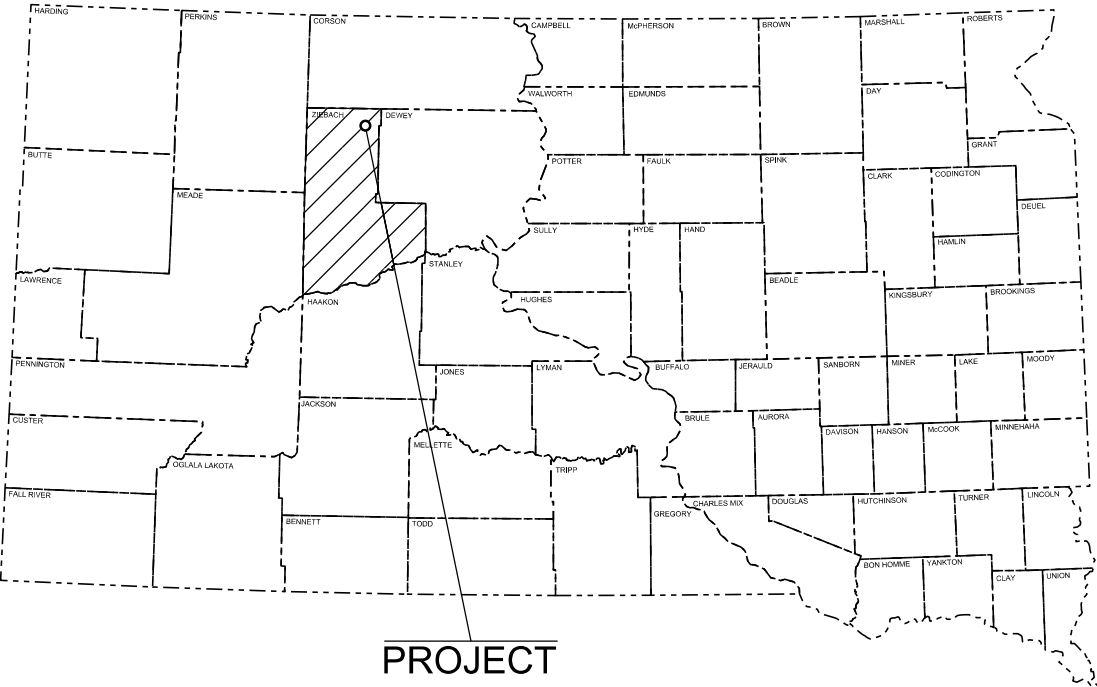


PLOT SCALE - 1:200

PLOTTED FROM - TRM01N104



STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
PLANS FOR PROPOSED

PROJECT 020-372  
SD HIGHWAY 20  
ZIEBACH COUNTY

INSLOPE EROSION REPAIR & DOWNSPOUT REPLACEMENT  
PCN I4YV

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	1	30

Plotting Date: 08/24/2018

INDEX OF SHEETS

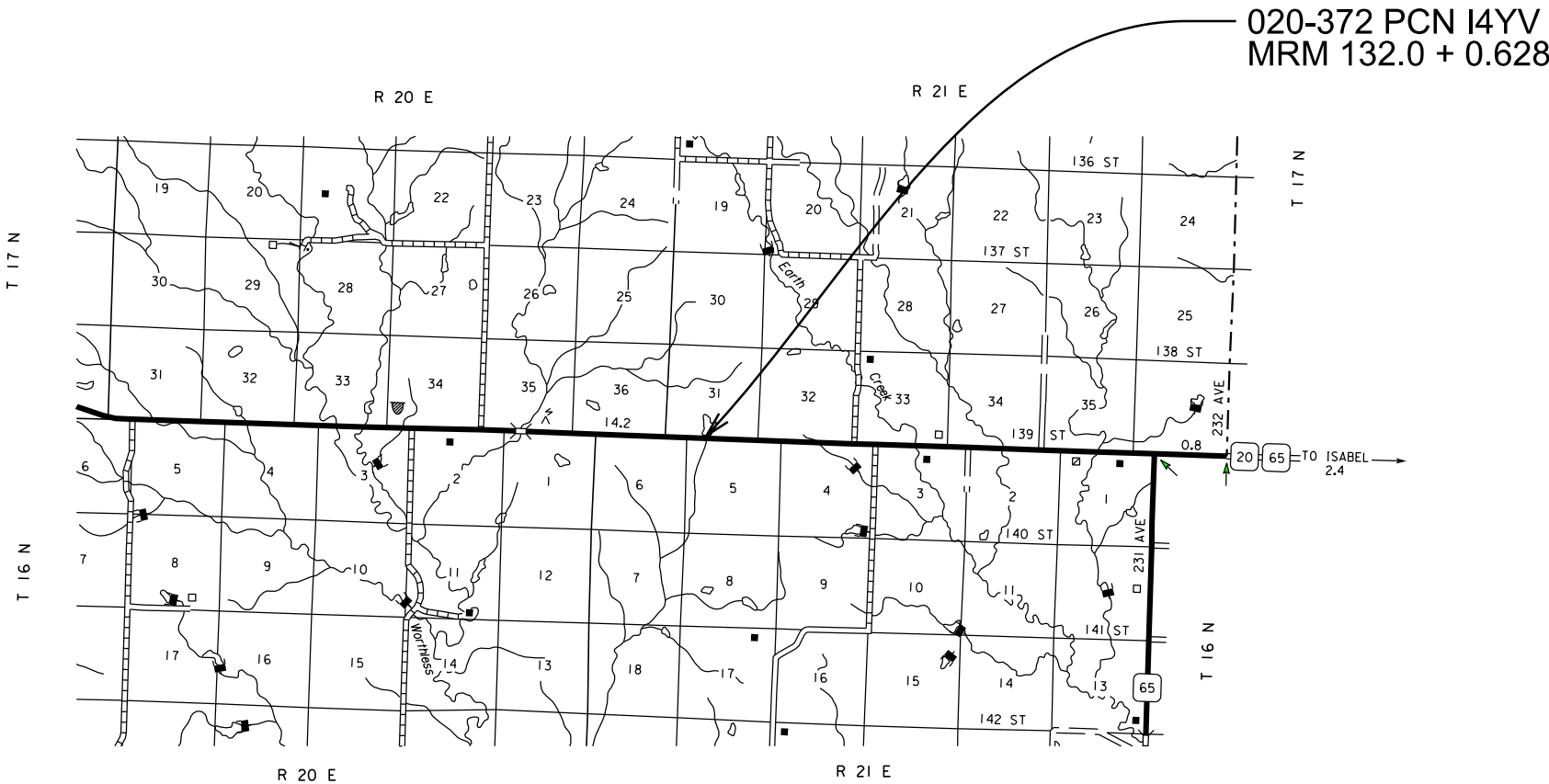
1	General Layout with Index
2-3	Estimate of Quantities and Environmental Commitments
4-6	Storm Water Pollution Prevention Plan (SWPPP)
7-11	General Notes & Tables
12	Fence Quantities
13	Control Data and Horizontal Alignment
14	Plan Sheet
15	Pipe Cross Section
16-17	Erosion and Sediment Control
18-22	Outlet Channel cross sections
23-30	Standard Plates

DESIGN DESIGNATION

AADT (2016)	134
AADT (2036)	186
DHV	22
D	50%
DHV T%	9.3%
AADT T%	20.4%
V	55 mph

STORM WATER PERMIT

(None required)  
Area disturbed 0.22 acre



Gross Length	100 Feet	0.02 Miles
Length of Exceptions	0 Feet	0 Miles
Net Length	100 Feet	0.02 Miles

PLOT NAME - 1

FILE - ...\\I4YV TITLE.DGN

ESTIMATE OF QUANTITIES AND ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	2	30

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E0500	Remove Pipe Culvert	30	Ft
110E0510	Remove Pipe End Section	2	Each
110E0600	Remove Fence	610	Ft
110E1650	Remove Bank and Channel Protection Gabion	1	Each
110E1690	Remove Sediment	0.5	CuYd
120E0020	Unclassified Excavation	Lump Sum	LS
230E0100	Remove and Replace Topsoil	Lump Sum	LS
421E0100	Pipe Culvert Undercut	8	CuYd
450E5310	24" CMP Sloped End, Furnish	2	Each
450E5311	24" CMP Sloped End, Install	2	Each
450E9226	Slipline 30" Pipe	124	Ft
462E0250	Cellular Grout	4.2	CuYd
464E0100	Controlled Density Fill	21.0	CuYd
620E0020	Type 2 Right-of-Way Fence	100	Ft
620E0040	Type 4 Right-of-Way Fence	510	Ft
620E0515	Type 1A Temporary Fence	365	Ft
620E1020	2 Post Panel	2	Each
620E1030	3 Post Panel	4	Each
634E0010	Flagging	20.0	Hour
634E0110	Traffic Control Signs	105.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
700E0210	Class B Riprap	252.0	Ton
734E0010	Erosion Control	Lump Sum	LS
734E0042	Soil Stabilizer	1,143.0	SqYd
734E0101	Type 1 Erosion Control Blanket	1,143	SqYd
734E0154	12" Diameter Erosion Control Wattle	200	Ft
734E0165	Remove and Reset Erosion Control Wattle	50	Ft
831E0110	Type B Drainage Fabric	340	SqYd

SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

COMMITMENT A: WETLANDS

Approximately 0.005 acres of wetlands will be impacted by the project. Refer to sheet "EROSION AND SEDIMENT CONTROL PLAN" for location and boundaries of the impacted wetlands. These unavoidable impacts to wetlands are less than 0.1 acres and the "Statewide Wetland Finding for South Dakota Federal-Aid Highway Projects" will apply.

Table of Impacted Wetlands

Wetland No.	Type	Station	Impact Left (Acres)	Impact Right (Acres)	Temporary Impact (Acres)	Total Impact (Acres)
1	PABFh	328+00 to 329+00	0.005	0	0.05	0.005

Action Taken/Required:

Temporary impacts will not be mitigated as original grades will be re-established.

A mitigation plan has been provided by the SDDOT Environmental Office. A monitoring plan has been included and responsibilities are accounted for. The contact person is the Environmental Project Scientist of the SDDOT Environmental Office at 605-773-3268.

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT B4: BALD EAGLE

Bald eagles are known to occur in this area.

Action Taken/Required:

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

COMMITMENT D: WATER QUALITY STANDARDS

COMMITMENT D1: SURFACE WATER QUALITY

The unnamed stream and associated impounded water is classified as fish and wildlife propagation, recreation, irrigation, and stock watering waters. Because of these beneficial uses, special construction measures may have to be taken to ensure that this water body is not impacted.

Action Taken/Required:

The Contractor is advised the South Dakota Surface Water Quality Standards, administered by the Department of Environment and Natural Resources (DENR), apply to this project. Special construction measures shall be taken to ensure the above standard(s) of the surface waters are maintained and protected.

ESTIMATE OF QUANTITIES AND ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	3	30

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for 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 Project 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 and/or 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 and/or demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public 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 Public 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.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC 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 artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

COMMITMENT O: SECTION 401 WATER QUALITY CERTIFICATION

The SDDOT has obtained a Clean Water Act Section 401 Water Quality Certification from the Environmental Protection Agency (EPA) regarding an US Army Corp of Engineers CWA Section 404 Permit for the actions associated with this project.

Action Taken/Required:

The Contractor will comply with all requirements contained in the Section 401 certification. A copy of the EPA CWA 401 Certification must be retained on-site.

**STORM WATER POLLUTION PREVENTION PLAN (SWPPP)**  
**CHECKLIST (EPA 2017 CGP)**

(The numbers right of the title headings are **reference numbers** to the National Pollutant Discharge Elimination System General Permit for Discharges from Construction Activities)

**NATURE OF CONSTRUCTION ACTIVITIES (7.2.3)**

- **Project Limits: See Title Sheet (7.2.3)**
- **Project Description: See Title Sheet (7.2.3 a.)**
- **Site Map(s): See Title Sheet and Plans (7.2.4)**
- **Major Soil Disturbing Activities** (check all that apply)
  - ☐ Clearing and grubbing
  - ☐ Excavation/borrow
  - ☒ Grading and shaping
  - ☐ Filling
  - ☐ Cutting and filling
  - ☐ Other (describe):
- **Total Project Area: 6.0 acres (7.2.3 b.)**
- **Total Area To Be Disturbed: 0.22 Acres (7.2.3 c.)**
- **Existing Vegetative Cover (%): 100 %**
- **Soil Properties: Bullock-Parchin fine sandy loams (2.1.1 c.)**
- **Name of Receiving Water Body/Bodies: Unarmed creek (7.2.4 g.)**
- **Project discharges to Sensitive water: Yes / No (3.2)**

**SEQUENCE OF ACTIVITIES (7.2.3)**

- (Soil stabilization measures shall be initiated **immediately** whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 14 calendar days. **Temporary stabilization must be completed within 14 days**)
- **Install perimeter protection where runoff sheets from the site.**
  - **Remove and store topsoil.**
  - **Remove culvert end sections**
  - **Plug and fill downspout section of pipe**
  - **Line pipe and install end sections**
  - **Install Riprap Outlet Channel**
  - **Spread topsoil**
  - **Seed and stabilize disturbed areas.**

**EROSION AND SEDIMENT CONTROLS (7.2.6 b.)**

(Check all that apply)

- **Perimeter controls**
  - ☒ Vegetation Buffer Strips
  - ☒ Erosion Control Wattles
  - ☐ Compost Logs
  - ☐ Stockpile berms
  - ☐ Silt Fence
  - ☒ Temporary Berms
  - ☐ Stabilized Construction Entrances
  - ☐ Entrance/Exit Equipment Tire Wash
  - ☐ Other:

➤ **Construction Dewatering Sediment Control**

- ☐ Dewatering bag
- ☐ Dewatering tank
- ☐ Flocculent sock
- ☐ Temporary sedimentation basin
- ☐ Off-site disposal
- ☐ Dust control or irrigation
- ☐ Other:

➤ **Stabilization Practices**

- ☒ Surface Roughening (e.g. tracking)
- ☒ Soil Stabilizer
- ☐ Temporary Seeding (Cover Crop Seeding)
- ☒ Permanent Seeding
- ☐ Sodding
- ☐ Planting (Woody Vegetation for Soil Stabilization)
- ☐ Mulching (Grass Hay or Straw)
- ☐ Fiber Mulching (Wood Fiber Mulch)
- ☐ Bonded Fiber Matrix
- ☐ Fiber Reinforced Matrix
- ☒ Erosion Control Blankets
- ☐ Dust Control
- ☐ Other:

➤ **Structural Temporary Erosion and Sediment Controls**

- ☐ Silt Fence
- ☐ Floating Silt Curtain
- ☐ Erosion Bales
- ☐ Temporary Berm (Windrow)
- ☐ Temporary Slope Drain
- ☒ Erosion Control Wattles
- ☐ Temporary Sediment Barriers
- ☐ Turf Reinforcement Mat
- ☒ Riprap
- ☐ Gabions
- ☐ Rock Check Dams
- ☐ Sediment Traps/Basins
- ☐ Culvert Inlet Protection
- ☐ Transition Mats
- ☐ Median/Area Drain Inlet Protection
- ☐ Curb Inlet Protection
- ☐ Interceptor Ditch
- ☐ Concrete Washout Facility
- ☐ Temporary Diversion Channel
- ☐ Work Platform
- ☐ Temporary Water Barrier
- ☐ Temporary Water Crossing
- ☐ Other:
- 

➤ **Wetland Avoidance**

Will construction and/or erosion and sediment controls impinge on regulated wetlands? Yes ☐ No ☒ If yes, the structural and erosion and sediment controls have been included in the total project wetland impacts and have been included in the 404 permit process with the USACE.

➤ **Storm Water Management (7.2.6)**

Storm water management will be handled by temporary controls outlined in “EROSION AND SEDIMENT CONTROLS” above, and any permanent controls needed to meet permanent storm water management needs in the post construction period. Permanent controls will be shown on the plans and noted as permanent.

➤ **Other Storm Water Controls (7.2.6 b. viii.)**

- **Waste Disposal**

All liquid waste materials will be collected and stored in sealed containers approved by the project engineer. All trash and construction debris from the site will be deposited in the approved containers. Containers will be serviced as necessary, and the trash will be hauled to an approved disposal site or licensed landfill. All onsite personnel will be instructed in the proper procedures for waste disposal, and notices stating proper practices will be posted in the field office. The general Contractor’s representative responsible for the conduct of work on the site will be responsible for seeing waste disposal procedures are followed.
- **Hazardous Waste**

All hazardous waste materials will be disposed of in a manner specified by local or state regulations or by the manufacturer. Site personnel will be instructed in these practices, and the individual designated as the Contractor’s on-site representative will be responsible for seeing that these practices are followed.
- **Sanitary Waste**

Portable sanitary facilities will be provided on all construction sites. Sanitary waste will be collected from the portable units in a timely manner by a licensed waste management Contractor or as required by any local regulations.

**MAINTENANCE AND INSPECTION (7.2.7)**

➤ **Maintenance and Inspection Practices**

- Inspections will be conducted at least one time per week and after a storm event of 0.25 inches or greater.
- All controls will be maintained in good working order. Necessary repairs will be initiated within 24 hours of the site inspection report.
- Silt fence will be inspected for depth of sediment and for tears in order to ensure the fabric is securely attached to the posts and that the posts are well anchored. Sediment buildup will be removed from the silt fence when it reaches 1/3 of the height of the silt fence.
- Sediment basins and traps will be checked. Sediment will be removed when depth reaches approximately 50 percent of the structure’s capacity, and at the conclusion of the construction.
- Check dams will be inspected for stability. Sediment will be removed when depth reaches 1/2 the height of the dam.
- All seeded areas will be checked for bare spots, washouts, and vigorous growth free of significant weed infestations.
- Inspection and maintenance reports will be prepared on form DOT 298 for each site inspection, this form will also be used to document changes to the SWPPP. A copy of the completed inspection form will be filed with the SWPPP documents.
- The SDDOT Project Engineer and Contractor’s Erosion Control Supervisor are responsible for inspections. Maintenance, repair activities are the responsibility of the Contractor. The SDDOT Project Engineer will complete the inspection and maintenance reports and distribute copies per the distribution instructions on DOT 298.

**NON-STORM WATER DISCHARGES (7.2.5)**

The following non-storm water discharges are anticipated during the course of this project (check all that apply).

- ☐ Discharges from water line flushing.
- ☐ Pavement wash-water, where no spills or leaks of toxic or hazardous materials have occurred.
- ☐ Uncontaminated ground water associated with dewatering activities.
- ☐ Water for dust control.
- ☐ Landscape irrigation.

**MATERIALS INVENTORY (7.2.3 g)**

The following materials or substances are expected to be present on the site during the construction period. These materials will be handled as noted under the headings “EROSION AND SEDIMENT CONTROLS” and “SPILL PREVENTION” (check all that apply).

