

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0081(98)35	1	36

Plotting Date: 03/28/2014

PLANS FOR PROPOSED
PROJECT NH 0081(98)35
US HIGHWAY 81
HUTCHINSON &
McCOOK COUNTIES

PCC PAVEMENT REPAIR, SPALL REPAIR,
TIE BAR RETROFIT (STITCHING),
SEALING RANDOM CRACKS,
RESEAL TRANSVERSE JOINTS, &
ASPHALT CONCRETE SHOULDER REPAIR

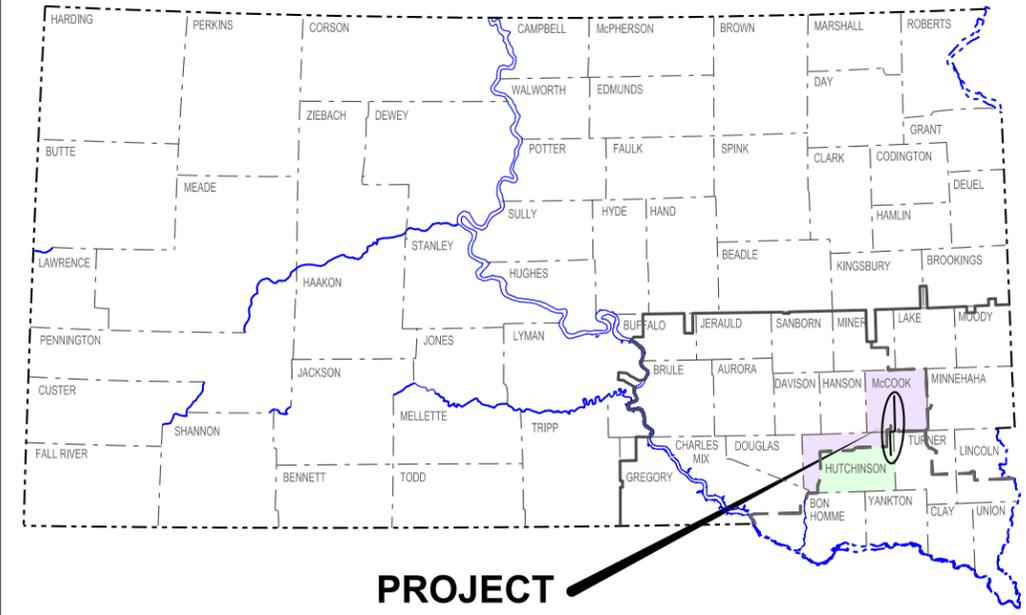
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PLOT SCALE - 1:12250

PLOT NAME -

FILE - ...NEW\DDC.DGN: XLS\TTL047D.DGN



PROJECT

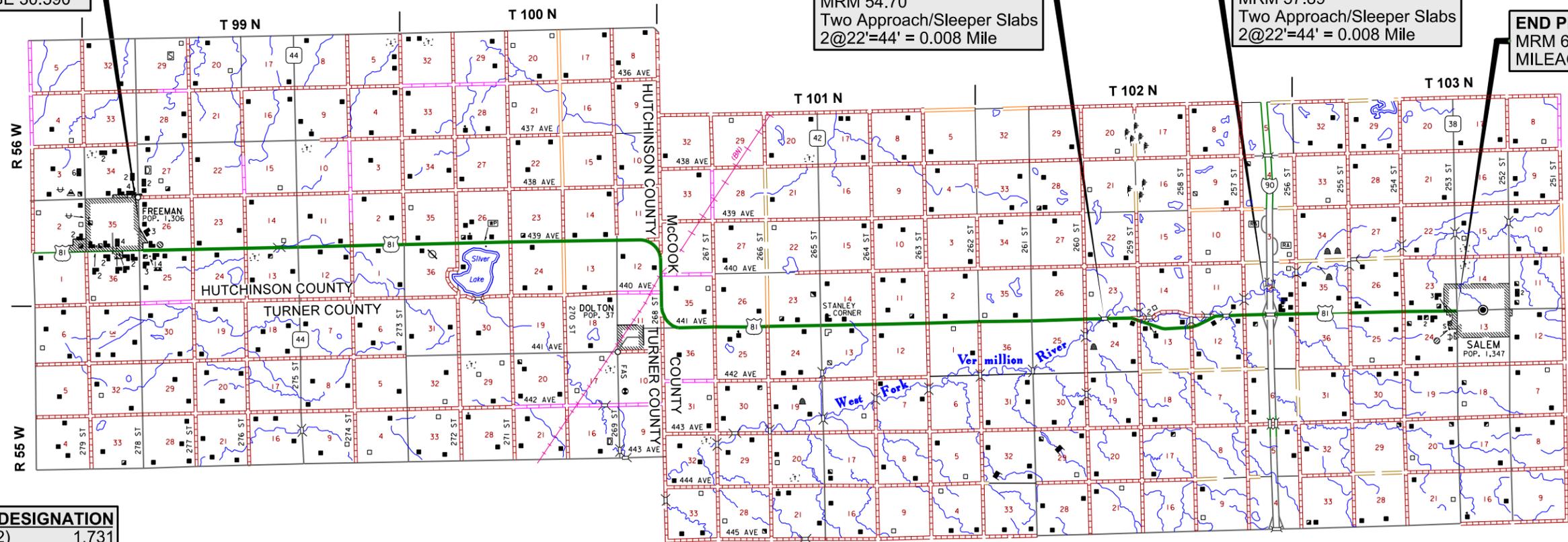
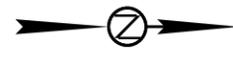
PCN 047D

BEGIN PROJECT
MRM 35.00 +0.295
MILEAGE 30.590

STR. NO. 44-110-156
Continuous Concrete Bridge
112'-6"=0.021 Mile
MRM 54.70
Two Approach/Sleeper Slabs
2@22'=44' = 0.008 Mile

STR. NO. 44-110-125
Prestr. Conc. Girder Bridge
246'-0"=0.047 Mile
MRM 57.89
Two Approach/Sleeper Slabs
2@22'=44' = 0.008 Mile

END PROJECT
MRM 61.58 +0.189
MILEAGE 56.906



DESIGN DESIGNATION

ADT(2012)	1,731
ADT(2032)	2,182
DHV	297
D	51%
T DHV	10.9%
T ADT	24.0%
V (RURAL)	65 MPH
V (SALEM)	30/45 MPH
V (FREEMAN)	55 MPH

STORM WATER PERMIT
(None required)

PROJECT LENGTH

Gross Length:	26.316 Miles
Bridges & Approach Slabs Length:	0.084 Mile
Net Length:	26.232 Miles

5

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
120E0100	Unclassified Excavation, Digouts	400	CuYd
210E1000	Shoulder Preparation	13.400	Mile
260E1050	Base Course, Salvaged Asphalt Mix	400.0	Ton
260E1080	Base Course, Salvaged, State Furnished	400.0	Ton
320E0004	PG 58-28 Asphalt Binder	380.7	Ton
320E1070	Class HR Asphalt Concrete	9,518.0	Ton
320E5010	Saw and Seal Shoulder Joint	71,280	Ft
330E0010	MC-70 Asphalt for Prime	80.4	Ton
330E0100	SS-1h or CSS-1h Asphalt for Tack	0.4	Ton
330E0210	SS-1h or CSS-1h Asphalt for Flush Seal	13.4	Ton
332E0010	Cold Milling Asphalt Concrete	63,078	SqYd
380E5030	Nonreinforced PCC Pavement Repair	6,003.3	SqYd
380E6000	Dowel Bar	1,776	Each
380E6110	Insert Steel Bar in PCC Pavement	4,333	Each
380E6200	Tie Bar Retrofit, Stitching	487	Each
380E6300	Reseal PCC Pavement Joint - Silicone	194,600	Ft
380E6310	Seal Random Cracks in PCC Pavement	1,749	Ft
390E0200	Repair Type A Spall	523.2	SqFt
600E0200	Type II Field Laboratory	1	Each
634E0010	Flagging	3,200	Hour
634E0020	Pilot Car	1,400	Hour
634E0100	Traffic Control	8,187	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0310	Temporary Road Markers	15,500	Ft
634E0610	4" Temporary Pavement Marking Tape Type 2	720	Ft
998E0100	Railroad Protective Insurance	Lump Sum	LS

SPECIFICATIONS

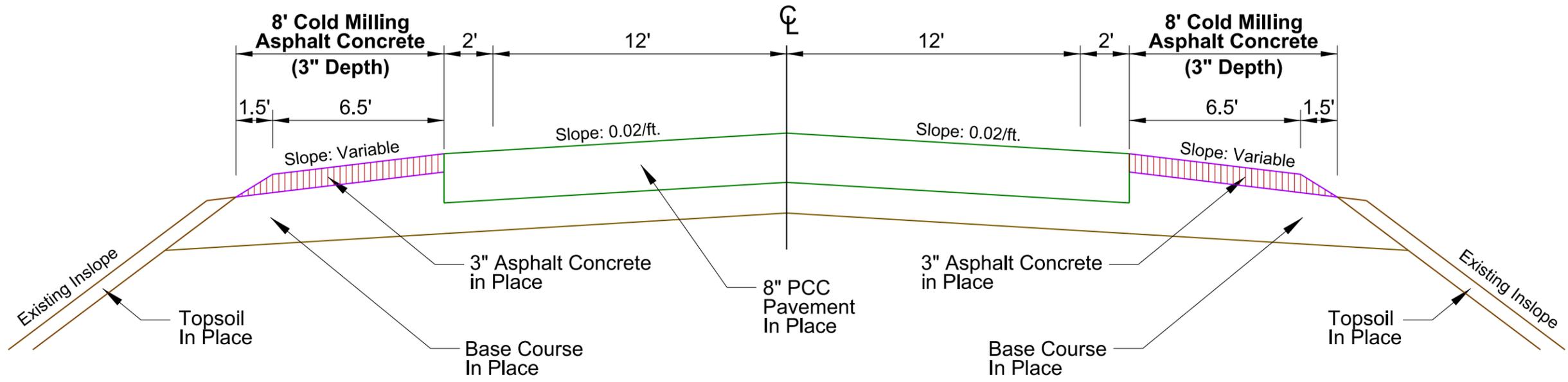
Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications and/or Special Provisions as included in the Proposal.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0081(98)35	3	36

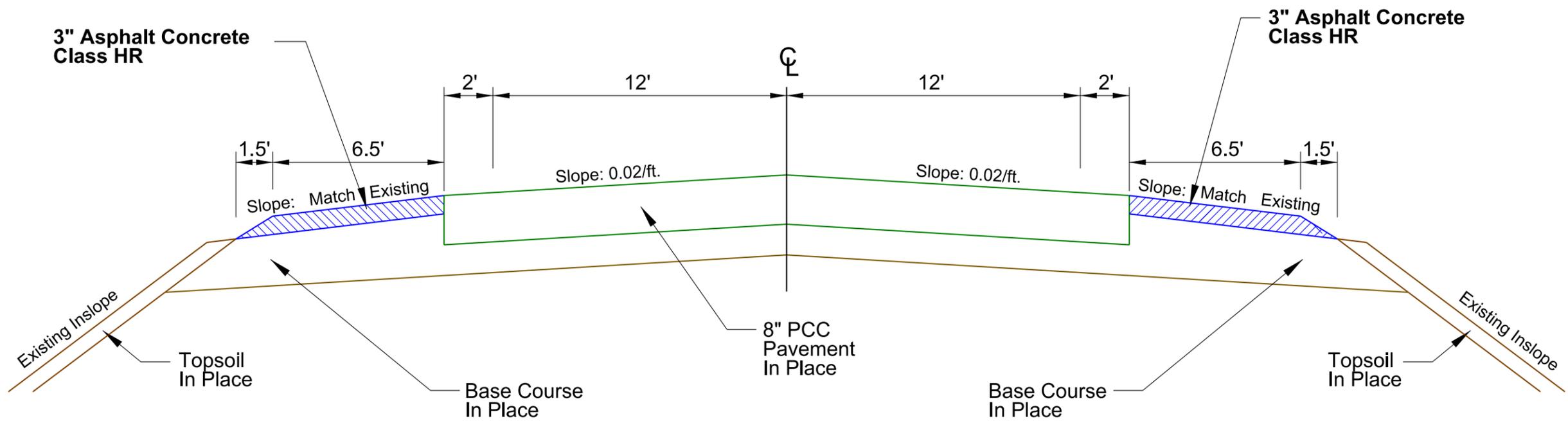
Plotting Date: 03/28/2014

TYPICAL COLD MILLING SECTION

Both Shoulders Shown
Some locations require only one shoulder to be repaired



TYPICAL RESURFACING SECTION



PLOT SCALE - 1:4.8

PLOTTED FROM - TRM11.025

PLOT NAME - 1

FILE - ... \TYPICAL SECTION.DGN

TABLE FOR PCC PAVEMENT REPAIR

MRM	LANE	NB DRIVING LANE		SB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			TIE BAR RETROFIT STITCHING Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS	
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each		DOWEL BAR Each	L				W
35.284	Both															30	
35.389	NB	6	6			4.0	R		8	2	6						
35.445	SB											36"	12"	3.00			
35.445	SB											18"	6"	0.75			
35.445	NB											12"	6"	0.50			
35.471	NB											18"	6"	0.75			
35.489	NB											10"	10"	0.69			
35.527	NB											6"	6"	0.25			
35.543	SB			6	6	4.0	R		8	4	6						
35.572	NB											10"	18"	1.25			
35.586	NB											8"	12"	0.67			
35.694	NB											12"	12"	1.00			
35.759	SB														5		
35.802	SB											18"	9"	1.13			
35.813	SB											12"	12"	1.00			
35.838	SB											18"	6"	0.75			
36.136	SB											12"	6"	0.50			
36.181	SB											18"	9"	1.13			
36.218	SB											6"	12"	0.50			
36.241	SB											6"	12"	0.50			
36.526	Both	6	14	6	14	18.7	R		32	2	24						
36.577	SB											12"	6"	0.50			
37.129	SB											7"	12"	0.58			
37.728	SB											12"	18"	1.50			
37.741	NB											18"	18"	2.25			
37.741	SB											12"	18"	1.50			
37.775	SB											6"	12"	0.50			
37.788	Both	6	14	9	14	23.3	R		32	3	24						
37.795	Both	6	14	6	14	18.7	R		32	2	24						
37.801	SB											6"	36"	1.50			
37.839	SB											6"	12"	0.50			
37.843	SB											6"	12"	0.50			
37.870	SB											12"	12"	1.00			
37.870	NB											6"	18"	0.75			
37.916	Both														29		
37.942	NB											7"	12"	0.58			
37.953	NB											12"	12"	1.00			
37.953	SB											9"	18"	1.13			
37.972	NB	6	6			4.0	R		8	2	6						
37.987	SB											9"	24"	1.50			
37.998	NB											9"	12"	0.75			
38.021	SB											12"	24"	2.00			
38.036	SB			6	14	9.3	R		16	2	12						
38.047	SB											10"	18"	1.25			
38.089	SB											12"	18"	1.50			
38.112	SB											9"	24"	1.50			
38.119	NB	6	6			4.0	R		8	2	6	12"	24"	2.00			
38.130	Both	6	14	6	6	13.3	R		24	4	18						
38.134	NB											12"	24"	2.00			
38.144	SB											12"	12"	1.00			
38.144	NB											7"	12"	0.58			
38.155	Both														30		
38.170	SB			6	6	4.0	R		8	4	6						
38.178	NB	6	6			4.0	R		8	2	6						
38.219	SB			6	6	4.0	R		8	4	6	18				36	
38.277	SB												12"	24"	2.00		

TABLE FOR PCC PAVEMENT REPAIR

MRM	LANE	NB DRIVING LANE		SB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			TIE BAR RETROFIT STITCHING Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each		DOWEL BAR Each	L			
38.277	NB											12"	24"	2.00		
38.339	Both			6	6	4.0	R		8	4	6	12"	12"	1.00		
38.350	SB											12"	12"	1.00		
38.467	NB											10"	24"	1.67		
38.492	SB											12"	24"	2.00		
38.593	NB	6	6			4.0	R		8	2	6	6"	12"	0.50		
38.601	SB											6"	18"	0.75		
38.632	Both														28	
38.669	SB											12"	12"	1.00		
38.876	SB											12"	12"	1.00		
38.929	SB											12"	24"	2.00		
39.013	Both														28	
39.016	Both														28	
39.020	Both														31	
39.078	SB											9"	18"	1.13		
39.120	NB	6	6			4.0	R		8	2	6					
39.477	SB			6	6	4.0	R		8	4	6					
39.578	NB											7"	18"	0.88		
40.299	SB											12"	18"	1.50		
40.350	SB											6"	18"	0.75		
40.639	Both											12"	18"	1.50		
40.662	SB											12"	12"	1.00		
40.814	NB											12"	18"	1.50		
40.943	NB											9"	18"	1.13		
41.092	NB											12"	18"	1.50		
41.095	NB											9"	9"	0.56		
41.666	SB											12"	12"	1.00		
42.394	Both														29	
43.030	SB											12"	12"	1.00		
43.148	SB											24"	24"	4.00		
43.508	SB											6"	24"	1.00		
43.619	Both	30	14	30	14	93.3	R		32	12	24					
44.053	Both														28	
44.056	Both														28	
44.484	Both	6	14	6	14	18.7	R		32	2	24					
44.739	NB	6	6			4.0	R		8	2	6					
45.246	SB											12"	12"	1.00		
45.265	SB											6"	18"	0.75		
45.265	SB											12"	12"	1.00		
45.510	SB														40	
45.545	SB														14	
45.548	NB														15	
45.555	Both														14	
45.560	NB	24	14			21.8			16	16	9	12				Railroad - Triangle - Needs rebar mat
46.111	SB											9"	12"	0.75		
46.161	SB											7"	36"	1.75		
46.263	NB											6"	18"	0.75		
46.263	SB											12"	12"	1.00		
46.506	Both	17.5	14	17.5	14	54.4	R		32	7	24					
46.749	NB											7"	18"	0.88		
46.899	NB											12"	12"	1.00		
46.910	NB											12"	18"	1.50		
46.918	NB											18"	18"	2.25		
47.529	NB											12"	12"	1.00		
47.677	SB											12"	12"	1.00		
47.810	NB											12"	12"	1.00		

TABLE FOR PCC PAVEMENT REPAIR

MRM	LANE	NB DRIVING LANE		SB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			DOWEL BAR Each	TIE BAR RETROFIT STITCHING Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each			L	W			
48.106	NB												12"	12"	1.00		
48.583	SB												12"	18"	1.50		
48.840	NB												12"	18"	1.50		
49.226	NB												6"	24"	1.00		
49.245	SB			6	14	9.3	R		16	2	12						
49.252	SB												6"	36"	1.50		
49.270	Both															14	
49.285	Both	6	14			9.3	R		16	2	12					30	
49.293	SB			6	14	9.3	R		16	2	12						
49.301	SB												12"	24"	2.00		
49.307	Both	6	14			9.3	R		16	2	12		6"	24"	1.00		
49.320	NB												6"	36"	1.50		
49.332	SB			8	14	12.4	R		16	3	12						
49.391	Both	12	14	12	14	37.3	B	16	16	4							
49.396	Both	10	14	10	14	31.1	B	16	16	4							
49.492	NB												12"	12"	1.00		
49.793	SB												6"	12"	0.50		
49.815	NB												12"	24"	2.00		
49.854	NB												12"	12"	1.00		
49.906	NB												12"	12"	1.00		
49.924	NB												12"	12"	1.00		
49.973	NB												12"	12"	1.00		
49.991	NB												12"	12"	1.00		
49.995	SB												12"	12"	1.00		
50.780	NB												12"	36"	3.00		
50.780	SB												12"	12"	1.00		
50.983	NB												12"	18"	1.50		
51.015	Both	12	14	12	14	37.3	B	16	16	4							
51.055	NB												12"	24"	2.00		
51.093	NB												12"	12"	1.00		
51.226	NB												12"	18"	1.50		
51.226	SB												12"	12"	1.00		
51.351	SB			8	14	12.4	B	8	8	3							
51.430	SB												12"	12"	1.00		
51.464	NB												6"	12"	0.50		
51.464	SB												18"	18"	2.25		
51.604	SB			20	8	17.8	W	10		16							
51.641	NB												6"	36"	1.50		
51.645	SB												6"	24"	1.00		
51.671	NB												6"	36"	1.50		
51.683	NB												6"	48"	2.00		
51.699	NB												12"	18"	1.50		
51.887	SB												12"	18"	1.50		
51.996	NB	20	14			31.1	W	16		8							
52.184	NB												6"	18"	0.75		
52.374	NB	16	14			24.9	B	8	8	6							
52.398	Both	10	14	10	14	31.1	B	16	16	4							
52.595	NB												12"	12"	1.00		
52.595	SB												12"	12"	1.00		
52.613	NB												12"	18"	1.50		
52.964	SB												18"	18"	2.25		
53.072	NB												18"	30"	3.75		
53.108	NB												12"	12"	1.00		
53.186	SB												12"	24"	2.00		
53.311	NB	10	14			15.6	B	8	8	4							
53.364	SB			6	14	9.3	R		16	2	12						

