

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E1520	Remove Signal Equipment	Lump Sum	LS
634E0100	Traffic Control	280	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0410	Type B Advance Warning Arrow Panel	1	Each
635E5540	Sawed-In Detector Loop	6	Each
635E5550	Detector Unit	1	Each
635E7600	Maintenance of Traffic Signal(s)	8	Hour

SPECIFICATIONS

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

SCOPE OF WORK

The vehicle detector replacement and traffic signal work includes, but is not limited to, the following:

1. Remove existing sawed-in vehicle detector loop wiring and sealant.
2. Clean existing sawed-in vehicle detector loop grooves, including grooves for lead-ins.
3. Saw grooves for new detector loops and lead-in wiring.
4. Install new vehicle detector loops and lead-in wiring, and connect to detector unit conductor at junction boxes.
5. Install detector unit and energize detector loops.
6. Perform diagnostics and make necessary adjustments for proper operation of all intersection detector loops, traffic signal heads, and pedestrian push buttons. Adjust detector loop frequencies where necessary.
7. Verify programmed traffic signal timings and provide a copy of the programmed signal timings to the Mitchell Region Traffic Office.
8. Arrange a time for final traffic signal inspection.

Work on the roadway shall be conducted during daylight hours only. Daylight hours are considered to be sunrise until sunset.

SAWED-IN VEHICLE DETECTOR LOOPS

The Contractor shall remove the sawed-in detector loops and lead-in wires as specified in these plans. The Contractor shall take care not to damage the existing sawed-in detector loop and lead-in grooves for reuse with the new detector loops. The existing sawed-in grooves shall be thoroughly clean and dry. All materials such as old sealant, oil, asphalt, curing compound, paint, rust, and other foreign materials shall be completely removed.

Cleaning shall be accomplished with adhesive remover or by sand blasting and other tools as necessary. Existing sawed-in grooves that are sand blasted shall be sand blasted utilizing a mechanical device that holds the sand blaster at the appropriate angle and distance from the joint to ensure proper cleaning. The device shall have a mechanism attached that will correctly guide the device in the joint.

Just prior to sealing, each sawed-in groove shall be blown out using a jet of compressed air, at a working pressure of not less than 90 psi (620 kPa), to remove all traces of dust. Air compressors used for cleaning sawed-in grooves shall be equipped with traps capable of removing all free water and oil from the compressed air. Care shall be taken to avoid damage to adjacent concrete pavement.

Detector loop wires shall be sealed with the type of sealant appropriate for the ambient air temperatures at the time of installation.

The Contractor shall carefully disconnect the lead-in wires from the detector unit conductor at junction boxes JB4 and JB11. The ends of the existing detector unit conductors shall be trimmed back for a fresh, clean copper connection to the new detector loop lead-in wires. The new connections shall be sealed in accordance with the Standard Plates.

Costs for removal of existing sawed-in vehicle detector loops shall be incidental to the contract lump sum for "Remove Signal Equipment".

Costs for the installation of new vehicle detector loops, including sawing of new grooves and cleaning of the existing loop and lead-in wire grooves shall be incidental to the contract unit price per each for "Sawed-In Detector Loop".

CONTROLLER

The existing controller shall retain existing programming. Programmed patterns and timings should match the patterns and timings specified on the Signal Timing Sheet in these plans. Proper function of the controller, vehicle detector loops, traffic signal heads, and pedestrian push buttons shall be verified by a qualified technician.

Costs for a qualified technician, diagnostics and adjustments, including reprogramming, shall be included in the contract price per hour for "Maintenance of Traffic Signals".

Additional diagnostics, adjustments, and rewiring may be necessary beyond the Scope of Work, as approved by the Engineer. The "Maintenance of Traffic Signals" estimate quantity shall be adjusted as necessary by the Engineer for payment.

The Contractor shall furnish the Mitchell Region Traffic Office with a copy of the data programmed into the controller upon project completion.

DETECTOR UNIT

The detector unit shall be a two channel NEMA TS-2 Eberle Design Inc. LMD 622 loop monitor, or equivalent. The detector unit shall conform to the standards of NEMA.

ON-SITE INSPECTION

An on-site inspection of the traffic signals shall be conducted before acceptance of the project, once the traffic signals are completed and operational. The on-site inspection shall be conducted by the Contractor, City Traffic Engineer, Project Engineer, and the Region Traffic Engineer.

ITEMIZED LIST FOR TRAFFIC CONTROL

MAINTENANCE OF TRAFFIC

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

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

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

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

Adequate traffic control devices are included in the Itemized List for Traffic Control Devices for one work space.

The Contractor may install all traffic control devices on temporary supports. Traffic control devices shall be removed or covered during non-working hours.

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
E5-1	36" x 32"	EXIT GORE SIGN		24	
G20-2	36" x 18"	END ROAD WORK	2	17	34
R1-1	48" x 48"	STOP		34	
R1-2	48" x 48"	YIELD		34	
R2-1	24" x 30"	SPEED LIMIT 25		18	
R2-6	24" x 24"	FINES DOUBLE		16	
R3-7	30" x 30"	RIGHT OR LEFT LANE MUST TURN RIGHT OR LEFT	2	21	42
R4-7	24" x 30"	KEEP RIGHT (SYMBOL)		18	
R5-1	48" x 48"	DO NOT ENTER		34	
R5-1a	48" x 36"	WRONG WAY		29	
R10-6	24" x 36"	STOP HERE ON RED		20	
R11-2	48" x 30"	ROAD CLOSED		27	
R11-3a	60" x 30"	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY		30	
R11-4	60" x 30"	ROAD CLOSED TO THRU TRAFFIC		30	
SW12-1b	120" x 60"	HIGHWAY WORKERS GIVE EM A BRAKE		80	
W1-1	48" x 48"	LEFT OR RIGHT TURN ARROW		34	
W1-2	48" x 48"	LEFT OR RIGHT CURVE ARROW		34	
W1-3	48" x 48"	REVERSE TURN SIGN (LEFT OR RIGHT)		34	
W1-4	48" x 48"	REVERSE CURVE SIGN (LEFT OR RIGHT)		34	
W3-1	48" x 48"	STOP AHEAD (SYMBOL)		34	
W3-2	48" x 48"	YIELD AHEAD (SYMBOL)		34	
W3-3	48" x 48"	SIGNAL AHEAD (SYMBOL)		34	
W3-4	48" x 48"	BE PREPARED TO STOP		34	
W3-5	48" x 48"	SPEED REDUCTION (65 MPH)		34	
W4-1	48" x 48"	MERGE (SYMBOL)		34	
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	1	34	34
W5-2	48" x 48"	NARROW BRIDGE		34	
W5-3	48" x 48"	ONE LANE BRIDGE		34	
W7-3a	30" x 24"	NEXT ___ MILES		18	
W8-1	36" x 36"	BUMP		27	
W8-3	36" x 36"	PAVEMENT ENDS		27	
W8-6	48" x 48"	TRUCK CROSSING		34	
W8-7	36" x 36"	LOOSE GRAVEL		27	
W8-9a	48" x 48"	SHOULDER DROP-OFF		34	
W8-17	48" x 48"	SHOULDER DROP-OFF (SYM)		34	
W8-11	48" x 48"	UNEVEN LANES		34	
W9-2	48" x 48"	LANE ENDS MERGE RIGHT OR LEFT	1	34	34
W9-3	48" x 48"	CENTER LANE CLOSED AHEAD	1	34	34
W13-1	24" x 24"	ADVISORY SPEED PLATE		16	
W16-7P	24" x 12"	DOWNWARD DIAGONAL ARROW (PLAQUE)		15	
W16-9P	24" x 12"	AHEAD (PLAQUE)		15	
W20-1	48" x 48"	ROAD WORK AHEAD	2	34	68
W20-2	48" x 48"	DETOUR AHEAD		34	
W20-3	48" x 48"	ROAD CLOSED AHEAD		34	
W20-4	48" x 48"	ONE LANE ROAD AHEAD		34	
W20-5	48" x 48"	LT. OR RT. LANE CLOSED AHEAD	1	34	34
W20-7a	48" x 48"	FLAGGER		34	
W21-1a	48" x 48"	WORKERS (SYMBOL)		34	
W21-2	36" x 36"	FRESH OIL		27	
W21-3	48" x 48"	ROAD MACHINERY AHEAD		34	
W21-5	48" x 48"	SHOULDER WORK		34	
W21-5a	48" x 48"	RIGHT SHOULDER CLOSED		34	
W21-5b	48" x 48"	RIGHT SHOULDER CLOSED AHEAD		34	
*****	12" x 36"	TYPE III OBJECT MARKER		15	
*****	*****	TYPE III BARRICADE - 8 FT. SINGLE SIDED		40	
*****	*****	TYPE III BARRICADE - 8 FT. DOUBLE SIDED		56	
TOTAL UNITS					280

