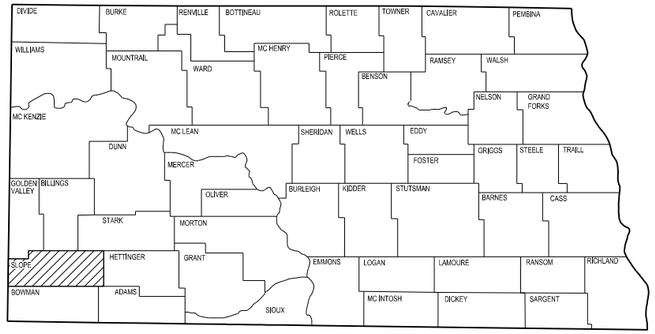
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SC-4424(052)	20418	1	1



JOB #11

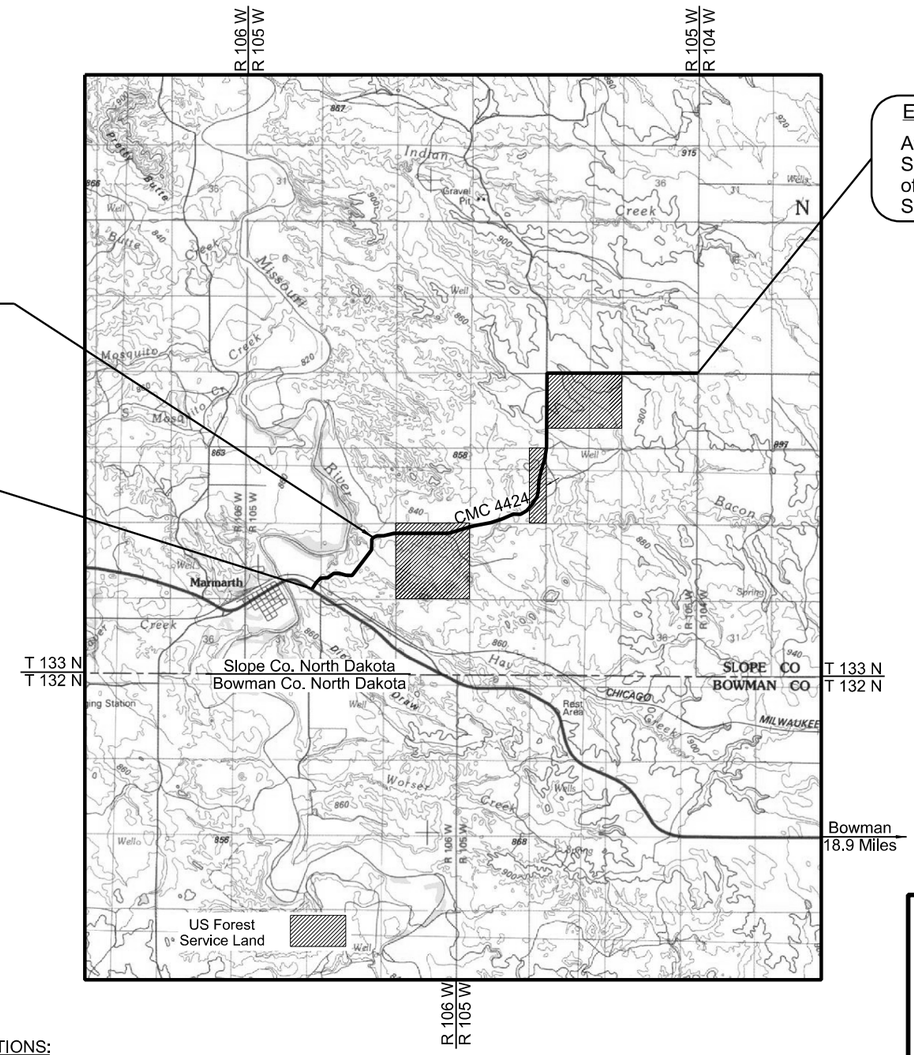
NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

SC-4424(052)

FHWA Project of Division Interest (PODI)
Slope County
CMC 4424 RECONSTRUCTION (YELLOWSTONE TRAIL)
GRADING, AGGREGATE SURFACE COURSE, STRUCTURE INSTALLATION
CULVERT REPLACEMENTS, AND INCIDENTALS

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SC-4424(052)	7.045	7.045



END OF PROJECT SC-4424(052)

At Sta. 375+00 = A point approximately 5.2' South and 204.2' East of the Southwest corner of Section 7, T133N, R104W
Slope County, North Dakota

Double Cell 14'x10'x63' Precast RCBC Installation
Sta 59+62
BN 108-23.0

BEGIN PROJECT SC-4424(052)

At Sta. 3+00 = A point approximately 1185.4' North and 238.4' West of the Southeast corner of Section 30, T133N, R105W
Slope County, North Dakota

NORTH DAKOTA ONE CALL
"CALL BEFORE YOU DIG AND DIG SAFELY"
1-800-795-0555

U.S.D.A. FOREST SERVICE
DAKOTA PRAIRIE GRASSLANDS

APPROVED BY: John Kinney /s/ — GRASSLANDS SUPERVISOR — 03/11/16 DATE

APPROVED BY: Curtis L. Grudniewski /s/ — GRASSLANDS ENGINEER — 03/11/16 DATE

109 S. Main • Box 357
Bowman, ND 58623
Ph: 701.523.3340
Brosz ENGINEERING, INC.
ARCHITECTURE ENGINEERING SURVEYING

DESIGNERS

Gary Brennan, PE

Lucas Doerr

GOVERNING SPECIFICATIONS:

2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

PLANS

Survey by: Brosz Engineering, Inc. Bowman, ND

Plans by: Brosz Engineering, Inc. Bowman, ND

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 03/04/2016

Gary Brennan /s/
Brosz Engineering, Inc. Bowman, ND 58623

This document was originally issued and sealed by Gary Brennan Registration Number PE- 4513, on 03/04/16 and the original document is stored at the Office of Brosz Engineering, Inc Bowman, ND

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D-704-13	Barricade Details and Channelizing Devices
D-704-14	Construction Sign and Barricade Assembly Details
D-704- 22	Construction Truck and Temporary Detour Layouts
D-704-30	Windrow Marking
D-704-50	Portable Sign Support Assembly
D-708-6	Erosion and Siltation Controls-Median or Ditch Inlet Protection
D-714-4	Round Corrugated Steel Pipe Culverts and End Sections
D-754-25	Mounting Details Perforated Tube
D-754-26,27,28,29,30,31,32,33,34	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D-754-87	Sign Punching, Stringer and Support Location Details for Street Name Signs and 911 Signs

LIST OF SPECIAL PROVISIONS (SP)

SP#	Description
299(14)	United State Forest Service Considerations
5110(14)	Permits and Environmental Considerations

NOTES

GENERAL:

The scope of this project consists of reconstructing and installing gravel surfacing on 7.0 miles of existing road. The County will arrange for all permanent and temporary easements, permanent and temporary fencing, and any utility adjustments.

Coordinate the work schedule with the landowners, the County and utility companies. The County will be responsible for the cost of any adjustments in utilities, except in cases of negligence by the Contractor.

It may be necessary to work around power poles, telephone lines, pipelines and other utilities.

107-P01 **MAINTAINING TRAFFIC:** Maintain traffic according to Section 107.07 A of the Standard Specifications with the following changes or additions:

Once work begins on any part of the project it will be a requirement to maintain all parts of the project. The Engineer may direct the Contractor to maintain any or all sections of roadway included in the project.

Include cost of maintaining the roadway for traffic in the unit price bid for the various contract items.

151-P01 **GENERAL EQUIPMENT:** Tow-type pneumatic-tired rollers shall conform to section 151.01 A2. of the Standard Specifications with the following changes or additions:

The roller shall be wide enough to provide complete coverage of the wheel tracks left by the towing vehicle.

200-P01 **SHRINKAGE:** 35 percent additional volume is included for shrinkage in earth embankment from 3+00 to 112+91, 131+73 to 185+59, and 204+98 to 375+00 (Bal 1-4, 6-8, and 10-15). 32 percent additional volume is included for shrinkage in earth embankment from 112+91 to 131+73 and 185+59 to 204+98 (Bal 5 and 9).

201-P01 **CLEARING AND GRUBBING:** Removed items not slated for salvage on Forest Service lands shall be removed from the Forest Service lands and disposed of in accordance with all applicable federal, state and local ordinances, laws and regulations.

202-P01 **REMOVAL OF STRUCTURE:** Removal of Structure – Site 2 is a 3'x4'x26' concrete box culvert located at station 32+04. Remove and dispose of said box culvert. Include all costs associated with removing and disposing in the unit price bid for the bid item "Removal of Structure – Site 2".

Removal of Structure – Site 3 is a 15'x20'x8' concrete bridge with a timber deck located at station 147+19. Remove and salvage the timber bridge deck, stockpile deck inside the right of way for pick up by county forces. Remove and dispose of the concrete abutments and floor. Include all costs associated with removing and salvaging the timber deck and disposing of the concrete abutment and floor in the unit price bid for the bid item "Removal of Structure – Site 3".

Removal of Structure – Site 4 is a 4'x4'x25' concrete box culvert located at station 226+30. Remove and dispose of said box culvert. Include all costs associated with removing and disposing in the unit price bid for the bid item "Removal of Structure – Site 4".

Removal of Structure – Site 5 is a 4'x4'x42' concrete box culvert located at station 239+12. Remove and dispose of said box culvert. Include all costs associated with removing and disposing in the unit price bid for the bid item "Removal of Structure – Site 5".

203-P01 **COMMON EXCAVATION-TYPE C:** Areas of embankment that have layers or sections that are inconsistent in moisture will be rejected. Visible areas of wet and dry layers will be sufficient evidence of inconsistent moisture and these areas will be rejected. When encountered, correct said areas without additional payment

An additional 500 cubic yards of excavation per mile is included in the estimate of quantities for repairing subgrade deficiencies. Notify the Engineer if any soft spots are encountered, the Engineer will determine the depth of undercut. Backfill the undercut with either suitable grading material or salvaged aggregate surfacing as determined by the Engineer. Place and compact salvaged aggregate surfacing per section 302.04 of the standard specifications.

Dispose of any unsuitable material that is excavated along the inslopes of the roadway.

The subcut volume will be determined by measuring the area of the dig out. Payment for removal of the unsuitable material for repairing the subgrade deficiency will be paid as "Common Excavation-Type C". Use suitable grading material for backfill; the cost of backfilling the material will be paid for as "Common Excavation-Type C" as determined by the final cross sections.

At the discretion of the Engineer, salvaged aggregate surfacing may be used for backfill, the costs associated with loading, hauling, laying and compacting the salvage aggregate will be paid for at the unit price bid for "Salvage Aggregate Base Course".

Volume will be computed in cubic yards by the average end area method. The measurement of accepted quantities of excavation will be measured in its original position by cross sectioning before the topsoil is removed. Final cross-sections will be taken after the topsoil is replaced.

No additional measurement for payment will be made for the construction of intersecting roads or approaches, as per plan or added by the Owner. Payment will be part of the excavation as measured by the final cross-sections.

203-P02 **APPROACH ROAD:** The existing road from 53+00 to 67+00 Lt including the existing bridge shall be left for the landowner. The existing road will require approaches at 90° to the proposed alignment, as shown in these plans.

203-P03 **TOPSOIL:** The quantity of topsoil included in the plans is based on a four (4) inch depth.

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NOTES

203-P04 TOPSOIL-WETLAND: Strip the topsoil to a depth of eight inches from the existing wetland at station 85+00 to 88+00 Lt. Stockpile the wetland topsoil separately from other topsoil. Upon completion of the onsite mitigation at station 85+00 to 88+00 Lt, spread all wetland topsoil that has been stripped on the mitigation site. The locations and boundaries of the impacted wetlands and the mitigation site are shown in the plans.

Include all costs to remove, stockpile and place the wetland topsoil in the price bid for "Topsoil-Wetland."

203-P05 WETLAND EXCAVATION: Undercut to an elevation of 8" below the proposed Finished Elevation of 2727.9 prior to placing the topsoil

Include the cost for excavation associated with wetland mitigation in the unit price bid for "Common Excavation-Type C."

203-P06 BACKFILL OF BOX CULVERT: Compact according to Section 203.04E.2.a.

210-P01 EXCAVATION FOR BOX CULVERTS: Class 1 Excavation is the excavating and disposing, when required, of material from the right-of-way or construction easement to facilitate the installation of the RCB Culvert. Utilize Class 1 Excavation as road embankment shown in the earth work balance on the Plan & Profile sheet. Dispose any material not utilized or needed as road embankment outside of the right of way as approved by the field engineer. Class 1 Excavation will be paid for as a Lump Sum.

An estimated quantity for Class 1 Excavation is included in the plans to install the box culvert to the elevation specified in the plans. Class 1 Excavation will also include shaping the creek to make it as wide as the opening of the box culvert on both the inlet and outlet sides. The quantity is based on the plan shown dimensions and will not be measured.

Class 2 Excavation is the excavating and disposing of material from the right-of-way or construction easement to facilitate the installation of foundation fill for RCB Culvert. Upon Foundation inspection, perform Class 2 Excavation deeper if the Engineer deems the foundation to not be suitable to support the RCB Culvert foundation. Class 2 Excavation will be paid for as Cubic Yards.

Include all costs associated with excavation required to install the box culvert, and end sections including the excavation required for the installation of the cut-off walls, and for the placement of foundation fill and the disposal of unsuitable backfill material, in the unit price bid for the bid item "Class 2 Excavation".

The County has stockpiles of gravel available for purchase that may meet the specifications for "Foundation Fill". Assure that the material meets the specifications. Contact the County Highway Superintendent, Dale Powell, at 701-440-8506 for further information.

210-P02 DEWATERING: High groundwater elevations may be present on this project. Dewatering may be required in the wet areas to handle water seeping

Fluctuations in the groundwater level may occur due to rainfall, spring thaw, drainage or other factors. Recognize the possibility of changes in the existing water conditions. Examine the site of the proposed work, become familiar with the site conditions, both soil and water conditions, before submitting a proposal.

The County assumes no responsibility for the soil and water conditions encountered during construction. The submission of a bidding proposal will be considered conclusive evidence that the bidder is satisfied with the conditions to be encountered in performing the work and as to the requirements of the proposed contract.

Consider all costs relating to and incorporated with dewatering incidental to the unit price bid for "Foundation Preparation".

251–P01 SEEDING: Cover all the disturbed areas except the 32 foot roadbed with seed. The area to be seeded on private land is 56.3 acres and will be seeded with SEEDING CLASS II and TEMPORARY COVER CROP. The area to be seeded US Forest Service Land is 43.3 acres and will be seeded with SEEDING CLASS III.

The Class III seed mixture is Forest Service Seed Mix #12 and shall consist of the following:

Species	Variety	Common Name	% of Mix	Actual PLS Mix Lbs/Acre	Broadcast Actual PLS Lbs/Acre
Grasses Cool Season:					
Agropyron smithii	Rodan	Western wheatgrass	40%	4.00	8.00
Stipa viridula	Lodorm	Green Needlegrass	30%	3.00	6.00
Grasses Warm Season Calamovilfa longifolia	Goshen	Prairie sandreed	30%	3.00	6.00
Total of All Species			100%	10.00	20.00
Cover Crop: 1 of 3	Mandan	Oats or Barley or Canadian Wild Rye		4.00	8.00
Total Pounds per Type				14.00	28.00

The seed mixture in the Class III table gives the rate of pure live seed (PLS) for each species per acre. These rates were derived using three basic figures: percent of each species desired by composition, number of seeds per pound according to species, and total number of PLS per square foot.

The following equation should be used to calculate how much seed is needed to provide the required pounds of PLS needed.

% Purity X Germination Rate % = % PLS
Pounds of PLS Desired divided by % PLS = Pounds of Seed Required

256–P01 RIPRAP: The 10'x6'x4" slab of concrete at station 109+34 Rt may be used as riprap on condition that it is broke up to meet gradation specified for Grade I Riprap. Concrete contains reinforcing steel. If used as Grade I Riprap, ensure no reinforcing steel is present outside of the concrete. Concrete cannot be used as Grade I Riprap on USFS land.

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NOTES

302-P01 AGGREGATE BASE OR SURFACE COURSE: Contact the Engineer prior to hauling aggregate surfacing to allow the Engineer to set the section corners in the road prior to placing any aggregate surfacing on the roadway.

Place, compact and shape the aggregate surface course as stated in Section 302.04 of the NDDOT Standard Specification with the following changes and additions:

During the aggregate surface course operation lay down, water and compact the aggregate in sections that are at least 1/2 mile long.

Areas of gravel that have layers or sections that are inconsistent in moisture will be rejected. Visible areas of wet and dry layers will be sufficient evidence of inconsistent moisture and these areas will be rejected. When encountered, correct said areas without additional payment

Aggregate surface course will be measured by the cubic yard. Trucks will be measured by the Engineer to determine the amount of aggregate per load. Load the trucks uniformly as approved by the engineer. Mark the spread for each load on the roadway with pin flags or other devices. The Engineer will verify the spread of random loads and count the markers to determine the amount of gravel used. The Contractor will be responsible for the cost of any overruns or under runs caused by the use of trucks that are not loaded uniformly or do not dump the load at the agreed upon spread.

The County has stockpiles of gravel available for purchase that may meet the specifications. Assure that the material meets the specifications for “Aggregate Surface Course CL 13”. Contact the County Highway Superintendent, Dale Powell, at 701-440-8506 for further information. Include the cost for loading, hauling, laying, compacting and any other incidentals to complete the work in the price bid for “Aggregate Surface Course CL 13”

302–P02 SALVAGE AGGREGATE BASE COURSE: This work consists of salvaging the existing surfacing from the roadbed, stockpiling the material then placing it on the new roadbed.

The existing granular surfacing shall be removed and salvaged from the existing roadway. Scrapers may be used to remove the material. The material shall be stockpiled and upon completion of the subgrade, the salvaged aggregate shall be relayed and compacted on the newly constructed roadbed. The salvage aggregate shall be relayed and compacted according to Section 302.04 of the Standard Specifications.

The salvaged granular material shall be measured in the stockpile. Measurement will be by the cubic yard.

Payment for removing and salvaging the existing granular material shall be made at the contract unit price per cubic yard for “Salvage Aggregate Base Course” and shall include the cost for removing, stockpiling, loading, hauling, laying and any other incidentals to complete this work.

606-P01 PRECAST REINFORCED CONCRETE BOX CULVERT AND END SECTIONS: Payment for Furnishing and Installing the Precast Box Culvert and End Sections shall be at the unit price bid for the applicable bid items and shall include the cost for delivery, unloading, placing and all incidentals to complete this work, including but not limited to wrapping the joints with fabric, fastening the sections together with tie bolts, drilling and epoxying the last section to the cut-off walls and grouting the lifting holes in the end sections.

A minimum of 2’ of earthen fill is required over top of the new box culvert prior to the application of live load. Scrapers will not be allowed to drive over the box culvert unless a minimum of 3’ of cover is placed over the roof of the new box or as otherwise recommended by the manufacturer.

The double cell 14’ x 10’ RCBC shall be constructed by laying two lines of single cell box culverts parallel to one another, as detailed on section 170 sheet 1. The precast box culverts and end sections will be paid for as “14FT x 10FT Precast RCB Culvert” and “14FT x 10FT Precast RCB End Section”

704-P01 TRAFFIC CONTROL: The County will not pay for any change in traffic control requested by the Contractor and approved by the Engineer.

709-P01 GEOSYNTHETIC FABRIC-TYPE RR: Place Geosynthetic Fabric-Type RR under all riprap around the RCBC and up the vertical face between the riprap and earth edge.

709-P02 GEOSYNTHETIC FABRIC-TYPE R1: Place Geosynthetic Fabric- Type R1 at the bottom of the undercut beneath the box culvert prior to the placement of the foundation fill.

714–P01 CULVERTS, STORM DRAINS, EDGE DRAINS AND UNDERDRAINS: The work consists of furnishing and installing culverts. The salvaged culverts will become the property of the County. Stockpile them inside the right of way for pick up by county forces.

The culverts shall be aluminized steel Type 2.

The removal and installation of pipes shall be completed in the same day. Culverts may be backfilled with suitable grading material unless otherwise specified. Where specified, install mainline culverts per the pipe backfill detail included in these plans; gravel encasement will be required ½ way up the side of the pipe. The gravel for pipe backfill shall meet the requirements for Aggregate Surface Course CL 13. Include the cost associated with loading, hauling, placing and compacting the encasement gravel with the pipe bid items.

752-P01 TEMPORARY SAFETY FENCE: The installation, removal and maintenance of the temporary fence shall be included in the unit price bid for “Temporary Safety Fence”.

754–P01 PERMANENT SIGNING: The bid item “Steel Galv Posts – Flange Channel” shall consist of 1.12 lb per foot Green Painted U Channel Posts. These posts will be used as supports for the P.L.O.T.S. Signs.

980–P01 CATTLE GUARD RESET: As designated in the plans, remove and salvage the cattle guards, complete the grading in that area and then reset the cattle guard in the designated location. Take care when handling the cattle guards, the Contractor will be responsible for any damages that may occur due to Contractor’s negligence. The cost of removing, salvaging, and resetting the cattle guards shall be paid for at the unit price bid for “Cattle Guard Reset”

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ENVIRONMENTAL NOTES

ENVIRONMENTAL COMMITMENTS: Slope County, the North Dakota Department of Transportation, and FHWA have made several environmental commitments to various agencies and the public to secure approval of this project. The environmental commitments are as follows:

Commitment No. 1: Reseed all disturbed vegetation upon completion of construction.

Action taken/required: Replace topsoil and reseed with an approved Forest Service seed mix scenario #12 for reclamation practices. The site will be monitored to ensure proper establishment of native species.

Commitment No. 2: Seasonal work restrictions apply to this project. No construction activities are to take place from March 15th to May 15th.

Action taken/required: No work will be performed on this project from March 15th to May 15th, due to sage grouse lekking activities in the project vicinity.

Commitment No. 3: Minimize all erosion and sedimentation into all streams and their adjacent habitat.

Action taken/required: Install and maintain erosion control devices as shown in the plans.

Commitment No. 4: No drainage alterations will be made.

Action taken/required: The project has been designed to avoid alterations to any drainages.

Commitment No. 5: In order to comply with the National Historic Preservation Act, a Class III cultural resource inventory will need to be conducted for this project.

Action taken/required: A Class III cultural resource inventory was conducted for this project. The report has been submitted to the North Dakota State Historic Preservation Office (SHPO) with a No Historic Properties Affected Determination recommendation for this project, if and only if location 32SL8 is avoided by constructing a temporary fence around the area from station 98+70 to 100+70. In accordance with Section 107 of the Standard Specifications, ensure that applicable cultural resource laws and regulations have been followed for all material sources. All material source locations, even those opened prior to the current project, must have been subjected to Class III cultural resource inventory prior to use.

Commitment No. 6: A US Army Corps of Engineers Section 404 Permit is required.

Action taken/required: Slope County is obtaining the Section 404 Permit. Comply with all requirements listed in 404 Permit.

Commitment No. 7: A NPDES permit is required.

Action taken/required: Obtain an NPDES (National Pollutant Discharge Elimination System) Permit from the North Dakota Department of Health and comply with all requirements contained in the permit.

Commitment No. 8: Take all necessary measures to minimize fugitive dust emissions during construction and complaints must be dealt with in an effective manner.

Action taken/required: Implement measures to minimize fugitive dust emissions created during construction. All complaints will be dealt with in an effective manner.

Commitment No. 9: Minimize noise levels prevent adverse effects on people living near the construction area.

Action taken/required: Ensure that all construction machinery is equipped with recommended mufflers in good working order.

Commitment No. 10: Any portions of the existing roadway that is made obsolete by the new alignment should be completely obliterated and reclaimed.

Action taken/required: Any obsolete portions of the existing roadway will be obliterated and reclaimed to natural contours on NFS Lands.

Commitment No. 11: Take care during construction activity near any waters of the state to minimize adverse effects on a water body.

Action taken/required: Use caution during construction activities to minimize adverse effects to the water bodies. This includes reseeding any disturbed areas as soon as possible upon completion of the construction activity. Take caution prevent spills of oil and grease that may reach the receiving water from equipment maintenance and/or the handling of fuels on site.

Commitment No. 12: No invasive and or noxious weeds shall be spread or introduced to the project area.

Action taken/required: Clean all vehicles and equipment before entering the project for construction. Any North Dakota state-listed or Slope County-listed noxious weeds need to be controlled, if found on reclamation sites and in compliance of the 2007 DPG Weed EIS. Disturbances will be kept to a minimum to reduce the impacts to the native vegetation and spreading of invasive species.

Commitment No. 13: Report any sensitive or watch plants that are discovered.

Action taken/required: Report any sensitive or watch plants that are found to the Medora Ranger District office to help increase accuracy of the Medora Ranger District botanical survey of the species and their habitats for future conservation strategies.

Commitment No. 14: Only use certified Erionite free aggregate on USDA portion.

Action taken/required: Follow the Aggregate Source Limitations as defined in Section 106.02 D in the 2014 NDDOT Spec Book.

Commitment No. 15: The USFS Paleontology department suggests we follow Beaver Creek Archaeology's recommendation, in their June 2014 report, of having a monitor present during the topsoil stripping process in areas where soils are conductive for finding fossils.

Action taken/required: Notify Beaver Creek prior to striping the topsoil so an archaeologist can be on site during that operation. The cost of having a monitor on site will be paid for by the County.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	8	1

ESTIMATE OF QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT		TOTAL
103	0100	CONTRACT BOND	L SUM		1
201	0330	CLEARING & GRUBBING	L SUM		1
202	0109	REMOVAL OF STRUCTURE - SITE 2	L SUM		1
202	0110	REMOVAL OF STRUCTURE - SITE 3	L SUM		1
202	0170	REMOVAL OF CULVERTS - ALL TYPES & SIZES	LF		471
202	0269	REMOVAL OF STRUCTURE - SITE 4	L SUM		1
202	0270	REMOVAL OF STRUCTURE - SITE 5	L SUM		1
203	0103	COMMON EXCAVATION-TYPE C	CY		285,440
203	0109	TOPSOIL	CY		53,459
203	0110	ROCK EXCAVATION	CY		1,000
203	0121	TOPSOIL-WETLAND	CY		173
203	0180	ROADWAY OBLITERATION	LF		200
210	0202	FOUNDATION PREPARATION - SITE 1	L SUM		1
210	0210	FOUNDATION FILL	CY		388
210	0101	CLASS 1 EXCAVATION	L SUM		1
210	0110	CLASS 2 EXCAVATION	CY		310
216	0100	WATER	M GAL		3,845
251	0200	SEEDING CLASS II	ACRE		56.3
251	0300	SEEDING CLASS III	ACRE		43.3
251	2000	TEMPORARY COVER CROP	ACRE		56.3
255	0101	ECB TYPE 1	SY		13,053
255	0201	TRM TYPE 1	SY		1,103
256	0100	RIPRAP GRADE I	CY		563
261	0112	FIBER ROLLS 12IN	LF		38,030
261	0113	REMOVE FIBER ROLLS 12IN	LF		19,015
302	0099	SALVAGE AGGREGATE BASE COURSE	CY		9,350
302	0357	AGGREGATE SURFACE COURSE CL 13	CY		23,665
602	1130	CLASS AE-3 CONCRETE	CY		40
606	1410	14FT X 10FT PRECAST RCB CULVERT	LF		126
606	5410	14FT X 10FT PRECAST RCB END SECTION	EA		4
702	0100	MOBILIZATION	L SUM		1
704	1000	TRAFFIC CONTROL SIGNS	UNIT		600
704	1052	TYPE III BARRICADE	EA		6
704	1081	VERTICAL PANELS-BACK TO BACK	EA		30
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY		466
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY		1,231
714	5015	PIPE CORR STEEL .064IN 18IN	LF		1,018
714	5035	PIPE CORR STEEL .064IN 24IN	LF		770
714	5210	PIPE CORR STEEL .079IN 30IN	LF		190
714	5215	PIPE CORR STEEL .079IN 36IN	LF		266
714	5220	PIPE CORR STEEL .079IN 42IN	LF		64
714	5225	PIPE CORR STEEL .079IN 48IN	LF		386
714	5325	PIPE CORR STEEL .109IN 54IN	LF		116
714	5340	PIPE CORR STEEL .109IN 84IN	LF		150
752	0911	TEMPORARY SAFETY FENCE	LF		340
754	0112	FLAT SHEET FOR SIGNS - TYPE IV REFL SHEETING	SF		194.2
754	0206	STEEL GALV POSTS - TELESCOPING PERFORATED TUBE	LF		499.4
754	0207	STEEL GALV POSTS - FLANGE CHANNEL	LF		42
754	0592	RESET SIGN PANEL	EA		6
902	0400	MACHINE HYGIENE	L SUM		1
980	0170	CATTLE GUARD RESET	EA		6

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Details

Estimate of Quantities
Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	10	1

Basis of Estimate

Basis of Estimate

Water

10 Gal/C.Y. for Excavation
30 Gal/C.Y. for Aggregate
30 Gal/C.Y. for Salvage Aggregate
25 MGal/Mile for Dust Palliative

Surfacing

(2 lifts) 1600 C.Y./Mile/Lift for Aggregate Surface Course

40 C.Y. Aggregate/Approach
50 C.Y. Aggregate/ Double Approach

Approach Subgrades

Approach Drive - 36' Wide
Double Approach - 44' Wide

Aggregate Base Course Depths		
Station	Offset	Depth
26+40	Rt	5.5"
79+20	Lt	2.0"
924+00	Rt	2.5"
132+00	Lt	4.5"
184+80	Rt	2.0"
237+60	Lt	3.5"
290+40	Rt	1.5"
343+20	Lt	2.5"

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Details

Basis of Estimate
Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	11	1

Earthwork Summary

Alignment	Common Excavation Type C (CY) Pay Item	Embankment (CY) Includes Shrinkage	Borrow Excavation (CY)	Topsoil (CY) Pay Item
CMC 4424 Reconstruction	✳ 281,917	281,917	0	53,459
Repair of Subgrade Deficiencies	3,523	0	0	0
Total =	285,440	281,917	0	53,459

✳ This quantity is as measured from cross sections which includes additional embankment provisions for construction of approaches.

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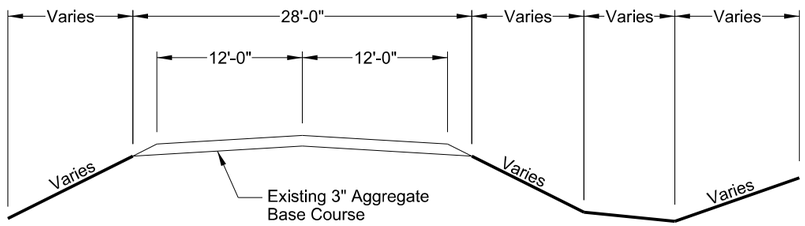
Details

Earthwork Summary
Slope County, North Dakota

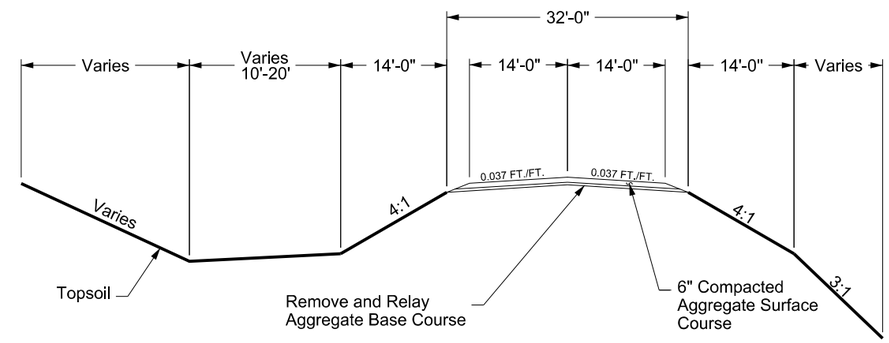
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	30	1

Typical Sections

NOTE: Drawings NOT to Scale.

