

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

PROJECT IM-NH-P 0021(155)
INTERSTATES 90 & 90L, US HIGHWAYS 18, 81 & 281,
SD HIGHWAYS 34, 37, 38, 43, 50 & 262
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON,
GREGORY, HANSON, HUTCHINSON, JERAULD,
MCCOOK, MINNEHAHA & SANBORN COUNTIES
MITCHELL AREA
ASPHALT SURFACE TREATMENT
PCN 047L

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	1	89

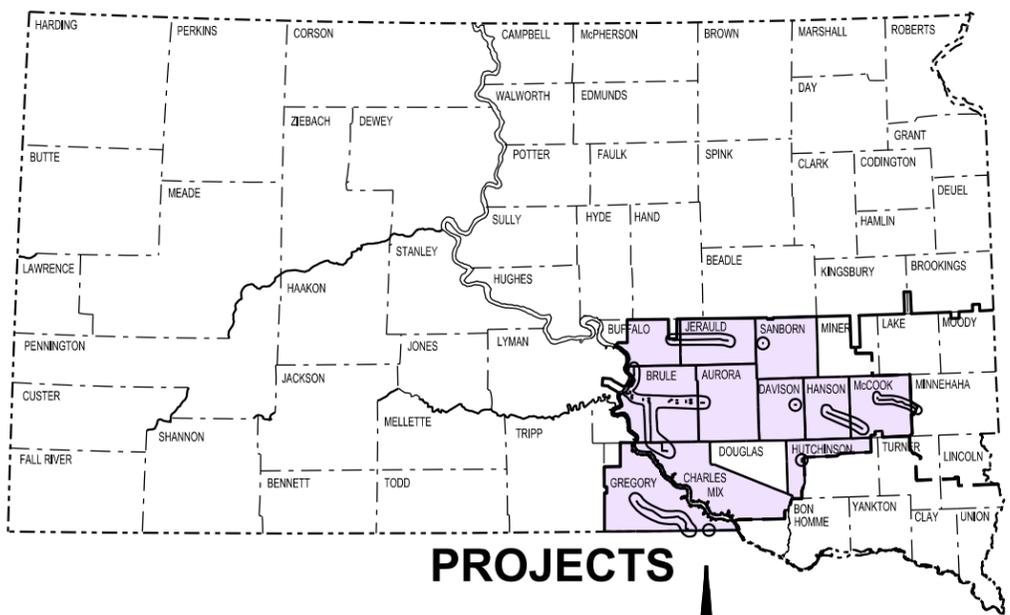
Plotting Date: 12/31/2014

INDEX OF SHEETS

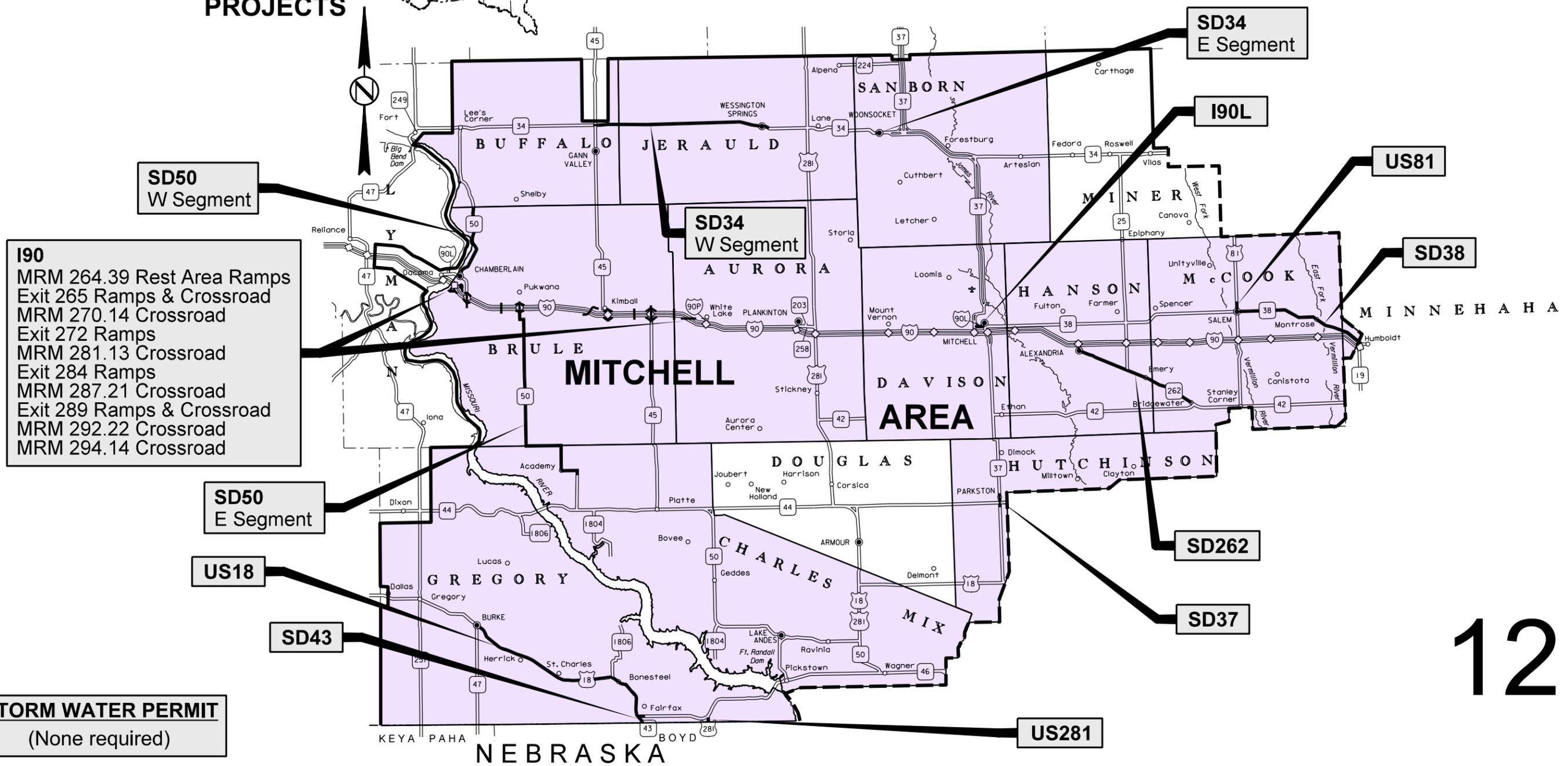
Sheet 1	Title Sheet
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Sheets 16 & 17	Estimate of Quantities
Sheets 18 - 23	Rates of Materials
Sheets 24 - 29	Table of Additional Quantities
Sheets 29 - 38	Plan Notes
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PLOT SCALE - 1:7000

PLOT NAME - 15



PROJECTS



I90
MRM 264.39 Rest Area Ramps
Exit 265 Ramps & Crossroad
MRM 270.14 Crossroad
Exit 272 Ramps
MRM 281.13 Crossroad
Exit 284 Ramps
MRM 287.21 Crossroad
Exit 289 Ramps & Crossroad
MRM 292.22 Crossroad
MRM 294.14 Crossroad

STORM WATER PERMIT
(None required)

12

PLOTTED FROM - TRW\INT06

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN

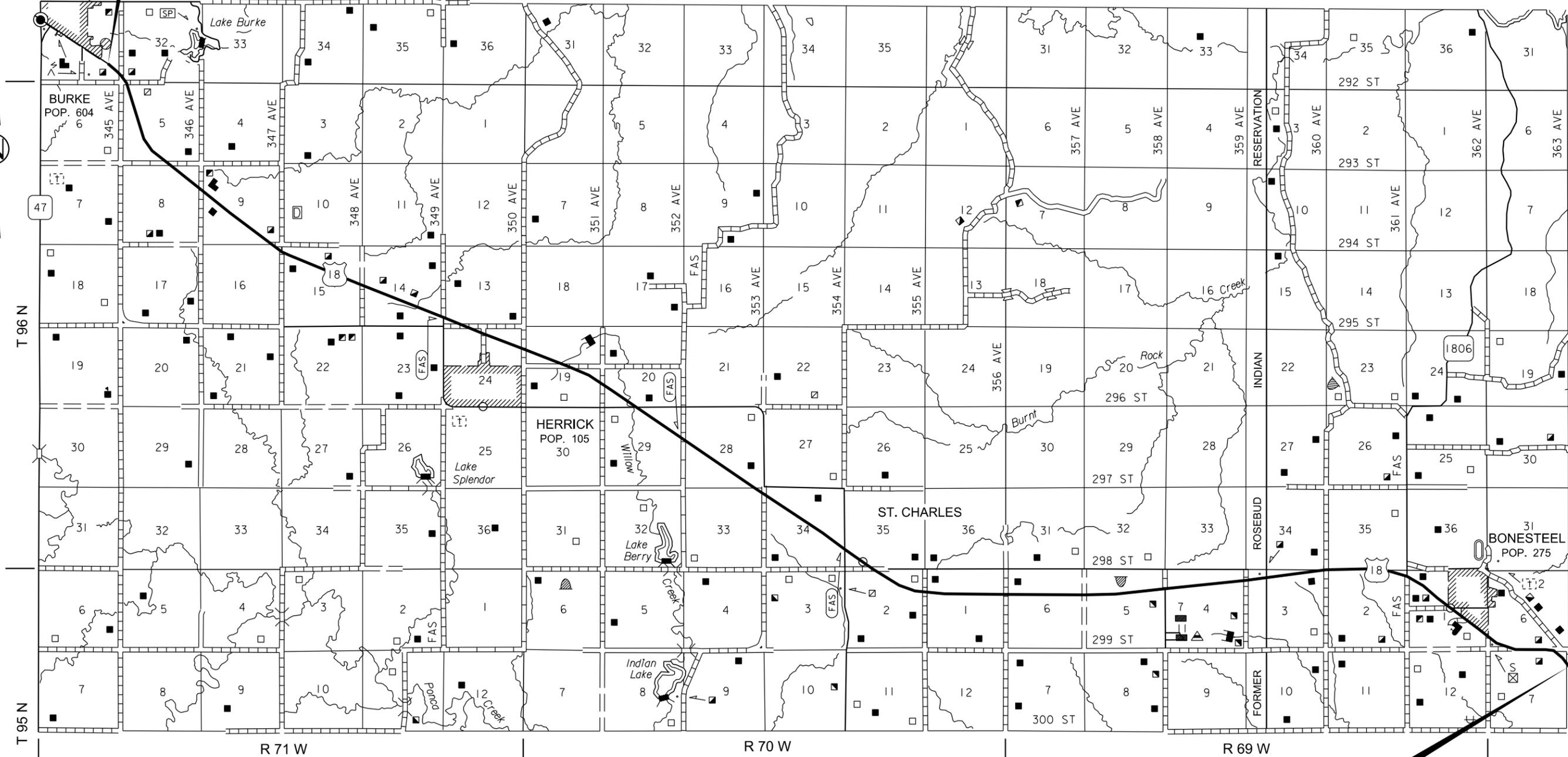
**NH 0021(155)
US HIGHWAY 18
GREGORY COUNTY
ASPHALT SURFACE TREATMENT
LENGTH: 25.347 MILES
PCN 047L**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	2	89

Plotting Date: 12/31/2014

BEGIN US18
STA. 0+00
MRM 286.48 +0.375
MILEAGE 263.488

US18 continues on next sheet



PLOT SCALE - 1:17000

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN

PLOTTED FROM - IRWJINT06

ADT (2013) 980

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	3	89

Plotting Date: 12/31/2014

NH 0021(155)
US HIGHWAY 18
(CONTINUED FROM PREVIOUS SHEET)
GREGORY COUNTY
ASPHALT SURFACE TREATMENT
PCN 047L

P 0021(155)
SD HIGHWAY 43
GREGORY COUNTY
ASPHALT SURFACE TREATMENT
LENGTH: 1.115 MILES
PCN 047L

NH 0021(155)
US HIGHWAY 281
GREGORY COUNTY
ASPHALT SURFACE TREATMENT
LENGTH: 0.770 MILE
PCN 047L

US18 continues from previous sheet

END US18
 STA. 1338+32
 MRM 312.00 +0.239
 MILEAGE 288.835

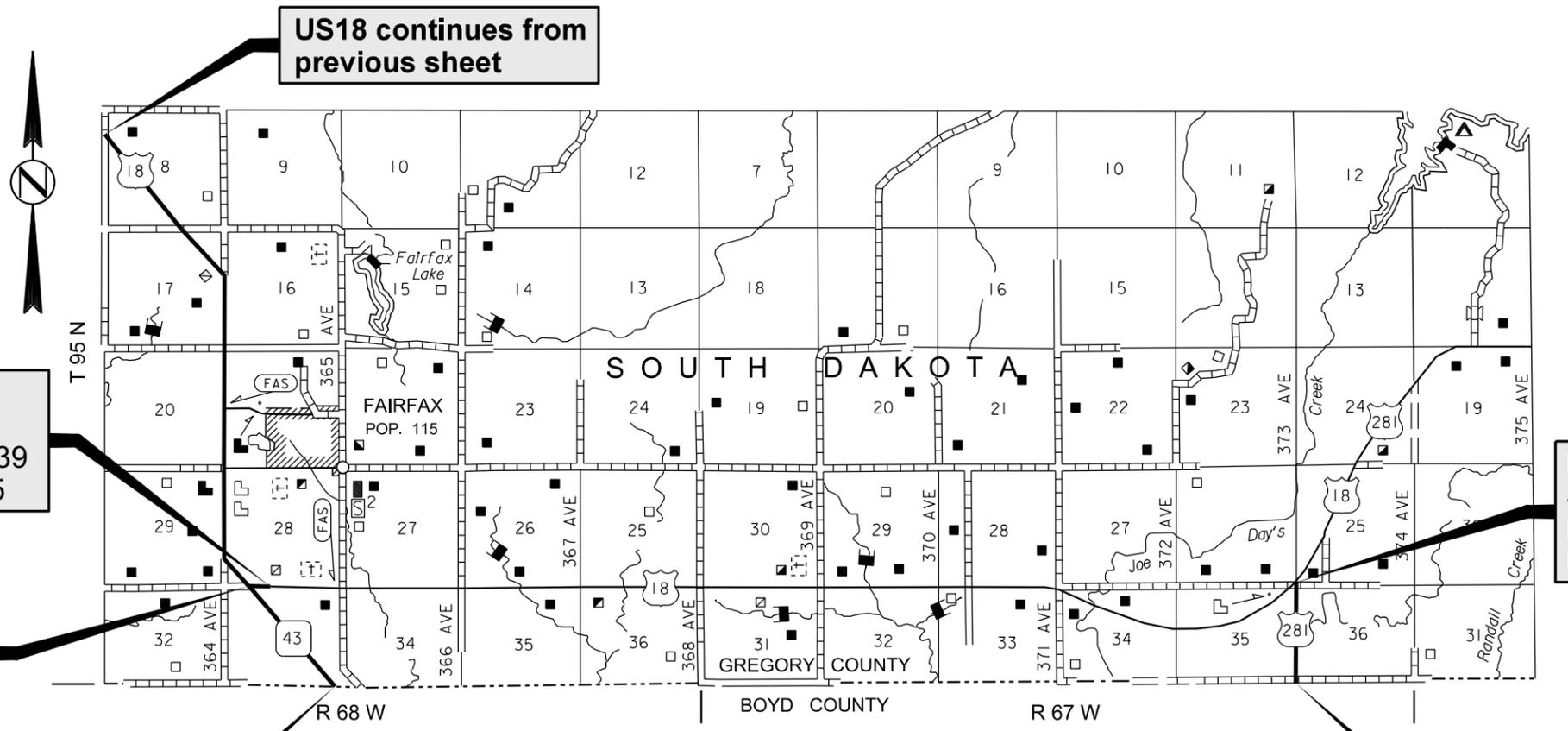
END SD43
 STA. 58+87
 MRM 1.14 +0.043
 MILEAGE 1.115

BEGIN SD43
 STA. 0+00
 MRM 0.00 +0.000
 MILEAGE 0.000

END US281
 STA. 40+66
 MRM 0.00 +0.770
 MILEAGE 0.770

BEGIN US281
 STA. 0+00
 MRM 0.00 +0.000
 MILEAGE 0.000

US18 ADT (2013) 980
SD43 ADT (2013) 310
US281 ADT (2013) 551



PLOT SCALE - 1:7000

PLOTTED FROM - IRWIN106

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN

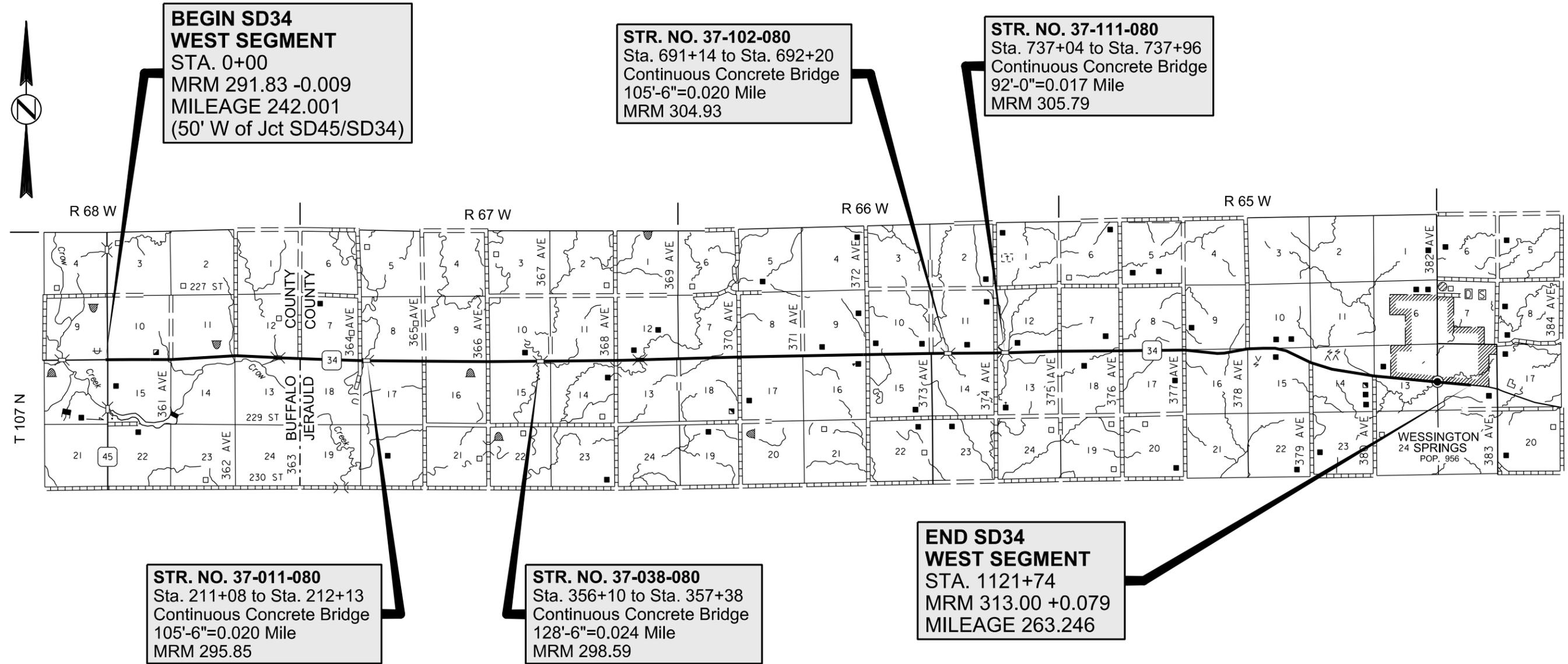
P 0021(155)
SD HIGHWAY 34 (WEST SEGMENT)
BUFFALO & JERAULD COUNTIES
ASPHALT SURFACE TREATMENT
GROSS LENGTH: 21.245 MILES
BRIDGE LENGTH: 0.081 MILE
NET LENGTH: 21.164 MILES
PCN 047L

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	4	89

Plotting Date: 12/31/2014

PLOT SCALE - 1:7000

PLOT NAME - 15



ADT (2013) 698

PLOTTED FROM - TRM\INT06

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN

P 0021(155)
SD HIGHWAY 34 (EAST SEGMENT)
SANBORN COUNTY
ASPHALT SURFACE TREATMENT
LENGTH: 1.067 MILES
PCN 047L

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	5	89

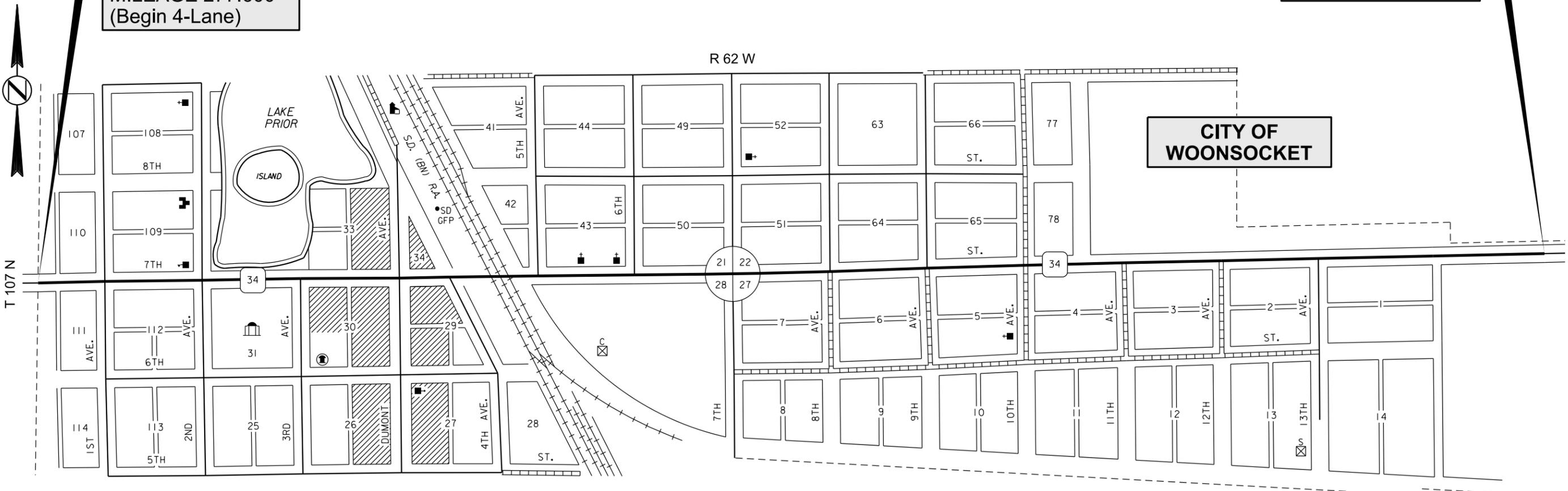
Plotting Date: 12/31/2014

PLOT SCALE - 1:7000

PLOT NAME - 15

BEGIN SD34 EAST SEGMENT
 STA. 0+00
 MRM 327.00 +0.382
 MILEAGE 277.600
 (Begin 4-Lane)

END SD34 EAST SEGMENT
 STA. 56+35
 MRM 328.29 +0.154
 MILEAGE 278.667
 (End 4-Lane)



CITY OF WOONSOCKET

ADT (2013) 2,487

PLOTTED FROM - IRWJINT06

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN

**NH 0021(155)
SD HIGHWAY 37
HUTCHINSON COUNTY
ASPHALT SURFACE TREATMENT
LENGTH: 1.337 MILES
PCN 047L**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	6	89

Plotting Date: 12/31/2014

BEGIN SD37
STA. 0+00
MRM 51.00 +0.406
MILEAGE 47.493

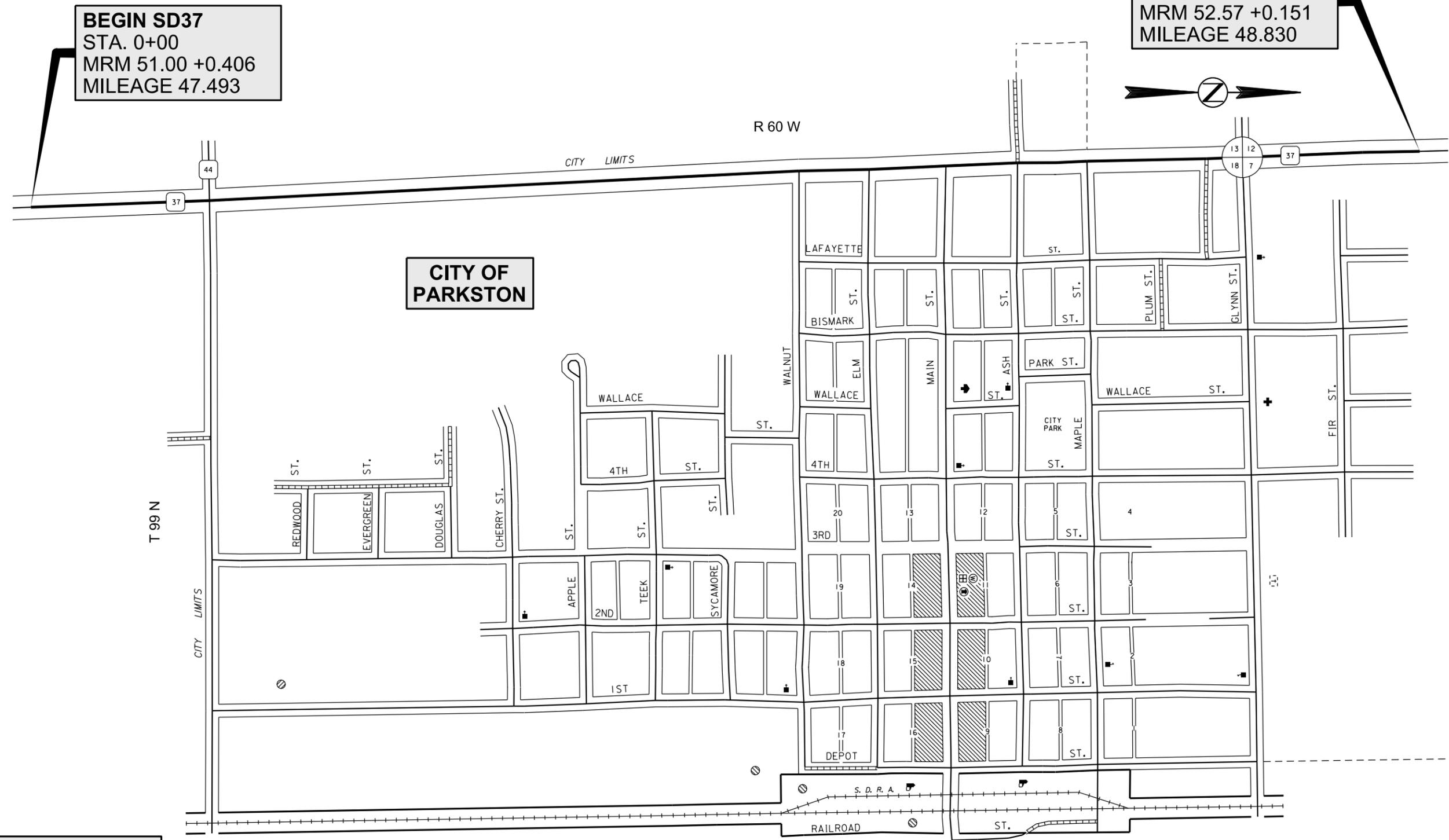
END SD37
STA. 70+59
MRM 52.57 +0.151
MILEAGE 48.830



PLOT SCALE - 1:7000

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN



ADT (2013) 2,028

P 0021(155)
SD HIGHWAY 38
McCOOK & MINNEHAHA COUNTIES
ASPHALT SURFACE TREATMENT
GROSS LENGTH: 16.539 MILES
BRIDGE LENGTH: 0.030 MILE
NET LENGTH: 16.509 MILES
PCN 047L

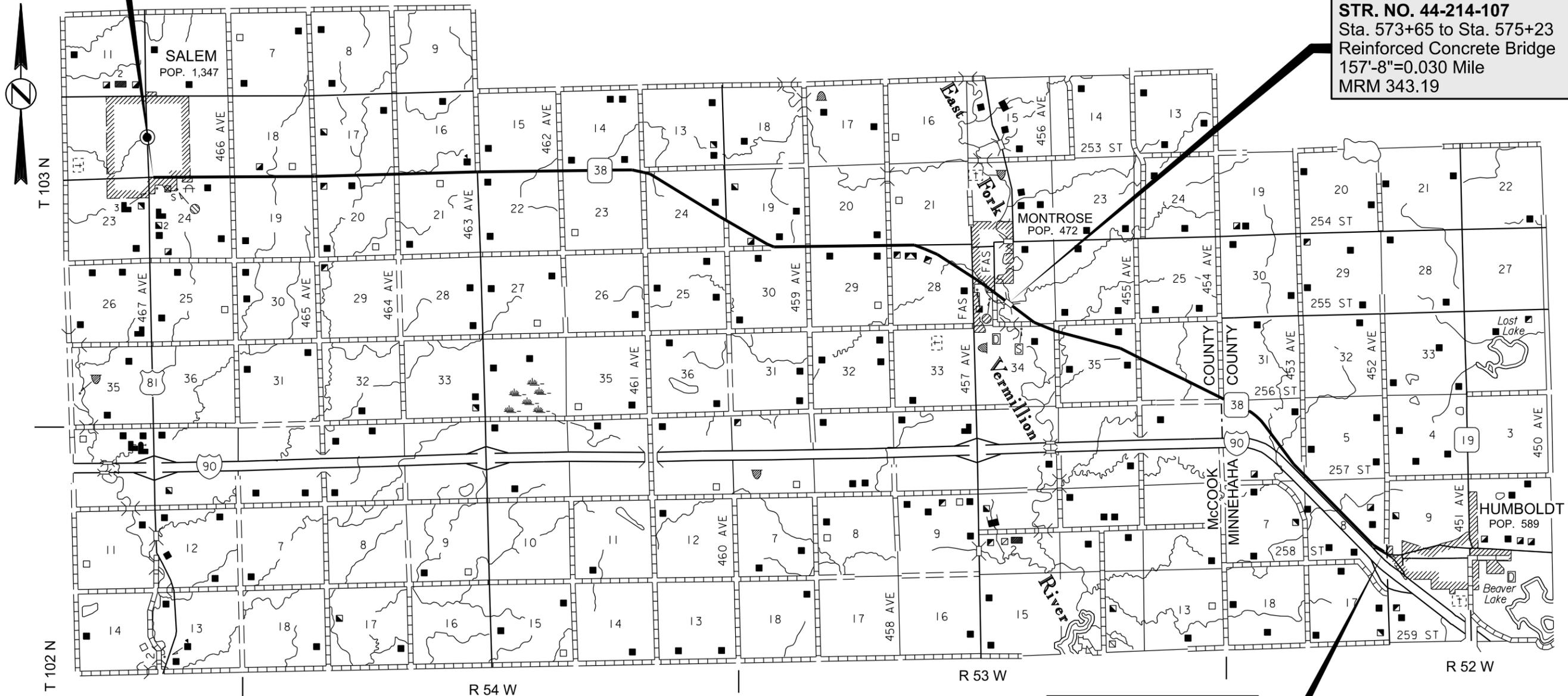
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	7	89

Plotting Date: 12/31/2014

BEGIN SD38
 STA. 0+00
 MRM 332.28 +0.025
 MILEAGE 31.965
 (132' E of Jct US81)

STR. NO. 44-214-107
 Sta. 573+65 to Sta. 575+23
 Reinforced Concrete Bridge
 157'-8"=0.030 Mile
 MRM 343.19

END SD38
 STA. 873+27
 MRM 348.00 +0.836
 MILEAGE 48.504
 (111' W of Jct SD19)



ADT (2013) 1,122

PLOT SCALE - 1:7000

PLOTTED FROM - IRWIN106

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL T11L047L.DGN

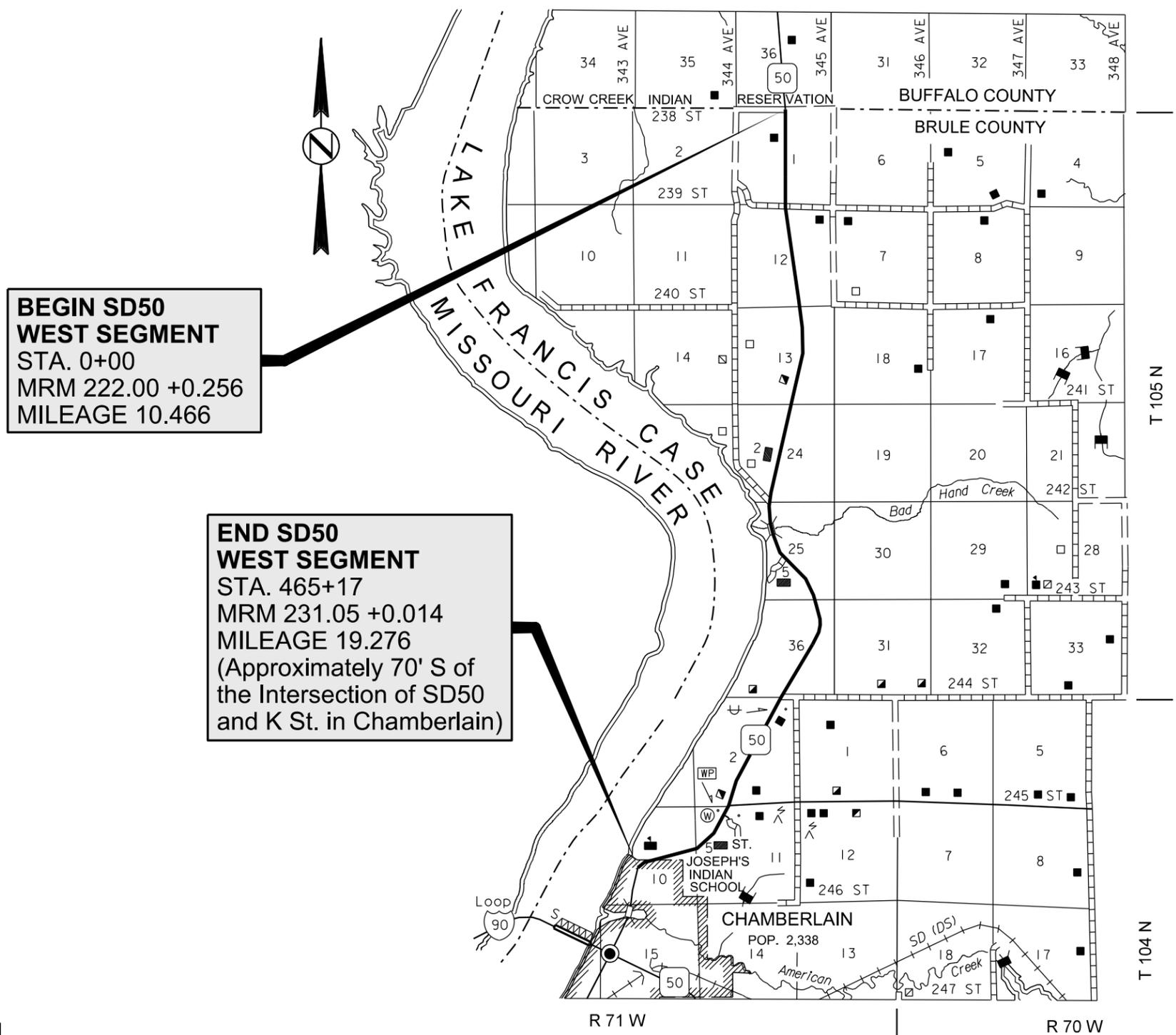
P 0021(155)
SD HIGHWAY 50 (WEST SEGMENT)
BRULE COUNTY
ASPHALT SURFACE TREATMENT
LENGTH: 8.810 MILES
PCN 047L

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	8	89

Plotting Date: 12/31/2014

PLOT SCALE - 1:7000

PLOT NAME - 15



ADT (2013) 1,142

PLOTTED FROM - IRWJINT06

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	9	89

Plotting Date: 12/31/2014

P 0021(155)
SD HIGHWAY 50 (EAST SEGMENT)
BRULE & CHARLES MIX COUNTIES
ASPHALT SURFACE TREATMENT
GROSS LENGTH: 27.251 MILES
BRIDGE & APPROACH/SLEEPER SLAB LENGTH: 0.077 MILE
NET LENGTH: 27.174 MILES
PCN 047L

BEGIN SD50 EAST SEGMENT
 STA. 0+00
 MRM 241.50 -0.205
 MILEAGE 23.301

STR. NO. 08-145-124
 Sta. 13+79 to Sta. 16+77
 Cont. Composite Girder Bridge
 254'-0"=0.048 Mile and
 Two Appr/Slpr Slabs = 0.009 Mile
 MRM 241.61

STR. NO. 08-150-166
 Sta. 240+96 to Sta. 242+02
 Continuous Concrete Bridge
 106'-0"=0.020 Mile
 MRM 245.88

END SD50 EAST SEGMENT
 STA. 1438+87
 MRM 268.00 +0.761
 MILEAGE 50.552



PLOT SCALE - 1:7000

PLOTTED FROM - TRW\INT06

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN

ADT (2013) 221

**NH 0021(155)
US HIGHWAY 81
McCOOK COUNTY
ASPHALT SURFACE TREATMENT
LENGTH: 1.016 MILES
PCN 047L**

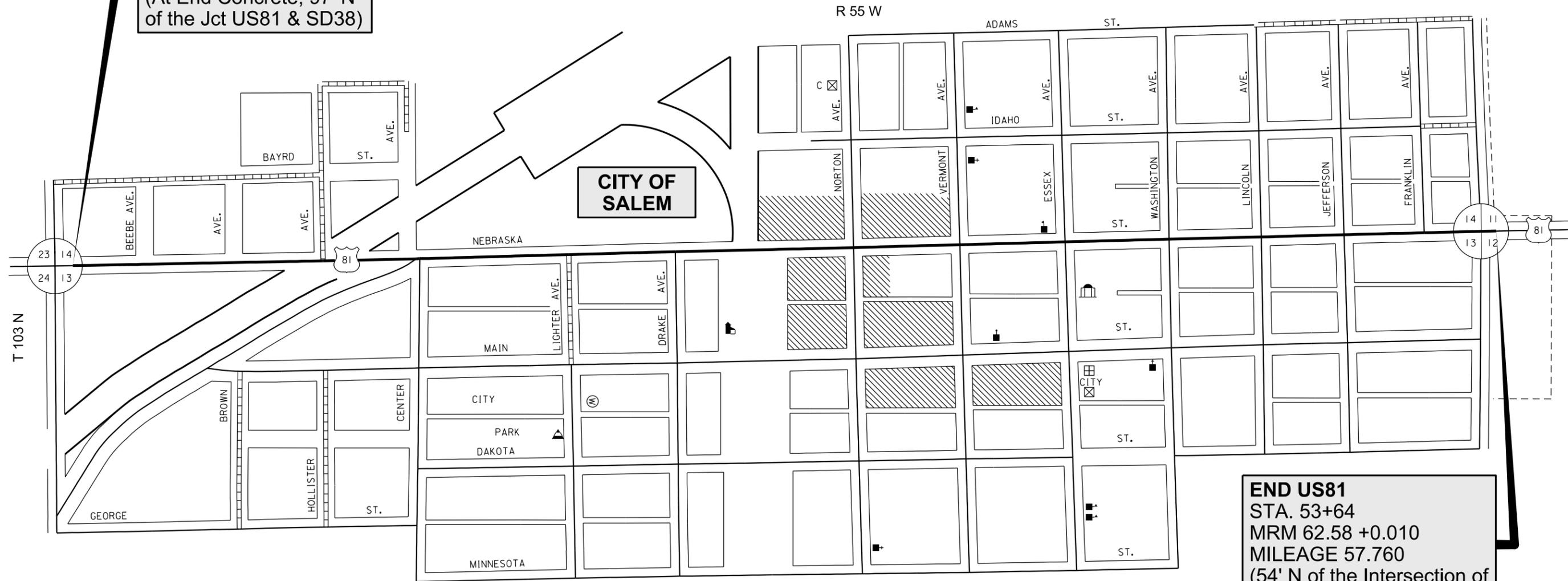
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	10	89

Plotting Date: 12/31/2014

PLOT SCALE - 1:7000

PLOT NAME - 15

BEGIN US81
STA. 0+00
MRM 61.58 +0.027
MILEAGE 56.744
(At End Concrete, 97' N of the Jct US81 & SD38)



END US81
STA. 53+64
MRM 62.58 +0.010
MILEAGE 57.760
(54' N of the Intersection of US81 & Richard Avenue)

ADT (2013) 1,838

PLOTTED FROM - TRM\INT06

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	11	89

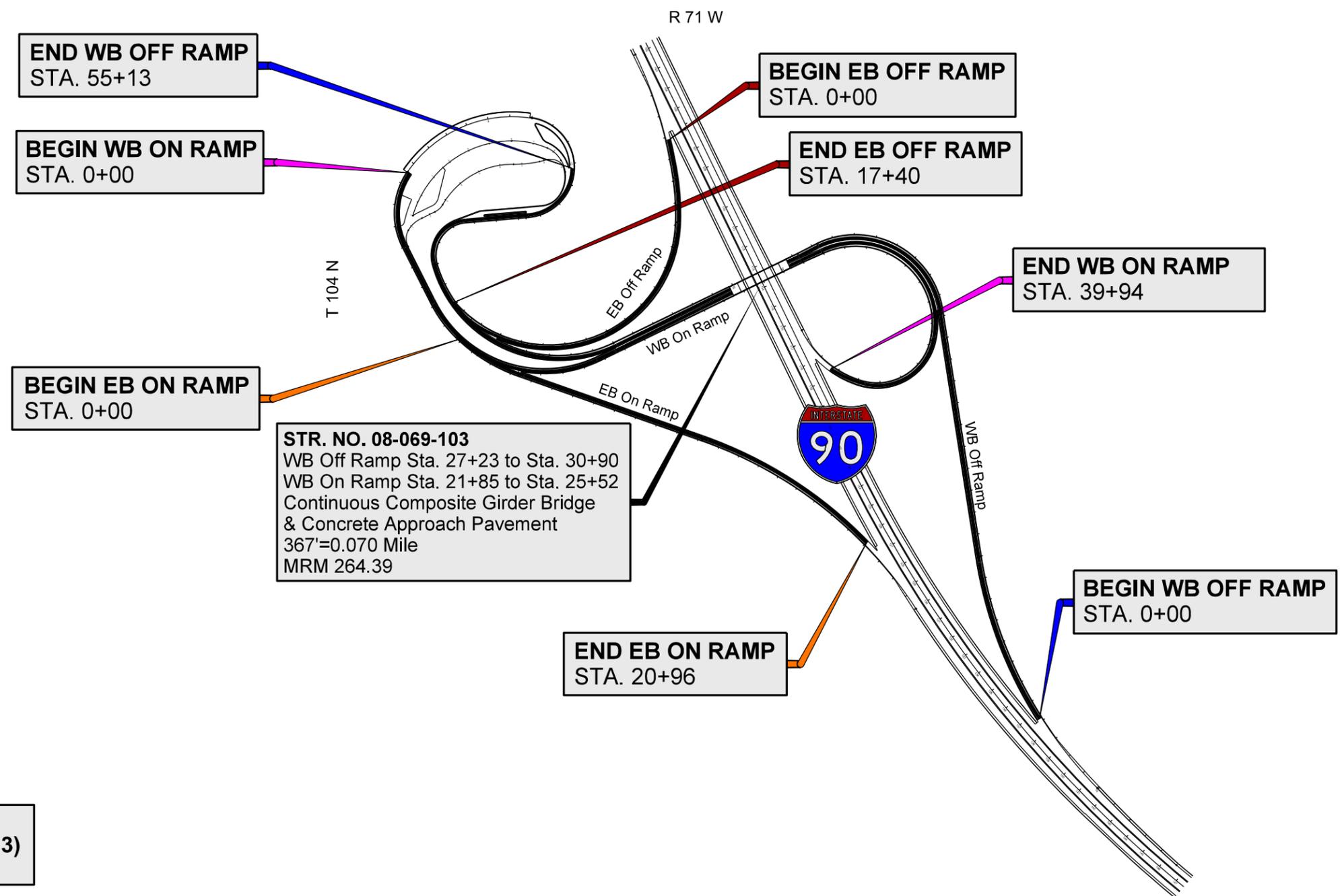
Plotting Date: 12/31/2014

IM 0021(155)
INTERSTATE 90
BRULE COUNTY
ASPHALT SURFACE TREATMENT OF REST AREA RAMPS
EB ON RAMP LENGTH: 0.397 MILE
EB OFF RAMP LENGTH: 0.330 MILE
WB ON RAMP LENGTH: 0.687 MILE
WB OFF RAMP LENGTH: 0.975 MILE
TOTAL RAMP LENGTH: 2.389 MILES
PCN 047L

PLOT SCALE - 1:7000

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN



STR. NO. 08-069-103
 WB Off Ramp Sta. 27+23 to Sta. 30+90
 WB On Ramp Sta. 21+85 to Sta. 25+52
 Continuous Composite Girder Bridge
 & Concrete Approach Pavement
 367'=0.070 Mile
 MRM 264.39

I90 MRM 264.39
REST AREA ADT (2013)
Not Available

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	12	89

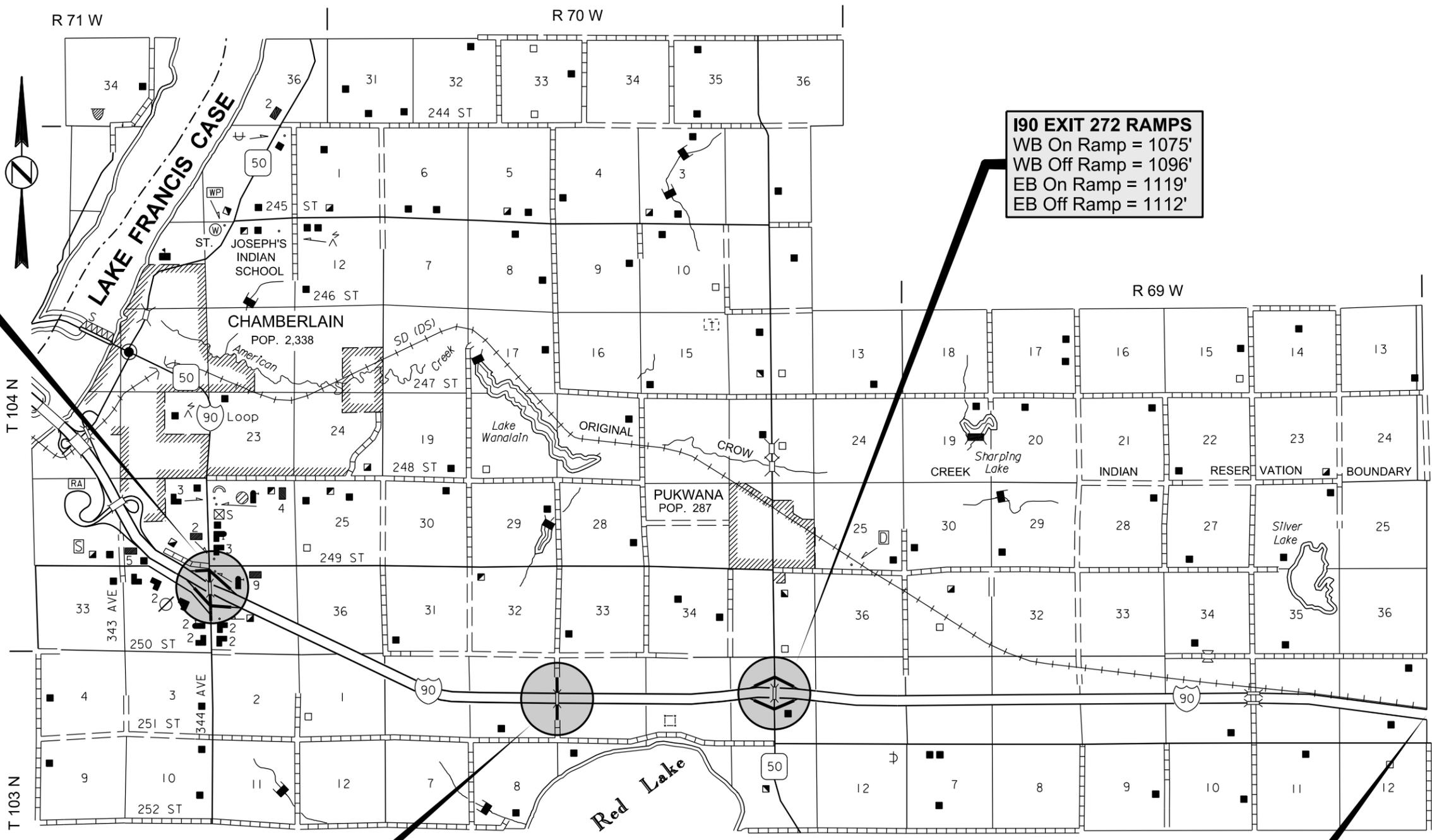
Plotting Date: 12/31/2014

IM 0021(155)
INTERSTATE 90
BRULE & AURORA COUNTIES
ASPHALT SURFACE TREATMENT OF RAMPS & CROSSROADS
RAMP LENGTH: 3.234 MILES
CROSSROAD LENGTH: 2.653 MILES
PCN 047L

PLOT SCALE - 1:7000

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN



I90 EXIT 265 RAMPS & CROSSROAD
 WB On Ramp = 975'
 WB Off Ramp = 1319'
 EB On Ramp = 1003'
 EB Off Ramp = 1319'
 N Crossroad = 1126'
 S Crossroad = 1121'

I90 EXIT 272 RAMPS
 WB On Ramp = 1075'
 WB Off Ramp = 1096'
 EB On Ramp = 1119'
 EB Off Ramp = 1112'

I90 EXIT 265 ADT (2013)
 WB On Ramp 1,179
 WB Off Ramp 972
 EB On Ramp 1,472
 EB Off Ramp 492
 Crossroad 3,272

I90 MRM 270.14 ADT (2013)
 Crossroad N/A

I90 EXIT 272 ADT (2013)
 WB On Ramp 134
 WB Off Ramp 121
 EB On Ramp 205
 EB Off Ramp 212
 Crossroad 913

I90 MRM 270.14
 N Crossroad = 814'
 S Crossroad = 847'

I90 continues on next sheet

PLOTTED FROM - IRWJINT06

**IM 0021(155)
INTERSTATE 90
(CONTINUED FROM PREVIOUS SHEET)
BRULE & AURORA COUNTIES
ASPHALT SURFACE TREATMENT OF RAMPS & CROSSROADS
PCN 047L**

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	13	89

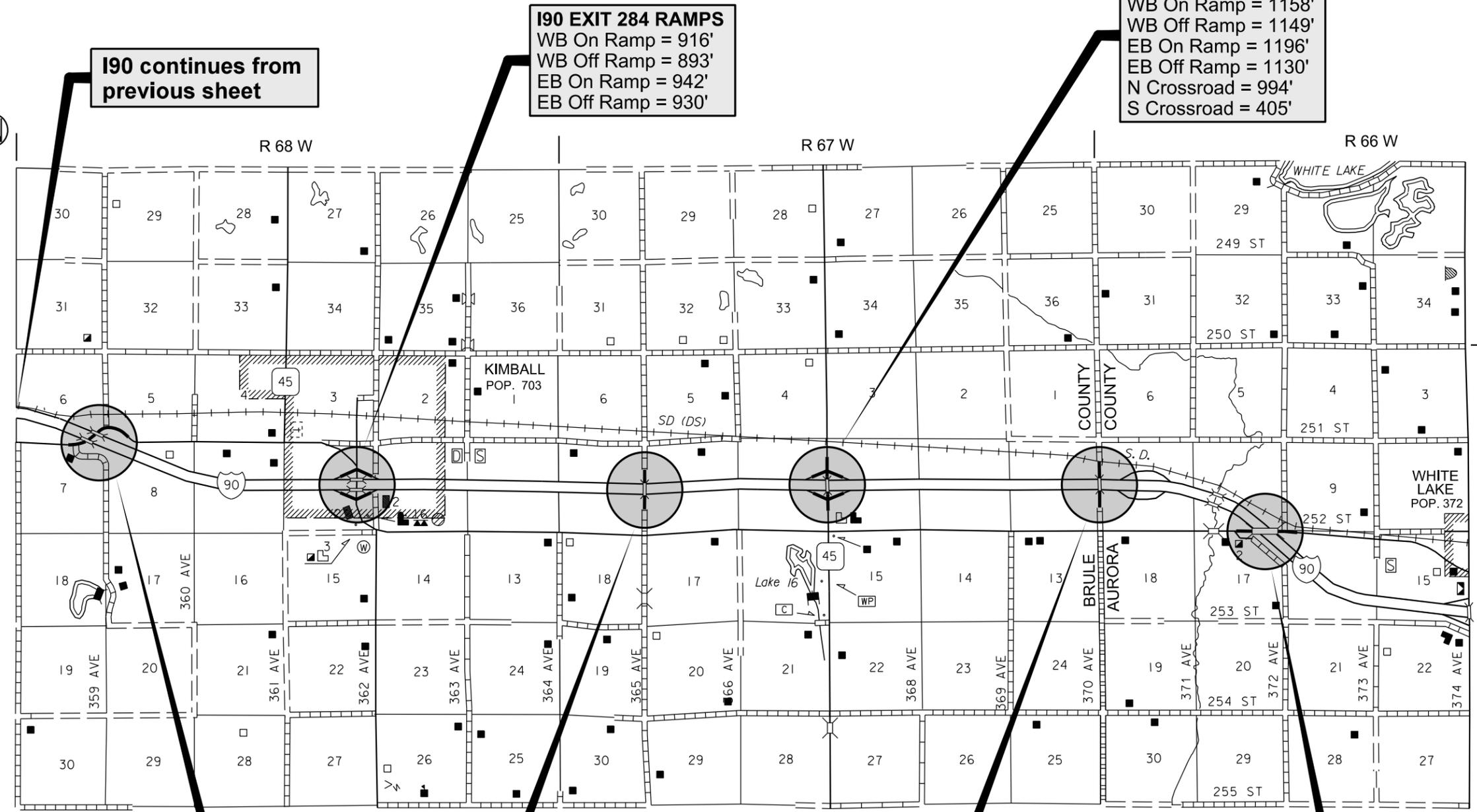
Plotting Date: 12/31/2014

PLOT SCALE - 1:7000

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL T11L047L.DGN

PLOTTED FROM - TRW\INT06



I90 continues from previous sheet

I90 EXIT 284 RAMPS
WB On Ramp = 916'
WB Off Ramp = 893'
EB On Ramp = 942'
EB Off Ramp = 930'

