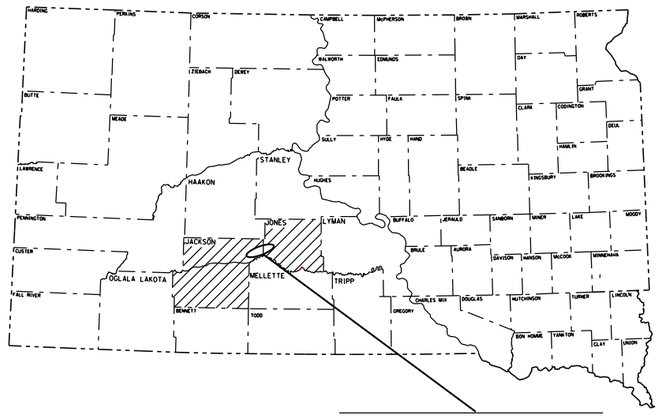
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-391& 090W-391	1	18

Plotting Date: 04/06/2017



PROJECTS
090E-391 (i4je)
090W-391 (i4jf)

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECTS 090E–391 & 090W–391
INTERSTATE 90
JACKSON & JONES COUNTIES

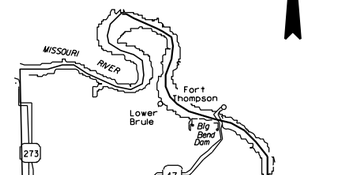
FULL DEPTH CONCRETE REPAIR

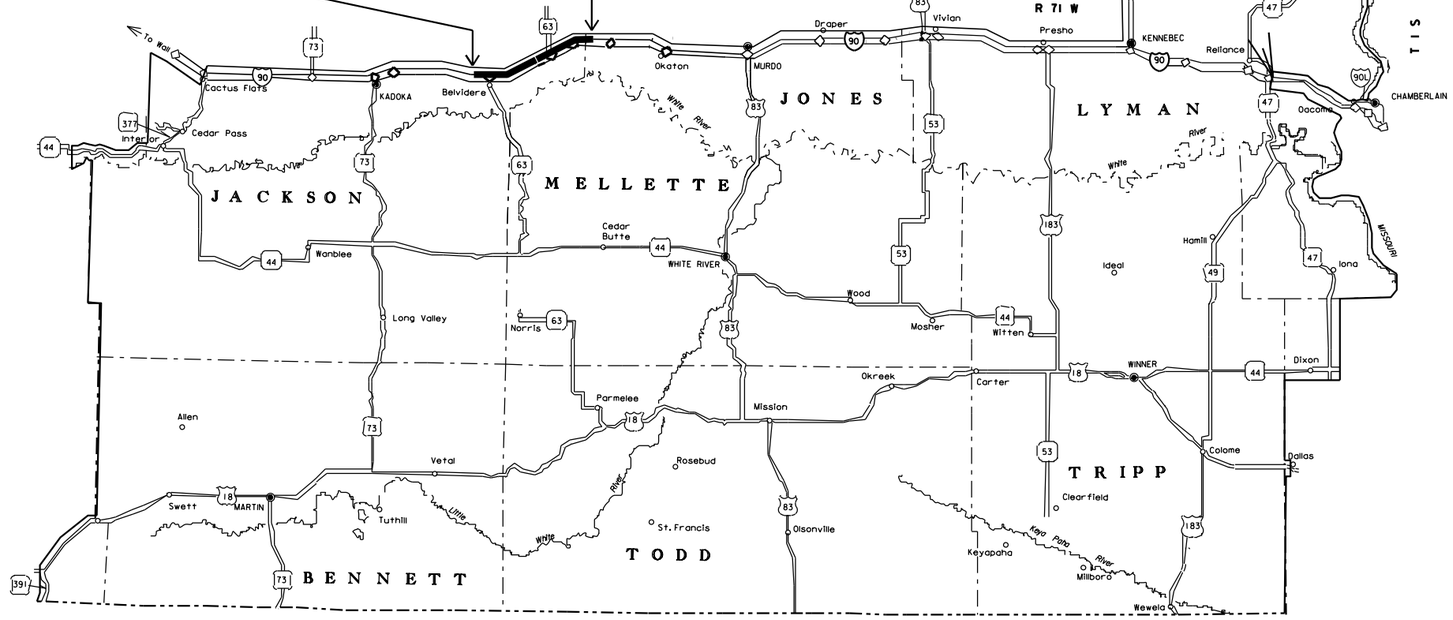
PCN i4je & i4jf

INDEX OF SHEETS

BEGIN PROJECTS
i4je & i4jf
MRM 163.00 + 0.340

END PROJECTS
i4je & i4jf
MRM 174.00 + 0.000





090E-391
JACKSON & JONES COUNTIES
i4je

DESIGN DESIGNATION	
ADT (2016)	3037
ADT (2036)	3495
DHV	678
D	50%
T DHV	11.9%
T ADT	26.1%

090W-391
JACKSON & JONES COUNTIES
i4jf

DESIGN DESIGNATION	
ADT (2016)	3037
ADT (2036)	3495
DHV	678
D	50%
T DHV	11.9%
T ADT	26.1%

STORM WATER PERMIT
NO PERMIT REQUIRED

ESTIMATE OF QUANTITIES

090E-391 PCN i4je

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
380E5100	Continuously Reinforced PCC Pavement Repair	89.4	SqYd
380E6110	Insert Steel Bar in PCC Pavement	80	Each
634E0010	Flagging	30.0	Hour
634E0110	Traffic Control Signs	655.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0280	Type 3 Barricade, 8' Single Sided	22	Each
634E0420	Type C Advance Warning Arrow Board	2	Each
634E0640	Temporary Pavement Marking	3,180	Ft

090W-391 PCN i4jf

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
380E5100	Continuously Reinforced PCC Pavement Repair	91.9	SqYd
380E6110	Insert Steel Bar in PCC Pavement	98	Each
634E0010	Flagging	30.0	Hour
634E0110	Traffic Control Signs	655.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0280	Type 3 Barricade, 8' Single Sided	18	Each
634E0420	Type C Advance Warning Arrow Board	2	Each
634E0640	Temporary Pavement Marking	3,180	Ft

SPECIFICATIONS

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

ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the 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 Project 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 and/or 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 and/or 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".

COMMITMENT H: WASTE DISPOSAL SITE (CONTINUED)

Action Taken/Required:

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.

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.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC 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 artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow 30 Days from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

SCOPE OF WORK

This project consists of full depth replacement of 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.

GENERAL MAINTENANCE OF TRAFFIC

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. The name and phone number of person or persons shall be provided to the SD Department of Transportation (605-842-0810), SD Highway Patrol, Sgt. Slade Ross (605-381-7090), Jackson County Sheriff Department (605-837-2285), SD Highway Patrol State Radio (605-393-8121), and the Jones County Sheriff Department (605-669-7111).

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, or as approved by the Engineer 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.

GENERAL MAINTENANCE OF TRAFFIC (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 square foot for Traffic Control and shall be considered as one sign for payment purposes.

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.

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

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.

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.

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.

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.

The location of signs, barricades, and channelizing devices at the mainline interchange ramp tapers 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.

The Contractor shall place an eight foot Type 3 Barricade in front of each repair area prior to the removal of the concrete repair section. The Contractor will be paid for a maximum of 40 Type 3 Barricades, providing at least 40 barricades are in use at the same time, throughout the four work zones. If the Contractor chooses to remove more than 40 repair sections at any one time, the Contractor shall furnish additional barricades at no expense to the State.

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

Additional standard signs, as ordered by the Engineer, shall be available within 2 working days. Failure to provide signs within this time limit will result in Liquidated Damages being assessed in the amount of $400.00 per Calendar Day. Payment for additional signs will be paid using the contract unit price per square foot for Traffic Control.

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 no cost to the State.

TEMPORARY PAVEMENT MARKING

Temporary Pavement Marking shall be used on the tapers for the lane closures, and shall be paid for per linear foot.

