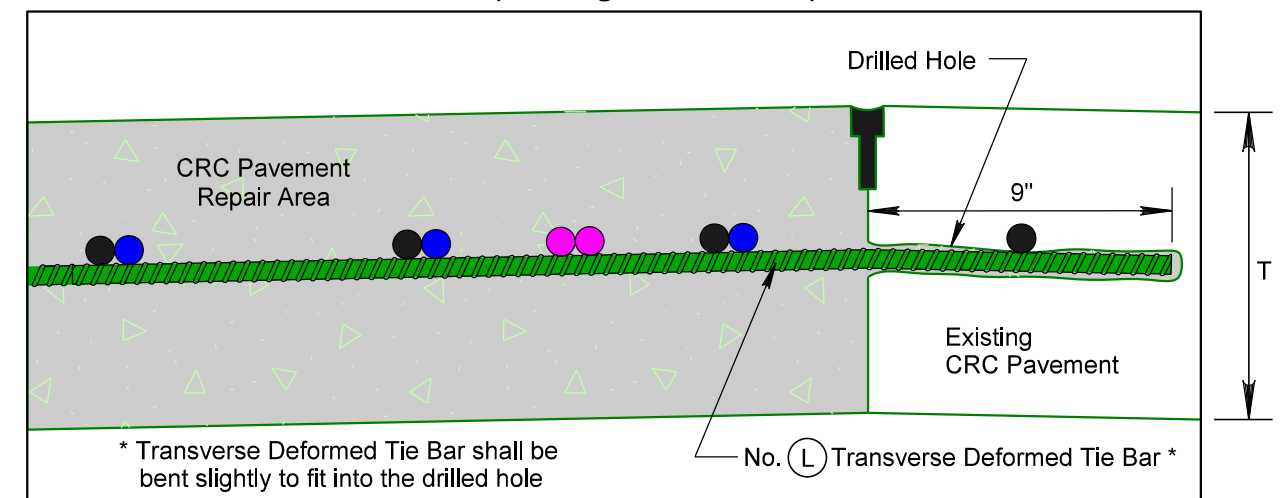
BAR DETAIL



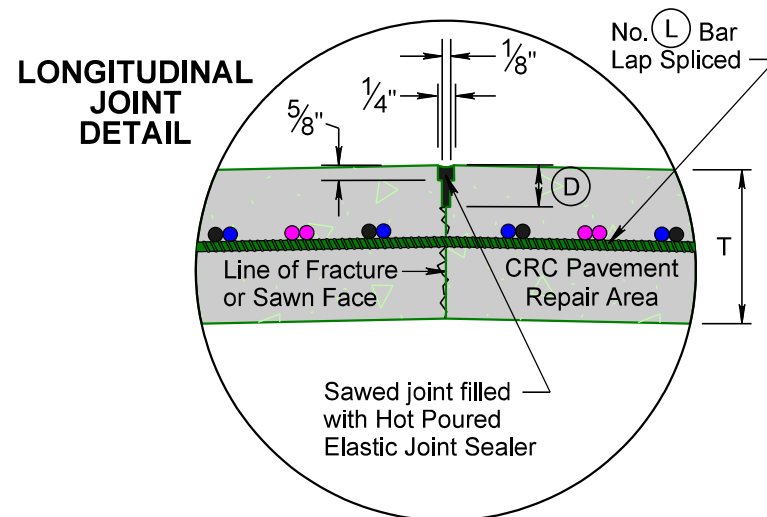
Placement of longitudinal steel bars may vary from +1/2" to -1/2" vertically and 3/4" horizontally. Placement of transverse steel bars may vary from +1/2" to -1/2" vertically and 2" horizontally.

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

DRILLED IN TIE BAR DETAIL (In Longitudinal Joint)



* Transverse Deformed Tie Bar shall be bent slightly to fit into the drilled hole

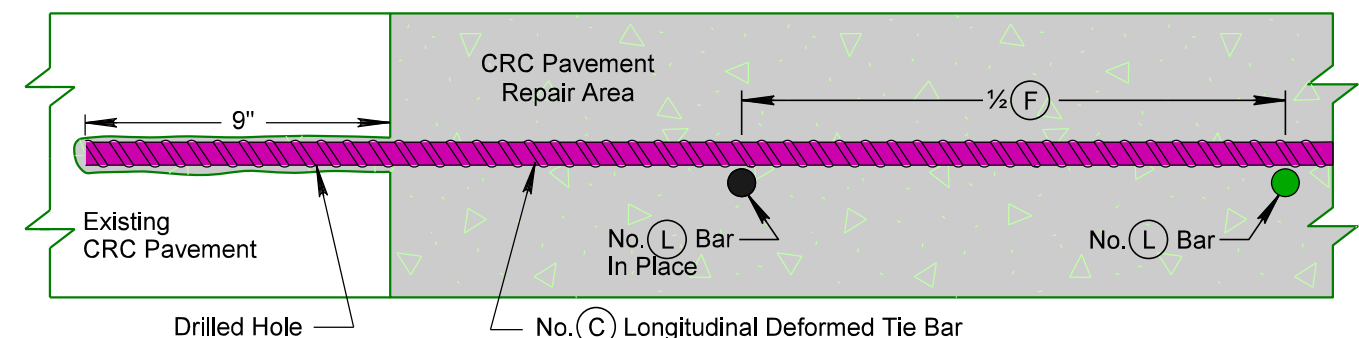


NOTE:

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

LONGITUDINAL SECTION SHOWING STEEL PLACEMENT

DRILLED IN TIE BAR DETAIL (In Transverse Joint)



CRC PAVEMENT IN PLACE & CRC PAVEMENT REPAIR KEY & DIMENSIONS	Underlying Plans	CRC Depth	CRC Width	Clearance		Longitudinal Steel		Saw Cut Depth	Transverse Steel		Longitudinal Bar Count (full lane width repair)						Lap Splice Length (for Repair Length L)			Not Assigned	Perimeter Bar Spacing				Chair Width
				Top	Bottom	Size	Spacing		Size	Spacing	12' Wide Slab			14' Wide Slab			L < 6'	L = 6' to 8'	L > 8'		(K)	(M)	(N)	(P)	
				(A)	(B)	(C)	(E)		(D)	(L)	(F)	(G)	(H ₁)	(H ₂)	(G)	(H ₁)	(H ₂)	(I ₁)	(I ₂)		(I ₃)	(-)	(K)	(M)	
I29N MRM 72.00 +0.866 to MRM 73.38	1948	11"	26'	4"	5 3/8"	7	7"	2 3/4"	4	36"	21	10	10	23	11	11	14"	20" to 28"	30"	-	6"	6"	7"	9"	5"
I29S MRM 72.00 +0.875 to MRM 73.38	1948	11"	26'	4"	5 3/8"	7	7"	2 3/4"	4	36"	21	10	10	23	11	11	14"	20" to 28"	30"	-	6"	6"	7"	9"	5"
I29N MRM 73.38 to MRM 73.38 +0.634	1948	11"	34'/36'	4"	5 3/8"	7	7"	2 3/4"	4	36"	21	10	10	-	-	-	14"	20" to 28"	30"	-	6"	6"	7"	9"	5"
I229N&S MRM 2.08 to MRM 5.32 +0.067	1231	10.5"	24'/36'	3 3/4"	5 1/2"	6	6"	2 5/8"	4	48"	24	12	12	-	-	-	14"	20" to 25"	25"	-	4"	5"	5"	5"	5"

PLOT SCALE - 1/8" = 36"

PLOTTED FROM - IRSE12105

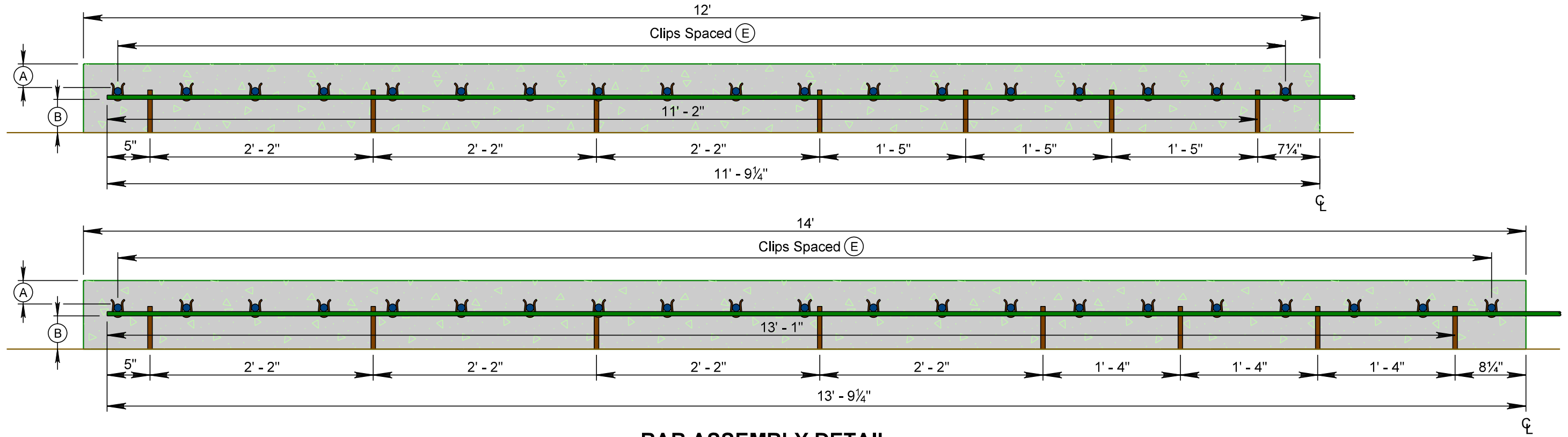
PLOT NAME - 5

FILE - ... \MICROSTATION\CRC BARS 2.DGN

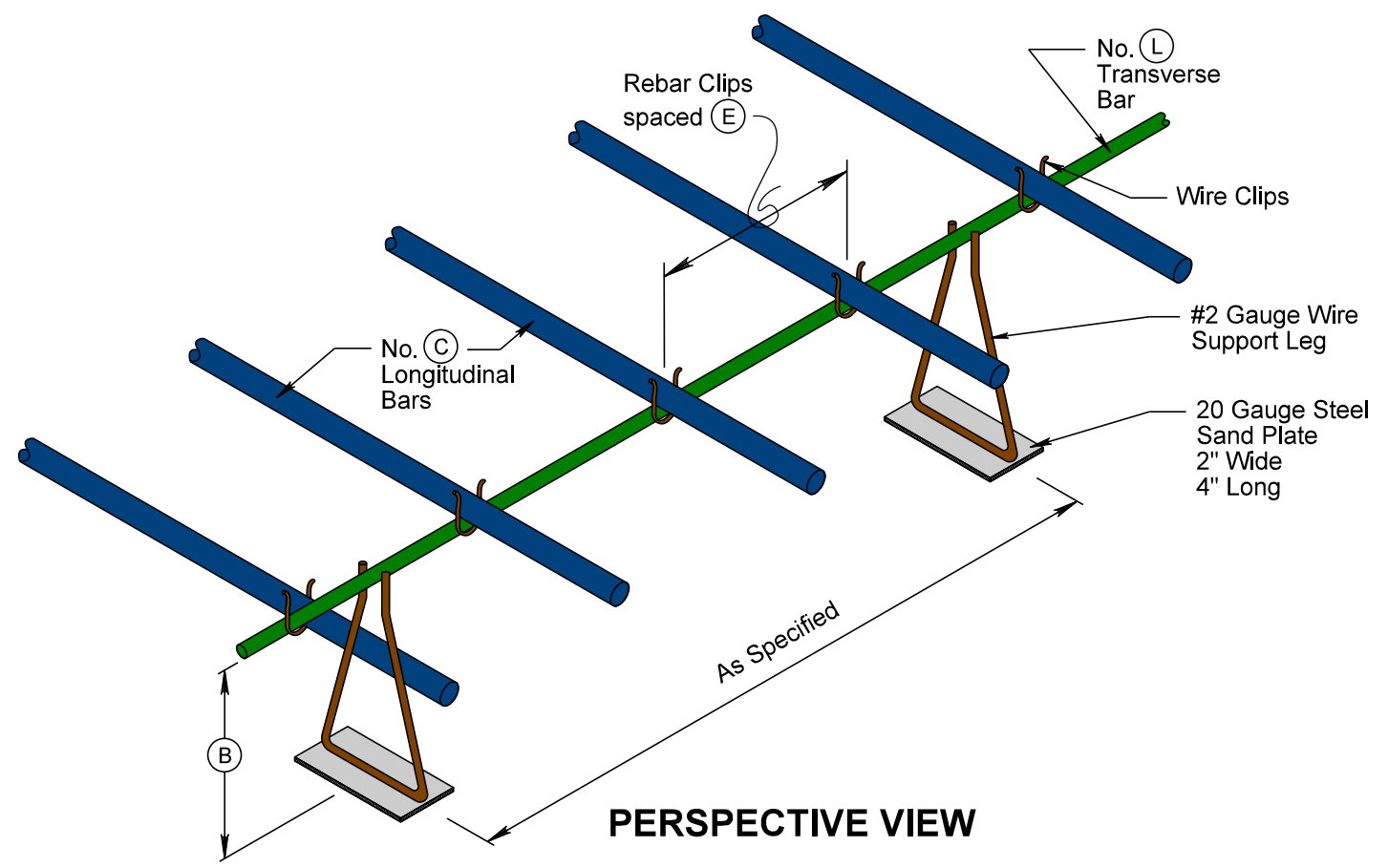
CRC PAVEMENT CHAIR DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	16	29