TABLE FOR PCC PAVEMENT REPAIR

MRM	LANE	NB DRIVING LANE		SB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			DOWEL BAR Each	TIE BAR RETROFIT STITCHING Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each			L	W			
53.896	NB	6	6			4.0	R		8	2	6						
53.928	SB												12"	12"	1.00		
54.023	SB												6"	6"	0.25		
54.065	Both	6	14	6	14	18.7	W	32		2							
54.114	Both	14	14	14	14	43.6	B	16	16	5							
54.191	SB												12"	12"	1.00		
54.221	NB												18"	12"	1.50		
54.315	SB			10	14	15.6	W	16		4							
54.356	SB												18"	12"	1.50		
54.401	NB												18"	12"	1.50		
54.498	SB												24"	24"	4.00		
54.513	SB												12"	12"	1.00		
54.517	SB												12"	12"	1.00		
54.551	NB												6"	6"	0.25		
54.597	NB												12"	48"	4.00		
54.631	NB												12"	48"	4.00		
54.649	Both	6	14	6	14	18.7	W	32		2							
54.653	Both	6	14	6	14	18.7	W	32		2							
54.657	Both	6	14	6	14	18.7	W	32		2							
54.699	Both	14	14	14	14	43.6	W	32		5							
54.746	NB												12"	18"	1.50		
54.880	SB												48"	24"	8.00		
54.945	NB												12"	12"	1.00		
54.945	SB												12"	12"	1.00		
54.980	SB												12"	12"	1.00		
55.074	SB												12"	12"	1.00		
55.112	Both	6	14	6	14	18.7	W	32		2			12"	12"	1.00		
55.185	SB												12"	12"	1.00		
55.223	SB			6	14	9.3	R		16	2	12						
55.269	SB												36"	12"	3.00		
55.275	Both	6	14	6	14	18.7	W	32		2							
55.356	NB	40	14			62.2	W	16		16	24						
55.358	SB												24"	12"	2.00		
55.382	SB												48"	12"	4.00		
55.399	Both	12	14	12	14	37.3	W	32		4							
55.451	NB												12"	12"	1.00		
55.501	NB												12"	12"	1.00		
55.501	SB												12"	12"	1.00		
55.507	Both	6	14	6	14	18.7	W	32		2							
55.619	NB												12"	12"	1.00		
55.619	SB												12"	12"	1.00		
55.681	SB												12"	12"	1.00		
55.685	NB												12"	12"	1.00		
55.685	NB												12"	12"	1.00		
55.733	Both	6	14	6	14	18.7	W	32		2							
55.753	Both	6	14	6	14	18.7	W	32		2							
55.756	NB	6	14			9.3	T		16	2							
55.785	SB			6	14	9.3	W	16		2							
55.816	SB												12"	12"	1.00		
55.828	NB	6	14			9.3	B	8	8	2							
55.828	SB												18"	18"	2.25		
55.847	SB												12"	12"	1.00		
55.866	NB												24"	12"	2.00		
55.874	Both	6	14	6	14	18.7	W	32		2							
55.974	NB												12"	12"	1.00		
55.974	NB												12"	12"	1.00		

TABLE FOR PCC PAVEMENT REPAIR

MRM	LANE	NB DRIVING LANE		SB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			DOWEL BAR Each	TIE BAR RETROFIT STITCHING Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each			L	W			
55.978	NB												12"	12"	1.00		
56.045	NB												24"	12"	2.00		
56.045	SB												12"	12"	1.00		
56.145	NB												12"	24"	2.00		
56.168	NB												18"	36"	4.50		
56.176	NB												12"	12"	1.00		
56.176	SB												12"	12"	1.00		
56.186	NB												12"	12"	1.00		
56.191	NB												12"	12"	1.00		
56.191	SB												12"	24"	2.00		
56.241	NB												12"	12"	1.00		
56.245	NB												12"	24"	2.00		
56.261	NB												6"	60"	2.50		
56.284	NB												12"	72"	6.00		
56.309	Both	20	14	20	14	62.2	W	32		8							
56.334	NB												12"	12"	1.00		
56.354	NB												6"	36"	1.50		
56.354	SB												12"	12"	1.00		
56.365	NB												12"	12"	1.00		
56.365	NB												24"	12"	2.00		
56.373	SB												12"	12"	1.00		
56.388	NB												24"	36"	6.00		
56.388	SB												12"	12"	1.00		
56.402	Both	20	14	20	14	62.2	W	32		8							
56.407	SB												12"	12"	1.00		
56.426	SB												12"	18"	1.50		
56.446	SB												12"	12"	1.00		
56.457	Both	22	14			34.2	W	16		8	12		12"	12"	1.00		
56.534	NB												6"	12"	0.50		
56.549	NB												12"	12"	1.00		
56.549	SB												6"	12"	0.50		
56.570	Both	10	14	10	14	31.1	B	16	16	4							
56.641	NB												6"	18"	0.75		
56.721	NB												12"	12"	1.00		
56.721	SB												12"	12"	1.00		
56.737	NB												12"	18"	1.50		
56.763	NB	6	14			9.3	W	16		2							
56.783	SB												6"	12"	0.50		
56.840	Both	6	6			4.0	B	4	4	2			12"	12"	1.00		
56.905	NB												12"	12"	1.00		
56.916	SB												12"	30"	2.50		
56.932	NB												6"	6"	0.25		
56.932	SB												12"	12"	1.00		
56.993	NB												12"	12"	1.00		
57.000	SB												6"	18"	0.75		
57.037	NB												6"	12"	0.50		
57.054	Both	10	14	10	14	31.1	W	32		4							
57.184	SB												12"	18"	1.50		
57.214	SB												12"	12"	1.00		
57.264	NB												6"	12"	0.50		
57.290	SB												6"	12"	0.50		
57.359	SB												6"	6"	0.25		
57.359	SB												12"	12"	1.00		
57.390	NB												12"	18"	1.50		
57.390	SB												12"	18"	1.50		
57.413	NB												12"	12"	1.00		

TABLE FOR PCC PAVEMENT REPAIR

MRM	LANE	NB DRIVING LANE		SB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			TIE BAR RETROFIT STITCHING Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each		DOWEL BAR Each	L			
57.413	SB											24"	18"	3.00		
57.493	NB	20	14			31.1	W	16		8						
57.496	Both	10	14	10	14	31.1	W	32		4						
57.657	SB			6	14	9.3	R		16	2	12					
57.677	NB											12"	24"	2.00		
57.688	SB			6	14	9.3	B	8	8	2						
57.750	NB	26	14			40.4	W	16		10	12					
57.765	SB											12"	12"	1.00		
57.777	NB											6"	6"	0.25		
57.846	Both	20	14	20	14	62.2	W	32		8						
57.906	Both	20	14	20	14	62.2	W	32		8						
57.972	NB	6	6			4.0	B	4	4	2						
57.981	SB											48"	12"	4.00		
58.000	SB			6	14	9.3	B	8	8	2						
58.021	SB											24"	30"	5.00		
58.055	SB											12"	24"	2.00		
58.082	NB	6	14			9.3	W	16		2						
58.109	NB											6"	12"	0.50		
58.150	SB			100	14	155.6	W	16		40	60					
58.158	SB Shld			20	6	13.3	W	8		16						
58.165	SB Shld			20	6	13.3	W	8		16						
58.182	NB											12"	42"	3.50		
58.182	SB											12"	12"	1.00		
58.182	SB											12"	48"	4.00		
58.199	SB Shld			10	6	6.7	B	4	4	8						
58.203	SB Shld			10	6	6.7	B	4	4	8						
58.208	NB	6	8			5.3	R		10	2	8					
58.320	SB			80	14	124.4	W	16		32	48					
58.377	NB											12"	36"	3.00		
58.377	SB											12"	36"	3.00		
58.383	Both	20	14	20	14	62.2	W	32		8						
58.412	NB											6"	18"	0.75		
58.423	SB											6"	12"	0.50		
58.443	SB											6"	12"	0.50		
58.443	SB											6"	24"	1.00		
58.546	NB	100	14			155.6	W	16		40	60					
58.561	Both	40	14	40	14	124.4	W	32		16	48					
58.569	SB			120	14	186.7	W	16		48	72					
58.600	SB											6"	12"	0.50		
58.645	SB											12"	12"	1.00		
58.670	NB	140	14			217.8	W	16		56	84					
58.711	SB											12"	18"	1.50		
58.790	NB											6"	18"	0.75		
58.864	NB	40	14			62.2	W	16		16	24					
58.910	NB											12"	18"	1.50		
58.973	SB											6"	30"	1.25		
58.990	SB											6"	30"	1.25		
59.027	SB			6	8	5.3	R		10	4	8					
59.102	NB											6"	30"	1.25		
59.124	NB											12"	12"	1.00		
59.124	SB											6"	36"	1.50		
59.130	SB											12"	18"	1.50		
59.196	NB											12"	30"	2.50		
59.214	Both	40	14	100	14	217.8	W	32		40	84					
59.244	SB											12"	18"	1.50		
59.266	NB	6	6			4.0	R		8	2	6					

TABLE FOR PCC PAVEMENT REPAIR

MRM	LANE	NB DRIVING LANE		SB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			DOWEL BAR Each	TIE BAR RETROFIT STITCHING Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each			L	W			
59.361	Both	6	14	6	14	18.7	W	32		2							
59.379	NB	50	14			77.8	B	8	8	20	24						
59.393	NB												12"	30"	2.50		
59.393	SB												12"	18"	1.50		
59.407	NB	190	14			295.6	W	16		76	108						
59.421	SB			60	14	93.3	W	16		24	36						
59.446	SB											20				40	
59.456	NB											30				60	
59.460	SB											10				20	
59.486	SB			100	14	155.6	W	16		40	60						
59.493	NB												18"	36"	4.50		
59.523	SB											20				40	
59.590	NB												6"	24"	1.00		
59.590	SB												12"	12"	1.00		
59.602	SB												12"	12"	1.00		
59.612	NB												12"	12"	1.00		
59.612	NB												12"	18"	1.50		
59.635	Both	6	6	6	6	8.0	R		16	6	12						
59.667	SB											30	12"	12"	1.00	60	
59.716	NB												12"	12"	1.00		
59.716	NB												24"	18"	3.00		
59.716	SB												24"	12"	2.00		
59.730	Both	20	14	20	14	62.2	W	32		8							
59.766	Both	7	14	7	14	21.8	W	32		2							
60.004	SB												12"	12"	1.00		
60.104	NB												12"	12"	1.00		
60.104	SB												12"	18"	1.50		
60.195	SB												12"	12"	1.00		
60.265	Both	6	6	6	6	8.0	R		16	6	12						
60.323	SB											80				160	
60.337	NB	14	14			21.8	B	8	8	5							
60.381	NB												12"	12"	1.00		
60.387	NB												18"	12"	1.50		
60.414	SB												12"	12"	1.00		
60.426	NB												24"	12"	2.00		
60.438	SB											40				80	
60.459	NB												30"	18"	3.75		
60.459	NB												6"	48"	2.00		
60.459	SB												18"	18"	2.25		
60.530	NB												12"	12"	1.00		
60.530	SB												12"	12"	1.00		
60.534	NB												18"	18"	2.25		
60.552	NB												12"	18"	1.50		
60.552	NB												12"	36"	3.00		
60.604	Both	14	14	14	14	43.6	W	32		5							
60.624	SB											20				40	
60.648	SB												18"	24"	3.00		
60.662	SB												6"	24"	1.00		
60.679	NB												6"	30"	1.25		
60.698	SB												6"	30"	1.25		
60.713	NB												12"	12"	1.00		
60.718	SB											5				10	
60.805	NB												12"	24"	2.00		
60.836	NB															20	
60.840	Both	20	14	20	14	62.2	W	32		8							
60.844	NB												10				20

TABLE FOR PCC PAVEMENT REPAIR

MRM	LANE	NB DRIVING LANE		SB PASSING LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			TIE BAR RETROFIT STITCHING Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each		DOWEL BAR Each	L			
60.954	Both	8	14	8	14	24.9	W	32		3						
60.970	SB											12"	18"	1.50		
60.990	Both	40	14	80	14	186.7	W	32		32	72					
61.028	Both	10	14	10	14	31.1	W	32		4						
61.033	SB											6"	30"	1.25		
61.089	SB											6"	30"	1.25		
61.120	SB											6"	36"	1.50		
61.174	NB											6"	6"	0.25		
61.174	SB											24"	24"	4.00		
61.185	SB											12"	24"	2.00		
61.204	NB											18"	12"	1.50		
61.215	Both	10	14	10	14	31.1	W	32		4						
61.225	SB											50	24"	24"	4.00	100
61.243	NB												12"	12"	1.00	
61.243	NB												12"	36"	3.00	
61.247	SB			20	14	31.1	W	16		8						
61.251	Both	80	14	80	14	248.9	W	32		32	96					
61.266	NB											20				40
61.274	NB												18"	18"	2.25	
61.289	NB											14				28
61.293	Both	40	14	20	14	93.3	W	32		16	24					
61.313	SB												12"	12"	1.00	
61.324	NB											10				20
61.324	SB											20				40
61.332	Both	60	14	120	14	280.0	W	32		48	108					
61.369	Both	6	14	6	14	18.7	W	32		2						
61.376	Both	14	14	14	14	43.6	W	32		5						
61.390	NB												12"	36"	3.00	
61.394	SB												12"	84"	7.00	
61.394	NB												12"	24"	2.00	
TOTALS:						4769.1		1642	732	999	1462	407		425.7	1235	
ADDITIONAL QUANTITIES:						950.0		330	150	200	290	80		85.1	250	
GRAND TOTALS:						5719.1		1972	882	1199	1752	487		510.8	1485	

PCC PAVEMENT REPAIR AREA TYPES

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

TABLE FOR PCC PAVEMENT REPAIR AT INTERSECTING ROADS

JUNCT	SIDE	EB LANE		WB LANE		PCCP SqYds	NEW JOINT CON-FIG.	INSERT STEEL BAR IN PCC PAVEMENT			DOWEL BAR Each	TYPE A SPALL SIZE		REPAIR TYPE A SPALL SqFt	SEAL RANDOM CRACKS IN PCC PAVEMENT Ft	COMMENTS
		L Ft	W Ft	L Ft	W Ft			1" x 18" PLAIN ROUND DOWEL BARS Each	No. 8 x 18" DEFORMED TIE BARS Each	No. 5 x 24" DEFORMED TIE BARS Each		L	W			
SD 42	E Leg											12"	12"	1.00	56	
SD 42	W Leg														56	
SD 44	E Leg											12"	12"	1.00	56	
SD 44	W Leg											12"	24"	2.00	42	
SD 44	W Leg											12"	12"	1.00		
SD 44	W Leg											12"	18"	1.50		
Canistota	W Leg	8	14	8	14	24.9	W	32		3						
I90	EB On	6	6			4.0	B	4	4	2						
I90	EB On	8	14	8	14	24.9	W	32		3						
I90	EB Off	8	14	8	14	24.9	W	32		3						
I90	WB Off	10	14	10	14	31.1	W	32		4						
I90	WB On	12	14	12	14	37.3	W	32		4					14	
Salem	E Leg	28	14	28	14	87.1	R		32	11	24					
Salem	W Leg											6"	30"	1.25		
Salem	W Leg											12"	24"	2.00		
Salem	W Leg											6"	12"	0.50		
TOTALS:						234.2		164	36	30	24			10.3	224	
ADDITIONAL QUANTITIES:						50.0		30	10	10	0			2.1	40	
GRAND TOTALS:						284.2		194	46	40	24			12.4	264	

PCC PAVEMENT REPAIR AREA TYPES

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

TABLE FOR AC SHOULDER REPAIR

MRM to MRM	LOCATION	LENGTH FT	TOP WIDTH FT	BOTTOM WIDTH FT	COLD MILLING ASPHALT CONCRETE (3" DEPTH) SqYd	CLASS HR ASPHALT CONCRETE TON	PG 58-28 TON	MC 70 PRIME TON	SS-1h TACK TON	SS-1h FLUSH TON	SHOULDER PREPARATION MI
49.24 to 51.36	NB Shoulder	11194	6.5	8	9950	1501	60.1	12.7	0.1	2.1	2.1
49.24 to 51.30	SB Shoulder	10877	6.5	8	9668	1459	58.4	12.3	0.1	2.1	2.1
56.72 to 57.76	NB Shoulder	5491	6.5	8	4881	737	29.5	6.2	0.0	1.0	1.0
57.30 to 57.76	SB Shoulder	2429	6.5	8	2159	326	13.0	2.8	0.0	0.5	0.5
57.97 to 58.15	NB Shoulder	950	6.5	8	845	127	5.1	1.1	0.0	0.2	0.2
58.21 to 61.56	NB Shoulder	17688	6.5	8	15723	2372	94.9	20.0	0.1	3.3	3.4
57.97 to 61.56	SB Shoulder	18955	6.5	8	16849	2542	101.7	21.5	0.1	3.6	3.6
TOTALS					60075	9065	362.6	76.6	0.4	12.8	12.8
Quantities increased 5%					63078	9518	380.7	80.4	0.4	13.4	13.4

These quantities and locations are estimates only.

Final locations and dimensions shall be marked by the Engineer and are subject to change.

PG 58-28 Binder calculated at 4.0% of the total mix

MC 70 for Prime, Rate = 0.30 gallons/square yard

SS-1h or CSS-1h for Tack, Rate = 0.05 gallons/square yard

SS-1h or CSS-1h for Flush, Rate = 0.05 gallons/square yard

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0081(98)35	14	36

UTILITIES

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

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

SCOPE OF WORK

This project consists of crack sealing, tie bar retrofit (stitching), spall repair, and full depth replacement of concrete pavement in areas where concrete pavement blowups or major failures have occurred, as well as cold milling and asphalt paving on the shoulders. Full depth areas vary in length and width; however the minimum size is 6 feet square. Spall repairs will be a minimum of 6 inches square.

All existing transverse joints shall be sawed and sealed. In addition, all joints at repair areas shall be sawed and sealed.

COORDINATION BETWEEN CONTRACTORS

A separate contract for Project 081-292, PCN I3AJ will be awarded to another Contractor for shoulder repair on US Highway 81 from MRM 35.20 to MRM 49.30.

The Contractor shall schedule his work so as not to interfere with or hinder the progress of the work performed by other Contractors on the shoulder repair project.

RAILROAD CROSSING

The Contractor is to coordinate work with the Railroad Company regarding any work to be done adjacent to the railroad tracks and give 30 days notice to the Railroad Company in advance of required flagging dates. See Special Provision for Working on Railroad Company Right of Way.

TYPE II FIELD LABORATORY

The lab shall be equipped with an internet connection such as DSL, cable modem, or other approved service. The internet connection shall be provided with a multi-port wireless router. The internet connection shall be a minimum speed of 512 Kb unless limited by job location and approved by the DOT. Prior to installing the wireless router the Contractor shall submit the wireless router's technical data to the Area Office to check for compatibility with the state's computer equipment. The internet connection is intended for state personnel usage only. The Contractor's personnel are prohibited from using the internet connection unless pre-approved by the Project Engineer.

The Contractor shall submit a copy of each monthly bill for calls charged to this phone at the end of each month. The Project Engineer will then audit the bills to ensure all calls are legitimate and then initiate a Construction Change Order (CCO) to reimburse the Contractor for the actual phone calls made, including local and long distance calls. Reimbursement will not be made for fees associated with the purchase, installation, disconnection, monthly line charges, and incidentals involved in the installation, maintenance, and disconnection of the phone (including attachments). These items shall be incidental to the contract unit price per each for "Type II Field Laboratory".

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:

FEDERALLY THREATENED, ENDANGERED & 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 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:

COMMITMENT H: WASTE DISPOSAL SITE (Continued)

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 designated option borrow 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: 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; 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.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0081(98)35	15	36

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES (Continued)

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 wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

EXISTING PCC PAVEMENT

The existing pavement is 8" x 28' Nonreinforced PCC Pavement.

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

The aggregate in the existing PCC Pavement is quartzite.

RESTORATION OF GRAVEL CUSHION

An inspection of the gravel cushion subgrade shall be made after removing concrete from each pavement replacement area. Areas of excess moisture shall be dried to the satisfaction of the Engineer. Loose material shall be removed. Each replacement area shall be leveled and compacted to the satisfaction of the Engineer.

If additional gravel cushion material is required, the Contractor shall haul, place and compact gravel cushion to the satisfaction of the Engineer at no additional cost to the State. Additional gravel cushion (blended asphalt and gravel stockpile) can be obtained from the Department of Transportation Maintenance shop located in Salem and may be used without further testing.

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

NONREINFORCED PCC PAVEMENT REPAIR - GENERAL

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

Existing concrete pavement shall be sawed full depth at the beginning and end of the PCCP repair areas. When either the beginning or end of a PCCP repair area falls close to an existing joint or crack, the PCCP repair area shall be extended to eliminate the existing joint or crack. Where possible, new working joints shall be adjacent to existing working joints.

NONREINFORCED PCC PAVEMENT REPAIR – GENERAL (Continued)

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

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

If the pavement replacement area is entirely on either side of the existing contraction joint, the location of one of the working joints will be at the original location. Any existing dowel bar assemblies/steel bars shall be sawed off and removed.

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

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

At repair locations where the new working joint is not opposite the existing working joint, the Contractor shall place a 1/4" preformed asphalt expansion joint material along the longitudinal joint from the existing working joint to the new working joint. The expansion joint material shall meet the requirements of AASHTO M33. Cost for this material shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

All joints (longitudinal and transverse) through and around the repair areas will be sawed and sealed in accordance with the details shown in these plans. Refer to Saw and Seal Joints notes.

NONREINFORCED PCC PAVEMENT REPAIR

New pavement thickness shall be 9", which is equal to existing pavement thickness + 1" (T_N = T+1").

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

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

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air. The concrete 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 mix design shall contain at least 650 lbs of Type I or II cement or 600 lbs of Type III cement per cubic yard. The minimum 28 day compressive strength shall be 4,000 psi. The Contractor is responsible for the mix design used. The Contractor shall submit a mix design and supporting documentation for approval at least 2 weeks prior to use.

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

NONREINFORCED PCC PAVEMENT REPAIR (Continued)

Concrete shall be cured with white pigmented curing compound (AASHTO M148, Type 2) applied as soon as practical at a rate of 125 square feet per gallon. Concrete shall be cured for a minimum of 24 hours before opening to traffic. The 24 hours is based upon a concrete surface temperature of 60° F or higher throughout the cure period. If the concrete temperature falls below 60° F, the cure time shall be extended or other measures shall be taken, at no additional cost to the State. In addition to the curing time requirements, a strength of 3,800 psi must be attained prior to opening to traffic. For purposes of traffic control quantity estimation, cure time needed to obtain 3,800 psi has been estimated at 48 hours.

An initial cylinder shall be made and the Engineer shall calibrate a Swiss Hammer to it. All subsequent strength tests shall be by Swiss Hammer. Cylinders will be made according to Materials Manual requirements and the Swiss Hammer calibration regularly updated according to the early break cylinders.

The Engineer will test the repair areas after an initial 24 hour cure period by Swiss Hammer. No section is to be opened to traffic without the permission of the Engineer.

If the concrete does not achieve 3,800 psi by 48 hours after placement, the Contractor shall provide required traffic control (at no cost to the State) until the Engineer determines the 3,800 psi has been obtained. No additional work zones will be set up until strength requirement is met.

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

Concrete shall be covered with suitable insulation blanket consisting of a layer of closed cell polystyrene foam protected by at least one layer of plastic. Insulation blanket shall have an R-value of at least 0.5, as rated by the manufacturer. Insulation blanket shall be left in place, except for joint sawing operations, until the 3,800 psi is attained. Insulation blanket shall be overlapped on to the existing concrete by 4'. The initial contraction joint sawing shall be performed as soon as practical after placement to avoid random cracking. This requirement for covering repair areas with insulation blankets may be waived during periods of hot weather upon approval of the Engineer.

