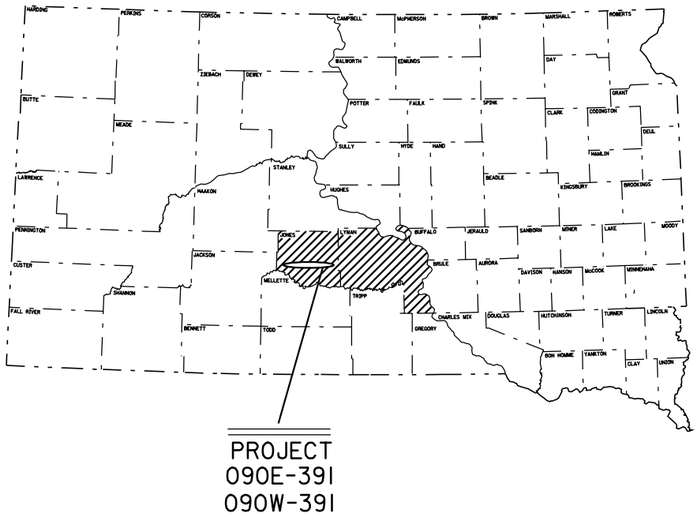
STATE OF SD	PROJECT	SHEET NO.	TOTAL SHEETS
	090E-391 & 090W-391	1	13



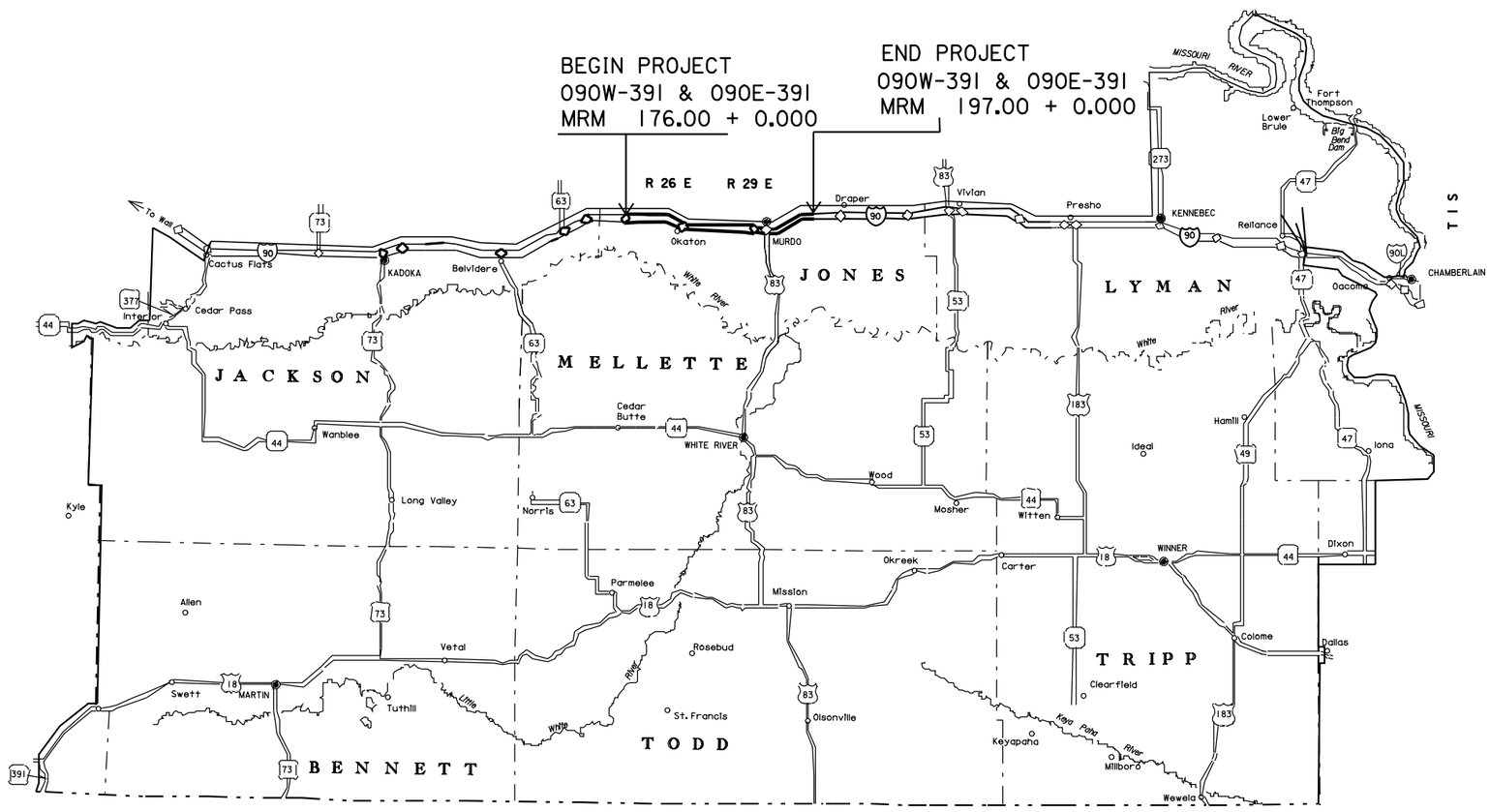
STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT 090E-391 & 090W-391
INTERSTATE HIGHWAY 90
JONES COUNTY

FULL DEPTH CONCRETE REPAIR

PCN 121D & 121E

INDEX OF SHEETS



090E-391 &
090W-391
JONES COUNTY
121D & 121E

DESIGN DESIGNATION

ADT (2009)	6045
ADT (2029)	9250
DHV	1270
D	50%
T DHV	12.6%
T ADT	27.7%

STORM WATER PERMIT

No Permit Required

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E1100	Remove Concrete Pavement	171.2	SqYd
260E2090	Gravel Cushion, State Furnished	100.0	Ton
380E5100	Continuously Reinforced PCC Pavement Repair	171.2	SqYd
380E6110	Insert Steel Bar in PCC Pavement	1,231	Each
634E0010	Flagging	40	Hour
634E0100	Traffic Control	2,652	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0310	Temporary Road Markers	6,300	Ft
634E0420	Type C Advance Warning Arrow Panel	4	Each

SPECIFICATIONS

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

SCOPE OF WORK

This project consists of full depth replacement of Continuously Reinforced Concrete (CRC) Pavement in areas where concrete pavement blowups or major failures have occurred. Full depth areas may vary in length and width throughout the project. The exact size and number of repair areas will be determined on construction by the Engineer.

SEQUENCE OF OPERATIONS

The Contractor shall submit his proposed sequence of operations for the Engineer's approval at least two weeks prior to the preconstruction meeting.

TRAFFIC CONTROL

Full depth concrete repairs shall be confined to a single lane width, leaving the adjoining lane open as a through traffic lane. Traffic shall not be routed onto the bituminous shoulders. Closure of both mainline lanes will not be permitted.

It will be permissible to work on both the eastbound and westbound lanes simultaneously.

TRAFFIC CONTROL (CONTINUED)

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

The length of repair zones (encompassing more than one repair location) will depend on the Contractor's operation, however, the length shall not exceed 3 miles and it will be classified and signed as one repair zone by placement of continuous channelization throughout the entire length of the repair zone. Under no circumstances will the Contractor be allowed to set up two work zones in the same direction of travel which are closer than 3 miles apart.

The Contractor's vehicles and equipment will not be allowed to use the maintenance crossovers at any time during the construction of the project.

Contractor's vehicles or equipment entering or leaving a closed work area or when traveling in an open lane at speeds less than 40 MPH shall display a flashing amber light.

Storage of vehicles and equipment shall be as near the right-of-way as possible. 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.

Work activities will not be allowed during non-daylight hours.

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

Fixed location signing placed more than two days prior to the start of construction shall be covered until the time of construction. The cost of materials, labor and equipment necessary to complete this work shall be incidental to other contract items. No separate payment will be made.

TRAFFIC CONTROL (CONTINUED)

Removing, relocating, covering, salvaging and resetting of existing 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.

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

The Contractor shall designate an employee whose primary responsibility is for the maintenance of traffic, 24 hours a day and 7 days a week. The designated person must have sufficient training and experience in the field of construction traffic control and be knowledgeable about the Manual of Uniform Traffic Control Devices (MUTCD). The cost of the traffic control person shall be incidental to the contract lump sum price for TRAFFIC CONTROL, MISCELLANEOUS. The employee selected shall be approved by the Engineer. Name, phone number, and location of person or persons shall be provided to the SD Department of Transportation, SD Highway Patrol, and the respective County Sheriff's Departments.

Traffic will be maintained on the proper directional set of lanes and ramps throughout the project during repair operations. No crossing over of traffic to the opposing set of lanes or wrong way movement on ramps will be allowed. The Contractor will so arrange the details of their operations as to cause a minimum of inconvenience and delay to the traveling public.

At interchange ramp tapers, location of signs, barricades and channelizing devices on the mainline shall be adjusted to accommodate traffic entering or leaving the work area.

Certified flaggers will be required in a work zone occupied by workers and or equipment when work activity presents a hazard to the worker or through traffic.

TRAFFIC CONTROL (CONTINUED)

The Contractor will be paid for the actual quantity of movable signs and advance warning arrow panels used, not to exceed four repair zones, regardless of the number of times they are moved or the number of work zones. No payment will be made for signs used in traffic set ups exceeding four repair zones. Signs may use a hinged section or tabs to expedite changing the message. If hinged signs or tabs are used, cost of the hinged section and tabs shall be incidental to the contract unit price per unit for Traffic Control and shall be considered as one sign for payment purposes.

The Contractor shall place an eight foot Type III Barricade in front of each repair area prior to the removal of the concrete repair section. The Contractor will be paid for twelve Type III Barricades, providing at least twelve are in use at the same time. If the Contractor chooses to remove more than twelve repair sections at any one time, The Contractor at no expense to the State, shall furnish additional barricades.

Signs shall be removed, covered or turned from view and channelizing devices removed when no longer applicable. Resetting, temporary relocation and/or covering of existing traffic control devices as necessary to adequately maintain traffic or perform the work shall be the responsibility of the contractor and the cost shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

The Contractor is responsible to ensure that all traffic control devices are displayed in accordance with the MUTCD, corresponding plan sheets and standard plates illustrated in the plans. If a device is improperly displayed, or not displayed at all when it should be, it will be considered as an infraction upon the plans.

The Contractor may use 42" Grabber Cones for longitudinal delineation only. All tapers, lane transitions, and marking of full depth repairs shall be accomplished utilizing drums in accordance with the MUTCD.

TRAFFIC CONTROL (CONTINUED)

Channelizing drums are to be of a two part type construction with breakaway bases. All individual drum locations shall be adequately marked on the roadway surface to expedite their replacement upon the event that any drums become displaced. The cost of these devices shall be incidental to the contract lump sum price for “Traffic Control Miscellaneous”.

All traffic control devices are to be in like new condition. Any traffic control device that warrants replacement due to its poor condition or absence shall be replaced immediately by the Contractor at his expense.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

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

The Contractor shall saw the in place concrete transversely full depth at the limits of the repair area.

The Contractor shall lift out or break out the center section of concrete (including reinforcing steel).

The Contractor shall remove and dispose of the in place concrete and shape and recompact the underlying base material prior to placement of concrete.

Existing concrete faces shall be cleaned to remove dirt and debris prior to placement of concrete.

Place reinforcing steel according to the notes and layout for 24’ Continuously Reinforced PCC Pavement Repair Area.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR – (CONTINUED)

Concrete placed adjacent to asphalt concrete shoulders shall be formed full depth to match the width of existing concrete pavement. Care shall be taken to limit the amount of shoulder damaged during concrete removal and form placement. The excavated area of the asphalt concrete shoulder adjacent to repair areas shall be filled with asphalt concrete cold millings furnished by the State and located in the Murdo Maintenance Yard. Payment for loading, hauling and any incidentals required for placing the cold millings shall be incidental to the contract unit price per square yard for “Continuously Reinforced PCC Pavement Repair”.

A central stationary plant site or truck mixers, or self contained, mobile, continuous mixers, meeting the requirements of Section 460.3D or 460.3E, shall be used for all concrete repair work unless otherwise approved by the Engineer. Either delivery method must ensure that all requirements pertaining to delivery and placement of the concrete as noted in the Standard Specifications Section 380.3.G and 380.3.H are met.

To allow the adjacent concrete to reach its maximum expansion, concrete shall not be placed in the repair areas before 12:00 (noon) or as directed by the Engineer.

Any saw cuts that extend beyond the boundaries of the repair area will be filled with a non-shrinkage mortar mix at the Contractor’s own expense.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR – (CONTINUED)

Upon placement of the concrete, all repair areas will be straight edged to ensure a smooth riding surface and shall be textured transversely with the pavement by finishing with a stiff broom. Repair areas longer than ten (10) feet shall be checked with a ten (10) foot straight edge. The permissible longitudinal and transverse surface deviation shall be 1/8 inch in 10 feet.

New pavement thickness shall be 8" which is equal to existing pavement thickness.

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

The slump requirement will be limited to three (3") inches maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air content. Coarse aggregate shall be crushed ledge rock, Size No. 1 unless an alternate gradation is approved by the concrete engineer as part of the mix design submittal. The Contractor is responsible for the mix design used. The Contractor shall submit a mix design and supporting documentation for approval at least 2 weeks prior to use. In lieu of submitting a mix design, the Contractor may elect to use one of the following dependent upon the type of cement to be used:

	LB / CU YD	LB / CU YD
Cement	800 (Type I-II)	710 (Type III)
Water	282	300
Fine Aggregate	1039	1114
Coarse Aggregate	1726	1668

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

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

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR – (CONTINUED)

Concrete shall be covered with a suitable insulation blanket consisting of a closed cell polystyrene foam protected by at least one layer of plastic. Insulation blanket shall have and 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 the existing concrete by 4'.

Locations and quantities of Continuously Reinforced PCC Pavement Repair are subject to change in the field at the discretion of the Engineer.

Continuously Reinforced PCC Pavement Repair will be measured to the nearest tenth of a foot and computed to the nearest tenth of a square yard.

Continuously Reinforced PCC Pavement Repair, measured as provided above, will be paid for at the contract unit price per square yard. This will be full compensation for all labor, equipment, materials, and incidentals necessary for the preparation of removed area, furnishing and placing concrete, finishing and curing of Continuously Reinforced Pavement Repair.

REMOVE CONCRETE PAVEMENT

Remove Concrete Pavement will be measured to the nearest tenth of a foot and computed to the nearest tenth of a square yard.

Remove Concrete Pavement, measured as provided above, will be paid for at the contract unit price per square yard. This will be full compensation for all labor, equipment, materials, and incidentals necessary for the saw cutting and removal of concrete pavement.

GRAVEL CUSHION, STATE FURNISHED

After removal of full depth concrete pavement, an inspection of the gravel cushion subgrade is to be made. Areas of excess moisture are to be dried to the satisfaction of the Engineer. Loose material shall be removed and disturbed areas leveled and compacted to the satisfaction of the Engineer.

GRAVEL CUSHION, STATE FURNISHED – (CONTINUED)

If additional gravel cushion material is required, the material shall be obtained from the Murdo Maintenance Yard and may be used without further testing.

Compaction of the Gravel Cushion, State Furnished shall be to the satisfaction of the Engineer.

Cost of this work, including loading, hauling and placement of the gravel cushion material, shall be incidental to the contract unit price bid per ton for "Gravel Cushion, State Furnished".

This material is royalty free to the Contractor.

Furnish cost to the State for the Gravel Cushion, State Furnished from the Murdo Maintenance Yard Stockpile is $3.00 per ton.

PLACEMENT OF REINFORCING STEEL FOR CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

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

1. No. 5 longitudinal bars shall be drilled in between every in place longitudinal steel bar. The No. 5 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 with new No. 5 longitudinal bars across the length of the repair area.

2. No. 5 transverse bars shall be drilled in starting 6" from both ends of the repair area. The spacing shall then be 30" center to center throughout the length of the repair area. The transverse bars shall overlap 9" into the existing concrete. New No. 5 deformed steel bars shall be placed across the width of the repair area and lapped 4' minimum with the drilled in bars. The drilled holes and rebar shall be installed per the steel bar installation note.

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

CONCRETE PLACEMENT AND FINISHING FOR CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

Concrete placement and finishing shall conform to Section 380. Finishing and curing will not be measured for payment and cost of this work and materials shall be incidental to the contract unit price bid per square yard for "Continuously Reinforced PCC Pavement Repair".

STEEL BAR INSERTION

The Contractor shall insert steel bars into drilled holes in the joints as specified. An epoxy resin adhesive must be used to anchor the steel bar into the drilled hole.

The 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)

The diameter of the drilled holes in the existing concrete 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 and 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 one-third to one-half 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 eliminated voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed.

STEEL BAR INSERTION (CONTINUED)

Cost for the 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 JOINTS

All longitudinal and transverse joints at concrete repair areas shall be sawed and sealed. Saw cuts shall be a minimum of 1/4" wide and 5/8" deep.

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

Joints shall be sealed with Hot Pour or Silicone Joint Sealant.

