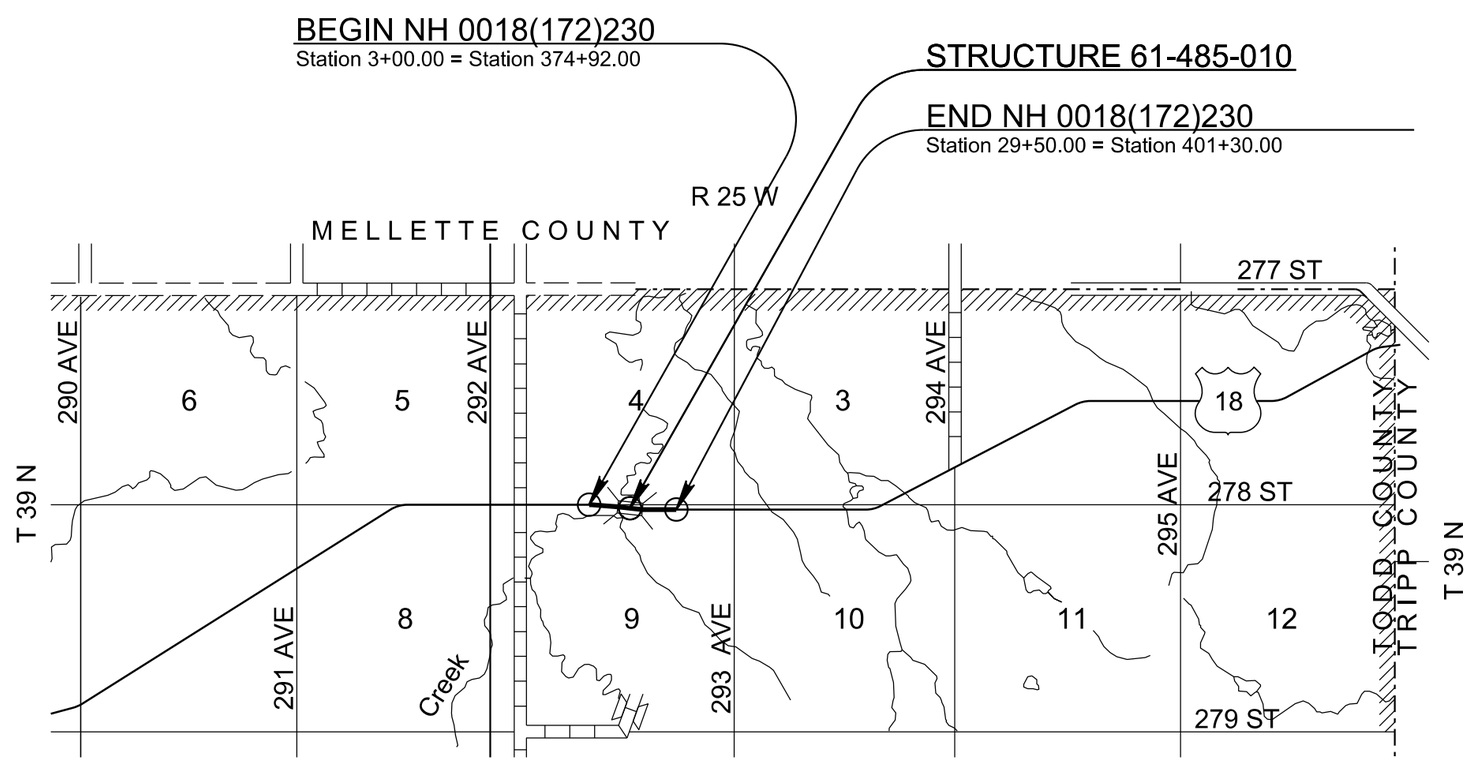
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(172)230	C1	C9

Plotting Date: 07/24/2014

SECTION C: TRAFFIC CONTROL PLANS

INDEX OF SHEETS

C1	Layout Map and Index
C2-C4	Estimate of Quantities and Notes
C5	Fixed Location Sign Layout
C6-C9	Standard Plates



PLOT SCALE - 1:200.127

PLOTTED FROM - TRWIINT26

PLOT NAME - 1

FILE - ...\TODD02RV\DESIGN\TITLE.DGN

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
004E0030	Maintenance of Traffic Diversion(s)	Lump Sum	LS
633E1300	Pavement Marking Paint, White	24.0	Gal
633E1305	Pavement Marking Paint, Yellow	9.0	Gal
634E0010	Flagging	600	Hour
634E0020	Pilot Car	200	Hour
634E0100	Traffic Control	2,442	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0610	4" Temporary Pavement Marking Tape Type 2	2,544	Ft
634E0896	Portable Temporary Traffic Signal System	1	Each

SEQUENCE OF OPERATIONS

The Contractor may perform work only during daylight hours unless additional hours are approved by the Engineer. The Contractor shall maintain traffic through the project at all times.

The following sequence of operations will be followed unless an alternate sequence is submitted in writing prior to the preconstruction meeting to the Area Engineer and approved.

Once the box culvert work commences the work shall be completed continuously until completed.

1. Install traffic control devices to construct the north section of the box culvert.
2. Construct the north section of box culvert and backfill.
3. Install traffic control devices to remove existing surfacing.
4. Build traffic diversion over north section of box culvert and mill existing surface.
5. Install traffic control for traffic diversion and utilize diversion.
6. Remove existing structure and construct south section of box culvert.
7. Complete box culvert and backfill.
8. Complete grading and install surfacing.
9. Complete paving and install pavement markings.
10. Complete, clean up, and remove traffic control devices to open the roadway to traffic.

