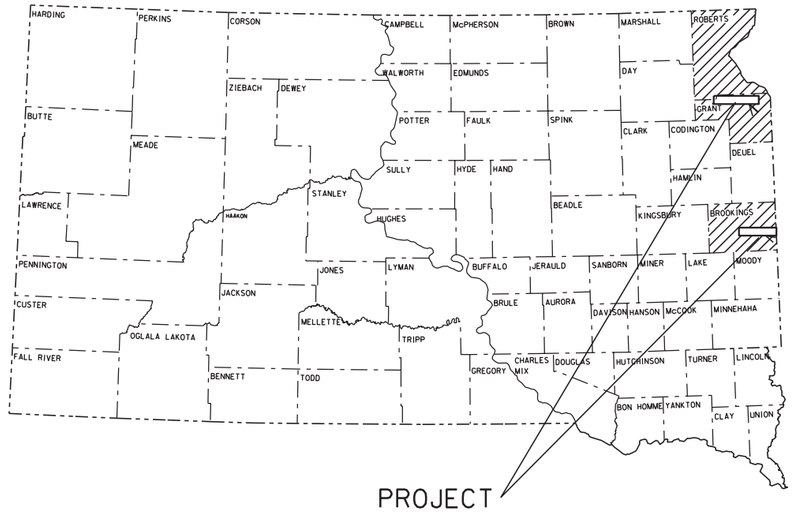


STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT NH 0012(192)
US HIGHWAYS 14 & 12
BROOKINGS, ROBERTS & GRANT COUNTIES

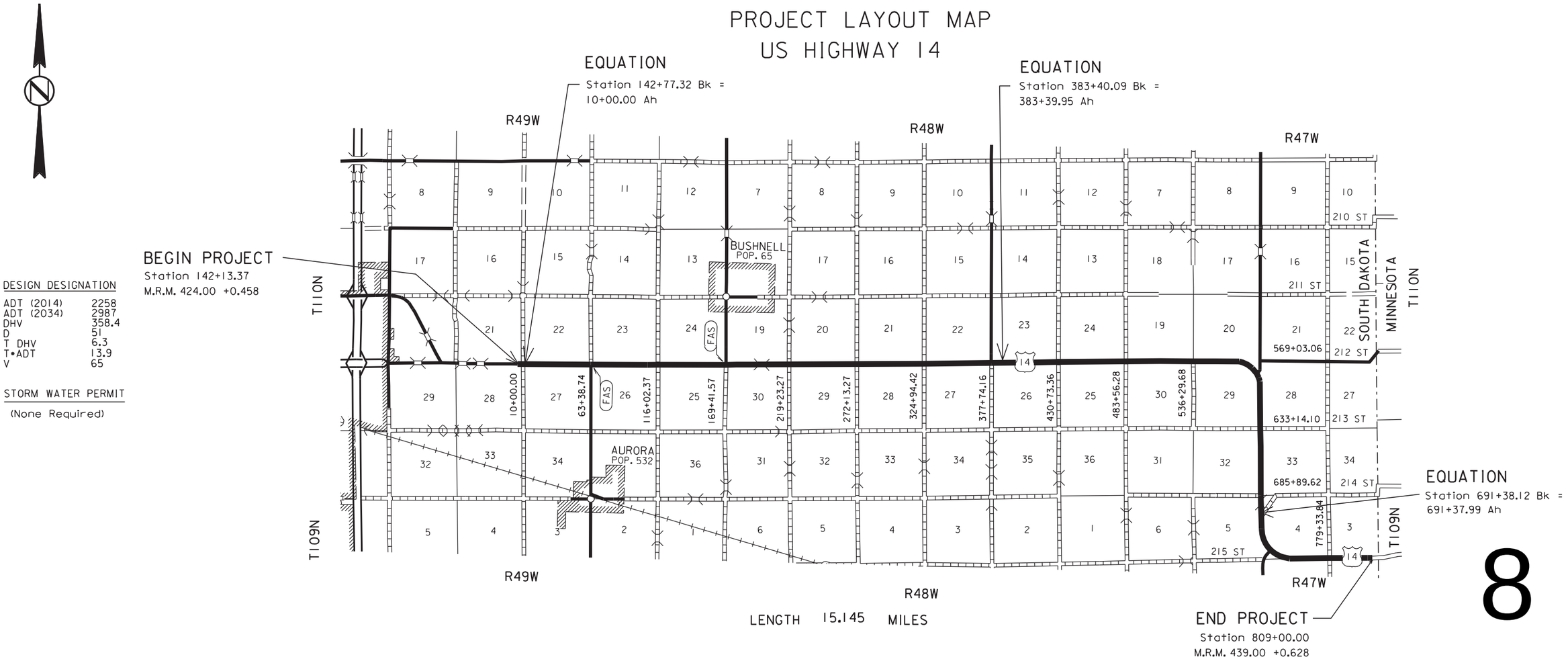
JOINT AND CONCRETE REPAIR, And DURABLE PAVEMENT MARKING

PCN 052T

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	1	44
Plotting Date: 12/21/2015			

INDEX OF SHEETS

PROJECT LAYOUT MAP
US HIGHWAY 14



DESIGN DESIGNATION

ADT (2014)	2258
ADT (2034)	2987
DHV	358.4
D	51
T DHV	6.3
T•ADT	13.9
V	65

STORM WATER PERMIT

(None Required)

BEGIN PROJECT
Station 142+13.37
M.R.M. 424.00 +0.458

EQUATION
Station 691+38.12 Bk =
691+37.99 Ah

END PROJECT
Station 809+00.00
M.R.M. 439.00 +0.628

LENGTH 15.145 MILES

8

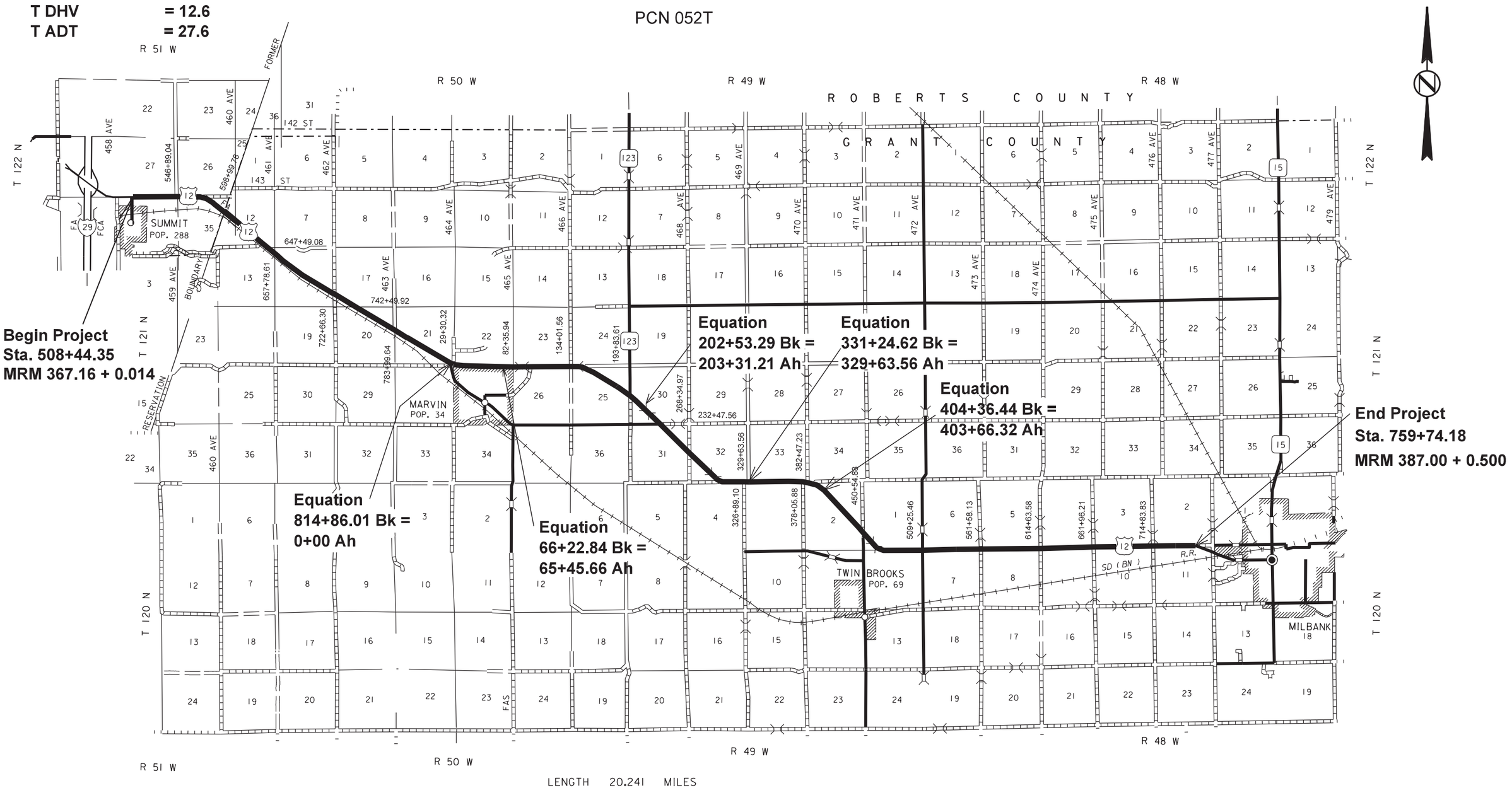
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	2	44

DESIGN DESIGNATION

ADT (2014)	= 1741
ADT (2034)	= 2043
DHV	= 222.7
D	= 51
T DHV	= 12.6
T ADT	= 27.6

PROJECT LAYOUT MAP
US HIGHWAY 12

PCN 052T



LENGTH 20.241 MILES

PLOTTED FROM - TRAB17882

ESTIMATE OF QUANTITES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E1100	Remove Concrete Pavement	3,273.1	SqYd
120E0010	Unclassified Excavation	27	CuYd
332E0010	Cold Milling Asphalt Concrete	1,400	SqYd
380E1050	9" Miscellaneous PCC Pavement	2,900.1	SqYd
380E5030	Nonreinforced PCC Pavement Repair	373.0	SqYd
380E6000	Dowel Bar	872	Each
380E6110	Insert Steel Bar in PCC Pavement	1,626	Each
380E6310	Seal Random Cracks in PCC Pavement	3,041	Ft
390E0100	Saw and Seal Joint	268,615	Ft
633E0030	Cold Applied Plastic Pavement Marking, 24"	605	Ft
633E0040	Cold Applied Plastic Pavement Marking, Arrow	14	Each
633E3000	Durable Pavement Marking, 4" White	373,203	Ft
633E3005	Durable Pavement Marking, 4" Yellow	74,943	Ft
633E5050	Surface Preparation for Pavement Marking	448,146	Ft
633E5052	Surface Preparation for Pavement Marking	14	Each
634E0010	Flagging	4,548.0	Hour
634E0020	Pilot Car	2,274.0	Hour
634E0110	Traffic Control Signs	1,121	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0285	Type 3 Barricade, 8' Double Sided	20	Each
634E0640	Temporary Pavement Marking	4,944	Ft

TABLE OF QUANTITIES FOR US HWY 14 AND US HWY 12

FOR INFORMATION ONLY

ROUTE	Mobilization	Remove Concrete Pavement	Unclassified Excavation	Cold Milling Asphalt	9" Misc. PCC Pavement	Nonreinf. PCC Pavement Repair	Dowel Bar	Insert Steel Bar In PCC Pavement	Seal Random Cracks in PCC Pavement	Saw and Seal Joint	Cold Applied Plastic Pavement Marking, 24"	Cold Applied Plastic Pavement Arrow	Durable Pavement Marking 4" White	Durable Pavement Marking 4" Yellow	Surface Preparation For Pavement Marking	Surface Preparation For Pavement Marking	Flagging	Pilot Car	Traffic Control Signs	Traffic Control Misc.	Type 3 Barricade 8' Double Sided	Temporary Pavement Marking
	Lump Sum	Sq.Yd.	Cu.Yd	Sq.Yd.	Sq.Yd.	Sq.Yd.	Each	Each	Ft.	Ft.	Ft.	Each	Gal.	Gal.	Ft.	Each	Hour	Hour	Sq.Ft.	Lump Sum	Each	Ft.
US Hwy 14	Lump Sum	2137.1	27	0	1920.1	217.0	526	1025	2963	111950	605	14	159458	46622	206080	14	2628.0	1314.0	550	Lump Sum	10	0
US Hwy 12	Lump Sum	1136.0	0	1400	980.0	156.0	346	601	78	156665	0	0	213745	28321	242066	0	1920.0	960.0	571	Lump Sum	10	4944
Total =	Lump Sum	3273.1	27	1400	2900.1	373.0	872	1626	3041	268615	605	14	373203	74943	448146	14	4548.0	2274.0	1121	Lump Sum	20	4944

SPECIFICATIONS

Standard Specifications for Roads and 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 B4: BALD EAGLE

Bald eagles are known to occur in this area.

Action Taken/Required:

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

COMMITMENT C: WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment before entering South Dakota to reduce the risk of invasive species introduction into the project vicinity.

The Contractor shall not withdraw water directly from streams of the James, Big Sioux, and Vermillion watersheds without prior approval from the SDDOT Environmental Office.

Action Taken/Required:

The Contractor shall obtain the necessary permits from the regulatory agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE) prior to executing water extraction activities.

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 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".

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 impact. This work includes, but is not limited to: staging areas, borrow sites, waste disposal sites, and all material processing sites.

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; 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 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 staging areas, borrow sites, waste disposal sites, or material processing sites that affect wetland, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	5	44

Project Stationing US Hwy 14

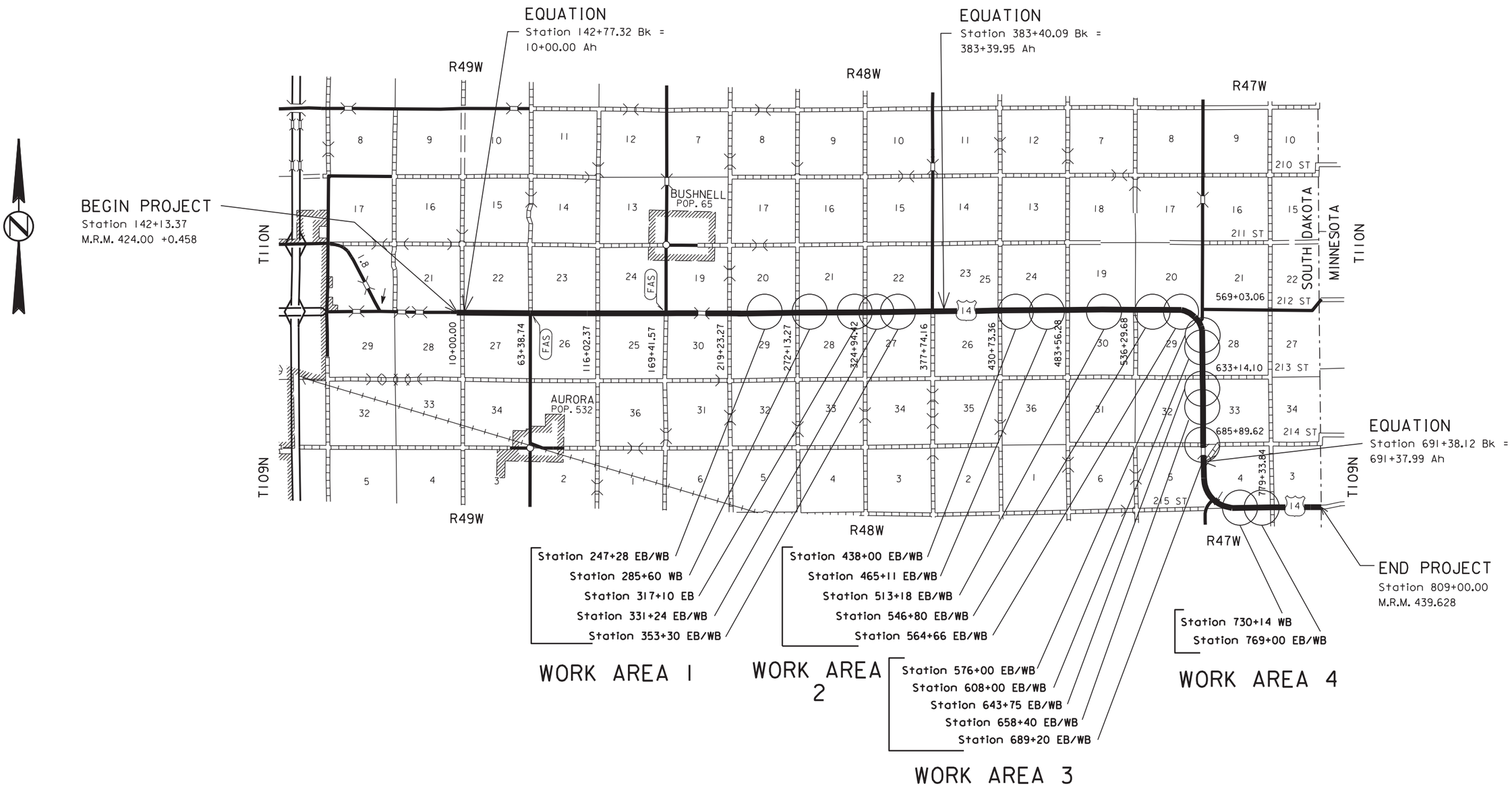
Station			Station			Station		Station	Length	Miles
		142+13.37	to		142+ 77.32	142+13.37	to	142+77.32	63.95	0.012
Equation		142+77.32 Bk	=		10+00.00 Ah					
		10+00.00	to		383+40.09	10+00.00	to	383+40.09	37,340.09	7.072
Equation		383+40.09 Bk	=		383+39.95 Ah					
		383+39.95	to		691+38.12	383+39.95	to	691+38.12	30,798.17	5.833
Equation		691+38.12 Bk	=		691+37.99 Ah					
		691+37.99	to		809+00.00	691+37.99	to	809+00.00	11,762.01	2.228
TOTAL									79,964.22	15.145

Project Stationing US Hwy 12

Station			Station			Station		Station	Length	Miles
		508+44.35	to		814+86.01	508+44.35	to	814+86.01	30,641.66	5.803
Equation		814+86.01 Bk	=		0+00 Ah					
		0+00.00	to		66+22.84	+0.00	to	66+22.84	6,622.84	1.254
Equation		66+22.84 Bk	=		65+45.66 Ah					
		65+45.66	to		202+53.29	65+45.66	to	202+53.29	13,707.63	2.596
Equation		202+53.29 Bk	=		203+31.21 Ah					
		203+31.21	to		331+24.62	203+31.21	to	331+24.62	12,793.41	2.423
Equation		331+24.62 Bk	=		329+63.56 Ah				0.00	0.000
		329+63.56	to		404+36.44	329+63.56	to	404+36.44	7,472.88	1.415
Equation		404+36.44 Bk	=		403+66.32 Ah				0.00	0.000
		403+66.32	to		759+74.18	403+66.32	to	760+00.00	35,633.68	6.749
TOTAL									106,872.10	20.241

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	6	44
Plotting Date: 12/16/2015			

REPAIR LOCATIONS US HWY 14



PLOT SCALE - 1:200

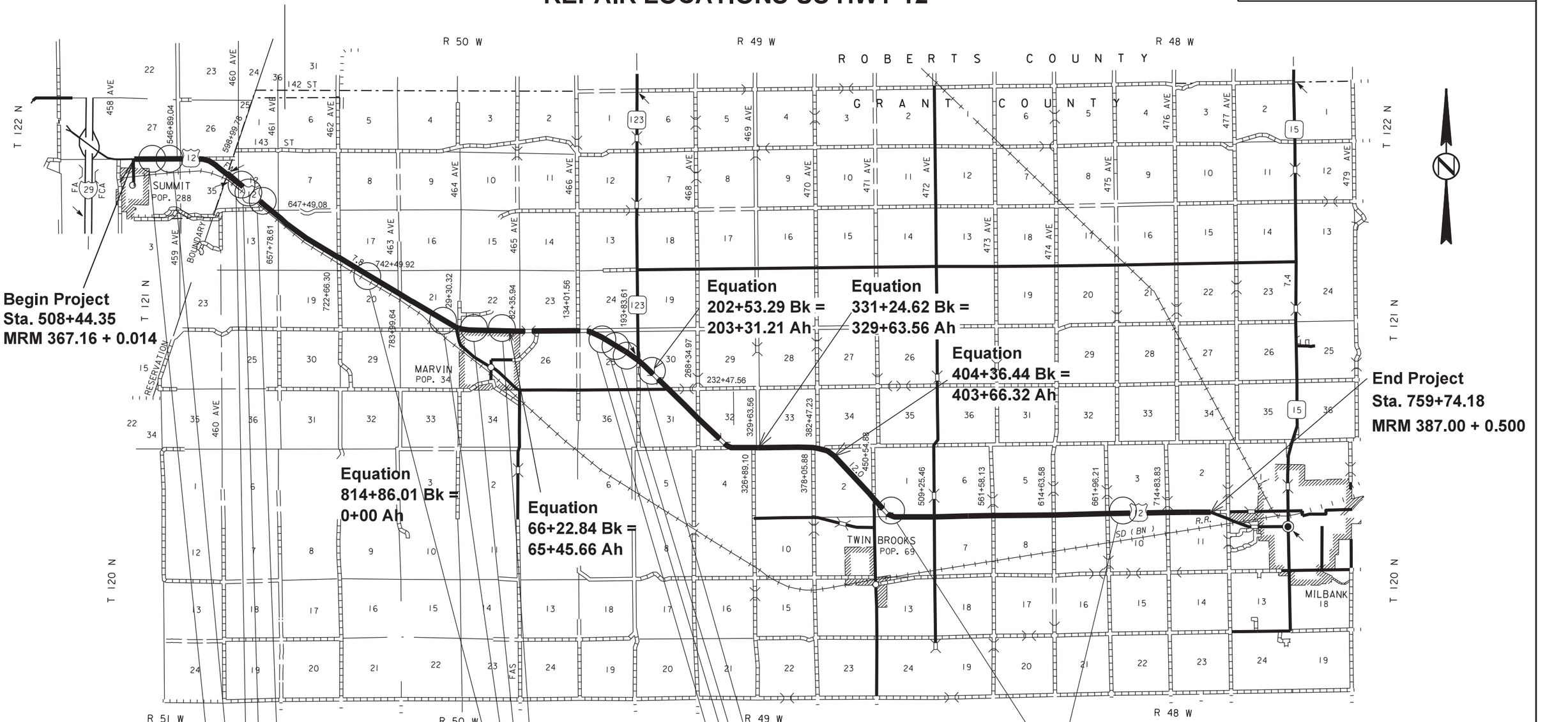
PLOT NAME - 3

PLOTTED FROM - TRAB17882

FILE - ...\REPAIR LOCATIONS HWY 14.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	7	44