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

TABLE OF PROJECT QUANTITIES (For Information Only)

BID ITEM	090E-391	090W-391
Mobilization	LS	LS
Remove Concrete Pavement(SqYd)	100.2	71.0
Gravel Cushion, State Furnished (Ton)	50	50
Continuously Reinforced PCC Pavement Repair (SqYd)	100.2	71.0
Insert Steel Bar in PCC Pavement (Each)	743	488
Flagging (Hour)	20	20
Traffic Control (Unit)	1326	1326
Traffic Control, Miscellaneous	LS	LS
Temporary Road Markers	3600	2700
Type C Advance Warning Arrow Panel (Each)	2	2

GENERAL NOTES FOR CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CONTINUED)

TABLE OF CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

LOCATION	LANE	WIDTH FEET	LENGTH FEET	SQYDS
EASTBOUND LANES				
183.345	DL	12	10	13.3
183.345	PL	12	6	8.0
185.870	DL	4	4	1.8
185.932	DL	4	4	1.8
185.983	DL	4	4	1.8
186.227	DL	12	4	5.3
186.227	PL	12	4	5.3
193.401	DL	4	6	2.7
193.445	DL	12	4	5.3
193.776	DL	12	4	5.3
193.808	DL	12	4	5.3
193.814	DL	4	5	2.2
193.815	DL	4	4	1.8
193.868	DL	6	4	2.7
194.718	DL	12	4	5.3
194.719	PL	12	4	5.3
194.926	DL	5	4	2.2
195.011	DL	6	8	5.3
195.011	PL	12	4	5.3
195.107	DL	5	8	4.4
195.312	DL	6	12	8.0
196.227	DL	4	4	1.8
			EB Total	100.2

GENERAL NOTES FOR CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CONTINUED)

TABLE OF CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

LOCATION	LANE	WIDTH FEET	LENGTH FEET	SQYDS
WESTBOUND LANES				
176.377	PL	12	4	5.3
177.315	DL	4	8	3.6
177.756	DL	12	4	5.3
177.756	PL	12	4	5.3
177.775	DL	6	8	5.3
179.123	DL	12	12	16.0
189.802	DL	6	4	2.7
190.543	DL	4	7	3.1
190.551	DL	8	4	3.6
191.276	DL	7	4	3.1
191.449	DL	6	4	2.7
191.451	DL	6	10	6.7
191.454	DL	5	10	5.6
191.505	DL	6	4	2.7
			WB Total	71.0

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 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.

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.

WASTE DISPOSAL SITE (CONTINUED)

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the Administrative Rules of South Dakota (Solid Waste) Article 74:27 administered 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”.

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.

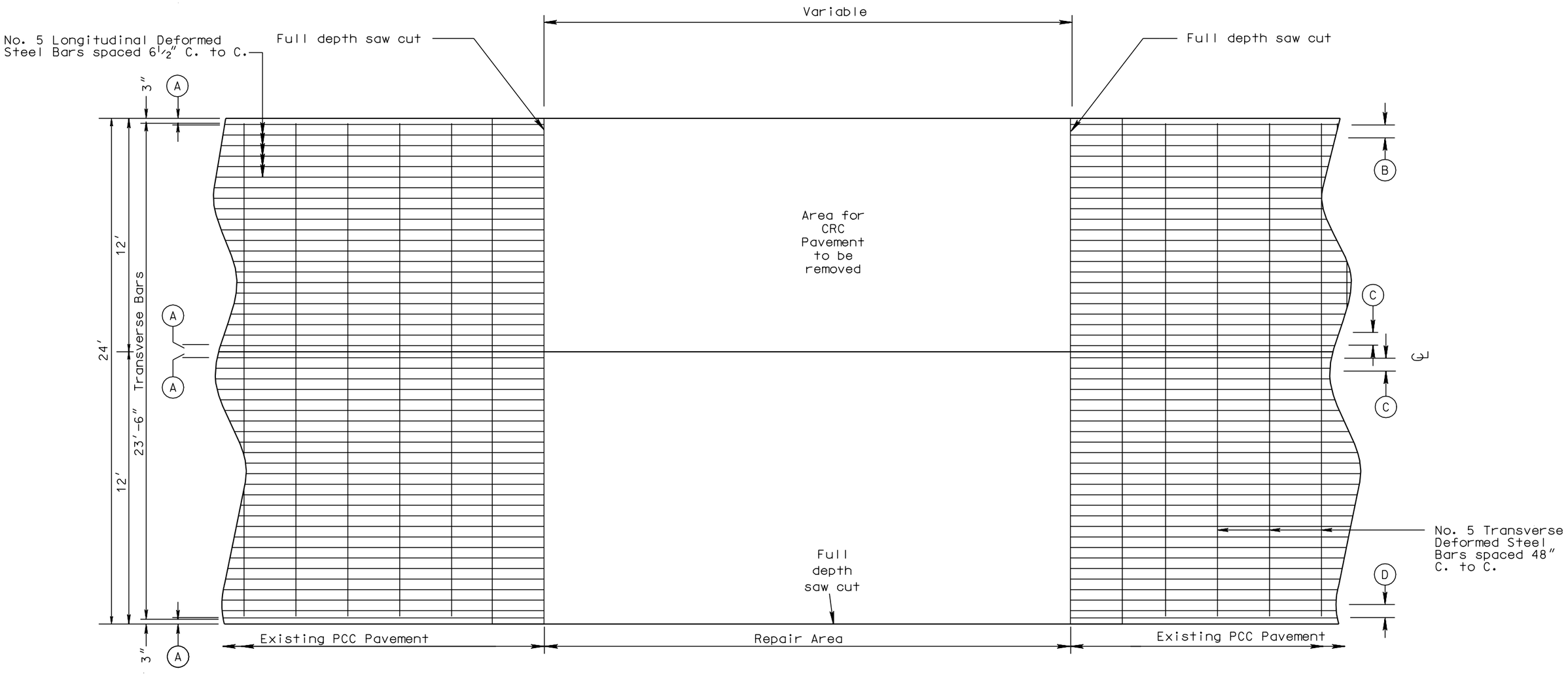
Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

WASTE DISPOSAL SITE (CONTINUED)

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.

24′ CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR AREA

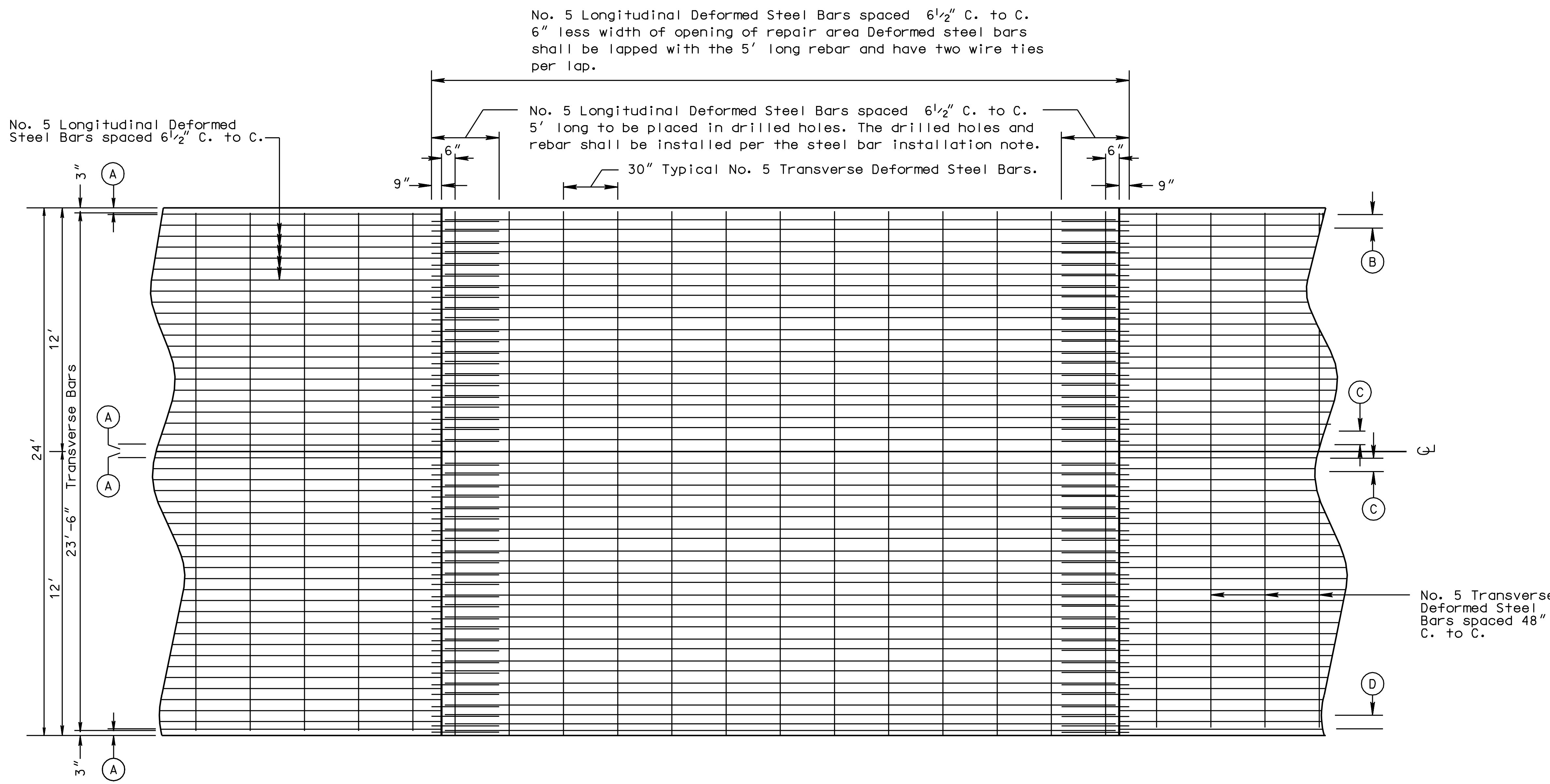
Sheet 1 of 2



Depth of Pavement	(A)	(B)	(C)	(D)	(E)	(F)
8″	4″	8″	8″	8″	8″	36″
8.5″	4″	4″	4½″	5½″	7½″	36″
9″	4″	5″	5″	8″	7″	48″
9.5″	3¾″	6½″	6½″	4½″	6½″	48″
10″	3¾″	6½″	6½″	4½″	6½″	48″
10.5″	4″	5″	5″	5″	6″	48″
11″	4″	5″	5″	5″	6″	48″

24′ CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR AREA

Sheet 2 of 2

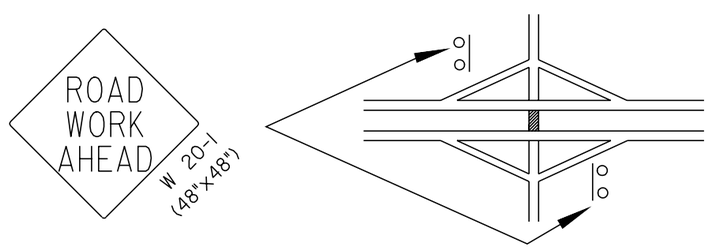


Depth of Pavement	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
8″	4″	8″	8″	8″	8″	36″	39	19	38
8.5″	4″	4″	4½″	5½″	7½″	36″	43	21	42
9″	4″	5″	5″	8″	7″	48″	45	22	44
9.5″	3¾″	6½″	6½″	4½″	6½″	48″	48	24	48
10″	3¾″	6½″	6½″	4½″	6½″	48″	48	24	48
10.5″	4″	5″	5″	5″	6″	48″	52	26	52
11″	4″	5″	5″	5″	6″	48″	52	26	52

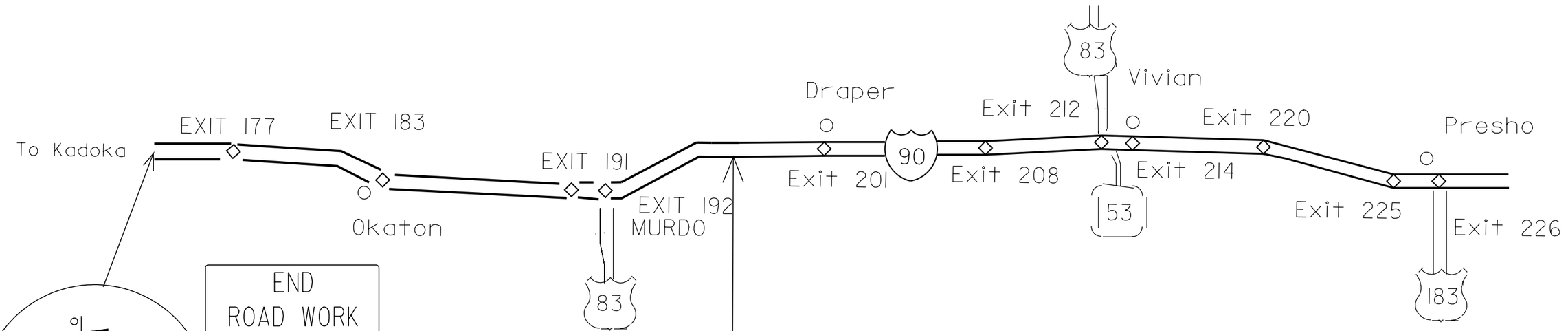
All rebar splice length shall be 4′ or Contractor may use Mechanical splicers.

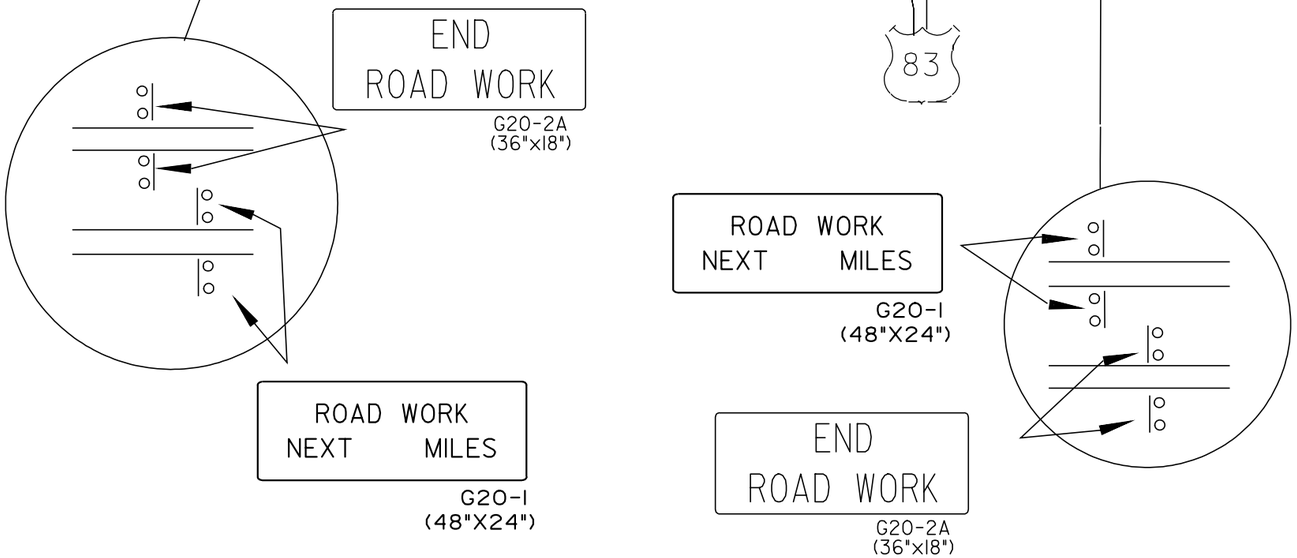
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	090E-391 & 090W-391	10	13

FIXED LOCATION SIGN LAYOUT



EXIT 177, 183, 191, & 192





NOTES:

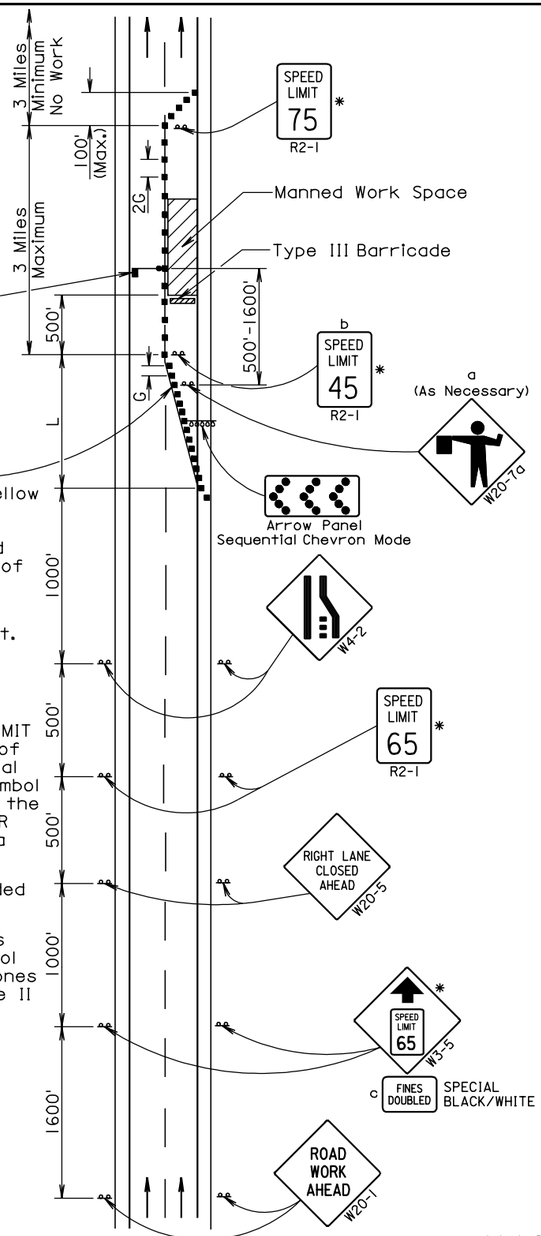
SIGN LOCATIONS WILL BE VERIFIED IN THE FIELD BY THE ENGINEER PRIOR TO INSTALLATION

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	090E-391 & 090W-391	11	13

ITEMIZED LIST FOR TRAFFIC CONTROL

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT ## MILES	4	24	96
G20-2A	36" x 18"	END ROAD WORK	4	17	68
R2-1	30" x 36"	SPEED LIMIT ##	16	23	368
W3-5	48" x 48"	SPEED REDUCTION	8	34	272
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	8	34	272
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	16	34	544
W20-5	48" x 48"	LT. OR RT. LANE CLOSED #### FT. OR AHEAD	8	34	272
W20-7a	48" x 48"	FLAGGER	4	34	136
SPECIAL	30" x 24"	FINES DOUBLED	8	18	144
*****	*****	TYPE III BARRICADE - 8 FT. SINGLE SIDED	12	40	480
				TOTAL UNITS	**2652**

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)
0 - 30	25	180
35 - 40	25	320
45 - 50	50	600
55	50	660
60 - 65	50	780
70 - 75	50	900



▪ Channelizing Device

* Speed appropriate for location.