- ☒ Concrete and Portland Cement
- ☐ Detergents
- ☐ Paints
- ☐ Metals
- ☐ Bituminous Materials
- ☒ Petroleum Based Products
- ☐ Cleaning Solvents
- ☐ Wood
- ☒ Cure
- ☐ Texture
- ☐ Chemical Fertilizers
- ☒ DEF
- ☐ Other:

**SPILL PREVENTION (7.2.6 b. vii.)**

➤ **Material Management**

- Housekeeping
  - Only needed products will be stored on-site by the Contractor.
  - Except for bulk materials the contractor will store all materials under cover and in appropriate containers.
  - Products must be stored in original containers and labeled.
  - Material mixing will be conducted in accordance with the manufacturer’s recommendations.
  - When possible, all products will be completely used before properly disposing of the container off-site.
  - The manufacturer’s directions for disposal of materials and containers will be followed.
  - The Contractor’s site superintendent will inspect materials storage areas regularly to ensure proper use and disposal.
  - Dust generated will be controlled in an environmentally safe manner.
  - Vegetation areas not essential to the construction project will be preserved and maintained as noted on the plans.
- Hazardous Materials
  - Products will be kept in original containers unless the container is not resealable.
  - Original labels and material safety data sheets will be retained in a safe place to relay important product information.

- If surplus product must be disposed of, manufacturer’s label directions for disposal will be followed.
- Maintenance and repair of all equipment and vehicles involving oil changes, hydraulic system drain down, de-greasing operations, fuel tank drain down and removal, and other activities which may result in the accidental release of contaminants will be conducted on an impervious surface and under cover during wet weather to prevent the release of contaminants onto the ground.
- Wheel wash water will be collected and allowed to settle out suspended solids prior to discharge. Wheel wash water will not be discharged directly into any storm water system or storm water treatment system.
- Potential pH-modifying materials such as: bulk cement, cement kiln dust, fly ash, new concrete washings, concrete pumping, residuals from concrete saw cutting (either wet or dry), and mixer washout waters will be collected on site and managed to prevent contamination of storm water runoff.

➤ **Product Specific Practices**

Petroleum Products

All on-site vehicles will be monitored for leaks and receive regular preventive maintenance to reduce the chance of leakage. Petroleum products will be stored in tightly sealed containers which are clearly labeled.

Fertilizers

Fertilizers will be applied only in the amounts specified by the SDDOT. Once applied, fertilizers will be worked into the soil to limit the exposure to storm water. Fertilizers will be stored in an enclosed area. The contents of partially used fertilizer bags will be transferred to sealable containers to avoid spills.

Paints

All containers will be tightly sealed and stored when not required for use. The excess will be disposed of according to the manufacturer’s instructions and any applicable state and local regulations.

Concrete Trucks

Contractors will provide designated truck washout facilities on the site. These areas must be self-contained and not connected to any storm water outlet of the site. Upon completion of construction, the area at the washout facility will be properly stabilized.

➤ **Spill Control Practices (7.2.6 b. vii.)**

In addition to the previous housekeeping and management practices, the following practices will be followed for spill prevention and cleanup if needed.

- For all hazardous materials stored on site, the manufacturer’s recommended methods for spill cleanup will be clearly posted. Site personnel will be made aware of the procedures and the locations of the information and cleanup supplies.
- Appropriate cleanup materials and equipment will be maintained by the Contractor in the materials storage area on-site. As appropriate, equipment and materials may include items such as brooms, dust pans, mops, rags, gloves, goggles, kitty litter, sand, sawdust, and plastic and metal trash containers specifically for cleanup purposes.
- All spills will be cleaned immediately after discovery and the materials disposed of properly.

- The spill area will be kept well ventilated and personnel will wear appropriate protective clothing to prevent injury from contact with a hazardous substance.
- After a spill a report will be prepared describing the spill, what caused it, and the cleanup measures taken. The spill prevention plan will be adjusted to include measures to prevent this type of spill from reoccurring, as well as clean up instructions in the event of reoccurrences.
- The Contractor’s site superintendent, responsible for day-to-day operations, will be the spill prevention and cleanup coordinator. The Contractor is responsible for ensuring that the site superintendent has had appropriate training for hazardous materials handling, spill management, and cleanup.

➤ **Spill Response (7.2.6 b. vii.)**

The primary objective in responding to a spill is to quickly contain the material(s) and prevent or minimize migration into storm water runoff and conveyance systems. If the release has impacted on-site storm water, it is critical to contain the released materials on-site and prevent their release into receiving waters. If a spill of pollutants threatens storm water or surface water at the site, the spill response procedures outlined below must be implemented in a timely manner to prevent the release of pollutants.

- The Contractor’s site superintendent will be notified immediately when a spill or the threat of a spill is observed. The superintendent will assess the situation and determine the appropriate response.
- If spills represent an imminent threat of escaping erosion and sediment controls and entering receiving waters, personnel will be directed to respond immediately to contain the release and notify the superintendent after the situation has been stabilized.
- Spill kits containing appropriate materials and equipment for spill response and cleanup will be maintained by the Contractor at the site.
- If oil sheen is observed on surface water (e.g. settling ponds, detention ponds, swales), action will be taken immediately to remove the material causing the sheen. The Contractor will use appropriate materials to contain and absorb the spill. The source of the oil sheen will also be identified and removed or repaired as necessary to prevent further releases.
- If a spill occurs the superintendent or the superintendent’s designee will be responsible for completing the spill reporting form and for reporting the spill to SD DENR.
- Personnel with primary responsibility for spill response and clean up will receive training by the Contractor’s site superintendent or designee. The training must include identifying the location of the spill kits and other spill response equipment and the use of spill response materials.
- Spill response equipment will be inspected and maintained as necessary to replace any materials used in spill response activities.

**SPILL NOTIFICATION (SDDENR and 2.3.6)**

In the event of a spill, the Contractor's site superintendent will make the appropriate notification(s), consistent with the following procedures:

- A release or spill of a regulated substance (includes petroleum and petroleum products) must be reported to SD DENR immediately if **any one of the following** conditions exists:
  1. The discharge threatens or is in a position to threaten the waters of the state (surface water or ground water).
  2. The discharge causes an immediate danger to human health or safety.
  3. The discharge exceeds 25 gallons.
  4. The discharge causes a sheen on surface water.
  5. The discharge of any substance that exceeds the ground water quality standards of ARSD (Administrative Rules of South Dakota) chapter 74:51:01.
  6. The discharge of any substance that exceeds the surface water quality standards of ARSD chapter 74:51:01.
  7. The discharge of any substance that harms or threatens to harm wildlife or aquatic life.
  8. The discharge of crude oil in field activities under SDCL (South Dakota Codified Laws) chapter 45-9 is greater than 1 barrel (42 gallons).
  9. The discharge is required to be reported according to SARA Title III List of Lists, Consolidated List of Chemicals Subject to Reporting Under the Emergency Planning and Community Right to Know Act, US Environmental Protection Agency.
- Where a leak, spill, or other release containing a hazardous substance or oil in an amount equal to or in excess of a reportable quantity established under either 40 CFR 110, 40 CFR 117, or 40 CFR 302 occurs during a 24-hour period, the operator must also report such spills to the National Response Center at (800) 424-8802.

To report a release or spill, call DENR at 605-773-3296 during regular office hours (8 a.m. to 5 p.m. Central time). To report the release after hours, on weekends or holidays, call State Radio Communications at 605-773-3231.

Reporting the release to DENR does not meet any obligation for reporting to other state, local, or federal agencies. Therefore, the responsible person must also contact local authorities to determine the local reporting requirements for releases.

**CONSTRUCTION CHANGES (7.4)**

When changes are made to the construction project that will require alterations in the temporary erosion controls of the site, the Storm Water Pollution Prevention Plan (SWPPP) will be amended to provide appropriate protection to disturbed areas, all storm water structures, and adjacent waters. The SDDOT Project Engineer will modify the SWPPP plan (DOT 298) and drawings to reflect the needed changes. Copies of changes will be routed per DOT 298. Copies of forms and the SWPPP will be retained in a designated place for review over the course of the project.

**CERTIFICATIONS**

➤ **Certification of Compliance with Federal, State, and Local Regulations (7.2.9)**

The Storm Water Pollution Prevention Plan (SWPPP) for this project reflects the requirements of all local municipal jurisdictions for storm water management and sediment and erosion control as established by ordinance, as well as other state and federal requirements for sediment and erosion control plans, permits, notices or documentation as appropriate.

➤ **South Dakota Department of Transportation**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.



Authorized Signature (See Appendix I, Part 1.11)

➤ **Prime Contractor**

This section is to be executed by the General Contractor after the award of the contract. This section may be executed any time there is a change in the Prime Contractor of the project.

I certify under penalty of law that this document and all attachments will be revised or maintained under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

\_\_\_\_\_  
Authorized Signature

**CONTACT INFORMATION**

➤ **Contractor Information:**

- Prime Contractor Name: \_\_\_\_\_
- Contractor Contact Name: \_\_\_\_\_
- Address: \_\_\_\_\_
- \_\_\_\_\_
- City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_
- Office Phone: \_\_\_\_\_ Field: \_\_\_\_\_
- Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

➤ **Erosion Control Supervisor**

- Name: \_\_\_\_\_
- Address: \_\_\_\_\_
- \_\_\_\_\_
- City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_
- Office Phone: \_\_\_\_\_ Field: \_\_\_\_\_
- Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

➤ **SDDOT Project Engineer**

- Name: \_\_\_\_\_
- Business Address: \_\_\_\_\_
- Job Office Location: \_\_\_\_\_
- City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_
- Office Phone: \_\_\_\_\_ Field: \_\_\_\_\_
- Cell Phone: \_\_\_\_\_ Fax: \_\_\_\_\_

➤ **SD DENR Contact Spill Reporting**

- Business Hours Monday-Friday (605) 773-3296
- Nights and Weekends (605) 773-3231

➤ **SD DENR Contact for Hazardous Materials.**

- (605) 773-3153

➤ **National Response Center Hotline**

- (800) 424-8802.



STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	020-372	7	30

SCOPE OF WORK

The work required within these sites includes, but is not limited to, the following items, not listed in order of execution.

1. Remove existing R.O.W. Fence
2. Install Temporary Fence
3. Remove and Stockpile Topsoil
4. Remove pipe and plug and abandon pipe
5. Shape and undercut for slip-lined pipe placement
6. Slipline Pipe and install end sections
7. Drainage Fabric & Riprap Installation
8. Replace Topsoil
9. Install R.O.W. Fence
10. Install Erosion Control Devices
11. Permanent Seeding & Erosion Blanket Disturbed Areas

The Contractor is encouraged to inspect the project prior to bidding to evaluate the extent of work that will be required for construction.

SCOPE OF WORK FOR PIPE

**Station 324+80:** The site work on the left consists of removing the existing inlet end section and installing a 24” CMP flared end sections onto the slipline pipe and shaping and reseeding the disturbed area. The site work on the right consists of a 1:1 cut at the edge of the pavement until the existing pipe is discovered. The existing elbow and approximately 16’ of the downspout pipe right of the elbow shall be removed or to a depth at least 2’ below the sliplined pipe. The existing pipe from the inlet to the removed elbow shall remain in-place and be sliplined with a 30" slipline pipe. The last 10 ft of the existing CMP downspout and the end section shall be removed and the remaining pipe shall be plugged and filled with controlled density fill. A 24” CMP sloped end section shall be installed on the sliplined pipe outlet. A 2.0' thick x 18' wide Class B Riprap outlet channel, with Type B Drainage Fabric beneath the riprap, shall be installed from the outlet to the bottom of the channel. Excess soil removed from the riprap outlet excavation shall be used as fill at other locations throughout the project. Scour holes and erosion shall be filled in. All disturbed areas will be seeded, stabilized and Erosion Control Blanket installed.

SEQUENCE OF OPERATIONS

The Contractor shall submit a proposed sequence of operations for the Engineer’s review and approval at least two weeks prior to the preconstruction meeting.

Traffic shall be maintained through the project at ALL times. The Contractor shall maintain access on and off the highway for local residences and county roads. The Contractor may perform work on the roadway during daylight hours only, unless additional hours are approved by the Engineer. Traffic shall be returned to normal driving lanes during non-working hours.

Contractor shall accommodate all over width traffic for the duration of the project.

GENERAL NOTES

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, signs, and markers that are damaged or lost shall be replaced by the Contractor at no cost to the State.

UTILITIES

The Contractor shall be aware that the existing utilities shown in the plans were surveyed prior to the design of this project and might have been relocated or replaced by a new utility facility prior to construction of this project, might be relocated or replaced by a new utility facility during the construction of this project, or might not require adjustment and may remain in its current location. The Contractor shall contact each utility owner and confirm the status of all existing and new utility facilities. The utility contact information is provided elsewhere in the plans or bidding documents.

The fiber optic line on the right is assumed to be at a depth of 4’ below existing ground. The line is to remain in-place and undisturbed by the construction.

REMOVE BANK AND CHANNEL PROTECTION GABION

The Contractor will be required to remove the existing gabion on the right side at the end of the existing pipe outlet.

It is estimated that 7.0 CuYd (for informational purposes only) of existing gabion will be removed.

All costs associated with the removal and disposal of the existing gabion shall be incidental to the contract unit price for “Remove Bank and Channel Protection Gabion”.

RIPRAP

**General:** The riprap outlet channel shall be established as shown on the cross sections and shall be placed to the satisfaction of the Engineer and by following the Specifications.

Prior to riprap placement, it will be necessary to re-construct the embankment necessary to insure the proper profile of the embankment is re-established.

All disturbed areas beyond the riprap placement and other areas disturbed due to construction activities shall be restored to the satisfaction of the Engineer.

A factor of 1.4 tons per cubic yard was used to convert cubic yard to Tons.

Drainage fabric shall be placed underneath and up the sides of the riprap. The fabric shall conform to Section 831 of the Specifications.

Location	Class B Riprap (Tons)	Type B Drainage Fabric (SqYd)
Station 324+80	252.2	335
<b>Total:</b>	<b>252.2</b>	<b>335</b>

UNCLASSIFIED EXCAVATION

The unclassified material shall be placed as shown in the applicable plan sheets and/or to the satisfaction of the Engineer.

For information only, the estimated quantity for Unclassified Excavation is shown in the Table of Unclassified Excavation. Payment for the bid item “Unclassified Excavation” shall be paid for as “Lump Sum” for overburdened material and other miscellaneous excavation. Once the overburdened material has been removed, payment for “Unclassified Excavation” to achieve the riprap footprint shall be incidental to the placement of the riprap.

A shrinkage factor of 30% was used.

TABLE OF UNCLASSIFIED EXCAVATION

Location	Removal Excavation (CuYd)	Topsoil (CuYd)	Excavation Quantity (Overburde n Material) (CuYd)	Excavation Quantity (Incidental to Riprap) (CuYd)	Place Back Quantity +30% (CuYd)
324+80	320	219	22	171	50
<b>Total:</b>	<b>320</b>	<b>219</b>	<b>22</b>	<b>171</b>	<b>224</b>

REMOVE AND REPLACE TOPSOIL

The Contractor will be required to remove and salvage 6 inches of the existing topsoil from all disturbed areas.

The Contractor shall stockpile the material at a site approved by the Engineer, and/or windrow the material near the disturbed areas to control potential sediment runoff as determined by the Engineer.

Following completion of construction, topsoil shall be spread evenly over the disturbed areas.

All topsoil removal, stockpiling, salvaging, windrowing, and replacement shall be done as according to the plans and/or as directed by the Engineer.

All cost associated with removing, salvaging, stockpiling, windrowing, and replacing topsoil shall be incidental to the contract lump sum price for “Remove and Replace Topsoil”.

All excess topsoil material shall be spread on the disturbed areas before seeding.

Measurement of topsoil quantities will not be made; however for informational purposes only, the Table of Estimated Topsoil Removal and Replacement shows the estimated topsoil removal and replacement throughout the sites within this Contract.

TABLE OF ESTIMATED TOPSOIL REMOVAL AND REPLACEMENT

Location	6" Topsoil Removal (CuYd)	7.5" Topsoil Replacement (CuYd)
Station 324+80 Lt.	4	5
Station 324+80 Rt.	215	213
Total:	219	218

EROSION CONTROL

The estimated area requiring erosion control is 0.24 acres (10287 square feet). All costs for the erosion control work for furnishing, placing, and maintaining erosion control including equipment, labor, seed and inoculum shall be incidental to the contract lump sum price for "Erosion Control".

The limits of erosion control work will be determined by the Engineer during construction.

The areas disturbed as a result of work on this project shall be restored and/or reshaped to the satisfaction of the Engineer. All disturbed areas shall be seeded, stabilized and blanketed.

Permanent Seeding

Type C Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Arriba, Flintlock, Rodan, Rosana, Walsh	16
Canada Wildrye	Mandan	2
Total:		18

Application of fertilizer will not be required on this project.

Mycorrhizal Inoculum

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

- 25%  
25%  
25%  
25%
- Glomus intraradices  
Glomus aggregatum or deserticola  
Glomus mosseae  
Glomus etunicatum

All seed shall be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed shall be incidental to the contract lump sum price for "Erosion Control."

The mycorrhizal inoculum shall be as shown below or an approved equal:

Product	Manufacturer
MycoApply	Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 www.mycorrhizae.com
AM 120 Multi Species Blend	Reforestation Technologies Int. Gilroy, CA Phone: 1-800-784-4769 www.reforest.com

EROSION CONTROL BLANKET

Erosion control blanket shall be installed at the locations noted in the table and at locations determined by the Engineer during construction.

The erosion control blanket provided shall be from the approved product list. The approved product list for erosion control blanket may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

Station to	Station	L/R	Location	Type	Quantity (SqYd)
324+68	324+86	L	Around Culvert End	1	25
324+51	325+09	R	Inslope around riprap	1	1068
324+10		R	Erosion Repair	1	25
325+30		R	Erosion Repair	1	25
Additional Quantity:				1	0
Total Type 1 Erosion Control Blanket:					1143

EROSION CONTROL WATTLE

Erosion control wattles for restraining the flow of runoff and sediment shall be installed at locations noted in the table and at locations determined by the Engineer during construction. Refer to Standard Plate 734.06 for details.

The Contractor shall provide certification that the erosion control wattles do not contain noxious weed seeds.

Erosion control wattles shall remain on the project to decompose.

The erosion control wattle provided shall be from the approved product list. The approved product list for erosion control wattle may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

An additional quantity of 12" Diameter Erosion Control Wattles has been added to the Estimate of Quantities for temporary erosion and sediment control in highway ditch channels, as an alternative to low flow or high flow silt fence at wetland areas adjacent to the highway and as ordered by the Engineer.