REPAIR LOCATIONS US HWY 12



Begin Project
Sta. 508+44.35
MRM 367.16 + 0.014

Equation
202+53.29 Bk =
203+31.21 Ah

Equation
331+24.62 Bk =
329+63.56 Ah

Equation
404+36.44 Bk =
403+66.32 Ah

Equation
814+86.01 Bk =
0+00 Ah

Equation
66+22.84 Bk =
65+45.66 Ah

End Project
Sta. 759+74.18
MRM 387.00 + 0.500

Station 504+40 WB
Station 527+10 EB/WB
Station 619+01 EB/WB
Station 634+10 EB
Station 642+24 EB/WB

WORK AREA 1

Station 733+58 EB/WB
Station 21+12 EB
Station 30+64 EB
Station 59+85 EB

WORK AREA 2

Station 162+26 EB/WB
Station 176+25 WB
Station 189+34 WB
Station 224+37 EB/WB

WORK AREA 3

Station 464+60 EB/WB
Station 678+10 EB/WB

WORK AREA 4

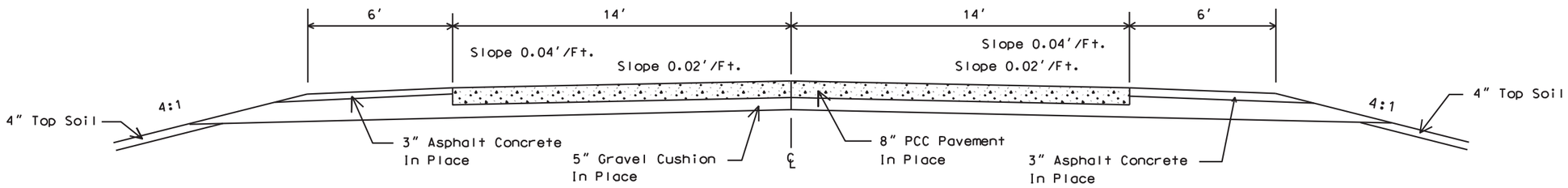
PLOTTED FROM - TRAB17882

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	8	44
Plotting Date: 12/16/2015			

TYPICAL SURFACING SECTIONS
US HIGHWAY 14

Mainline

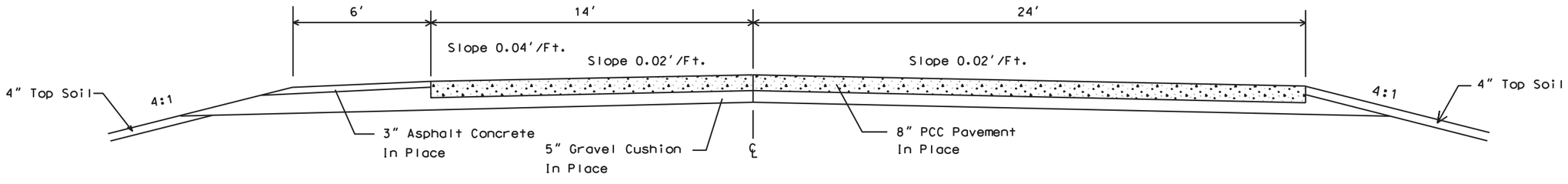
Sta. 142+13.37 to Sta. 54+80 (Thru Equation)
Sta. 70+58 to Sta. 169+91.50



Mainline

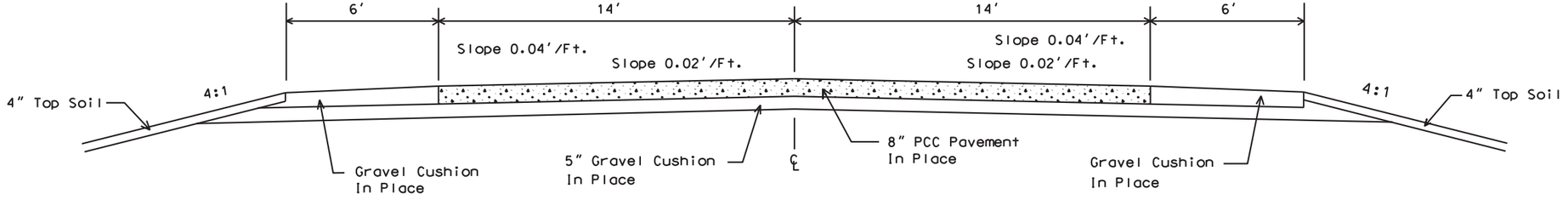
Sta. 62+00 to Sta. 63+38.70

Transition: Sta. 54+80 Rt. to Sta. 62+00 Rt.
Sta. 63+38.70 Rt. to Sta. 70+58 Rt.



Mainline

Sta. 169+91.50 to Sta. 809+00 (Thru Equations)



PLOT SCALE - 1:5.0625

PLOTTED FROM - TRAB17982

PLOT NAME - 6

FILE - ...\BROK052\TYPICAL SECTIONS.DGN

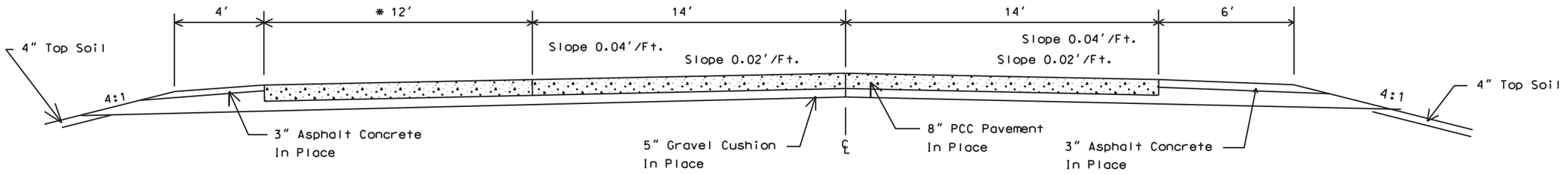
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	9	44
Plotting Date: 12/16/2015			

TYPICAL SURFACING SECTIONS
US HIGHWAY 14

Transition: Sta. 53+83 Rt. to Sta. 62+24 Rt.
* 2'to 12'
Sta. 70+38 Rt. to Sta. 70+25 Rt.
* 12'to 2'

Mainline

Sta. 53+83 to Sta. 79+25

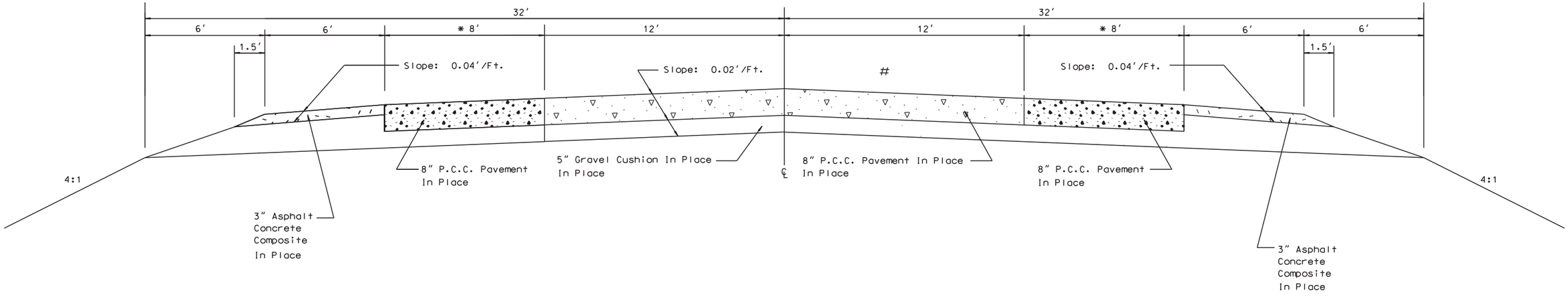


Transitions:

* Sta 159+00 to 162+90 - 2' to 8'
* Sta 172+40 to 176+30 - 8' to 2'

MAINLINE

Station 159+00 to Station 176+30

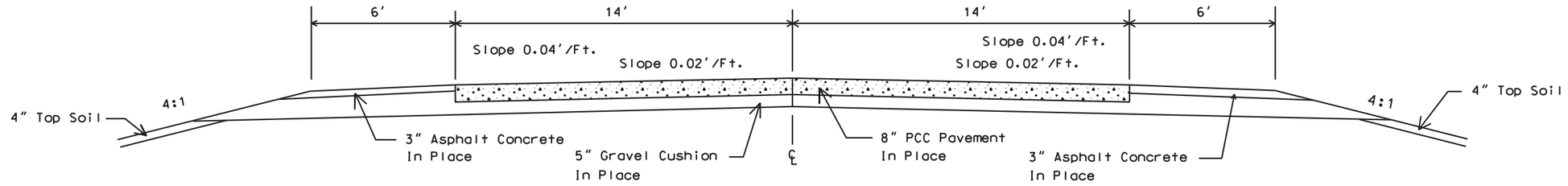


STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	10	44
Plotting Date: 12/16/2015			

TYPICAL SURFACING SECTIONS
US HIGHWAY 12

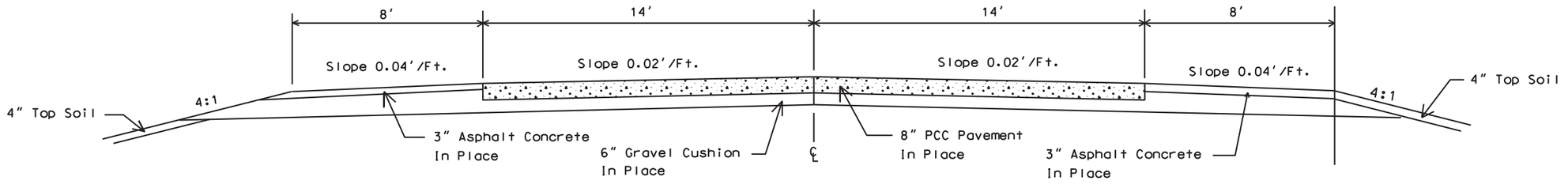
Mainline

Sta. 508+44.35 to Sta. 2+00 (Thru Equation)
Sta. 110+00 to Sta. 192+00



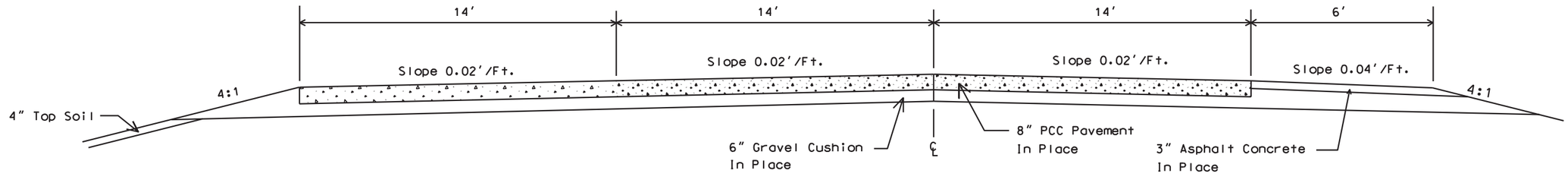
Mainline

Sta. 142+13.37 to Sta. 54+80 (Thru Equation)
Sta. 70+58 to Sta. 169+91.50



Mainline

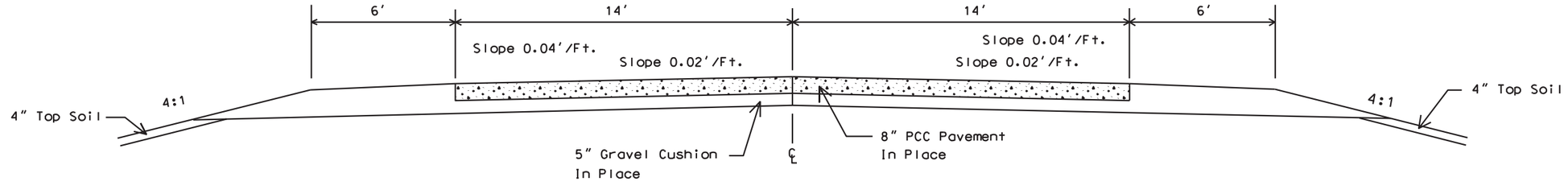
Sta. 8+00 to Sta. 104+00 (Thru Equation)



Mainline

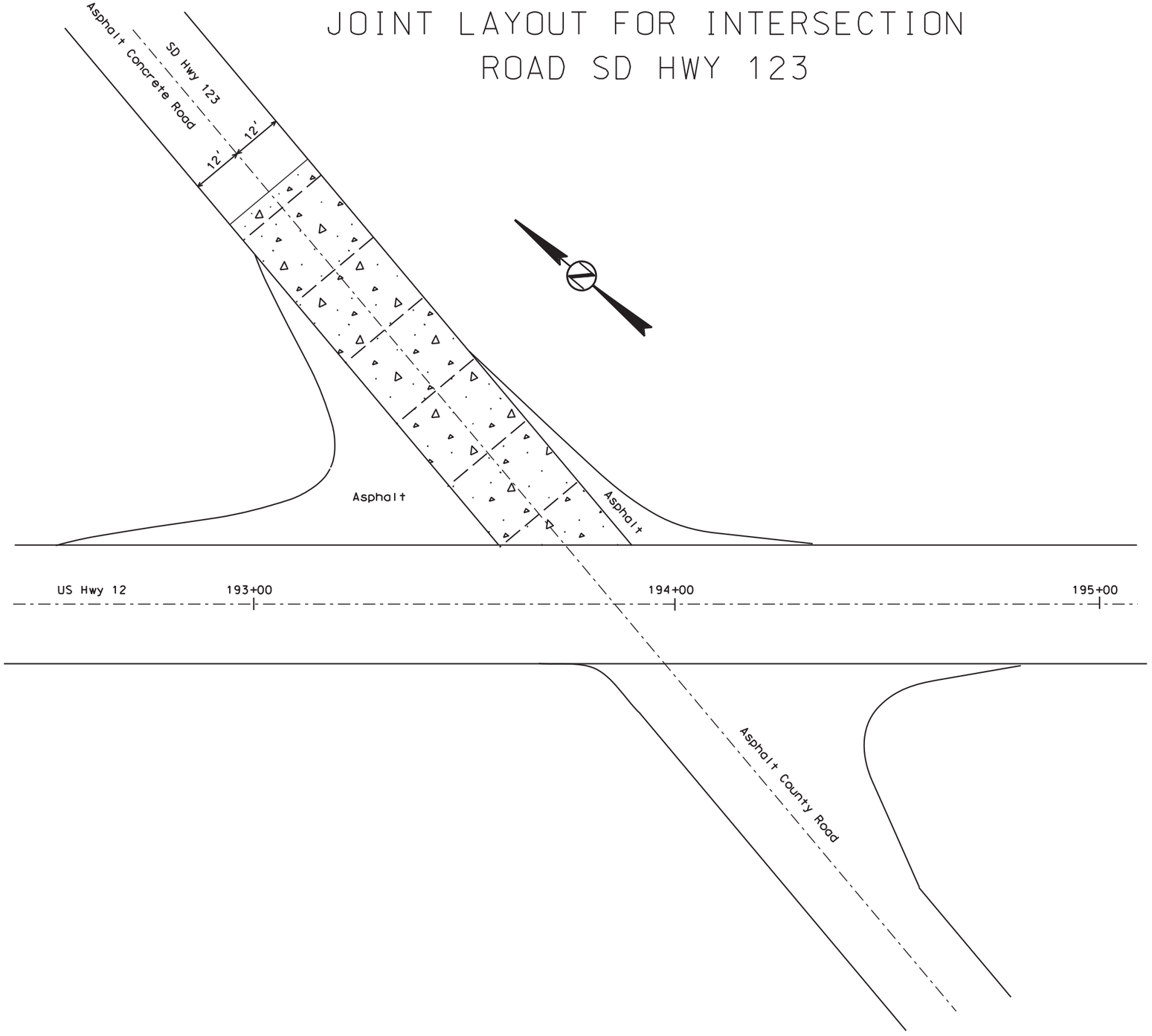
Sta. 192+00 to Sta. 634+25 (Thru Equation)
Sta. 639+35 to Sta. 759+74.18 (Thru Equation)

Transition: Sta. 634+25 to Sta. 635+35
Sta. 638+25 to Sta. 639+35



STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	11	44
Plotting Date: 12/16/2015			

JOINT LAYOUT FOR INTERSECTION
ROAD SD HWY 123



STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	12	44

Estimated Length of Transverse Joints to be Resealed US Hwy 14

	Station		Station	Length	Joints	Width	Total
Mainline	142+13.37	to	142+77.37	64	3.2	28	90
Mainline	10+00.00	to	383+40.09	37340	1867	28	52276
Mainline	383+39.95	to	691+38.12	30798	1540	28	43117
Mainline	691+37.99	to	809+00.00	11762	588	28	16467
TOTAL							111950

Estimated Length of Transverse Joints to be Resealed US Hwy 12

	Station		Station	Length	Joints	Width	Total
Mainline	508+44.35	to	814+86.01	30642	1532	28	42898
Mainline	+0.00	to	66+22.84	6623	331	28	9272
Mainline	65+45.66	to	202+53.29	13708	685	28	19191
Mainline	203+31.21	to	331+24.62	12793	640	28	17911
Mainline	329+63.56	to	404+36.44	7473	374	28	10462
Mainline	403+66.32	to	759+74.18	35608	1780	28	49851
Climbing Hill	8+00.00	to	104+00.00	9600	480	14	6720
Climbing Hill Transition	2+00.00	to	8+00.00	600	15	8	120
Climbing Hill Transition	104+00.00	to	110+00.00	600	15	8	120
Junction Hwy 123	+0.00	to	1+20.00	120	6	20	120
TOTAL							156665

Rev. 1-22-16 SLS

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	13	44

TABLE OF REMOVE AND INSTALL CONCRETE PAVEMENT

US Hwy 14 (East of Brookings to Minn. Border)

STA.	Dimensions		9" Misc. PCCP	NonReinforced PCCP Repair	Description	Bars			Dowel Bar
	L (ft)	W (ft)	SQYD	SQYD		#5	#9	1 "	(EACH)
*247+28	45	28	140.0	0.0	EB & WB	17	0	36	36
285+60	6	6	0.0	4.0	WB	2	8	5	0
317+10	6	6	0.0	4.0	EB	2	8	5	0
*331+24	60	28	186.7	0.0	EB & WB	24	0	36	54
353+30	20	28		62.2	EB & WB	8	0	36	0
*438+00	60	28	186.7	0.0	EB & WB	24	0	36	54
*465+11	45	28	140.0	0.0	EB & WB	17	0	36	36
*513+18	45	28	140.0	0.0	EB & WB	17	0	36	36
*546+80	45	28	140.0	0.0	EB & WB	17	0	36	36
*564+66	45	28	140.0	0.0	EB & WB	17	0	36	36
*576+00	45	28	140.0	0.0	EB & WB	17	0	36	36
*608+00	60	28	186.7	0.0	EB & WB	24	0	36	54
*643+75	45	28	140.0	0.0	EB & WB	17	0	36	36
*658+40	60	28	186.7	0.0	EB & WB	24	0	36	54
*689+20	45	28	140.0	0.0	EB & WB	17	0	36	36
728+90	6	14	0.0	9.3	EBTL	2	18	0	0
729+30	6	14	0.0	9.3	EBTL	2	18	0	0
729+90	6	14	0.0	9.3	EBTL	2	18	0	0
730+10	6	14	0.0	9.3	EBTL	2	18	0	0
730+30	6	14	0.0	9.3	EBTL	2	18	0	0
730+70	6	14	0.0	9.3	EBTL	2	18	0	0
730+90	6	14	0.0	9.3	EBTL	2	18	0	0
731+60	6	14	0.0	9.3	EBTL	2	18	0	0
**731+80	20	14	31.1	0.0	EBTL	7	0	0	9
**732+00	20	10	22.2	0.0	EBTL	7	0	0	9
732+60	20	6	0.0	13.3	EB	8	12	10	4
732+60	20	14	0.0	31.1	WB	7	0	18	0
769+00	6	42	0.0	28.0	EB, WB & TL	4	54	0	0
Total			**1920.1**	**217.0**		**293**	**226**	**506**	**526**

US Hwy 12 (Summit to West Side of Milbank)

STA.	Dimensions		9" Misc. PCCP	NonReinforced PCCP	Description	Bars			Dowel Bar
	L (ft)	W (ft)	SQYD	SQYD		#5	#9	1 "	(EACH)
						**	**	**	0
504+40	6	14	0	9.3	WB	**2**	**18**	**0**	**0**
527+10	6	28	0	18.7	EB & WB	**2**	**36**	**0**	**0**
619+01	6	8	0	5.3	EB	2	9	4	**0**
619+01	6	6	0	4.0	WB	2	8	4	**0**
634+10	6	7	0	4.7	EB	2	8	4	**0**
642+24	6	6	0	4.0	WB	2	8	4	**0**
642+24	6	6	0	4.0	EB	2	8	4	**0**
733+58	6	6	0	4.0	EB	2	8	4	**0**
733+58	6	6	0	4.0	WB	2	8	4	**0**
21+12	48	6	0	32.0	EB	18	27	8	**4**
30+64	6	6	0	4.0	EB	2	2	3	**0**
59+85	6	15	0	10.0	EB	5	8	8	**0**
162+26	6	28	0	18.7	EB & WB	2	22	24	**0**
176+25	6	14	0	9.3	WB	7	2	12	**0**
189+34	8	6	0	5.3	WB	7	0	2	**0**
224+37	6	28	0	18.7	EB & WB	2	22		**0**
***678+10**	180	28	560.0	0.0	EB & WB	108	0	36	198
***464+60**	135	28	420.0	0.0	EB & WB	81	0	36	144
Total			**980**	**156.0**		**250**	**194**	**157**	**346**

* Highlighted stations denotes locations where Asphlat Concrete Cold Milling will occur.

LEGEND: EB (East Bound), WB (West Bound), TL (Turn Lane)

* Locations where Reinforced PCCP will be placed.

** Location where the Turn Lane is being lengthed. Plans quantity of 27 cu.yds. of Unclassified Excavtion will be the basis of payment and shall consist of Asphalt Concrete shoulder and gravel surfacing removal. A 20' x 14' panel and a 20' x 14' panel tapering to 6' width (Average Width 20' x 10' shown in Table) shall be built out to the edge of the existing shoulder .

Note: Number of steel bars is for information only. Actual quantity to be determined on construction. Quantity of steel bars shall be paid for at the contract unit price per each for INSERT STEEL BAR IN PCC PAVEMENT.