I90 EXIT 289 RAMPS & CROSSROAD
WB On Ramp = 1158'
WB Off Ramp = 1149'
EB On Ramp = 1196'
EB Off Ramp = 1130'
N Crossroad = 994'
S Crossroad = 405'

**I90 MRM 281.13
ADT (2013)
Crossroad N/A**

I90 EXIT 284 ADT (2013)
WB On Ramp 556
WB Off Ramp 846
EB On Ramp 604
EB Off Ramp 443
Crossroad 3,570

**I90 MRM 287.21
ADT (2013)
Crossroad 28**

I90 EXIT 289 ADT (2013)
WB On Ramp 282
WB Off Ramp 371
EB On Ramp 413
EB Off Ramp 441
Crossroad 1,946

**I90 MRM 292.22
ADT (2013)
Crossroad 23**

**I90 MRM 294.14
ADT (2013)
Crossroad N/A**

I90 MRM 281.13
W Crossroad = 750'
E Crossroad = 1450'

I90 MRM 287.21
N Crossroad = 909'
S Crossroad = 928'

I90 MRM 292.22
N Crossroad = 1205'
S Crossroad = 875'

I90 MRM 294.14
W Crossroad = 1107'
E Crossroad = 1591'

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	15	89

Plotting Date: 12/31/2014

P 0021(155)
SD HIGHWAY 262
HANSON & McCOOK COUNTIES
ASPHALT SURFACE TREATMENT
GROSS LENGTH: 17.046 MILES
BRIDGE LENGTH: 0.023 MILE
NET LENGTH: 17.023 MILES
PCN 047L

BEGIN SD262
 STA. 0+00
 MRM 356.13 +0.297
 MILEAGE 0.422
 (Approx. 350' N
 of 257th St)

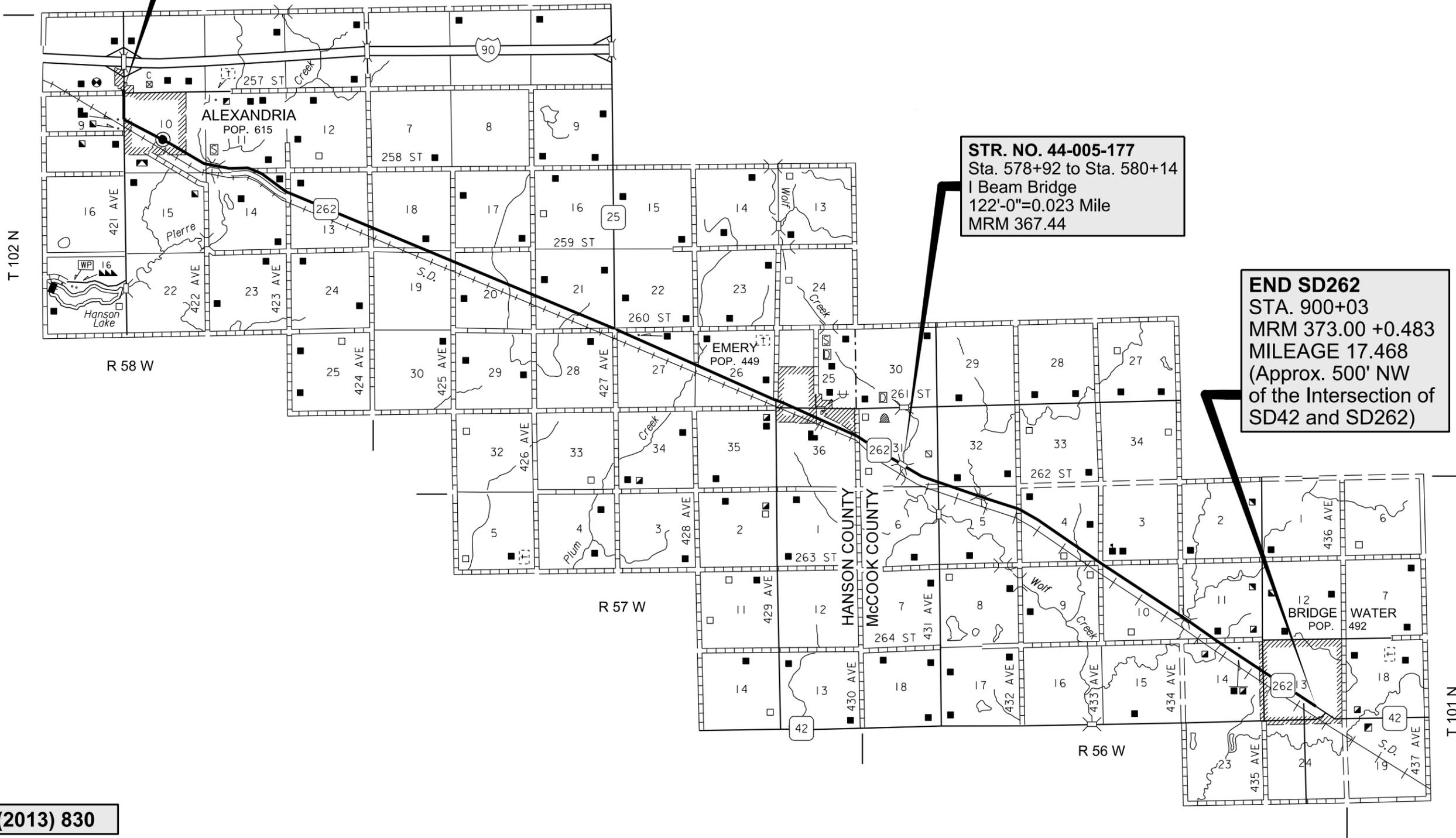
STR. NO. 44-005-177
 Sta. 578+92 to Sta. 580+14
 I Beam Bridge
 122'-0"=0.023 Mile
 MRM 367.44

END SD262
 STA. 900+03
 MRM 373.00 +0.483
 MILEAGE 17.468
 (Approx. 500' NW
 of the Intersection of
 SD42 and SD262)

PLOT SCALE - 1:7000

PLOT NAME - 15

FILE - ... \2015 MIT AREA CHIP SEAL TITL047L.DGN



ADT (2013) 830

ESTIMATE OF QUANTITIES

Revised 1-12-15 PEH

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	16	89

IM-NH-P 0021(155)
(US 18, SD 34 W Segment, SD 34 E Segment, SD 37, SD 38, SD 43, SD 50 W Segment,
SD 50 E Segment, US 81, I 90, I 90L, SD 262 & US 281
AURORA, BRULE, BUFFALO, CHARLES MIX, DAVISON, GREGORY, HANSON,
HUTCHINSON, JERAULD, McCOOK, MINNEHAHA & SANBORN COUNTIES
PCN 047L

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
330E0300	SS-1h or CSS-1h Asphalt for Fog Seal	845.1	Ton
330E3000	Sand for Fog Seal	290.0	Ton
360E0042	CRS-2P Asphalt for Surface Treatment	4,141.9	Ton
360E1200	Modified Cover Aggregate	6,010.4	Ton
360E1200	Modified Cover Aggregate	4,206.8	Ton
360E1200	Modified Cover Aggregate	315.5	Ton
360E1200	Modified Cover Aggregate	459.5	Ton
360E1200	Modified Cover Aggregate	3,568.2	Ton
360E1200	Modified Cover Aggregate	234.9	Ton
360E1200	Modified Cover Aggregate	1,888.1	Ton
360E1200	Modified Cover Aggregate	5,452.8	Ton
360E1200	Modified Cover Aggregate	319.7	Ton
360E1200	Modified Cover Aggregate	1,454.4	Ton
360E1200	Modified Cover Aggregate	428.8	Ton
360E1200	Modified Cover Aggregate	3,326.6	Ton
360E1200	Modified Cover Aggregate	161.3	Ton
633E1300	Pavement Marking Paint, White	5,663.0	Gal
633E1305	Pavement Marking Paint, Yellow	2,116.0	Gal
633E3000	Durable Pavement Marking, 4" White	4,150	Ft
633E3005	Durable Pavement Marking, 4" Yellow	15,100	Ft
633E3010	Durable Pavement Marking, 8" White	169	Ft
633E3030	Durable Pavement Marking, 24" White	1,446	Ft
633E3035	Durable Pavement Marking, 24" Yellow	35	Ft
633E3045	Durable Pavement Marking, Arrow	58	Each
633E6030	Pavement Marking Masking, Arrow	12	Each
633E6040	Pavement Marking Masking, Message	8	Word
634E0010	Flagging	7,205	Hour
634E0020	Pilot Car	1,110	Hour
634E0100	Traffic Control	15,705	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	6	Each
634E0630	Temporary Pavement Marking	262.0	Mile
998E0100	Railroad Protective Insurance	Lump Sum	LS

SPECIFICATIONS

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

RATES OF MATERIALS

The Estimate of Quantities is based on the following quantities of materials per mile.

US 18		
Mainline	0+00 to 1024+40	19.402 miles
	1029+50 to 1236+11	3.913 miles
	1238+55 to 1324+17	1.622 miles
	1334+84 to 1338+32	0.066 miles
		25.003 miles

CRS-2P Asphalt for Surface Treatment at the rate of 21.54 tons applied 24 feet wide (Rate = 0.36 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).

Mainline	1024+40 to 1029+50	0.097 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 43.08 tons applied 48 feet wide (Rate = 0.36 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 295.68 tons applied 48 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 8.98 tons applied 48 feet wide (Rate = 0.075 gallons per square yard).

Mainline	1236+11 to 1238+55	0.046 miles
	1324+17 to 1334+84	0.202 miles
		0.248 miles

CRS-2P Asphalt for Surface Treatment at the rate of 32.31 tons applied 36 feet wide (Rate = 0.36 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 221.76 tons applied 36 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 6.73 tons applied 36 feet wide (Rate = 0.075 gallons per square yard).

Shoulders	0+00 to 277+59	5.257 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 11.97 tons applied 12 feet wide (6 feet each shoulder) (Rate = 0.40 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 73.92 tons applied 12 feet wide (6 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.24 tons applied 12 feet wide (6 feet each shoulder) (Rate = 0.075 gallons per square yard).

US 18 (Continued)		
Shoulders	277+59 to 1338+32	20.090 miles
CRS-2P Asphalt for Surface Treatment at the rate of 13.96 tons applied 14 feet wide (7 feet each shoulder) (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 86.24 tons applied 14 feet wide (7 feet each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.62 tons applied 14 feet wide (7 feet each shoulder) (Rate = 0.075 gallons per square yard).		

SD 34 W Segment		
Mainline	0+00 to 211+08	3.998 miles
	212+13 to 356+10	2.727 miles
	357+38 to 691+14	6.321 miles
	692+20 to 737+04	0.849 miles
	737+96 to 1095+92	6.780 miles
	1099+48 to 1121+74	0.422 miles
		21.097 miles

CRS-2P Asphalt for Surface Treatment at the rate of 20.94 tons applied 24 feet wide (Rate = 0.35 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).

Mainline	1095+92 to 1099+48	0.067 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 41.89 tons applied 48 feet wide (Rate = 0.35 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 295.68 tons applied 48 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 8.98 tons applied 48 feet wide (Rate = 0.075 gallons per square yard).

SD 34 W Segment (Continued)		
Shoulders	0+00 to 211+08	3.998 miles
	212+13 to 356+10	2.727 miles
	357+38 to 691+14	6.321 miles
	692+20 to 737+04	0.849 miles
	737+96 to 1095+92	6.780 miles
	1099+48 to 1121+74	0.422 miles
		21.097 miles

CRS-2P Asphalt for Surface Treatment at the rate of 7.78 tons applied 8 feet wide (4 feet each shoulder) (Rate = 0.39 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 49.28 tons applied 8 feet wide (4 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 1.50 tons applied 8 feet wide (4 feet each shoulder) (Rate = 0.075 gallons per square yard).

Shoulders	1095+92 to 1099+48	0.067 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 11.67 tons applied 12 feet wide (6 feet each shoulder) (Rate = 0.39 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 73.92 tons applied 12 feet wide (6 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.24 tons applied 12 feet wide (6 feet each shoulder) (Rate = 0.075 gallons per square yard).

SD 34 E Segment		
Mainline	0+00 to 56+35	1.067 miles
CRS-2P Asphalt for Surface Treatment at the rate of 41.89 tons applied 48 feet wide (Rate = 0.35 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 295.68 tons applied 48 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 8.98 tons applied 48 feet wide (Rate = 0.075 gallons per square yard).		

RATES OF MATERIALS (CONTINUED)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	19	89

SD 37		
Mainline	0+00 to 6+65	0.126 miles
	64+27 to 70+59	0.120 miles
		0.246 miles
CRS-2P Asphalt for Surface Treatment at the rate of 19.75 tons applied 24 feet wide (Rate = 0.33 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).		
Mainline	6+65 to 64+27	1.091 miles
CRS-2P Asphalt for Surface Treatment at the rate of 29.62 tons applied 36 feet wide (Rate = 0.33 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 221.76 tons applied 36 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 6.73 tons applied 36 feet wide (Rate = 0.075 gallons per square yard).		
Shoulders	0+00 to 64+27	1.217 miles
CRS-2P Asphalt for Surface Treatment at the rate of 15.56 tons applied 16 feet wide (8 feet each shoulder) (Rate = 0.39 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 98.56 tons applied 16 feet wide (8 feet each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.99 tons applied 16 feet wide (8 feet each shoulder) (Rate = 0.075 gallons per square yard).		
Shoulders	64+27 to 70+59	0.120 miles
CRS-2P Asphalt for Surface Treatment at the rate of 17.50 tons applied 18 feet wide (9 feet each shoulder) (Rate = 0.39 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 110.88 tons applied 18 feet wide (9 feet each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 3.37 tons applied 18 feet wide (9 feet each shoulder) (Rate = 0.075 gallons per square yard).		

SD 38		
Mainline	0+00 to 573+65	10.865 miles
	575+23 to 873+27	5.645 miles
		16.510 miles
CRS-2P Asphalt for Surface Treatment at the rate of 21.54 tons applied 24 feet wide (Rate = 0.36 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).		
Shoulders	0+00 to 573+65	10.865 miles
	575+23 to 873+27	5.645 miles
		16.510 miles
CRS-2P Asphalt for Surface Treatment at the rate of 10.97 tons applied 11 feet wide (5.5 feet each shoulder) (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 67.76 tons applied 11 feet wide (5.5 feet each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.06 tons applied 11 feet wide (5.5 feet each shoulder) (Rate = 0.075 gallons per square yard).		

SD 43		
Mainline	0+00 to 58+87	1.115 miles
CRS-2P Asphalt for Surface Treatment at the rate of 22.14 tons applied 24 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).		
Shoulders	0+00 to 55+87	1.058 miles
CRS-2P Asphalt for Surface Treatment at the rate of 9.97 tons applied 10 feet wide (5 feet each shoulder) (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 61.60 tons applied 10 feet wide (5 feet each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 1.87 tons applied 10 feet wide (5 feet each shoulder) (Rate = 0.075 gallons per square yard).		

SD 43 Continued)		
Shoulders	55+87 to 58+87	0.057 miles
CRS-2P Asphalt for Surface Treatment at the rate of 13.96 tons applied 14 feet wide (7 feet each shoulder) (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 86.24 tons applied 14 feet wide (7 feet each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.62 tons applied 14 feet wide (7 feet each shoulder) (Rate = 0.075 gallons per square yard).		

SD 50 W Segment		
Mainline	0+00 to 464+64	8.800 miles
CRS-2P Asphalt for Surface Treatment at the rate of 20.35 tons applied 24 feet wide (Rate = 0.34 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).		
Mainline	464+64 to 465+17	0.010 miles
CRS-2P Asphalt for Surface Treatment at the rate of 47.47 tons applied 56 feet wide (Rate = 0.34 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 344.96 tons applied 56 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 10.47 tons applied 56 feet wide (Rate = 0.075 gallons per square yard).		
Shoulders	0+00 to 200+00	3.788 miles
CRS-2P Asphalt for Surface Treatment at the rate of 7.98 tons applied 8 feet wide (4 feet each shoulder) (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 49.28 tons applied 8 feet wide (4 feet each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 1.50 tons applied 8 feet wide (4 feet each shoulder) (Rate = 0.075 gallons per square yard).		

RATES OF MATERIALS (CONTINUED)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	20	89

SD 50 W Segment (Continued)

Shoulders	200+00 to 388+64	3.573 miles
	439+14 to 464+64	<u>0.483 miles</u>
		4.056 miles

CRS-2P Asphalt for Surface Treatment at the rate of 10.97 tons applied 11 feet wide (5.5 feet each shoulder) (Rate = 0.40 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 67.76 tons applied 11 feet wide (5.5 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.06 tons applied 11 feet wide (5.5 feet each shoulder) (Rate = 0.075 gallons per square yard).

Shoulders	388+64 to 439+14	0.956 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 15.96 tons applied 16 feet wide (8 feet each shoulder) (Rate = 0.40 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 98.56 tons applied 16 feet wide (8 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.99 tons applied 16 feet wide (8 feet each shoulder) (Rate = 0.075 gallons per square yard).

SD 50 E Segment

Mainline	0+00 to 13+79	0.261 miles
	16+77 to 240+96	4.246 miles
	242+02 to 815+91	<u>10.869 miles</u>
		15.376 miles

CRS-2P Asphalt for Surface Treatment at the rate of 22.14 tons applied 24 feet wide (Rate = 0.37 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).

Mainline	815+91 to 1438+87	11.798 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 25.83 tons applied 28 feet wide (Rate = 0.37 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 172.48 tons applied 28 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 5.24 tons applied 28 feet wide (Rate = 0.075 gallons per square yard).

SD 50 E Segment (Continued)

Shoulders	0+00 to 21+67	0.410 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 7.98 tons applied 8 feet wide (4 feet each shoulder) (Rate = 0.40 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 49.28 tons applied 8 feet wide (4 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 1.50 tons applied 8 feet wide (4 feet each shoulder) (Rate = 0.075 gallons per square yard).

Shoulders	21+67 to 37+06	0.291 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 9.97 tons applied 10 feet wide (5 feet each shoulder) (Rate = 0.40 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 61.60 tons applied 10 feet wide (5 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 1.87 tons applied 10 feet wide (5 feet each shoulder) (Rate = 0.075 gallons per square yard).

Shoulders	37+06 to 815+91	14.751 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 11.97 tons applied 12 feet wide (6 feet each shoulder) (Rate = 0.40 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 73.92 tons applied 12 feet wide (6 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.24 tons applied 12 feet wide (6 feet each shoulder) (Rate = 0.075 gallons per square yard).

US 81

Mainline	0+00 to 53+64	1.016 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 30.52 tons applied 36 feet wide (Rate = 0.34 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 221.76 tons applied 36 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 6.73 tons applied 36 feet wide (Rate = 0.075 gallons per square yard).

US 81 (Continued)

Shoulders	0+00 to 53+64	1.016 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 11.67 tons applied 12 feet wide (6 feet each shoulder) (Rate = 0.39 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 73.92 tons applied 12 feet wide (6 feet each shoulder) (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.24 tons applied 12 feet wide (6 feet each shoulder) (Rate = 0.075 gallons per square yard).

I 90

Chamberlain Rest Area

WB Off Ramp	0+00 to 27+23	0.516 miles
	30+90 to 55+13	<u>0.459 miles</u>
		0.975 miles

CRS-2P Asphalt for Surface Treatment at the rate of 28.20 tons applied 29 feet wide (Rate = 0.39 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 178.64 tons applied 29 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 5.42 tons applied 29 feet wide (Rate = 0.075 gallons per square yard).

WB On Ramp	0+00 to 21+86	0.414 miles
	25+52 to 39+94	<u>0.273 miles</u>
		0.687 miles

CRS-2P Asphalt for Surface Treatment at the rate of 27.23 tons applied 28 feet wide (Rate = 0.39 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 172.48 tons applied 28 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 5.24 tons applied 28 feet wide (Rate = 0.075 gallons per square yard).

EB Off Ramp	0+00 to 15+07	0.285 miles
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CRS-2P Asphalt for Surface Treatment at the rate of 26.25 tons applied 27 feet wide (Rate = 0.39 gallon per square yard).

Modified Cover Aggregate, (Type 2A) at the rate of 166.32 tons applied 27 feet wide (Rate = 21 pounds per square yard).

SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 5.05 tons applied 27 feet wide (Rate = 0.075 gallons per square yard).

RATES OF MATERIALS (CONTINUED)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	21	89

I 90 (Continued)		
Chamberlain Rest Area		
EB On Ramp	3+54 to 20+96	0.330 miles
CRS-2P Asphalt for Surface Treatment at the rate of 27.23 tons applied 28 feet wide (Rate = 0.39 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 172.48 tons applied 28 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 5.24 tons applied 28 feet wide (Rate = 0.075 gallons per square yard).		
Exit 265		
(NE) WB Off Ramp	0+00 to 13+19	0.250 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.34 tons applied 26 feet wide (Rate = 0.36 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 160.16 tons applied 26 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.86 tons applied 26 feet wide (Rate = 0.075 gallons per square yard).		
Exit 265		
(NW) WB On Ramp	0+00 to 9+75	0.185 miles
CRS-2P Asphalt for Surface Treatment at the rate of 22.04 tons applied 26 feet wide (Rate = 0.34 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 160.16 tons applied 26 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.86 tons applied 26 feet wide (Rate = 0.075 gallons per square yard).		
Exit 265		
(SW) EB Off Ramp	0+00 to 13+19	0.250 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.99 tons applied 26 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 160.16 tons applied 26 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.86 tons applied 26 feet wide (Rate = 0.075 gallons per square yard).		

I 90 (Continued)		
Exit 265		
(SE) EB On Ramp	0+00 to 10+03	0.190 miles
CRS-2P Asphalt for Surface Treatment at the rate of 22.04 tons applied 26 feet wide (Rate = 0.34 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 160.16 tons applied 26 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.86 tons applied 26 feet wide (Rate = 0.075 gallons per square yard).		
Exit 265		
Crossroad Mainline	0+00 to 11+21	0.212 miles
	14+49 to 25+75	0.213 miles
		0.425 miles
CRS-2P Asphalt for Surface Treatment at the rate of 19.75 tons applied 24 feet wide (Rate = 0.33 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).		
Exit 265		
Crossroad Shoulders	0+00 to 11+21	0.212 miles
	14+49 to 25+75	0.213 miles
		0.425 miles
CRS-2P Asphalt for Surface Treatment at the rate of 15.96 tons applied 16 feet wide (8 feet each shoulder) (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 98.56 tons applied 16 feet wide (8 each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 2.99 tons applied 16 feet wide (8 feet each shoulder) (Rate = 0.075 gallons per square yard).		
MRM 270.14		
Mainline	0+00 to 8+47	0.160 miles
	11+00 to 19+14	0.154 miles
		0.314 miles
CRS-2P Asphalt for Surface Treatment at the rate of 24.93 tons applied 25 feet wide (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		

I 90 (Continued)		
Exit 272		
(NE) WB Off Ramp	0+00 to 10+96	0.208 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.06 tons applied 25 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		
Exit 272		
(NW) WB On Ramp	0+00 to 10+75	0.204 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.06 tons applied 25 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		
Exit 272		
(SW) EB Off Ramp	0+00 to 11+12	0.211 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.06 tons applied 25 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		
Exit 272		
(SE) EB On Ramp	0+00 to 11+19	0.212 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.06 tons applied 25 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		

RATES OF MATERIALS (CONTINUED)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	22	89

I 90 (Continued)		
MRM 281.13		
Mainline	0+00 to 7+50	0.142 miles
	7+50 to 22+00	<u>0.275 miles</u>
		0.417 miles
CRS-2P Asphalt for Surface Treatment at the rate of 22.14 tons applied 24 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).		
MRM 281.13		
Shoulders	0+00 to 7+50	0.142 miles
	7+50 to 22+00	<u>0.275 miles</u>
		0.417 miles
CRS-2P Asphalt for Surface Treatment at the rate of 7.98 tons applied 8 feet wide (4 feet each shoulder) (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 49.28 tons applied 8 feet wide (4 feet each shoulder) (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 1.50 tons applied 8 feet wide (4 feet each shoulder) (Rate = 0.075 gallons per square yard).		
Exit 284		
(NE) WB Off Ramp	0+00 to 8+93	0.169 miles
CRS-2P Asphalt for Surface Treatment at the rate of 21.99 tons applied 24.5 feet wide (Rate = 0.36 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 150.92 tons applied 24.5 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.58 tons applied 24.5 feet wide (Rate = 0.075 gallons per square yard).		
Exit 284		
(NW) WB On Ramp	0+00 to 9+16	0.173 miles
CRS-2P Asphalt for Surface Treatment at the rate of 21.99 tons applied 24.5 feet wide (Rate = 0.36 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 150.92 tons applied 24.5 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.58 tons applied 24.5 feet wide (Rate = 0.075 gallons per square yard).		

I 90 (Continued)		
Exit 284		
(SW) EB Off Ramp	0+00 to 9+30	0.176 miles
CRS-2P Asphalt for Surface Treatment at the rate of 22.60 tons applied 24.5 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 150.92 tons applied 24.5 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.58 tons applied 24.5 feet wide (Rate = 0.075 gallons per square yard).		
Exit 284		
(SE) EB On Ramp	0+00 to 9+42	0.178 miles
CRS-2P Asphalt for Surface Treatment at the rate of 21.99 tons applied 24.5 feet wide (Rate = 0.36 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 150.92 tons applied 24.5 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.58 tons applied 24.5 feet wide (Rate = 0.075 gallons per square yard).		
MRM 287.21		
Mainline	0+00 to 9+28	0.176 miles
	11+96 to 21+05	<u>0.172 miles</u>
		0.348 miles
CRS-2P Asphalt for Surface Treatment at the rate of 25.93 tons applied 26 feet wide (Rate = 0.40 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 160.16 tons applied 26 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.86 tons applied 26 feet wide (Rate = 0.075 gallons per square yard).		
Exit 289		
(NE) WB Off Ramp	0+00 to 11+49	0.218 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.06 tons applied 25 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		

I 90 (Continued)		
Exit 289		
(NW) WB On Ramp	0+00 to 11+58	0.219 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.06 tons applied 25 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		
Exit 289		
(SW) EB Off Ramp	0+00 to 11+30	0.214 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.06 tons applied 25 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		
Exit 289		
(SE) EB On Ramp	0+00 to 11+96	0.227 miles
CRS-2P Asphalt for Surface Treatment at the rate of 23.06 tons applied 25 feet wide (Rate = 0.37 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 154.00 tons applied 25 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.68 tons applied 25 feet wide (Rate = 0.075 gallons per square yard).		
Exit 289		
Crossroad Mainline	0+00 to 4+05	0.077 miles
	7+02 to 16+96	<u>0.188 miles</u>
		0.265 miles
CRS-2P Asphalt for Surface Treatment at the rate of 20.35 tons applied 24 feet wide (Rate = 0.34 gallon per square yard).		
Modified Cover Aggregate, (Type 2A) at the rate of 147.84 tons applied 24 feet wide (Rate = 21 pounds per square yard).		
SS-1h or CSS-1h Asphalt for Fog Seal at the rate of 4.49 tons applied 24 feet wide (Rate = 0.075 gallons per square yard).		

TABLE OF ADDITIONAL QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	24	89

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>US 18</u>			
Sta. 287+94 Rt Intersecting Road & Radii – 349 Ave Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	201 SqYd 0.34	2.11	0.06
Sta. 429+47 Rt Intersecting Road & Radii – 296 St Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	135 SqYd 0.23	1.42	0.04
Sta. 429+73 Lt Intersecting Road & Radii – 296 St Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	155 SqYd 0.26	1.63	0.05
Sta. 593+08 Lt Intersecting Road & Radii – 354 Ave Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	227 SqYd 0.39	2.38	0.07
Sta. 539+13 Rt Intersecting Road & Radii – 354 Ave (Naper Road) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	657 SqYd 1.12	6.90	0.21
Sta. 811+17 Rt Intersecting Road & Radii – 358 Ave Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	184 SqYd 0.31	1.93	0.06
Sta. 970+94 Lt Intersecting Road & Radii – 361 Ave (Jct SD 1806) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	348 SqYd 0.59	3.65	0.11
Sta. 1005+58 Lt Bus Shed Entrance (Bonesteel) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	295 SqYd 0.50	3.10	0.09
Sta. 1007+06 Lt Bus Shed Entrance (Bonesteel) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	216 SqYd 0.37	2.27	0.07
Sta. 1007+93 Lt City St – First Ave (Bonesteel) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	431 SqYd 0.73	4.53	0.14
Sta. 1014+72 Lt City St – McKinley St (Bonesteel) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	361 SqYd 0.61	3.79	0.12
Sta. 1019+65 Lt City St – Howard St (Bonesteel) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	176 SqYd 0.30	1.85	0.06
Sta. 1020+21 to 1024+40 Lt Mainline Transition from 12' to 24' Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	279 SqYd 0.47	2.93	0.09

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>US 18 (Continued)</u>			
Sta. 1022+81 to 1024+40 Rt Mainline Transition from 12' to 24' Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	106 SqYd 0.18	1.11	0.03
Sta. 1024+49 Lt City St – Garrison St (Bonesteel) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	226 SqYd 0.38	2.37	0.07
Sta. 1026+25 Lt Commercial Entrance Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	176 SqYd 0.30	1.85	0.06
Sta. 1028+12 Lt Commercial Entrance Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	178 SqYd 0.30	1.87	0.06
Sta. 1029+49 Lt City St – Mellette St (Bonesteel) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	477 SqYd 0.81	5.01	0.15
Sta. 1029+50 to 1032+26 Lt Mainline Transition from 24' to 12' Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	184 SqYd 0.31	1.93	0.06
Sta. 1029+50 to 1032+ 81 Rt Mainline Transition from 24' to 12' Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	221 SqYd 0.38	2.32	0.07
Sta. 1043+21 Rt SDDOT Entrance (Bonesteel) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	244 SqYd 0.41	2.56	0.08
Sta. 1229+00 to 1236+11 Lt Mainline Transition from 12' to 24' Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	474 SqYd 0.81	4.98	0.15
Sta. 1237+92 Lt Intersecting Road & Radii – Turney Ave (Fairfax Road) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	407 SqYd 0.69	4.27	0.13
Sta. 1238+55 to 1245+83 Lt Mainline Transition from 24' to 12' Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	485 SqYd 0.82	5.09	0.15
Sta. 1263+95 Lt Intersecting Road & Radii – 302 St (Fairfax Road) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	367 SqYd 0.62	3.85	0.12
Sta. 1268+09 Rt Commercial Entrance Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	301 SqYd 0.51	3.16	0.10

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>US 18 (Continued)</u>			
Sta. 1317+93 Rt Gore Area – Jct SD 43 Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	222 SqYd 0.38	2.33	0.07
Sta. 1321+66 Rt Gore Area – Jct SD 43 Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	123 SqYd 0.21	1.29	0.04
Sta. 1334+84 to 1338+32 Rt Transition from 24' to 12' Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	232 SqYd 0.39	2.44	0.07
Spur Road at SD 43 Jct 400' x 48' Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	2133 SqYd 3.63	22.40	0.68
Spur Road Radii at SD 43 Jct Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	173 SqYd 0.29	1.82	0.06
US 18 Totals:	17.64	109.14	3.32

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 34 W Segment</u>			
Sta. 0+00 Lt Radius – Jct SD 45 Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	69 SqYd 0.11	0.72	0.02
Sta. 0+00 Rt Radius – Jct SD 45 Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	68 SqYd 0.11	0.71	0.02
Sta. 678+28 Rt Intersecting Road & Radii – 373 Ave (White Lake Road) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	277 SqYd 0.46	2.91	0.09
Sta. 1082+04 to 1095+92 Lt Shoulder Transition from 4' to 6' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	154 SqYd 0.26	1.62	0.05
Sta. 1082+04 to 1095+92 Rt Shoulder Transition from 4' to 6' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	154 SqYd 0.26	1.62	0.05
Sta. 1090+66 to 1095+92 Mainline Transition from 12' to 36' Rates = 0.35 gal, 21 lb & 0.075 gal/SqYd	701 SqYd 1.04	7.36	0.22
Sta. 1099+48 to 1105+50 Mainline Transition from 36' to 12' Rates = 0.35 gal, 21 lb & 0.075 gal/SqYd	803 SqYd 1.19	8.43	0.26
SD 34 W Segment Totals:	3.43	23.37	0.71

TABLE OF ADDITIONAL QUANTITIES (CONTINUED)

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 34 E Segment</u>			
None			
SD 34 E Segment Totals:	0.00	0.00	0.00

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 37</u>			
Sta. 0+75 to 6+65 Mainline Transition 12' to 24' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	393 SqYd 0.65	4.13	0.13
Sta. 5+51 Lt Commercial Entrance Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	276 SqYd 0.46	2.90	0.09
Sta. 9+02 Lt Intersecting Road & Radii – Jct SD 44 Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	854 SqYd 1.42	8.97	0.27
Sta. 9+02 Rt Intersecting Road & Radii – Jct SD 44 Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	757 SqYd 1.25	7.95	0.24
Sta. 20+77 Lt Residential Entrance Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	114 SqYd 0.19	1.20	0.04
Sta. 26+10 Lt Commercial Entrance Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	218 SqYd 0.36	2.29	0.07
Sta. 30+75 Lt Commercial Entrance Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	187 SqYd 0.31	1.96	0.06
Sta. 46+03 Lt Commercial Entrance Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	176 SqYd 0.29	1.85	0.06
Sta. 48+40 Lt Commercial Entrance Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	238 SqYd 0.39	2.50	0.08
Sta. 52+52 Lt Commercial Entrance Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	164 SqYd 0.27	1.72	0.05
Sta. 61+78 Lt Intersecting Road & Radii – 275 St Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	333 SqYd 0.55	3.50	0.11
Sta. 61+85 Lt Intersecting Road & Radii – 275 St Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	472 SqYd 0.78	4.96	0.15

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 37 (Continued)</u>			
Sta. 64+27 to 69+99 Mainline Transition 24' to 12' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	381 SqYd 0.63	4.00	0.12
SD 37 Totals:	7.55	47.93	1.47

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 38</u>			
Sta. 0+21 Lt Commercial Entrance Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	120 SqYd 0.20	1.26	0.04
Sta. 1+35 Lt Commercial Entrance Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	116 SqYd 0.20	1.22	0.04
Sta. 3+05 Lt City St – Main St (Salem) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	179 SqYd 0.30	1.88	0.06
Sta. 8+96 Lt City St – George St (Salem) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	90 SqYd 0.15	0.95	0.03
Sta. 11+89 Rt SDDOT Entrance (Salem) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	198 SqYd 0.34	2.08	0.06
Sta. 15+49 Lt City St – Hill St (Salem) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	123 SqYd 0.21	1.29	0.04
SD 38 Totals:	1.40	8.68	0.27

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 43</u>			
None			
SD 43 Totals:	0.00	0.00	0.00

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 50 W Segment</u>			
Sta. 396+70 Lt Intersecting Road & Radii – 245 St Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	198 SqYd 0.34	2.08	0.06
Sta. 402+37 Lt Intersecting Road & Radius – Thunder Rd Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	153 SqYd 0.26	1.61	0.05
Sta. 405+10 Rt Intersecting Road & Radii – Roam Free Park Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	163 SqYd 0.28	1.71	0.05

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 50 W Segment (Continued)</u>			
Sta. 427+73 to 432+10 Rt Runaway Truck Ramp Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	1275 SqYd 2.17	13.39	0.41
Sta. 455+59 Lt City St – Van Antwerp St (Chamberlain) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	121 SqYd 0.21	1.27	0.04
Sta. 456+61 Rt School Entrance Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	89 SqYd 0.15	0.93	0.03
Sta. 462+43 to 464+64 Mainline Transition from 24' to 56' Rates = 0.34 gal, 21 lb & 0.075 gal/SqYd	393 SqYd 0.57	4.13	0.13
Sta. 464+42 Lt City St – K St (Chamberlain) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	152 SqYd 0.26	1.60	0.05
Sta. 464+42 Rt City St – K St (Chamberlain) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	112 SqYd 0.19	1.18	0.04
SD 50 W Segment Totals:	4.43	27.90	0.86

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 50 E Segment</u>			
Sta. 47+09 Lt Intersecting Road & Radii – 251 St (Old 16) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	311 SqYd 0.53	3.27	0.10
Sta. 683+88 Lt Intersecting Road & Radii - 263 St Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	129 SqYd 0.22	1.35	0.04
Sta. 1427+89 Lt Intersecting Road & Radii – 271 St & 357 Ave Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	1097 SqYd 1.86	11.52	0.35
SD 50 E Segment Totals:	2.61	16.14	0.49

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>US 81</u>			
Sta. 12+42 Rt City St – Center Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	163 SqYd 0.27	1.71	0.05
Sta. 22+19 Rt City St – Drake Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	78 SqYd 0.13	0.82	0.02

TABLE OF ADDITIONAL QUANTITIES (CONTINUED)

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
US 81 (Continued)			
Sta. 29+01 Rt City St – Norton Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	138 SqYd 0.23	1.45	0.04
Sta. 29+01 Lt City St – Norton Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	108 SqYd 0.18	1.13	0.03
Sta. 33+21 Rt City St – Vermont Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	142 SqYd 0.24	1.49	0.05
Sta. 33+21 Lt City St – Vermont Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	104 SqYd 0.17	1.09	0.03
Sta. 36+98 Rt City St – Essex Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	82 SqYd 0.14	0.86	0.03
Sta. 36.98 Lt City St – Essex Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	80 SqYd 0.13	0.84	0.03
Sta. 40+94 Rt City St – Washington Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	107 SqYd 0.18	1.12	0.03
Sta. 40+94 Lt City St – Washington Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	98 SqYd 0.16	1.03	0.03
Sta. 44+10 Rt City St – Lincoln Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	78 SqYd 0.13	0.82	0.02
Sta. 44+10 Lt City St – Lincoln Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	100 SqYd 0.17	1.05	0.03
Sta. 47+24 Rt City St – Jefferson Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	84 SqYd 0.14	0.88	0.03
Sta. 47+24 Lt City St – Jefferson Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	89 SqYd 0.15	0.93	0.03
Sta. 50+38 Lt City St – Franklin Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	98 SqYd 0.16	1.03	0.03

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
US 81 (Continued)			
Sta. 52+52 Lt City St – Richard Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	15498 SqYd 0.26	1.62	0.05
Sta. 59+59 Rt City St – Richard Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	136 SqYd 0.23	1.43	0.04
US 81 Totals:	3.07	19.30	0.57

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
I 90			
Chamberlain Rest Area EB Off Ramp Sta. 15+07 to 17+40 Transition from 27' to 0' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	350 SqYd 0.58	3.68	0.11
Chamberlain Rest Area EB on Ramp Sta. 0+00 to 3+54 Transition from 0' to 28' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	551 SqYd 0.91	5.79	0.18
Chamberlain Rest Area East Parking Area Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	525 SqYd 0.87	5.51	0.17
Chamberlain Rest Area West Parking Area Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	355 SqYd 0.59	3.73	0.11
I 90 Chamberlain Rest Area Totals:	2.95	18.71	0.57

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
I 90			
Exit 265 (NE) WB Off Ramp Sta. 13+19 Lt SE Radius Rates = 0.36 gal, 21 lb & 0.075 gal/SqYd	336 SqYd 0.51	3.53	0.11
Exit 265 (NE) WB Off Ramp Sta. 13+19 Rt NE Radius Rates = 0.36 gal, 21 lb & 0.075 gal/SqYd	28 SqYd 0.04	0.29	0.01
Exit 265 (NW) WB On Ramp Sta. 0+00 Lt SW Radius Rates = 0.34 gal, 21 lb & 0.075 gal/SqYd	55 SqYd 0.08	0.58	0.02

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
I 90 (Continued)			
Exit 265 (NW) WB On Ramp Sta. 0+00 Rt NW Radius Rates = 0.34 gal, 21 lb & 0.075 gal/SqYd	180 SqYd 0.26	1.89	0.06
Exit 265 (SW) EB Off Ramp Sta. 13+19 Lt NW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	386 SqYd 0.61	4.05	0.12
Exit 265 (SW) EB Off Ramp Sta. 13+19 Rt SW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	12 SqYd 0.02	0.13	0.01
Exit 265 (SE) EB On Ramp Sta. 0+00 Lt NE Radius Rates = 0.34 gal, 21 lb & 0.075 gal/SqYd	92 SqYd 0.13	0.97	0.03
Exit 265 (SE) EB On Ramp Sta. 0+00 Rt SE Radius Rates = 0.34 gal, 21 lb & 0.075 gal/SqYd	117 SqYd 0.17	1.23	0.04
Exit 265 Crossroad Sta. 23+89 Rt Intersecting Road & Radii – 249 St (Old 16) Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	291 SqYd 0.49	3.06	0.09
Exit 265 Crossroad Sta. 23+89 Lt Intersecting Road & Radii – Sunset Road Rates = 0.40 gal, 21 lb & 0.075 gal/SqYd	87 SqYd 0.15	0.91	0.03
I 90 Exit 265 Totals:	2.46	16.64	0.52

TABLE OF ADDITIONAL QUANTITIES (CONTINUED)

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON	LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON	LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON			
<u>I 90(Continued)</u>				<u>I 90(Continued)</u>				<u>I 90(Continued)</u>						
Exit 272 (NE) WB Off Ramp Sta. 10+96 Lt SE Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	310 SqYd	0.49	3.26	0.10	Exit 284 (NE) WB Off Ramp Sta. 8+93 Lt SE Radius Rates = 0.36 gal, 21 lb & 0.075 gal/SqYd	45 SqYd	0.7	0.47	0.01	Exit 289 (NE) WB Off Ramp Sta. 11+49 Lt SE Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	71 SqYd	0.11	0.75	0.02
Exit 272 (NE) WB Off Ramp Sta. 10+96 Rt NE Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	52 SqYd	0.08	0.55	0.02	Exit 284 (NE) WB Off Ramp Sta. 8+93 Rt NE Radius Rates = 0.36 gal, 21 lb & 0.075 gal/SqYd	97 SqYd	0.15	1.02	0.03	Exit 289 (NE) WB Off Ramp Sta. 11+49 Rt NE Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	70 SqYd	0.11	0.74	0.02
Exit 272 (NW) WB On Ramp Sta. 0+00 Lt SW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	347 SqYd	0.55	3.64	0.11	Exit 284 (NW) WB On Ramp Sta. 0+00 Lt SW Radius Rates = 0.36 gal, 21 lb & 0.075 gal/SqYd	52 SqYd	0.08	0.55	0.02	Exit 289 (NW) WB On Ramp Sta. 0+00 Lt SW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	139 SqYd	0.22	1.46	0.04
Exit 272 (NW) WB On Ramp Sta. 0+00 Rt NW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	60 SqYd	0.09	0.63	0.02	Exit 284 (NW) WB On Ramp Sta. 0+00 Rt NW Radius Rates = 0.36 gal, 21 lb & 0.075 gal/SqYd	44 SqYd	0.07	0.46	0.01	Exit 289 (NW) WB On Ramp Sta. 0+00 Rt NW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	79 SqYd	0.12	0.83	0.03
Exit 272 (SW) EB Off Ramp Sta. 11+12 Lt NW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	217 SqYd	0.34	2.28	0.07	Exit 284 (SW) EB Off Ramp Sta. 9+30 Lt NW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	68 SqYd	0.11	0.71	0.02	Exit 289 (SW) EB Off Ramp Sta. 11+30 Lt NW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	118 SqYd	0.19	1.24	0.04
Exit 272 (SW) EB Off Ramp Sta. 11+12 Rt SW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	196 SqYd	0.31	2.06	0.06	Exit 284 (SW) EB Off Ramp Sta. 9+30 Rt SW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	63 SqYd	0.10	0.66	0.02	Exit 289 (SW) EB Off Ramp Sta. 11+30 Rt SW Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	72 SqYd	0.11	0.76	0.02
Exit 272 (SE) EB On Ramp Sta. 0+00 Lt NE Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	276 SqYd	0.43	2.90	0.09	Exit 284 (SE) EB On Ramp Sta. 0+00 Lt NE Radius Rates = 0.36 gal, 21 lb & 0.075 gal/SqYd	60 SqYd	0.09	0.63	0.02	Exit 289 (SE) EB On Ramp Sta. 0+00 Lt NE Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	141 SqYd	0.22	1.48	0.04
Exit 272 (SE) EB On Ramp Sta. 0+00 Rt SE Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	109 SqYd	0.17	1.14	0.03	Exit 284 (SE) EB On Ramp Sta. 0+00 Rt SE Radius Rates = 0.36 gal, 21 lb & 0.075 gal/SqYd	42 SqYd	0.06	0.44	0.01	Exit 289 (SE) EB On Ramp Sta. 0+00 Rt SE Radius Rates = 0.37 gal, 21 lb & 0.075 gal/SqYd	83 SqYd	0.13	0.87	0.03
I 90 Exit 272 Totals:	2.46	16.46	0.50		I 90 Exit 284 Totals:	0.73	4.94	0.14		I 90 Exit 289 Totals:	1.21	8.13	0.24	

TABLE OF ADDITIONAL QUANTITIES (CONTINUED)

LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON	LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON	LOCATION	CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON			
<u>I 90L</u>				<u>SD 262 (Continued)</u>				<u>SD 262 (Continued)</u>						
Sta. 53+01 Rt Intersecting Road – Rowley St Rates = 0.33 gal, 21 lb & 0.075 gal/SqYd	912 SqYd	1.28	9.58	0.29	Sta. 25+31 Rt City St – 4 th St (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	116 SqYd	0.19	1.22	0.04	Sta. 485+58 Rt Intersecting Road & Radii – 429 Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	151 SqYd	0.25	1.59	0.05
Sta. 53+01 Rt West Radius – Rowley St Rates = 0.33 gal, 21 lb & 0.075 gal/SqYd	48 SqYd	0.07	0.50	0.02	Sta. 25+84 Lt City St – Cedar (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	87 SqYd	0.14	0.91	0.03	Sta. 494+04 Lt City St – Main St (Emery) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	59 SqYd	0.10	0.62	0.02
Sta. 53+01 Rt East Radius – Rowley St Rates = 0.33 gal, 21 lb & 0.075 gal/SqYd	85 SqYd	0.12	0.89	0.03	Sta. 26+26 Lt City St – 4th St (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	139 SqYd	0.23	1.46	0.04	Sta. 498+21 Lt City St – 3 rd St (Emery) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	107 SqYd	0.18	1.12	0.03
I 90L Totals:	1.47	10.97	0.34		Sta. 29+96 Lt City St – Juniper (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	77 SqYd	0.13	0.81	0.02	Sta. 498+30 Rt City St – 3 rd St (Emery) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	46 SqYd	0.08	0.48	0.01
<u>SD 262</u>					Sta. 31+91 to 34+82 Lt Extra Widening – 291' x 10' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	323 SqYd	0.54	3.39	0.10	Sta. 502+25 Lt City St – 4 th St (Emery) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	98 SqYd	0.16	1.03	0.03
Sta. 0+49 Rt Commercial Entrance Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	289 SqYd	0.48	3.03	0.09	Sta. 38+29 Lt City St – Poplar (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	93 SqYd	0.15	0.98	0.03	Sta. 506+23 Lt City St – 5 th St (Emery) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	41 SqYd	0.07	0.43	0.01
Sta. 3+49 Lt Intersecting Road & Radii – 257 St Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	171 SqYd	0.28	1.80	0.05	Sta. 42+50 Lt City St – Cherry (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	88 SqYd	0.15	0.92	0.03	Sta. 507+28 Lt City St – Hanson (Emery) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	66 SqYd	0.11	0.69	0.02
Sta. 5+57 Lt City St – 9 th St (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	88 SqYd	0.15	0.92	0.03	Sta. 46+68 Lt City St – Walnut (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	99 SqYd	0.16	1.04	0.03	Sta. 607+53 Lt Intersecting Road & Radii – 431 Ave (Spencer Road) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	98 SqYd	0.16	1.03	0.03
Sta. 9+40 Lt City St – 8 th St (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	65 SqYd	0.11	0.68	0.02	Sta. 51+78 Lt City St – Broad (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	103 SqYd	0.17	1.08	0.03	Sta. 607+57 Rt Intersecting Road & Radii – 431 Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	177 SqYd	0.29	1.86	0.06
Sta. 13+03 Lt City St – 7 th St (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	32 SqYd	0.05	0.34	0.01	Sta. 364+65 to 370+58 Mainline Transition from 12' to 24' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	395 SqYd	0.65	4.15	0.13	Sta. 854+94 Lt Intersecting Road & Radii – 435 Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	218 SqYd	0.36	2.29	0.07
Sta. 13+14 Lt Extra Widening-School – 340' x 11' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	416 SqYd	0.69	4.37	0.13	Sta. 372+18 Lt Intersecting Road & Radii – Jct SD 25 Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	321 SqYd	0.53	3.57	0.10	Sta. 855+08 Rt Intersecting Road & Radii – 435 Ave Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	250 SqYd	0.41	2.63	0.08
Sta. 16+65 Lt City St – 6th St (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	28 SqYd	0.05	0.29	0.01	Sta. 373+58 to 377+67 Mainline Transition from 24' to 12' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	273 SqYd	0.45	2.87	0.09	Sta. 856+01 Lt City St – 4 th St (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	229 SqYd	0.38	2.40	0.07
Sta. 20+30 Rt Intersecting Road & Radius – 421 Ave (Alexandria) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	285 SqYd	0.47	2.99	0.09	Sta. 485+37 to 506+58 Rt Extra Widening – 2121' x 8' Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	1885 SqYd	3.12	19.79	0.60	Sta. 862+32 Lt City St – 3 rd St (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd	72 SqYd	0.12	0.76	0.02

TABLE OF ADDITIONAL QUANTITIES (CONTINUED)

LOCATION		CRS-2P ASPHALT SURFACE TREATMENT TON	MODIFIED COVER AGGREGATE (TYPE 2A) TON	SS-1h OR CSS-1h ASPH. FOR FOG SEAL TON
<u>SD 262 (Continued)</u>				
Sta. 867+97 Lt	192 SqYd	0.32	2.02	0.06
City St – Juniper Ave (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 870+32 Lt	223 SqYd	0.37	2.34	0.07
City St – 2 nd St (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 872+11 Lt	197 SqYd	0.33	2.07	0.06
City St – Main St (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 876+41 Lt	40 SqYd	0.07	0.42	0.01
City St – Poplar (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 877+23 Lt	138 SqYd	0.23	1.45	0.04
City St – 1 st St (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 881+14 Lt	33 SqYd	0.05	0.35	0.01
City St – Cherry (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 885+51 Lt	39 SqYd	0.06	0.41	0.01
City St – Walnut (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 887+09 Rt	464 SqYd	0.77	4.87	0.15
City St – Walnut Ave (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 890+76 Lt	90 SqYd	0.15	0.95	0.03
City St – Oak Ave (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
Sta. 895+35 Lt	58 SqYd	0.10	0.61	0.02
City St – Ash Ave (Bridgewater) Rates = 0.39 gal, 21 lb & 0.075 gal/SqYd				
SD 262 Totals:		14.10	89.39	2.68

<u>US 281</u>				
None				
US 281 Totals:		0.00	0.00	0.00

NOTE: The above quantities are included in the Estimate of Quantities.

RIDE ACROSS SOUTH DAKOTA BIKE TOUR

The Ride Across South Dakota bike tour may be on routes that are in this contract to have an asphalt surface treatment applied to them. The routes of the tour can be found at www.RASDAK.com. The Contractor shall schedule his work so as to complete the affected routes after the bike tour is completed.

COORDINATION BETWEEN CONTRACTORS

A separate contract for Project IM-P 0021(153) 046Q Davison, Hanson and McCook Counties has been awarded to another Contractor for asphalt concrete crack sealing on I 90L and SD 262.

The Contractor shall schedule his work so as to complete the asphalt surface treatment on I 90L and SD 262 after completion of the above asphalt concrete crack sealing projects.

SHOULDER WORK

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

Vegetation and accumulated material on or adjacent to the existing roadway shall be removed by the Contractor to the satisfaction of the Engineer prior to asphalt surface treatment.

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

BRIDGES, APPROACH SLABS, SLEEPER SLABS, STRIP SEALS, RAILROAD CROSSINGS, MANHOLES, WATER VALVES, RUMBLE STRIPS AND CONCRETE

Asphalt Surface Treatment, including the fog seal, shall not be placed on any of the bridges, approach slabs, sleeper slabs, strip seals, railroad crossings, manholes, water valves or any type of concrete on these projects. It also shall not be placed on the rumble strips in the mainline driving lane prior to a Stop sign.