TABLE OF EROSION CONTROL WATTLE

Station	L/R	Diameter (Inch)	Location	Quantity (Ft)
324+30 to 325+30	R	12	Outlet	100
324+55 to 325+05	R	12	Inlet	50
Additional Quantity				50
Total:				200

SOIL STABILIZER

An estimated quantity of 1143 SqYd of soil stabilizer has been included in the Estimate of Quantities. The soil stabilizer shall be applied on permanently seeded areas and areas deemed necessary by the Engineer.

The Contractor shall apply soil stabilizer in accordance with the manufacturer's application instructions and at the rate specified in the list of approved soil stabilizers.

Wood fiber mulch that contains a green dye shall be mixed with the soil stabilizer to be used as a tracer when the soil stabilizer is applied hydraulically. Wood fiber mulch shall be added at a rate of 300 pounds per acre to all of the approved soil stabilizers listed in the table except for the Pam-12 Plus product. The wood fiber mulch shall be a 100% wood fiber product and does not need to contain a tackifier.

All costs for furnishing and applying the soil stabilizer including wood fiber mulch, hauling, materials, equipment, labor, and incidentals necessary shall be paid for at the contract unit price per Square Yard for "Soil Stabilizer".



**SOIL STABILIZER (continued)**

The soil stabilizer shall be from the list below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
StarTak 600 Applied at a rate of 150 Lb/Acre	Chemstar Products Company Minneapolis, MN Phone: 1-800-328-5037 <a href="http://www.chemstar.com">www.chemstar.com</a>
Pam-12 Plus Applied at a rate of: <u>Slope</u> None to 4:1      1000 Lb/Acre 4:1 to 3:1    1000 to 2000 Lb/Acre 3:1 to 2:1    2000 to 3000 Lb/Acre	ENCAP, LLC Green Bay, WI Phone: 1-877-405-5050 <a href="http://professional.encap.net/">http://professional.encap.net/</a>
M-Binder Applied at a rate of 150 Lb/Acre	Ecology Controls Carpinteria, CA Phone: 1-805-684-0436 <a href="http://www.ssseeds.com">www.ssseeds.com</a>
FiberRX Applied at a rate of: <u>Slope</u> None to 4:1      50 Lb/Acre 3:1                60 Lb/Acre 2:1                70 Lb/Acre 1:1 or steeper    80 Lb/Acre	Hydrostraw, LLC Manteno, IL Phone: 1-800-545-1755 <a href="http://hydrostraw.com">hydrostraw.com</a>
Enviropam Applied at a rate of 9 Lb/Acre	Innovative Turf Solutions, LLC Cincinnati, OH Phone: 1-513-317-8311 <a href="http://www.innovativeturfsolutions.com">www.innovativeturfsolutions.com</a>
HydraTack, Tack Plus, Tack-P, or Tack-P Plus Applied at a rate of 30 Lb/Acre	Innovative Turf Solutions, LLC Cincinnati, OH Phone: 1-513-317-8311 <a href="http://www.innovativeturfsolutions.com">www.innovativeturfsolutions.com</a>
FI-1045 Hydrobond or FI-1046 Hydrobond Applied at a rate of 15 Lb/Acre	JRM Chemical, Inc. Cleveland, OH Phone: 1-216-475-8488 <a href="http://www.soilmoist.com">www.soilmoist.com</a>
HF5000 Tack Applied at a rate of 60 Lb/Acre	Rantec Corporation Ranchester, WY Phone: 1-307-655-9565 <a href="http://www.ranteccorp.com">www.ranteccorp.com</a>
R-Tack Applied at a rate of 150 Lb/Acre	Rantec Corporation Ranchester, WY Phone: 1-307-655-9565 <a href="http://www.ranteccorp.com">www.ranteccorp.com</a>

SpecTac  
Applied at a rate of:  
Slope  
None            30 to 80 Lb/Acre  
4:1              50 to 100 Lb/Acre  
3:1              80 to 120 Lb/Acre  
2:1              100 to 170 Lb/Acre

Super Tack  
Applied at a rate of 60 Lb/Acre

EarthGuard SFM  
Applied at a rate of 60 LB/Acre  
(approx. 6 Gallons/Acre)

Rantec Corporation  
Ranchester, WY  
Phone: 1-307-655-9565  
[www.ranteccorp.com](http://www.ranteccorp.com)

Rantec Corporation  
Ranchester, WY  
Phone: 1-307-655-9565  
[www.ranteccorp.com](http://www.ranteccorp.com)

Terra Novo Inc.  
Bakersfield, CA  
Phone: 1-661-747-5956  
[www.terranovo.com](http://www.terranovo.com)

SLIPLINE PIPE

The Contractor shall furnish and install slipliner pipe at locations specified in the Table of Slipline Pipe. This work consists of slipping a pipe liner inside existing pipe and grouting the void between the liner and the existing pipe.

The Contractor shall submit a proposed procedure for sliplining pipes, including the grouting procedure, to the Engineer at least two weeks prior to beginning this work.

Slipliner pipe shall conform to:

1. Solid Wall HDPE:  
Solid wall HDPE pipe shall meet the requirements of ASTM F714 (SDR 32.5) and shall have a cell classification of 445574C in accordance with ASTM D3350. Pipe joints may be grooved press-on joints or heat fused as approved by the Engineer. Heat fused joints shall be fused in accordance with the pipe manufacturer's recommendations by an experienced operator of the heat fusion equipment.

The diameter specified in the bid item description is the diameter of the existing pipe to be sliplined. The Contractor shall provide the largest diameter slipliner pipe that will fit into the existing pipe to maximize flow capacity.

Slipliner pipe shall have a smooth interior surface.

Slipliner pipe shall be joined into a continuous length with joints that are adequate for pushing, pulling, or winding the liner pipe through the existing pipe. The joints shall not allow seepage during pressure grouting. To allow for unrestricted insertion of the liner, the outside diameter of the liner pipe shall not be increased at the joints.

Prior to sliplining, the Contractor shall clean the existing pipe of all debris, silt, and obstructions to ensure that the slipliner pipe can be inserted, the grout will flow to all voids, and the inserted slipliner pipe will not be set upon or irregularly supported by such material. Cleaning shall be accomplished by the use of jet rodding equipment or other approved methods.

The slipliner pipe shall be inserted into the existing pipe by pushing, pulling, or winding methods that do not damage the slipliner pipe. The slipliner pipe shall be clean and substantially dry before insertion.

To minimize the change in flowline, slipliner pipe shall be held down during the grouting operation. This may be accomplished by attaching fasteners or blocks at the top of the pipe, adding weight to the inside of the slipliner pipe, placing multiple grout lifts, or other means as approved by the Engineer.

Bulkheads shall be constructed at each end of the pipe. Each bulkhead shall be constructed to withstand the pressure of the grouting operation. The bulkhead shall extend from the end of the existing pipe inward a minimum depth of 18 inches. The bulkhead shall be free from leaks and the exterior surface shall be given a smooth trowel finish. The bulkhead at the inlet end shall be finished with a 45 degree mitered bevel transition between the existing pipe and the inside of the slipliner pipe with the slipliner pipe face pushed inside the existing pipe face.

Pressure grouting shall be done to ensure all the voids are filled between the slipliner pipe and the existing pipe including all breaks or holes in and around the existing pipe. Grouting pressures used shall ensure all voids are filled, but do not collapse or deform the slipliner pipe more than 5 percent of the diameter. Multiple grout lifts may be necessary to minimize pipe deflection for 60-inch diameter and larger pipe in accordance with the pipe manufacturer's recommendations.

The grout shall be a cellular grout (grout with pre-generated foam) with a minimum 28 day compressive strength of 100 pounds per square inch. If water is not present within the sliplined pipe a low density grout with a minimum of 30 pounds per cubic foot wet density may be used. When it is not possible to dewater the existing pipe or keep water out of the annular space during grouting, a high density grout with a minimum of 70 pounds per cubic foot shall be used which may include approved sand. The foaming agent used shall meet the requirements of ASTM C869 when tested in accordance with ASTM C796.

Both of the cellular grout mix designs shall be submitted to the SDDOT Concrete Engineer for approval prior to use. The mix design submittal shall include the base cement slurry mix per cubic yard, expansion factor from the foaming agent, and the cellular grout wet density (pounds per cubic foot).

The Contractor shall install a bypass valve adjacent to the location where the pressure grouting hose is attached for obtaining samples to be checked for wet density. The wet density of the cellular grout shall be checked by the Contractor to verify the proper minimum wet density before the cellular grout filling operations begin and at a minimum once every two hours during production. The SDDOT shall document the results of the density checks.

Cellular grout shall be wasted until the cellular grout meets the minimum wet density required; however, if 0.5 cubic yards or more of base cement slurry is wasted trying to meet density requirements, then that quantity will not be included for payment.

If grout holes are utilized, cylindrical wooden plugs or other approved plugs shall be inserted to plug holes until the grout has set. After the plugs are removed the holes shall be filled with concrete.

The quantity of cellular grout was estimated based on void quantity between the slipliner pipe and the existing pipe, and an additional quantity if necessary was estimated for the void volume outside the existing pipe.

The quantity of base cement slurry ordered shall be approved by the Engineer. The quantity of base cement slurry needed shall be calculated to the nearest tenth of a cubic yard using the approved mix design, expansion factor of the foaming agent, and estimated amount of cellular grout. The quantity for payment to the nearest tenth of a cubic yard of "Cellular Grout" is a calculated quantity based on the amount of base cement slurry used on the project to the nearest tenth of a cubic yard, expansion factor of the foaming agent, and approved mix design.

All costs for furnishing and installing the slipliner pipe, including work area excavation, backfilling, pipe cleaning, and incidentals necessary to satisfactorily complete the work shall be included in the contract unit price per foot for the corresponding bid item for "Slipline \_\_\_" Pipe".

All costs for furnishing and installing the cellular grout including bulkhead construction, inlet bevel construction, and incidentals necessary to satisfactorily complete the work shall be included in the contract unit price per cubic yard for "Cellular Grout".

TABLE OF SLIPLINE PIPE

Station	Slipliner Minimum Inside Dia. (In)	Slipline 30" Pipe (Ft)	Cellular Grout (CuYd)
324+80	24	124	4.2
	Totals:	124	4.2

CONTROLLED DENSITY FILL FOR PIPE

Controlled density fill shall be in conformance with Section 464 of the Specifications.

The controlled density fill shall be placed to fill the abandon CMP downspout.

TABLE OF CONTROLLED DENSITY FILL FOR PIPE

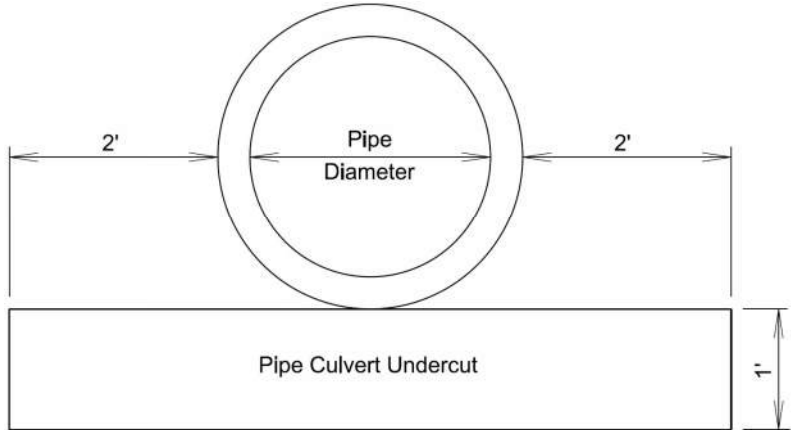
Station	Quantity (CuYd)
324+80	22.0
Total:	22.0

PIPE CULVERT UNDERCUT

Pipe culvert undercut shall be required for the portion of the liner pipe outside of the limits of the existing CMP. The pipe shall be undercut in accordance with Section 421 of the Specifications.

The table below contains the rate for one-foot depth of pipe culvert undercut per foot of pipe length. When calculating pipe culvert undercut, the length of pipe ends should be included in the overall pipe length.

Pipe Diameter (In)	Round Pipe Undercut Rate for 1' Depth (CuYd/Ft)	Arch Pipe Undercut Rate for 1' Depth (CuYd/Ft)
24	0.2407	0.2577



**RIGHT-OF-WAY (ROW) FENCE**

**General:**

Where fence is being removed and replaced, the Contractor shall install the fence on the same alignment and/or as detailed in the plans and as determined by the Engineer. Refer to the “Plan Layout” sheet for fence locations and details. The existing fence that is removed shall become property of the Contractor.

**TEMPORARY FENCE**

Refer to the “Plan Layout” sheet for fence locations and details.  
The Contractor shall verify the location of the temporary fence with the landowner prior to installation of the fence.

**BRACE PANELS FOR ROW FENCE**

The E-Z Brace or an approved equal may be utilized as an alternate horizontal brace in the brace panels if approved by the Engineer. The E-Z Brace shall be attached to each wood post utilizing two 5/16” x 3” lag screws. Holes of appropriate diameter, based on wood post condition, shall be drilled before placement of lag screws. The following are contacts regarding the E-Z Brace:

Roger Papka  
E-Z Brace  
1160 Karen St.  
Watertown, SD 57201  
605-881-6142

Dennis Mack  
E-Z Brace  
108 18<sup>th</sup> St. NE  
Watertown, SD 57201  
605-881-4990

**SHEETING FOR TRAFFIC CONTROL SIGNS**

All fluorescent orange background material on traffic control signs, all temporary delineators, and all temporary STOP (R1-1), YIELD (R2-1), DO NOT ENTER (R5-1), and WRONG WAY (R5-1a) signs shall conform to the requirements of ASTM D4956 Type IX or XI. All other traffic control signs and background colors shall conform to the requirements of ASTM D4956 Type IV.

**SIGN TABULATION**

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK	2	36" x 18"	4.5	9.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			105.0

FENCE QUANTITIES																		STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
																			020-372	12	30
Station to Station		Side (L/R)	Right-of-Way Fence					Temporary Fence			Post Panels			Gates					Remove Fence (Ft)	<p><b><u>Post Type and Sequence:</u></b> Right-of-way fence shall be constructed using alternate wood and steel posts except as noted.</p>	
			Type 2	Type 4				Type 1A			2 Post Panel (Each)	3 Post Panel (Each)									
			(Ft)	(Ft)				(Ft)													
322+35	327+35	L																510			
322+35	327+35	L						125													
322+35	327+35	L		510							4										
324+30	325+30	R																100			
324+30	325+30	R						240													
324+30	325+30	R	100								2										

# CONTROL DATA

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	13	30

HORIZONTAL AND VERTICAL CONTROL POINTS						
POINT	STATION	OFFSET	DESCRIPTION	NORTHING	EASTING	ELEVATION
20-129.86	-	-	BM disk 7.55 miles W OF SD 65 Jct. 100' N of SD 20 CL in fence line (PID AI4072)	570394.034	1546572.255	2360.35
B439			Steel rod in sleeve – SD 65 0.2 mile north Jct with SD 20 N of Isabel (HARN) (PID QS0621)	575202.420	1601506.090	2370.10
BM1			Rebar - 7.82 miles W OF SD 65 Jct. 100' S of SD 20 CL in fence line	570222.086	1545177.776	2343.75
BM2			Rebar - 0.97 miles W OF SD 65 Jct. 100' S of SD 20 CL in fence line	569443.995	1581321.704	2375.59
BM4			Rebar - 4.54 miles W OF SD 65 Jct. 131' N of SD 20 CL in fence line	570095.448	1562483.048	2368.89

# HORIZONTAL ALIGNMENT DATA

## SD 20

<u>Type</u>	<u>Station</u>	<u>Northing</u>	<u>Easting</u>
POB	314+00.00	570012.792	1560160.609
POE	339+00.00	569960.749	1562660.064

The coordinates shown on this sheet are based on the South Dakota State Plane Coordinate System. North Zone (NAD 83/2011); epoch 2010.00  
Geoid 12B; SF = 0.99994783  
The elevations shown on this sheet are based on NAVD 88

PLOT SCALE - 1:100

PLOTTED FROM - IRMOUNT04

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	14	30

Plotting Date: 08/24/2018



PLOT NAME - 2

FILE - ... \ZIEBI4V\M-020-372\317.DGN

Wayne Simon Real Estate Limited Partnership and Jerad Simon  
(INFORMATION ONLY)

SW 1/4

Sec. 31 - T17N - R21E

SE 1/4

Government Lot 4

Government Lot 3

Ronald and Evelyn Bierman  
Parcel 1  
Government Lot 4 of Section 5 -  
Township 16 North - Range 21 East of the BHM

Parcel 1  
Station 324+30.00 to 325+30.00 R  
Temporary easement containing  
0.18 ac.(7800 sf), more or less

324+80  
Retain 30" CMP 59.1' L to 64.9' R  
Retain 30" CMP 38' R to 159' R  
324+80 R  
Take out gabion  
324+80  
Remove 30" CMP End Section L and R  
Remove 30" CMP 38' R to 52' R  
Remove 30" CMP 159' R to 169' R  
324+80  
Plug and Abandon Pipe 58' R to 159' R  
324+80  
Slipline 30" Pipe 59.1' L to 64.9' R  
324+80 L and R  
Install 24" CMP Sloped End section  
324+80 - 67' R to 200' R  
Install Class B Riprap Outlet Channel

Sta. 322+35  
Begin type 4

Sta. 324+30 L  
Begin type 1A

Sta. 325+30 L  
End type 1A

Sta. 327+35  
End type 4

3 PP

3 PP

3 PP

3 PP

100'

320+00

100'

Section Line

325+00

330+00

T/F

T/F

T/F

T/F

T/F

T/F

T/F

T/F

T/F

T/F

T/F

T/F

T/F

T/F

T/F

Sta. 324+30 R  
Begin type 2

Sta. 325+30 R  
End type 2

2 PP

2 PP

Sta. 324+60 R  
Begin type 1A

Sta. 325+00 R  
End type 1A

324+30 - 100' & 220'

324+60 - 100' & 210.0'

325+00 - 100' & 210.0'

325+30 - 100' & 220'