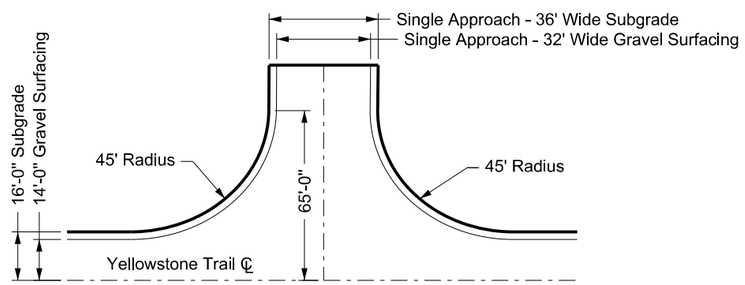


Existing Typical

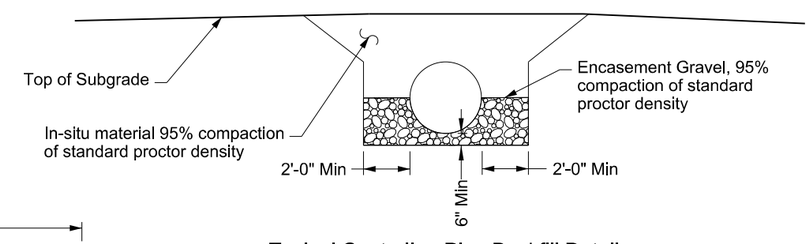


Standard Typical Section

Sta. 3+00 to Sta. 375+00



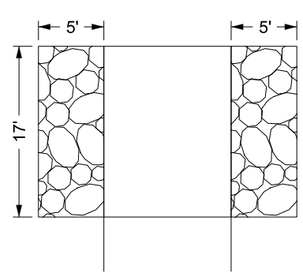
Private, Field Drive, Section Line Approaches
45' Radius



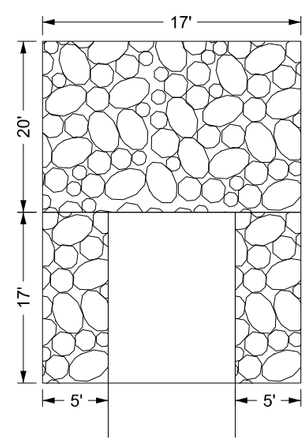
Typical Centerline Pipe Backfill Detail

Station Locations

Sta. 136+25
Sta. 312+00
Sta. 330+00



Riprap Detail Station 147+81-63' Lt
84" CMP Inlet



Riprap Detail Station 147+17-68' Rt
84" CMP Outlet

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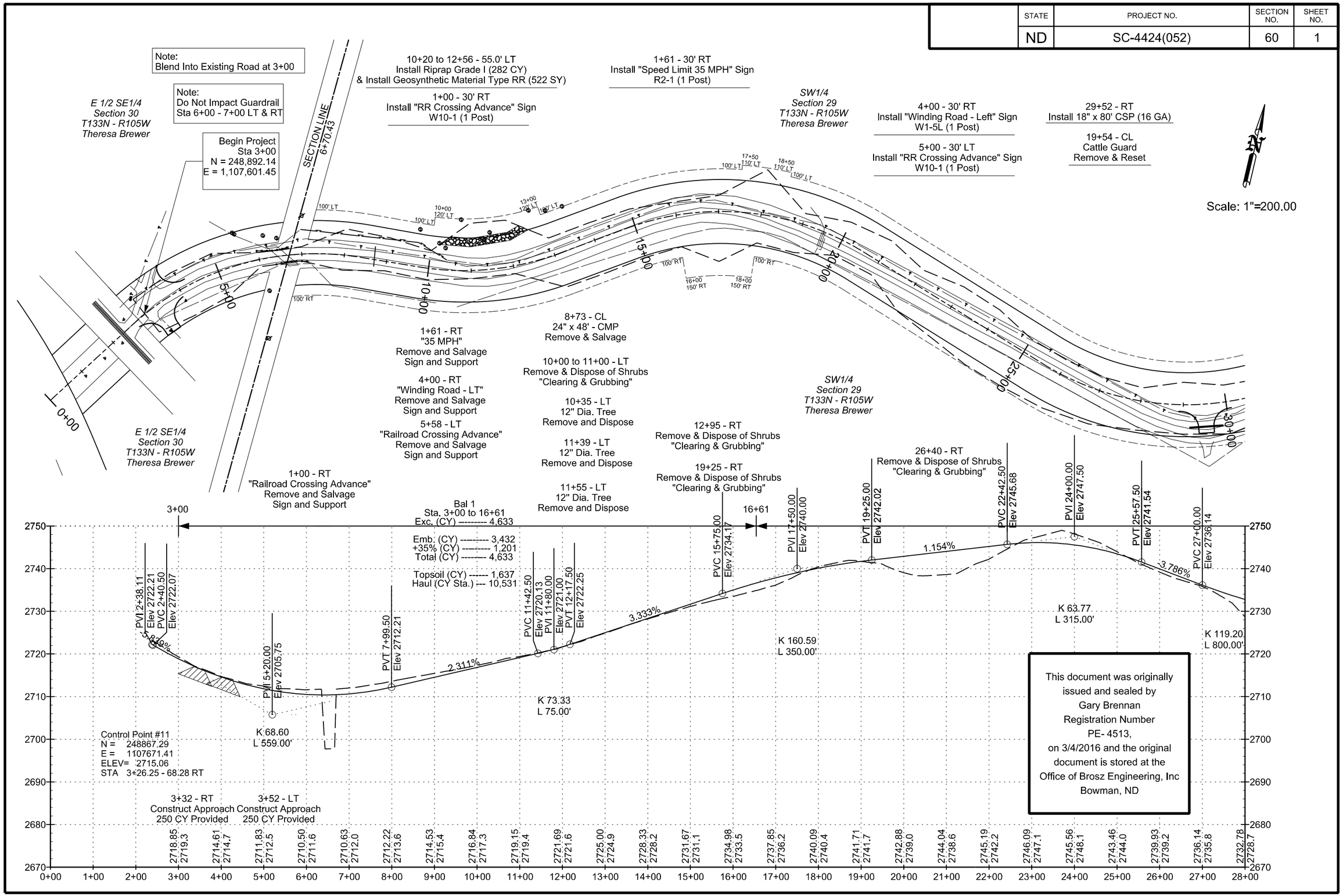
Details

Typical Sections
Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	1



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	2

32+02 - CL
Install 48" x 98' CSP (14 GA)
(5"X1" Corrugation)

32+02 - 47.2' LT
Install Riprap Grade I (11 CY)
& Install Geosynthetic Material Type RR (28 SY)

44+33 - LT
Install 18" x 74' CSP (16 GA)

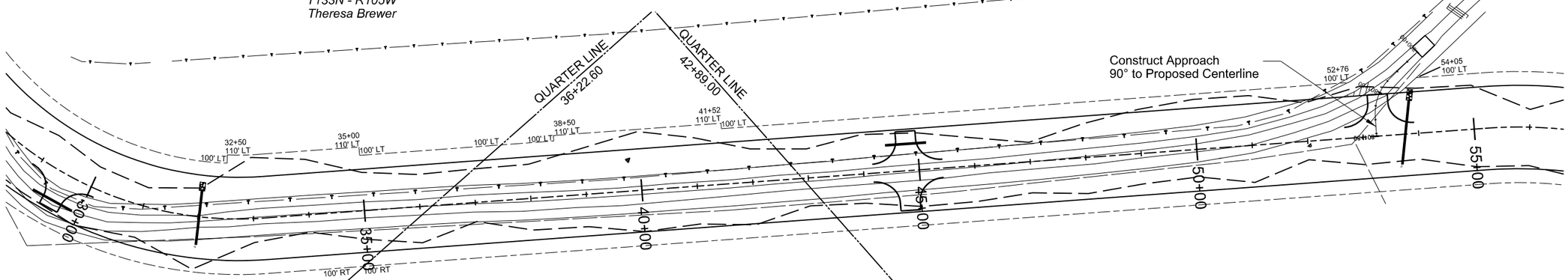
53+76 - CL Skew 10° LHF
Install 54" x 116' CSP (12 GA)
(5"x1" Corrugation)

53+86.4 - 58.7' LT
Install Riprap Grade I (15 CY)
& Install Geosynthetic Material Type RR (37 SY)

56+86 - LT
Cattle Guard
Remove & Reset at 52+91 - CL

SW1/4
Section 29
T133N - R105W
Theresa Brewer

Scale: 1"=200.00



SE 1/4
Section 29
T133N - R105W
Theresa Brewer

NE 1/4
Section 29
T133N - R105W
Theresa Brewer

52+06 - RT
"Weight Limit, 10 Tons"
Remove and Salvage
Sign and Support

56+06 - LT
"Weight Limit, 10 Tons"
Remove and Salvage
Sign and Support

32+04 - CL
3' x 4' x 26' - Concrete Box
Remove & Salvage

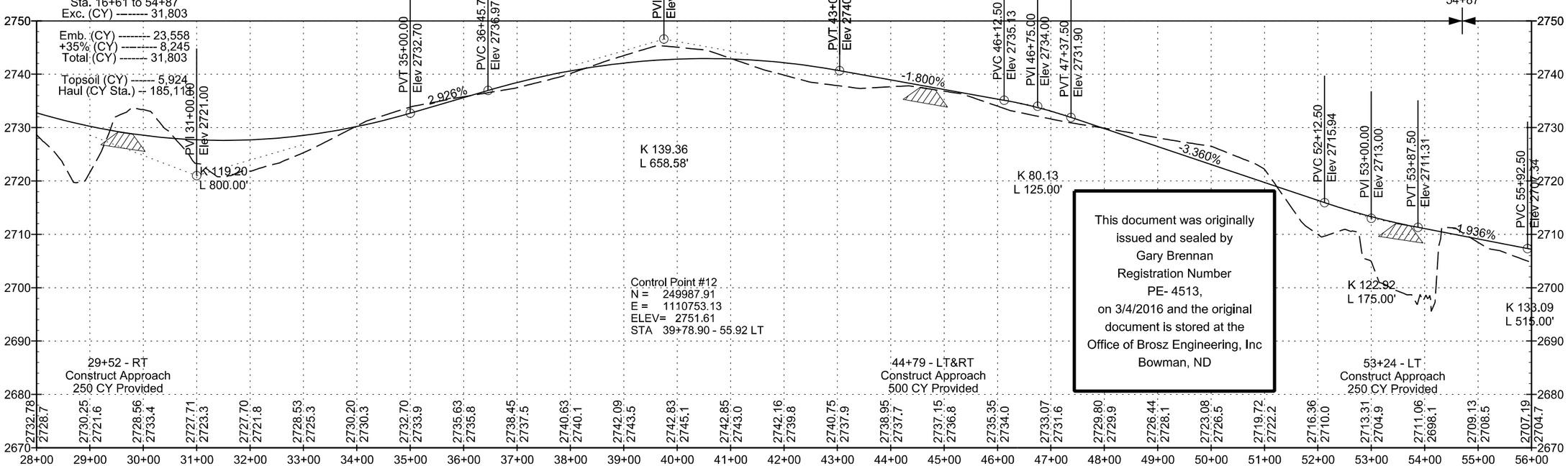
32+10 - LT
10" Dia. Tree
Remove and Dispose

Bal 2
Sta. 16+61 to 54+87
Exc. (CY) -------- 31,803

Emb. (CY) -------- 23,558
+35% (CY) -------- 8,245
Total (CY) -------- 31,803

Topsoil (CY) ------ 5,924
Haul (CY Sta.) -- 185,110

54+87



Control Point #12
N = 249987.91
E = 1110753.13
ELEV= 2751.61
STA 39+78.90 - 55.92 LT

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29+52 - RT
Construct Approach
250 CY Provided

44+79 - LT&RT
Construct Approach
500 CY Provided

53+24 - LT
Construct Approach
250 CY Provided

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	3

59+62 - CL Skew 45° LHF
Install Double Cell - 14'x10'x63' Precast RCBC
with Precast RCBC End Sections
(See General Drawing for Box Culvert)

60+13 - LT
Install Riprap Grade I (79 CY)
& Install Geosynthetic Material Type RR (175 SY)

59+13 - RT
Install Riprap Grade I (48 CY)
& Install Geosynthetic Material Type RR (125 SY)

67+07 - LT
Install 18" x 76' CSP (16 GA)

68+58 - CL Skew 30° RHF
Install 24" x 96' CSP (16 GA)

Obliterate Road
from 67+43 to 69+43 (200 LF)

NE 1/4
Section 29
T133N - R105W
Theresa Brewer

72+00 - RT
Install "Entering National
Grasslands" Sign
NFL-E (1 Post)

72+00 - LT
Install "Leaving National
Grasslands" Sign
NFL-L (1 Post)

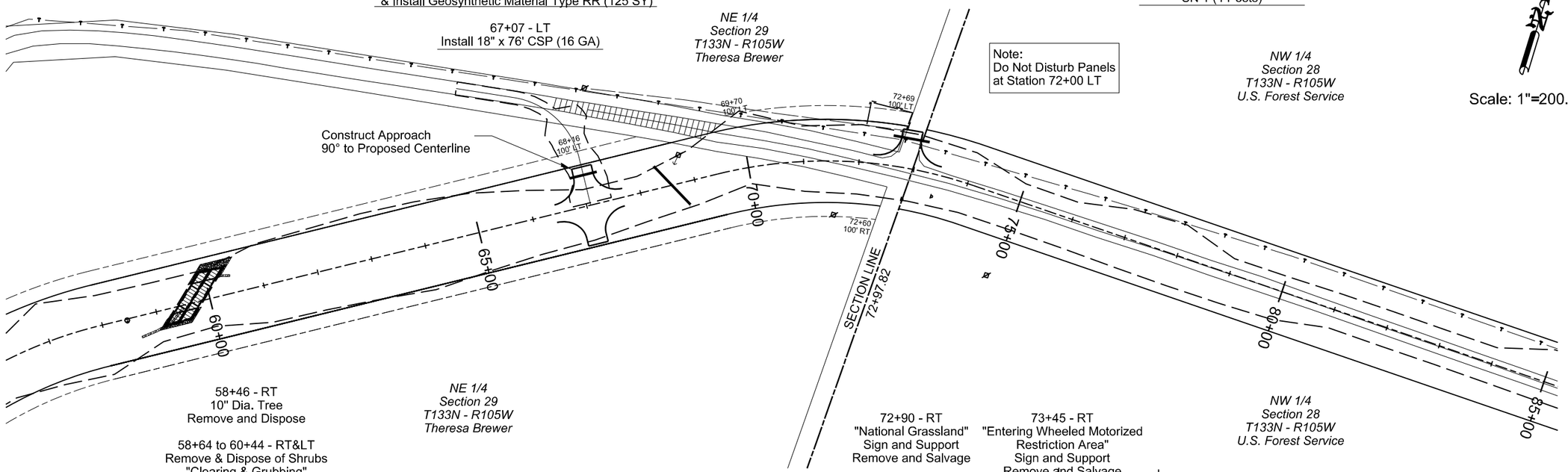
72+88 - LT
Install 18" x 70' CSP (16 GA)

74+00 - 30' RT
Install "Entering Wheeled Motorized
Restriction Area" Sign
SN 1 (4 Posts)

Note:
Do Not Disturb Panels
at Station 72+00 LT

NW 1/4
Section 28
T133N - R105W
U.S. Forest Service

Scale: 1"=200.00



58+46 - RT
10" Dia. Tree
Remove and Dispose

58+64 to 60+44 - RT&LT
Remove & Dispose of Shrubs
"Clearing & Grubbing"

NE 1/4
Section 29
T133N - R105W
Theresa Brewer

72+90 - RT
"National Grassland"
Sign and Support
Remove and Salvage

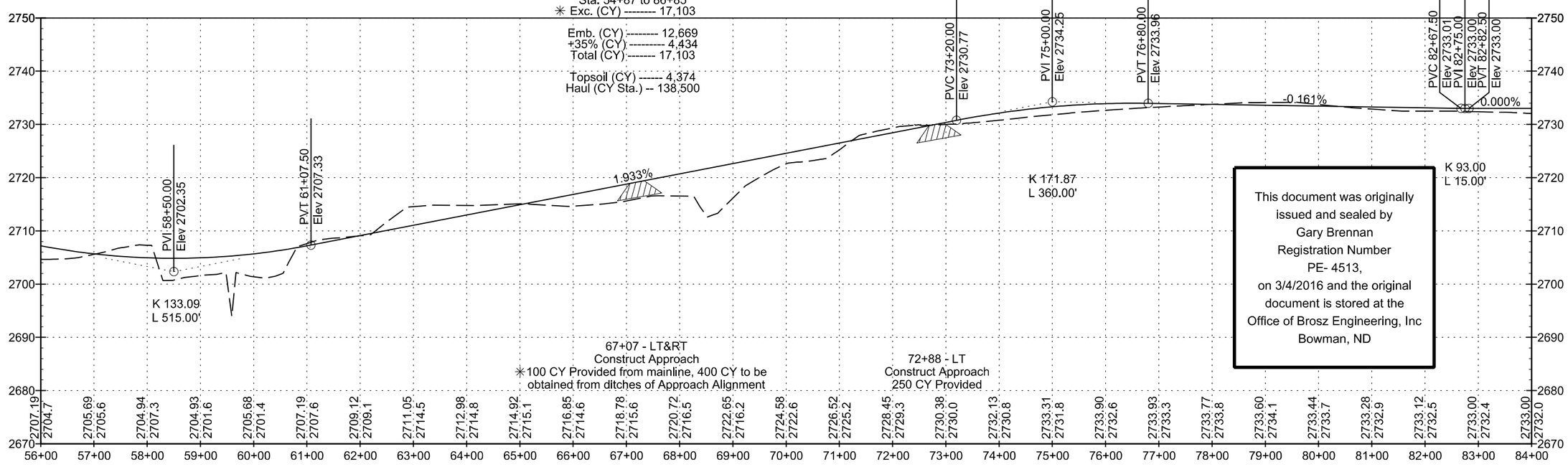
73+45 - RT
"Entering Wheeled Motorized
Restriction Area"
Sign and Support
Remove and Salvage

NW 1/4
Section 28
T133N - R105W
U.S. Forest Service

Bal 3
Sta. 54+87 to 86+85
✳ Exc. (CY) -------- 17,103

Emb. (CY) -------- 12,669
+35% (CY) -------- 4,434
Total (CY) ------- 17,103

Topsoil (CY) ------ 4,374
Haul (CY Sta.) -- 138,500



67+07 - LT&RT
Construct Approach
✳100 CY Provided from mainline, 400 CY to be
obtained from ditches of Approach Alignment

72+88 - LT
Construct Approach
250 CY Provided

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	4

86+75 - CL Skew 5° LHF
Install 42" x 64' CSP (14 GA)

86+72.1 - 33.5' RT
Install Riprap Grade I (11 CY)
& Install Geosynthetic Material Type RR (28 SY)

90+44 - LT
Install 18" x 64' CSP (16 GA)

90+44 - RT
Install 18" x 68' CSP (16 GA)

NW 1/4
Section 28
T133N - R105W
U.S. Forest Service

Construct Temporary Safety Fence
98+70 to 100+70 RT - 340 LF

QUARTER LINE
99+33.34

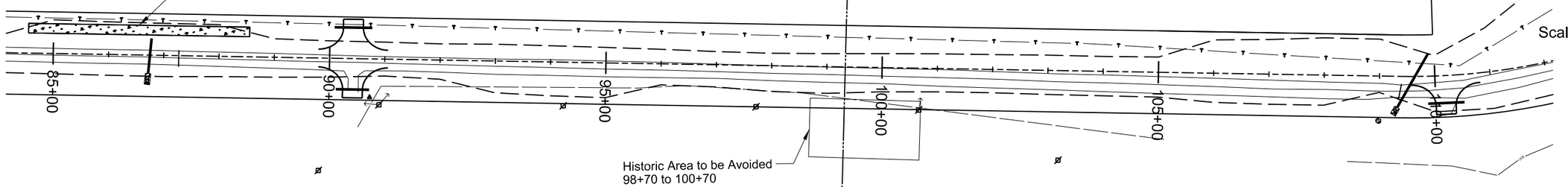
NE 1/4
Section 28
T133N - R105W
U.S. Forest Service

110+19 - RT
Install 18" x 64' CSP (16 GA)

109+64 - CL Skew 30° LHF
Install 48"x112' CSP (14 GA) (5"x1" Corrugation)

109+32.8 - 56.5' RT
Install Riprap Grade I (11 CY)
& Install Geosynthetic Material Type RR (28 SY)

Onsite Wetland Mitigation 0.16 Acres
Finished Elevation 2727.9
Wetland Topsoil - 173 CY



Scale: 1"=200.00

Historic Area to be Avoided
98+70 to 100+70

NW 1/4
Section 28
T133N - R105W
U.S. Forest Service

NE 1/4
Section 28
T133N - R105W
U.S. Forest Service

87+29 - CL
18" x 30' - CMP
Remove & Salvage

92+15 - LT
10" Dia. Tree Trunk
Remove and Dispose

109+41 -CL
48" x 30' - CMP
Remove & Salvage

86+85

Bal 4
Sta. 86+85 to 112+91
Exc. (CY) --------- 8,117

Emb. (CY) --------- 6,013
+35% (CY) --------- 2,104
Total (CY) --------- 8,117

Topsoil (CY) ------ 2,870
Haul (CY Sta.) -- 118,426

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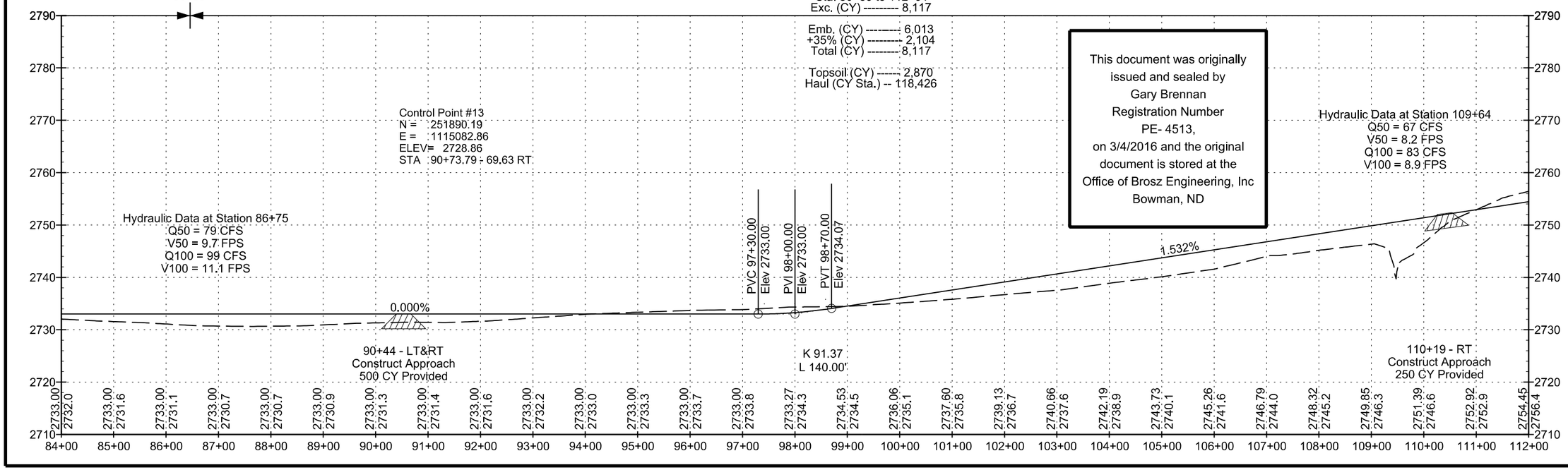
Control Point #13
N = 251890.19
E = 1115082.86
ELEV= 2728.86
STA 90+73.79 - 69.63 RT

Hydraulic Data at Station 86+75
Q50 = 79 CFS
V50 = 9.7 FPS
Q100 = 99 CFS
V100 = 11.1 FPS

Hydraulic Data at Station 109+64
Q50 = 67 CFS
V50 = 8.2 FPS
Q100 = 83 CFS
V100 = 8.9 FPS



90+44 - LT&RT
Construct Approach
500 CY Provided

K 91.37
L 140.00'

110+19 - RT
Construct Approach
250 CY Provided

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	5

116+49 - CL Skew 5° LHF
Install 36" x 82' CSP (14 GA)

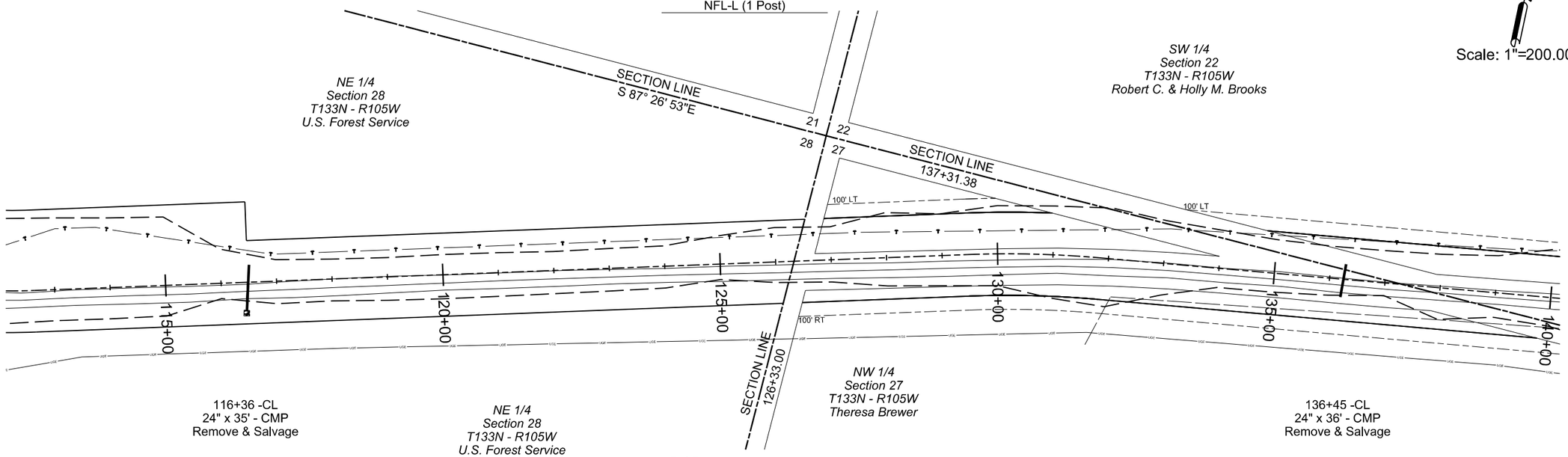
116+44.6 - 50.4' RT
Install Riprap Grade I (8 CY)
& Install Geosynthetic Material Type RR (22 SY)

126+33 - LT
Install "Entering National Grasslands" Sign
NFL-E (1 Post)

126+33 - RT
Install "Leaving National Grasslands" Sign
NFL-L (1 Post)

136+25 - CL Skew 5° LHF
Install 30" x 60' CSP (14 GA)
(Gravel Encased)

Scale: 1"=200.00



112+91

131+73

Bal 5
Sta. 112+91 to 131+73
Exc. (CY) ------- 21,751

Emb. (CY) -------- 16,478
+32% (CY) -------- 5,273
Total (CY) ------- 21,751

Topsoil (CY) ------ 2,539
Haul (CY Sta.) --- 94,226

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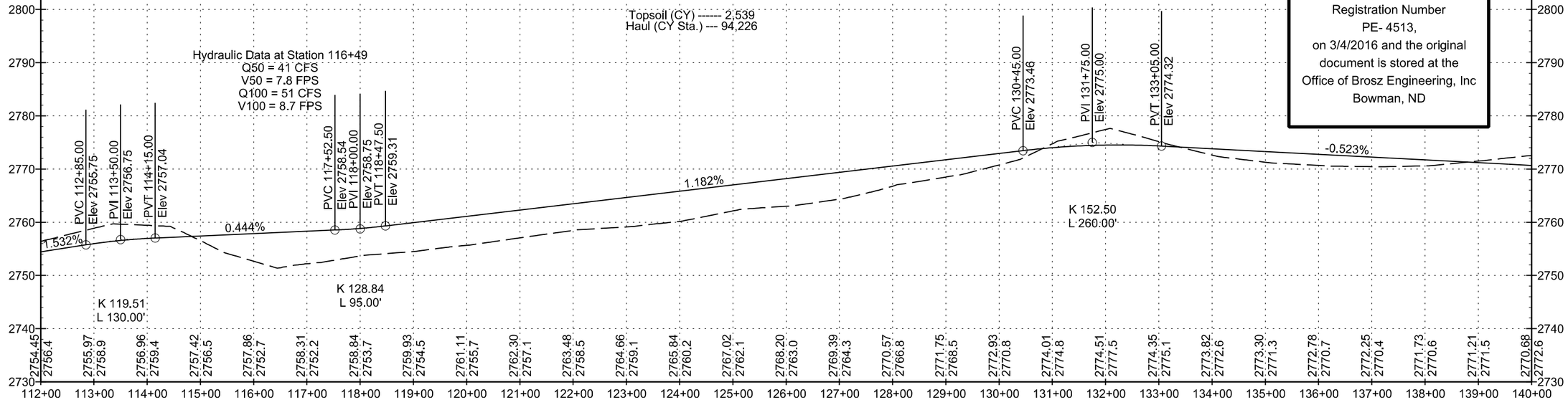
Hydraulic Data at Station 116+49
Q50 = 41 CFS
V50 = 7.8 FPS
Q100 = 51 CFS
V100 = 8.7 FPS



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	6

147+49 - CL Skew 25° LHF
Install 84" x 150' CSP (12 GA) (5"x1" Corrugation)
with 3:1 Step Bevel and 21" Top & Bottom Step

147+17 - 68.3' RT
Install Riprap Grade I (37 CY)
& Install Geosynthetic Material Type RR (98 SY)

147+81 - 63.3' LT
Install Riprap Grade I (12 CY)
& Install Geosynthetic Material Type RR (40 SY)

155+71 - LT
P.L.O.T.S.
Remove & Reset Sign Panel on New Supports

SW 1/4
Section 22
T133N - R105W
Robert C. & Holly M. Brooks

163+50 - LT
Rock Excavation (500 CY)

W 1/2 SE 1/4
Section 22
T133N - R105W
Robert C. & Holly M. Brooks

166+08 - CL
Install 36" x 112' CSP (14 GA)

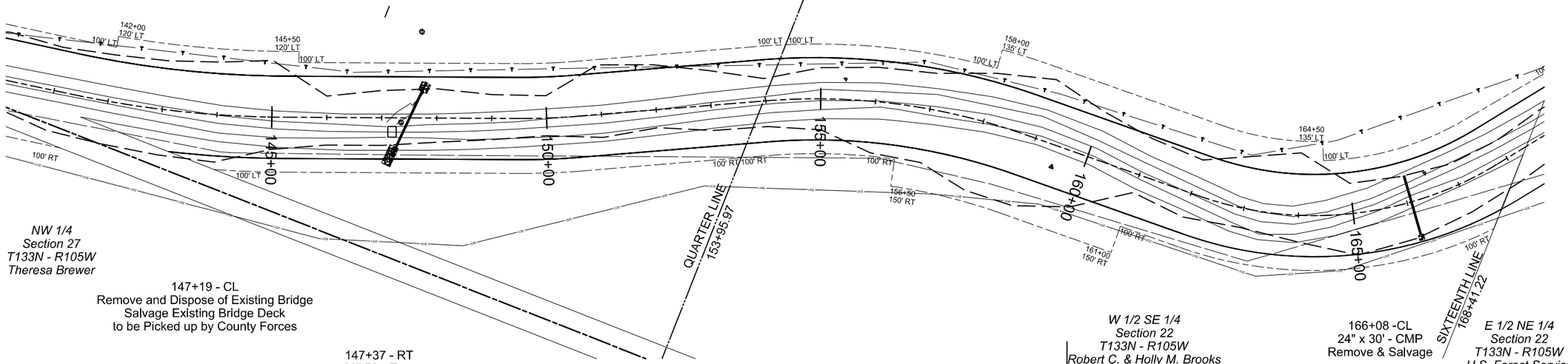
166+08 - 62.0' RT
Install Riprap Grade I (8 CY)
& Install Geosynthetic Material Type RR (22 SY)

167+12 - LT
P.L.O.T.S.
Remove & Reset Sign Panel on New Supports

168+41 - RT
Install "Entering National Grasslands" Sign
NFL-E (1 Post)

168+41 - LT
Install "Leaving National Grasslands" Sign
NFL-L (1 Post)