ITEMIZED LIST OF TRAFFIC CONTROL DEVICES

090E-391 PCN i4je

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-2	YIELD	3	36" x 36"	9	27
R2-1	SPEED LIMIT (45 MPH)	4	36" x 48"	12	48
R2-1	SPEED LIMIT (65 MPH)	6	36" x 48"	12	72
R2-1	SPEED LIMIT (80 MPH)	2	36" x 48"	12	24
R2-6aP	FINES DOUBLE (plaque)	2	36" x 24"	6	12
W3-5	SPEED REDUCTION AHEAD (45 MPH)	4	48" x 48"	16	64
W3-5	SPEED REDUCTION AHEAD (65 MPH)	4	48" x 48"	16	64
W4-2	LEFT or RIGHT LANE ENDS (symbol)	4	48" x 48"	16	64
W20-1	ROAD WORK AHEAD	7	48" x 48"	16	112
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	4	48" x 48"	16	64
W20-7	FLAGGER (symbol)	2	48" x 48"	16	32
SPECIAL	EXIT with 45° ARROW	3	36" x 32"	8	24
G20-1	ROAD WORK NEXT 11 MILES	2	48" x 24"	8	16
G20-2	END ROAD WORK	4	48" x 24"	8	32
		090E-391 PCN i4je TRAFFIC CONTROL SIGNS SQFT			655

TYPE 3 BARRICADES

ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Double Sided	22 Each

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Arrow Board	2 Each

090W-391 PCN i4jf

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-2	YIELD	3	36" x 36"	9	27
R2-1	SPEED LIMIT (45 MPH)	4	36" x 48"	12	48
R2-1	SPEED LIMIT (65 MPH)	6	36" x 48"	12	72
R2-1	SPEED LIMIT (80 MPH)	2	36" x 48"	12	24
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		090W-391 PCN i4jf TRAFFIC CONTROL SIGNS SQFT			655

TYPE 3 BARRICADES

ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Double Sided	18 Each

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Arrow Board	2 Each

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

Two alternatives of Continuously Reinforced PCC Pavement Repair are available to the Contractor. One method is the full-depth saw cut method, Alternate A. The other method, Alternate B, is a combination of full depth removal and partial removal utilizing jackhammers, leaving a portion of existing reinforcing steel intact.

Full Depth Saw Cut Method – Alternate A

The Contractor shall saw the in place concrete transversely full depth at the limits of the repair area. The area within the full depth saw cuts shall be removed by the lift out method or break out method. Damage to the face of in place concrete will not be permitted.

The Contractor shall remove and dispose of the in place concrete. The underlying base material shall be shaped and compacted by the Contractor prior to placement of concrete.

After removal of the in place concrete and repair of the gravel cushion subgrade, new reinforcing steel shall be installed according to the 24' Continuously Reinforced PCC Pavement Repair Area, Alternate A plan details.

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 width of the repair area.

Cost for furnishing steel bars, supplying epoxy resin adhesive, drilling of holes, applying adhesive, inserting steel bars into the drilled holes, and providing all other items and services contingent upon the insertion of the No. 5 steel longitudinal bars shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

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 length of the repair area and lapped 16" minimum with the drilled in bars. The drilled holes and rebar shall be installed per the steel bar installation note.

Cost for furnishing steel bars, supplying epoxy resin adhesive, drilling of holes, applying adhesive, inserting steel bars into the drilled holes, and providing all other items and services contingent upon the insertion of the No. 5 steel transverse bars shall be incidental to the contract unit price per each for Insert Steel Bar in PCC Pavement.

Full Depth / Partial Removal Method – Alternate B

The transverse boundaries are sawn to a depth of one and one-half to two inches (1-1/2 to 2"). Location of the full-depth transverse cuts will be eighteen inches (18") inside the partial depth transverse cuts and at the longitudinal boundaries. The eighteen-inch (18") area between the saw cuts will be the lap area for reinforcing steel.

The area inside the full-depth saw cuts will be removed by the lift-out or breakout method. Beginning at the center of the repair area, a type of pavement breaking device, such as a hydro hammer or other heavy equipment, may be used to shatter the concrete. The use of a ballbreaker will not be permitted as the large shockwaves may damage the adjacent concrete or reinforcing steel. No heavy break-up will be allowed within two feet of the full-depth saw cuts. The broken concrete may be removed by backhoe or other approved methods.

Jackhammers used to remove concrete in the lap area shall not exceed 30 pounds, with 15-pound jackhammers to be used along vertical walls and around existing reinforcing steel. Bending or damaging the existing reinforcing steel will not be permitted. Reinforcing steel damaged during removal of the lap area will require lap area extension at the Contractor's expense.

New No. 5 longitudinal reinforcing steel shall be installed according to the 24' Continuously Reinforced PCC Pavement Repair Area, Alternate B plan details. The No. 5 longitudinal bars shall overlap the existing reinforcing steel 16" on both sides of the repair area.

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 16" minimum with the drilled in bars. The drilled holes and rebar shall be installed per the steel bar installation note.

Cost for furnishing steel bars, supplying epoxy resin adhesive, drilling of holes, applying adhesive, inserting steel bars into the drilled holes, and providing all other items and services contingent upon the insertion of the No. 5 steel transverse bars shall be incidental to the contract unit price per each for Insert Steel Bar in PCC Pavement.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR – GENERAL

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

The Contractor shall remove and dispose of the in place concrete. The underlying base material shall be shaped and compacted by the Contractor prior to placement of 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.

The quantity estimated for the Continuously Reinforced PCC Pavement Repair, was based on the Full Depth / Partial Removal Method-Alternate B. The quantity may vary if a different method of removal is used, as the quantity for the Full Depth / Partial Removal Method-Alternate B includes the removal of extra concrete for splicing rebar. Payment for this item will be calculated based on actual measurements taken by the Engineer on site.

The Engineer will mark locations of the areas to be repaired in the field. The Contractor must understand that it is impossible to estimate the exact quantities of Continuously Reinforced PCC Pavement Repair. It is the Contractor's responsibility to examine the project limits prior to the bid letting to become familiar with the work involved. There will be no absolute quantities established and the Engineer may increase or decrease the number of removal sites and removal areas listed without additional compensation for the bid item for Continuously Reinforced PCC Pavement Repair.

A central stationary plant site; truck mixers; or self-contained, mobile, continuous mixers, meeting the requirements of Section 460.3 D. or 460.3 E., shall be used for all concrete repair work unless otherwise approved by the Engineer. All delivery methods shall meet the requirements pertaining to delivery and placement of the concrete as noted in the Specifications Section 380.3 G. and 380.3 H.

Concrete placed adjacent to asphalt concrete shoulders shall be formed full depth to match the thickness 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 Sylvax furnished by the State. Asphalt shoulder material shall not be removed a distance of more than 6.0" from the existing concrete pavement without prior approval by the Engineer. Any removal or damage to the asphalt shoulder beyond 6.0" from the existing concrete pavement shall require a total shoulder repair with Asphalt Concrete Composite hot mix along the length of the removal at no cost to the State, unless otherwise approved.

The Sylvax is located in the Murdo Maintenance Yard, legal description of NE1/4, Section 13, T2S, R28E; (Exit 192). This material is royalty free to the Contractor. Furnish cost to the State for this state furnished Sylvax material is $81.00 per ton. Payment for loading, hauling and any incidentals required for placing the Sylvax material shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

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.

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 equal to existing pavement thickness of 8".

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.

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

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air. 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 as part of the mix design submittal. The concrete mix shall contain at least 650 pounds of Type I or II cement, or 600 pounds 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 for a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60º F or higher throughout the cure period. If the concrete temperature falls below 60º 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 compressive strength of 3,500 psi, or as approved by the Engineer, must be attained prior to opening repair areas to traffic.

Concrete shall be covered with a 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 strength of 3500 psi is attained. Insulation blanket shall be overlapped on to the existing concrete by 4'. This requirement for covering repair areas with insulation blanket may be waived during periods of hot weather upon approval of the Engineer.

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 – GENERAL (CONTINUED)

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 saw cutting, removing of material, preparation of removed area, furnishing and placing concrete, finishing, and curing of Continuously Reinforced Pavement Repair.

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.

Cost for supplying epoxy resin adhesive, drilling of holes, applying adhesive, inserting steel bars into the drilled holes, and providing all other items and services contingent upon the insertion of the No. 5 steel longitudinal bars shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

Cost for supplying epoxy resin adhesive, drilling of holes, applying adhesive, inserting steel bars into the drilled holes, and providing all other items and services contingent upon the insertion of the No. 5 steel transverse bars shall be incidental to the contract unit price per each for Insert Steel Bar in PCC Pavement.

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 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. Holes should also be true and normal to the concrete surface. 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.

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.

Cost for furnishing steel bars, supplying epoxy resin adhesive, drilling of holes, applying adhesive, inserting steel bars into the drilled holes, and providing all other items and services contingent upon the insertion of the No. 5 steel transverse bars shall be incidental to the contract unit price per each for Insert Steel Bar in PCC Pavement.