Material used to cover and protect these areas shall be removed and disposed of properly after the application of the asphalt surface treatment. When the material is removed, the asphalt surface treatment that does not stay adhered to the material shall be removed from the road surface.

ESTIMATED QUANTITIES FOR ASPHALT SURFACE TREATMENT

The quantities of asphalt for surface treatment and cover aggregate are based off the rates shown in the Rates of Materials. This is only an estimate. The actual application rates of materials will be determined by mix design as stated in these plans. The mix design rates may vary from the estimated rates stated in the Rates of Materials depending on the aggregate source and the variation in gradation and flakiness index. The application rates may also be adjusted in the field due to results of gradations, flakiness index, sweep tests and differing surface conditions as encountered. Pay quantities will be based off the actual target rates the inspectors use even though they may vary significantly from plans estimates.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN

After the aggregate stockpiles have been produced, the Contractor shall submit samples of the aggregates to the asphalt supplier, prior to construction, to determine a mix design and verify compatibility of the aggregate and asphalt.

The asphalt surface treatment will be designed in accordance with the Modified McLeod Design Procedure found in Volume II of Appendix C of the Preventive Maintenance Surface Treatments Report. The asphalt surface treatment design will be prepared by qualified personnel experienced in asphalt surface treatment design.

The surface design will be based on the traffic volume(s) and pavement conditions contained in the plans. The final application rate for the asphalt binder and cover aggregate will be determined after the source of the material is known and field adjustments are made. The design will include the following information:

- 1) Aggregate gradation.
- 2) Bulk specific gravity of the aggregate.
- 3) Loose unit weight of the aggregate.
- 4) Asphalt type and rate of application.
- 5) Aggregate rate of application.

In addition to the above data, the Contractor will submit with the design of the asphalt surface treatment a sample of each aggregate and emulsion for use by the Engineer for verifying the test results. The design may be verified by the Department.

The passing mix design shall be submitted to the Engineer and the Bituminous Engineer at least two weeks prior to the start of construction.

Appendix C Volume II. Guidelines for Design of Chip Seals are reproduced below:

Volume II. Guidelines for Design of Chip Seals

Introduction

This volume presents the guidelines for the design of chip seals. The guidelines first cover some general information regarding the aggregate chips and the asphalt emulsion. The guidelines then address the specific material properties that are used in the recommended design procedure. Finally, the design equations for the aggregate and emulsion application rates are presented. An example design problem, illustrating the design procedure in a step-by-step manner, is also presented.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

Aggregate Chips

Aggregate Type

Three aggregate types—quartzite, limestone and natural aggregates—are commonly used throughout the state. Quartzite is more common in the eastern part of the state, whereas limestone is more common in the western part of the state. Natural aggregates are found in the central as well as the northeast portion of the state. Other aggregate types, such as river gravel and granite, have been used for chip seals but are not common.

The selection of the aggregate type should be based on the availability and cost of aggregates in the area. The performance of chip seals with specific aggregate types should also be considered in the selection. On specialized applications, such as for high-volume roadways, additional considerations may need to be taken into account. For example, crushed aggregate can provide improved retention and durability characteristics.

Aggregate Shape

The ideal shape for aggregate chips is cubical and angular, as opposed to flat and rounded. Flat particles tend to orient on their flattest side under traffic loadings and can become completely covered with emulsion and create a bleeding problem. In addition, these completely embedded chips prevent proper embedment of chips that lie on top of the embedded chips, resulting in continued chip loss. With cubical aggregates, the chip height is essentially the same regardless of its orientation, resulting in more uniform chip embedment.

Angular or crushed aggregate particles are preferred over rounded particles. Rounded aggregates are more susceptible to rolling and displacement under traffic, especially in locations of stopping or turning traffic. Angular particles tend to lock together and provide better long-term retention and stability.

Aggregate Gradation

The aggregate gradation plays a key role in the design, construction and performance of chip seals. The gradation requirements shown in this Design Procedure are for information only and Modified Cover Aggregate is specified in the plans. The ideal gradation comprises the following characteristics:

- The aggregate chips should be similarly sized. A one-size aggregate provides a more uniform thickness and a more consistent and proper embedment of the chips, which improves the retention and performance of the chip seal. Similarly sized chips also help improve the surface friction and drainage capabilities of the chip seal.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

- The aggregate bands should not be too wide. Allowing a wide range of aggregate retained on a particular sieve will result in widely varying gradations and differing performance. A tight gradation band ensures consistency and uniformity of the chip seal.
- The gradation should limit the amount of fines (material passing the 0.075 mm [No. 200] sieve). Fine materials create dust and can be a safety hazard for passing vehicles. Furthermore, fine materials absorb emulsion and can affect the bonding characteristics and performance of the chip seal.

To better account for these ideal properties, the aggregate gradations in Table II-1 are recommended for all roadways. The maximum aggregate size is 9.52 mm (3/8 in). The gradation also forces the majority of the aggregate to a small range to create a more uniform chip seal. The gradation also addresses the amount of fines by limiting the material passing the 0.075 mm (No. 200) sieve to one percent. The recommended gradation for sections using a second choke stone layer is also provided in the table.

Table II-1. Recommended aggregate gradations for chip seal designs.

Sieve Size	Percent Passing	
	Aggregate Chips	Choke Stone
12.7 mm (1/2 in)	100	100
9.52 mm (3/8 in)	90 – 100	100
6.35 mm (1/4 in)	40 – 70	100
4.75 mm (No. 4)	0 – 15	85 – 100
2.36 mm (No. 8)	0 – 5	10 – 40
1.18 mm (No. 16)	–	0 – 10
0.300 mm (No. 50)	–	0 – 5
0.075 mm (No. 200)	0 – 1	0 – 1

Flat and Elongated Particles (Flakiness Index)

Like small particles, flat and elongated particles can become completely embedded in the emulsion and thus prevent larger aggregate particles from achieving proper embedment. The flakiness index – determined in accordance with the Central Federal Lands Highway Division (CFLHD) DFT-508, *Standard Method of Determining the Flakiness Index and Average Least Dimension of Aggregates* – should be performed to limit the amount of flat and elongated particles. The Flakiness Index is a measure of the percentage, by weight, of flat particles. For most applications, the Flakiness Index should be limited to 30 percent (i.e., the weight of flat and elongated particles should not exceed 30 percent of the total aggregate weight). For special applications such as high-volume roadways, the limit should be tightened to 20 or 25 percent.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

Asphalt Emulsion

Emulsification is a process in which two otherwise incompatible materials are blended together. In the case of asphalt emulsion, the two incompatible materials are asphalt and water. An asphalt emulsion consists of asphalt particles dispersed in water, which is stabilized using a chemical solution (also known as an emulsifier). Upon application, the water and asphalt separate, a process referred to as "breaking" of the emulsion. The water then evaporates leaving the asphalt as the bonding agent.

Emulsion Classification

Asphalt emulsions are classified into three categories – anionic, cationic and nonionic – referring to the electrical charge of the emulsifier surrounding the asphalt particles. Anionic emulsions have a negative electrical charge surrounding the asphalt particles, and cationic emulsions have a positive charge.

Because opposite electrical charges attract, anionic emulsions should be used with aggregates that have a positive charge (such as limestone and natural aggregates). Likewise, cationic emulsions should be used with aggregates that have a negative charge (such as quartzite).

Emulsions are further identified based on how quickly they revert back to asphalt cement. The following terms are used to classify the emulsion grades:

- Rapid-setting (RS)
- Medium-setting (MS)
- Slow-setting (SS)
- Quick-setting (QS)

The grades indicate the speed at which the emulsion will become unstable and "break" coming into contact with the aggregate. An RS emulsion breaks very quickly and has little or no ability to mix with an aggregate. An MS emulsion will mix with coarse aggregate but not fine aggregate. SS and QS emulsions are designed to mix with fine aggregates.

High-float emulsions (designated as HF) allow a thicker film of asphalt material on the aggregate, which enhances the bonding and retention. They are designated as such because they pass the Float Test (ASTM D139 or AASHTO T50). High-float emulsions are recommended for use with dusty aggregates (greater than 2 percent fines).

Numbers are used in the classification to indicate the relative viscosity of the emulsion. Lower numbers indicate a lower viscosity or more fluid material (i.e., an MS-2 is more viscous than an MS-1). Letters are also sometimes used following the designation: "h" indicates a harder base asphalt, "s" indicates a softer base asphalt and "p" indicates a polymer-modified asphalt.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

Table II-2 shows the classifications for asphalt emulsion. Specifications are available for anionic asphalt emulsions (ASTM D977 or AASHTO M140) and for cationic asphalt emulsions (ASTM D2397 or AASHTO M208).

Table II-2. Classifications of asphalt emulsions.

Anionic Asphalt Emulsions	Cationic Asphalt Emulsions
RS-1	CRS-1
RS-2	CRS-2
HFRS-2	–
MS-1	–
MS-2	CMS-2
MS-2h	CMS-2h
HFMS-1	–
HFMS-2	–
HFMS-2h	–
HFMS-2s	–
SS-1	CSS-1
SS-1h	CSS-1h

Chip Seal Design

Chip seals should be designed so that the proposed materials are of sufficient quality and have the desired properties to provide the expected performance. Proper design also ensures that the proper application rates are being used. The design procedure presented herein is a modified version of the McLeod design procedure (McLeod 1969) and is currently being used by the Minnesota Department of Transportation (Janisch and Gaillard 1998).

The procedure is based on two basic principles:

- The aggregate application rate is designed to provide a chip seal that is one stone thick (i.e., there should be a single layer of uniformly sized chips) with minimal excess.
- The voids in the aggregate are designed to be 70 percent filled with asphalt cement for good performance (i.e., the chips should be 70 percent embedded).

Emulsion Properties

Residual Asphalt Content

A portion of an asphalt emulsion consists of water, which evaporates as the binder breaks. The amount of asphalt cement that remains after breaking is referred to as the residual asphalt content. It is important to consider the residual asphalt content because it represents the amount of material that is available for bonding to the aggregate. In general, the residual asphalt content is about 65 to 70 percent (i.e., 65 to 70 percent of an asphalt emulsion consists of asphalt cement).

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

As mentioned, the objective of this design procedure is to achieve 70 percent embedment of the average-sized aggregate. To accomplish this, the emulsion must be at the top of the average-sized aggregate before curing. If only 70 percent of the aggregate is covered initially, the asphalt height will be about 30 percent too low after curing.

Aggregate Properties

Median Particle Size

The median particle size is the theoretical size through which 50 percent of the material passes. It is determined from the gradation chart using the following sieve sizes: 25.0 mm (1 in), 19.0 mm (¾ in), 12.5 mm (½ in), 9.5 mm (⅜ in), 6.3 mm (¼ in), 4.75 mm (No. 4), 2.36 mm (No. 8), 1.18 mm (No. 16), 0.300 mm (No. 50) and 0.075 mm (No. 200).

Flakiness Index

The Flakiness Index is a measure of the percentage, by weight, of flat particles. It is determined by testing a sample of aggregate particles for their ability to fit through a slotted plate. The test is conducted in accordance with the Central Federal Lands Highway Division (CFLHD) DFT-508, *Standard Method of Determining the Flakiness Index and Average Least Dimension of Aggregates*. The weight of the material passing the slots is divided by the total weight of the aggregate sample to determine the percent of flat particles or Flakiness Index.

Average Least Dimension

The average least dimension represents a reduction of the median particle size after accounting for the amount of flat particles. It represents the chip seal thickness in the wheel path after traffic has reoriented the chips on their flattest side. It is determined from the median particle size and flakiness index using the following equation:

$$H = \frac{M}{1.139285 + 0.011506FI} \quad (\text{Eq. II-1})$$

where:

- H = Average Least dimension, in.
- M = Median particle size, in.
- FI = Flakiness index, percent.

Loose Unit Weight

The loose unit weight is required in order to determine the voids in the aggregate in a loose condition. The voids represent the available space for the asphalt binder after placement and rolling. The loose unit weight is a function of the gradation, shape and specific gravity of the aggregate. It should be determined in accordance with ASTM C29.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

Bulk Specific Gravity

Bulk specific gravity represents the weight of aggregate as compared to the weight of water. Different aggregate types have different unit weights or specific gravities. This factor affects the application rate of the aggregate chips because a heavier aggregate will require more weight of chips (or a higher application rate) than a lighter aggregate to cover the same area. Bulk specific gravities for aggregates typically range from 2.40 to 3.00. Natural aggregates are generally about 2.40 and quartzite and limestone aggregates are generally around 2.60.

Voids in Loose Aggregate

The voids in the loose aggregate represent the voids after the aggregate chips are placed on the pavement. It is based on the loose unit weight and can be determined using the following equation:

$$V = 1 - \frac{W}{62.4G} \quad (\text{Eq. II-2})$$

where:

- V = Voids in the loose aggregate.
- W = Loose unit weight of the aggregate chips, lb/ft³.
- G = Bulk specific gravity of the aggregate.

For one-sized chips, this factor will typically be around 50 percent. Rolling will reduce the amount of voids, typically to around 30 percent. Traffic will further reduce the amount of voids to around 20 percent.

Aggregate Absorption

Aggregates, especially porous aggregates, will absorb a portion of the asphalt emulsion. This will affect the amount of asphalt binder that is available for bonding with the aggregate chips. To ensure that enough binder remains, this factor must be taken into account when designing the emulsion application rate. An absorption correction factor of 0.09 l/m² (0.02 gal/yd²) is recommended for aggregates with absorption greater than 1.5 percent. Quartzite is generally not too absorptive and will not require an adjustment. Some limestone and natural aggregates, however, may require an adjustment to the emulsion application rate.

Other Design Properties

Traffic Volume

The traffic volume will influence the amount of asphalt binder that is required to provide sufficient embedment of the aggregate chips. All other factors equal, roadways with higher traffic volumes will require less asphalt binder. This may appear to be the opposite of what is typically expected. However, consider that traffic causes a reorientation of the chips until they eventually lie on their flattest side.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

More traffic thus results in a greater probability that the chips will be laying on their flattest side and will result in a thinner chip seal. Less traffic will result in a thicker chip seal and will thus require more asphalt binder to achieve sufficient embedment. Table II-3 provides the recommended traffic correction factor to be used in determining the emulsion application rate. Failure to account for this factor will result in bleeding in the wheel paths.

Table II-3. Recommended traffic correction factor.

Traffic (ADT)	Traffic Factor
< 100	0.85
100 – 500	0.75
500 – 1000	0.70
1000 – 2000	0.65
> 2000	0.60

Traffic Whip-Off

A portion of the aggregate chips will get thrown off the roadway before final curing and embedment under traffic has occurred. This is accounted for in the procedure using a traffic whip-off factor. The factor is based on the traffic volume and traffic speed of the roadway. Low-volume, residential streets will have about a 5 percent loss, whereas the loss on high-volume, high-speed roadways will be around 10 percent. The factor can be computed using the following equation:

$$E = 1 + \frac{P}{100} \quad (\text{Eq. II-3})$$

where:

- E = Traffic whip-off factor.
- P = Expected loss of aggregate chips, percent.

Thus, an expected loss of 10 percent results in a traffic whip-off factor of 1.10.

Existing Pavement Condition

The surface condition of the existing pavement will greatly influence the amount of asphalt emulsion that is required. A dry, porous pavement will absorb a tremendous amount of asphalt binder and thus affect the emulsion application rate. Conversely, a new pavement (or a pavement with bleeding on the surface) will absorb much less binder. The varying condition is accounted for in the design procedure by the surface correction factor. The recommended value, based on the pavement surface texture, is provided in Table II-4.

The same application rate cannot be used for all roadways with varying conditions. Similarly, the surface condition should be

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

monitored during placement, and the application rate adjusted as needed to address areas of differing condition

Table II-4. Recommended surface correction factors.

Existing Pavement Surface Texture	Surface Correction Factor, gal/yd ²
Black, flushed asphalt	-0.01 to -0.06
Smooth, non-porous	0.00
Slightly porous and oxidized	+0.03
Slightly pocked, porous and oxidized	+0.06
Badly pocked, porous and oxidized	+0.09

Design Equations

Once the inputs are determined, the application rates can be calculated using the McLeod design equations. The equations for aggregate and emulsion application rates are presented below.

Aggregate Application Rate

The following equation is used to determine the aggregate application rate:

$$C = 46.8(1 - 0.4V) \times H \times G \times E \quad (\text{Eq. II-4})$$

where:

- C = Chip application rate, lbs/yd².
- V = Voids in loose aggregate.
- H = Average Least dimension, in.
- G = Bulk specific gravity.
- E = Traffic whip-off factor.

Emulsion Application Rate

The emulsion application rate is determined using the following equation:

$$B = \frac{2.244 \times H \times T \times V + S + A}{R} \quad (\text{Eq. II-5})$$

where:

- B = Binder application rate, gal/yd².
- H = Average Least dimension, in.
- T = Traffic correction factor.
- V = Voids in loose aggregate.
- S = Surface correction factor.
- A = Aggregate absorption factor, gal/yd².
- R = Residual asphalt content of binder.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

Minnesota performs an additional calculation of the emulsion application rate to account for snowplow damage (Janisch and Gaillard 1998). The emulsion application rate is recalculated using the median particle size instead of the average least dimension. This new emulsion rate provides the required rate if the chips are not reoriented, and thus is more representative of the rate required outside the wheel path. The average of the two rates is then used as the starting point in the field. Minnesota has found that if this additional calculation is not performed, insufficient binder is applied in non-traffic areas, and snow plows shave off the chips (Janisch and Gaillard 1998).

Example Design Problem

A 68 kg (150 lb) sample of quartzite aggregate has been submitted for design. The roadway has traffic levels of 2,125 vehicles per day. The pavement surface is slightly pocked, porous and oxidized. A CRS-2 emulsion with a residual asphalt content of 66.5 percent will be used as the binder. Determine the emulsion and aggregate application rates for this project.

Step 1. Determine the aggregate gradation, bulk specific gravity and percent absorption.

Laboratory testing of the aggregate revealed the gradation as shown in Table II-5. Testing in accordance with AASHTO T 84-94 indicates a bulk specific gravity of the aggregate of 2.61. The aggregate absorption based on AASHTO T 84-94 is 0.55 percent, so no correction is needed.

Table II-5. Gradation results for design project.

Sieve Size	Percent Passing
12.7 mm (½ in)	100
9.52 mm (¾ in)	95
6.35 mm (¼ in)	62
4.75 mm (No. 4)	12
2.36 mm (No. 8)	3.2
0.075 mm (No. 200)	1.3

Step 2. Determine the mean particle size.

The median particle size (M) is determined by plotting the gradation results and reading off the size at which 50 percent of the particles pass. The median particle size represents the theoretical size at which half the stones are larger and half are smaller. For the given gradation, the median particle size is determined to be 5.8 mm (0.23 in).

Step 3. Determine the flakiness index.

To determine the flakiness index, the aggregate particles are fitted through slots. The results of this testing is shown in Table II-6.

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

Table II-6. Results of flakiness index test.

Size Fraction	Weight Retained on Slot, grams	Weight Passing Slot, grams
12.5 to 9.5 mm (½ to ¾ in)	54.2	12.3
9.5 to 6.3 mm (¾ to ¼ in)	123.3	43.5
6.3 to 4.75 mm (¼ in to No. 4)	184.4	89.5
Total	361.9	145.3

Using these results, the flakiness index (FI) is determined as follows:

$$FI = \frac{\text{Weight of Flat Chips}}{\text{Weight of Sample}} = \frac{145.3}{361.9 + 145.3} = 0.286 = 28.6 \text{ percent}$$

Step 4. Determine the average least dimension.

The average least dimension (H) is the expected thickness of the chip seal after the chips have been reoriented on their flattest side from traffic. It is determined using Equation II-2 as follows:

$$H = \frac{M}{1.139285 + 0.011506FI} = \frac{0.23 \text{ in}}{1.139285 + (0.011506 \times 28.6)} = 0.157 \text{ in}$$

Step 5. Determine the loose weight of the aggregate.

A metal cylinder with a volume of 0.014 m³ (0.50 ft³) was loosely filled with aggregate and weighed. This process was repeated three times, the results of which are shown in Table II-7.

Table II-7. Results of loose unit weight testing.

Test Number	Weight of Aggregate, kg (lbs)
1	20.57 (45.25)
2	20.60 (45.32)
3	20.59 (45.29)
Average	20.59 (45.29)

The loose unit weight (W) is then determined as follows:

$$W = \frac{\text{Weight of Aggregate}}{\text{Volume of Cylinder}} = \frac{45.29 \text{ lbs}}{0.50 \text{ ft}^3} = 90.58 \text{ lbs/ft}^3$$

Step 6. Determine the voids in the loose aggregate.

The voids in the loose aggregate (V) is determined using Equation II-2 as follows:

$$V = 1 - \frac{W}{62.4 G} = 1 - \frac{90.58 \text{ lbs/ft}^3}{62.4 \text{ lbs/ft}^3 \times 2.61} = 0.44$$

ASPHALT FOR SURFACE TREATMENT MIX DESIGN (CONTINUED)

Step 7. Determine the aggregate application rate.

With the inputs determined above, Equation II-4 is used to determine the aggregate application rate (C):

$$C = 46.8(1 - (0.4V)) \times H \times G \times E$$

$$= 46.8(1 - (0.4 \times 0.44)) \times 0.157 \times 2.61 \times 1.10 = 17.3 \text{ lbs/yd}^2$$

Step 8. Determine the emulsion application rate.

The emulsion application rate is determined using Equation II-5. The calculation is performed twice – once for the wheel path areas (using the average least dimension) and again for the non-wheel path areas (using the median particle size). These calculations are shown below:

$$B = \frac{2.244 \times H \times T \times V + S + A}{R}$$

$$= \frac{2.244 \times 0.157 \times 0.60 \times 0.44 + 0.06 + 0.00}{0.665} = 0.23 \text{ gal.yd}^2$$

$$B = \frac{2.244 \times M \times T \times V + S + A}{R}$$

$$= \frac{2.244 \times 0.23 \times 0.60 \times 0.44 + 0.06 + 0.00}{0.665} = 0.30 \text{ gal.yd}^2$$

The average of the two results (0.27 gal/yd²) is used as the starting point in the field.

COVER AGGREGATE

Cover aggregate shall conform to the requirements of the Specifications for Type 2A except:

Aggregate shall be Modified Cover Aggregate and conform to the following gradation requirements:

Passing a 3/8" Sieve	100%
Passing a No. 4 Sieve	0-60%
Passing a No. 8 Sieve	0-18%
Passing a No. 40 Sieve	0-4%
Passing a No. 200 Sieve	0-1.3%

Delete foot note 1 and replace with:

100% of the material retained on the No. 4 sieve shall have two or more fractured faces produced by crushing.

The Flakiness Index shall be a maximum of 30 percent.

After the aggregate stockpiles have been produced, the Contractor shall submit samples of the aggregates to the asphalt supplier, prior to construction, to determine a mix design and verify compatibility of the aggregate and asphalt.

The asphalt surface treatment will be designed in accordance with the Modified McLeod Design Procedure found in Volume II of Appendix C of the Preventive Maintenance Surface Treatments Report. The asphalt surface treatment design will be prepared by qualified personnel experienced in asphalt surface treatment design.

The surface design will be based on the traffic volume(s) and pavement conditions contained in the plans. The final application rate for the asphalt binder and cover aggregate will be determined after the source of the material is known and field adjustments are made. The design will include the following information:

- 1) Aggregate gradation.
- 2) Bulk specific gravity of the aggregate.
- 3) Loose unit weight of the aggregate.
- 4) Asphalt type and rate of application.
- 5) Aggregate rate of application.

In addition to the above data, the Contractor will submit with the design of the asphalt surface treatment a sample of each aggregate and emulsion for use by the Engineer for verifying the test results. The design may be verified by the Department.

The passing mix design shall be submitted to the Engineer and the Bituminous Engineer at least two weeks prior to the start of construction.

Quality tests on the Cover Aggregate for abrasion and soundness are required by specification. The Contractor shall notify the Area Office prior to sampling and a representative from the Area Office shall witness all sampling of aggregates to be submitted to the Central Testing Laboratory for Quality testing. Satisfactory test results for the Cover Aggregate shall be obtained prior to its use on the Project.

COVER AGGREGATE (CONTINUED)

At least 50% of the aggregate shall be stockpiled at each stockpile site at least one week prior to work beginning on that project. This is to allow the Area Office time to run tests on the material and enter the results into the mix design spread sheets.

ASPHALT FOR SURFACE TREATMENT

The asphalt for surface treatment that is delivered for use on this contract shall be used in the order it is received. Storage of asphalt for surface treatment shall only be allowed at the end of the work day. The material that is placed in storage shall be the first material used the following day.

PROJECT BROOMING

All material shall be broomed off of bridges and curb & gutter areas adjacent to the bridges. No material shall be broomed under the guardrail, including the 3 cable guardrail or into the drop inlets. This material from the curb & gutter areas of the bridges, the guardrail areas of the bridges and the drop inlets shall be disposed of in a manner satisfactory to the Engineer.

No material shall be broomed into the ditches or on the boulevards in residential and commercial areas where the adjacent landowner conducts the mowing of the right-of-way. This material shall be disposed of in a manner satisfactory to the Engineer.

Material that is broomed onto the roadway inslopes shall not be left in piles or windrows. The material shall be evenly distributed at a height that will not hinder mowing operations or cause dispersion of the material into the traveled roadway when passed over with a mower.

Anticipated areas, other than the bridge areas stated above, that will require either removal of the chips with a pickup sweeper or additional dispersal of the chips with the rotary powered broom are:

PROJECT	LOCATION
US 18	Residential and commercial areas in the City of Bonesteel.
SD 34 E Segment	Curb & gutter areas in the City of Woonsocket.
SD 37	Curb & gutter, residential and commercial areas in the City of Parkston.
SD 38	Residential and commercial areas in the City of Salem.
SD 50 W Segment	Residential and commercial areas and adjacent bike path in the City of Chamberlain.
US 81	Curb & gutter areas in the City of Salem.
I 90	Chamberlain Rest Area East and West Parking Areas.
I 90L	Curb & Gutter Area in the City of Mitchell.
SD 262	Residential and commercial areas in the Cities of Alexandria, Emery and Bridgewater.

This list may not be complete. Additional areas may need attention as directed by the Engineer.

FOG SEAL

Fog Seal will be placed on all the routes on this contract.

The fog seal shall be placed following the completion of the chip seal and prior to the placement of the permanent pavement marking. Application of the fog seal shall begin no earlier than the morning following application of the chip seal but no later than four days after the application of each day's chip seal.

The application of the fog seal will be permitted only when the ambient air and surface temperature on the project are both at least 50° F in the shade and conditions are dry.

Immediately prior to the application of the fog seal the Contractor will be required to broom the entire width of the chip seal. A CSS-1h or SS-1h emulsion shall be used for the fog seal application. An emulsion-to-water rate of 3:1 should be used for the binder application.

Blotting Sand for Fog Seal shall conform to the Specifications Section 879.1.B except for the following requirements:

The shale content or other particles of low specific gravity (less than 1.95) passing the No. 4 sieve shall not exceed 4.5%. Prior to hauling, Blotting Sand shall be screened to minimize segregation, eliminate oversize and effectively breakup or discard material bonded into chunks.

Blotting Sand shall be furnished by the Contractor. A rate of application for the Blotting Sand will not be given. A small quantity of Blotting Sand is set up, for each respective route to be Fog Sealed, to be used as directed by the Engineer at locations of high traffic volumes, such as intersecting state or county highways, that traffic cannot be stopped from crossing. The Contractor will be required to keep traffic off all other areas until the Fog Seal has cured sufficiently as to not stick to tires.

TEMPORARY PAVEMENT MARKING

Paint will not be allowed for Temporary Pavement Marking, except after the placement of the fog seal.

The total length of no passing zones on this contract is estimated to be 50.0 miles.

It is estimated that 228 DO NOT PASS and 223 PASS WITH CARE signs will be required to mark the no passing zones, should the Contractor elect to use these signs.

Use of DO NOT PASS and PASS WITH CARE signs will be allowed for a two week duration.

Cost for furnishing, installing and removing the DO NOT PASS and PASS WITH CARE signs shall be incidental to the contract unit price per mile for Temporary Pavement Marking.

TEMPORARY PAVEMENT MARKING (CONTINUED)

TABLES OF DO NOT PASS AND PASS WITH CARE SIGNS

PROJECT	DO NOT PASS	PASS WITH CARE
US 18	51	52
SD 34 West Segment	58	57
SD 34 East Segment	0	0
SD 37	0	0
SD 38	22	21
SD 43	2	2
SD 50 West Segment	24	24
SD 50 East Segment	19	19
US 81	0	0
I 90	15	11
I 90L	0	0
SD 262	36	36
US 281	1	1
TOTAL	228	223

Prior to asphalt surface treatment the Contractor shall mark, with appropriately colored temporary road markers, the location of all existing pavement marking, except edgelines. However, the Contractor shall place temporary road markers on the edgeline of all transition areas such as turn lanes and climbing lanes and on all dashed edgelines. Prior to installation of the permanent pavement marking, the Engineer is to be notified. The Contractor shall give the Engineer ample notification to verify and check the placement of the temporary road markers that are to be used for placement of the permanent pavement marking.

If the Contractor uses the DO NOT PASS and PASS WITH CARE signs, the beginning and ending of no passing zones shall be marked with temporary road markers.

The temporary road markers shall have secure covers. If the covers become detached, prior to sealing, the temporary road marker shall be replaced with a new marker. Any markers that are non-reflective shall be cleaned.

Where the asphalt surface treatment has been applied, the tab covers shall be removed prior to nightfall each day.

The tab covers are considered construction debris and shall be disposed of properly by the Contractor.

The Contractor shall remove and dispose of the temporary road markers after Permanent Pavement Marking is applied. Method of removal shall be nondestructive to the road surface and shall result in the marker being separated from the adhesive (the adhesive shall remain on the road surface and the marker is discarded) or the marker shall be cut in such a manner that no more than 1/4" of the vertical portion of the marker remains on the road surface. Removal shall be accomplished within 7 days of completion of the Permanent Pavement Marking.

Cost for furnishing, applying, uncovering, cleaning, removing and disposing of the Temporary Road Markers shall be included in the contract unit price per mile for Temporary Pavement Marking.

TEMPORARY PAVEMENT MARKING (CONTINUED)

In the absence of a signed lane closure or pilot car operation, Flagger symbol signs (W20-7) and flaggers, or a shadow vehicle with rotating yellow lights or strobe lights shall be positioned on the roadway shoulder in advance of workers for both directions of traffic during the installation and removal of temporary road markers. The traffic control device used shall be moved intermittently to provide proper warning of the work operation. A ROAD WORK AHEAD (W20-1), a Workers symbol sign (W21-1) or a BE PREPARED TO STOP (W3-4) warning sign shall be mounted on the rear of the shadow vehicle. The method of traffic control used by the Contractor for this work shall be approved by the Engineer.

Cost for the traffic control to install and remove the Temporary Road Markers shall be incidental to the contract unit price per mile for Temporary Pavement Marking.

PAVEMENT MARKING MASKING

Any existing pavement marking that is to be salvaged on this contract shall be covered with an approved pavement marking masking immediately prior to sealing to preserve the various markings. The masking material shall be sturdy enough to eliminate being punctured by the cover aggregate when traffic drives over it.

All pavement markings to be masked shall be cleaned with a high pressure air blast device immediately prior to the application of the Pavement Marking Masking. The width of this masking shall be one inch wider than the existing marking. The various items for Pavement Marking Masking shall include material, labor and equipment to satisfactorily install the masking prior to sealing and remove and dispose of the masking after the completion of the work and shall be incidental to the contract unit price for Pavement Marking Masking.

If the pavement marking is damaged due to improper masking, it shall be replaced or repaired at the Contractor's expense.

When the masking is removed, the asphalt surface treatment that does not stay adhered to the masking shall be removed from the road surface.

TABLE OF PAVEMENT MARKING MASKING

PROJECT	LOCATION	DESCRIPTION
*US 18	Turn Bay (Fairfax)	Arrow (2 Each - Left)
*SD 34 W Segment	Turn Bay (Wessington Springs)	Arrow (4 Each - Left)
*SD 38	US 81 Intersection – WB	STOP (1 Each)
*SD 38	US 81 Intersection – WB	AHEAD (1 Each)
*US 281	US 18 Intersection – NB	STOP (1 Each)
*US 281	US 18 Intersection - NB	AHEAD (1 Each)

*Masking of the required areas on these routes may need to be done twice due to the required placement of the Fog Seal on these routes. Once prior to the placement of the chip seal and once prior to the fog seal application. Each masking application will be paid for separately. If the Contractor can achieve satisfactory results by leaving the masking in place for both the chip seal and the fog seal applications, this procedure will be allowed. In this case, the masking will be paid for once.

PERMANENT PAVEMENT MARKING

The application of permanent pavement marking shall begin no sooner than 7 calendar days following completion of the fog seal. It shall be completed within 14 calendar days following completion of the fog seal.

Marking eight inch edgelines and gore areas shall require the use of two spray nozzles to achieve the required width. Marking twelve inch gore lines shall require the use of three spray nozzles to achieve the required width.

The Contractor will be required to repaint all existing pavement marking including centerline, edgeline, dashed edgelines, dashed lane lines, lane lines, turn lanes, gore areas, etc.

Stop lines are to be located a minimum of 10' and a maximum of 30' back from the edge of the intersecting roadway. The stop line is to be located to provide the best sight distance for a stopped motorist to view intersecting traffic. The Project Engineer is to be notified prior to the installation of the stop lines to verify their location. Adjustments of the location of the existing stop lines, if needed, shall be made prior to the placement of the new stop lines.

Flush sealing shall not be allowed as an option for correction of markings that are not within tolerance due to the occurrence of shadow through.

The following table contains locations of existing pavement marking to be painted by hand.

TABLE OF HAND PAINTED PAVEMENT MARKING

PROJECT	LOCATION
US 18	Stop Line at Jct SD 1806 – SB
US 18	24" Hashes in Turn Bay for Fairfax
US 18	Solid Areas in Turn Bay for Fairfax
US 18	Stop Line on Spur Road at Jct SD 43 - WB
SD 34 W Segment	Word Messages at SD 45 Intersection – WB
SD 34 W Segment	Stop Line at Wessington Springs – SB
SD 34 W Segment	24" Hashes in Turn Bay for Wessington Springs
SD 34 W Segment	Solid Areas in Turn Bay for Wessington Springs
SD 34 E Segment	Pedestrian Crossings in Woonsocket
SD 34 E Segment	Railroad Crossings in Woonsocket
SD 37	24" Hashes in Turn Bays in Parkston
SD 37	Arrows in Turn Bays and Center Turn Lane
SD 37	Stop Lines at Jct SD 44 – NB, SB, EB & WB
SD 43	Stop Line at Jct US 18 – NB
SD 50 W Segment	24" Yellow Hashes for Gore Area in Chamberlain
SD 50 W Segment	Solid Areas for Gore Area in Chamberlain
SD 50 E Segment	Stop Line at 271 st Street – SB

PERMANENT PAVEMENT MARKING (CONTINUED)

TABLE OF HAND PAINTED PAVEMENT MARKING

PROJECT	LOCATION
US 81	Pedestrian Crossings in Salem
SD 262	Pedestrian Crossings in Alexandria, Emery and Bridgewater
SD 262	24" Hashes in Turn Bay at Jct SD 25
SD 262	Solid Areas in Turn Bay at Jct SD 25
SD 262	Arrows in Turn Bay at Jct SD 25

TABLES OF PERMANENT PAVEMENT MARKING

US 18	White	Yellow
Yellow Centerline Dashes = 23.560 miles @ 6.2 Gal/Mile		146.1
Solid Yellow Centerline = 9.934 miles @ 22.5 Gal/Mile		223.5
Double Yellow for Turn Bays = 2 (4" line) X 0.596 miles @ 22.5 Gal/Mile		26.8
24" Yellow Hashes for Turn Bays= 0.064 miles @ 135 Gal/Mile		8.6
Solid Yellow Areas for Turn Bays = 91.6 SqFt = 0.052 miles @ 22.5 Gal/Mile		1.2
8" Yellow for Gore Areas = 0.043 miles @ 45 Gal/Mile		1.9
Solid White Edgelines = 1 (4" line) X 49.380 miles @ 22.5 Gal/Mile	1111.1	
White Edgeline Dashes = 0.257 miles @ 6.2 Gal/Mile	1.6	
Solid White Lane Lines = 0.022 miles @ 22.5 Gal/Mile	0.5	
White Lane Line Dashes = 0.317 miles @ 6.2 Gal/Mile	2.0	
8" Solid White for Gore Areas = 0.252 miles @ 45 Gal/Mile	11.3	
24" White Stop Line = 0.009 miles @ 135.0 Gal/Mile	1.2	
TOTAL GALLONS	1128	408

SD 34 W Segment	White	Yellow
Yellow Centerline Dashes = 19.742 miles @ 6.2 Gal/Mile		122.4
Solid Yellow Centerline = 11.426 miles @ 22.5 Gal/Mile		257.1
Double Yellow for Turn Bays = 2 (4" line) X 0.548 miles @ 22.5 Gal/Mile		24.7
24" Yellow Hashes for Turn Bays= 0.023 miles @ 135 Gal/Mile		3.1
Solid Yellow Areas for Turn Bays = 66.8 SqFt = 0.038 miles @ 22.5 Gal/Mile		0.9
8" Yellow for Gore Areas = 0.030 miles @ 45 Gal/Mile		1.4
Solid White Edgelines = 1 (4" line) X 41.811 miles @ 22.5 Gal/Mile	940.7	
Solid White Lane Lines = 0.069 miles @ 22.5 Gal/Mile	1.6	
8" White for Acceleration Lane Gore Areas = 0.077 miles @ 45 Gal/Mile	3.5	
White Word Messages = 86.7 SqFt = 0.049 miles @ 22.5 Gal/Mile	1.1	
24" White Stop Line = 0.002 miles @ 135.0 Gal/Mile	0.3	
TOTAL GALLONS	947	410

PERMANENT PAVEMENT MARKING (CONTINUED)

TABLES OF PERMANENT PAVEMENT MARKING

034 E Segment	White	Yellow
Solid Yellow Centerline = 1.833 miles @ 22.5 Gal/Mile		41.2
Solid White Edgelines = 1 (4" line) X 0.017 miles @ 22.5 Gal/Mile	0.4	
White Lane Line Dashes = 2.134 miles @ 6.2 Gal/Mile	13.2	
24" White Pedestrian Crossings = 0.039 miles @ 135 Gal/Mile	5.3	
White Railroad Crossings 4 Each	20.0	
TOTAL GALLONS	39	41

SD 37	White	Yellow
Solid Yellow Centerline = 0.072 miles @ 22.5 Gal/Mile		1.6
Yellow Center Turn Lane Dashes = 1.601 miles @ 6.2 Gal/Mile		9.9
Solid Yellow Center Turn Lane = 1.874 miles @ 22.5 Gal/Mile		42.2
Double Yellow for Turn Bays = 2 (4" line) X 0.255 miles @ 22.5 Gal/Mile		11.5
24" Yellow Hashes for Turn Bays= 0.037 miles @ 135 Gal/Mile		5.0
Solid White Edgelines = 1 (4" line) X 2.662 miles @ 22.5 Gal/Mile	59.9	
Solid White Lane Lines = 0.108 miles @ 22.5 Gal/Mile	2.4	
24" White Stop Lines = 0.020 miles @ 135.0 Gal/Mile	2.7	
Arrows = 35 each @ 0.19 Gal/Each	6.7	
TOTAL GALLONS	72	70

SD 38	White	Yellow
Yellow Centerline Dashes = 16.343 miles @ 6.2 Gal/Mile		101.3
Solid Yellow Centerline = 3.924 miles @ 22.5 Gal/Mile		88.3
Solid White Edgelines = 1 (4" line) X 32.827 miles @ 22.5 Gal/Mile	738.6	
White Edgeline Dashes = 0.115 miles @ 6.2 Gal/Mile	0.7	
TOTAL GALLONS	739	190

SD 43	White	Yellow
Yellow Centerline Dashes = 1.068 miles @ 6.2 Gal/Mile		6.6
Solid Yellow Centerline = 0.422 miles @ 22.5 Gal/Mile		9.5
Solid White Edgelines = 1 (4" line) X 2.170 miles @ 22.5 Gal/Mile	48.8	
24" White Stop Lines = 0.002 miles @ 135.0 Gal/Mile	0.3	
TOTAL GALLONS	49	16

PERMANENT PAVEMENT MARKING (CONTINUED)

TABLES OF PERMANENT PAVEMENT MARKING

SD 50 W Segment	White	Yellow
Yellow Centerline Dashes = 7.733 miles @ 6.2 Gal/Mile		47.9
Solid Yellow Centerline = 5.699 miles @ 22.5 Gal/Mile		128.2
Double Yellow for Turn Bays = 2 (4" line) X 0.083 miles @ 22.5 Gal/Mile		3.7
24" Yellow Hashes for Turn Bays= 0.006 miles @ 135 Gal/Mile		0.8
Solid Yellow Areas for Turn Bays = 102 SqFt = 0.058 miles @ 22.5 Gal/Mile		1.3
Solid White Edgelines = 1 (4" line) X 17.372 miles @ 22.5 Gal/Mile	390.9	
TOTAL GALLONS	391	182

SD 50 E Segment	White	Yellow
Yellow Centerline Dashes = 26.604 miles @ 6.2 Gal/Mile		164.9
Solid Yellow Centerline = 4.744 miles @ 22.5 Gal/Mile		106.7
Solid White Edgelines = 1 (4" line) X 53.698 miles @ 22.5 Gal/Mile	1208.2	
24" White Stop Lines = 0.003 miles @ 135.0 Gal/Mile	0.4	
TOTAL GALLONS	1209	272

US 81	White	Yellow
Solid Yellow Centerline = 1.639 miles @ 22.5 Gal/Mile		36.9
Solid White Edgelines = 1 (4" line) X 1.712 miles @ 22.5 Gal/Mile	38.5	
24" White Pedestrian Crossings = 0.027 miles @ 135.0 Gal/Mile	3.6	
TOTAL GALLONS	42	37

I 90 Chamberlain Rest Area	White	Yellow
Solid Yellow Edgelines = 1 (4" line) X 2.196 mile @ 22.5 Gal/Mile		49.4
Solid White Edgelines = 1 (4" line) X 2.292 miles @ 22.5 Gal/Mile	51.6	
8" Solid White Gore = 0.099 mile @ 45.0 Gal/Mile	4.5	
12" Solid White for Gore Areas = 0.011 mile @ 67.5 Gal/Mile	0.7	
TOTAL GALLONS	57	49

I 90 Exit 265 Ramps & Crossroad	White	Yellow
Yellow Centerline Dashes = 0.336 miles @ 6.2 Gal/Mile		2.1
Solid Yellow Centerline = 0.479 miles @ 22.5 Gal/Mile		10.8
Solid Yellow Edgelines = 1 (4" line) X 0.793 mile @ 22.5 Gal/Mile		17.8
Solid White Edgelines Crossroad = 1 (4" line) X 0.764 miles @ 22.5 Gal/Mile	17.2	
Solid White Edgelines Ramps = 1 (4" line) X 1.009 miles @ 22.5 Gal/Mile	22.7	
TOTAL GALLONS	40	31

PERMANENT PAVEMENT MARKING (CONTINUED)

TABLES OF PERMANENT PAVEMENT MARKING

I 90 MRM 270.14	White	Yellow
Solid Yellow Centerline = 0.725 miles @ 22.5 Gal/Mile		16.3
Solid White Edgelines = 1 (4" line) X 0.725 miles @ 22.5 Gal/Mile	16.3	
TOTAL GALLONS	16	16

I 90 Exit 272 Ramps	White	Yellow
Solid Yellow Edgelines = 1 (4" line) X 0.745 mile @ 22.5 Gal/Mile		16.8
Solid White Edgelines Ramps = 1 (4" line) X 0.980 miles @ 22.5 Gal/Mile	22.1	
TOTAL GALLONS	22	17

I 90 MRM 281.13	White	Yellow
Solid Yellow Centerline = 0.828 miles @ 22.5 Gal/Mile		18.6
Solid White Edgelines = 1 (4" line) X 0.796 miles @ 22.5 Gal/Mile	17.9	
TOTAL GALLONS	18	19

I 90 Exit 284 Ramps	White	Yellow
Solid Yellow Edgelines = 1 (4" line) X 0.649 mile @ 22.5 Gal/Mile		14.6
Solid White Edgelines Ramps = 1 (4" line) X 0.758 miles @ 22.5 Gal/Mile	17.1	
TOTAL GALLONS	17	15

I 90 MRM 287.21	White	Yellow
Yellow Centerline Dashes = 0.321 miles @ 6.2 Gal/Mile		2.0
Solid Yellow Centerline = 0.465 miles @ 22.5 Gal/Mile		10.5
Solid White Edgelines = 1 (4" line) X 0.799 miles @ 22.5 Gal/Mile	18.0	
TOTAL GALLONS	18	13

I 90 Exit 289 Ramps & Crossroad	White	Yellow
Yellow Centerline Dashes = 0.121 miles @ 6.2 Gal/Mile		0.8
Solid Yellow Centerline = 0.458 miles @ 22.5 Gal/Mile		10.3
Solid Yellow Edgelines = 1 (4" line) X 0.816 mile @ 22.5 Gal/Mile		18.4
Solid White Edgelines Crossroad = 1 (4" line) X 0.531 miles @ 22.5 Gal/Mile	11.9	
Solid White Edgelines Ramps = 1 (4" line) X 0.995 miles @ 22.5 Gal/Mile	22.4	
TOTAL GALLONS	34	30

PERMANENT PAVEMENT MARKING (CONTINUED)

TABLES OF PERMANENT PAVEMENT MARKING

I 90 MRM 292.22	White	Yellow
Yellow Centerline Dashes = 0.340 miles @ 6.2 Gal/Mile		2.1
Solid Yellow Centerline = 0.535 miles @ 22.5 Gal/Mile		12.0
Solid White Edgelines = 1 (4" line) X 0.884 miles @ 22.5 Gal/Mile	19.9	
TOTAL GALLONS	20	14

I 90 MRM 294.14	White	Yellow
Yellow Centerline Dashes = 0.371 miles @ 6.2 Gal/Mile		2.3
Solid Yellow Centerline = 0.719 miles @ 22.5 Gal/Mile		16.2
Solid White Edgelines = 1 (4" line) X 1.145 miles @ 22.5 Gal/Mile	25.8	
TOTAL GALLONS	26	19
I 90 GRAND TOTAL GALLONS	268	223

SD 262	White	Yellow
Yellow Centerline Dashes = 15.686 mile @ 6.2 Gal/Mile		97.3
Solid Yellow Centerline = 6.280 mile @ 22.5 Gal/Mile		141.3
Double Yellow for Turn Bays = 2 (4" line) X 0.338 miles @ 22.5 Gal/Mile		15.2
24" Yellow Hashes for Turn Bays= 0.012 miles @ 135 Gal/Mile		1.6
Solid Yellow Areas for Turn Bays = 23.1 SqFt = 0.013 miles @ 22.5 Gal/Mile		0.3
Solid White Edgelines = 1 (4" line) X 32.863 miles @ 22.5 Gal/Mile	739.4	
Solid White Lane Lines = 0.038 miles @ 22.5 Gal/Mile	0.9	
24" White Pedestrian Crossings = 0.023 miles @ 135 Gal/Mile	3.1	
Arrows = 4 each @ 0.19 Gal/Each	0.8	
TOTAL GALLONS	744	256

US 281	White	Yellow
Yellow Centerline Dashes = 0.642 miles @ 6.2 Gal/Mile		4.0
Solid Yellow Centerline = 0.298 miles @ 22.5 Gal/Mile		6.7
Solid White Edgelines = 1 (4" line) X 1.538 miles @ 22.5 Gal/Mile	34.6	
TOTAL GALLONS	35	11

PERMANENT PAVEMENT MARKING I 90L

The permanent pavement marking on I 90L shall be durable pavement marking.

It shall be surface applied after cleaning the road surface with a high pressure air blast device immediately prior to the application of the durable pavement marking.

Durable pavement marking shall conform to the requirements of the Special Provision for Durable Pavement Marking.

SEQUENCE OF OPERATIONS

The below sequence is per project:

1. Install fixed location "ground mounted" traffic control devices.
2. Install and remove temporary traffic control devices as needed for each type of work.
3. Place temporary pavement marking not more than 24 hours prior to chip seal.
4. Place pavement marking masking immediately prior to chip seal. **See Pavement Marking Masking note for alternate sequence.**
5. Apply chip seal. (See workspace note under General Maintenance of Traffic notes.)

The brooming operation shall be immediately in front of the asphalt distributor.

The Contractor shall begin sealing operations at the farthest point from the stockpile site and work towards the stockpile site to eliminate unnecessary driving and turning on the fresh seal.

The application of the asphalt and aggregate shall cease at least one hour prior to sunset each day.

6. Remove pavement marking masking immediately after chip seal.
 7. Broom chip sealed areas each morning following chip seal application.
 8. Place pavement marking masking immediately prior to fog seal. **See Pavement Marking Masking note for alternate sequence.**
 9. Apply fog seal.
 10. Remove pavement marking masking immediately after fog seal.
 11. Pick up cover aggregate in curb & gutter areas and other areas as stated in the plans and directed by the Engineer.
 12. Immediately prior to application of the permanent pavement marking, the areas to be painted shall be broomed or blown off with high pressure compressed air. (If a high pressure air device is used to clean the pavement surface, it shall be capable of sustaining continuous high pressure for the duration of the pavement marking process.)
- Complete the pavement marking.
13. Complete required hand painted pavement marking areas within the 14 day time period specified elsewhere in the plans.
 14. Remove temporary pavement markers within the seven day time period specified elsewhere in the plans.
 15. Remove traffic control devices.

SEQUENCE OF OPERATIONS FOR I 90

In addition to the previous sequence of operations, the following sequence of operations will be followed for I 90 ramps and crossroads unless an alternate plan is submitted by the Contractor and approved by the Engineer.

1. Work activities shall be conducted so as to maintain a single lane of one-way traffic on ramps, 9' (1/2 driving width) + 3' shoulder = 12' minimum. Ramp traffic shall be controlled by flaggers, as shown in the details.
2. Work activities on the crossroads shall be conducted so as to maintain alternating two-way traffic using flaggers and pilot car or flaggers with 2-way radios.
3. Work may be in progress on the ramp(s) and crossroads simultaneously, provided sufficient traffic control devices and flaggers are provided to adequately control traffic. Any crossroad or ramp sealing started during the day shall be completed in the same day.

The Chamberlain Rest Area shall be allowed to be closed for a period of not more than 48 consecutive hours. The first day the ramps shall be chip sealed. The second day the fog seal shall be applied. Early the following morning the rest area shall be opened to traffic

SEQUENCE OF OPERATIONS FOR I 90L

The following sequence of operations shall be followed for I 90L unless an alternate sequence of operations is submitted to the Engineer and approved. If an alternate sequence of operations is desired, it shall be submitted at least one week prior to work starting on this route.

1. Install temporary traffic control devices as per the Standard Plates for a 5-Lane roadway from Ohlman St. to Miller Ave.
2. Place temporary pavement marking prior to chip seal.
3. Apply chip seal.

The brooming operation shall be immediately in front of the asphalt distributor.

The existing surface is 48 feet wide and has five lanes. The two outside lanes are each 9 feet wide and the three inside lanes are each 10 feet wide. Each lane shall be sealed separately unless the distributor and chip spreader are capable of applying oil and aggregate at a width of 19 feet or 20 feet. If so, two lanes may be done at once.

4. Remove covers from temporary pavement marking.
5. Remove temporary traffic control devices.
6. Install temporary traffic control devices as per the Standard Plates for a 5-Lane roadway from Miller Ave. to Duff St.
7. Repeat steps 2 through 5.
8. Install temporary traffic control devices as per the Standard Plates for a 5-Lane roadway from Duff St. to Burr St.
9. Repeat steps 2 through 5.
10. Use a pickup broom to remove loose material the next morning following the chip seal application.
11. Install temporary traffic control devices as per the Standard Plates for a 5-Lane roadway from Ohlman St. to Miller Ave.

SEQUENCE OF OPERATIONS FOR I 90L (CONTINUED)

12. Apply fog seal.
13. Remove covers from temporary pavement marking.
14. Remove temporary traffic control devices.
15. Install temporary traffic control devices as per the Standard Plates for a 5-Lane roadway from Miller Ave. to Duff St.
16. Repeat steps 12 through 14.
17. Install temporary traffic control devices as per the Standard Plates for a 5-Lane roadway from Duff St. to Burr St.
18. Repeat steps 12 through 14.
19. Install temporary traffic control devices as needed for durable pavement marking.
20. Complete the durable pavement marking, including the hand work, no sooner than 7 days after the completion of the fog seal but no later than 21 days after the completion of the fog seal.
21. Remove temporary traffic control devices.

GENERAL MAINTENANCE OF TRAFFIC

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 bottom of signs on portable or temporary supports shall not be less than seven feet above the pavement in urban areas and one foot above the pavement in rural areas. Portable sign supports may be used as long as the duration is less than 3 days. If the duration is more than 3 days the signs shall be on fixed location, ground mounted supports.