SIGNAL LAYOUT

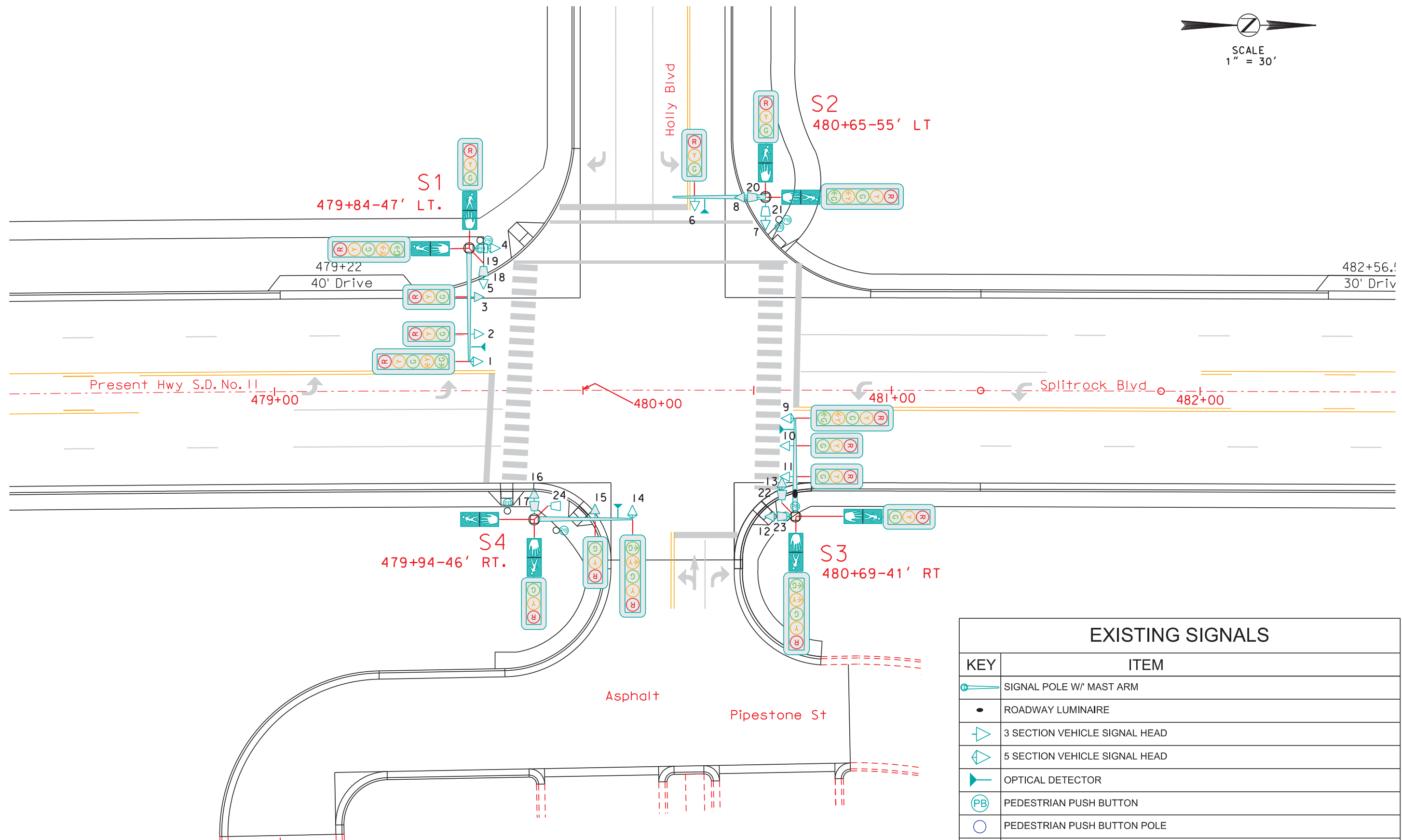
SD HWY 11 (SPLITROCK BLVD) & HOLLY BLVD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	011-271	4	12

Plotting Date: mmm-ddd-yyy



SCALE
1" = 30'



EXISTING SIGNALS	
KEY	ITEM
	SIGNAL POLE W/ MAST ARM
	ROADWAY LUMINAIRE
	3 SECTION VEHICLE SIGNAL HEAD
	5 SECTION VEHICLE SIGNAL HEAD
	OPTICAL DETECTOR
	PEDESTRIAN PUSH BUTTON
	PEDESTRIAN PUSH BUTTON POLE
	PEDESTRIAN SIGNAL HEAD

PLOT SCALE - \$\$SCALE\$\$

PLOT NAME - \$\$PLOTNAME\$\$

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CONDUIT LAYOUT

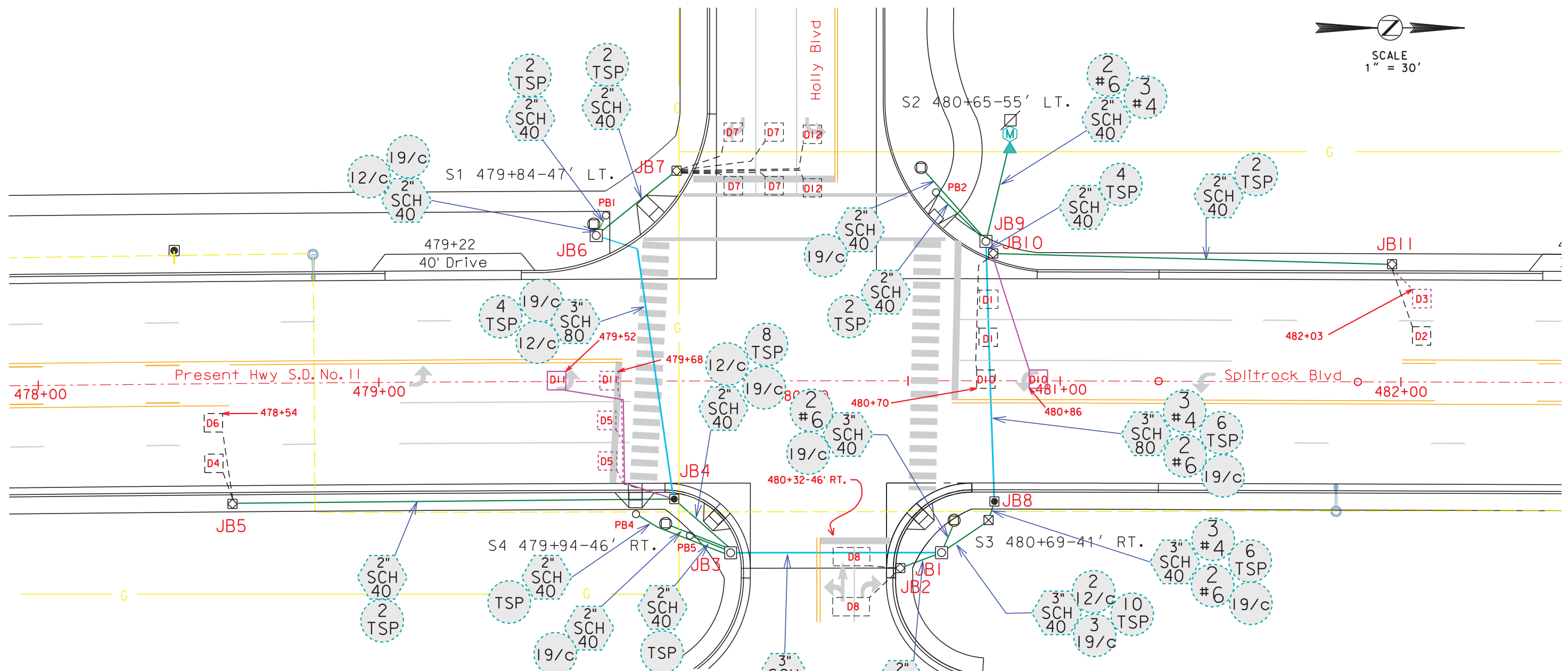
SD HWY 11 (SPLITROCK BLVD) & HOLLY BLVD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	011-271	5	12

