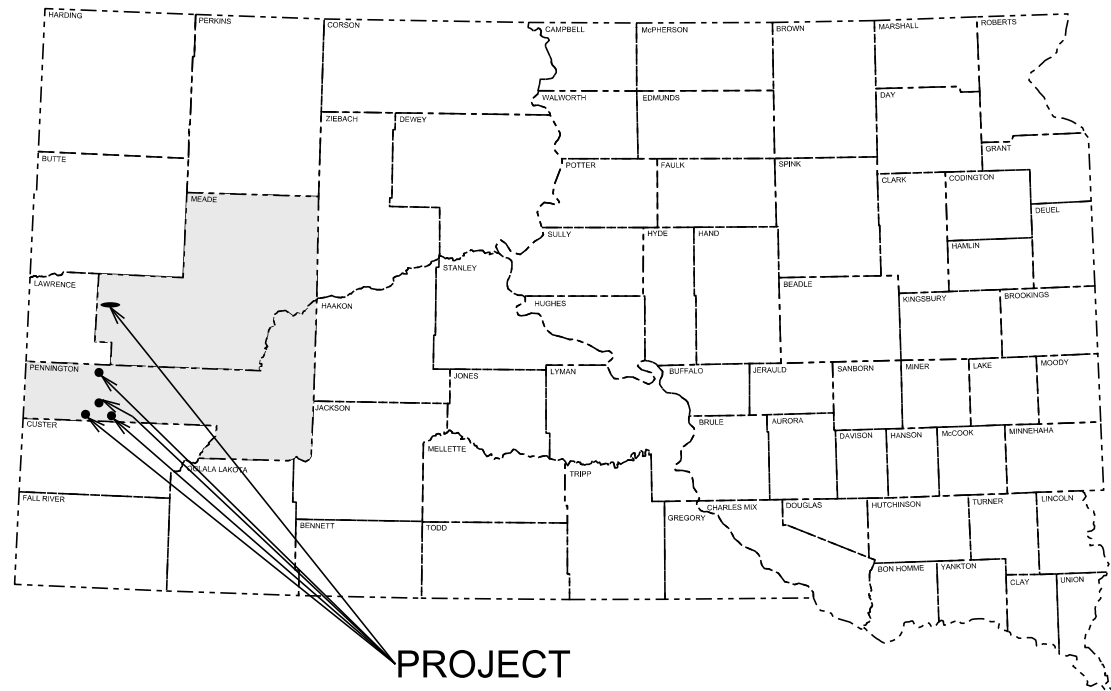


Plot Scale - 1:200

trc12895

Plotted From -



STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT 000P-451, 000N-451,
000P-491, 000N-491
US HIGHWAY 16, 16A, 385,
SD HIGHWAY 34, 244
MEADE & PENNINGTON
COUNTIES

SOLAR POWERED FLASHING LIGHT AND
WARNING SIGN INSTALLATION
PCN i49f, i49g, i49h, i49j

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000P-451,000N-451, 000P-491,000N-491	1	7

Plotting Date: 03/30/2016

INDEX OF SHEETS

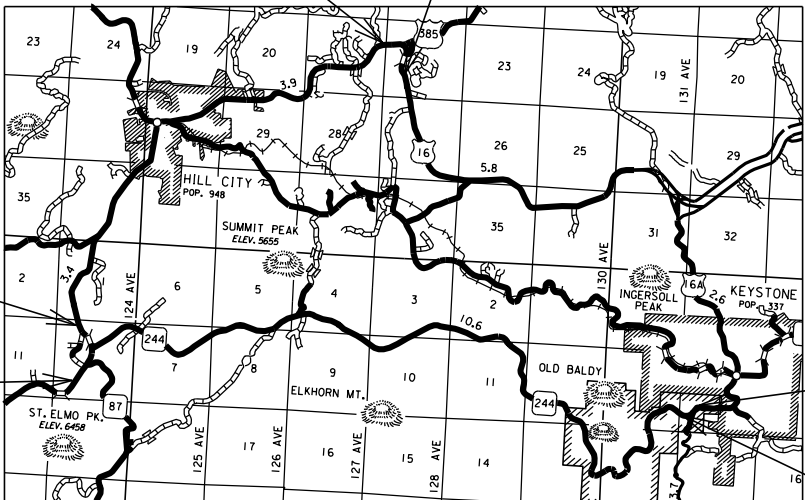
- Sheet 1: Title Sheet
Sheets 2-5: Estimate of Quantities and General Notes
Sheet 6: Details
Sheet 7: Standard Plates