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

The actual workspace for the chip seal shall be limited to two mile segments. A sufficient buffer space shall be installed so as not to cause congestion at the workspace. The traveling public shall not have to wait longer than 15 minutes at the flagger station. The pilot car shall travel no faster than 20 mph on the fresh seal.

In addition to the traffic control shown in the layouts contained in these plans, the Contractor shall provide the following:

Until initial brooming, additional flagger(s) and Flagger symbol sign(s) shall be provided during daylight hours to alert the traveling public entering completed portions of the project to the potential of airborne chips.

GENERAL MAINTENANCE OF TRAFFIC (CONTINUED)

Flagger(s) shall provide each motorist with a printed notice on the Contractor's letterhead similar to the one shown. Cost for the notice shall be incidental to the contract unit prices for the various items.

"CONTRACTOR'S LETTERHEAD"

THIS HIGHWAY IS BEING RESURFACED WITH A CHIP SEAL COAT.

THIS TYPE OF CONSTRUCTION HAS THE POTENTIAL OF CAUSING VEHICLE DAMAGE SUCH AS CHIPPED WINDSHIELDS AND BROKEN HEADLIGHTS DUE TO ROCKS BEING THROWN BY HIGH SPEED ONCOMING OR PASSING TRAFFIC.

YOU MAY WISH TO CONSIDER TAKING AN ALTERNATE ROUTE. IF YOU PROCEED, KEEP TO THE RIGHT AND DRIVE 40 MPH OR LESS. ANOTHER FLAGGER AND A PILOT CAR WILL BE ESCORTING YOU AROUND THE SEAL COAT APPLICATION AREA.

THANK YOU.

The 40 MPH Advisory Speed Plaque should not be installed with the LOOSE GRAVEL sign in areas where the posted speed limit is less than 40 MPH. LOOSE GRAVEL and 40 MPH Advisory Speed Plaques or LOOSE GRAVEL and ON SHOULDER signs shall be covered or removed from view when they are not applicable.

The Contractor shall furnish, install and maintain TRUCK CROSSING signs daily. The TRUCK CROSSING signs shall be displayed at all times when haul vehicles are hauling material. When hauling conditions no longer exist, the signs shall be covered or removed from view. The exact number and location shall be determined on construction. Payment for additional signs will be based on the contract unit price per unit for Traffic Control.

Sufficient traffic control devices have been included in these plans to sign one workspace on each project. If the Contractor elects to work on additional sites simultaneously, the cost for additional traffic control devices shall be incidental to the Contract unit price per unit for Traffic Control.

The size of some signs to be used on construction projects shall be larger than the minimum sizes shown in the Manual on Uniform Traffic Control Devices. **Sign sizes shown in the itemized list for traffic control shall be the minimum sizes used on this contract.** Note the difference in sign sizes between the conventional routes and the interstate routes.

STOCKPILE SITE RELEASES

Upon completion of the contract, the Contractor shall supply the Engineer a copy of all stockpile site releases to place in the Department's file.

FURNISHING AND APPLYING PAVEMENT MARKING PAINT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	39	89

Paint application rates shall be as follows:

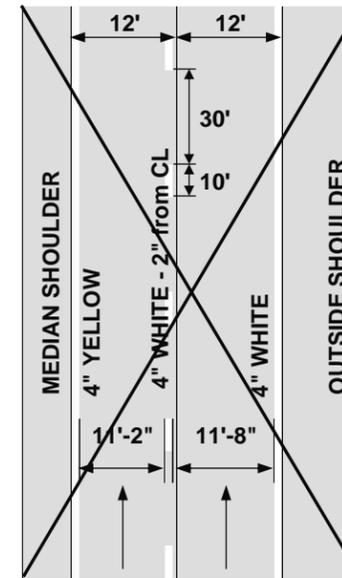
UNDIVIDED ROADWAY			
PROJECT NO.:	PROJECT NO.:	PROJECT NOS.:	PROJECT NOS.:
SD 34 E Segment		SD 37	US 18 SD 34 W SD 38 SD 43 SD 50 W SD 50 E US 81 I 90 (Part) SD 262 US 281
		Two Lane Roadway with Climbing Lane	Two Lane Roadway
Four Lane Roadway	Two Lane Roadway with Left/Center Turn Lane		
(Rate for one line)			
Solid Yellow Centerline Rate = 22.5 Gals./Pass-Mile	Solid Yellow Centerline Rate = 22.5 Gals./Pass-Mile	Dashed Yellow Centerline Rate = 6.2 Gals./Pass-Mile	Dashed Yellow Centerline Rate = 6.2 Gals./Pass-Mile
Dashed White Laneline Rate = 6.2 Gals./Pass-Mile	Dashed Yellow Centerline Rate = 6.2 Gals./Pass-Mile	Solid Yellow Centerline Rate = 22.5 Gals./Pass-Mile	Solid Yellow Centerline Rate = 22.5 Gals./Pass-Mile
Solid White Edgeline (Not applicable in curb & gutter section) Rate = 22.5 Gals./Pass-Mile	Solid White Edgeline (Not applicable in curb & gutter section) Rate = 22.5 Gals./Pass-Mile	Solid White Edgeline (Not applicable in curb & gutter section) Rate = 22.5 Gals./Pass-Mile	Solid White Edgeline - 4" Rate = 22.5 Gals./Pass-Mile
Glass Beads = 8 Lbs./Gal.	Dashed White Laneline Rate = 6.2 Gals./Pass-Mile Glass Beads = 8 Lbs./Gal.	Glass Beads = 6 Lbs./Gal.	Glass Beads = 8 Lbs./Gal.

Typical pavement marking as shown on the following sheets shall be applied throughout the entire length of applicable sections of roadway.

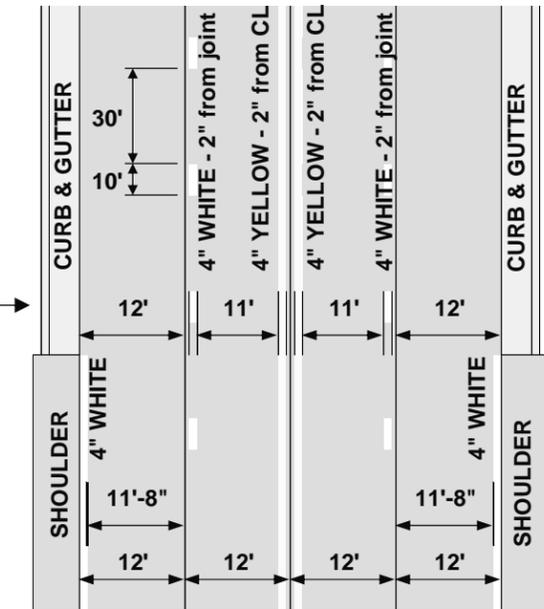
Traffic Control shall be incidental to the cost of application. The striper and advance or trailing warning vehicle shall be equipped with flashing amber lights or advance warning arrow panel.

ESTIMATED QUANTITIES		
PROJECTS	PAVEMENT MARKING PAINT	
	WHITE	YELLOW
US 18	1128	408
SD 34 W Segment	947	410
SD 34 E Segment	39	41
SD 37	72	70
SD 38	739	190
SD 43	49	16
SD 50 W Segment	391	182
SD 50 E Segment	1209	272
US 81	42	37
I 90	268	223
SD 262	744	256
US 281	35	11
TOTALS:	5663 GALLONS	2116 GALLONS

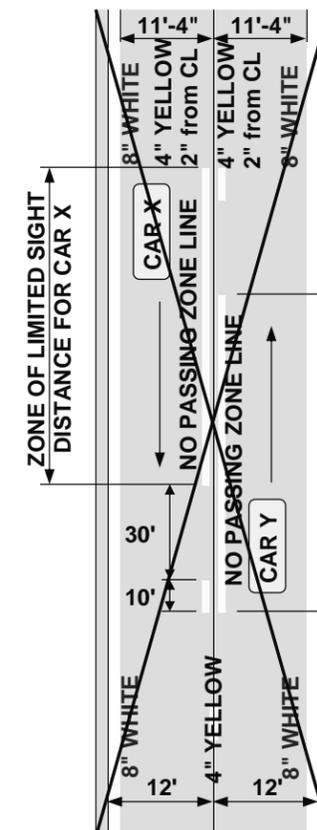
DIVIDED ROADWAY (ONE DIRECTION SHOWN)



UNDIVIDED ROADWAY

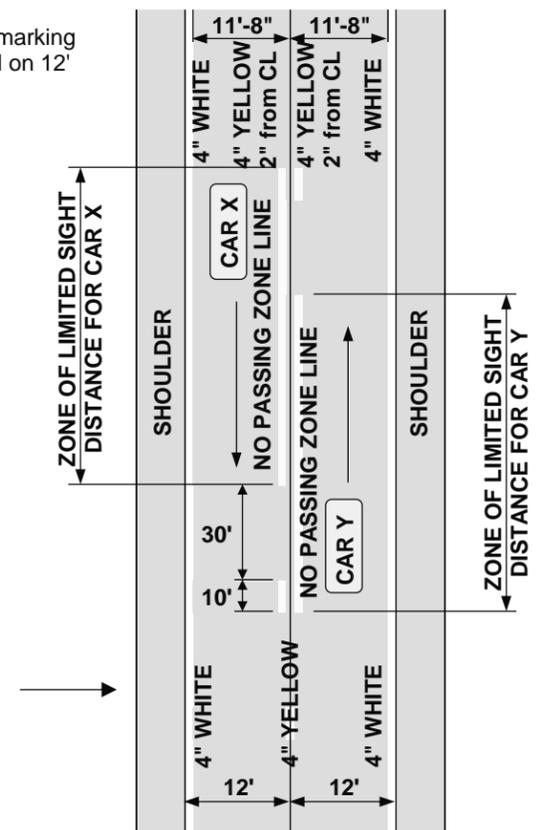


UNDIVIDED ROADWAY



NOTE: All pavement marking dimensions are based on 12' driving lanes.

UNDIVIDED ROADWAY

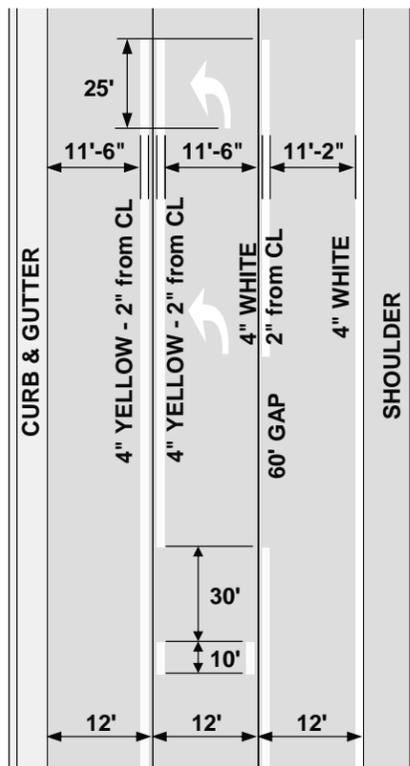


- US 18
- SD 34 W
- SD 38
- SD 43
- SD 50 W
- SD 50 E
- I 90 (Part)
- SD 262
- US 281

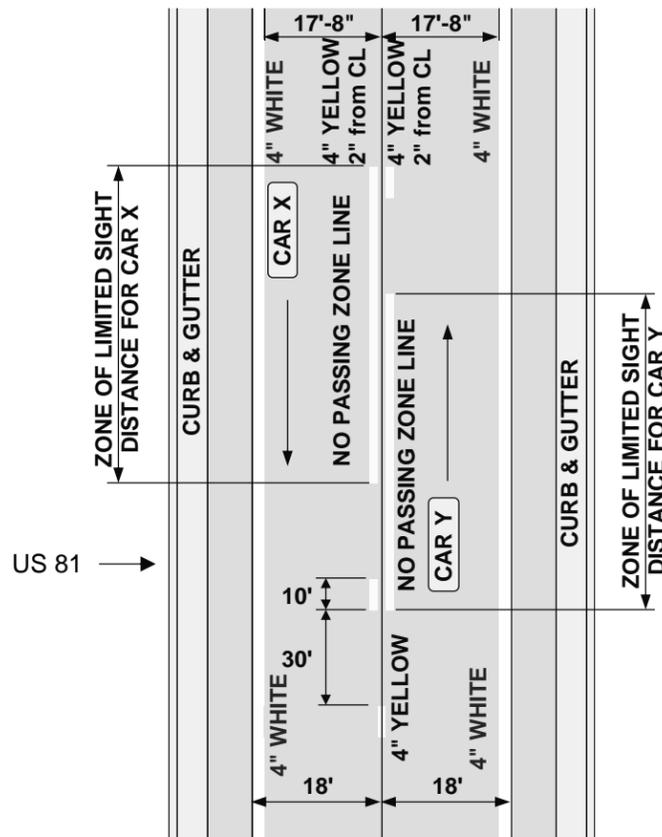
FURNISHING AND APPLYING PAVEMENT MARKING PAINT (CONTINUED)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	40	89

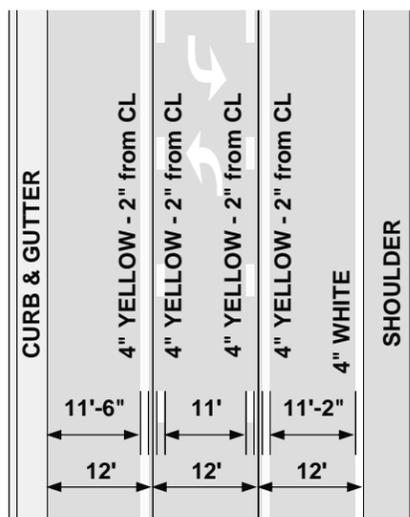
TWO LANE ROADWAY WITH LEFT TURN LANE AT INTERSECTING ROADS AND STREETS



TWO LANE ROADWAY WITH 18' LANES



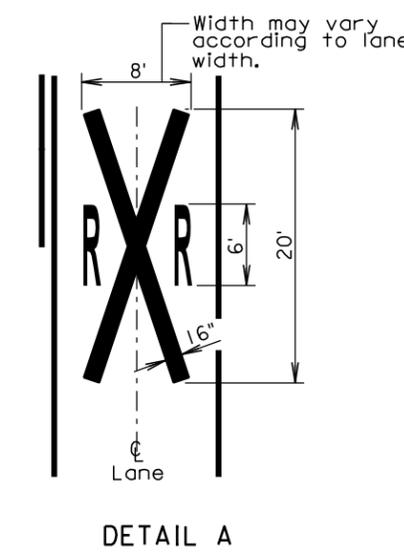
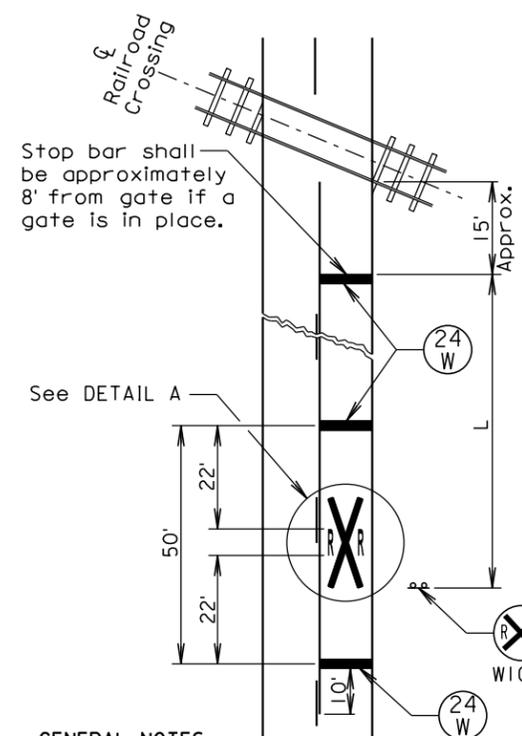
TWO LANE ROADWAY WITH CENTER TURN LANE AT ENTRANCES



NOTE: All pavement marking dimensions are based on 12' driving lanes for SD 37 and

KEY	ITEM
(24 W)	24" White
X	White

Posted Speed Limit (M.P.H.)	L (Ft.)
≤ 30	100
35	100
40	125
45	175
50	250
55	325
60	400
65	475
70	550



GENERAL NOTES:

- The railroad crossing pavement markings shall be placed symmetrically about the centerline of the railroad crossing.
- When pavement markings are used, a portion of the RXR symbol shall be placed directly opposite of the advance warning sign W10-1.
- On multi-lane roads the transverse bands shall extend across all approach lanes and individual RXR symbols shall be placed in each approach lane.
- The railroad crossing pavement markings shall consist of all the transverse bands, stop bars, and RXR symbols.
- When pavement marking paint is used for marking the railroad crossing, all costs for furnishing and painting the markings, materials, labor, and necessary equipment shall be incidental to the contract unit price per gallon for "Pavement Marking Paint, White".
- When pavement marking tape is used for marking the railroad crossing, all costs for furnishing and placing the markings, materials, labor, and necessary equipment shall be incidental to the contract unit price per each for "Cold Applied Plastic Pavement Marking, Railroad Crossing".

June 26, 2013

Published Date: 4th Qtr. 2014	S D D O T	PAVEMENT MARKINGS AT RAILROAD CROSSING	PLATE NUMBER 633.10
			Sheet 1 of 1

TURN LANE PAVEMENT MARKING US 18

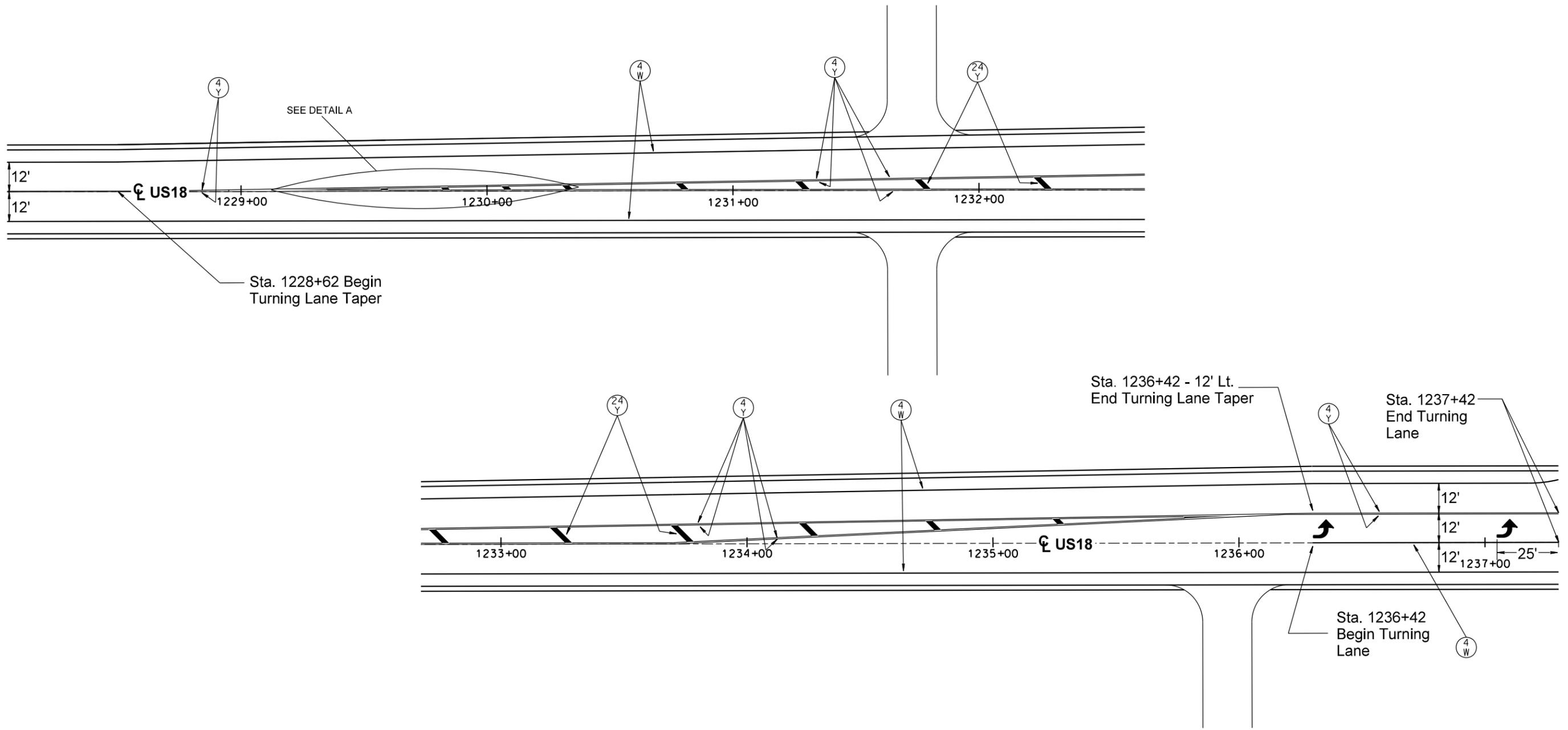
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	41	89

Plotting Date: 01/02/2015

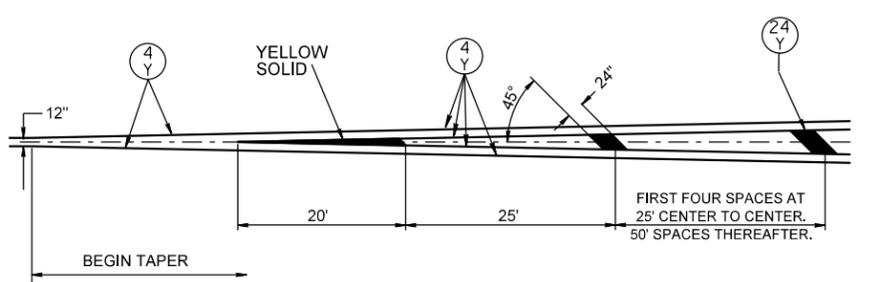


PLOT SCALE - 1:7000

PLOT NAME - 4



DETAIL A



KEY

(4 W)	4" WHITE
(4 Y)	4" YELLOW
(24 Y)	24" YELLOW

PLOTTED FROM - TRWJ1N106

FILE - ... \PAYMARK 18 FAIRFAX 047L 2015.DGN

TURN LANE PAVEMENT MARKING US 18

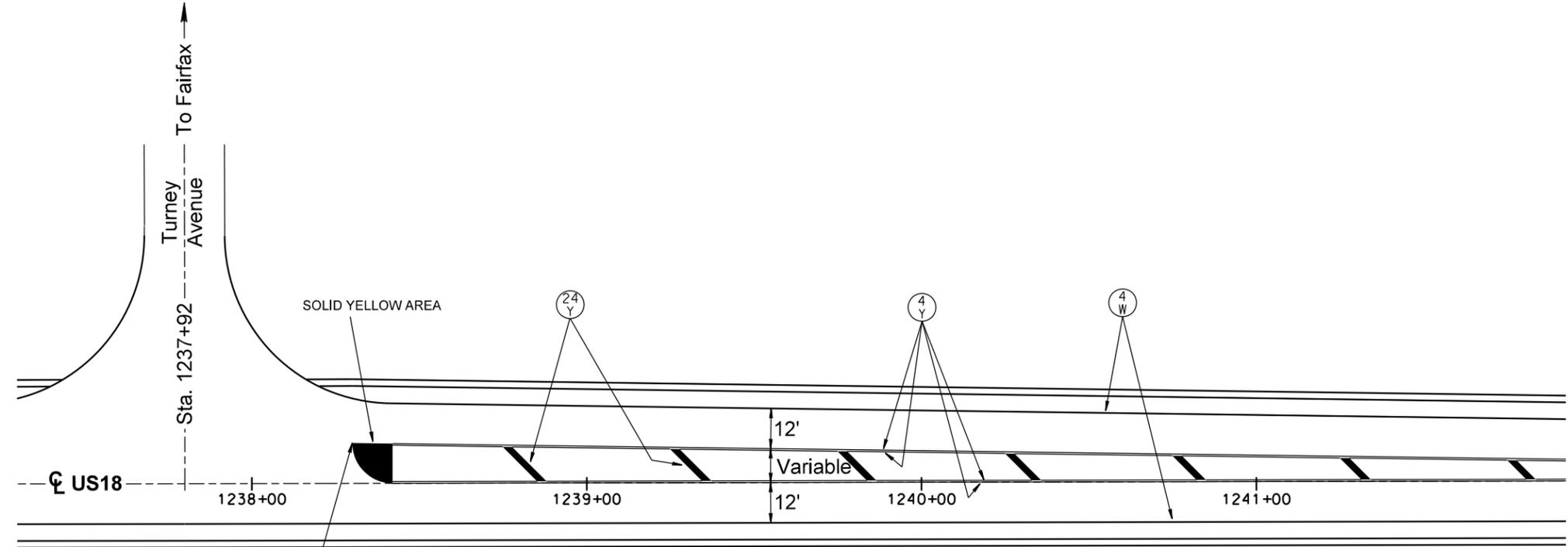
STATE OF SOUTH DAKOTA	PROJECT IM-NH-P 0021(155)	SHEET 42	TOTAL SHEETS 89
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Plotting Date: 01/02/2015

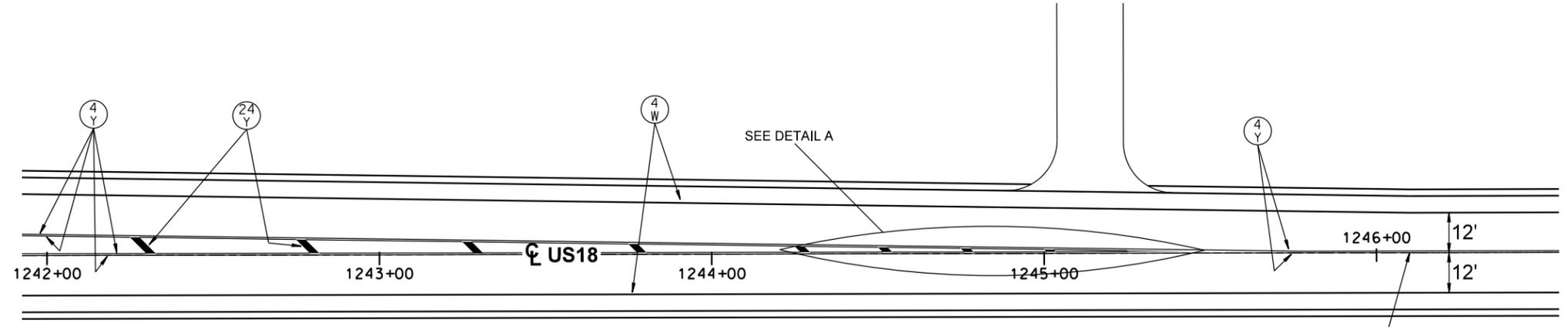


PLOT SCALE - 1:7000

PLOT NAME - 4

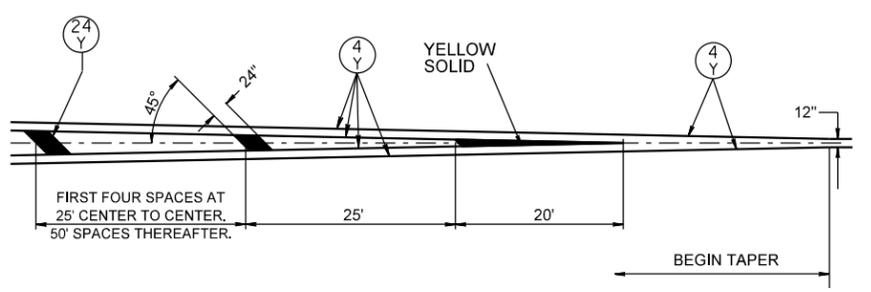


Sta. 1238+42 - 12' Lt.
Begin Turning Lane
Taper



Sta. 1246+22
End Turning
Lane Taper

DETAIL A



KEY

(4W)	4" WHITE
(4Y)	4" YELLOW
(24Y)	24" YELLOW

PLOTTED FROM - TRW\INT06

FILE - ... \PAYMARK 18 FAIRFAX 047L 2015.DGN

PERMANENT PAVEMENT MARKING JCT US 18 & SD 43

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	43	89

Plotting Date: 01/02/2015

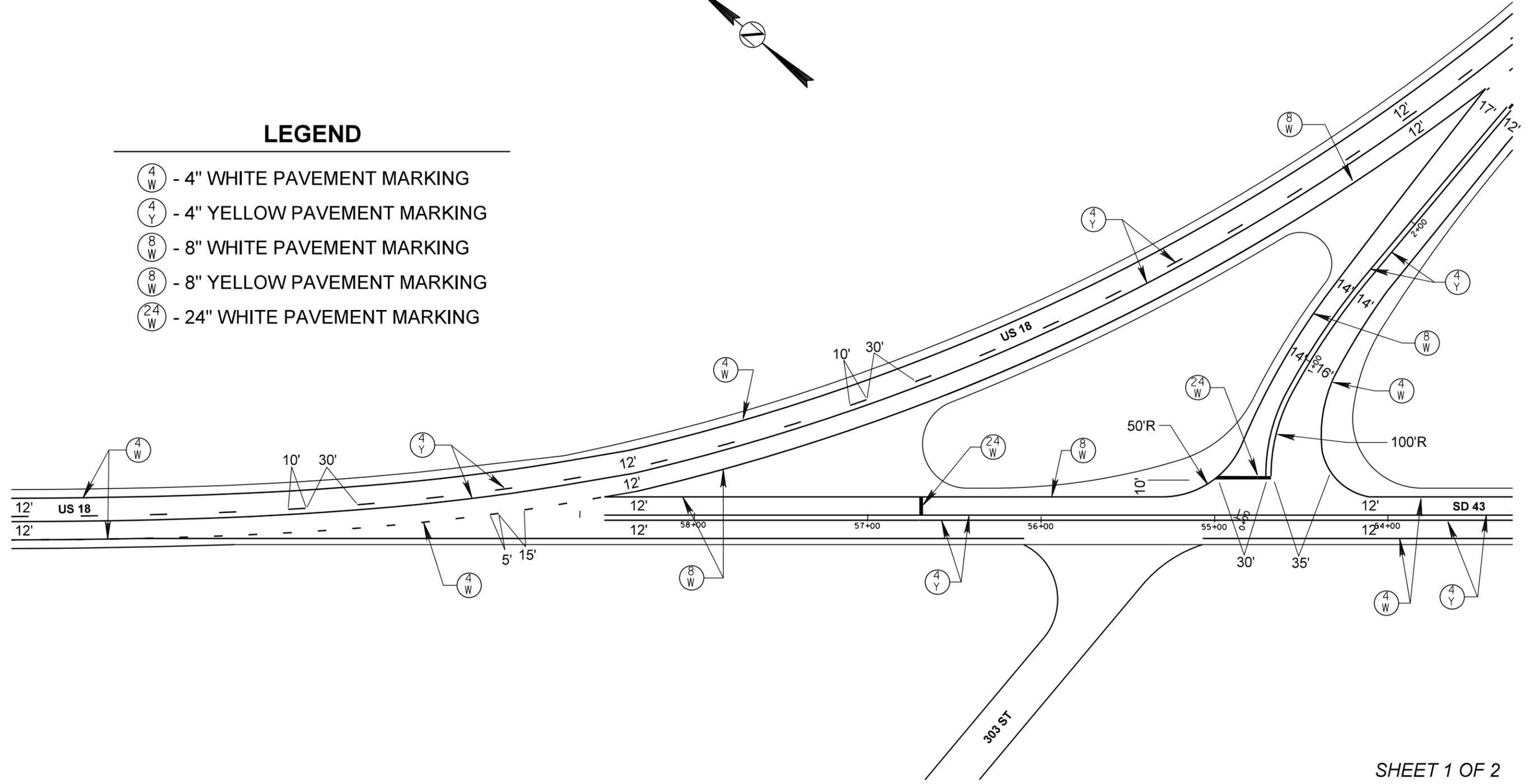
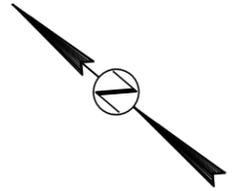
PLOT SCALE - 1:7000

PLOT NAME - 4

FILE - ... \PAVMARK 18 FAIRFAX 047L 2015.DGN

LEGEND

- (4 W) - 4" WHITE PAVEMENT MARKING
- (4 Y) - 4" YELLOW PAVEMENT MARKING
- (8 W) - 8" WHITE PAVEMENT MARKING
- (8 Y) - 8" YELLOW PAVEMENT MARKING
- (24 W) - 24" WHITE PAVEMENT MARKING



PLOTTED FROM - IRWIN106

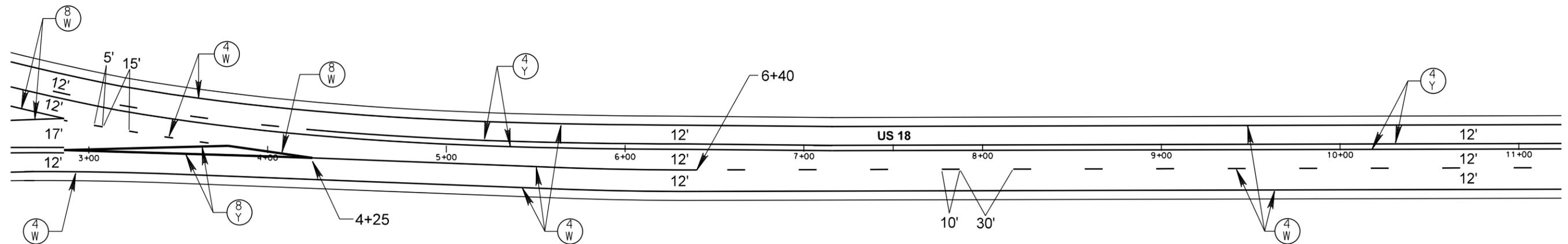
PERMANENT PAVEMENT MARKING JCT US 18 & SD 43

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	44	89

Plotting Date: 01/02/2015

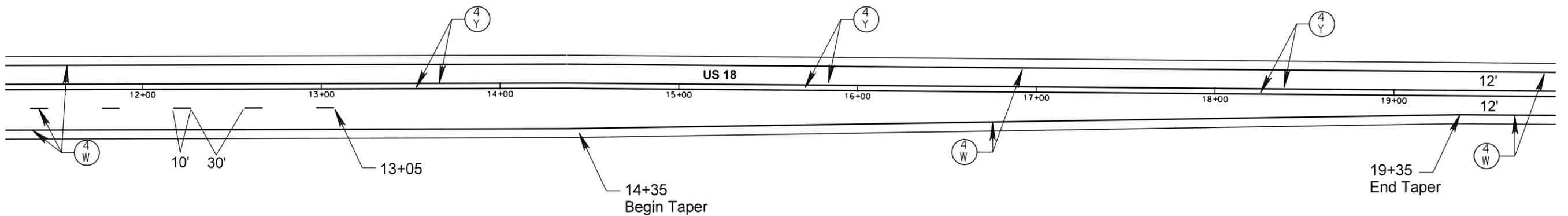
PLOT SCALE - 1:7000

PLOT NAME - 4



LEGEND

- 4
W - 4" WHITE PAVEMENT MARKING
- 4
Y - 4" YELLOW PAVEMENT MARKING
- 8
W - 8" WHITE PAVEMENT MARKING
- 8
Y - 8" YELLOW PAVEMENT MARKING
- 24
W - 24" WHITE PAVEMENT MARKING



PLOTTED FROM - IRWINI06

FILE - ... \PAYMARK 18 FAIRFAX 047L 2015.DGN

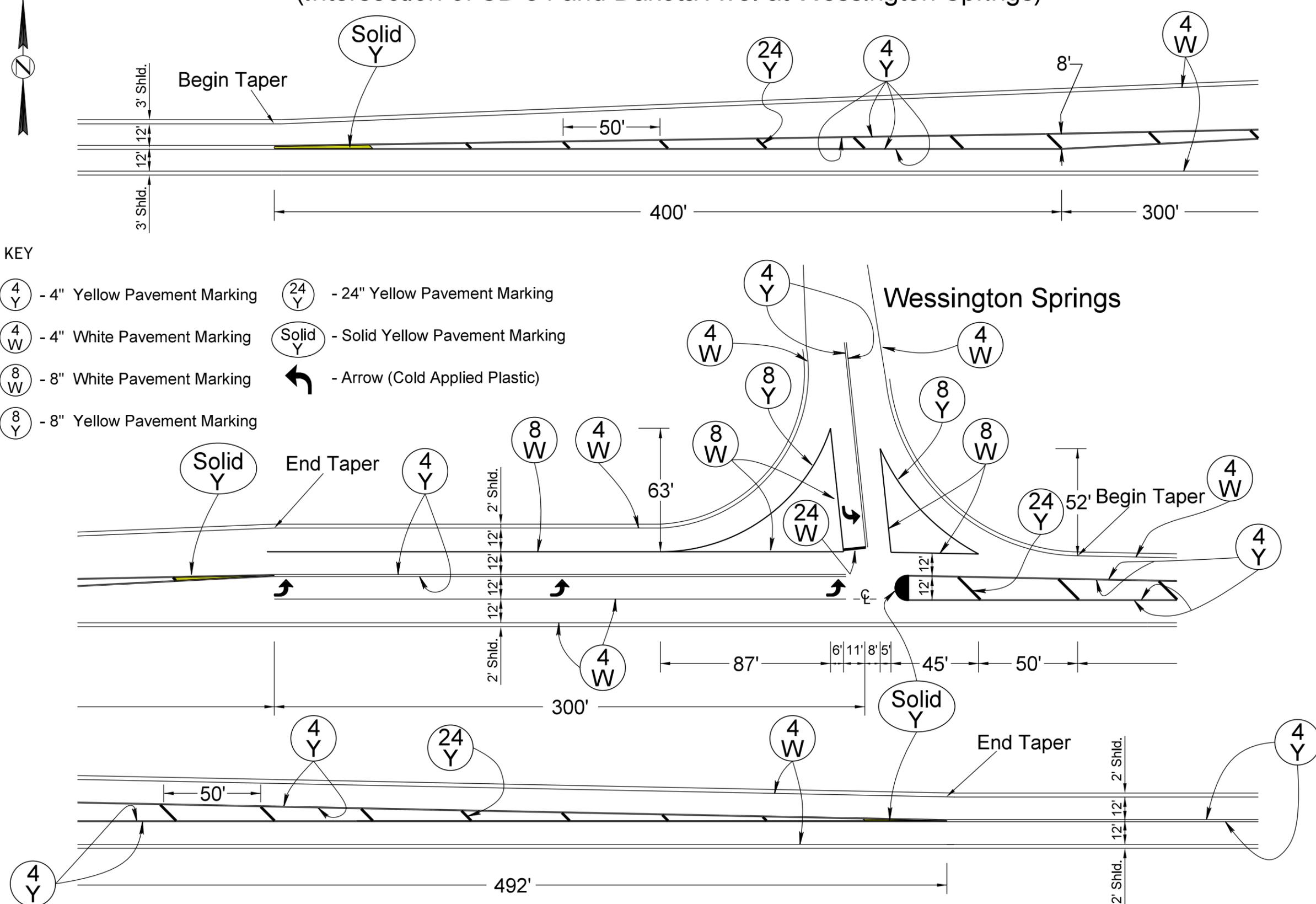
PAVEMENT MARKING LAYOUT

SD 34 W Segment

(Intersection of SD 34 and Dakota Ave. at Wessington Springs)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	45	89

Plotting Date: 01/02/2015



KEY

- 4
Y - 4" Yellow Pavement Marking
- 24
Y - 24" Yellow Pavement Marking
- 4
W - 4" White Pavement Marking
- Solid
Y - Solid Yellow Pavement Marking
- 8
W - 8" White Pavement Marking
- Arrow (Cold Applied Plastic)
- 8
Y - 8" Yellow Pavement Marking

PLOT SCALE - 1:7000

PLOTTED FROM - TRW110106

PLOT NAME - 1

FILE - ... \PAYMARK 34 WESSSPRINGS 047L 2015.DGN

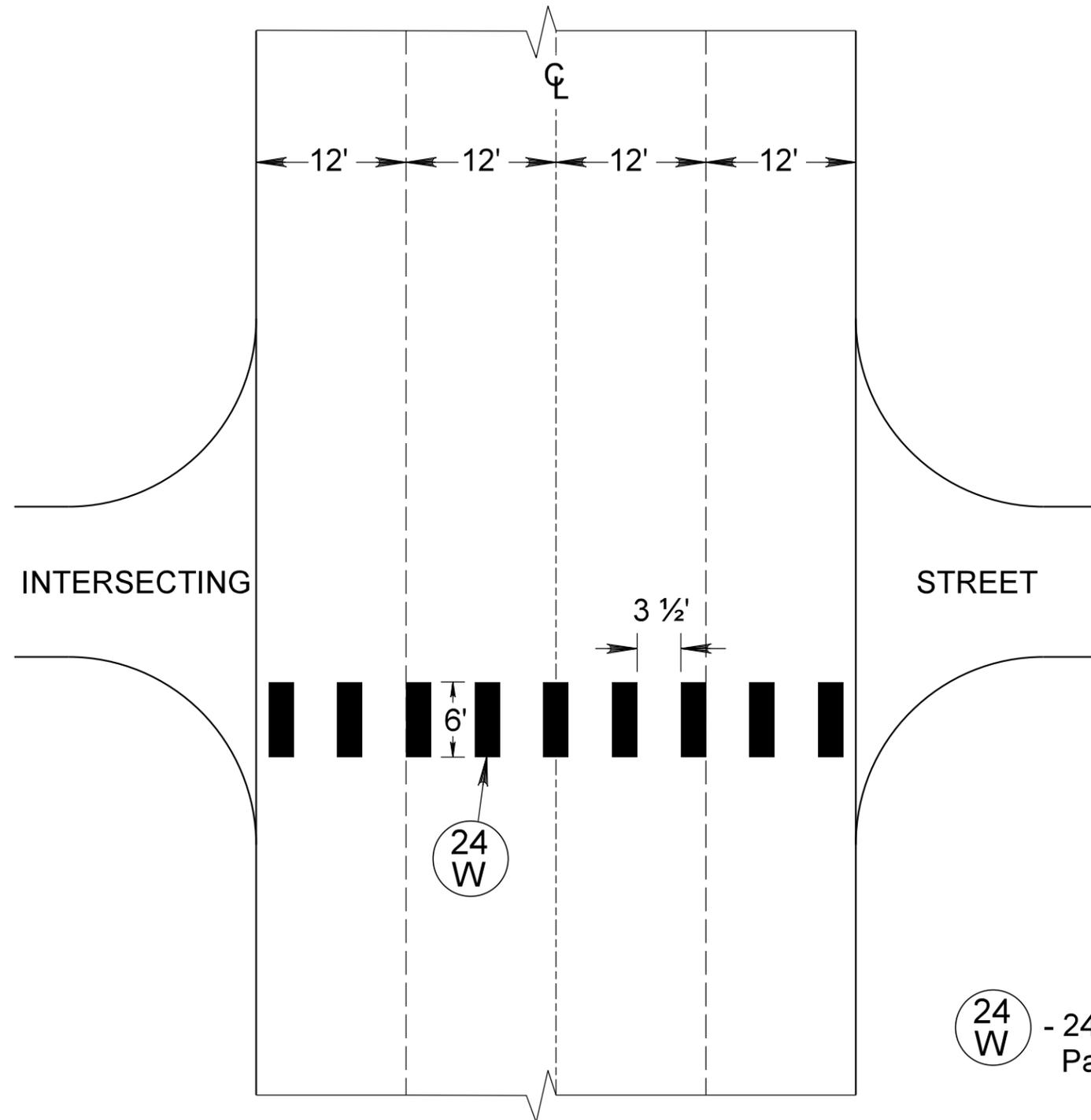
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	46	89

Plotting Date: 01/02/2015

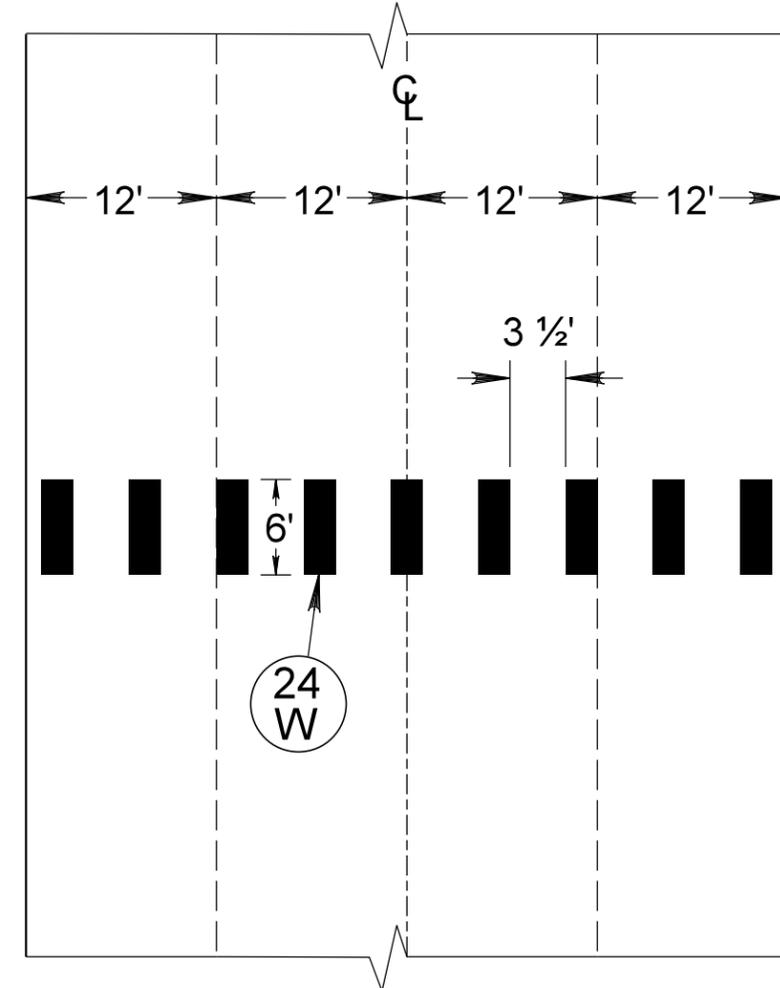
CROSSWALK PAVEMENT MARKING

(TYPICAL 4-LANE)
SD 34 E Segment

INTERSECTION



MID-BLOCK



(24 W) - 24" White Permanent Pavement Marking

PLOT SCALE - 1:7000

PLOTTED FROM - TRWJINT06

PLOT NAME - 2

FILE - ... \CROSSWALK DETAILS 047L 2015.DGN

PAVEMENT MARKING LAYOUT

SD 37 THRU PARKSTON - JCT SD 44

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	47	89

Plotting Date: 01/02/2015



SCALE: 1" = 40'

PLOT SCALE - 1:7000

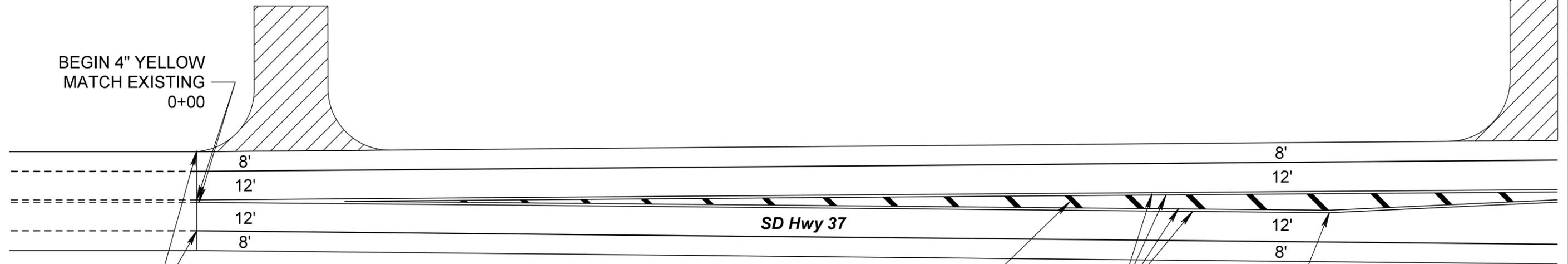
PLOT NAME - 4

FILE - ... \PAYMARK 37 PARKSTON 047L 2015.DGN

BEGIN 4" YELLOW MATCH EXISTING
0+00

BEGIN 4" WHITE MATCH EXISTING
0+00

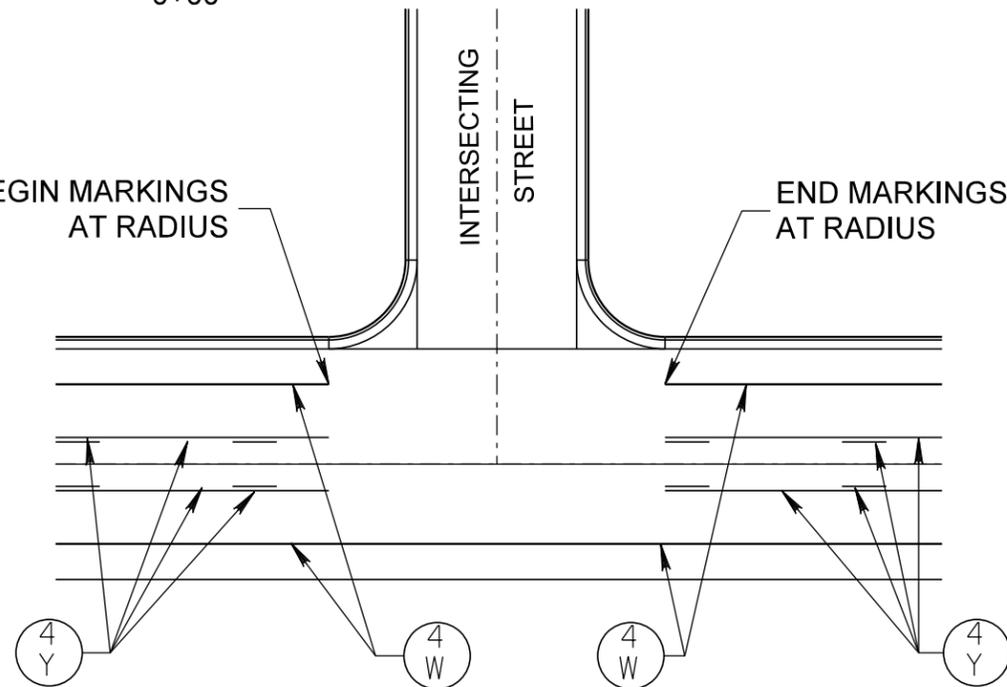
END TAPER
4+65 - 4' R



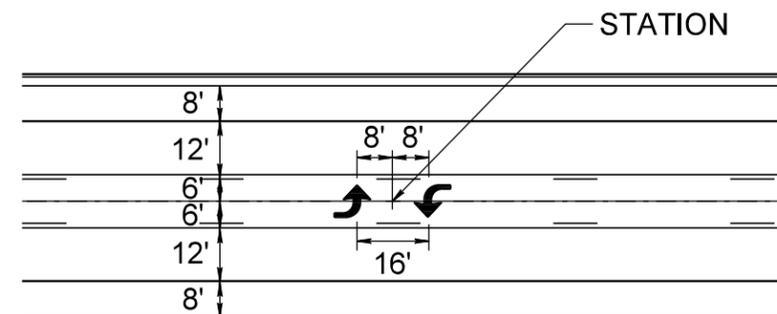
BEGIN MARKINGS AT RADIUS

END MARKINGS AT RADIUS

INTERSECTING STREET



INTERSECTING STREETS
(TYPICAL)



CENTER TURN LANE ARROWS
(TYPICAL)

CENTER TURN LANE ARROWS	
STATION	
14+63	
18+38	
22+39	
25+81	
29+62	
33+37	
37+09	
40+87	
44+59	
48+35	
52+08	
55+85	
60+55	