The concrete paving shall be constructed half width through the project length and traffic shall be maintained at half width through the duration of the paving operation. During the paving or working hours, flaggers and pilot car shall be used. The temporary traffic signal system shall be used during the night and/or non-work hours. Full width paving will not be allowed.

MAINTENANCE OF TRAFFIC DIVERSION

The traffic diversion location shall be at the discretion of the Engineer. The traffic diversion shall have a 28 foot wide finished top with 4 inches of salvaged surfacing. The minimum radius on the horizontal curves shall be 400 foot. The minimum K values for the crest and sag vertical curves shall be 19 and 37 respectively. The inslopes shall be a maximum of 3:1. The earthwork construction of the traffic diversion is incidental to the contract unit price per cubic yard for “Unclassified Excavation”.

The cost of all work required for maintenance of the traffic diversion(s) and any temporary accesses, including blading, shall be incidental to the contract lump sum price for Maintenance of Traffic Diversion(s). The Contractor shall provide a blade for maintaining the roadway for traffic on diversions and temporary accesses. The cost for using this blade shall be incidental to the contract lump sum price for Maintenance of Traffic Diversion(s). The blading and watering of the traffic diversion(s) shall be completed as directed by the Engineer.

The Contractor shall place the north section stage 1 of the new box culvert during the first phase of construction. During the stage 1 construction, the traffic shall be maintained utilizing the existing pavement and structure with the appropriate traffic control as directed by the Engineer until this phase is completed. Once the new section of the box culvert is completed and has attained concrete strength, the Contractor shall backfill this section and construct a traffic diversion. The milling operation may begin and this material shall be used for surfacing on the traffic diversion.

During stage 2 of the construction, traffic shall be diverted in accordance with standard plate 634.28 utilizing the portion of the new structure completed during stage 1. The applicable signs shown shall be fixed locations for the duration of the traffic diversion use, except that the Type 3 Barricades may be on portable stands. The Contractor shall mark the locations of all the signs and the Engineer will approve these locations prior to installation. The quantity of signs required in constructing the traffic diversion is included in the estimate of quantities.

The Contractor shall install 4” x 4” delineators, back-to-back, or bi-directional vertical panels mounted 4 ft to the bottom of the reflective unit and 3 ft off the edge of roadway for the entire length of the traffic diversion(s). They shall be placed on both sides of the traffic diversion at 100 ft maximum spacing on tangent and 50 ft maximum spacing on curves. They shall begin at the W1-3 signs located at the beginning and end of the traffic diversion. All costs for installing this delineation shall be incidental to the contract lump sum price for Maintenance of Traffic Diversion(s).

The Contractor shall remove the existing structure once the traffic diversion is completed and continue with the box culvert construction. Once the box culvert is completed and has attained concrete strength, it shall be backfilled and all grading shall be completed. The placement of granular material and concrete pavement shall follow the grading completion. Once the granular material is placed on the new grade, it shall be maintained by the Contractor until the PCC is placed. This is at their own cost for repairs, blading and compacting to the typical section prior to PCC placement. Flaggers and pilot car will be used during the placement of the granular material and the half width concrete paving. The Temporary Traffic Signal System shall be utilized when the half width paving is completed for the day, when a single lane is present, or during non-work hours.

GENERAL MAINTENANCE OF TRAFFIC

Removing, relocating, covering, salvaging and resetting of existing 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

GENERAL MAINTENANCE OF TRAFFIC (CONTINUED)

MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

A Bump sign, if appropriate, shall be placed in advance of any bump conditions.

The Contractor shall furnish, install and maintain Truck Crossing signs. The exact number and location will be determined on construction. Payment for additional signs will be based on the contract unit price per unit for Traffic Control.

The Truck Crossing signs shall be displayed at all times when haul vehicles are hauling material. When the truck haul condition no longer exists, and also during nighttime hours, the signs shall be covered or removed from view. Hinged signs may be used.

All traffic control sign locations shall be set in the field by the Contractor and verified by the Engineer prior to installation.

Traffic Control units, as shown in the Estimate of Quantities, are estimates. The amount of Traffic Control paid for will be the greatest number of installations per sign in place at any one time, regardless of the number of set-ups throughout the duration of the project. Payment will be for those signs actually ordered by the Engineer and used.

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 supports.

Once the existing surface is removed, the Contractor shall install a 42” grabber cone or an equivalent channelizing device as approved by the Engineer along the outside edge of roadway at 264 feet maximum spacing on alternating sides throughout the tangent and 132 feet spacing on the outside of curves greater than three degrees. These channelizing devices shall remain in place and maintained by the Contractor until the permanent delineation is installed. All cost associated with furnishing, installing, and maintaining of these channelizing devices shall be incidental to the contract lump sum price for “Traffic Control Miscellaneous”.

The Contractors operation shall ensure that at no time traffic is subject to a drop off on the shoulder without the approval of the Engineer. A minimum of 6:1 temporary gravel shoulder shall be placed adjacent to mainline traffic at all times to avoid any drop offs on the shoulder. The installation of the 6:1 temporary gravel shoulder shall be incidental to the various contract items.

The Contractor shall designate an employee whose responsibility is the maintenance of traffic, 24 hours per day and 7 days per week. The person so designated must have training and experience in the field of construction traffic control and be knowledgeable about the MUTCD. Cost for the traffic control person shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous. The employee selected must be approved by the Engineer. The name, phone number, and location of person(s) shall be provided to the SD Department of Transportation and the Todd County Sheriff.

TEMPORARY TRAFFIC SIGNAL SYSTEM

The Contractor shall furnish, install, operate, and maintain a “Portable Temporary Traffic Signal System” during construction phases as determined by the Engineer.

The Temporary Traffic Signal System shall be set up to dwell in red.

The green time may be adjusted as needed.