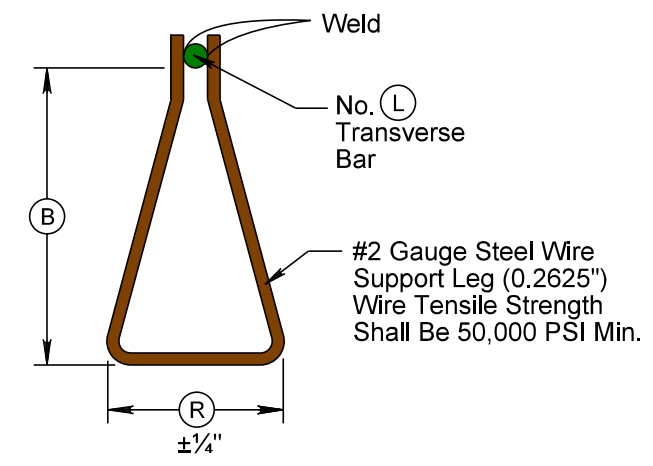
Plotting Date: 02/13/2014



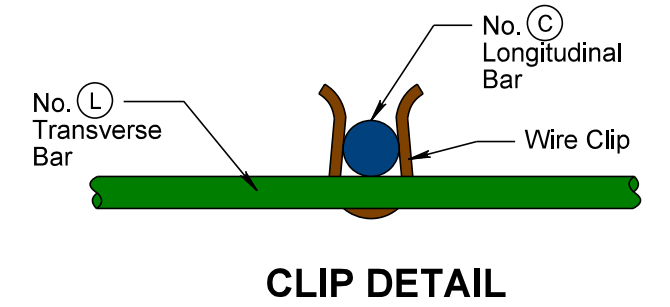
BAR ASSEMBLY DETAIL



PERSPECTIVE VIEW



CHAIR DETAIL



CLIP DETAIL

DEFORMED TIE BAR DIMENSIONS KEY									
Underlying Plans	CRC Depth	CRC Width	Clearance		Longitudinal Steel		Transverse Steel		Chair Width
			Top	Bottom	Size	Spacing	Size	Spacing	
PCN	T	W	(A)	(B)	(C)	(E)	(L)	(F)	(R)
3784	8"	26'	3"	3 3/4"	6	8"	4	36"	5"
3945	8"	26'	3"	3 3/4"	6	8"	4	36"	5"
5360	11"	26'	4"	5 3/4"	6	6"	4	48"	5"
5360	11"	26'	4"	5 3/4"	6	6"	4	48"	5"

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

PLOTTED FROM - IRSE12105

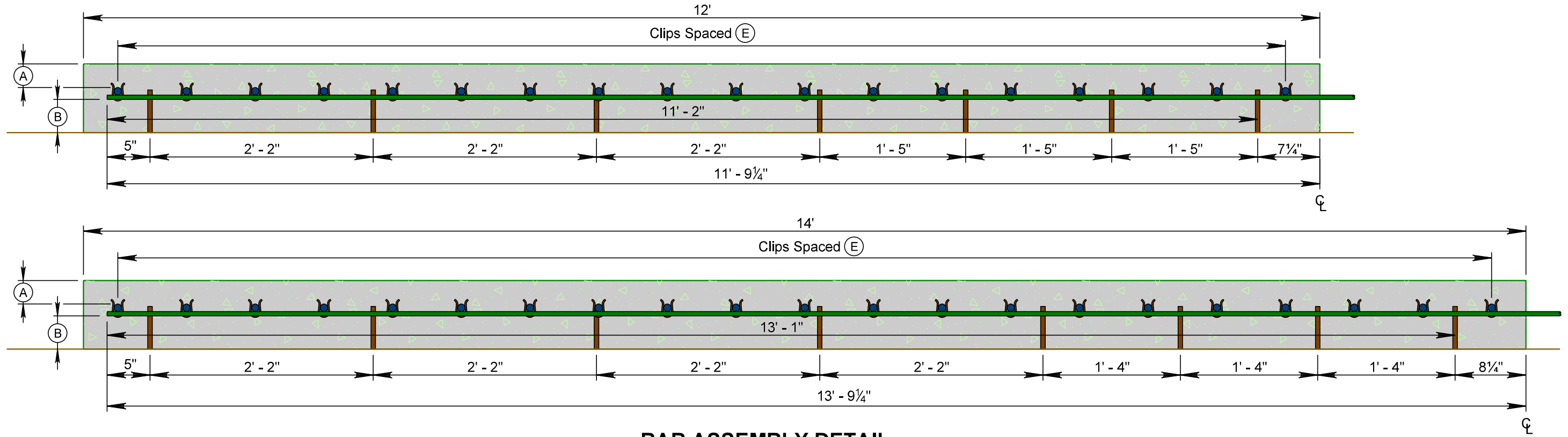
PLOT NAME - 6

FILE - ... \CRC CHAIR DETAILS.DGN

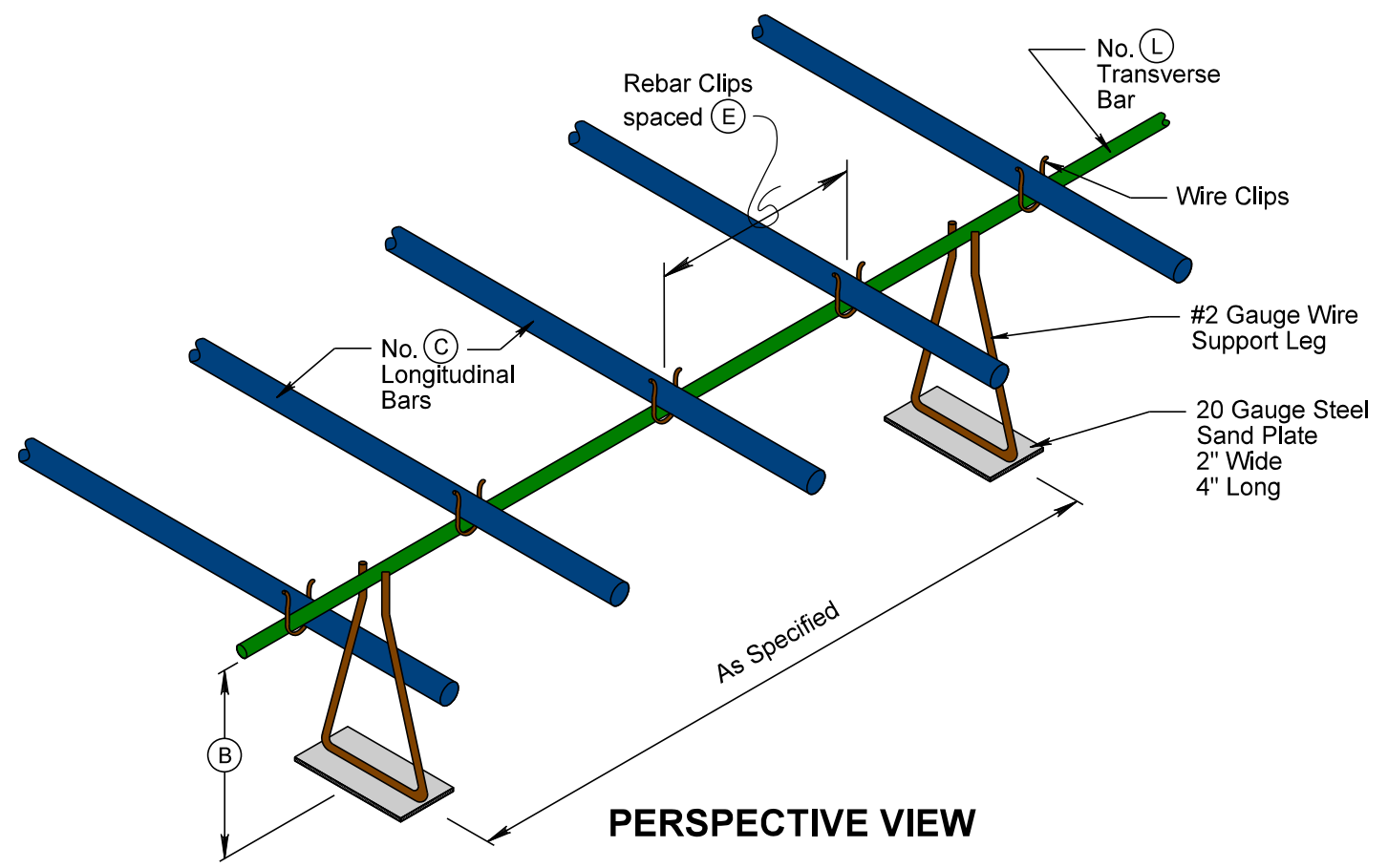
CRC PAVEMENT CHAIR DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	17	29

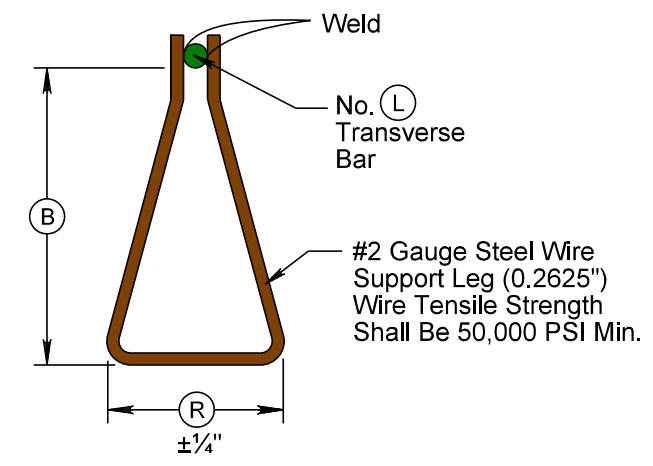
Plotting Date: 02/13/2014



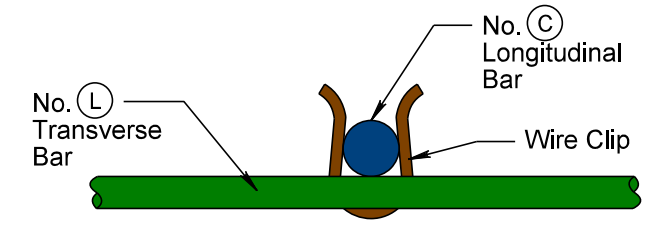
BAR ASSEMBLY DETAIL



PERSPECTIVE VIEW



CHAIR DETAIL



CLIP DETAIL

DEFORMED TIE BAR DIMENSIONS KEY									
Underlying Plans	CRC Depth	CRC Width	Clearance		Longitudinal Steel		Transverse Steel		Chair Width
			Top	Bottom	Size	Spacing	Size	Spacing	
PCN	T	W	(A)	(B)	(C)	(E)	(L)	(F)	(R)
1948	11"	26'	4"	5 3/8"	7	7"	4	36"	5"
1948	11"	26'	4"	5 3/8"	7	7"	4	36"	5"
1948	11"	34'/36'	4"	5 3/8"	7	7"	4	36"	5"
1231	10.5"	24'/36'	3 3/4"	5 1/2"	6	6"	4	48"	5"