Plotting Date: mmm-ddd-yyy



SCALE
1" = 30'



EXISTING ITEMS

KEY	ITEM	KEY	ITEM
⊙	SIGNAL POLE	2" SCH 40	2" RIGID CONDUIT, SCHEDULE 40
⊘	UTILITY POLE	3" SCH 40	3" RIGID CONDUIT, SCHEDULE 40
○	PEDESTRIAN PUSH BUTTON POLE	3" SCH 80	3" RIGID CONDUIT, SCHEDULE 80
⊠	12" JUNCTION BOX	#4	1/C #4 AWG COPPER WIRE
⊡	18" JUNCTION BOX	#6	1/C #6 AWG COPPER WIRE
⊞	24" JUNCTION BOX	12/c	12/C #14 AWG IMSA COPPER, K1
▲	ELECTRICAL SERVICE CABINET	19/c	19/C #14 AWG IMSA COPPER, K1
Ⓜ	METER SOCKET	TSP	#16 AWG COPPER TWISTED SHIELDED PAIR
⊞	DETECTOR LOOP		

ESTIMATE OF QUANTITIES

KEY	ITEM	EST QUANT	UNIT
⊞	REPLACEMENT DETECTOR LOOP (D3, D5, & D11)	4	EACH
⊞	NEW DETECTOR LOOP (D10 & D11)	2	EACH

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PLOT SCALE - 1:40

PLOTTED FROM - TRW11126

SIGNAL TIMING

SD 11/SPLIT ROCK BLVD & HOLLY BLVD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	011-271	7	12

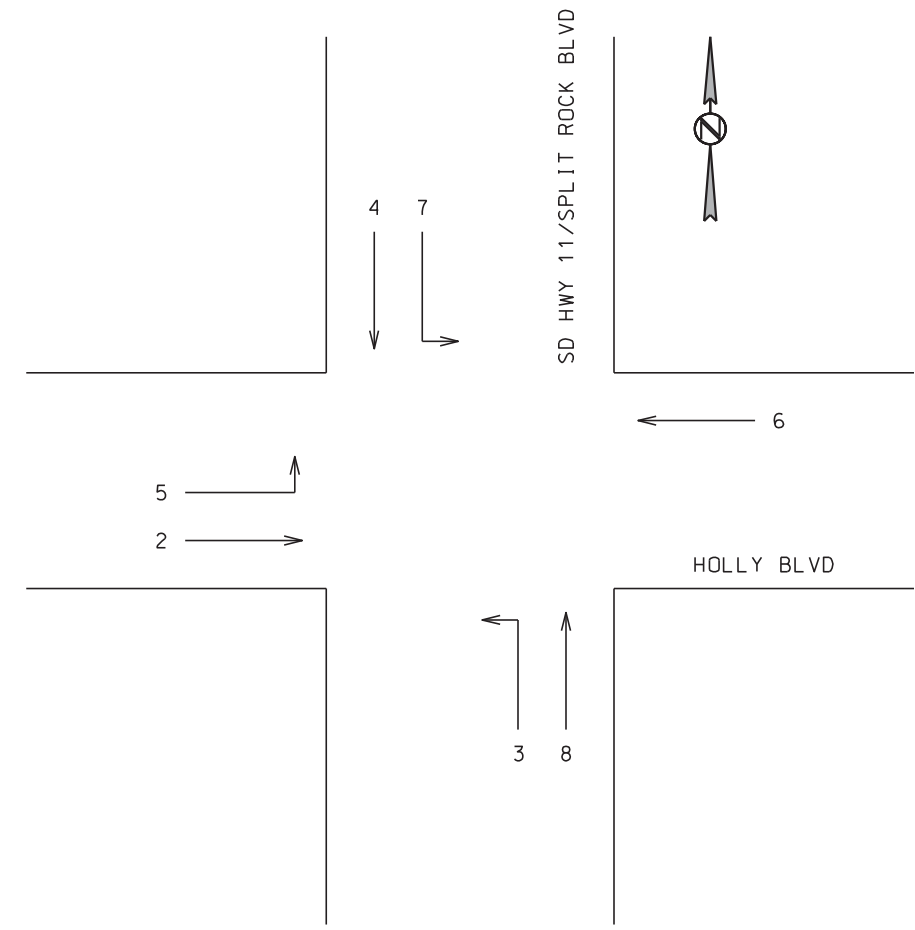
PHASING AND SEQUENCING																									
INTERVAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	FLASH DISPLAY
SIGNAL HEAD	<G	<Y	<G	<Y			G	Y		G	G	Y													
1																									
2,3			G	G			G	Y		G	G	Y													
4			G	G			G	Y		G	G	Y		G>	Y>	G>	Y>								
8,9	<G	<Y			<G	<Y	G	Y		G	G	Y													
10,11,12					G	G	G	Y		G	G	Y													
13,14														<G	<Y	<G	<Y								
15,16																		G	Y		G	G	Y		
5,6,7																		G	Y		G	G	Y		
19,20,23,24	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	F	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	NO DISPLAY
17,18,21,22	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	DW	W	F	DW	DW	NO DISPLAY
MOVEMENTS	3&7	4&7	3&8	4&8	4&8	W/PED	5	2&5	2&6	2&6	W/PED														
PHASES	↔ or ↕		↔ or ↕		↕ or ↔		↔ or ↕		↔ or ↕		↔ or ↕		↔ or ↕		↔ or ↕		↔ or ↕		↔ or ↕		↔ or ↕				

CONTROLLER TIMINGS (FREE OPERATION)								
MOVEMENT	1	2	3	4	5	6	7	8
PHASE	NA	→	↗	↓	↘	←	↖	↑
MIN GREEN	1	10	7	15	7	10	7	15
ADDED INITIAL								
MAX INITIAL								
PASSAGE TIME	3	3	3	5	3	3	3	5
MAXIMUM 1	10	25	10	31	10	25	10	31
MAXIMUM 2	3	18	9	30	9	18	9	30
TIME BEFORE								
TIME TO REDUCE								
MINIMUM GAP								
YELLOW CHANGE	3	3.5	4	4	3	3.5	4	4
RED CLEARANCE		1.5		1.5		1.5		1.5
WALK		4		4		4		4
PED CLEARANCE		18		16		18		16

DETECTOR SETTINGS								
DETECTOR LABEL	AMPLIFIED CHANNEL DETECTOR	SAWED-IN DETECTOR LOOP	DETECTOR OPERATION			LOCKING CALL	MOVEMENT CALLED	MOVEMENT EXTENDED
			CALLS & EXTENDS	CALLS ONLY	EXTENDS ONLY			
D3	1	REPLACE			X	X	4	4
D4	2	EXISTING			X	X	8	8
D1	3	EXISTING	X				4	4
D2	4	EXISTING			X	X	4	4
D7	5	EXISTING	X				2	2
D8	6	EXISTING	X				6	6
D5	7	REPLACE	X				8	8
D6	8	EXISTING			X	X	8	8
D11	9	REPL/NEW	X				3	3
D12	10	EXISTING	X				5	5
D9	11	NA					-	-
D10	12	EXIST/NEW	X				7	7