Scale: 1"=200.00



Bal 6
Sta. 131+73 to 149+09
Exc. (CY) -------- 16,248

Emb. (CY) -------- 12,036
+35% (CY) -------- 4,212
Total (CY) -------- 16,248

Topsoil (CY) ------ 2,688
Haul (CY Sta.) --- 62,945

147+37 - RT
36" Dia. Tree
Remove and Dispose

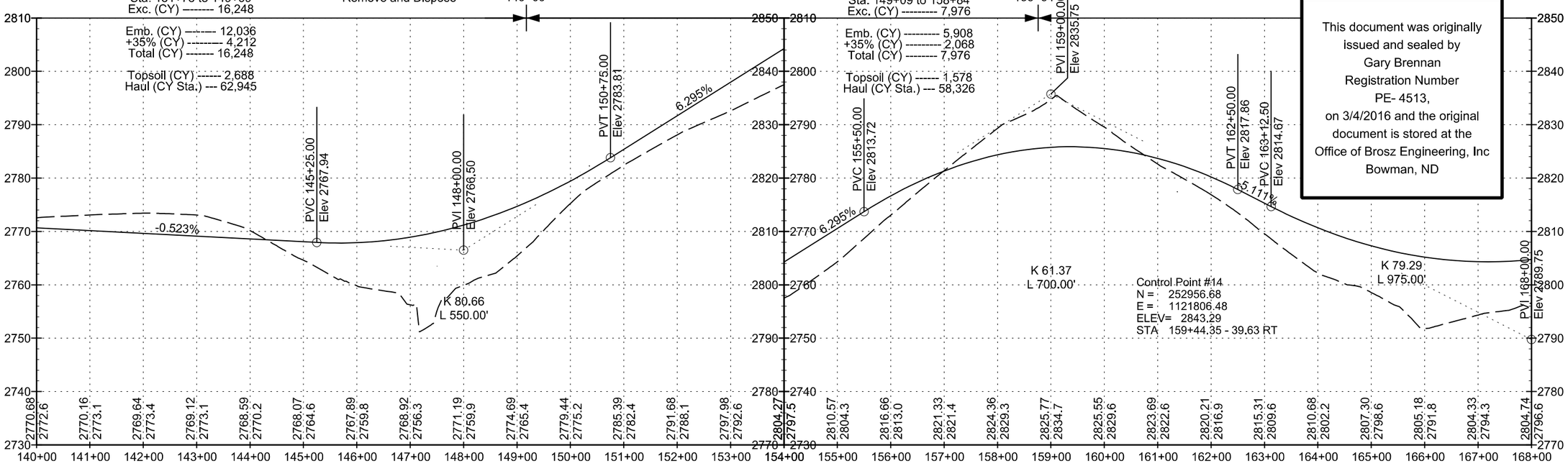
149+09

Bal 7
Sta. 149+09 to 158+84
Exc. (CY) --------- 7,976

Emb. (CY) --------- 5,908
+35% (CY) --------- 2,068
Total (CY) --------- 7,976

Topsoil (CY) ------ 1,578
Haul (CY Sta.) --- 58,326

158+84



Control Point #14
N = 252956.68
E = 1121806.48
ELEV= 2843.29
STA 159+44.35 - 39.63 RT

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	7

170+00 - RT
Install 18" x 86' CSP (16 GA)

174+50 - RT
Rock Excavation (500 CY)

196+65 - CL
Install 24" x 92' CSP (16 GA)

194+00 - LT
Install 18" x 102' CSP (16 GA)

Scale: 1"=200.00

W1/2SE1/4
Section 22
T133N - R105W
Robert C. & Holly M. Brooks

E1/2SE1/4
Section 22
T133N - R105W
U.S. Forest Service

E12NE1/4
Section 22
T133N - R105W
U.S. Forest Service

QUARTER LINE
187+44.28

170+00
175+00
180+00
185+00
190+00
195+00

E1/2NE1/4
Section 22
T133N - R105W
U.S. Forest Service

183+43 - LT
12" Dia. Tree Trunk
Remove and Dispose

E1/2NE1/4
Section 22
T133N - R105W
U.S. Forest Service

196+66 -CL
24" x 39' - CMP
Remove & Salvage

195+55 - LT
(4) 36" Dia. Tree
Remove and Dispose

Bal 8
Sta. 158+84 to 185+59
Exc. (CY) -------- 43,973
Rock Excavation (CY) 1,000
Emb. (CY) -------- 32,573
+35% (CY) -------- 11,400
Total (CY) ------- 43,973

Topsoil (CY) ------ 4,128
Haul (CY Sta.) -- 175,525

Bal 9
Sta. 185+59 to 204+98
Exc. (CY) -------- 35,386

Emb. (CY) -------- 26,808
+32% (CY) -------- 8,578
Total (CY) ------ 35,386

Topsoil (CY) ------ 3,164
Haul (CY Sta.) -- 104,535

185+59

PVI 168+00.00
Elev 2789.75

PVT 172+87.50
Elev 2824.78

7.186%

PVC 176+25.00
Elev 2849.03

7.186%

PVI 178+75.00
Elev 2867.00

PVT 181+25.00
Elev 2869.42

0.967%

PVC 183+72.50
Elev 2871.81

K 79.51
L 505.00'

K 80.39
L 500.00'

K 79.29
L 975.00'

PVI 186+25.00
Elev 2874.25

K 79.51
L 505.00'

PVT 188+77.50
Elev 2892.73

7.318%

PVC 189+35.00
Elev 2896.94

K 64.66
L 480.00'

PVI 191+75.00
Elev 2914.50

PVT 194+15.00
Elev 2914.25

-0.105%

PVC 194+25.00
Elev 2914.24

K 79.64
L 450.00'

K 64.66
L 480.00'

Hydraulic Data at Station 196+65
Q50 = 24 CFS
V50 = 8.3 FPS
Q100 = 30 CFS
V100 = 9.8 FPS

170+00 - RT
Construct Approach
250 CY Provided

182+05 - RT
Construct Approach
250 CY Provided

194+00 - LT
Construct Approach
250 CY Provided

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Station	Elevation
168+00	2804.74
169+00	2796.6
170+00	2806.41
171+00	2799.1
172+00	2809.33
173+00	2802.5
174+00	2813.53
175+00	2808.6
176+00	2818.98
177+00	2816.6
178+00	2825.68
179+00	2824.7
180+00	2832.87
181+00	2832.6
182+00	2840.05
183+00	2839.8
184+00	2847.24
185+00	2845.2
186+00	2854.07
187+00	2853.5
188+00	2859.71
189+00	2863.0
190+00	2864.09
191+00	2867.2
192+00	2867.24
193+00	2866.6
194+00	2869.14
195+00	2866.2
196+00	2870.14
185+59	2867.0
	2871.11
	2866.7
	2872.12
	2866.6
	2874.06
	2867.3
	2877.26
	2868.3
	2881.72
	2871.1
	2887.43
	2877.1
	2894.38
	2886.4
	2901.37
	2898.7
	2906.91
	2913.3
	2910.90
	2922.2
	2913.35
	2917.5
	2914.25
	2913.7
	2914.51
	2910.2
	2915.98
	2909.7

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	8

210+25 - CL Skew 15° RHF
Install 24" x 86' CSP (16 GA)

219+91 - 30' LT
Install "Winding Road - LT" Sign
W1-5L (1 Post)

E1/2NE1/4
Section 22
T133N - R105W
U.S. Forest Service

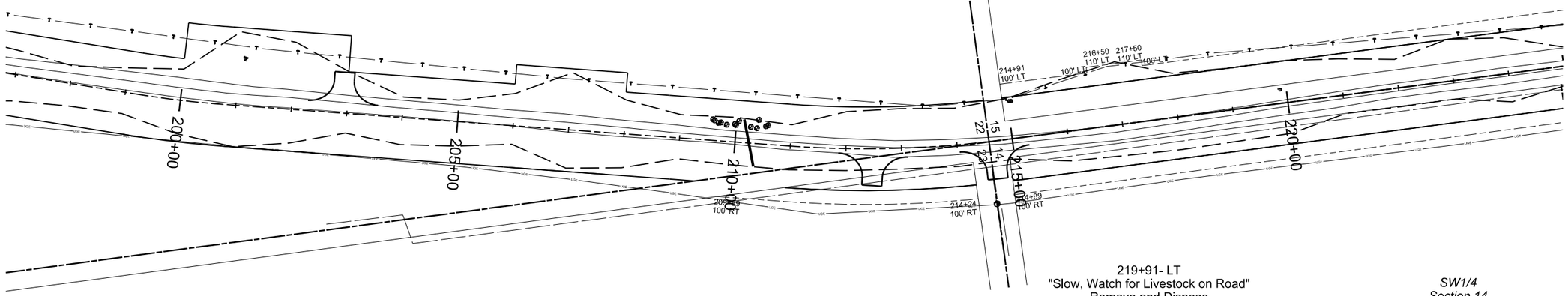
214+57 - LT
Install "Entering National Grasslands" Sign
NFL-E (1 Post)

209+00 - RT
Install "Leaving National Grasslands" Sign
NFL-L (1 Post)

SECTION LINE
214+57.71

SE1/4
Section 15
T133N - R105W
East Marmarth Pasture Members

Scale: 1"=200.00



219+91- LT
"Slow, Watch for Livestock on Road"
Remove and Dispose

219+91 - LT
"Winding Road - RT"
Remove and Salvage
Sign and Support

SW1/4
Section 14
T133N - R105W
Robert C. & Holly M. Brooks

NW1/4
Section 23
T133N - R105W
Robert C. & Holly M. Brooks

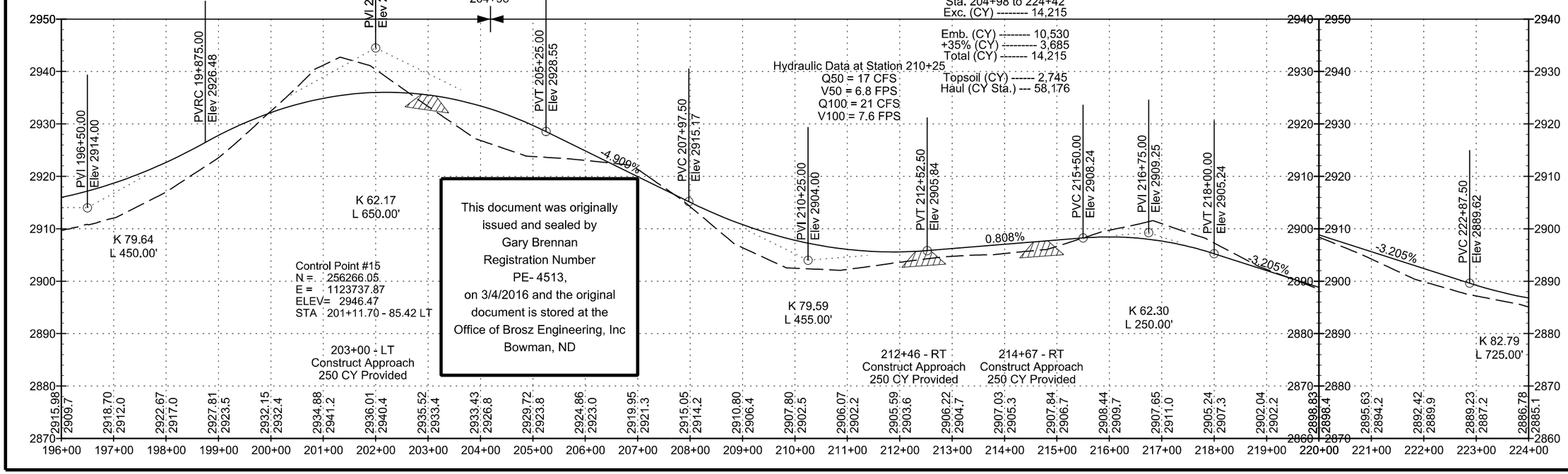
209+80 to 210+40 - LT
Multiple 12" Dia. Multiple Tree Trunks
Remove and Dispose

Bal 10
Sta. 204+98 to 224+42
Exc. (CY) -------- 14,215

Emb. (CY) -------- 10,530
+35% (CY) -------- 3,685
Total (CY) ------- 14,215

Topsoil (CY) ------ 2,745
Haul (CY Sta.) --- 58,176

Hydraulic Data at Station 210+25
Q50 = 17 CFS
V50 = 6.8 FPS
Q100 = 21 CFS
V100 = 7.6 FPS



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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	9

227+69 - CL
Cattle Guard
Remove & Reset

226+26 - CL
Install 48" x 72' CSP (14 GA)
(5"x1" Corrugation)

226+26 - 36.1' RT
Install Riprap Grade I (11 CY)
& Install Geosynthetic Material Type RR (28 SY)

227+68 - RT
(2) P.L.O.T.S.
Remove & Reset Sign Panels on New Supports

229+00 - LT
Install 18" x 60' CSP (16 GA)

239+11 - CL Skew 30° LHF
Install 48"x104' CSP (14 GA) (5"x1" Corrugation)

238+82.4 - 49.6' RT
Install Riprap Grade I (11 CY)
& Install Geosynthetic Material Type RR (28 SY)

247+00 - CL
Install 24" x 56' CSP (16 GA)

SE 1/4
Section 15
T133N - R105W
East Marmarth Pasture Members

NE 1/4
Section 15
T133N - R105W
East Marmarth Pasture Members

QUARTER LINE
240+96.85

Scale: 1"=200.00

234+00
150' LT

238+00
150' LT

100' LT

100' RT

225+00 230+00 235+00 240+00 245+00 250+00

Sta 247+00 RT
Grade to Drain

Sixteenth Line
227+77

226+30 -CL
4' x 4' x 25' - Concrete Box
Remove & Salvage

SW 1/4
Section 14
T133N - R105W
U.S. Forest Service

239+12 -CL
4' x 4' x 42' - Concrete box
Remove & Salvage

NW 1/4
Section 14
T133N - R105W
U.S. Forest Service

224+42

251+23

Bal 11
Sta. 224+42 to 251+23
Exc. (CY) -------- 21,751

Emb. (CY) -------- 16,112
+35% (CY) -------- 5,639
Total (CY) ------- 21,751

Topsoil (CY) ------ 4,041
Haul (CY Sta.) -- 136,981

PVI 226+50.00
Elev 2878.00

K 82.79
L 725.00'

PVT 230+12.50
Elev 2898.13

5.552%

PVC 231+95.00
Elev 2908.26

K 61.67
L 360.00'

PVI 233+75.00
Elev 2918.25

PVT 235+55.00
Elev 2917.74

0.286%

PVC 235+90.00
Elev 2917.64

K 80.15
L 620.00'

PVI 239+00.00
Elev 2916.75

Hydraulic Data at Station 239+11
Q50 = 42 CFS
V50 = 6.9 FPS
Q100 = 53 CFS
V100 = 7.5 FPS

PVT 242+10.00
Elev 2939.84

7.430%

PVC 242+25.00
Elev 2940.96

K 80.15
L 620.00'

K 61.56
L 350.00'

PVI 244+00.00
Elev 2954.00

PVT 245+75.00
Elev 2957.09

1.765%

PVC 246+65.00
Elev 2958.68

K 91.81
L 320.00'

PVI 248+25.00
Elev 2961.50

PVT 249+85.00
Elev 2969.90

5.750%

PVC 250+00.00
Elev 2970.69

K 62.92
L 450.00'

K 91.81
L 320.00'

229+00 - LT
Construct Approach
250 CY Provided

246+80 - LT&RT
Construct Ditch Block
200 CY Provided

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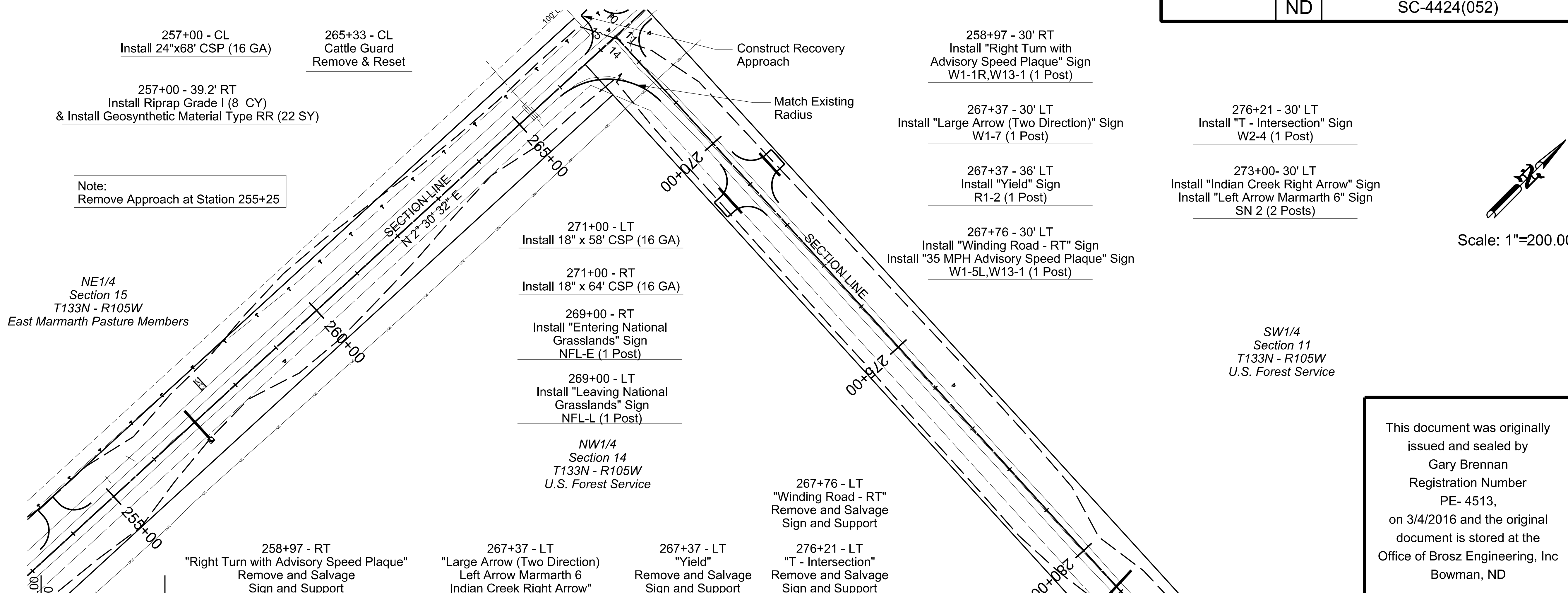
2930 2920 2910 2900 2890 2880 2870 2860 2850

2970 2960 2950 2940 2930 2920 2910 2900 2890

3020 3010 3000 2990 2980 2970 2960 2950 2940

224+00 225+00 226+00 227+00 228+00 229+00 230+00 231+00 232+00 233+00 234+00 235+00 236+00 237+00 238+00 239+00 240+00 241+00 242+00 243+00 244+00 245+00 246+00 247+00 248+00 249+00 250+00 251+00 252+00

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	10



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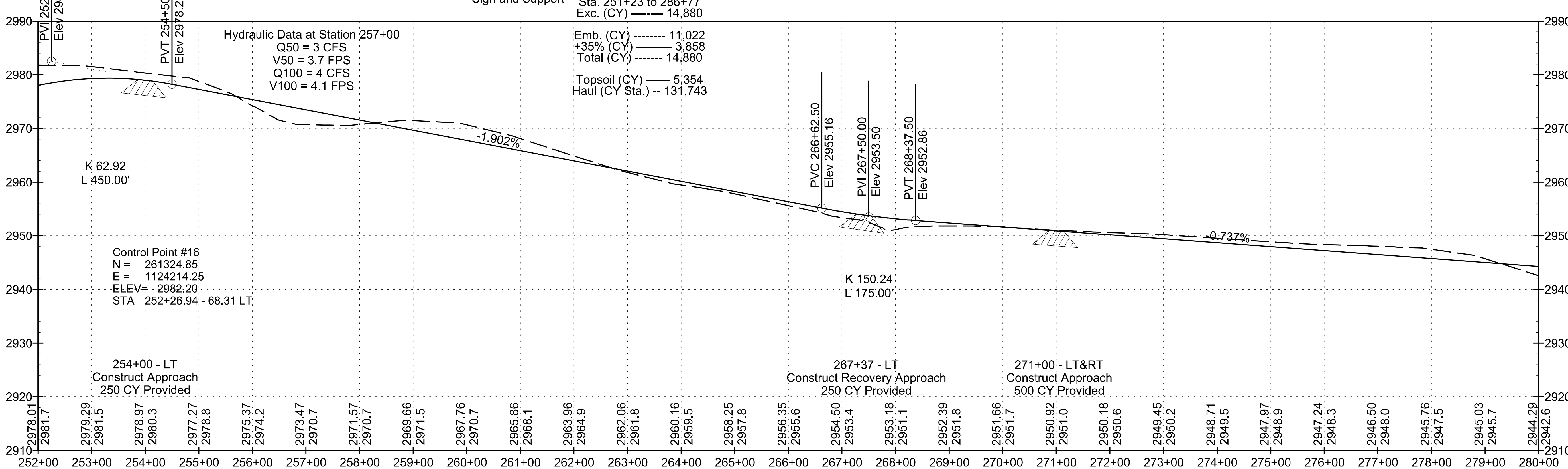
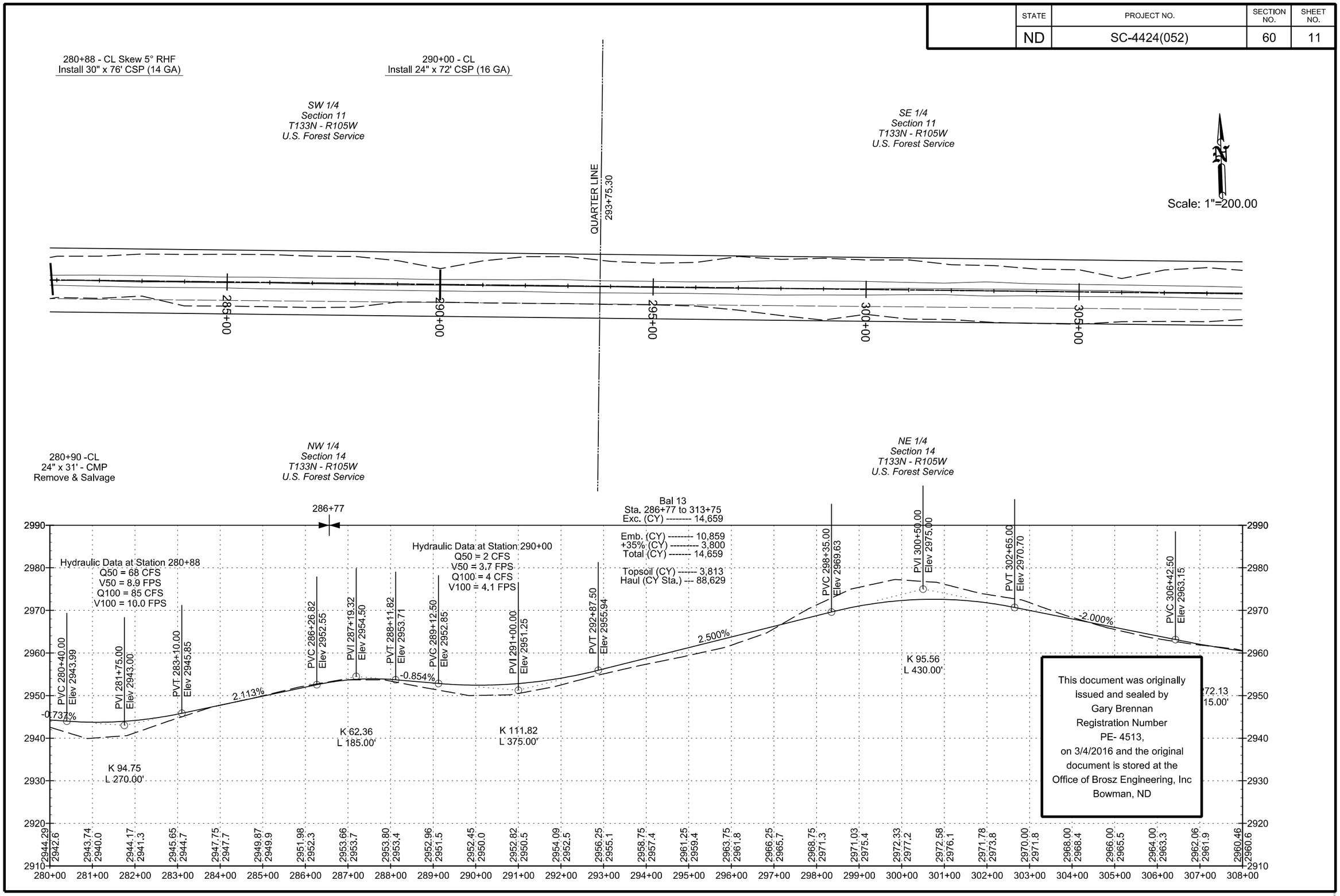


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	11



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	12

312+00 - CL
Install 24" x 56' CSP (16 GA)
(Gravel Encased)

317+13 - CL
Cattle Guard
Remove & Reset

317+84 - RT
Install 18" x 64' CSP (16 GA)

320+27 - LT
P.L.O.T.S.
Remove & Reset Sign Panel on New Supports

320+14 - LT
Install "Entering National Grasslands" Sign
NFL-E (1 Post)

320+14 - RT
Install "Leaving National Grasslands" Sign
NFL-L (1 Post)

330+00 - CL
Install 30" x 54' CSP (14 GA)
(Gravel Encased)

SE 1/4
Section 11
T133N - R105W
U.S. Forest Service

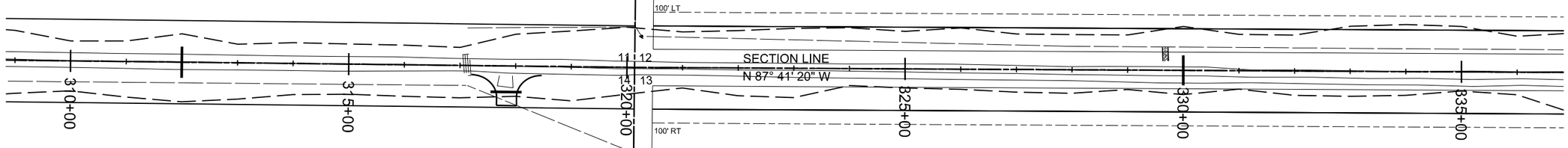
SW 1/4
Section 12
T133N - R105W
Robert C. & Holly M. Brooks

NE 1/4
Section 14
T133N - R105W
U.S. Forest Service

NW 1/4
Section 13
T133N - R105W
Robert C. & Holly M. Brooks

SECTION LINE
320+13.75

Scale: 1"=200.00



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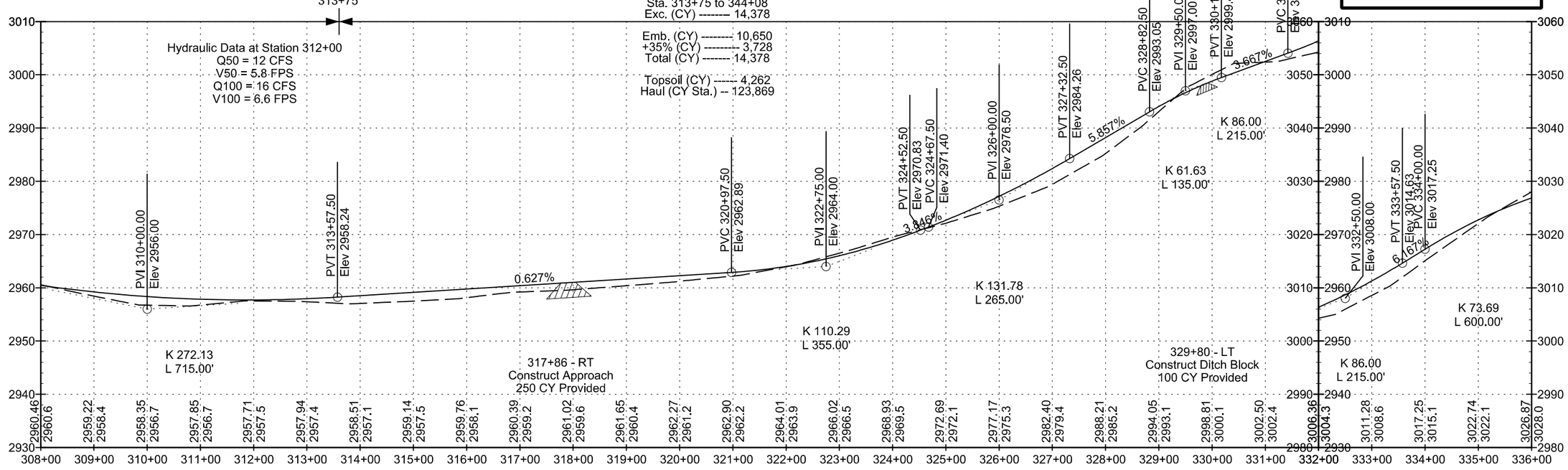
313+75

Bal 14
Sta. 313+75 to 344+08
Exc. (CY) -------- 14,378

Emb. (CY) -------- 10,650
+35% (CY) -------- 3,728
Total (CY) -------- 14,378

Topsoil (CY) ------ 4,262
Haul (CY Sta.) -- 123,869

Hydraulic Data at Station 312+00
Q50 = 12 CFS
V50 = 5.8 FPS
Q100 = 16 CFS
V100 = 6.6 FPS



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	13

347+60 - CL
Install 24" x 78' CSP (16 GA)

354+72 - CL Skew 10° RHF
Install 24" x 96' CSP (16 GA)

358+75 - CL
Install 24" x 70' CSP (16 GA)

363+94 - CL Skew 30° RHF
Install 36" x 72' CSP (14 GA)

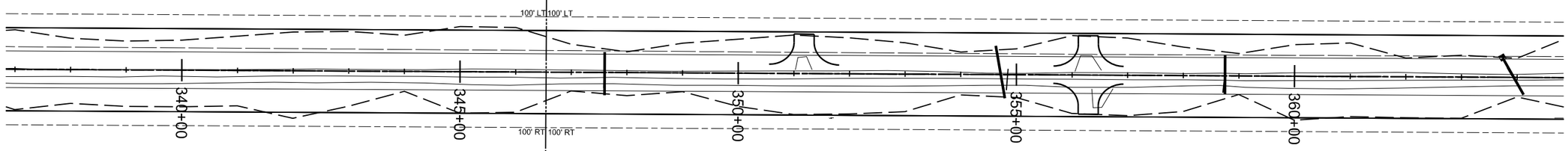
363+76 - 31.4' LT
Install Riprap Grade I (11 CY)
& Install Geosynthetic Material Type RR (28 SY)

SW 1/4
Section 12
T133N - R105W
Robert C. & Holly M. Brooks

QUARTER LINE
346+54.75

SE 1/4
Section 12
T133N - R105W
Robert C. & Holly M. Brooks

Scale: 1"=200.00



NE 1/4
Section 13
T133N - R105W
Robert C. & Holly M. Brooks

NW 1/4
Section 13
T133N - R105W
Robert C. & Holly M. Brooks

347+61 - CL
24" x 35' - CMP
Remove & Salvage

354+84 - CL
24" x 39' - CMP
Remove & Salvage

358+75 - CL
24" x 45' - CMP
Remove & Salvage

363+95 - CL
24" x 49' - CMP
Remove & Salvage

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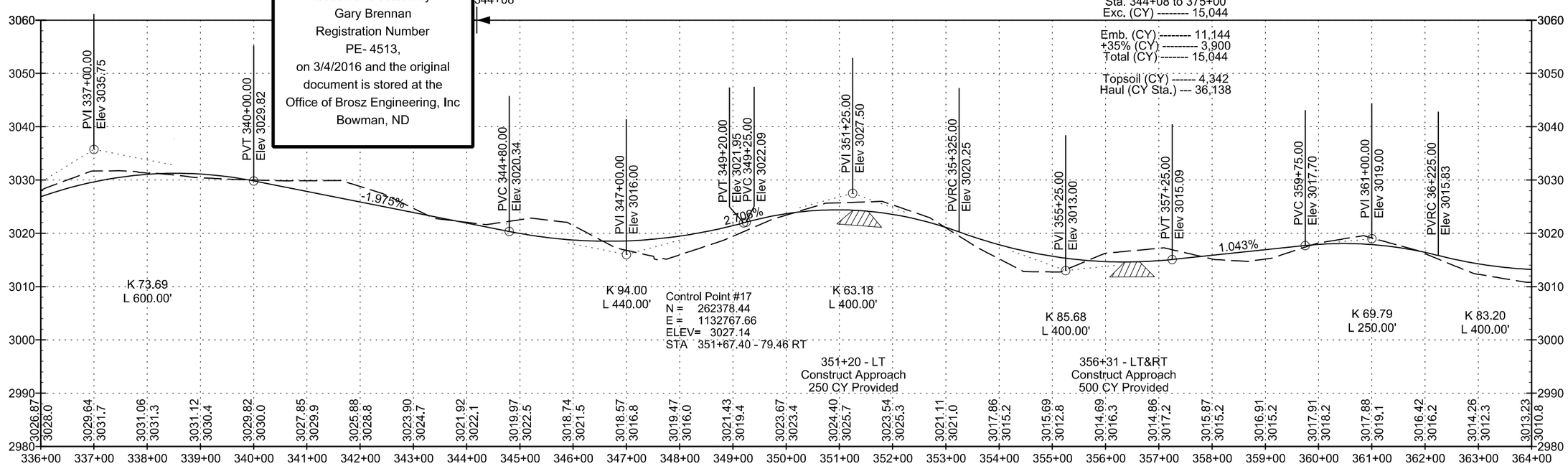
344+08