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

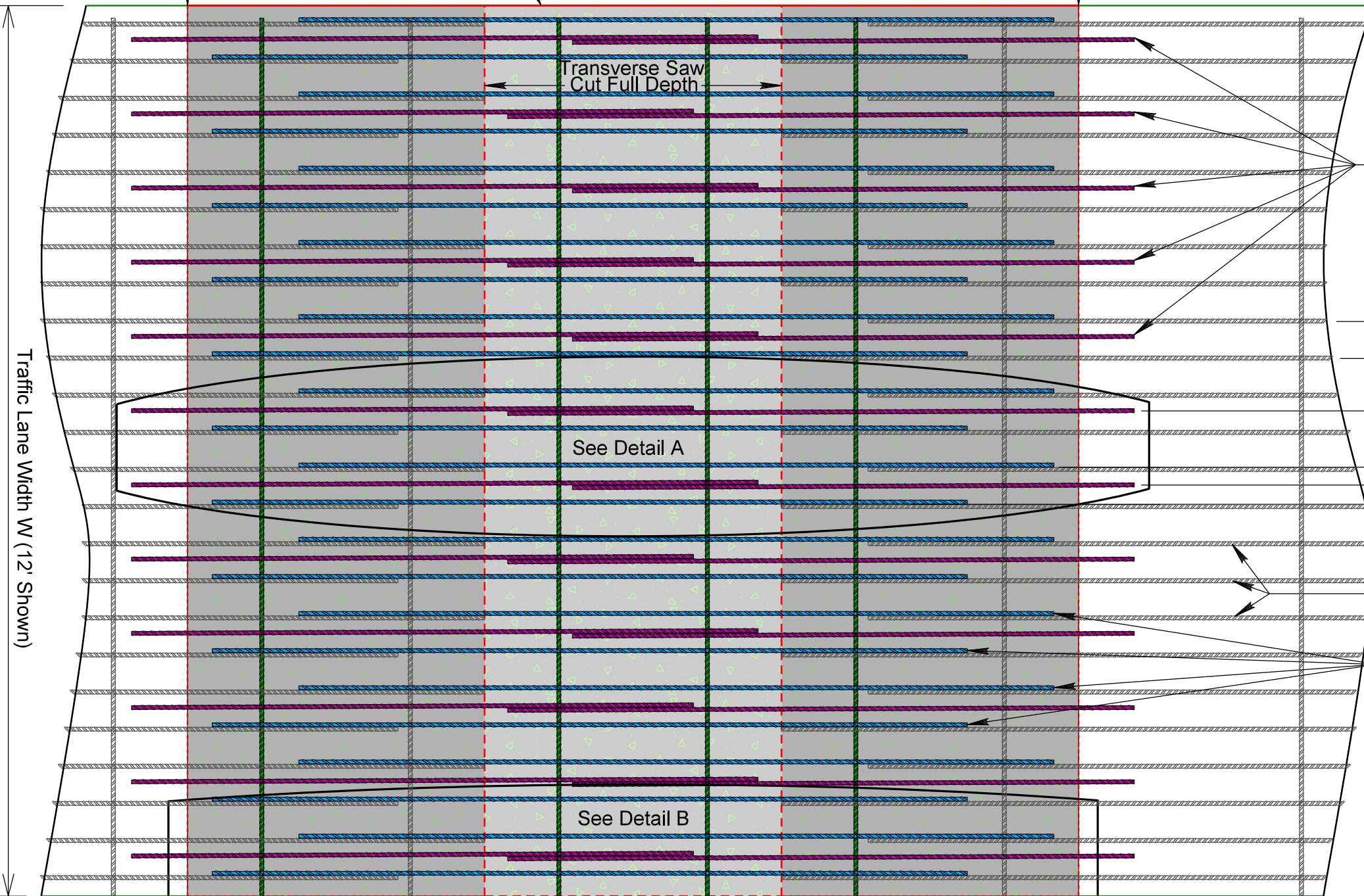
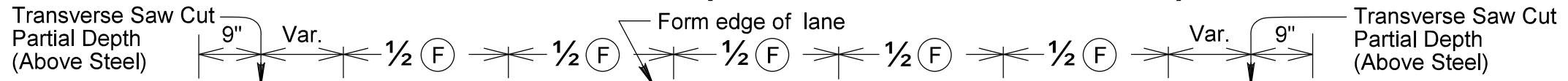
PLOTTED FROM - IRSE12105

PLOT NAME - 7

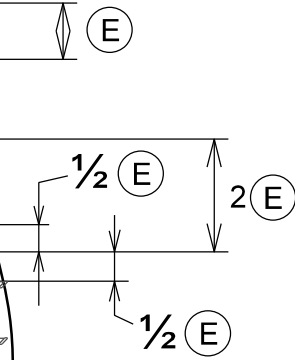
FILE - ... \CRC CHAIR DETAILS 2.DGN

CRC PAVEMENT REPAIR (FULL LANE WIDTH) - TYPICAL

Plotting Date: 02/13/2014



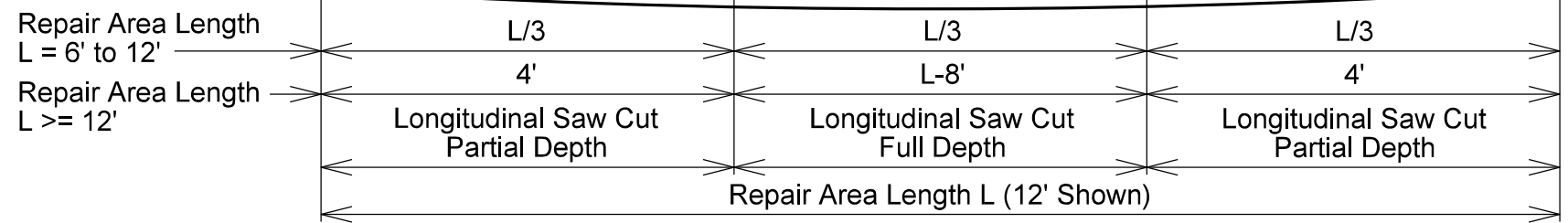
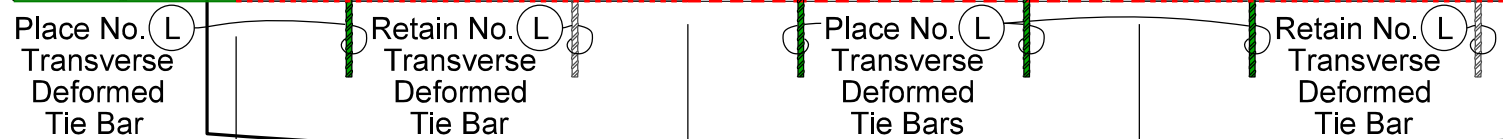
Place No. (C) Longitudinal Deformed Tie Bar (Place bars into drilled holes in existing concrete on both sides of the repair area and tie the bars to each other and to in place No. (L) Transverse Bars)



No. (C) Longitudinal Deformed Tie Bars In Place

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

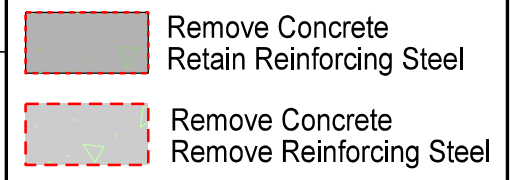
For Repair Area Length L=12' or more - every other in place No. (C) Longitudinal Deformed Tie Bar shall be cut off and lap splices shall be staggered.



DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
3784	8"	6	8"	4	36"
3945	8"	6	8"	4	36"
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"

CRC REPAIR AREA KEY



PLOT SCALE - 1:1.7

PLOT NAME - 8

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

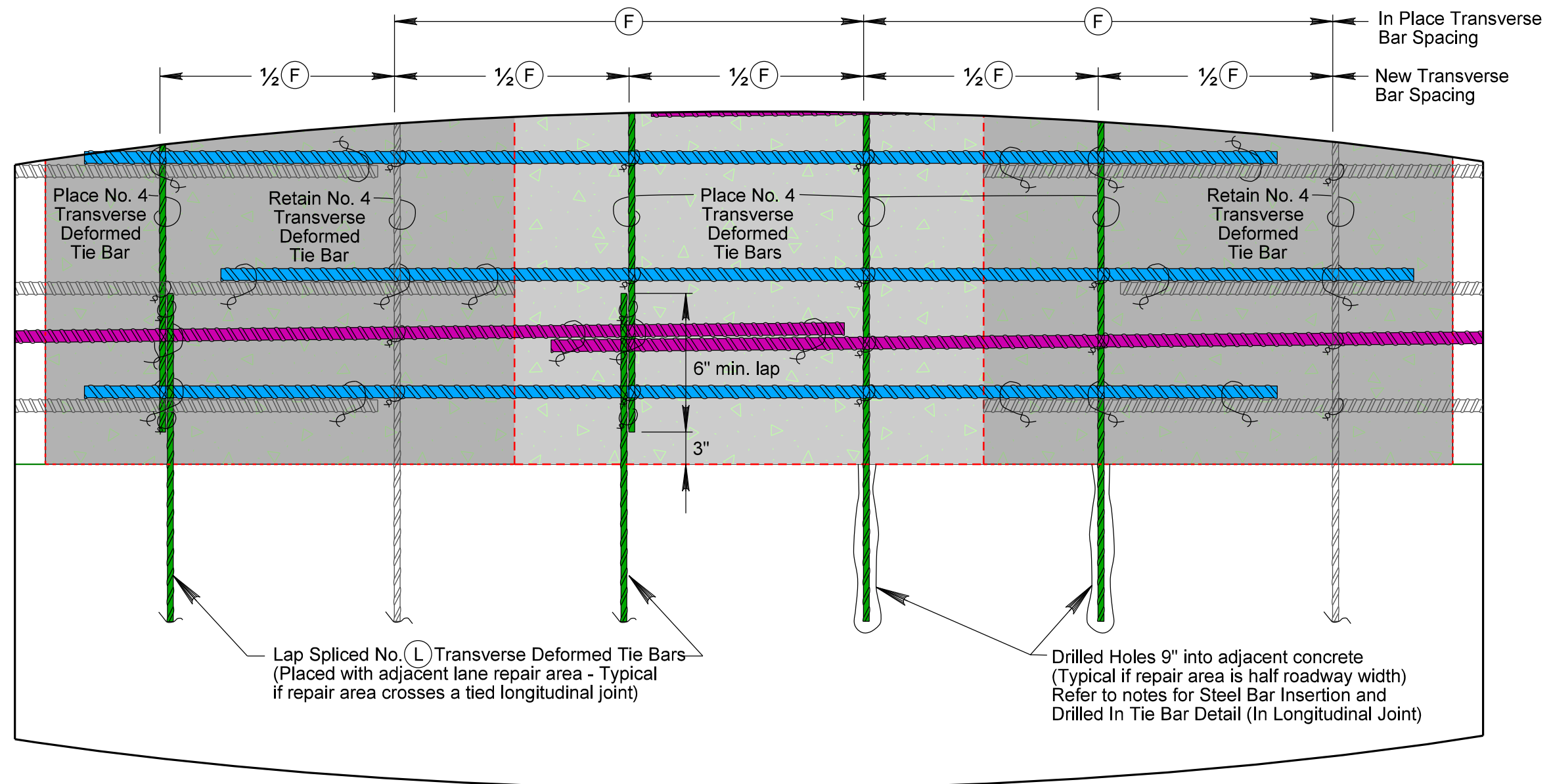
PLOTTED FROM - TRSF12105

CRC PAVEMENT REPAIR (FULL LANE WIDTH)

Detail B

STATE OF SOUTH DAKOTA	PROJECT SF AREA PAVEMENT REPAIR	SHEET 20	TOTAL SHEETS 29
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Plotting Date: 02/13/2014



PLOT SCALE - 1:1.075

PLOT NAME - 10

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

DEFORMED TIE BAR KEY

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

DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
3784	8"	6	8"	4	36"
3945	8"	6	8"	4	36"
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"

CRC REPAIR AREA KEY

	Remove Concrete Retain Reinforcing Steel
	Remove Concrete Remove Reinforcing Steel

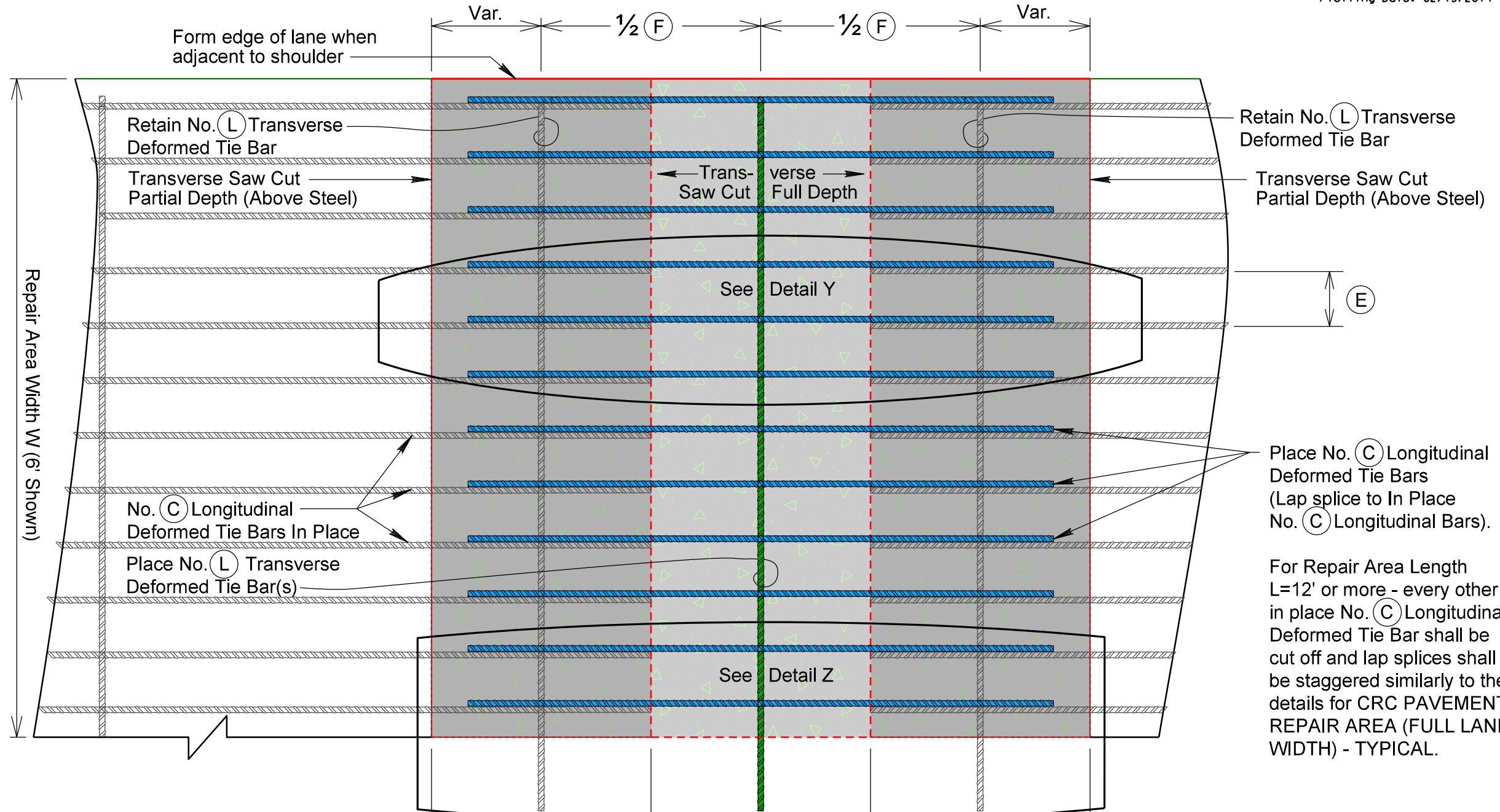
Note: All lapped bars shall have a minimum of two ties per lap.