Sec. 5 - T16N - R21E

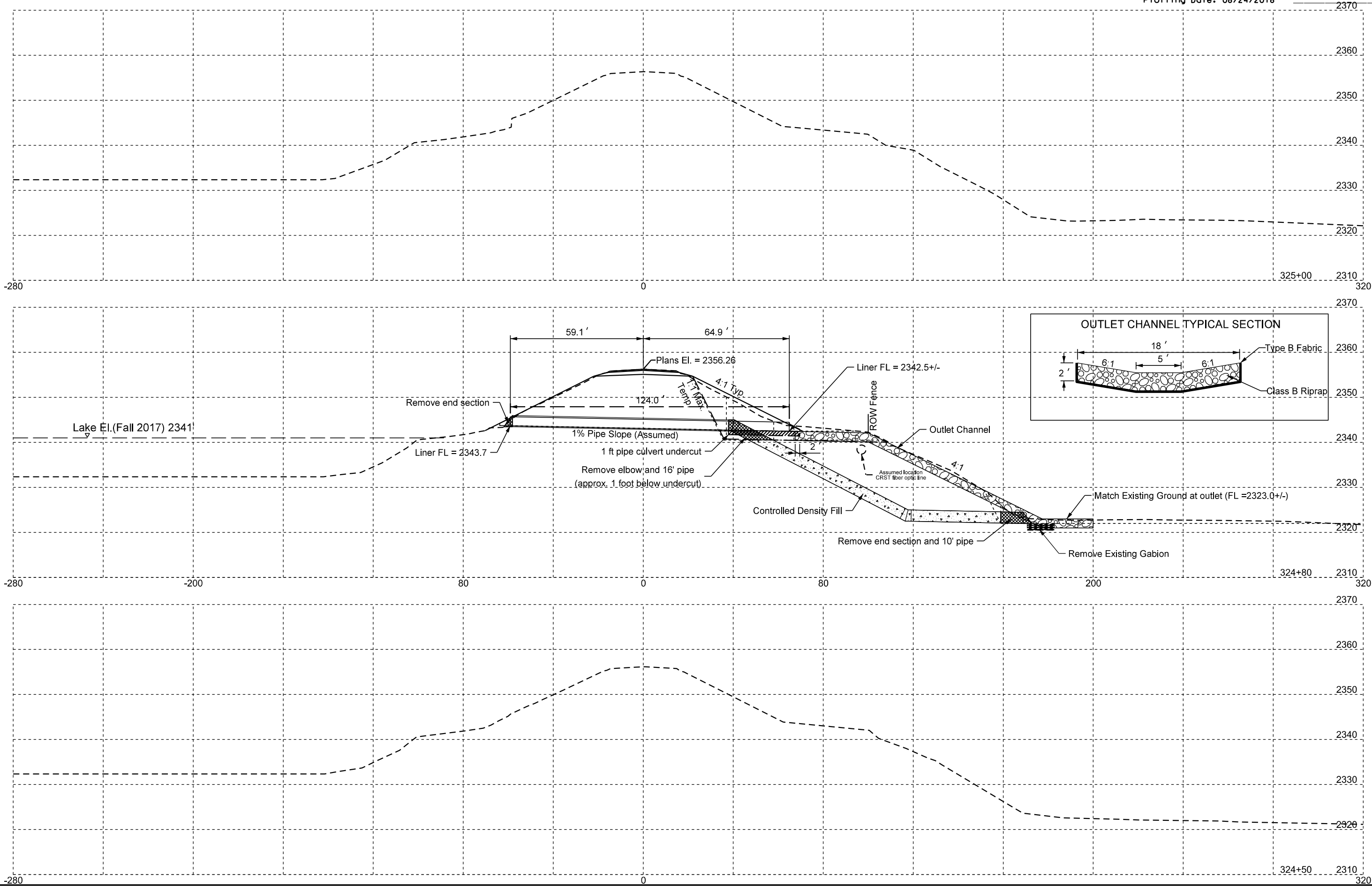
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	15	30

Plotting Date: 08/24/2018

PLOT SCALE - 1:40

PLOT NAME - 3

FILE - ... \ZIEB14YV-M-020-372\PI14YV.DGN



PLOTTED FROM - TRM01N104



# EROSION AND SEDIMENT CONTROL LEGEND

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	16	30

Plotting Date: 08/24/2018

- Low Flow Silt Fence
- High Flow Silt Fence
- High Flow Silt Fence at Pipe
- Sediment Control at Inlet After Placement of Surfacing
- Sediment Control at Inlet Before Placement of Surfacing
- Temporary Sediment Barrier
- Temporary Water Barrier
- Floating Silt Curtain
- Sediment Filter Bags
- Triangular Silt Barriers
- Erosion Control Wattles on Slopes
- Erosion Control Wattles at Inlets
- Erosion Control Wattles in Ditches
- Erosion Bales
- Surfacing Roughening
- Soil Stabilizer
- Temporary Grass Hay or Straw Mulch/ Soil Stabilizer
- Cut Interceptor Ditch
- Temporary Slope Drain
- Bonded Fiber Matrix/ Fiber Reinforced Matrix
- Rock Check Dam
- Type 1 Erosion Control Blanket
- Type 2 Erosion Control Blanket
- Type 3 Erosion Control Blanket
- Type 4 Erosion Control Blanket
- Type 1 Turf Reinforcement Mat
- Type 2 Turf Reinforcement Mat
- Type 3 Turf Reinforcement Mat
- Transition Mat
- Silt Trap (See Standard Plate 734.04)

## BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) are split into three categories and are to be used throughout construction.

### INITIAL PHASE

BMPs from the Legend shown as Orange Symbols on the Erosion and Sediment Control Plan Sheets are to be installed in the Initial Phase prior to earth disturbing activities and remain in place for the Intermediate Phase for temporary stabilization and in the Final Phase to achieve final stabilization.

### INTERMEDIATE PHASE

BMPs from the Legend shown as Blue Symbols on the Erosion and Sediment Control Plan Sheets are to be installed in the Intermediate Phase for temporary stabilization and remain in place in the Final Phase to achieve final stabilization.

### FINAL PHASE

BMPs from the Legend shown as Green Symbols on the Erosion and Sediment Control Plan Sheets are to be installed in the Final Phase to achieve final stabilization.

If these items are applicable they are to be shown in the updated SWPPP using the Symbols given.

- TS Topsoil Stockpile
- M On-Site Construction Material Storage Area
- B Borrow Area
- SK Spill Kit
- CE Stabilized Construction Entrance
- WP Work Platform
- VB Vegetated Buffer Strip
- CC Cover Crop Seeding
- CW Concrete Washout
- AP Asphalt Plant Site
- CP Concrete Plant Site
- V Vehicle and Equipment Parking, Fueling, and Maintenance Areas
- D Dumpster or other Trash and Debris Containers

PLOT SCALE - 1:100

PLOTTED FROM - IRPOINT04

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	17	30

Plotting Date: 08/24/2018

# EROSION AND SEDIMENT CONTROL PLAN

TEMPORARY STABILIZATION   PERIMETER CONTROL   FINAL STABILIZATION

Approximate area of temporarily impacted wetlands

Soill Stabilizer  
Permanent Seed  
Erosion Control Blanket

Soill Stabilizer  
Permanent Seed  
Erosion Control Blanket

Apply Soil Stabilizer at the following locations:  
324+10 R Inslope 25 SqYd  
325+30 R Inslope 25 SqYd  
324+68 L to 324+86 L Inslope 25 SqYd  
324+51 R to 325+09 R Inslope 1068 SqYd

Install (12") Diameter Erosion Control Wattles  
at the following locations:  
324+30 R to 325+30 R 100 Ft

Install Type 1 Erosion Control Blanket at the following locations:  
324+10 R Inslope 25 SqYd  
325+30 R Inslope 25 SqYd  
324+68 L to 324+86 L Inslope 25 SqYd  
324+51 R to 325+09 R Inslope 1068 SqYd

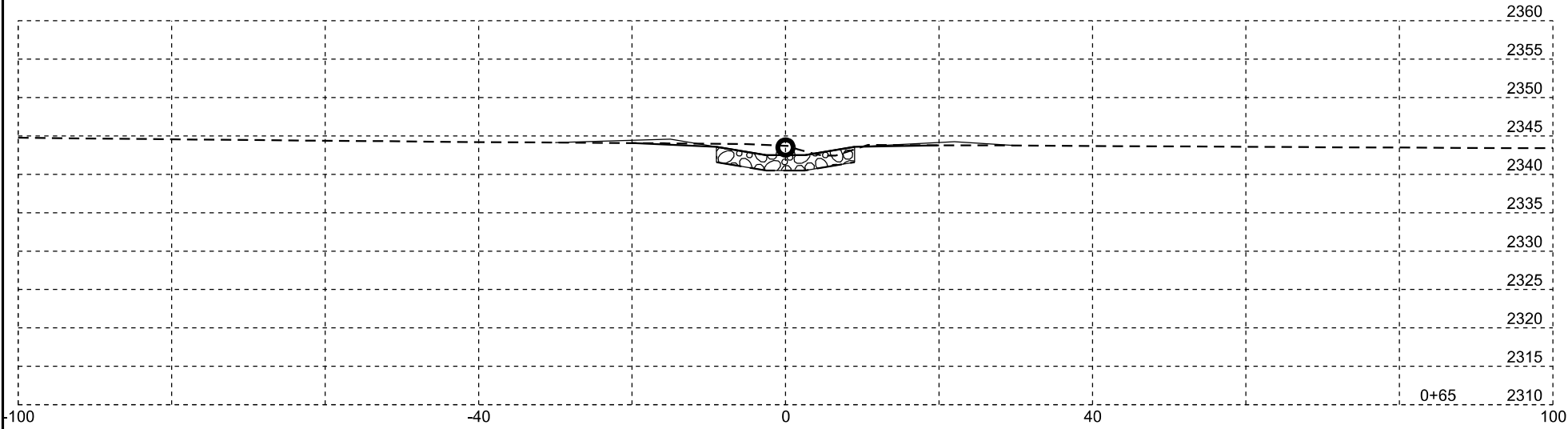
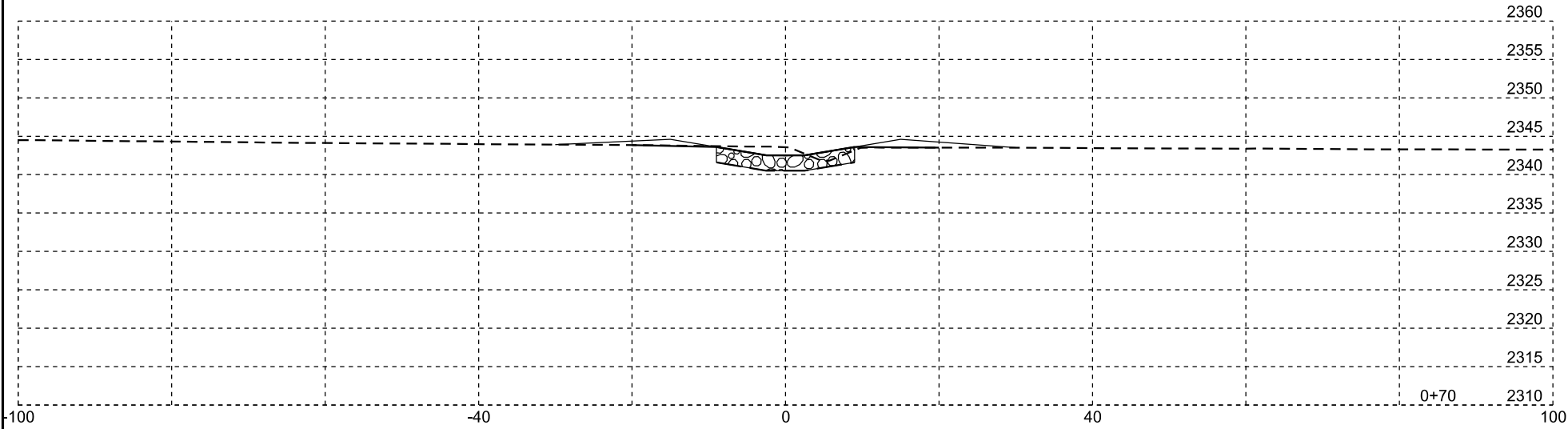
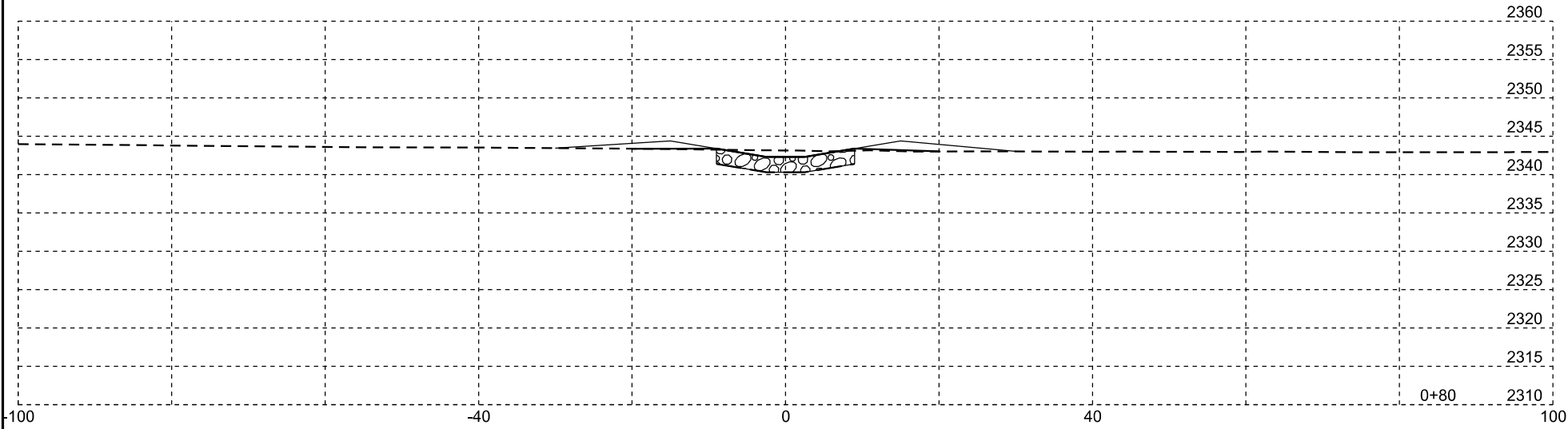
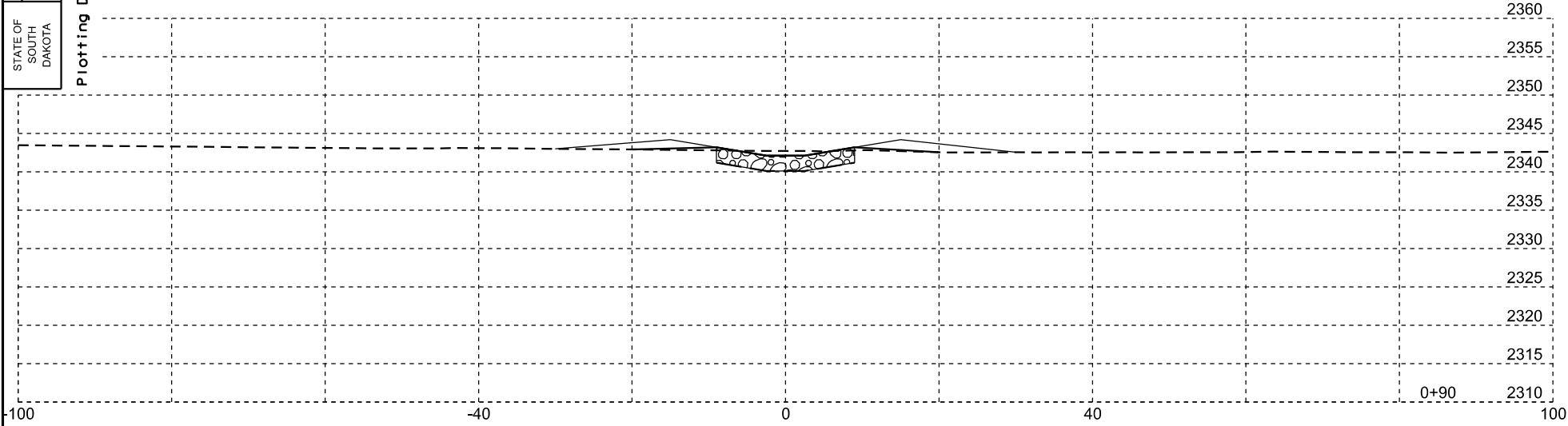
PLOT NAME - 5