WEEKLY PROGRAM							
	SUN	MON	TUE	WED	THU	FRI	SAT
TIMING PLAN	1	1	1	1	1	1	1

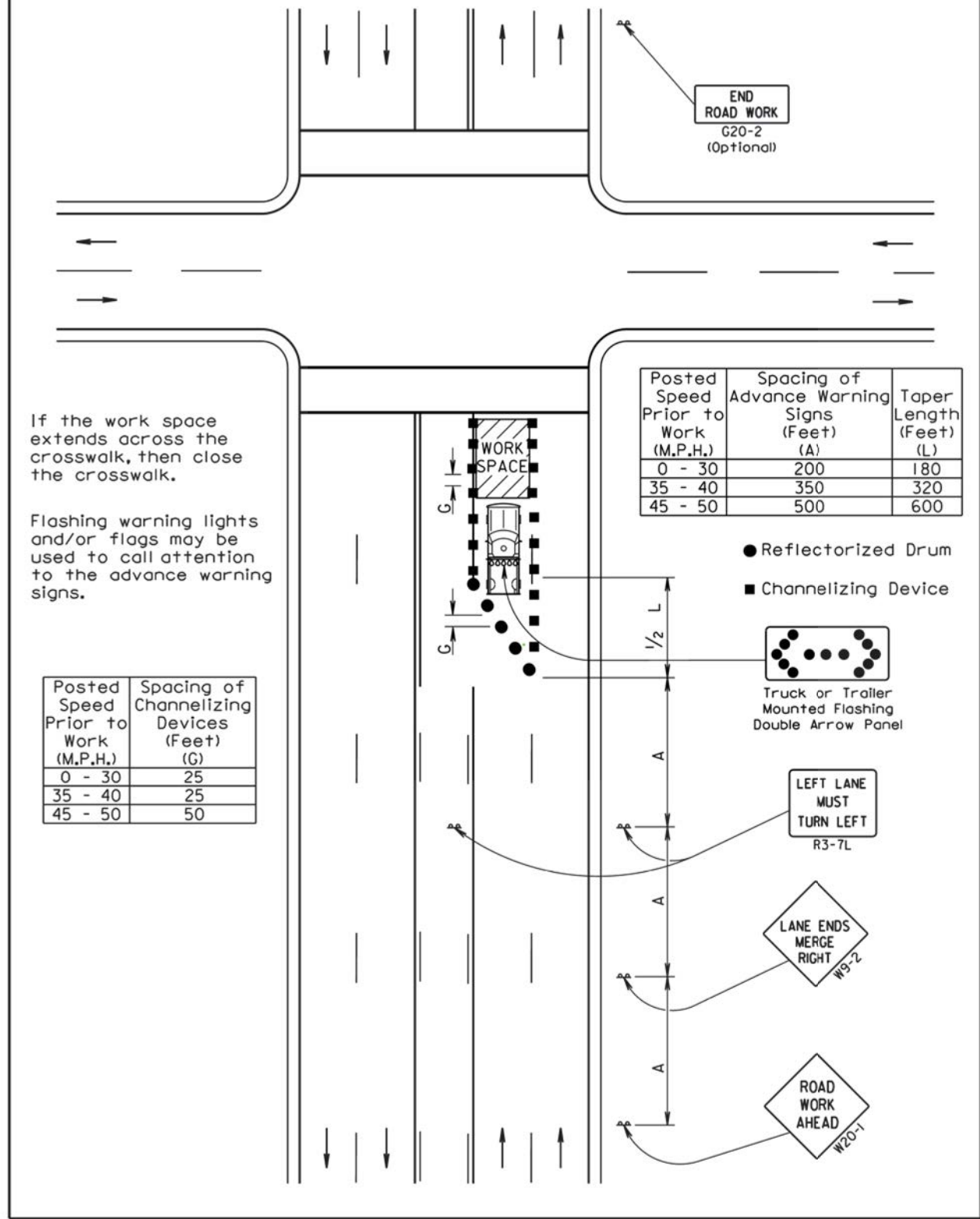
TIMING PLAN 1	
TIME OF DAY (TOD)	PATTERN (C/S/O)
6:00 - 23:00	FREE
23:00 - 6:00	FLASH



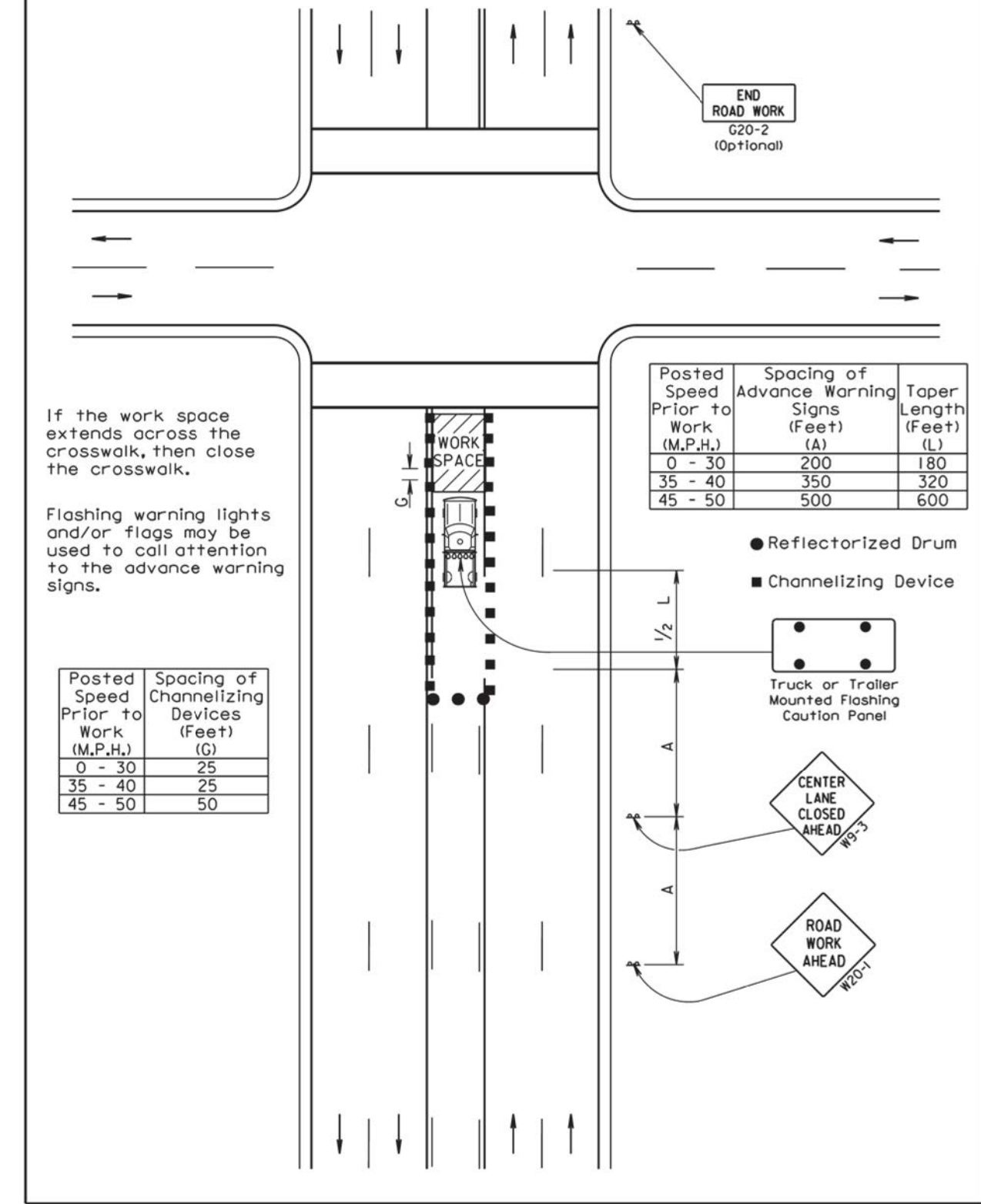
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GUIDES FOR TRAFFIC CONTROL DEVICES DAY-TIME LANE CLOSURE NEAR SIDE OF INTERSECTION