US 16 (i49h)
MRM 44.00 + 0.315

US 16 (i49h)
MRM 45.16 + 0.002

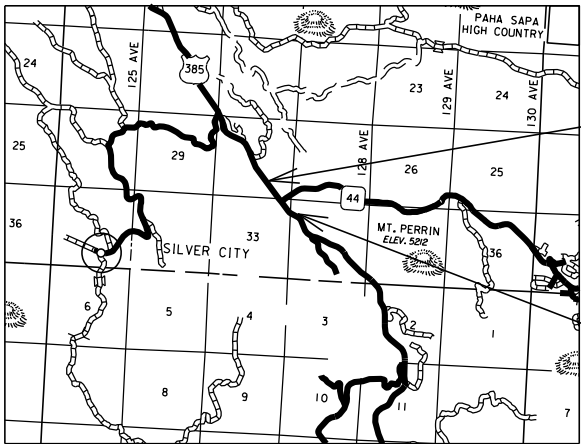
US 16 (i49h)
MRM 37.67 + 0.239

US 16 (i49h)
MRM 37.16 + 0.010



US 16A (i49j)
MRM 55.75 + 0.175

SD 244 (i49j)
MRM 34.00 + 0.281



US 385 (i49h)
MRM 98.13 + 0.316

US 385 (i49h)
MRM 98.00 + 0.001

DESIGN DESIGNATION (SD34)

ADT (2015)	2503
ADT (2035)	3351
DHV	379
D	52
T DHV	5.2
T ADT	11.4
V	45 & 65

DESIGN DESIGNATION (SD244)

ADT (2015)	2350
ADT (2035)	3410
DHV	539
D	51
T DHV	5.2
T ADT	1.6
V	35

DESIGN DESIGNATION (US16A)

ADT (2015)	2920
ADT (2035)	4237
DHV	669
D	51
T DHV	1.2
T ADT	2.6
V	35

DESIGN DESIGNATION (US16)
AT SD244 INTERSECTION

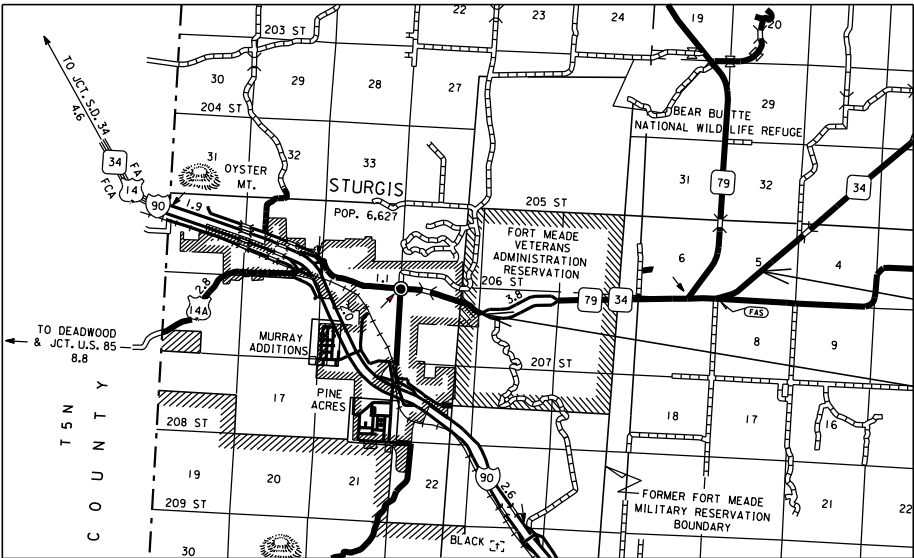
ADT (2015)	5268
ADT (2035)	7101
DHV	1122
D	51
T DHV	3.6
T ADT	7.9
V	45