Initial Timings for the structure are as detailed below:

Red = 200 sec. Yellow = 7 sec. Green = 25 sec.

The aforementioned dwell timing is based on 4,410 feet between opposing STOP BARS.

PERMANENT PAVEMENT MARKING

Prior to opening up the newly reconstructed roadway, the Contractor shall place Permanent Pavement Markings. This will require 3,650 feet of center line and 7,300 feet of edge line which is the project length with 500 feet additional length on each end. All costs associated with this work shall be incidental to the contract unit price per gallon for “Pavement Marking Paint, White” and “Pavement Marking Paint, Yellow”.

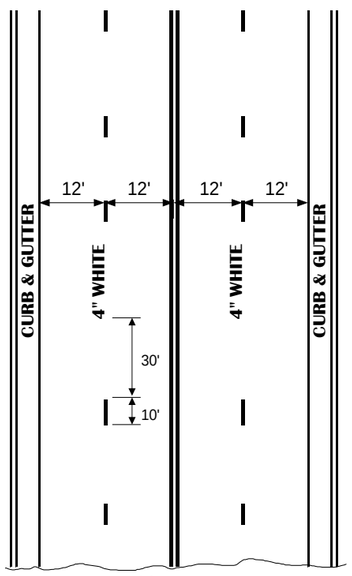
SIGN TABULATION

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-1	48" x 24"	ROAD WORK NEXT ## MILES	2	24	48
G20-2	36" x 18"	END ROAD WORK	2	17	34
R10-6	24" x 36"	STOP HERE ON RED	2	20	40
R11-2	48" x 30"	ROAD CLOSED	2	27	54
W1-3	48" x 48"	REVERSE TURN SIGN (LEFT OR RIGHT)	5	34	170
W1-6	60" x 30"	ONE DIRECTION LARGE ARROW	6	30	180
W3-3	48" x 48"	SIGNAL AHEAD (SYMBOL)	2	34	68
W3-4	48" x 48"	BE PREPARED TO STOP	2	34	68
W8-1	48" x 48"	BUMP	4	34	136
W8-6	48" x 48"	TRUCK CROSSING	2	34	68
W16-2P	30" x 24"	### FEET	8	18	144
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	11	34	374
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	4	34	136
W20-7	48" x 48"	FLAGGER (SYMBOL)	4	34	136
W21-5	48" x 48"	SHOULDER WORK	5	34	170
*****	12" x 36"	TYPE III OBJECT MARKER	4	14	56
*****		TYPE 3 BARRICADE - 8 FT. DOUBLE SIDED	10	56	560
				TOTAL UNITS	**2442**

The amount of Traffic Control paid for will be the greatest number of installations per sign in place at any one time, regardless the number of set-ups throughout the duration of the project.

FURNISHING AND APPLYING PAVEMENT MARKING PAINT

UNDIVIDED ROADWAY



1. Pavement marking paint and glass beads will be furnished and applied by the Contractor. Material shall meet the requirements of Section 980 and 981 of the Specifications. The bead application rate shall be 8 pounds per gallon of paint.

2. Construction requirements, methods of measurement and basis of payment shall conform to the requirements of Section 633 of the Specifications and the Supplemental Specifications.

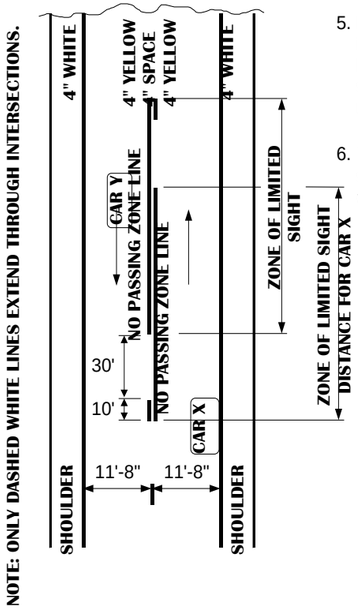
3. Approximate paint application rates shall be as follows:

Four Lane Roadway (Rates for one line)	Two Lane Roadway
Solid Yellow Centerline Rate = 16.90 Gals./Pass-Mile	Yellow Centerline (Includes No Passing Zones) Rate = 12± Gals./Pass-Mile
Dashed White Laneline Rate = 4.60 Gals./Pass-Mile	Solid White Edgeline (Rate for one line) Rate = 16.90 Gals./Pass-Mile
Solid White Edgeline (Not applicable in curb & gutter section) Rate = 16.90 Gals./Pass-Mile	

4. Typical pavement marking as shown on this sheet shall be applied throughout the entire length of undivided roadway.

5. Exact location of NO PASSING ZONE lines will be determined in the field by the Engineer. A dash of white paint will mark the beginning and end of all no passing zones. NO PASSING ZONE signs and the ending post in fence lines, if present, shall not be used as the beginning and ending of NO PASSING ZONE lines.

6. 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.