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

FULL DEPTH REPAIR – MRM 45.560 NB

The full depth repair area at this location shall be reinforced with No. 5 reinforcing steel as detailed in these plans. The exact size of the repair area will be determined by the Engineer upon construction.

All costs to furnish and install the No. 5 reinforcing steel will be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

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	NH 0081(98)35	16	36

FORMED RUMBLE STRIP IN PCCP

If 2 or more consecutive rumble strips are removed, all shall be replaced in that repair location as detailed in these plans, except that the spacing shall be 60' to match the existing rumble strips. New formed rumble strips shall be in the original locations.

Cost for Formed Rumble Strip in PCCP shall be incidental to the contract unit price for Nonreinforced PCC Pavement repair.

STEEL BAR INSERTION

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

The Contractor shall insert the steel bars (1" x 18" epoxy coated plain round dowel bars and No. 8 x 18" epoxy coated deformed tie bars for transverse joints and No. 5 x 24" epoxy coated deformed tie bars for longitudinal joints) into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole.

Plain round dowel bars shall be cut to the specified length by sawing and shall be free from burring or other deformations. Shearing will not be permitted.

Epoxy resin adhesive shall be of the type intended for horizontal applications, and shall conform to the requirements of ASTM C 881, Type IV, Grade 3 (equivalent to AASHTO M235, Type IV, Grade 3).

Steel bars shall be inserted in the transverse joint on 18" centers. The first steel bar in the transverse joint shall be placed 9" from the edge of the slab closest to centerline. No transverse bars are to be used in the outer 2' of concrete beyond the 12' lane. Steel bars shall be inserted in the longitudinal joint on 30" centers and shall be a minimum of 15" from either transverse joint. A typical one-lane patch 14' wide and 6' long will require 18 steel bars (8 in each transverse joint and 2 in the longitudinal joint). It will be necessary to laterally adjust the location of some of the inserted steel bars when the dimensions above interfere with existing steel bar locations.

The diameter of the drilled holes in the existing concrete pavement for the steel bars shall not be less than 1/8 inch nor more than 3/8 inch greater than the overall diameter of the steel bar. Holes drilled into the existing concrete pavement shall be located at mid-depth of the slab and true and normal.

The drilled holes shall be blown out with compressed air using a device that will reach to the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.

A rigid frame or mechanical device will be required to guide the drill to ensure proper horizontal and vertical alignment of the steel bars in the drilled holes.

Mix the epoxy resin as recommended by the manufacturer and apply by an injection method approved by the Engineer. If an epoxy pump is utilized, it shall be capable of metering the components at the manufacturer's designated rate and be equipped with an automatic shut-off. The pump shall shut off when any of the components are not being metered at the designated rate.

Fill the drilled holes 1/3 to 1/2 full of epoxy, or as recommended by the manufacturer, prior to insertion of the steel bar. Care shall be taken to prevent epoxy from running out of the horizontal holes prior to steel bar insertion. Rotate the steel bar during insertion to eliminate voids and ensure complete bonding of the bar. Insertion by the dipping method will not be allowed. The epoxy shall start to gel before placing fresh concrete or as per manufacturer's recommendations if given.

STEEL BAR INSERTION (Continued)

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

SAW AND SEAL JOINTS

All longitudinal and transverse joints at concrete repair areas shall be sawed and sealed.

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

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

Cost for sawing and sealing of the longitudinal construction joint(s) and transverse joint(s) at the repair areas shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

RESEAL PCC PAVEMENT JOINT

Existing transverse joints shall be cleaned and resealed with Low Modulus Silicone Sealant.

Joints shall not be sealed unless they are thoroughly clean and dry to the satisfaction of the Engineer. Removal of existing sealant shall be accomplished by sawing, cutting, sandblasting and/or other tools as necessary. Sand blasting of both sides of the vessel shall be accomplished simultaneously with a mechanical device approved by the Engineer after the majority of the sealant is removed. Just prior to sealing, each joint shall be blown out using a jet of compressed air to remove all traces of dust.

In certain areas the 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.

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.

Cost for cleaning and resealing transverse joints shall be included in the contract unit price per foot for Reseal PCC Pavement Joint – Silicone.

REPAIR TYPE A SPALLS

The Contractor shall saw an area a minimum of 6" x 6" and remove the material to a minimum depth of 1½" until sound concrete is found. After sawing the Contractor shall remove the vertical edge by chipping with a jackhammer not to exceed 15 lbs. Alternatively, the Contractor may remove concrete by milling, provided it produces results similar to the sawing and chipping process described above.

Spall repair locations will be marked in the field by the Engineer. Spall locations not large enough to be repaired will be marked for resealing.

REPAIR TYPE A SPALLS (Continued)

Type A Spalls shall conform to Section 390 with the following exceptions:

The concrete patching material used for spall repair shall be a bagged MNDOT 3U18 patching material. The product shall be submitted and be approved by the Concrete Engineer. A product known to meet this requirement is Spec Mix/TCC Materials "Air Entrained Concrete Patching Mix".

Grout for bonding the concrete patching material to the existing concrete shall consist of two parts by weight of Portland Cement and one part sand, mixed with sufficient water to form a creamy slurry.

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

The concrete patching material shall be mixed and placed in accordance with the manufacturer's technical data sheet. The Contractor shall provide a manufacturer's technical data sheet to the Engineer prior to performing the work. The concrete patching material shall be maintained at or above 45°F (7°C) for at least 72 hours after placement.

Patched areas shall be sprayed with curing compound as per Section 390. An additional coat of curing compound shall be applied not less than 20 minutes and not more than 1 hour after the first application.

Repair areas can be opened to traffic once the repair material meets 3,000 psi as long as the above requirement for temperature can be met.

An initial cylinder shall be made and the Engineer shall calibrate a Swiss Hammer to it. All subsequent strength tests shall be by Swiss Hammer. Cylinders will be made according to Materials Manual requirements and the Swiss Hammer calibration regularly updated according to the early break cylinders.

The Engineer will test the repair areas after an initial cure period by Swiss Hammer. If the area does not meet strength after the initial cure period, the area will be tested every 2-4 hours until nightfall, then not again until 7:00am. No section is to be opened to traffic without the permission of the Engineer.

If the Patch Material does not achieve 3,000 psi by 7 a.m. the day after placement, the Contractor shall provide required traffic control (at no cost to the State) until the Engineer determines the 3,000 psi has been obtained. No additional work zones will be set up until strength requirement is met. If strength requirement has not been met by 36 hours after placement, the patches shall be removed and replaced at no cost to the State.

Material used to form the joint shall be a foam core board or other stiff material capable of standing without deflection. The Contractor shall fill the area (with the foam core board or other approved material in place) with an approved patching material. The patching material shall be vibrated with a small hand held vibrator capable of thoroughly consolidating the patching compound into the area. The top surface of the filled area shall be trowel finished and cured.

REPAIR TYPE A SPALLS (Continued)

After screeding and finishing, the same bonding grout shall be used to paint the edges of the repair. Any saw cuts that extend beyond the patch perimeter shall be filled with patching material and must also have the surface painted with bonding grout.

After removal of the form material, the repaired length of the joint(s) shall be sealed. Cost for removing the form material and sealing the joint(s) shall be incidental to the contract unit price per square foot for Repair Type A Spall.

Spalls which are repaired according to plans and specifications and exhibit partial respalling or cracking, shall be repaired to the satisfaction of the Engineer at no additional cost to the Department of Transportation.

TIE BAR RETROFIT, STITCHING

Tie Bar Retrofit, Stitching shall be done on longitudinal joints and random cracks as marked out by the Engineer.

The Contractor shall insert No. 5 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. A rotary drill or other approved drill shall be used that will not damage the concrete surface. The diameter of the disturbed surface from drilling shall be less than 2 inches. A rigid frame or mechanical device will be required to guide the drill to ensure the proper angle of the steel bars in the drilled holes.

Epoxy resin adhesive shall be of the type intended for horizontal applications, and shall conform to the requirements of ASTM C 881, Type IV, Grade 3 (equivalent to AASHTO M235, Type IV, Grade 3). The dried color of the epoxy shall be gray or black.

The diameter of the drilled holes in the existing concrete pavement for the steel bars shall not be less than 1/8 inch nor more than 3/8 inch greater than the overall diameter of the steel bar. The holes shall be drilled at an angle alternating from opposite sides of the joint to produce a cross-stitching pattern. 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. Damage to pavement shall be repaired to the satisfaction of the Engineer at the Contractor's expense.

Mix the epoxy resin as recommended by the manufacturer and apply by an injection method approved by the Engineer. If an epoxy pump is utilized, it shall be capable of metering the components at the manufacturer's designated rate and be equipped with an automatic shut-off. The pump shall shut-off when any of the components are not being metered at the designated rate.

Fill the drilled holes sufficiently with epoxy prior to the insertion of the tie bar such that the epoxy will be level with the top of the concrete pavement after insertion of the tie bar. Rotate the steel bar during insertion to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed. The top of the drilled hole shall be filled with epoxy or excess epoxy removed such that the epoxy is level with the existing pavement.

No bars shall be inserted within 15" of an existing transverse contraction joint. Any bars not functioning or damaged shall be repaired or replaced at the Contractor's expense.

Cost for the epoxy resin adhesive, tie bars, drilling of holes, debris or loose material removal, applying the adhesive, inserting the tie bars into the drilled holes and incidentals necessary for the insertion of the tie bars shall be included in the contract unit price per each for Tie Bar Retrofit, Stitching.

SEAL RANDOM CRACKS IN PCC PAVEMENT

Random cracks shall be repaired in accordance with the detail for Sealing Random Cracks. 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.

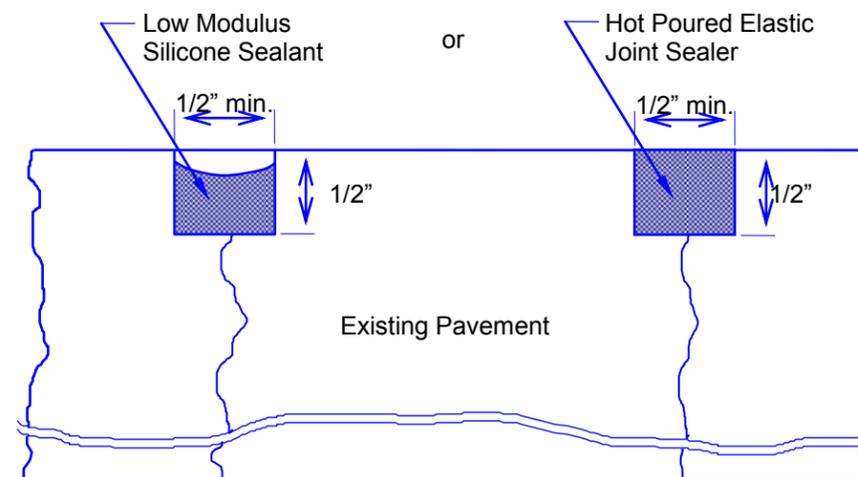
Only those random cracks in the existing concrete pavement that are open and accept water and incompressible materials as selected by the Engineer shall be prepared and sealed with either Low Modulus Silicone Sealant or Hot Poured Elastic Joint Sealer.

Prior to sealing, each random crack shall be routed and thoroughly cleaned with compressed air or by other methods satisfactory to the Engineer. Routing shall be performed with a saw designed for that purpose.

Random cracks narrower than 1/2 inch shall be routed and sealed 1/2 inch wide by 1/2 inch deep. Random cracks wider than 1/2 inch may require the placement of a backer rod prior to sealing.

Sealant shall be placed in the routed reservoir with equipment and by methods that insure complete and uniform filling. Hot Poured Elastic Joint Sealer shall be placed level with the driving surface of the concrete. Low Modulus Silicone Sealant shall have a tooled surface with the top middle portion of the sealant recessed. Any excess or overrun of sealant shall be removed by the Contractor at no additional cost to the state.

Seal Random Cracks in PCC Pavement will be measured by the foot to the nearest 0.1 foot of random cracks sealed and accepted on the project, and will be paid for at the contract unit price per foot measured for payment. Payment shall be full compensation for all labor, equipment, material and incidentals required for crack routing, cleaning, furnishing and installing backer rod when necessary, furnishing and placing sealant and removing routed and foreign material from the roadway.

SEALING RANDOM CRACKS**UNCLASSIFIED EXCAVATION-DIGOUTS**

Included in the Estimate of Quantities are 400 cubic yards of Unclassified Excavation-Digouts for repairing any base material issues that may become apparent during repairs of the PCCP roadway or AC shoulders. Locations and dimensions shall be determined in the field by the Engineer.

UNCLASSIFIED EXCAVATION-DIGOUTS (Continued)

Cost for removal, hauling, and disposal of existing base material shall be included in the contract unit price per cubic yard for Unclassified Excavation-Digouts.

BASE COURSE, SALVAGED ASPHALT MIX

Backfill for digouts under the Asphalt shoulders, estimated at 400 tons, shall be obtained from Cold Milling Asphalt Concrete operation and may be used without further testing. Shoulder backfill shall be compacted according to Section 260.3.B of the Standard Specifications except that a pneumatic tired roller will be required.

If necessary, water shall be added to the backfill material to bring it to $\pm 6\%$ of optimum moisture content at the time of compaction. Compaction shall be to the satisfaction of the Engineer.

Cost for material, hauling, placing, watering, and compacting backfill shall be included in the contract unit price per cubic yard for Base Course, Salvaged Asphalt Mix.

BASE COURSE, SALVAGED, STATE FURNISHED

Backfill for digouts under the PCCP roadway, estimated at 400 tons, shall be blended asphalt and gravel obtained from the Department of Transportation Maintenance shop located in Salem and may be used without further testing.

The material is provided royalty free to the Contractor.

Furnish cost to the State for Base Course, Salvaged, State Furnished is \$11.00 per ton.

If necessary, water shall be added to the backfill material to bring it to $\pm 6\%$ of optimum moisture content at the time of compaction. Compaction shall be to the satisfaction of the Engineer.

Cost for material, hauling, placing, watering, and compacting backfill shall be included in the contract unit price per cubic yard for Base Course, Salvaged, State Furnished.

REPAIR OF ASPHALT CONCRETE SHOULDERS

Cost for asphalt concrete required on the shoulder adjacent to full depth pavement replacement sections that are not in areas not designated for shoulder replacement shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

SURFACING THICKNESS DIMENSIONS

Plans tonnage or quantities will be applied even though the thickness may vary from that shown on the plans.

At those locations where material must be placed to achieve a required elevation, plans tonnage or quantities may be varied to achieve the required elevation.

SHOULDER WORK

Prior to construction, Department of Transportation Maintenance Forces will spray the shoulders to kill existing vegetation. It is the Contractor's responsibility to notify the State a minimum of 30 days prior to starting work on the surface of the highway. The State assumes no responsibility for the effectiveness of the herbicide applied.

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SHOULDER WORK (Continued)

Vegetation and accumulated material on or adjacent to the existing roadway edge shall be removed to the satisfaction of the Engineer prior to asphalt concrete resurfacing. Any remaining windrow of accumulated material shall be spread evenly on the inslope adjacent to the asphalt shoulder, to the satisfaction of the Engineer, prior to the application of the flush seal.

Shoulder work shall be incidental to other contract items. Separate measurement and payment will not be made.

COLD MILLING ASPHALT CONCRETE

The Contractor shall cold mill areas where the asphalt shoulders are damaged as directed by the Engineer. The depth of cold milling shall be 3 inches and the entire width of the asphalt shoulder.

Cold milling is estimated to produce 10000 tons of salvaged asphalt concrete material. An estimated 2855 tons of salvaged asphalt concrete will be used in the Class HR Asphalt Concrete mixture. An estimated 400 tons of salvaged asphalt concrete will be used to backfill digouts in the asphalt shoulder. Estimated quantities are for information purposes only and the exact quantity will be determined upon construction. No allowance will be made for loss of expected reimbursement of loss of anticipated profit.

The Los Angeles Abrasion Loss value on the aggregate used for the in place asphalt concrete varied from 25 to 35 percent. These values were obtained from testing during construction of the in place asphalt concrete.

Cold Milling Asphalt Concrete operations ahead of asphalt concrete laydown will be limited by particular job conditions and will be subject to approval of the Engineer. In no case shall cold milling operations ahead of asphalt concrete laydown operations exceed seven calendar days.

The Contractor shall ensure a reasonably smooth transition from all side roads, homes, and businesses to the driving lanes using material obtained from the cold milling process from the time the shoulder is milled until it is paved with hot mix asphalt. The cost of this work shall be incidental to the contract unit price per square yard for Cold Milling Asphalt Concrete.

Milled material not reused on the project shall become property of the Contractor for disposal.

Cold Milling Asphalt Concrete will be paid for at the contract unit price per square yard measured for payment. Payment shall be full compensation for all labor, equipment, and incidentals required for the cold milling operation.

SHOULDER PREPARATION

Prior to placement of asphalt concrete on the shoulders the existing base shall be bladed, watered, and compacted until a uniform, stable surface is obtained. Material obtained from Cold Milling Asphalt Concrete operations may be used on the shoulders as needed. Cost for this work shall be incidental to the contract unit price per mile for Shoulder Preparation. Compaction shall be to the satisfaction of the Engineer.

Water needed for compaction shall be incidental to the contract unit price per mile for Shoulder Preparation.

SAWING IN EXISTING SURFACING

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

CLASS HR ASPHALT CONCRETE

Virgin mineral aggregate for Class HR Asphalt Concrete shall conform to the requirements for Class E, Type 1.

Virgin mineral aggregate shall be furnished by the Contractor.

Salvaged asphalt concrete material (RAP) shall be obtained from the cold milled material produced on this project. The RAP shall be crushed to provide a homogeneous mixture of material so that the maximum particle size in the cold feed will not exceed 1 ½ inches (37.5 mm).

Screening or scalping of the RAP stockpile(s) will not be allowed.

The Class HR Asphalt Concrete shall include 30% RAP in the mixture. Job mix formula tolerances for the RAP shall be ±5% from the target value.

All other requirements for Class HR shall apply.

Asphalt shall be placed in one 3" (compacted) lift. Slope may need to be adjusted to match the existing shoulder slope.

The estimated quantities are approximate and there will be no increase in the contract unit price per ton for Class HR Asphalt Concrete for any increases or decreases in either the haul or quantity.

SAW AND SEAL SHOULDER JOINT

After completion of the asphalt shoulder paving, the Contractor shall saw and seal the joint between the concrete pavement and the asphalt shoulder over the length of replaced shoulder.

Saw and Seal Shoulder Joint will be paid at the contract unit price per foot measured for payment. Payment shall be full compensation for all materials, equipment, labor, and incidentals to the sawing and sealing operation.

FLUSH SEAL

Application of the flush seal shall be completed within 10 working days following completion of the asphalt concrete resurfacing.

WORK ADJACENT TO EXISTING GUARDRAIL

Beam type guardrail exists along the shoulders of the project. The Contractor shall conduct operations so as not to disturb the existing guardrail. Any guardrail disturbed / damaged due to the Contractor's operations shall be replaced by the Contractor at no expense to the State.

TEMPORARY PAVEMENT MARKING

Temporary pavement marking on lane closure tapers shall consist of Temporary Road Markers. (Estimate four workspaces x 1,125' tapers on I90 ramps = 4,500').

Temporary pavement marking on centerline shall consist of Temporary Road Markers and shall be used as depicted on Standard Plate 634.25 when the stop condition must remain in place during nighttime hours 9:00PM to 6:00AM (Estimate five workspaces remaining during nighttime hours x 2,200' per workspace = 11,000').

Temporary Road Markers shall be removed when no longer needed. Removal can be accomplished by any method that fully removes the marker and does not damage the pavement. The Contractor shall be responsible for collection and disposal of removed markers.

Cost for removal and disposal of Temporary Road Markers shall be incidental to the contract unit price per foot for Temporary Road Markers.

TEMPORARY PAVEMENT MARKING (Continued)

Temporary pavement marking for stop bars shall consist of 4" Temporary Pavement Marking Tape Type 2. Placement of each 24" white stop bar shall be accomplished by placing six pieces of 4" x 12' tape adjacent to one another. Each workspace requires two stop bars which is an equivalent of approximately 144' of 4" tape (five workspaces at 144' = 720').

Tape shall be removed when no longer needed. Removal can be accomplished by any method that fully removes the tape and does not damage the pavement. The Contractor shall be responsible for disposal of removed tape.

Cost for removal and disposal of Temporary Pavement Marking Tape shall be incidental to the contract unit price per foot for 4" Temporary Pavement Marking Tape Type 2.

GENERAL MAINTENANCE OF TRAFFIC

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

Storage of vehicles and equipment shall be outside the clear zone and as near as possible to the right-of-way line. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work.

Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

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

Sufficient traffic control devices have been included in these plans to sign three flagger controlled workspaces and one stop sign controlled workspace. If the Contractor elects to work on additional stop sign controlled workspaces simultaneously, the cost for additional traffic control devices shall be incidental to the contract unit price per unit for Traffic Control. However, there shall be no more than three flagger controlled workspaces at any time.

MAINTENANCE OF TRAFFIC – PCC PAVEMENT REPAIR

A Type III Barricade shall be installed at the end of a lane closure taper as detailed in these plans. Additional Type III Barricades shall be installed facing traffic within the closed lane at a spacing of 1/4 mile. At intersecting roadways, two additional Type III Barricades shall be used to block the entire closed lane and shoulder.

Each mainline concrete repair location from which the in place concrete has been removed shall be marked with a minimum of two reflectorized cones (42" minimum height) or two reflectorized drums. In areas containing numerous concrete repair locations, two reflectorized drums should be installed at a spacing of 660' alternating with the Type III Barricades.

Signs may be mounted on portable supports.

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MAINTENANCE OF TRAFFIC – PCC PAVEMENT REPAIR (Continued)

Construction workspaces shall be limited to 300 feet in length for stop sign controlled workspaces and 3 miles in length for Flagger and Pilot Car controlled workspaces. The distance between the closest points of any two construction workspaces, including channeling devices, shall not be less than 3 miles. Drivers in two-way traffic workspaces must be able to see approaching traffic through and beyond the work zone.

At the end of each day, the Contractor shall move traffic control devices and flagging stations to reduce the length of closures to include only the repair areas that are not able to be opened to traffic.

When work is in progress within an intersection, Flaggers will be required to direct traffic.

The Contractor shall use Flaggers during peak traffic hours and at times specified by the Engineer to supplement the stop condition and signing shown on Standard Plate 634.25. It is possible that Flagging will be required during all daytime hours. Advance warning Flagger signs will be required when Flaggers are present and removed when no Flaggers are present.