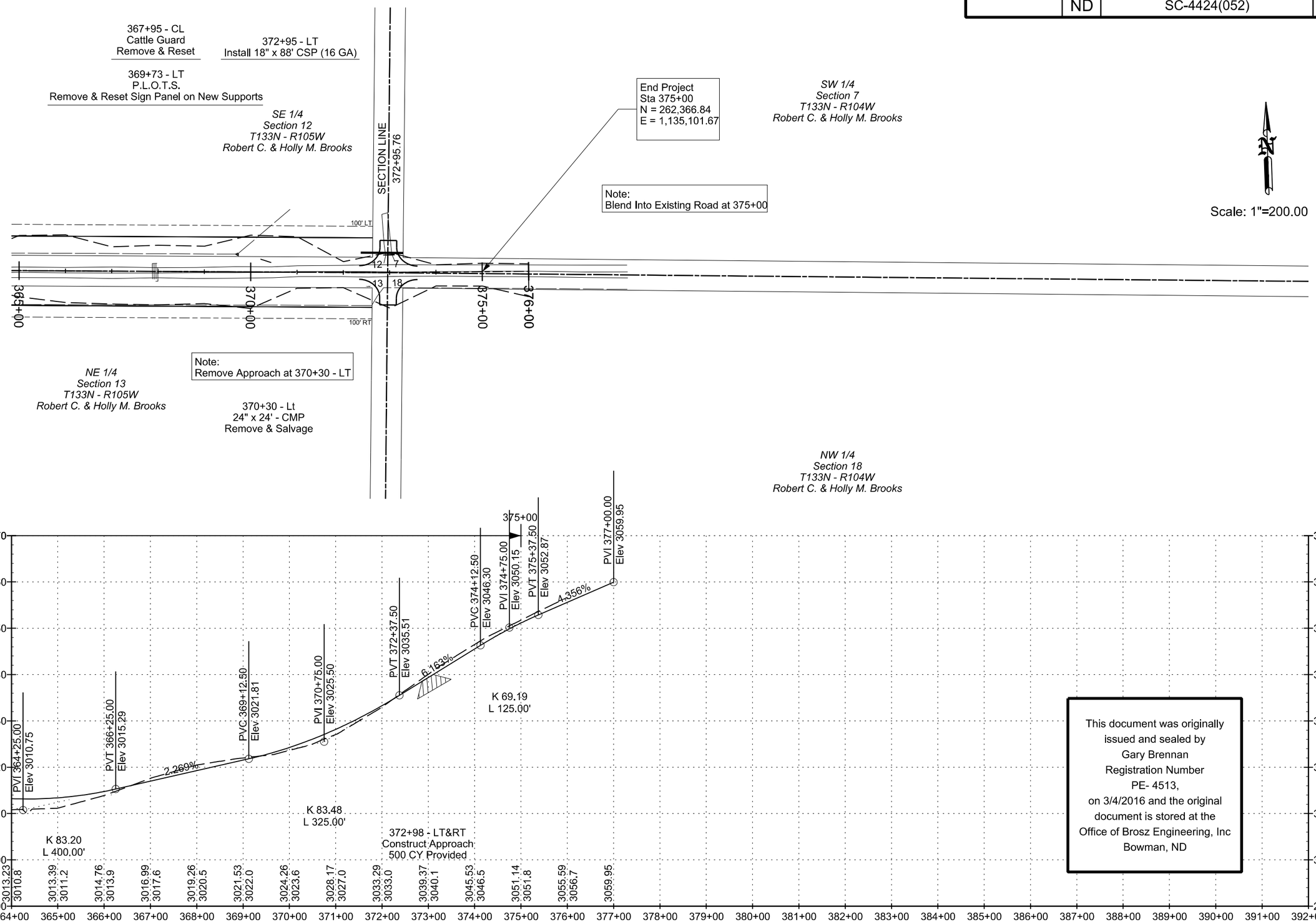
Bal 15
Sta. 344+08 to 375+00
Exc. (CY) -------- 15,044

Emb. (CY) -------- 11,144
+35% (CY) -------- 3,900
Total (CY) ------- 15,044

Topsoil (CY) ------ 4,342
Haul (CY Sta.) --- 36,138



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	60	14



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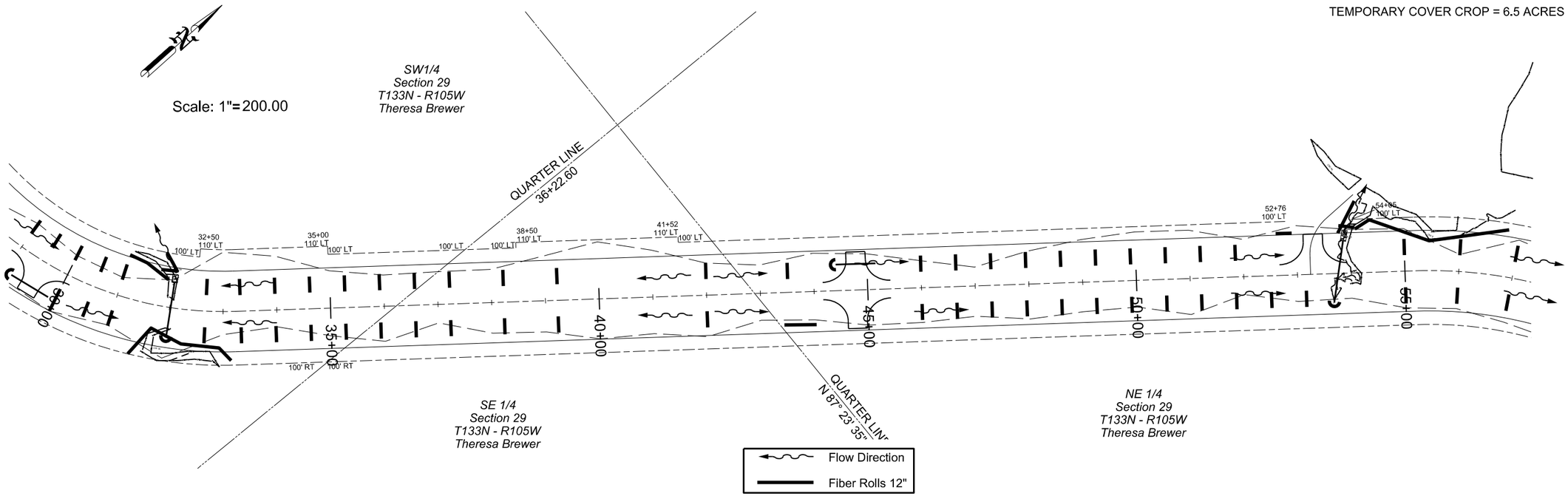
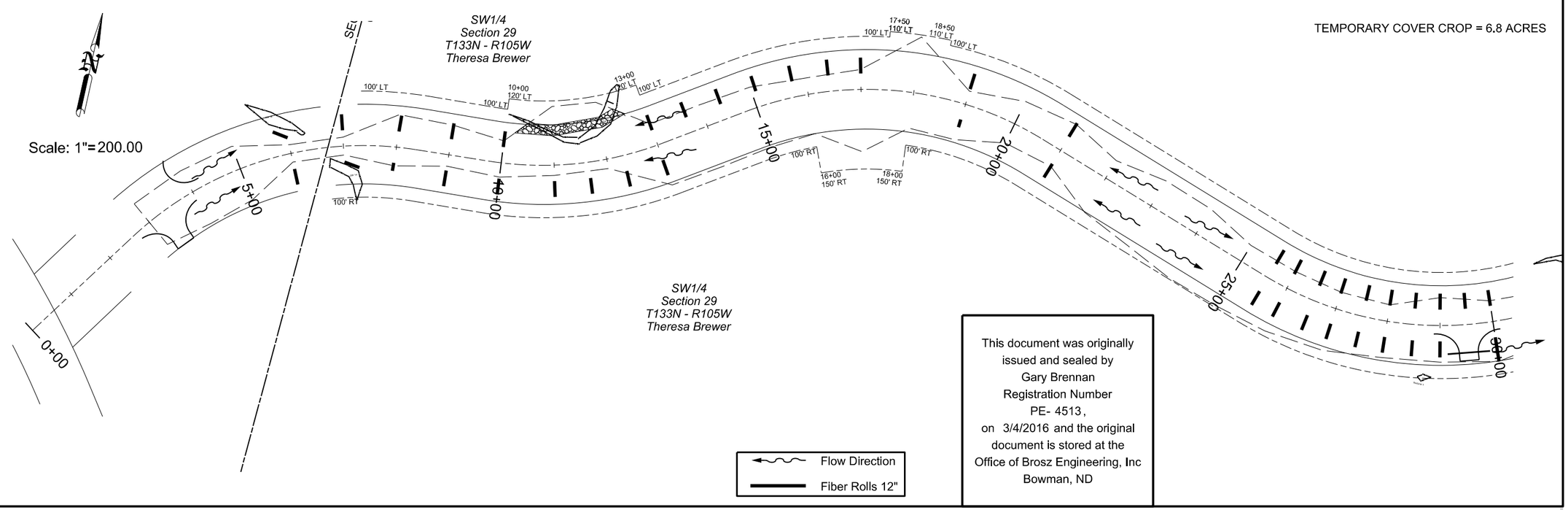
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	76	1

Erosion Control

TEMPORARY COVER CROP = 6.5 ACRES



TEMPORARY COVER CROP = 6.8 ACRES



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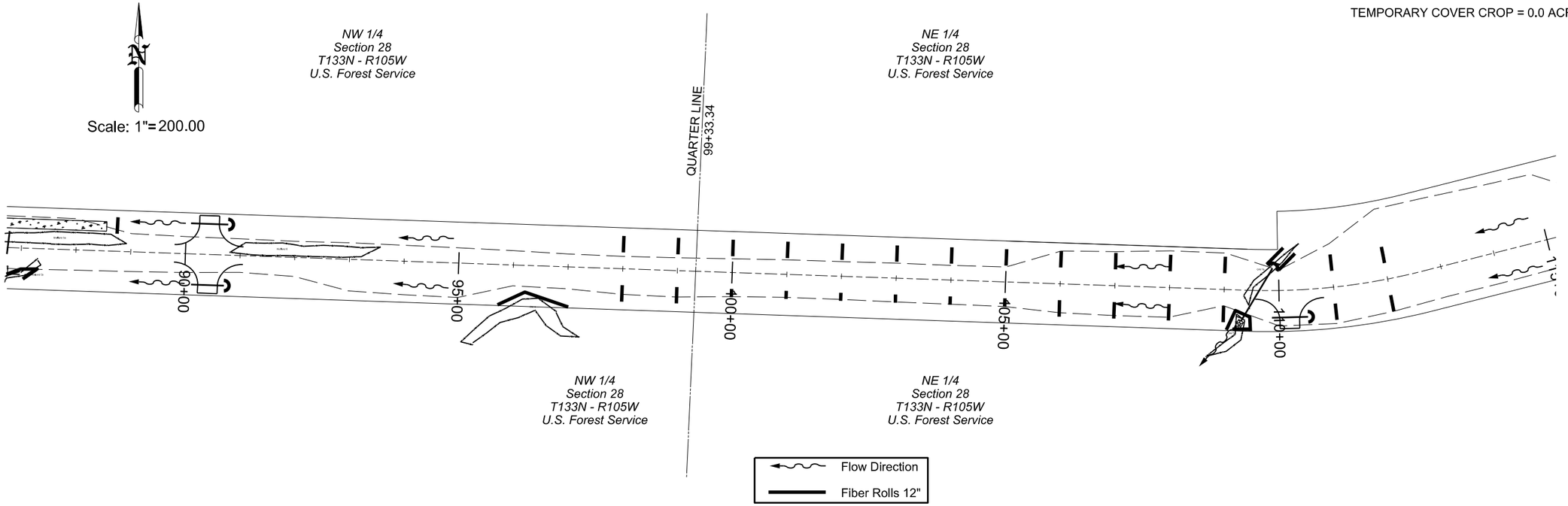
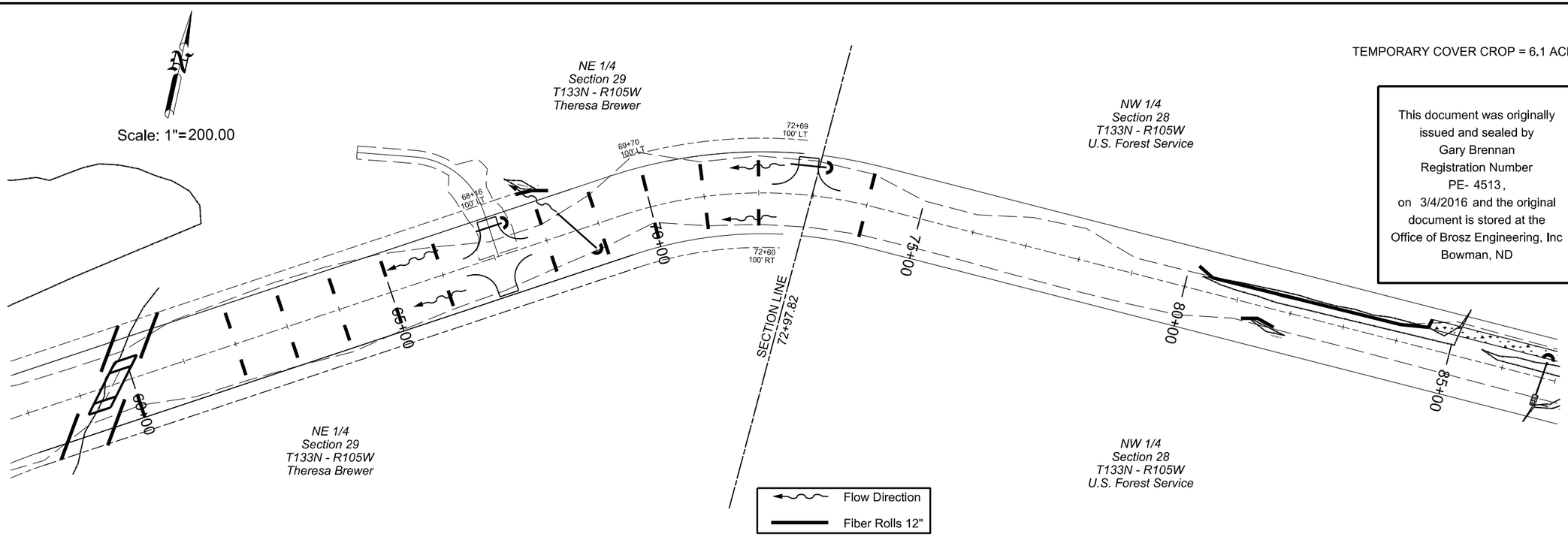
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	76	2

Erosion Control

TEMPORARY COVER CROP = 0.0 ACRES



TEMPORARY COVER CROP = 6.1 ACRES



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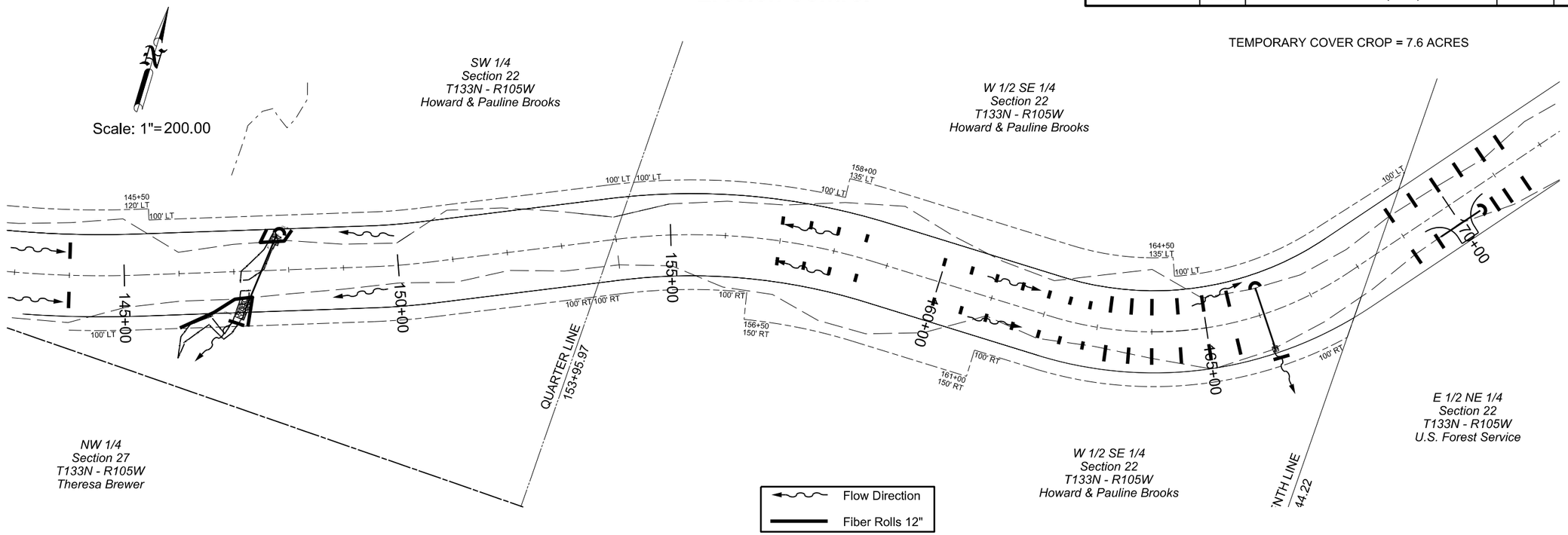
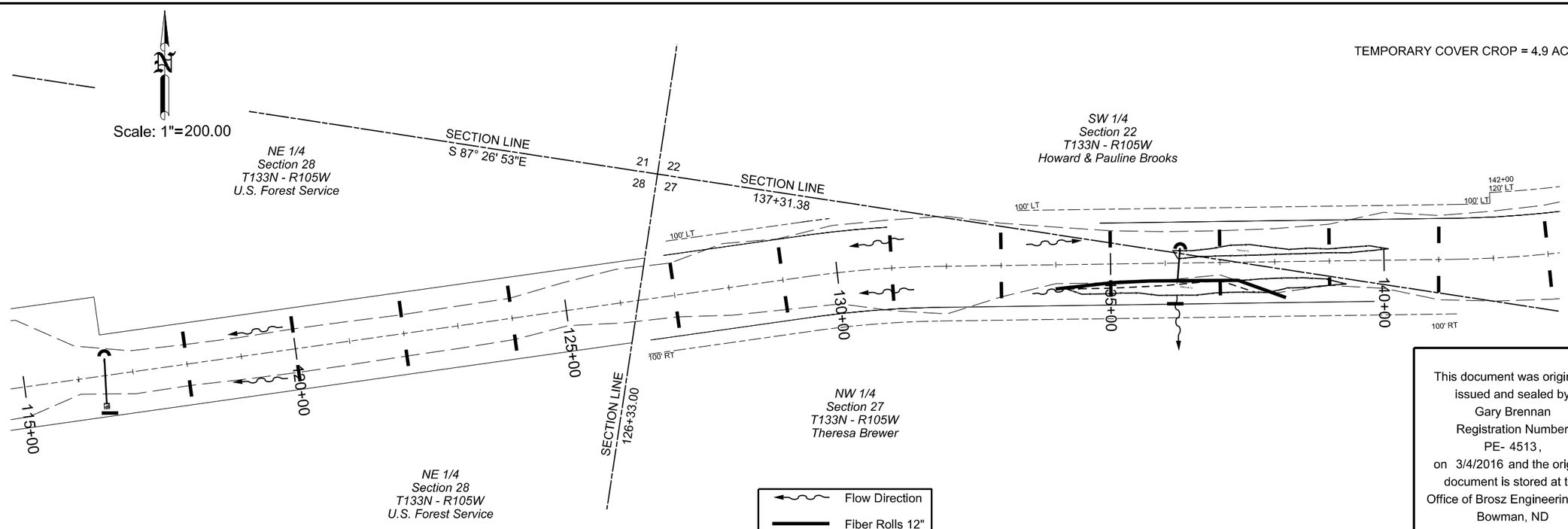
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	76	3

Erosion Control

TEMPORARY COVER CROP = 7.6 ACRES



TEMPORARY COVER CROP = 4.9 ACRES



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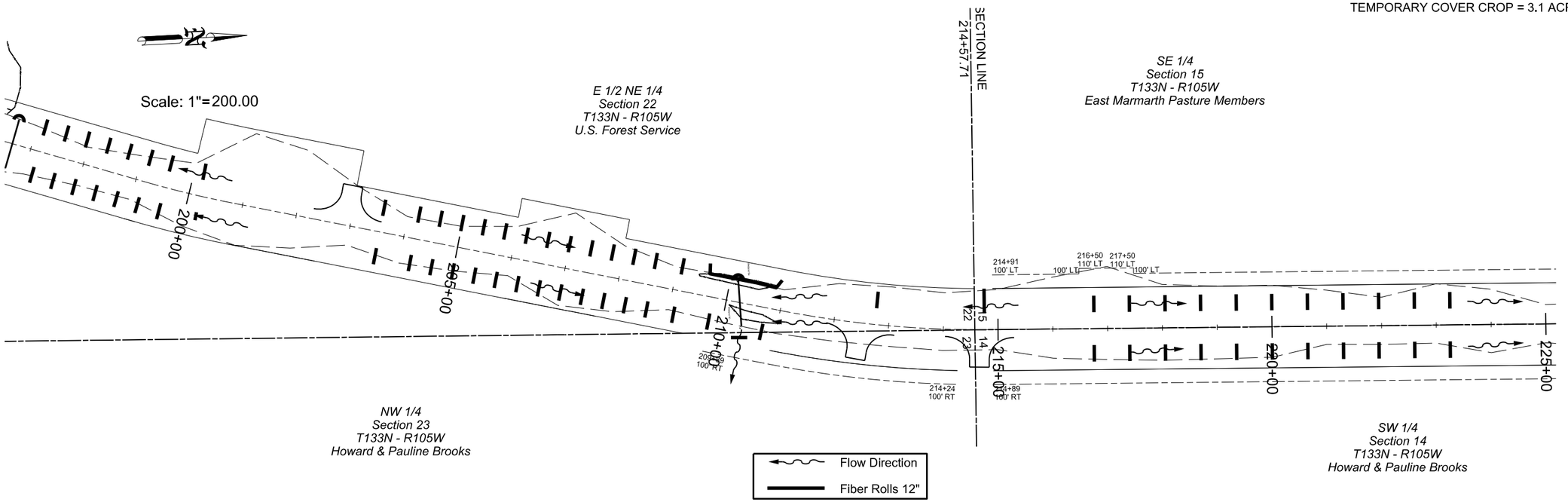
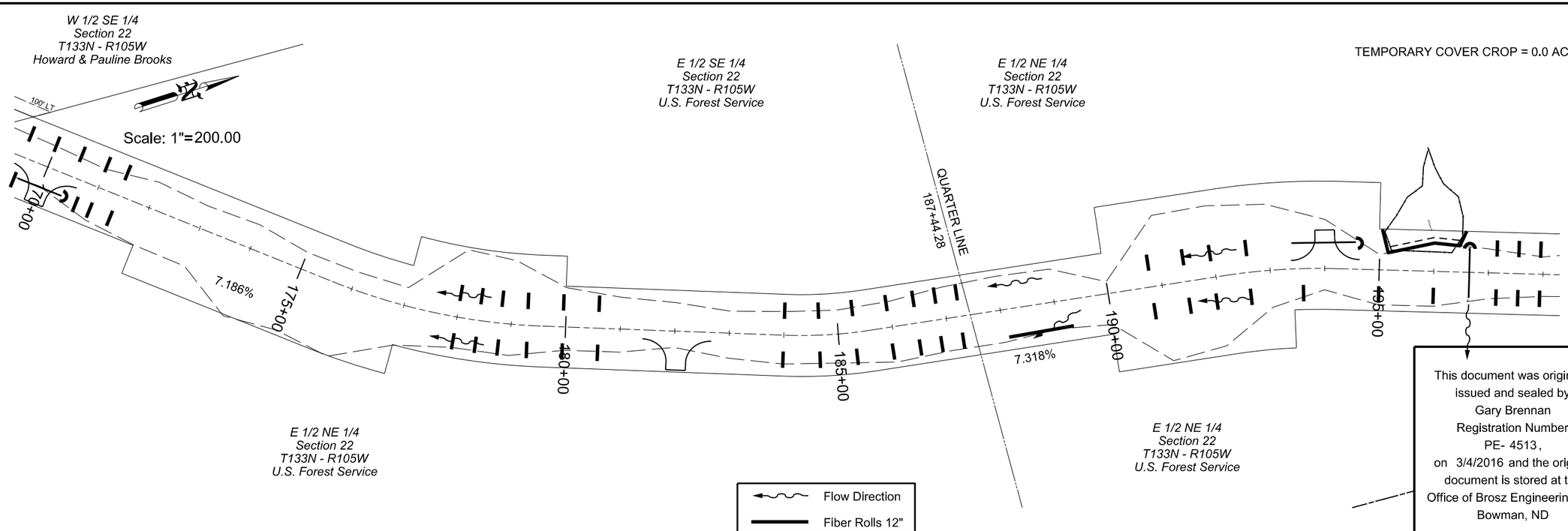
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	76	4

Erosion Control

TEMPORARY COVER CROP = 3.1 ACRES



TEMPORARY COVER CROP = 0.0 ACRES



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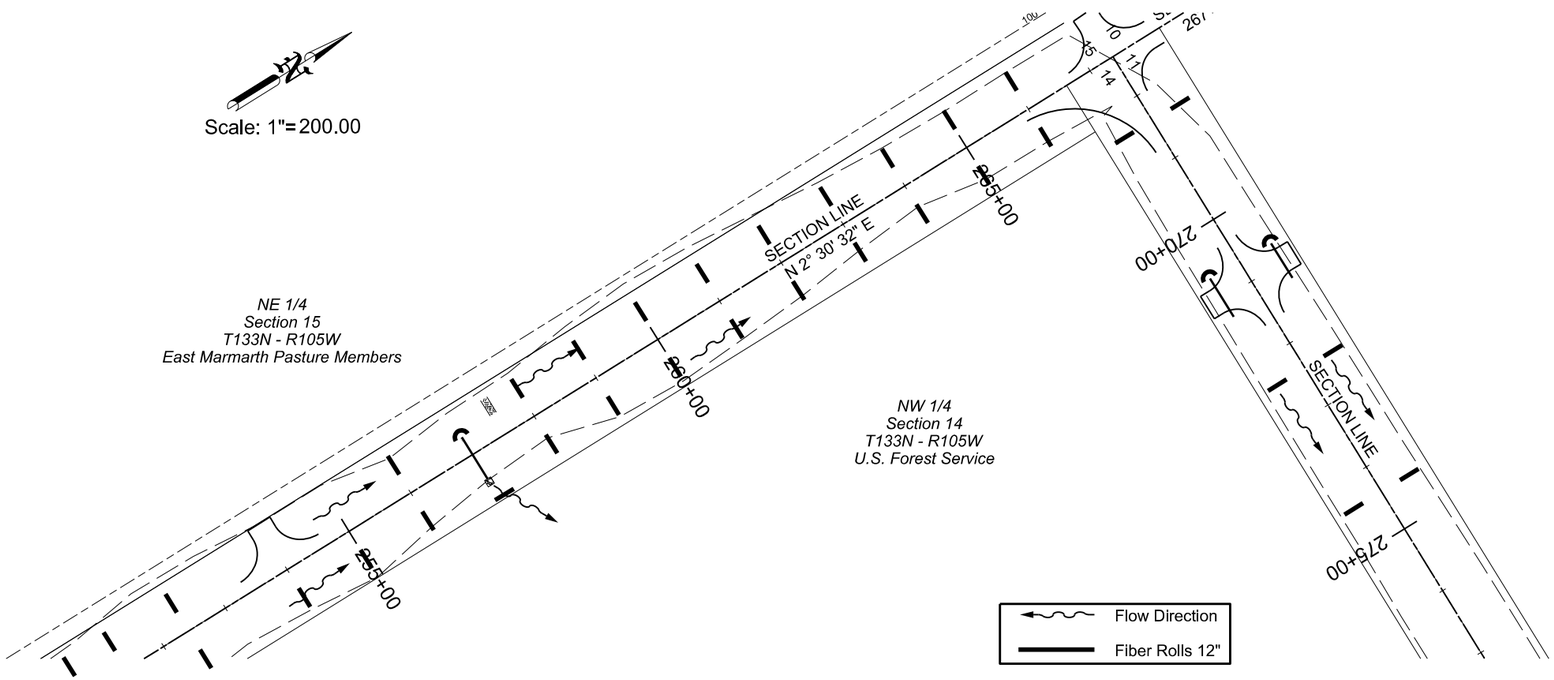
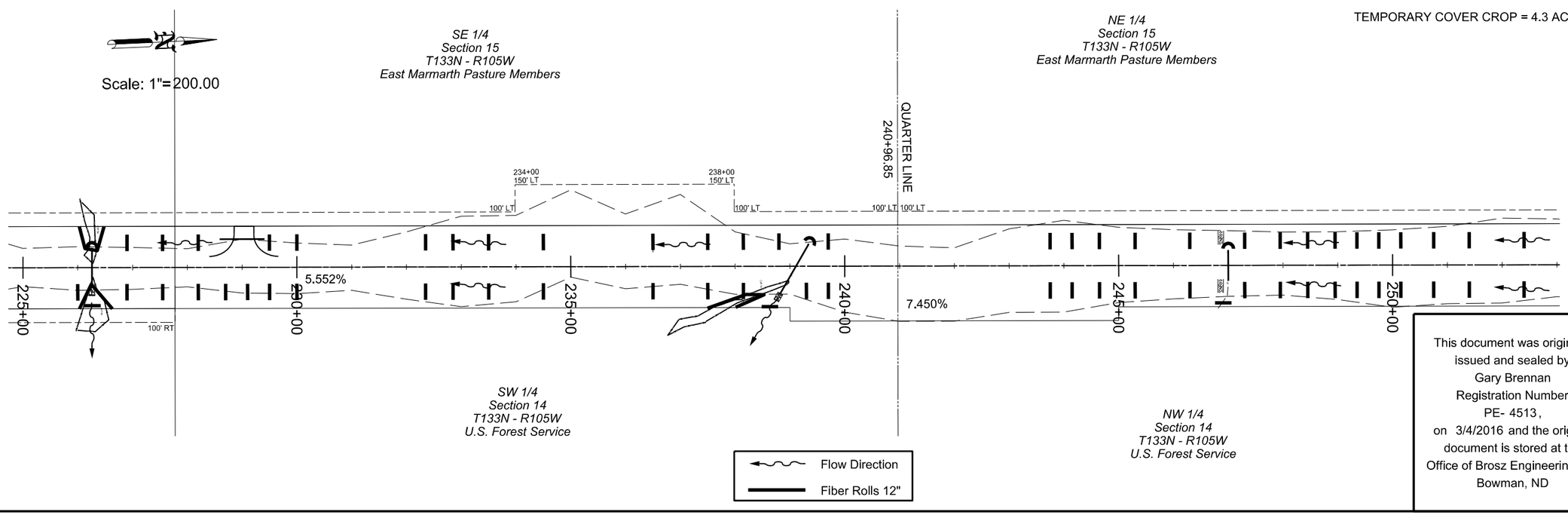
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	76	5