FILE - ... \ZIEB14V-M-020-372\317EC.DGN

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	18	30

Plotting Date: 08/24/2018

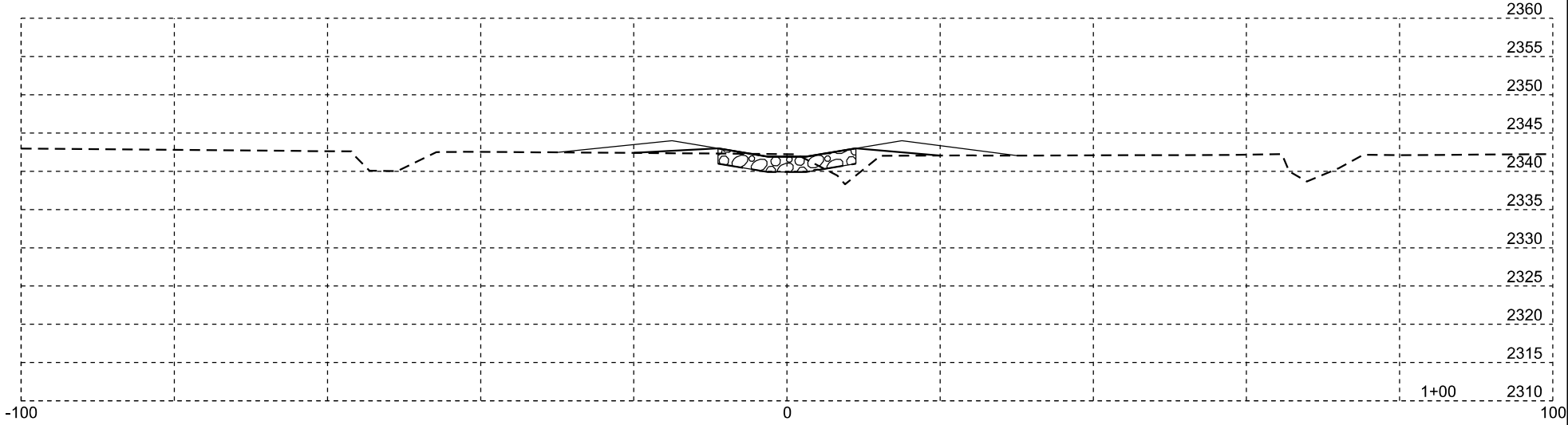
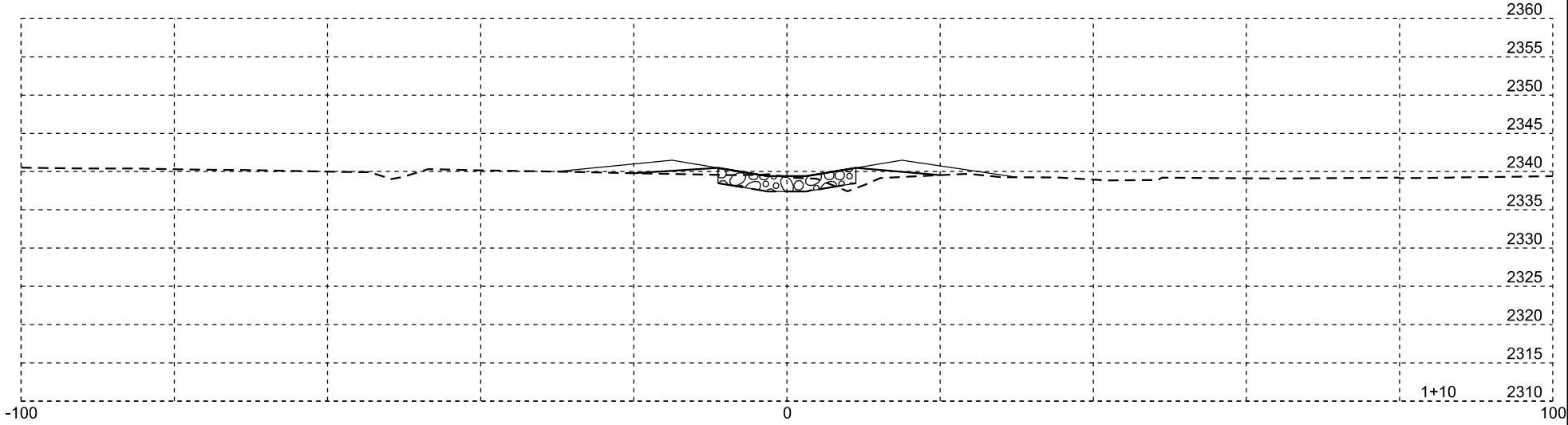
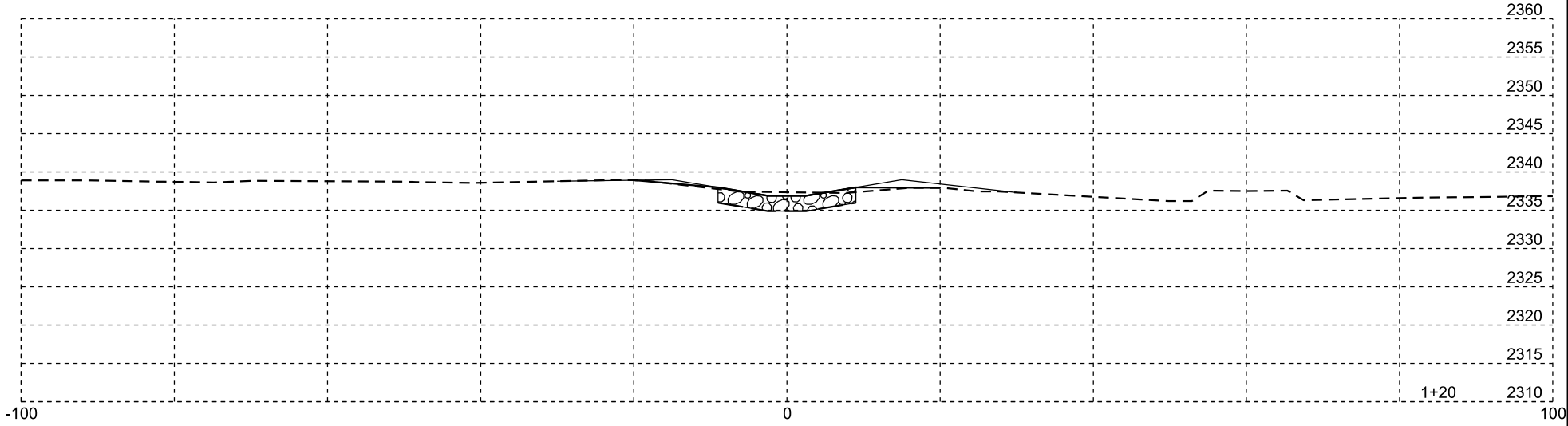
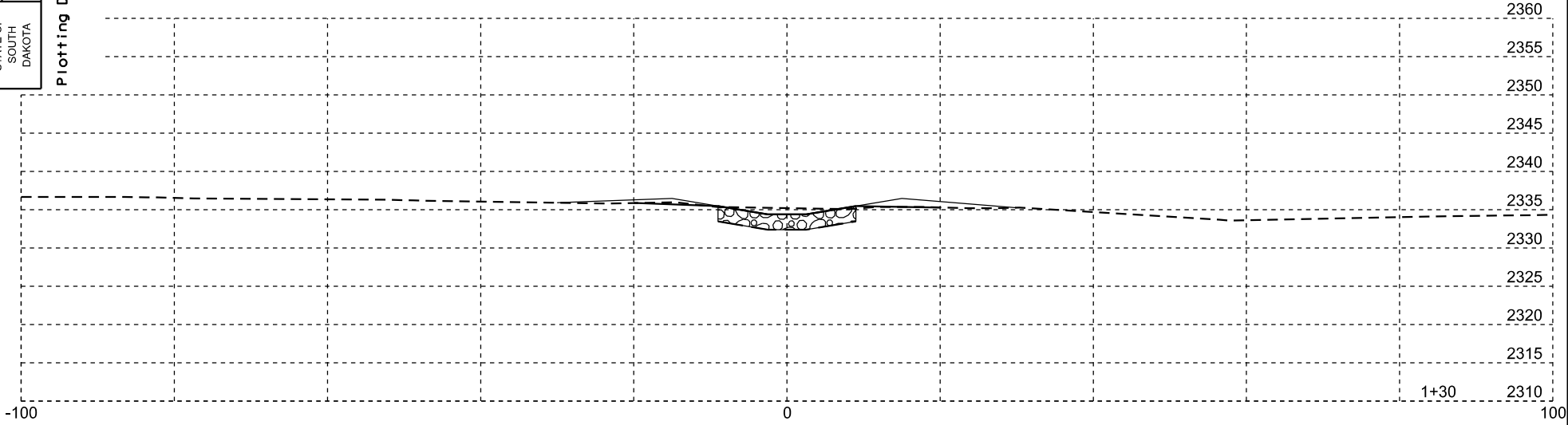
OUTLET CHANNEL  
Sta. 324+80 Rt.



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	19	30

Plotting Date: 08/24/2018

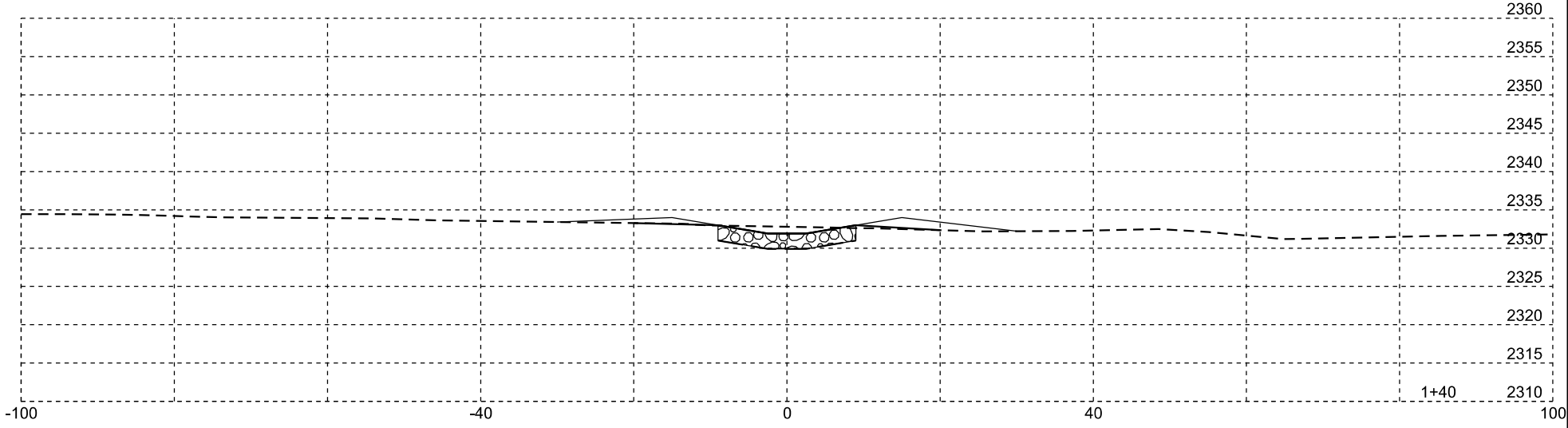
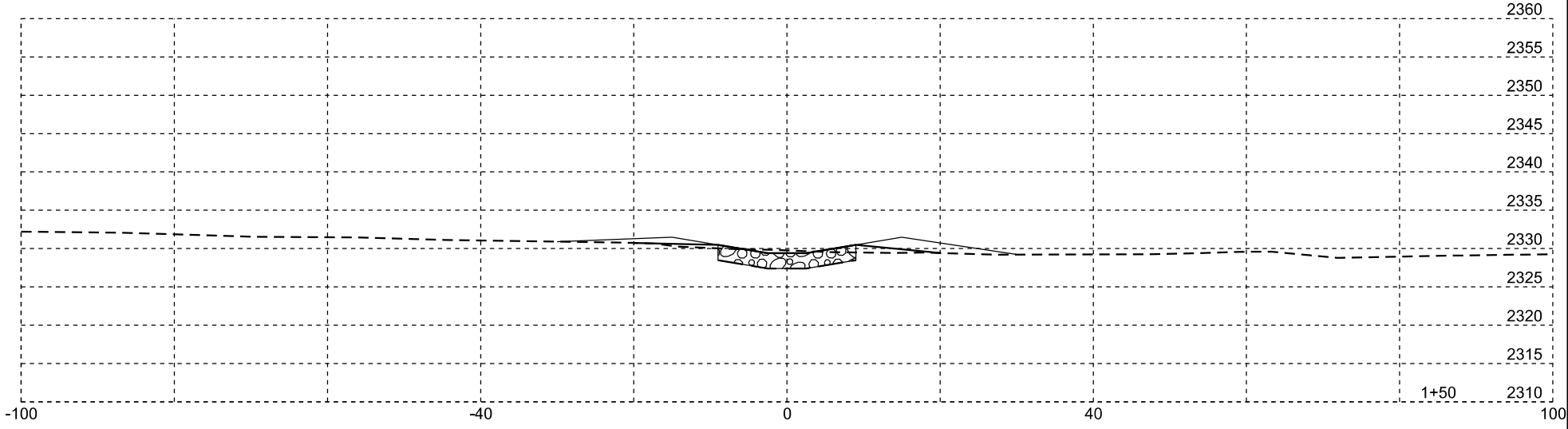
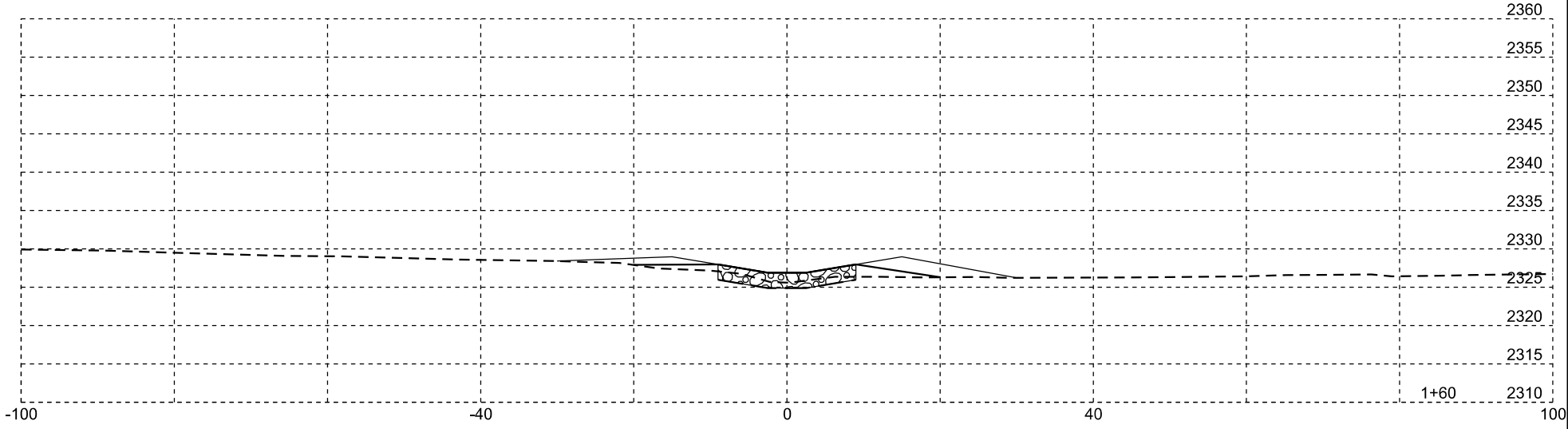
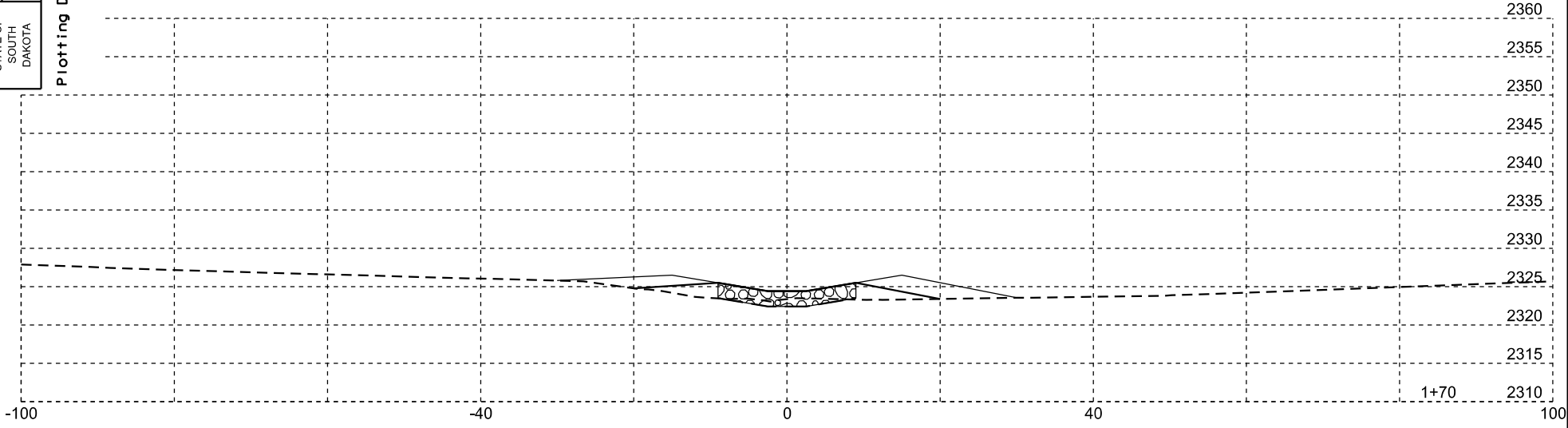
OUTLET CHANNEL  
Sta. 324+80 Rt.



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
		20	

Plotting Date: 08/24/2018

OUTLET CHANNEL  
Sta. 324+80 Rt.