PLOTTED FROM - TRAB17882

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	14	44

Sealing Random Cracks

US Hwy 14 (East of Brookings to Minn. Border)

STA.	Dimensions L (ft)	Lane	Description
38+62	20		Longitudinal
51+44	40		Longitudinal
80+98	28	EB & WB	Transverse
130+30	28	EB & WB	Transverse
162+72	40		Longitudinal
175+00	80		Longitudinal
186+27	80		Longitudinal
202+93	28	EB & WB	Transverse
219+89	80		Longitudinal
221+25	100		Longitudinal
222+20	60		Longitudinal
222+90	40		Longitudinal
229+50	80		Longitudinal
242+90	20		Longitudinal
259+31	40		Longitudinal
211+30	40		Longitudinal
273+00	100		Longitudinal
278+10	80		Longitudinal
300+00	80		Longitudinal
319+90	40		Longitudinal
331+24	68	EB & WB	Transverse
331+24	40		Longitudinal
348+80	60		Longitudinal
351+00	60		Longitudinal
351+25	60		Longitudinal
353+58	28	EB & WB	Transverse
397+30	100		Longitudinal
414+90	60		Longitudinal
435+25	90		Longitudinal
436+00	60		Longitudinal
438+00	140		Longitudinal
440+00	80		Longitudinal
446+00 to 454+14	415		Longitudinal, Random Areas
500+10	48	EB & WB	2 each, Transverse
711+48	28	EB & WB	Transverse
714+42	28	EB & WB	Transverse
717+60	28	EB & WB	Transverse
719+68	28	EB & WB	Transverse
720+00	60		Longitudinal
724+05	28	EB & WB	Transverse
725+50	60		Longitudinal
727+04	28	EB & WB	Transverse
730+14	40		Longitudinal
731+40	42	EB, WB & TL	Transverse
732+25	40		Longitudinal
787+90	60		Longitudinal
800+27	60		Longitudinal
802+90	20		Longitudinal
Total	**2963**		

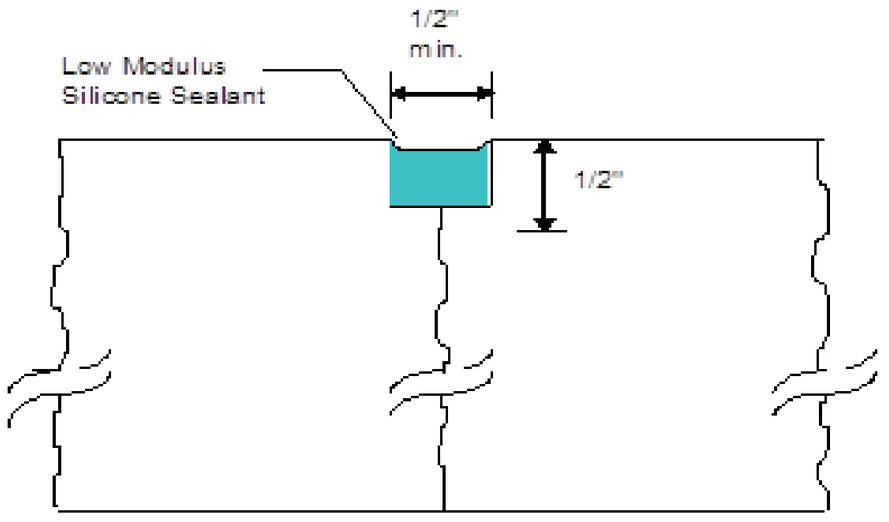
LEGEND: EB (East Bound), WB (West Bound)

Note: Quantity for sealing random cracks is for info only. Actual quantity to be determined on construction.

US Hwy 12 (Summit to West Side of Milbank)

STA.	Dimensions L (ft)	Lane	Description
520+43	28	EB & WB	Transverse
25+60	20	EB	Longitudinal
26+13	15	EB	Longitudinal
59+85	15	WB	Longitudinal
Total	**78**		

DETAIL FOR SEALING RANDOM CRACKS



SCOPE OF WORK

Work on this project includes, but is not limited to removal and replacement of nonreinforced PCC Pavement with nonreinforced PCC Pavement and/or Reinforced PCC Pavement, Cold Milling Asphalt Concrete, Sealing Random Cracks, Reseal PCC Pavement Joints and Durable Pavement Marking.

SEQUENCE OF OPERATIONS

The following Sequence of Operation shall be adhered to. Any change must be approved in writing by the Engineer prior to the change being made. The Contractor shall provide a detailed Sequence of Operations to the Area Engineer a minimum of 2 weeks prior to the preconstruction meeting.

1. PCC Pavement Removal and Repair
2. Sealing Random Cracks and Joint Saw and Seal
3. Durable Pavement Marking

Concrete repairs areas on US Hwy 14 and US Hwy 12 shall be worked on in Work Areas as noted in the plans.

US Hwy 14 consists of 4 distinct roadway work areas for Concrete Repairs.

- Work Area 1 - Sta.247+28 (Begin Concrete Repair) to Sta. 353+30
- Work Area 2 - Sta. 438+00 to Sta. 564+66
- Work Area 3 - Sta. 576+00 to Sta. 689+20
- Work Area 4 - Sta. 730+14 to Sta 769+00 (End Concrete Repair)

US Hwy 12 consists of 4 distinct roadway work areas for Concrete Repairs.

- Work Area 1 - Sta.504+40 (Begin Concrete Repair) to Sta. 642+24
- Work Area 2 - Sta. 733+58 to Sta. 59+85
- Work Area 3 - Sta. 162+26 to Sta. 224+37
- Work Area 4 - Sta. 464+60 to Sta. 678+10 (End Concrete Repair)

The Contractor shall also allow for 3 miles between work areas, including channelizing, devices to accommodate traffic.

All construction activities, except for Flagging and Pilot Car, will be permitted during daylight hours only.

MAINTENANCE OF TRAFFIC

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

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.

Traffic control during the pavement marking shall be a minimum of a mobile work operation. The Contractor may use lane closures to complete the work should conditions dictate.

Vehicles used for mobile work operations should be equipped with highly visible devices on the equipment such as; high-intensity rotating, flashing, oscillating, or strobe lights. All other equipment shall display high-intensity rotating, flashing, oscillating, or strobe lights visible to traffic in all directions.

A lead vehicle is optional if the striper operates in its own lane. The shadow vehicle shall be used at all times. The shadow vehicle shall operate in the same lane as the striper. The shadow vehicle shall display a sign with the legend “WET PAINT AHEAD” and an arrow panel.

Where practical and when needed, the work and shadow vehicles should pull over periodically to allow vehicular traffic to pass.

Cost of equipment and traffic control devices on equipment, including arrow panels and signs, shall be incidental to the contract lump sum price for TRAFFIC CONTROL, MISCELLANEOUS.

The Contractor shall have someone present and in charge during all flagging operations, including at night. A list of the individuals in charge of flagging shall be submitted to the Engineer.

One lane of traffic shall be maintained in each direction on mainline construction.

A maximum of **2** sets of work zone signing per highway will be measured and paid for. If more closures are utilized, additional cost of signing shall be at the Contractor’s expense.

Construction work areas shall be limited to 3 miles in length.
Locations of signs on traffic control layouts are diagrammatic. Portable stands may be used on the shoulders or on driving lanes closed to traffic. 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 be on fixed location, ground mounted, breakaway supports.

Contractor will be allowed to encroach on the traffic lane approximately 2 feet if flagger signs and a flagger are used. The flagger signs and flagging are included in the Estimate of Quantities.

Type 3 Barricades 8’ wide shall be placed on both sides of a repair area to protect PCC Pavement replacement during open excavation and concrete cure periods. Work areas 20 feet or longer will require Channelizing Device to further mark out the repair area. The cost for the Channelizing Devices shall be included in the contract lump sum price for TRAFFIC CONTROL, MISCELLANEOUS.

The Contractor's equipment will be required to enter and leave the project at intersections.

The Contractor shall designate an employee to maintain traffic as described in Section 634.3 of the Specification. This person shall be required to do weekend checks to ensure traffic control devices are in satisfactory condition. The Contractor shall submit a weekly log stating time and date of all such inspections. The log shall be signed by the person doing the inspections. The cost of the traffic control person shall be incidental to the contract lump sum price for TRAFFIC CONTROL MISCELLANEOUS. The employee selected must be approved by the Engineer.

A night inspection of traffic control signing shall be done by the Contractor’s designated employee after the signs are revised for each phase of construction. The Contractor shall submit additional log information for this inspection to the Engineer.

Flaggers and pilot car operators shall all have radio or telephone contact with one another. This equipment is to be used to assist with traffic movement and in the event that an emergency vehicle needs to pass through the project in an expedient manner. All costs associated with this shall be incidental to the contract lump sum price for TRAFFIC CONTROL, MISCELLANEOUS.

The Contractor shall designate an individual(s) to be on the project 24/7 to be in charge of Flagging. This person(s) shall have experience as a Flagger and have experience in supervision of others. This person(s) shall be approved by the Engineer. This person shall work with the Engineer, monitor traffic flow, and have the authority to call in additional flagging personnel. This person may be one of the Flaggers actively working on the project.

Warning lights shall be placed on top of flagging station signing and shall be yellow in color. This shall be incidental to the contract lump sum price for TRAFFIC CONTROL, MISCELLANEOUS.

The Flagging stations shall be lighted during nighttime operations. All costs associated with the flagging station flood lights shall be incidental to the contract lump sum price for TRAFFIC CONTROL, MISCELLANEOUS.

The flagging station shall be flood type light, shielded to prevent glare and a minimum of 300,000 lumens (3000-watts). The light shall have the ability for illumination over a minimum of 4 acres at 0.5 foot candles. The floodlights shall be installed at a minimum height of 24 feet above the roadway surface and shall be located a minimum of 15’ from the edge of the roadway. The light shall be located and adjusted such as not to impact the nearby residence at this location.

The Contractor shall be responsible for maintaining all existing traffic control signing for the safety of the traveling public.

All traffic control devices used on this project shall be new or in like-new condition, as approved by the Engineer.

Channelizing Devices, Drums and/or Type 2 Barricades shall be maintained to a minimum height of 3’ above the surface which is being used to maintain traffic.

STOP BARS

Stop bars required for lane closures as per Standard Plate 634.25 shall be white temporary pavement marking tape and shall be 24 inches wide. The removal of the stop bars shall be incidental to the unit bid price price per foot for Temporary Pavement Marking. The use of Standard Plate 634.25 may be used on US Highway 12 at stations 464+60 and Station 678+10 in the East Bound and West Bound Lanes.

EXISTING PCC PAVEMENT

The existing PCC Pavement is nonreinforced and was constructed using crushed ledge rock aggregate and natural sand. Transverse joints were sealed with low modulus silicone sealant.

Route	Pavement Thickness	Pavement Type
US Hwy 14	8”	Dowel Jointed
US Hwy 12	8”	Dowel Jointed

Existing transverse joints are spaced at approximately 20'. Longitudinal joints are reinforced with No. 5 x 24” deformed tie bars spaced 30” to 48” center to center. Transverse joints are reinforced with 1¼” x 18” plain round dowel bars spaced 12” center to center.

REMOVE CONCRETE PAVEMENT

Approximate locations of existing non-reinforced concrete pavement to be removed are provided in the Table of Remove and Install Concrete Pavement. Prior to removal the Contractor shall saw cut full depth at the limits of the removal area as directed by the Engineer. Existing concrete in the replacement areas shall be removed by the lift out method or by means that minimize damage to the sides of the remaining in place concrete. All removed concrete shall be removed from within the right of way by the end of the workday and disposed of at the Contractor’s waste disposal site.

The Contractor shall notify the Engineer two working days prior to beginning work at each particular location so the Engineer may mark out removal limits. The Engineer shall mark exact dimensions prior to removal of concrete pavement. Payment will be made for quantity marked out and measured in the field. Variations from plans estimated quantities and/or locations will not be considered cause for re-negotiation of the contract unit prices.

Care shall be exercised in the removal of concrete slab panels to avoid damage to adjacent pavement.

After concrete removal has been accomplished, the Contractor shall shape, water and recompact the remaining granular material prior to placement of concrete. Any additional gravel cushion required to prepare the area shall be furnished and placed by the Contractor and shall be incidental to the contract unit price per square yard for the various PCC Pavement Repair bid items.

Gravel cushion material shall be from a Contractor furnished source. Water content and compaction shall be to the satisfaction of the Engineer.

The contract item Remove Concrete Pavement will be full compensation for full and partial depth sawing, removal of all PCC Pavement, disposal of all removed material, and all equipment, labor, and incidentals necessary to satisfactorily complete work.

NONREINFORCED PCC PAVEMENT REPAIR AND 9” MISCELLANEOUS PCC PAVEMENT

Nonreinforced PCC Pavement Repair shall be constructed over pipe areas to a depth of 9 inches.

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

The slump requirement will be limited to 3” maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air. Coarse aggregate shall be crushed ledge rock, Size No. 1. Mix proportions shall be as follows, dependent upon type of cement the Contractor elects to use:

	LB./CU.YD	LB./CU.YD
CEMENT	800 (TYPE I-II)	710 (TYPE III)
FINE AGGREGATE	1039	1114
COARSE AGGREGATE	1726	1668

The use of a High Range water reducer at manufacturer’s recommended dosage will be required.

Concrete shall be maintained at a temperature of 60 degrees Fahrenheit or higher by use of insulated blankets or other means. The requirements for strength shall be a minimum of 3,000 psi prior to opening to traffic for all repair areas which are one panel in size (14’ width by 20’ length) or smaller. The requirements for strength shall be a minimum of 4,000 psi prior to opening to traffic for all repair areas which are greater in size than one panel (14’ width by 20’ length).

A broom finish will be required. A transverse metal tine finish will be required as specified by the Engineer. Prior to opening to traffic, transverse and longitudinal joints shall be temporarily sealed with a backer rod of sufficient size approved by the Engineer. The cost of the backer rod and its installation shall be incidental to the contract unit price per square yard for NONREINFORCED PCC PAVEMENT REPAIR and or 9” MISCELLANEOUS PCC PAVEMENT. This backer rod shall be removed during permanent joint sealing operations.

Transverse Joints shall be constructed in accordance with the details shown in the plan sheets and shall be measured and paid for at the contract unit price per linear foot for SAW AND SEAL JOINT if the joints are in new or existing pavement.

All longitudinal joints through and around the repair areas shall be sawed and sealed in accordance with the details shown in these plans. All costs incurred in performing the aforementioned work including furnishing and placing concrete, sawing and sealing joints, labor, tools and equipment shall be incidental to the contract unit price per square yard for NONREINFORCED PCC PAVEMENT REPAIR and/or 9” MISCELLANEOUS PCC PAVEMENT.

For information purposes only there is estimated 1,242’ of Longitudinal Centerline joints on the project for sealing.

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.

Tie bars that require drilling holes and epoxy injection shall be measured and paid for at the contract unit price per each for INSERT STEEL BAR IN PCC PAVEMENT.

Placement of NONREINFORCED PCC PAVEMENT REPAIR will be paid for at the contract unit price per square yard. This payment will be full compensation for concrete, equipment, labor, and incidentals necessary to satisfactorily complete the work.

Epoxy coated reinforcing steel bars shall be placed in repair areas.

9” Miscellaneous PCC Pavement is being used in areas where the existing PPC Pavement has settled over pipe culvert. The Contractor shall furnish and place Gravel Cushion as needed to adjust the PCC Pavement grade elevation.

The Contractor will need to adjust the grade to allow for the Nonreinforced PCC Pavement Repair and 9” Miscellaneous PCC Pavement. The Contractor shall shape and recompact the base to the satisfaction of the Engineer. All costs incurred in performing the aforementioned work including the removal of the gravel cushion, furnishing gravel cushion, shaping and compacting the gravel surfacing, labor, tools and equipment shall be incidental to the contract unit price per square yard for NONREINFORCED PCC PAVEMENT REPAIR and 9” MISCELLANEOUS PCC PAVEMENT.

The Contractor shall reconstruct any rumble strip removed as per Standard Plate 380.15. All costs incurred in performing the aforementioned work shall be incidental to the contract unit price per square yard for NONREINFORCED PCC PAVEMENT REPAIR and 9” MISCELLANEOUS PCC PAVEMENT.

CURING OF CONCRETE

Portland Cement Concrete Pavement Repair shall be cured with Linseed Oil Base Emulsion Compound in accordance with section 821 of specifications.

ALKALI SILICA REACTIVITY –

Fine aggregate shall conform to Section 800.2.D Alkali Silica Reactivity (ASR) Requirements.

Below is a list of known fine aggregate sources and the average corresponding 14 day expansion values:

Source	Location	Expansion Value
Bachman	Winner, SD	0.335*
Bitterman	Delmont, SD	0.316*
Concrete Materials	Corson, SD	0.170
Croell	Hot Springs, SD	0.089
Croell	Wasta, SD	0.212
Emme Sand & Gravel	Oneil, NE	0.217
Fisher S&G – Mickelson Pit	E. of Nisland, SD	0.129
Fisher S&G - Vallery Pit	Nisland, SD	0.110
Fisher S&G	Rapid City, SD	0.092
Fisher S&G	Spearfish, SD	0.053
Fisher S&G	Wasta, SD	0.159
Fuchs	Pickstown, SD	0.275*
Higman	Akron, IA	0.203
Higman	Hudson, SD	0.187
Hilde	Madison, SD	0.116
Jensen	Herried, SD	0.276*
L.G. Everist	Brookings, SD	0.186
L.G. Everist	Hawarden, IA	0.166
L.G. Everist	Summit, SD	0.178
Morris	Blunt, SD	0.192
Morris - Richards Pit	Onida, SD	0.188
Myrl & Roys - East Sioux Quarry	NE Sioux Falls, SD	0.214
Myrl & Roys - Nelson Pit	Sioux Falls, SD	0.156
Northern Concrete Agg.	Rauville, SD	0.113
Northern Concrete Agg.	Luverne, MN	0.133
Opperman - Gunvordahl Pit	Burke, SD	0.362*
Opperman - Cahoy Pit	Herrick, SD	0.307*
Opperman - Jones Pit	Burke, SD	0.321*
Opperman - Randall Pit	Pickstown, SD	0.239
Pete Lien & Sons	Creston, SD	0.158
Pete Lien & Sons	Oral, SD	0.129
Pete Lien & Sons	Wasta, SD	0.192
Thorpe Pit	Britton, SD	0.098
Wagner Building Supplies	Pickstown (Wagner), SD	0.241
Winter Brothers- Whitehead Pit	Brookings, SD	0.197

* These sources will require Type V cement in the concrete mix design and Class F (Modified) fly ash as specified.

The Department will use the running average of the last three known expansion test results or less for determining acceptability of source and the required Type of cement. These expansion results are reported in the preceding table. Additional testing, when requested by the Contractor, will be performed by the Department at the Contractor's expense.

The values listed in the table are intended for use in bidding. If a previously tested pit by SDDOT with acceptable test values (less than 0.250) is discovered after letting to require Type V cement (greater than 0.250) the Department will accept financial responsibility for the change from Type II to Type V cement.

Type II or Type V cement will not change the requirement for the fly ash. The cost for either type of cement shall be subsidiary to the contract item.

STEEL BAR INSTALLATION

The Contractor shall install the steel bars (**1** inch epoxy coated plain round dowel bars and No. **5** and No. **9** epoxy coated deformed tie 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 deformations. Shearing will not be permitted.

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 manufacturers 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 from the back to the front 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 hole prior to steel bar insertion. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed.

Steel bars shall not be placed closer than 6 inches to any longitudinal joint, not closer than 18 inches to any transverse joint, and not closer than 15 inches to any construction joint.

Concrete shall be placed when the epoxy for anchoring the steel bars has hardened sufficiently to permit no movement of the steel bars as recommended by the manufacturer.

All costs for the installation of steel bars shall be incidental to the contract unit price per each for INERT STEEL BAR IN PCC PAVEMENT.

SAW AND SEAL JOINTS

The existing transverse joints were sawed to **3/8** inch width and filled with low modulus silicone sealant and backer rod. The Contractor shall remove silicone sealant and backer rod and widen the joints to a minimum width of **1/2** inch. The depth of the saw cut shall allow for the placement of the backer rod and low modulus silicone sealant.

Traffic will not be allowed on pavement until low modulus silicone sealant has been allowed to cure to a point it is tack free.

The existing transverse joints shall be cleaned of incompressibles and sealant to the satisfaction of the Engineer. 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.

Just prior to sealing, the joints shall be sandblasted and cleaned with compressed air.

In certain areas the joint may be wider than the original construction. It may be necessary to provide backer rod 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.

Transverse joints shall be sealed with Low Modulus Silicone Sealant.

All sealed transverse joints will be measured for payment regardless if the joints are in new or existing pavement. All costs for sawing and sealing transverse joints shall be incidental to the contract unit price per foot for SAW AND SEAL JOINT.

DIMENSIONS OF EXISTING CONTRACTION JOINTS

All details and dimensions of the existing contraction joints contained in these plans are provided as information only. It is the Contractor's responsibility to inspect and verify the actual field conditions and necessary dimensions affecting the satisfactory completion of the work required for this project.

SEALING RANDOM CRACKS IN PCC PAVEMENT

Random cracks shall be repaired in accordance with the detail for Sealing Random Cracks In Concrete Pavement. Reservoir dimensions may vary slightly from the details, due to the nature of this operation. However, any variance due to Contractor negligence will be repaired at the Contractor’s expense.

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 low modulus silicone sealant. 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. Backer rod may be used in wider random cracks.

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

All costs for routing and sealing random cracks shall be incidental to the contract unit price per foot for SEAL RANDOM CRACKS IN PCC PAVEMENT.

ASPHALT CONCRETE SHOULDERS

To allow for form placement at locations where full depth repairs are adjacent to asphalt concrete shoulders, the Contractor shall be allowed to saw cut full depth the existing asphalt concrete shoulder. The saw cut shall be parallel to and no more than one foot from existing pavement edge. All costs incurred in performing the above-mentioned work, and for equipment, labor, and incidentals necessary to complete work shall be incidental to the contract unit price per square yard for REMOVE CONCRETE PAVEMENT.

Upon completion of pavement repair, the Contractor shall reestablish the asphalt concrete shoulder. Asphalt Concrete Composite shall be placed at a depth that matches that of the existing asphalt concrete shoulder depth. All costs for furnish and installing granular material, for furnishing and installing Asphalt Concrete Composite, and for all equipment, labor, and incidentals necessary to complete work shall be incidental to the contract unit price per square yard for NONREINFORCED PCC PAVEMENT REPAIR, and 9” MISCELLANEOUS PCC PAVEMENT.