DESIGN DESIGNATION (US16)
AT US385 INTERSECTION

ADT (2015)	5497
ADT (2035)	7976
DHV	1260
D	51
T DHV	2.8
T ADT	6.2
V	45

DESIGN DESIGNATION (US385)

ADT (2015)	1772
ADT (2035)	2571
DHV	406
D	51
T DHV	2.3
T ADT	5.1
V	55



SD 34 (i49g)
MRM 39.00 + 0.600

SD 34 (i49f)
MRM 36.00 + 0.410

ESTIMATE OF QUANTITIES

i49f 000P-451:

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
632E1340	2.5"x2.5" Perforated Tube Post	40.0	Ft
632E3205	Flat Aluminum Sign, Nonremovable Copy Super/Very High Intensity	16.0	SqFt
634E0110	Traffic Control Signs	16.0	SqFt
635E5960	Solar Powered Flashing Beacon	1	Each
635E6200	Miscellaneous, Electrical	Lump Sum	LS

i49g 000N-451:

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
632E1340	2.5"x2.5" Perforated Tube Post	40.0	Ft
632E3205	Flat Aluminum Sign, Nonremovable Copy Super/Very High Intensity	16.0	SqFt
634E0110	Traffic Control Signs	16.0	SqFt
635E5960	Solar Powered Flashing Beacon	1	Each
635E6200	Miscellaneous, Electrical	Lump Sum	LS

i49h 000P-491:

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E5020	Salvage Traffic Sign	2	Each
632E1340	2.5"x2.5" Perforated Tube Post	240.0	Ft
632E3205	Flat Aluminum Sign, Nonremovable Copy Super/Very High Intensity	96.0	SqFt
634E0110	Traffic Control Signs	16.0	SqFt
635E5960	Solar Powered Flashing Beacon	6	Each
635E6200	Miscellaneous, Electrical	Lump Sum	LS

i49j 000N-491:

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
632E1340	2.5"x2.5" Perforated Tube Post	80.0	Ft
632E3205	Flat Aluminum Sign, Nonremovable Copy Super/Very High Intensity	32.0	SqFt
634E0110	Traffic Control Signs	16.0	SqFt
635E5960	Solar Powered Flashing Beacon	2	Each
635E6200	Miscellaneous, Electrical	Lump Sum	LS

WORK DESCRIPTION

Work on this project consists of the Contractor furnishing and installing 10 Signal Ahead Warning Signs with Solar Powered Flashers.

PERMANENT SIGNING

The Contractor shall furnish all signs, posts, stiffeners, bases, hardware, and labor for installation of permanent signs in size, type, and quantity as shown in these plans and/or as required by the Engineer.

The Contractor shall provide all labor and equipment necessary to install permanent signing, remove existing signs, and reset existing signs as detailed in these plans and/or as required by the Engineer. Payment for furnishing and installing permanent signs will be paid for at the contract unit price per square foot for each type of sign based on sheeting requirements. All signs shall have ASTM D4956 Type XI (Super /Very High Intensity) sheeting as noted on the table for Permanent Signing. Payment for new signposts, hardware, bases, and labor will be made at the contract unit price per foot for the associated size Perforated Tube Post or Steel Post. Breakaway post details regarding posts, hardware, and bases shall be followed as per the manufacturer’s recommendations. The sign post contract items shall include post bases and all hardware. The lengths of the posts in the sign tables are approximate lengths only. The post lengths shall be verified by the Contractor. The Contractor is urged to cut posts to length on job site after site by site verification of post length.