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS

020-372

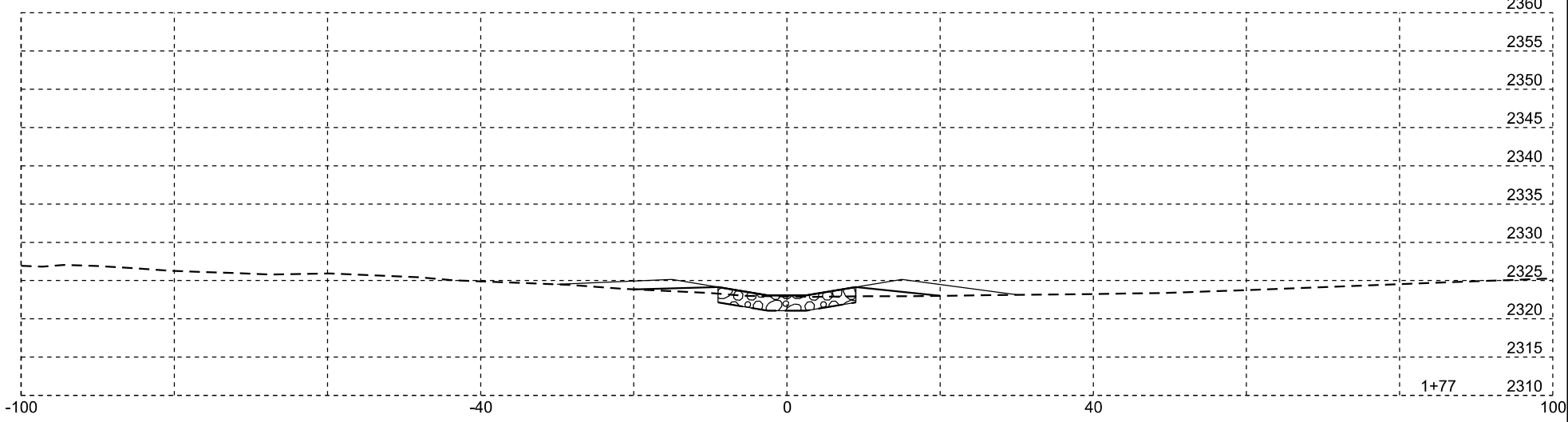
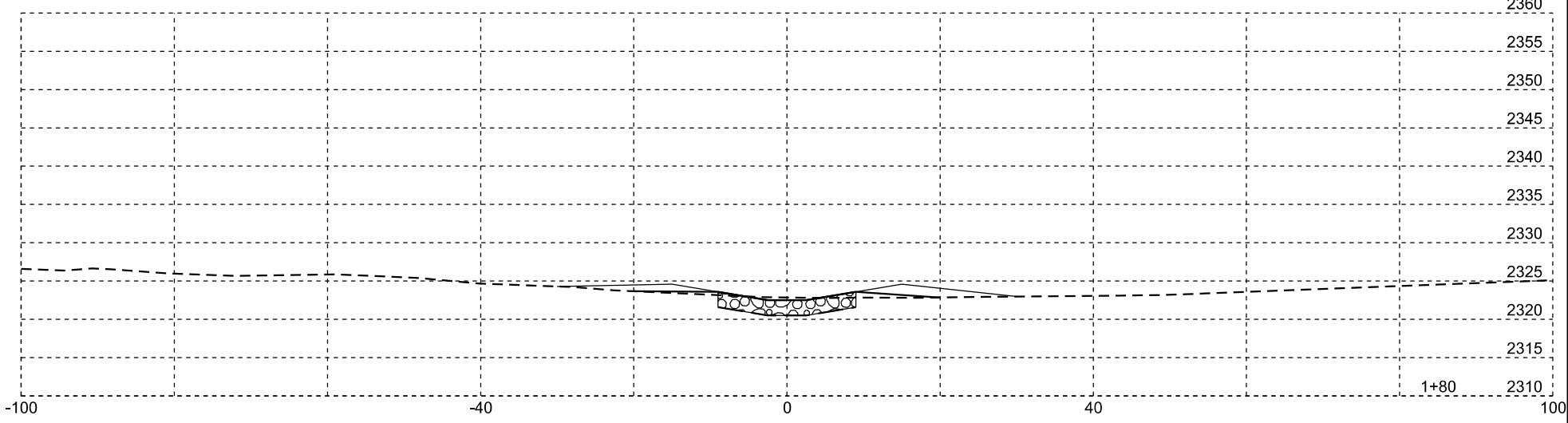
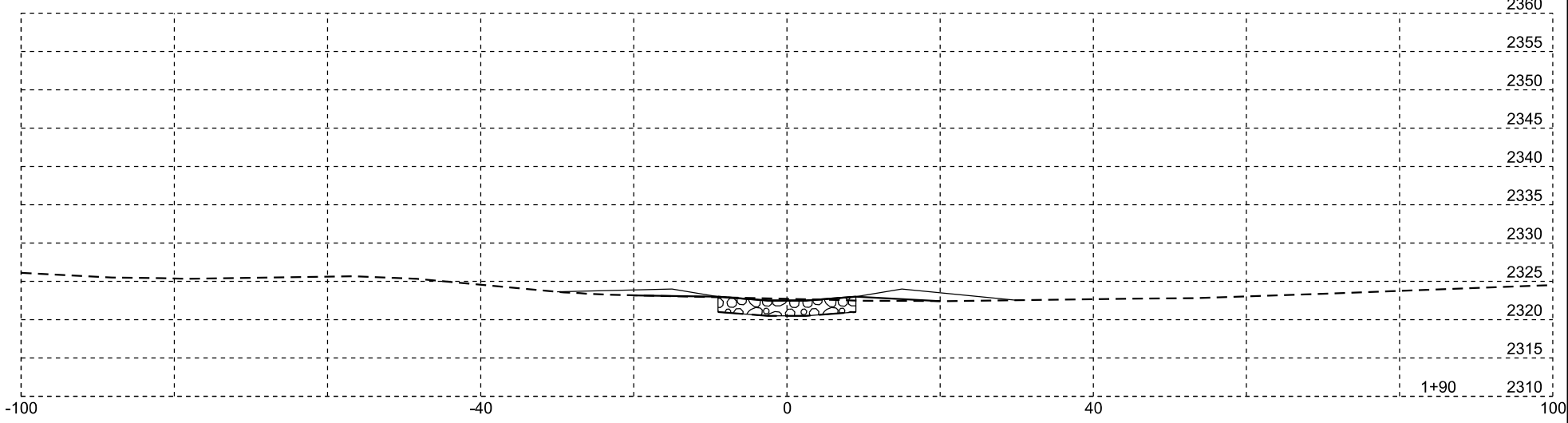
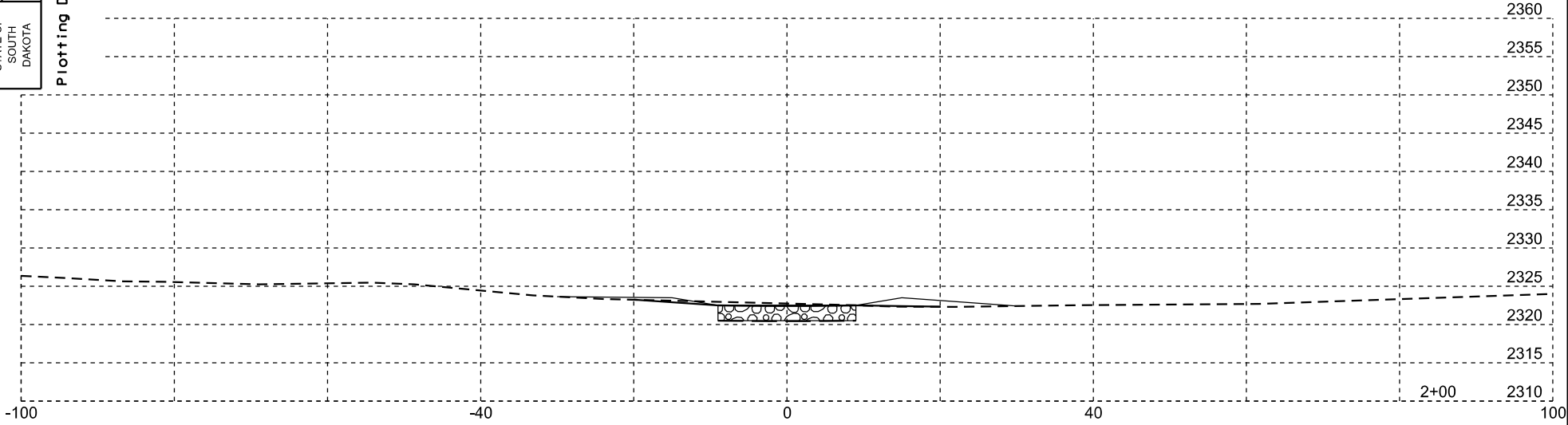
21

30

Plotting Date: 08/24/2018

# OUTLET CHANNEL

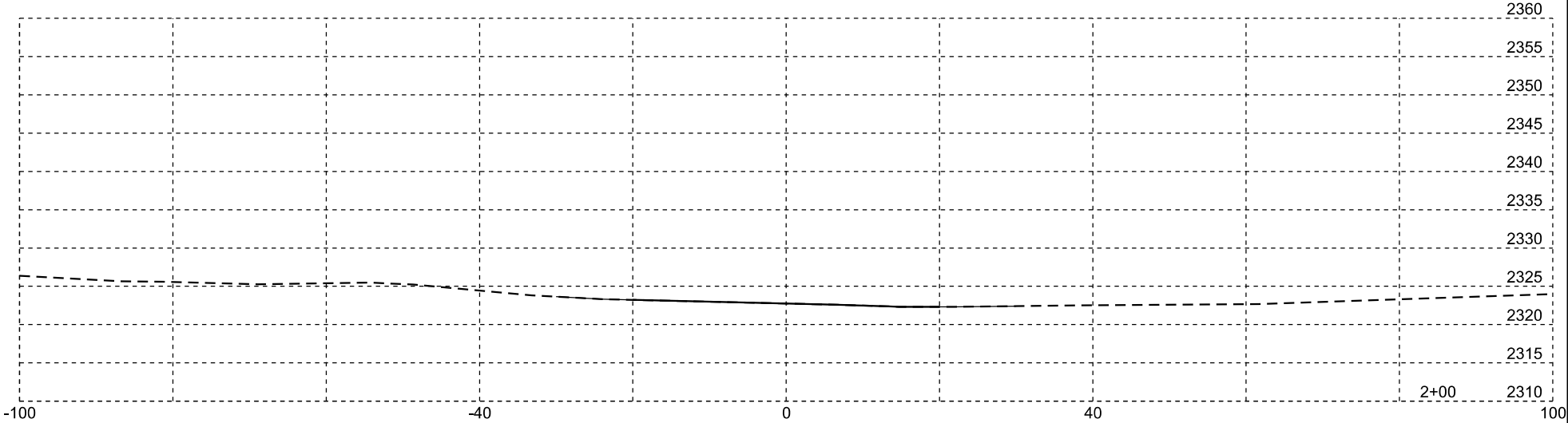
Sta. 324+80 Rt.



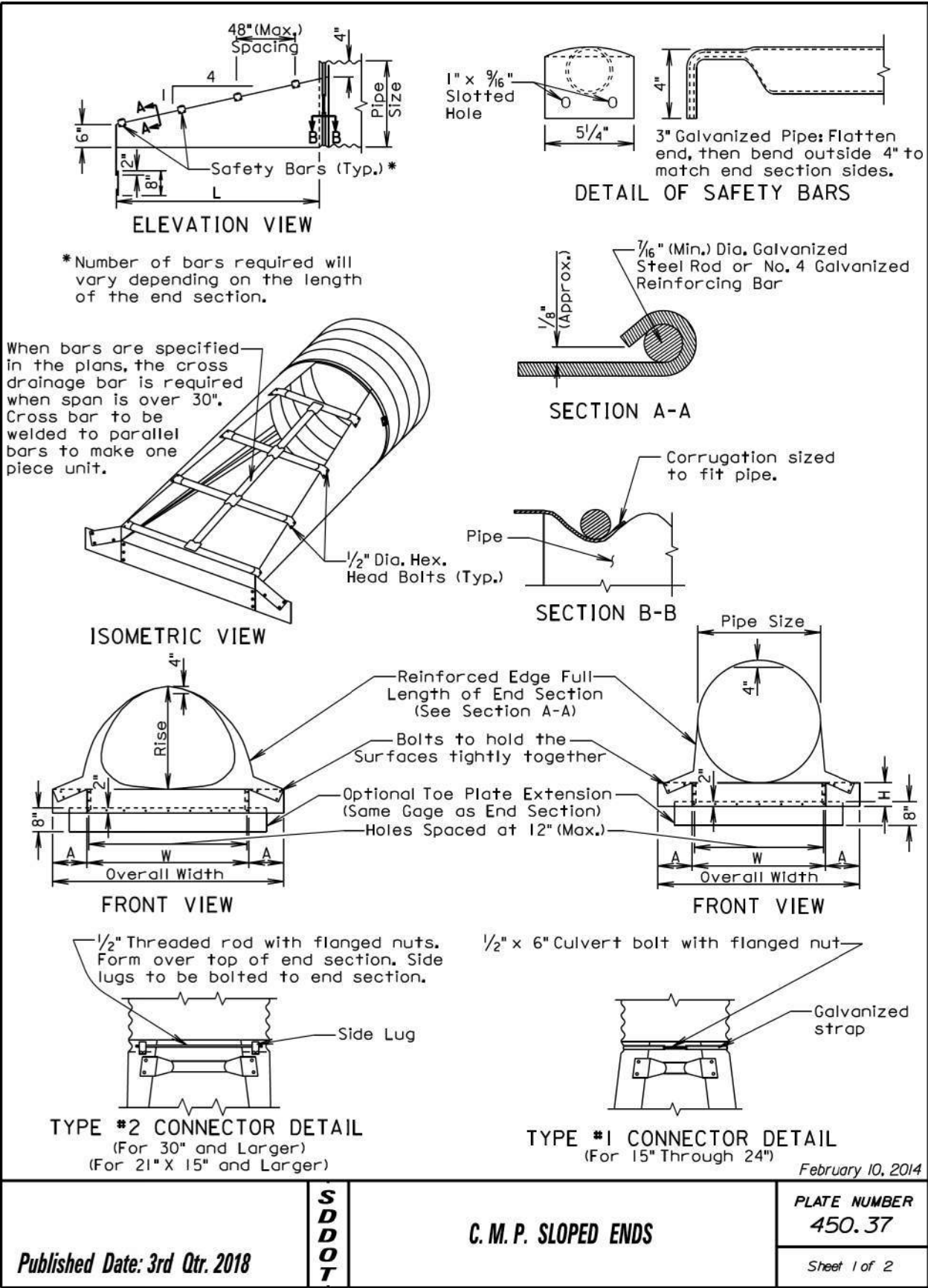
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	22	30

Plotting Date: 08/24/2018

OUTLET CHANNEL  
Sta. 324+80 Rt.







ARCH C.M.P. SLOPED ENDS										
Equiv. Dia. (Inch)	(Inches)		Min. Thick.		Dimensions (Inches)			L Dimensions		
	Span	Rise	Inch	Gage	A	H	W	Overall Width	Slope	Length (Inch)
18	21	15	.064	16	8	6	27	43	4:1	20
21	24	18	.064	16	8	6	30	46	4:1	32
24	28	20	.064	16	8	6	34	50	4:1	40
30	35	24	.079	14	12	9	41	65	4:1	56
36	42	29	.109	12	12	9	48	72	4:1	76
42	49	33	.109	12	16	12	55	87	4:1	92
48	57	38	.109	12	16	12	63	95	4:1	112
54	64	43	.109	12	16	12	70	102	4:1	132
60	71	47	.109	12	16	12	77	109	4:1	148
72	83	57	.109	12	16	12	89	121	4:1	188

CIRCULAR C.M.P. SLOPED ENDS								
Pipe Dia. (Inch)	Min. Thick.		Dimensions (Inches)			L Dimensions		
	Inch	Gage	A	H	W	Overall Width	Slope	Length (Inch)
15	.064	16	8	6	21	37	4:1	20
18	.064	16	8	6	24	40	4:1	32
21	.064	16	8	6	27	43	4:1	44
24	.064	16	8	6	30	46	4:1	56
30	.109	12	12	9	36	60	4:1	80
36	.109	12	12	9	42	66	4:1	104
42	.109	12	16	12	48	80	4:1	128
48	.109	12	16	12	54	86	4:1	152
54	.109	12	16	12	60	92	4:1	176
60	.109	12	16	12	66	98	4:1	200

**GENERAL NOTES:**

Safety bars shall be attached to sloped ends over 30" in diameter only when specified in the plans.

Sloped ends shall be fabricated from galvanized steel and shall conform to the requirements of the Specifications.

Safety bars shall be fabricated from steel schedule 40 pipe in conformance with ASTM A53, grade B or HSS 3.5X.216 in conformance with ASTM A500, grade B.

Slotted holes for safety bar attachment shall be provided for all end sections.

Attachment to circular pipes 15" through 24" diameter shall be made with Type #1 straps. All other sizes shall be attached with Type #2 rods and lugs.

When stated in the plans, optional toe plate extension shall be punched and bolted to end section apron lip with 3/8" diameter galvanized bolts. Steel for toe plate extension shall be same gauge as end section. Dimensions shall be overall width less 6" by 8" high.

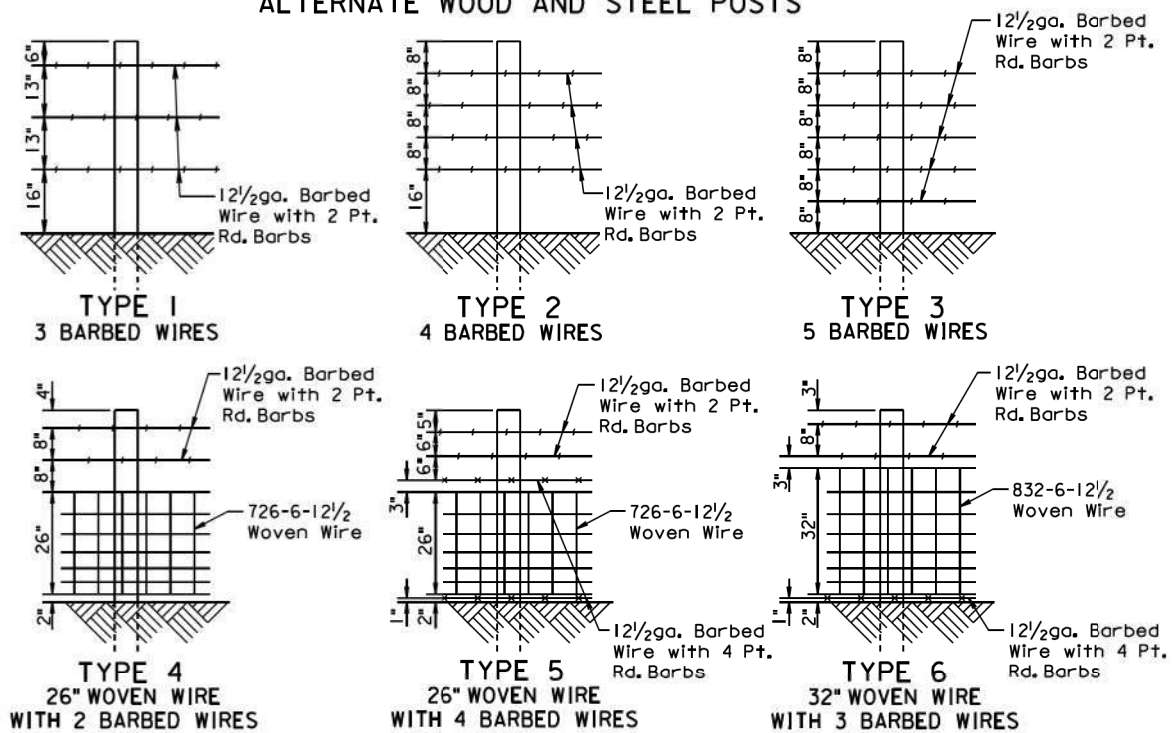
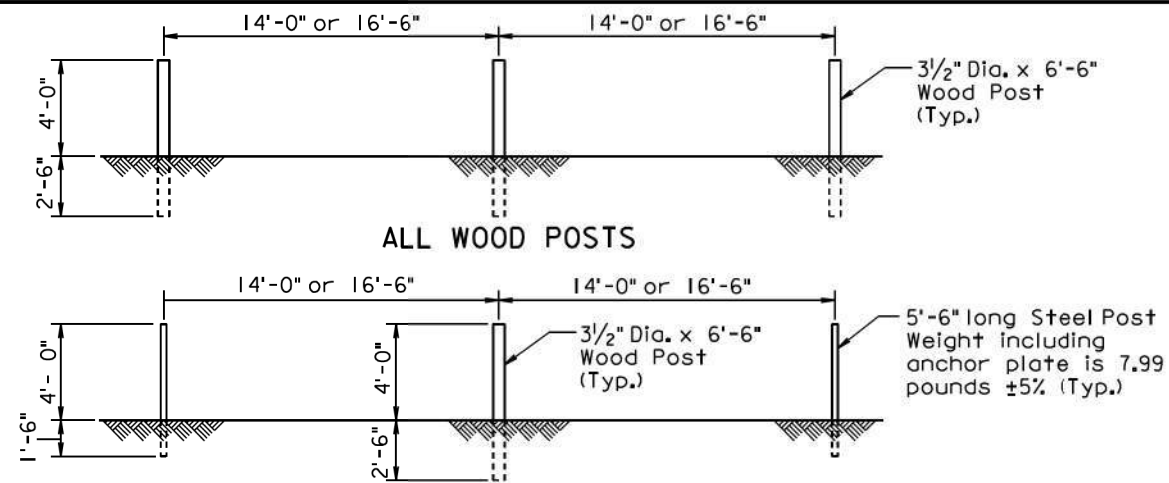
Installation shall be performed in accordance with the Specifications.

Cost of all work and materials required for fabrication and installation of sloped ends shall be incidental to the bid items for the various sizes of sloped ends.