ASPHALT CONCRETE COMPOSITE

For Informational purposes only. An estimated 18.6 ton of Asphalt Concrete Composite will be needed for the area removed for construction along the PCC Pavement on the shoulder. 18.6 tons is based upon a width of 12’ and 3” thick.

COLD MILLING ASPHALT CONCRETE

Cold Milling of Asphalt Concrete shall consist of removing the Asphalt Concrete patches placed on US Highway 12, station 463+93 to station 465+28 and station 677+20 to station 679+00. The asphalt concrete patches shall be removed to expose the existing PCC Pavement. The removal of asphalt concrete will allow for determining the length of the PCC Pavement removal through a dip in the existing PCC Pavement in both lanes of traffic.

The Cold Milled Asphalt Concrete shall be the property of the Contractor.

DURABLE PAVEMENT MARKING

Durable pavement marking shall meet the requirements of the Special Provision.

If damage to joints, joint sealant material, backer rod, etc. occurs, the grooving operation shall be stopped and modifications shall be made to the grooving operation to prevent further damage. The Contractor may be required to use specially prepared circular diamond blade cutting heads to prevent damage at the joints. Damage caused to joints, the joint sealant material, backer rod, etc. shall be repaired or replaced by the Contractor, as directed by the Engineer. No additional payment will be made for the repair work or any reapplication of the pavement marking in the area of the repair.

Durable Pavement Markings shall be installed to match existing markings on US Highway 14 and US Highway 12.

COLD APPLIED PLASTIC PAVEMENT MARKING

The cold applied plastic pavement marking material shall be as defined in Section 983 of the Specifications.

Cold applied plastic pavement markings shall be installed to match existing markings on US Highway 14.

There are an additional 2 each Right Hand Turn Arrows at the Junction of SD Highway 13 and US Highway 14 not shown in the plan layouts that shall be installed.

SURFACE PREPARATION

The in place 4” lines are an epoxy pavement marking. The in place 24” yellow diagonals and the arrows are a cold applied pavement marking tape.

The existing pavement marking grooves shall be cleaned. The cleaning of the grooves shall result in the existing marking being scuffed, abraded and removed to allow proper adhesion of the new durable pavement marking as per the manufacture’s recommendations to comply with any warranties. Cleaning of the existing pavement marking grooves shall not add any additional depth to the existing grooves.

Surface preparation, removal and cleaning work shall be conducted in such a manner as to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owners.

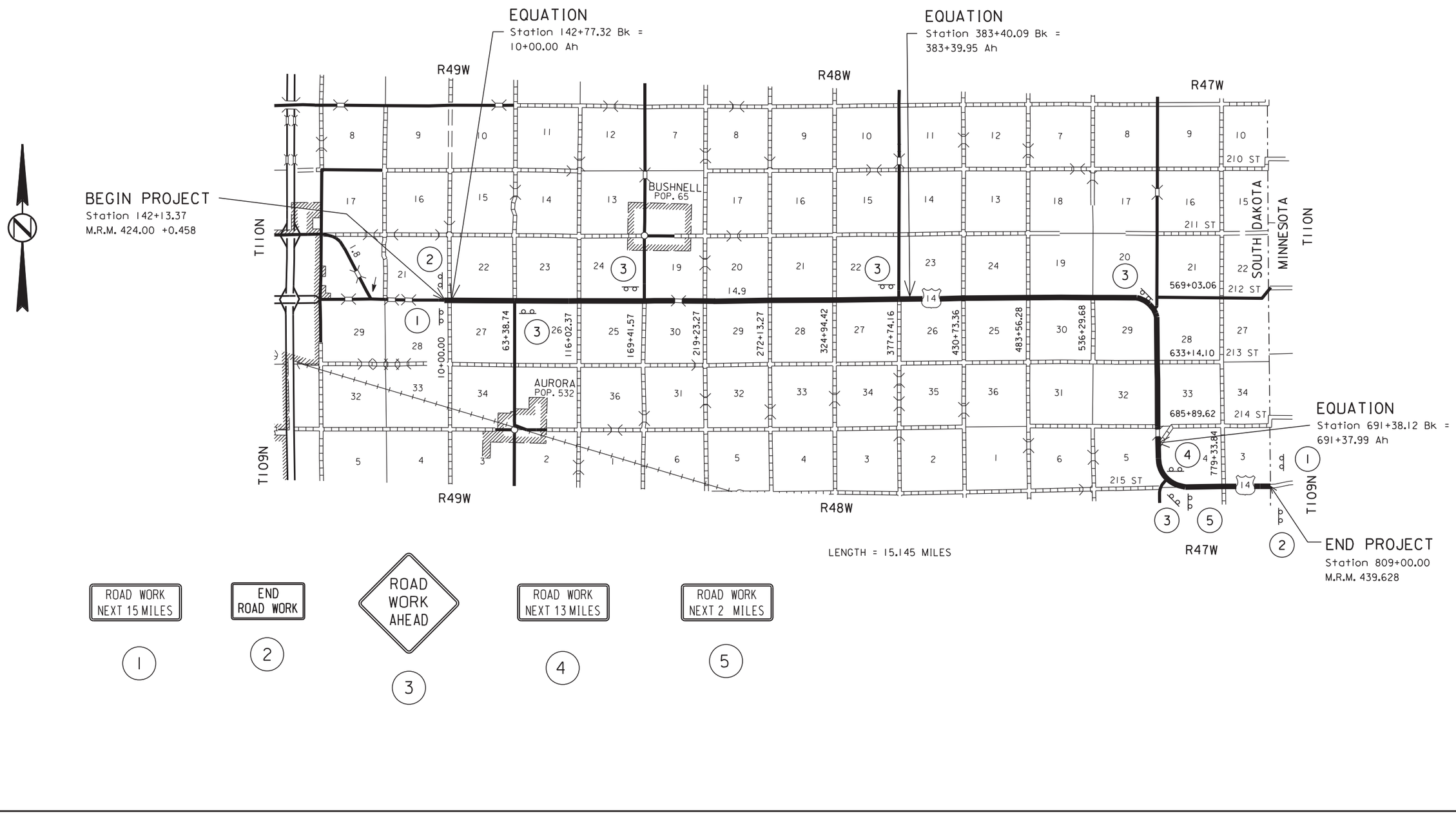
The Contractor shall be responsible for repairing and/or replacing any joint sealant which is damaged during the surface preparation.

All cost associated with removal of the existing 4” and 24” pavement marking and cleaning of the existing pavement marking grooves shall be incidental to the contract unit price per foot for SURFACE PREPARATION FOR PAVEMENT MARKING. Measurement for Surface Preparation for Pavement Marking per foot shall be measured as 4” equivalent.

All cost associated with removal of the existing arrow pavement marking and cleaning of the existing pavement marking grooves shall be incidental to the contract unit price per each for SURFACE PREPARATION FOR PAVEMENT MARKING.

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	19	44
Plotting Date: 12/16/2015			

FIXED LOCATION TRAFFIC CONTROL
US HWY 14



PLOT SCALE - 1:200

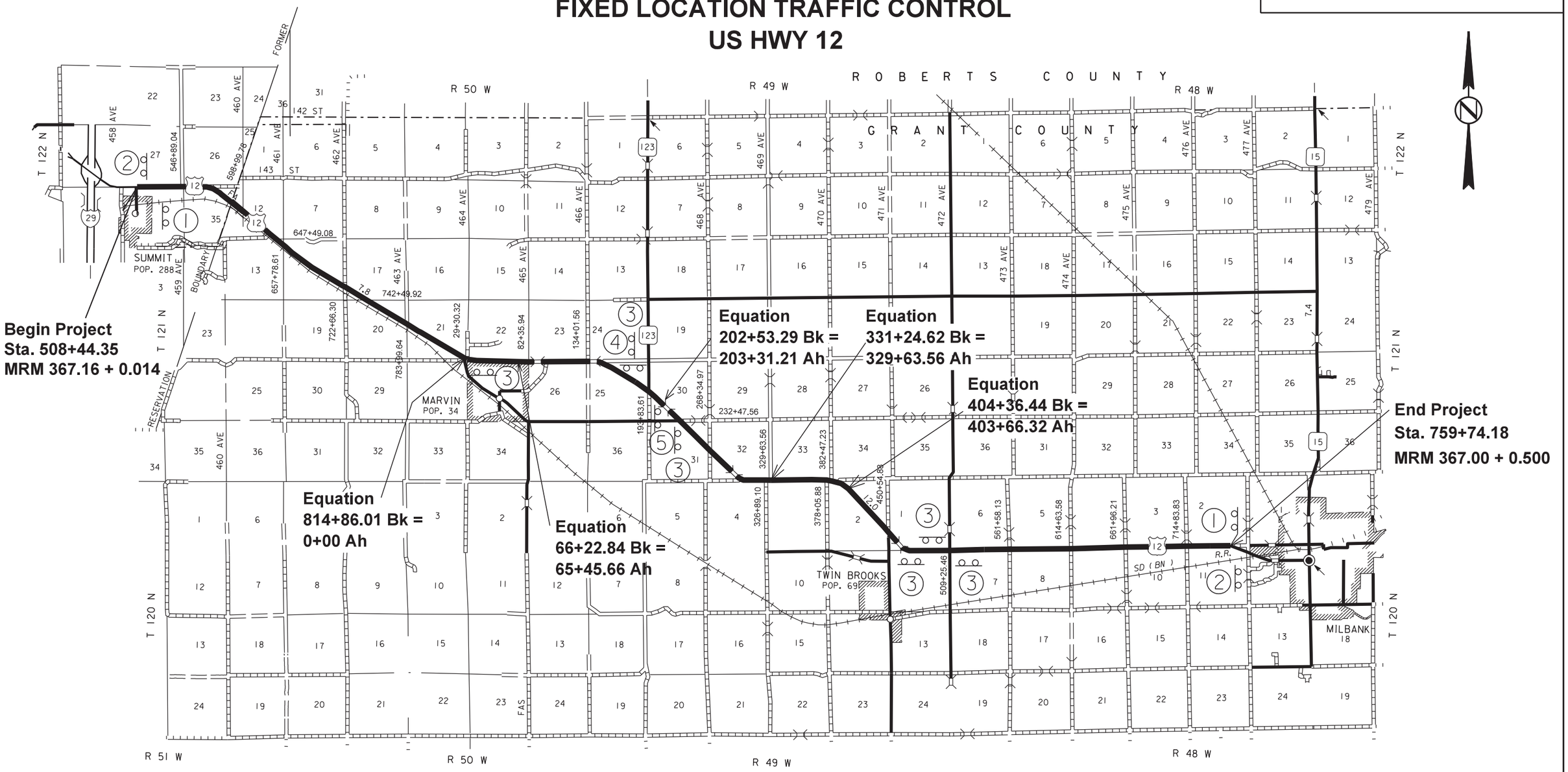
PLOT NAME - 9

FILE - ...\FIXED TRAFFIC CONTROL US HWY 14.DGN

PLOTTED FROM - TRAB17882

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	20	44

FIXED LOCATION TRAFFIC CONTROL
US HWY 12



LENGTH = 20.241 MILES

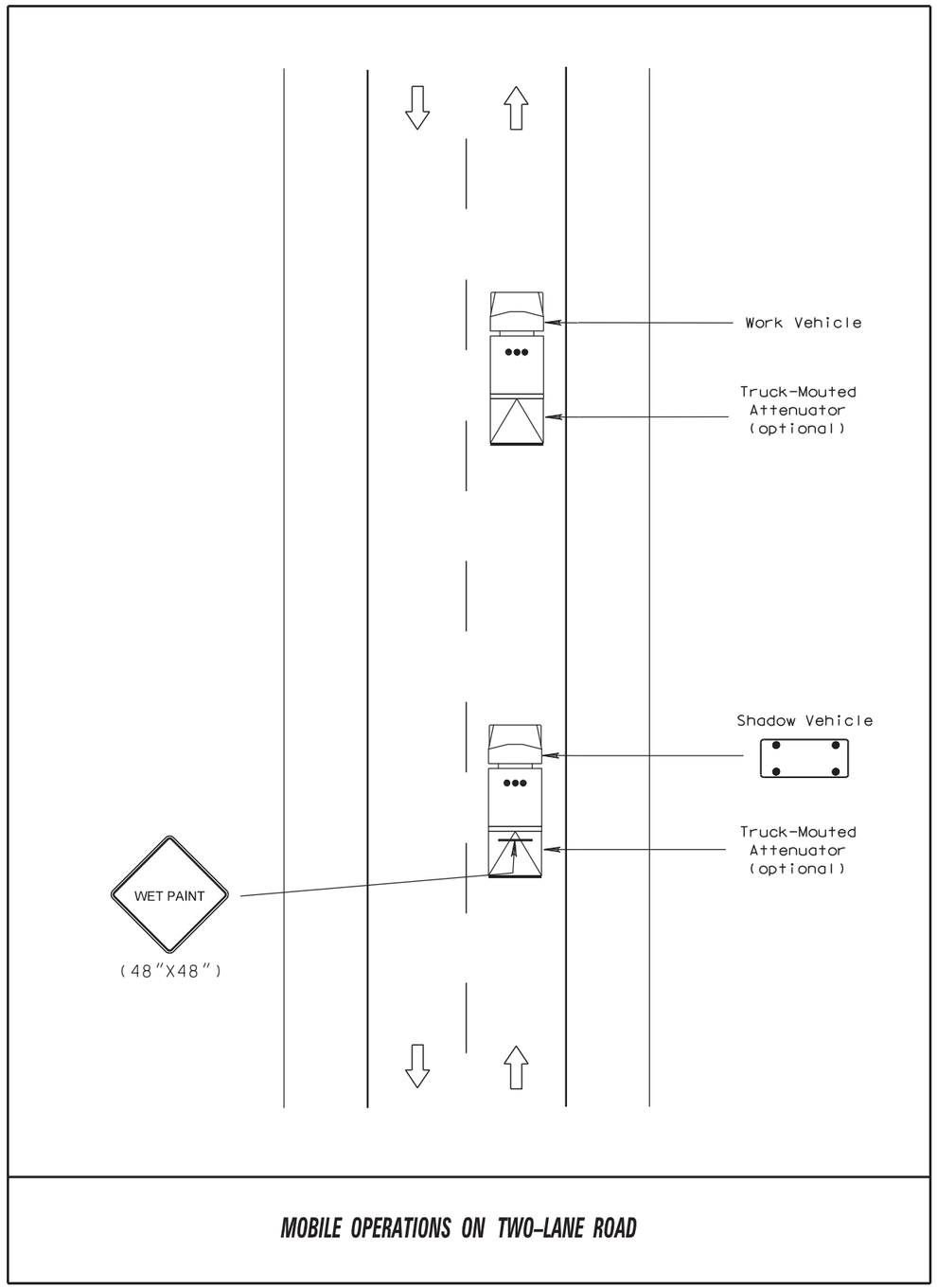
PLOTTED FROM - TRAB17882

PLOT SCALE - 1:200

MOBILE OPERATIONS ON TWO-LANE ROAD
(TYPICAL PAINT APPLICATION)

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	21	44

Plotting Date: 12/16/2015



MOBILE OPERATIONS ON TWO-LANE ROAD

Notes for Mobile Operations on Two-lane Road (Typical)

Standard:

1. Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.
2. Shadow and work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights.
3. If an arrow board is used, it shall be used in the caution mode.

Guidance:

4. Where practical and when needed, the work and shadow vehicles should pull over periodically to allow vehicular traffic to pass.
5. Whenever adequate stopping sight distance exists to the rear, the shadow vehicle should maintain the minimum distance from the work vehicle and proceed at the same speed. The shadow vehicle should slow down in advance of vertical or horizontal curves that restrict sight distance.
6. The shadow vehicles should also be equipped with two high-intensity flashing lights mounted on the rear, adjacent to the sign.

Option:

7. The distance between the work and shadow vehicles may vary according to terrain, paint drying time, and other factors.
8. Additional shadow vehicles to warn and reduce the speed of oncoming or opposing vehicular traffic may be used. Law enforcement vehicles may be used for this purpose.
9. A truck-mounted attenuator may be used on the work vehicle and the shadow vehicle.
10. If the work and shadow vehicles cannot pull over to allow vehicular traffic to pass frequently, a DO NOT PASS sign may be placed on the rear of the vehicle blocking the lane.

Support:

11. Shadow vehicles are used to warn motor vehicle traffic of the operation ahead.

Standard:

12. Vehicle hazard warning signals shall not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.

PLOTTED FROM - TRAB17892

PLOT NAME - 11

FILE - ...\BROK0527\MOB OP ABERDEEN.DGN

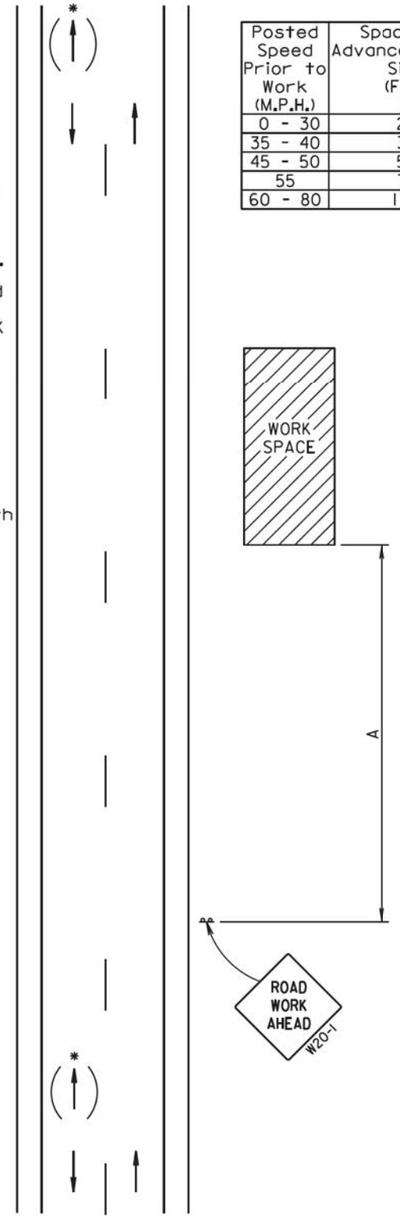
The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

The signs illustrated shall be used where there are distracting situations; such as: vehicles parked on shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform work operations.

The ROAD WORK AHEAD sign may be replaced with other appropriate signs, such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.

* If the work space is on a divided highway, an advance warning sign should also be placed on the left side of the directional roadway.

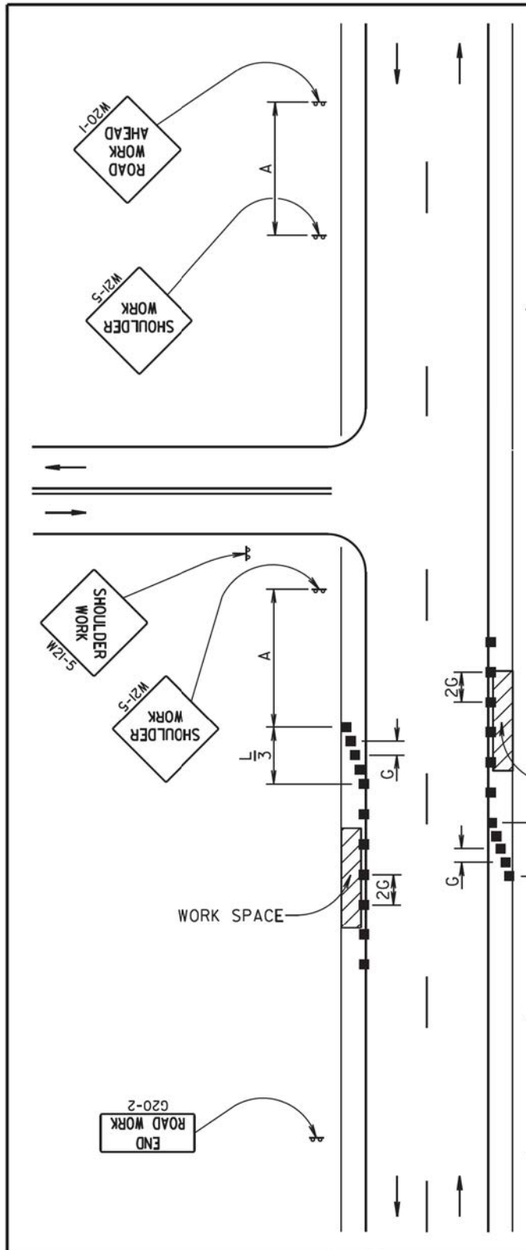
For short term, short duration, or mobile operations, all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.



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

April 15, 2015

Published Date: 4th Qtr. 2015	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES WORK BEYOND THE SHOULDER	PLATE NUMBER 634.01 Sheet 1 Of 1



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	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

The channelizing devices shall be drums or 42" cones if traffic control must remain overnight.

For short duration operations (1 hour or less) all channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Worker signs (W21-1 or W21-1a) may be used instead of SHOULDER WORK signs.

A SHOULDER WORK sign should be placed on the left side of a divided or one-way roadway only if the left shoulder is affected.

The SHOULDER WORK sign on an intersecting roadway is not required if drivers emerging from that roadway will encounter another advance warning sign before they reach a work activity area.

September 22, 2014

Published Date: 4th Qtr. 2015	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES WORK ON SHOULDERS	PLATE NUMBER 634.03 Sheet 1 of 1

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

Flagger

■ Channelizing Device

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

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

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

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

The channelizing devices shall be drums or 42" cones.

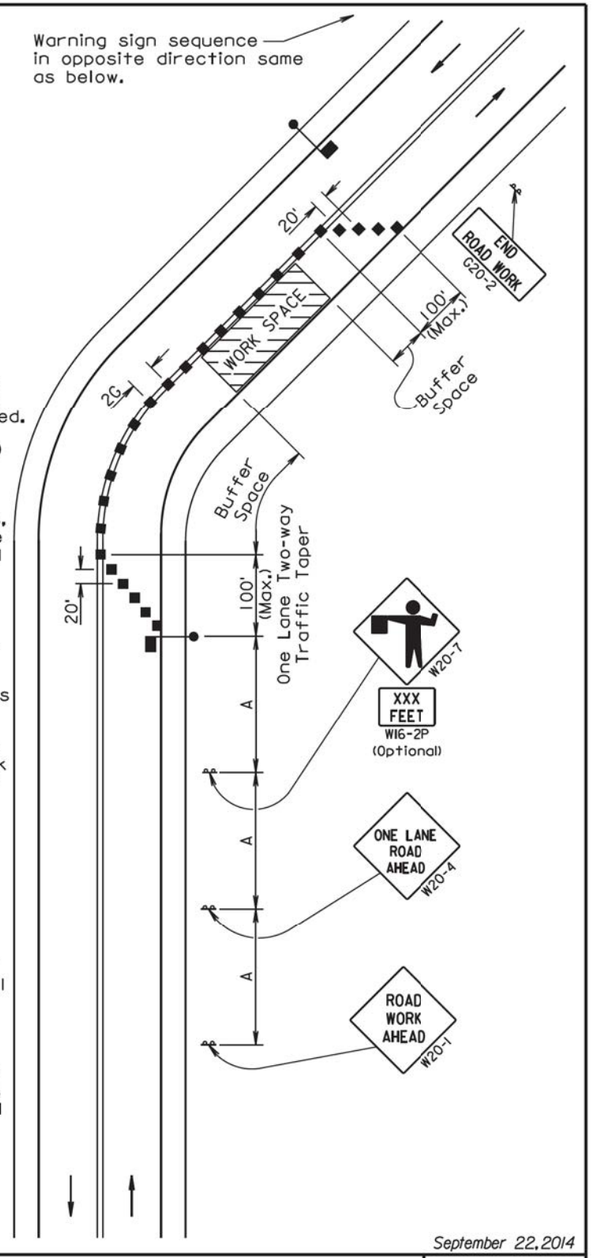
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

END ROAD WORK G20-2

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

The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.

