

PLOT SCALE - 200,000000:1,000000

STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
PLANS FOR PROPOSED

|                       |          |           |              |
|-----------------------|----------|-----------|--------------|
| STATE OF SOUTH DAKOTA | PROJECT  | SHEET NO. | TOTAL SHEETS |
|                       | 000P-452 | 1         | 8            |

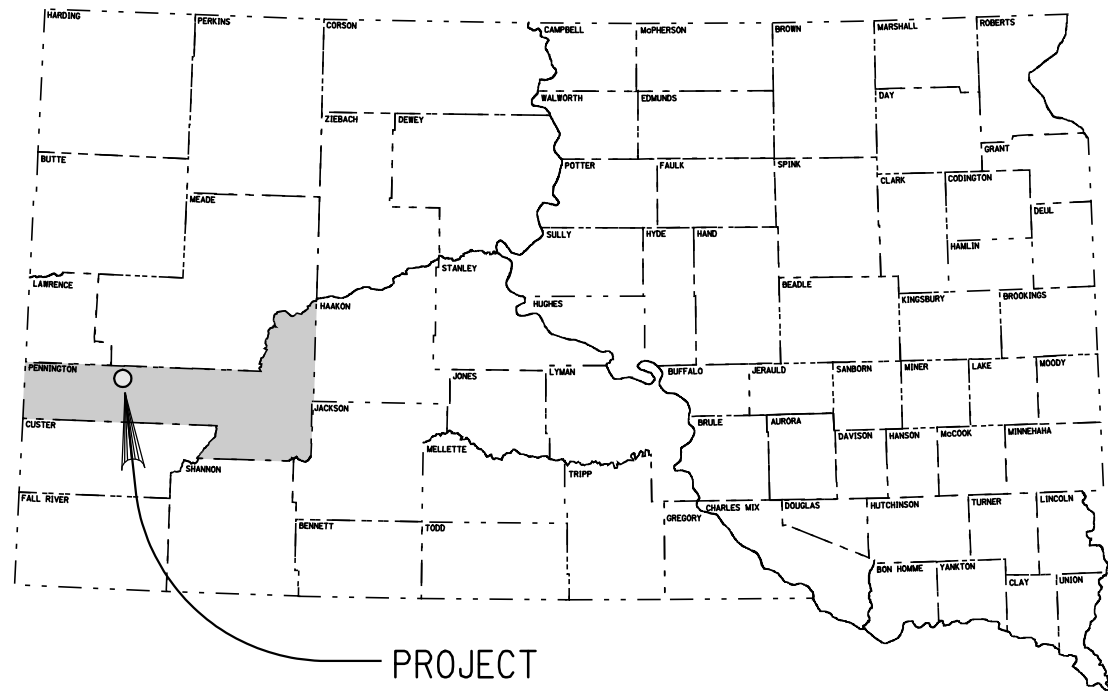
Plotting Date: 23-MAR-2010

PROJECT 000P-452  
SD HIGHWAY 44  
PENNINGTON COUNTY

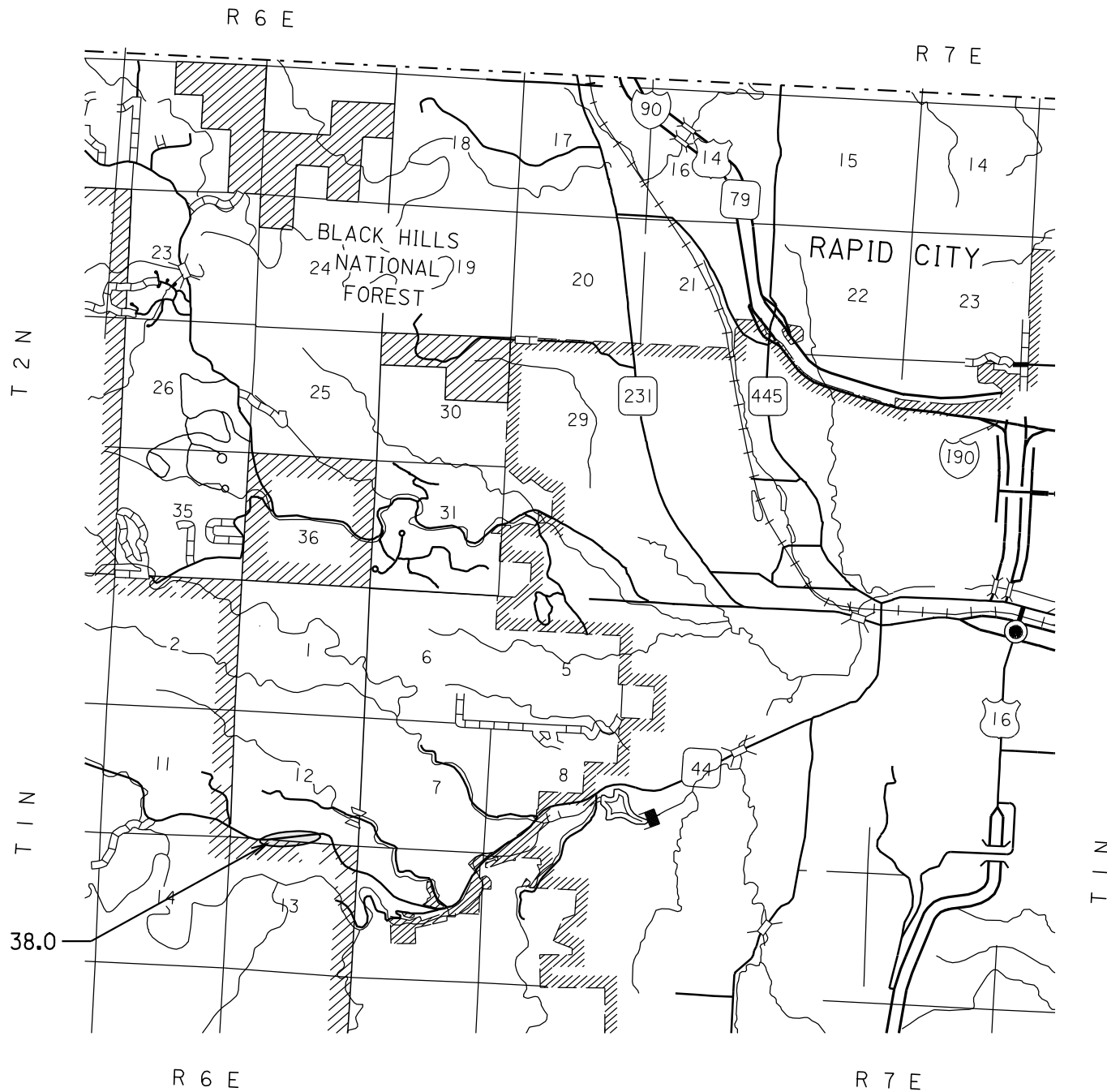
REMOVE 3 CABLE GUARDRAIL &  
INSTALL HIGH TENSION CABLE GUARDRAIL  
PCN 11Q8

INDEX OF SHEETS

|     |                                      |
|-----|--------------------------------------|
| 1   | General Layout W/Index               |
| 2-3 | Estimate With General Notes & Tables |
| 4-6 | Traffic Control                      |
| 7   | Guardrail Location                   |
| 8   | Guardrail Layout                     |



PROJECT



DESIGN DESIGNATION

|            |        |
|------------|--------|
| ADT (2009) | 2760   |
| ADT (2029) | 3300   |
| DHV        | 495    |
| D          | 50 %   |
| T DHV      | 2.1 %  |
| T ADT      | 4.7 %  |
| V          | 50 mph |

MRM 37.4 to MRM 38.0

PLOTTED FROM - TRRC11610

FILE - U:\REGIONRC\PR\2010\REGMAINT\PLANS\000P-452 REPLACE CABLE RAIL SD\REGMAINT\000P-452

## ESTIMATE OF QUANTITIES

| Bid Item Number | Item  | Quantity | Unit |
|-----------------|---|----------|------|
| 009E0010        | Mobilization  | Lump Sum | LS   |
| 110E0740        | Remove 3 Cable Guardrail Anchor Assembly                            | 6        | Each |
| 110E4100        | Salvage 3 Cable Guardrail   | 1,045    | Ft   |
| 629E0110        | NCHRP 350 Test Level 3 High Tension Cable Guardrail                 | 1,132    | Ft   |