GUIDES FOR TRAFFIC CONTROL DEVICES DAY-TIME CENTER TURN LANE CLOSURE NEAR SIDE OF INTERSECTION



Plot Scale - 1:200

Plotted From - trm11126

Plot Scale - 1:200

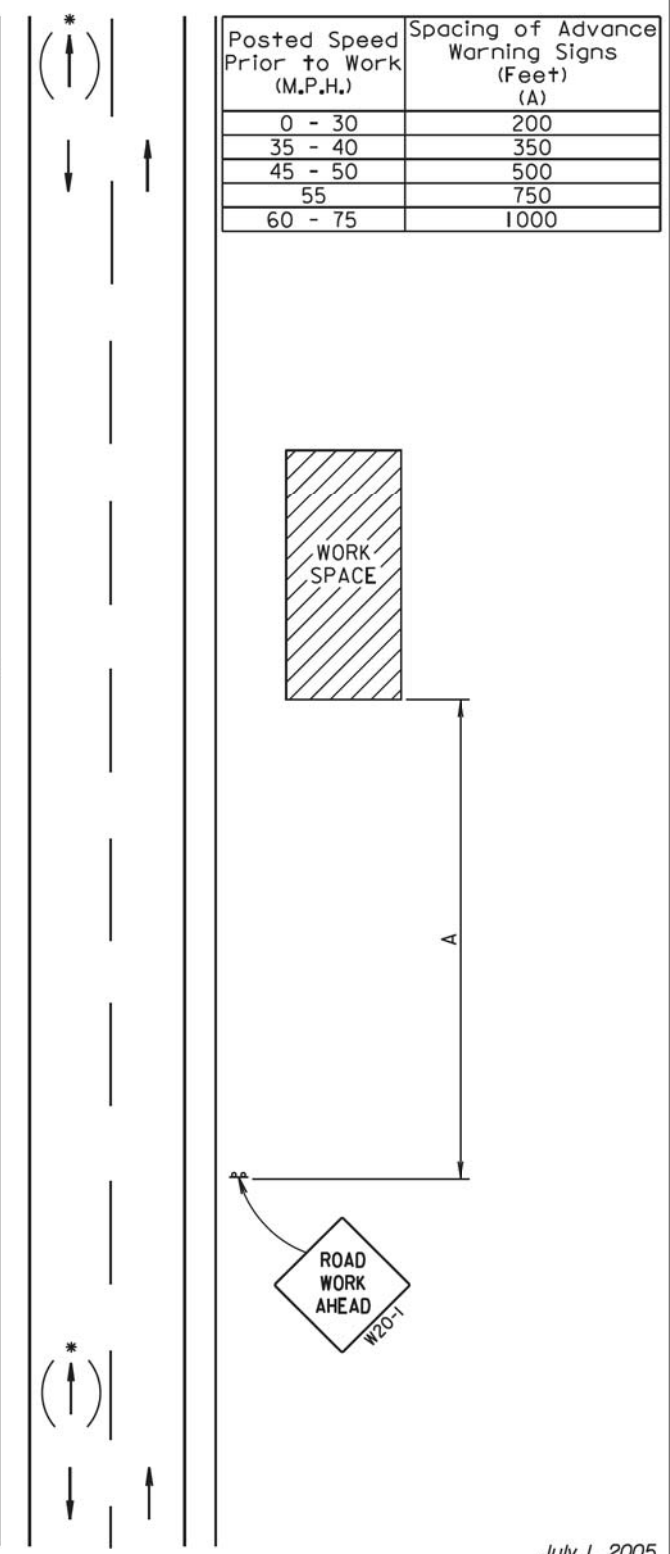
The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

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

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

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

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



July 1, 2005

S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES WORK BEYOND THE SHOULDER	PLATE NUMBER 634.01
		Sheet 1 of 1

Published Date: 4th Qtr. 2012

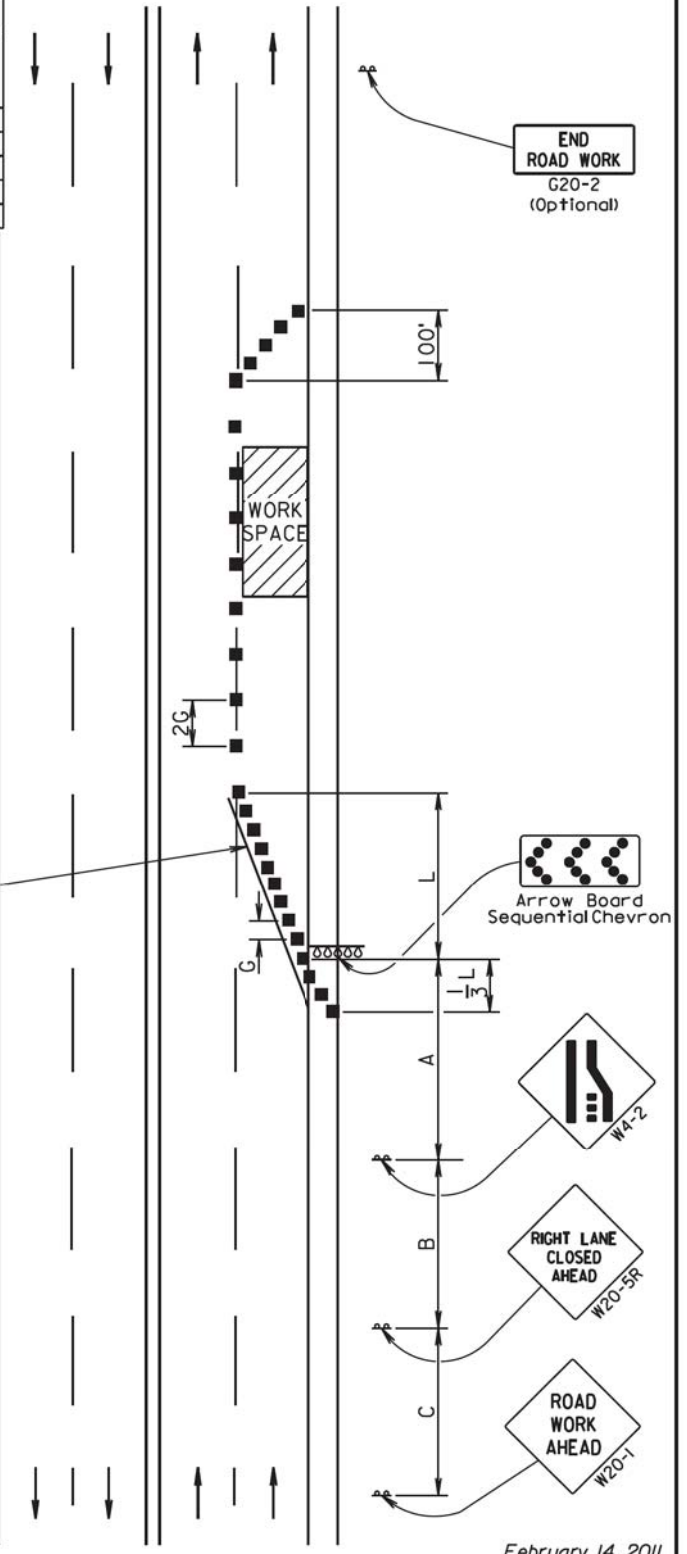
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)			Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
	(A)	(B)	(C)		
0 - 30	200			180	25
35 - 40	350			320	25
45 - 50	500			600	50
55	750			660	50
60 - 65	1000			780	50