PLOTTED FROM - TRWJINT06

PAVEMENT MARKING LAYOUT

SD 37 THRU PARKSTON - JCT SD 44

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	48	89

Plotting Date: 01/02/2015

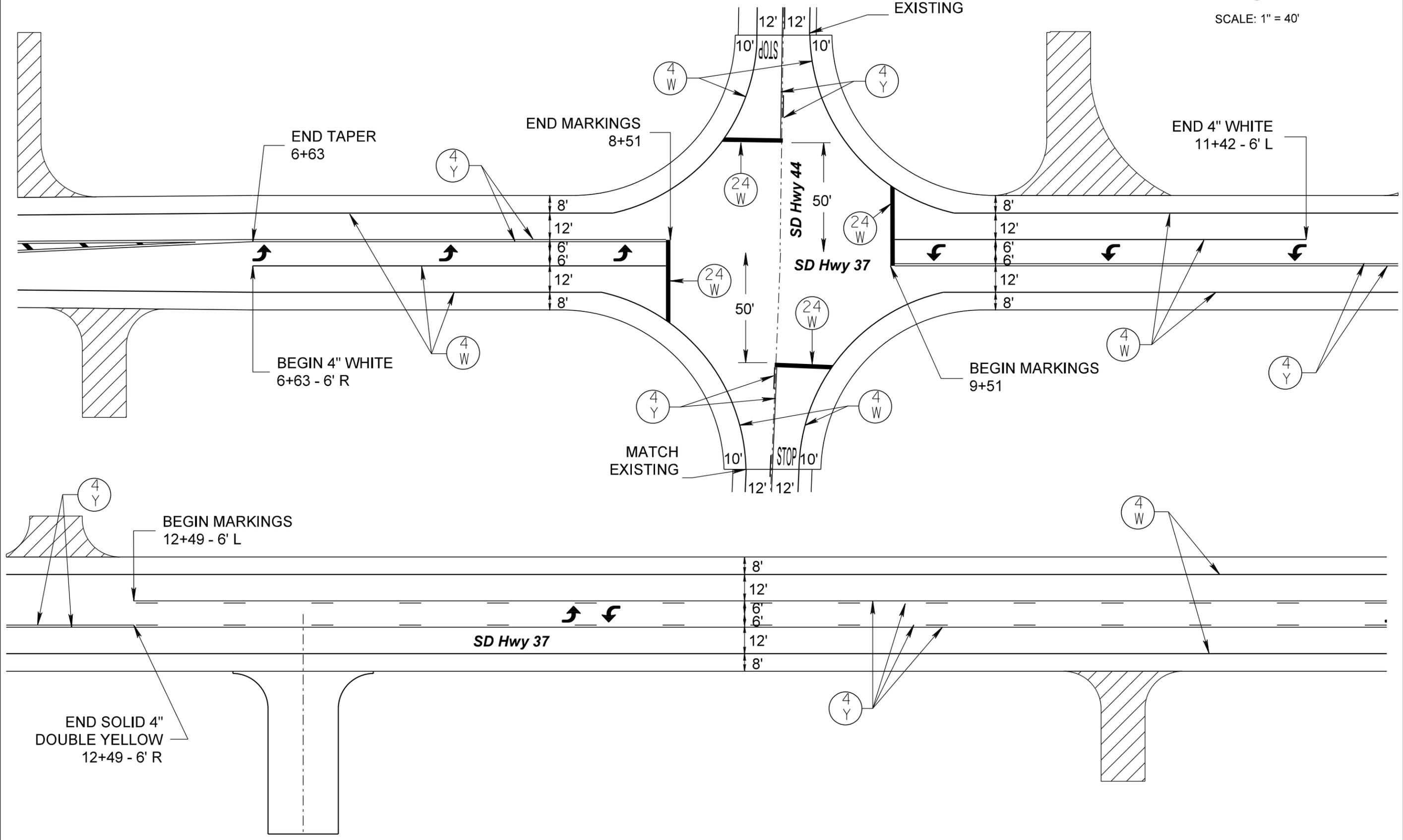


SCALE: 1" = 40'

PLOT SCALE - 1:7000

PLOT NAME - 4

FILE - ... \PAYMARK 37 PARKSTON 047L 2015.DGN



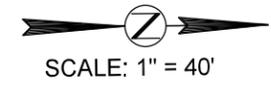
PLOTTED FROM - TRWJINT06

PAVEMENT MARKING LAYOUT

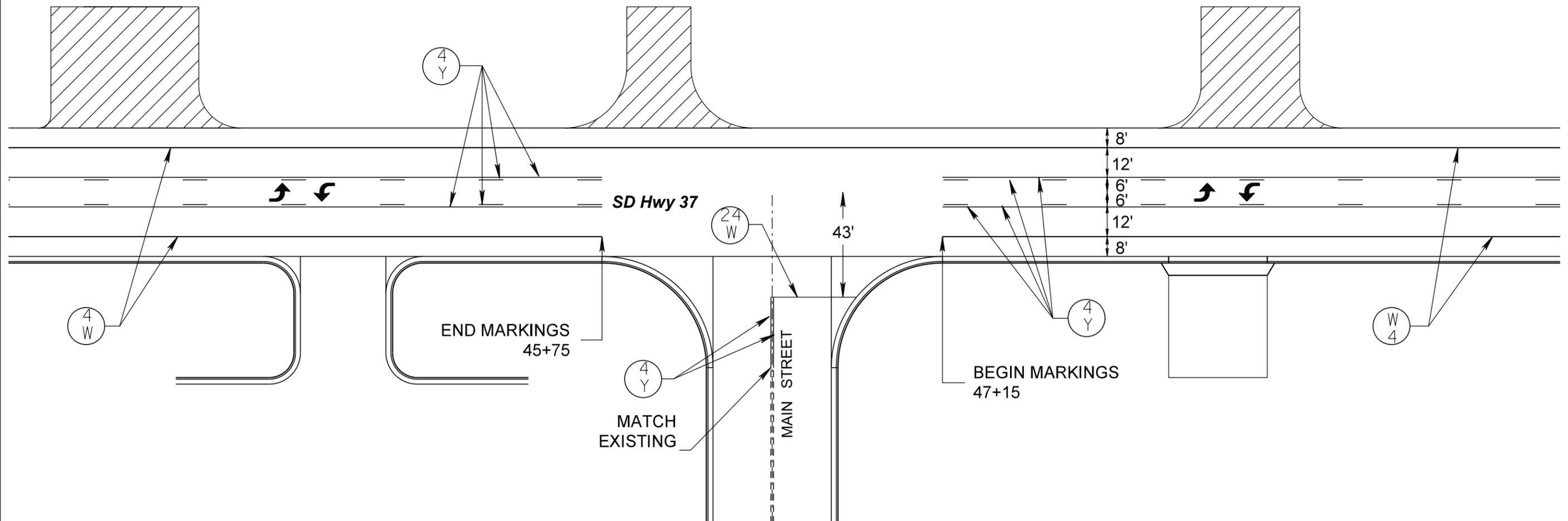
SD 37 THRU PARKSTON - MAIN ST

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	49	89

Plotting Date: 01/02/2015



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
(4 W)	PAVEMENT MARKING PAINT, 4" WHITE	62	GAL
(4 Y)	PAVEMENT MARKING PAINT, 4" YELLOW	65	GAL
(24 W)	PAVEMENT MARKING PAINT, 24" WHITE	3	GAL
(24 Y)	PAVEMENT MARKING PAINT, 24" YELLOW	5	GAL
↩	PAVEMENT MARKING PAINT, ARROW	7	GAL



PLOT SCALE - 1:7000

PLOTTED FROM - TRMINT06

PLOT NAME - 4

FILE - ... \PAYMARK 37 PARKSTON 047L 2015.DGN

PAVEMENT MARKING LAYOUT

SD 37 THRU PARKSTON - GLYNN DR

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	50	89

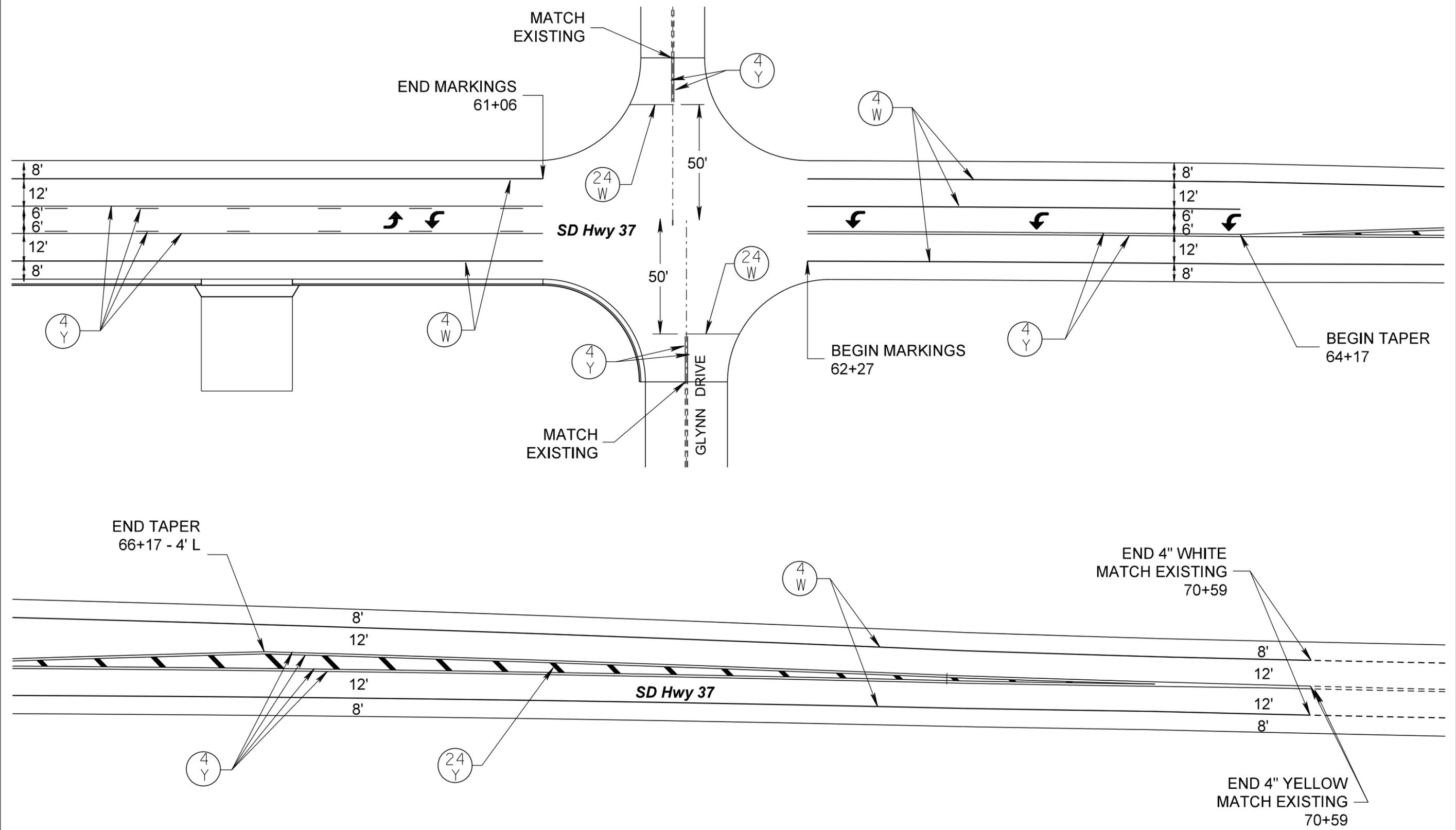
Plotting Date: 01/02/2015



PLOT SCALE - 1:7000

PLOT NAME - 4

FILE - ... \PAYMARK 37 PARKSTON 047L 2015.DGN



PLOTTED FROM - IRWJ106

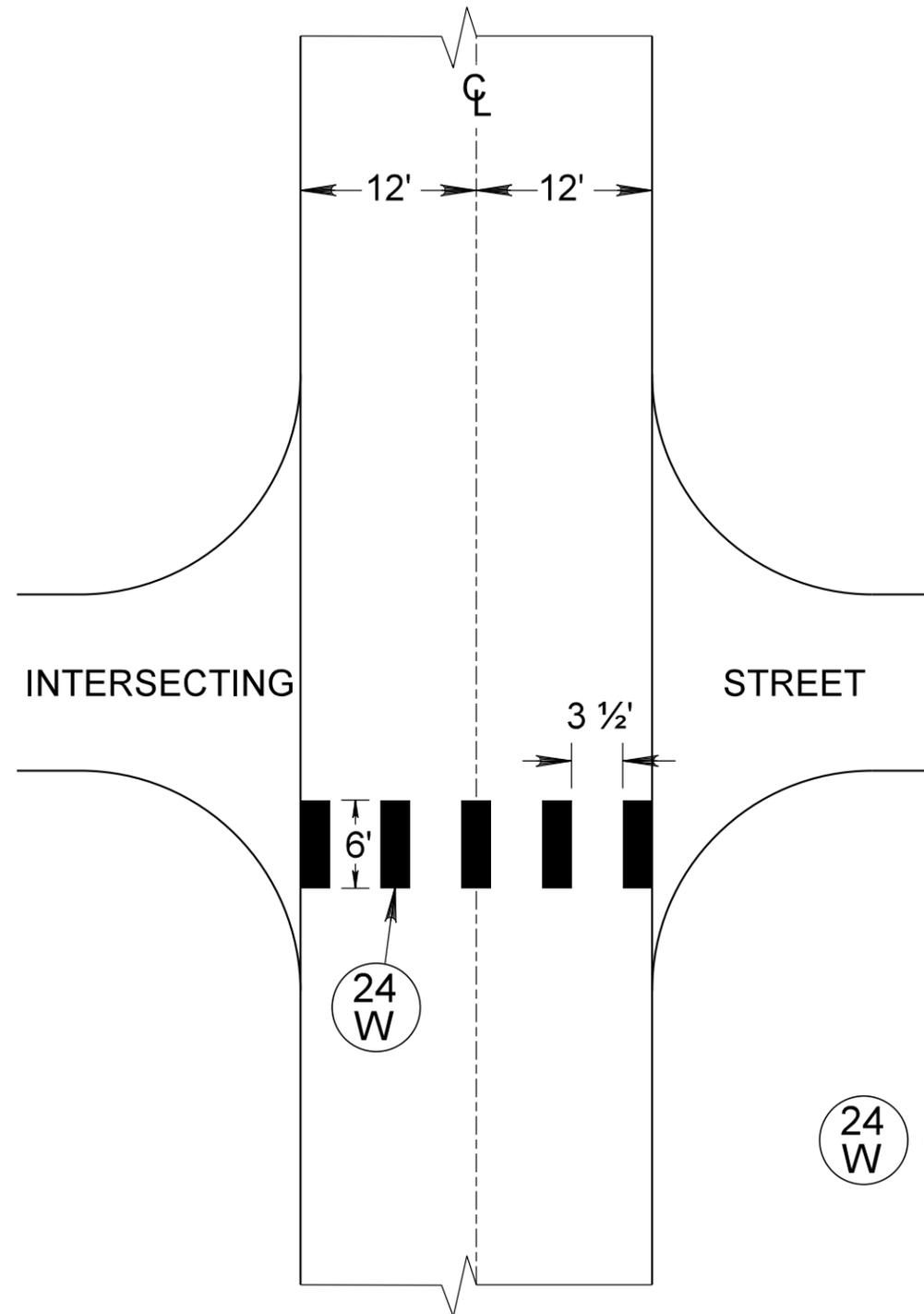
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	52	89

Plotting Date: 01/02/2015

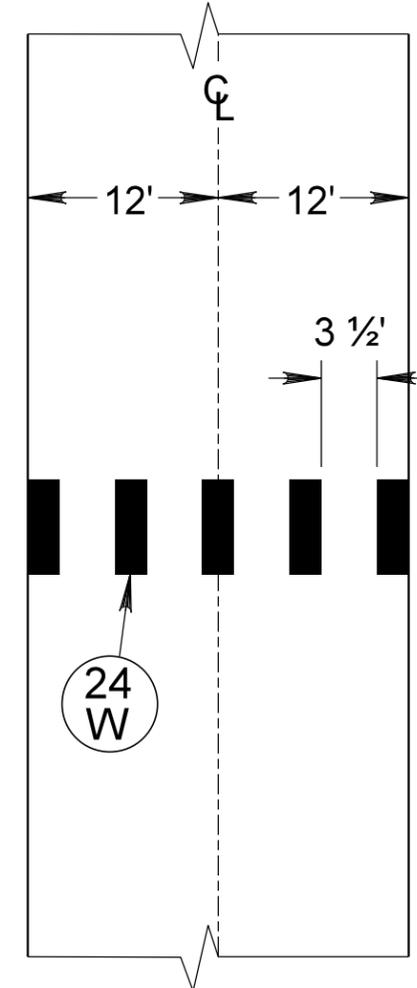
CROSSWALK PAVEMENT MARKING

(TYPICAL 2-LANE)
US 81 & SD 262

INTERSECTION



MID-BLOCK



24 W - 24" White Permanent Pavement Marking

PLOT SCALE - 1:7000

PLOTTED FROM - TRM\INT06

PLOT NAME - 2

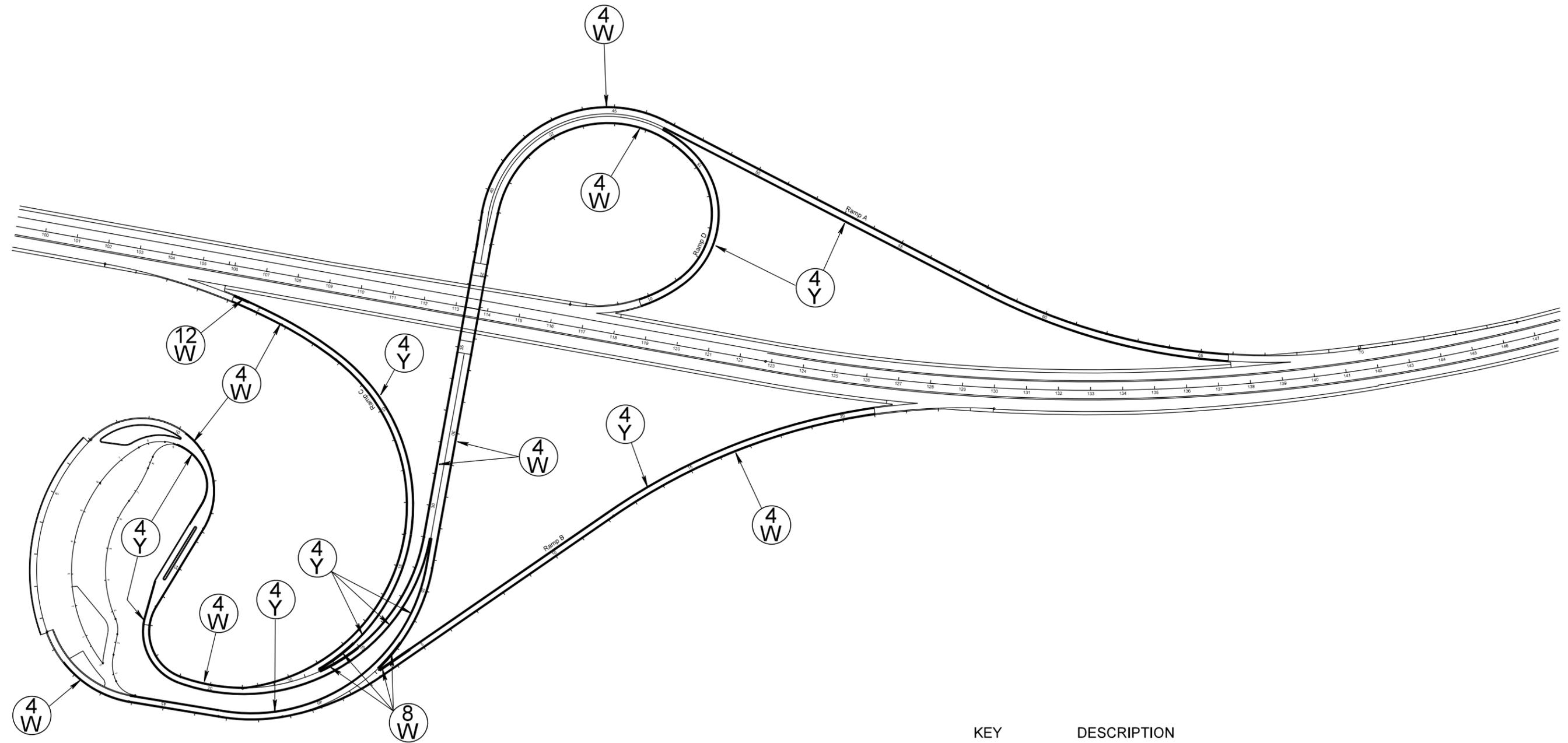
FILE - ... \CROSSWALK DETAILS 047L 2015.DGN

PAVEMENT MARKING LAYOUT

I 90 - EXIT 264 REST AREA

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	53	89

Plotting Date: 01/02/2015



KEY	DESCRIPTION
(4 W)	4" WHITE PAVEMENT MARKING
(8 W)	8" WHITE PAVEMENT MARKING
(12 W)	12" WHITE PAVEMENT MARKING
(4 Y)	4" YELLOW PAVEMENT MARKING

PLOT SCALE - 1:7000

PLOTTED FROM - IRWIN106

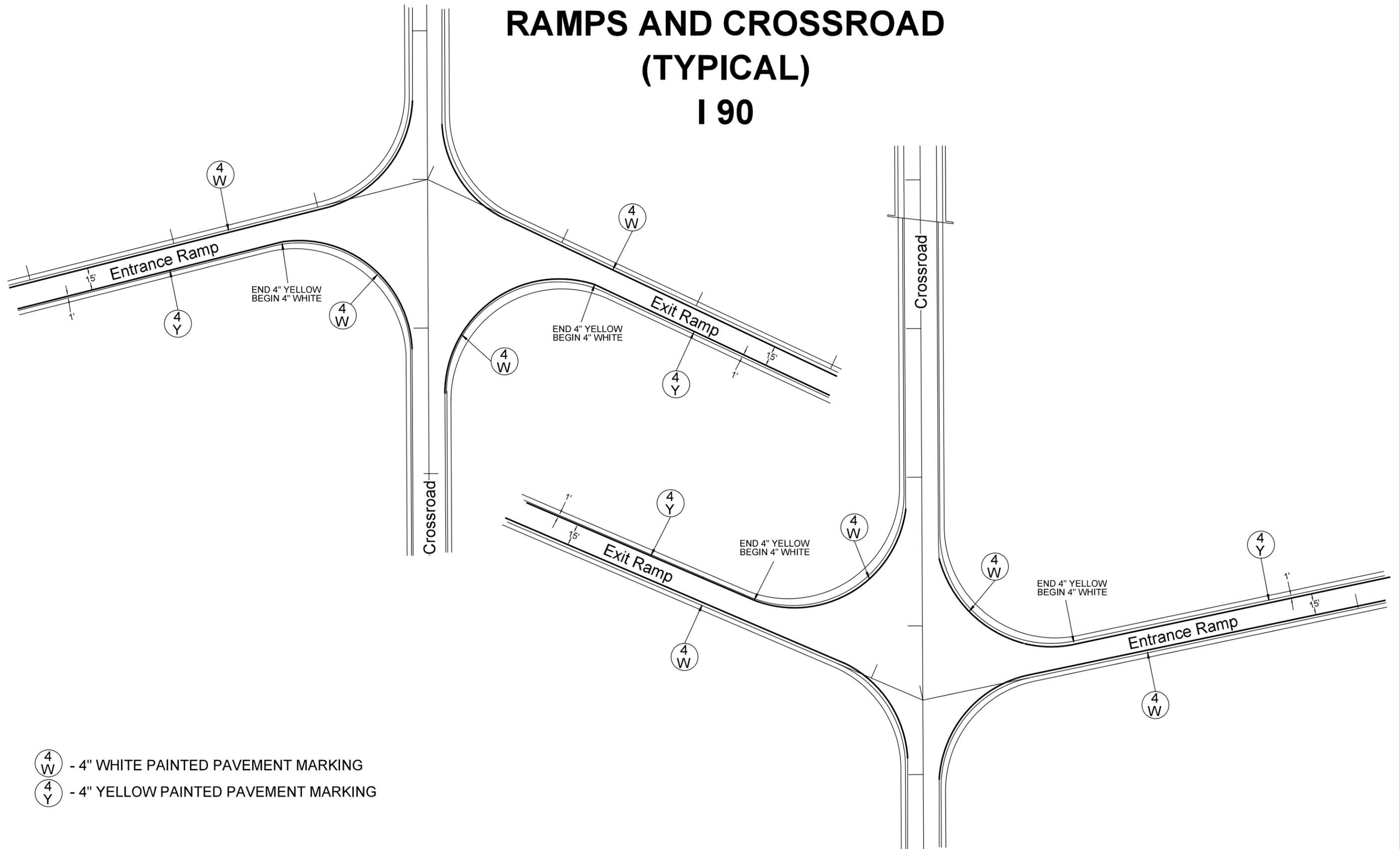
PLOT NAME - 1

FILE - ... \PAVMARK CHAMB R A RAMP 047L 2015.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	54	89

Plotting Date: 01/02/2015

PAVEMENT MARKING RAMPS AND CROSSROAD (TYPICAL) I 90



- 4
W - 4" WHITE PAINTED PAVEMENT MARKING
- 4
Y - 4" YELLOW PAINTED PAVEMENT MARKING

PLOT SCALE - 1:7000

PLOTTED FROM - IRWJINT06

PLOT NAME - 1

FILE - ... \TOP OF RAMP MARK 047L 2015.DGN

PAVEMENT MARKING LAYOUT

I-90L/W HAVENS AVENUE

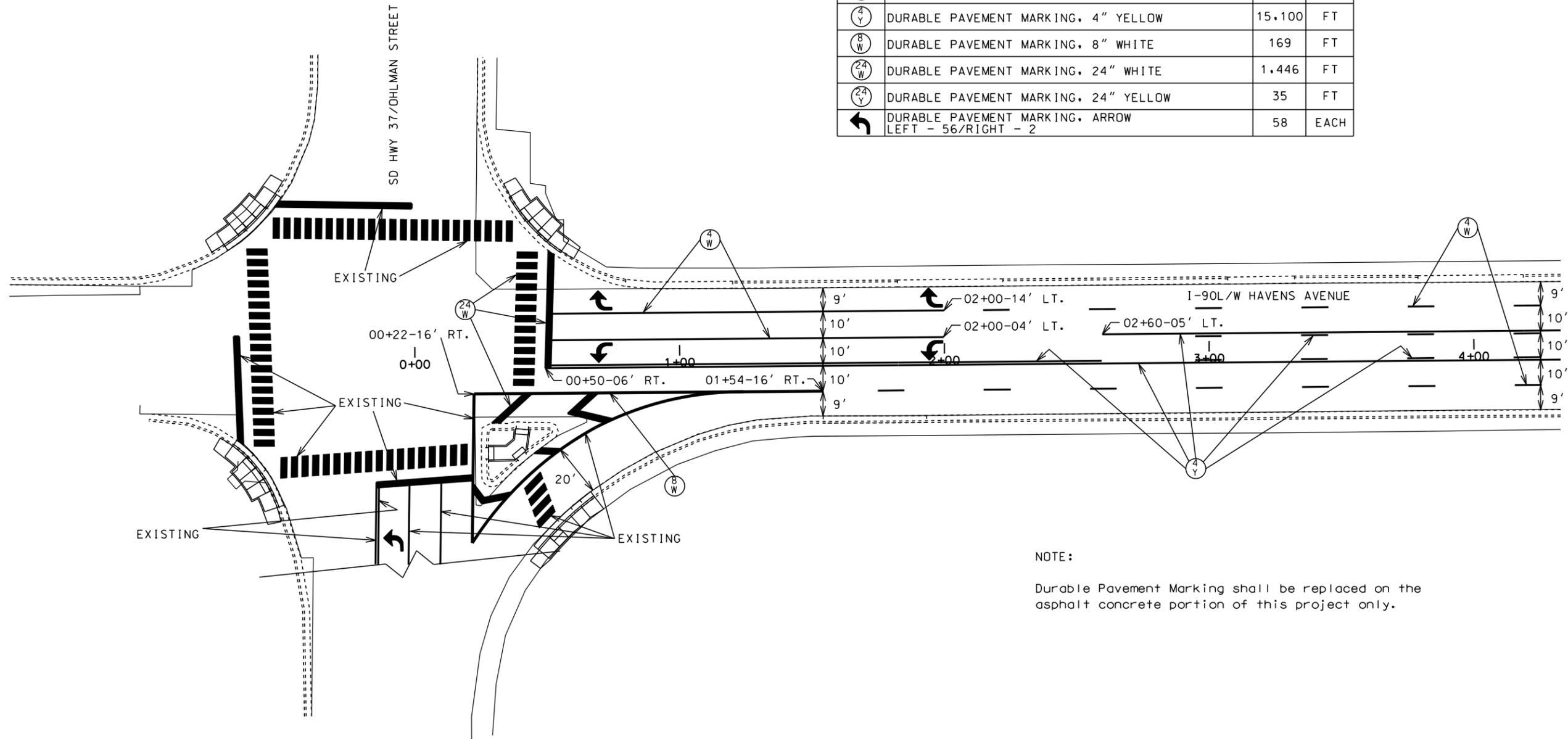
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	55	89

Plotting Date: 01/02/2015

SCALE
1" = 40'



ESTIMATE OF QUANTITIES			
KEY	ITEM	EST QUANT	UNIT
(4) W	DURABLE PAVEMENT MARKING, 4" WHITE	4.150	FT
(4) Y	DURABLE PAVEMENT MARKING, 4" YELLOW	15.100	FT
(8) W	DURABLE PAVEMENT MARKING, 8" WHITE	169	FT
(24) W	DURABLE PAVEMENT MARKING, 24" WHITE	1.446	FT
(24) Y	DURABLE PAVEMENT MARKING, 24" YELLOW	35	FT
↩	DURABLE PAVEMENT MARKING, ARROW LEFT - 56/RIGHT - 2	58	EACH



NOTE:

Durable Pavement Marking shall be replaced on the asphalt concrete portion of this project only.

PLOT SCALE - 1:7000

PLOTTED FROM - TRWJINT06

PLOT NAME - 8

FILE - ... \PAVMARK I 90L 047L 2015.DGN

PAVEMENT MARKING LAYOUT

I-90L/W HAVENS AVENUE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	56	89

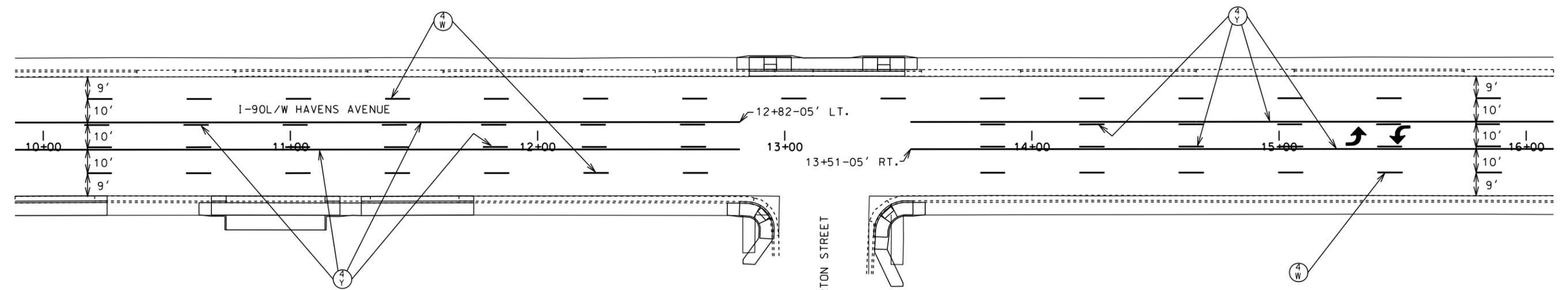
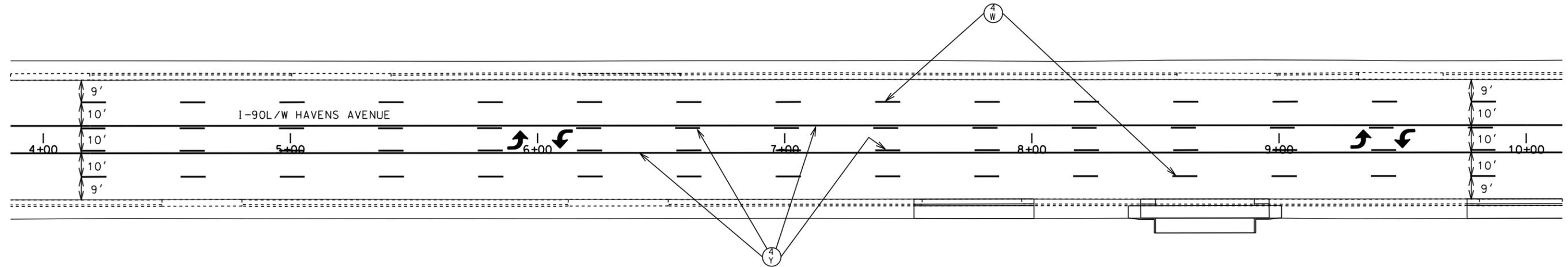
Plotting Date: 01/02/2015

SCALE
1" = 40'



PLOT SCALE - 1:7000

PLOT NAME - 8



NOTE:

Durable Pavement Marking shall be replaced on the asphalt concrete portion of this project only.

PLOTTED FROM - IRWJINT06

FILE - ... \P\AVMARK I 90L 047L 2015.DGN

PAVEMENT MARKING LAYOUT

I-90L/W HAVENS AVENUE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	57	89

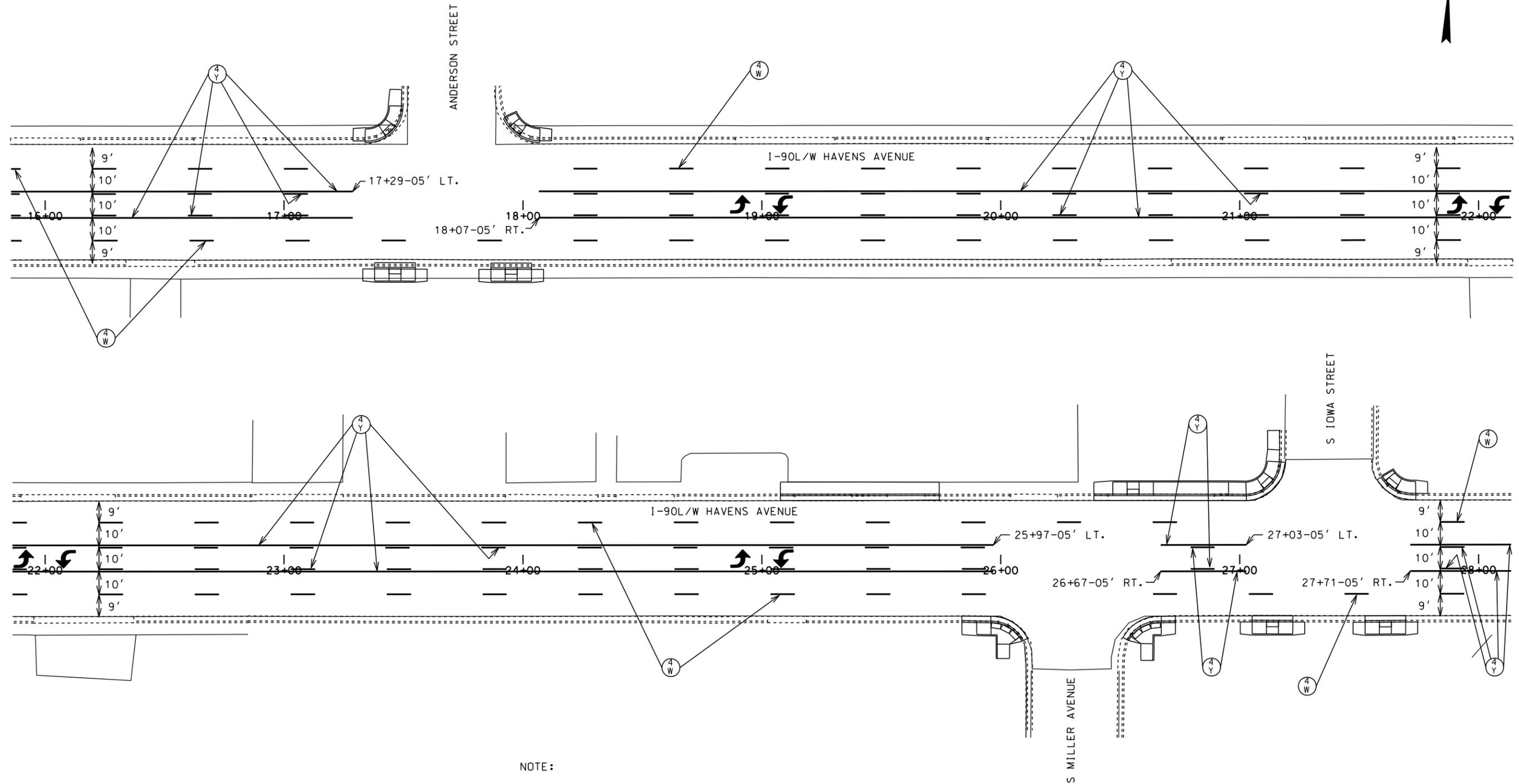
Plotting Date: 01/02/2015

SCALE
1" = 40'



PLOT SCALE - 1:7000

PLOT NAME - 8



NOTE:

Durable Pavement Marking shall be replaced on the asphalt concrete portion of this project only.

PLOTTED FROM - IRWJINT06

FILE - ... \P\AVMARK I 90L 047L 2015.DGN

PAVEMENT MARKING LAYOUT

I-90L/W HAVENS AVENUE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	58	89

Plotting Date: 01/02/2015

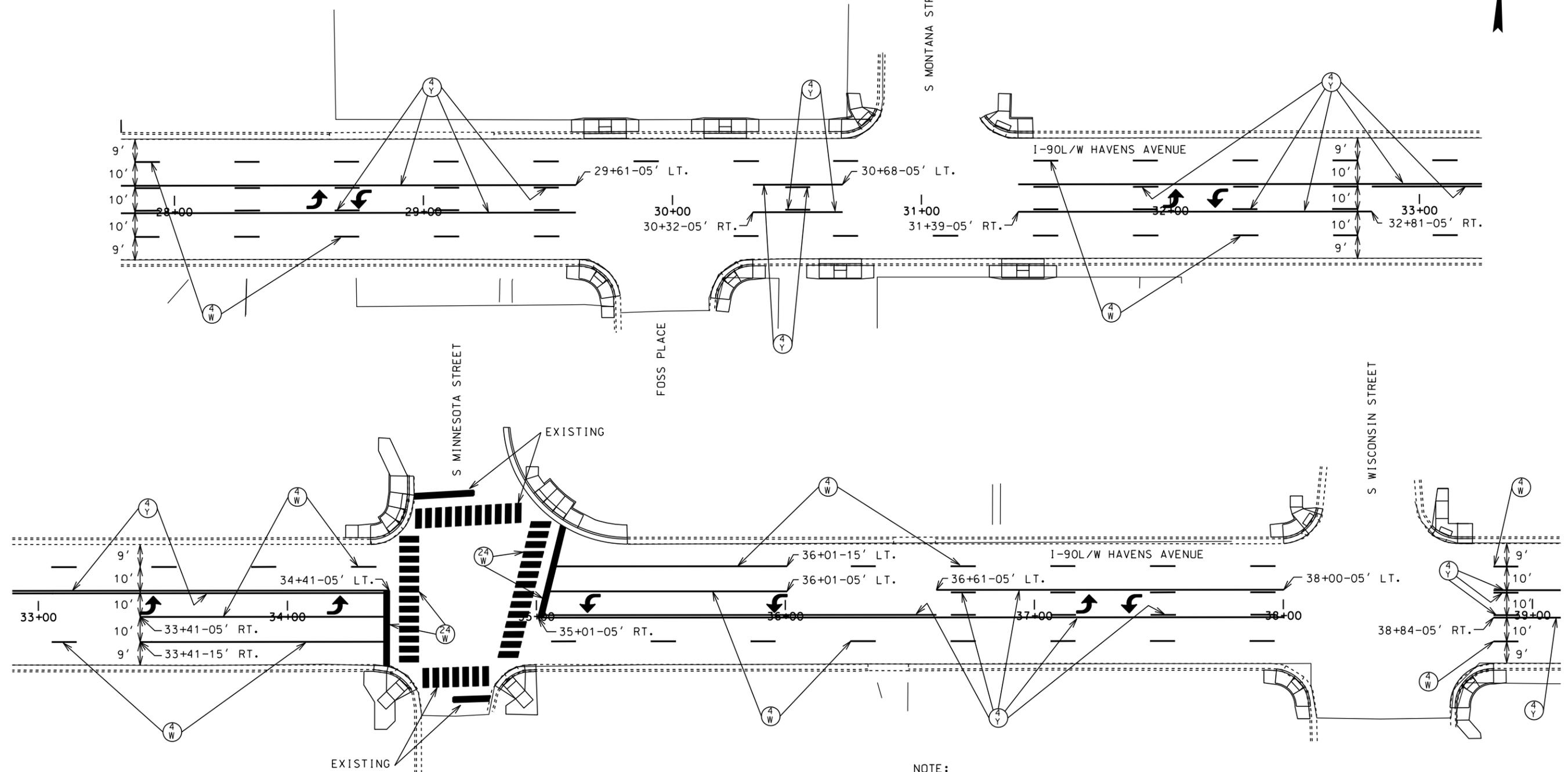
SCALE
1" = 40'



PLOT SCALE - 1:7000

PLOT NAME - 8

FILE - ... \P\AVMARK I 90L 047L 2015.DGN



NOTE:

Durable Pavement Marking shall be replaced on the asphalt concrete portion of this project only.

PLOTTED FROM - IRWJINT06

PAVEMENT MARKING LAYOUT

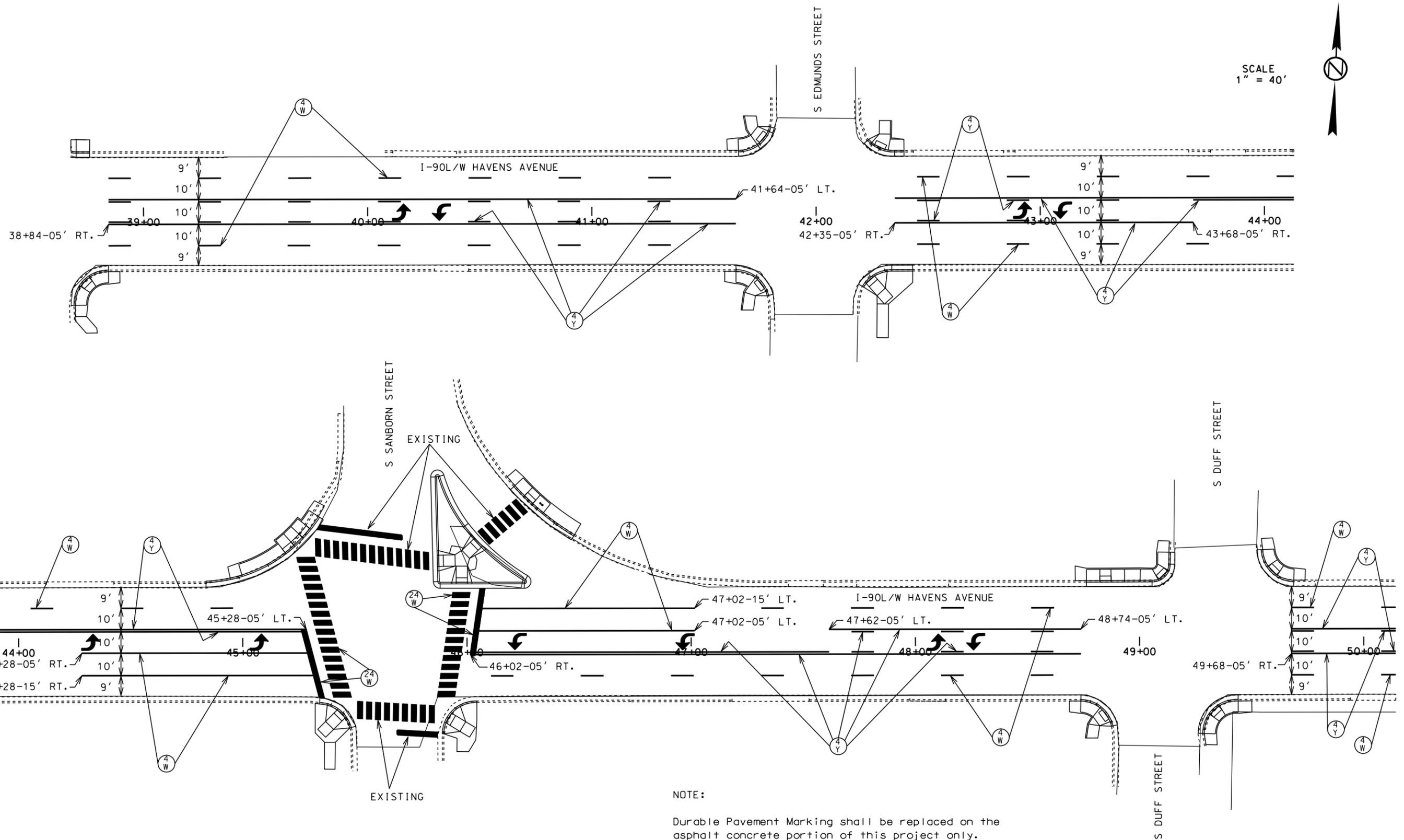
I-90L/W HAVENS AVENUE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	59	89

Plotting Date: 01/02/2015

PLOT SCALE - 1:7000

PLOT NAME - 8



NOTE:

Durable Pavement Marking shall be replaced on the asphalt concrete portion of this project only.

PLOTTED FROM - IRWJ106

FILE - ... \P\AVMARK I 90L 047L 2015.DGN

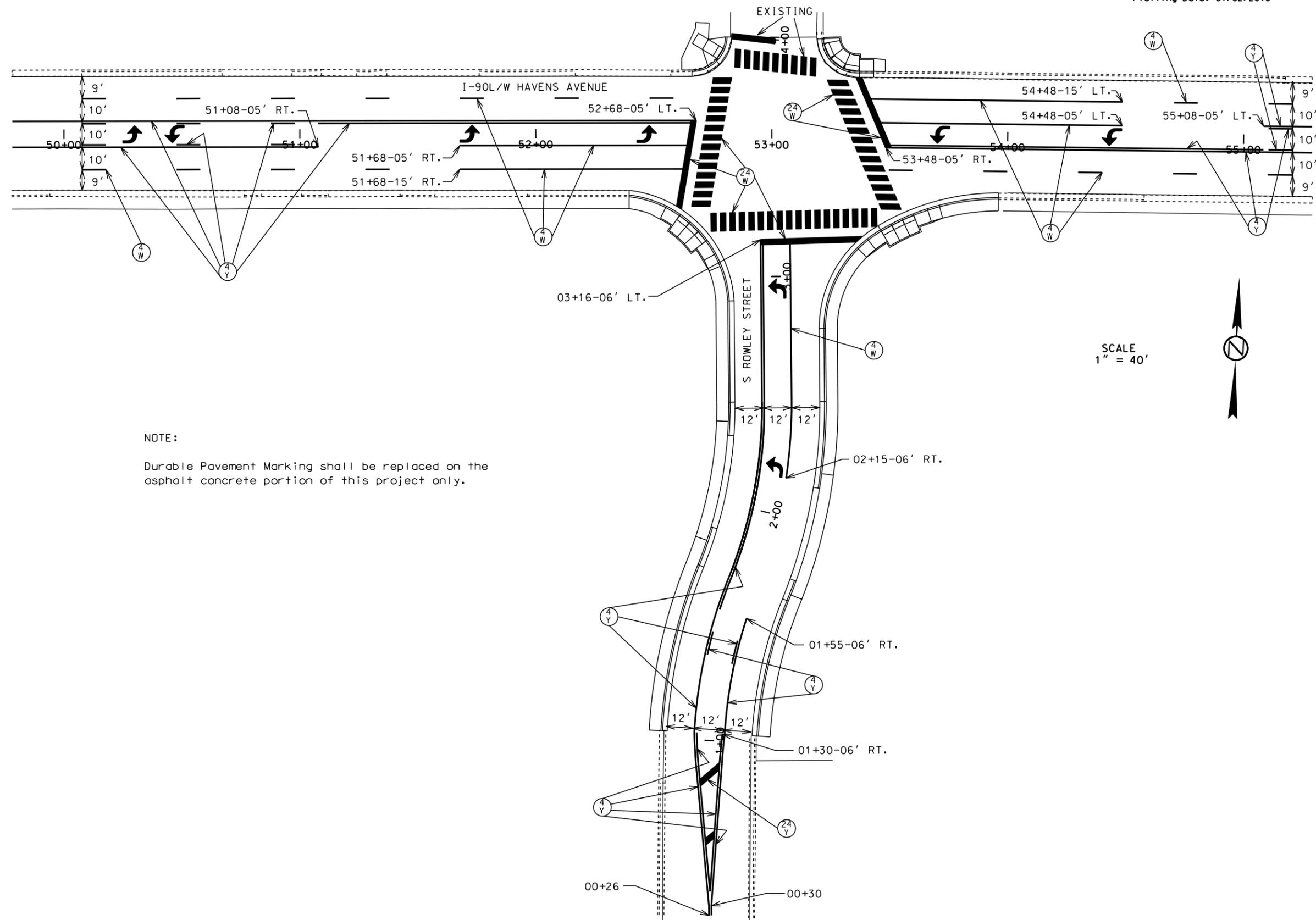
PAVEMENT MARKING LAYOUT

I-90L/W HAVENS AVENUE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	60	89

Plotting Date: 01/02/2015

Plotting Date: 01/02/2015



NOTE:

Durable Pavement Marking shall be replaced on the asphalt concrete portion of this project only.

PLOT SCALE - 1:7000

PLOT SCALE - 1:7000

PLOTTED FROM - TRM1INT06

PLOTTED FROM - TRM1INT06

PLOT NAME - 8

FILE - ... \PAYMARK I 90L 047L 2015.DGN
FILE - ... \PAYMARK I 90L 047L 2015.DGN

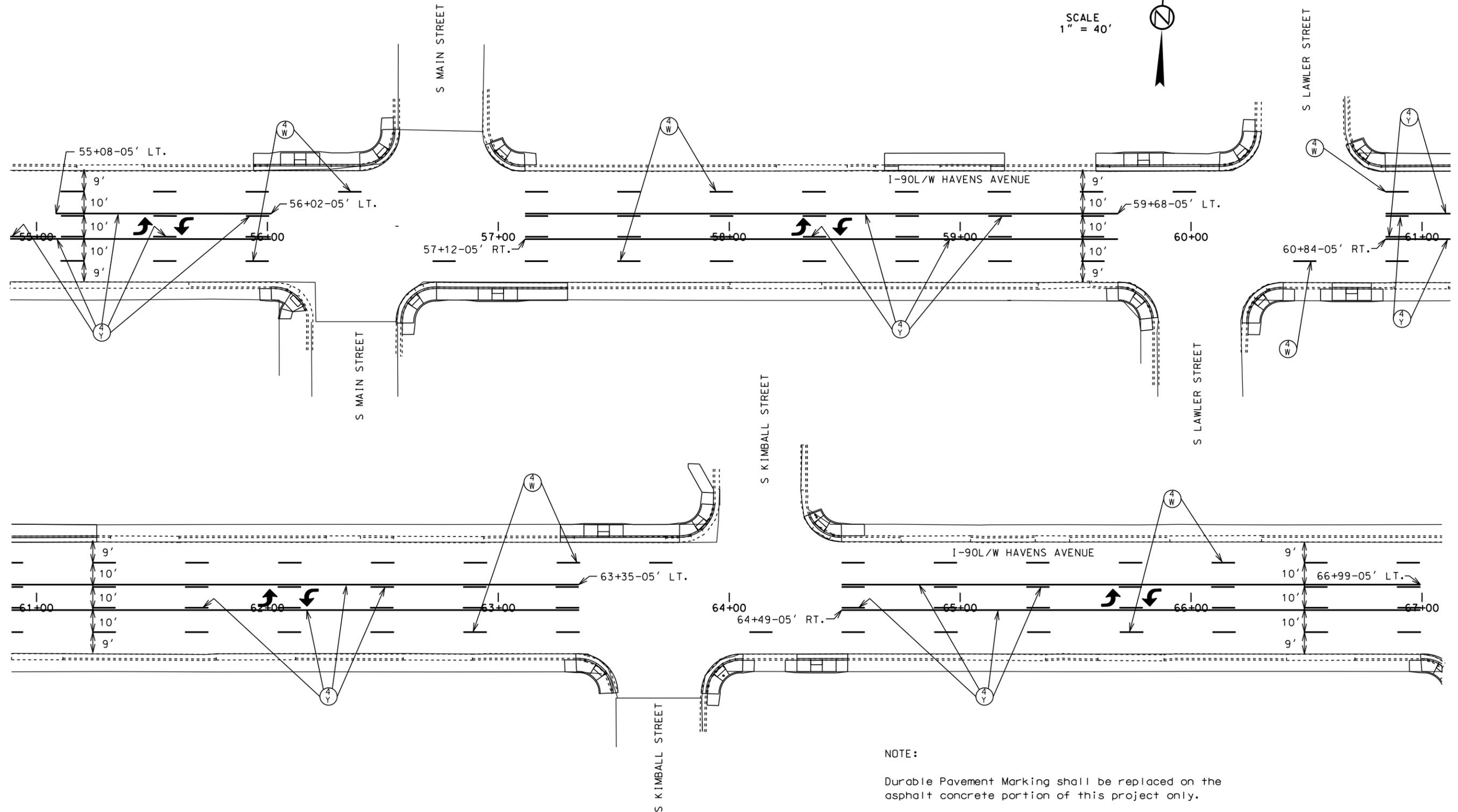
PAVEMENT MARKING LAYOUT

I-90L/W HAVENS AVENUE

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	61	89

Plotting Date: 01/02/2015

SCALE
1" = 40'



Durable Pavement Marking shall be replaced on the asphalt concrete portion of this project only.