The Contractor shall use Telespar brand (or equivalent) posts and bases on all new standard highway signs with perforated tube posts as approved by the Engineer. All post materials shall conform to Section 982 of the Specifications, and be in accordance with ASTM specifications. Signs designated as requiring a shear slip base shall have a 4 foot long base assembly with a shear breakaway base connecting the base to the signpost. The height of the post shall not exceed the minimum height needed by more than 0.5 feet. Any portion that extends above the sign shall be cut off. No separate payment will be made for cutting the post or for that length cut off. All posts and bases shall be accompanied by Certificates of Compliance and shall meet all safety standards as set forth in the current edition of the Manual on Uniform Traffic Control Devices (MUTCD).

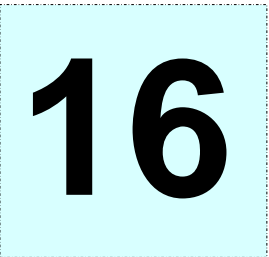
The Contractor shall stake the signs and the Engineer will verify the location prior to installation. The lateral distance from the roadway and the height of the sign shall be established by the Contractor according to the Permanent Signing Typicals, as well as the Standard Plates in the plans and the MUTCD.

Installation of a new sign assembly shall be completed immediately upon removal of the existing sign. The new sign to replace the existing sign shall be installed prior to nightfall.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	000P-451,000N-451,000P-491, 000N-491	2	7

DATE DECAL

Each decal is approximately 2” X 2” with black numerals on a white background. The date decal displays the last two digits of the year the sign was manufactured (as illustrated).



Cost for installing the date decal on new signs shall be incidental to the contract unit price for the various signing bid items.

PERFORATED TUBE POST

Payment for 2.5” x 2.5” Perforated Tube Post shall include all costs for labor, equipment, and materials necessary to complete the following work:

1. Furnish all posts, stiffeners, breakaway bases, soil stabilizers, and hardware.
2. Assembly and installation of breakaway base sign supports as per details shown in these plans.
3. Assembly of sign(s) to sign post as per erection details for Highway Signs as shown in these plans.
4. Installation of signpost and sign(s).

When telescoping 2.5” x 2.5” 10 gauge posts, the inner post shall be 2-3/16” x 2-3/16” 10 gauge posts and a minimum length of 4’ measured from the base with a maximum length of that to where the bottom of the sign is. Costs for telescoped reinforced square steel perforated tube posts and anchor stub posts shall be incidental to the respective contract unit price per foot for the post size indicated, and are not included in the Estimate of Quantities.

REMOVE, SALVAGE, RELOCATE & RESET TRAFFIC SIGN

The Contractor shall remove signs, posts, and bases for remove and stockpile as shown in the table for Permanent Signing. All existing signs, posts, and hardware removed as per these plans shall remain property of the State of South Dakota and shall be transported to the SDDOT Custer maintenance yard by the Contractor. The Contractor shall notify the Engineer two days prior to time of delivery to the maintenance yard so correct placement for storage and inventory of materials can be made upon receipt.

All signs, posts, and bases that call for removal shall be included in the contract unit price per each for “Salvage Traffic Sign”. These payments shall include all cost for labor and equipment necessary to remove, dismantle, backfill holes, and deliver signs to the SDDOT Custer maintenance yard.

HARDWARE

Aluminum U-Channel stiffeners shall be used on all standard highway signs greater than or equal to 36” in width and shall conform to Alloy 6063-T6 or 6061-T6. The U-Channel shall be 2 inches in width and free of holes. The U-Channel stiffeners shall also be used to connect various signs and perforated tube posts together so that an entire sign can be erected as a single installation. Stiffeners may be fastened to signs by use of 1/4” drive rivets with a minimum of one on each end and one centered between each post. Installation of the stiffeners shall be incidental to other contract items.