■ Channelizing Device

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

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

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



February 14, 2011

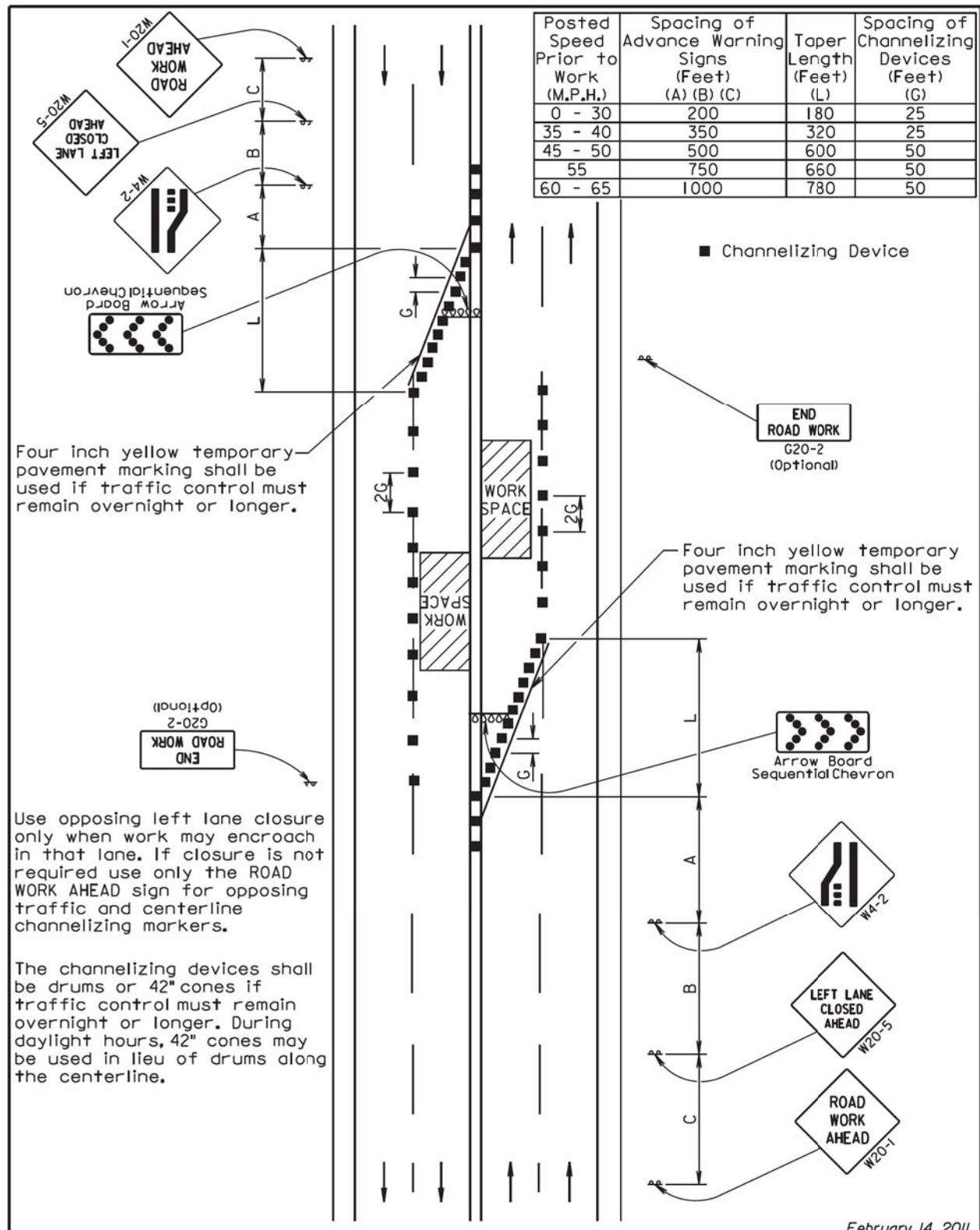
S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES 4-LANE UNDIVIDED, RIGHT LANE CLOSED	PLATE NUMBER 634.47
		Sheet 1 of 1

Published Date: 4th Qtr. 2012

- Plotted From - trm11126

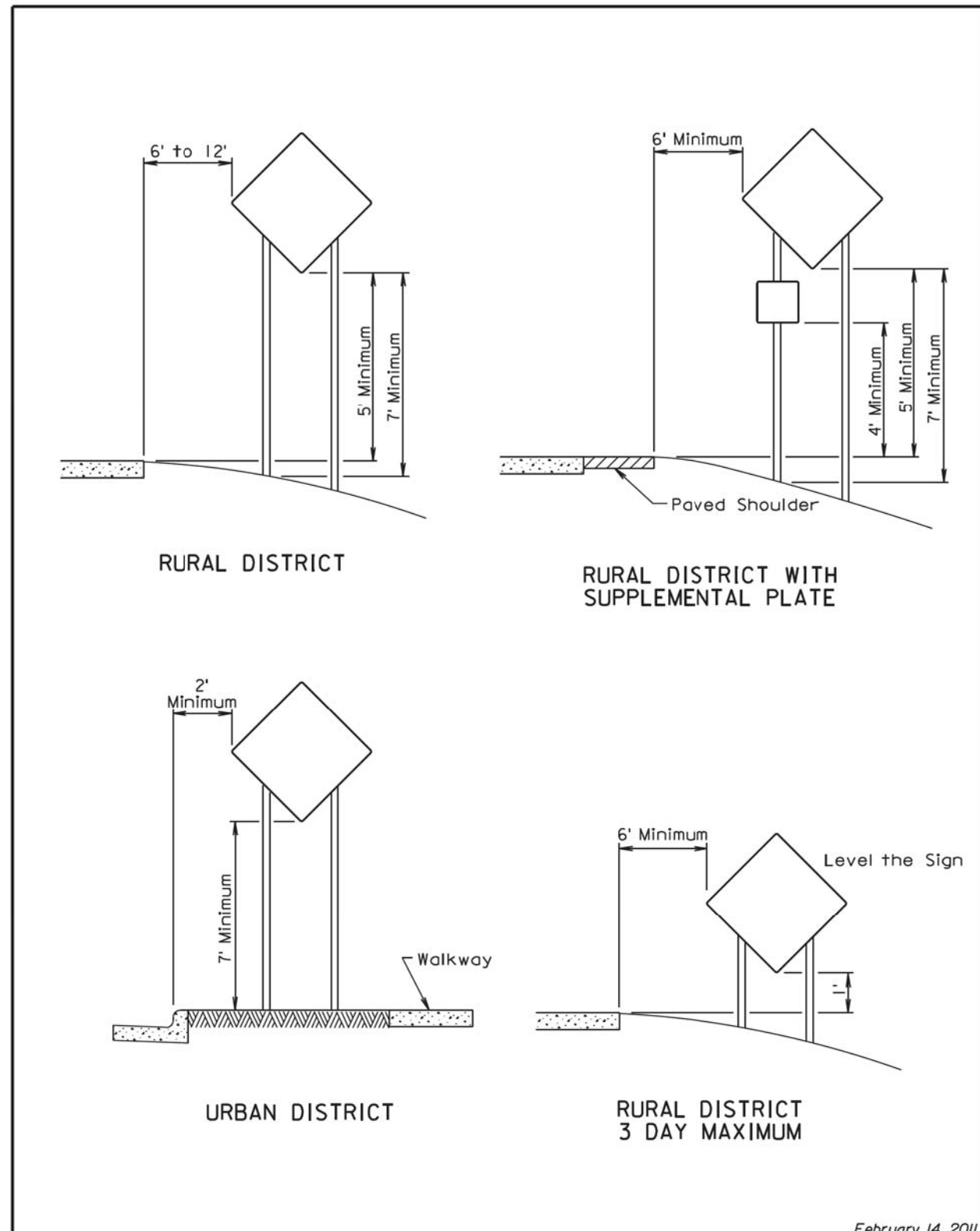
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Plot Scale - 1:200



February 14, 2011

S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES 4-LANE UNDIVIDED, LEFT LANE CLOSED	PLATE NUMBER 634.48
	Published Date: 4th Qtr. 2012	Sheet 1 of 1



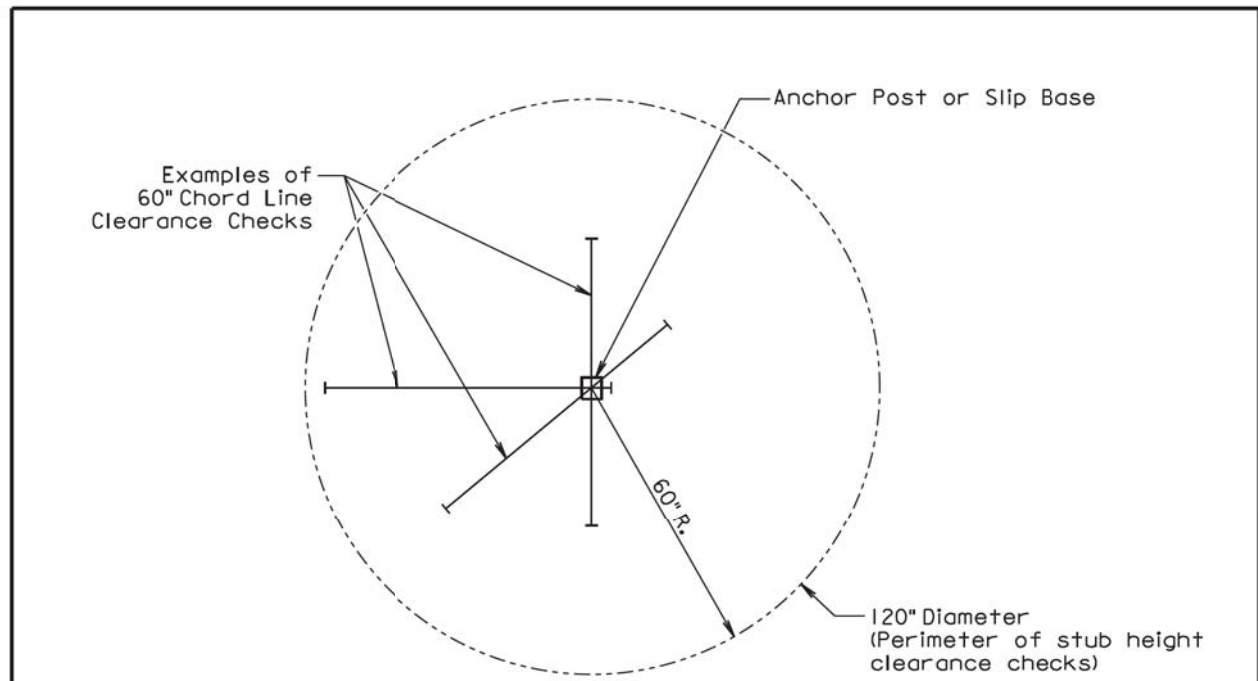
February 14, 2011

S D D O T	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
	Published Date: 4th Qtr. 2012	Sheet 1 of 1