The length of A may be adjusted to fit field conditions.



September 22, 2014

Published Date: 4th Qtr. 2015	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23 Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	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

(24 W) 24" White Temporary Pavement Marking

(4 Y) 4" Yellow Temporary Pavement Marking

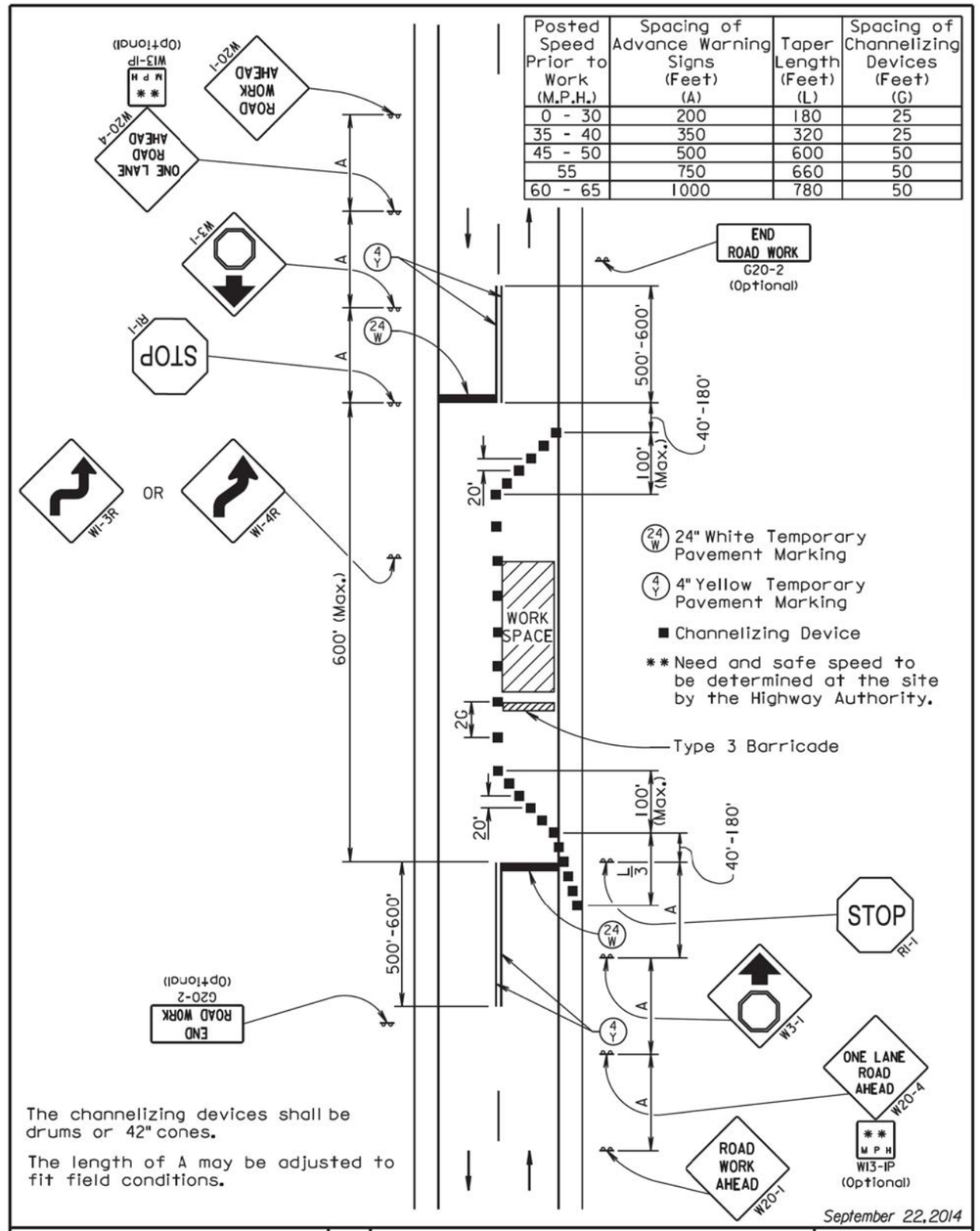
■ Channelizing Device

** Need and safe speed to be determined at the site by the Highway Authority.

Type 3 Barricade

The channelizing devices shall be drums or 42" cones.

The length of A may be adjusted to fit field conditions.



September 22, 2014

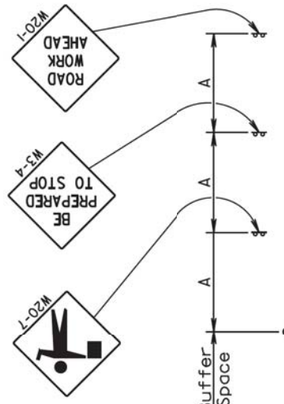
Published Date: 4th Qtr. 2015	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING STOP SIGNS	PLATE NUMBER 634.25 Sheet 1 of 1

PLOT SCALE - 1:200

PLOT NAME - 2

FILE - ...\63423_&_63425.DGN

-PLOTTED FROM - TRAB17882



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

Flagger

END ROAD WORK G20-2 (Optional)

Posted Speed Prior to Work (M.P.H.)	Length of Longitudinal Buffer Space (Feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

Buffer space dependent on work site limitations.

Conditions represented are for work that requires closings during daytime hours only.

This application is intended for a planned temporary closing not to exceed 15 to 20 minutes.

September 6, 2015

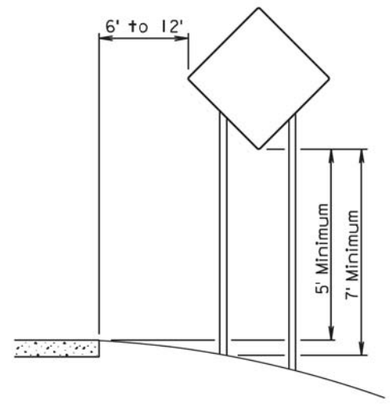
Published Date: 4th Qtr. 2015

SDDOT

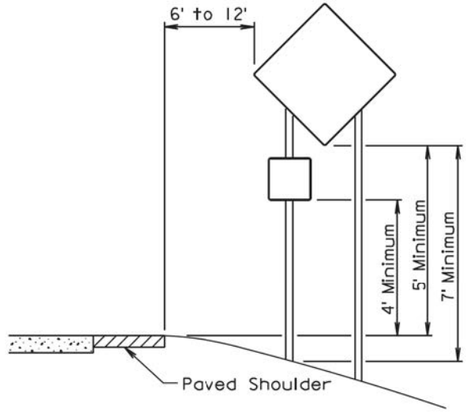
GUIDES FOR TRAFFIC CONTROL DEVICES TEMPORARY ROAD WORK

PLATE NUMBER 634.30

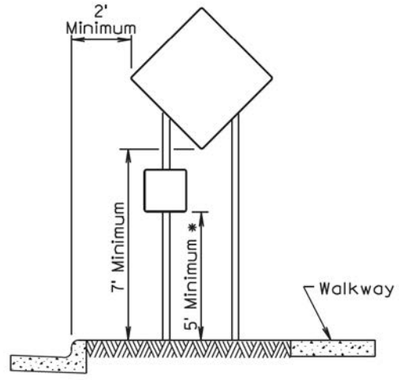
Sheet 1 of 1



RURAL DISTRICT

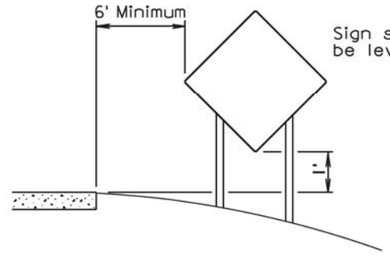


RURAL DISTRICT WITH SUPPLEMENTAL PLATE



URBAN DISTRICT

* 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.



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

September 22, 2014

Published Date: 4th Qtr. 2015

SDDOT

CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)

PLATE NUMBER 634.85

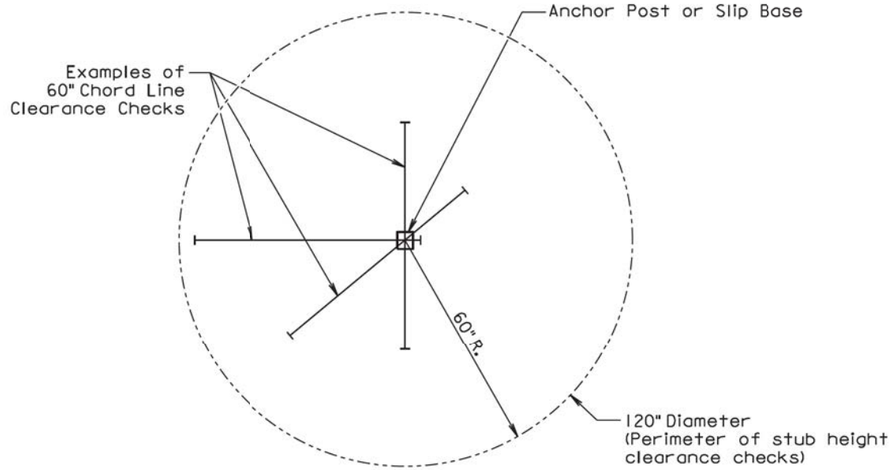
Sheet 1 of 1

PLOT SCALE - 1:200

PLOT NAME - 3

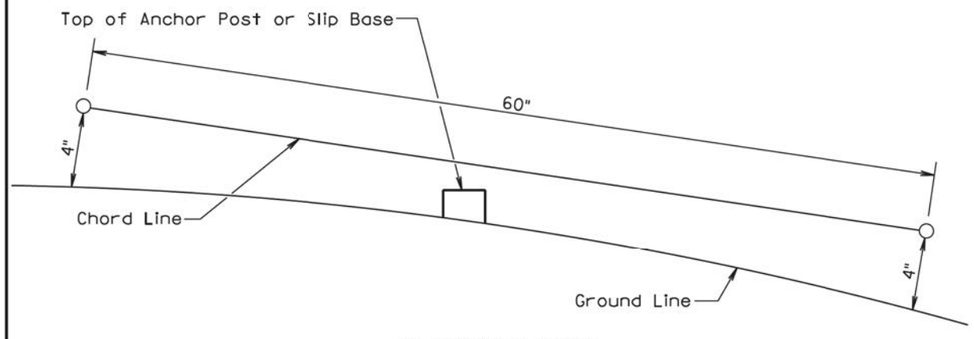
FILE - ...\63430_&_63485.DGN

PLOTTED FROM - TRAB17882



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: 4th Qtr. 2015	**SDDOT**	***BREAKAWAY SUPPORT STUB CLEARANCE***	*PLATE NUMBER* 634.99
			Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	26	44

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

For US 14

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	4	30" x 30"	6	24
W1-4b	REVERSE CURVE (two lanes shift) (L or R)	2	48" x 48"	16	32
W3-1	STOP AHEAD (symbol)	4	48" x 48"	16	64
W3-4	BE PREPARED TO STOP	4	48" x 48"	16	64
W20-1	ROAD WORK AHEAD	9	48" x 48"	16	144
W20-4	ONE LANE ROAD AHEAD	4	48" x 48"	16	64
W20-7	FLAGGER (symbol)	4	48" x 48"	16	64
W21-5	SHOULDER WORK	4	48" x 48"	16	64
G20-1	ROAD WORK NEXT __ MILES	4	36" x 18"	5	20
G20-2	END ROAD WORK	2	36" x 18"	5	10
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			550

TYPE 3 BARRICADES

ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Double Sided	10 Each

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

For US 12

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	4	30" x 30"	6	24
W1-4b	REVERSE CURVE (two lanes shift) (L or R)	2	48" x 48"	16	32
W3-1	STOP AHEAD (symbol)	4	48" x 48"	16	64
W3-4	BE PREPARED TO STOP	4	48" x 48"	16	64
W20-1	ROAD WORK AHEAD	10	48" x 48"	16	160
W20-4	ONE LANE ROAD AHEAD	4	48" x 48"	16	64
W20-7	FLAGGER (symbol)	4	48" x 48"	16	64
W21-5	SHOULDER WORK	4	48" x 48"	16	64
G20-1	ROAD WORK NEXT __ MILES	4	36" x 18"	5	20
G20-2	END ROAD WORK	3	36" x 18"	5	15
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			571

TYPE 3 BARRICADES

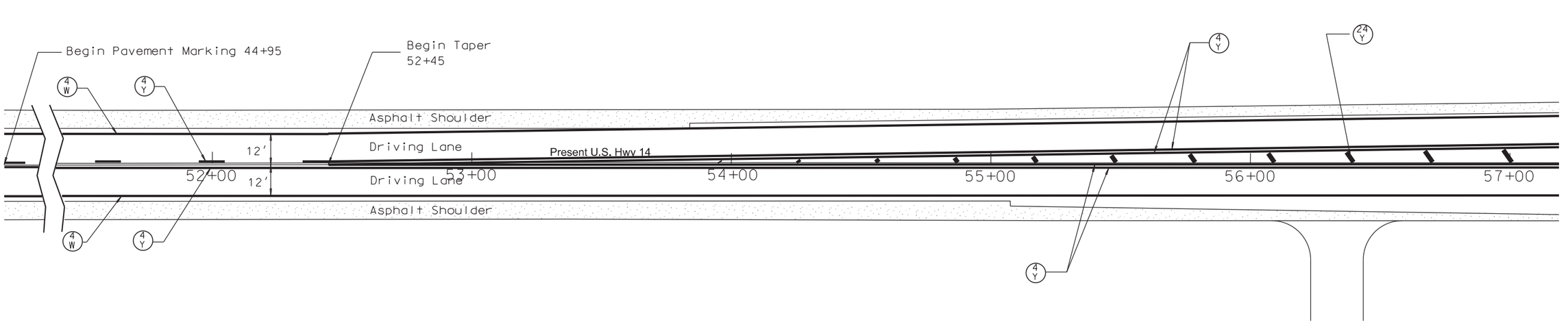
ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Double Sided	10 Each

PAVEMENT MARKING LAYOUTS

(US 14 & 476 Ave)

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	27	44

Plotting Date: 12/16/2015



24 Y — Cold Applied Plastic Pavement Marking, 24" (Yellow)

Cold Applied Plastic Pavement Marking, Arrow

4 Y — Durable Pavement Marking (4" Yellow)

4 W — Durable Pavement Marking (4" White)

PLOT SCALE - 1:40

PLOT NAME - 12

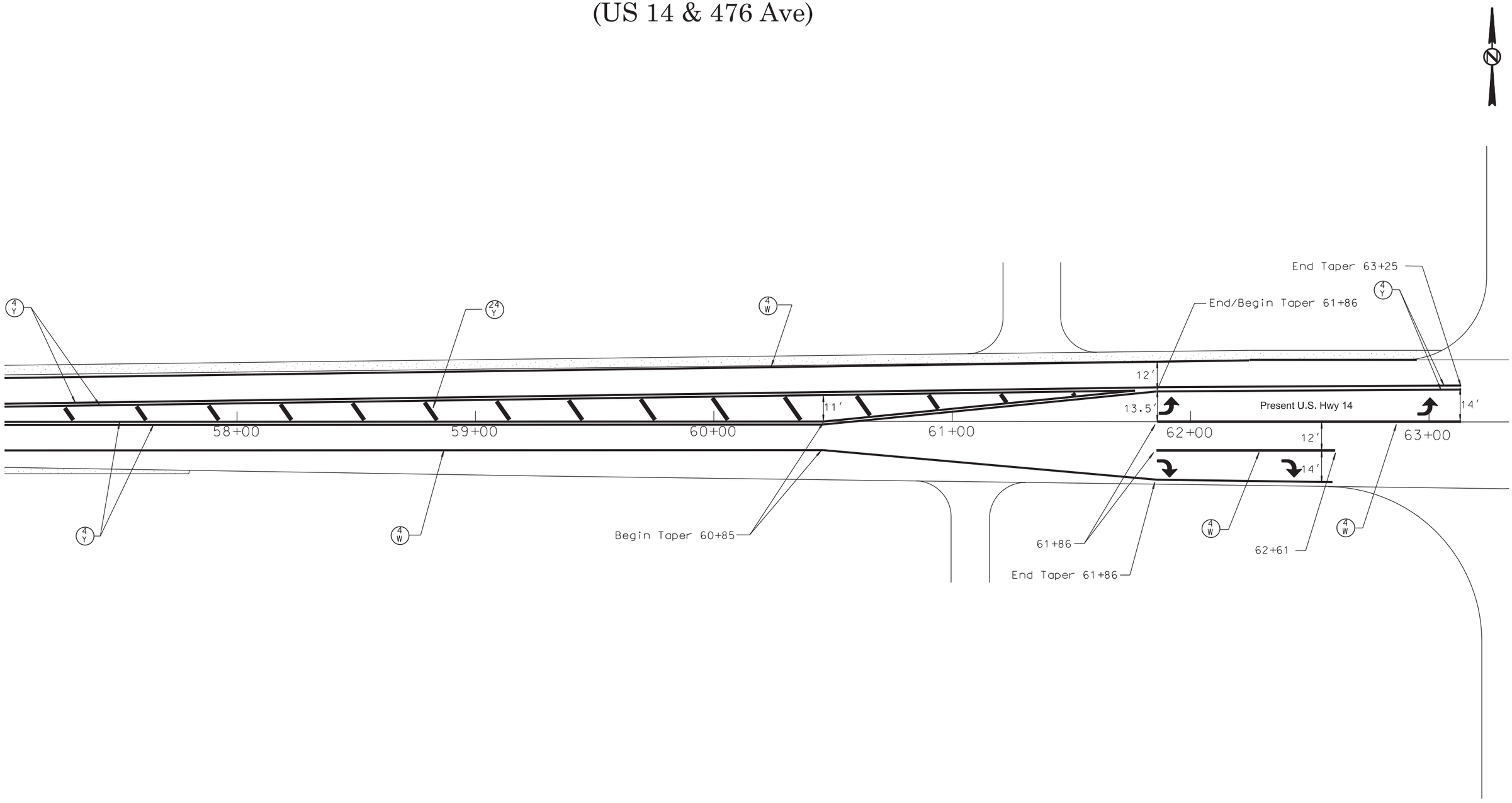
FILE - ...\BR0K0527\AURORAPVMTLAYOUT.DGN

PLOTTED FROM - TRAB17882

PAVEMENT MARKING LAYOUTS
(US 14 & 476 Ave)

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	28	44

Plotting Date: 12/16/2015



24 Y — Cold Applied Plastic Pavement Marking, 24" (Yellow)

Cold Applied Plastic Pavement Marking, Arrow

4 Y — Durable Pavement Marking (4" Yellow)

4 W — Durable Pavement Marking (4" White)

PLOT SCALE - 1:40

PLOT NAME - 13

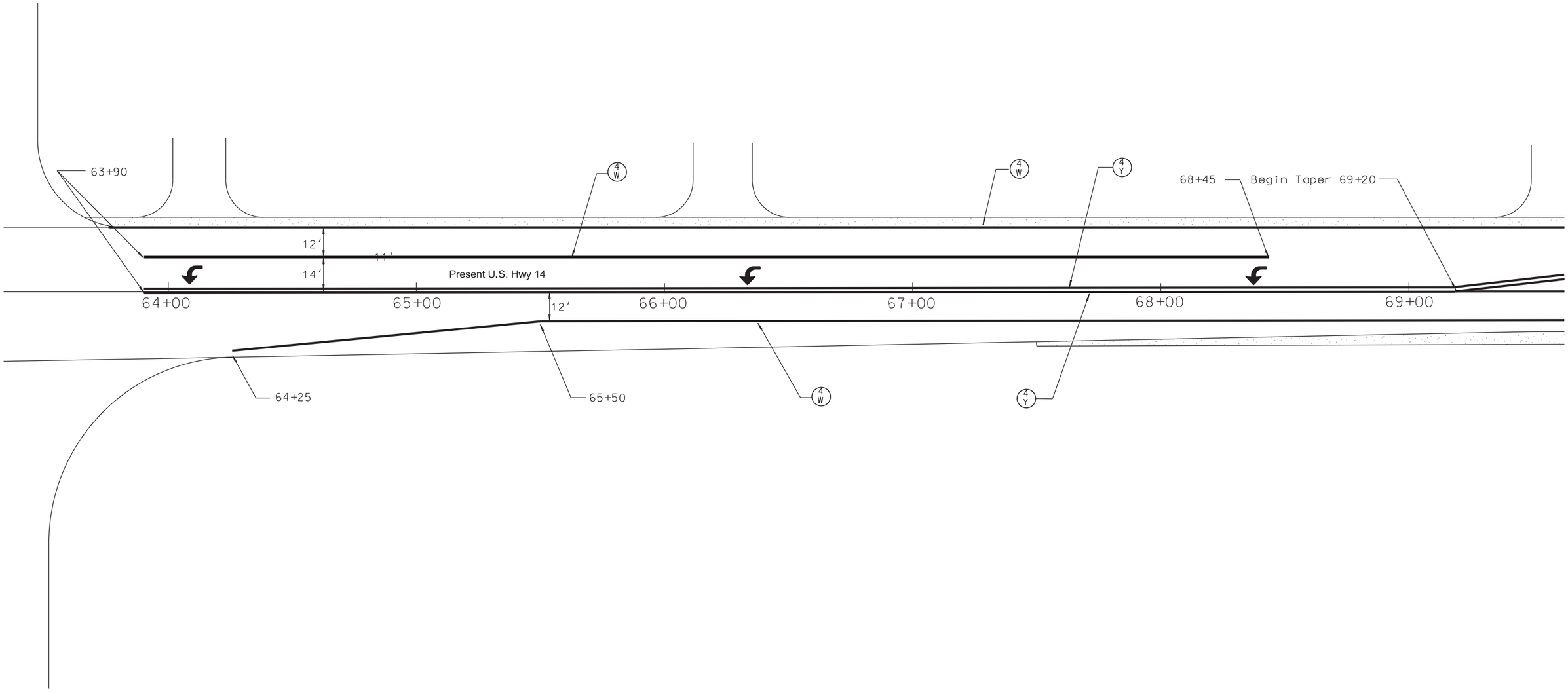
FILE - ...\BROK052T\AURORAPVMTLAYOUT.DGN