| 629E0290        | NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly | 6        | Each |
| 629E1107        | High Tension Cable Guardrail Post                                   | 24       | Each |
| 634E0010        | Flagging  | 40       | Hour |
| 634E0100        | Traffic Control   | 390      | Unit |
| 634E0120        | Traffic Control, Miscellaneous                                      | Lump Sum | LS   |
| 634E0420        | Type C Advance Warning Arrow Panel                                  | 2        | Each |

## SPECIFICATIONS

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

## WORK DESCRIPTION

Work on this project includes removing 3 cable guardrail and replacing with High Tension Cable guardrail.

## SEQUENCE OF OPERATIONS

Variations from this sequence shall be submitted to the Engineer for approval.

1. Set up Traffic Control westbound
2. Remove existing 3 Cable Guardrail
3. Install High Tension Cable Guardrail
4. Remove Traffic Control
5. Repeat steps 1 – 4 for eastbound

## UTILITIES

The Contractor is required to comply with South Dakota Codified Law and Administrative Rule addressing excavation activities. Notification of Utility companies will be in accordance with Section 5.6 of the Standard Specifications. South Dakota One Call phone number is 1-800-781-7474.

## HISTORICAL PRESERVATION OFFICE CLEARANCES

To obtain State Historical Preservation Office (SHPO) clearance, a cultural resources survey may need to be conducted by a qualified archaeologist. In lieu of a cultural resources survey, the Contractor could request a records search from Jim Donohue, State Archaeological Research Center (SARC). Provide SARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that no artifacts have been found on the site. The Contractor shall arrange and pay for the cultural resource survey and/or records search.