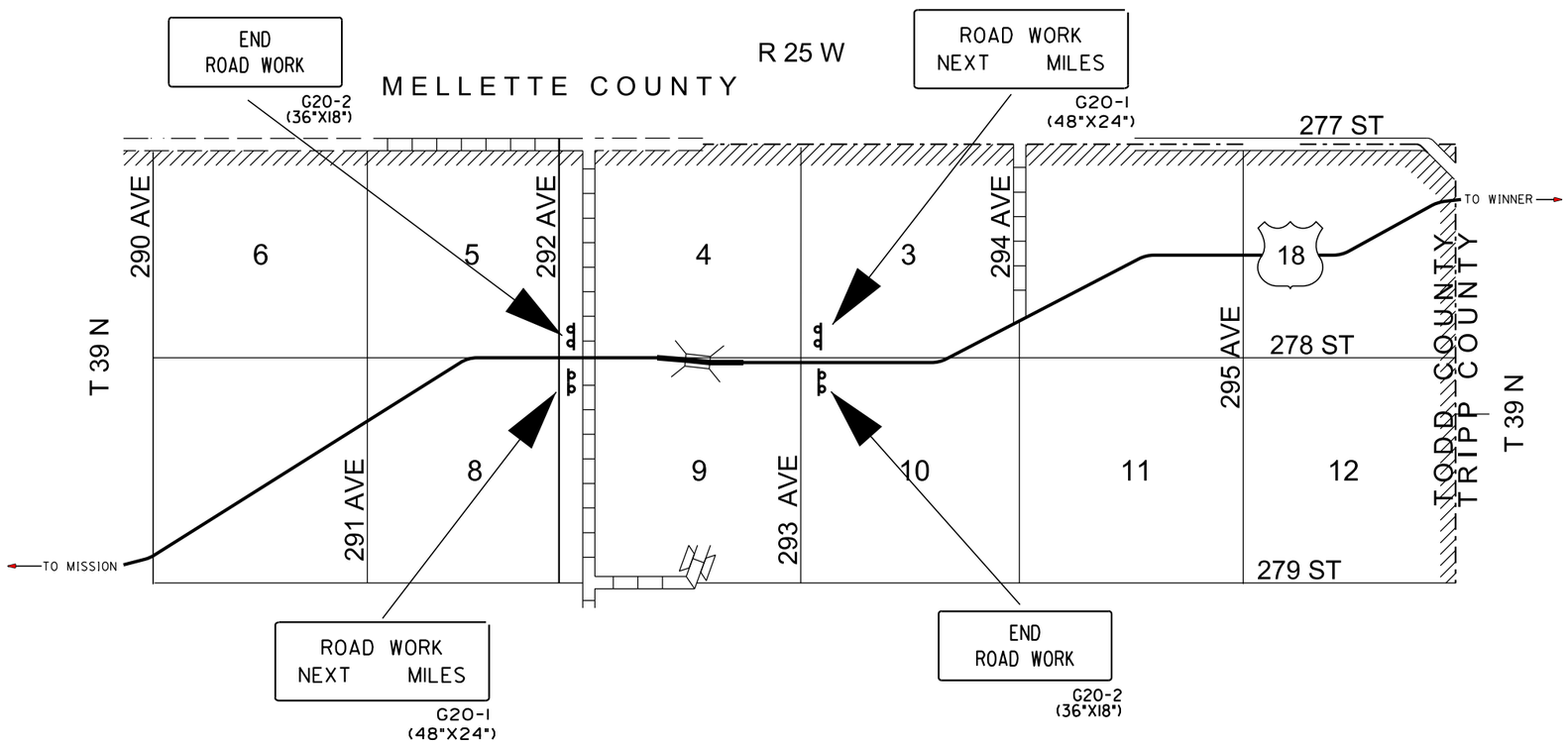


ESTIMATED QUANTITIES	
PAVEMENT MARKING PAINT	QUANTITY
WHITE YELLOW	24 GALLONS 9 GALLONS
TOTAL	33 GALLONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(172)230	C5	C9

Plotting Date: 07/24/2014

FIXED LOCATION SIGN LAYOUT



NOTES:

EXACT LOCATION AND SPACING OF THE SIGNS SHOWN TO BE DETERMINED IN THE FIELD BY THE ENGINEER.

FIXED LOCATION SIGNS TO REMAIN IN PLACE UNTIL THE COMPLETION OF THE PERMANENT PAVEMENT MARKINGS.

FIXED LOCATION SIGNS SHALL BE PAID FOR AT THE CONTRACT UNIT PRICE PER UNIT FOR "TRAFFIC CONTROL".

PLOT SCALE - 1:200.127

PLOT NAME - 2

FILE - ...\DESIGN\02RVFIXED SIGNS.DGN

PLOTTED FROM - TRW11NT26

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.

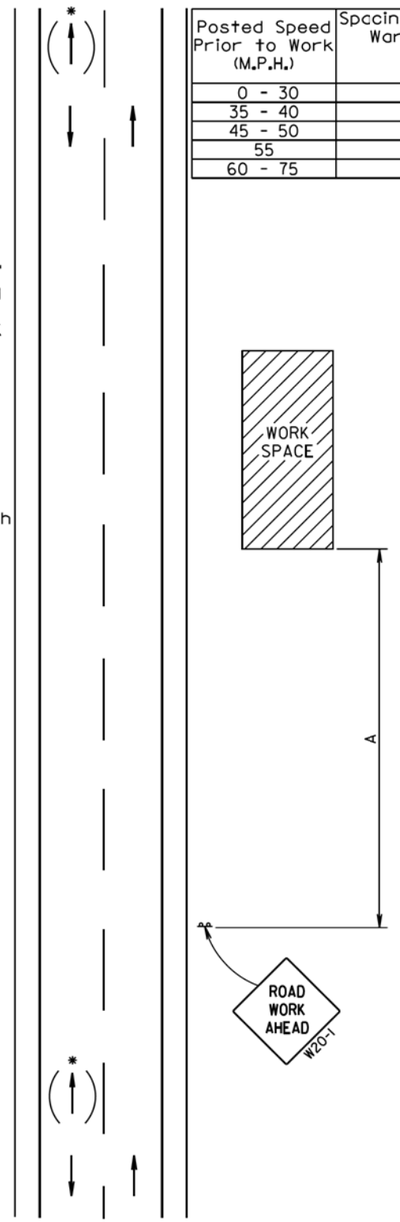
The signs illustrated shall be used where there are distracting situations; such as: vehicles parked on shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform work operations.