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

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

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

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

Left mounted advance signs on undivided highways are not required.

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

July 1, 2005

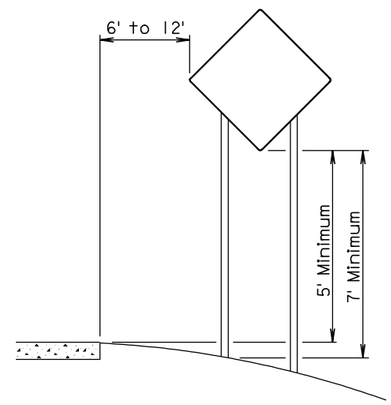
Published Date: 1st Qtr. 2011

SDDOT

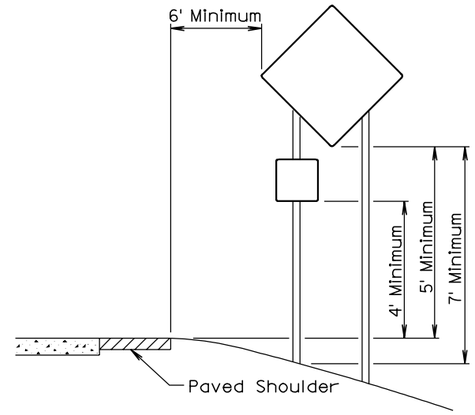
MANNED WORK SPACE SIGNING FOR DIVIDED AND UNDIVIDED HIGHWAYS

PLATE NUMBER 634.63

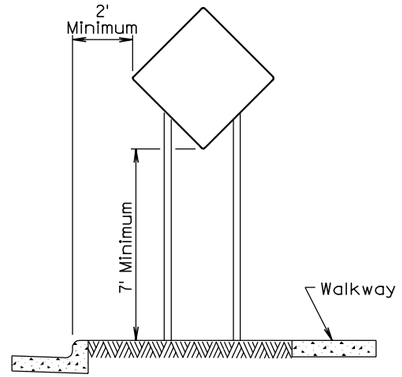
Sheet 1 of 1



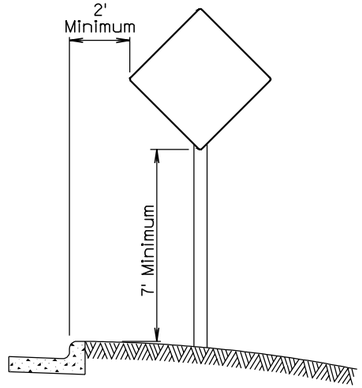
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT



URBAN DISTRICT

December 23, 2003

Published Date: 1st Qtr. 2011

SDDOT

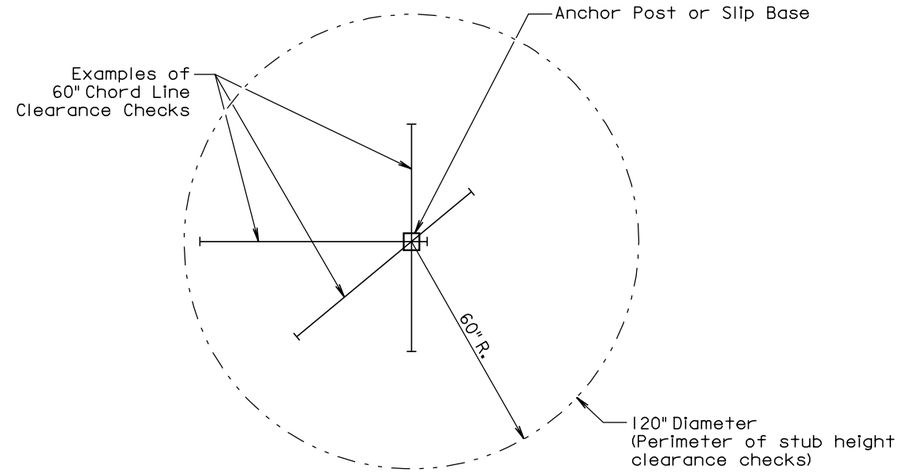
BREAKAWAY SIGN SUPPORTS (Typical Construction Signing)

PLATE NUMBER 634.85

Sheet 1 of 1

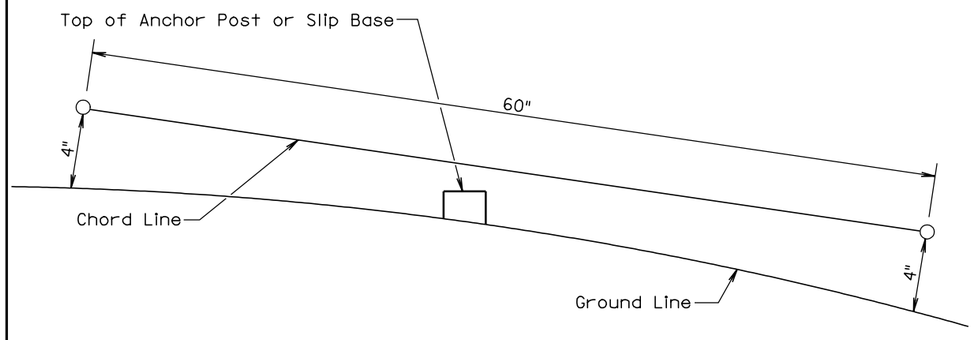
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-391 & 090W-391	13	13

Plotting Date: 22-FEB-2011



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. 2011	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99 Sheet 1 of 1

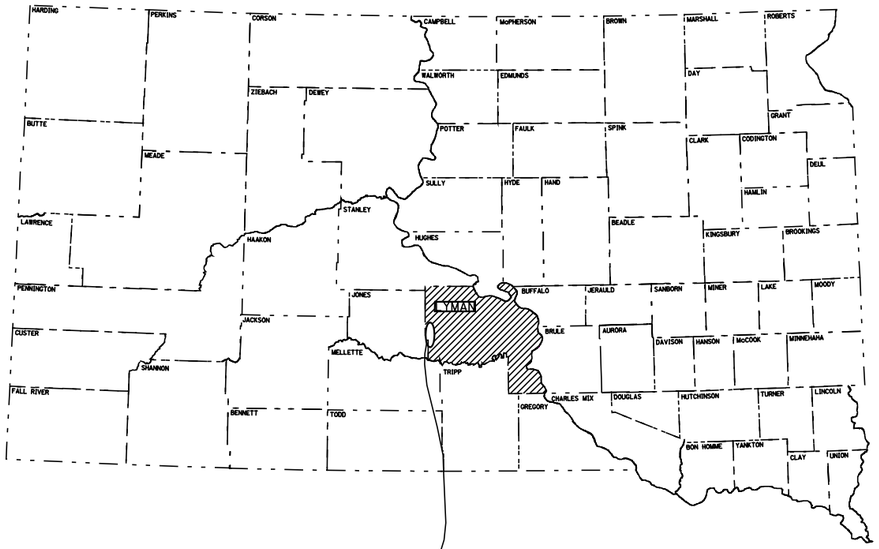
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083-351	1	24

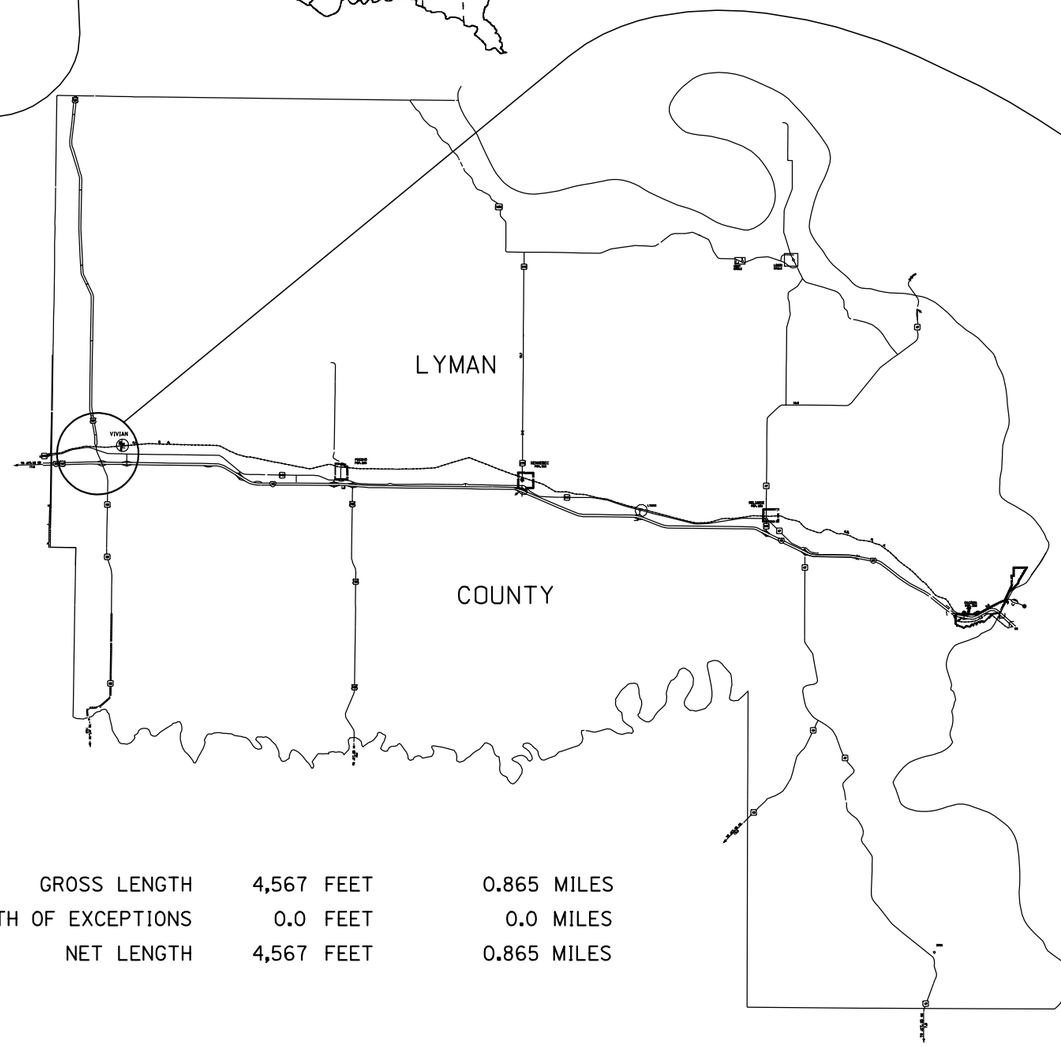
STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

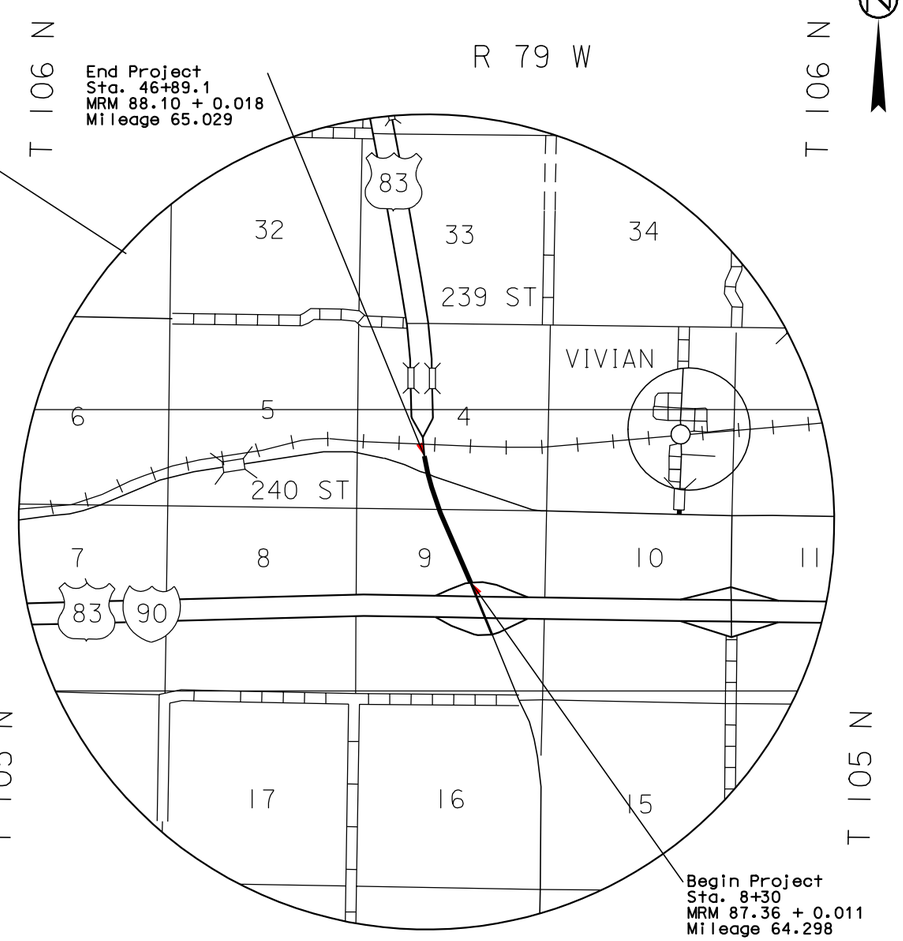
PROJECT 083-351
US HIGHWAY 83
LYMAN COUNTY

MINOR CONCRETE PAVEMENT RESTORATION
PCN: I25K

INDEX OF SHEETS







DESIGN DESIGNATION

ADT (2010)	2010
ADT (2030)	2180
DHV	300
D	50%
T DHV	8.5%
T ADT	18.7%
V	55 mph

STORM WATER PERMIT

None Required

GROSS LENGTH	4,567 FEET	0.865 MILES
LENGTH OF EXCEPTIONS	0.0 FEET	0.0 MILES
NET LENGTH	4,567 FEET	0.865 MILES

	STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
	S.D.	083-351	2	24

ESTIMATE OF QUANTITIES

083-351 PCN i25k

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E5020	Fast Track Concrete for PCC Pavement Repair	247.9	SqYd
380E6000	Dowel Bar	182	Each
380E6110	Insert Steel Bar in PCC Pavement	276	Each
380E6302	Reseal PCC Pavement Joint - Hot Pour	1,852	Ft
380E6310	Seal Random Cracks in PCC Pavement	450	Ft
634E0100	Traffic Control	1,119	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each

SPECIFICATIONS

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

SCOPE OF WORK

The work required for this project includes, but is not limited to, the following items, not listed in order of execution:

1. PCC Panel Repair or Replacement
2. Reseal PCC Pavement Joints
3. Seal Random Cracks

All work shall be done during daylight hours.

Lane closures shall be used during PCC Panel Repair or Replacement, and the Sealing Operations. Fast Track Concrete shall be used to insure that the pavement repair areas can be opened to traffic within 24 hours after concrete placement.

Once work begins on the roadway surface, work shall be pursued in a continuous manner, until the project is complete.

TRAFFIC CONTROL

The Contractor shall designate an employee who will be available 24 hours/day, 7 days/week to be responsible for the maintenance of traffic The cost of the traffic control person shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous. The Engineer must approve the employee selected. The name and phone number of person(s) shall be provided to the SD Department of Transportation (605-773-5294), SD Highway Patrol (Pierre State Radio (605-773-3536), and Lyman County Sheriff Department (605-869-2267).

During construction of the project, existing State owned traffic control devices shall be removed, reset or relocated as necessary by the Contractor. Devices no longer needed shall be neatly stockpiled on the project at a location(s) designated by the Engineer. Cost of this work shall be incidental to the contract lump sum price for “Traffic Control, Miscellaneous”.

Channelizing devices in a series shall be of the same type. Channelizing drums shall be of a two part construction with breakaway bases.

All traffic control devices shall be in “like new” condition.