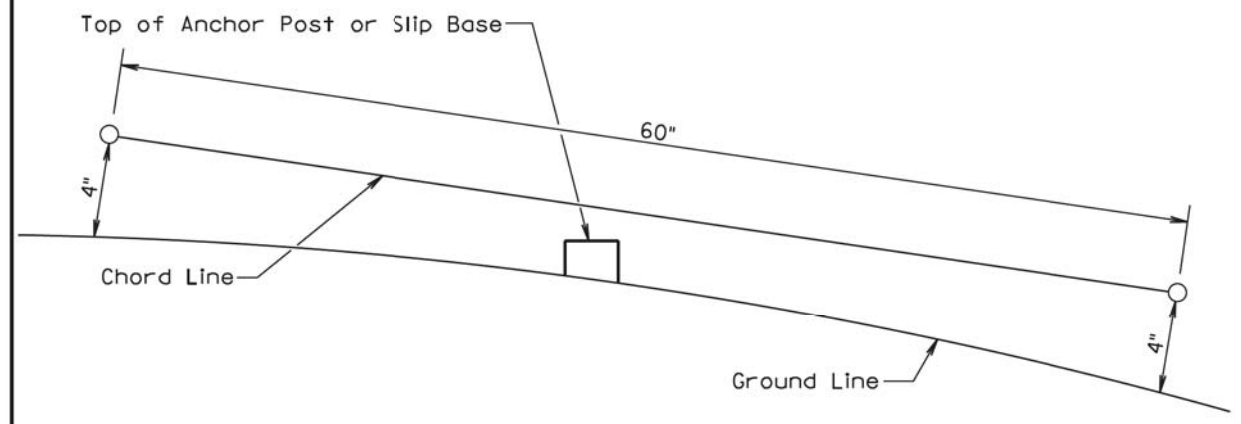
- Plotted From - trm11126

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Plot Scale - 1:200



PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

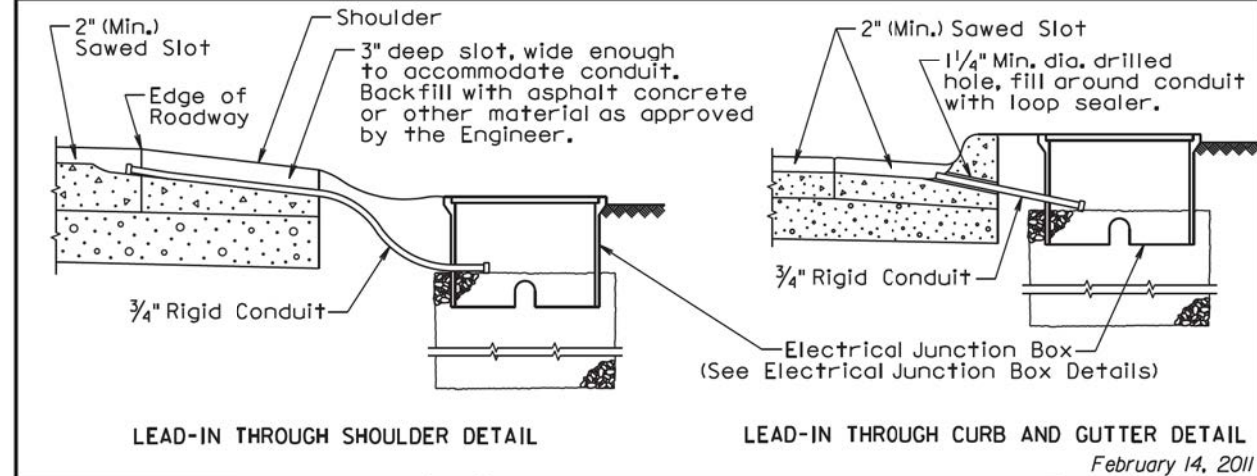
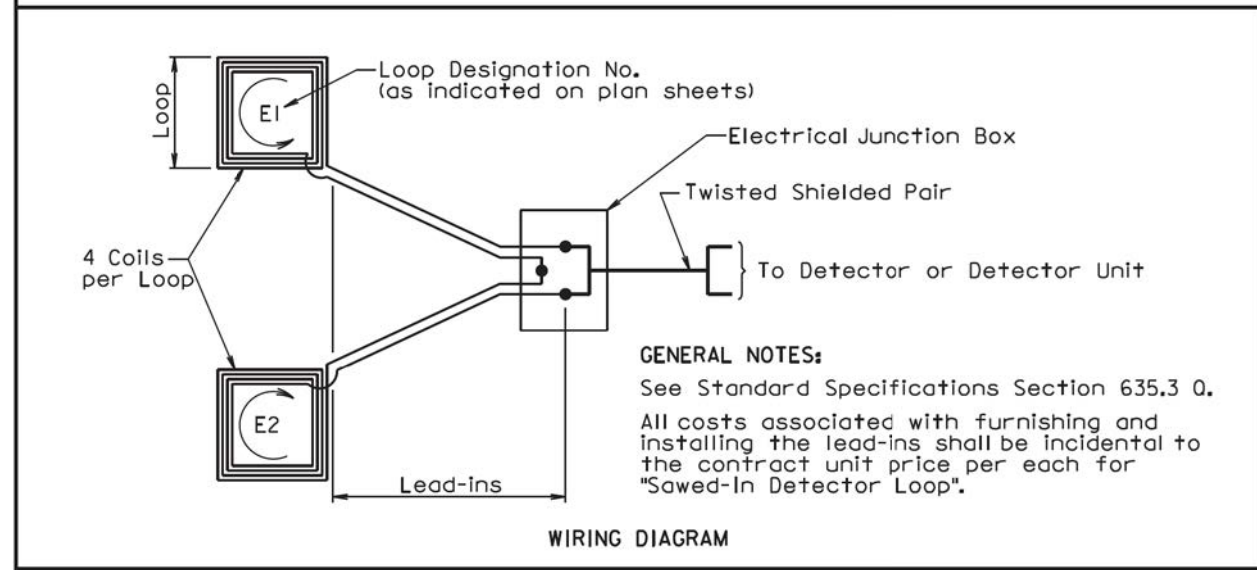
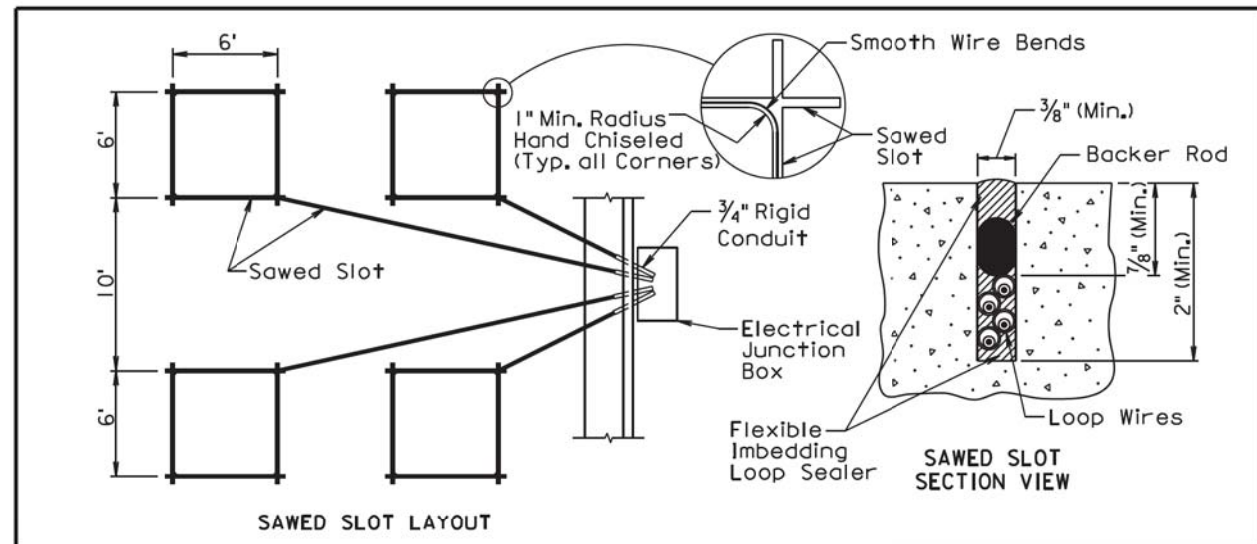
The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