PLOT SCALE - 1:7000

PLOTTED FROM - TRWJINT06

PLOT NAME - 8

FILE - ... \P\AVMARK I 90L 047L 2015.DGN

PAVEMENT MARKING LAYOUT

I-90L/W HAVENS AVENUE

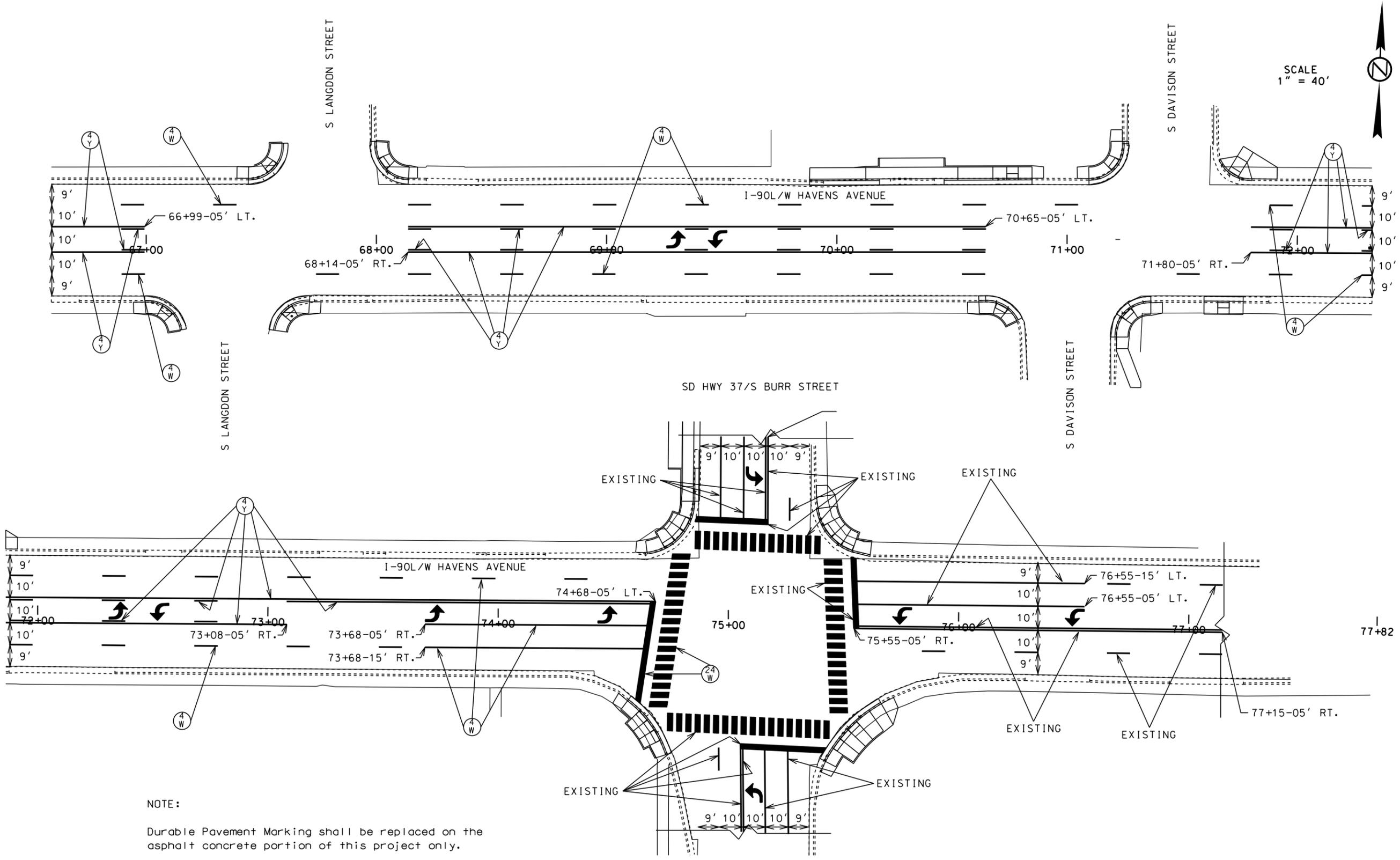
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	62	89

Plotting Date: 01/02/2015

PLOT SCALE - 1:7000

PLOT NAME - 8

FILE - ... \PAYMARK I 90L 047L 2015.DGN



NOTE:
Durable Pavement Marking shall be replaced on the asphalt concrete portion of this project only.

PAVEMENT MARKING DETAIL

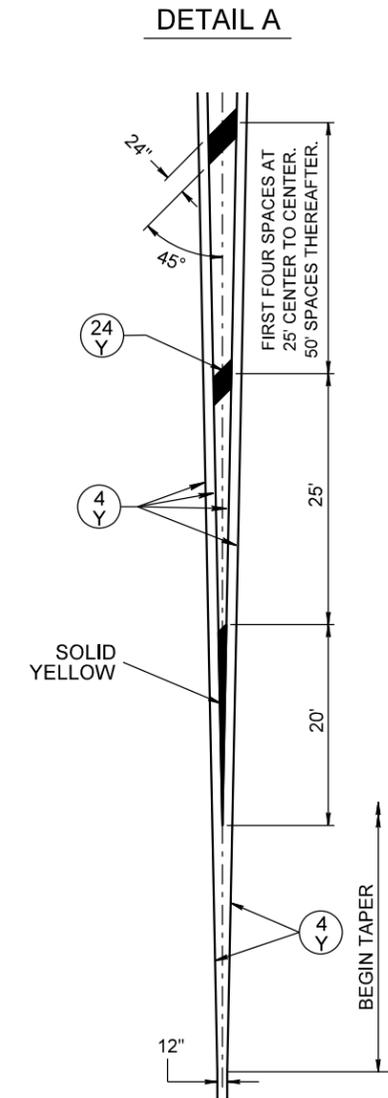
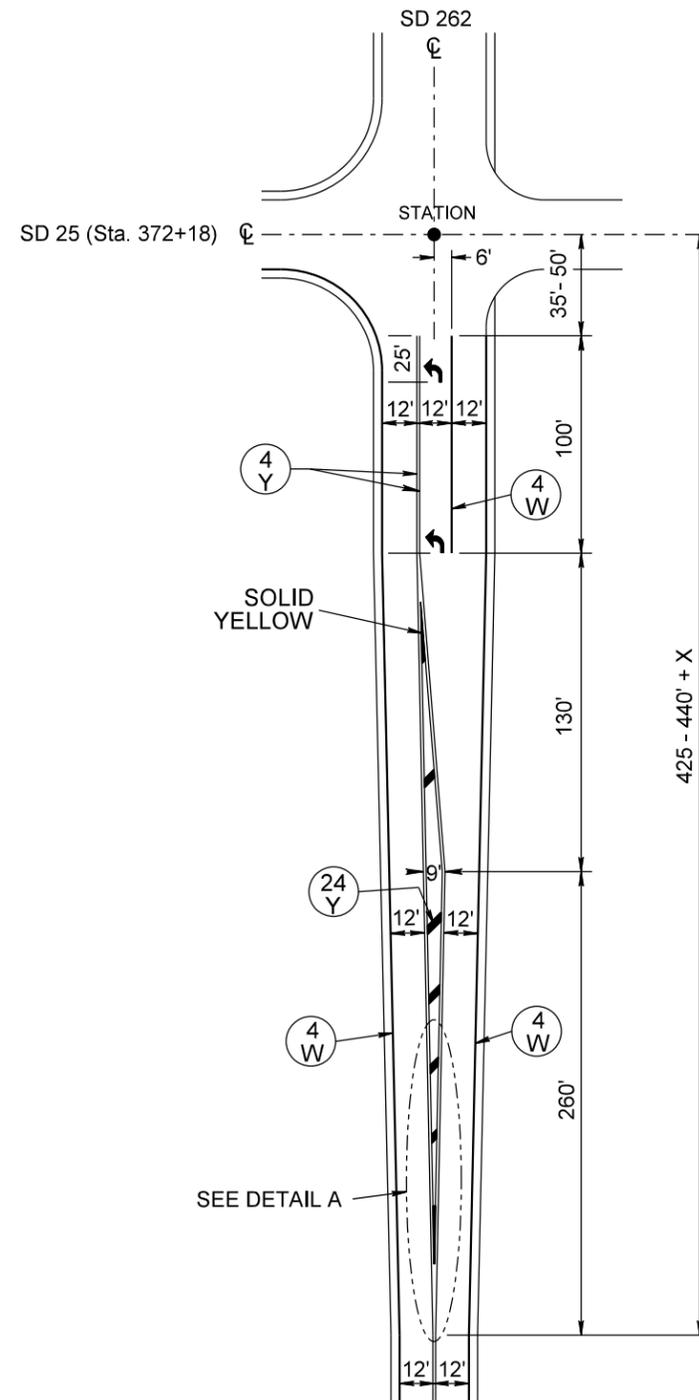
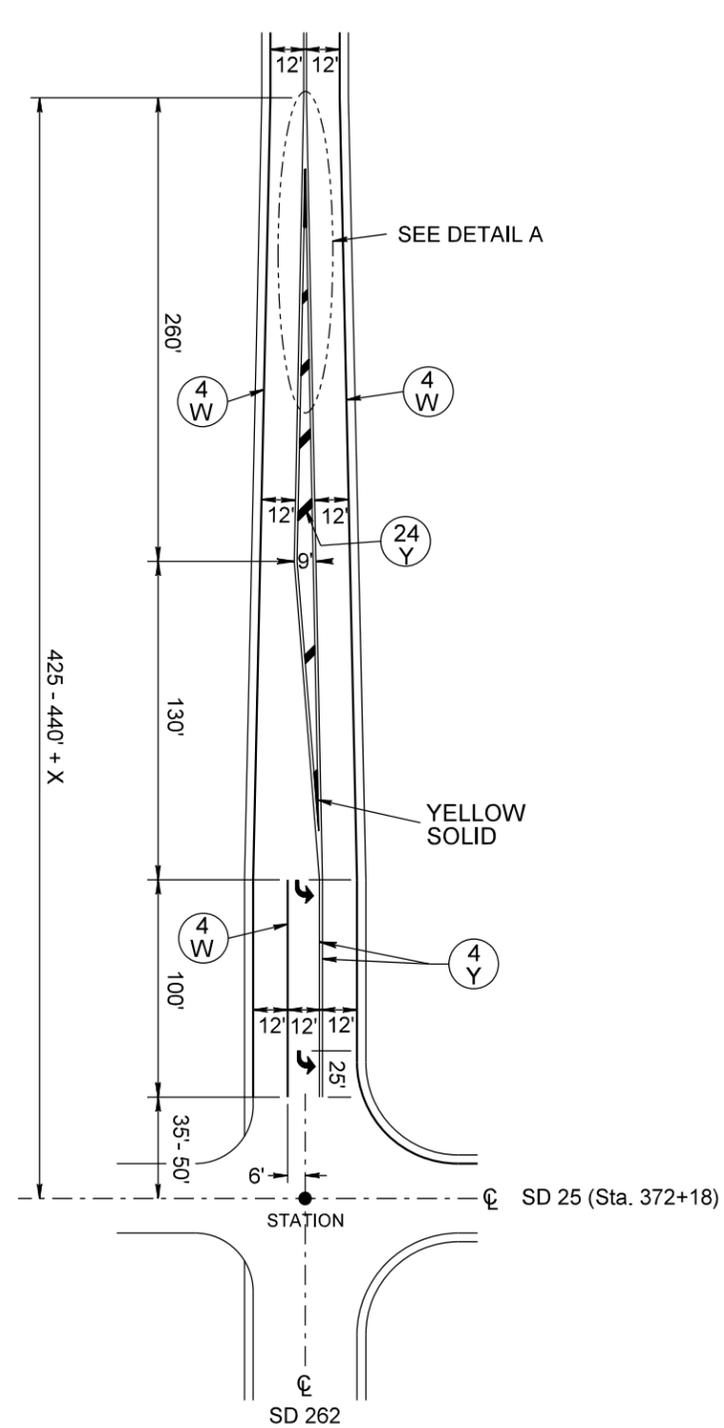
TURN BAY LAYOUTS - SD 262

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM-NH-P 0021(155)	63	89

Plotting Date: 01/02/2015

PLOT SCALE - 1:7000

PLOT NAME - 1



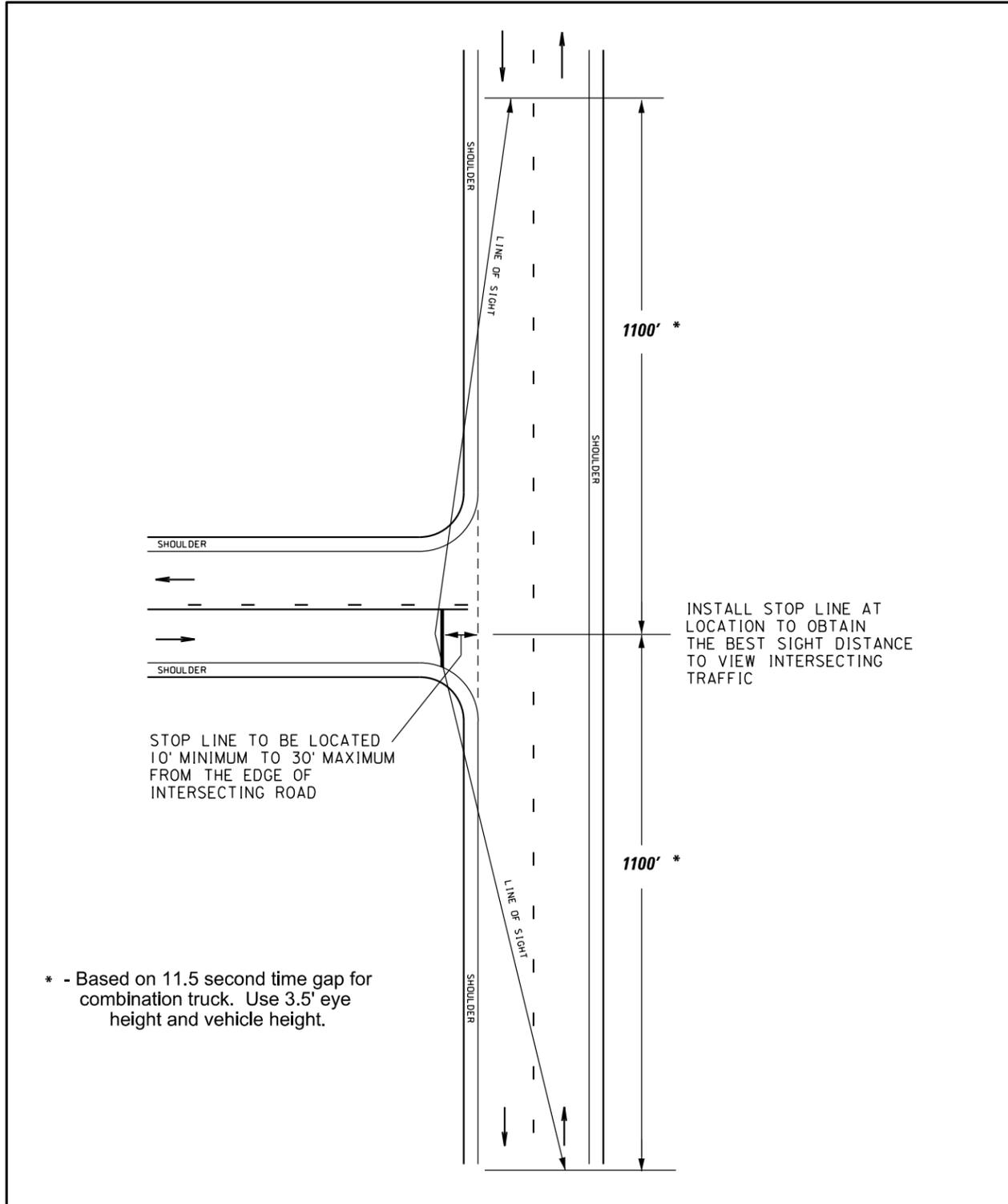
KEY	ITEM
(4 W)	4" White
(4 Y)	4" Yellow
(24 Y)	24" Yellow
↪	Arrow

PLOTTED FROM - TRWJ1N106

FILE - ... \P\AVMARK 262 TURN BAY 047L 2015.DGN

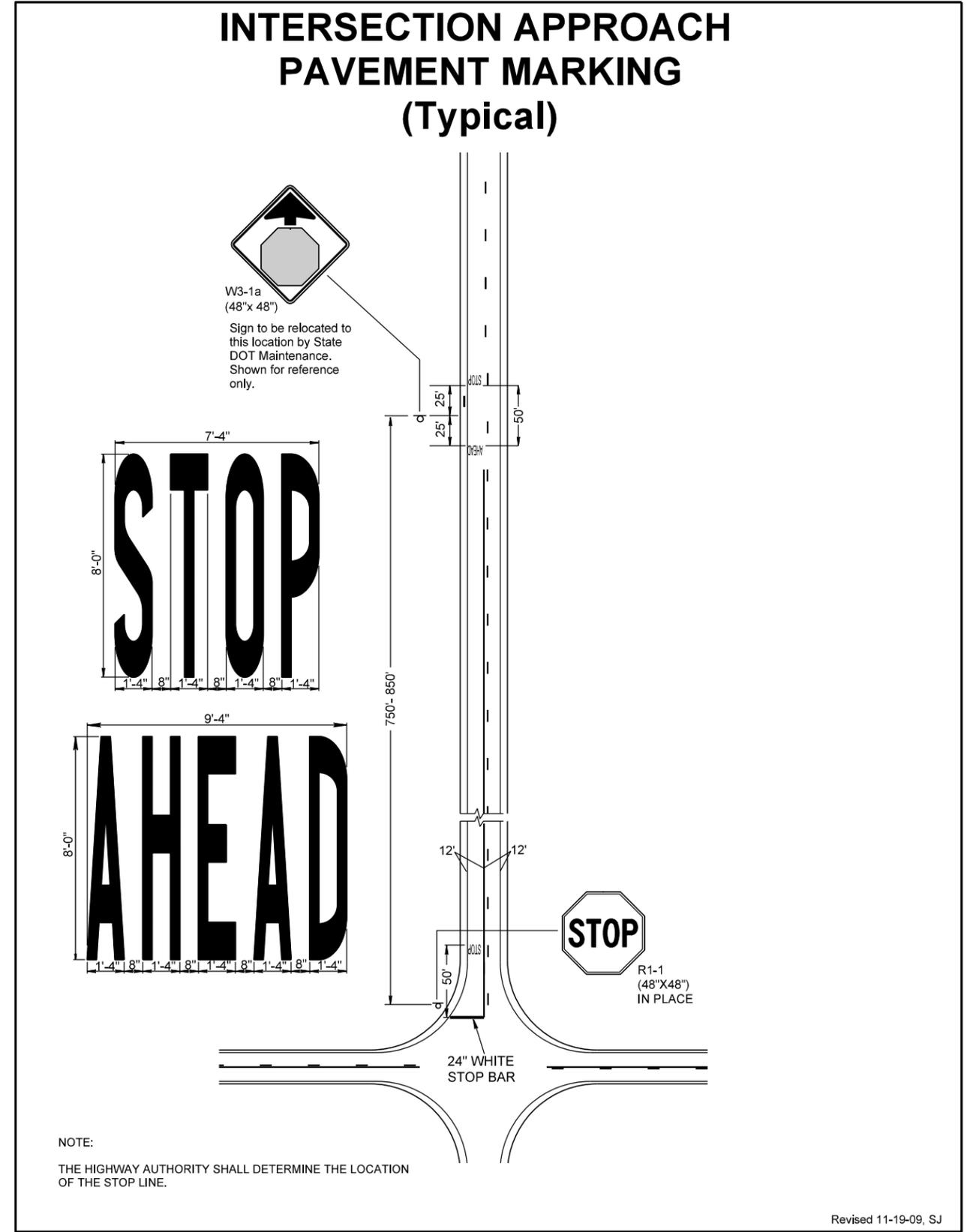
PLOT SCALE - 1:7000

PLOT NAME - 1



STOP LINE PAVEMENT MARKING INSTALLATION

* - Based on 11.5 second time gap for combination truck. Use 3.5' eye height and vehicle height.



NOTE:
THE HIGHWAY AUTHORITY SHALL DETERMINE THE LOCATION OF THE STOP LINE.

PLOTTED FROM - TRWJINT06

FILE - ... \PAINT\STOP LINE 047L 2015.DGN

TRAFFIC CONTROL

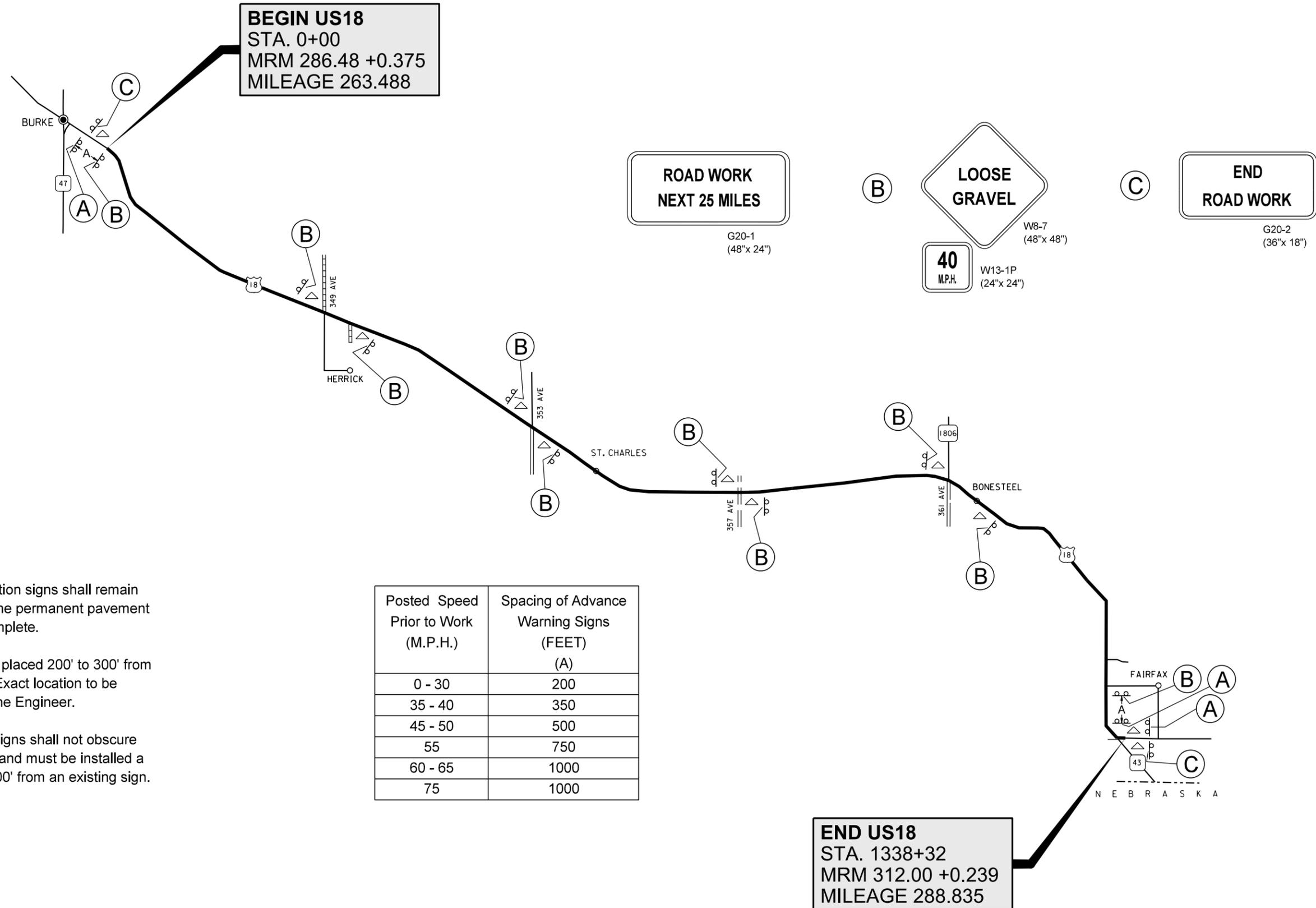
FIXED LOCATION SIGNS (GROUND MOUNTED SUPPORTS)

US 18 - PCN 047L GREGORY COUNTY

PLOT SCALE - 1:7000

PLOT NAME - 12

FILE - ... \GREG047L\TC 047L 2015.DGN



NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

△ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

PLOTTED FROM - TRM\INT06

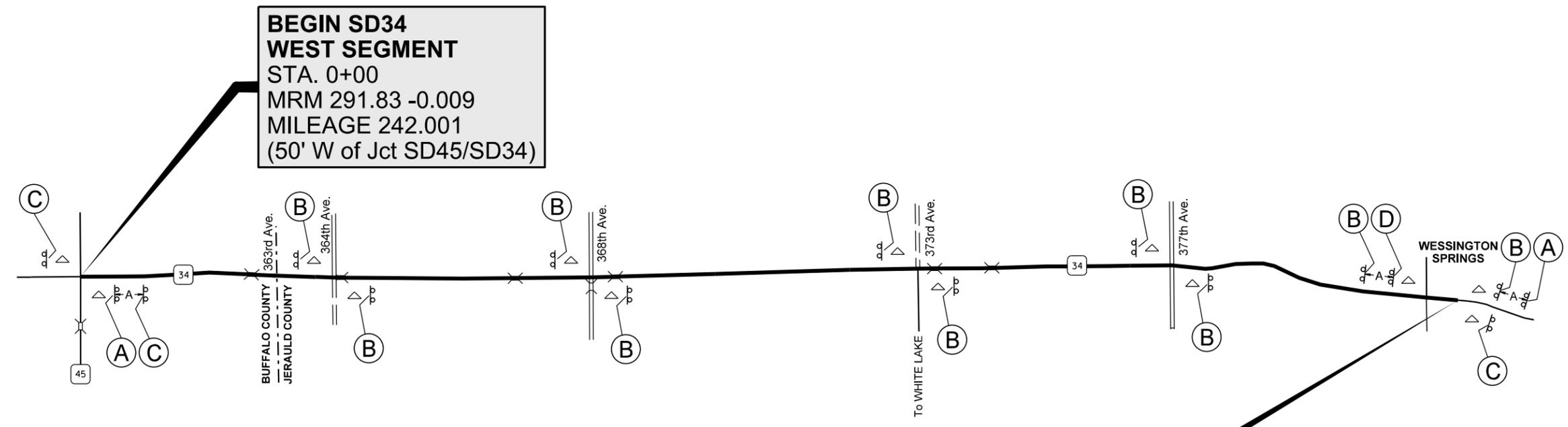
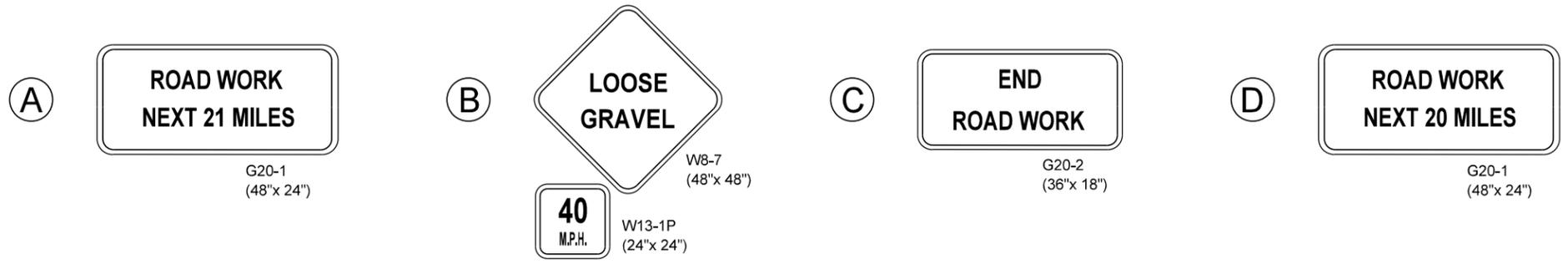


N E B R A S K A

TRAFFIC CONTROL FIXED LOCATION SIGNS (GROUND MOUNTED SUPPORTS) SD 34 W SEGMENT - PCN 047L BUFFALO & JERAULD COUNTIES

PLOT SCALE - 1:7000

PLOT NAME - 12



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

END SD34 WEST SEGMENT
 STA. 1121+74
 MRM 313.00 +0.079
 MILEAGE 263.246

- NOTES:**
- All Fixed Location signs shall remain in place until the permanent pavement marking is complete.
 - △ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.
 - Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

PLOTTED FROM - TRWJ1N106

FILE - ... \OREG047L\TC 047L 2015.DGN

TRAFFIC CONTROL FIXED LOCATION SIGNS (GROUND MOUNTED SUPPORTS) SD 34 E SEGMENT - PCN 047L SANBORN COUNTY

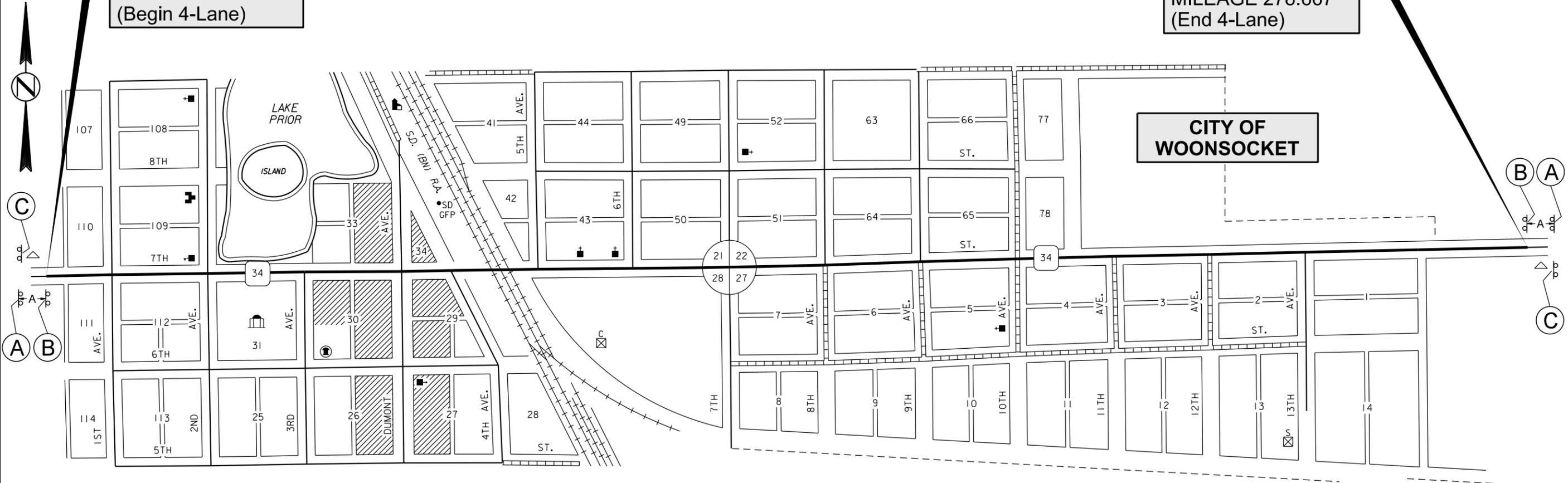
PLOT SCALE - 1:7000

PLOT NAME - 12

FILE - ... \OREG047L\1C 047L 2015.DGN

BEGIN SD34 EAST SEGMENT
STA. 0+00
MRM 327.00 +0.382
MILEAGE 277.600
(Begin 4-Lane)

END SD34 EAST SEGMENT
STA. 56+35
MRM 328.29 +0.154
MILEAGE 278.667
(End 4-Lane)



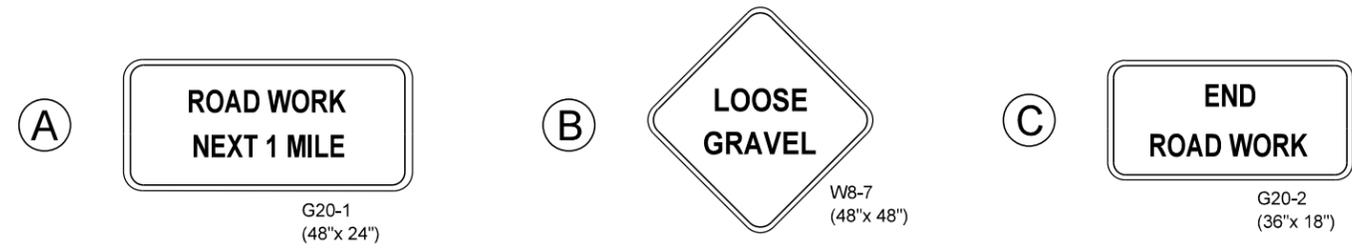
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET)
0 - 30	200 (A)
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

▲ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.



TRAFFIC CONTROL FIXED LOCATION SIGNS (GROUND MOUNTED SUPPORTS) SD 37 - PCN 047L HUTCHINSON COUNTY

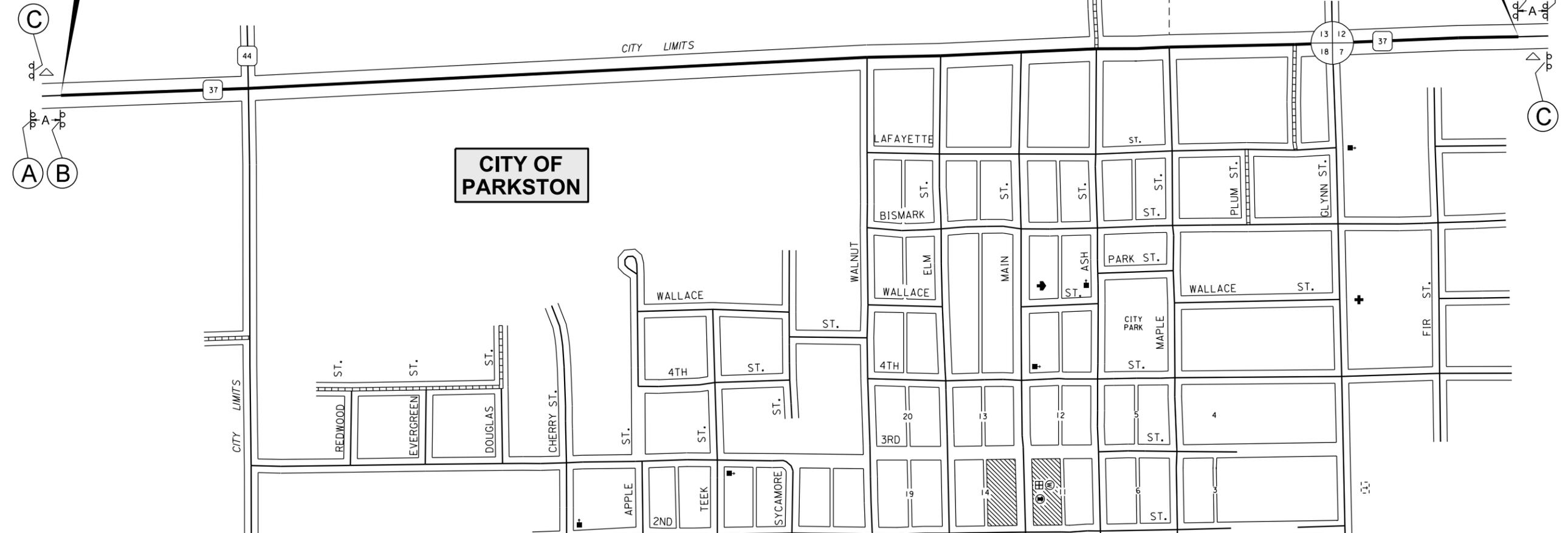
PLOT SCALE - 1:7000

PLOT NAME - 12

FILE - ... \CORE047L\TC 047L 2015.DGN

BEGIN SD37
STA. 0+00
MRM 51.00 +0.406
MILEAGE 47.493

END SD37
STA. 70+59
MRM 52.57 +0.151
MILEAGE 48.830



NOTES:

- All Fixed Location signs shall remain in place until the permanent pavement marking is complete.
- ▲ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.
- Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

(A)



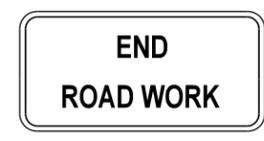
G20-1
(48"x 24")

(B)



W8-7
(48"x 48")

(C)



G20-2
(36"x 18")

PLOTTED FROM - TRW\INT06

TRAFFIC CONTROL FIXED LOCATION SIGNS (GROUND MOUNTED SUPPORTS) SD 38 - PCN 047L McCOOK & MINNEHAHA COUNTIES

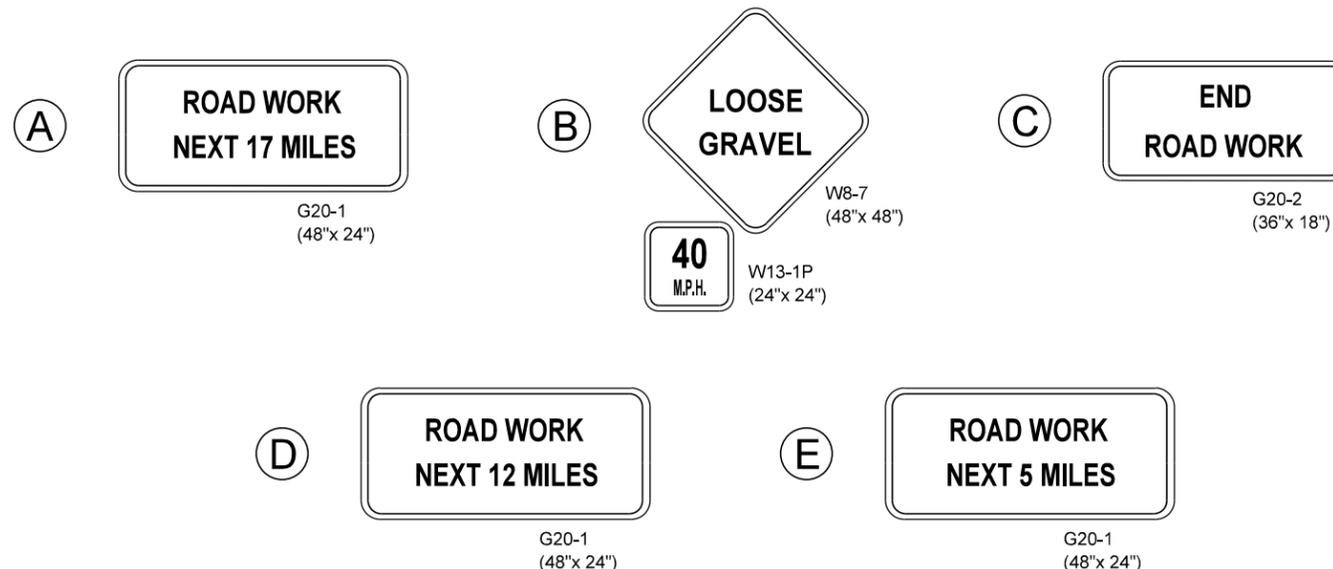
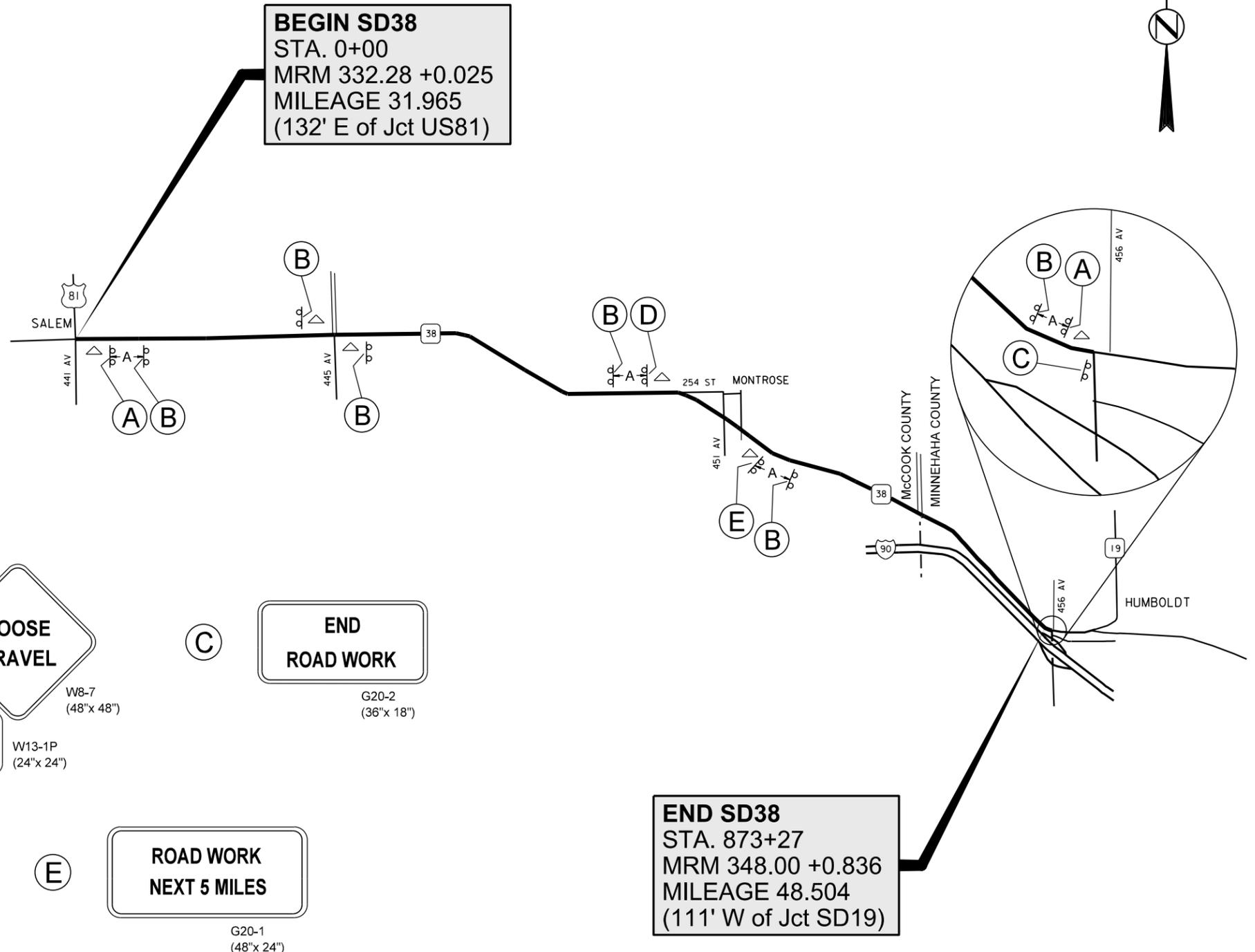
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

△ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.



PLOT SCALE - 1:7000

PLOTTED FROM - TRW1INT06

PLOT NAME - 12

FILE - ... \OREG047L\TC 047L 2015.DGN

**TRAFFIC CONTROL
FIXED LOCATION SIGNS
(GROUND MOUNTED SUPPORTS)
SD 43 - PCN 047L
GREGORY COUNTY**

PLOT SCALE - 1:7000



NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

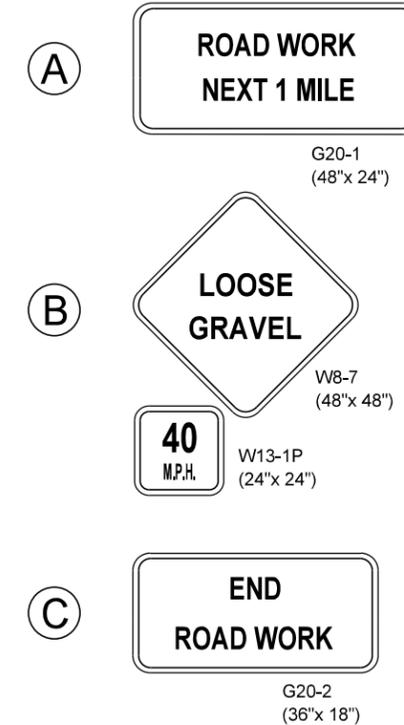
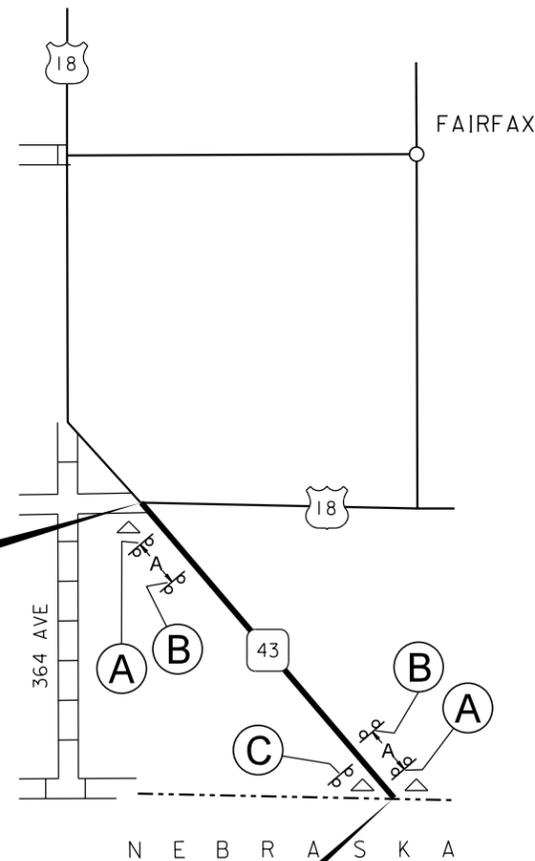
△ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

END SD43
STA. 58+87
MRM 1.14 +0.043
MILEAGE 1.115

BEGIN SD43
STA. 0+00
MRM 0.00 +0.000
MILEAGE 0.000



PLOTTED FROM - TRWJINT06

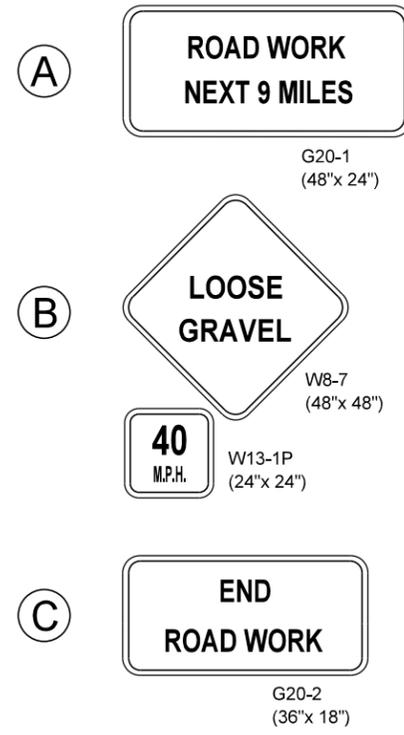
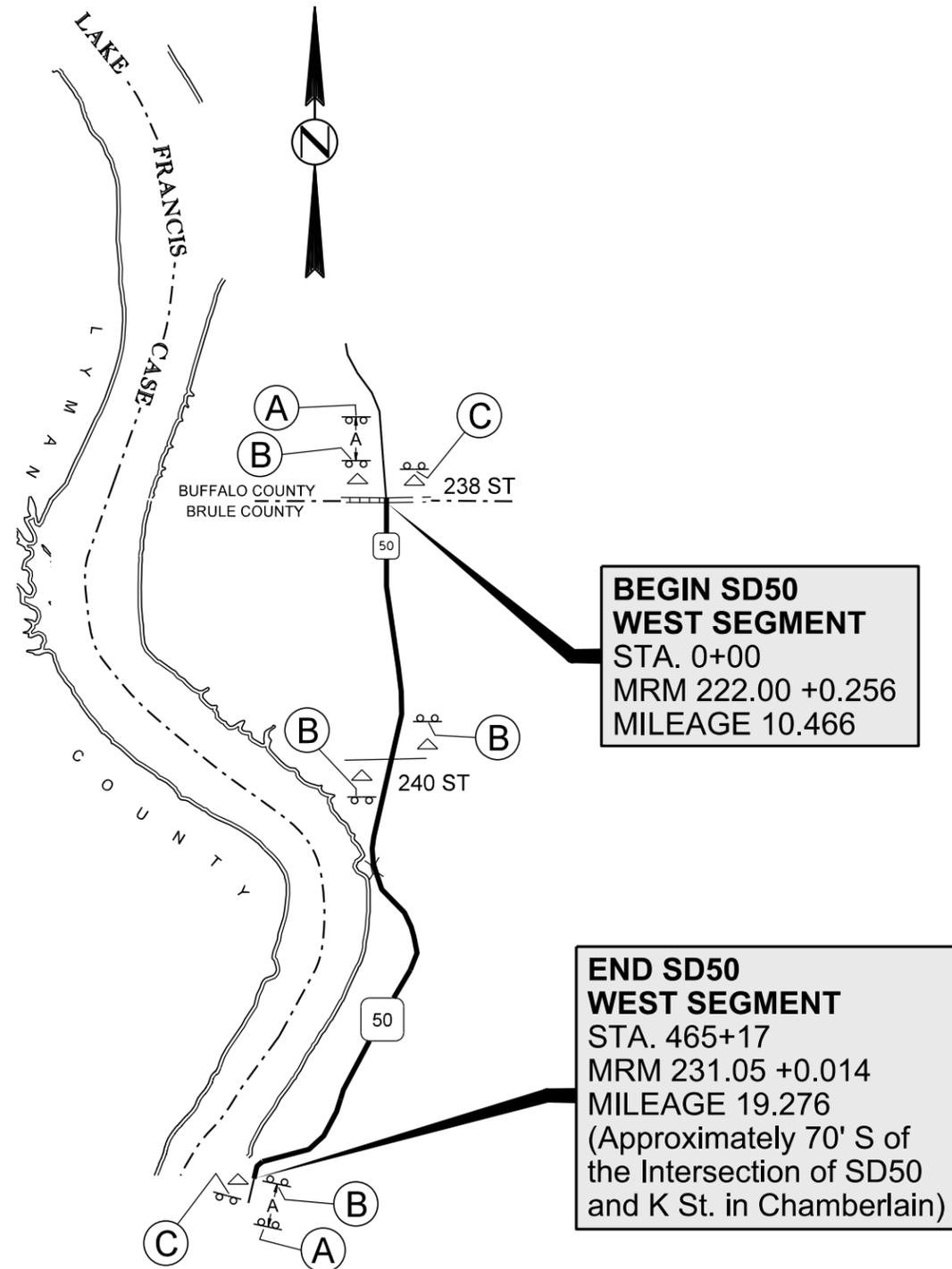
PLOT NAME - 12

FILE - ... \GREG047L\TC 047L 2015.DGN

TRAFFIC CONTROL FIXED LOCATION SIGNS (GROUND MOUNTED SUPPORTS) SD 50 W SEGMENT - PCN 047L BRULE COUNTY

PLOT SCALE - 1:7000

PLOT NAME - 12



NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

△ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

PLOTTED FROM - IRWJ1N106

FILE - ... \OREG047L\TC 047L 2015.DGN

TRAFFIC CONTROL FIXED LOCATION SIGNS (GROUND MOUNTED SUPPORTS) SD 50 E SEGMENT - PCN 047L BRULE & CHARLES MIX COUNTIES

NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

△ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

BEGIN SD50 EAST SEGMENT
STA. 0+00
MRM 241.50 -0.205
MILEAGE 23.301

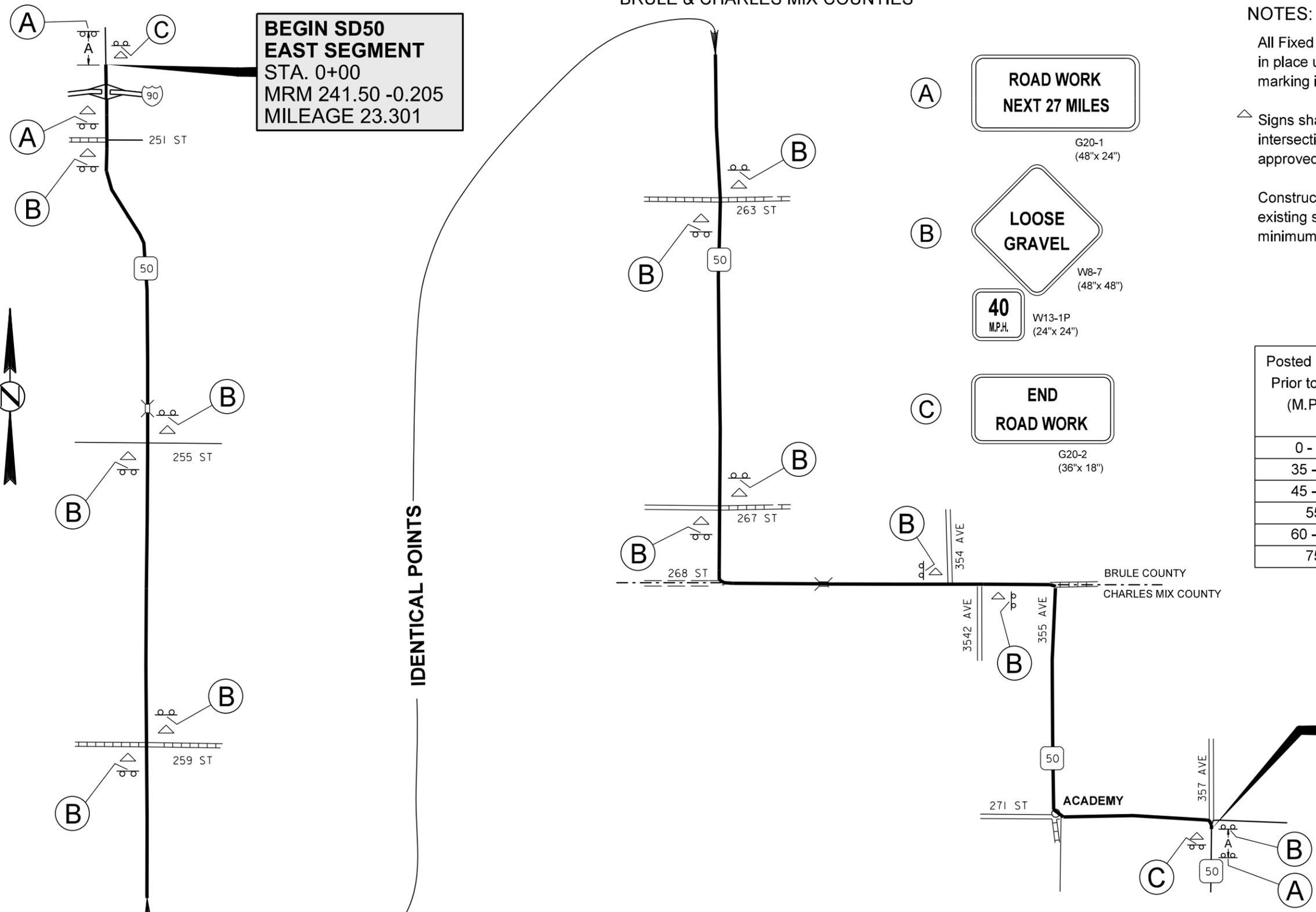
END SD50 EAST SEGMENT
STA. 1438+87
MRM 268.00 +0.761
MILEAGE 50.552