The plans include the necessary quantities of signs and arrow boards to allow for all traffic to be moved into head to head conditions in either the NB lanes or the SB lanes. Any additional signs and/or arrow boards for lane closures different than that suggested above shall be provided by the Contractor at no additional cost to the State.

MAINTENANCE OF TRAFFIC

All fixed location signs and applicable traffic control devices shall be in place prior to the start of work or mobilization of equipment within the traveled way.

Erect only those signs that are applicable to the work in progress. When the Contractor is working at specific work spaces within the project, only those traffic control devices applicable to that operation should be displayed. The fixed location signs at the ends of the project shall not be installed until a work activity that encompasses the entire project has begun.

The bottom of 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 meet the minimum mounting heights of 5 foot for rural areas and 7 foot for urban areas.

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.

Traffic Control units, as shown in the Estimate of Quantities, are estimates. Contractor’s operation may require adjustments in quantities, either less or more. Payment will be for those signs actually ordered by the Engineer and used.

Certified flaggers, properly attired and preceded by FLAGGER symbol signs, will be required where work activity and/or equipment present a hazard to the workers, a hazard to through traffic, or encroaches into a driving lane.

Traffic approaching the project from intersecting streets, highways and approaches must be adequately accommodated. Major intersections, urban intersections or large commercial approaches may require extra advanced warning signs, flaggers, advance flagger symbol signs and additional channeling devices on a temporary basis until the work activities move from these congested areas. The cost for additional signs shall be paid for at the contract unit price per unit for Traffic Control. Additional Flagger hours shall be paid for at the contract unit price per hour for Flagging. The cost of additional channeling devices shall be incidental to the contract lump sum price for “Traffic Control, Miscellaneous”.

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.

A shadow vehicle, equipped with a flashing amber light and a ROAD MACHINERY AHEAD sign prominently displayed, shall be used in advance of landscaping, clean up, and other mobile work activities. Highway equipment working within traffic or adjacent to traffic shall, at all times, display a flashing or revolving amber light to warn the traveling public. The Contractor shall maintain the driving surface on the project to eliminate hazards to the traveling public.

Non-applicable signs and/or devices shall be removed from view by the Contractor and stored outside the ROW.

All operations shall be confined to the lanes being worked in, leaving the adjoining lanes open for thru traffic. **Two lanes of traffic shall be open at all times.**

The Contractor shall be required to accommodate over width vehicles that travel through the project.

Access shall be maintained at all times to all businesses, intersecting roads, and residences along the project.

A Type III Barricade shall be installed at the end of a lane closure taper as detailed in these plans during concrete pavement repair work on the mainline.

Each mainline concrete repair location from which the in place concrete has been removed shall be marked with a minimum of one Type Ill Barricade or four reflectorized drums (two per each side of removed concrete area).

Panel replacement areas shall have a reflectorized drum placed at the center of each panel at the edge of the roadway on the existing pavement. These drums shall be incidental to the contract lump sum price for “Traffic Control, Miscellaneous”.

Damage to the boulevards, median, asphalt or concrete shoulder, 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.

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 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.

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 Administrative Rules of South Dakota (Solid Waste) Article 74:27 administered 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”.

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.

WASTE DISPOSAL SITE (CONTINUED)

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.

All waste water from sawing, concrete truck wash out, etc. shall not be allowed to enter the storm sewer. It shall be hauled and disposed of at a site acceptable to the Engineer. All costs for this work shall be incidental to the various bid items for this project.

EXISTING PCC PAVEMENT

All PCC Pavement is 8" Nonreinforced PCC Pavement (see typical sections). The coarse aggregate in the existing PCC Pavement is quartzite. The existing contraction joints are perpendicular to centerline.

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 price per square yard for "Fast Track Concrete for PCC Pavement Repair".

EXPANSION JOINT CONSTRUCTION

One existing contraction joint shall be replaced with a new Expansion Joint at the location shown on the "PCC Pavement Layout" sheet and the "Table of Panel Repair". The Doweled Expansion Joint Type EE (2" joint opening) as shown on the Joint Detail sheet shall be used. All costs for the Joint Filler, Expansion Tubes, steel plate (1/8 inch x 8 inch x 52 foot plus 2 times the slab depth), hot pour sealant, and labor to install these items shall be incidental to the contract unit price per each for "Dowel Bar".

NOTE: The Expansion Joint shall be as per manufactured by "Construction Materials" of Des Moines, Iowa or approved equal.

FAST TRACK CONCRETE FOR PCC PAVEMENT REPAIR

The intent of the Fast Track Concrete is to insure the new pavement can be opened to traffic within 24 hours after placement.

Fast Track Concrete shall be constructed according to plan details and Standard Specifications for the 8" Nonreinforced PCC Pavement except as follows:

Fast Track Concrete shall be used at all repair locations to ensure that the pavement repair area has obtained 4000 psi within 24 hours after placement. After 24 hours, the Engineer will make a determination if the actual in-place strength is acceptable for opening the newly placed concrete for use by the traveling public. An initial cylinder shall be made and the Engineer shall calibrate a Swiss Hammer to it. All subsequent 24 hour strength tests shall be by Swiss Hammer. Cylinders will be made according to Materials Manual Requirements and the Swiss Hammer calibration regularly updated according to the early break cylinders. The Engineer will test the area after the initial 24 hour cure period by Swiss Hammer. If the area does not meet strength after the 24 hour cure period, the area will be tested every 2 hours until 10:00 P.M., and then not again until 6:00 A.M. No section is to be opened without permission of the Engineer.

The slump requirement prior to use of a set accelerator or super-plasticizer will be limited to 2 inches maximum. After the addition of all admixtures the maximum slump shall be 8 inches and the concrete shall contain 4.5 to 7.5 percent entrained air. The concrete mixture shall contain a minimum of 50% coarse aggregate by weight. The concrete mix shall contain at least 650 pounds of type I, II, or III cement per cubic yard. The minimum 28 day compressive strength shall be 4000 psi. 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 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. NOTE: The existing concrete's coarse aggregate is quartzite.

The use of a set accelerator and super-plasticizer at manufacturer's recommended dosage may be needed. Both admixtures shall be added at the project site.

Fast Track Concrete shall be cured with white pigmented curing compound (AASHTO M148, Type 2) applied as soon as practical at a rate of 125 square feet per gallon. In addition, the concrete shall be immediately covered with suitable insulation blanket consisting of a layer of closed cell polystyrene foam protected by at least one layer of plastic. The insulation blanket shall have an R value of at least 0.5, as rated by the manufacturer.

An insulation blanket may be left in place, except for joint sawing operations, until the 4000 psi strength is attained.

If the area of removal requires a transverse contraction joint to be reestablished, a dowel bar assembly shall be installed at the joint and paid for at the contract unit price per each for DOWEL BAR. Centerline of individual dowel bars in the dowel bar assembly shall be parallel to the roadway centerline. Sawing of the contraction joint shall commence when the concrete has hardened sufficiently to permit sawing without raveling.

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

NOTE: Any random cracks that develop in the new PCC Pavement sections shall be repaired as per Section 380.3 M 4.

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

The pavement may be opened to traffic, earlier than 24 hours, provided the compressive strength of 4000 psi has been attained. The final contraction joint sawing and sealing are not required at this time to open up pavement to traffic.

An estimated 247.9 square yards of Fast Track Concrete is to be used on this project. All costs for Fast Track Concrete shall be incidental to the contract unit price per square yard for "Fast Track Concrete for PCC Pavement Repair".

PCC PAVEMENT REPAIR

The new PCC Pavement thickness for repair areas shall be 8" as shown in the typical sections for this project. The existing pavement's joint width and transverse joint spacing may vary throughout the project.

The saw cuts around the removal areas shall be full depth. Sawing beyond the limits of the panel to be removed will not be allowed. The Contractor will be required to remove the corners by an approved method that will not damage the PCC pavement to remain in place.

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

After removal, the Contractor shall shape and recompact the remaining granular material prior to replacement of the concrete.

All Partial Panel Full Depth Repair areas shall have tie bars installed as per the notes and special details regarding STEEL BAR INSERTION. No tie bars shall be inserted into working joints such as: 1) across the crown of the road, or 2) from a driving lane into a concrete shoulder or approach.

A keyway shall be installed at locations determined by the Engineer and as detailed in the Standard Plate 380.12. All costs for installing the keyway shall be incidental to the unit contract price per square yard for "Fast Track Concrete for PCC Pavement Repair". **NOTE: The PCC Pavement Layout sheets show where one side of existing keyways along longitudinal joints shall be salvaged.**

For longitudinal construction joints where a new transverse working joint (that did not previously exist) is installed on one side of a longitudinal joint and no working joint exists on the other side of the longitudinal joint, the contractor shall place a bond breaker in the longitudinal joint from the new working joint to the existing working joint(s). Cost for the material shall be incidental to the contract unit price per square yard for "Fast Track Concrete for PCC Pavement Repair". NOTE: See the comments on Sheet 10 of 24 concerning the location of the bond breaker needed at Station 28+10.

Location and size (length or width) of the concrete repair areas are subject to change in the field at the discretion of the Engineer. It should be noted that no change in the contract's unit price will be made for quantity changes due to location or size. However, payment will be based on actual area replaced at the contract's unit price per square yard for "Fast Track Concrete for PCC Pavement Repair".

The shoulders and approaches along the project shall not be disturbed during this project. Any damage to the existing shoulders or approaches shall be repaired by the Contractor, as determined by the Engineer, at no cost to the State.

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 Reseal PCC Pavement Joints notes for details on sawing and sealing joints.

The surface of the PCC Pavement Repair shall be either metal tined or heavy carpet drag to match the existing PCC Pavement.

STEEL BAR INSERTION

The Contractor shall insert all deformed steel bars into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole.

The 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.

The Contractor will be responsible for ordering the actual quantity of steel bars necessary to complete the work.

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, and 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. 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.

STEEL BAR INSERTION (CONTINUED)

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".

RESEAL PCC PAVEMENT JOINTS

It is estimated that 15% of the existing transverse contraction joints shall be cleaned and resealed with Hot Pour Elastic Joint Sealer. The joints to be resealed will be determined in the field by the Engineer.

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

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

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

Sealant shall be placed in the joint with equipment and by methods that insure complete and uniform filling. Sealant shall be placed level with the driving surface of the concrete. Any excess or overrun of sealant shall be removed by the Contractor at no additional cost to the State.

Widening of the transverse joint shall be minimized during sawing and shall only be widened as necessary to provide a clean surface. Each joint shall not be widened more than 1/8 inch. Over widening of the joints will not be permitted. This may require 2 passes with the saw, one pass for each side of the joint.

Sealing operations are restricted to the closed lane only. All sealed joints will be measured for payment. All costs for removing, cleaning, sawing, plugging and sealing pavement joints shall be incidental to the contract unit price per foot for "Reseal PCC Pavement Joint".

SEALING RANDOM CRACKS

Only those random cracks in the existing concrete pavement with joints that are open and accept water and incompressibles as selected by the Engineer shall be prepared and sealed with Hot Poured Elastic Joint Sealant. The quantity of random cracks shown in the Estimate of Quantities is only an estimate and the cracks to be sealed will be determined in the field by the Engineer.

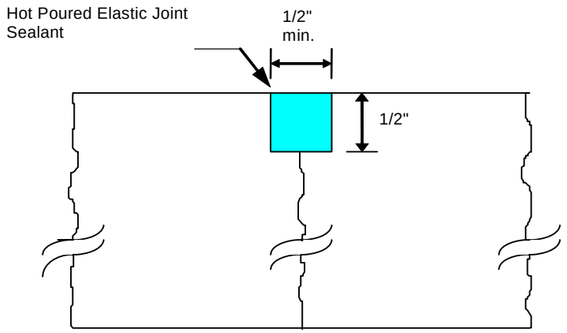
Each random crack shall be routed and the joint and roadway surface immediately cleaned by flushing with water or compressed air. The use of a concrete saw to route the crack will not be allowed. If there is any existing joint filler remaining in the cracks following routing, it shall be satisfactorily removed prior to sealing. Just prior to sealing, the sides of the routed crack shall be cleaned by sandblasting and the routed reservoir blown clean with compressed air.

The sealant shall be placed in the routed reservoir with equipment and by methods that insure complete and uniform filling.

Sealing Random Cracks will be measured by the linear foot to the nearest 0.1 foot of random cracks sealed and accepted on the project.

Sealing Random Cracks will be paid for at the contract unit price per linear foot for "Seal Random Cracks in PCC Pavement". Payment shall be full compensation for all labor, equipment, materials and incidentals required for crack routing, cleaning, furnishing and placing sealant and removing routed and foreign material from the roadway.

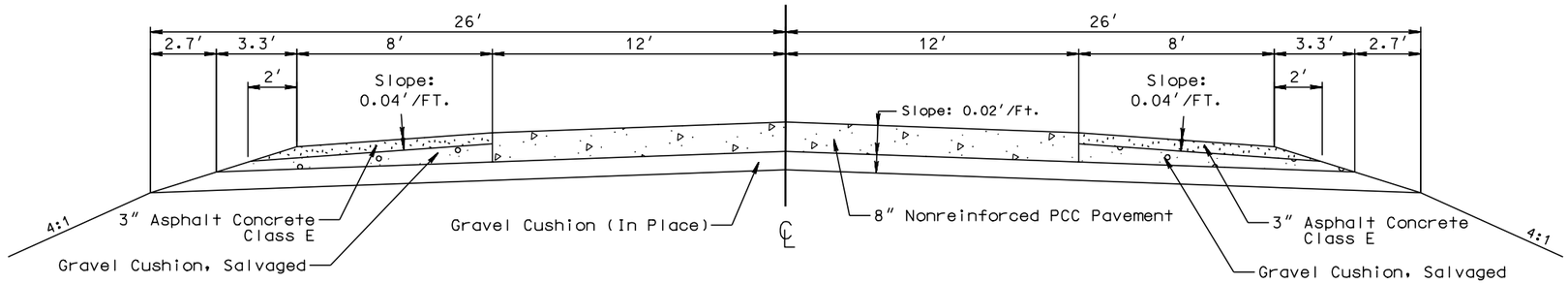
DETAIL FOR SEALING RANDOM CRACKS



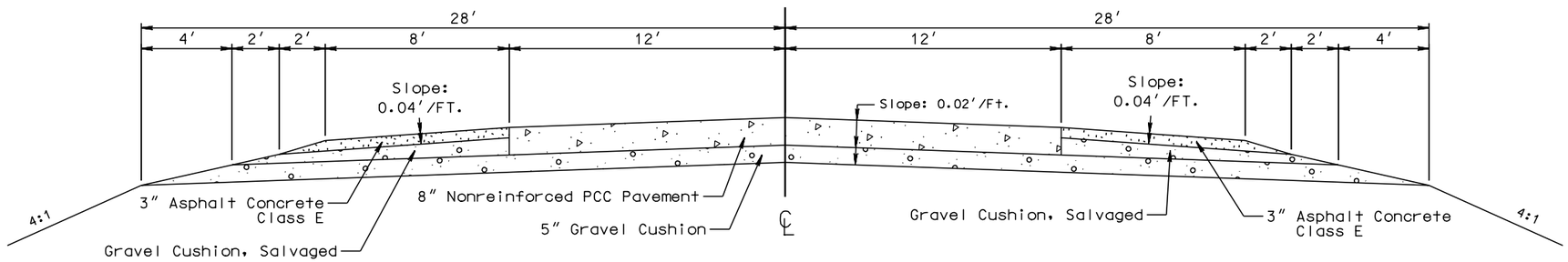
TYPICAL SURFACING SECTIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083-351	6	24

Mainline
Sta. 8+30 to Sta. 9+00



Mainline
Sta. 9+00 to Sta. 12+09



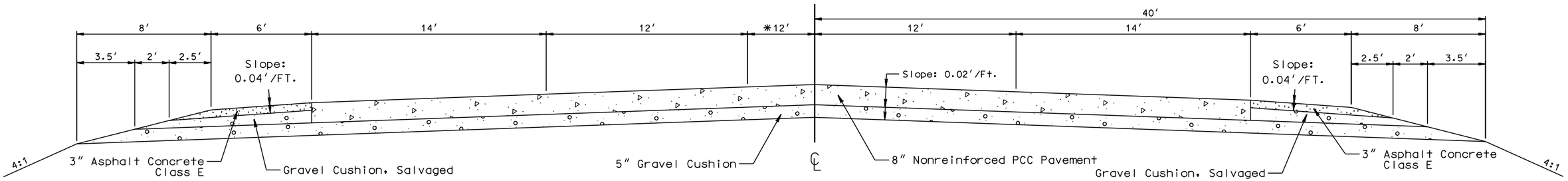
TYPICAL SURFACING SECTIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083-351	7	24

Transitions:
Sta. 13+48 to Sta. 14+25
✱ 0′
Sta. 14+25 to Sta. 20+85
✱ 0′ to 12′
Sta. 20+85 to Sta. 44+01.6
✱ 12′