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 - 75	1000



July 1, 2005

Published Date: 2nd Qtr. 2014

SDDOT

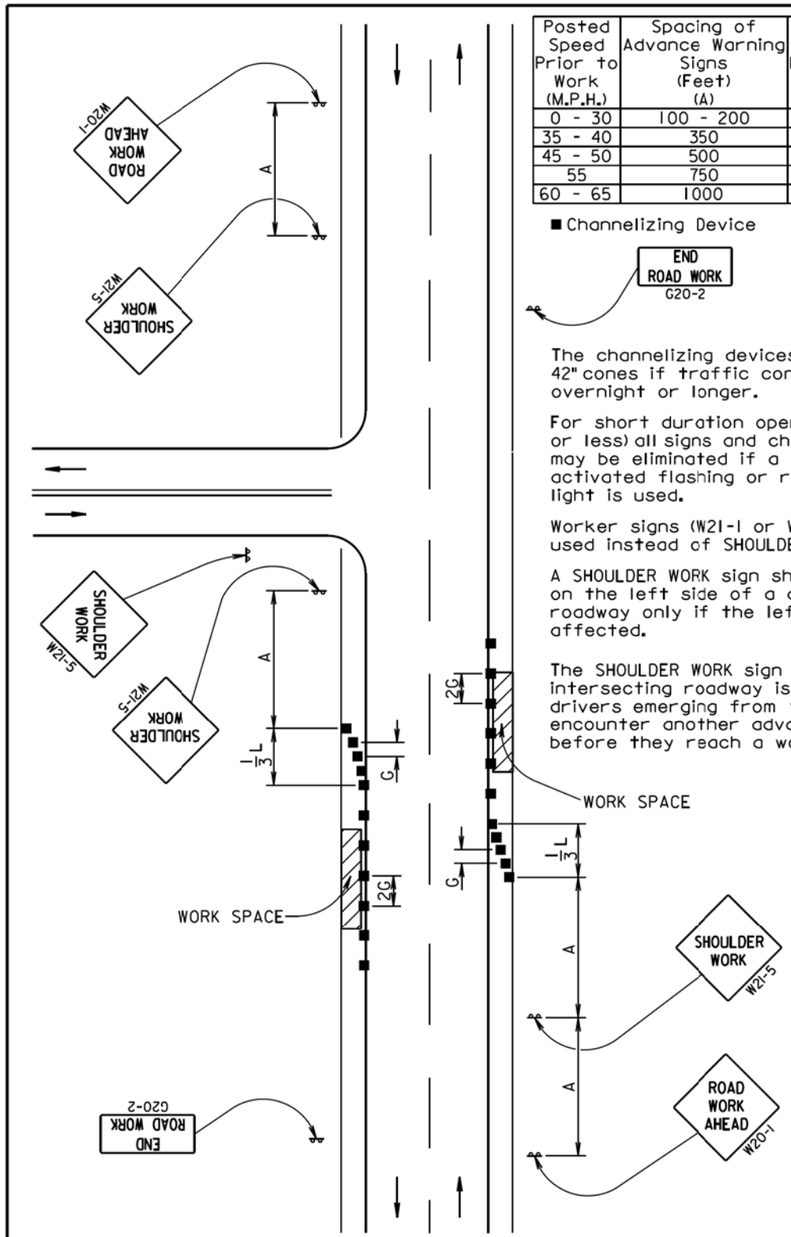
GUIDES FOR TRAFFIC CONTROL DEVICES
WORK BEYOND THE SHOULDER

PLATE NUMBER 634.01

Sheet 1 of 1

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	100 - 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.

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

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

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

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

February 14, 2011

Published Date: 2nd Qtr. 2014

SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
WORK ON SHOULDERS

PLATE NUMBER 634.03

Sheet 1 of 1

Plot Scale - 1:200
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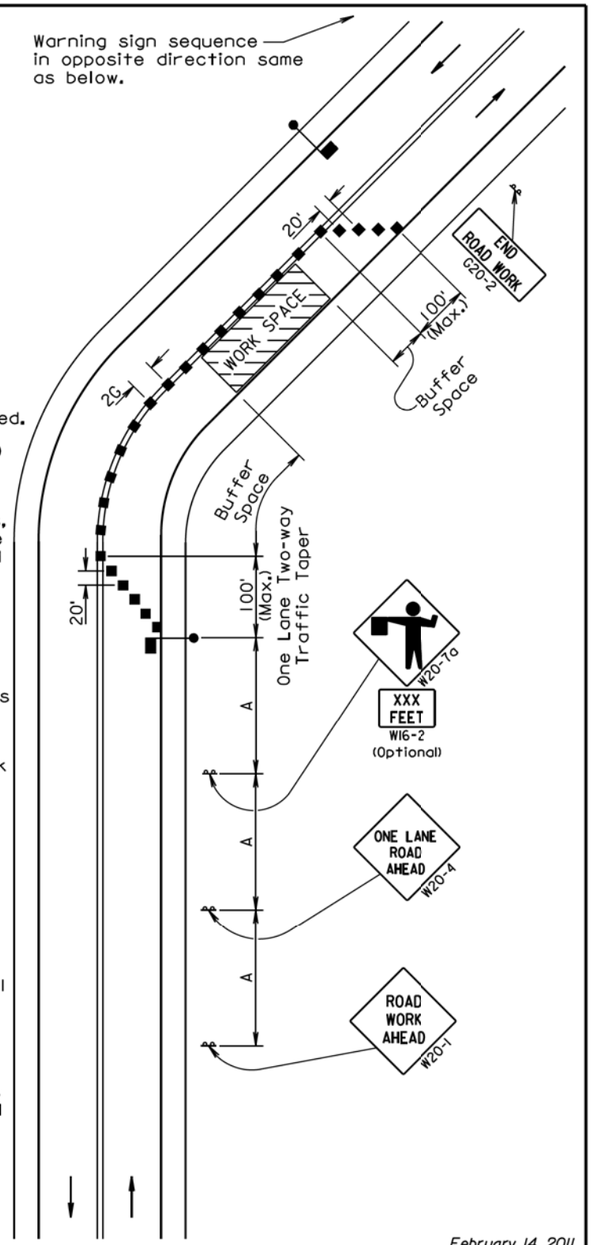
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45 - 50	500	50
55	750	50
60 - 65	1000	50

Warning sign sequence in opposite direction same as below.