Before concrete may be placed, the epoxy resin shall be allowed to cure for the time specified in the manufacturer's recommendations, or 24 hours, whichever is greater; unless otherwise approved by the Engineer.

SAW AND SEAL JOINTS

All existing center line longitudinal joints located within concrete repair areas shall be re-sawed and sealed.

Joints shall be thoroughly clean and dry prior to placement of any sealant. 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.

All joints shall be sealed with either a hot pour sealant or a low modulus silicone sealant in accordance with joint detail shown on Standard Plate 380.10.

All costs associated with the sawing and sealing of the longitudinal center line joints shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

RESTORATION OF GRAVEL CUSHION

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.

If additional gravel cushion material is required, the Contractor shall furnish, place, and compact gravel cushion to the satisfaction of the Engineer.

Gravel Cushion material shall be approved by the Engineer, and shall be furnished by the Contractor. Gravel Cushion material shall conform to Section 882.

Cost of this work, including gravel cushion material, shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

TABLE OF CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (MRM 163.00 +0.340 TO MRM 174.00 +0.000)

090E-391 PCN i4je

MRM	Lane	Length'	Width'	SqYd	Insert Bars
164.106	PL	4	4	1.8	3.0
164.680	DL	6	4	2.7	3.0
164.746	DL	4	4	1.8	3.0
164.969	DL	4	4	1.8	3.0
165.216	DL	7	4	3.1	4.0
165.269	DL	4	5	2.2	3.0
165.375	DL	4	4	1.8	3.0
165.671	DL	4	4	1.8	3.0
165.741	DL	4	6	2.7	3.0
166.210	DL	4	12	5.3	3.0
166.730	DL/PL	4	24	10.7	3.0
166.755	DL	4	4	1.8	3.0
167.557	DL/PL	4	24	10.7	3.0
168.655	DL	4	10	4.4	3.0
168.786	DL	5	5	2.8	3.0
168.884	DL	4	5	2.2	3.0
169.499	DL	4	4	1.8	3.0
169.522	DL	4	4	1.8	3.0
170.596	DL	4	12	5.3	3.0
171.127	DL	4	12	5.3	3.0
172.390	DL	4	4	1.8	3.0
172.770	DL	4	5	2.2	3.0
173.215	DL	4	4	1.8	3.0
173.501	DL	10	6	6.7	5.0
173.941	DL	4	12	5.3	3.0
			Total =	89.4	78.0

090W-391 PCN i4jf

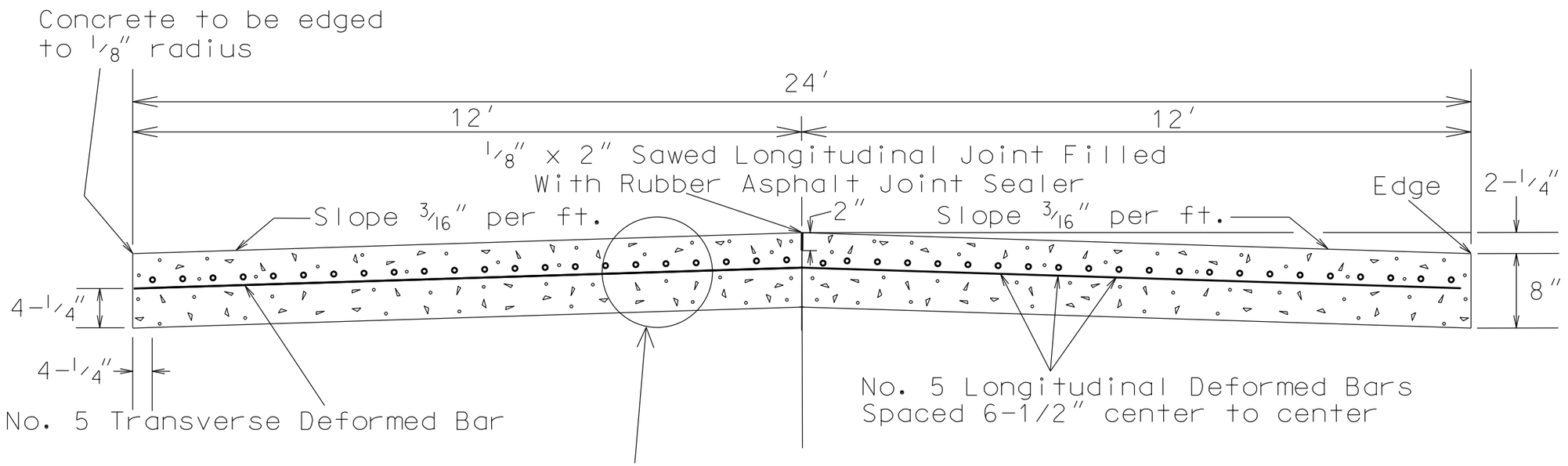
MRM	Lane	Length'	Width'	SqYd	Insert Bars
164.077	DL	4	4	1.8	3.0
164.757	DL	4	4	1.8	3.0
164.993	DL	34	4	15.1	15.0
165.266	DL	5	5	2.8	3.0
165.319	PL	4	4	1.8	3.0
165.442	DL	4	4	1.8	3.0
165.587	DL	5	12	6.7	3.0
166.338	DL	4	12	5.3	3.0
166.358	DL	4	4	1.8	3.0
166.385	DL	4	4	1.8	3.0
166.495	DL	5	12	6.7	3.0
166.882	DL	4	8	3.6	3.0
168.256	DL	4	4	1.8	3.0
169.471	DL	4	5	2.2	3.0
170.034	DL	15	4	6.7	7.0
170.571	DL	6	8	5.3	4.0
170.656	PL	4	4	1.8	3.0
171.811	PL	4	4	1.8	3.0
171.811	DL	4	10	4.4	3.0
172.592	DL	6	5	3.3	3.0
172.822	DL	5	4	2.2	3.0
173.389	DL	4	12	5.3	3.0
173.785	PL	4	4	1.8	3.0
173.785	DL	4	6	2.7	3.0
173.833	PL	4	4	1.8	3.0
			Total =	91.9	92.0

*Mile Reference Points (MRP) are based on approximations to the field MRM's and are not to be considered as an MRM

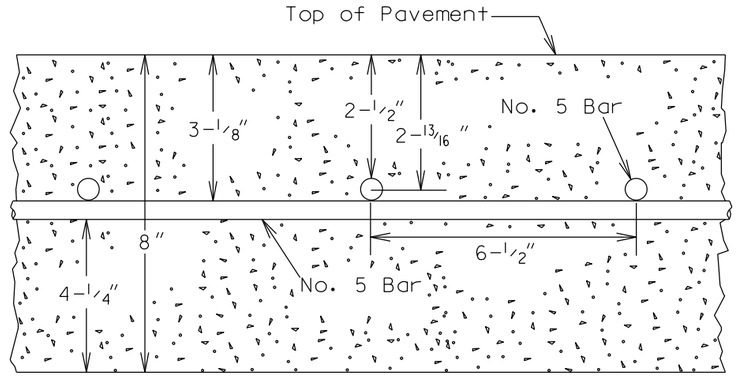
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-391& 090W-391	9	18