PLOTTED FROM - TRSE12105

CRC PAVEMENT REPAIR (PARTIAL LANE WIDTH) - TYPICAL

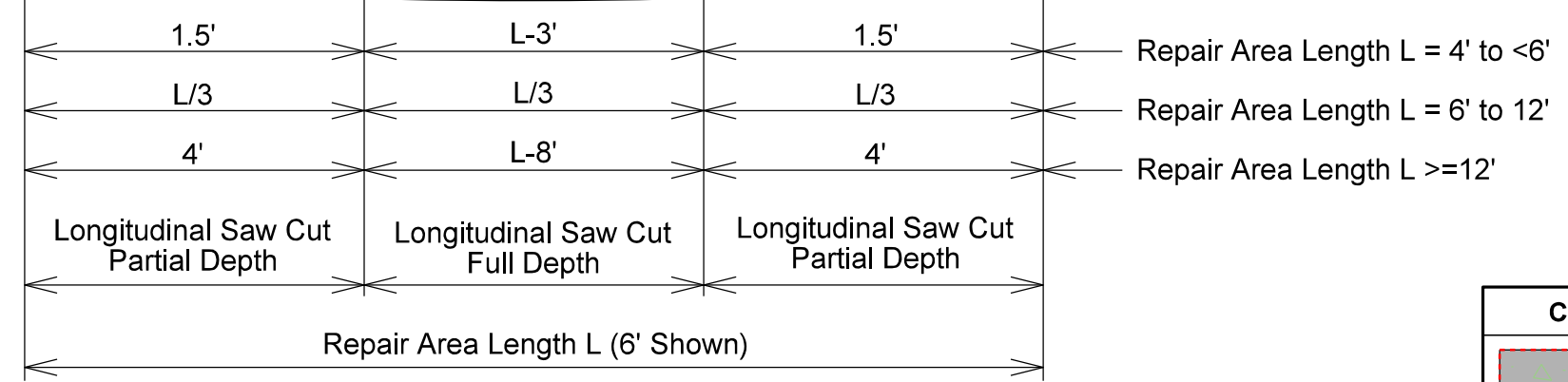
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	21	29

Plotting Date: 02/13/2014



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

For Repair Area Length L=12' or more - every other in place No. (C) Longitudinal Deformed Tie Bar shall be cut off and lap splices shall be staggered similarly to the details for CRC PAVEMENT REPAIR AREA (FULL LANE WIDTH) - TYPICAL.



DEFORMED TIE BAR DIMENSIONS KEY					
Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
3784	8"	6	8"	4	36"
3945	8"	6	8"	4	36"
5360	11"	6	6"	4	48"
5360	11"	6	6"	4	48"

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

PLOT SCALE - 1:1.075

PLOTTED FROM - TRSE12105

PLOT NAME - 11

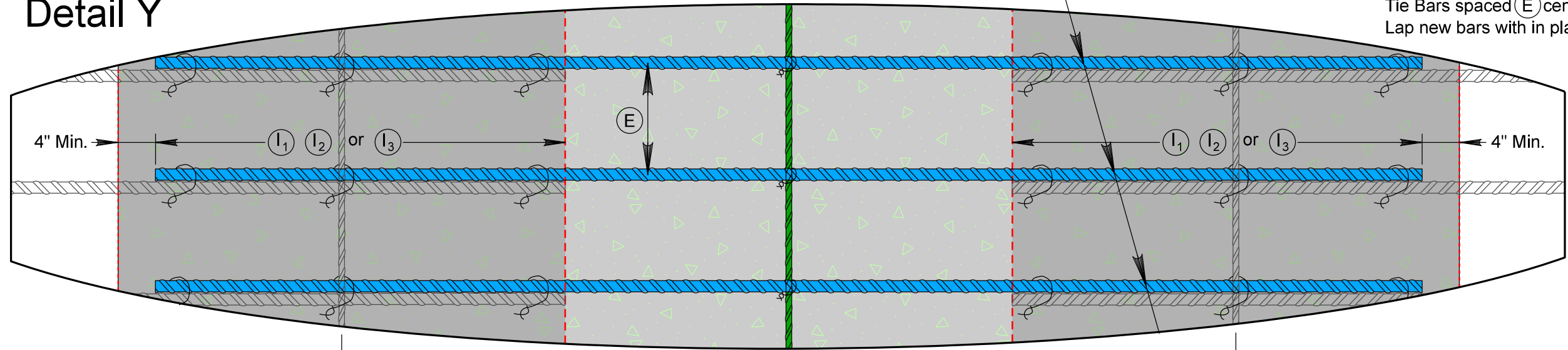
FILE - ... \CRC PARTIAL WIDTH REPAIR.DGN

CRC PAVEMENT REPAIR (PARTIAL LANE WIDTH)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	22	29

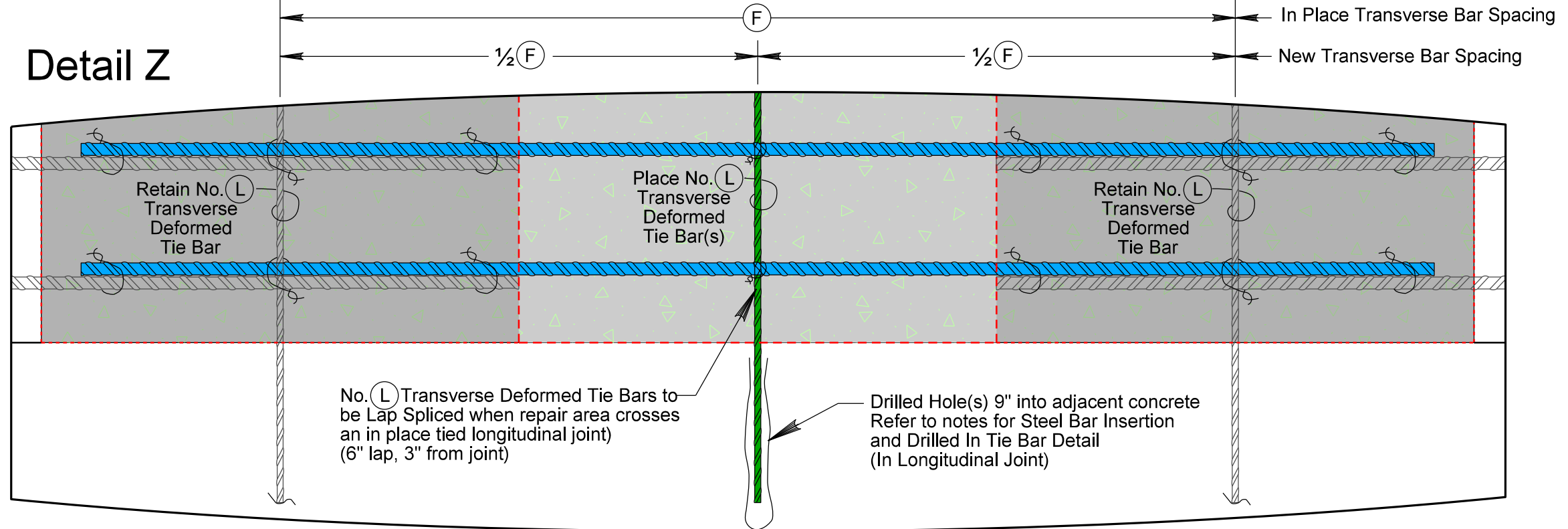
Plotting Date: 02/13/2014

Detail Y



Place No. (C) Longitudinal Deformed Tie Bars spaced (E) center to center. Lap new bars with in place bars.

Detail Z



No. (L) Transverse Deformed Tie Bars to be Lap Spliced when repair area crosses an in place tied longitudinal joint) (6" lap, 3" from joint)

Drilled Hole(s) 9" into adjacent concrete Refer to notes for Steel Bar Insertion and Drilled In Tie Bar Detail (In Longitudinal Joint)

DEFORMED TIE BAR & DIMENSIONS KEY		Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel		LAP SPLICE LENGTH KEY
				Size	Spacing	Size	Spacing	
No. (L) Transverse Deformed Tie Bar In Place (Retain)	No. (C) Longitudinal Deformed Tie Bar In Place (Retain)	PCN	T	(C)	(E)	(L)	(F)	(I ₁) Lap Splice length for Repair Area Length L = 4' to <6'. (I ₂) Lap Splice length for Repair Area Length L = 6' to 8'. (I ₃) Lap Splice length for Repair Area Length L >8'.
Place No. (L) Transverse Deformed Tie Bar (Tie to In Place No. (C) Longitudinal Bars)	Place No. (C) Longitudinal Deformed Tie Bar (Tie to In Place No. (C) Longitudinal Bars)	3784	8"	6	8"	4	36"	
		3945	8"	6	8"	4	36"	
		5360	11"	6	6"	4	48"	
		5360	11"	6	6"	4	48"	

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

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

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

PLOTTED FROM - IRSE12105

PLOT NAME - 12

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

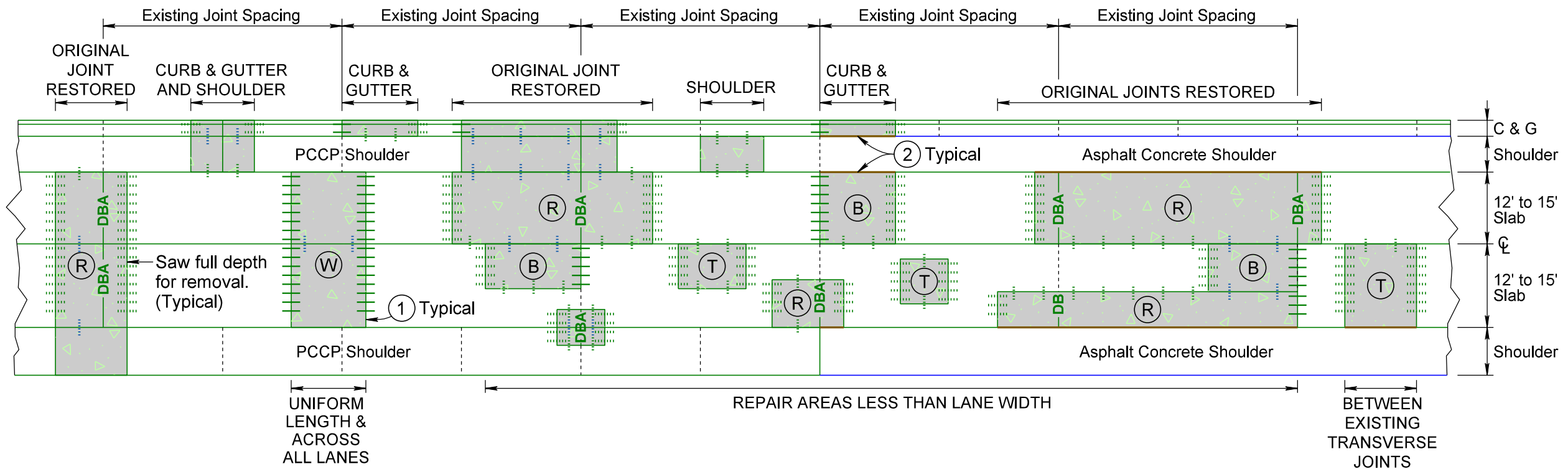
NONREINFORCED PCC PAVEMENT REPAIR

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

TYPICAL REPAIR AREAS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	23	29

Plotting Date: 02/13/2014



KEY:

PCC Pavement Repair Area

PCC PAVEMENT REPAIR AREA TYPES:

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

Steel Bars for Transverse Joints

Pavement Thickness ≥ 10.5 "

— Drilled in $1\frac{1}{2}$ " x 18" epoxy coated plain round dowel bars spaced 18" center to center.