A 3/8” diameter straight bolt (Grade 8) shall be used in all breakaway shear bases for the 2.5” perforated tube posts. All other perforated tube signpost base material shall be fastened with 5/16” diameter corner bolts (Grade 2).

All perforated tube signposts shall have a soil stabilizer attached to the base.

FURNISH & INSTALL FLAT ALUMINUM SIGNS / NON-REMOVABLE COPY HIGH INTENSITY & SUPER/VERY HIGH INTENSITY

Measurement of sign areas will include payment for the entire sign blank before trimming for rounded corners. The square unit measurement for each sign shall be as shown in the table for Permanent Signing. The payment shall include all labor (including installing date decals), equipment, and materials to complete the work, and shall be paid for at the contract unit price per square foot for Flat Aluminum Sign, Non-Removable Copy Super/Very High Intensity.

SHEETING REQUIREMENTS

All signs in the table for permanent signing that call for “Type XI” shall have micro-cube corner prismatic reflectorized background, Type XI as per AASHTO designation M 268 (ASTM D4956).

SIGN LEGEND, BORDER, BACKGROUND, AND MOUNTING

All sign material shall comply with Section 982 of the Specifications.

All W-series warning signs and plaques shall be fluorescent yellow.

All other sign colors shall be as stipulated in the MUTCD.

Lateral placement of signs shall be determined by the Engineer.

SOLAR POWERED FLASHER

The contractor shall provide all labor and equipment necessary to install the Solar Powered Flashers to the new sign assemblies. Payment for furnishing and installing the Solar Powered Flashers will be paid for at the contract unit price per each and all other costs shall be incidental.

The solar powered flasher shall be a JSF Technologies’ Solar Powered 24-Hour Flashing Beacon or equivalent.

The system shall be self-contained with all components mounted within the signal head or solar panel housing. No additional cabinet is required. The flashing beacon shall be LED and 12” yellow with a tunnel visor and include mounting hardware to mount to a 2” or 2.5” square tubular post.

The Solar Powered Flasher shall be mounted to the top of each sign assembly shown in the details in these plans. Two 3/8” diameter straight bolts (Grade 8) shall be used to attach each flasher to the existing sign post.

The single section shall be constructed of polycarbonate material and must be adjustable independently from the bracket for lens alignment.

The system shall include a Flash Pattern Selector with the ability to operate at least (2) flash patterns:

- 1. High Visibility Strobe – one second cycle of four 1/16th second flashes, followed by a ½ second pause.
- 2. MUTCD – a ½ second on, ½ second off cycle.

The solar panel housing section shall house Hawker 25 Ah, 2V, BC Cell, sealed lead acid or equivalent batteries. The batteries shall be field replaceable, and have a 3-5 year service life.

MISCELLANEOUS ELECTRICAL

The Contractor shall provide all labor and equipment necessary to install a single pole switch, wire, conduit, and weather proof switch box for each Solar Powered Flasher.

All costs for labor and material for furnishing and installing the switches, wire, conduit, and switch boxes will be paid for at the contract lump sum price for Miscellaneous, Electrical.

The switch shall be mounted to the sign post at a height accessible from ground level and have the capability to be locked in the ON or OFF positions.

The Contractor shall be responsible for the restoration of any disturbed areas to the satisfaction of the Engineer.

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TRAFFIC CONTROL

Indiscriminant 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.

Adequate traffic control devices have been included in the Itemized List For Traffic Control for one work area. If the Contractor chooses to work at multiple locations at the same time, no additional payment will be made for the additional traffic control devices required.