Plotting Date: 02/16/2017

TYPICAL SECTIONS OF IN PLACE CRC PAVEMENT
MRM 163.00+0.340 TO MRM 174.00+0.000



Detail A

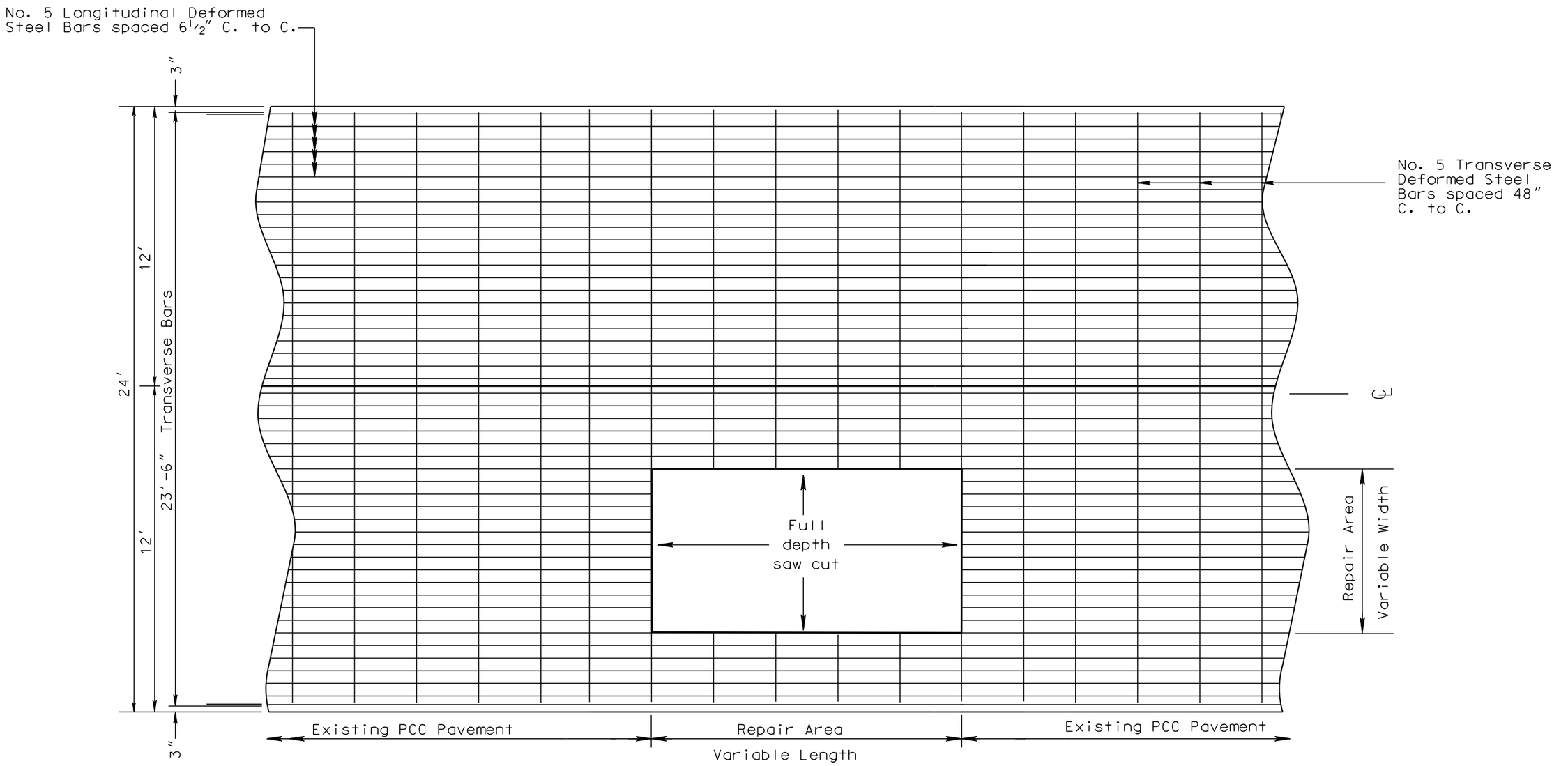


Detail A

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-391& 090W-391	10	18

Plotting Date: 02/16/2017

24' CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR AREA
MRM 163.00+0.340 TO MRM 174.00+0.000
ALTERNATE A



Plot Scale - 1:200

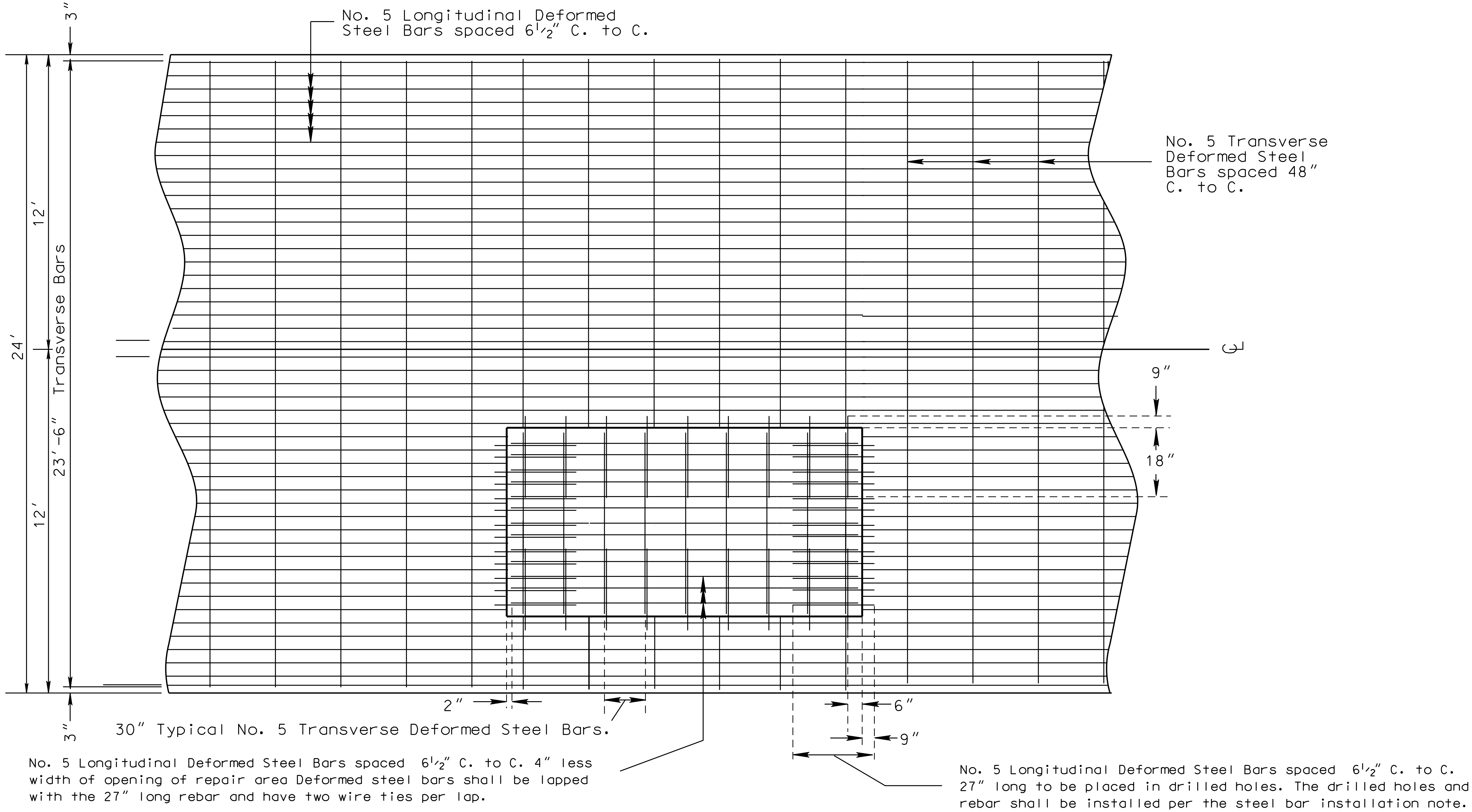
• Plotted From - tnvi1n20

File - ...\Review_2\Jack f4je_review2.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-391& 090W-391	11	18

Plotting Date: 02/16/2017

24' CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR AREA
MRM 163.00+0.340 TO MRM 174.00+0.000
ALTERNATE A



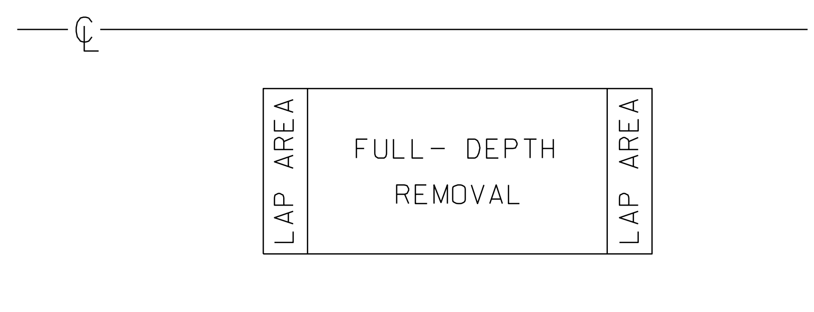
Plot Scale - 1:200

- Plotted From - trwl1nt20

File - ...\Review_2\Jack l4je_review2.dgn

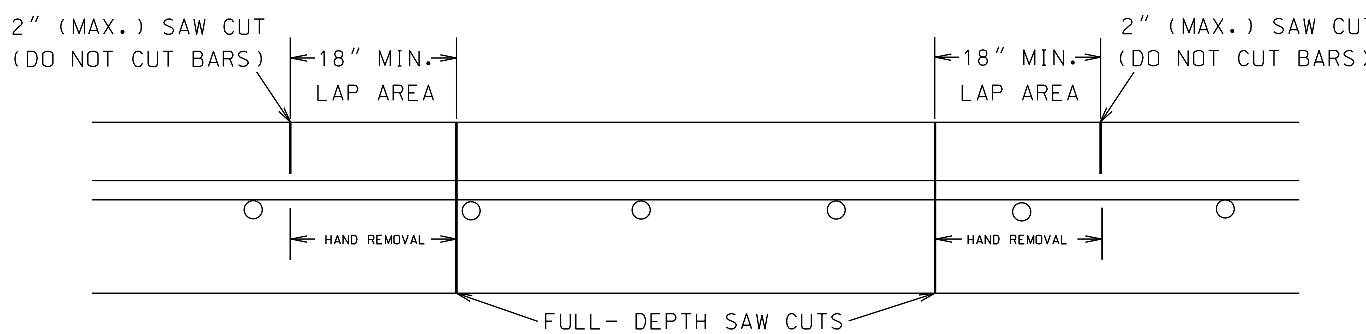
24' CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR AREA
MRM 163.00+0.340 TO MRM 174.00+0.000
ALTERNATE B