If any earth disturbing activities occur within the current geographical or historic boundaries of any South Dakota reservation, the Contractor shall obtain Tribal Historical Preservation Office (THPO) clearance. If no THPO exists, the required SHPO clearance shall suffice, with documentation of Tribal contact efforts provided to SHPO.

To facilitate SHPO or THPO responses, the Contractor should submit a records search or cultural resources survey report to Tom Lehmkuhl, DOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). Allow 30 days from the date this information is submitted to the Environmental Engineer for SHPO/THPO approval. The Contractor is responsible for obtaining all required permits and clearances for staging areas, borrow sites, waste disposal sites, and all material processing sites. The Contractor shall provide the required permits and clearances to the Engineer at the preconstruction meeting.

## WASTE DISPOSAL SITE

The Contractor will be required to furnish a site(s) for the disposal of construction/demolition debris generated by this project.

Construction/demolition debris may not be disposed of within the State ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Highway, Road, and Railway Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

1. Construction/demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction/demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the State ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the State ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".
2. Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

**TABLE OF GUARDRAIL**

| Location  | Salvage 3<br>Cable<br>Guardrail | Remove 3<br>Cable<br>Guardrail<br>Anchor<br>Assembly | High<br>Tension<br>Cable<br>Guardrail | High<br>Tension<br>Cable<br>Guardrail<br>Anchor<br>Assembly |
|-----------|---------------------------------|--|---------------------------------------|---|
| MRM       | (Ft)                            | (Each)   | (Ft)                                  | (Each)  |
| WB 37.814 | 310                             | 2  | 339                                   | 2   |
| WB 37.955 | 515                             | 2  | 544                                   | 2   |
| EB 38.073 | 220                             | 2  | 249                                   | 2   |
| TOTALS    | 1045                            | 6  | 1132                                  | 6   |

**SALVAGE 3 CABLE GUARDRAIL**

The cables, posts, anchor assemblies, and hardware items shall become the property of the State and shall be removed, hauled, and neatly stacked at the DOT South Maintenance Yard in Rapid City as approved by the Engineer.

Payment for removing, hauling, and stacking the salvaged guardrail items except for the anchor shall be incidental to the contract unit price per foot for "Salvage 3 Cable Guardrail".

**REMOVE 3 CABLE GUARDRAIL ANCHOR ASSEMBLY**

The Contractor shall provide the backfill material necessary as a result of the guardrail footing removal. All costs associated with removing and disposing of the concrete anchor, backfilling and compaction shall be incidental to the contract unit price per each "Remove 3 Cable Guardrail Anchor Assembly".

**NCHRP 350 TEST LEVEL 3 HIGH TENSION CABLE GUARDRAIL**

The Contractor shall furnish and install a 3 or 4 cable high tension guardrail system that meets the crash testing requirements of NCHRP 350 Test Level 3. The maximum dynamic deflection of the system shall be less than 8'. All posts shall be galvanized. **Socketed concrete foundations will not be allowed.** A steel driven sleeve with soil plate shall be used. Reflective sheeting shall be placed on the face and back of every other post cap and on the cable release post. The sheeting shall be in conformance with Section 982.2.1.2 of the Standard Specifications. The color shall be the same as the nearest pavement marking, white.

The Contractor shall check and adjust the tension of the cables approximately 3 weeks after installation. Cost for this work shall be incidental to the contract unit price per foot for "NCHRP 350 Test Level 3 High Tension Cable Guardrail".

The Contractor shall install the system according to the manufacturer's recommendations, specifications, and installation instructions. A copy of the specifications, detail drawings, and installation instructions for the high tension cable guardrail and anchor assemblies shall be given to the Engineer 2 weeks prior to installation of the high tension cable guardrail system.

The lengths of high tension cable guardrail stated in the plans were based on a CASS Cable Guardrail Safety System. The length and location of the high tension cable guardrail at each site will need to be adjusted during construction as necessary if a system with a different non-effective length is used and it shall be approved by the Engineer before installation.

The high tension cable guardrail shall be measured along the centerline of the cable guardrail from the first post of the approach anchor assembly to last post of the departure anchor assembly to the nearest foot.

All costs for furnishing and installing the 3 or 4 cable high tension guardrail system including all labor, materials, and equipment shall be incidental to the contract unit price per foot for "NCHRP 350 Test Level 3 High Tension Cable Guardrail".

**NCHRP 350 TEST LEVEL 3 HIGH TENSION CABLE GUARDRAIL ANCHOR ASSEMBLY**

The beginning and end of each "run" of high tension cable guardrail shall terminate with an anchor assembly that meets the crash testing requirements of NCHRP 350 Test Level 3.

The footing size for the anchor assembly shall be designed appropriately based on the soil type and conditions located on the project. The footing size shall be a minimum of 5' deep and shall be approved by the Engineer before installation. The soil on this project is UC classifications GM, SM, GP-Gm, and SP-SM. The AASHTO classifications of A-1 & A-2.