PLOTTED FROM - TRAB17882

PAVEMENT MARKING LAYOUTS
(US 14 & 476 Ave)

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	29	44

Plotting Date: 12/16/2015



24 Y Cold Applied Plastic Pavement Marking, 24" (Yellow)

Cold Applied Plastic Pavement Marking, Arrow

4 Y Durable Pavement Marking (4" Yellow)

4 W Durable Pavement Marking (4" White)

PLOT SCALE - 1:40

PLOT NAME - 14

FILE - ...\BR0K0527\AURORAPVMTLAYOUT.DGN

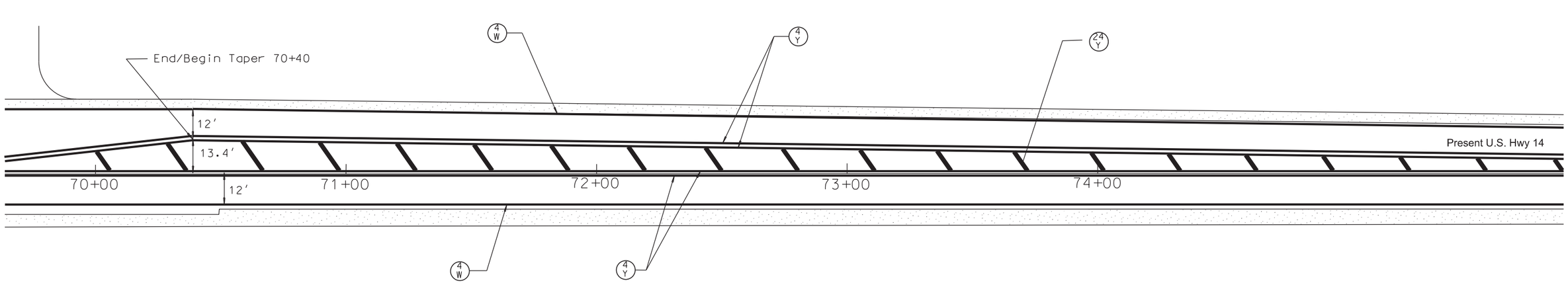
PLOTTED FROM - TRAB17882

PAVEMENT MARKING LAYOUTS

(US 14 & 476 Ave)

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	30	44

Plotting Date: 12/16/2015



24 Y — Cold Applied Plastic Pavement Marking, 24" (Yellow)

Cold Applied Plastic Pavement Marking, Arrow

4 Y — Durable Pavement Marking (4" Yellow)

4 W — Durable Pavement Marking (4" White)

PLOT SCALE - 1:40

PLOT NAME - 15

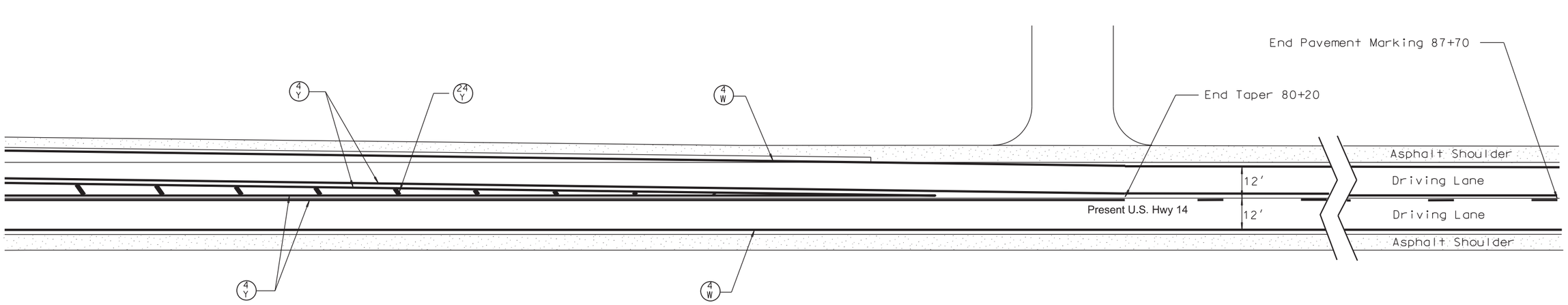
FILE - ...\BROK052T\AURORAPVMTLAYOUT.DGN

PLOTTED FROM - TRAB17892

PAVEMENT MARKING LAYOUTS
(US 14 & 476 Ave)

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	31	44

Plotting Date: 12/16/2015



24 Y — Cold Applied Plastic Pavement Marking, 24" (Yellow)

Cold Applied Plastic Pavement Marking, Arrow

4 Y — Durable Pavement Marking (4" Yellow)

4 W — Durable Pavement Marking (4" White)

PLOT SCALE - 1:40

PLOTTED FROM - TRAB17882

PLOT NAME - 16

FILE - ...\BROK052T\AURORAPVMTLAYOUT.DGN

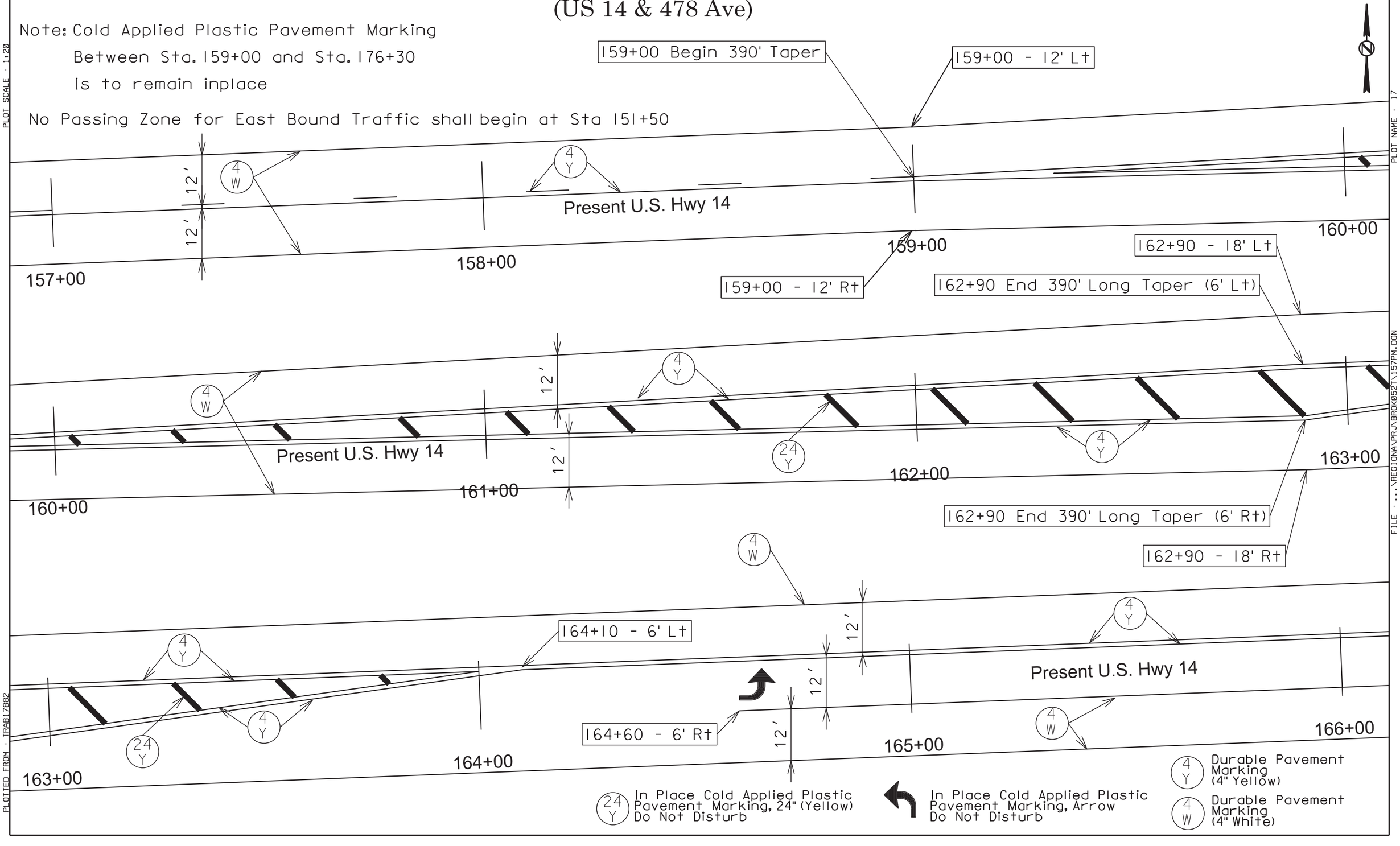
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	32	44
Plotting Date: 12/16/2015			

PAVEMENT MARKING LAYOUTS

(US 14 & 478 Ave)

Note: Cold Applied Plastic Pavement Marking
Between Sta. 159+00 and Sta. 176+30
Is to remain inplace

No Passing Zone for East Bound Traffic shall begin at Sta 151+50



PLOT SCALE - 1:20

PLOT NAME - 17

FILE - ...\REGIONAL\PRJ\BROK052T\157PM.DGN

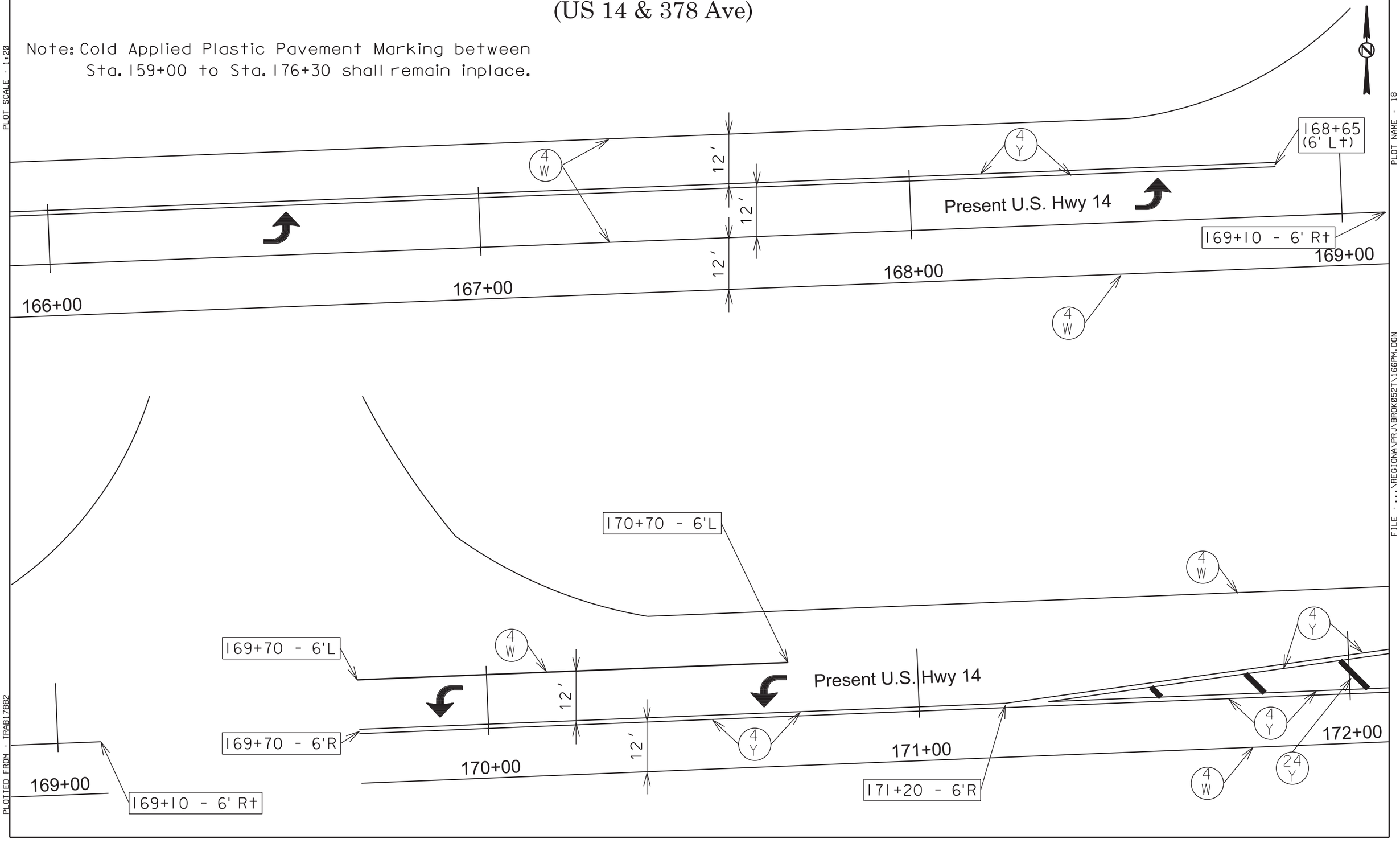
PLOTTED FROM - TRAB17882

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	33	44
Plotting Date: 12/16/2015			

PAVEMENT MARKING LAYOUTS

(US 14 & 378 Ave)

Note: Cold Applied Plastic Pavement Marking between Sta. 159+00 to Sta. 176+30 shall remain inplace.



PLOT SCALE - 1:20

PLOT NAME - 18

FILE - ...\REGIONA\PRJ\BROK052T\166PM.DGN

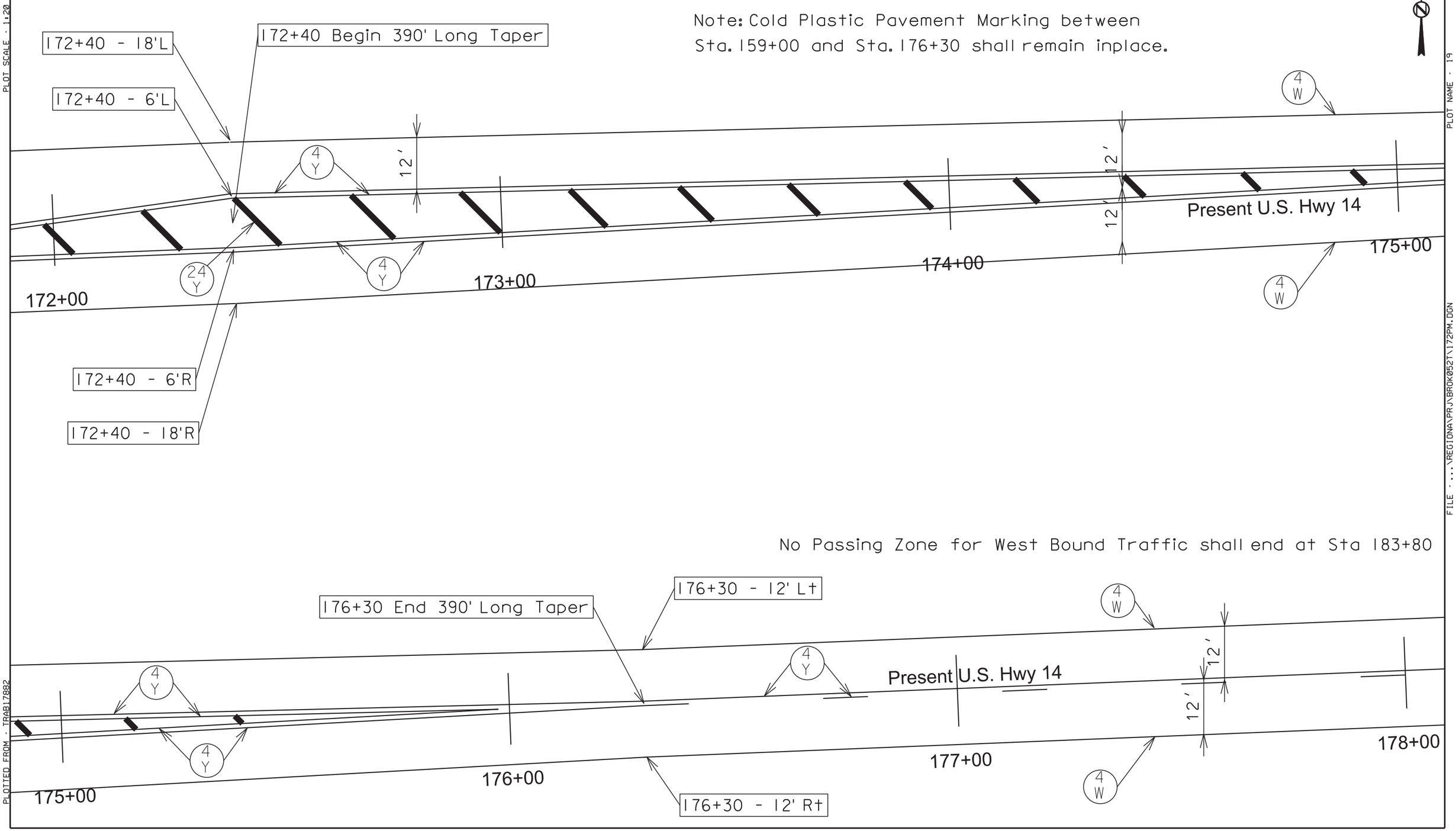
PLOTTED FROM - TRAB17982

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	34	44
Plotting Date: 12/16/2015			

PAVEMENT MARKING LAYOUTS

(US 14 & 378 Ave)

Note: Cold Plastic Pavement Marking between Sta. 159+00 and Sta. 176+30 shall remain inplace.



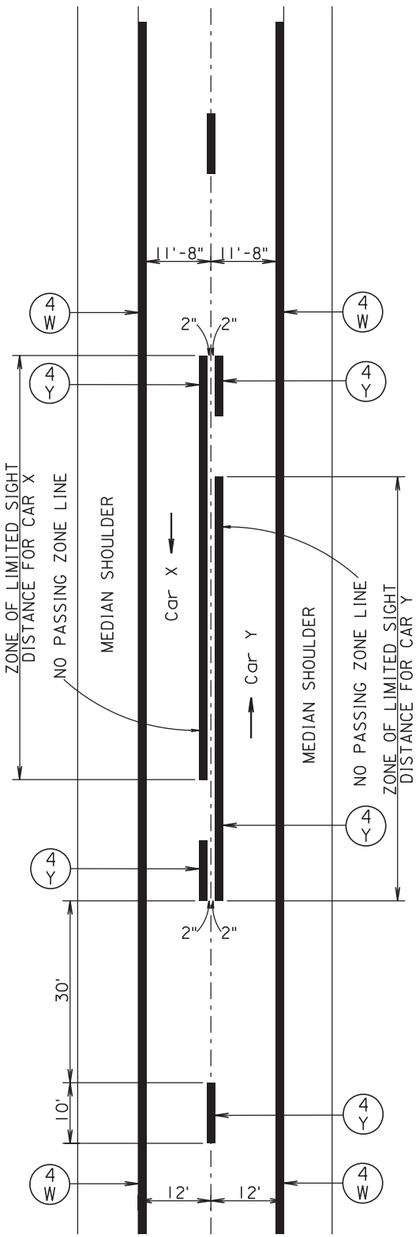
PLOT SCALE - 1:20

PLOT NAME - 19

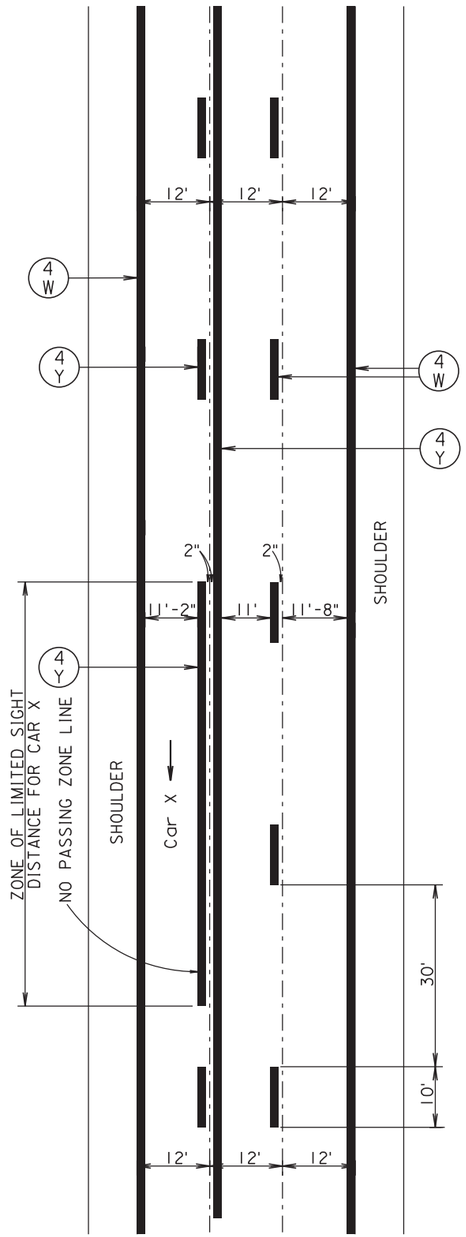
FILE - ...\REGIONA\PRJ\BROK052T\172PM.DGN