PLAN VIEW

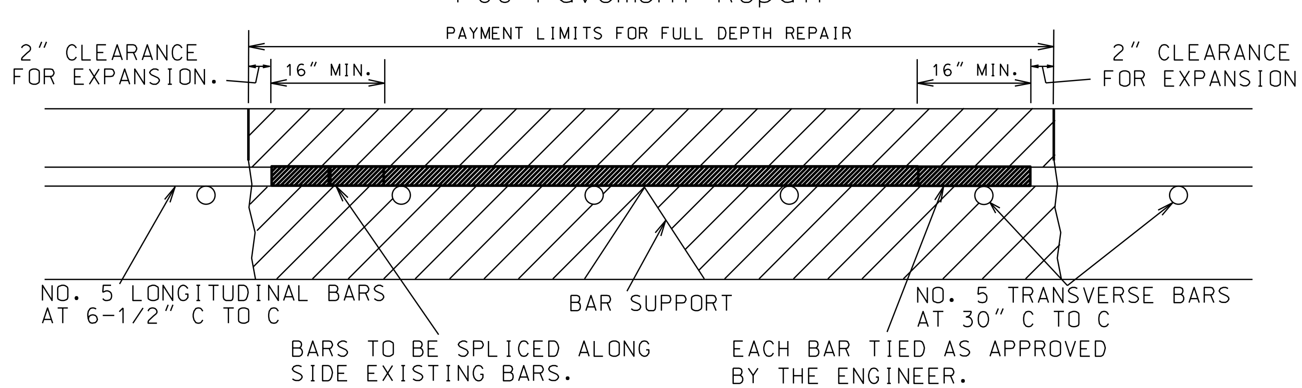


SIDE VIEWS (LONGITUDINAL DIRECTION)

Full Depth Removal

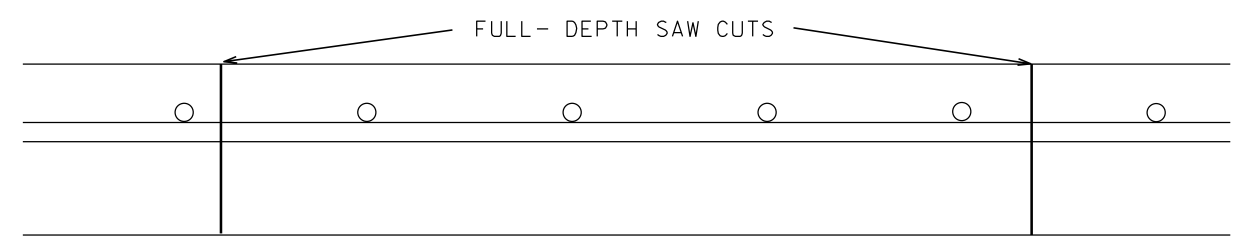


PCC Pavement Repair

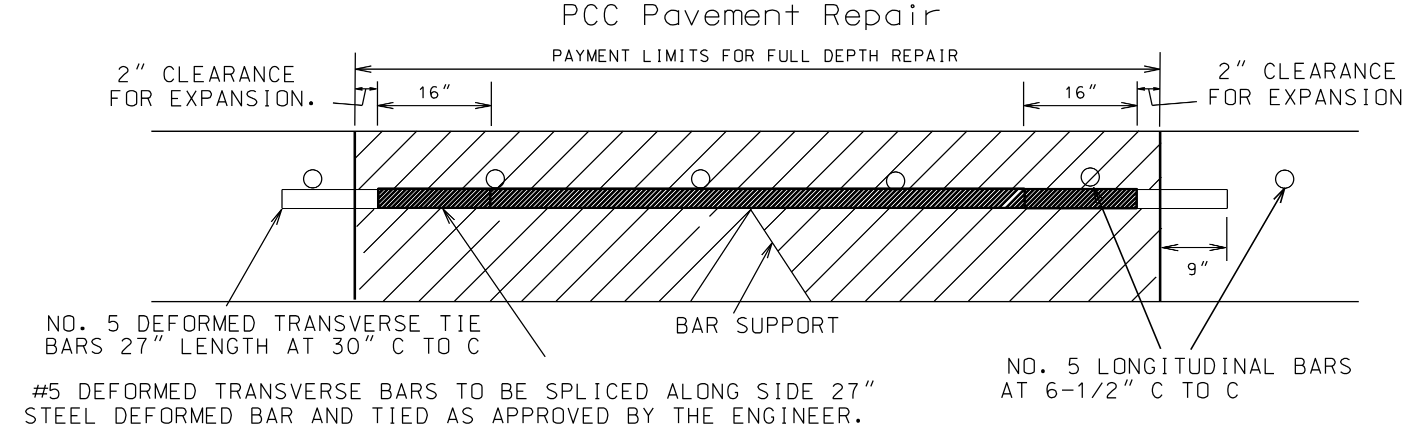


SIDE VIEWS (TRANSVERSE DIRECTION)