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

Pavement Thickness ≥ 8.5 " and < 10.5 "

— Drilled in $1\frac{1}{4}$ " x 18" epoxy coated plain round dowel bars spaced 18" center to center.

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

Pavement Thickness < 8.5 "

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

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

DBA Dowel Bar Assembly

Steel Bars for Longitudinal Joints

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

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

NOTES: Saw around repair areas full depth for removal.

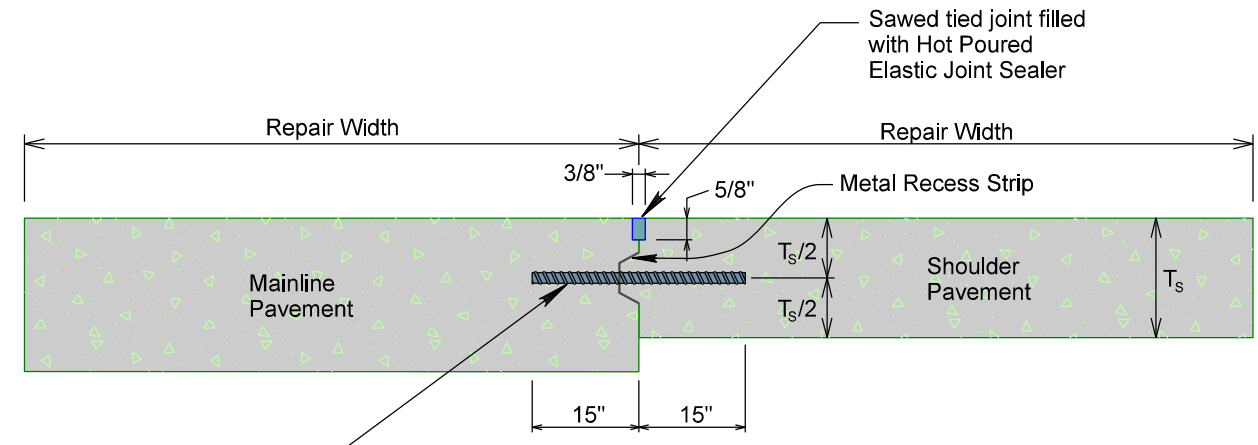
- ① Where possible, transverse joints shall be constructed/maintained full roadway width.
- ② Edges of repair areas shall be formed to match the width of the existing concrete pavement.
- ③ Need for bars in small repair areas on/near the shoulder to be determined on a case-by-case basis, on construction by the Engineer.

NONREINFORCED PCC PAVEMENT REPAIR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	24	29

Plotting Date: 02/13/2014

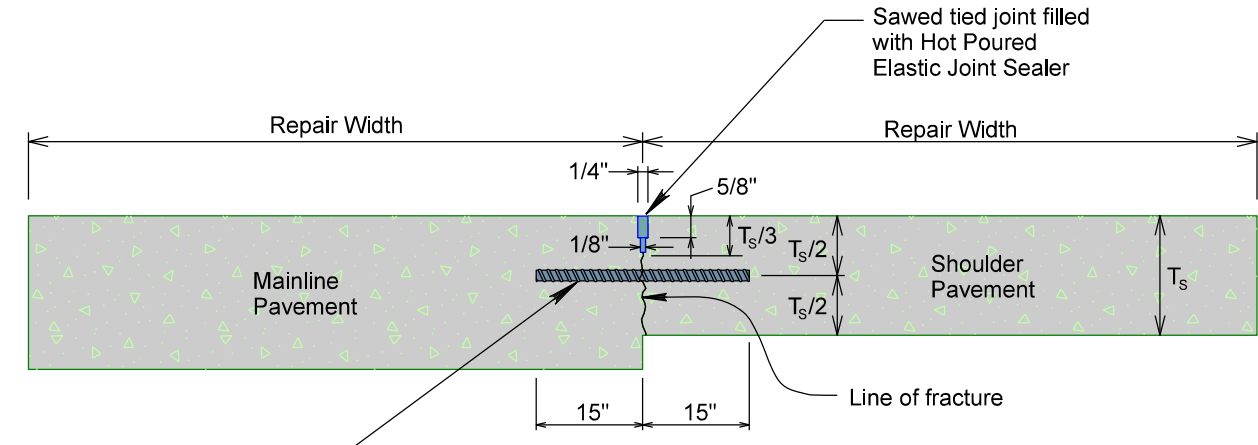
LONGITUDINAL SHOULDER CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



No. 5 x 30" Epoxy Coated Deformed Tie Bars spaced 48" center to center

T_s = New shoulder pavement thickness.
 Cost for furnishing and inserting tie bars shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

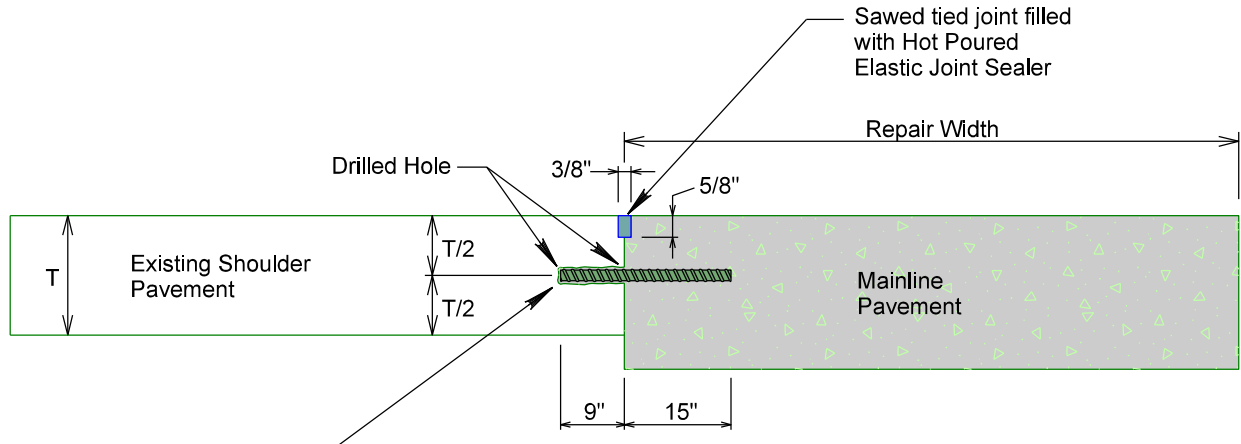
SAWED LONGITUDINAL SHOULDER JOINT



No. 5 x 30" Epoxy Coated Deformed Tie Bars spaced 48" center to center

T_s = New shoulder pavement thickness.
 The first saw cut to control cracking shall be a minimum of 1/3 the depth of the pavement. Additional sawing for widening the saw cut will be necessary.
 Cost for furnishing and inserting tie bars shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

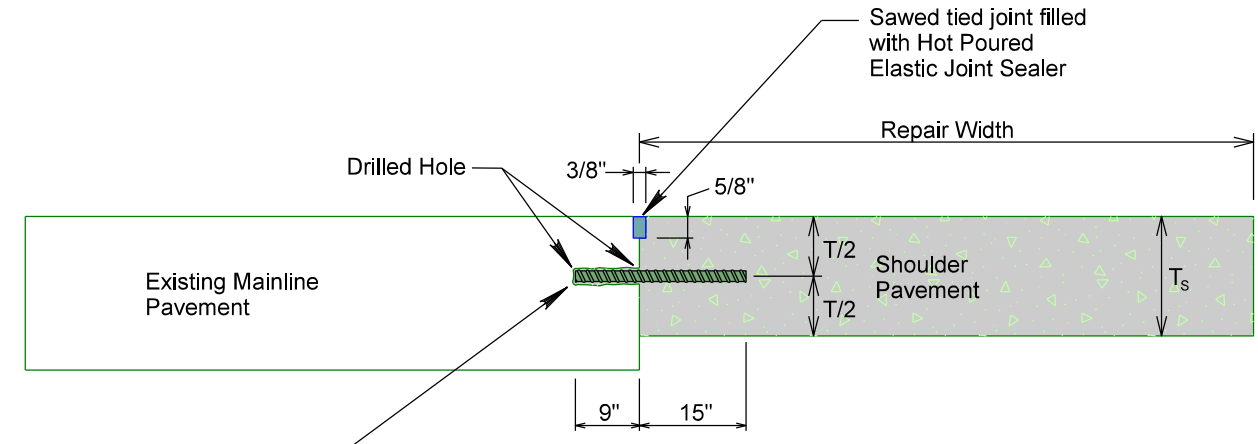
LONGITUDINAL SHOULDER JOINT WITH DRILLED IN TIE BARS



No. 5 x 24" Epoxy Coated Deformed Tie Bars spaced 30" center to center

T = Existing shoulder 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 tie bars shall be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

LONGITUDINAL SHOULDER JOINT WITH DRILLED IN TIE BARS



No. 5 x 24" Epoxy Coated Deformed Tie Bars spaced 30" center to center

T_s = New shoulder pavement thickness.
 Bar embedded a minimum depth of 9 inches into the existing pavement by utilizing an epoxy resin adhesive.
 Bars shall be placed a minimum of 15 inches from existing transverse contraction joints.
 Cost for furnishing and inserting drilled in tie bars shall be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

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

PLOT FROM - IRSE12105

PLOT NAME - 14

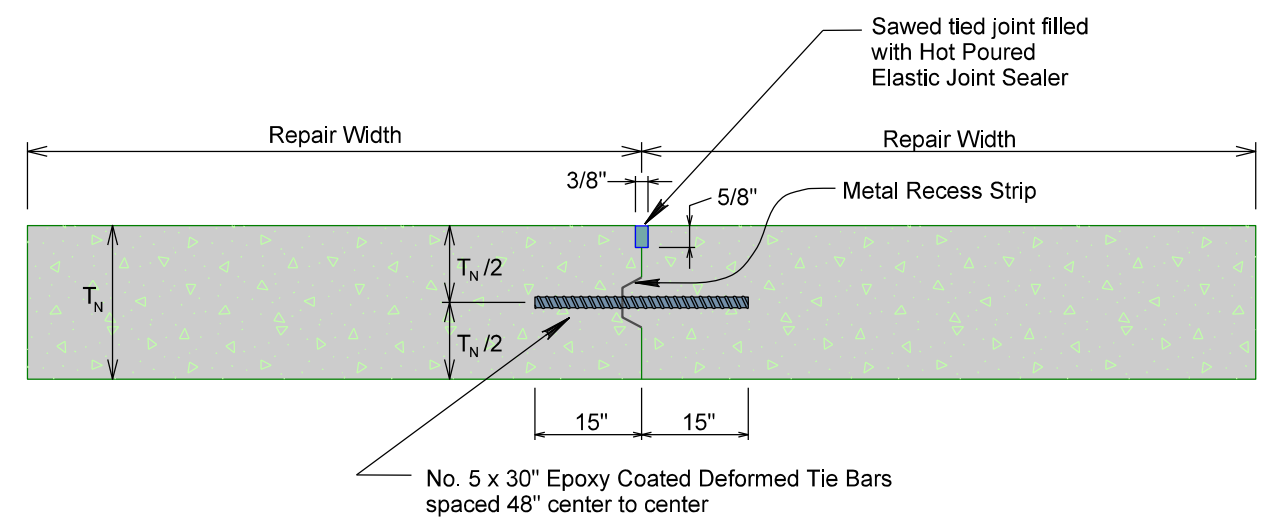
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NONREINFORCED PCC PAVEMENT REPAIR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	25	29

Plotting Date: 02/13/2014

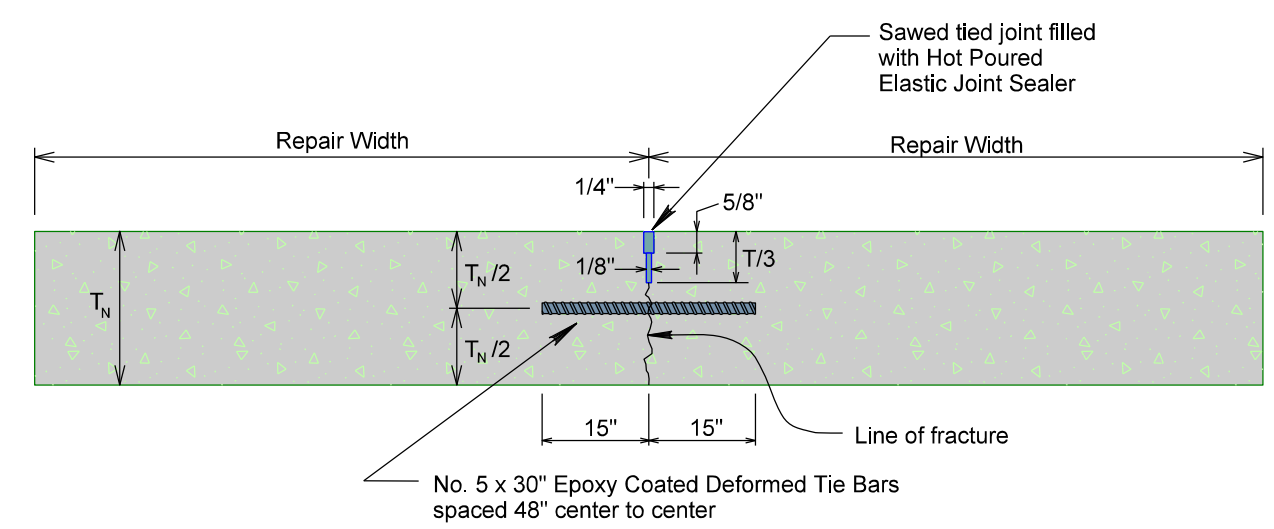
LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



T_N = New pavement thickness.