Erosion Control

TEMPORARY COVER CROP = 2.3 ACRES



TEMPORARY COVER CROP = 4.3 ACRES



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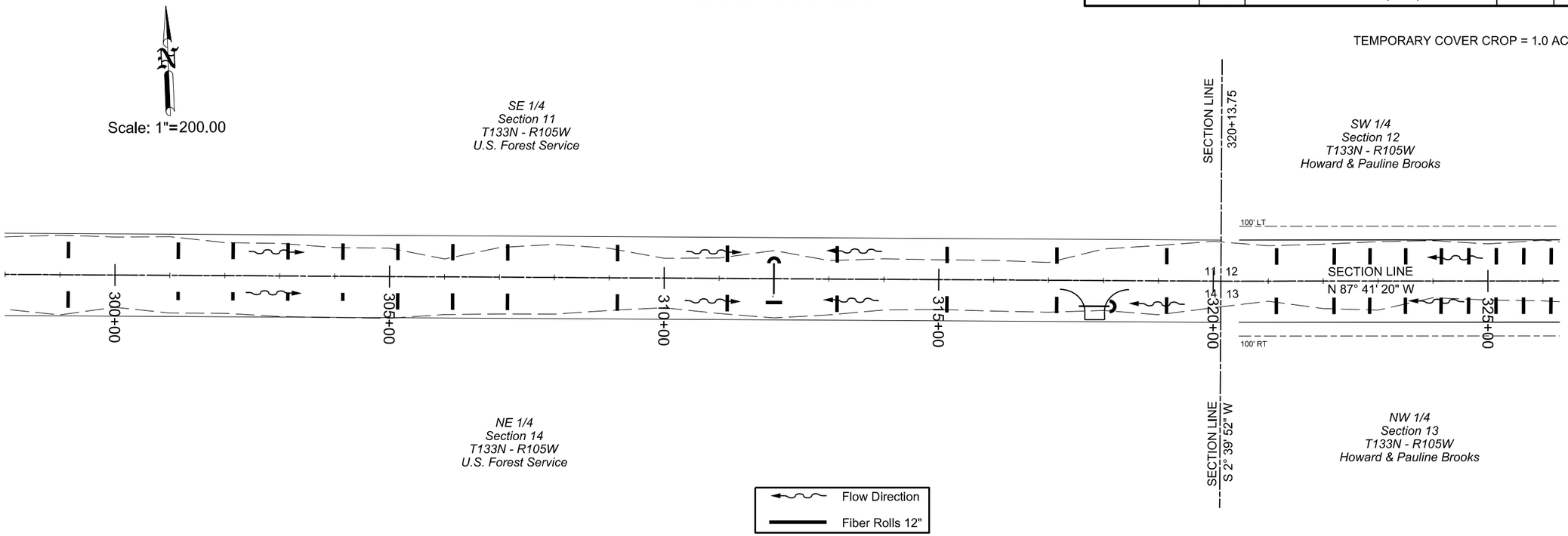
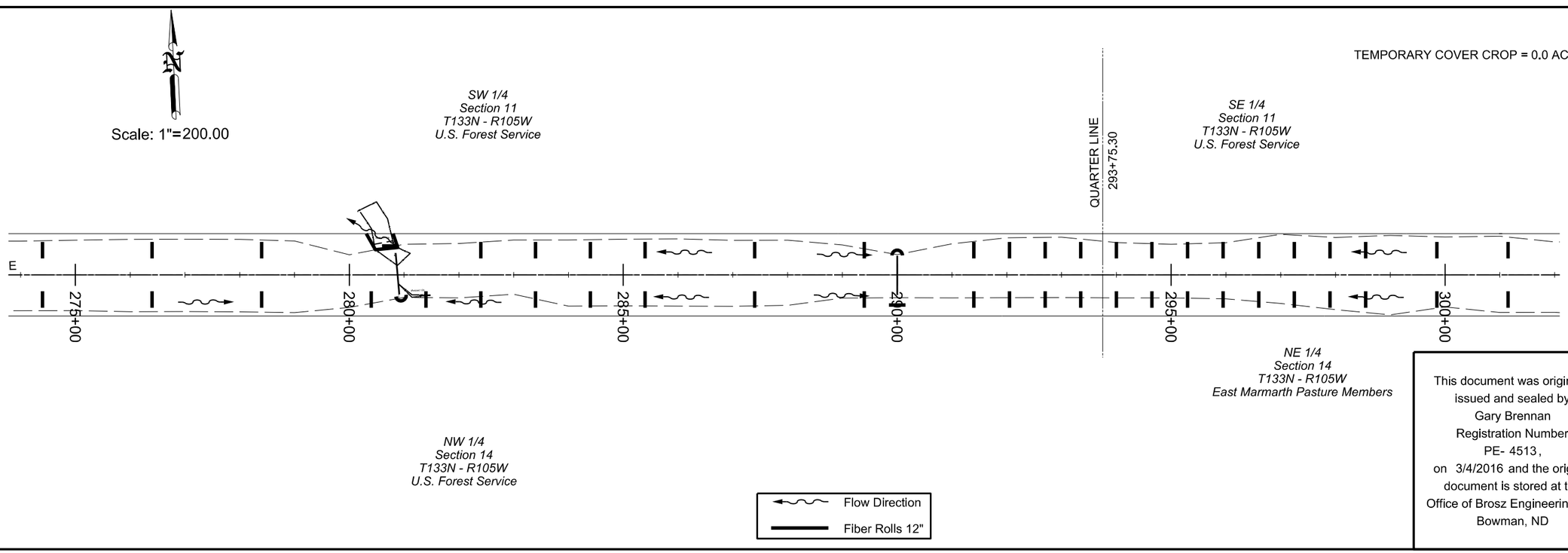
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	76	6

Erosion Control

TEMPORARY COVER CROP = 1.0 ACRES



TEMPORARY COVER CROP = 0.0 ACRES



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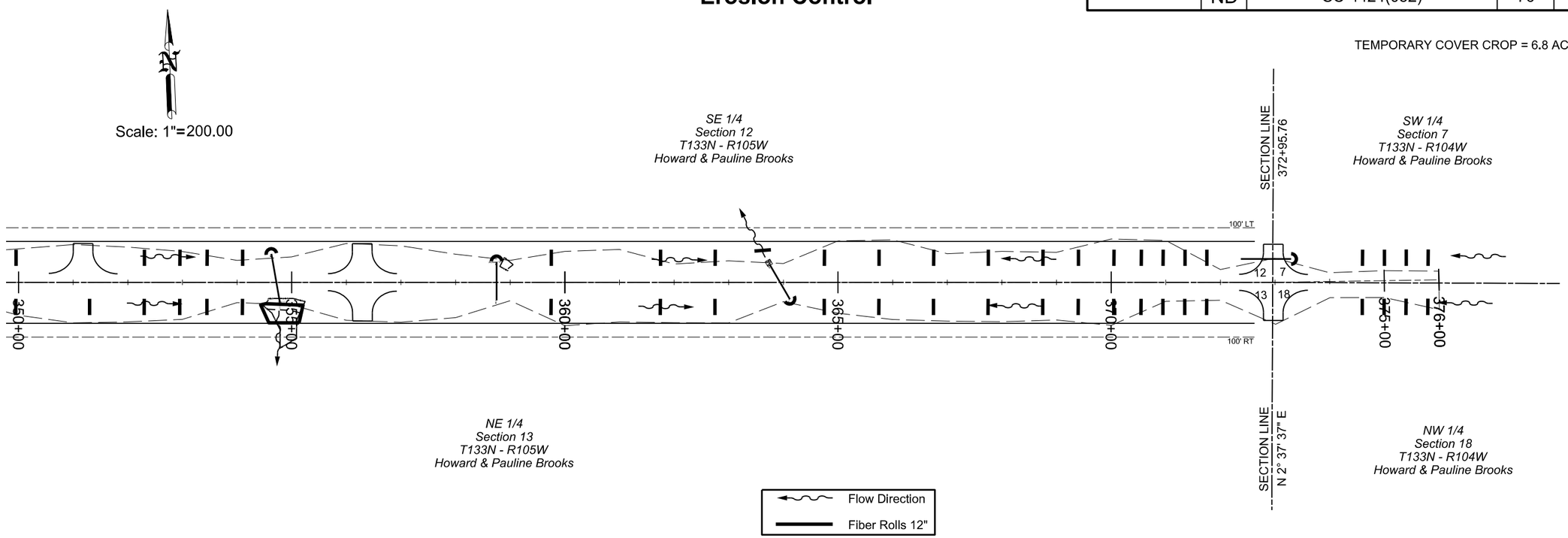
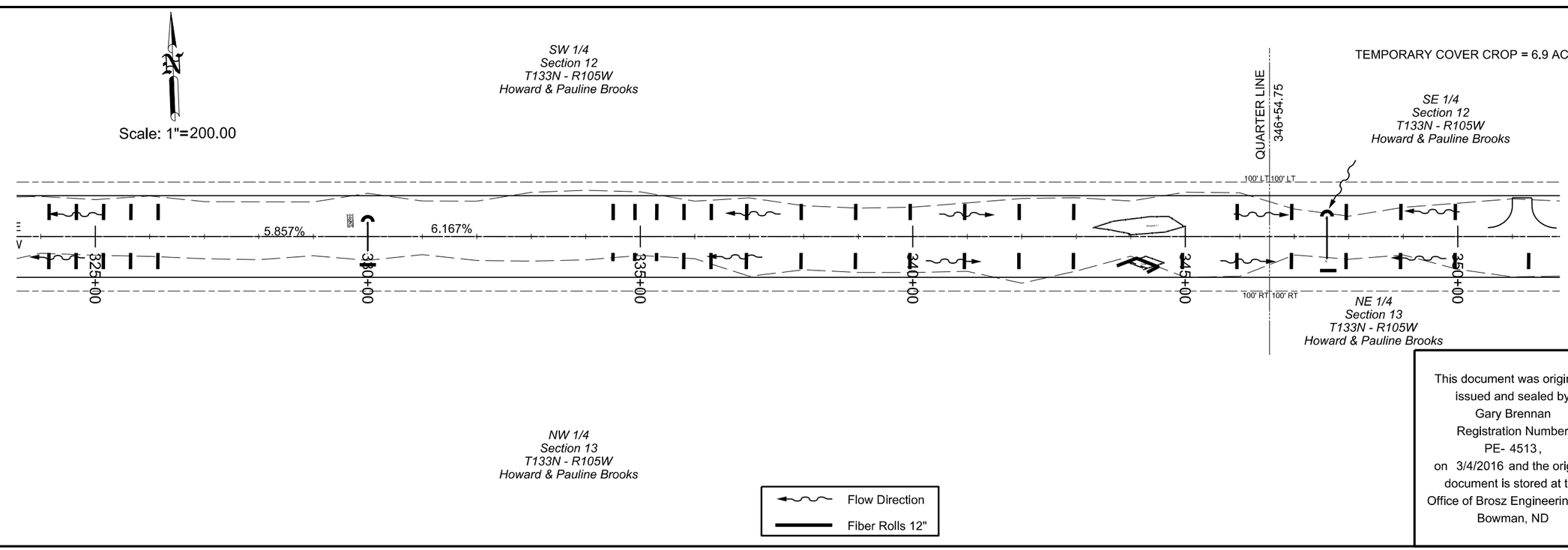
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	76	7

Erosion Control

TEMPORARY COVER CROP = 6.8 ACRES



TEMPORARY COVER CROP = 6.9 ACRES



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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	76	8

Erosion Control

Station		(LF)
6+00	Rt	30'
6+00	Lt	30'
7+00	Rt	30'
7+00	Lt	30'
8+00	Rt	15'
8+00	Lt	30'
9+00	Rt	30'
9+00	Lt	30'
10+00	Rt	30'
10+00	Lt	30'
11+00	Rt	30'
11+00	Lt	30'
11+65	Rt	30'
11+65	Lt	30'
12+30	Rt	30'
12+95	Lt	30'
12+95	Rt	30'
13+60	Lt	30'
14+25	Lt	30'
14+90	Lt	30'
15+55	Lt	30'
16+20	Lt	30'
16+85	Lt	30'
19+00	Lt	30'
19+00	Rt	15'
21+00	Lt	30'
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31+00	Rt	30'
31+00	Lt	30'
31+50	Lt	90'
31+50	Rt	240'
32+00	Lt	75'
32+00	Rt	30'
32+65	RT	30'
32+65	Lt	30'
33+30	Lt	30'
33+30	Rt	30'
33+95	Lt	30'
33+95	Rt	30'
34+60	Lt	30'
34+60	Rt	30'
35+25	Lt	30'

35+25	Rt	30'
35+90	Lt	30'
35+90	Rt	30'
36+55	Lt	30'
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39+20	Rt	30'
42+00	Lt	30'
42+00	Rt	30'
43+50	Lt	30'
43+50	Rt	60'
44+33	Lt	30'
44+33	Rt	30'
46+00	Lt	30'
46+00	Rt	30'
46+65	Lt	30'
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47+30	Lt	30'
47+30	Rt	30'
47+95	Lt	30'
47+95	Rt	30'
48+60	Lt	30'
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66+00	Lt	30'
66+00	Rt	30'

67+30	Lt	30'
68+00	Rt	30'
68+00	Lt	30'
68+00	Lt	60'
68+80	Rt	30'
69+00	Lt	30'
69+00	Rt	30'
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70+00	Rt	30'
71+00	Lt	30'
71+00	Rt	30'
72+00	Lt	30'
72+00	Rt	30'
73+20	Rt	30'
74+00	Lt	30'
74+00	Rt	30'
80+00	Lt	450'
81+50	Rt	60'
86+75	Lt	30'
87+25	Rt	90'
88+80	Lt	30'
90+75	Rt	30'
90+75	Lt	30'
96+00	Rt	150'
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99+00	Lt	30'
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109+80	Lt	30'
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112+00	Rt	30'
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116+60	Lt	30'
118+00	Lt	30'
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120+00	Rt	30'

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141+00	Rt	30'
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375+80	Rt	30'

Additional		1000'
Total		19015'

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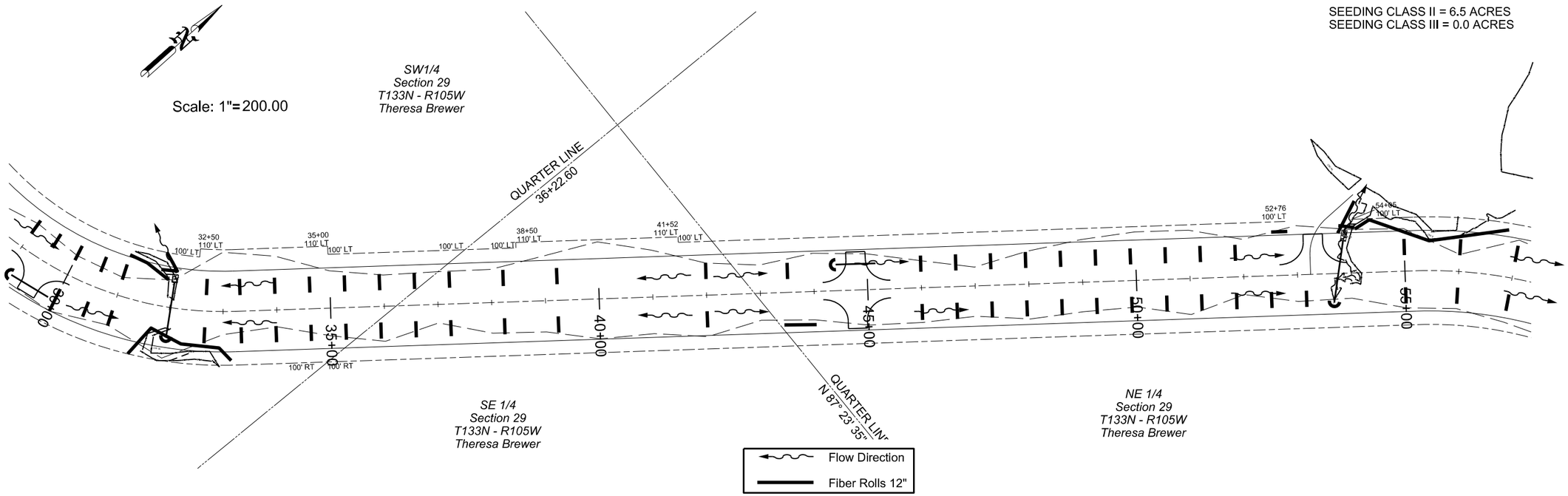
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	77	1

Erosion Control

SEEDING CLASS II = 6.5 ACRES
SEEDING CLASS III = 0.0 ACRES



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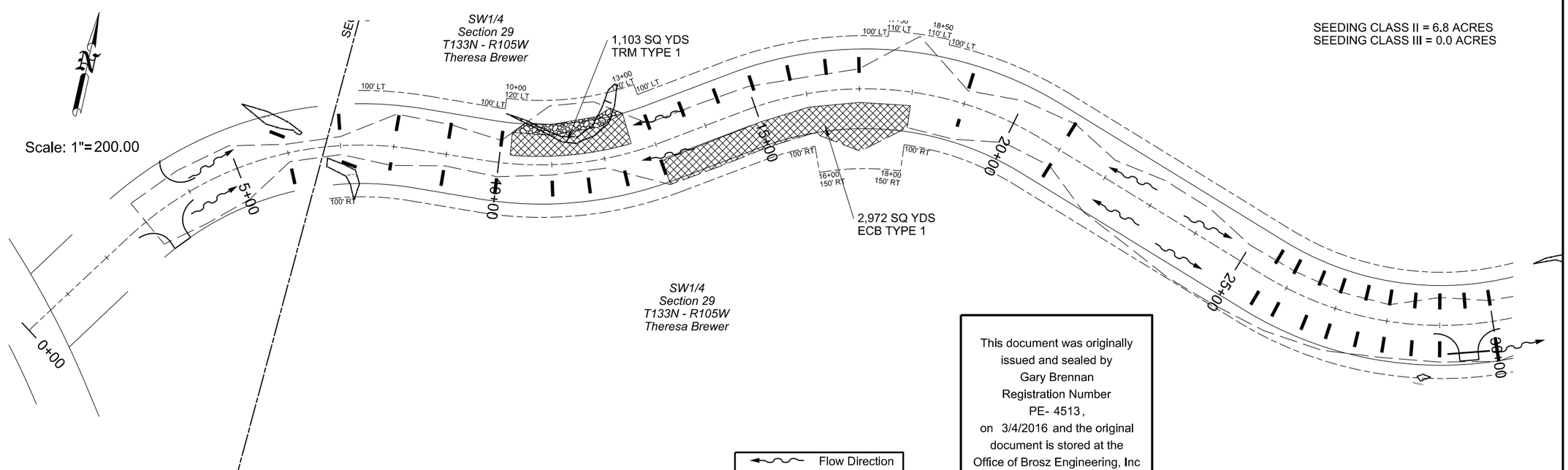

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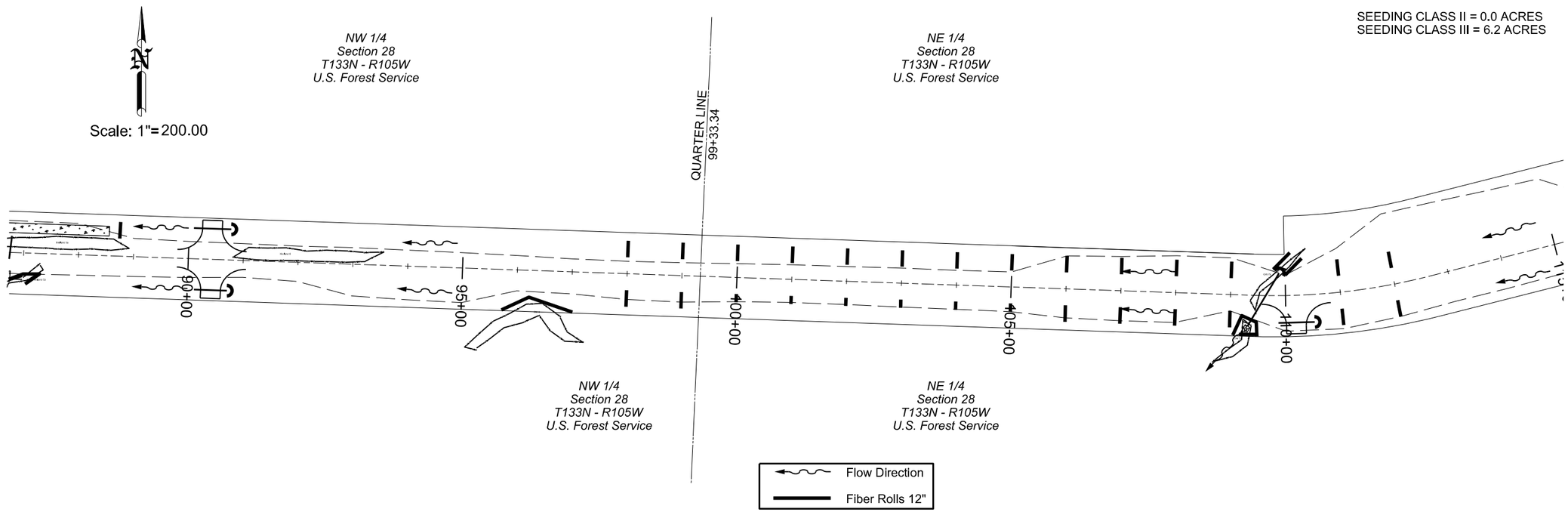
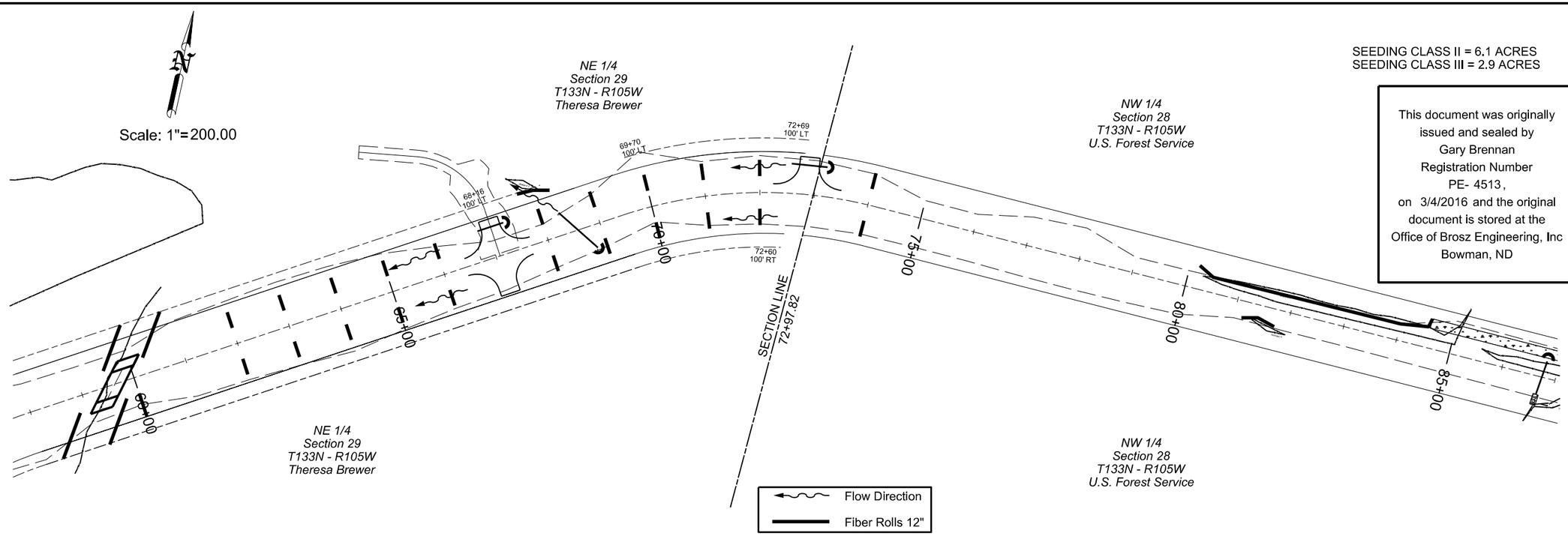
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	77	2

Erosion Control

SEEDING CLASS II = 0.0 ACRES
SEEDING CLASS III = 6.2 ACRES



SEEDING CLASS II = 6.1 ACRES
SEEDING CLASS III = 2.9 ACRES



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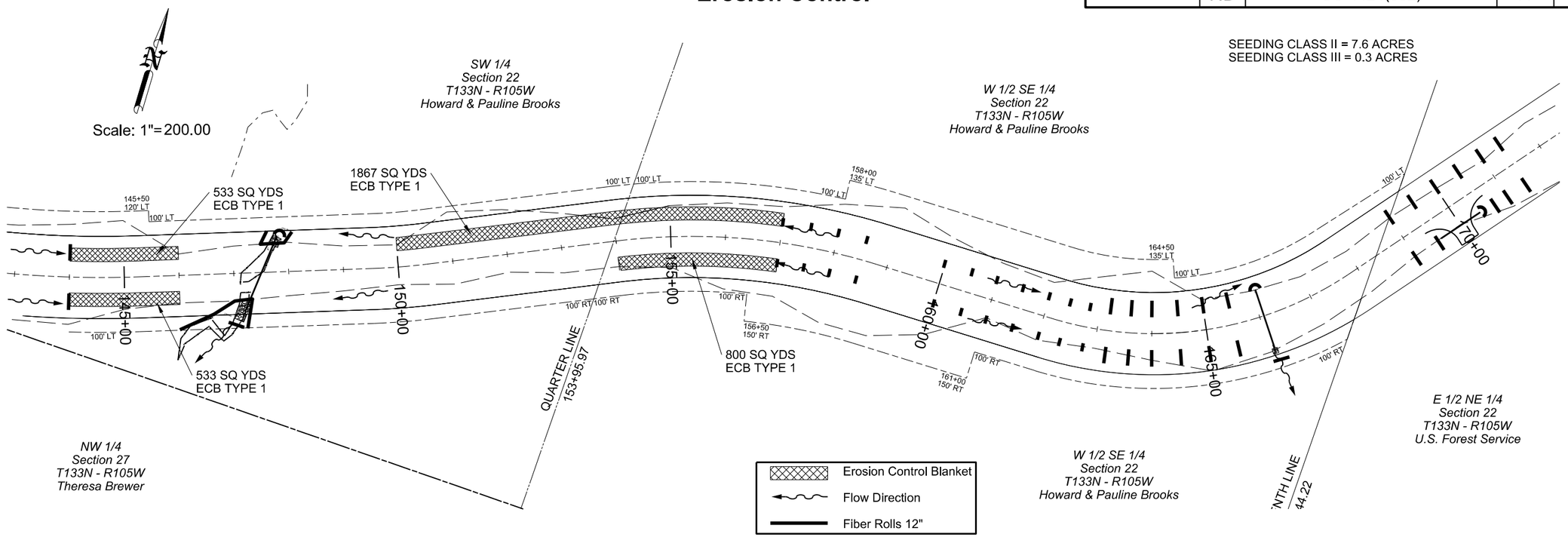
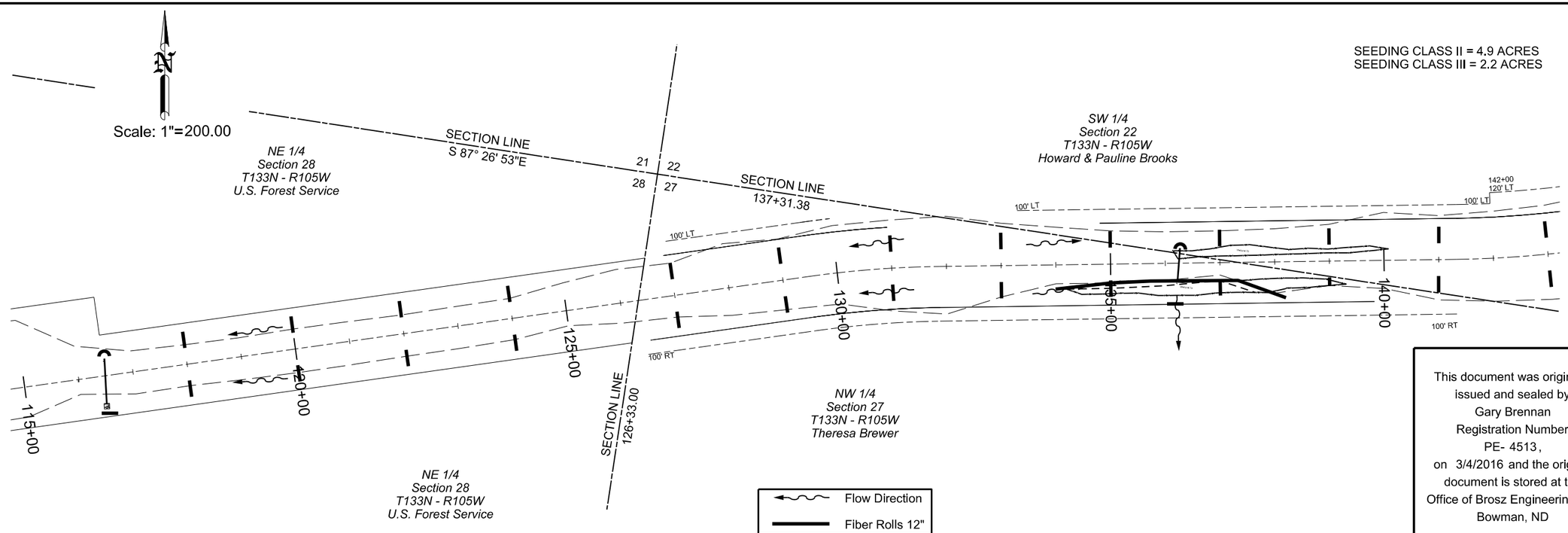
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	77	3

Erosion Control





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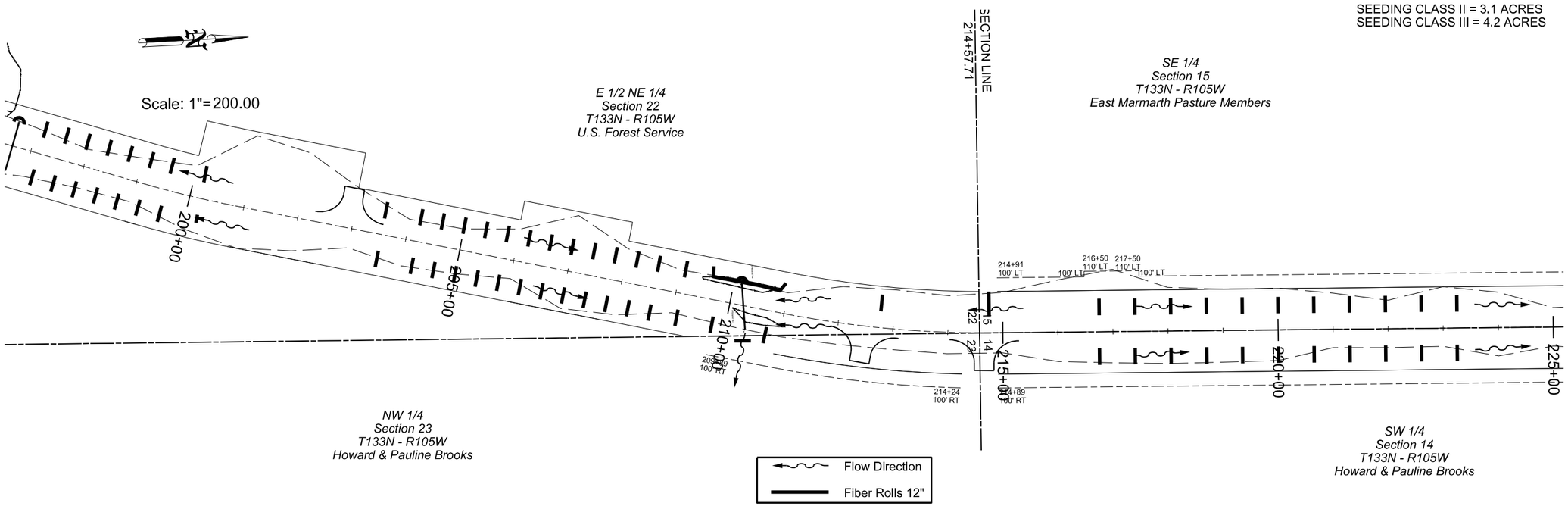
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	77	4