All costs for furnishing and installing the NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly including all labor, equipment, and materials which include the anchor footing, hardware, and all attachments to the anchor footing, shall be incidental to the contract unit price per each for "NCHRP 350 Test Level 3 High Tension Cable Guardrail Anchor Assembly".

**HIGH TENSION CABLE GUARDRAIL POST**

The Contractor shall furnish an additional 6 (CCT Terminal Post 1 – 3) posts and 18 (CCT Terminal Post 4 – 9) posts with reflective sheeting on the face and back and shall deliver and stockpile the materials at the DOT South Maintenance Yard in Rapid City.

All costs for furnishing the posts and caps and delivering them to the DOT South Maintenance Yard in Rapid City shall be incidental to the contract unit price per each for "High Tension Cable Guardrail Post".

**TRAFFIC CONTROL AND MAINTENANCE OF TRAFFIC**

Traffic control shall be in accordance with the Standard Specifications, applicable MUTCD standards, and all plan requirements.

Only one set of traffic control devices will be paid for in each direction regardless of the number of times the signs will be moved from one location to the next on this project or taken down and set back up.

Work activities shall only be during daylight hours. Daylight hours are considered to be 1/2 hour before sunrise until 1/2 hour after sunset.

All equipment and vehicles entering or exiting the roadway, traveling on the shoulders, traveling at speeds less than 40 MPH between work sites, or working within the right-of-way shall be equipped with an activated high intensity flashing or revolving yellow light to warn the traveling public.

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

Storage of vehicles, materials, and equipment shall be not closer than 30' from the edge of the driving lane. 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.

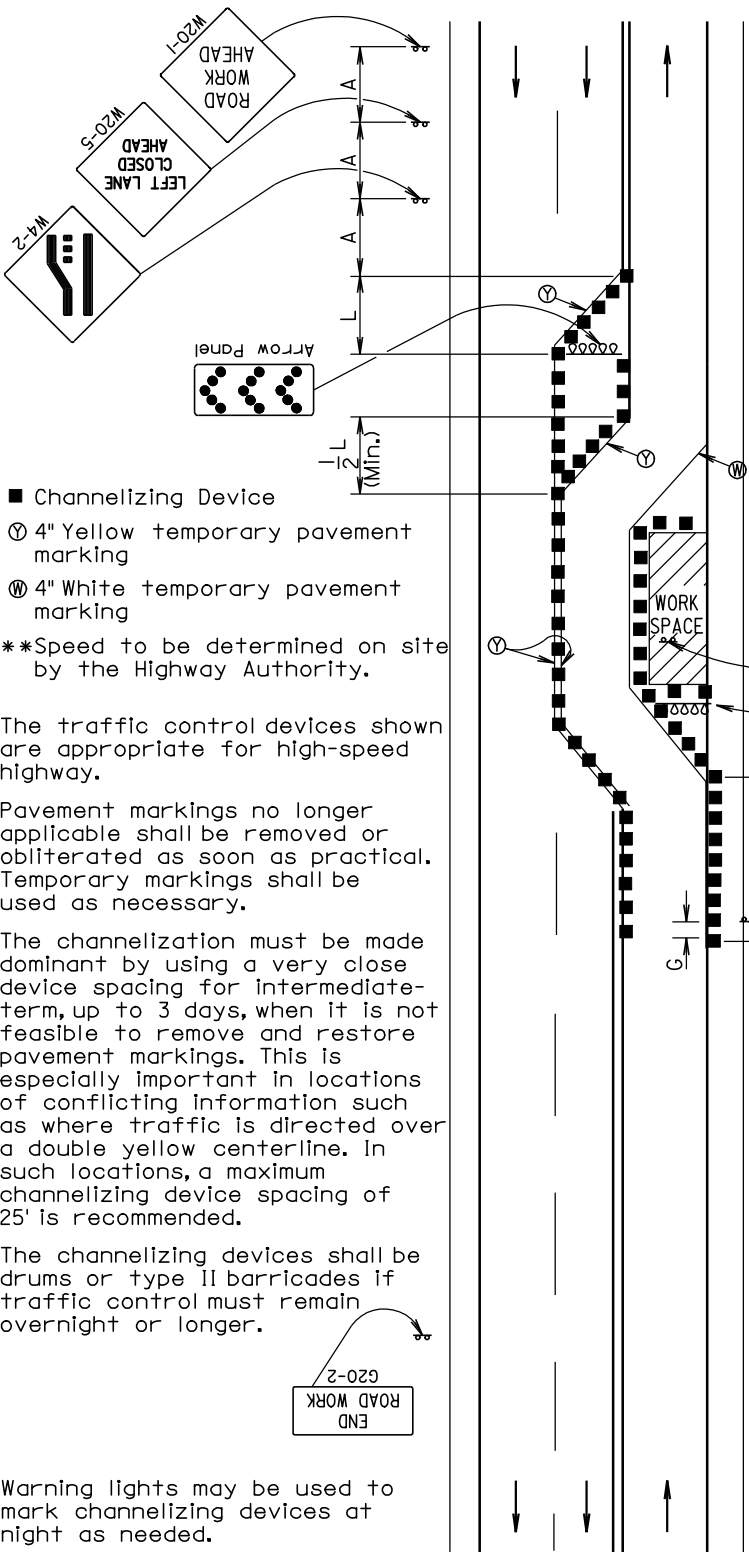
Non-applicable signing will be covered or removed and reset during periods of in-activity. All costs to do this work shall be incidental to Traffic Control, Miscellaneous.