Holes adjacent to centerline in the lane open to traffic created during removal and replacement of PCC Pavement Repair areas shall be filled with gravel and cold-mix asphalt concrete prior to opening the lane to traffic. Gravel and cold-mix asphalt concrete shall be furnished and installed by the Contractor at no additional cost to the State.

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

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

Routing traffic onto the shoulders during any phase of the construction will not be allowed.

Damage to the shoulders, median or ditch due to the Contractor's operations shall be repaired by the Contractor, to the satisfaction of the Engineer, at no expense to the State. This includes the apparent routing of traffic onto these shoulders around the work zones.

Extra care shall be taken to protect the in place asphalt concrete shoulders. In all workspaces, the same channelizing devices and spacing used on centerline will also be required on the shoulders. These channelizing devices shall be placed in locations to adequately keep traffic completely off these shoulders. Continuous maintenance of the shoulder devices will be required to keep them in place. Cost for these extra channelizing devices shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

Type B warning lights shall be placed on top of flagging station signing as per Section 634.3A and shall comply with the MUTCD. This shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

The Contractor shall notify businesses/homeowners a minimum of two weeks prior to construction to inform them of upcoming construction and again a minimum of 48 hours prior to any blocked access to make appropriate arrangements.

MAINTENANCE OF TRAFFIC – PCC PAVEMENT REPAIR (Continued)

It is required that the flaggers and pilot car operators 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. Cost associated with this shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

Four additional sets of flagger warning signs and additional flagger hours have been included in the Estimate of Quantities for use on intersecting roads. These flaggers will be used as directed by the Engineer and will be used primarily during daytime hours. Also included in the Itemized List for Traffic Control are US 81 ONE LANE ROAD WAIT FOR PILOT CAR signs for use on intersecting roads. These signs shall be mounted on 6' barricades and placed at the stop sign.

Traffic approaching the project from intersecting roadways, streets and approaches must be adequately accommodated. Major intersections or large commercial entrances may require additional signing, flaggers and channelizing devices on a temporary basis until work activities pass these areas.

Work activities (not including flagging and pilot car) during nondaylight hours are subject to prior approval.

MAINTENANCE OF TRAFFIC

The Contractor shall mark and maintain alternating one-way access to businesses and residences along the project with cones, drums or Type I Barricades. The Contractor shall advise affected businesses before restriction and anticipated duration of construction time.

LIGHTING FOR NIGHT TIME WORK

Flagger stations, working construction equipment and active workspaces shall be lighted between sunset and sunrise. Nonflare light sources are to be provided.

Light levels as defined in NCHRP 476 shall be furnished and measured as:

- Level I: 59 lux (5 foot-candles),
- Level II: 108 lux (10 foot-candles),
- Level III: 215 lux (20 foot-candles).

Light in conformance with Level I is to be provided at the active workspaces.

Acceptable light sources for Level I are existing roadway lighting that produce 59 lux (5 foot-candles), Contractor furnished standalone lights, or vehicle/equipment mounted lights. Standalone units shall be marked with a minimum of two reflectorized drums on an approaching traffic side.

Light in conformance with Level II shall be provided at the locations of working construction equipment.

Light in conformance with Level III is to be provided where labor intensive work is being completed such as during hand work, pavement sawing, project inspection, materials testing and flagging.

Acceptable light sources for Level II and Level III will be Contractor furnished stand-alone lights or vehicle/equipment mounted lights.

Cost for this lighting shall be included in the contract lump sum price for Traffic Control, Miscellaneous.

FIXED LOCATION SIGNS

END ROAD WORK

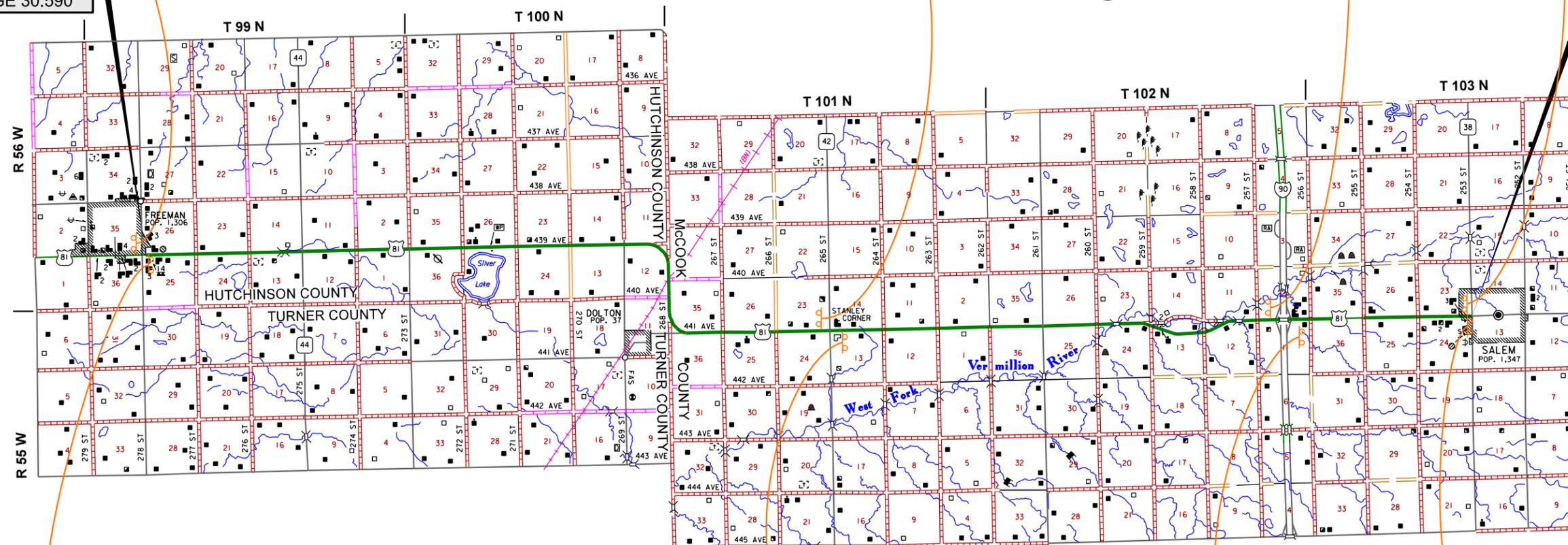
ROAD WORK NEXT 14 MILES

ROAD WORK NEXT 23 MILES

ROAD WORK NEXT 26 MILES

BEGIN PROJECT
MRM 35.00 +0.295
MILEAGE 30.590

END PROJECT
MRM 61.58 +0.189
MILEAGE 56.906



ROAD WORK NEXT 26 MILES

ROAD WORK NEXT 12 MILES

ROAD WORK NEXT 3 MILES

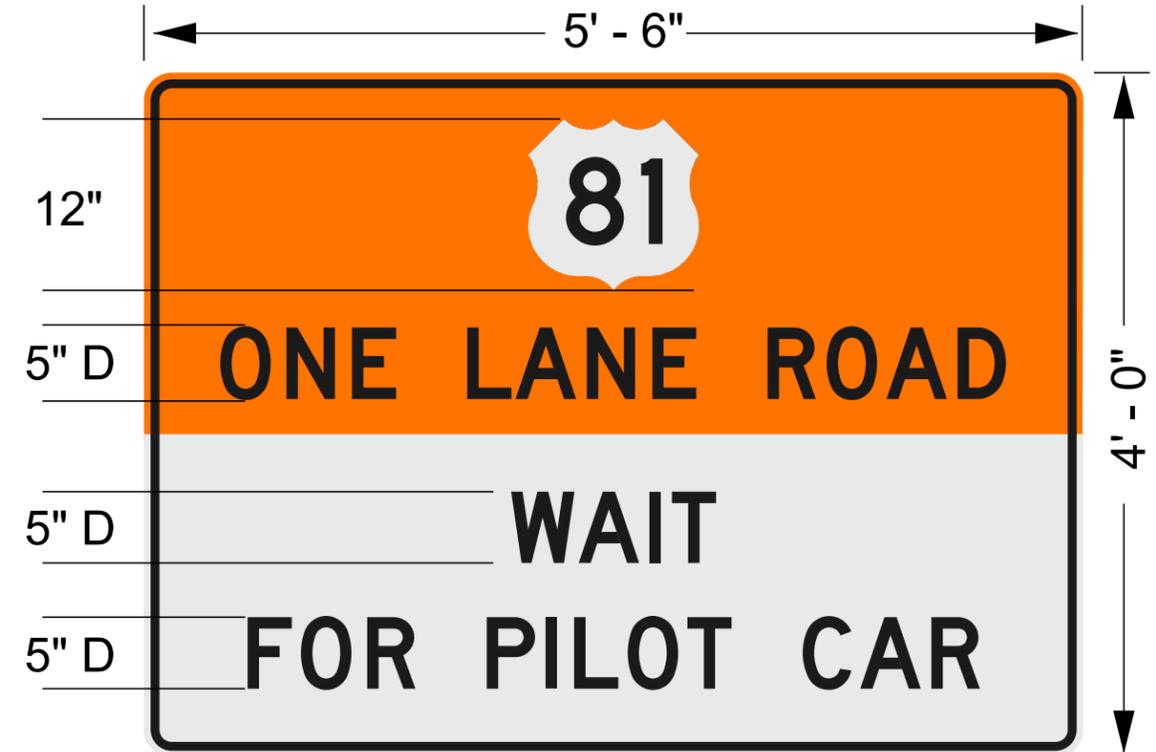
END ROAD WORK

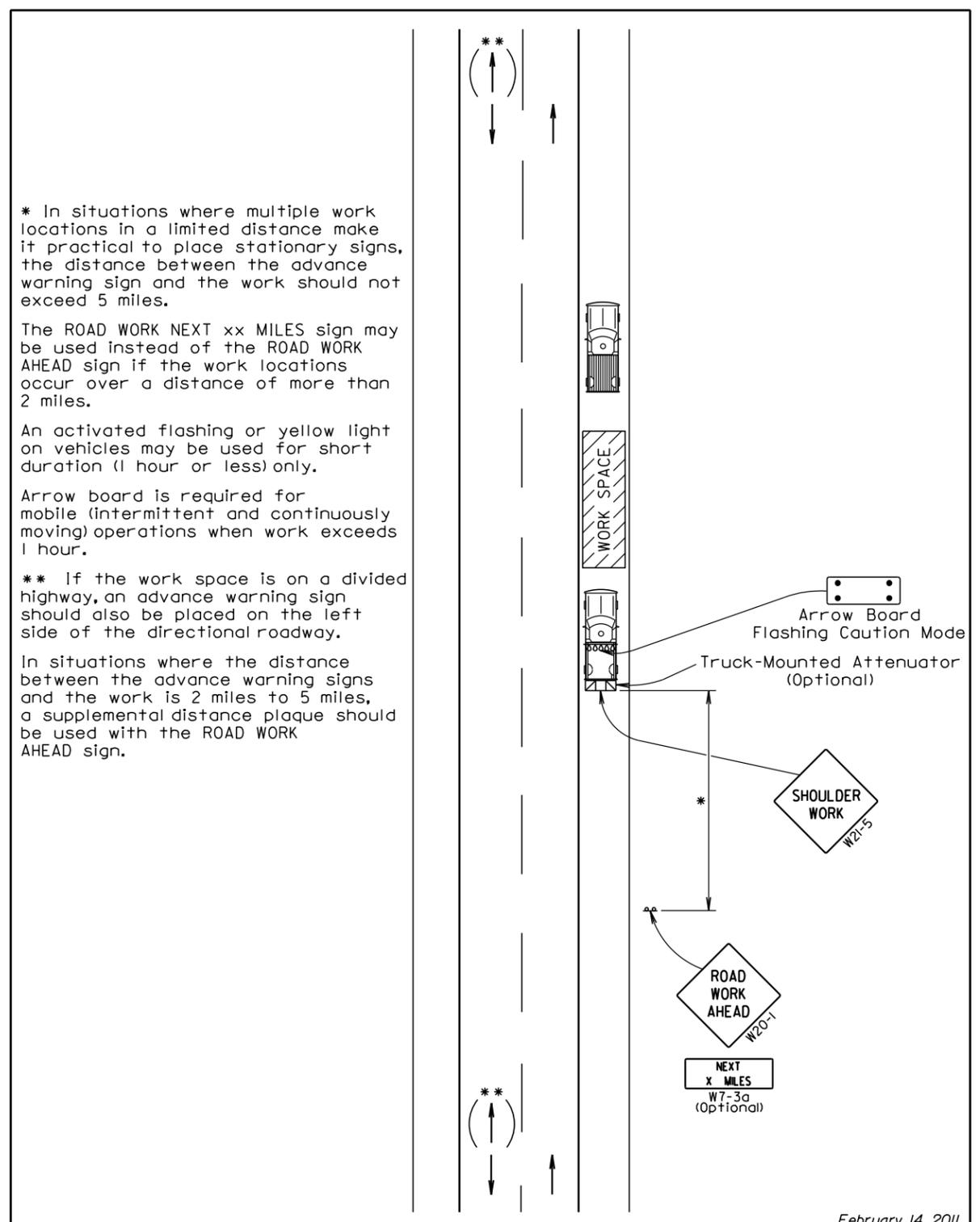
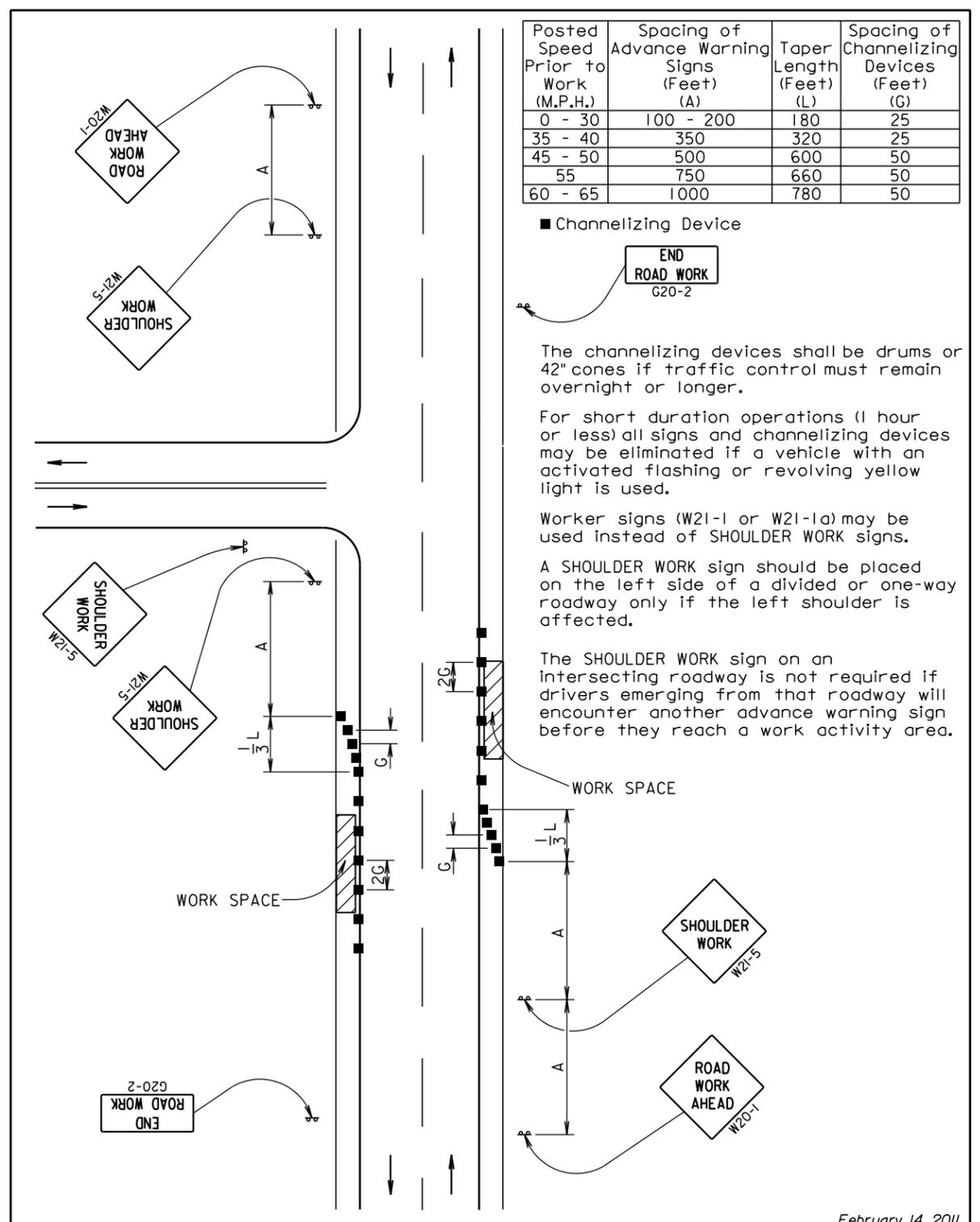
PROJECT LENGTH	
Gross Length:	26.316 Miles
Bridges & Approach Slabs Length:	0.084 Mile
Net Length:	26.232 Miles

ITEMIZED LIST FOR TRAFFIC CONTROL

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 26 MILES	2	24	48
G20-1	48" x 24"	ROAD WORK NEXT 23 MILES	1	24	24
G20-1	48" x 24"	ROAD WORK NEXT 14 MILES	1	24	24
G20-1	48" x 24"	ROAD WORK NEXT 12 MILES	1	24	24
G20-1	48" x 24"	ROAD WORK NEXT 3 MILES	1	24	24
G20-2	36" x 18"	END ROAD WORK	14	17	238
R1-1	48" x 48"	STOP	2	34	68
W1-3	48" x 48"	REVERSE TURN SIGN (LEFT OR RIGHT)	1	34	34
W3-1	48" x 48"	STOP AHEAD (SYMBOL)	2	34	68
W5-4	48" x 48"	RAMP NARROWS	2	34	68
W8-1	36" x 36"	BUMP	13	27	351
W13-1P	24" x 24"	ADVISORY SPEED (PLAQUE)	4	16	64
W20-1	48" x 48"	ROAD WORK AHEAD	14	34	476
W20-1a	48" x 48"	RAMP WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	12	34	408
W20-7	48" x 48"	FLAGGER (SYMBOL)	10	34	340
W21-5	48" x 48"	SHOULDER WORK	23	34	782
SPECIAL	66" x 48"	US 81 WAIT FOR PILOT CAR	18	41	738
*****	*****	TYPE III BARRICADE - 6 FT. DOUBLE SIDED	18	42	756
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	64	56	3584
TOTAL UNITS			8187		

SPECIAL SIGN DETAIL





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.

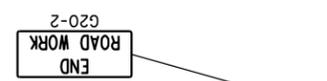
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

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.

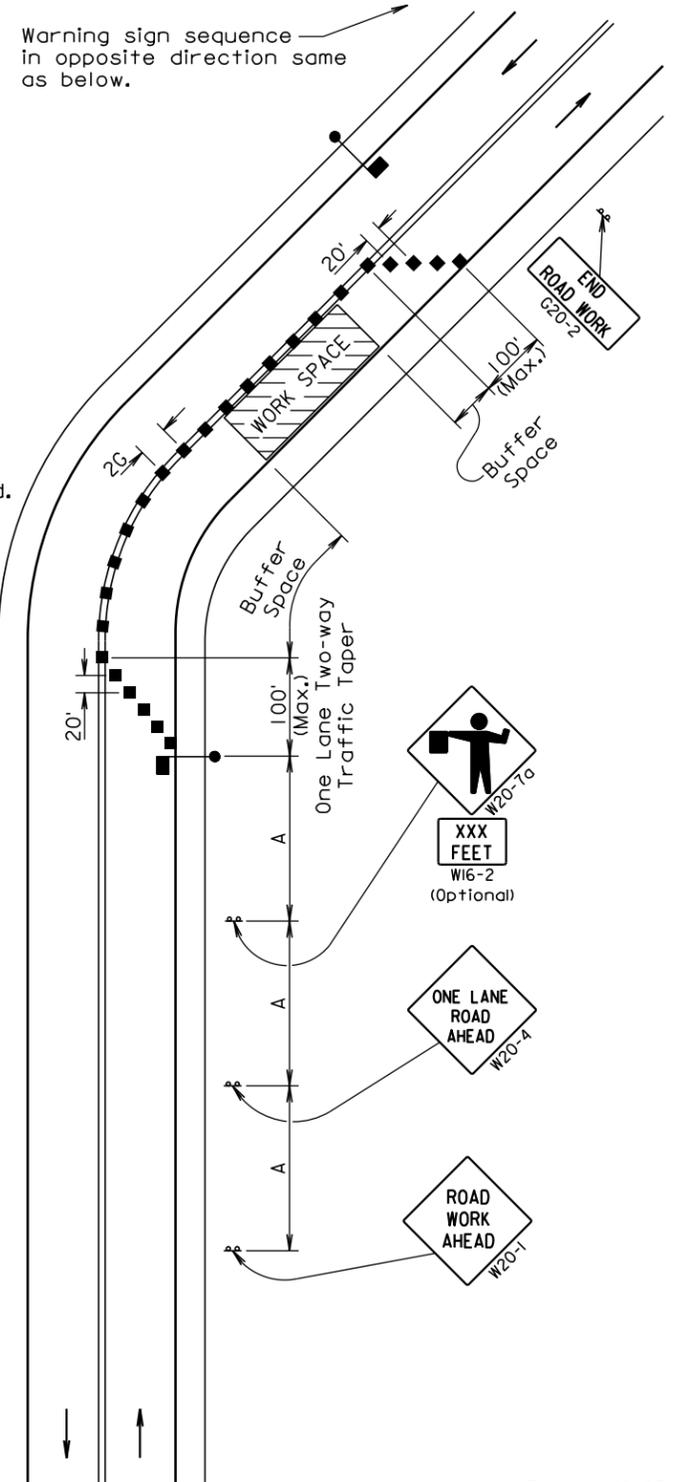
The channelizing devices shall be drums or 42" cones.