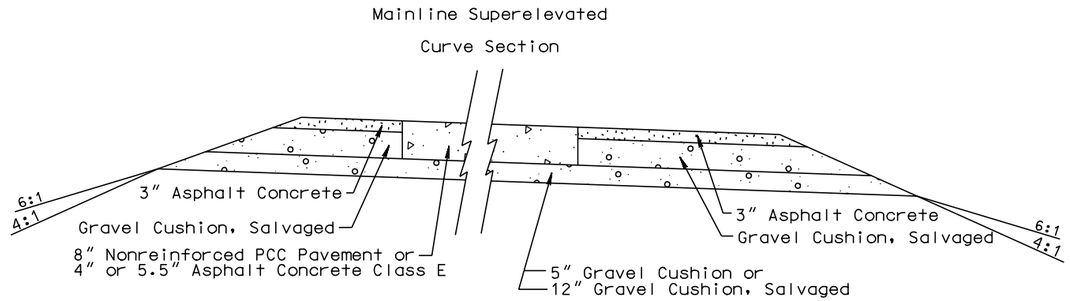
Mainline

Sta. 13+48 to Sta. 44+01.6



Mainline Superelevated

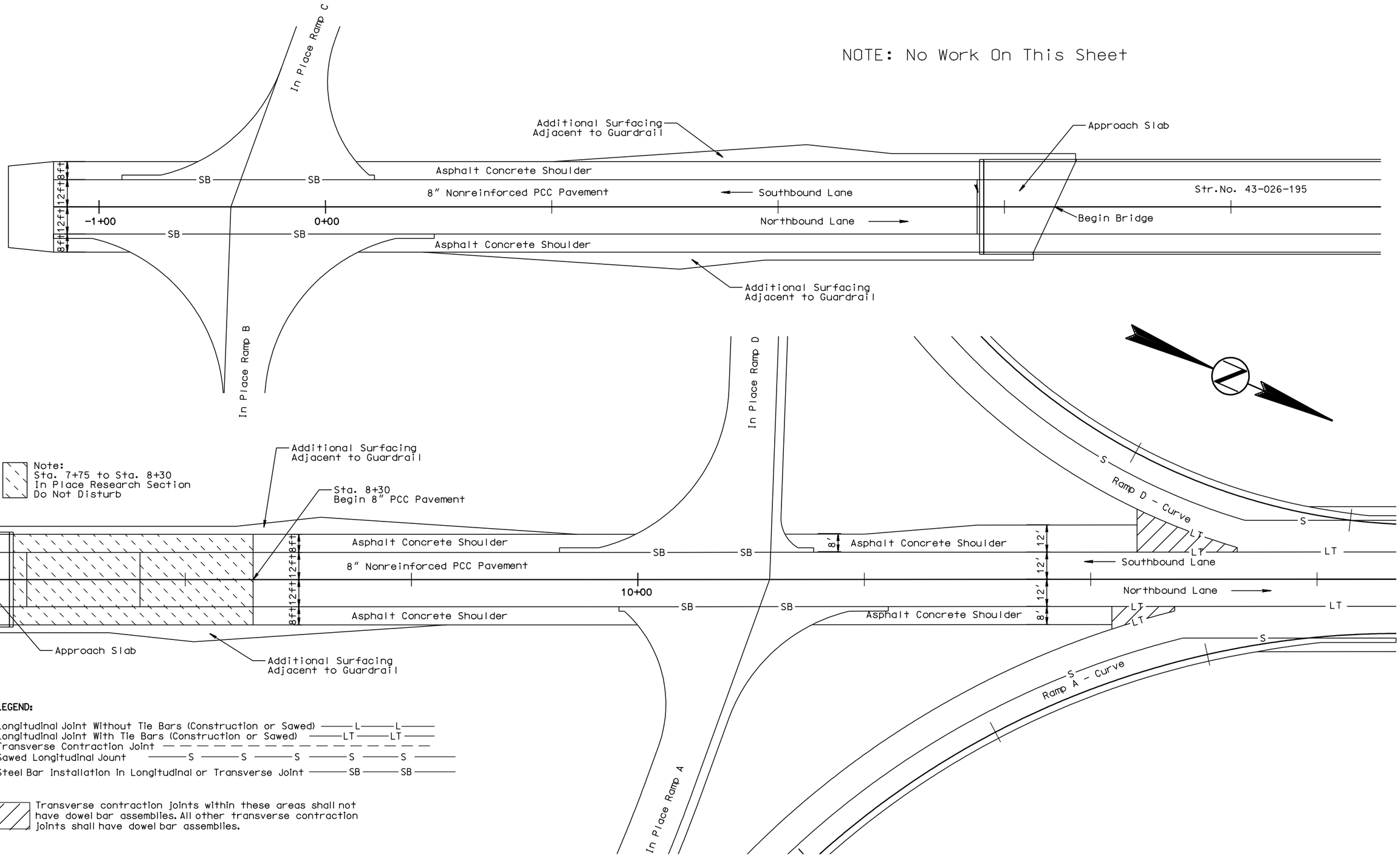
Curve Section



PCC PAVEMENT LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083-351	8	24

NOTE: No Work On This Sheet



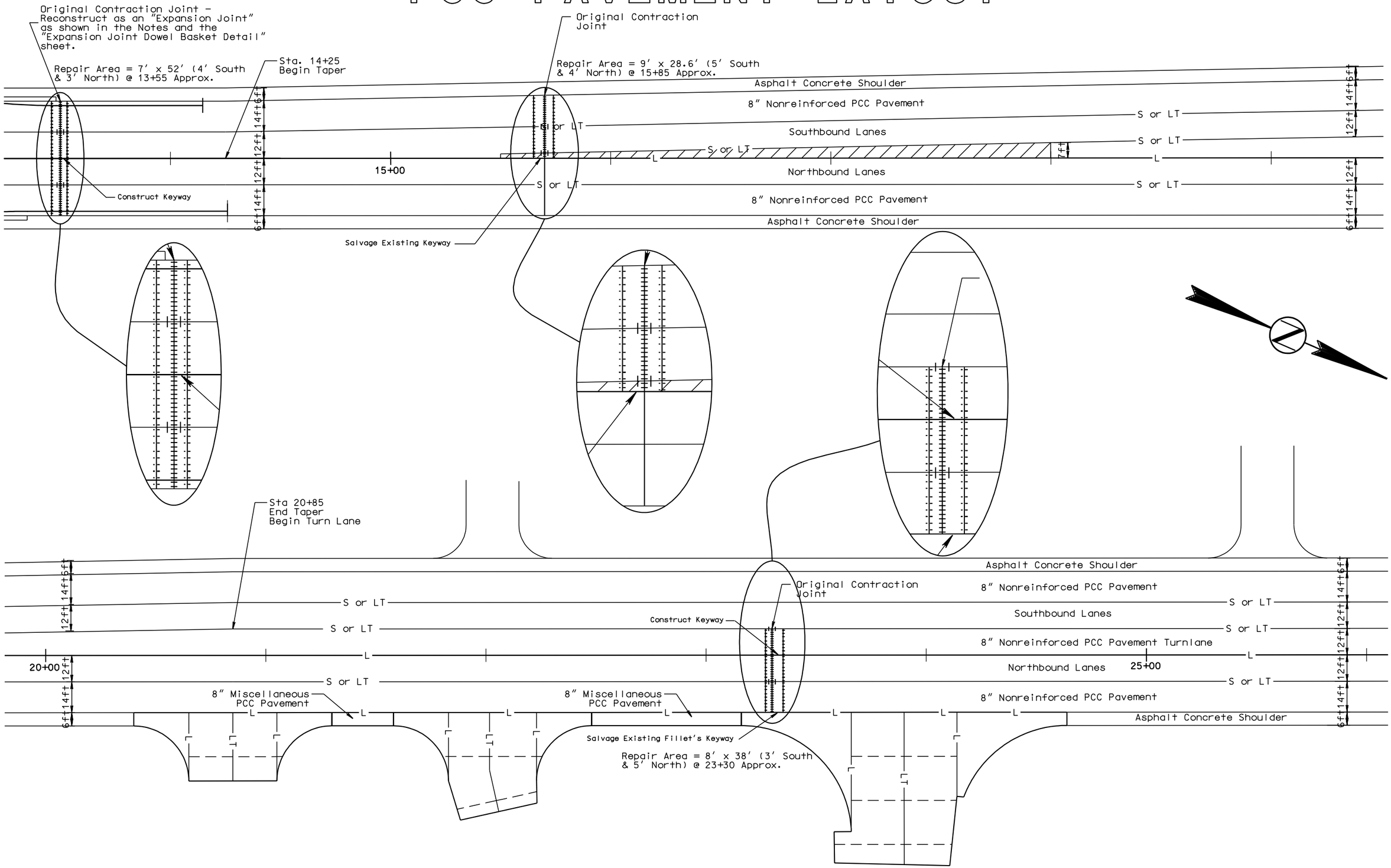
LEGEND:

Longitudinal Joint Without Tie Bars (Construction or Sawed) ——L——L——
Longitudinal Joint With Tie Bars (Construction or Sawed) ——LT——LT——
Transverse Contraction Joint — — — — — — — — — — — — — — — — —
Sawed Longitudinal Jount ——S——S——S——S——S——
Steel Bar Installation In Longitudinal or Transverse Joint ——SB——SB——

Transverse contraction joints within these areas shall not have dowel bar assemblies. All other transverse contraction joints shall have dowel bar assemblies.

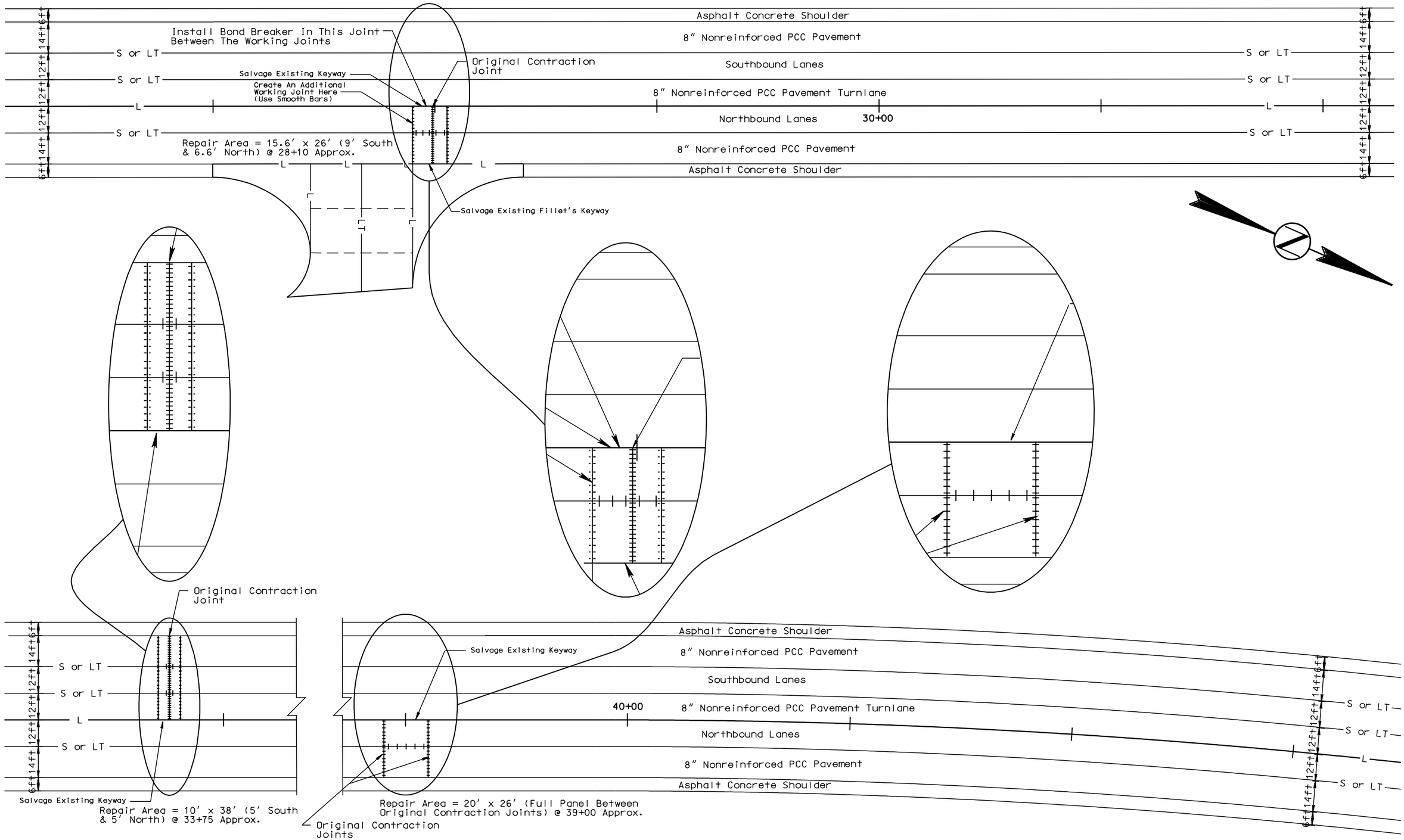
PCC PAVEMENT LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083-351	9	24



PCC PAVEMENT LAYOUT

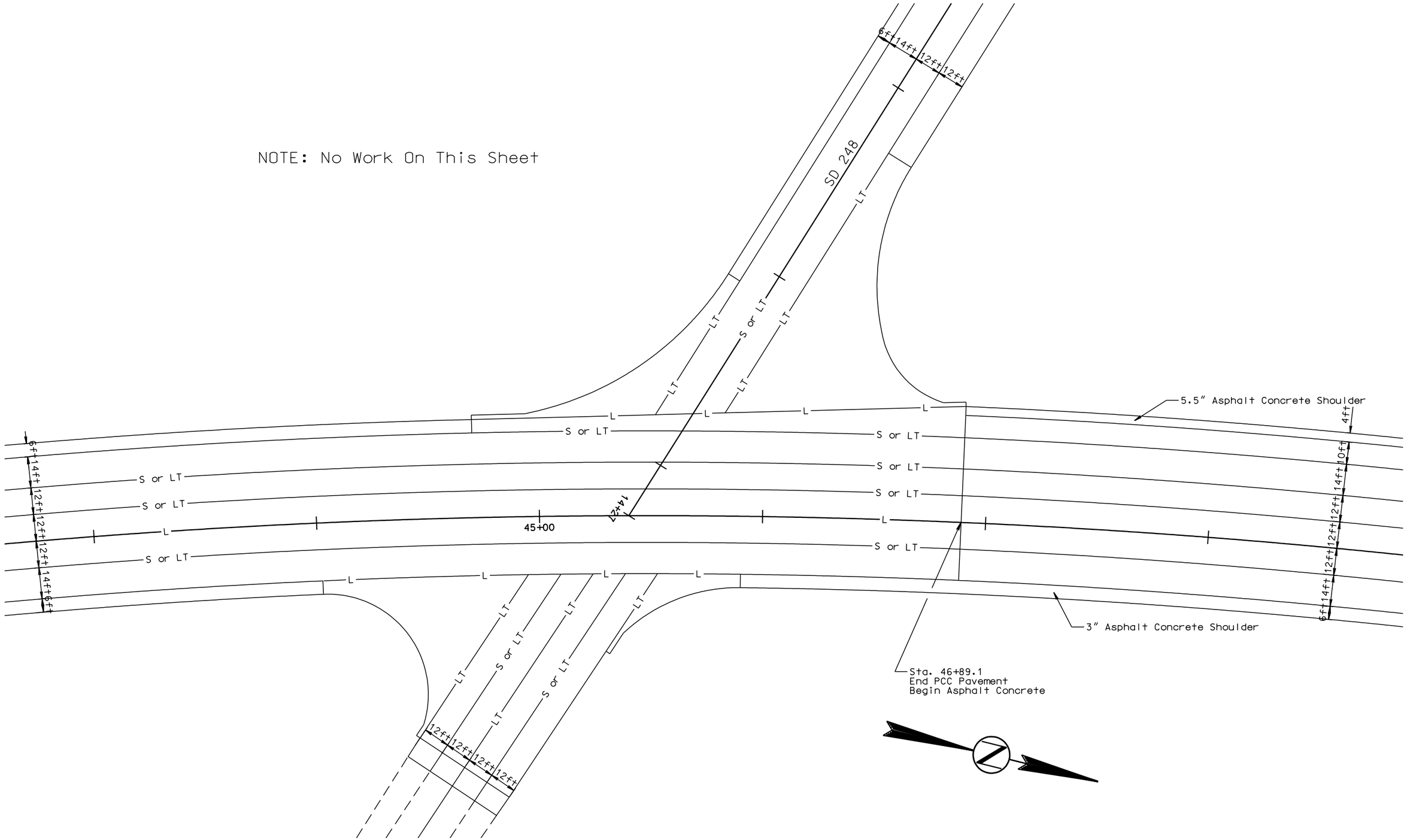
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083-351	10	24