PLOTTED FROM - TRAB17982

TWO LANE UNDIVIDED ROADWAY



TWO LANE ROADWAY WITH CLIMBING LANE WITH NO PASSING ZONE



KEY	ITEM
4 W	4" White
4 Y	4" Yellow

FURNISHING AND APPLYING DURABLE PAVEMENT MARKINGS

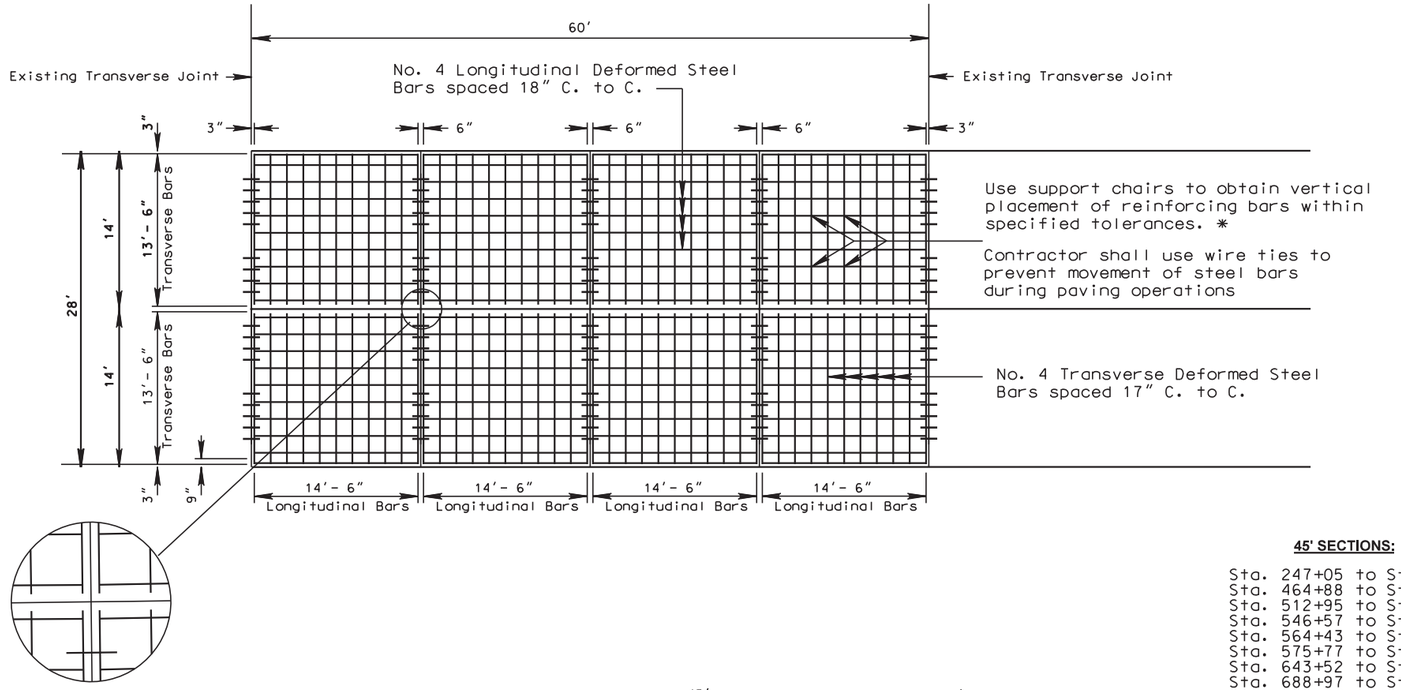
The "Two Lane Undivided Roadway" typical pavement markings as shown on this sheet shall be applied throughout the entire length of the project, except as noted below:

- The "Two Lane Roadway Climbing Lane with No Passing Zone" shall be utilized on US12 where there is the climbing lane for west bound traffic.
- The "Pavement Marking Layouts" located previous to this sheet shall be utilized for the indicated locations on US14.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(192)	36	44

Plotting Date: 12/16/2015

9" Miscellaneous PCC PAVEMENT
Layout US Hwy 14



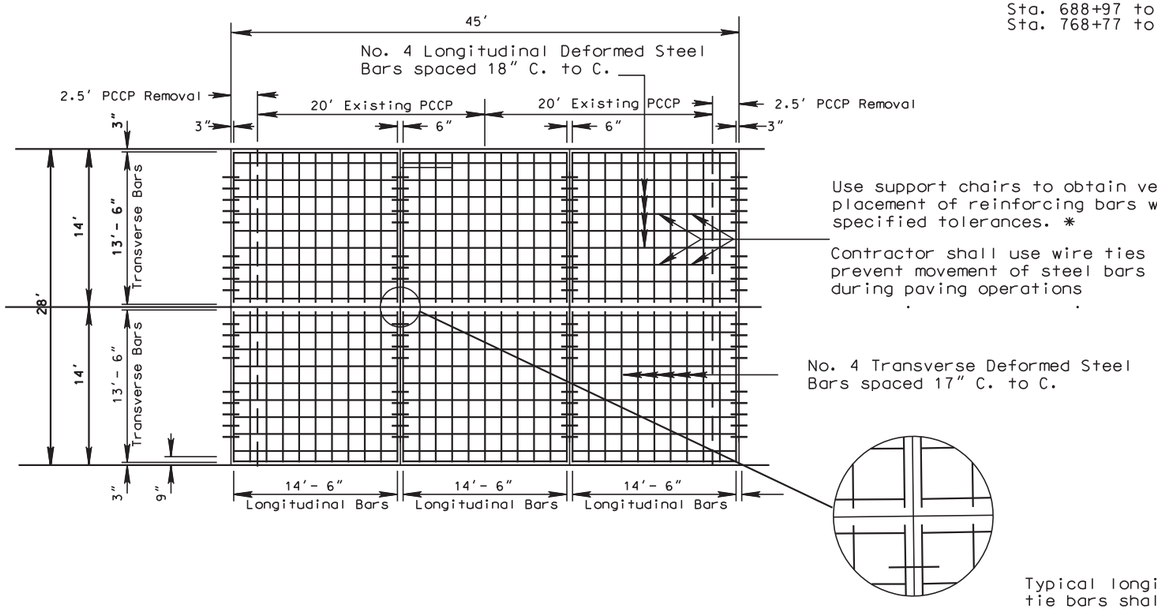
Typical longitudinal joint with tie bars shall continue thru the areas of special reinforcement.

60' SECTIONS:

Sta. 330+94 to Sta. 331+54
Sta. 437+70 to Sta. 438+30
Sta. 607+70 to Sta. 608+30
Sta. 658+10 to Sta. 658+70

45' SECTIONS:

Sta. 247+05 to Sta. 247+50
Sta. 464+88 to Sta. 465+33
Sta. 512+95 to Sta. 513+40
Sta. 546+57 to Sta. 547+02
Sta. 564+43 to Sta. 564+88
Sta. 575+77 to Sta. 576+22
Sta. 643+52 to Sta. 643+97
Sta. 688+97 to Sta. 689+42
Sta. 768+77 to Sta. 769+22



Typical longitudinal joint with tie bars shall continue thru the areas of special reinforcement.

* NOTE:

The Length of the deformed steel bars may vary +/- 2 inches

Top of longitudinal bars shall be located at 1/2 depth of pcc pavement slab +/- 1/2"

Cost of additional reinforcement shall be incidental to the cost of 9" Miscellananeous PCC Pavement

(For Information Only)
Number 4 Rebar = 0.668 lbs./ft.
A 14'x 15' PCCP section has an estimate 293.5' of No. 4 Rebar. A 14'x 15'PCCP section has an estimated 196.06 lbs. of Number 4 Rebar.

The start and ending point for pavement removal shall begin and end 2.5'from Tranverse Contraction Joint. The removal shall include taking out the existing DowelBar Assembly at the Tranverse Contraction Joint.

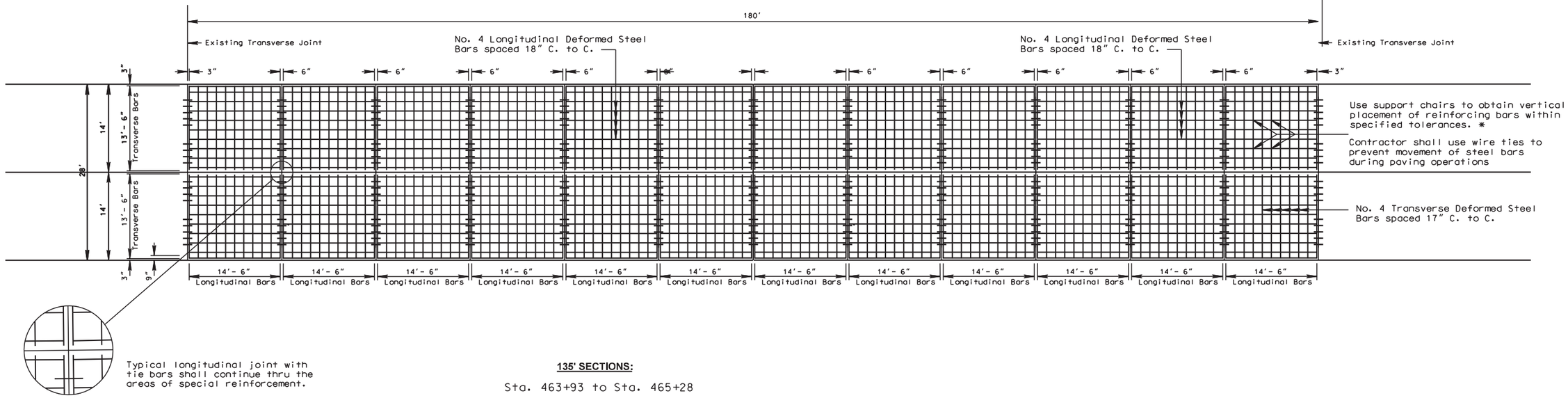
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(192)	37	44

Plotting Date: 12/16/2015

9" Miscelleous P.C.C. PAVEMENT
Layout US Hwy 12

180' SECTIONS:

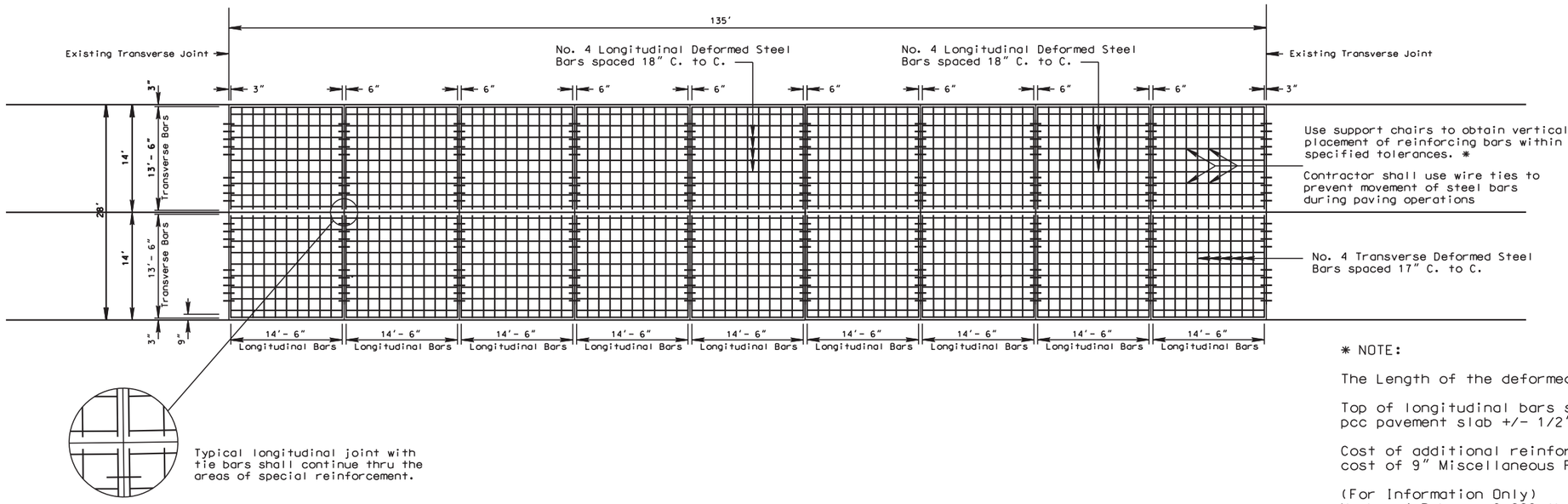
Sta. 677+20 to Sta. 679+00



Typical longitudinal joint with tie bars shall continue thru the areas of special reinforcement.

135' SECTIONS:

Sta. 463+93 to Sta. 465+28



Typical longitudinal joint with tie bars shall continue thru the areas of special reinforcement.

* NOTE:

The Length of the deformed steel bars may vary +/- 2 inches

Top of longitudinal bars shall be located at 1/2 depth of pcc pavement slab +/- 1/2"

Cost of additional reinforcement shall be incidental to the cost of 9" Miscellaneous PCC Pavement.

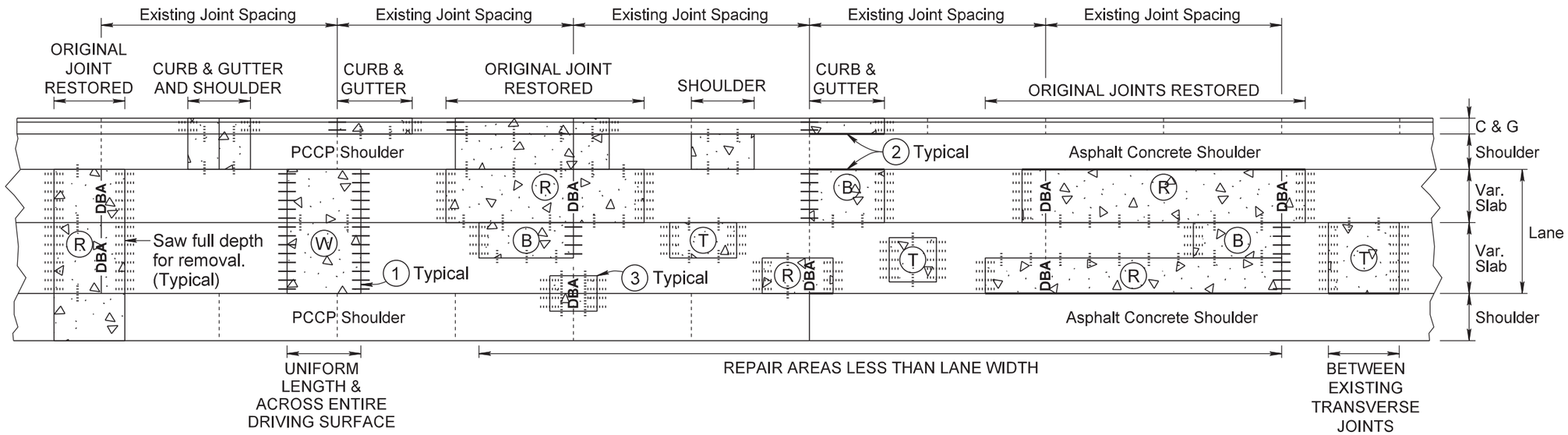
(For Information Only)
Number 4 Rebar = 0.668 lbs./ft.
A 14' x 15' PCCP section has an estimate 293.5' of No. 4 Rebar. A 14'x 15'PCCP section has an estimated 196.06 lbs. of Number 4 Rebar.

The start and ending point for pavement removal shall begin and end 2.5'from Tranverse Contraction Joint. The removal shall include taking out the existing DowelBar Assembly at the Tranverse Contraction Joint.

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	NH 0012(192)	38	44
Plotting Date: 12/16/2015			

NONREINFORCED PCC PAVEMENT REPAIR

ANY SINGLE LANE ROADWAY (RAMPS, ETC.)
TYPICAL REPAIR AREAS



KEY:

PCC Pavement Repair Area

PCC PAVEMENT REPAIR AREA TYPES:

(W) Two Working Joints (Use only if repair is full roadway width and uniform length (across entire driving surface))

(T) Two Tied Joints

(B) One Working & One Tied Joint

(R) Two Tied Joints with Original Joint Restored with Dowel Bar Assembly

Steel Bars for Transverse Joints

Pavement Thickness >= 10.5"
— Drilled in 1½" x 18" epoxy coated plain round dowel bars spaced 18" center to center.
..... Drilled in No. 11 x 18" epoxy coated deformed tie bars spaced 18" center to center.

Pavement Thickness >= 8.5" and < 10.5"
— Drilled in 1¼" x 18" epoxy coated plain round dowel bars spaced 18" center to center.
..... Drilled in No. 9 x 18" epoxy coated deformed tie bars spaced 18" center to center.

Pavement Thickness < 8.5"
— Drilled in 1" x 18" epoxy coated plain round dowel bars spaced 18" center to center.
..... Drilled in No. 8 x 18" epoxy coated deformed tie bars spaced 18" center to center.

DBA Dowel Bar Assembly

Steel Bars for Longitudinal Joints

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

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

NOTES: Saw around repair areas full depth for removal.

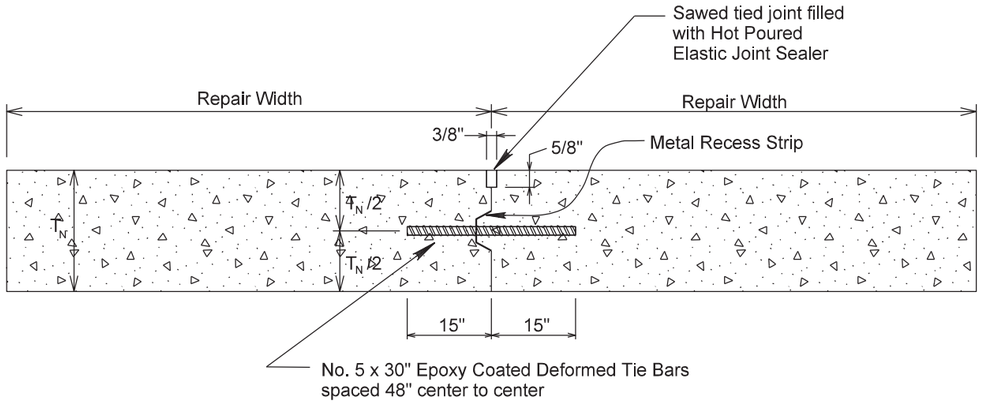
(1) Where possible, transverse joints shall be constructed/maintained full roadway width.

(2) Edges of repair areas shall be formed to match the width of the existing concrete pavement.

(3) Need for bars in small repair areas on/near the shoulder to be determined on a case-by-case basis, on construction by the Engineer.

NONREINFORCED PCC PAVEMENT REPAIR

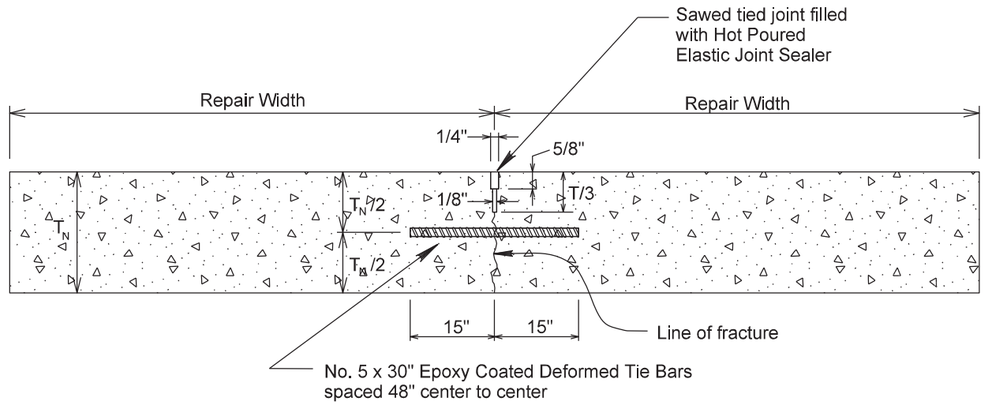
LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



T_N = New pavement thickness.

Cost for furnishing and inserting tie bars shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair and/or 9" Miscellaneous PCC Pavement.

SAWED LONGITUDINAL JOINT

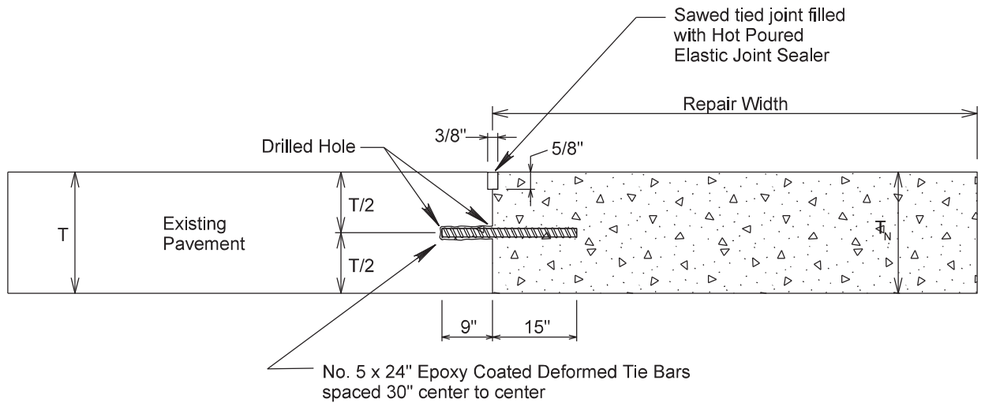


T_N = New pavement thickness.

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

Cost for furnishing and inserting tie bars shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair and/or 9" Miscellaneous PCC Pavement.