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

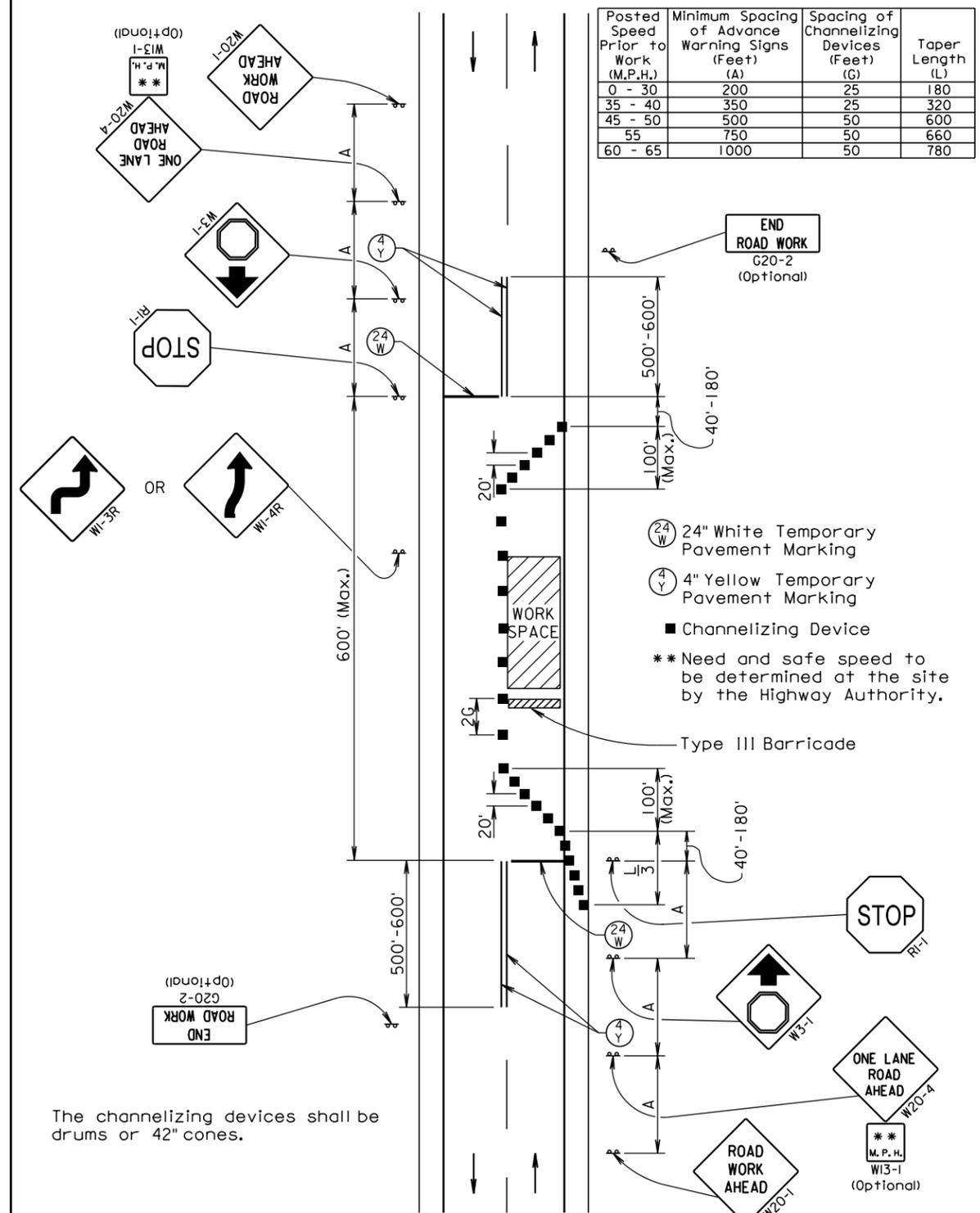


Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

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.



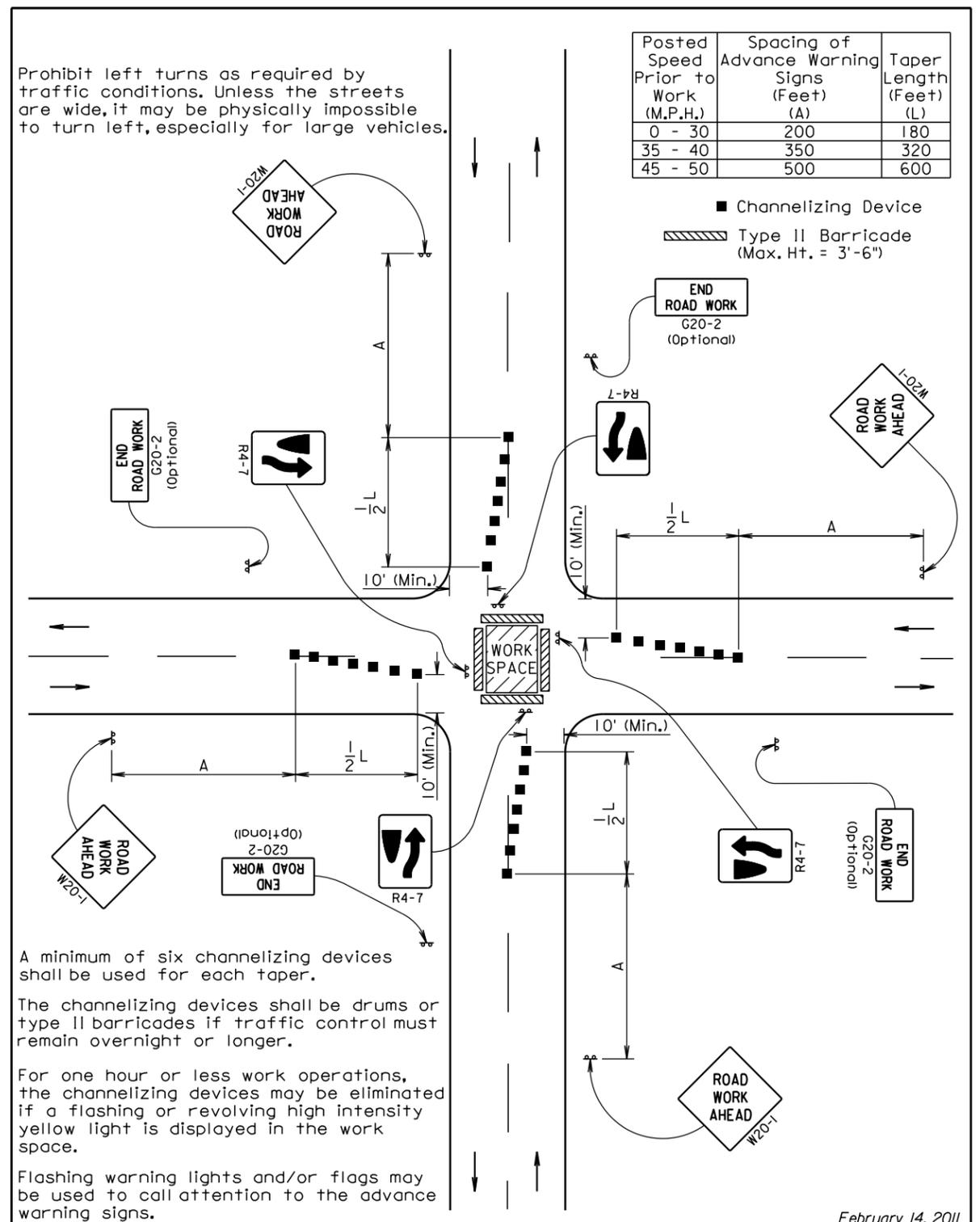
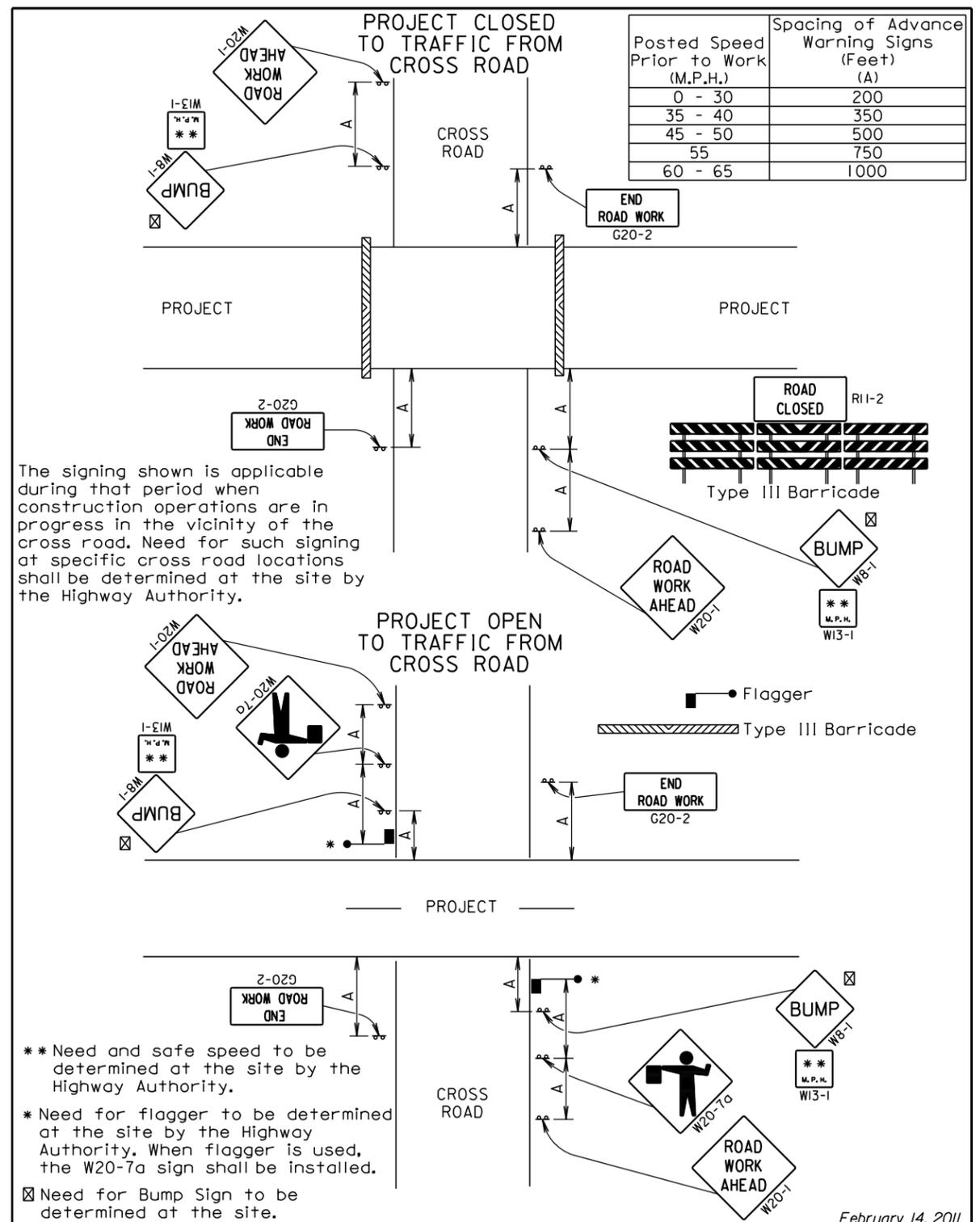
February 14, 2011

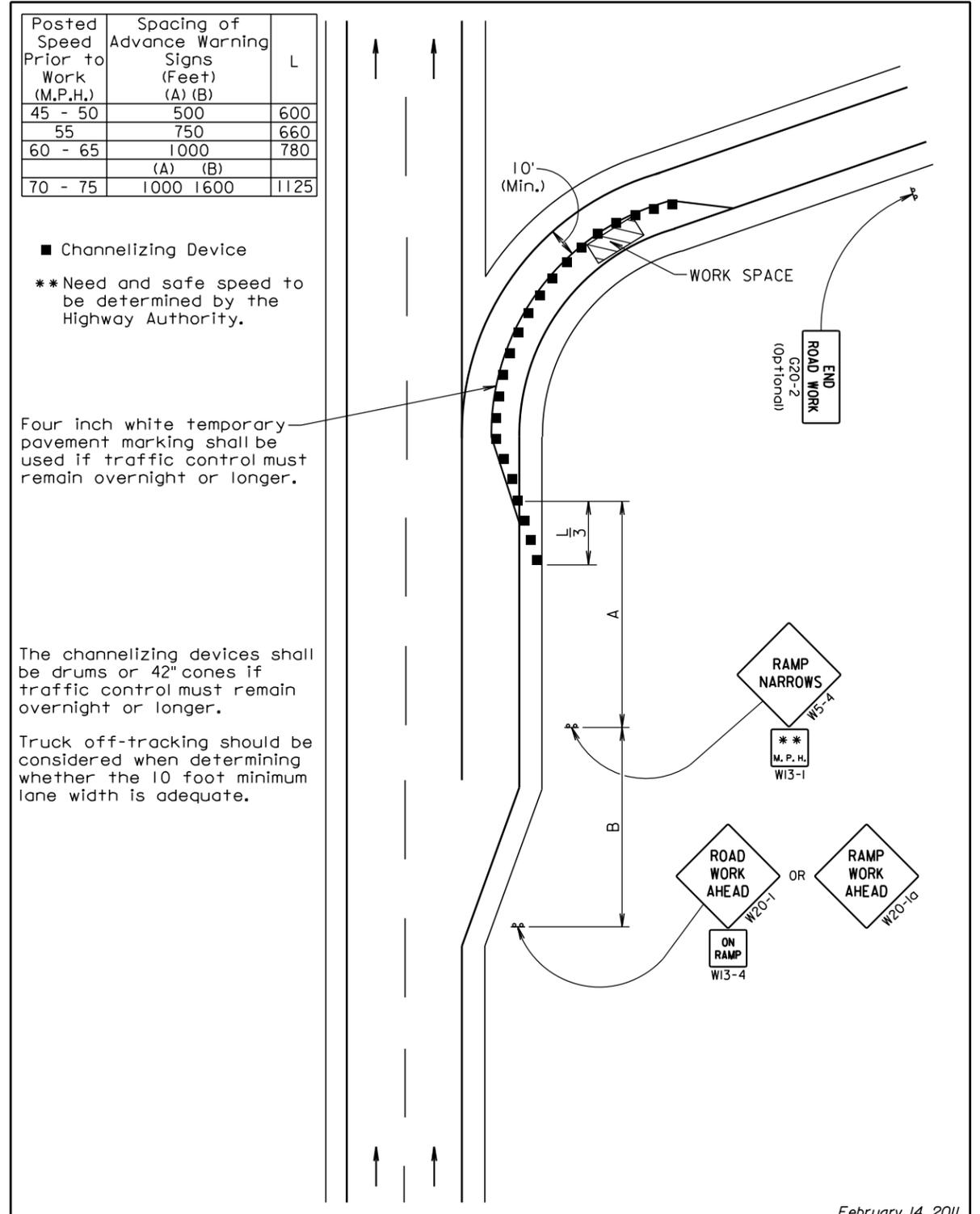


Posted Speed Prior to Work (M.P.H.)	Minimum Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (L)
0 - 30	200	25	180
35 - 40	350	25	320
45 - 50	500	50	600
55	750	50	660
60 - 65	1000	50	780

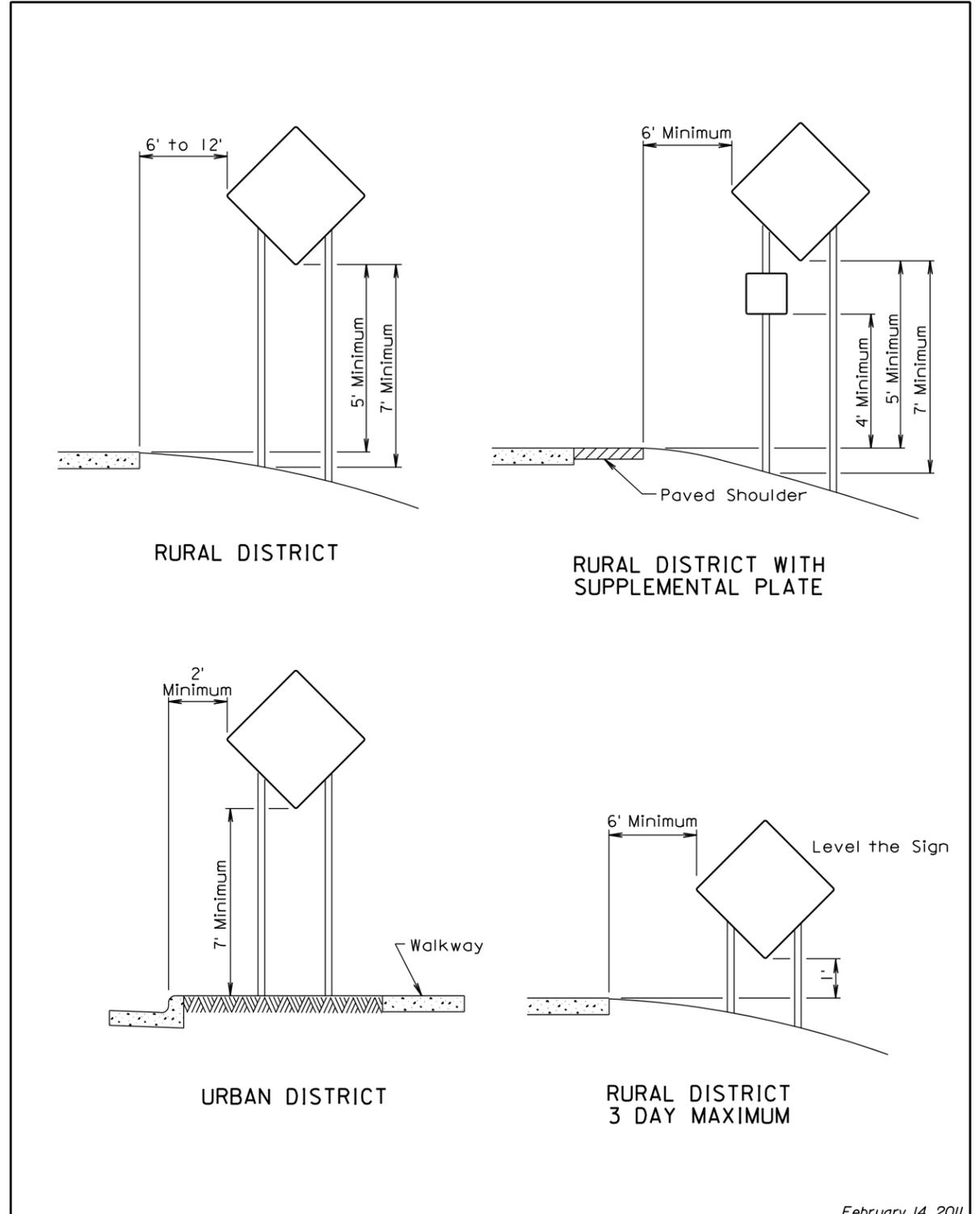
The channelizing devices shall be drums or 42" cones.

December 23, 2010

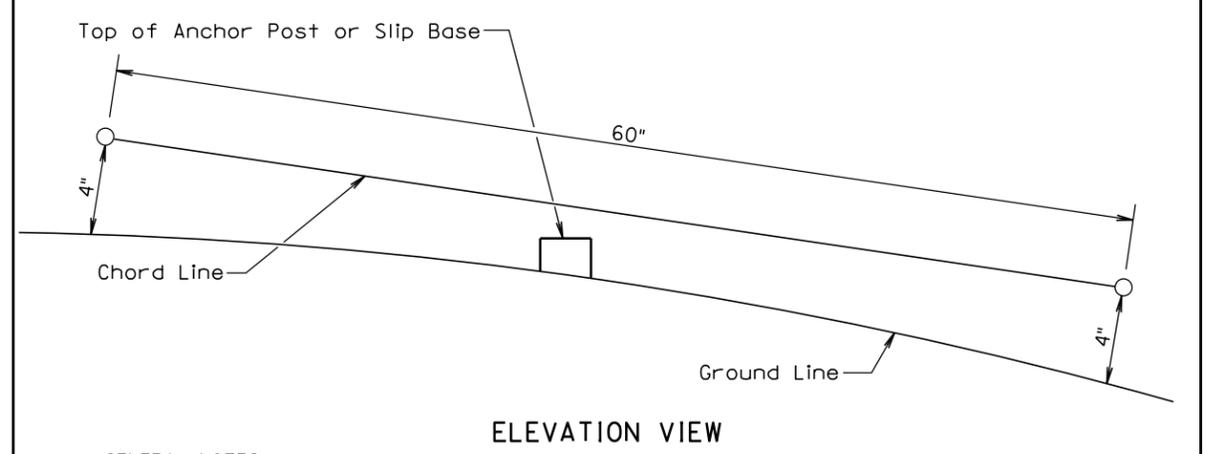
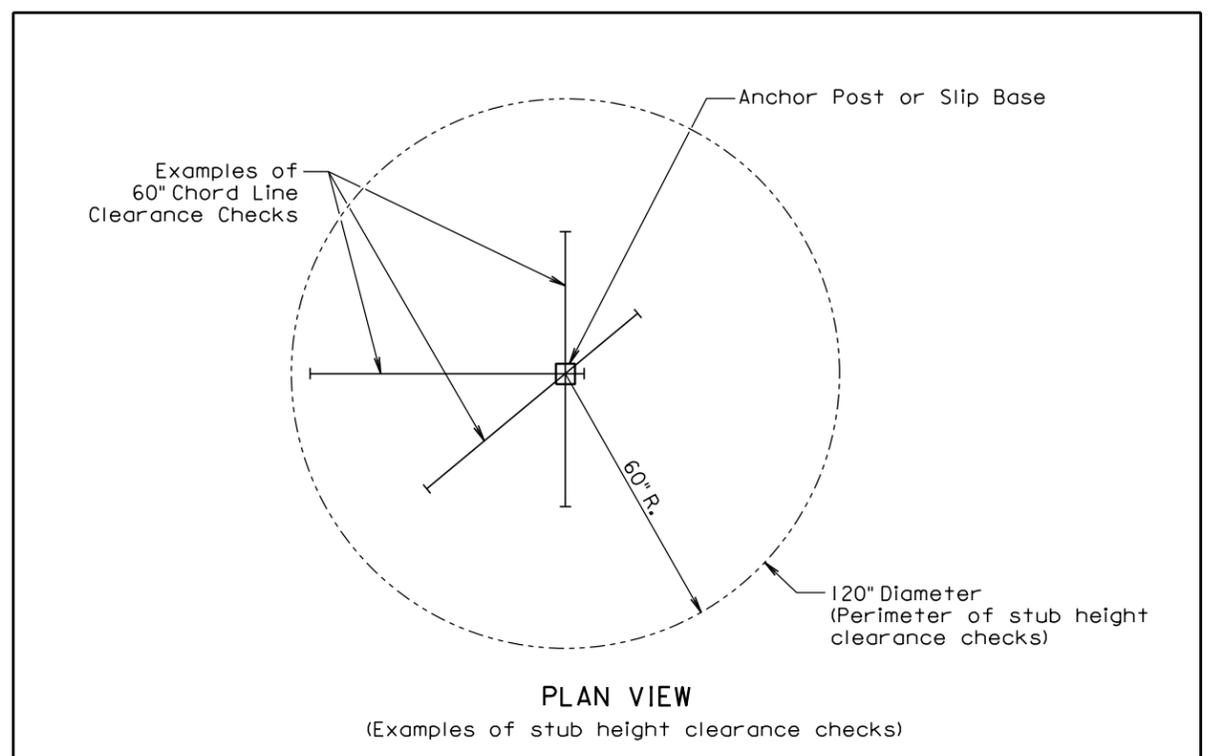