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

SAWED LONGITUDINAL JOINT

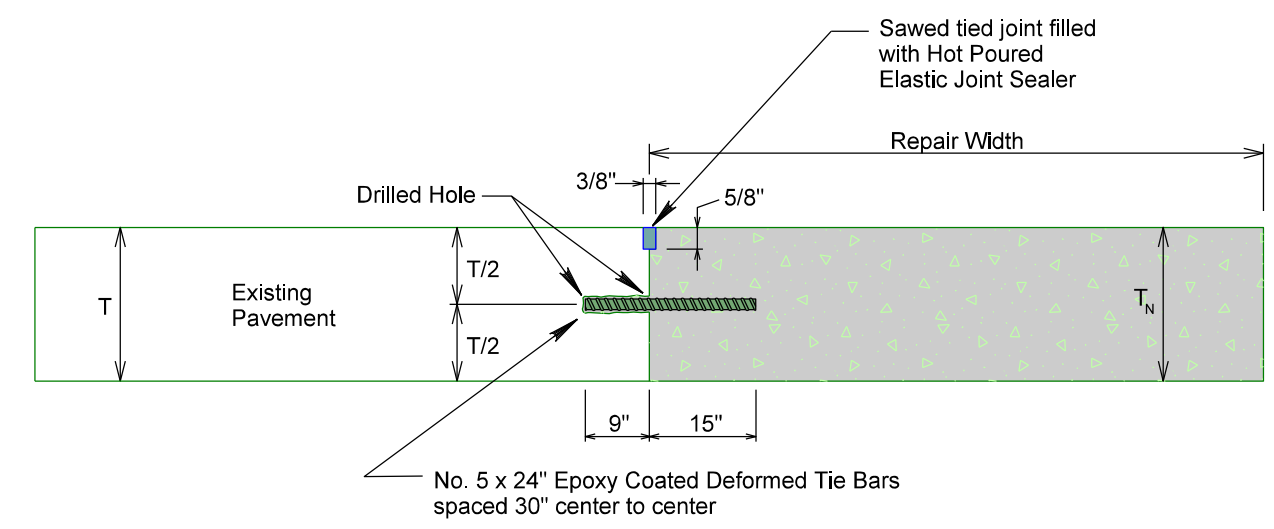


T_N = New pavement thickness.

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

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

LONGITUDINAL CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



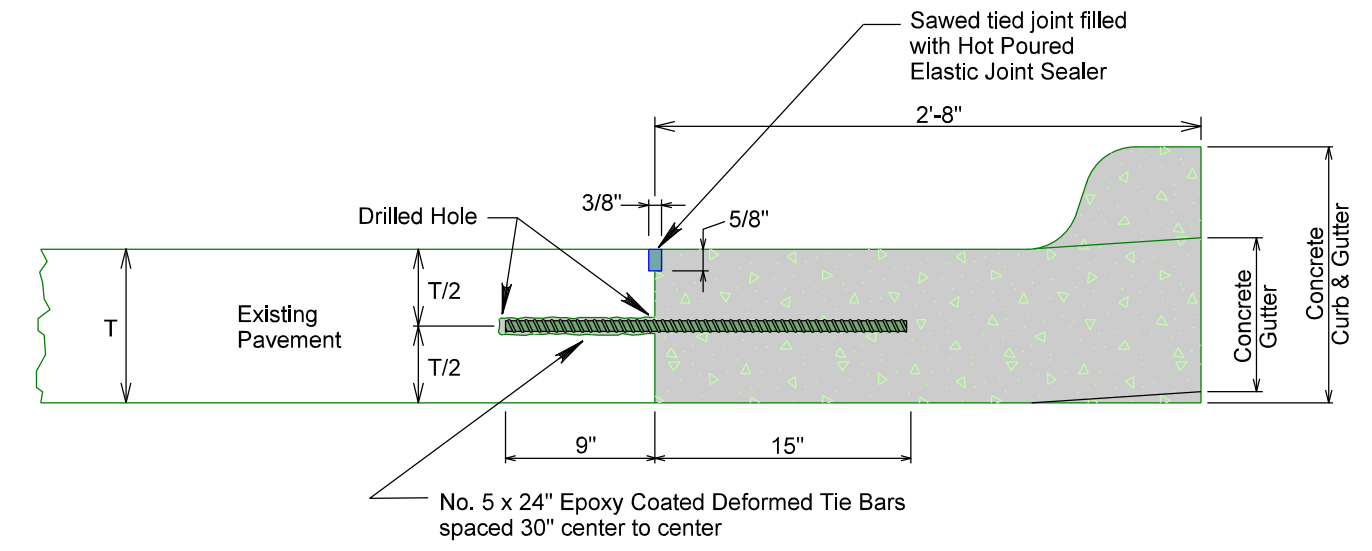
T = Existing pavement thickness.
 T_N = New pavement thickness.

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

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

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

LONGITUDINAL CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



T = Existing pavement thickness.

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

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

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

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

PLOTTED FROM - IRSE12105

PLOT NAME - 15

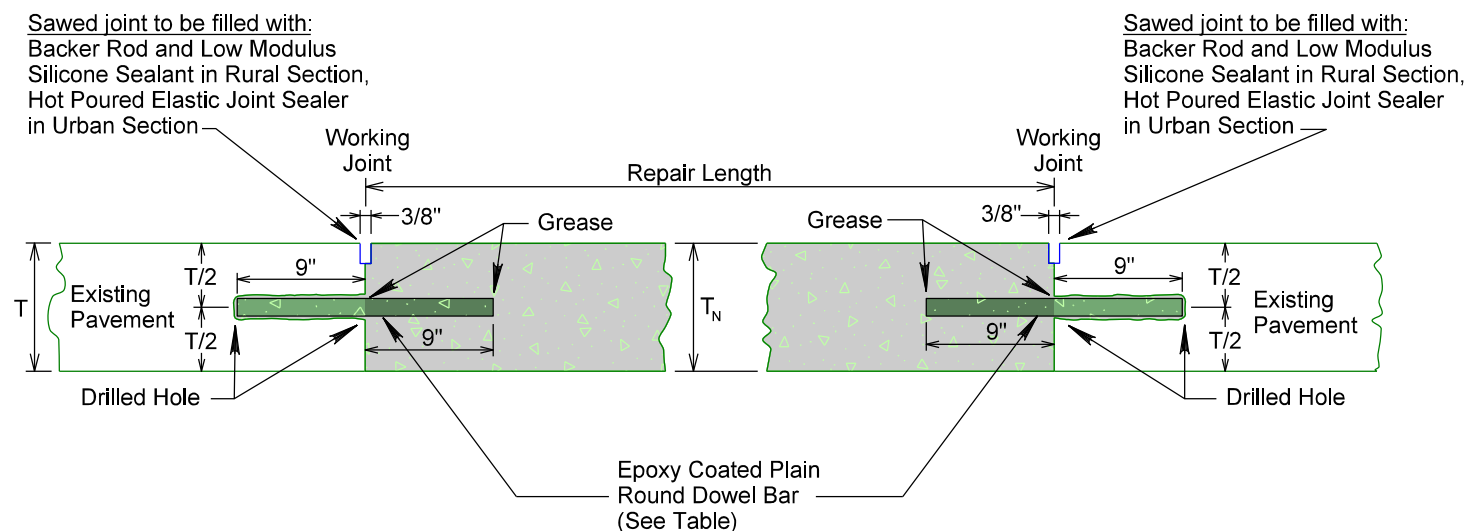
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NONREINFORCED PCC PAVEMENT REPAIR

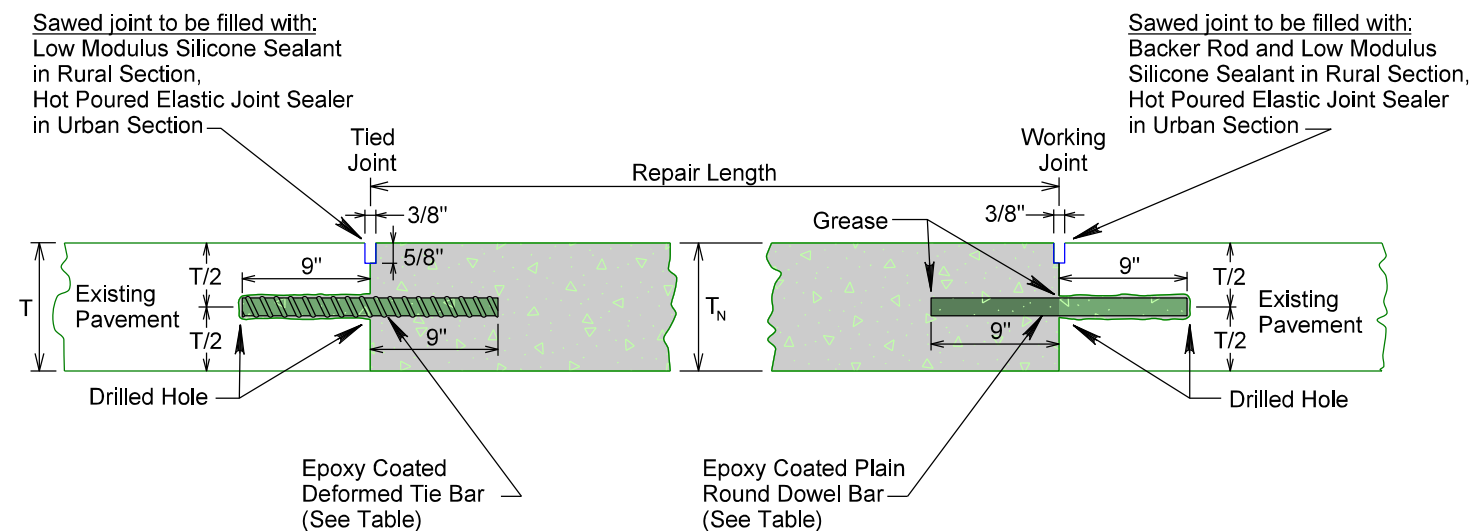
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	SF AREA PAVEMENT REPAIR	26	29

Plotting Date: 02/13/2014

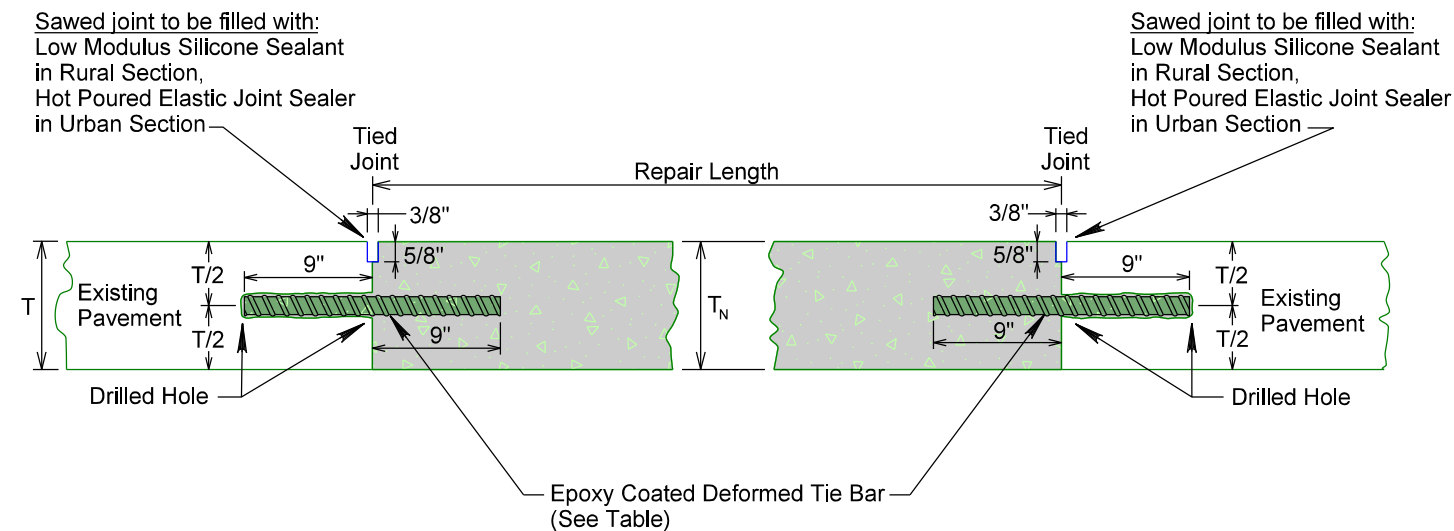
PLAIN ROUND DOWEL BAR INSERTION
TYPE W - (TWO WORKING JOINTS)