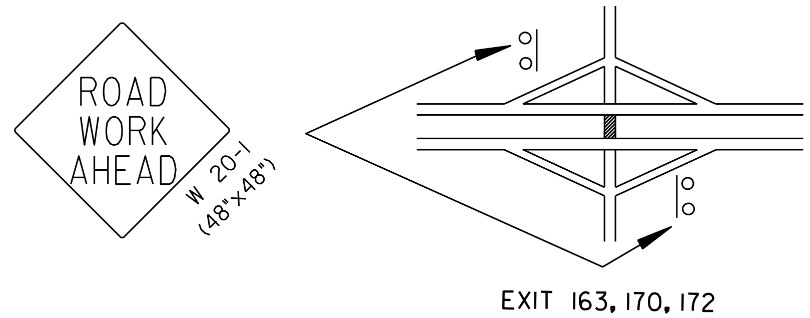
Full Depth Removal



PCC Pavement Repair

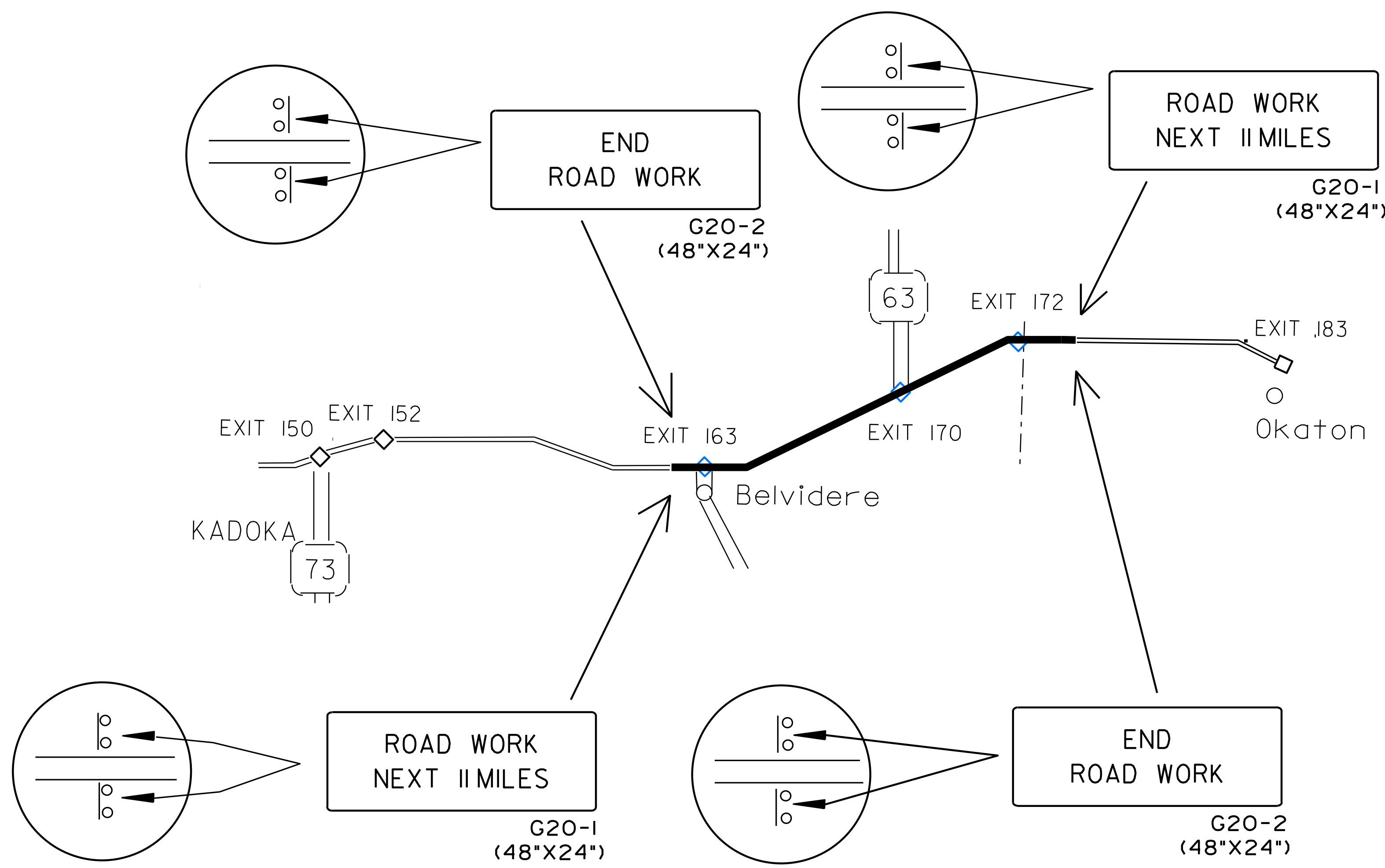


FIXED LOCATION SIGN LAYOUT



NOTES:

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

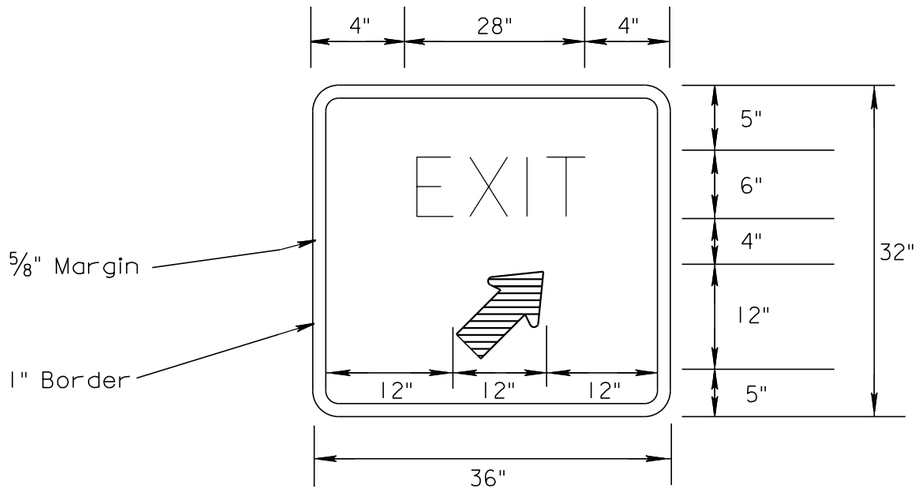


STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-391& 090W-391	14	18

Plotting Date: 02/16/2017

SPECIAL DETAIL FOR TRAFFIC CONTROL AT RAMP LOCATIONS

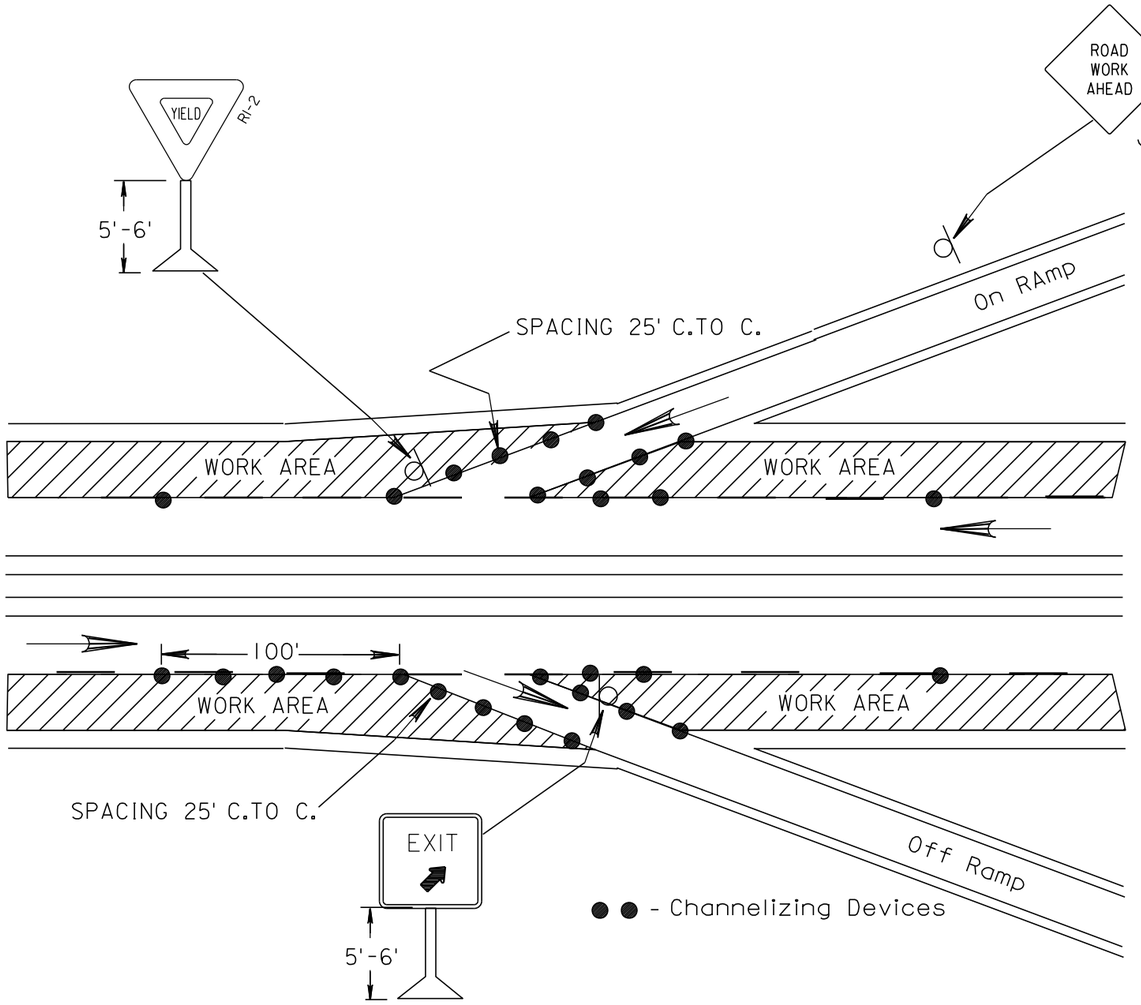
DETAILS FOR SPECIAL SIGN



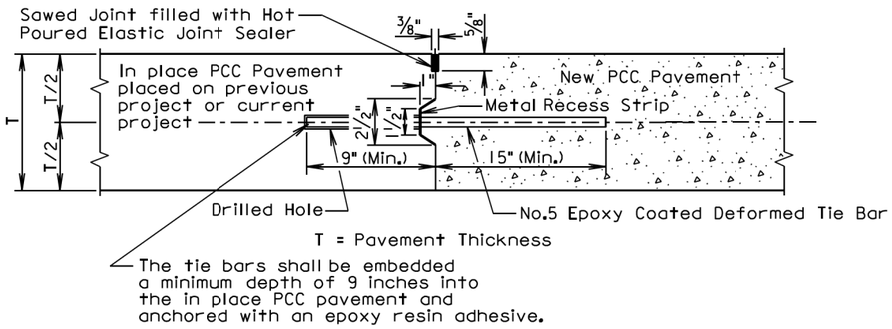
Legend - White (High Intensity)
Background - Green (High Intensity)
Sign Blank - 0.100" Aluminum

NOTE: Quantity included as Special Sign in the Sign Tabulation.