PCC PAVEMENT LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083-351	11	24

NOTE: No Work On This Sheet



	STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
	S.D.	083-351	12	24

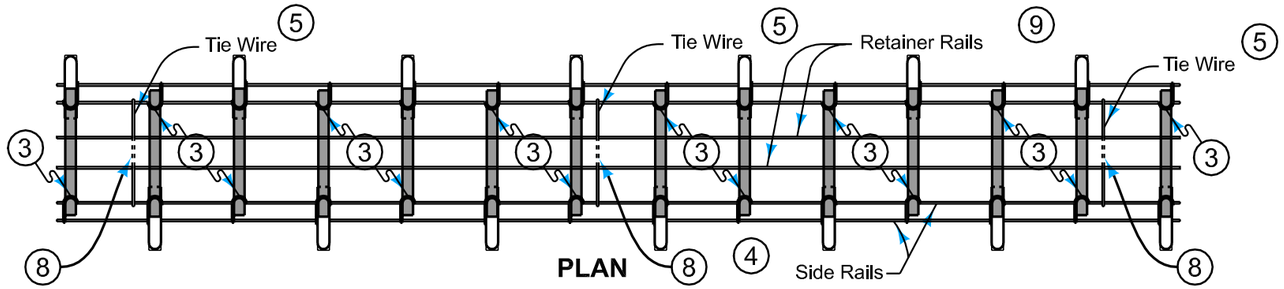
TABLE OF PANEL REPAIR

083-351 PCN i25k

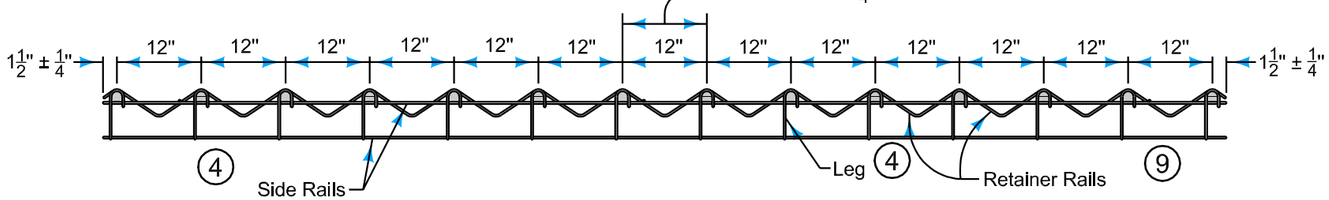
Approximate Sta.	Lanes	Length Ft	Width Ft	Fast Track Concrete For PCC Pavement Repair SqYds	INSERT STEEL BAR IN PCC PAVEMENT			DOWEL BAR EACH	No. 5 x 30" DEFORMED TIE Bars Info. Only	Notes
					1 1/4" X 18" PLAIN ROUND DOWEL BARS Each	No. 9 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE Bars Each			
13+55	NBDL, NBPL, SBPL, & SBDL	7	52	40.4	0	68	0	52	4	4' South & 3' North -- Type EE Doweled Expansion Joint
15+85	SBDL, SBPL, & Gore	9	28.6	28.6	0	38	0	28	4	5' South & 4' North
23+30	NBDL, NBPL, & TL	8	38	33.8	0	50	2	38	2	3' South & 5' North - Do Not Place Tie Bars Across Crown Or Shoulder.
28+10	NBDL & NBPL	15.6	26	45.1	17	17	0	26	5	9' South & 6.6' North
33+75	SBDL, SDPL, & TL	10	38	42.2	0	50	0	38	4	5' South & 5' North
39+00	NBDL & NBPL	20	26	57.8	34	0	0	0	5	One Entire Panel
			Totals:	**247.9**	**51**	**223**	**2**	**182**	**24**	

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	083–351	13	24

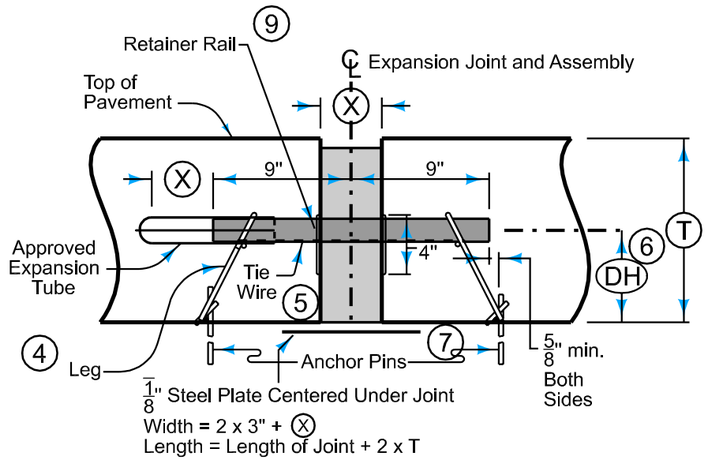
EXPANSION JOINT DOWEL BASKET DETAIL



Spaces between dowel bars are nominal dimensions with a $\frac{1}{4}$" allowable tolerance.



ELEVATION



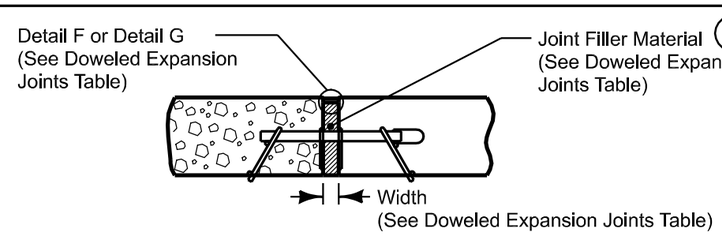
SECTION THRU EXPANSION JOINT

DOWEL HEIGHT AND DIAMETER		
T	DH (6)	Diameter
7" to 7½"	3½"	¾"
8" to 9½"	4¼"	1¼"
10" to 11½"	5¼"	1½"
12" to 13"	6¼"	1½"

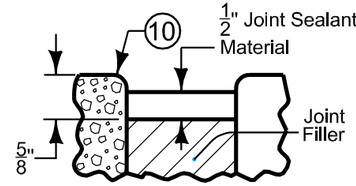
JOINT OPENING AND EXPANSION TUBE EXTENSION		
Joint Type	X	Minimum Tube Length
"ED"	1"	6"
"EE"	2"	7"
"EF"	4"	9"

DOWEL ASSEMBLIES (1) (2)

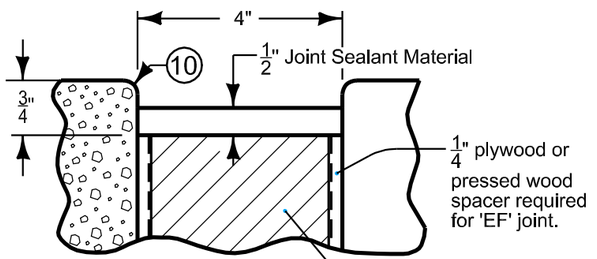
(Expansion Joints)



'ED', 'EE', 'EF'
DOWELED EXPANSION JOINT



DETAIL F



DETAIL G

NOTE: The Expansion Joint shall be as per manufactured by "Construction Materials" of Des Moines, Iowa or approved equal.

(1) Use 18 inch long dowel bars with a tolerance of ± 1/8 inch. Ensure the centerlines of individual dowels are parallel to the other dowels in the assembly within ± 1/8 inch. Coat the free end of dowel bar to prevent bond with pavement. At intake locations, dowel bars may be cast-in-place.

(2) Wire sizes shown are the minimum required. Use wires with a minimum tensile strength of 50 ksi.

(3) Weld alternately throughout.

(4) #1/0 gauge (0.306 inch diameter) wire.

(5) #10 gauge (0.135 inch diameter) wire, welded or friction fit to upper side rail, both sides.

(6) Measured from the centerline of dowel bar to bottom of lower side rail + 1/4 inch.

(7) Per lane width, install a minimum of 8 anchor pins evenly spaced (4 per side), to prevent movement of assembly during construction. Anchor assemblies placed on pavement or PCC base with devices approved by the Engineer.

(8) Clip and remove center portion of tie during field assembly.

(9) 1/4 inch diameter wire.

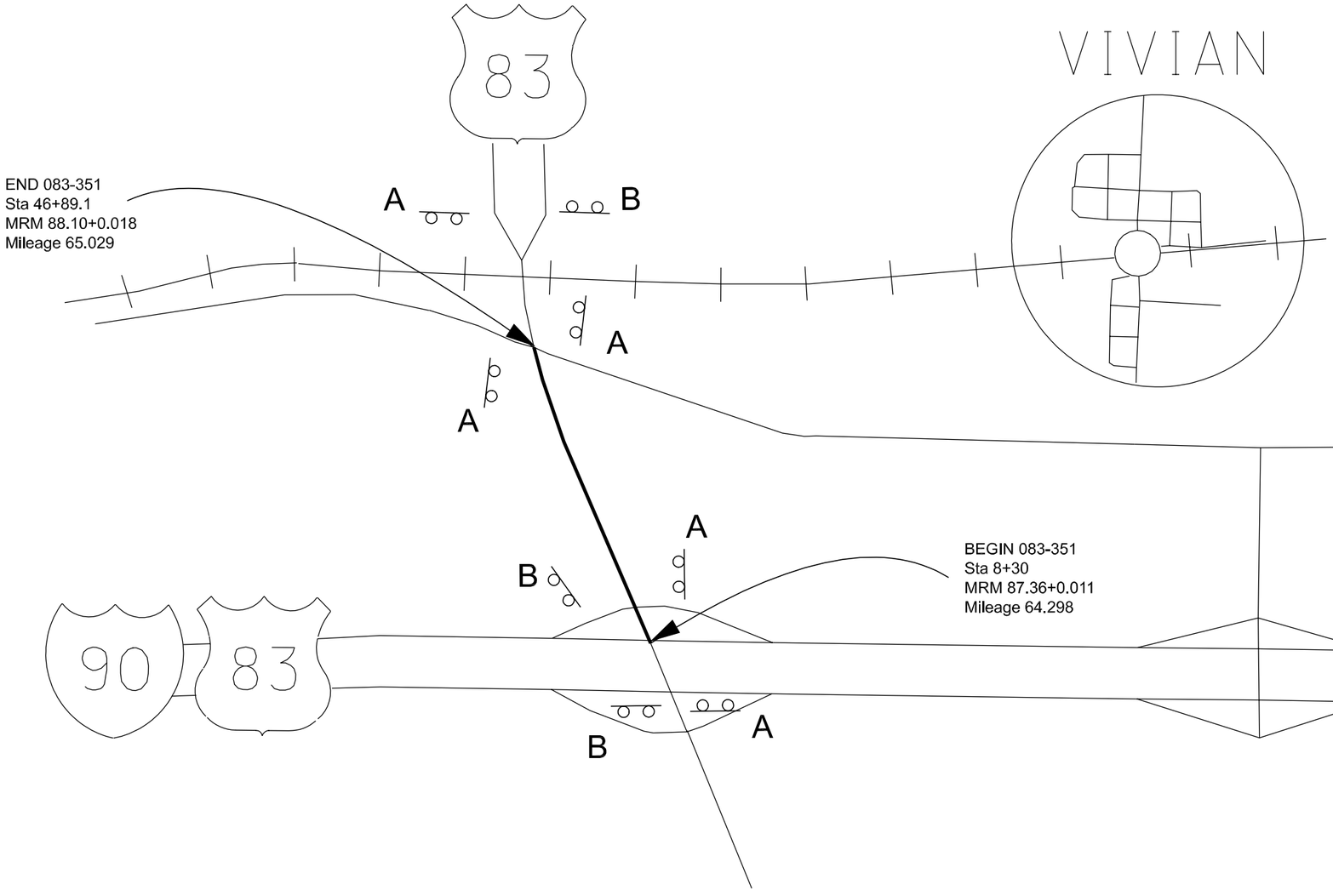
DOWELED EXPANSION JOINTS		
TYPE	WIDTH	FILLER MATERIAL (11)
ED	1"	Resilient (Detail F)
EE	2"	Flexible Foam (Detail F)
EF	4"	Flexible Foam (Detail G)

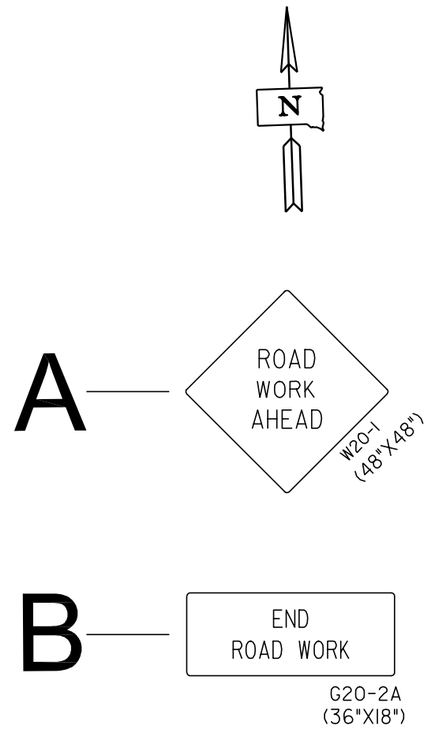
(10) Edge with 1/4 inch tool for length of joint indicated if formed; edging not required when cut with diamond blade saw.

(11) Predrill or preform holes in joint material for appropriate dowel size.

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	083-351	14	24

FIXED LOCATION SIGNS
US83





NOTES:

- Sign locations will be set by the Contractor and verified in the field by the Engineer prior to installation.
- Fixed location signs to remain in place until the completion of permanent pavement markings.

	STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
	S.D.	083-351	15	24

ITEMIZED LIST FOR TRAFFIC CONTROL

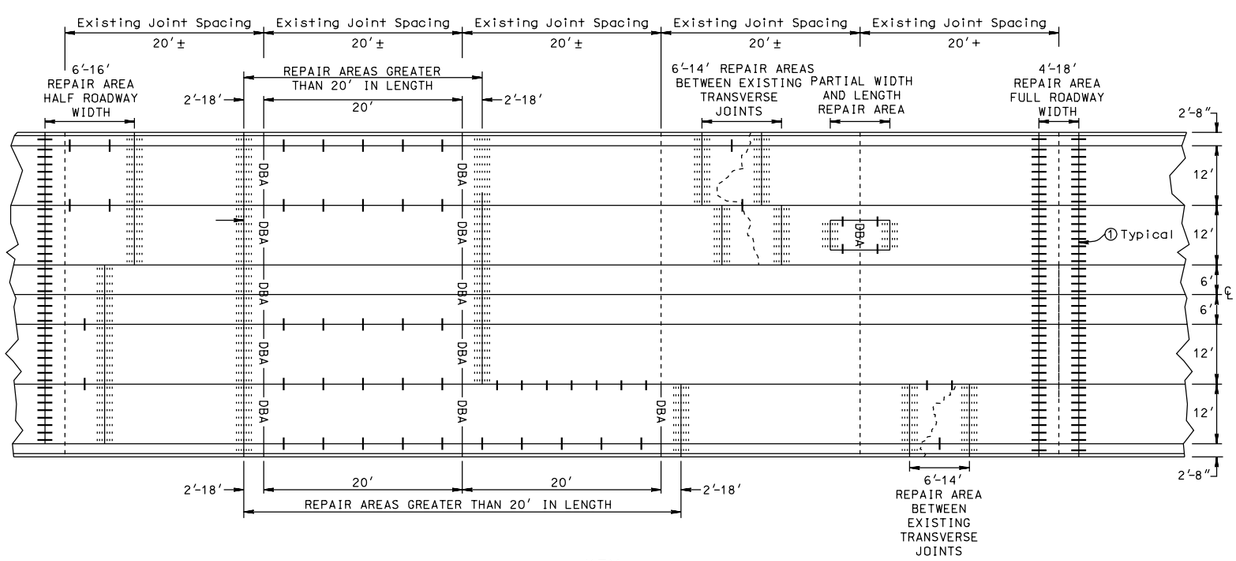
083-351 PCH: i25k

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2A	36" x 18"	END ROAD WORK	3	17	51
W1-4a	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)	3	34	102
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W13-1	24" x 24"	ADVISORY SPEED PLATE	2	16	32
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	7	34	238
W20-5	48" x 48"	LT. OR RT. LANE CLOSED #### FT. OR AHEAD	2	34	68
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	10	56	560
				TOTAL UNITS	**1119**

If a sign is required on a project and not listed in the above inventory, the units per sign will be determined as follows:
Signs 36" x 36" will be measured at 27 units each and signs 48" x 48" will be measured at 34 units each, otherwise:
If a sign measures less than 25" high and 25" wide the units per sign will be computed as sign size (sq ft) x 3.
If a sign measures between 23H" and 37H" the units per sign will be computed as sign size (sq ft) x 1.2 +15.

NONREINFORCED PCC PAVEMENT REPAIR

FIVE LANE WITH CURB & GUTTER
TYPICAL REPAIR AREAS



NOTE:

① Where possible, transverse joints shall be constructed full roadway width.

KEY:

Steel Bars for Longitudinal Joints (for repair areas greater than 5 feet in length)

| 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.

Steel Bars for Transverse Joints

— Drilled in 1" x 18" or 1¼" x 18" epoxy coated plain round dowel bars spaced 18" center to center.

····· Drilled in No. 8 x 18" or No. 9 x 18" epoxy coated deformed tie bars spaced 18" center to center.