PLOT SCALE - 1:7000

PLOTTED FROM - TRWJINT06

PLOT NAME - 12

FILE - ... \OREG047L\TC 047L 2015.DGN



IDENTICAL POINTS

BRULE COUNTY
CHARLES MIX COUNTY

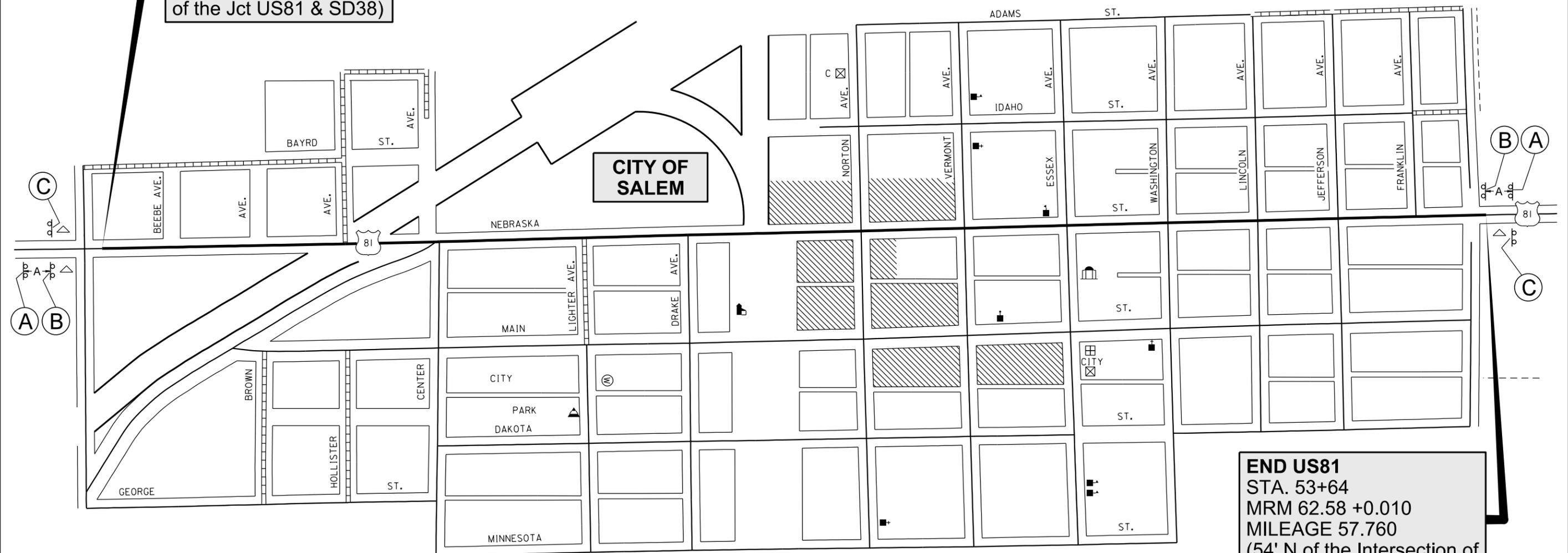
ACADEMY

TRAFFIC CONTROL
 FIXED LOCATION SIGNS
 (GROUND MOUNTED SUPPORTS)
 US 81 - PCN 047L
 McCOOK COUNTY

BEGIN US81
 STA. 0+00
 MRM 61.58 +0.027
 MILEAGE 56.744
 (At End Concrete, 97' N
 of the Jct US81 & SD38)



CITY OF SALEM



END US81
 STA. 53+64
 MRM 62.58 +0.010
 MILEAGE 57.760
 (54' N of the Intersection of
 US81 & Richard Avenue)

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET)
	(A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

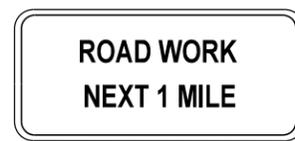
NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

△ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

(A)



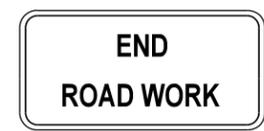
G20-1
(48"x 24")

(B)



W8-7
(48"x 48")

(C)



G20-2
(36"x 18")

PLOT SCALE - 1:7000

PLOTTED FROM - TRV\INT06

PLOT NAME - 12

FILE - ... \GREG047\TC 047L 2015.DGN

Plotting Date: 01/12/2015

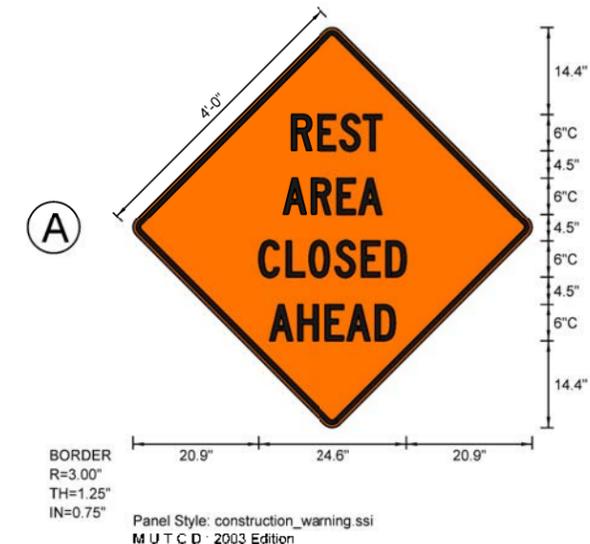
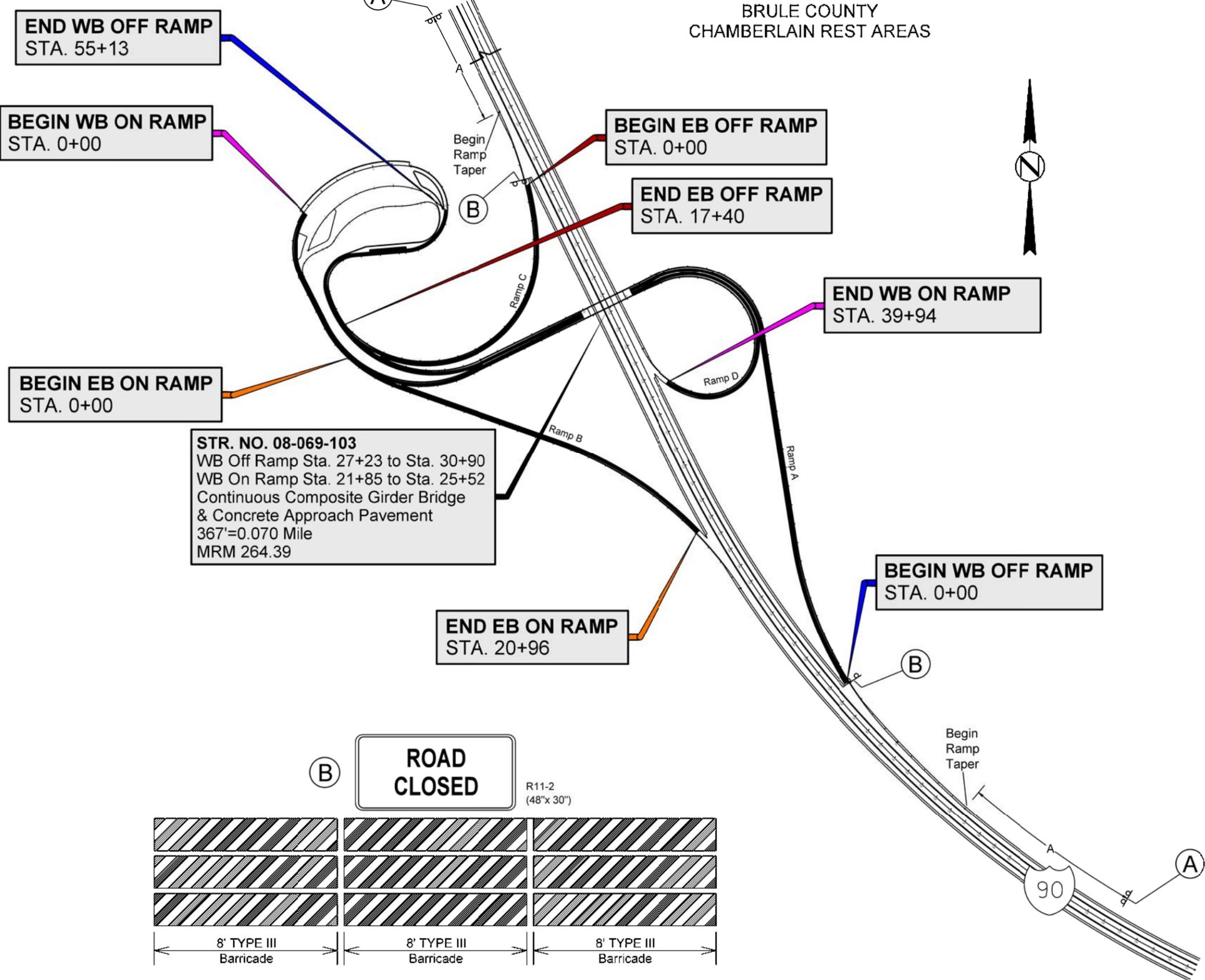
TRAFFIC CONTROL

I 90 - 047L
BRULE COUNTY
CHAMBERLAIN REST AREAS

PLOT SCALE - 1:7000

PLOT NAME - 12

FILE - ... \GREG047L\IC 047L 2015.DGN



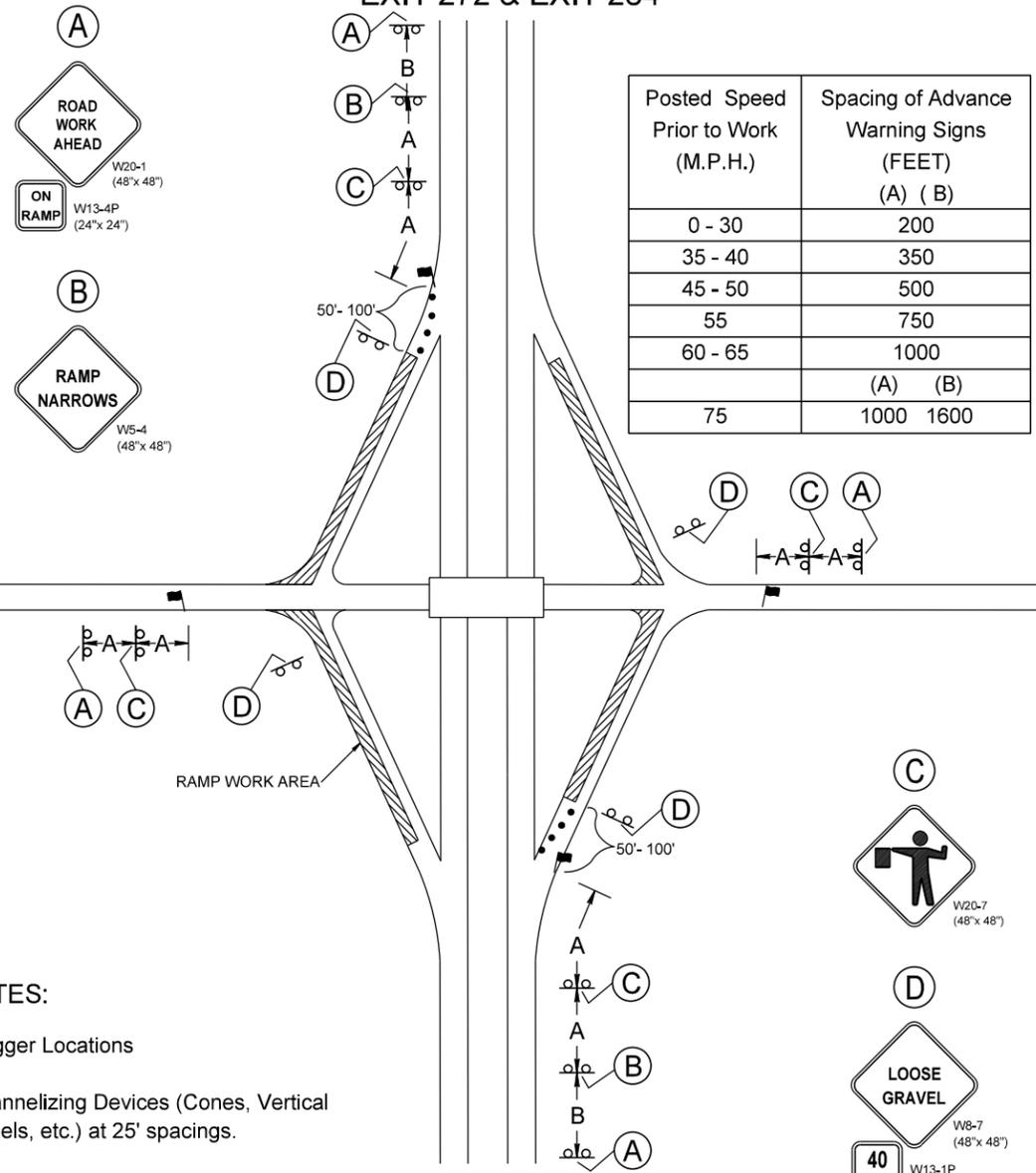
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

PLOTTED FROM - ITRHINT06

PLOT SCALE - 1:7000

TRAFFIC CONTROL ENTRANCE RAMP AND EXIT RAMP DETAILS

I 90 - 047L
BRULE COUNTY
EXIT 272 & EXIT 284



NOTES:

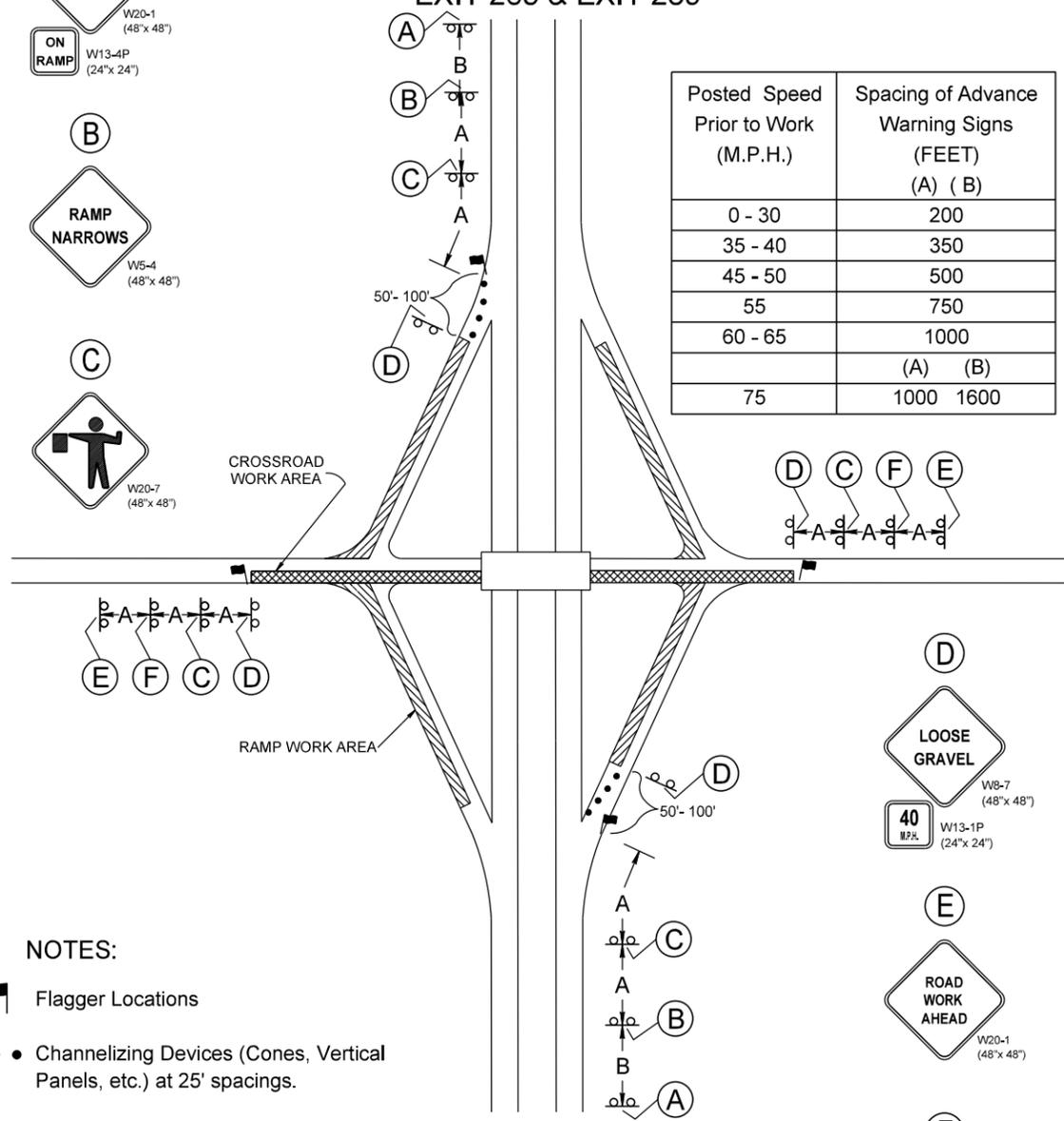
- Flagger Locations
 - Channelizing Devices (Cones, Vertical Panels, etc.) at 25' spacings.
- All signs for this project may be portable and may be removed as soon as final brooming has been completed.

Construction signs shall not obscure existing signs and must be installed a minimum of 100' from an existing sign.

PLOTTED FROM - TRW11N106

TRAFFIC CONTROL ENTRANCE RAMP, EXIT RAMP & CROSSROAD DETAILS

I 90 - 047L
BRULE COUNTY
EXIT 265 & EXIT 289



NOTES:

- Flagger Locations
 - Channelizing Devices (Cones, Vertical Panels, etc.) at 25' spacings.
- All signs for this project may be portable and may be removed as soon as final brooming has been completed.

Construction signs shall not obscure existing signs and must be installed a minimum of 100' from an existing sign.

PLOT NAME - 2

FILE - ... \OREG047L\TC RAMP 2015.DGN

PLOT SCALE - 1:7000

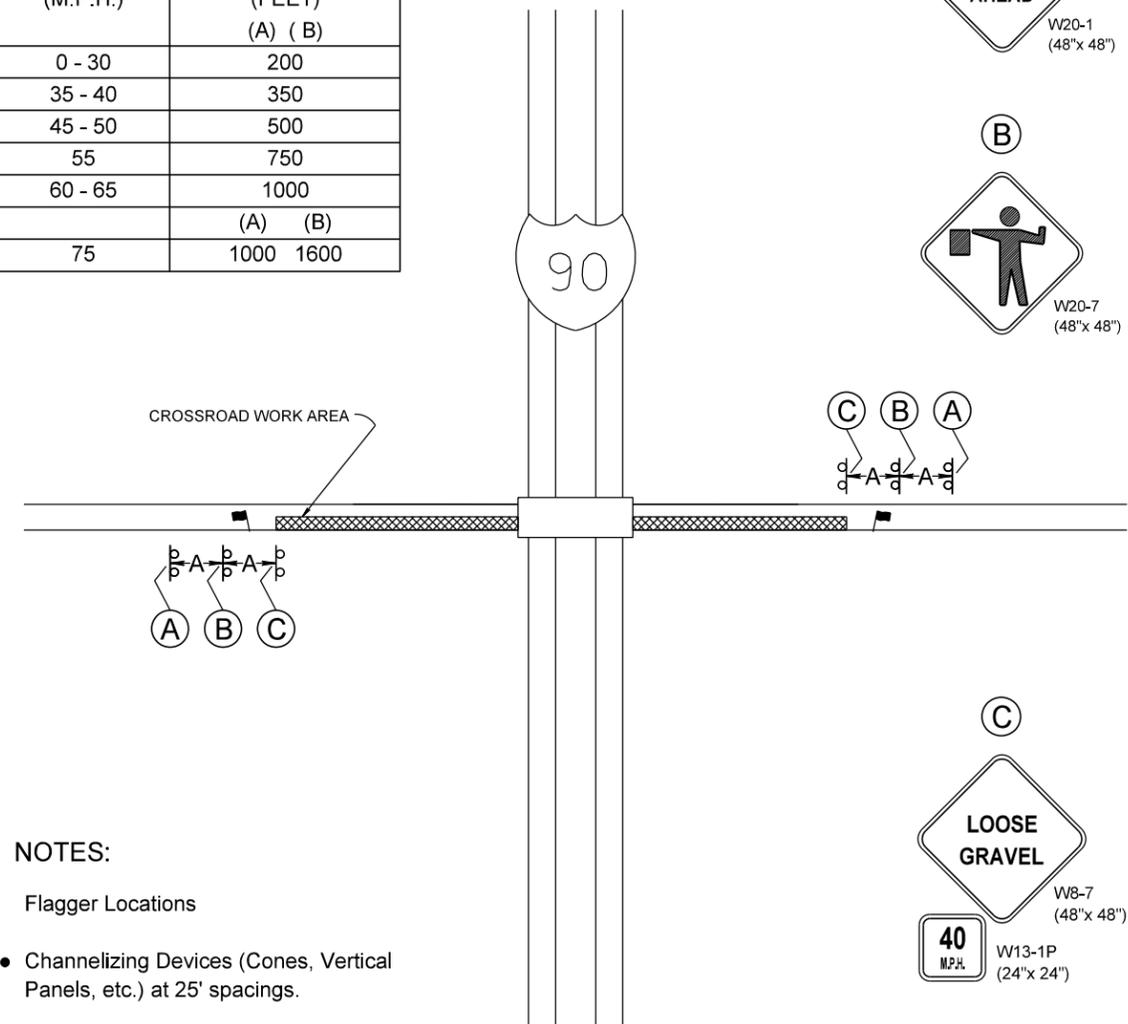
PLOT NAME - 2

FILE - ... \OREG047\1C RAMP 2015.DGN

TRAFFIC CONTROL CROSSROAD DETAILS

I 90 - 047L
BRULE & AURORA COUNTIES
MRM 270.14, MRM 281.13, MRM 287.21,
MRM 292.22 & MRM 294.14

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET)	
	(A)	(B)
0 - 30	200	
35 - 40	350	
45 - 50	500	
55	750	
60 - 65	1000	
	(A)	(B)
75	1000	1600



NOTES:

- Flagger Locations
- ● ● Channelizing Devices (Cones, Vertical Panels, etc.) at 25' spacings.

All signs for this project may be portable and may be removed as soon as final brooming has been completed.

Construction signs shall not obscure existing signs and must be installed a minimum of 100' from an existing sign.

TRAFFIC CONTROL FIXED LOCATION SIGNS (GROUND MOUNTED SUPPORTS) SD 262 - PCN 047L HANSON & McCOOK COUNTIES

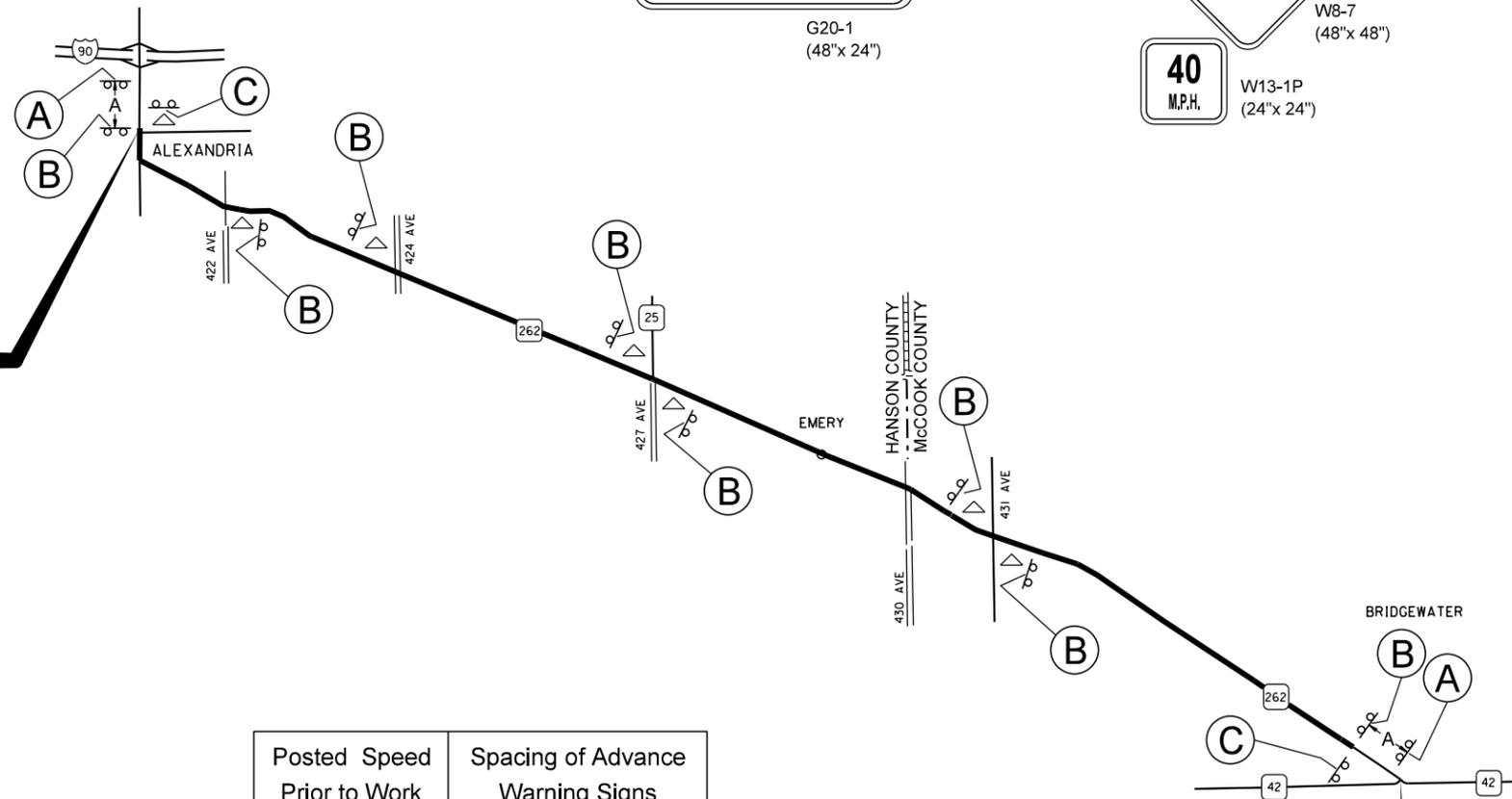
PLOT SCALE - 1:7000

PLOT NAME - 12

FILE - ... \GREG047L\TC 047L 2015.DGN



BEGIN SD262
STA. 0+00
MRM 356.13 +0.297
MILEAGE 0.422
(Approx. 350' N
of 257th St)



**ROAD WORK
NEXT 17 MILES**
G20-1
(48"x 24")

**LOOSE
GRAVEL**
W8-7
(48"x 48")
**40
M.P.H.**
W13-1P
(24"x 24")

**END
ROAD WORK**
G20-2
(36"x 18")

NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

△ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000

END SD262
STA. 900+03
MRM 373.00 +0.483
MILEAGE 17.468
(Approx. 500' NW
of the Intersection of
SD42 and SD262)

PLOTTED FROM - TRWJINT06

**TRAFFIC CONTROL
FIXED LOCATION SIGNS
(GROUND MOUNTED SUPPORTS)
US 281 - PCN 047L
GREGORY COUNTY**

PLOT SCALE - 1:7000

PLOT NAME - 12

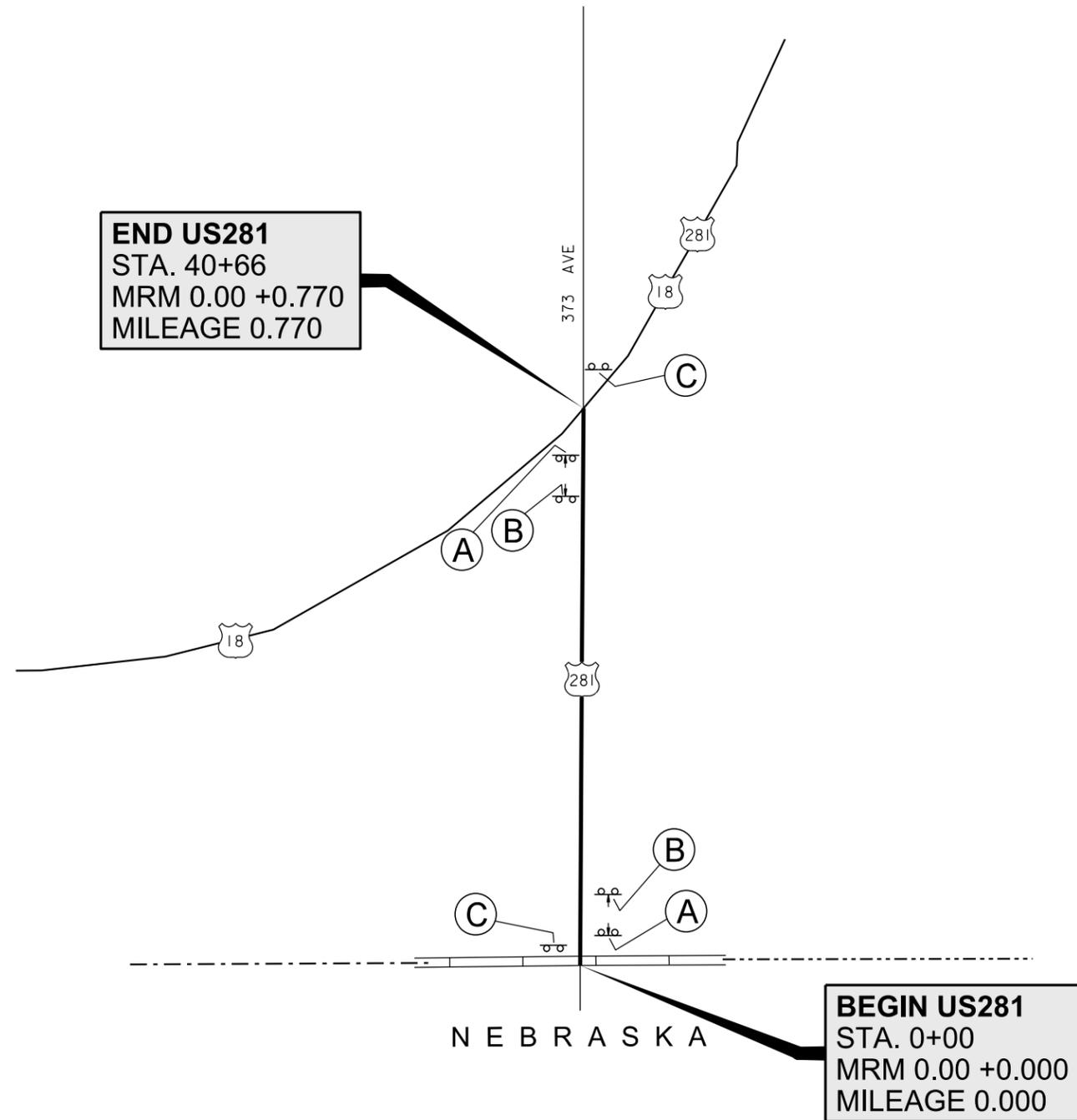
NOTES:

All Fixed Location signs shall remain in place until the permanent pavement marking is complete.

△ Signs shall be placed 200' to 300' from intersection. Exact location to be approved by the Engineer.

Construction signs shall not obscure existing signs and must be installed a minimum of 200' from an existing sign.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (FEET) (A)
0 - 30	200
35 - 40	350
45 - 50	500
55	750
60 - 65	1000
75	1000



(A) ROAD WORK NEXT 1 MILE
G20-1 (48"x 24")

(B) LOOSE GRAVEL
W8-7 (48"x 48")

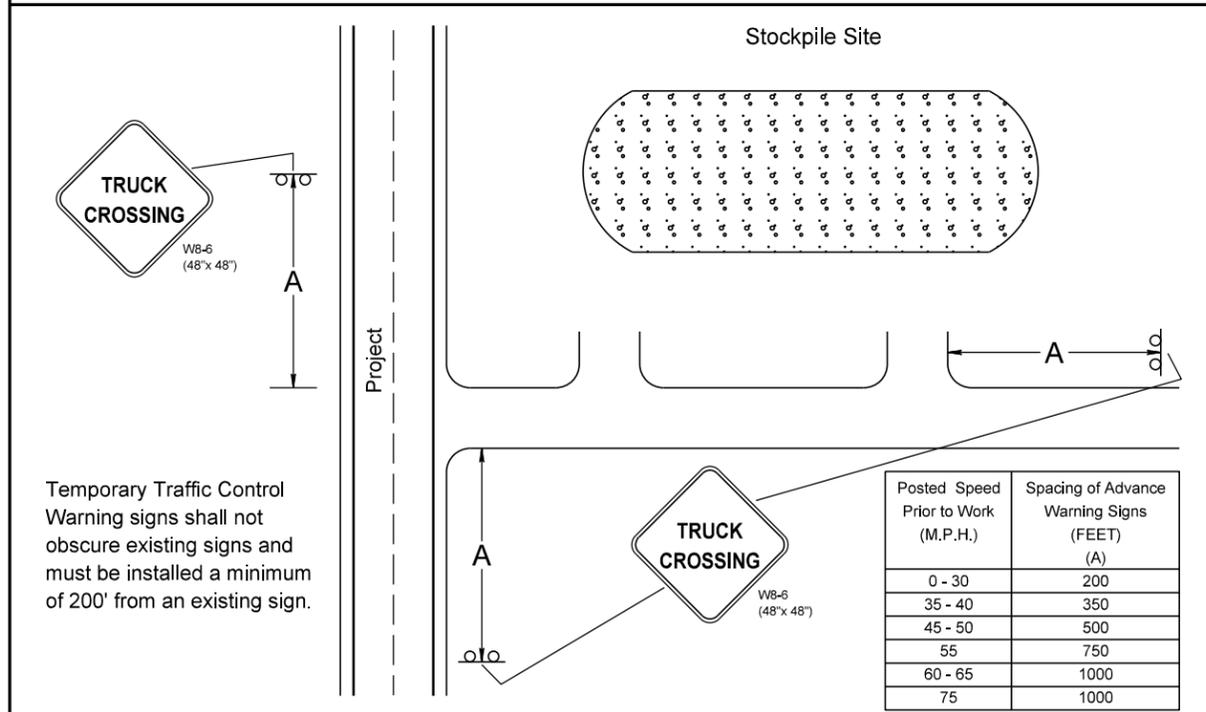
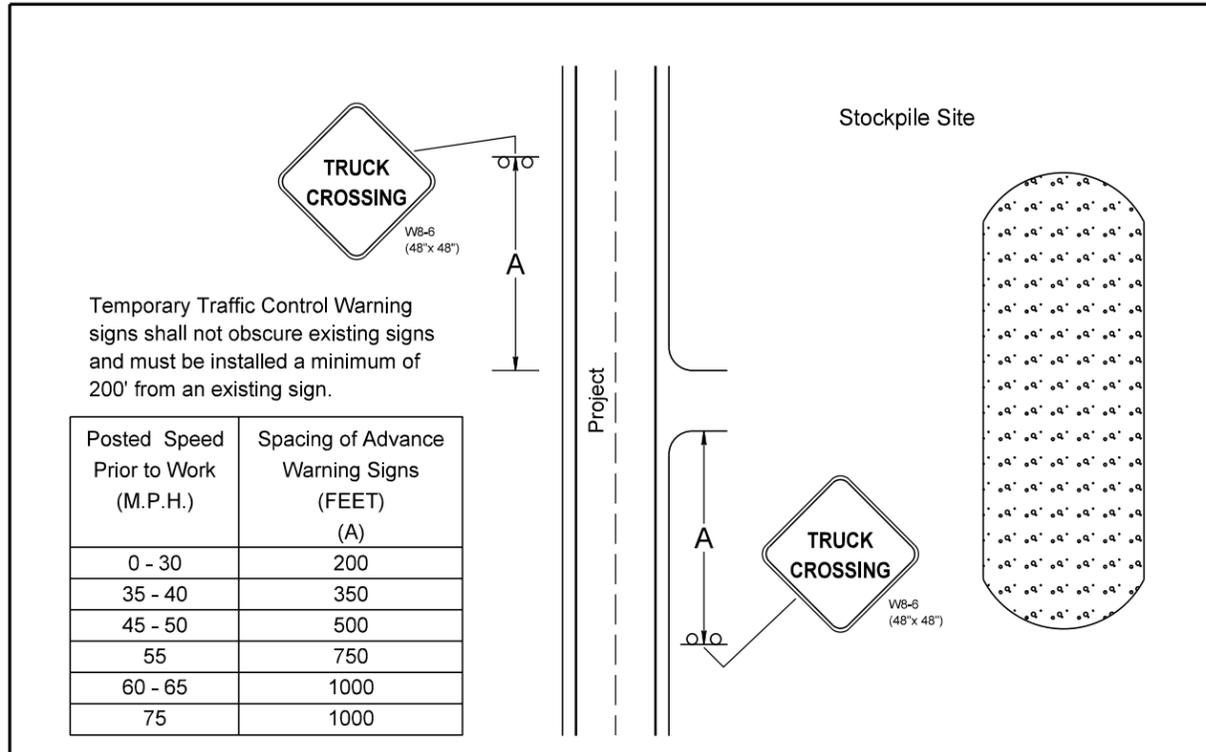
40 M.P.H. W13-1P (24"x 24")

(C) END ROAD WORK
G20-2 (36"x 18")

PLOTTED FROM - TRWJ10106

FILE - ... \GREG047L\TC 047L 2015.DGN

PLOT SCALE - 1:7000

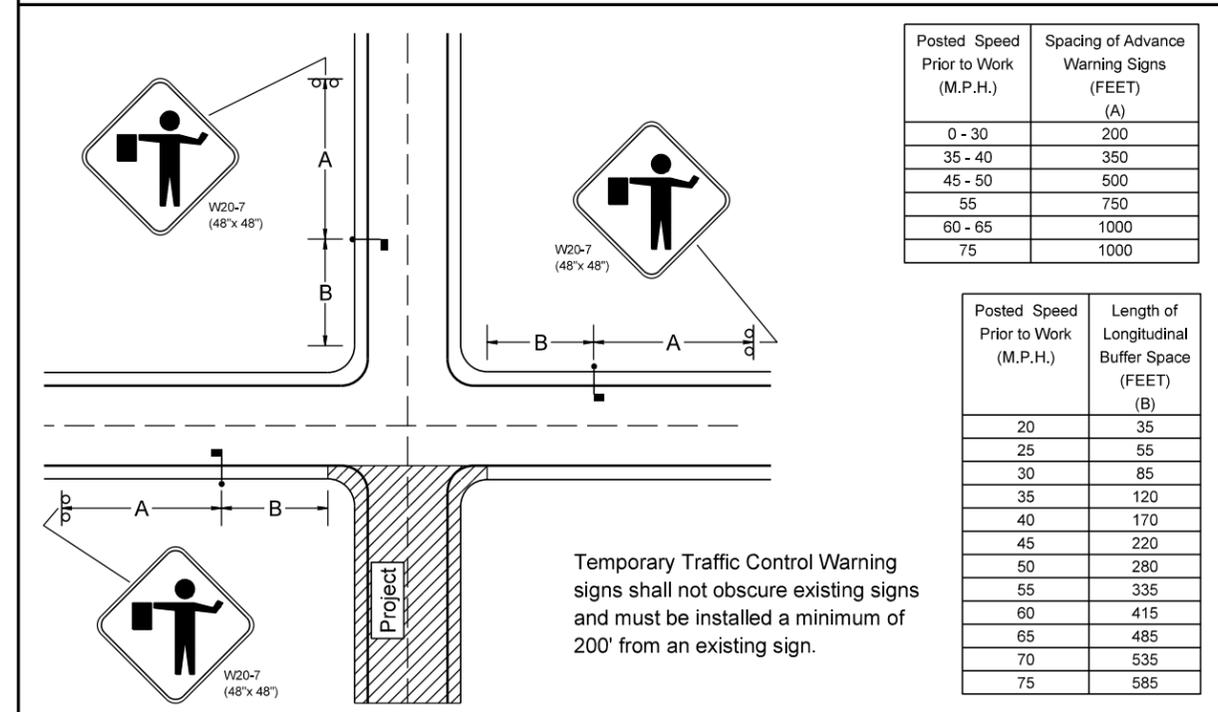
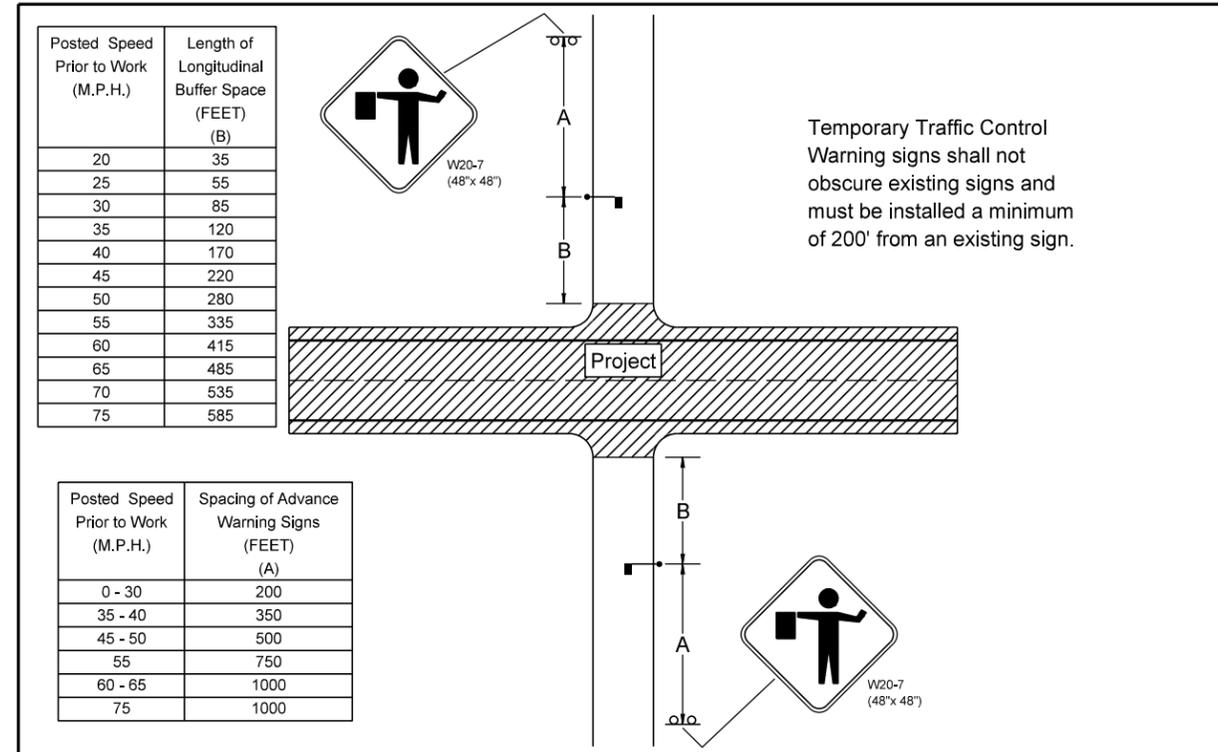


GUIDES FOR TRAFFIC CONTROL DEVICES TRUCK CROSSING SIGN INSTALLATION

PLOTTED FROM - TRV11026

PLOT NAME - 1

FILE - ... \TRUCK CROSSING & FLAGGER 2015.DGN



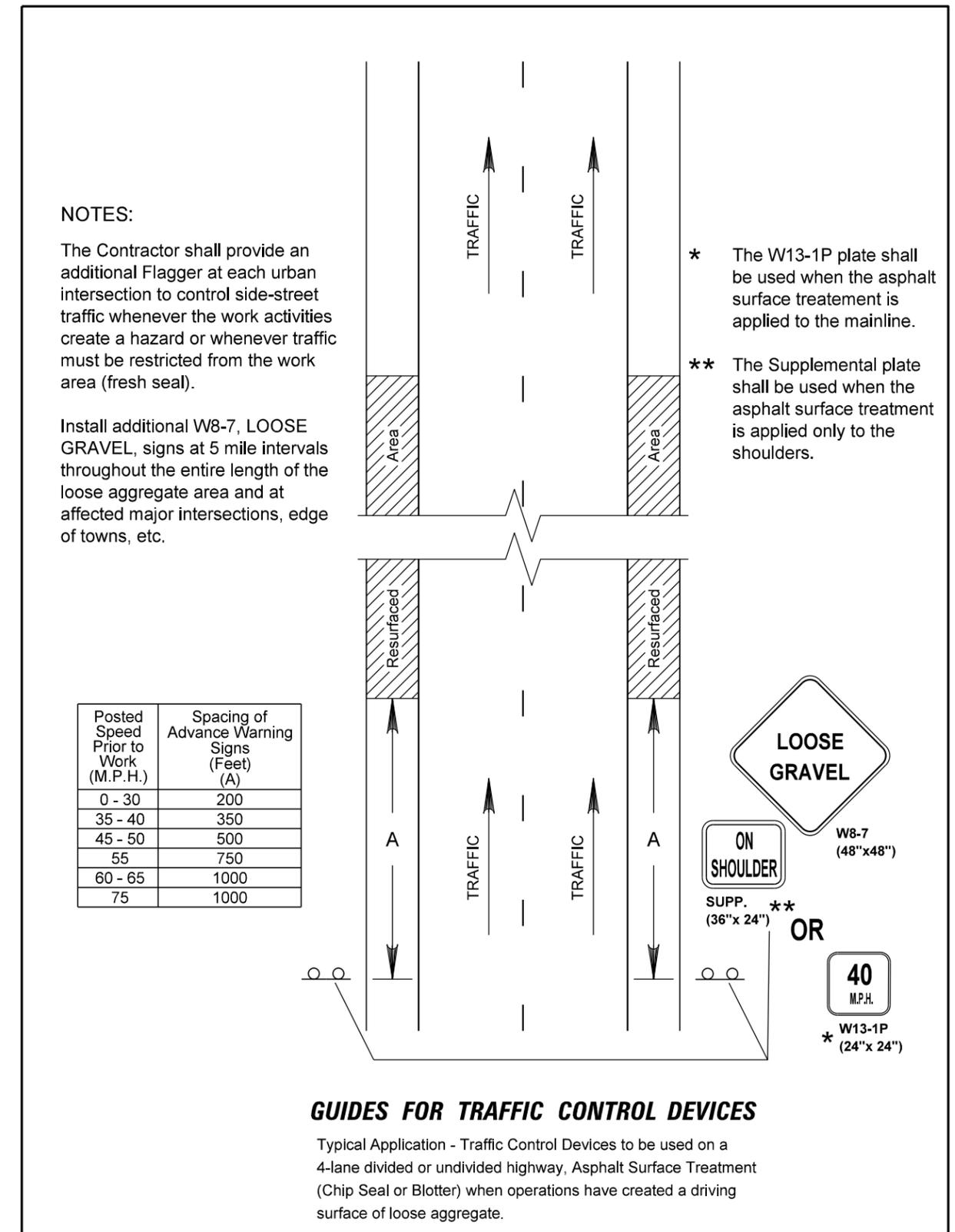
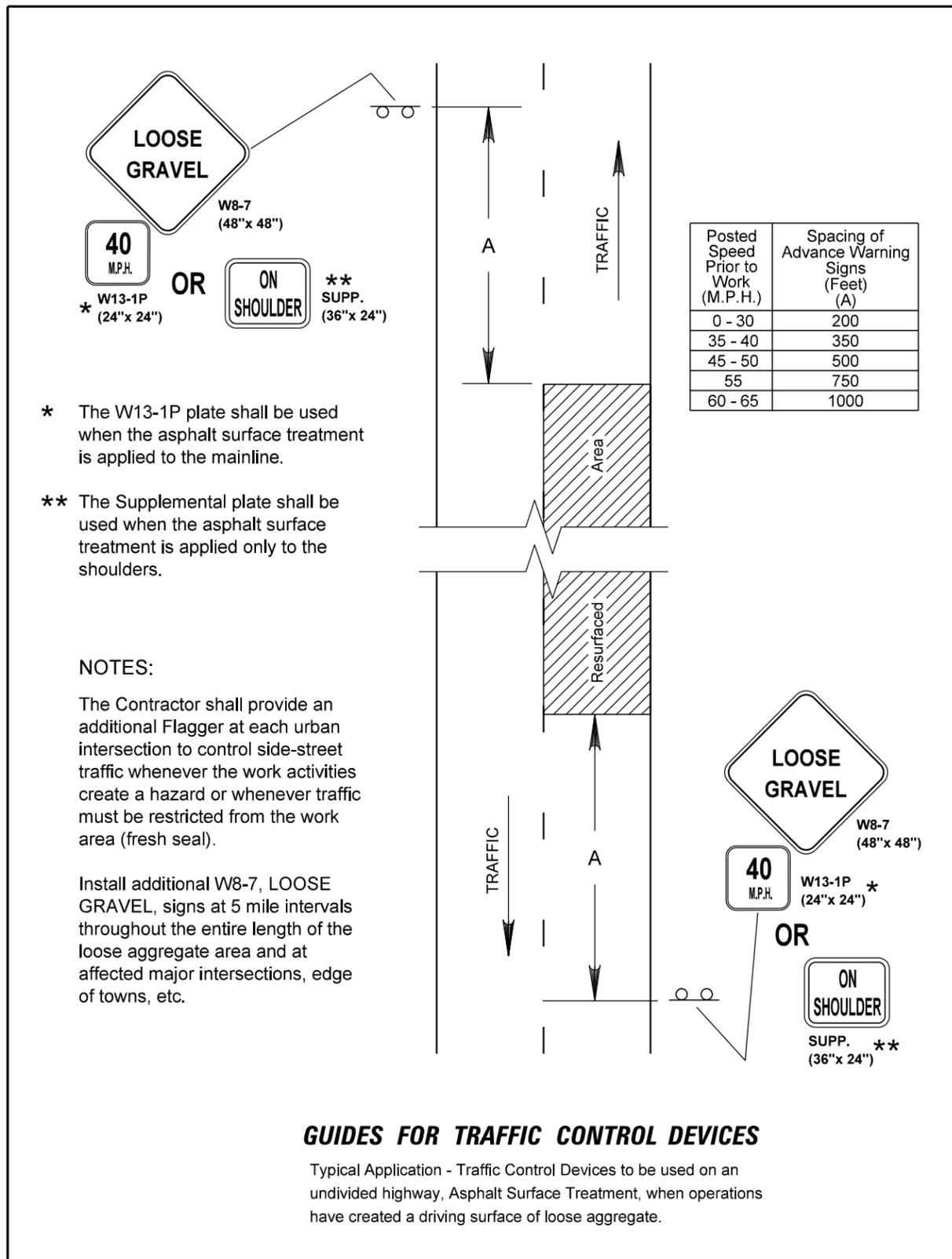
GUIDES FOR TRAFFIC CONTROL DEVICES FLAGGER SIGN INSTALLATION AT INTERSECTING ROADS

PLOT SCALE - 1:7000

PLOT NAME - 1

FILE - ... \0REG047\LOOSE GRAVEL 2015.DGN

PLOTTED FROM - TRWJINT06



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.