Construction signing that remains in the same location for more than 3 days shall be mounted on fixed supports, unless approved by the Engineer.

**INVENTORY OF TRAFFIC CONTROL DEVICES**

| SIGN CODE          | SIGN SIZE | DESCRIPTION                             | NUMBER REQUIRED | UNITS PER SIGN | UNITS      |
|--------------------|-----------|---|-----------------|----------------|------------|
| G20-2              | 36" x 18" | END ROAD WORK                           | 2               | 17             | 34         |
| W1-4               | 48" x 48" | REVERSE CURVE SIGN (LEFT OR RIGHT)      | 2               | 34             | 68         |
| W4-2               | 48" x 48" | LEFT OR RIGHT LANE ENDS (SYMBOL)        | 1               | 34             | 34         |
| W13-1              | 24" x 24" | ADVISORY SPEED PLATE                    | 1               | 16             | 16         |
| W20-1              | 48" x 48" | ROAD WORK ### FT. OR AHEAD              | 2               | 34             | 68         |
| W20-5              | 48" x 48" | LT. OR RT. LANE CLOSED ### FT. OR AHEAD | 1               | 34             | 34         |
| W20-7a             | 48" x 48" | FLAGGER                                 | 2               | 34             | 68         |
| W21-5              | 48" x 48" | SHOULDER WORK                           | 2               | 34             | 68         |
| <b>TOTAL UNITS</b> |           |   |                 |                | <b>390</b> |

|                       |          |       |              |
|-----------------------|----------|-------|--------------|
| STATE OF SOUTH DAKOTA | PROJECT  | SHEET | TOTAL SHEETS |
|                       | 000P-425 | 4     | 8            |



**Channelizing Device**

Y 4" Yellow temporary pavement marking

W 4" White temporary pavement marking

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

The traffic control devices shown are appropriate for high-speed highway.

Pavement markings no longer applicable shall be removed or obliterated as soon as practical. Temporary markings shall be used as necessary.

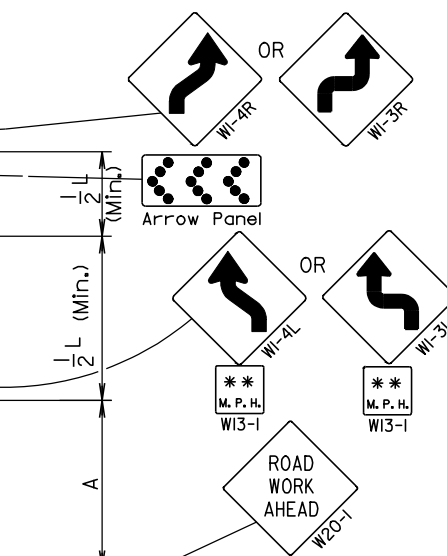
The channelization must be made dominant by using a very close device spacing for intermediate-term, up to 3 days, when it is not feasible to remove and restore pavement markings. This is especially important in locations of conflicting information such as where traffic is directed over a double yellow centerline. In such locations, a maximum channelizing device spacing of 25' is recommended.

The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer.

Warning lights may be used to mark channelizing devices at night as needed.

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

| Posted Speed Prior to Work (M.P.H.) | Spacing of Channelizing Devices (Feet) (G) |
|-------------------------------------|--|
| 0 - 30                              | 25   |
| 35 - 40                             | 25   |
| 45 - 50                             | 50   |
| 55                                  | 50   |
| 60 - 65                             | 50   |