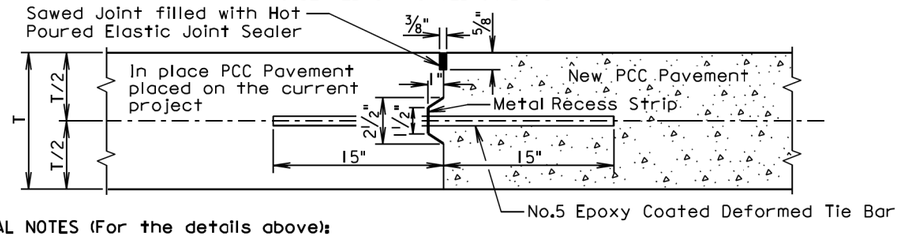
ON-RAMP AND OFF-RAMP DETAILS



LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS
(DRILLED IN BARS)



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



GENERAL NOTES (For the details above):

The epoxy coated deformed tie bars shall be spaced in accordance with the following tables:

Tie Bar Spacing 48" Maximum	
Transverse Contraction Joint Spacing	Number of Tie Bars
6.5' to 10'	2
10.5' to 14'	3
14.5' to 18'	4
18.5' to 22'	5

Tie Bar Spacing 30" Maximum	
Transverse Contraction Joint Spacing	Number of Tie Bars
5' to 7'	2
7.5' to 9.5'	3
10' to 12'	4
12.5' to 14.5'	5
15' to 17'	6
17.5' to 19.5'	7
20' to 22'	8

The tie bars shall be placed a minimum of 15 inches from transverse contraction joints.

The required number of tie bars as shown in the table shall be uniformly spaced within each panel. The uniformly spaced tie bars shall be spaced a maximum of 48 inches center to center for a female keyway and shall be spaced a maximum of 30 inches center to center for a vertical face and male keyway. The maximum tie bar spacing shall apply to tie bars within each panel.

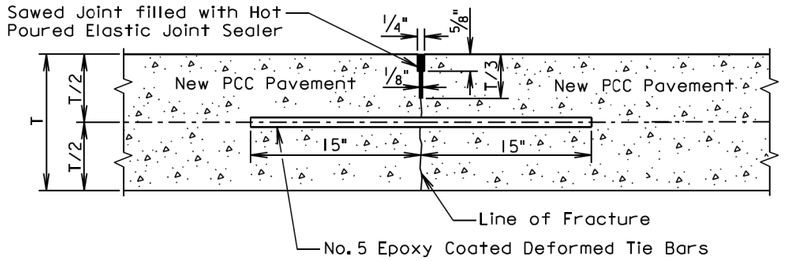
The keyway illustrated in the above details depict a female keyway.

The keyway is optional and is not required. When concrete pavement is formed and a keyway is provided, a metal recess strip shall be used. When concrete pavement is slip formed, a metal recess strip is not required.

August 31, 2013

Published Date: 1st Qtr. 2017	SDDOT	***PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS***	***PLATE NUMBER 380.10*** Sheet 1 of 2

SAWED LONGITUDINAL JOINT WITH TIE BARS
(POURED MONOLITHICALLY)



T = Pavement Thickness

GENERAL NOTES (For the detail above):

The epoxy coated deformed tie bars shall be spaced in accordance with the following table:

Tie Bar Spacing 48" Maximum	
Transverse Contraction Joint Spacing	Number of Tie Bars
6.5' to 10'	2
10.5' to 14'	3
14.5' to 18'	4
18.5' to 22'	5

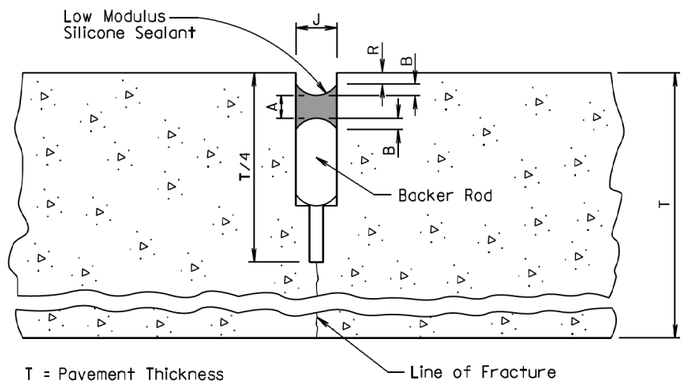
The tie bars shall be placed a minimum of 15 inches from the transverse contraction joints.

The required number of tie bars as shown in the table shall be uniformly spaced within each panel with a maximum space of 48 inches center to center. The maximum tie bar spacing shall apply to tie bars within each panel.

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 is necessary.

August 31, 2013

Published Date: 1st Qtr. 2017	SDDOT	***PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS***	***PLATE NUMBER 380.10*** Sheet 2 of 2



LOW MODULUS SILICONE SEALANT ALLOWABLE CONSTRUCTION TOLERANCES				
J = 3/8"				
A (Min.) (In)	A (Max.) (In)	B (Min.) (In)	B (Max.) (In)	R (In)
3/16	5/16	1/8	1/4	1/4
J = 1/2"				
A (Min.) (In)	A (Max.) (In)	B (Min.) (In)	B (Max.) (In)	R (In)
3/16	3/8	1/8	1/4	1/4
J = 5/8"				
A (Min.) (In)	A (Max.) (In)	B (Min.) (In)	B (Max.) (In)	R (In)
1/4	7/16	1/8	5/16	1/4
J = 3/4"				
A (Min.) (In)	A (Max.) (In)	B (Min.) (In)	B (Max.) (In)	R (In)
5/16	1/2	3/16	3/8	5/16
J = 1"				
A (Min.) (In)	A (Max.) (In)	B (Min.) (In)	B (Max.) (In)	R (In)
3/8	5/8	3/16	1/2	5/16

GENERAL NOTE:

The backer rod shall be a nonmoisture absorbing resilient material approximately 25% larger in diameter than the width of the joint to be sealed.

February 14, 2011

Published Date: 1st Qtr. 2017	***SDDOT***	***RESEAL PCC PAVEMENT JOINT (SILICONE)***	*PLATE NUMBER* 380.13
			Sheet 1 of 1

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

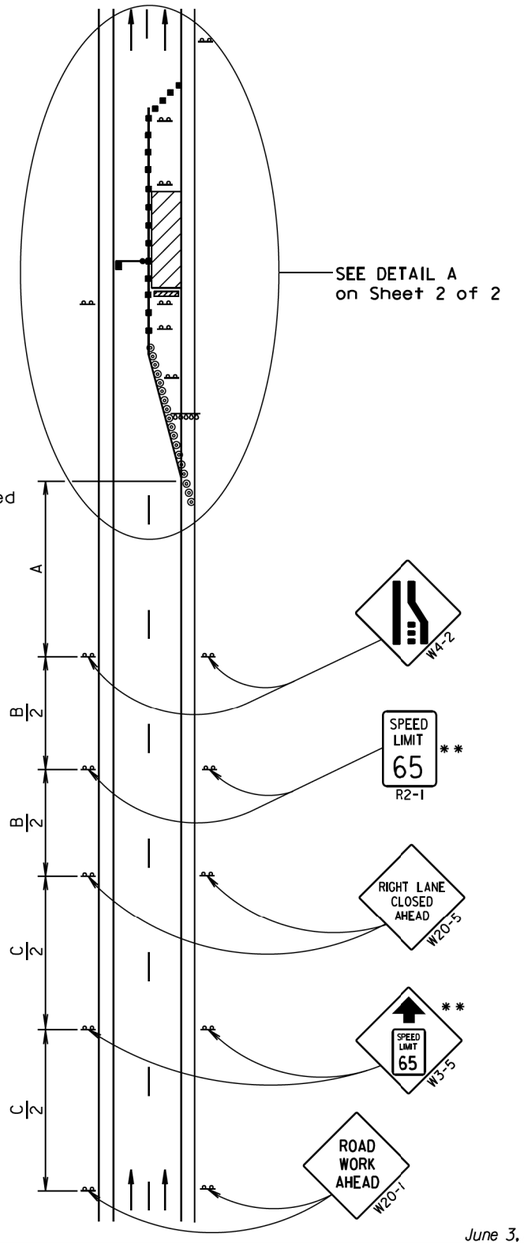
** Speed appropriate for location.