February 14, 2011



February 14, 2011



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

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

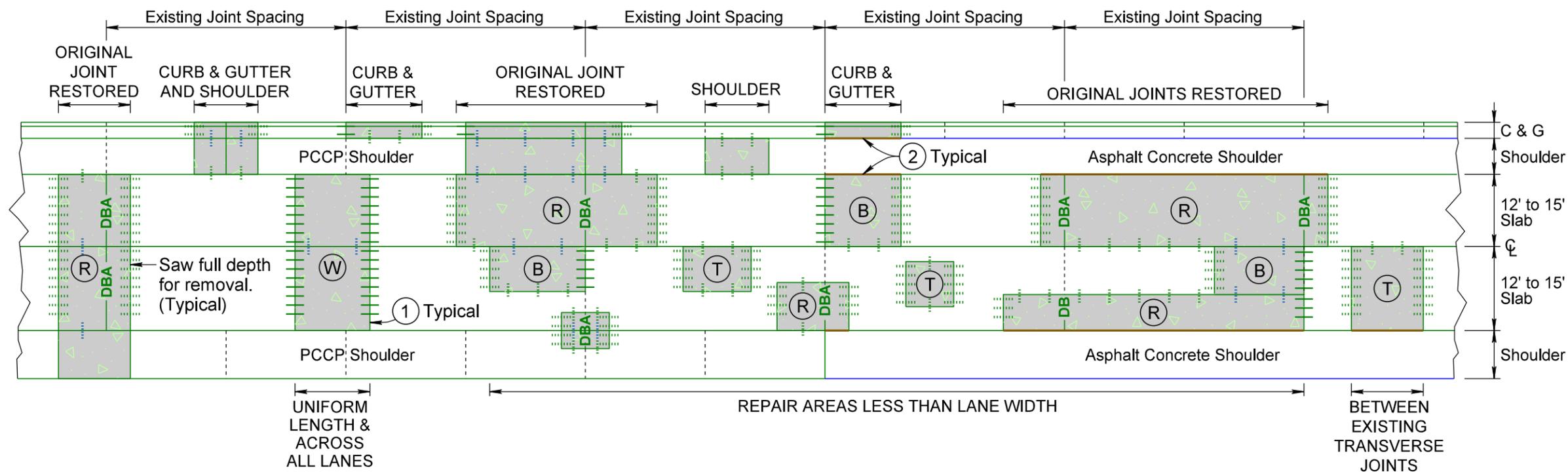
NONREINFORCED PCC PAVEMENT REPAIR

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

TYPICAL REPAIR AREAS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0081(98)35	27	36

Plotting Date: 02/26/2014



KEY:

PCC Pavement Repair Area

PCC PAVEMENT REPAIR AREA TYPES:

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

Steel Bars for Transverse Joints

- Pavement Thickness $\geq 10.5"$**
 - Drilled in $1\frac{1}{2}"$ x 18" epoxy coated plain round dowel bars spaced 18" center to center.
 - Drilled in No. 11 x 18" epoxy coated deformed tie bars spaced 18" center to center.
- Pavement Thickness $\geq 8.5"$ and $< 10.5"$**
 - Drilled in $1\frac{1}{4}"$ x 18" epoxy coated plain round dowel bars spaced 18" center to center.
 - Drilled in No. 9 x 18" epoxy coated deformed tie bars spaced 18" center to center.
- Pavement Thickness $< 8.5"$**
 - Drilled in 1" x 18" epoxy coated plain round dowel bars spaced 18" center to center.
 - Drilled in No. 8 x 18" epoxy coated deformed tie bars spaced 18" center to center.

DBA Dowel Bar Assembly

Steel Bars for Longitudinal Joints

- No. 5 x 30" epoxy coated deformed tie bars. Sawed Joint - spaced 48" center to center. Construction Joint - spaced 48" center to center.
- No. 5 x 24" epoxy coated deformed tie bars. Drilled In - spaced 30" center to center.

NOTES: Saw around repair areas full depth for removal.

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

PLOT SCALE - 1:10

PLOTTED FROM - TRM11.025

PLOT NAME - 1

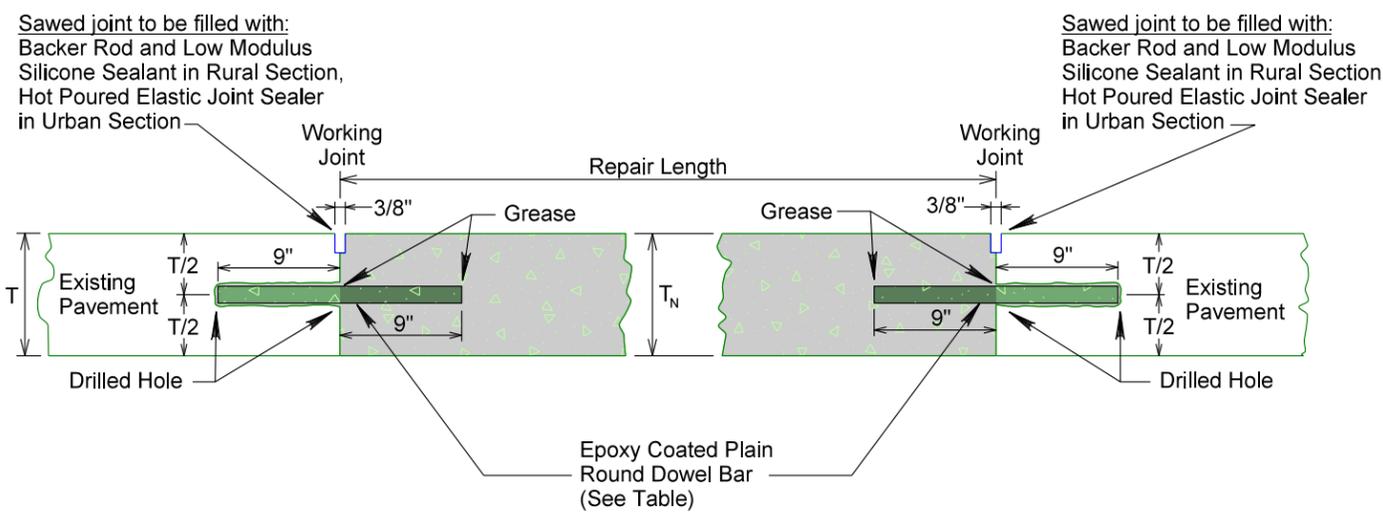
FILE - ... \DESKTOP\047D PLANS\FATCH2.DGN

NONREINFORCED PCC PAVEMENT REPAIR

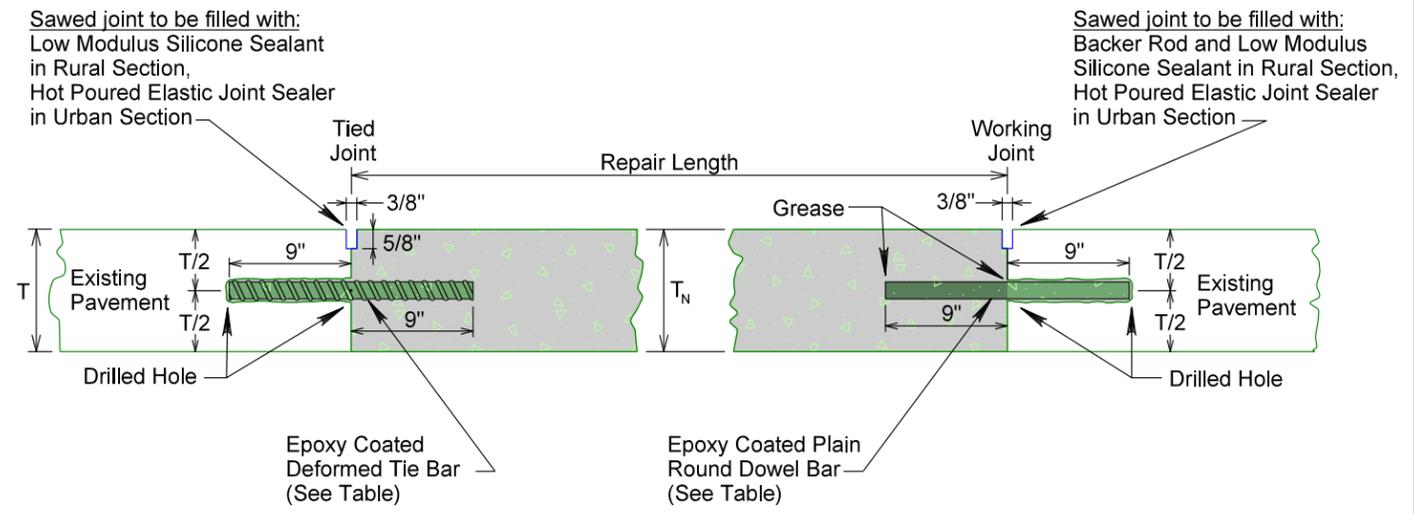
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0081(98)35	28	36

Plotting Date: 02/26/2014

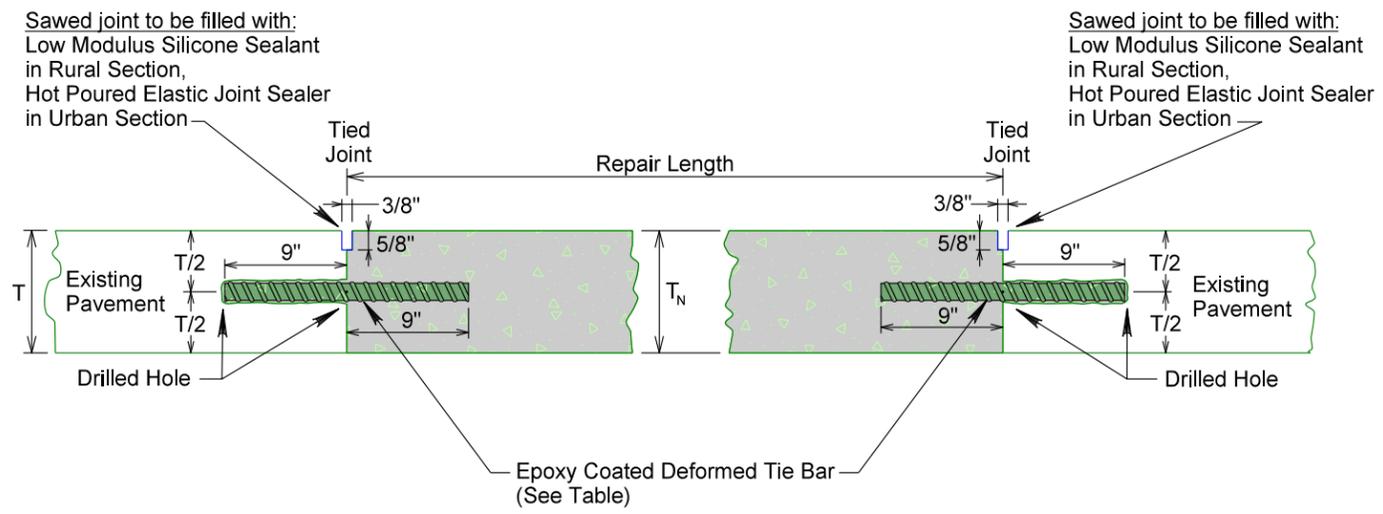
**PLAIN ROUND DOWEL BAR INSERTION
TYPE W - (TWO WORKING JOINTS)**



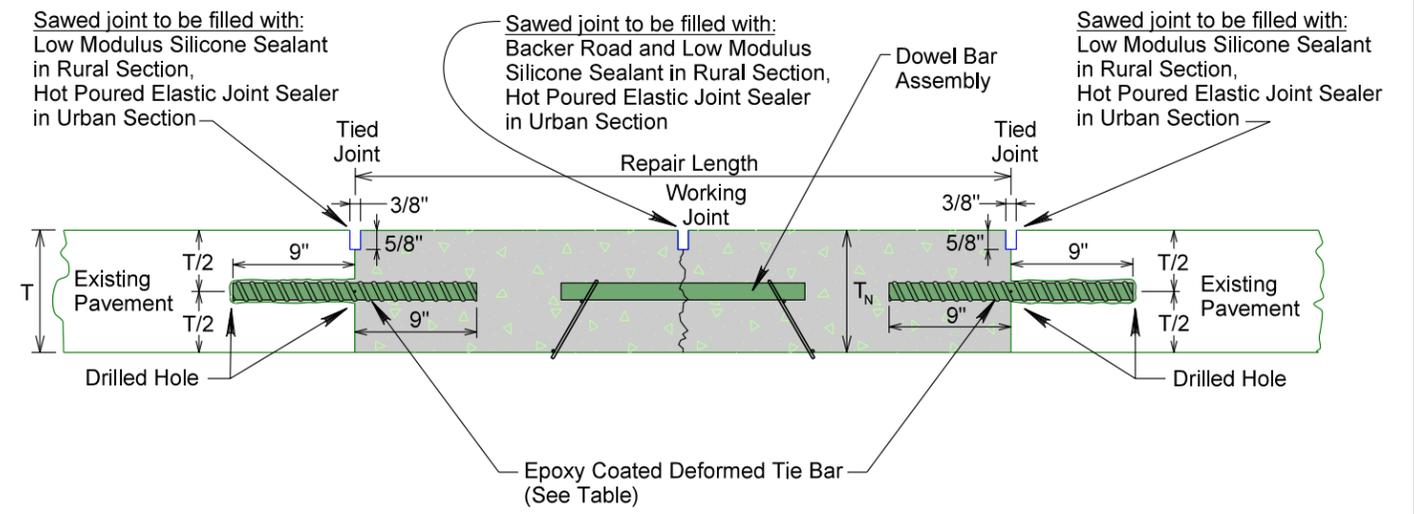
**DEFORMED TIE BAR AND PLAIN ROUND DOWEL BAR INSERTION
TYPE B - (ONE TIED JOINT AND ONE WORKING JOINT)**



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



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



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

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

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

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

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

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

PLOT SCALE - 1:11.25

PLOTTED FROM - TRM11.025

PLOT NAME - 1

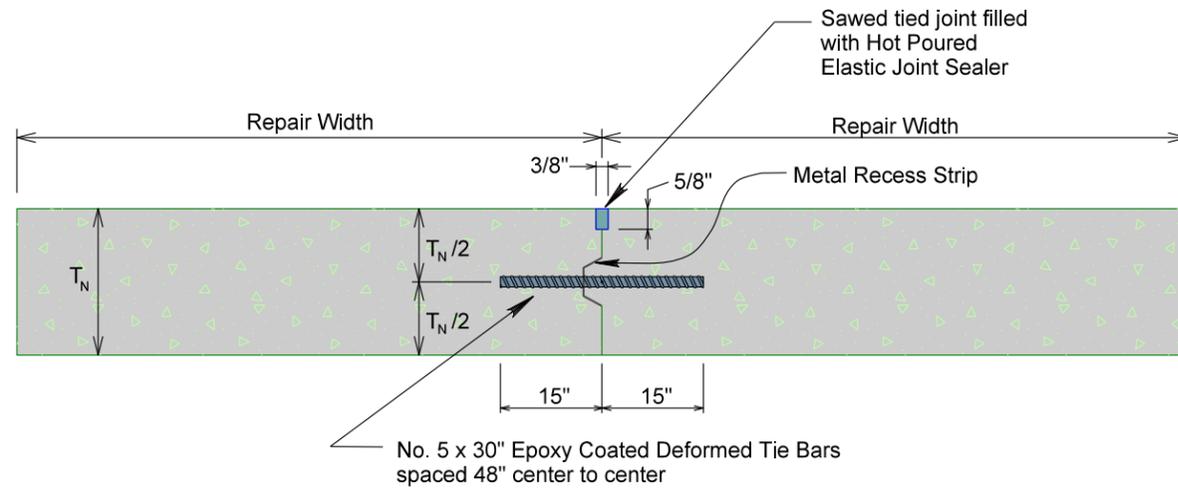
FILE - ... \DGN\PCPREP\TR\BARS.DGN

NONREINFORCED PCC PAVEMENT REPAIR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0081(98)35	29	36

Plotting Date: 02/28/2014

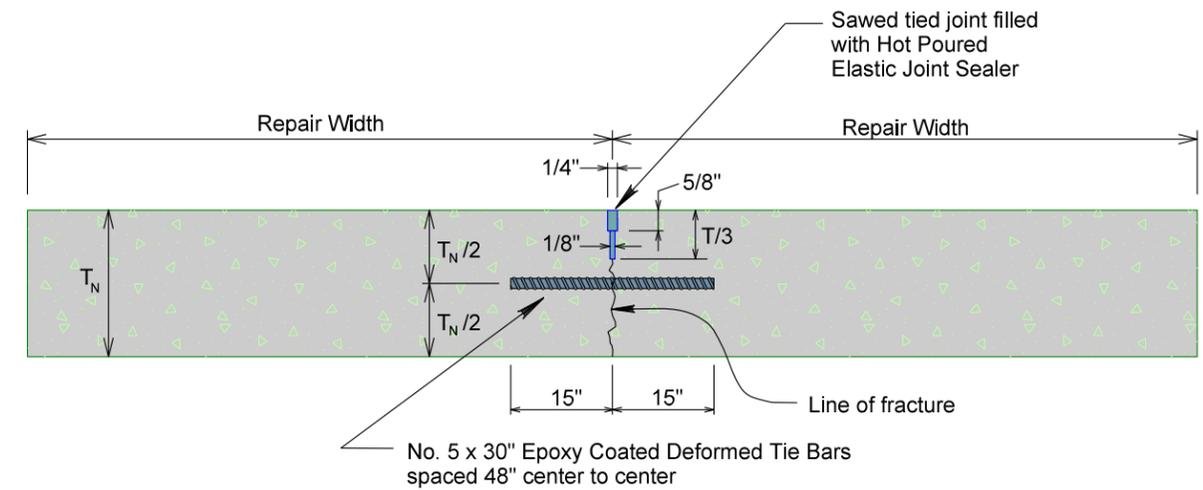
LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



T_N = New pavement thickness.

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

SAWED LONGITUDINAL JOINT

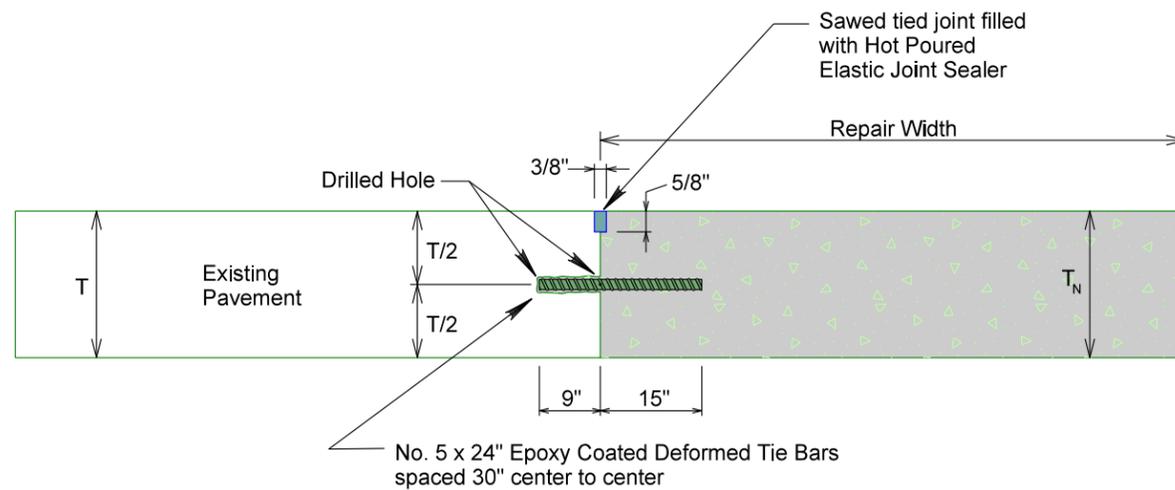


T_N = New pavement thickness.

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

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

LONGITUDINAL CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



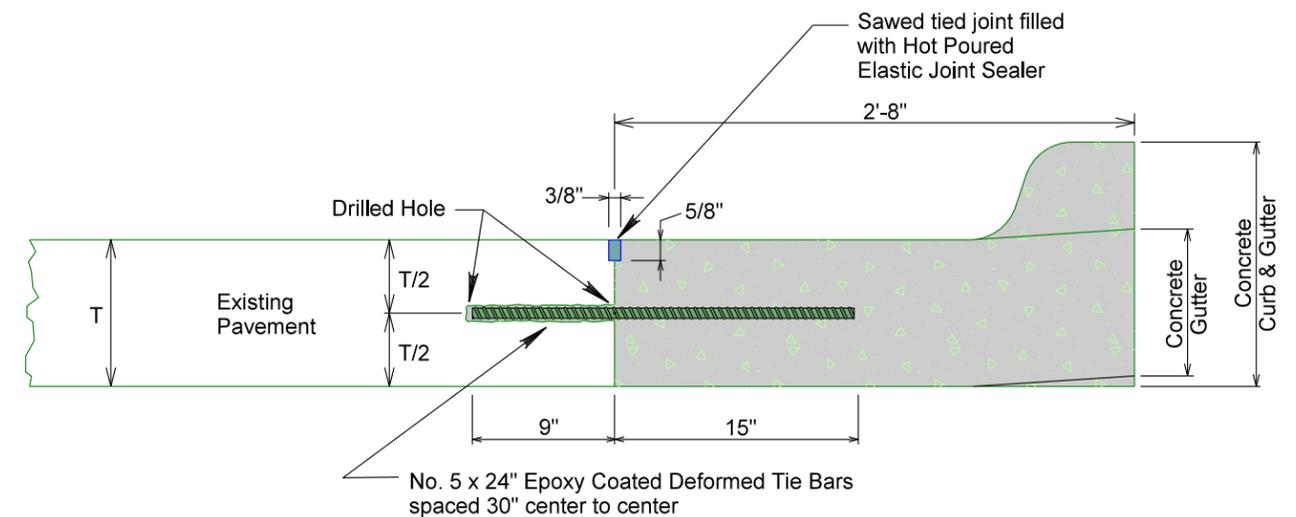
T = Existing pavement thickness.
 T_N = New pavement thickness.