Flagger

Channelizing Device

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

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

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

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

The channelizing devices shall be drums or 42" cones.

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

END ROAD WORK G20-2

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

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

February 14, 2011

Published Date: 2nd Qtr. 2014

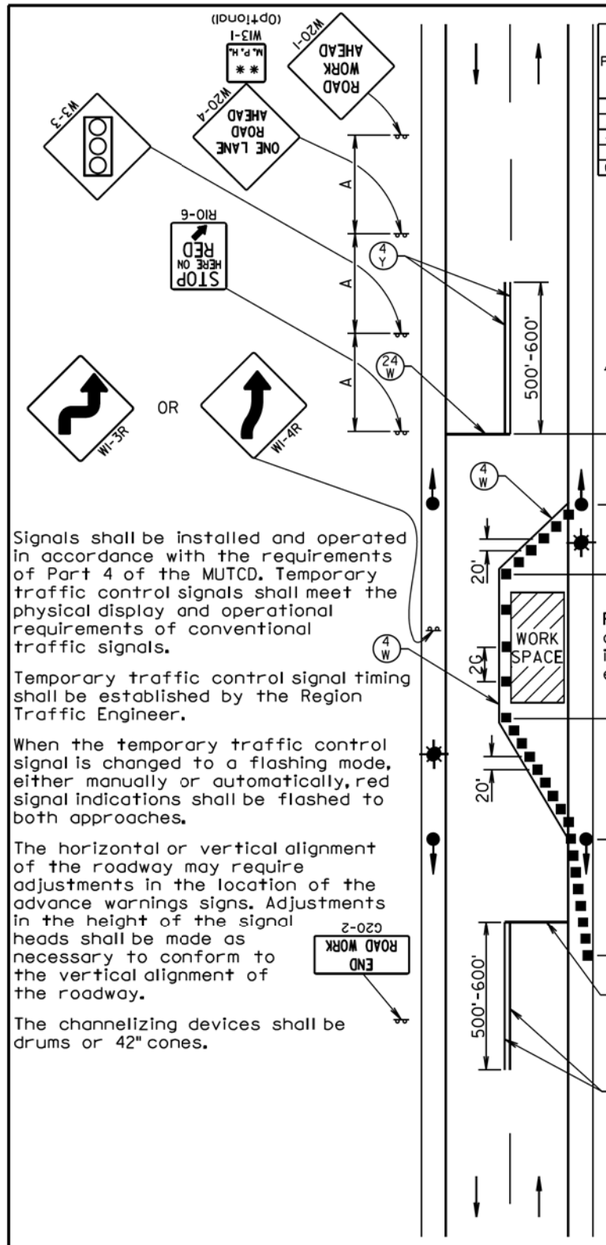
SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE WITH FLAGGER PROVIDED

PLATE NUMBER 634.23

Sheet 1 of 1

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



Signals shall be installed and operated in accordance with the requirements of Part 4 of the MUTCD. Temporary traffic control signals shall meet the physical display and operational requirements of conventional traffic signals.

Temporary traffic control signal timing shall be established by the Region Traffic Engineer.

When the temporary traffic control signal is changed to a flashing mode, either manually or automatically, red signal indications shall be flashed to both approaches.

The horizontal or vertical alignment of the roadway may require adjustments in the location of the advance warnings signs. Adjustments in the height of the signal heads shall be made as necessary to conform to the vertical alignment of the roadway.

The channelizing devices shall be drums or 42" cones.

24" White Temporary Pavement Marking

4" White Temporary Pavement Marking

4" Yellow Temporary Pavement Marking

Channelizing Device

Traffic Signal

Lighting (Optional)

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

For long-term operations the ends of the work space area shall be illuminated to clearly identify the ends of the work space area.

December 23, 2010

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SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES
LANE CLOSURE USING TRAFFIC SIGNALS