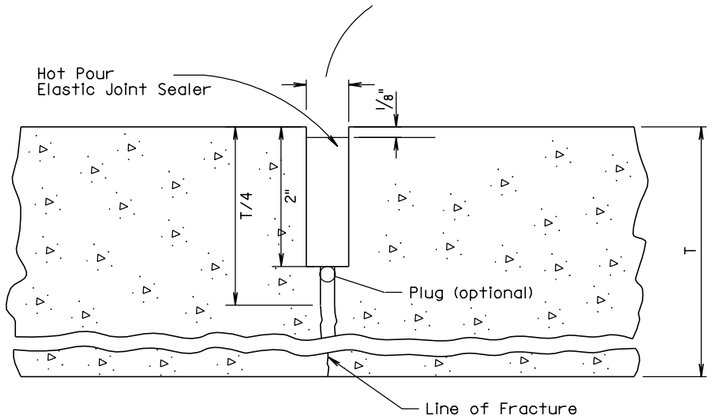
DBA Dowel Bar Assembly (for repair areas greater than 20' in length)

STATE OF SOUTH DAKOTA	PROJECT
	083-351
SHEET NO.	16
TOTAL SHEETS	24

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	083-351	17	24

RESEAL PCC PAVEMENT TRANSVERSE JOINT

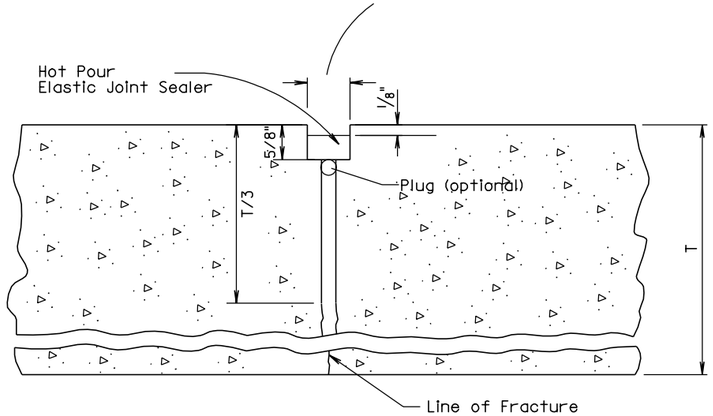
Joint shall be widened to a maximum of 1/8" wider than existing joint.



T/4 when saw cutting to control cracking.

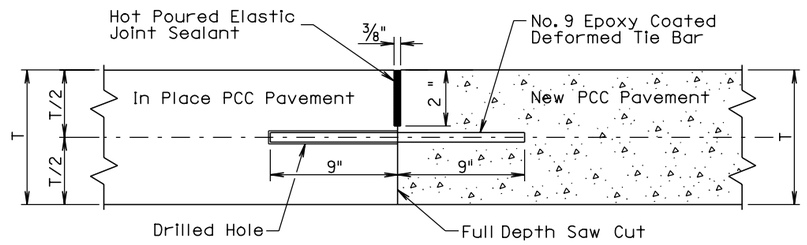
RESEAL PCC PAVEMENT LONGITUDINAL JOINT

Joint shall be widened to a maximum of 1/8" wider than existing joint.



T/3 when saw cutting to control cracking.

TRANSVERSE CONSTRUCTION JOINT WITH TIE BARS



T = In Place PCC Pavement and New PCC Pavement Thickness

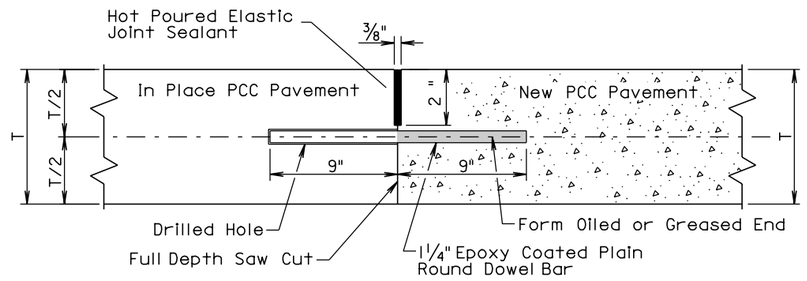
GENERAL NOTES:

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. 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:

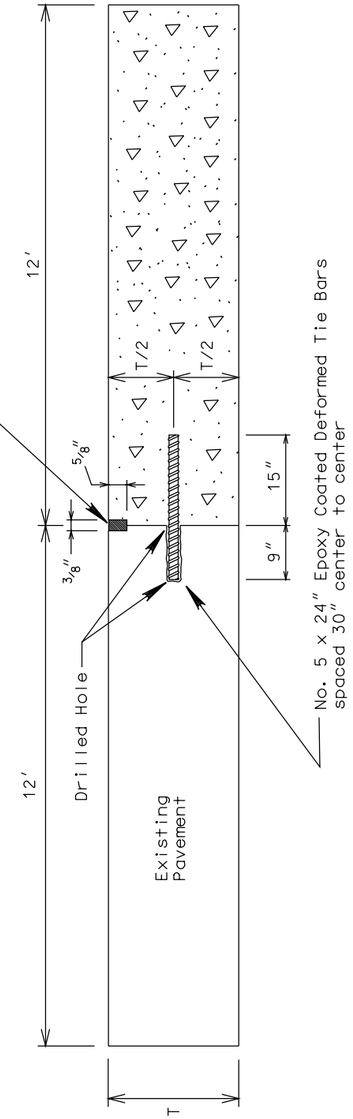
The plain round dowel bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.

The 1¼" epoxy coated plain round dowel 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 or current project.

PCC PAVEMENT REPAIR, NONREINFORCED

LONGITUDINAL CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



T = New existing and new pavement thickness.

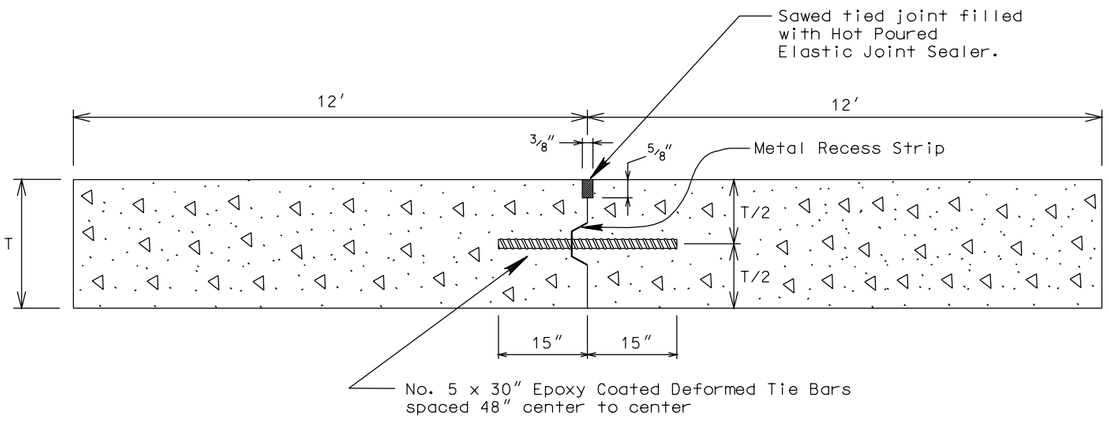
Bar embedded a minimum depth of 9 inches into the existing pavement by utilizing an epoxy resin adhesive.

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

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

PCC PAVEMENT REPAIR, NONREINFORCED

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



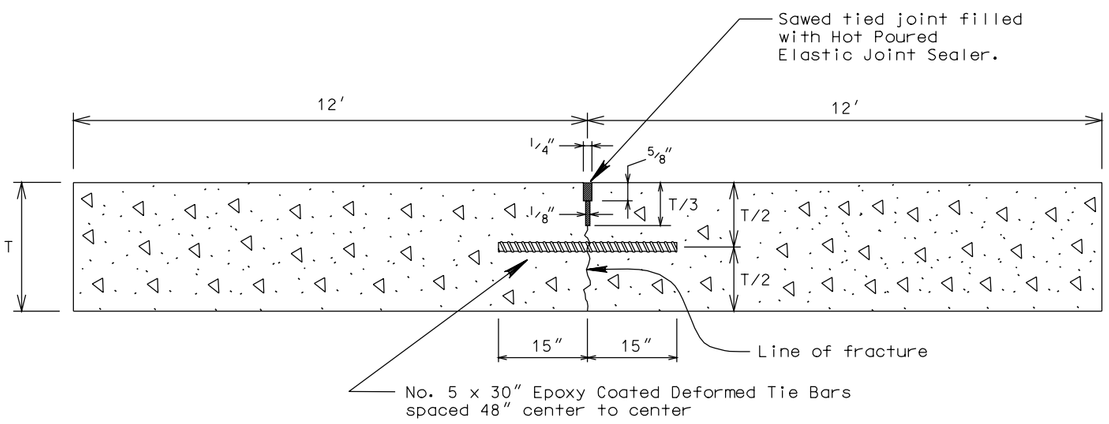
T = New pavement thickness.

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

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

PCC PAVEMENT REPAIR, NONREINFORCED

SAWED LONGITUDINAL JOINT

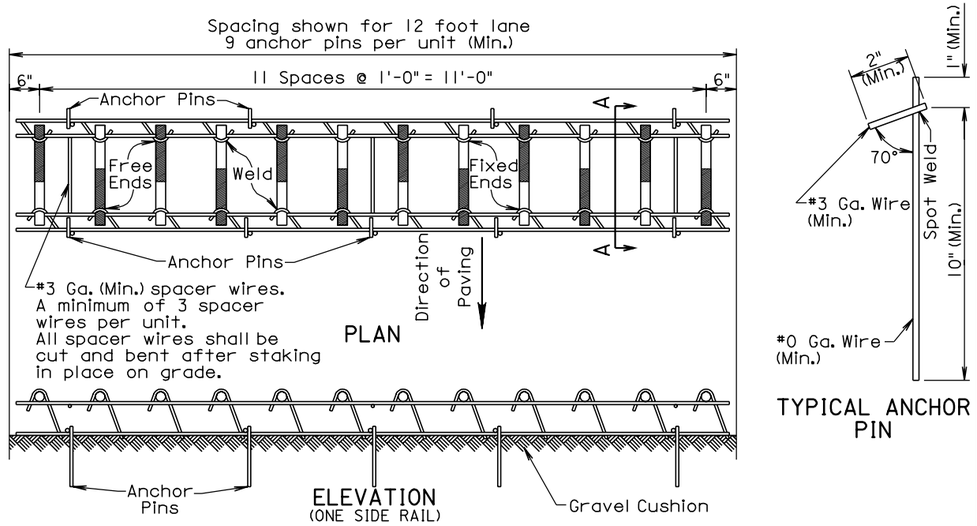


T = New pavement thickness.

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 to provide the width for the installation of the Hot Poured Elastic Joint Sealer will be necessary.

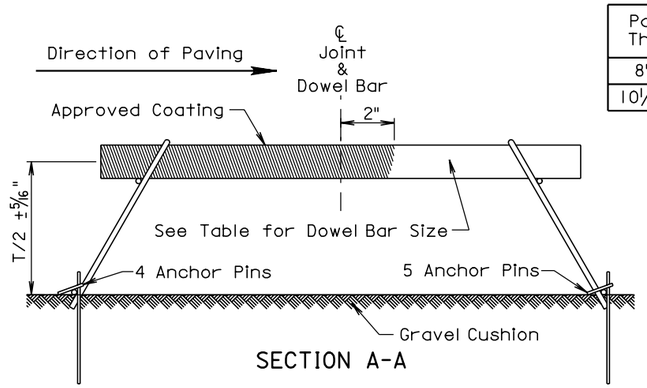
Cost for furnishing and installing centerline tie bars shall be incidental to the contract unit price per square yard for PCC Pavement Repair, Nonreinforced.

STATE OF SOUTH DAKOTA	PROJECT
	083-351
SHEET NO.	19
TOTAL SHEETS	24

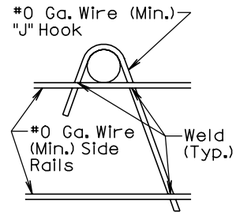


TYPICAL ANCHOR PIN

Pavement Thickness	Epoxy Coated Dowel Bar Size
8" to 10"	1¼" x 18"
10½" to 12"	1½" x 18"



SECTION A-A



SIDE RAIL DETAIL

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.

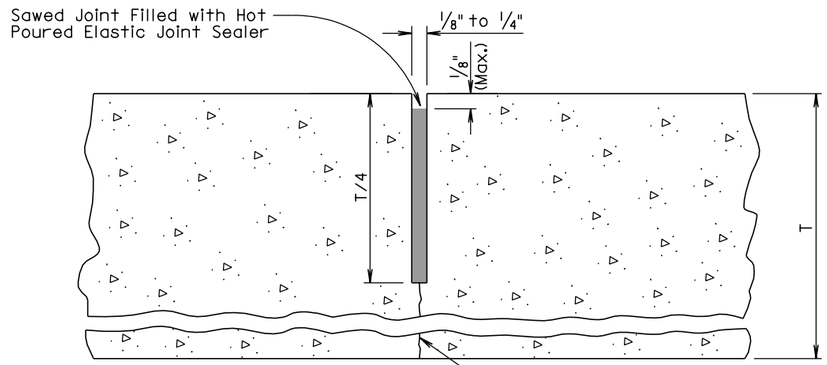
Centerline of individual dowel bars shall be parallel to the centerline of the roadway ±1/2 inch in 18 inches.

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.

December 23, 2007

Published Date: 1st Qtr. 2011	SDDOT	**PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS**	PLATE NUMBER 380.01 Sheet 1 of 1



GENERAL NOTES:

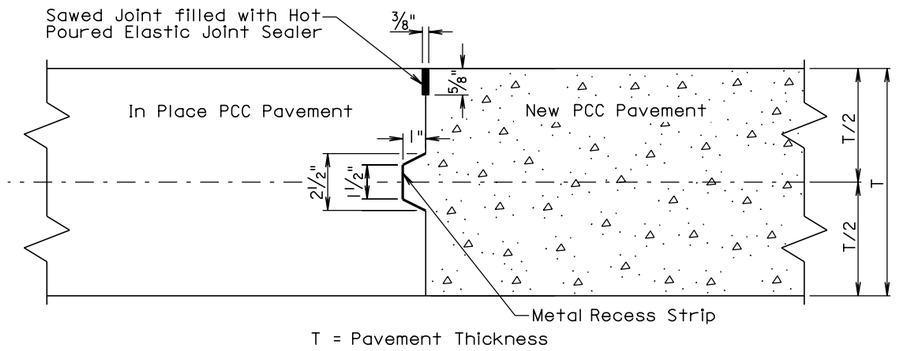
The saw cut to control cracking shall be a minimum of ¼ the thickness of the pavement.

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: 1st Qtr. 2011	SDDOT	**PCC PAVEMENT TRANSVERSE CONTRACTION JOINT WITH OR WITHOUT DOWEL BAR ASSEMBLY**	PLATE NUMBER 380.03 Sheet 1 of 1

LONGITUDINAL CONSTRUCTION JOINT WITHOUT TIE BARS



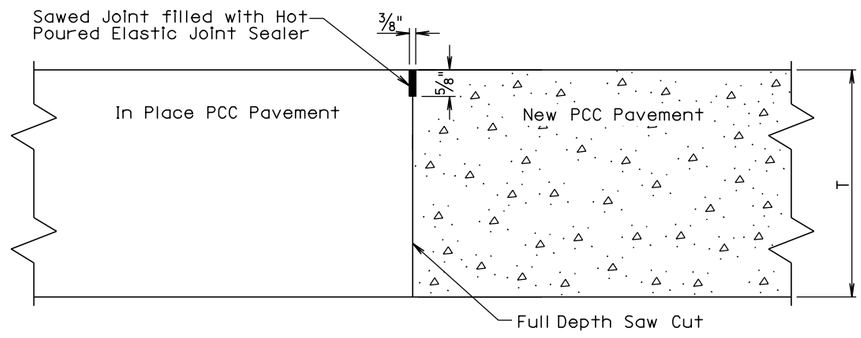
T = Pavement Thickness

GENERAL NOTES:

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.

LONGITUDINAL CONSTRUCTION JOINT WITHOUT TIE BARS



T = Pavement Thickness

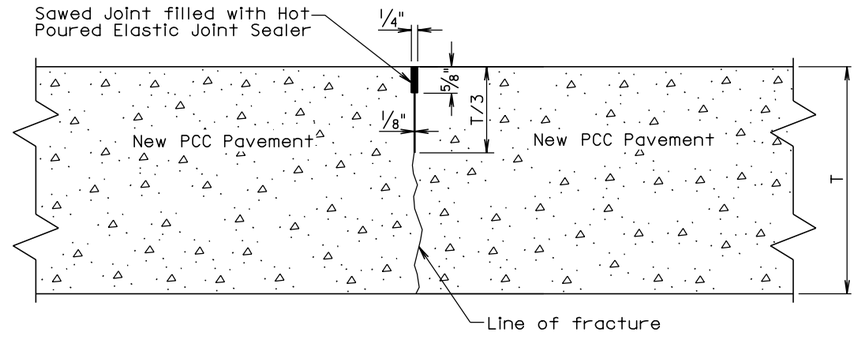
GENERAL NOTE:

The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.