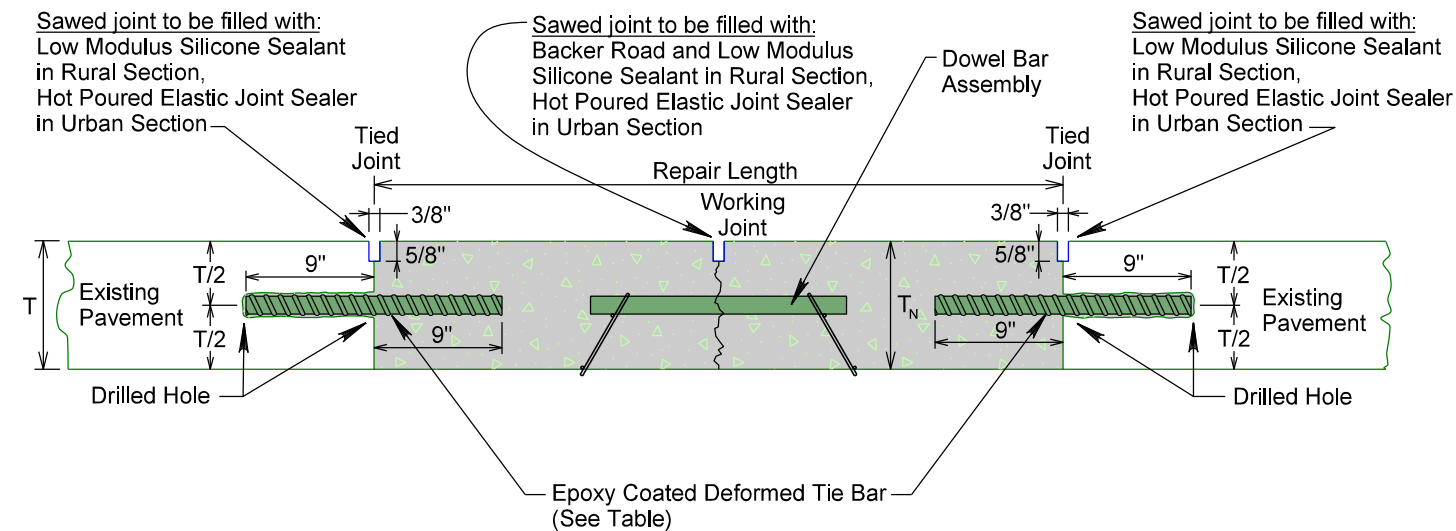
DEFORMED TIE BAR AND PLAIN ROUND DOWEL BAR INSERTION
TYPE B - (ONE TIED JOINT AND ONE WORKING JOINT)



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



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



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

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

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

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

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

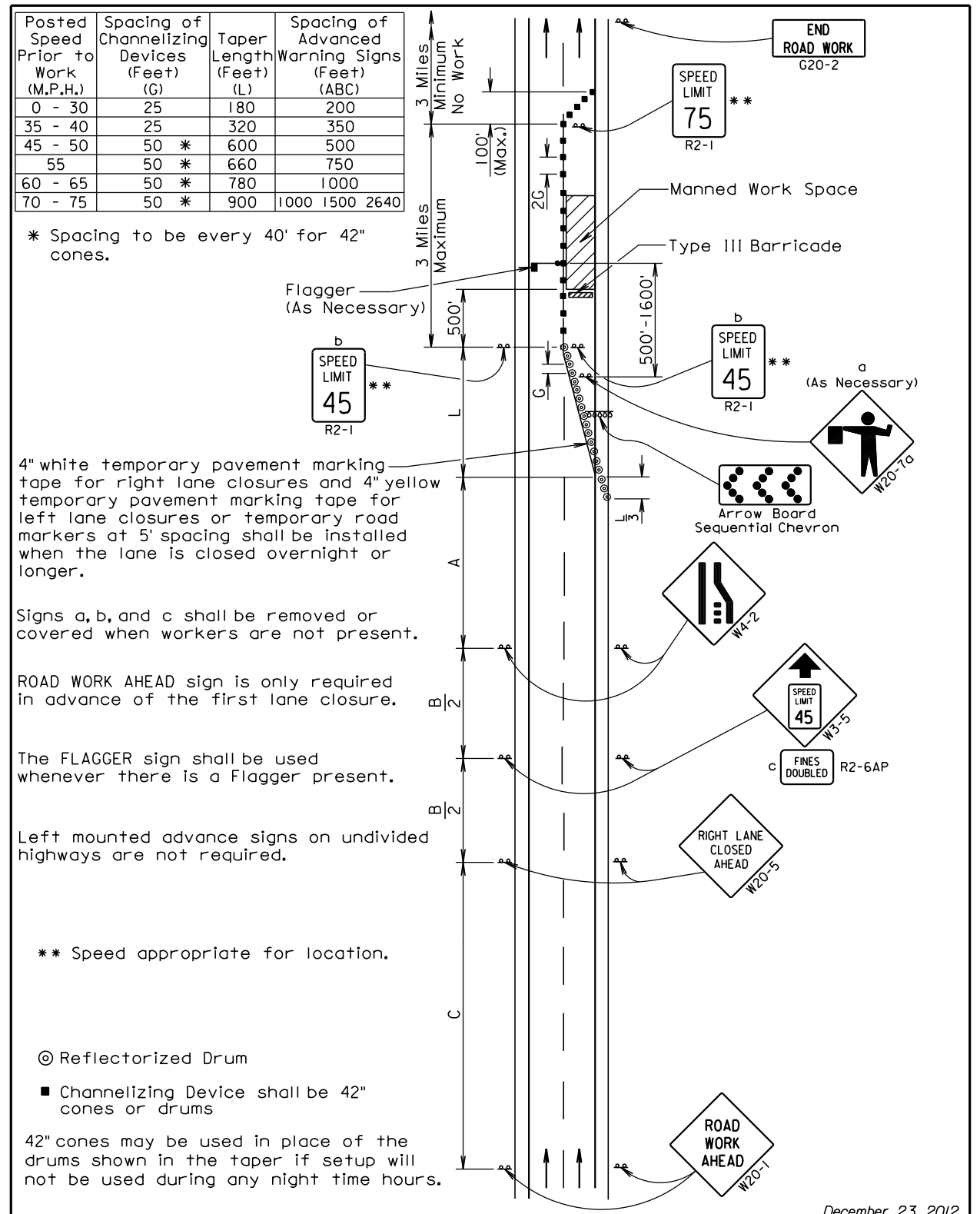
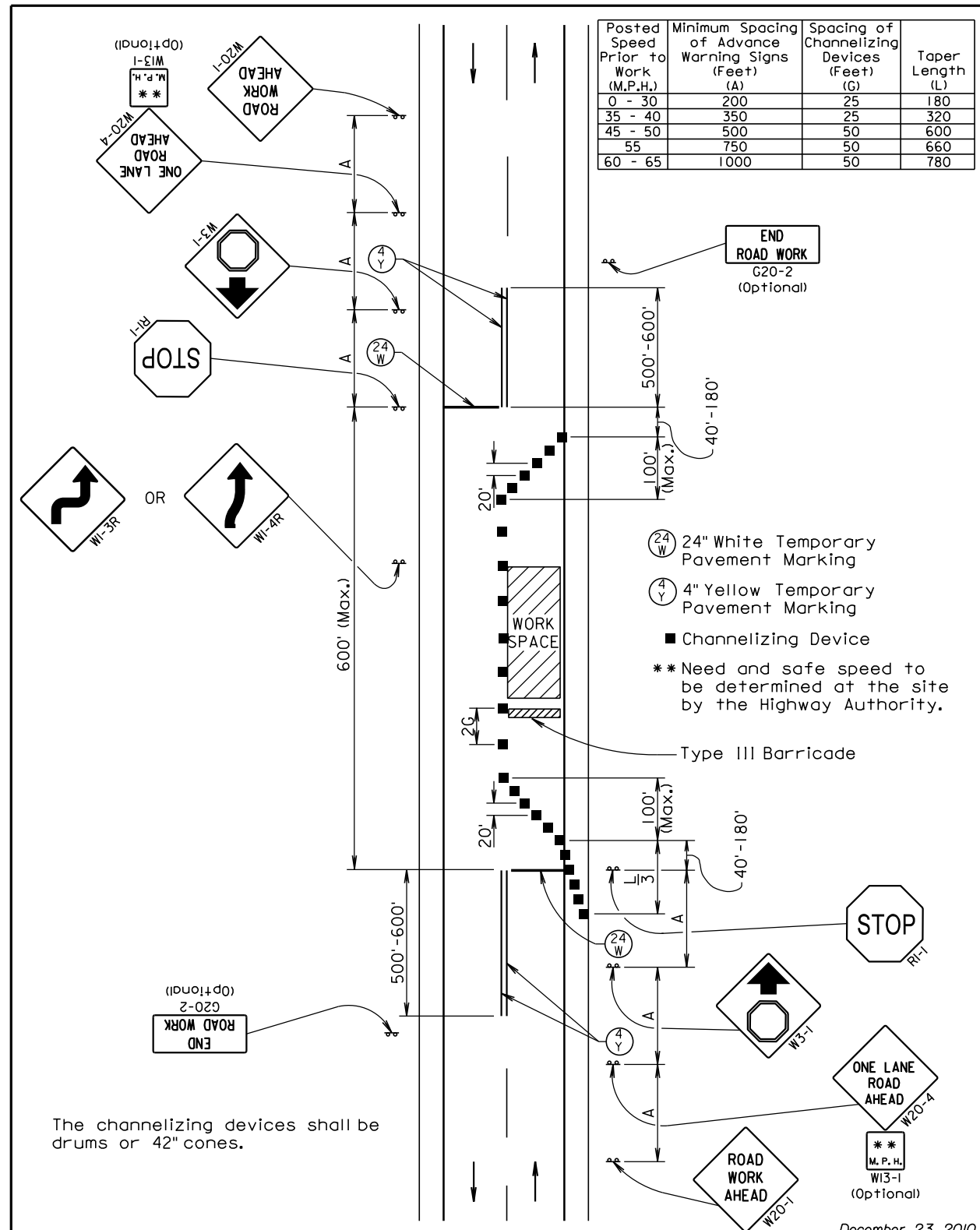
For T ≥ 8.5", T_N = T
For T < 8.5", T_N = T + 1"
(top of new pavement shall be flush with top of existing pavement)