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

S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
	Published Date: 4th Qtr. 2012	Sheet 1 of 1

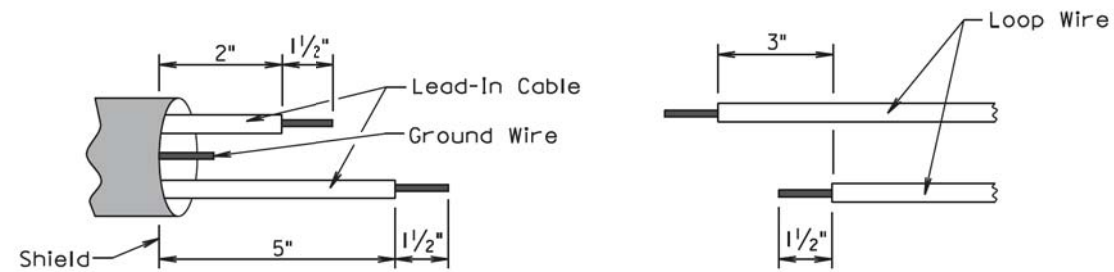


S D D O T	SAWED-IN DETECTOR LOOP	PLATE NUMBER 635.71
	Published Date: 4th Qtr. 2012	Sheet 1 of 1

- Plotted From -

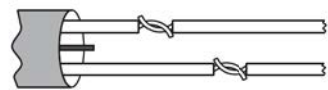
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Step 1. Strip loop wires and lead-in cable.

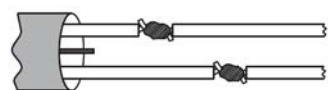


Step 2. Connect and solder.

Twist bare conductors together

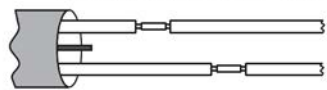


and solder with 60/40 (tin/lead) resin solder

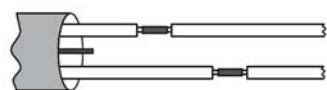


OR

Crimp bare conductors together with an uninsulated butt connector

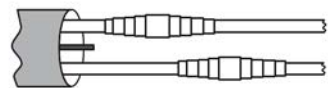


and solder with 60/40 (tin/lead) resin solder



Step 3. Insulate each solder joint separately.

Electrical Tape

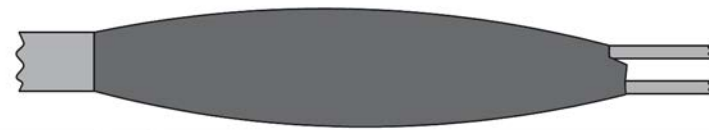


OR

Shrink Tube



Step 4. Environmentally seal total splice against weather, moisture and abrasion. Methods for environmentally sealing the splice include heat-shrinkable tubing, special sealing kits, special forms to be filled by sealant, and tape and coating.



June 20, 2000

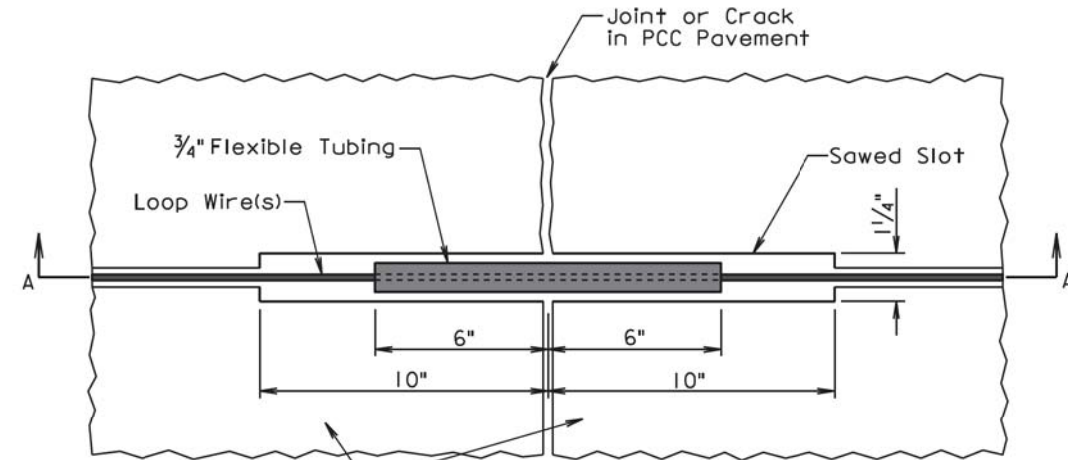
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DETECTOR LOOP WIRE SPLICING

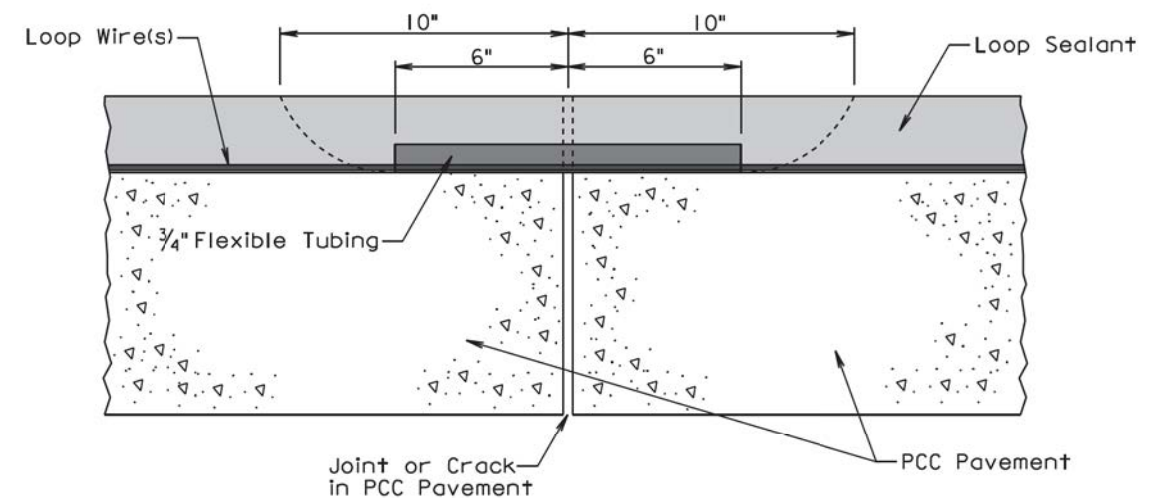
PLATE NUMBER
635.77

Sheet 1 of 1

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TOP VIEW
(Loop Sealant and Backer Rod not shown)



SECTION A-A
(Backer Rod not shown)

GENERAL NOTE:

All costs for constructing the sawed-in detector loop protection including labor, equipment, and materials shall be incidental to the contract unit price per each for "Sawed-In Detector Loop".

March 28, 2001

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SAWED-IN DETECTOR LOOP PROTECTION
AT JOINT OR CRACK IN PCC PAVEMENT

PLATE NUMBER
635.78

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