| 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   |

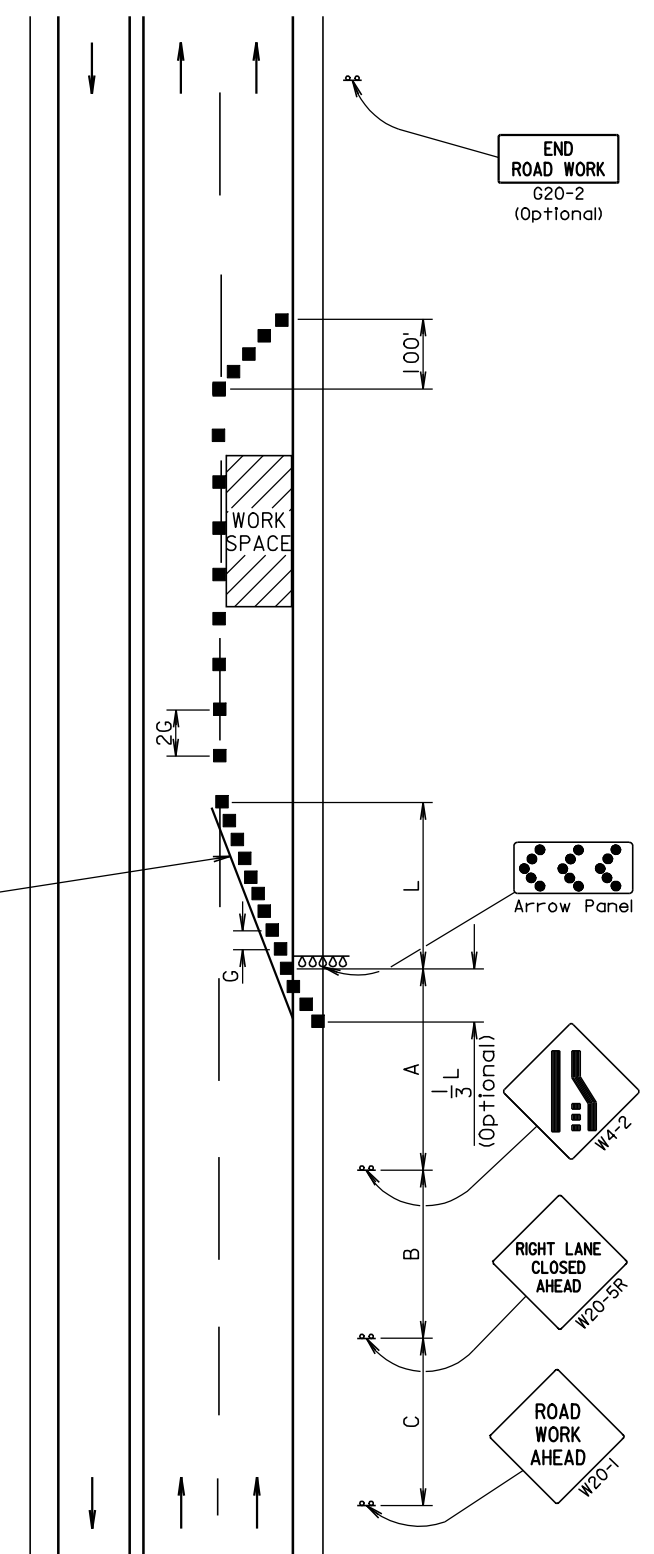
**Channelizing Device**

Drums or Type II Barricades shall be used if required overnight.

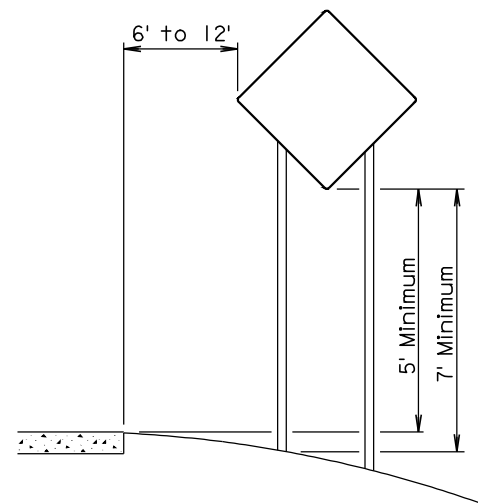
42" cones may be used along centerline

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

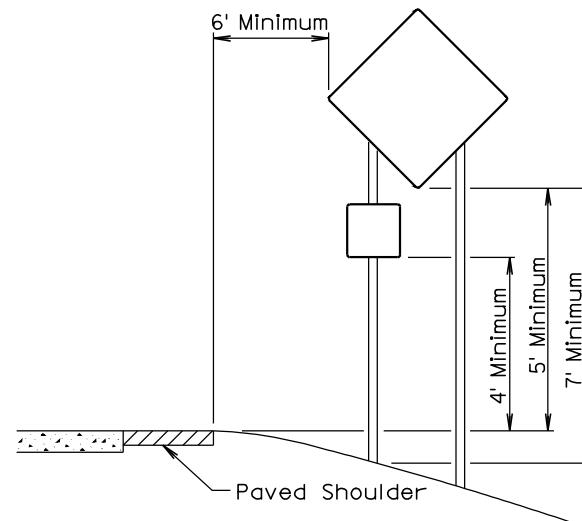
Four inch white temporary pavement marking shall be used if traffic control must remain overnight or longer.