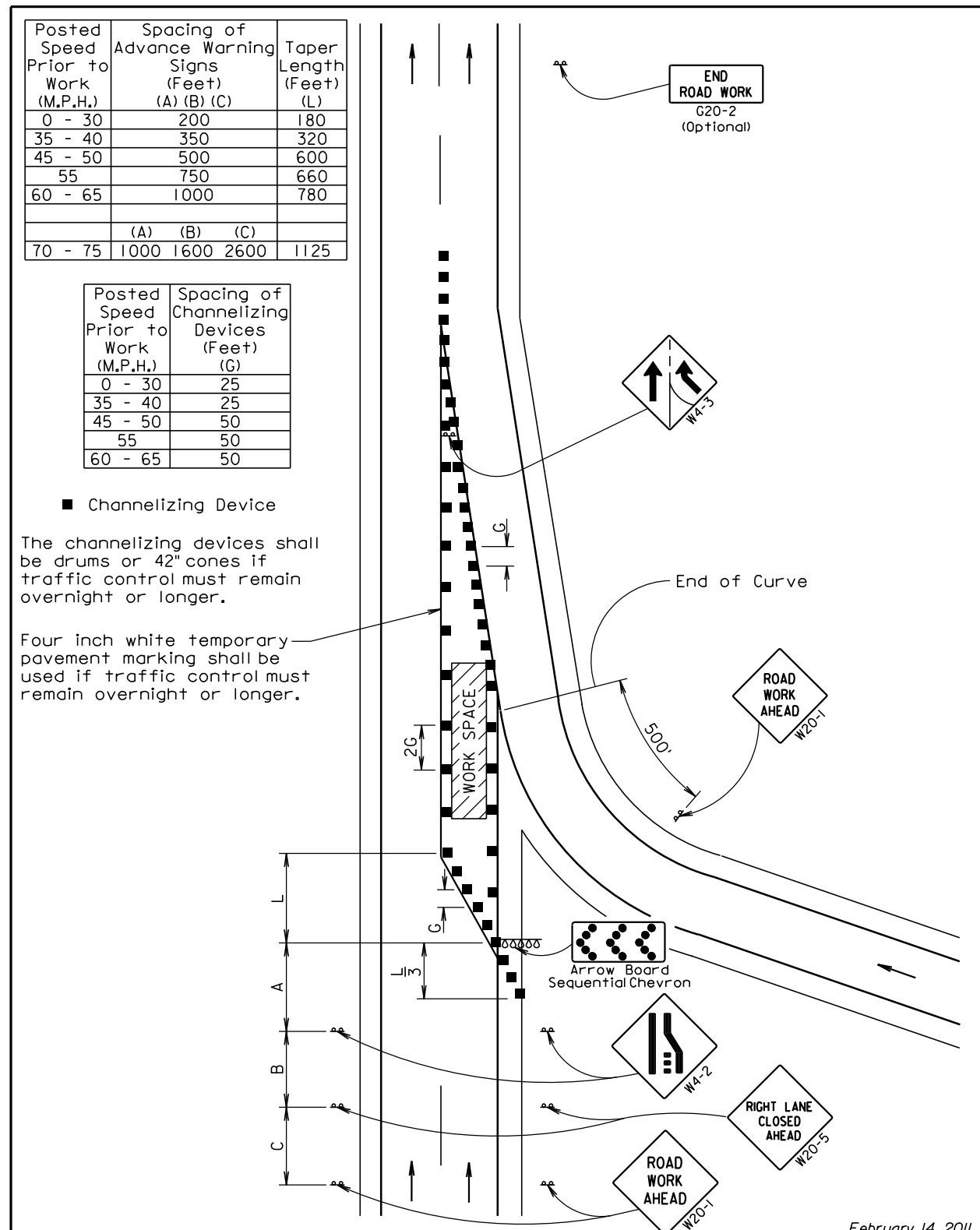
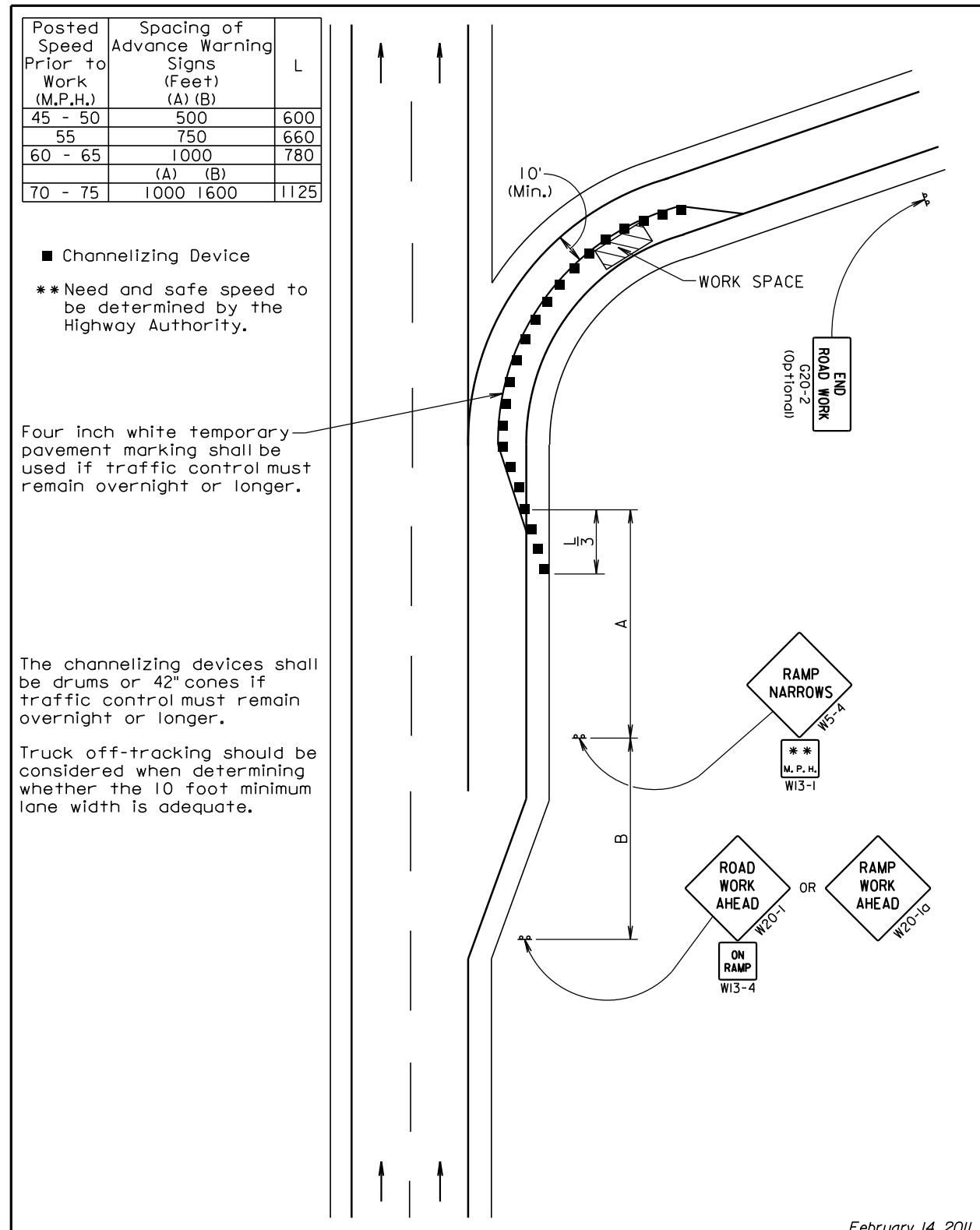
PLOT SCALE - 1" = 11.25'

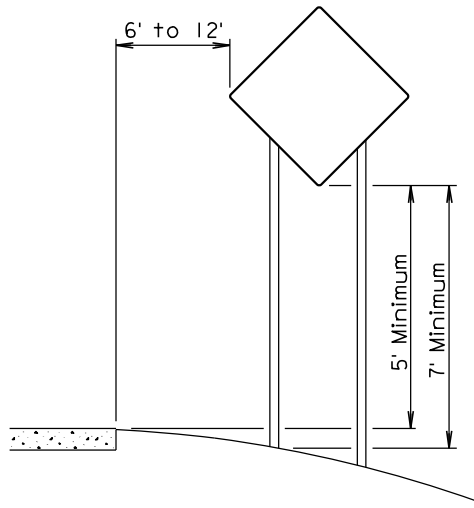
PLOTTED FROM - IRSE12105

PLOT NAME - 16

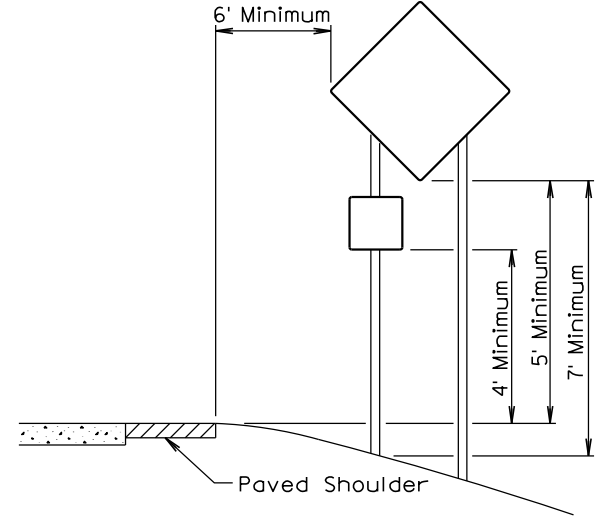
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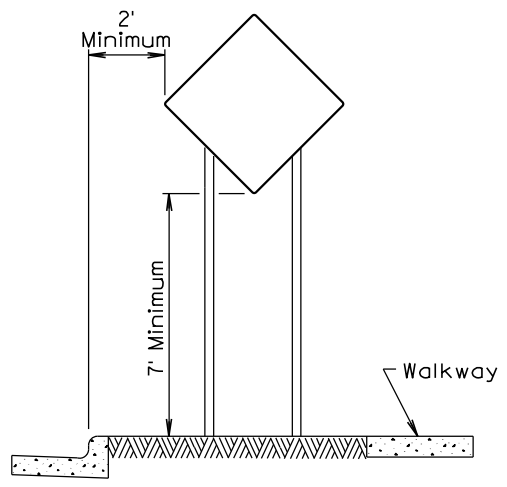




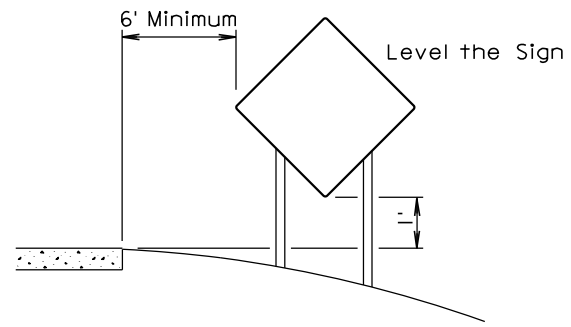
RURAL DISTRICT



RURAL DISTRICT WITH
SUPPLEMENTAL PLATE



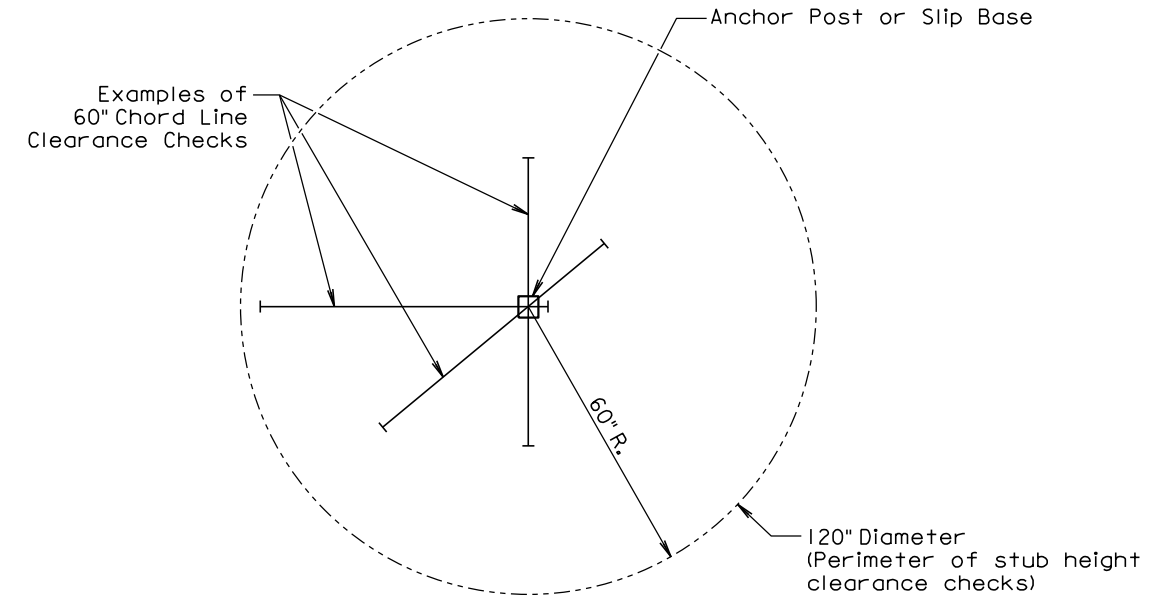
URBAN DISTRICT



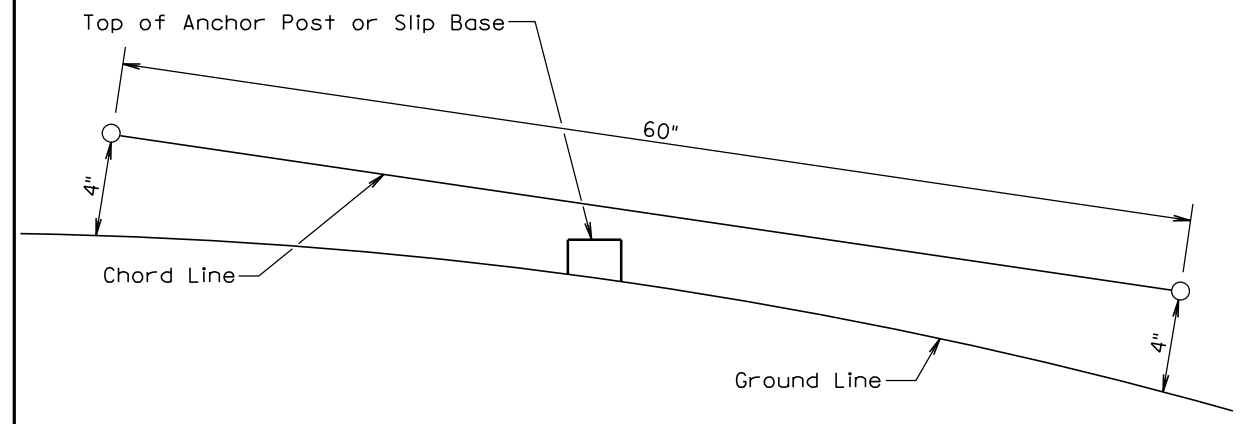
RURAL DISTRICT
3 DAY MAXIMUM

February 14, 2011

Published Date: 1st Qtr. 2014	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: 1st Qtr. 2014	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1