◎ Reflectorized Drum

■ Channelizing Device

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

High speed is defined as having a posted speed limit greater than 45 mph.



June 3, 2016

Published Date: 1st Qtr. 2017	SDDOT	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
			Sheet 1 of 2

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)
0 - 30	25	180
35 - 40	25	320
45	25	600
50	50 *	600
55	50 *	660
60 - 65	50 *	780
70 - 80	50 *	960

* Spacing is 40' for 42" cones.

** Speed appropriate for location.

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

■● Flagger (As Necessary)

◎ Reflectorized Drum

■ Channelizing Device

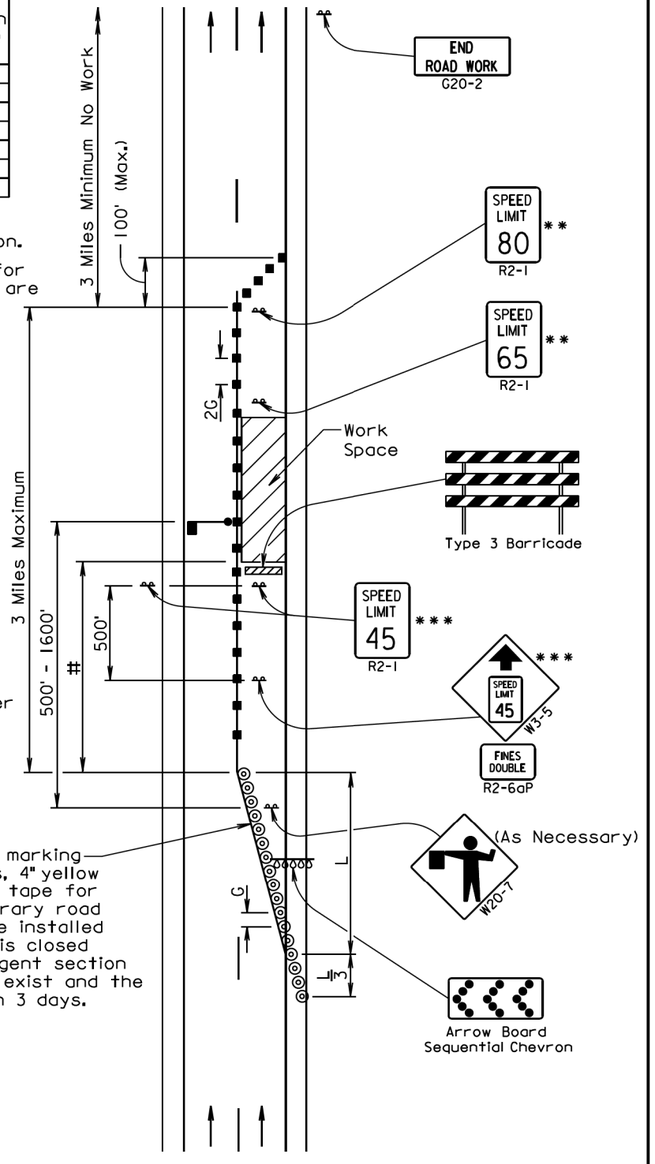
The Work Space shall be a minimum of 500' from the end of the taper.

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

The channelizing devices shall be 42" cones or drums.

42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

4" white temporary pavement marking tape for right lane closures, 4" yellow temporary pavement marking tape for left lane closures, or temporary road markers at 5' spacing shall be installed in the taper when the lane is closed overnight, and along the tangent section where the skip lines do not exist and the lane is closed for more than 3 days.



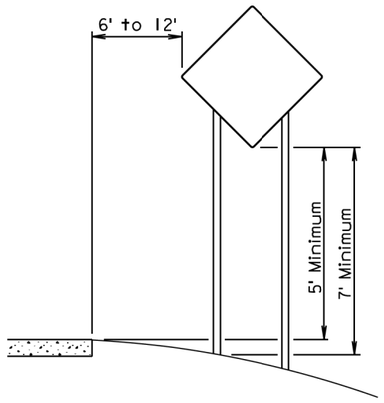
DETAIL A

June 3, 2016

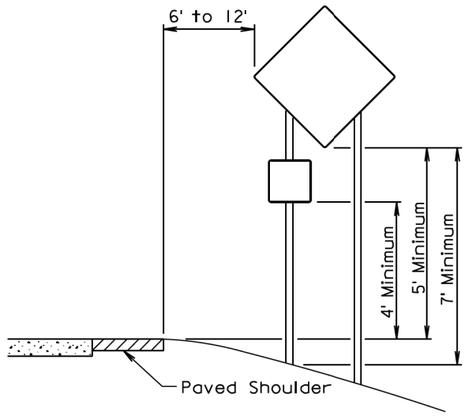
Published Date: 1st Qtr. 2017	SDDOT	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
			Sheet 2 of 2

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090E-391& 090W-391	18	18

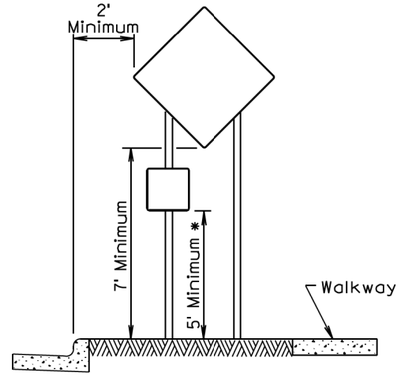
Plotting Date: 02/16/2017



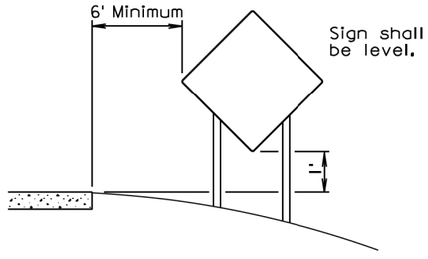
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT

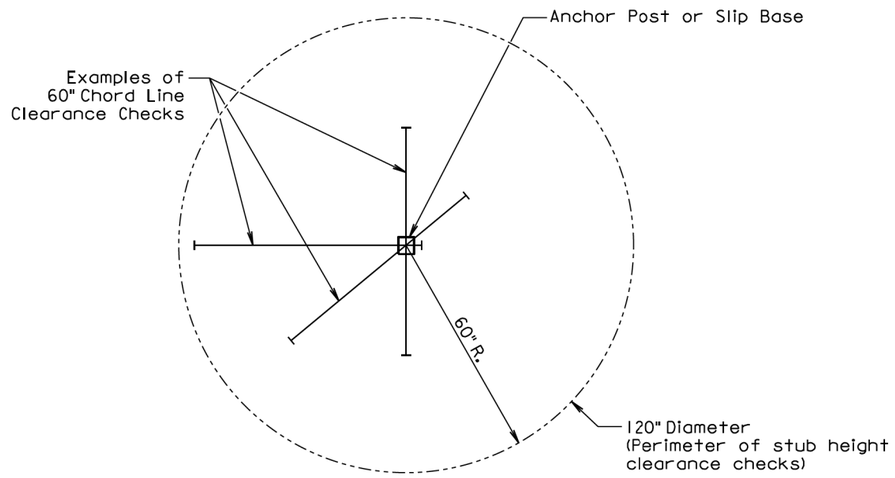


RURAL DISTRICT
3 DAY MAXIMUM
(Not applicable to regulatory signs)

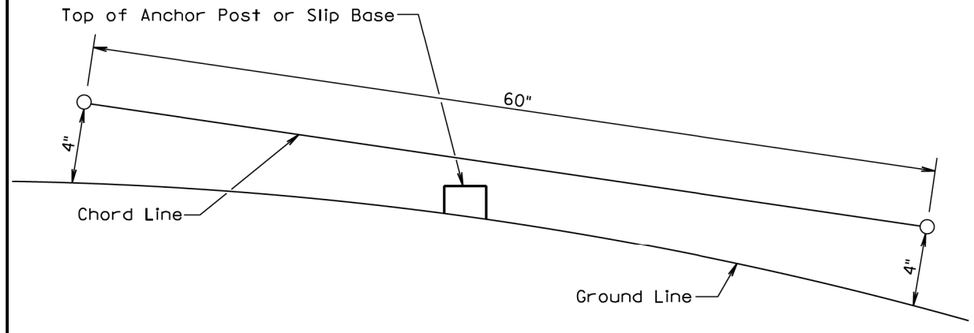
* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.

September 22,2014

Published Date: 1st Qtr. 2017	SDDOT	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. 2017	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1