PLATE NUMBER 634.26

Sheet 1 of 1

Plot Scale - 1:200

- Plotted From - trwi1nt26

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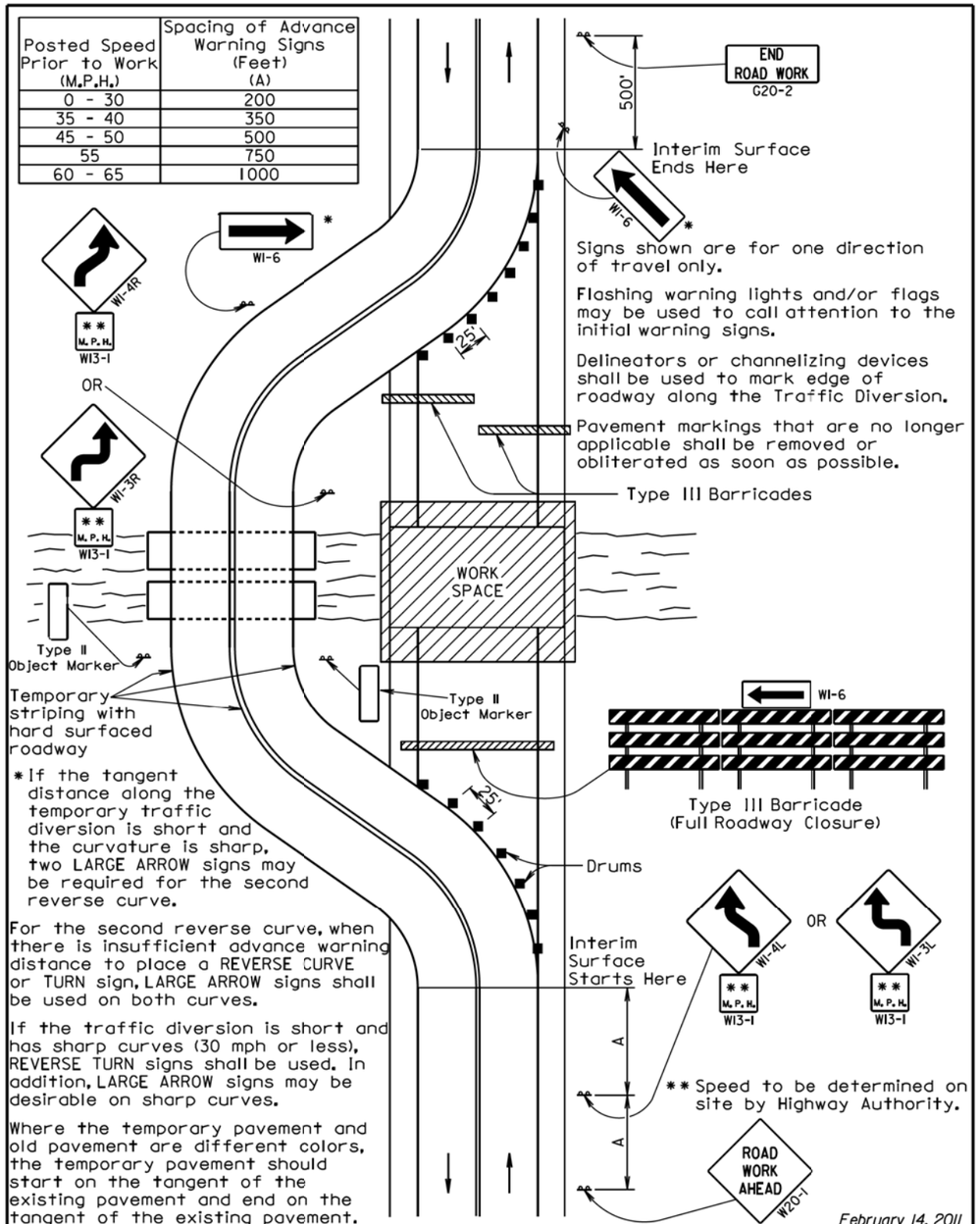
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0018(172)230	C8	C9

Plotting Date: 07/24/2014

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



Signs shown are for one direction of travel only.

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

Delineators or channelizing devices shall be used to mark edge of roadway along the Traffic Diversion.

Pavement markings that are no longer applicable shall be removed or obliterated as soon as possible.

* If the tangent distance along the temporary traffic diversion is short and the curvature is sharp, two LARGE ARROW signs may be required for the second reverse curve.

For the second reverse curve, when there is insufficient advance warning distance to place a REVERSE CURVE or TURN sign, LARGE ARROW signs shall be used on both curves.

If the traffic diversion is short and has sharp curves (30 mph or less), REVERSE TURN signs shall be used. In addition, LARGE ARROW signs may be desirable on sharp curves.

Where the temporary pavement and old pavement are different colors, the temporary pavement should start on the tangent of the existing pavement and end on the tangent of the existing pavement.

** Speed to be determined on site by Highway Authority.

February 14, 2011

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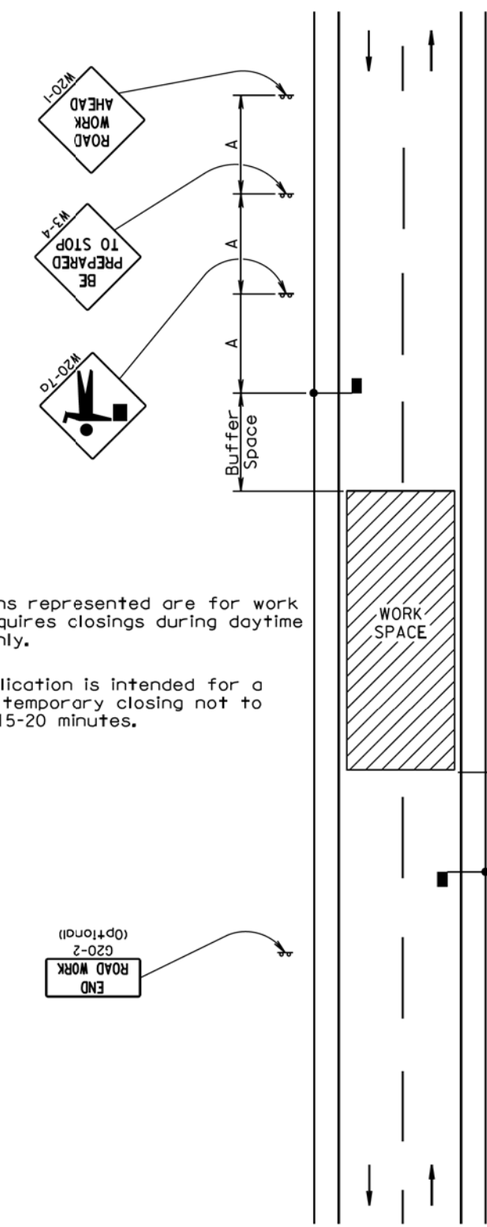
SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES ROAD CLOSED WITH TRAFFIC DIVERTED

PLATE NUMBER 634.28

Sheet 1 of 1



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

Flagger

END ROAD WORK G20-2 (Optional)

Posted Speed Prior to Work (M.P.H.)	Length of Longitudinal Buffer Space (Feet)
20	35
25	55
30	85
35	120
40	170
45	220
50	280
55	335
60	415
65	485

Buffer space dependent on work site limitations.