February 10, 2014

Published Date: 3rd Qtr. 2018	S D D O T	C. M. P. SLOPED ENDS	PLATE NUMBER
			450.37
			Sheet 2 of 2

Plotting Date: 08/24/2018



TYPE OF FENCE	LINE POST SPACING	BARBED WIRE		WOVEN WIRE
		WIRE GAGE	NUMBER AND SHAPE OF BARBS	STYLE OR DESIGN NO.
1	3 Barbed Wires	16'-6" 12 1/2	2 Point Round	---
2	4 Barbed Wires	16'-6" 12 1/2	2 Point Round	---
3	5 Barbed Wires	16'-6" 12 1/2	2 Point Round	---
4	26" Woven Wire with 2 Barbed Wires	14'-0" 12 1/2	2 Point Round	726-6-12 1/2
5	26" Woven Wire with 4 Barbed Wires	14'-0" 12 1/2	2 wires with 2 Pt. Rd., 2 wires with 4 Pt. Rd.	726-6-12 1/2
6	32" Woven Wire with 3 Barbed Wires	14'-0" 12 1/2	2 wires with 2 Pt. Rd., 1 wire with 4 Pt. Rd.	832-6-12 1/2

**GENERAL NOTES:**

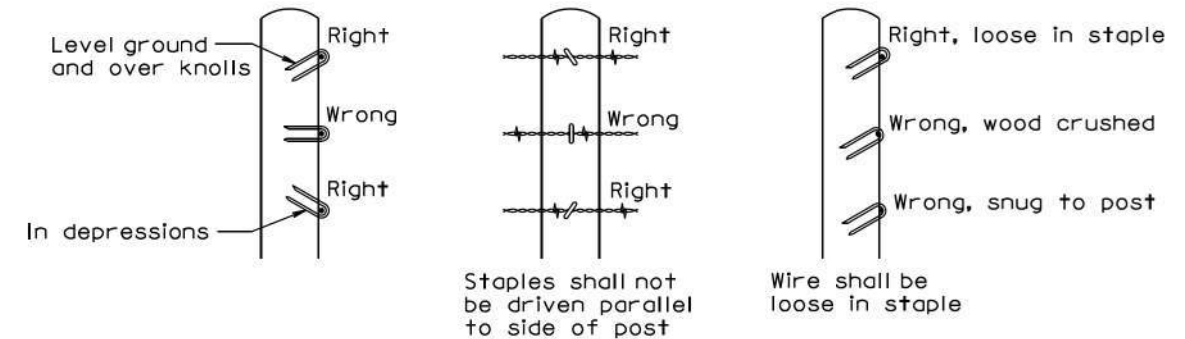
Fence types designated on the plans that are followed by the letter S shall have smooth (barbless) wires.

When type 5S or 6S is designated the bottom wire may be barbed, smooth, or left off.

All degrees of curvature stated for fence are at centerline of roadway.

September 14, 2009

<i>Published Date: 3rd Qtr. 2018</i>	<i>S D D O T</i>	<i>RIGHT-OF-WAY FENCE</i>	<i>PLATE NUMBER</i>
			<i>620.01</i>
			<i>Sheet 1 of 1</i>

**STAPLE INSTALLATION****GENERAL NOTES:**

The Right-of-Way fence shall consist of barbed wire or a combination of woven wire and barbed wire. The barbed wire and/or woven wire shall be fastened to all wood posts or fastened to alternating wood and steel posts. Only wood posts shall be used for brace panels. Gates shall be of the type designated in the plans or as otherwise directed by the Engineer. Fence shall be constructed conforming to the details on the standard plates and in the plans unless otherwise directed by the Engineer.

Right-of-Way fence on Interstate Projects shall be constructed one foot within the Interstate Right-of-Way lines except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

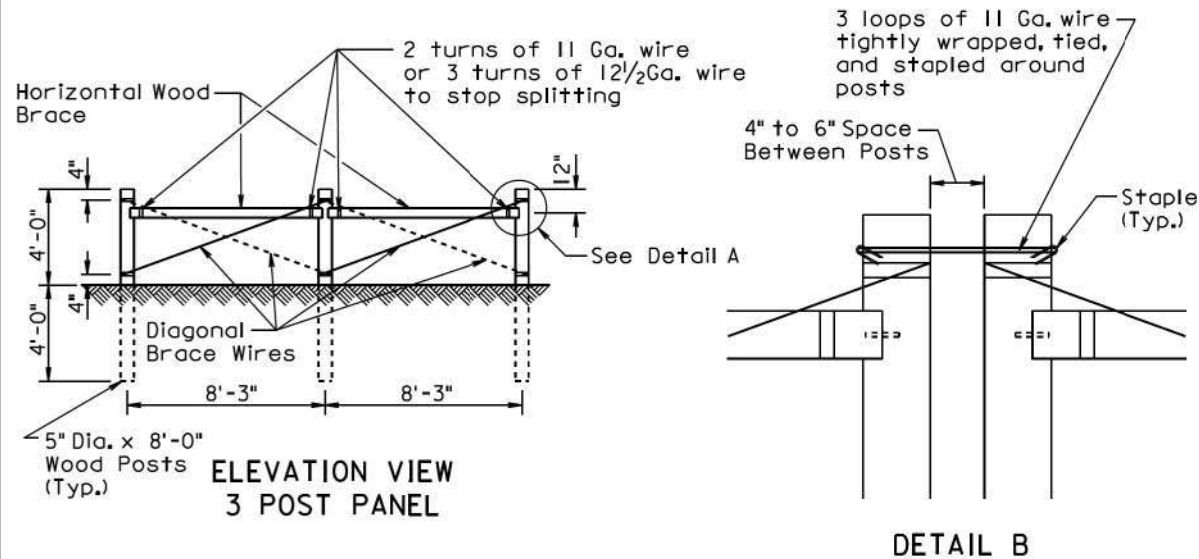
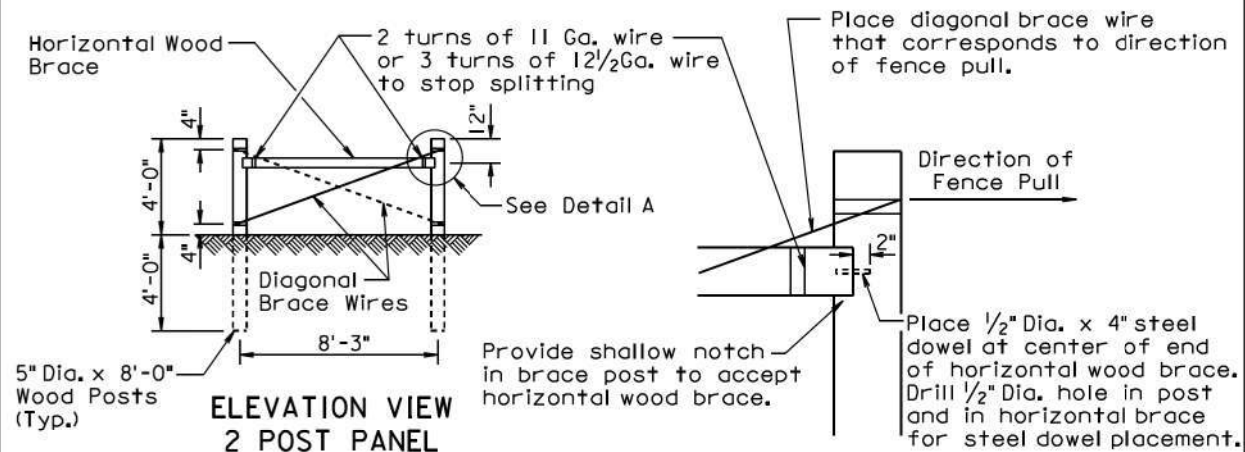
Right-of-Way fence other than on Interstate Projects shall be constructed within one foot of the Right-of-Way on the Landowner's side except at bridge openings, cattle passes, and as otherwise directed by the Engineer.

Barbs shall be fabricated from zinc coated 14 ga. wire. Two point barbs shall be wrapped twice around one main strand at 4" spacings and the four point barbs shall be interlocked and wrapped around both main strands at 5" spacings.

The gages of wire and wood post lengths and sizes are the minimum acceptable unless otherwise specified in the plans. The tolerances for steel posts shall be as stated in AASHTO M281. Woven wire shall conform to design and specifications of ASTM A116 and barbed wire shall conform to ASTM A121.

December 23, 2004

<i>Published Date: 3rd Qtr. 2018</i>	<b>S D D O T</b>	<b>STAPLE INSTALLATION AND GENERAL RIGHT-OF-WAY FENCE NOTES</b>	<b>PLATE NUMBER</b>
			<b>620.02</b>
<i>Sheet 1 of 1</i>			



**GENERAL NOTES:**

Two Post Panels shall be installed at least every 1320' between corners.

Two Post Panels shall be installed at any sharp vertical angle crest points and as directed by the Engineer.

Horizontal wood braces shall consist of 4" dia. x 8' wood posts or rough 4" x 4" x 8' timbers.

Diagonal brace wires shall be fabricated with 4 strands of 9 Ga. galvanized wire twisted tight. The diagonal brace wires shall be installed in accordance with the direction of the fence pull. Two diagonal brace wires are required if fence pull is in both directions.

December 23, 2004

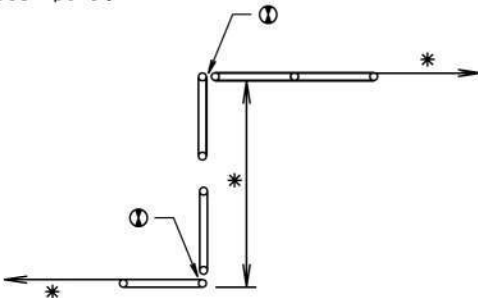
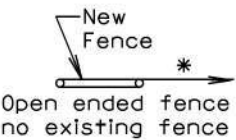
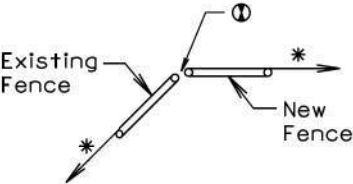
Published Date: 3rd Qtr. 2018	S D D O T	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER
			620.03
			Sheet 1 of 3

SPACING OF 2 POST PANELS WITHIN CURVES	
DEGREE OF CURVE	SPACING OF 2 POST PANEL
less than 3°15'	** 1320'
3°15' and greater	**At P.C., P.T., and at every 1320' between P.C. and P.T.

**GENERAL NOTE:**

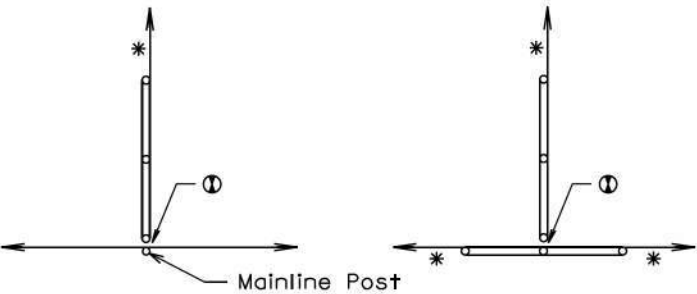
All degrees of curvature stated for fence are at centerline of roadway.

- \* If fence length is less than 600' to next corner use a 2 post panel.
- \* If fence length is greater than 600' to next corner use a 3 post panel.
- \*\* Fence lengths greater than 1320' and less than 2640' place 2 Post Panel approximately at midpoint.
- ① See Detail B on Sheet 1 of 3.

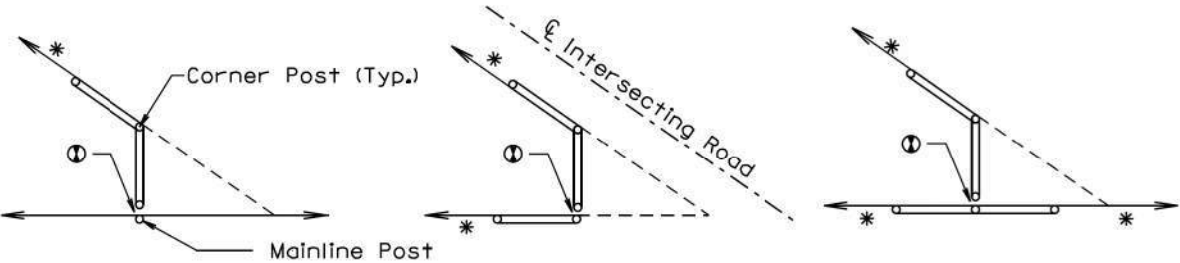


**BEGIN OR END FENCE**  
(where new fence ties into existing fence)

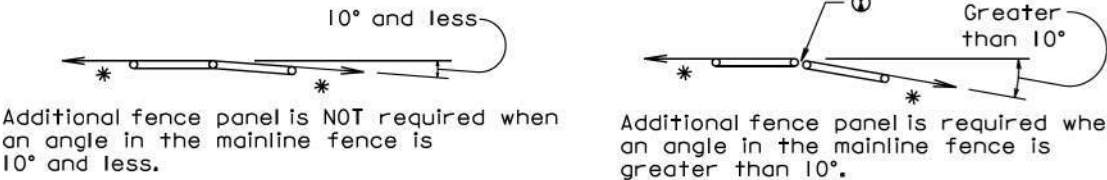
**SHORT JOGS IN FENCE**



**CROSS FENCE**



**SHARP ANGLES IN CROSS FENCE**




Additional fence panel is NOT required when an angle in the mainline fence is 10° and less.

Additional fence panel is required when an angle in the mainline fence is greater than 10°.

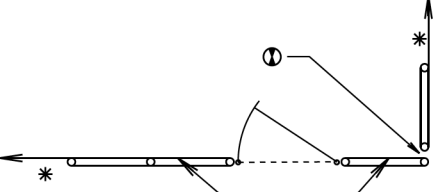
**ANGLES IN MAINLINE FENCE**

December 23, 2004

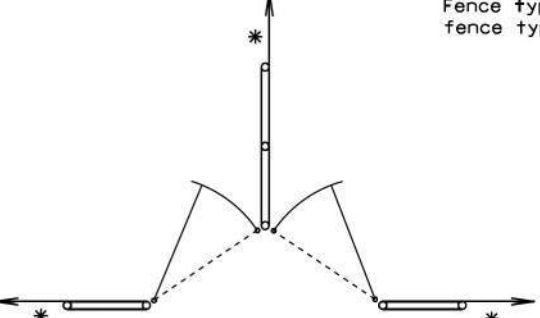
Published Date: 3rd Qtr. 2018	S D D O T	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER
			620.03
			Sheet 2 of 3



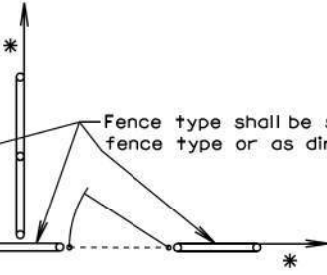
ENTRANCE  
(NOT ON CORNER)



ENTRANCES AT CORNERS



DOUBLE ENTRANCES



GATES

Fence type shall be same as adjacent fence type or as directed by the Engineer.

\* If fence length is less than 600' to next corner use a 2 post panel.  
If fence length is greater than 600' to next corner use a 3 post panel.

① See Detail B on Sheet 1 of 3.

December 23, 2004

Published Date: 3rd Qtr. 2018	S D D O T	BRACE PANELS AND APPLICATIONS OF BRACE PANELS	PLATE NUMBER 620.03
		Sheet 3 of 3	

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.

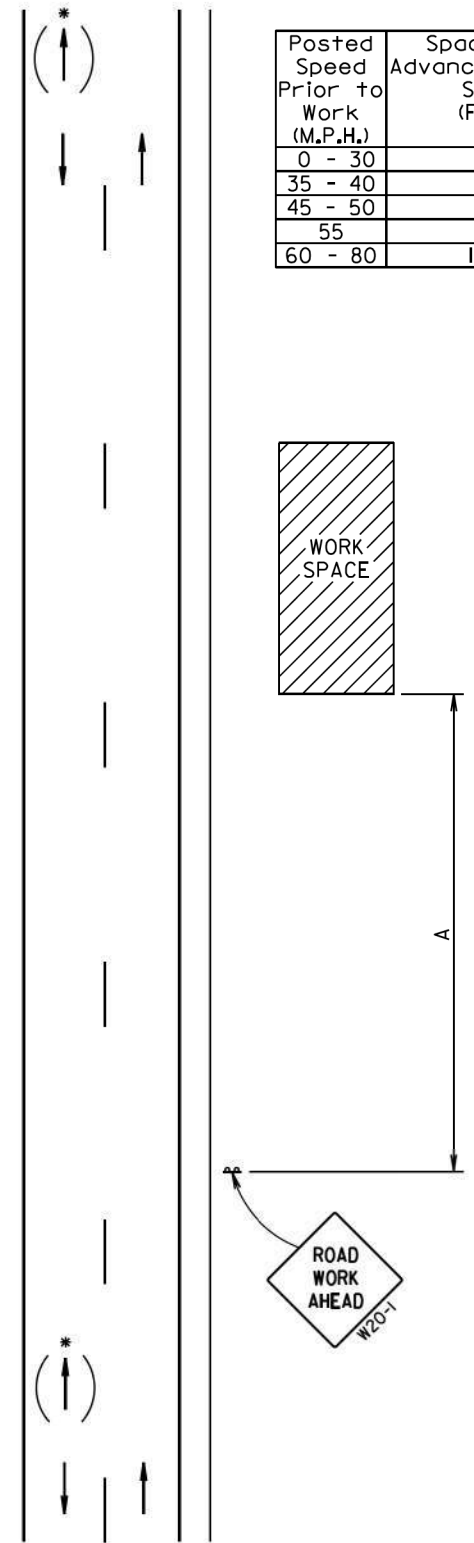
The signs illustrated shall be used where there are distracting situations; such as: vehicles parked on shoulder, vehicles accessing the work site via the highway, and equipment traveling on or crossing the roadway to perform work operations.

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: 3rd Qtr. 2018	S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES WORK BEYOND THE SHOULDER	PLATE NUMBER 634.01
		Sheet 1 Of 1	

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	27	30

Plotting Date: 08/24/2018

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	500	25
50	500	50
55	750	50
60 - 65	1000	50

- Flagger
- Channelizing Device

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

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

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

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

The channelizing devices shall be drums or 42" cones.