LONGITUDINAL CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



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

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

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

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

NONREINFORCED PCC PAVEMENT REPAIR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(192)	40	44

Plotting Date: 12/16/2015

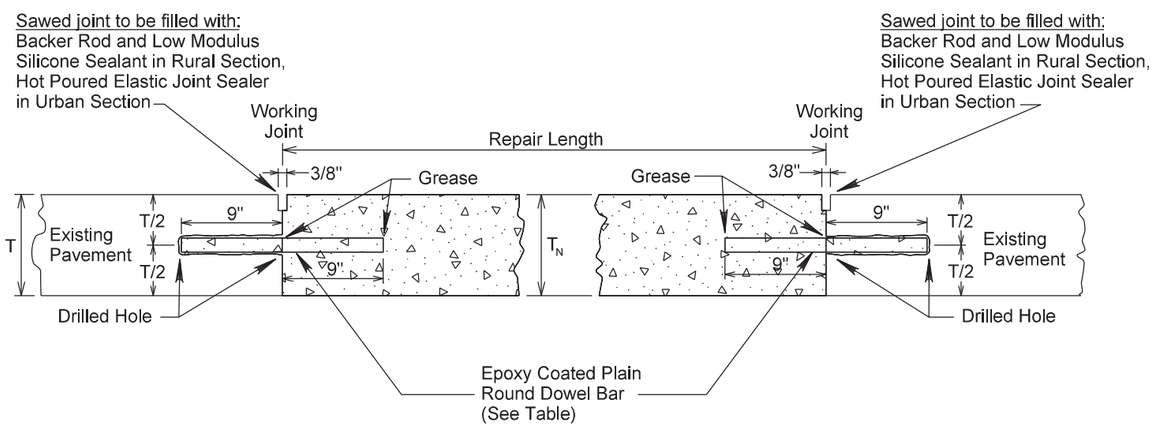
PLOT SCALE - 1:11.25

PLOT NAME - 25

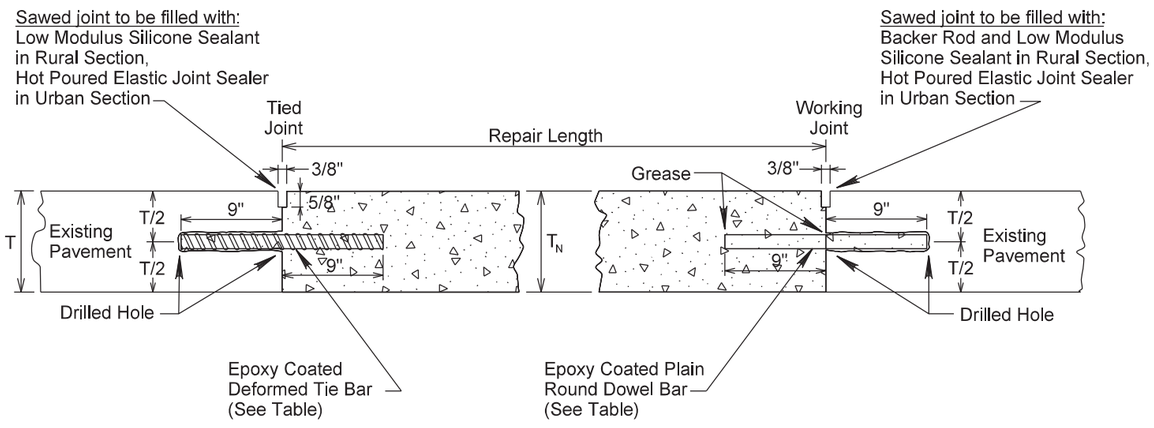
FILE - ...\REGIONAL\PROJ\BROK052T\BARS.DGN

PLOTTED FROM - TRAB17882

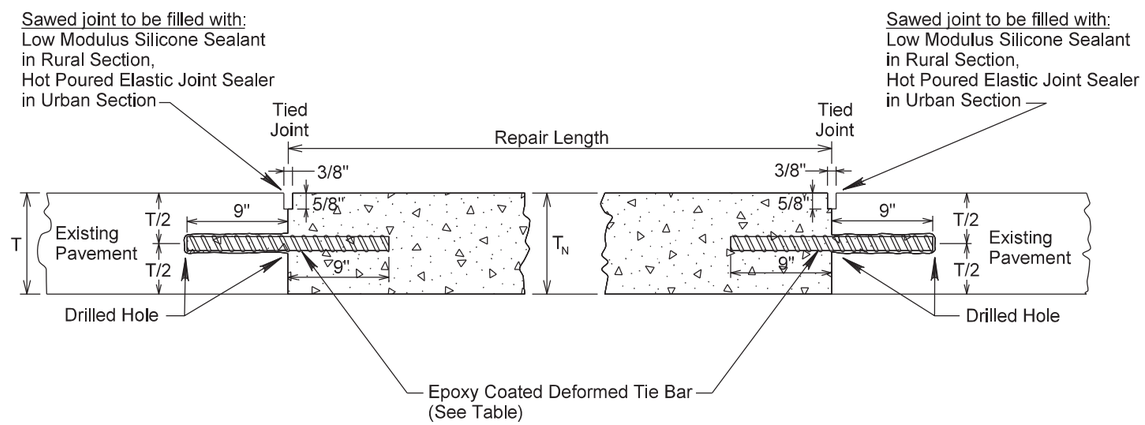
PLAIN ROUND DOWEL BAR INSERTION
TYPE W - (TWO WORKING JOINTS)



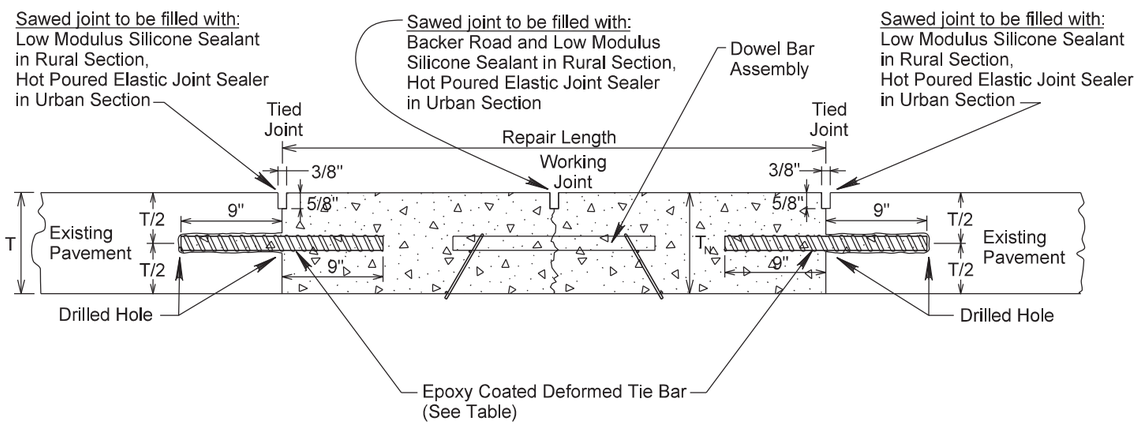
DEFORMED TIE BAR AND PLAIN ROUND DOWEL BAR INSERTION
TYPE B - (ONE TIED JOINT AND ONE WORKING JOINT)



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



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



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

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

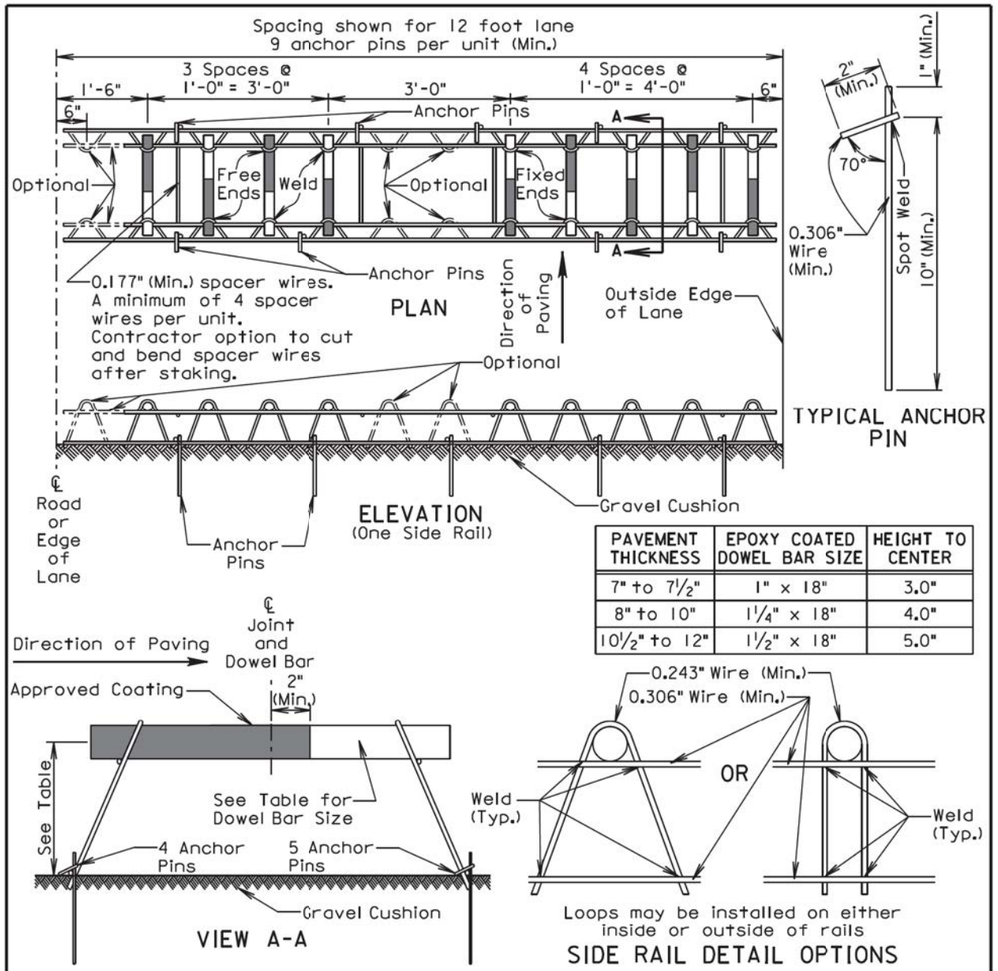
Bar embedded to a minimum depth of 9 inches into the existing pavement by utilizing an epoxy resin adhesive.

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

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

T_N = T

(top of new pavement shall be flush with top of existing pavement)



PAVEMENT THICKNESS	EPOXY COATED DOWEL BAR SIZE	HEIGHT TO CENTER
7" to 7½"	1" x 18"	3.0"
8" to 10"	1¼" x 18"	4.0"
10½" to 12"	1½" x 18"	5.0"

GENERAL NOTES:

Longitudinal 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.

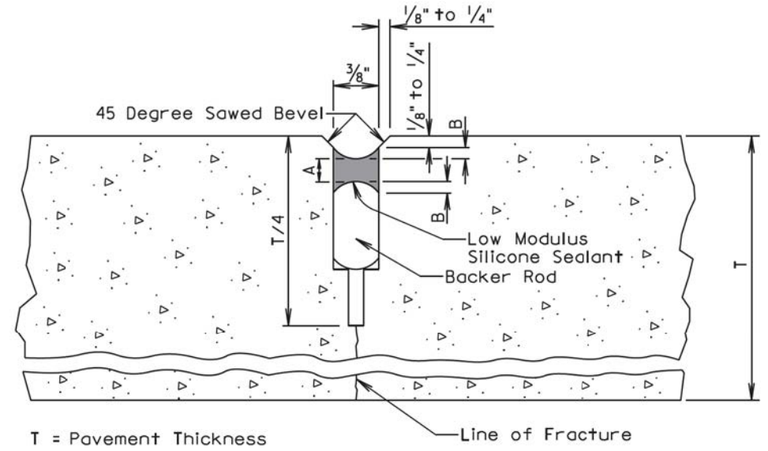
Centerline of individual dowel bars shall be parallel to the centerline of the roadway ±1/2 inch in 18 inches.

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 as 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.

August 30, 2013

Published Date: 4th Qtr. 2015	SDDOT	PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS 9 Bar Assembly on Granular Base Material	PLATE NUMBER 380.03 Sheet 1 of 1



LOW MODULUS SILICONE SEALANT ALLOWABLE CONSTRUCTION TOLERANCES			
A (Min.) (In.)	A (Max.) (In.)	B (Min.) (In.)	B (Max.) (In.)
3/16	5/16	1/8	1/4

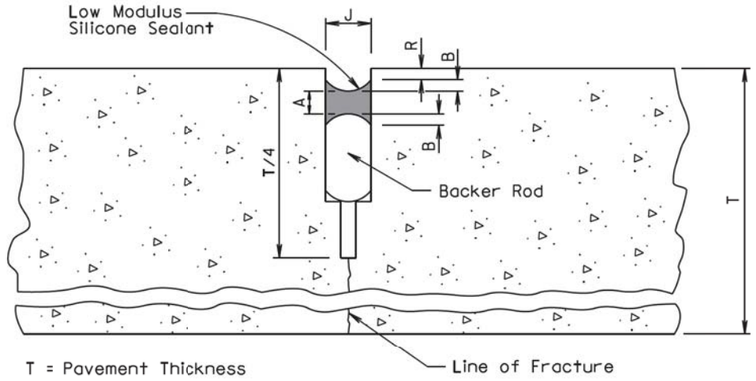
GENERAL NOTES:

The first saw cut to control cracking shall be a minimum of ¼ the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the low modulus silicone joint sealant will be necessary.

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

June 26, 2013

Published Date: 4th Qtr. 2015	SDDOT	PCC PAVEMENT BEVELED TRANSVERSE CONTRACTION JOINT WITH OR WITHOUT DOWEL BAR ASSEMBLY	PLATE NUMBER 380.06 Sheet 1 of 1



LOW MODULUS SILICONE SEALANT ALLOWABLE CONSTRUCTION TOLERANCES

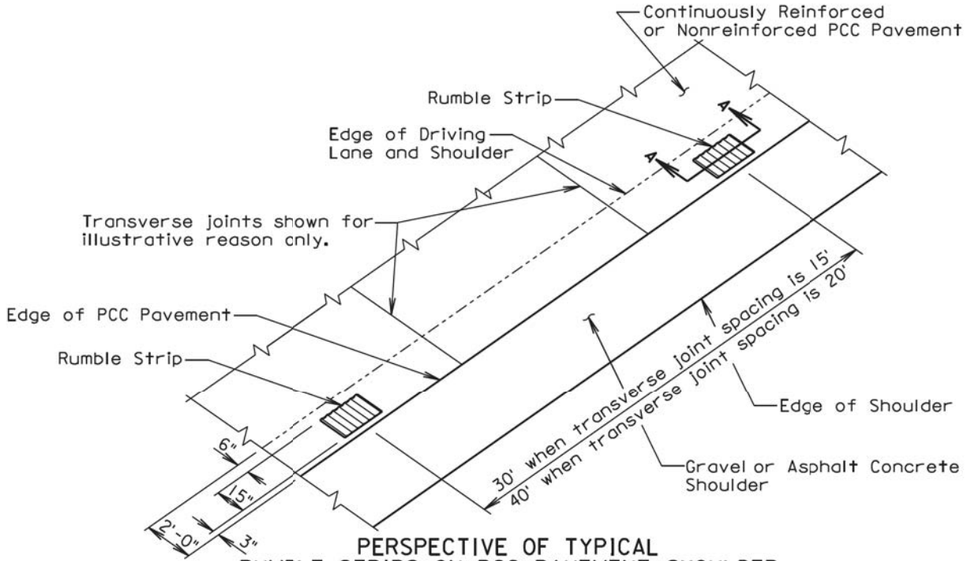
A (Min.) (In)	A (Max.) (In)	B (Min.) (In)	B (Max.) (In)	R (In)
J = 3/8"				
3/16	5/16	1/8	1/4	1/4
J = 1/2"				
3/16	3/8	1/8	1/4	1/4
J = 5/8"				
1/4	7/16	1/8	5/16	1/4
J = 3/4"				
5/16	1/2	3/16	3/8	5/16
J = 1"				
3/8	5/8	3/16	1/2	5/16

GENERAL NOTE:

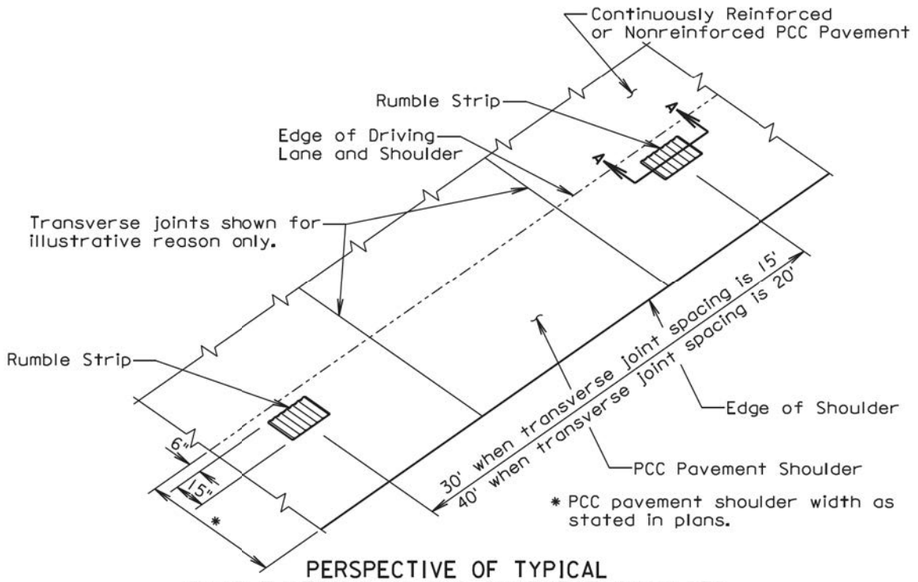
The backer rod shall be a nonmoisture absorbing resilient material approximately 25% larger in diameter than the width of the joint to be sealed.

February 14, 2011

Published Date: 4th Qtr. 2015	SDDOT	***RESEAL PCC PAVEMENT JOINT (SILICONE)***	*PLATE NUMBER* 380.13
			Sheet 1 of 1



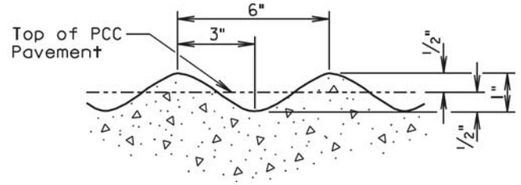
PERSPECTIVE OF TYPICAL
RUMBLE STRIPS ON PCC PAVEMENT SHOULDER
ADJACENT TO GRAVEL OR ASPHALT CONCRETE SHOULDER



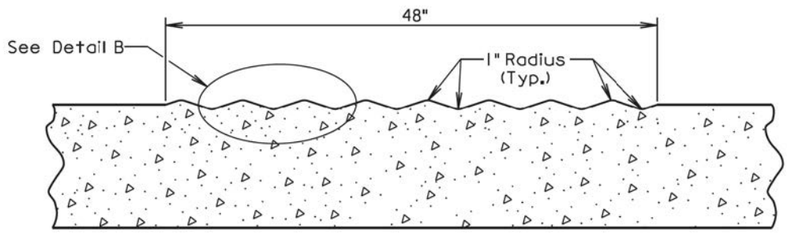
PERSPECTIVE OF TYPICAL
RUMBLE STRIPS ON PCC PAVEMENT SHOULDER

August 31, 2013

Published Date: 4th Qtr. 2015	SDDOT	RUMBLE STRIP ON PCC PAVEMENT SHOULDER	PLATE NUMBER 380.15
			Sheet 1 of 2



DETAIL B



SECTION A-A

GENERAL NOTES:

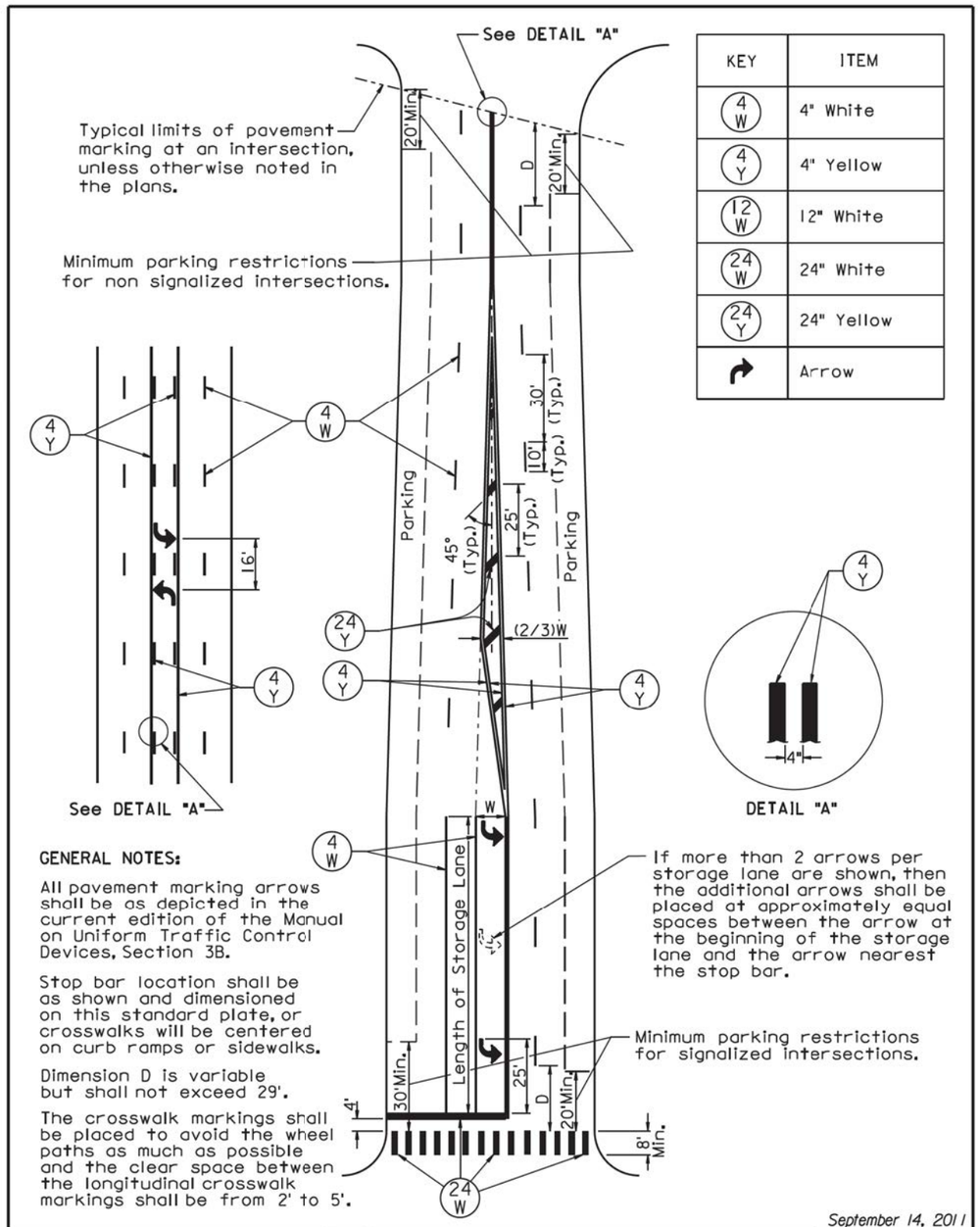
The rumble strips shall be evenly spaced and shall not coincide with any transverse contraction joints.

The rumble strips shall NOT be placed along areas adjacent to entrance ramps, exit ramps, and gore areas.

Payment for constructing the PCC Pavement Rumble Strips shall be incidental to the contract unit price per square yard for the corresponding PCC Pavement bid item.

August 31, 2013

Published Date: 4th Qtr. 2015	SDDOT	RUMBLE STRIP ON PCC PAVEMENT SHOULDER	PLATE NUMBER 380.15
			Sheet 2 of 2



KEY	ITEM
4 W	4" White
4 Y	4" Yellow
12 W	12" White
24 W	24" White
24 Y	24" Yellow
	Arrow

GENERAL NOTES:

All pavement marking arrows shall be as depicted in the current edition of the Manual on Uniform Traffic Control Devices, Section 3B.

Stop bar location shall be as shown and dimensioned on this standard plate, or crosswalks will be centered on curb ramps or sidewalks.

Dimension D is variable but shall not exceed 29'.

The crosswalk markings shall be placed to avoid the wheel paths as much as possible and the clear space between the longitudinal crosswalk markings shall be from 2' to 5'.

September 14, 2011

Published Date: 4th Qtr. 2015	SDDOT	***PAVEMENT MARKINGS FOR ADJACENT INTERSECTIONS AND CENTER TURN LANE***	*PLATE NUMBER* 633.01 *Sheet 1 of 1*