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

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

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SDDOT

GUIDES FOR TRAFFIC CONTROL DEVICES TEMPORARY ROAD WORK

PLATE NUMBER 634.30

Sheet 1 of 1

Plot Scale - 1:200
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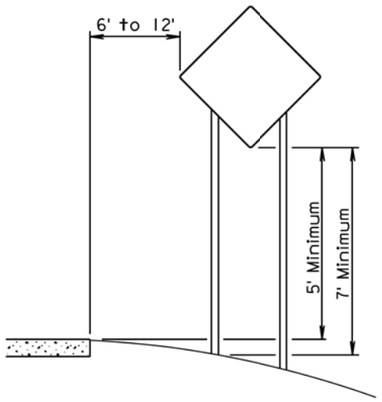
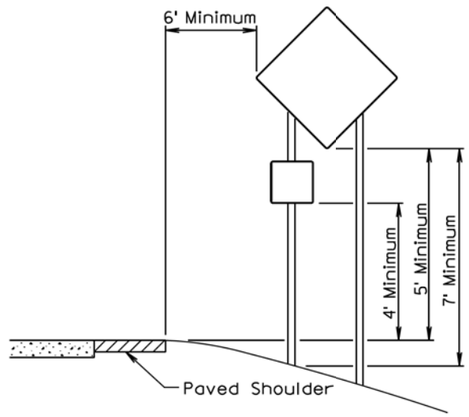
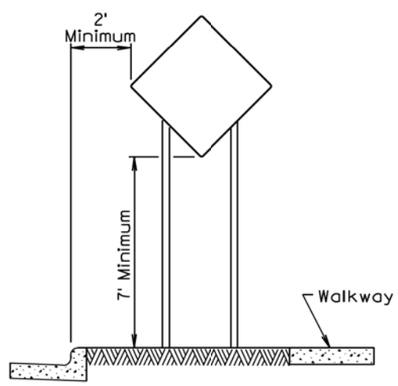


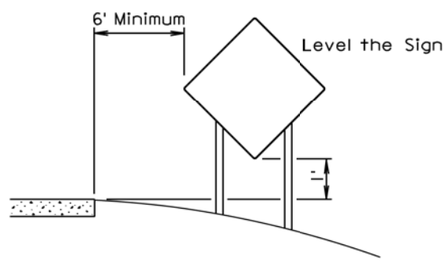
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



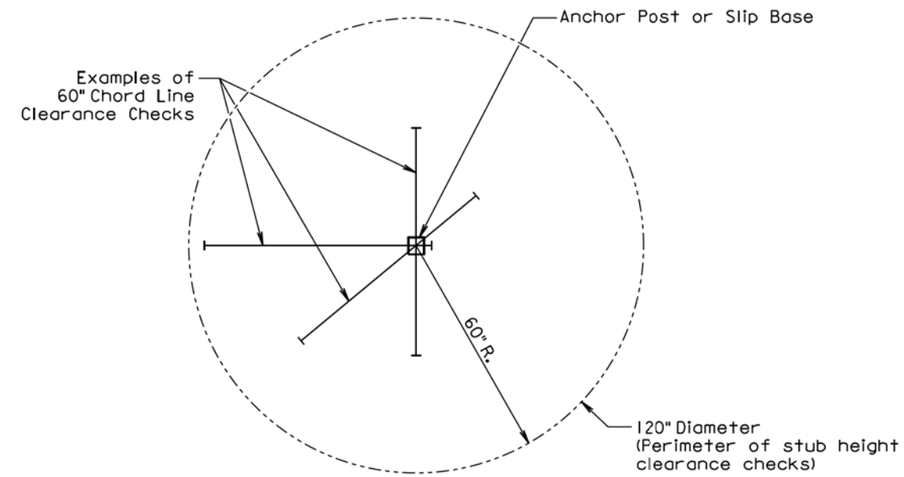
URBAN DISTRICT



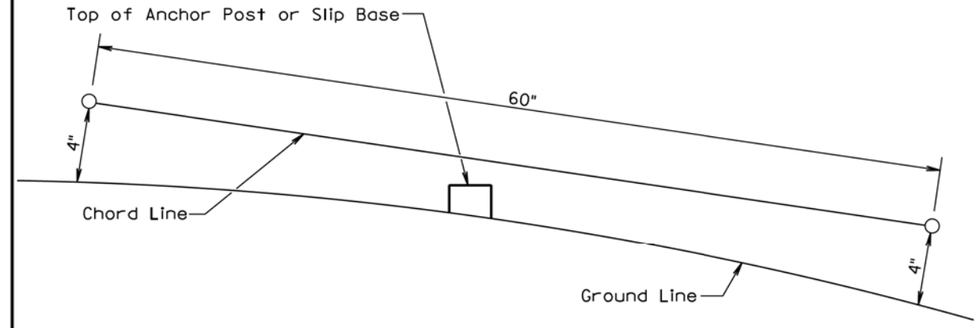
RURAL DISTRICT
3 DAY MAXIMUM

February 14, 2011

Published Date: 2nd Qtr. 2014	SDDOT	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85 Sheet 1 of 1



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: 2nd Qtr. 2014	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99 Sheet 1 of 1

Plot Scale - 1:200
- Plotted From - trwi1n126
File - ...\Design\s63485e63499.dgn