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

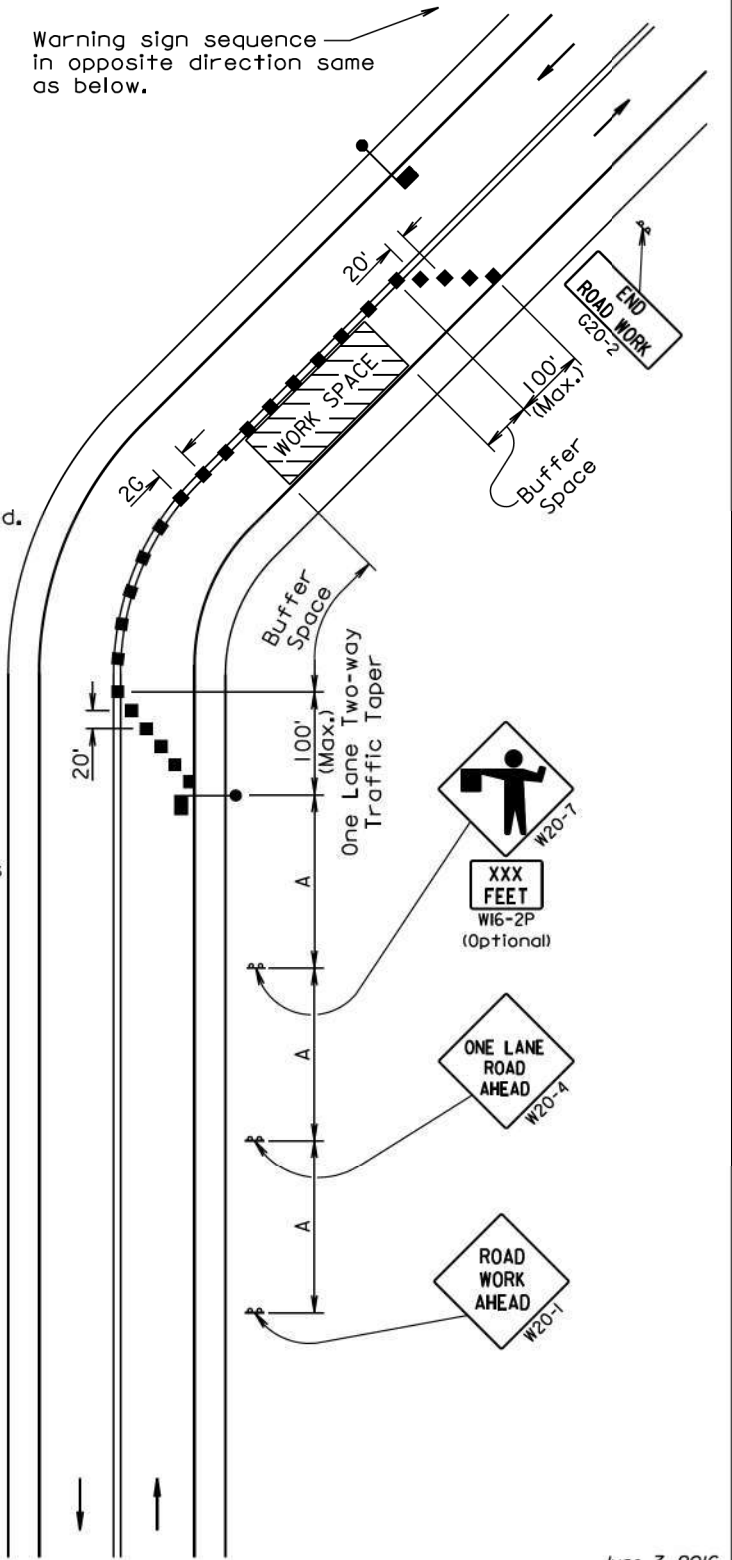
END  
ROAD WORK  
G20-2

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.

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

Warning sign sequence  
in opposite direction same  
as below.



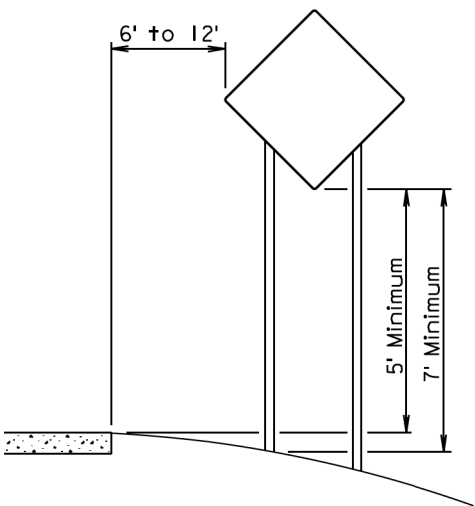
June 3, 2016

Published Date: 3rd Qtr. 2018	S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1

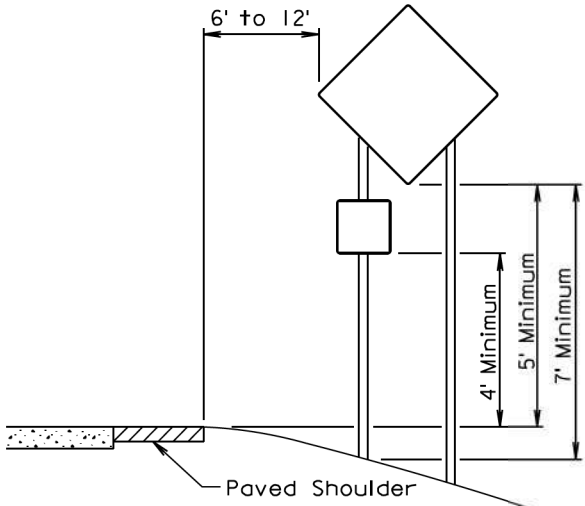


STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	28	30

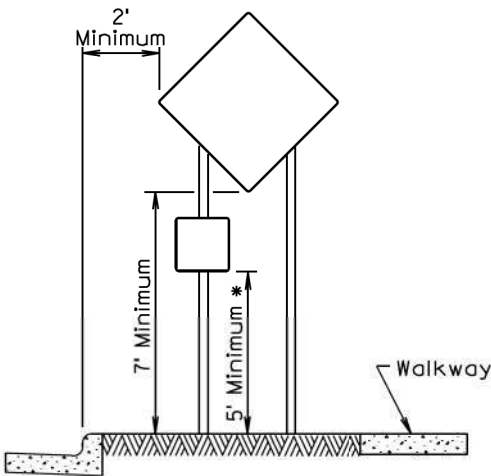
Plotting Date: 08/24/2018



RURAL DISTRICT

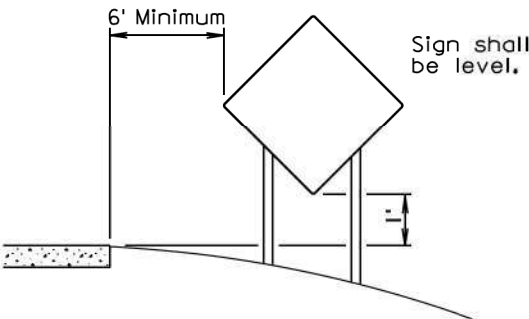


RURAL DISTRICT WITH  
SUPPLEMENTAL PLATE



URBAN DISTRICT

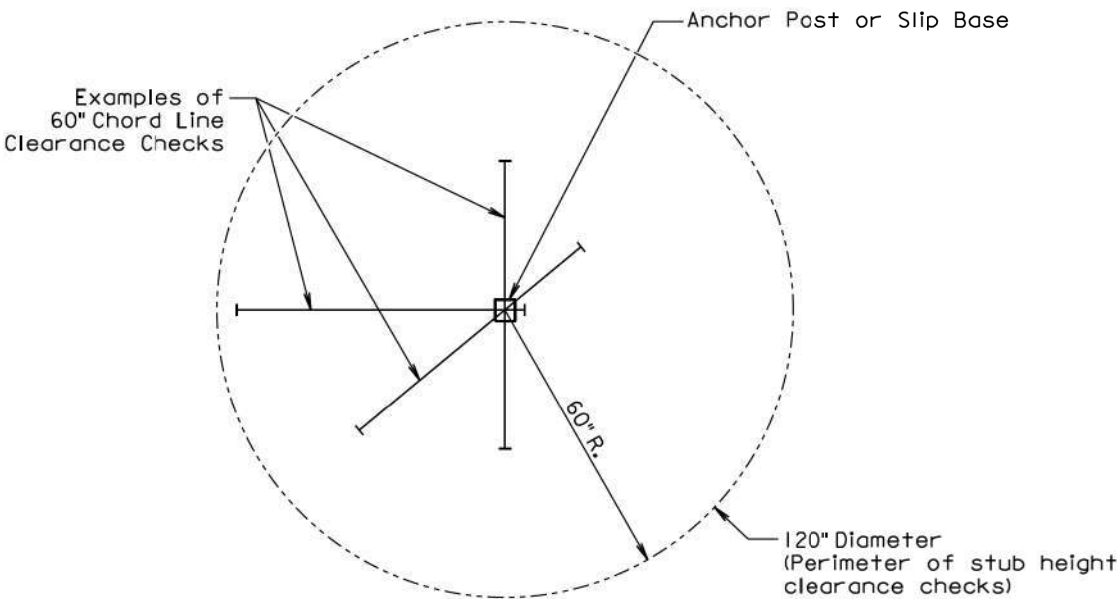
\* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



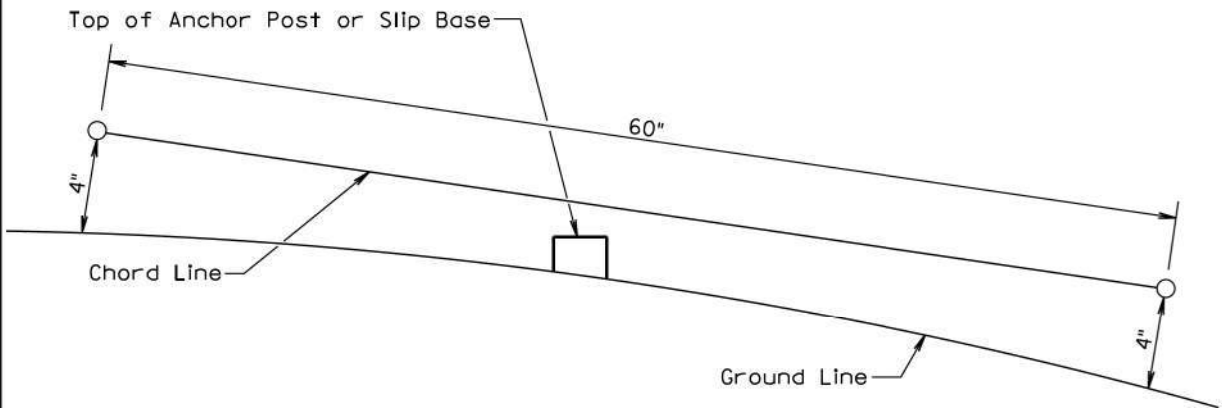
RURAL DISTRICT  
3 DAY MAXIMUM  
(Not applicable to regulatory signs)

September 22, 2014

Published Date: 3rd Qtr. 2018	S D D O T	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:

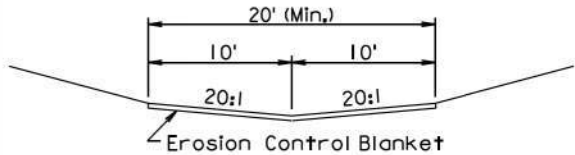
The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

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.

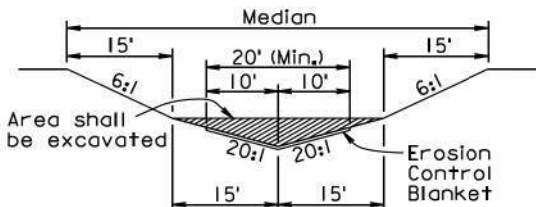
The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

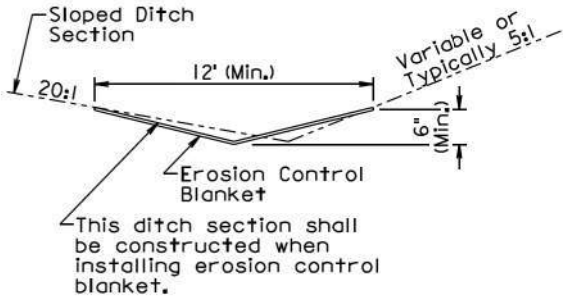
Published Date: 3rd Qtr. 2018	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1



STANDARD DITCH SECTION



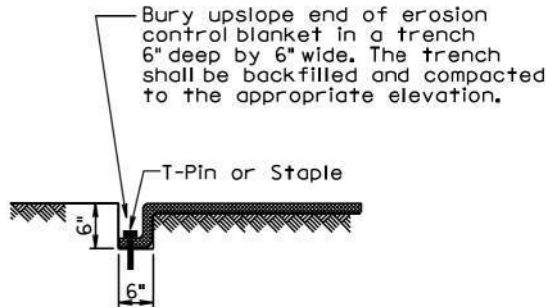
MEDIAN SECTION



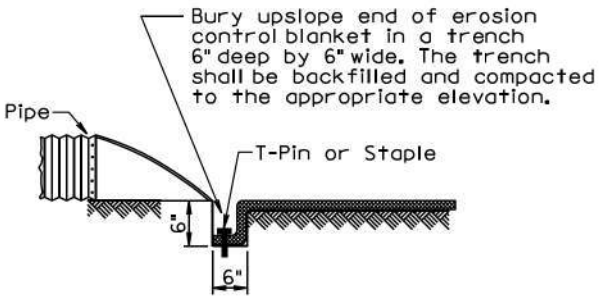
SLOPED DITCH SECTION

- \* Use a 4" (Min.) overlap wherever two widths of erosion control blanket are applied side by side.
- \* Use a 6" (Min.) overlap wherever one roll of erosion control blanket ends and another begins.

OVERLAP DETAIL



TRENCH DETAIL



PIPE END DETAIL

GENERAL NOTES:

Prior to placement of the erosion control blanket, the areas shall be properly prepared, shaped, seeded, and fertilized.

Erosion control blanket shall be unrolled in the direction of the flow of water when placed in ditches and on slopes. The upslope end of the erosion control blanket shall be buried in a trench 6" wide by 6" deep. There shall be at least a 6" overlap wherever one roll of erosion control blanket ends and another begins, with the upslope erosion control blanket placed on top of the downslope erosion control blanket.

The erosion control blanket shall be pinned to the ground according to the manufacturer's installation recommendations.

After the placement of the erosion control blanket, the Contractor shall fine grade along all edges of the blanket to maintain a uniform slope adjacent to the blanket and level any low spots which might prevent uniform and unrestricted flow of side drainage directly onto the erosion control blanket.

All ditch sections shall be shaped when installing the erosion control blanket. All costs for shaping the ditches shall be incidental to the contract unit price per foot for "Shaping for Erosion Control Blanket".

December 23, 2004

Published Date: 3rd Qtr. 2018

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EROSION CONTROL BLANKET

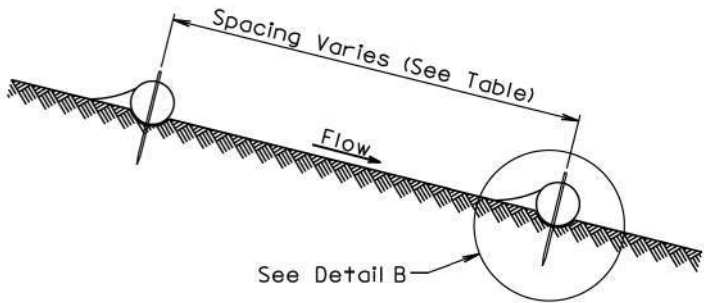
PLATE NUMBER  
734.01

Sheet 1 of 1



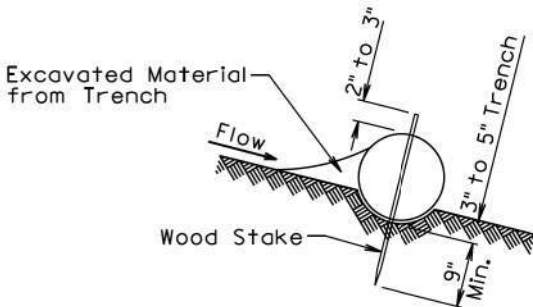
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	020-372	30	30

Plotting Date: 08/24/2018

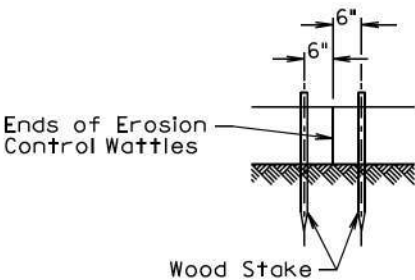


ELEVATION VIEW  
CUT OR FILL SLOPE INSTALLATION

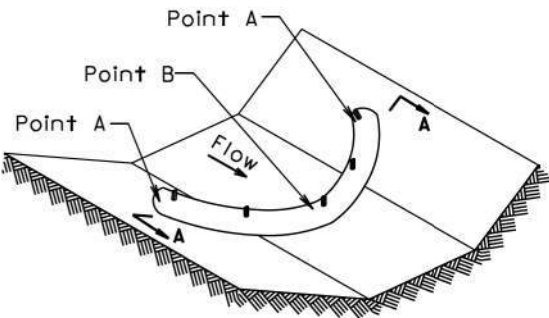
CUT OR FILL SLOPE INSTALLATION	
Slope	Spacing (Ft)
1:1	10
2:1	20
3:1	30
4:1	40



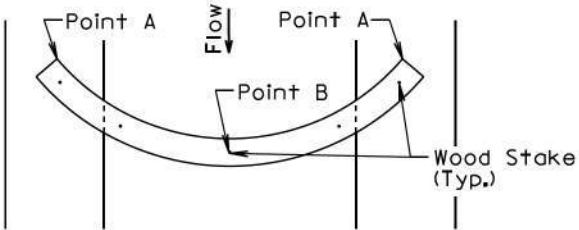
DETAIL B  
(TYPICAL OF ALL INSTALLATIONS)



DETAIL C

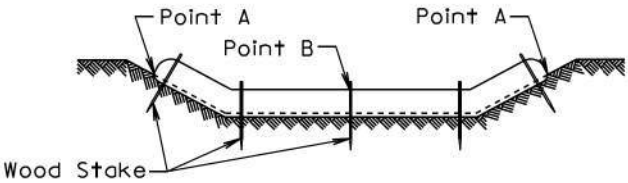


ISOMETRIC VIEW  
DITCH INSTALLATION



PLAN VIEW  
DITCH INSTALLATION

DITCH INSTALLATION	
Grade	Spacing (Ft)
2%	150
3%	100
4%	75
5%	50



SECTION A-A

December 23, 2004

Published Date: 3rd Qtr. 2018

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EROSION CONTROL WATTLE

PLATE NUMBER  
734.06

Sheet 1 of 2

GENERAL NOTES:

- At cut or fill slope installations, wattles shall be installed along the contour and perpendicular to the water flow.
- At ditch installations, point A must be higher than point B to ensure that water flows over the wattle and not around the ends.
- The Contractor shall dig a 3" to 5" trench, install the wattle tightly in the trench so that daylight can not be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side. See Detail B.
- The stakes shall be 1"x2" or 2"x2" wood stakes, however, other types of stakes such as rebar may be used only if approved by the Engineer. The stakes shall be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles shall be 3' to 4'.
- Where installing running lengths of wattles, the Contractor shall butt the second wattle tightly against the first and shall not overlap the ends. See Detail C.
- The Contractor and Engineer shall inspect the erosion control wattles once every week and within 24 hours after every rainfall event greater than 1/2". The Contractor shall remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.
- Sediment removal, disposal, or necessary shaping shall be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping shall be incidental to the contract unit price per cubic yard for "Remove Sediment".
- All costs for furnishing and installing the erosion control wattles including labor, equipment, and materials shall be incidental to the contract unit price per foot for the corresponding erosion control wattle bid item.
- All costs for removing the erosion control wattle from the project including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Remove Erosion Control Wattle".

December 23, 2004

Published Date: 3rd Qtr. 2018

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EROSION CONTROL WATTLE

PLATE NUMBER  
734.06

Sheet 2 of 2