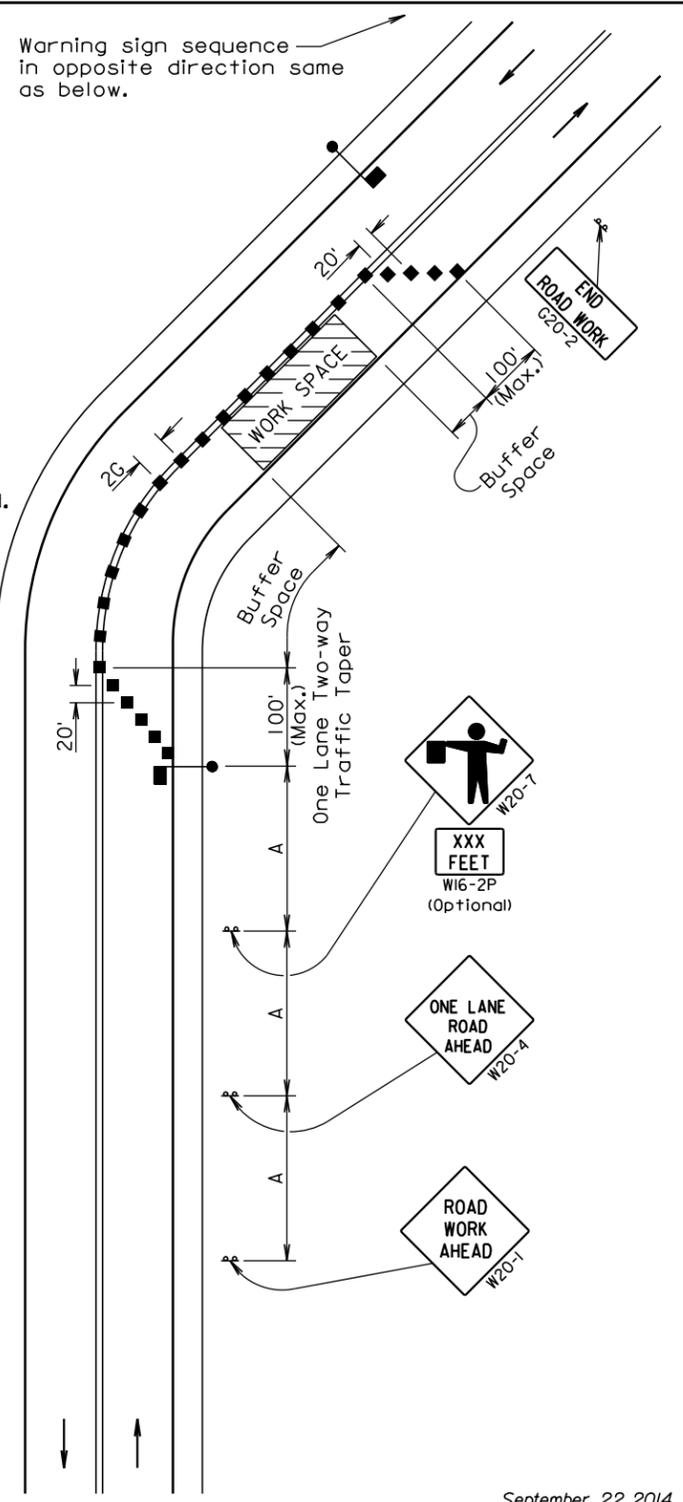
The channelizing devices shall be drums or 42" cones.

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.

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



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

* Spacing to be every 40' for 42" cones.

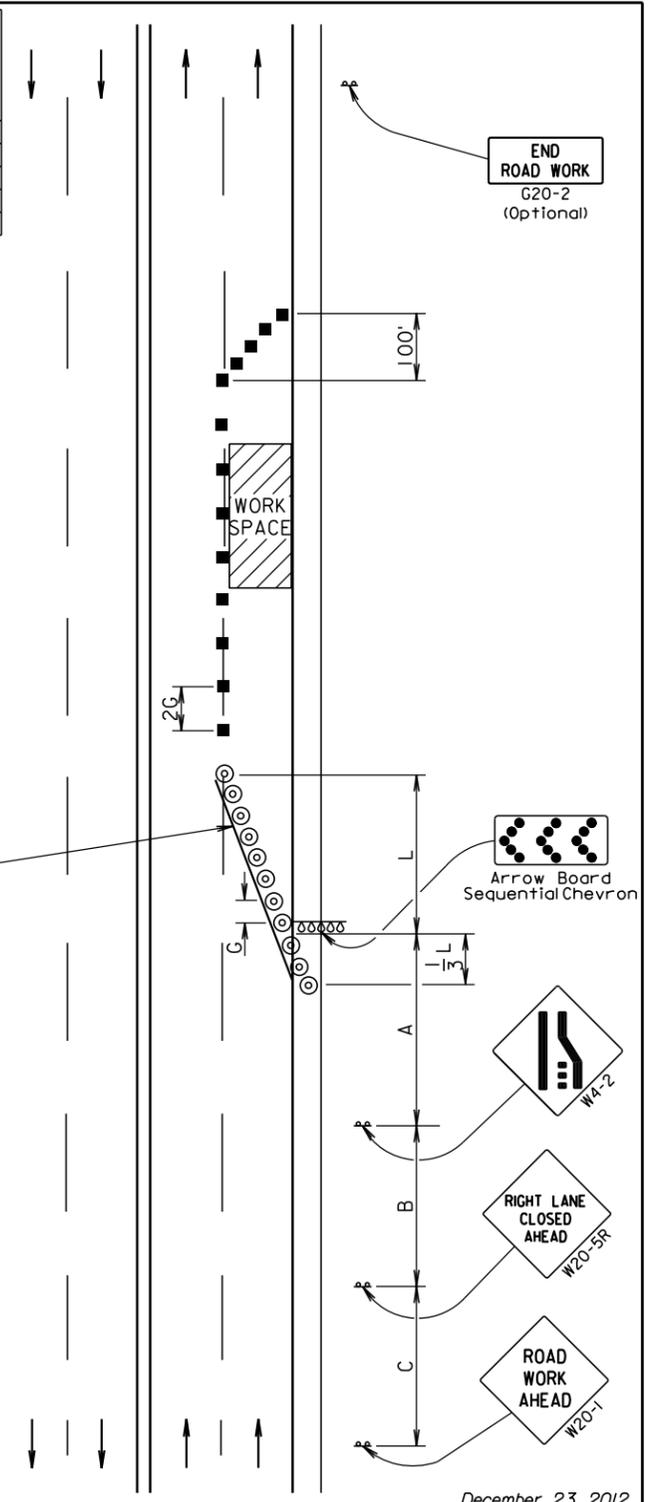
⊙ Reflectorized Drum

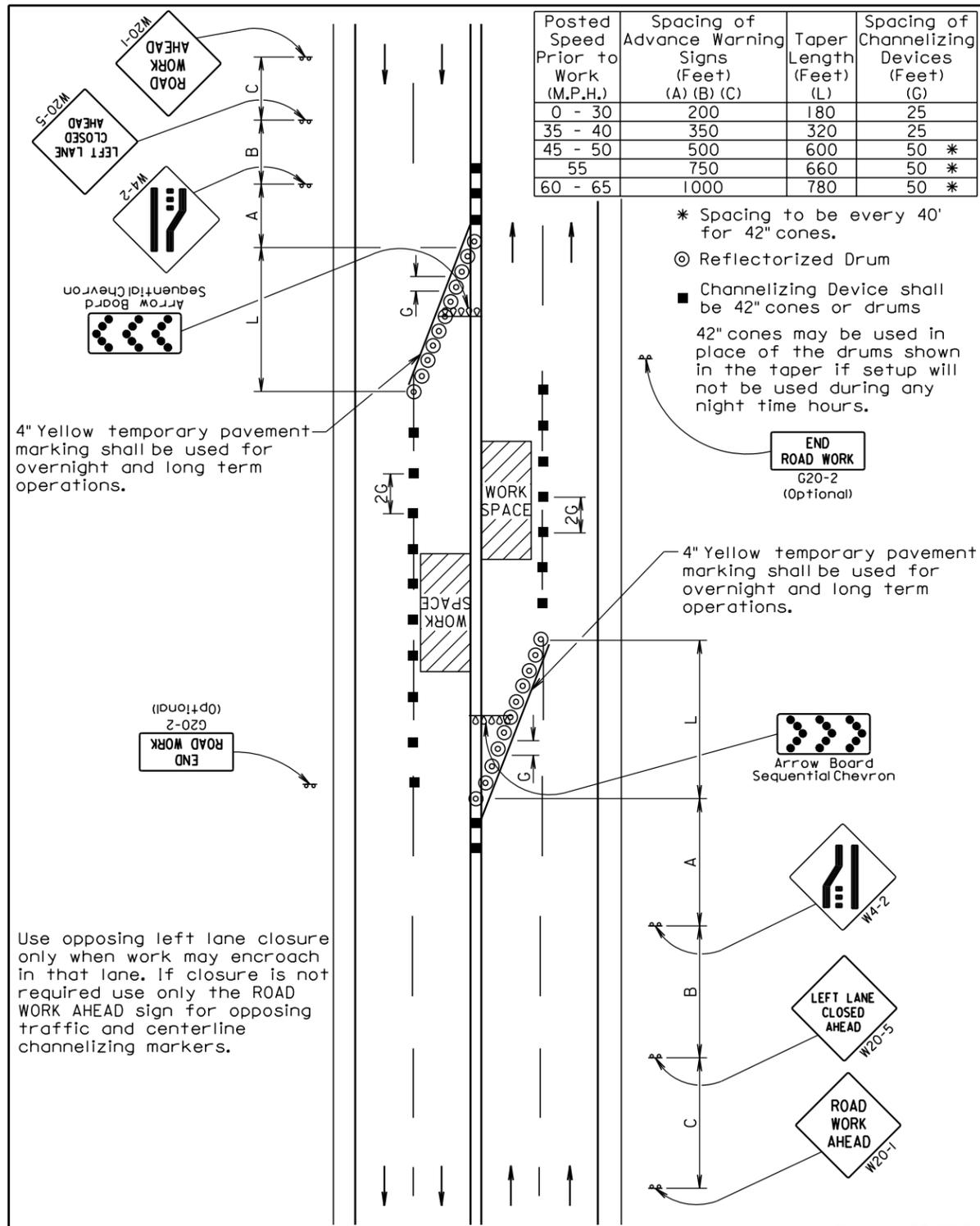
■ Channelizing Device shall be 42" cones or drums

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

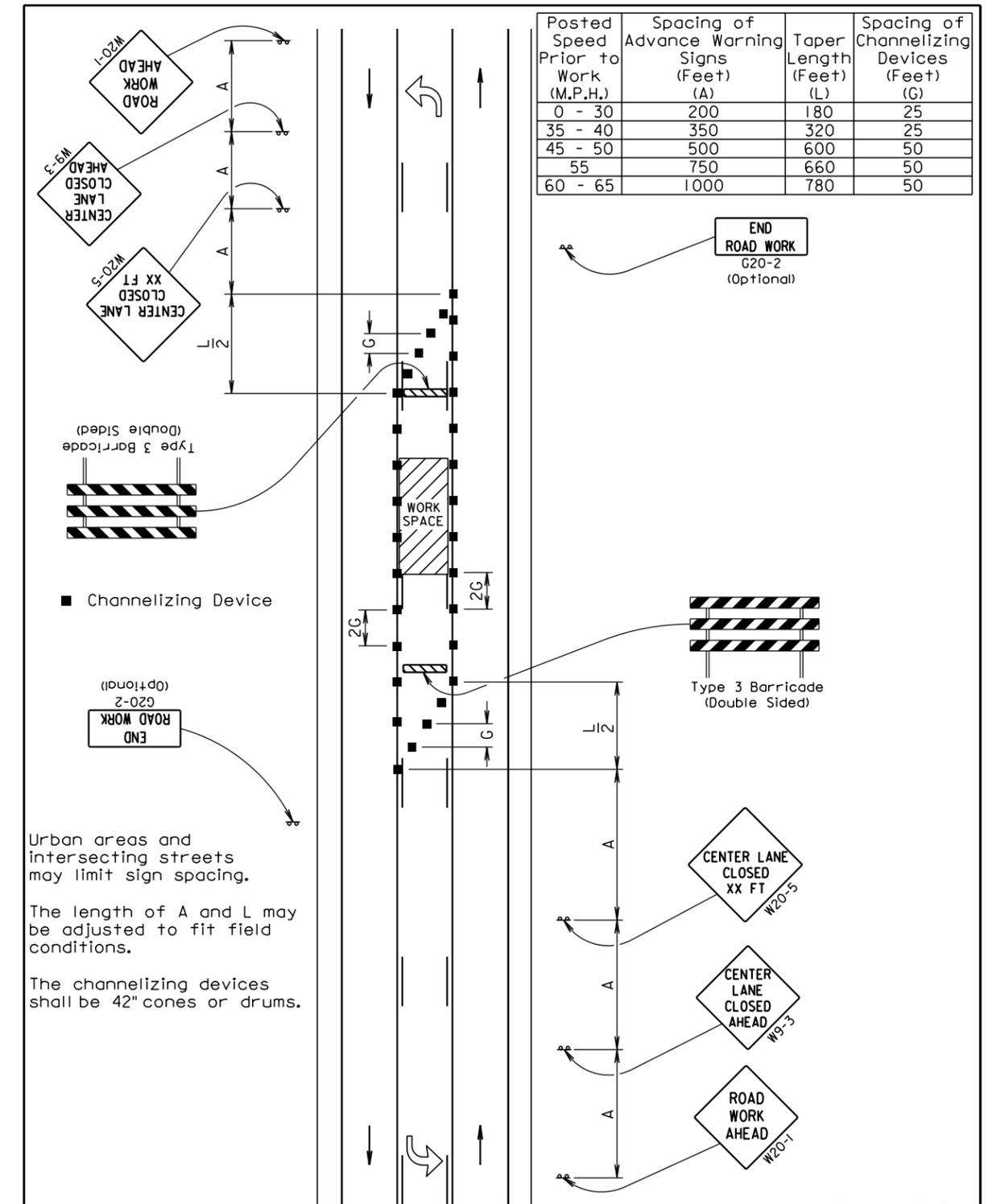
4" white temporary pavement marking shall be used for overnight and long term operations.

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

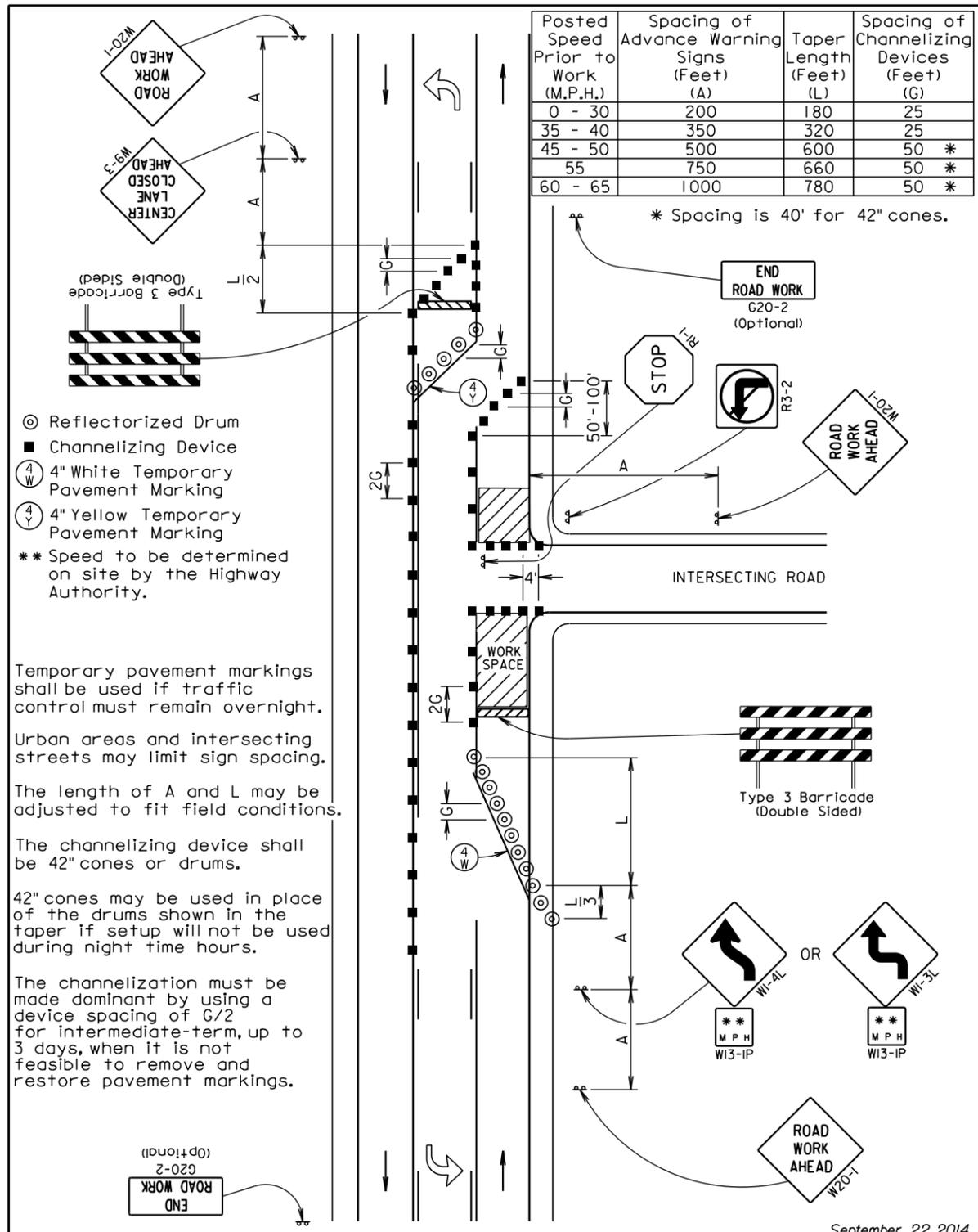




December 23, 2012



September 22, 2014



- ⊙ Reflectorized Drum
- Channelizing Device
- ④ 4" White Temporary Pavement Marking
- ④ 4" Yellow Temporary Pavement Marking
- ** Speed to be determined on site by the Highway Authority.

Temporary pavement markings shall be used if traffic control must remain overnight.

Urban areas and intersecting streets may limit sign spacing.

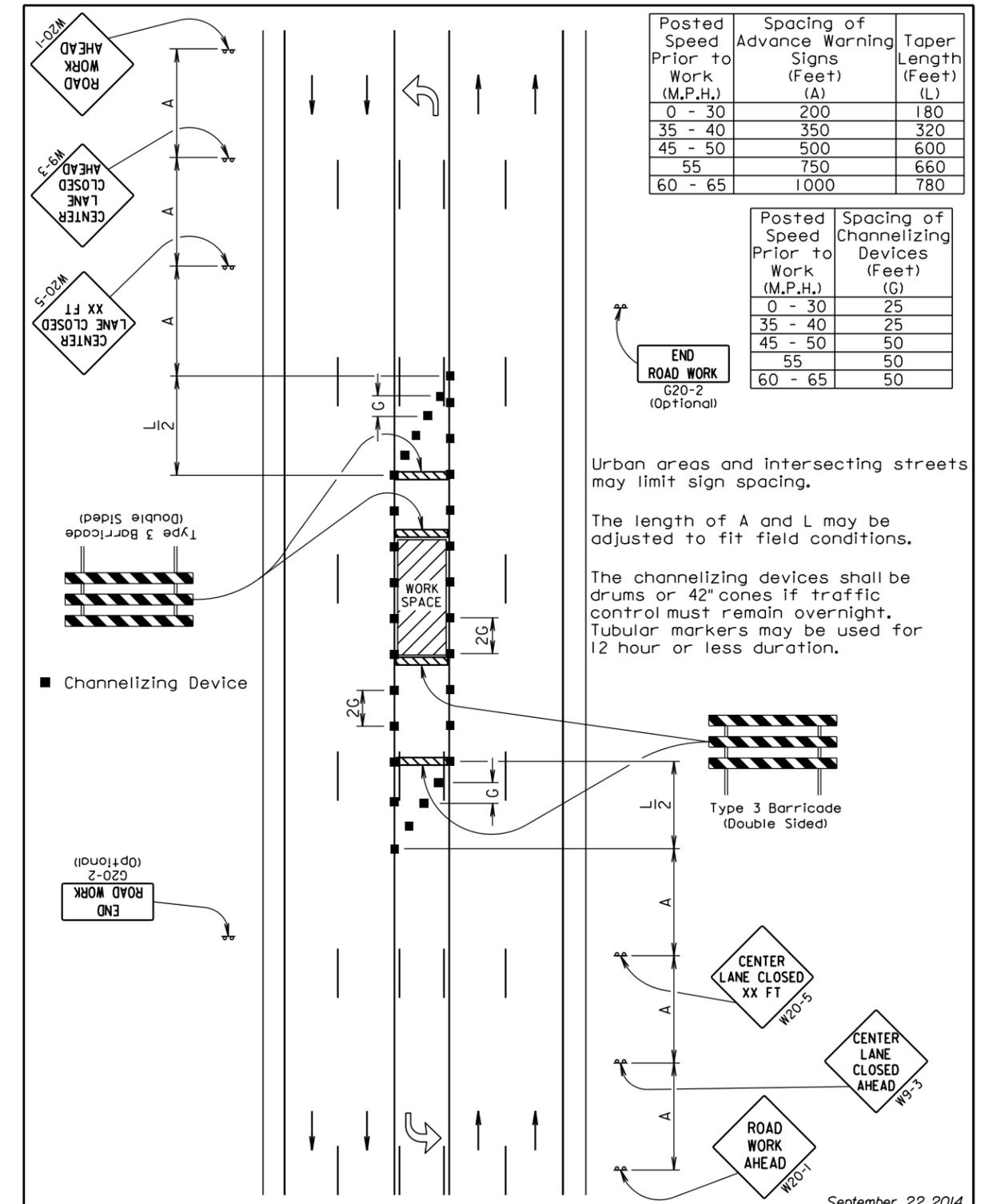
The length of A and L may be adjusted to fit field conditions.

The channelizing device shall be 42" cones or drums.

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

The channelization must be made dominant by using a device spacing of G/2 for intermediate-term, up to 3 days, when it is not feasible to remove and restore pavement markings.

September 22, 2014

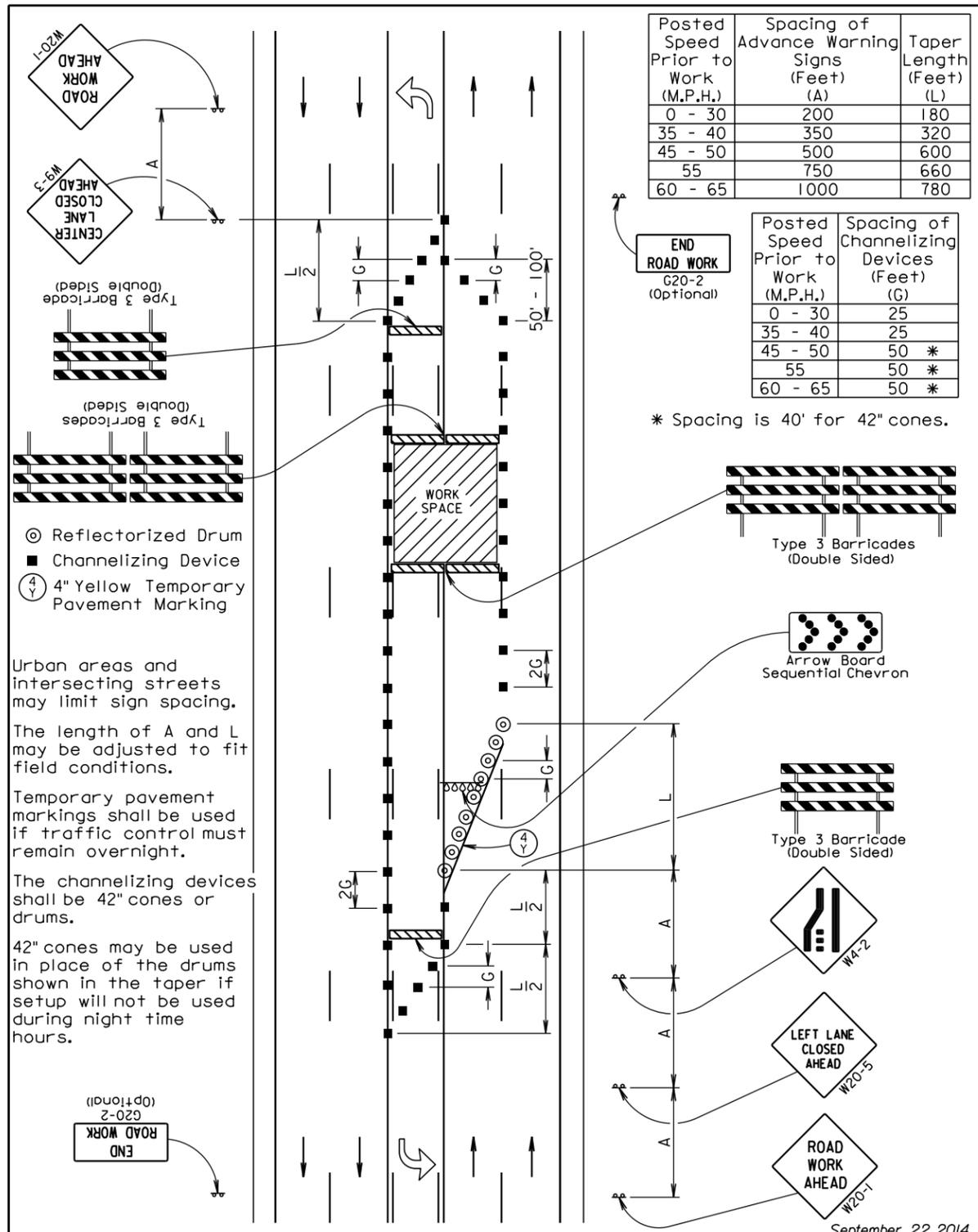


Urban areas and intersecting streets may limit sign spacing.

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

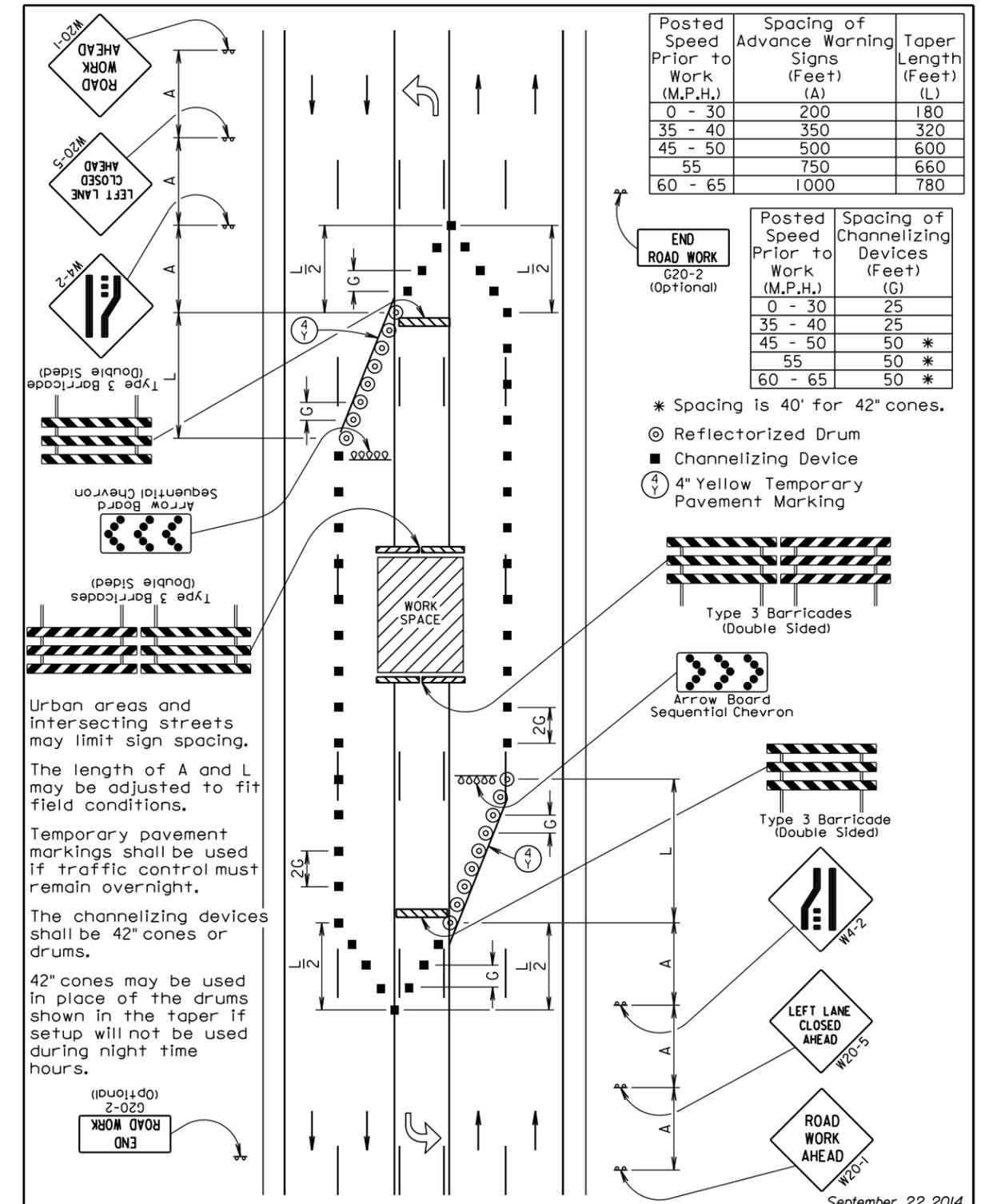
The channelizing devices shall be drums or 42" cones if traffic control must remain overnight. Tubular markers may be used for 12 hour or less duration.

September 22, 2014



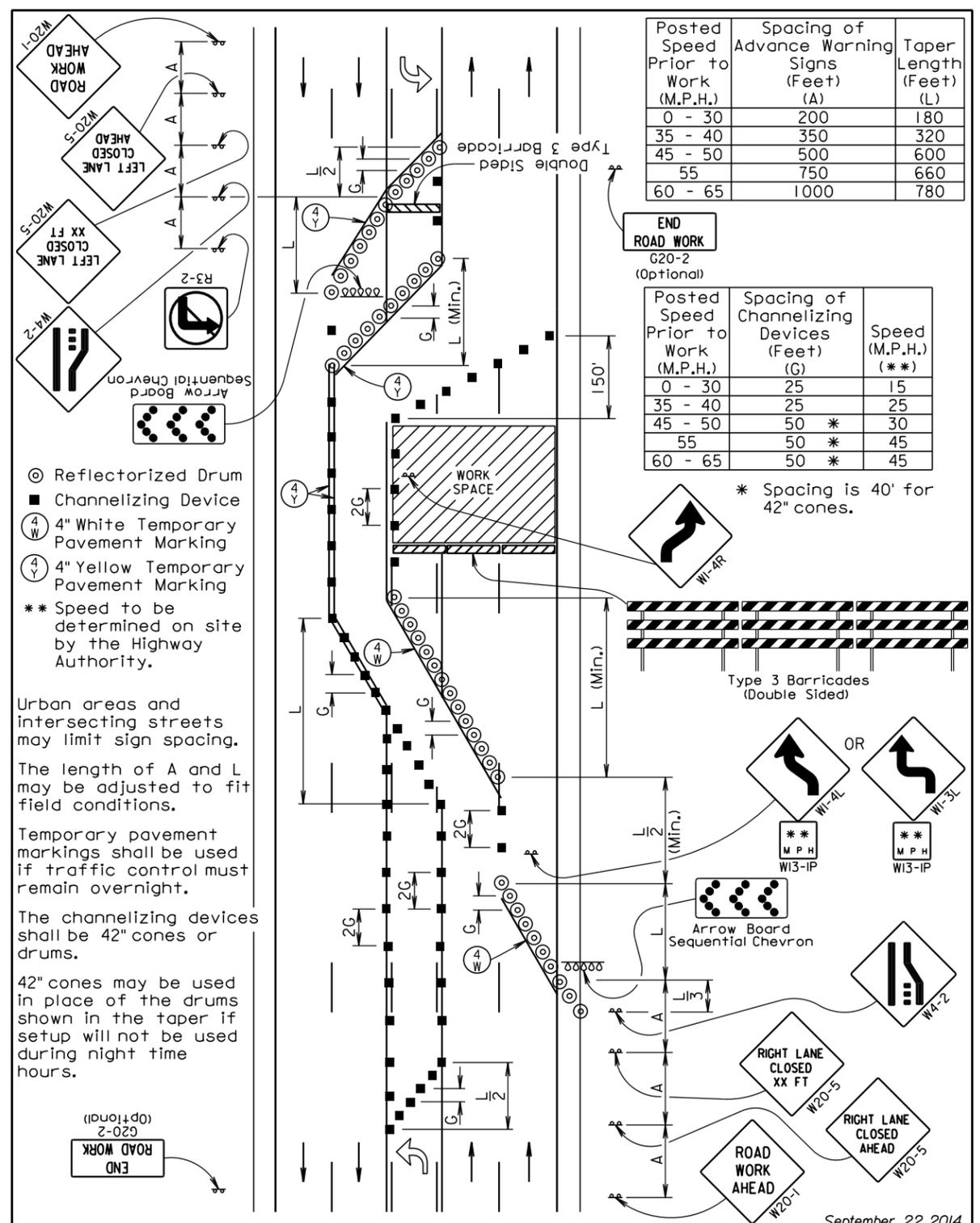
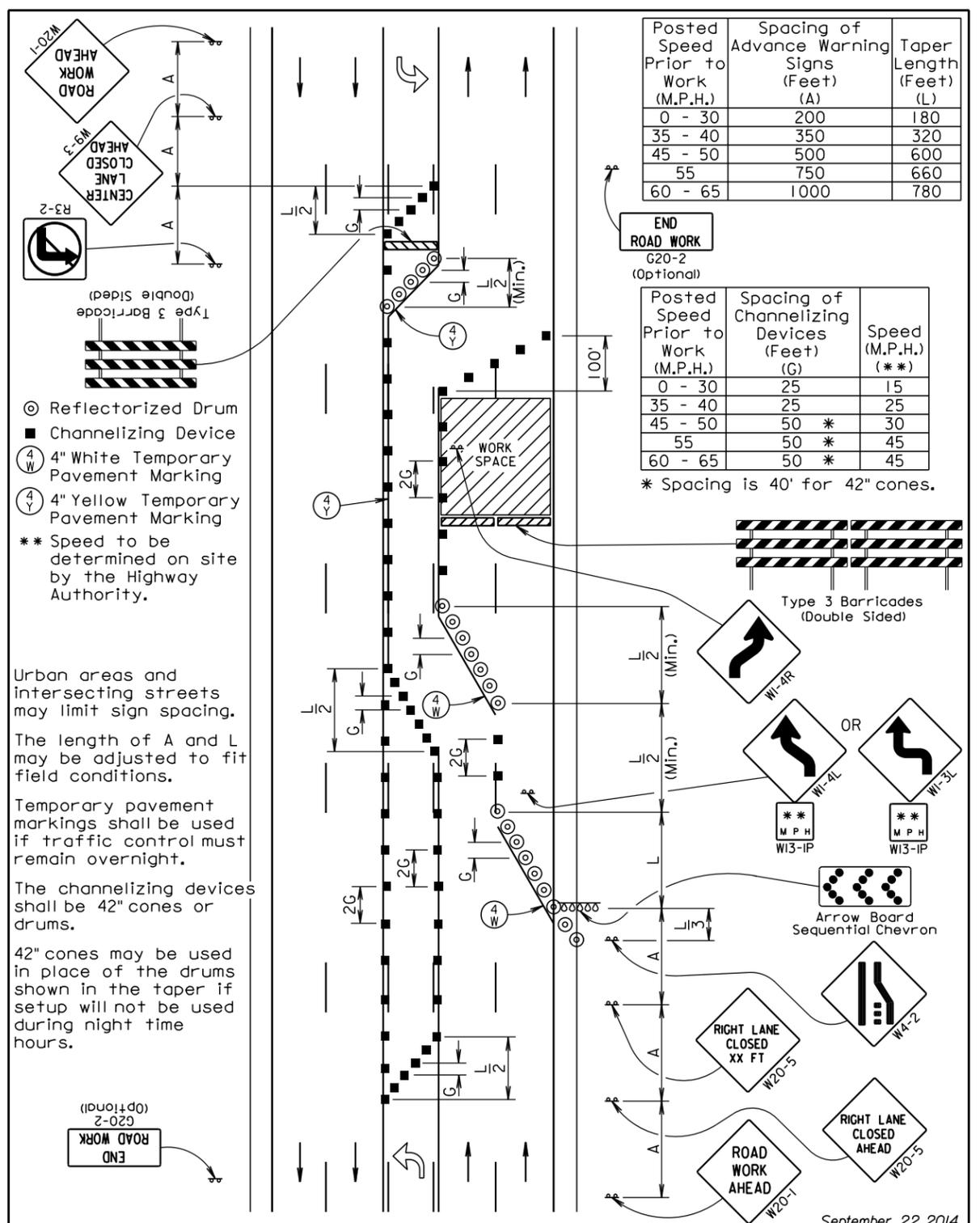
Urban areas and intersecting streets may limit sign spacing. The length of A and L may be adjusted to fit field conditions. Temporary pavement markings shall be used if traffic control must remain overnight. The channelizing devices shall be 42" cones or drums. 42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

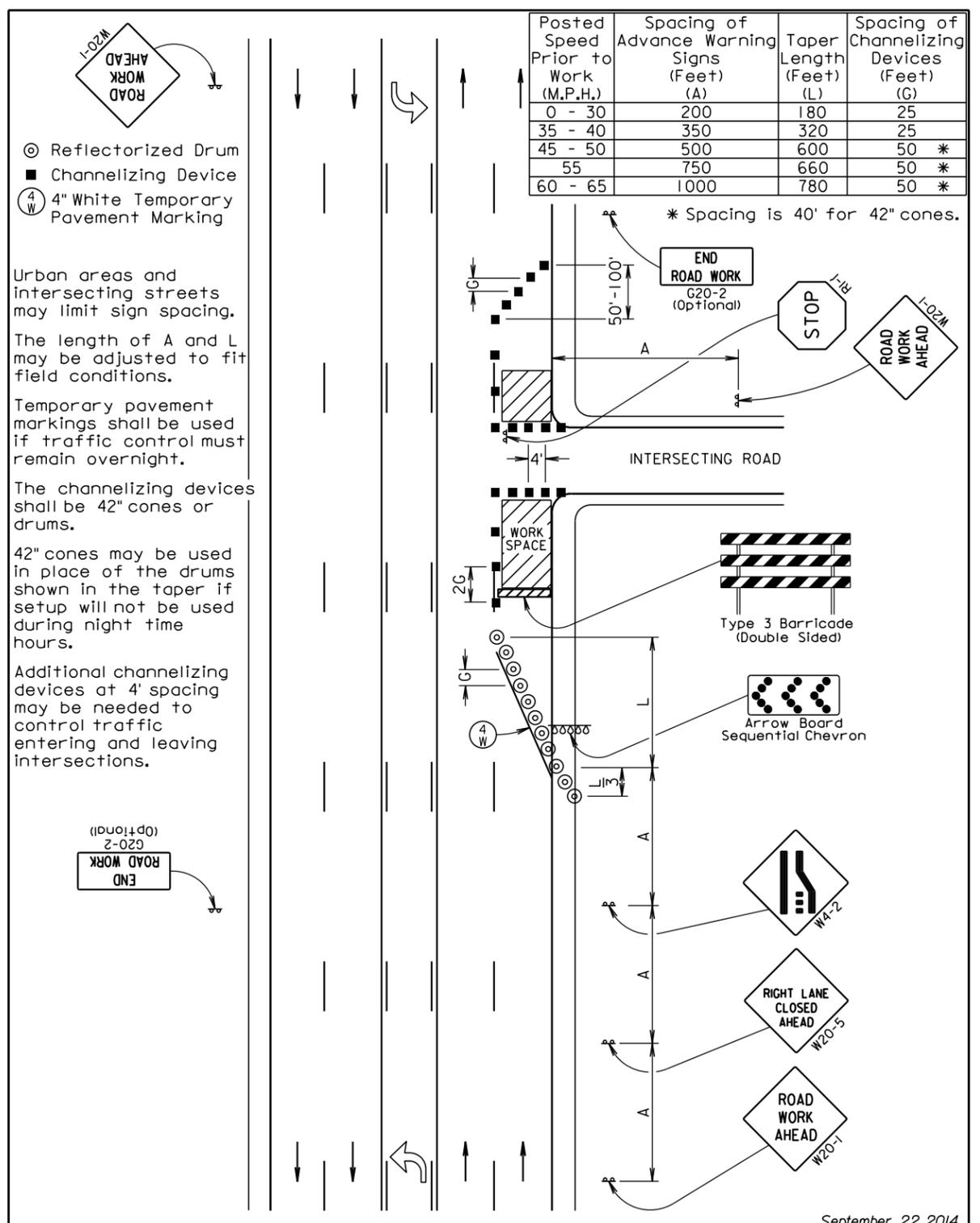
September 22, 2014



Urban areas and intersecting streets may limit sign spacing. The length of A and L may be adjusted to fit field conditions. Temporary pavement markings shall be used if traffic control must remain overnight. The channelizing devices shall be 42" cones or drums. 42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

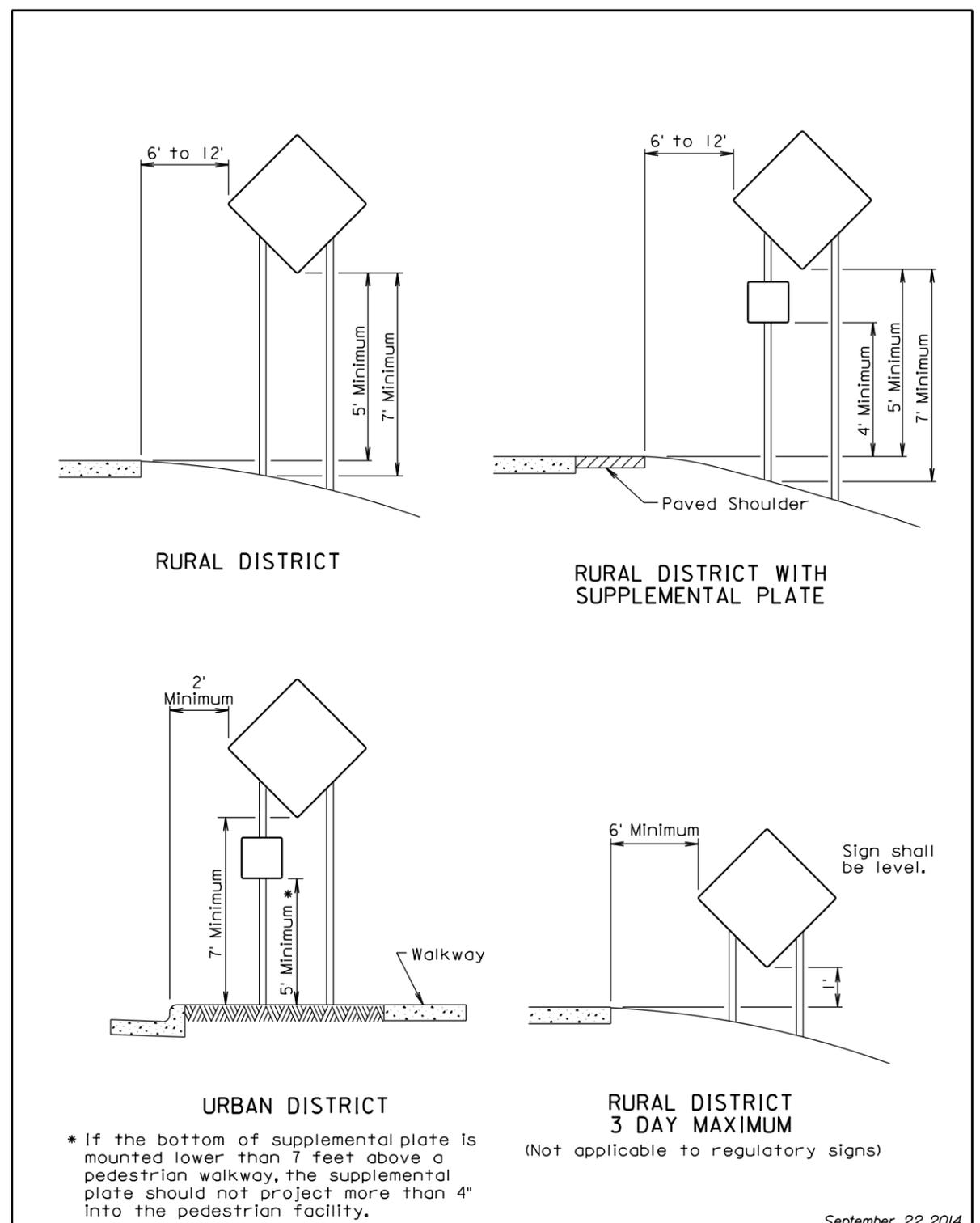
September 22, 2014

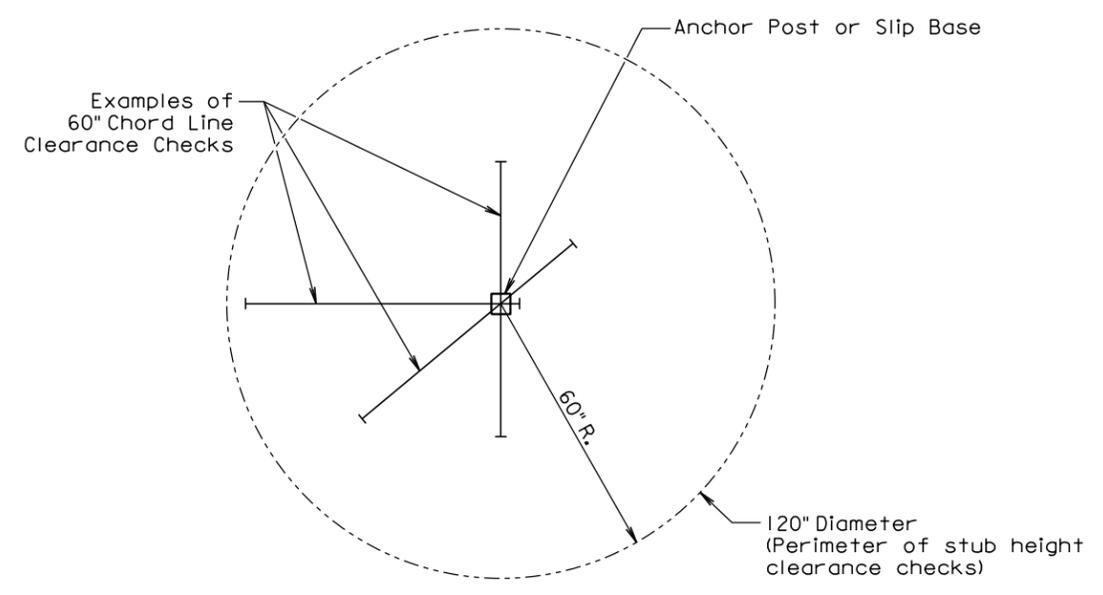




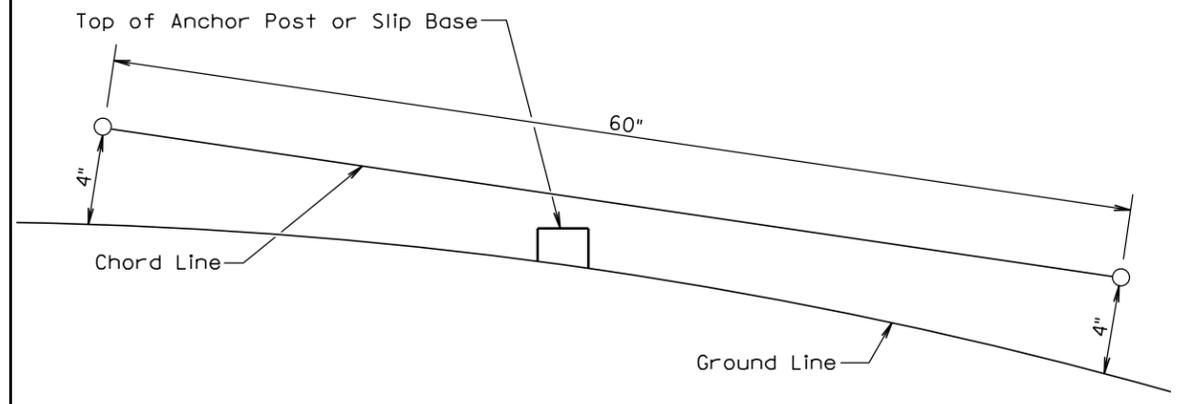
◎ Reflectorized Drum
 ■ Channelizing Device
 (4) 4" White Temporary Pavement Marking

Urban areas and intersecting streets may limit sign spacing. The length of A and L may be adjusted to fit field conditions. Temporary pavement markings shall be used if traffic control must remain overnight. The channelizing devices shall be 42" cones or drums. 42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours. Additional channelizing devices at 4' spacing may be needed to control traffic entering and leaving intersections.





PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 4th Qtr. 2014	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

ITEMIZED LIST FOR TRAFFIC CONTROL

US 18 GREGORY COUNTY PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 25 MILES	3	24	72
G20-2	36" x 18"	END ROAD WORK	2	17	34
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	10	34	340
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	10	16	160
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	6	34	204
TOTAL UNITS					1014

SD 34 W Segment BUFFALO & JERAULD COUNTIES PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 21 MILES	2	24	48
G20-1	48" x 24"	ROAD WORK NEXT 20 MILES	1	24	24
G20-2	36" x 18"	END ROAD WORK	2	17	34
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	11	34	374
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	11	16	176
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	6	34	204
TOTAL UNITS					1064

SD 34 E Segment SANBORN COUNTY PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 1 MILE	2	24	48
G20-2	36" x 18"	END ROAD WORK	2	17	34
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	2	34	68
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-5	48" x 48"	LEFT OR RIGHT LANE CLOSED AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	10	34	340
TOTAL UNITS					762

SD 37 HUTCHINSON COUNTY PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 1 MILE	2	24	48
G20-2	36" x 18"	END ROAD WORK	2	17	34
R1-1	36" x 36"	STOP	4	27	108
R3-2	30" x 30"	NO LEFT TURN (SYMBOL)	4	21	84
W1-4	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)	4	34	136
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	2	34	68
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	4	16	64
W9-3	48" x 48"	CENTER LANE CLOSED AHEAD	2	34	68
W20-1	48" x 48"	ROAD WORK AHEAD	6	34	204
W20-5	48" x 48"	CENTER LANE CLOSED XX FT	2	34	68
W20-7	48" x 48"	FLAGGER	10	34	340
****	*** 48"	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	2	56	112
TOTAL UNITS					1402

SD 38 McCOOK & MINNEHAHA COUNTIES PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 17 MILES	2	24	48
G20-1	48" x 24"	ROAD WORK NEXT 12 MILES	1	24	24
G20-1	48" x 24"	ROAD WORK NEXT 5 MILES	1	24	24
G20-2	36" X 18"	END ROAD WORK	2	17	34
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	6	34	204
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	5	16	80
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	6	34	204
TOTAL UNITS					822

SD 43 GREGORY COUNTY PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 1 MILE	2	24	48
G20-2	36" X 18"	END ROAD WORK	1	17	17
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	2	34	68
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	2	16	32
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	6	34	204
TOTAL UNITS					573

SD 50 W Segment BRULE COUNTY PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 9 MILES	2	24	48
G20-2	36" X 18"	END ROAD WORK	2	17	34
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	4	34	136
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	4	16	64
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	6	34	204
TOTAL UNITS					690

SD 50 E Segment BRULE & CHARLES MIX COUNTIES PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 27 MILES	3	24	72
G20-2	36" X 18"	END ROAD WORK	2	17	34
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	12	34	408
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	12	16	192
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	6	34	204
TOTAL UNITS					1114

ITEMIZED LIST FOR TRAFFIC CONTROL (CONTINUED)**US 81 McCOOK COUNTY PCN 047L**

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 1 MILE	2	24	48
G20-2	36" X 18"	END ROAD WORK	2	17	34
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	2	34	68
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	10	34	340
TOTAL UNITS					694

I 90 BRULE & AURORA COUNTIES PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
R11-2	48" x 30"	ROAD CLOSED	2	27	54
W5-4	48" x 48"	RAMP NARROWS	2	34	68
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	26	34	884
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	26	16	416
W13-4P	36" x 36"	ON RAMP	2	27	54
W20-1	48" x 48"	ROAD WORK AHEAD	4	34	136
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	4	34	136
SPECIAL	48" x 48"	REST AREA CLOSED AHEAD	2	34	68
****	****	TYPE III BARRICADE - 8 FT. SINGLE SIDED	6	40	240
TOTAL UNITS					2192

I 90L DAVISON COUNTY PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	4	17	68
R1-1	36" x 36"	STOP	2	27	54
R3-2	24" x 24"	NO LEFT TURN (SYMBOL)	2	16	32
W1-4	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)	4	34	136
W1-6	48" x 24"	LARGE ARROW	8	24	192
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	4	34	136
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	8	34	272
W9-3	48" x 48"	CENTER LANE CLOSED AHEAD OR XXX FT	8	34	272
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE (5 MPH)	10	16	160
W20-1	48" x 48"	ROAD WORK AHEAD	6	34	204
W20-5	48" x 48"	LEFT OR RIGHT LANE CLOSED AHEAD OR XXX FT	8	34	272
W20-7	48" x 48"	FLAGGER	40	34	1360
****	****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED	12	56	672
TOTAL UNITS					3898

SD 262 HANSON & McCOOK COUNTIES PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 17 MILES	2	24	48
G20-2	36" x 18"	END ROAD WORK	2	17	34
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	8	34	272
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE (5 MPH)	8	16	128
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	6	34	204
TOTAL UNITS					890

US 281 GREGORY COUNTY PCN 047L

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT 1 MILE	2	24	48
G20-2	36" x 18"	END ROAD WORK	2	17	34
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W8-7	48" x 48"	LOOSE GRAVEL	2	34	68
W13-1P	24" x 24"	ADVISORY SPEED PLAQUE	2	16	32
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER	6	34	204
TOTAL UNITS					590

When the same stockpile site is used for more than one project, the TRUCK CROSSING signs shall be paid for on one project only.