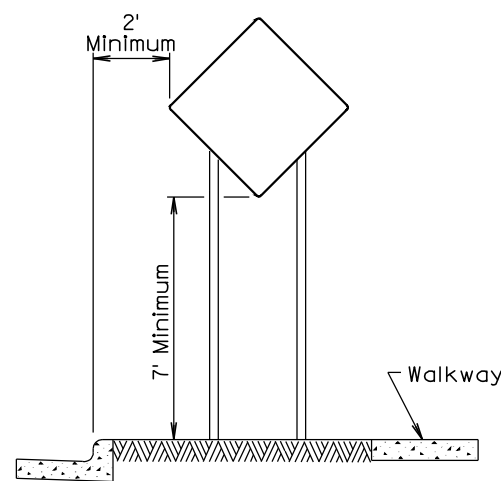
Plotting Date: 23-MAR-2010



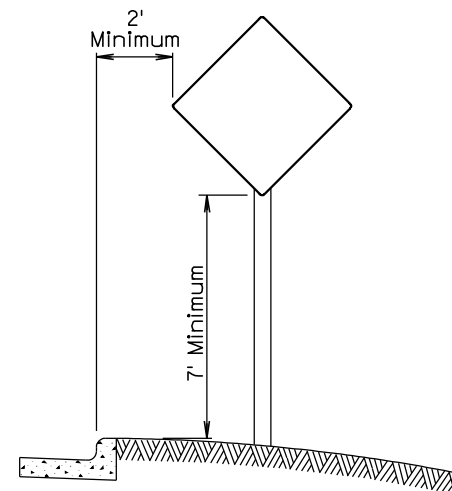
RURAL DISTRICT



RURAL DISTRICT WITH  
SUPPLEMENTAL PLATE



URBAN DISTRICT



URBAN DISTRICT

December 23, 2003

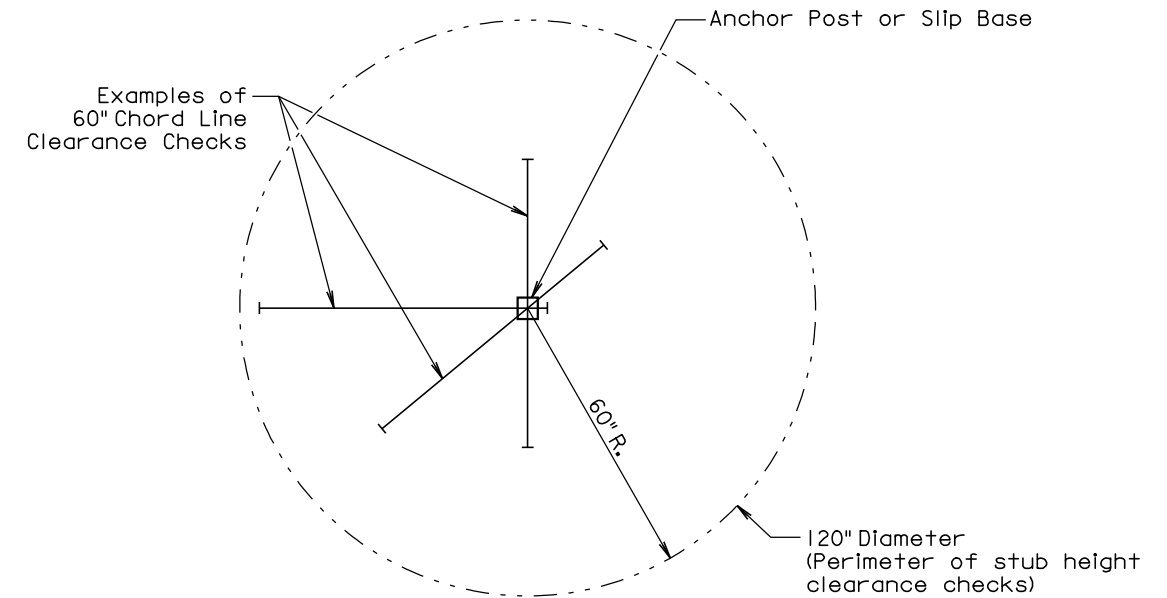
Published Date: 1st Qtr. 2010

**S  
D  
D  
O  
T**

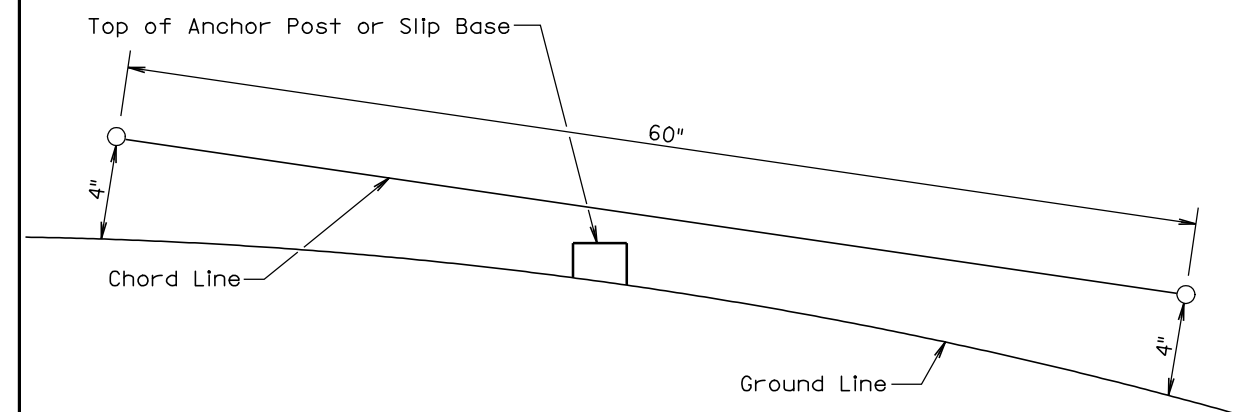
**BREAKAWAY SIGN SUPPORTS**  
(Typical Construction Signing)