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

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

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

LONGITUDINAL CONSTRUCTION JOINT WITH DRILLED IN TIE BARS



T = Existing pavement thickness.

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

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

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

PLOT SCALE - 1:11.25

PLOTTED FROM - TRM11.025

PLOT NAME - 1

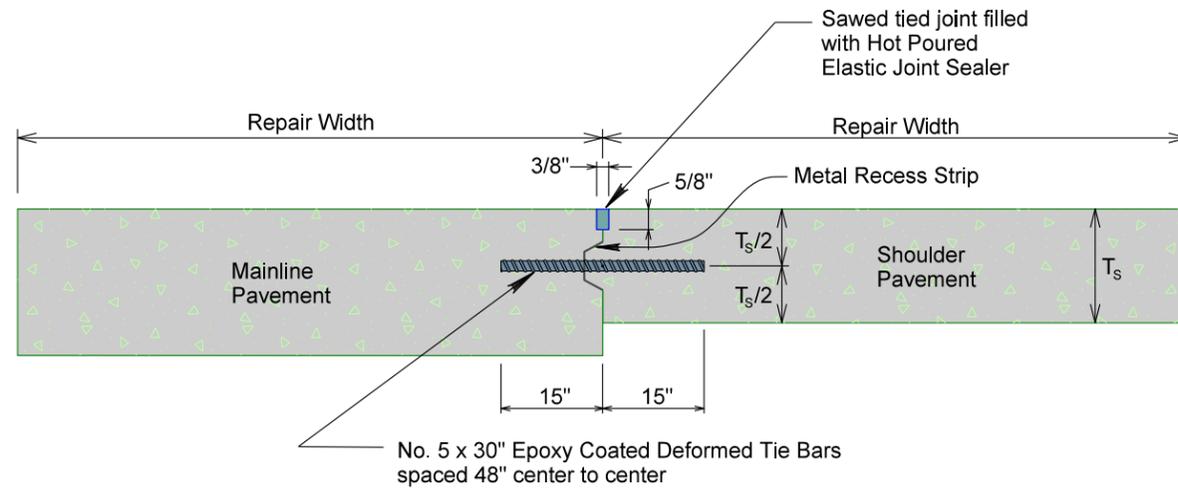
FILE - ... \DGN - XLS, DOC\BARS.DGN

NONREINFORCED PCC PAVEMENT REPAIR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0081(98)35	30	36

Plotting Date: 02/26/2014

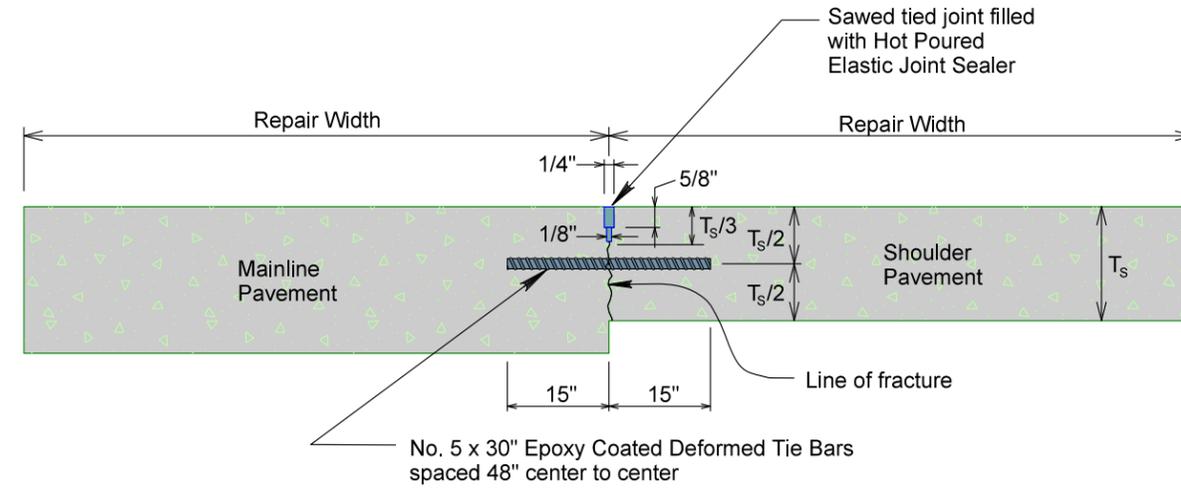
LONGITUDINAL SHOULDER CONSTRUCTION JOINT WITH TIE BARS & KEYWAY



T_s = New shoulder pavement thickness.

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

SAWED LONGITUDINAL SHOULDER JOINT

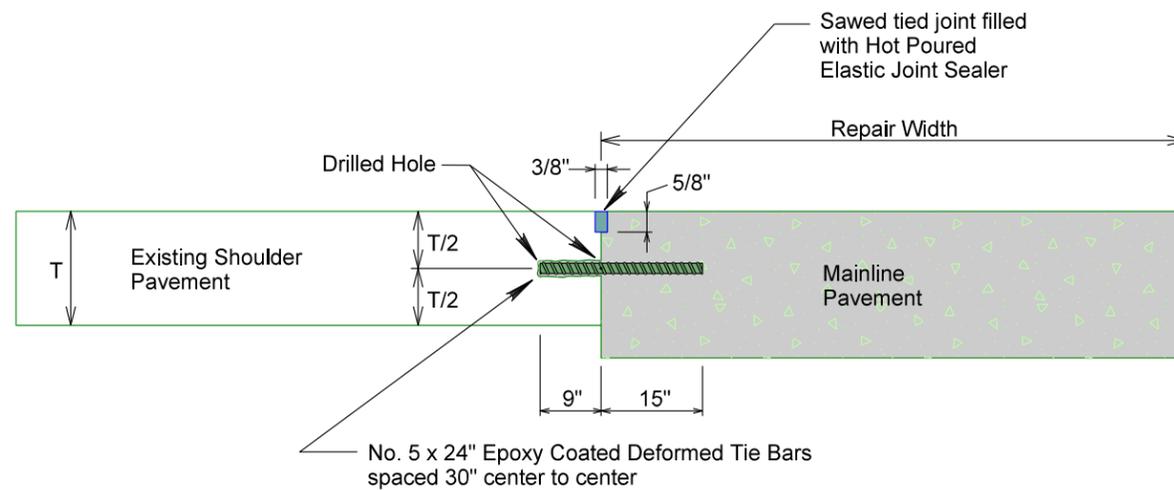


T_s = New shoulder pavement thickness.

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

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

LONGITUDINAL SHOULDER JOINT WITH DRILLED IN TIE BARS



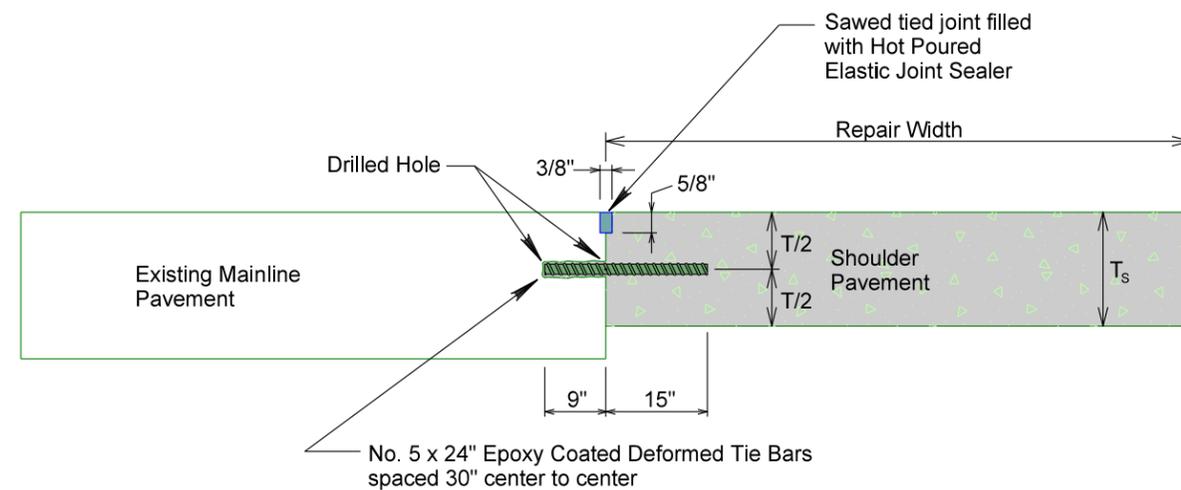
T = Existing shoulder pavement thickness.

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

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

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

LONGITUDINAL SHOULDER JOINT WITH DRILLED IN TIE BARS



T_s = New shoulder pavement thickness.

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

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

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

PLOT SCALE - 1:11.25

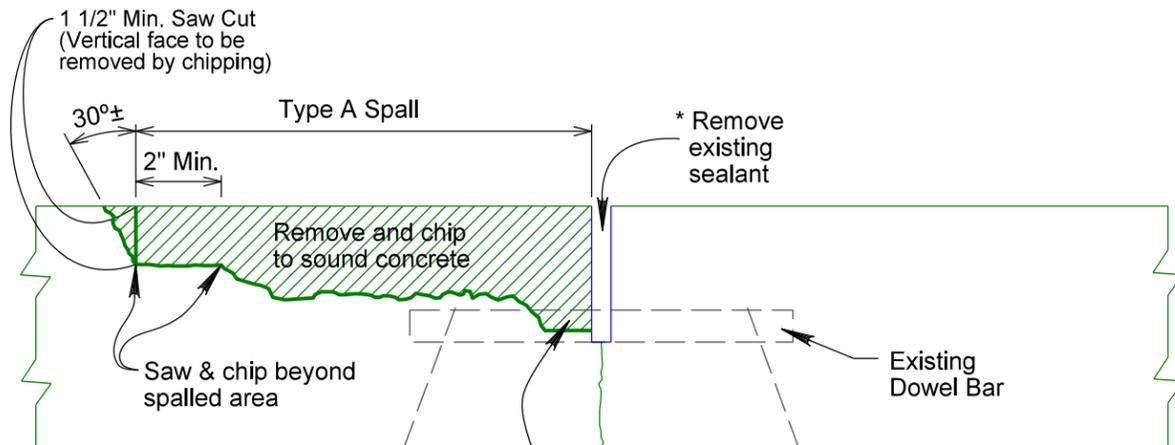
PLOTTED FROM - TRM11.025

PLOT NAME - 1

FILE - ... \DGN\PCCPREPAIR\BARS.DGN

REPAIR OF TYPE A SPALLS

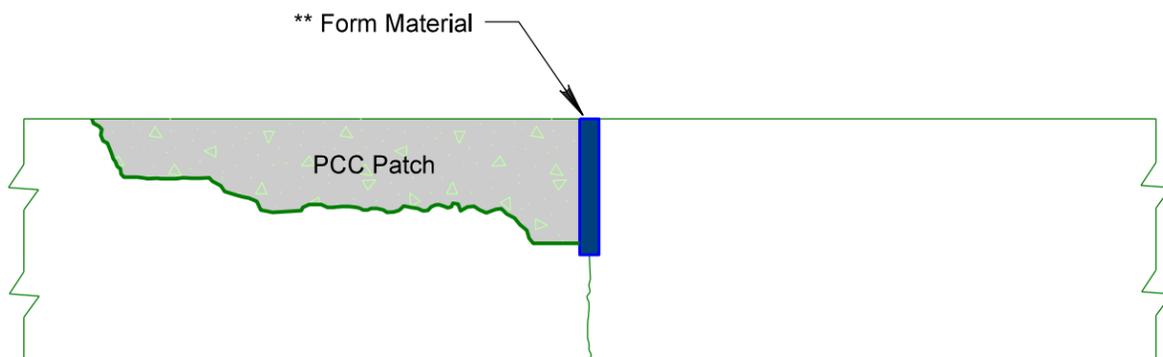
SPALL REMOVAL



If Dowel Bar is exposed coat the bar with duct tape as a bond breaker

* Existing Sealant to be removed is low modulus silicone sealant with backer rod or hot poured elastic joint sealer.

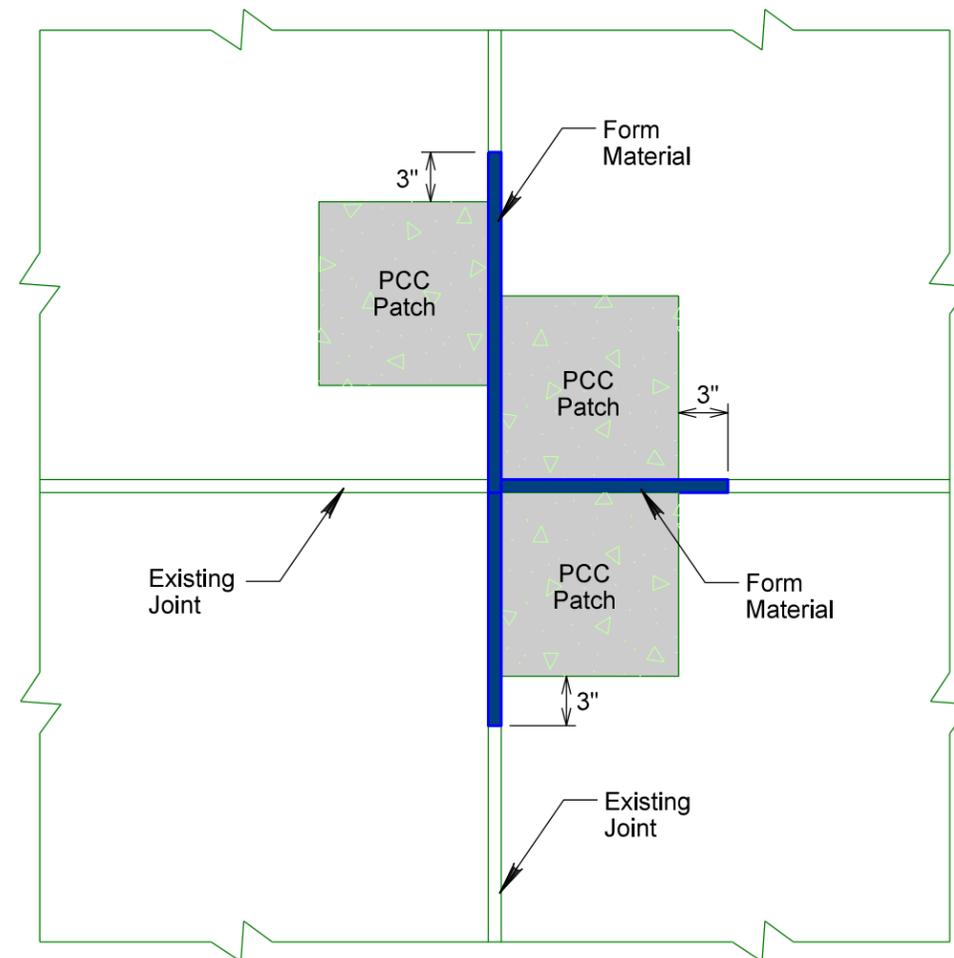
SPALL PATCH



** Form Material shall be removed by sawing or other means approved by the Engineer. Spall repaired joints shall then be sealed with Backer Rod and Low Modulus Silicone Sealant.

REPAIR OF TYPE A SPALLS

SPALL PATCHES (PLAN VIEW)



PLOT SCALE - \$SCALE\$\$

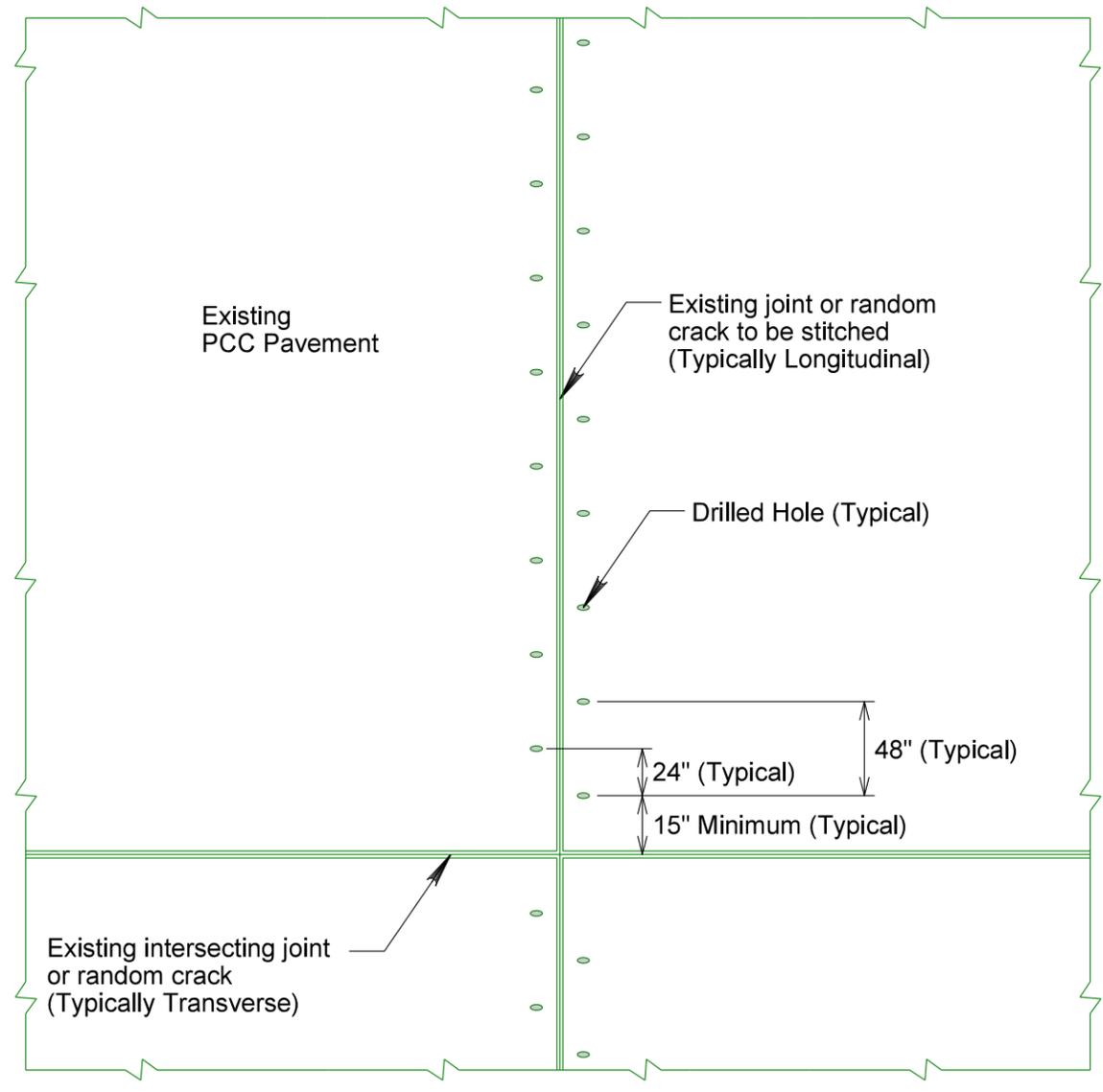
PLOTTED FROM - \$USERNAME\$\$

PLOT NAME - \$PLOTNAME\$\$

FILE - \$FILENAME\$\$

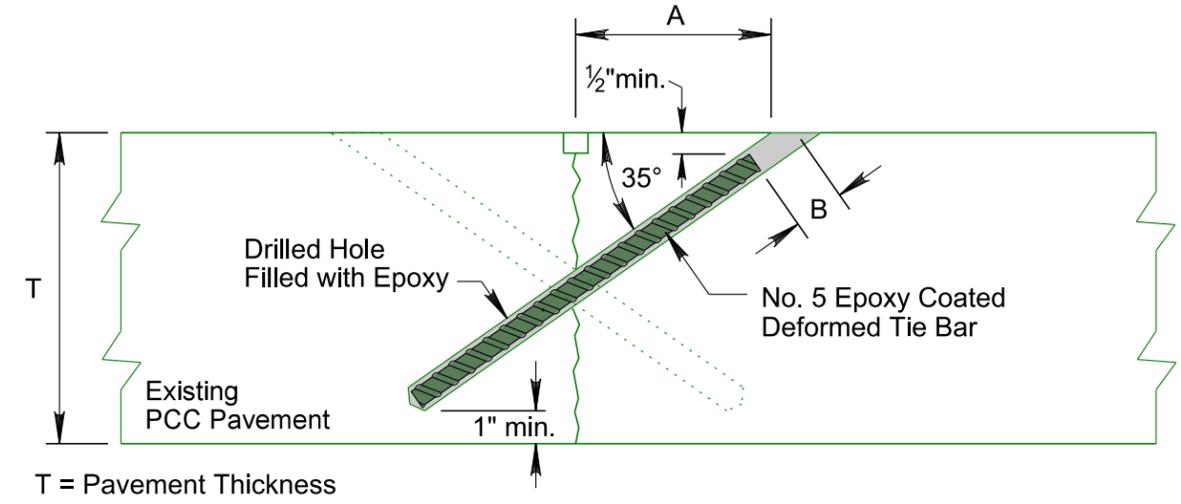
PLOT SCALE - 1:0.46667

TIE BAR RETROFIT (STITCHING)



PLAN VIEW

TIE BAR RETROFIT (STITCHING)