Erosion Control

SEEDING CLASS II = 3.1 ACRES
SEEDING CLASS III = 4.2 ACRES



SEEDING CLASS II = 0.0 ACRES
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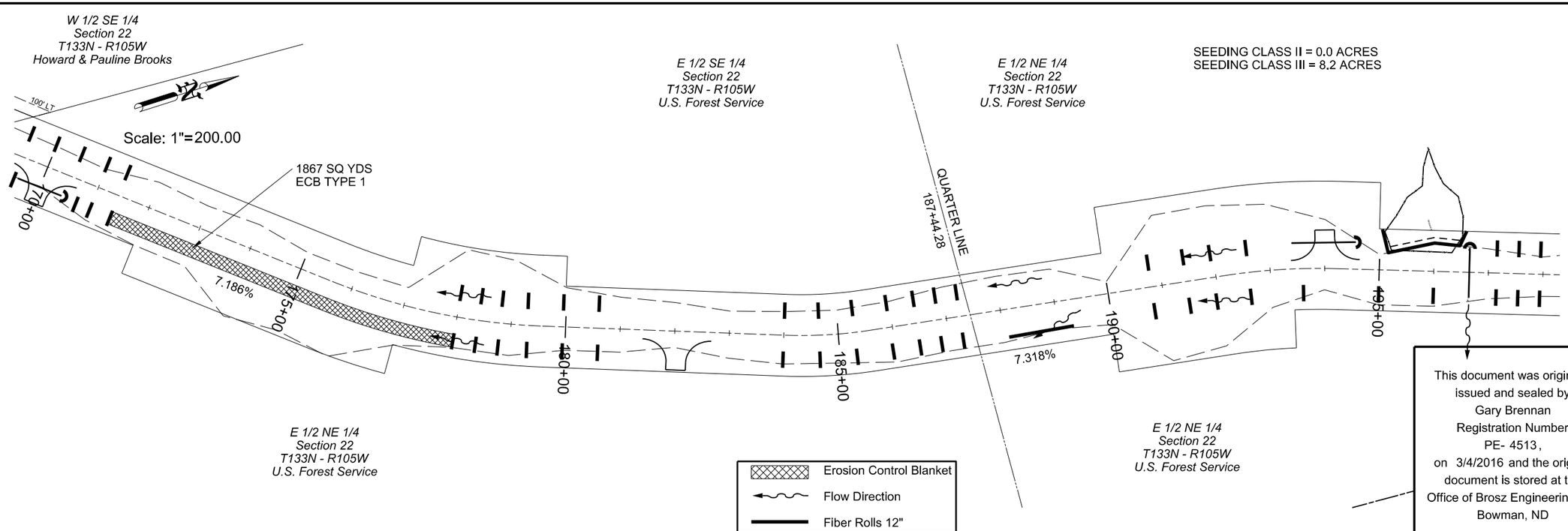

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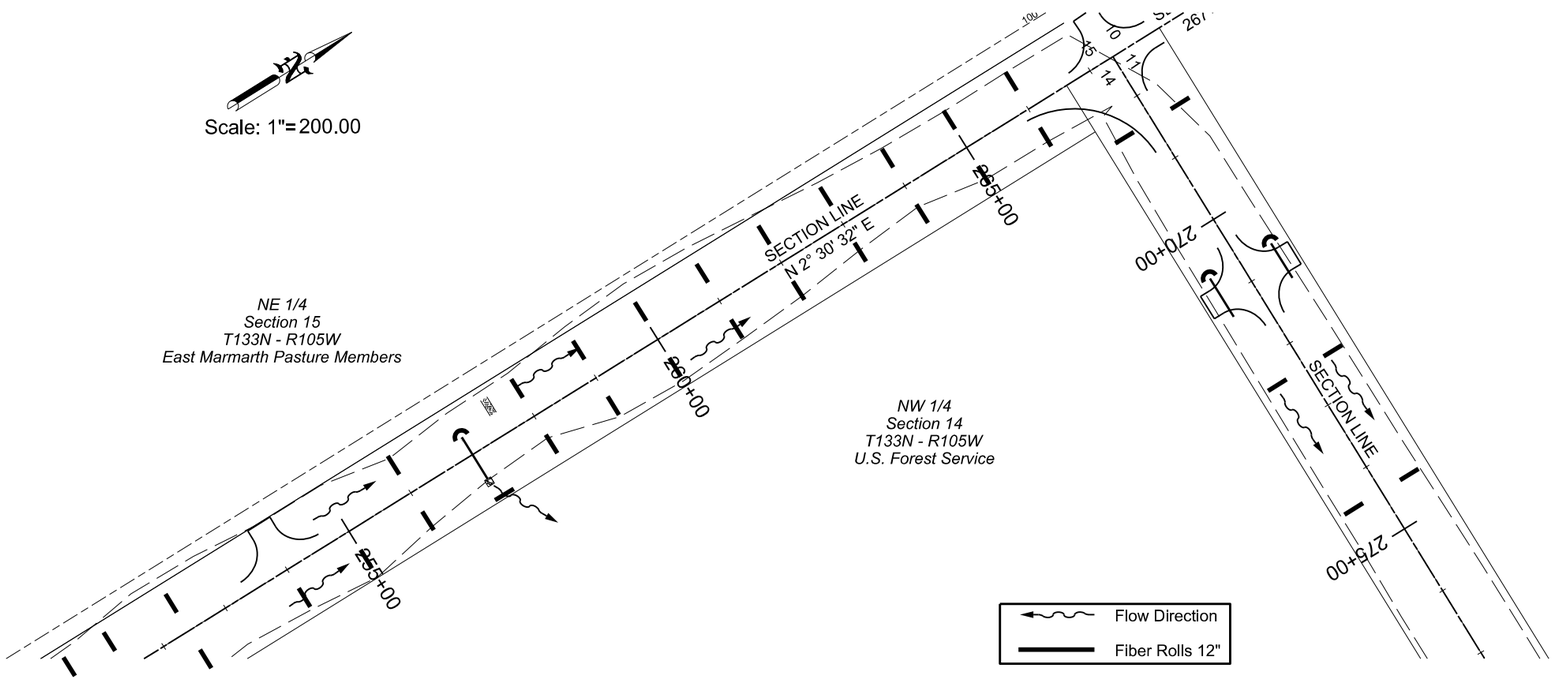
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	77	5

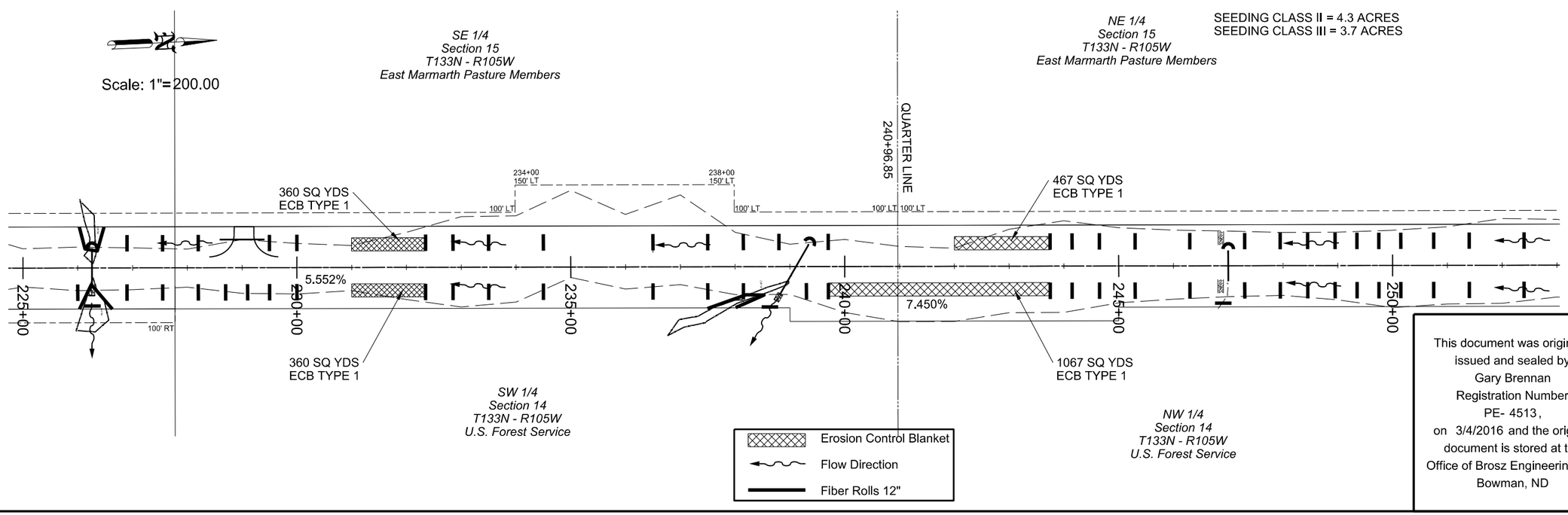
Erosion Control

SEEDING CLASS II = 2.3 ACRES
SEEDING CLASS III = 3.9 ACRES



SW 1/4
Section 11
T133N - R105W
U.S. Forest Service

SEEDING CLASS II = 4.3 ACRES
SEEDING CLASS III = 3.7 ACRES



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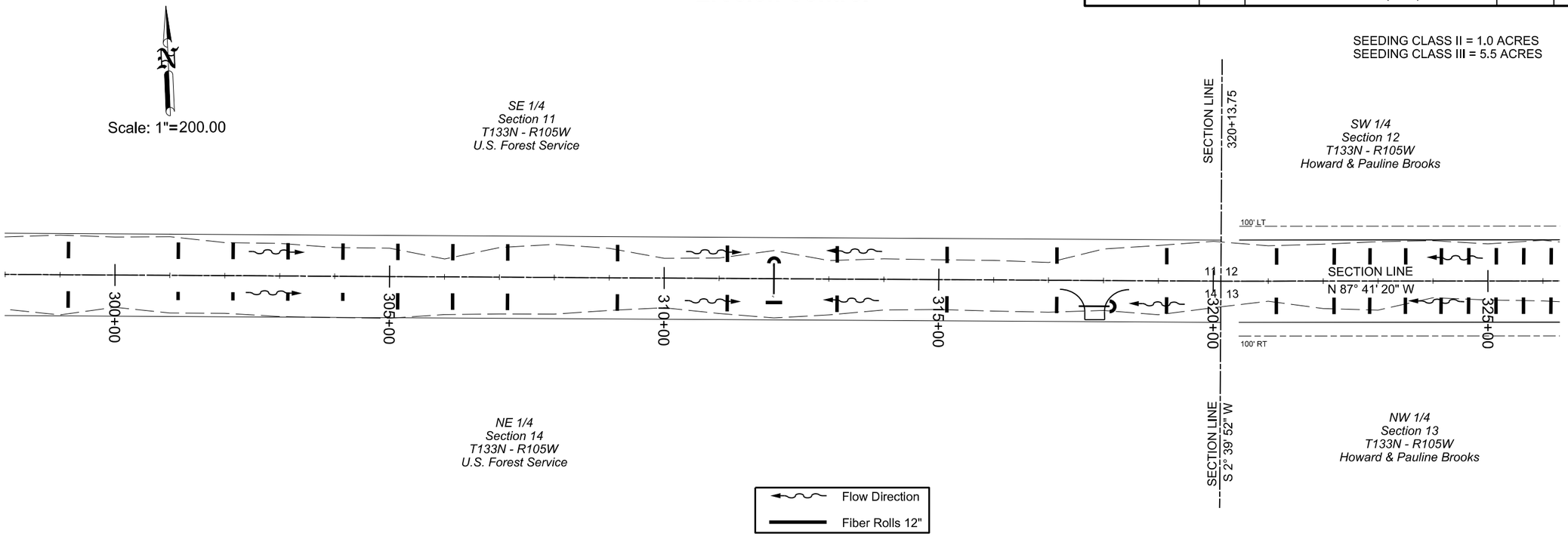
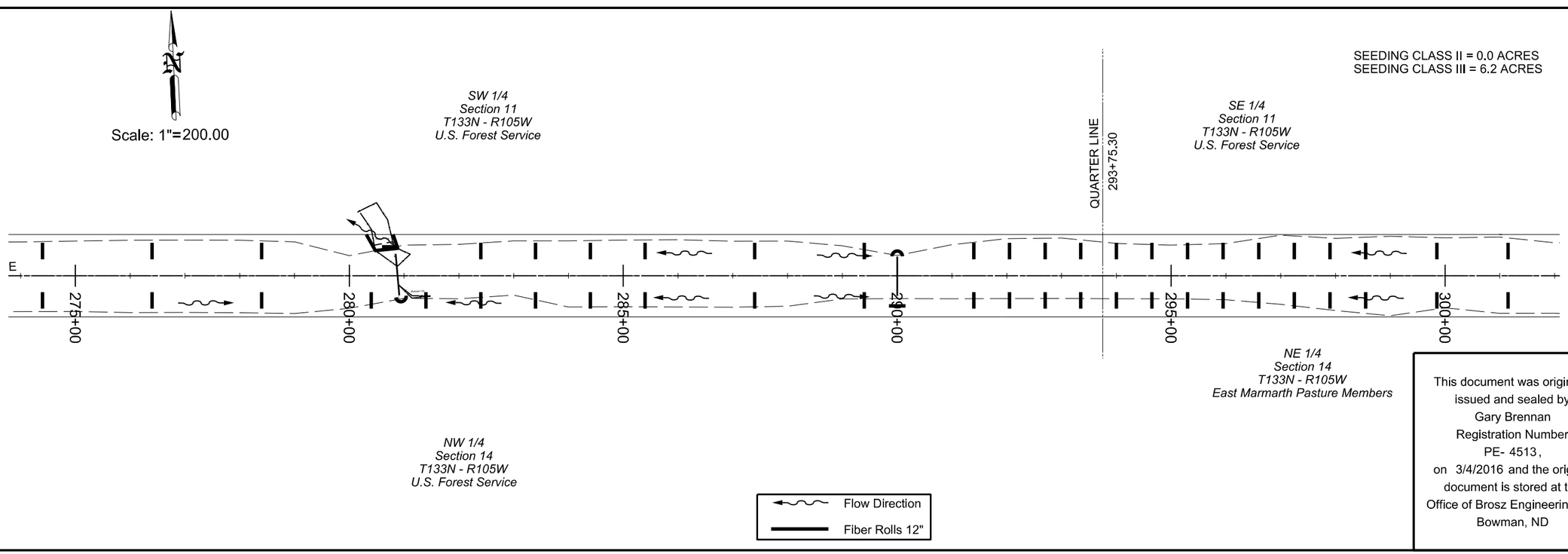
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	77	6

Erosion Control

SEEDING CLASS II = 1.0 ACRES
SEEDING CLASS III = 5.5 ACRES



SEEDING CLASS II = 0.0 ACRES
SEEDING CLASS III = 6.2 ACRES



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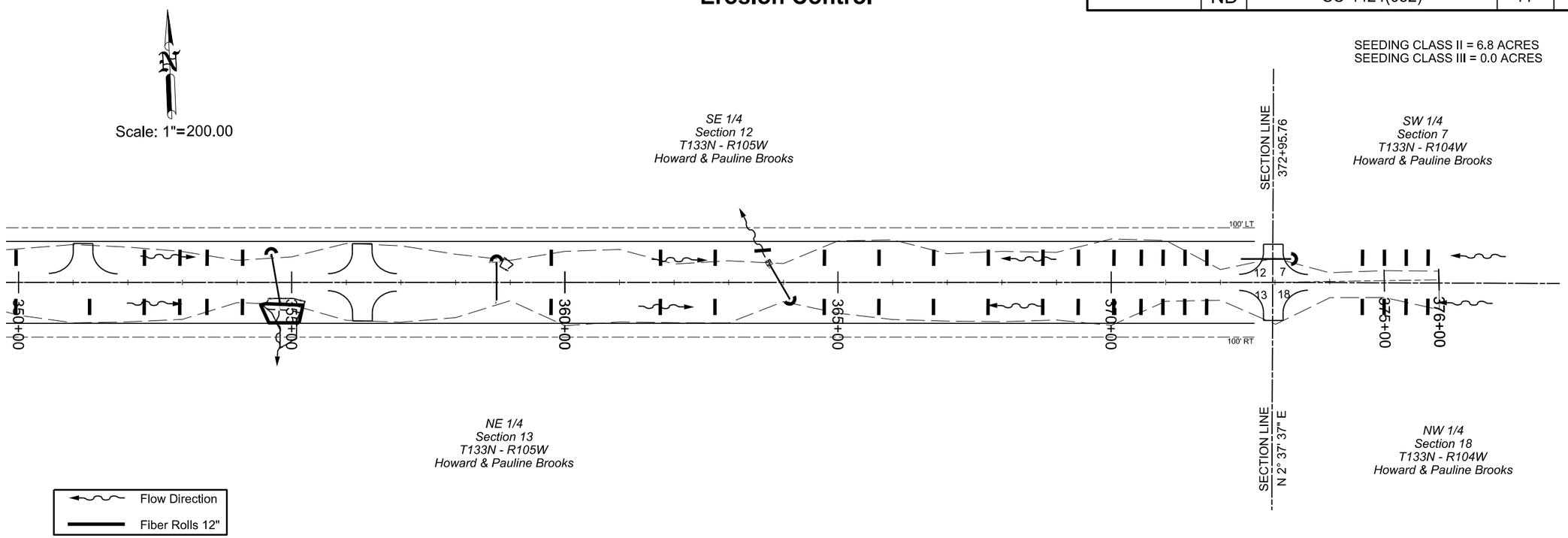
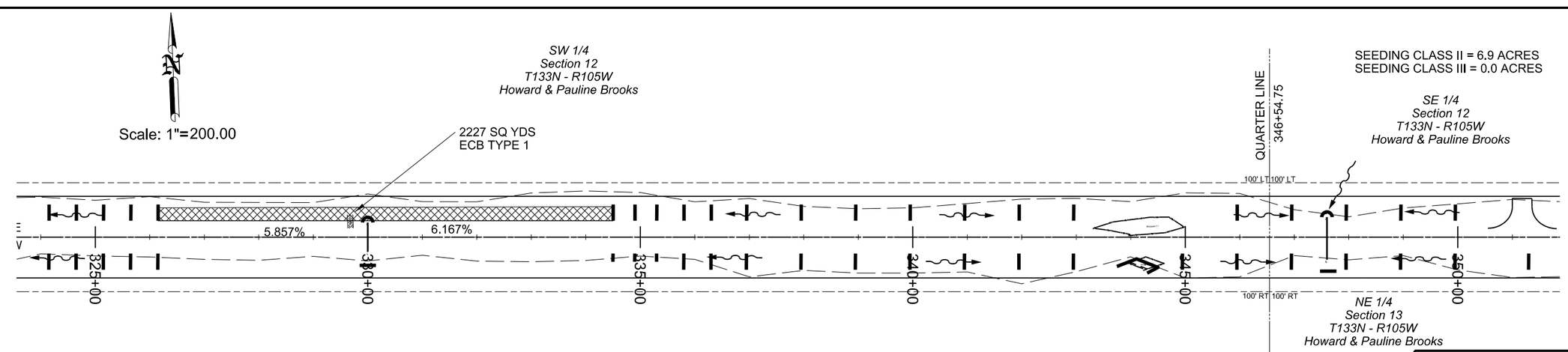
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	77	7

Erosion Control

SEEDING CLASS II = 6.8 ACRES
SEEDING CLASS III = 0.0 ACRES



SEEDING CLASS II = 6.9 ACRES
SEEDING CLASS III = 0.0 ACRES



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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	77	8

Erosion Control

Station		(LF)
6+00	Rt	30'
6+00	Lt	30'
7+00	Rt	30'
7+00	Lt	30'
8+00	Rt	15'
8+00	Lt	30'
9+00	Rt	30'
9+00	Lt	30'
10+00	Rt	30'
10+00	Lt	30'
11+00	Rt	30'
11+00	Lt	30'
11+65	Rt	30'
11+65	Lt	30'
12+30	Rt	30'
12+95	Lt	30'
12+95	Rt	30'
13+60	Lt	30'
14+25	Lt	30'
14+90	Lt	30'
15+55	Lt	30'
16+20	Lt	30'
16+85	Lt	30'
19+00	Lt	30'
19+00	Rt	15'
21+00	Lt	30'
21+00	Lt	30'
25+50	Rt	30'
25+50	Rt	30'
26+00	Lt	30'
26+00	Lt	30'
26+50	Rt	30'
26+50	Lt	30'
27+00	Rt	30'
27+00	Lt	30'
27+50	Lt	30'
27+50	Lt	30'
28+00	Lt	30'
28+00	Lt	30'
28+50	Rt	30'
28+50	Lt	30'
29+25	Rt	30'
29+50	Lt	30'
30+00	Lt	30'
30+00	Rt	30'
30+00	Lt	30'
30+50	Rt	30'
30+50	Lt	30'
31+00	Rt	30'
31+00	Lt	30'
31+50	Lt	90'
31+50	Rt	240'
32+00	Lt	75'
32+00	Rt	30'
32+65	RT	30'
32+65	Lt	30'
33+30	Lt	30'
33+30	Rt	30'
33+95	Lt	30'
33+95	Rt	30'
34+60	Lt	30'
34+60	Rt	30'
35+25	Lt	30'

35+25	Rt	30'
35+90	Lt	30'
35+90	Rt	30'
36+55	Lt	30'
36+55	Rt	30'
37+20	Lt	30'
37+20	Rt	30'
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38+20	Lt	30'
39+20	Lt	30'
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43+50	Lt	30'
43+50	Rt	60'
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44+33	Rt	30'
46+00	Lt	30'
46+00	Rt	30'
46+65	Lt	30'
46+65	Rt	30'
47+30	Lt	30'
47+30	Rt	30'
47+95	Lt	30'
47+95	Rt	30'
48+60	Lt	30'
48+60	Lt	30'
49+25	Lt	30'
49+25	Lt	30'
49+90	Lt	30'
49+90	Rt	30'
50+55	Lt	30'
50+55	Rt	30'
51+20	Lt	30'
51+20	Rt	30'
51+85	Lt	30'
51+85	Rt	30'
52+50	Lt	30'
52+50	Rt	30'
53+15	Rt	30'
53+60	Lt	75'
53+66	Rt	30'
53+90	Lt	30'
54+25	Lt	300'
55+00	Lt	30'
55+00	Rt	30'
56+00	Lt	30'
56+00	Rt	30'
57+00	Lt	30'
57+00	Rt	30'
59+00	Rt	90'
59+30	Lt	90'
59+90	Rt	90'
60+10	Lt	90'
62+00	Lt	30'
62+00	Rt	30'
63+00	Lt	30'
63+00	Rt	30'
64+00	Lt	30'
64+00	Rt	30'
65+00	Lt	30'
65+00	Rt	30'
66+00	Lt	30'
66+00	Rt	30'

67+30	Lt	30'
68+00	Rt	30'
68+00	Lt	30'
68+00	Lt	60'
68+80	Rt	30'
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69+00	Rt	30'
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70+00	Rt	30'
71+00	Lt	30'
71+00	Rt	30'
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72+00	Rt	30'
73+20	Rt	30'
74+00	Lt	30'
74+00	Rt	30'
80+00	Lt	450'
81+50	Rt	60'
86+75	Lt	30'
87+25	Rt	90'
88+80	Lt	30'
90+75	Rt	30'
90+75	Lt	30'
96+00	Rt	150'
98+00	Lt	30'
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99+00	Lt	30'
100+00	Rt	15'
100+00	Lt	30'
101+00	Rt	15'
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112+00	Lt	30'
116+40	Rt	30'
116+60	Lt	30'
118+00	Lt	30'
118+00	Rt	30'
120+00	Lt	30'
120+00	Rt	30'

122+00	Rt	30'
122+00	Lt	30'
124+00	Lt	30'
124+00	Rt	30'
127+00	Lt	30'
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134+00	Rt	420'
135+00	Rt	30'
135+00	Lt	30'
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136+20	Rt	30'
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139+00	Rt	15'
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141+00	Rt	30'
143+00	Lt	30'
143+00	Rt	30'
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146+00	Rt	200'
147+00	Rt	30'
147+00	Lt	90'
147+90	Lt	30'
157+00	Rt	15'
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157+50	Lt	15'
157+50	Lt	15'
158+00	Rt	15'
158+00	Lt	15'
158+50	Rt	15'
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164+50	Lt	30'
164+50	Rt	30'
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165+00	Lt	30'
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165+50	Lt	30'
166+00	Lt	30'

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169+00	Lt	30'
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169+50	Lt	30'
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199+45	Lt	30'
199+45	Lt	30'

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200+20	Rt	15'
203+55	Lt	30'
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210+75	Rt	30'
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218+05	Lt	30'
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221+95	Lt	30'
221+95	Rt	30'
222+60	Rt	30'
222+60	Lt	30'
223+25	Rt	30'
223+25	Lt	30'
226+00	Lt	110'

226+26	Rt	30'
226+10	Rt	110'
223+25	Rt	30'
226+90	Lt	30'
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250+75	Lt	30'
250+75	Rt	30'

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252+40	Rt	30'
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255+00	Rt	30'
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290+00	Rt	30'
298+40	Lt	30'
290+00	Lt	30'
291+40	Rt	30'
291+40	Lt	30'
292+05	Rt	30'

292+05	Lt	30'
292+70	Rt	30'
292+70	Lt	30'
293+35	Rt	30'
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322+85	Lt	30'
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323+50	Lt	30'
323+50	Rt	30'
324+15	Rt	30'
324+15	Lt	30'
324+65	Rt	30'
324+65	Lt	30'

325+15	Rt	30'
325+15	Lt	30'
325+65	Rt	30'
325+65	Lt	30'
326+15	Rt	30'
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330+00	Rt	30'
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334+50	Lt	30'
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359+75	Rt	30'
359+75	Lt	30'
361+75	Rt	30'
361+75	Lt	30'
362+75	Lt	30'

362+75	Rt	30'
363+75	Lt	30'
364+00	Rt	30'
364+75	Rt	30'
364+75	Lt	30'
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375+00	Rt	30'
375+00	Lt	30'
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375+80	Rt	30'
375+80	Rt	30'

Additional		1000'
Total		19015'

Turf Reinforced Mat			
Begin	End	Lt/Rt	SY
10+20	12+56	LT	1,103
		Total	1,103

Erosion Control Blanket			
Begin	End	Lt/Rt	SY
13+00	18+00	Rt	2,972
144+00	146+00	Lt	533
144+00	146+00	Rt	533
150+00	157+00	Lt	1,867
154+00	157+00	Rt	800
171+50	178+00	Rt	1,867
231+00	232+50	Lt	360
231+00	232+50	Rt	360
239+75	243+75	Rt	1,067
242+00	243+75	Lt	467
326+10	234+50	Lt	2,227
		Total	13,053

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	82	1

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Linear			
	POB ( )	0+00.00	248644.28	1107432.5
	PC ( )	2+58.91	248858.05	1107578.56
	Tangent Direction:	N34^20'34" E		
	Tangent Length:	258.91		
Element:	Circular			
	PC ( )	2+58.91	248858.05	1107578.56
	PI ( )	5+69.33	249114.36	1107753.68
	CC ( )		248498.91	1108104.2
	PT ( )	8+36.56	249134.22	1108063.47
	Radius:	636.62		
	Design Speed(mph):	25		
	Superelevation:	4.00%		
	Delta:	51^59'18"	Right	
Degree	of Curvature(Arc):	9^00'00"		
	Length:	577.65		
	Tangent:	310.42		
	Chord:	558.04		
	Middle Ordinate:	64.4		
	External:	71.65		
	Tangent Direction:	N 34^20'34" E		
	Radial Direction:	S 55^39'26" E		
	Chord Direction:	N 60^20'13" E		
	Radial Direction:	S 3^40'07" E		
	Tangent Direction:	N 86^19'53" E		
Element:	Linear			
	PT ( )	8+36.56	249134.22	1108063.47
	PC ( )	9+78.56	249143.31	1108205.18
	Tangent Direction:	N 86^19'53" E		
	Tangent Length:	142		
Element:	Circular			
	PC ( )	9+78.56	249143.31	1108205.18
	PI ( )	11+47.15	249154.1	1108373.42
	CC ( )		249778.63	1108164.44
	PT ( )	13+08.17	249246.74	1108514.27
	Radius:	636.62		
	Design Speed(mph):	45		
	Superelevation:	-6.00%		
	Delta:	29^39'52"	Left	
Degree	of Curvature(Arc):	9^00'00"		
	Length:	329.61		
	Tangent:	168.59		
	Chord:	325.94		
	Middle Ordinate:	21.21		
	External:	21.94		
	Tangent Direction:	N 86^19'53" E		
	Radial Direction:	S 3^40'07" E		
	Chord Direction:	N 71^29'56" E		
	Radial Direction:	S 33^20'00" E		
	Tangent Direction:	N 56^40'00" E		

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Linear			
	PT ( )	13+08.17	249246.74	1108514.27
	PC ( )	14+79.30	249340.78	1108657.25
	Tangent Direction:	N 56^40'00" E		
	Tangent Length:	171.13		
Element:	Circular			
	PC ( )	14+79.30	249340.78	1108657.25
	PI ( )	17+91.84	249512.52	1108918.37
	CC ( )		248808.89	1109007.08
	PT ( )	20+60.38	249410.96	1109213.95
	Radius:	636.62		
	Design Speed(mph):	45		
	Superelevation:	6.00%		
	Delta:	52^17'48"	Right	
Degree	of Curvature(Arc):	9^00'00"		
	Length:	581.08		
	Tangent:	312.54		
	Chord:	561.11		
	Middle Ordinate:	65.15		
	External:	72.58		
	Tangent Direction:	N 56^40'00" E		
	Radial Direction:	S 33^20'00" E		
	Chord Direction:	N 82^48'54" E		
	Radial Direction:	S 18^57'48" W		
	Tangent Direction:	S 71^02'12" E		
Element:	Linear			
	PT ( )	20+60.38	249410.96	1109213.95
	PC ( )	25+51.62	249251.32	1109678.54
	Tangent Direction:	S 71^02'12" E		
	Tangent Length:	491.25		
Element:	Circular			
	PC ( )	25+51.62	249251.32	1109678.54
	PI ( )	29+90.62	249108.66	1110093.71
	CC ( )		249853.39	1109885.42
	PT ( )	33+20.27	249446	1110374.63
	Radius:	636.62		
	Design Speed(mph):	45		
	Superelevation:	-6.00%		
	Delta:	69^10'41"	Left	
Degree	of Curvature(Arc):	9^00'00"		
	Length:	768.64		
	Tangent:	438.99		
	Chord:	722.8		
	Middle Ordinate:	112.53		
	External:	136.69		
	Tangent Direction:	S 71^02'12" E		
	Radial Direction:	S 18^57'48" W		
	Chord Direction:	N 74^22'28" E		
	Radial Direction:	S 50^12'52" E		
	Tangent Direction:	N 39^47'08" E		

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Linear			
	PT ( )	33+20.27	249446	1110374.63
	PC ( )	55+19.51	251136	1111781.95
	Tangent Direction:	N 39^47'08" E		
	Tangent Length:	2199.24		
Element:	Circular			
	PC ( )	55+19.51	251136	1111781.95
	PI ( )	56+59.56	251243.62	1111871.57
	CC ( )		250612.23	1112410.94
	PT ( )	57+96.92	251315.32	1111991.87
	Radius:	818.51		
	Design Speed(mph):	45		
	Superelevation:	6.00%		
	Delta:	19^25'08"	Right	
Degree	of Curvature(Arc):	7^00'00"		
	Length:	277.41		
	Tangent:	140.05		
	Chord:	276.08		
	Middle Ordinate:	11.72		
	External:	11.89		
	Tangent Direction:	N 39^47'08" E		
	Radial Direction:	S 50^12'52" E		
	Chord Direction:	N 49^29'41" E		
	Radial Direction:	S 30^47'45" E		
	Tangent Direction:	N 59^12'15" E		
Element:	Linear			
	PT ( )	57+96.92	251315.32	1111991.87
	PC ( )	69+43.06	251902.13	1112976.41
	Tangent Direction:	N 59^12'15" E		
	Tangent Length:	1146.14		
Element:	Circular			
	PC ( )	69+43.06	251902.13	1112976.41
	PI ( )	71+83.73	252025.34	1113183.14
	CC ( )		251199.03	1113395.47
	PT ( )	74+11.21	252017.05	1113423.67
	Radius:	818.51		
	Design Speed(mph):	45		
	Superelevation:	6.00%		
	Delta:	32^46'12"	Right	
Degree	of Curvature(Arc):	7^00'00"		
	Length:	468.14		
	Tangent:	240.67		
	Chord:	461.79		
	Middle Ordinate:	33.24		
	External:	34.65		
	Tangent Direction:	N 59^12'15" E		
	Radial Direction:	S 30^47'45" E		
	Chord Direction:	N 75^35'21" E		
	Radial Direction:	S 1^58'27" W		
	Tangent Direction:	S 88^01'33" E		