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: 1st Qtr. 2010

**S  
D  
D  
O  
T**

**BREAKAWAY SUPPORT STUB CLEARANCE**

PLATE NUMBER  
634.99

Sheet 1 of 1

|                             |          |              |                 |
|-----------------------------|----------|--------------|-----------------|
| STATE OF<br>SOUTH<br>DAKOTA | PROJECT  | SHEET<br>NO. | TOTAL<br>SHEETS |
|                             | 000P-452 | 7            | 8               |

Plotting Date: 23-MAR-2010

# GUARDRAIL LOCATION



PLOT SCALE - 200,000,000:1,000,000

PLOTTED FROM - TRR011610

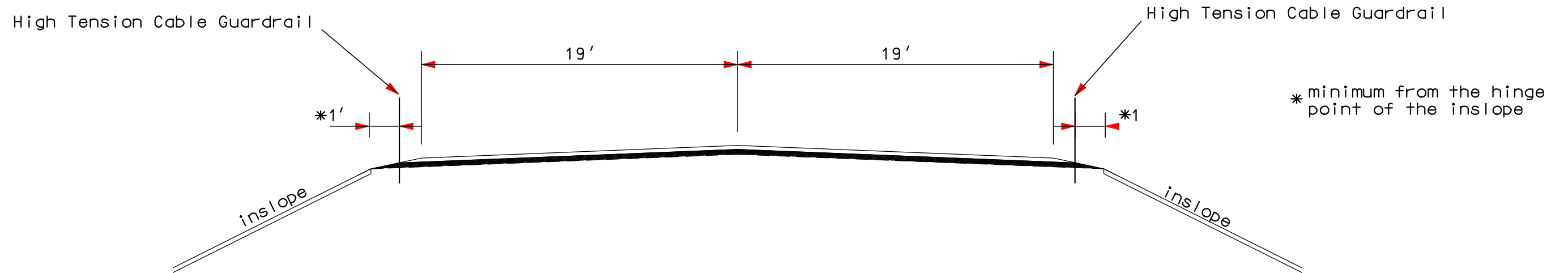
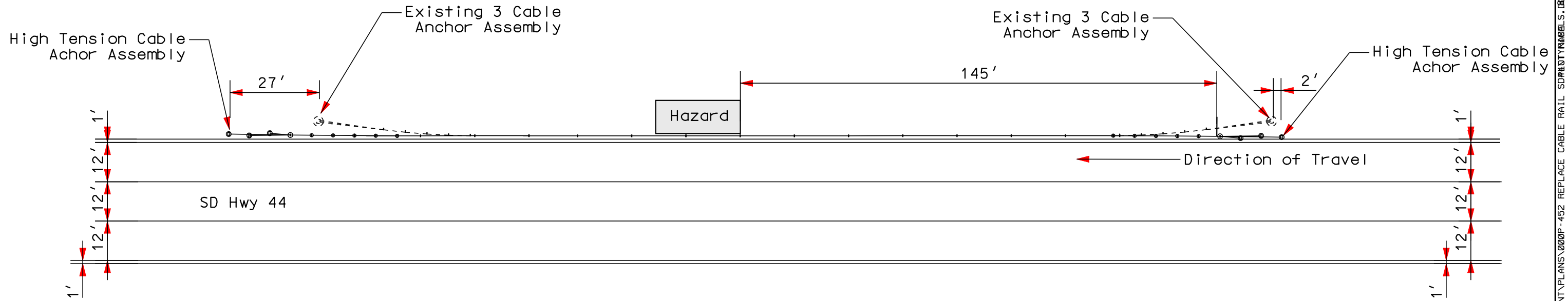
FILE - U:\REGION\RC\PR\2010\REGMAINT\PLANS\000P-452 REPLACE CABLE RAIL SD\REGMAINT\WEGN 7



# GUARDRAIL LAYOUT

|                       |                     |                |                   |
|-----------------------|---------------------|----------------|-------------------|
| STATE OF SOUTH DAKOTA | PROJECT<br>000P-452 | SHEET NO.<br>8 | TOTAL SHEETS<br>8 |
|-----------------------|---------------------|----------------|-------------------|

Plotting Date: 23-MAR-2010



\* minimum from the hinge point of the inslope

PLOT SCALE - 30.000000:1.000000

PLOTTED FROM - TRRC11610

FILE - U:\REGION\RC\PR\2010\REGMAINT\PLANS\000P-452 REPLACE CABLE RAIL SD\RD\TR\GABLS.DGN