ITEMIZED LIST FOR TRAFFIC CONTROL

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W20-1	ROAD WORK AHEAD	1	48" x 48"	16	16
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			
		16			

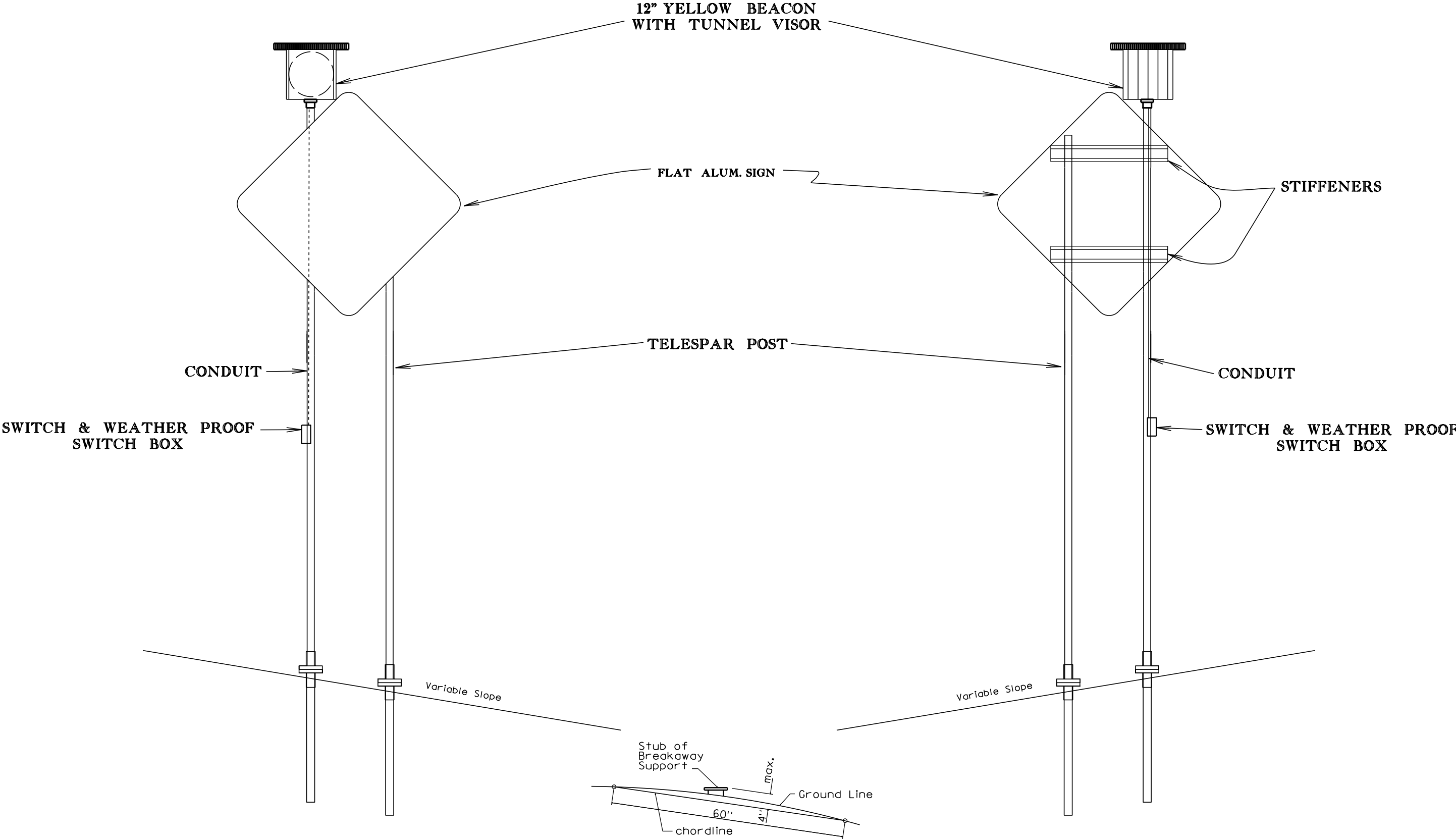
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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PERMANENT SIGNING - Hwy #: US16, US16A, US385, SD34, SD244																
HIGHWAY	MRM (Approx.)	SIGN								POST					SIGN DESCRIPTION	WORK TO BE DONE
		Number	Width (in)	Height (in)	Facing Traffic	New Sign	Remove Existing	Square Footage	Sheeting Type	New Post	Length (ft)	Size (in)	# of Posts	Shear Slip Base		
SD34	36.00+0.410	W3-3	48	48	EASTBOUND	FLAT ALUM	N/A	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
SD34	39.00+0.600	W3-3	48	48	WESTBOUND	FLAT ALUM	N/A	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
SD244	34.00+0.281	W3-3	48	48	EASTBOUND	FLAT ALUM	N/A	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
US16A	55.75+0.175	W3-3	48	48	WESTBOUND	FLAT ALUM	N/A	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
US16	37.16+0.010	W3-3	48	48	EASTBOUND	FLAT ALUM	YES	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	REMOVE EXISTING SIGN AND POST AND INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
US16	37.67+0.239	W3-3	48	48	WESTBOUND	FLAT ALUM	YES	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	REMOVE EXISTING SIGN AND POST AND INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
US16	44.00+0.315	W3-3	48	48	EASTBOUND	FLAT ALUM	N/A	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
US16	45.16 +.002	W3-3	48	48	WESTBOUND	FLAT ALUM	N/A	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
US385	98.00+0.001	W3-3	48	48	NORTHBOUND	FLAT ALUM	N/A	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST
US385	98.13+0.316	W3-3	48	48	SOUTHBOUND	FLAT ALUM	N/A	16.0	XI	YES	20	2.5	2	YES	SIGNAL AHEAD SYMBOL (HINGED)	INSTALL NEW SIGN AND SOLAR POWERED FLASHER ON NEW 10 GAUGE TELESKOPE POST