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Details

Alignment Data
Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	82	2

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Linear			
	PT ( )	74+11.21	252017.05	1113423.67
	PC ( )	109+40.04	251895.48	1116950.41
	Tangent Direction:	S 88^01'33" E		
	Tangent Length:	3528.84		
Element:	Circular			
	PC ( )	109+40.04	251895.48	1116950.41
	PI ( )	111+02.89	251889.87	1117113.16
	CC ( )		253040.72	1116989.89
	PT ( )	112+63.58	251929.83	1117271.04
	Radius:	1145.92		
	Design Speed(mph):	45		
	Superelevation:	-5.00%		
	Delta:	16^10'36"	Left	
Degree	of Curvature(Arc):	5^00'00"		
	Length:	323.54		
	Tangent:	162.85		
	Chord:	322.46		
	Middle Ordinate:	11.4		
	External:	11.51		
	Tangent Direction:	S 88^01'33" E		
	Radial Direction:	S 1^58'27" W		
	Chord Direction:	N 83^53'09" E		
	Radial Direction:	S 14^12'09" E		
	Tangent Direction:	N 75^47'51" E		
Element:	Linear			
	PT ( )	112+63.58	251929.83	1117271.04
	PC ( )	129+45.67	252342.53	1118901.71
	Tangent Direction:	N 75^47'51" E		
	Tangent Length:	1682.09		
Element:	Circular			
	PC ( )	129+45.67	252342.53	1118901.71
	PI ( )	130+66.62	252372.21	1119018.97
	CC ( )		250491.05	1119370.29
	PT ( )	131+87.26	252386.85	1119139.04
	Radius:	1909.86		
	Design Speed(mph):	45		
	Superelevation:	4.00%		
	Delta:	7^14'52"	Right	
Degree	of Curvature(Arc):	3^00'00"		
	Length:	241.59		
	Tangent:	120.96		
	Chord:	241.43		
	Middle Ordinate:	3.82		
	External:	3.83		
	Tangent Direction:	N 75^47'51" E		
	Radial Direction:	S 14^12'09" E		
	Chord Direction:	N 79^25'17" E		
	Radial Direction:	S 6^57'17" E		
	Tangent Direction:	N 83^02'43" E		
Element:	Linear			
	PT ( )	131+87.26	252386.85	1119139.04
	PC ( )	141+32.74	252501.34	1120077.56
	Tangent Direction:	N 83^02'43" E		
	Tangent Length:	945.48		

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Circular			
	PC ( )	141+32.74	252501.34	1120077.56
	PI ( )	143+29.25	252525.13	1120272.63
	CC ( )		254397.14	1119846.3
	PT ( )	145+24.39	252588.15	1120458.77
	Radius:	1909.86		
	Design Speed(mph):	45		
	Superelevation:	-4.00%		
	Delta:	11^44'59"	Left	
Degree	of Curvature(Arc):	3^00'00"		
	Length:	391.66		
	Tangent:	196.52		
	Chord:	390.97		
	Middle Ordinate:	10.03		
	External:	10.08		
	Tangent Direction:	N 83^02'43" E		
	Radial Direction:	S 6^57'17" E		
	Chord Direction:	N 77^10'13" E		
	Radial Direction:	S 18^42'16" E		
	Tangent Direction:	N 71^17'44" E		
Element:	Linear			
	PT ( )	145+24.39	252588.15	1120458.77
	PC ( )	149+52.33	252725.39	1120864.1
	Tangent Direction:	N 71^17'44" E		
	Tangent Length:	427.94		
Element:	Circular			
	PC ( )	149+52.33	252725.39	1120864.1
	PI ( )	150+02.23	252741.39	1120911.37
	CC ( )		253810.78	1120496.62
	PT ( )	150+52.07	252761.44	1120957.07
	Radius:	1145.92		
	Design Speed(mph):	45		
	Superelevation:	-5.00%		
	Delta:	4^59'14"	Left	
Degree	of Curvature(Arc):	5^00'00"		
	Length:	99.75		
	Tangent:	49.9		
	Chord:	99.71		
	Middle Ordinate:	1.09		
	External:	1.09		
	Tangent Direction:	N 71^17'44" E		
	Radial Direction:	S 18^42'16" E		
	Chord Direction:	N 68^48'07" E		
	Radial Direction:	S 23^41'30" E		
	Tangent Direction:	N 66^18'30" E		
Element:	Linear			
	PT ( )	150+52.07	252761.44	1120957.07
	PC ( )	153+97.70	252900.32	1121273.56
	Tangent Direction:	N 66^18'30" E		
	Tangent Length:	345.62		

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Circular			
	PC ( )	153+97.70	252900.32	1121273.56
	PI ( )	156+43.27	252999	1121498.45
	CC ( )		251850.98	1121734.01
	PT ( )	158+81.53	252996.85	1121744.01
	Radius:	1145.92		
	Design Speed(mph):	45		
	Superelevation:	5.00%		
	Delta:	24^11'31"	Right	
Degree	of Curvature(Arc):	5^00'00"		
	Length:	483.84		
	Tangent:	245.58		
	Chord:	480.25		
	Middle Ordinate:	25.44		
	External:	26.02		
	Tangent Direction:	N 66^18'30" E		
	Radial Direction:	S 23^41'30" E		
	Chord Direction:	N 78^24'15" E		
	Radial Direction:	S 0^30'00" W		
	Tangent Direction:	S 89^30'00" E		
Element:	Linear			
	PT ( )	158+81.53	252996.85	1121744.01
	PC ( )	162+12.69	252993.96	1122075.15
	Tangent Direction:	S 89^30'00" E		
	Tangent Length:	331.15		
Element:	Circular			
	PC ( )	162+12.69	252993.96	1122075.15
	PI ( )	165+16.25	252991.31	1122378.71
	CC ( )		253630.56	1122080.71
	PT ( )	167+79.21	253225.51	1122571.85
	Radius:	636.62		
	Design Speed(mph):	45		
	Superelevation:	-6.00%		
	Delta:	50^59'14"	Left	
Degree	of Curvature(Arc):	9^00'00"		
	Length:	566.52		
	Tangent:	303.56		
	Chord:	548.02		
	Middle Ordinate:	61.99		
	External:	68.67		
	Tangent Direction:	S 89^30'00" E		
	Radial Direction:	S 0^30'00" W		
	Chord Direction:	N 65^00'24" E		
	Radial Direction:	S 50^29'13" E		
	Tangent Direction:	N 39^30'47" E		
Element:	Linear			
	PT ( )	167+79.21	253225.51	1122571.85
	PC ( )	175+61.62	253829.12	1123069.66
	Tangent Direction:	N 39^30'47" E		
	Tangent Length:	782.41		

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Details

Alignment Data
Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	82	3

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Circular			
	PC ( )	175+61.62	253829.12	1123069.66
	PI ( )	177+61.57	253983.38	1123196.88
	CC ( )		254558.21	1122185.61
	PT ( )	179+57.55	254171.62	1123264.34
	Radius:	1145.92		
	Design Speed(mph):	45		
	Superelevation:	-5.00%		
	Delta:	19^47'47"	Left	
Degree	of Curvature(Arc):	5^00'00"		
	Length:	395.93		
	Tangent:	199.96		
	Chord:	393.96		
	Middle Ordinate:	17.06		
	External:	17.32		
	Tangent Direction:	N 39^30'47" E		
	Radial Direction:	S 50^29'13" E		
	Chord Direction:	N 29^36'53" E		
	Radial Direction:	S 70^17'01" E		
	Tangent Direction:	N 19^42'59" E		
Element:	Linear			
	PT ( )	179+57.55	254171.62	1123264.34
	PC ( )	184+03.24	254591.18	1123414.7
	Tangent Direction:	N 19^42'59" E		
	Tangent Length:	445.7		
Element:	Circular			
	PC ( )	184+03.24	254591.18	1123414.7
	PI ( )	184+81.47	254664.83	1123441.1
	CC ( )		254867.32	1122644.18
	PT ( )	185+59.23	254742.14	1123453.06
	Radius:	818.51		
	Design Speed(mph):	45		
	Superelevation:	-6.00%		
	Delta:	10^55'08"	Left	
Degree	of Curvature(Arc):	7^00'00"		
	Length:	155.99		
	Tangent:	78.23		
	Chord:	155.75		
	Middle Ordinate:	3.71		
	External:	3.73		
	Tangent Direction:	N 19^42'59" E		
	Radial Direction:	S 70^17'01" E		
	Chord Direction:	N 14^15'25" E		
	Radial Direction:	S 81^12'09" E		
	Tangent Direction:	N 8^47'51" E		
Element:	Linear			
	PT ( )	185+59.23	254742.14	1123453.06
	PC ( )	192+14.14	255389.34	1123553.23
	Tangent Direction:	N 8^47'51" E		
	Tangent Length:	654.91		

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Circular			
	PC ( )	192+14.14	255389.34	1123553.23
	PI ( )	193+17.99	255491.97	1123569.11
	CC ( )		255214.08	1124685.66
	PT ( )	194+21.27	255590.07	1123603.18
	Radius:	1145.92		
	Design Speed(mph):	45		
	Superelevation:	5.00%		
	Delta:	10^21'24"	Right	
Degree	of Curvature(Arc):	5^00'00"		
	Length:	207.14		
	Tangent:	103.85		
	Chord:	206.85		
	Middle Ordinate:	4.68		
	External:	4.7		
	Tangent Direction:	N 8^47'51" E		
	Radial Direction:	S 81^12'09" E		
	Chord Direction:	N 13^58'33" E		
	Radial Direction:	S 70^50'45" E		
	Tangent Direction:	N 19^09'15" E		
Element:	Linear			
	PT ( )	194+21.27	255590.07	1123603.18
	PC ( )	199+19.52	256060.73	1123766.66
	Tangent Direction:	N 19^09'15" E		
	Tangent Length:	498.24		
Element:	Circular			
	PC ( )	199+19.52	256060.73	1123766.66
	PI ( )	200+02.14	256138.78	1123793.77
	CC ( )		256687.38	1121962.54
	PT ( )	200+84.65	256218.87	1123814.04
	Radius:	1909.86		
	Design Speed(mph):	45		
	Superelevation:	-4.00%		
	Delta:	4^57'14"	Left	
Degree	of Curvature(Arc):	3^00'00"		
	Length:	165.13		
	Tangent:	82.62		
	Chord:	165.08		
	Middle Ordinate:	1.78		
	External:	1.79		
	Tangent Direction:	N 19^09'15" E		
	Radial Direction:	S 70^50'45" E		
	Chord Direction:	N 16^40'38" E		
	Radial Direction:	S 75^47'59" E		
	Tangent Direction:	N 14^12'01" E		
Element:	Linear			
	PT ( )	200+84.65	256218.87	1123814.04
	PC ( )	210+96.26	257199.57	1124062.2
	Tangent Direction:	N 14^12'01" E		
	Tangent Length:	1011.61		

Project Name: 13176 Design
Description:
Horizontal Alignment Name: 13176 Horizontal
Description: Horizontal Alignment
Style: Default

		STATION	NORTHING	EASTING
Element:	Circular			
	PC ( )	210+96.26	257199.57	1124062.2
	PI ( )	212+91.80	257389.13	1124110.17
	CC ( )		257668.08	1122210.7
	PT ( )	214+85.98	257584.48	1124118.73
	Radius:	1909.86		
	Design Speed(mph):	45		
	Superelevation:	-4.00%		
	Delta:	11^41'29"	Left	
Degree	of Curvature(Arc):	3^00'00"		
	Length:	389.72		
	Tangent:	195.54		
	Chord:	389.04		
	Middle Ordinate:	9.93		
	External:	9.98		
	Tangent Direction:	N 14^12'01" E		
	Radial Direction:	S 75^47'59" E		
	Chord Direction:	N 8^21'17" E		
	Radial Direction:	S 87^29'28" E		
	Tangent Direction:	N 2^30'32" E		
Element:	Linear			
	PT ( )	214+85.98	257584.48	1124118.73
	PI ( )	267+36.85	262830.32	1124348.59
	Tangent Direction:	N 2^30'32" E		
	Tangent Length:	5250.88		
Element:	Linear			
	PI ( )	267+36.85	262830.32	1124348.59
	PI ( )	320+13.75	262584.99	1129619.77
	Tangent Direction:	S 87^20'07" E		
	Tangent Length:	5276.89		
Element:	Linear			
	PI ( )	320+13.75	262584.99	1129619.77
	PI ( )	372+95.76	262372.02	1134897.49
	Tangent Direction:	S 87^41'21" E		
	Tangent Length:	5282.01		
Element:	Linear			
	PI ( )	372+95.76	262372.02	1134897.49
	POE ( )	376+00.03	262364.31	1135201.67
	Tangent Direction:	S 88^32'55" E		
	Tangent Length:	304.28		

This document was originally issued and sealed by Gary Brennan Registration Number PE- 4513, on 3/4/2016 and the original document is stored at the Office of Brosz Engineering, Inc Bowman, ND

Details

Alignment Data
Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1a-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**34**	**68**
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2a-48	**48"x24"**	**END ROAD WORK**	**3**	**19**	**57**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME		18	
G20-10-108	108"x48"	CONTRACTOR SIGN		64	
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**1**	**37**	**37**
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		30	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	**30"x24"**	**DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT**	**2**	**15**	**30**
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-1a-18	18"x18"	STOP and SLOW PADDLE Back to Back		5	
R1-2-60	60"x60"	YIELD		29	
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1a-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	**60"x30"**	**STREET CLOSED TO THRU TRAFFIC**	**3**	**31**	**93**
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT.**	**2**	**35**	**70**
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT.		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**3**	**35**	**105**
W20-2-48	**48"x48"**	**DETOUR AHEAD or __ FT**	**2**	**35**	**70**
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.		35	
W20-7a-48	48"x48"	FLAGGING SYMBOL		35	
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	**48"x48"**	**MATERIAL ON ROADWAY**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**600**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**6**
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	**VERTICAL PANELS - BACK TO BACK**	**EACH**	**30**
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-1500	OBLITERATION OF PVMT MK	SF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

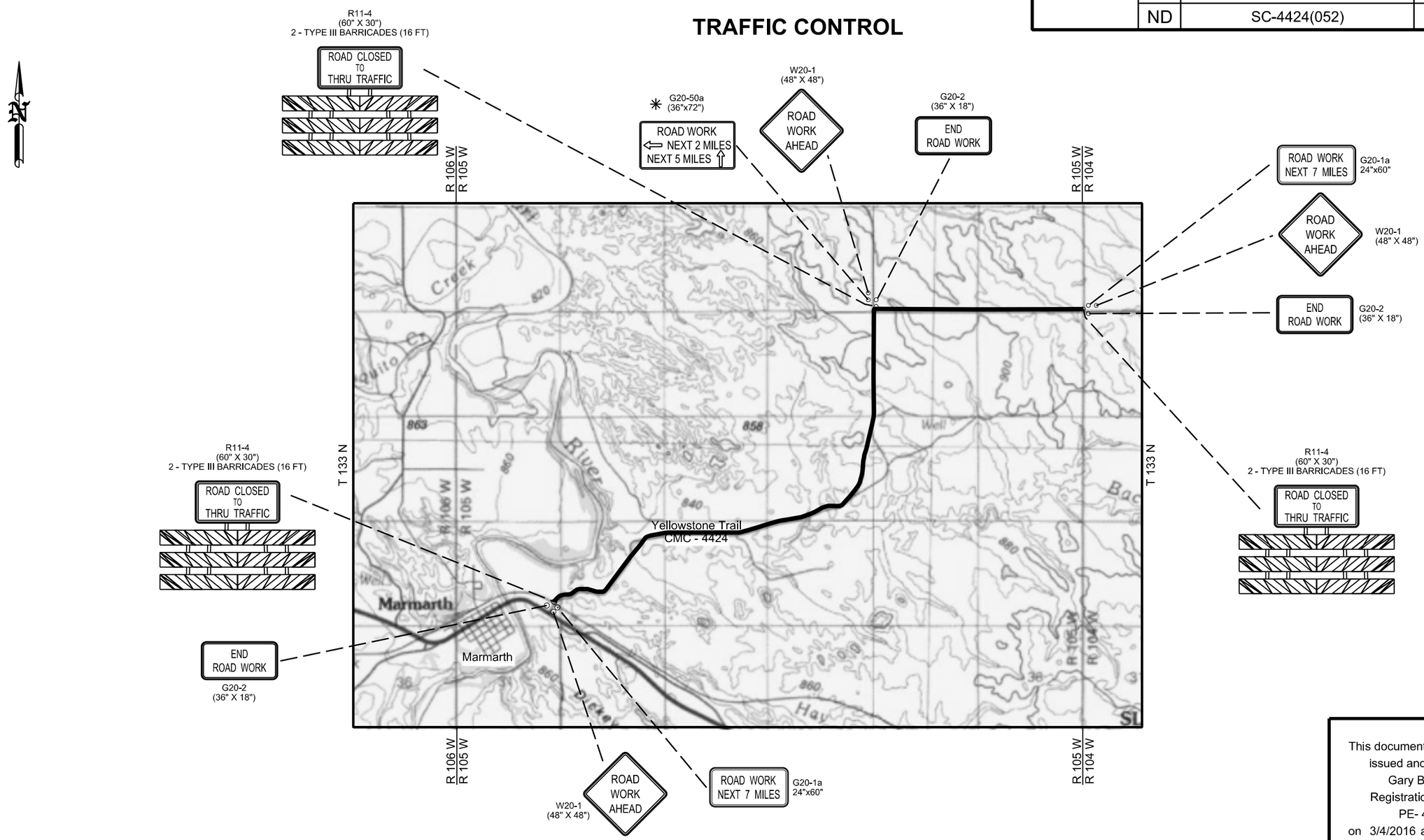
This document was originally issued and sealed by Gary Brennan, Registration Number PE-4513, on 3/21/16 and the original document is stored at the Office of Brosz Engineering, Inc. Bowman, ND.

Traffic Control Devices List

Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	100	2

TRAFFIC CONTROL



✳ NOTE:
Include an arrow cover plate to make arrow point up.

NOTE:
The sign layout as shown is for general informational purposes only. The contractor will be required to conform to MUTCD and the standard drawings when installing the Traffic Control Signing.

Two W8-54-48 (Trucks Entering) & two W21-51-48 (Material on Roadway) signs are required when hauling aggregate surfacing.

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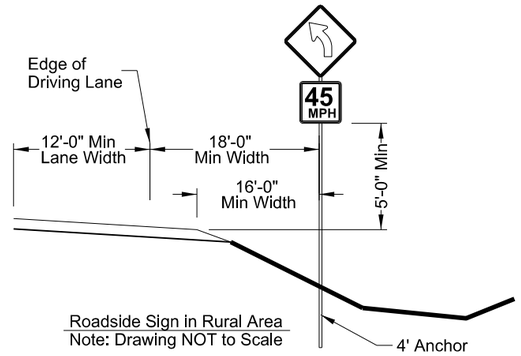
Details

Traffic Control
Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	110	1

Typical Sign Offset Details



Roadside Sign in Rural Area
Note: Drawing NOT to Scale

Note:
Offset is a minimum of 16' measured from the edge of the shoulder, or 18 feet measured from the edge of the traveled way to the sign post.

TABLE OF RESET AND NEW SIGNS

Location	Offset		Direction Sign Faces	Size (In)	Sign No.	Assembly No.	Message	Action Description	Install Sign Panel Area (SF)	Anchor Length (Ft)	Post 1 Length (Ft)	Post 2 Length (Ft)	Post 3 Length (Ft)	Post 4 Length (Ft)	Sleeve 1 Length	Sleeve 2 Length	Sleeve 3 Lenth	Sleeve 4 Length	Sleeve Size	Post Size	Anchor Size	NOTES
1+00	30'	RT	South	36x36	W10-1	63	RR Crossing Advance	Replace	7.1	4	14.5									2.5 x 2.5 10 ga	3 x 3 7 ga	
1+61	30'	RT	South	24x30	R2-1	9	Speed Limit 35 MPH	Replace	5.0	4	14.8									2.25 x 2.25 12 ga	2.5 x 2.5 12 ga	
4+00	30'	RT	South	30x30	W1-5L	19	Winding Road - Left	Replace	6.3	4	13.3									2.5 x 2.5 12 ga	3 x 3 7 ga	
5+00	30'	LT	North	36x36	W10-1	63	RR Crossing Advance	Replace	7.1	4	12.6									2.5 x 2.5 10 ga	3 x 3 7 ga	
52+06	9'	RT	South	24x30	R12-1	9	Weight Limit 10 Tons	Remove														Weight limit for bridge
56+06	365'	LT	North	24x30	R12-1	9	Weight Limit 10 Tons	Remove														Weight limit for bridge
72+00	30'	LT	East	27x22	NFL-L	NA	Leaving National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
72+00	30'	RT	West	27x22	NFL-E	NA	Entering National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
74+00	30'	RT	West	144x54	SN 1	NA	Entering Wheeled Motorized Restricted Area	Replace	54.0	4	13.4	13.5	13.6	13.7	4.4	4.5	4.6	4.7	2.19 x 2.19 10 ga	2.5 x 2.5 10 ga	3 x 3 7 ga	
126+33	30'	LT	East	27x22	NFL-E	NA	Entering National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
126+33	30'	RT	West	27x22	NFL-L	NA	Leaving National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
168+41	30'	LT	Northeast	27x22	NFL-L	NA	Leaving National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
168+41	30'	RT	Southwest	27x22	NFL-E	NA	Entering National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
209+00	30'	RT	South	27x22	NFL-L	NA	Leaving National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
214+57	30'	LT	North	27x22	NFL-E	NA	Entering National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
219+91	30'	LT	North	30x30	W1-5L	19	Winding Road - Left	Replace	6.3	4	13.3									2.5 x 2.5 12 ga	3 x 3 7 ga	
219+91	30'	LT	North				Slow, Watch for Livestock	Remove														
258+97	30'	RT	South	30x30 18x18	W1-1R W13-1	53	Right Turn w/ 20 MPH Advisory Speed Plaque	Replace	8.5	4	14.4				4.3				2 x 2 12 ga	2.25 x 2.25 12 ga	3 x 3 7 ga	
267+37	30'	LT	East	48x24	W1-7	34	Large Arrow (Two Direction)	Replace	8.0	4	11.8									2.5 x 2.5 10 ga	3 x 3 7 ga	
267+37	36'	LT	North	36x36	R1-2	4	Yield	Replace	3.9	4	14.5									2.5 x 2.5 12 ga	3 x 3 7 ga	Behind Double Arrow Sign - Faces north - Move North
267+76	30'	LT	South	30x30 18x18	W1-5L W13-1	53	Winding Road - Left 35 MPH Advisory Speed Plaque	Replace	8.5	4	18.6				6.4				2.19 x 2.19 10 ga	2.5 x 2.5 10 ga	3 x 3 7 ga	Move 400' south of nearest curve to the north (3,970' North of T Intersection)
269+00	30'	RT	West	27x22	NFL-E	NA	Entering National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
269+00	30'	LT	East	27x22	NFL-L	NA	Leaving National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
273+00	30'	LT	East	96x36	SN 2	NA	Left Arrow Marmarth 6 Indian Creek Right Arrow	Replace	24.0	4	12.3	12.4			4.4	4.5			2.25 x 2.25 12 ga	2.5 x 2.5 12 ga	3 x 3 7 ga	
276+21	30'	LT	East	30x30	W2-4	19	T - Intersection	Replace	6.3	4	13.3									2.5 x 2.5 12 ga	3 x 3 7 ga	
320+14	30'	LT	East	27x22	NFL-E	NA	Entering National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
320+14	30'	RT	West	27x22	NFL-L	NA	Leaving National Grasslands	Install	4.1	4	10.8									2 x 2 12 ga	2.25 x 2.25 12 ga	
							Project TOTALS		**194.2**	**112**	**349.6**				**37.8**							
										499.4												

Location	Offset		Direction Sign Faces	Size (In)	Sign No.	Assembly No.	Message	Action Description	Install Sign Panel Area (SF)	Post Length (Ft)	Post Size	NOTES
155+71	75'	LT	South		NA	NA	P.L.O.T.S. sign	Reset		7.0	1.12 lb/ft	U-Channel Post
167+12	75'	LT	East		NA	NA	P.L.O.T.S. sign	Reset		7.0	1.12 lb/ft	U-Channel Post
227+68	75'	RT	West		NA	NA	P.L.O.T.S. sign	Reset		7.0	1.12 lb/ft	U-Channel Post
227+68	75'	RT	North		NA	NA	P.L.O.T.S. sign	Reset		7.0	1.12 lb/ft	U-Channel Post
320+27	75'	LT	West		NA	NA	P.L.O.T.S. sign	Reset		7.0	1.12 lb/ft	U-Channel Post
369+73	75'	LT	South		NA	NA	P.L.O.T.S. sign	Reset		7.0	1.12 lb/ft	U-Channel Post
							Project TOTALS	**6**	**0.0**	**42.0**		

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Details

Typical Sign Detail
Slope County, North Dakota

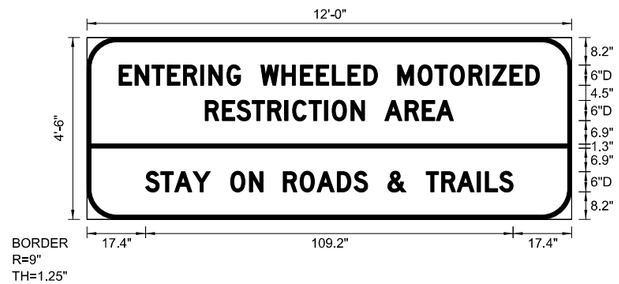
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	110	2

SIGN NUMBER	SN 1
WIDTH x HEIGHT	12'-0" x 4'-6"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	9"
MOUNTING	Ground
BACKGROUND	**TYPE:** IV Reflective
	COLOR: Brown / Brown
LEGEND/BORDER	**TYPE:** IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
74+00 RT

AREA: 54.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Recreation.ssi

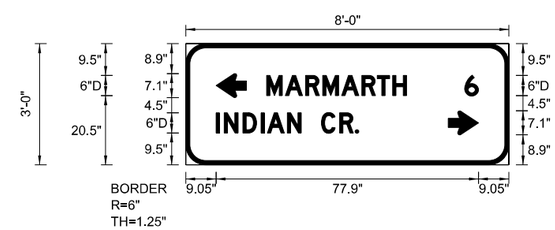
LETTER POSITION (X)																																			LENGTH	SIZE	SERIES
E	N	T	E	R	I	N	G		W	H	E	E	L	E	D		M	O	T	O	R	I	Z	E	D										124.9	6	D 2000
9.6	14.3	19.3	23.9	28.7	33.8	36.2	41.6	45.6	51.6	57.9	63.4	68.1	72.9	77.5	82.2	86.3	92.3	98.3	103.4	107.9	113.4	118.5	120.5	125.6	130.4												
R	E	S	T	R	I	C	T	I	O	N		A	R	E	A																				73.8	6	D 2000
35.1	40.2	44.5	49.1	53.7	58.8	61.1	65.9	70.6	72.8	78.4	82.5	88.5	94.5	99.6	103.8																						
S	T	A	Y		O	N		R	O	A	D	S		&		T	R	A	I	L	S														109.2	6	D 2000
17.4	22	26	31.5	36.7	42.7	48.2	52.3	58.3	63.3	68.3	74.3	79.3	83.4	89.4	94.7	100.7	105.4	109.9	115.9	118.3	122.5																

SIGN NUMBER	SN 2
WIDTH x HEIGHT	8'-0" x 3'-0"
BORDER WIDTH	1.25" (inset 0")
CORNER RADIUS	6"
MOUNTING	Ground
BACKGROUND	**TYPE:** IV Reflective
	COLOR: Green
LEGEND/BORDER	**TYPE:** IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ARDD	9	20	7.1	9	180
ARDD	78	8.9	7.1	9	0

STATION(S):
273+00 LT

AREA: 24.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Destination.ssi

LETTER POSITION (X)																																			LENGTH	SIZE	SERIES
M	A	R	M	A	R	T	H																												41.5	6	D 2000
24	29.6	35.6	40.7	46.3	52.3	56.9	61.5																														
6																																			4.1	6	D 2000
82.9																																					
I	N	D	I	A	N		C	R	.																										42.4	6	D 2000
9	11.4	17	22.4	24.2	30.2	34.3	40.3	45.7	50.3																												

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Details

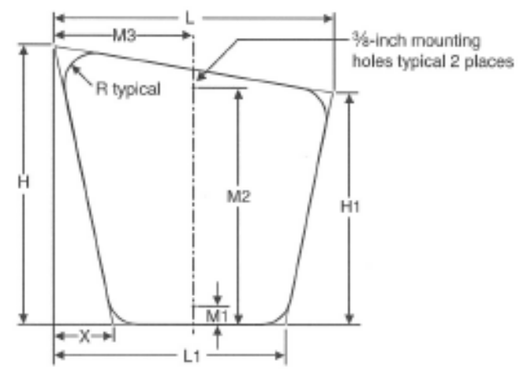
Special Sign Detail
Slope County, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	110	3

Note:
Replace the word "Forest" with "Grass" and replace the word "LAND" with "lands"

The background shall be Type IV Reflective and Brown while the legend shall be Type IV Reflective and White.

Blank Standard for Nation Forest Land (NFL)



Dimensions (Inches)

Sign Number	L	H	X	L1	H1	M1	M2	M3	R
NFL-2	27	27	5 3/4	22 1/4	22 1/4	1 3/4	2 3/4	13 1/2	3

Note:
All mounting holes are 3/8-inch diameter.

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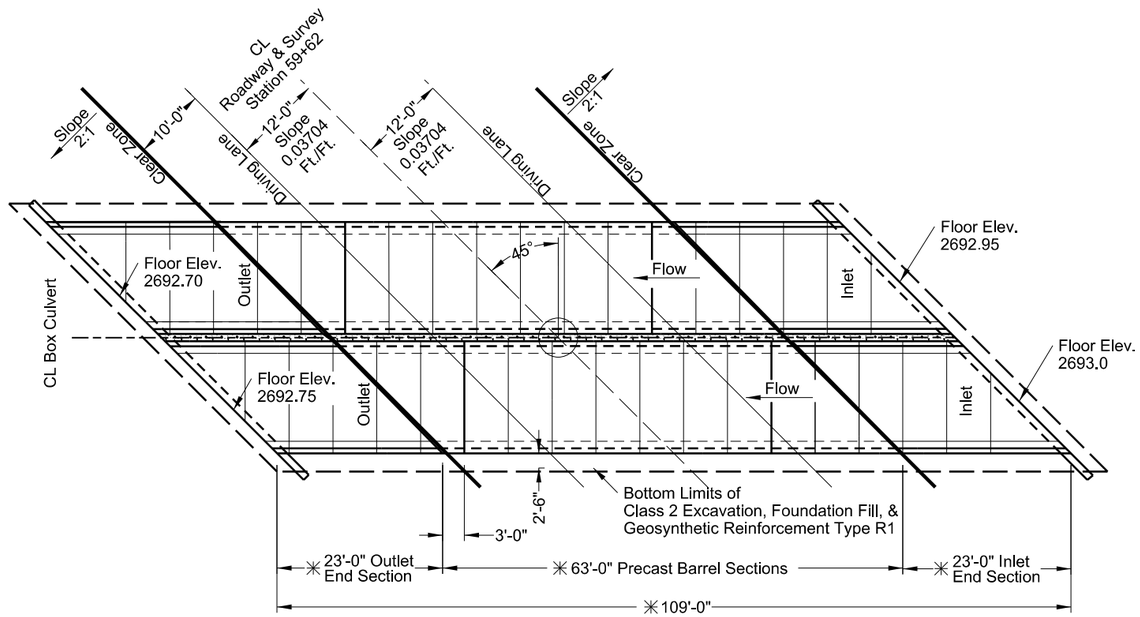
Details

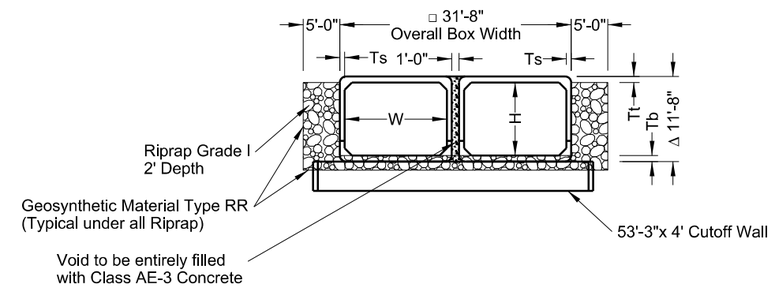
Special Sign Detail
Slope County, North Dakota

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SC-4424(052)	170	1

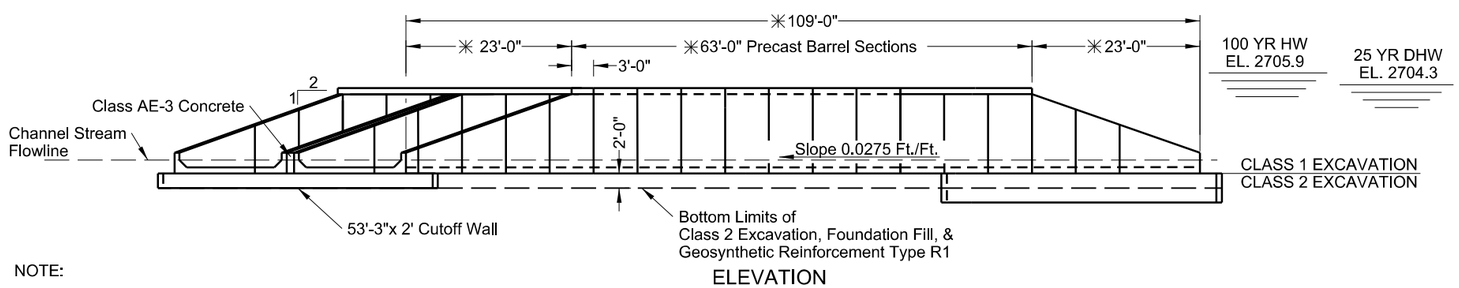
Scale 1" = 20.00



PLAN



END VIEW
SHOWING FINISHED SECTION



ELEVATION

DRAINAGE HYDRAULIC DATA

Station 59+62	V10 = 4.5 FPS
Drainage Area = 33.34 Sq. Mi.	V25 = 7.7 FPS
Slope = 29.0 Ft./Mile	Q100 = 2,897 CFS
Q2 = 248 CFS	VMax = 10.1 FPS
Q10 = 1,109 CFS	25 Yr. DHW Elev. = 2704.3
Q25 = 1,755 CFS	100 Yr. High Water Elev. = 2705.9

✳Dimensions may vary with installation and/or fabrication.