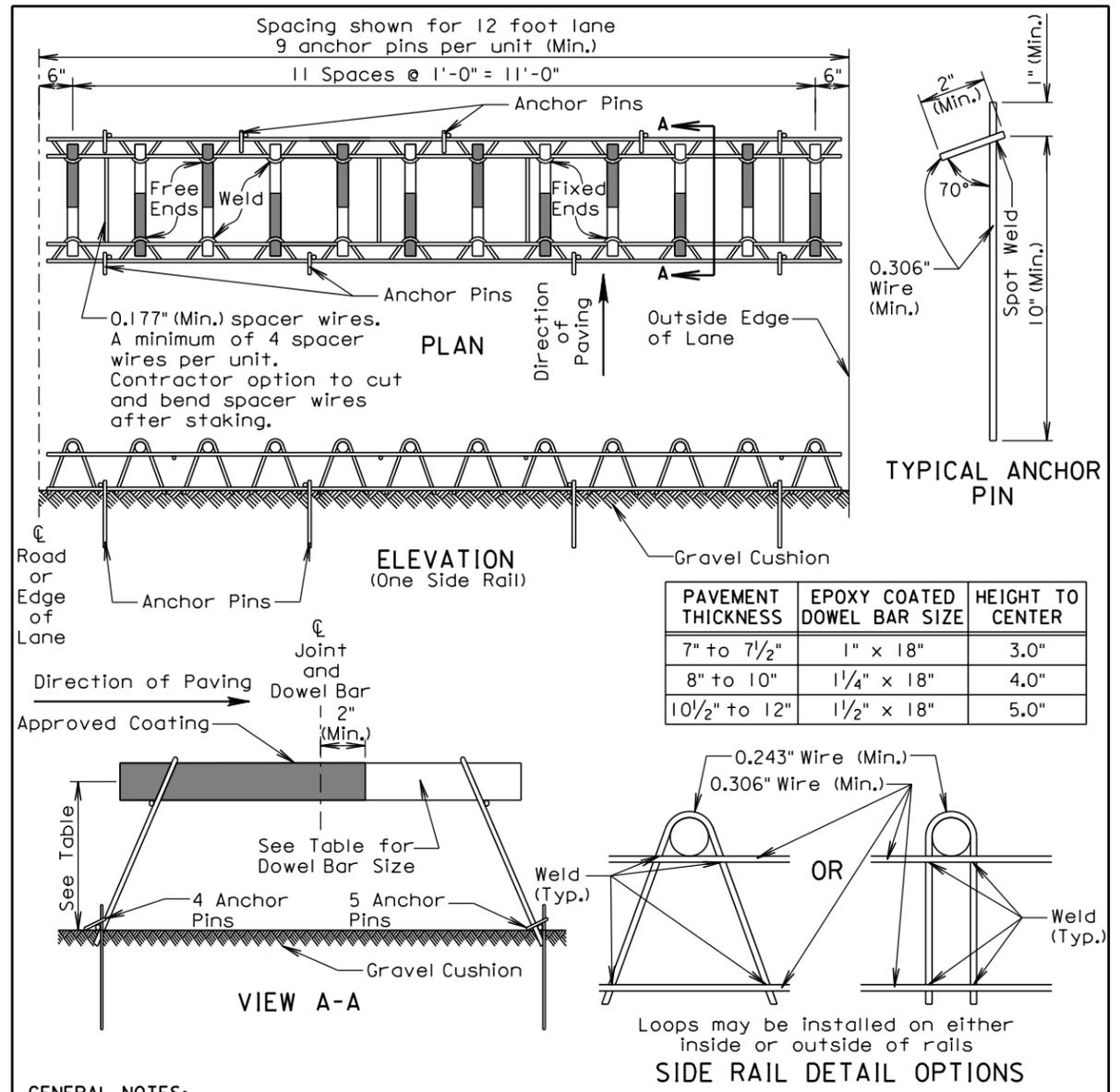
ELEVATION VIEW

TABLE OF STITCHING DIMENSIONS			
T	A	B	Length of Tie Bar
8"	5"	1 1/2" ±	10"
8 1/2"	5 1/4"	1 3/8" ±	11"
9"	5 5/8"	1 1/4" ±	12"
9 1/2"	6"	1 5/8" ±	12 1/2"
10"	6 3/8"	1 1/2" ±	13 1/2"
10 1/2"	6 3/4"	1 3/8" ±	14 1/2"
11"	7"	1 1/4" ±	15 1/2"
11 1/2"	7 3/8"	1 3/8" ±	16"
12"	7 3/4"	1 3/8" ±	16 1/2"
12 1/2"	8 1/8"	1 1/4" ±	17 1/2"

PLOTTED FROM - IRM111025

PLOT NAME - 1

FILE - ... \NEW\DOC - DGN - XLS\STITCH.DGN



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 $\pm 1/8$ inch in 18 inches and to all other dowel bars in the assembly $\pm 1/16$ inch in 18 inches.

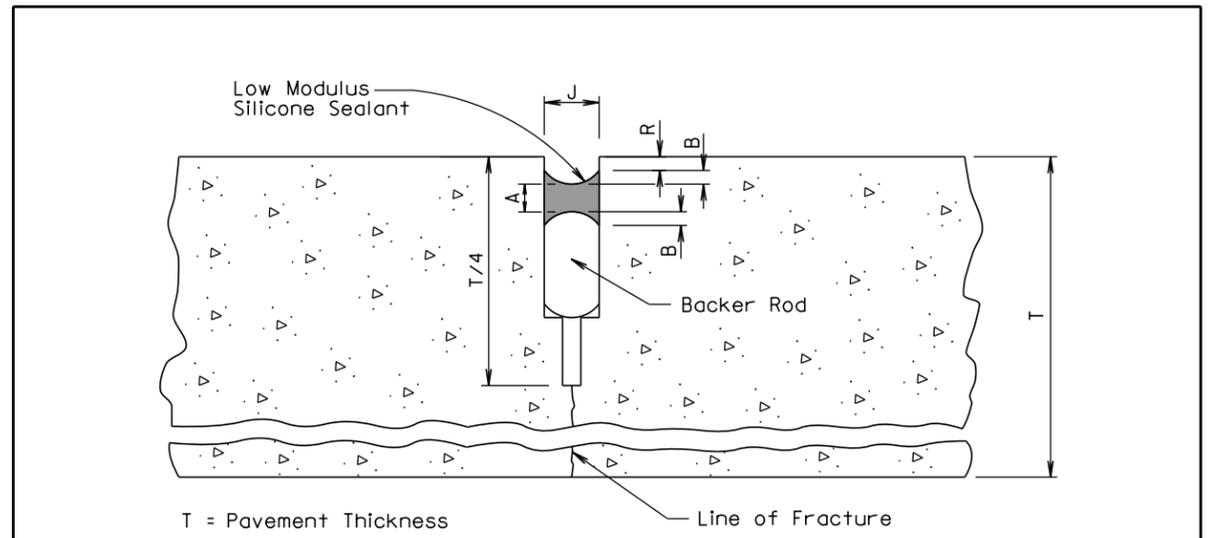
Centerline of individual dowel bars shall be parallel to the centerline of the roadway $\pm 1/2$ inch in 18 inches.

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

Supporting devices 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: 1st Qtr. 2014	S D D O T	PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS 12 Bar Assembly on Granular Base Material	PLATE NUMBER 380.01
			Sheet 1 of 1

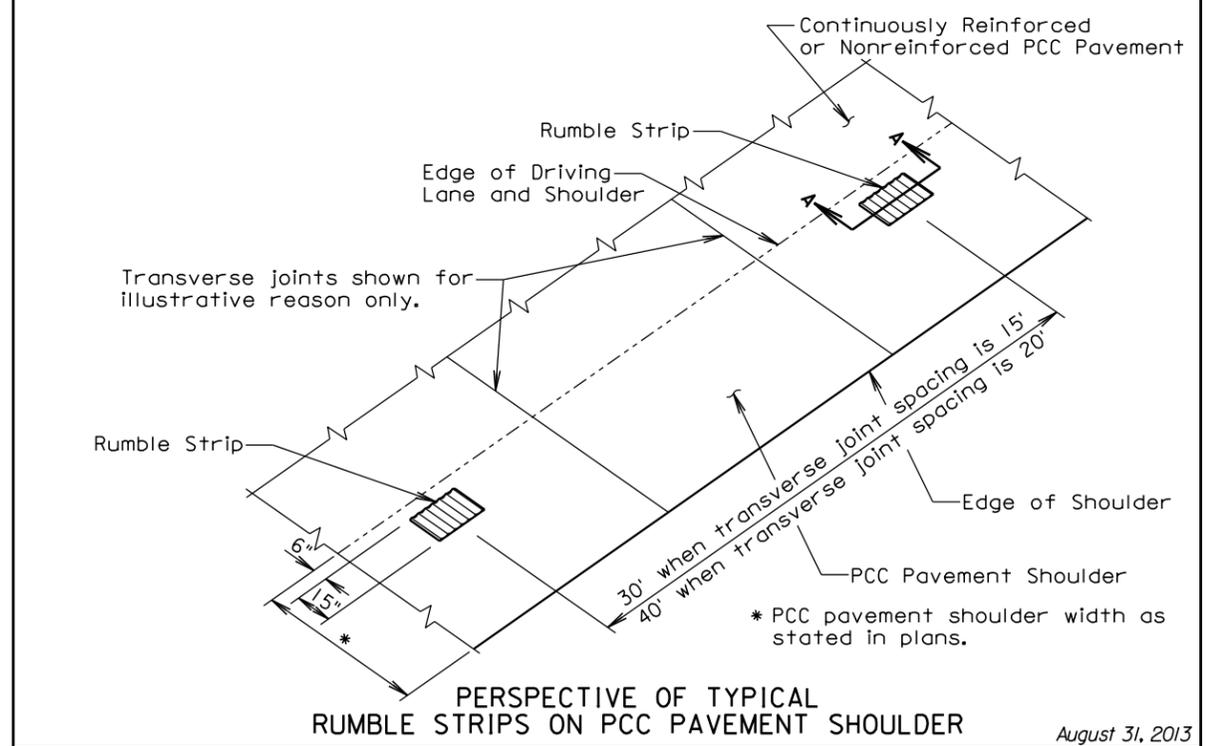
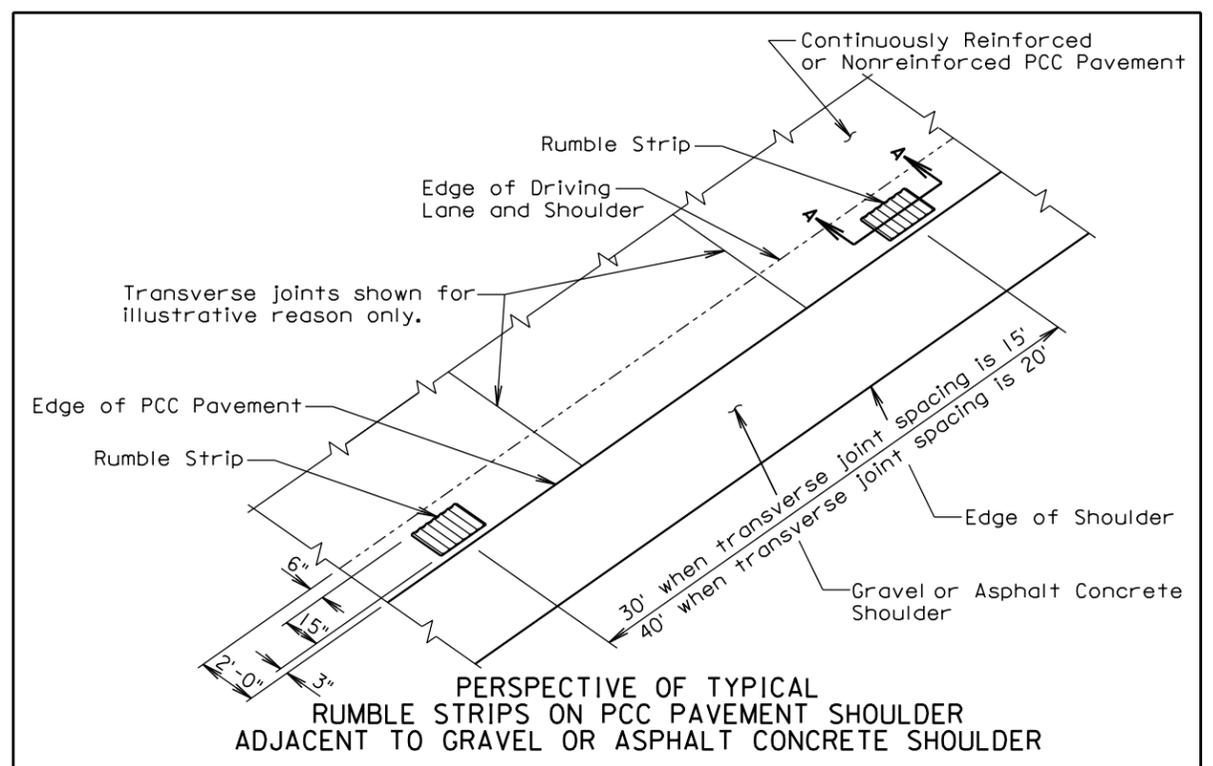


LOW MODULUS SILICONE SEALANT ALLOWABLE CONSTRUCTION TOLERANCES				
J = 3/8"				
A (Min.) (In)	A (Max.) (In)	B (Min.) (In)	B (Max.) (In)	R (In)
3/16	5/16	1/8	1/4	1/4
J = 1/2"				
A (Min.) (In)	A (Max.) (In)	B (Min.) (In)	B (Max.) (In)	R (In)
3/16	3/8	1/8	1/4	1/4
J = 5/8"				
A (Min.) (In)	A (Max.) (In)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

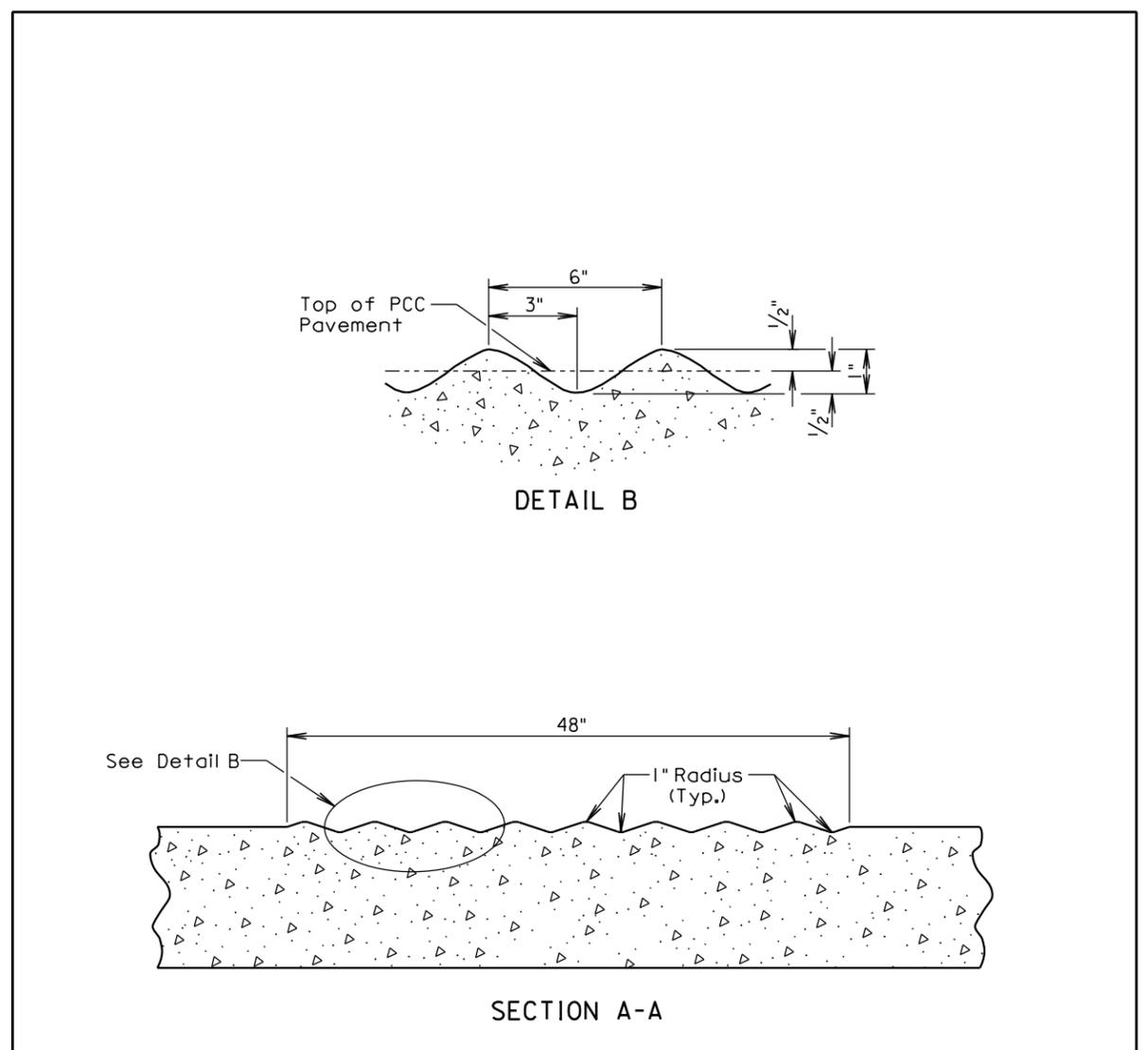
The backer rod shall be a nonmoisture absorbing resilient material approximately 25% larger in diameter than the width of the joint to be sealed.

Published Date: 1st Qtr. 2014	S D D O T	RESEAL PCC PAVEMENT JOINT (SILICONE)	PLATE NUMBER 380.13
			Sheet 1 of 1



August 31, 2013

Published Date: 1st Qtr. 2014	S D D O T	RUMBLE STRIP ON PCC PAVEMENT SHOULDER	PLATE NUMBER 380.15
			Sheet 1 of 2

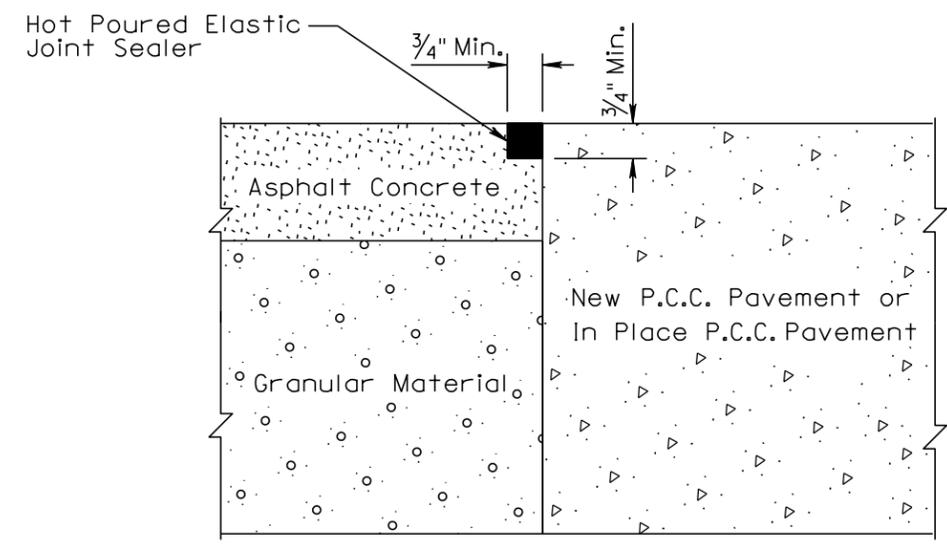


GENERAL NOTES:

- 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

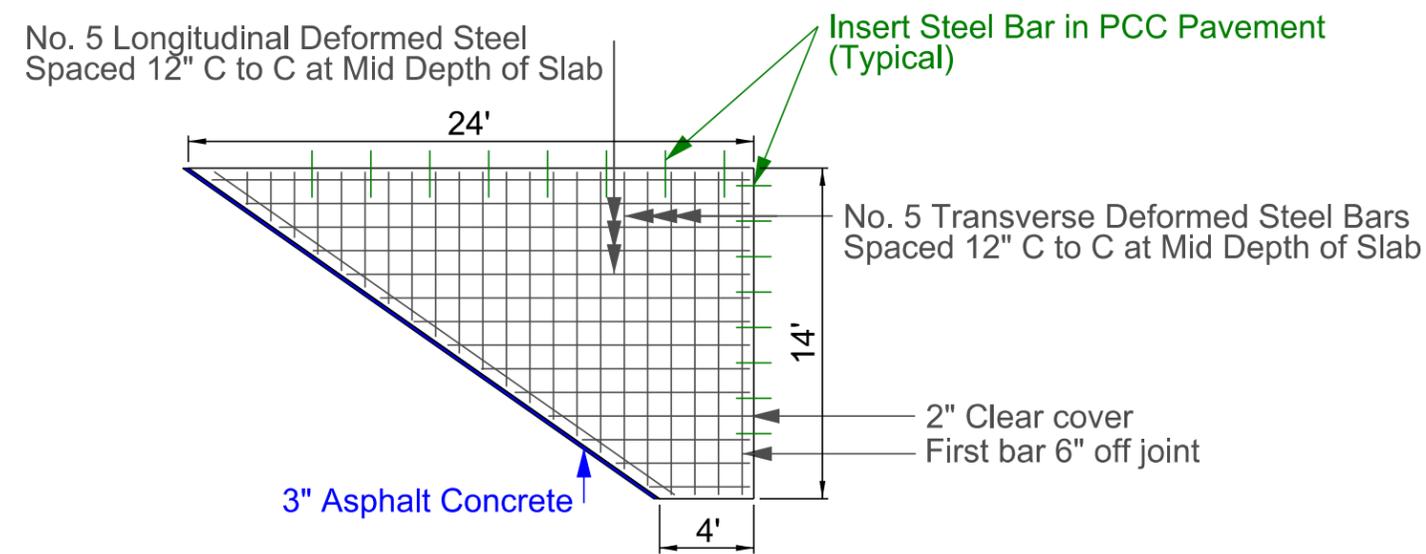
Published Date: 1st Qtr. 2014	S D D O T	RUMBLE STRIP ON PCC PAVEMENT SHOULDER	PLATE NUMBER 380.15
			Sheet 2 of 2



March 31, 2000

Published Date: 1st Qtr. 2014	S D D O T	ASPHALT CONCRETE SHOULDER JOINT ADJACENT TO PCC PAVEMENT	PLATE NUMBER 320.15
			Sheet 1 of 1

MRM 45.560 REPAIR



#5 Bars for Railroad Intersection Repair

Longitudinal	Transverse	Diagonal
22' 10-1/4"	13' 8-1/4"	23' 10-1/4"
21' 5"	13' 8-1/4"	
20' 0"	13' 8-1/4"	
18' 6-3/4"	13' 8-1/4"	
17' 1-1/2"	13' 3-1/2"	
15' 8-1/2"	12' 7-1/4"	
14' 3-1/4"	11' 10-3/4"	
12' 10-1/4"	11' 2-1/4"	
11' 5"	10' 6"	
10' 0"	9' 9-1/2"	
8' 6-3/4"	9' 1-1/4"	
7' 1-1/2"	8' 4-3/4"	
5' 8-1/2"	7' 8-1/4"	
4' 3-1/4"	7' 0"	
	6' 3-1/2"	
	5' 7-1/4"	
	4' 10-3/4"	
	4' 2-1/4"	
	3' 6"	
	2' 9-1/2"	
	2' 1-1/4"	
	1' 4-3/4"	

Total Length 400' 7-3/4"