September 14, 2001

Published Date: 1st Qtr. 2011	SDDOT	*PCC PAVEMENT LONGITUDINAL JOINTS WITHOUT TIE BARS*	*PLATE NUMBER* 380.12
			Sheet 1 of 2

SAWED LONGITUDINAL JOINT WITHOUT TIE BARS



T = Pavement Thickness

GENERAL NOTE:

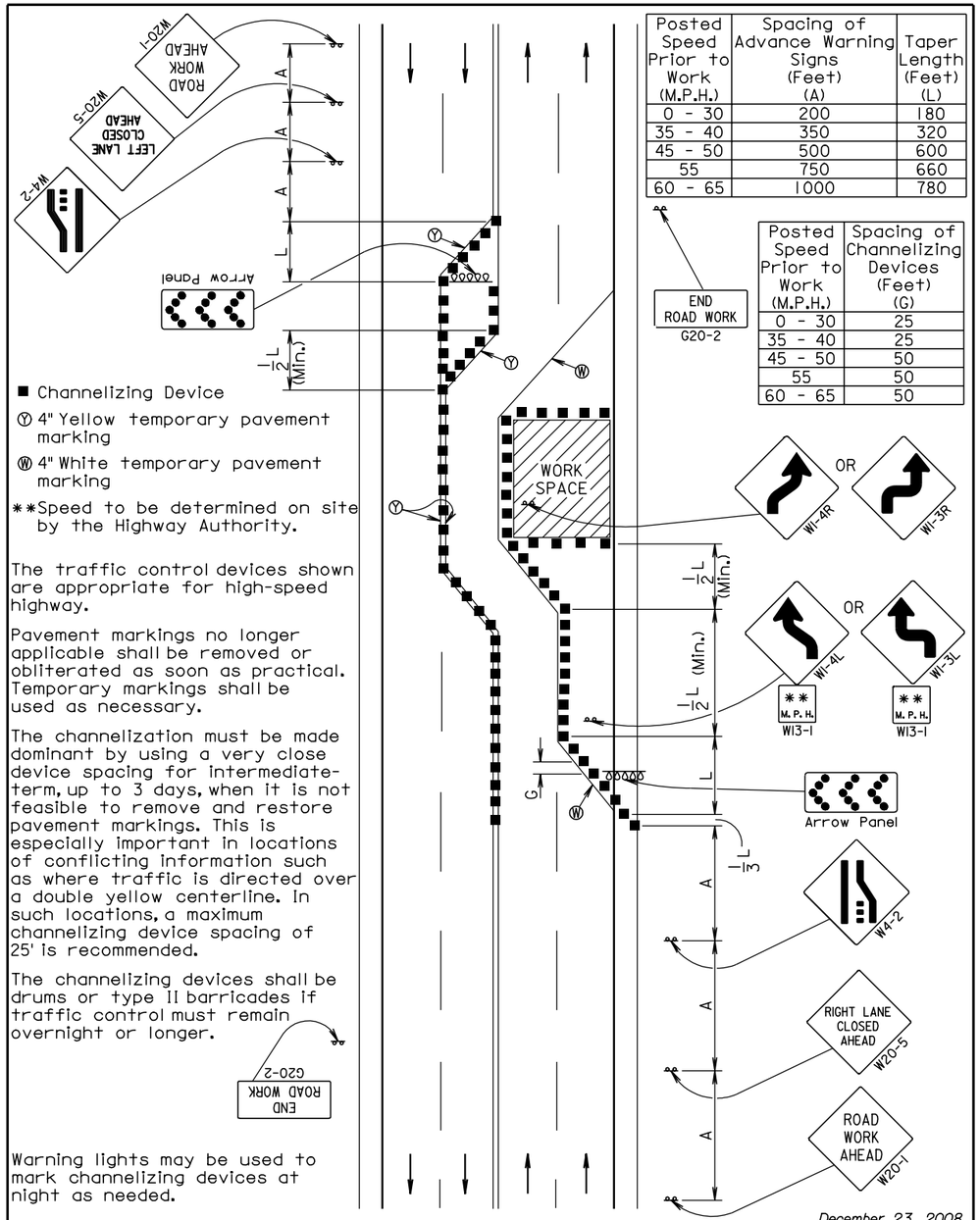
The first saw cut to control cracking shall be a minimum of 1/3 the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the hot poured elastic joint sealer will be necessary.

September 14, 2001

Published Date: 1st Qtr. 2011	SDDOT	*PCC PAVEMENT LONGITUDINAL JOINTS WITHOUT TIE BARS*	*PLATE NUMBER* 380.12
			Sheet 2 of 2

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	083-351	22	24

Plotting Date: 13-APR-2011



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

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	25
35 - 40	25
45 - 50	50
55	50
60 - 65	50

■ Channelizing Device

Ⓨ 4" Yellow temporary pavement marking

Ⓦ 4" White temporary pavement marking

**Speed to be determined on site by the Highway Authority.

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

Pavement markings no longer applicable shall be removed or obliterated as soon as practical. Temporary markings shall be used as necessary.

The channelization must be made dominant by using a very close device spacing for intermediate-term, up to 3 days, when it is not feasible to remove and restore pavement markings. This is especially important in locations of conflicting information such as where traffic is directed over a double yellow centerline. In such locations, a maximum channelizing device spacing of 25' is recommended.

The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer.

Warning lights may be used to mark channelizing devices at night as needed.

December 23, 2008

SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES HALF ROAD CLOSURE ON MULTILANE HIGHWAY	PLATE NUMBER 634.46
Published Date: 1st Qtr. 2011		Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45 - 50	500	600	50
55	750	660	50
60 - 65	1000	780	50

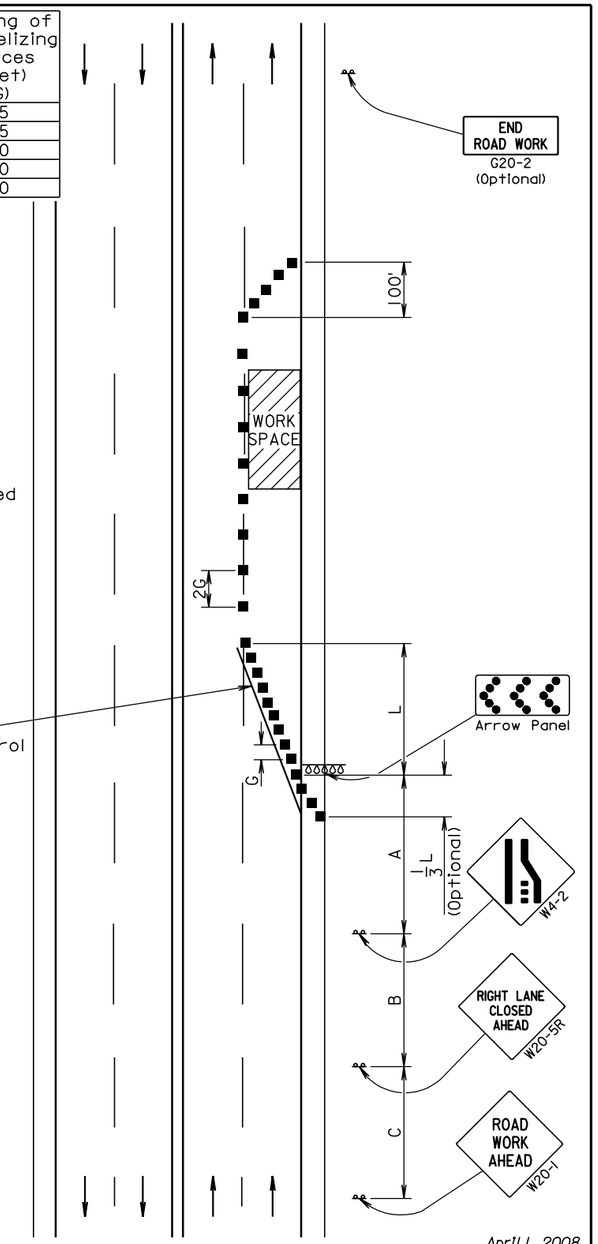
■ Channelizing Device

Drums or Type II Barricades shall be used if required overnight.

42" cones may be used along centerline

Longitudinal dimensions may be adjusted to fit project conditions such as horizontal curves, vertical curves, and other site restrictions.

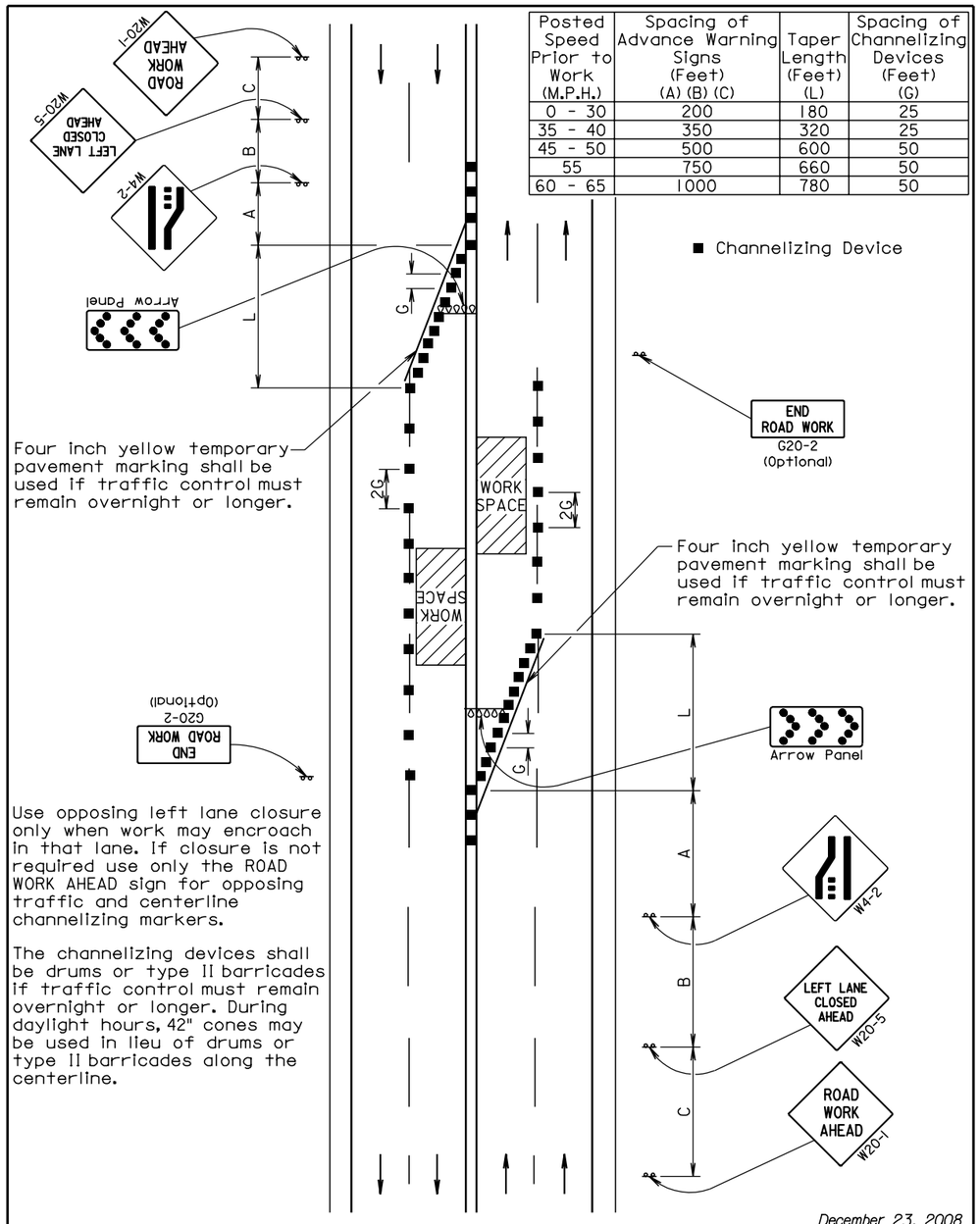
Four inch white temporary pavement marking shall be used if traffic control must remain overnight or longer.



April 1, 2008

SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 4-LANE UNDIVIDED, RIGHT LANE CLOSED	PLATE NUMBER 634.47
Published Date: 1st Qtr. 2011		Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	180	25
35 - 40	350	320	25
45 - 50	500	600	50
55	750	660	50
60 - 65	1000	780	50

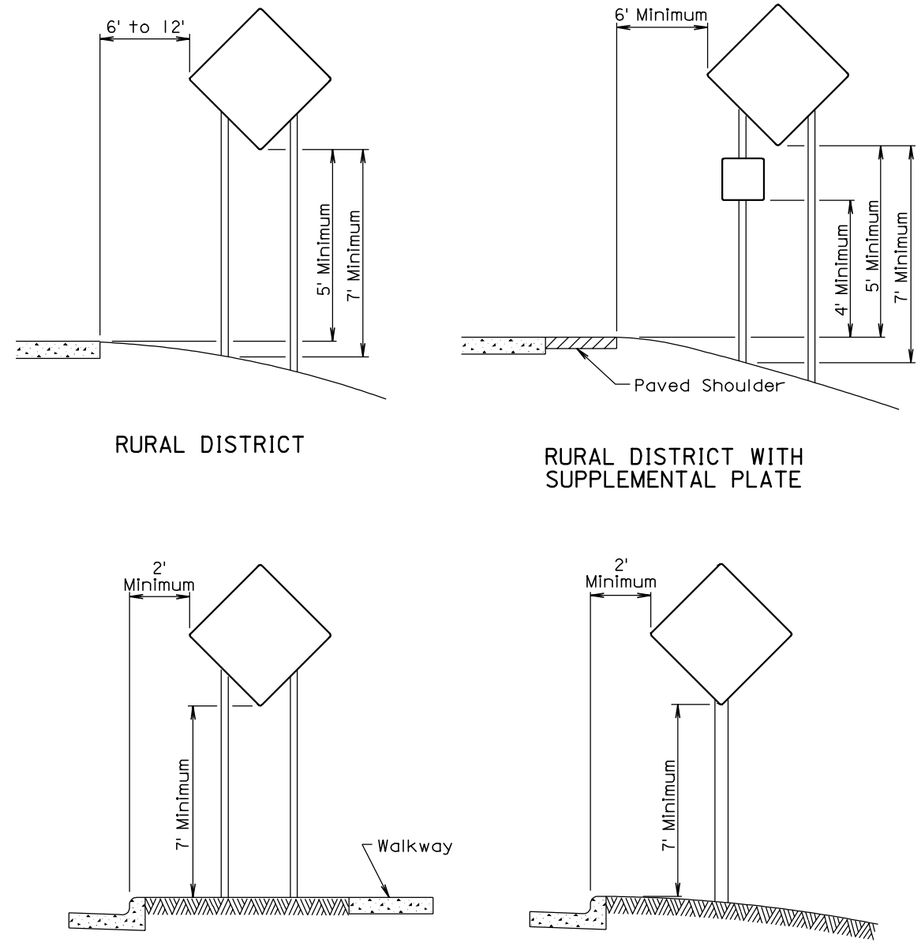


Use opposing left lane closure only when work may encroach in that lane. If closure is not required use only the ROAD WORK AHEAD sign for opposing traffic and centerline channelizing markers.

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

December 23, 2008

Published Date: 1st Qtr. 2011	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 4-LANE UNDIVIDED, LEFT LANE CLOSED	PLATE NUMBER 634.48 Sheet 1 of 1

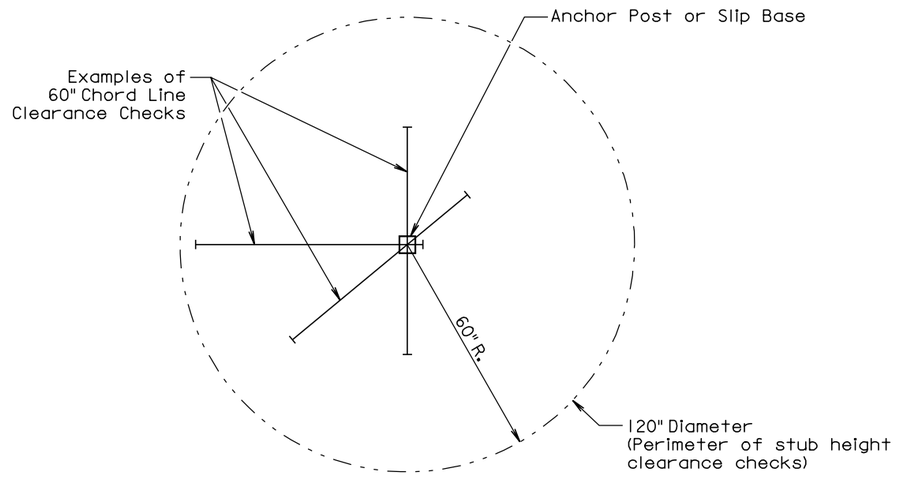


December 23, 2003

Published Date: 1st Qtr. 2011	SDDOT	BREAKAWAY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85 Sheet 1 of 1

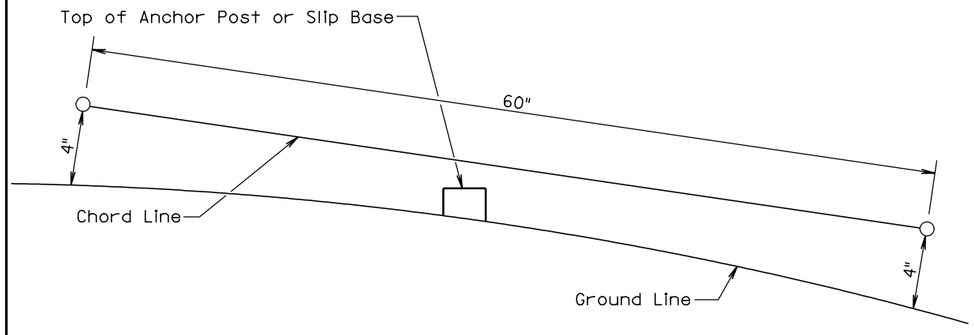
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	083-351	24	24

Plotting Date: 13-APR-2011



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. 2011	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99 Sheet 1 of 1

Username - trpr22414