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FLASHING BEACON DETAILS



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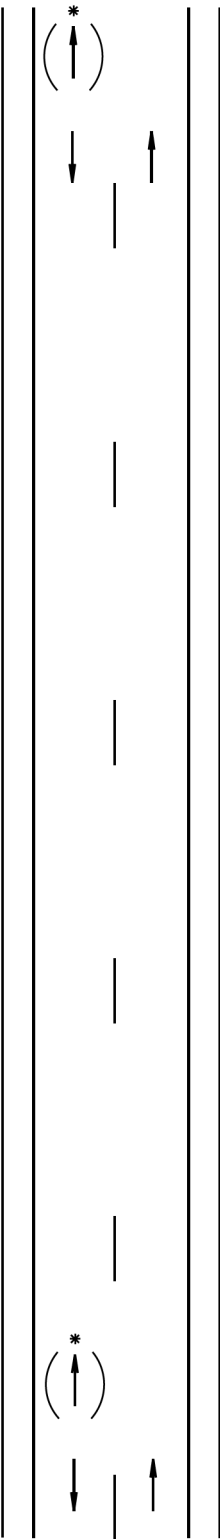
The signs illustrated are not required if the work space is behind a barrier, more than 2 feet behind the curb, or 15 feet or more from the edge of any roadway.

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

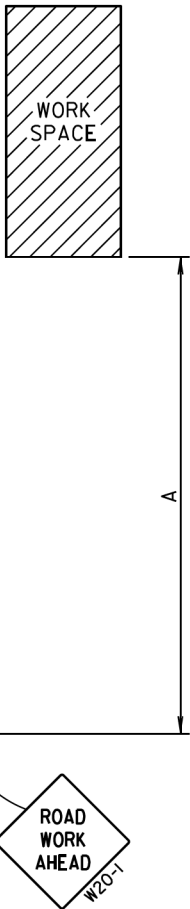
The ROAD WORK AHEAD sign may be replaced with other appropriate signs, such as the SHOULDER WORK sign. The SHOULDER WORK sign may be used for work adjacent to the shoulder.

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

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



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



April 15, 2015

Published Date: 1st Qtr. 2016	S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES WORK BEYOND THE SHOULDER	PLATE NUMBER 634.01
			Sheet 1 Of 1