NOTE:

Void between Precast RCBCs to be entirely filled with Class AE-3 Concrete.

The RCB Culvert shall be set 1' below the existing flowline to allow for safe fish passage during times of low flow in the channel and to provide for wetland delineation.

Box Cross Section is cut along the centerline of the Box Culvert.

☆For payment, quantities are based on plan shown dimensions and will not be measured unless the Engineer orders a change. Foundation Fill contains 25% adjustment to account for shrinkage.

ESTIMATED QUANTITIES

	Class 1 Excavation	L SUM	1
	Class 2 Excavation	CY	310
	Foundation Preparation - Site 1	L SUM	1
☆	Foundation Fill	CY	388
	14' x 10' Precast RCB Culvert	LF	126
	14' x 10' Precast RCB End Section	EA	4
	Class AE-3 Concrete	CY	40
	Geosynthetic Material Type RR	SY	300
	Geosynthetic Material Type R1	SY	466
	Riprap Grade I	CY	127

LEGEND

W = Width of Opening =14'-0"
H = Height of Opening =10'-0"
Tt = Thickness of Top Slab =10"
Tb = Thickness of Bottom Slab =10"
Ts = Thickness of Side Wall =8"

Δ Based on dimensions shown
□ Based on 8" outside walls, and 8" middle wall

FOR INFORMATIONAL PURPOSES ONLY		
Class 1 Excavation	CY	2,572
Channel Cleanout	CY	305

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HL-93 DESIGN LOADING

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

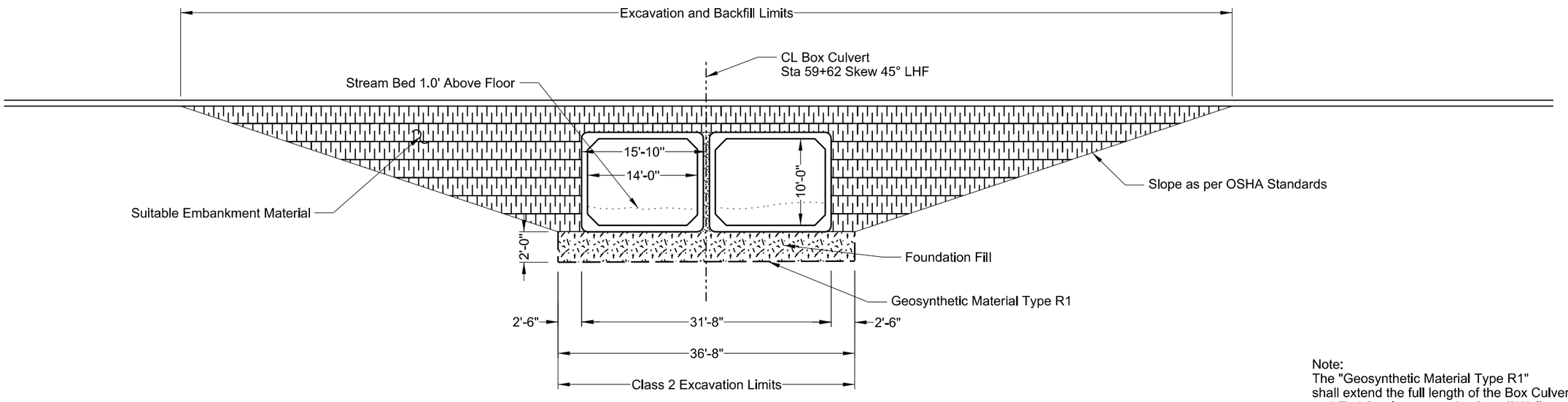
PRECAST REINFORCED CONCRETE DOUBLE BOX CULVERT LAYOUT

CLEAR SPAN 2 x 14' CLEAR HEIGHT 10'
MAXIMUM FILL 3'

PROJECT: SC-4424(052)
STATION: 59+62 - CL SKEW 45° LHF
SLOPE COUNTY

03/04/16 — DATE
Gary Brennan — BRIDGE ENGINEER

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SC-4424(052)	170	2



BOX CULVERT EXCAVATION AND BACKFILL

Note:
The "Geosynthetic Material Type R1" shall extend the full length of the Box Culvert and End Sections up to the Cuttoff Wall.

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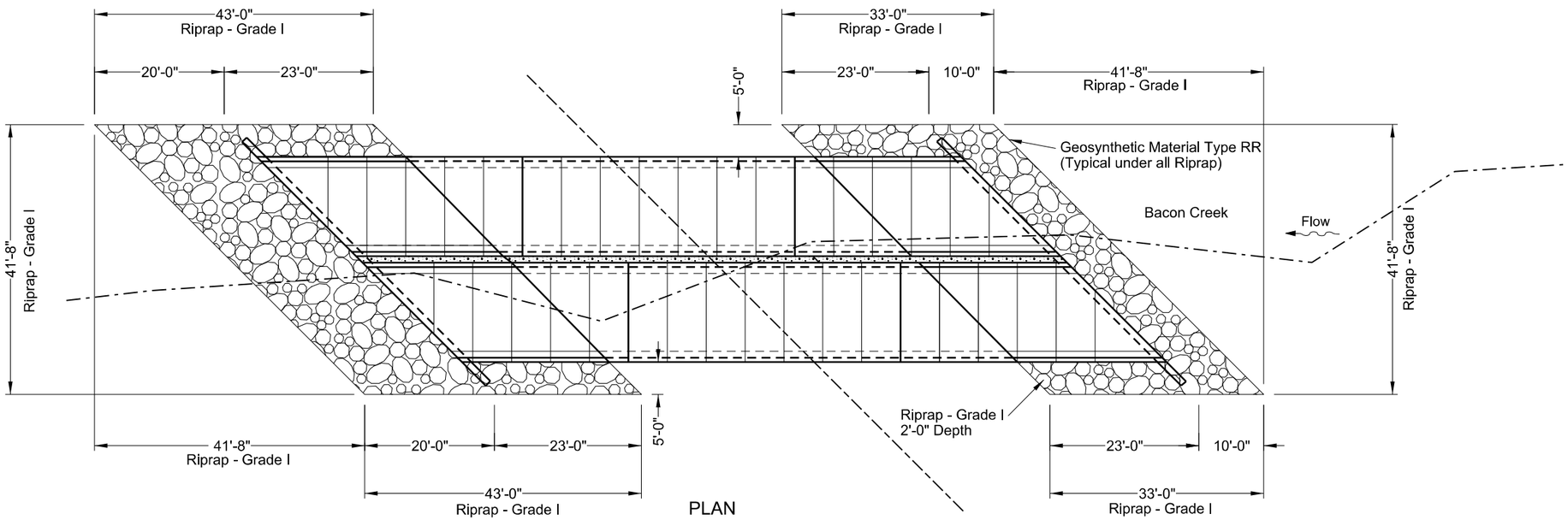
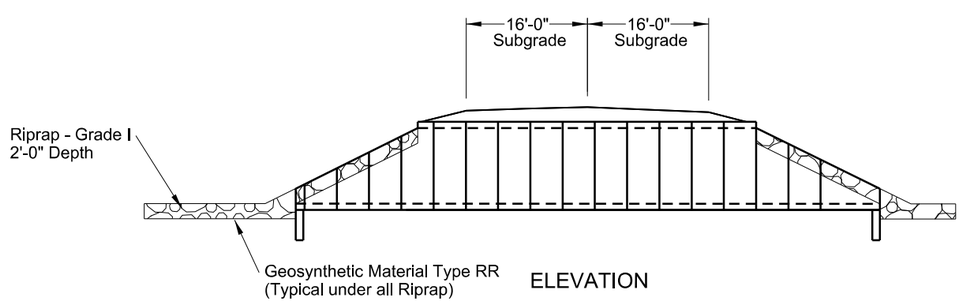
BACON CREEK

EXCAVATION AND BACKFILL DETAILS

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SC-4424(052)	170	3



PLAN



ELEVATION

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BACON CREEK

RIPRAP DETAILS

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SC-4424(052)	170	4

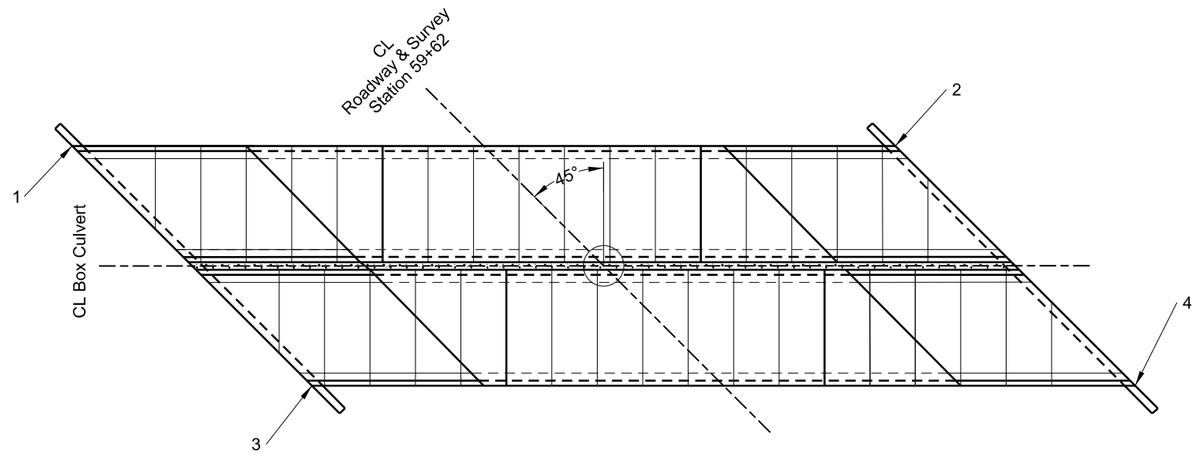

TABLE OF WORKING POINTS

1	Sta. 60+22.82 - 38.43' Lt
2	Sta. 59+45.96 - 38.43' Rt
3	Sta. 59+78.02 - 38.42' Lt
4	Sta. 59+01.18 - 38.43' Rt

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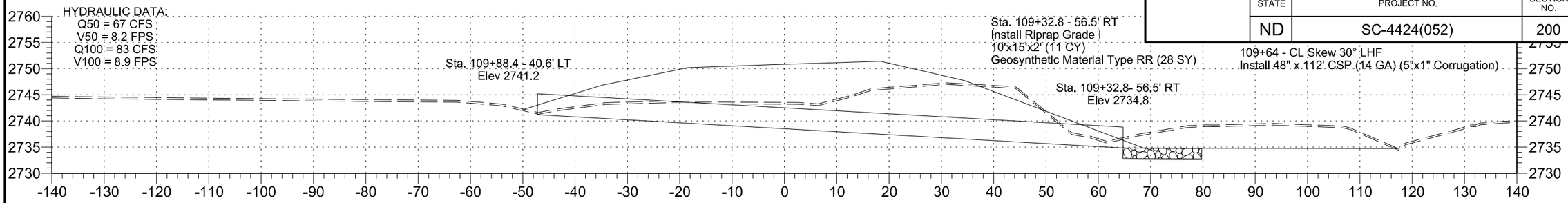
BACON CREEK

BOX CULVERT STAKING DETAIL

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	200	1



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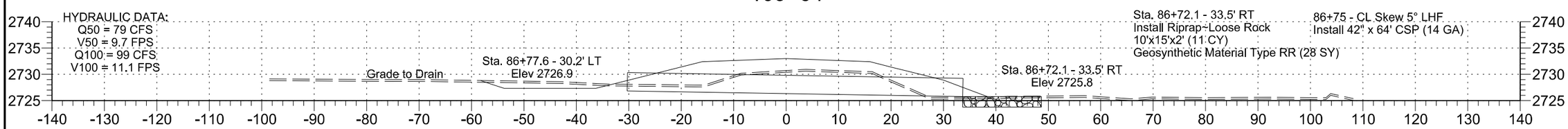

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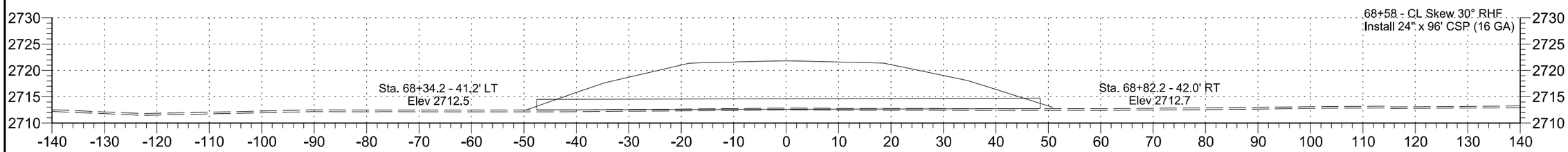

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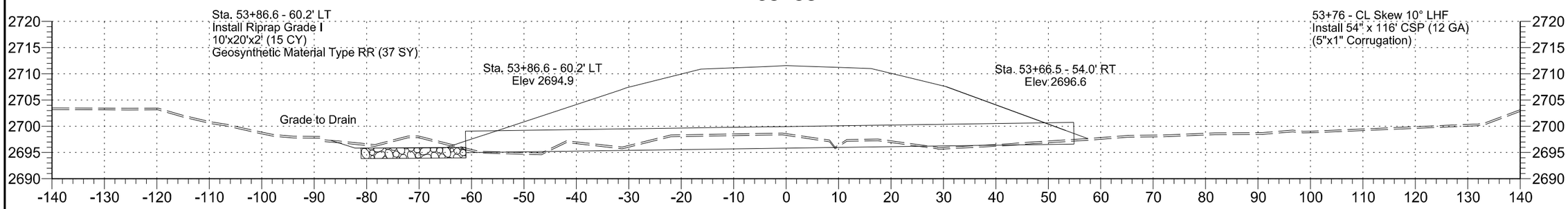

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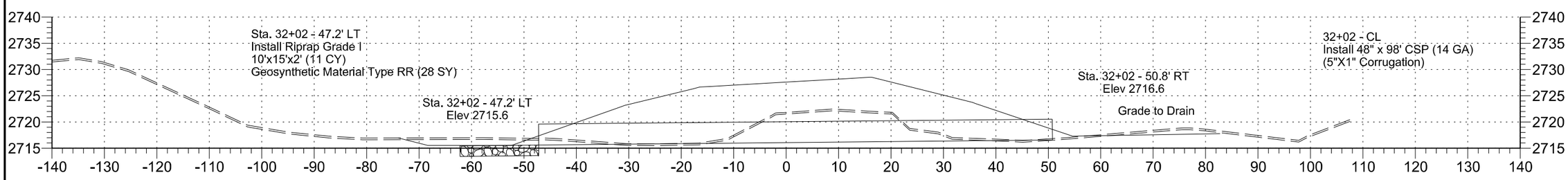

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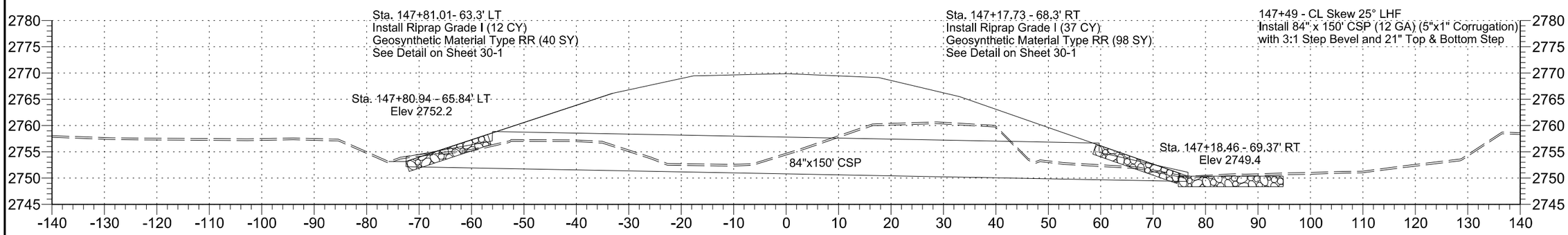
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	200	2



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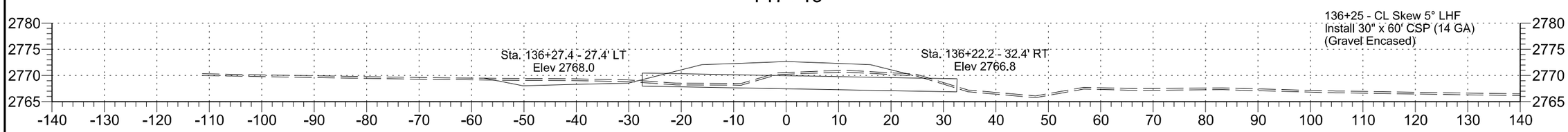

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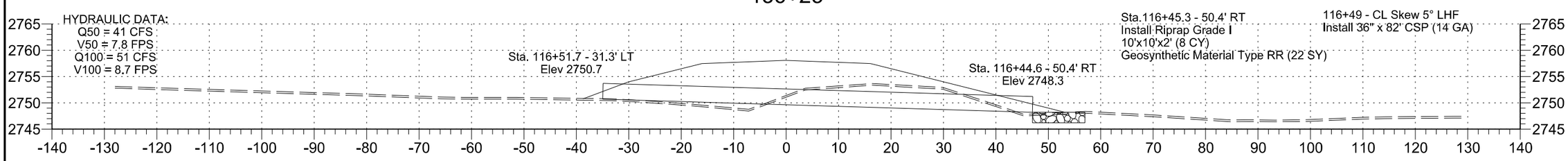

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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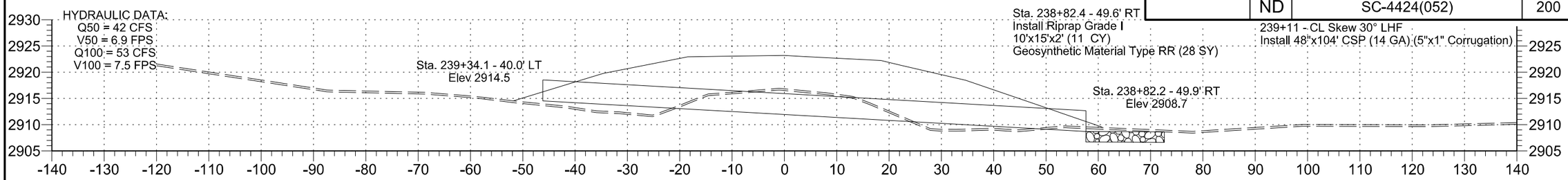

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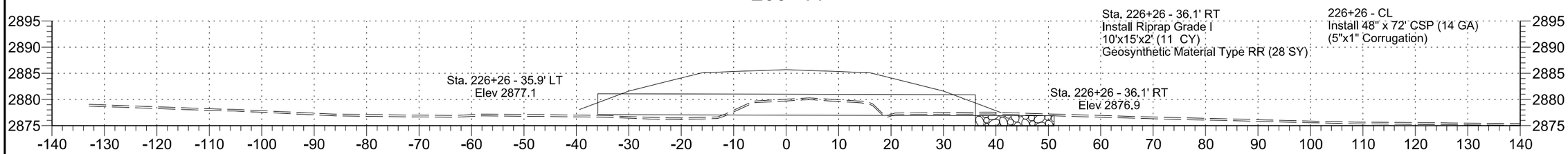

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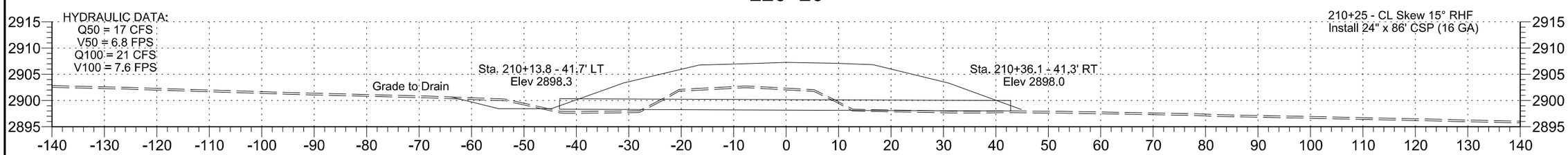

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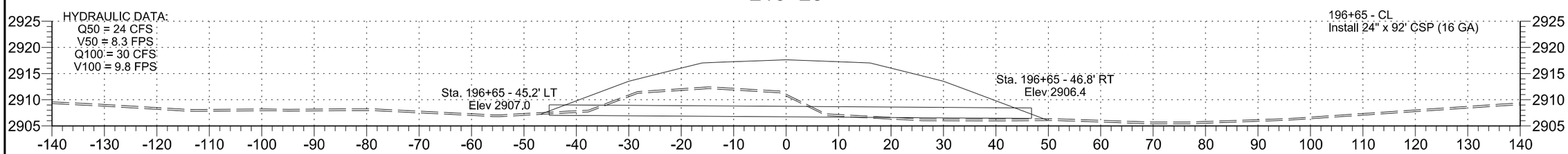

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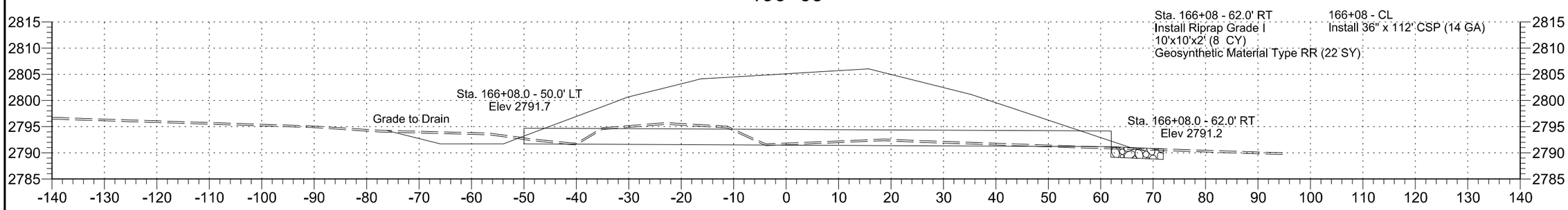

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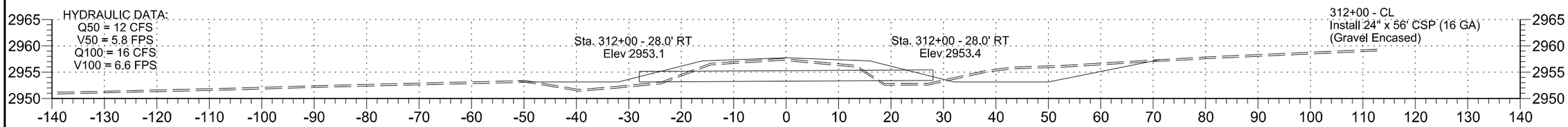
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	200	4



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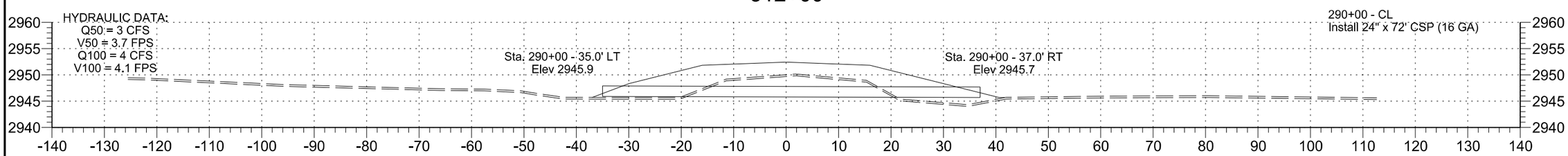

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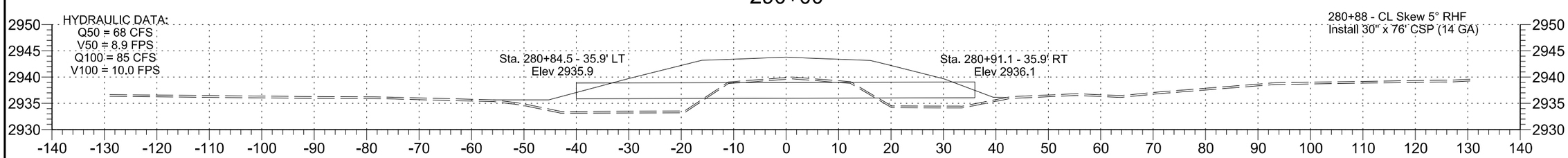

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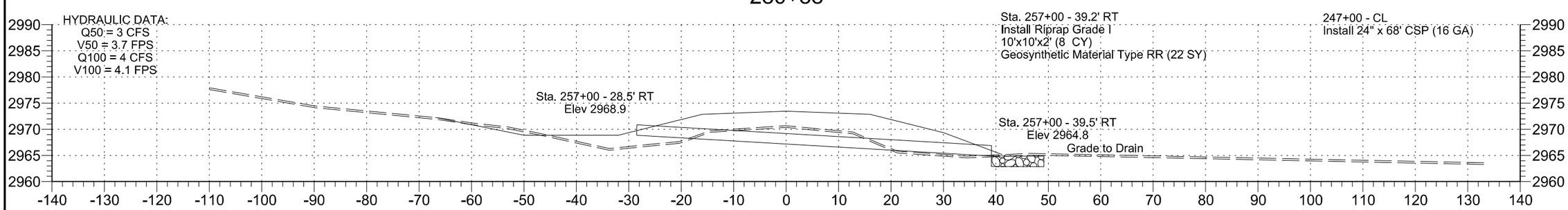

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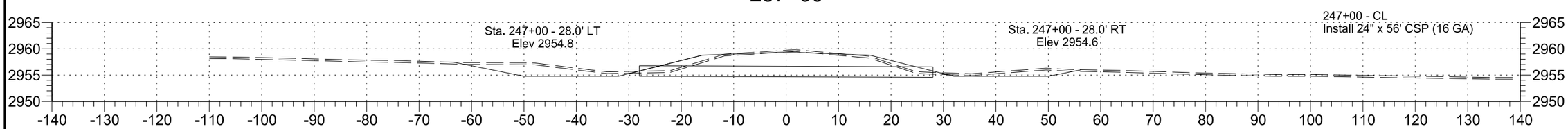

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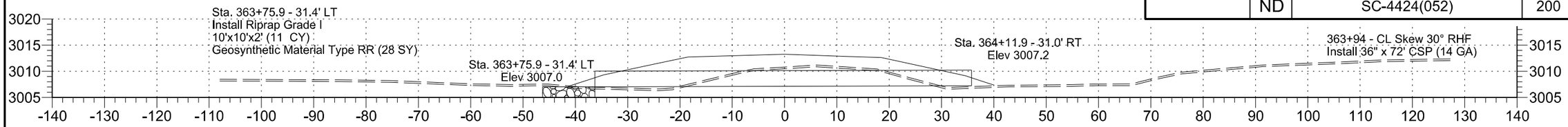
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-4424(052)	200	5



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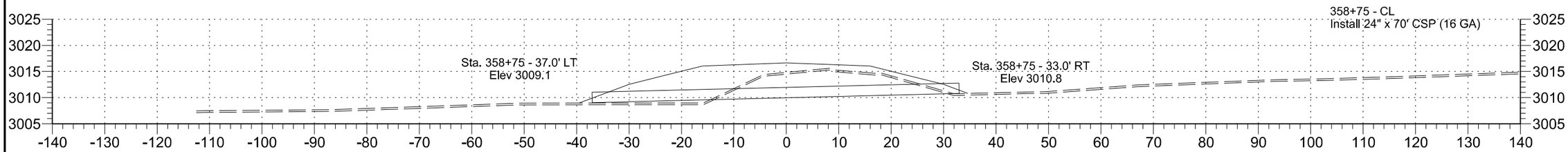

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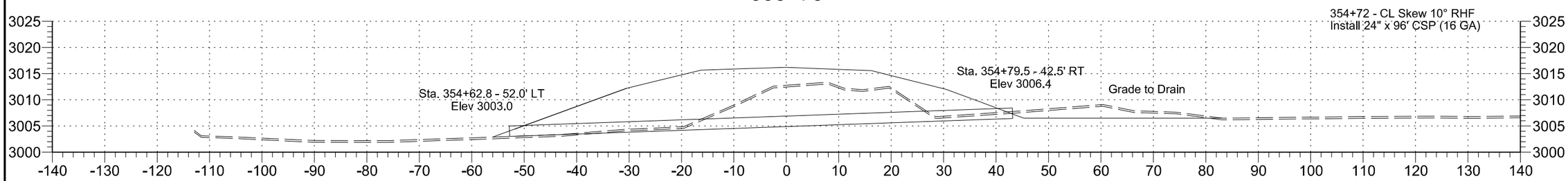

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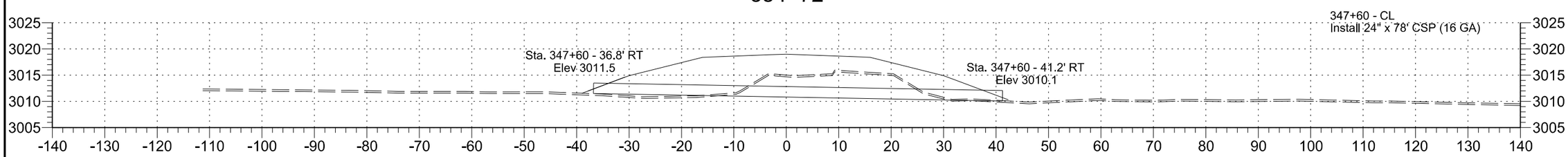

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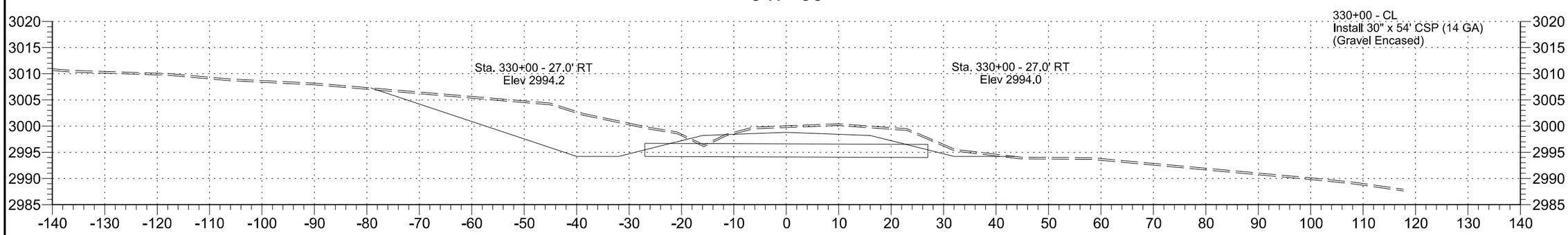
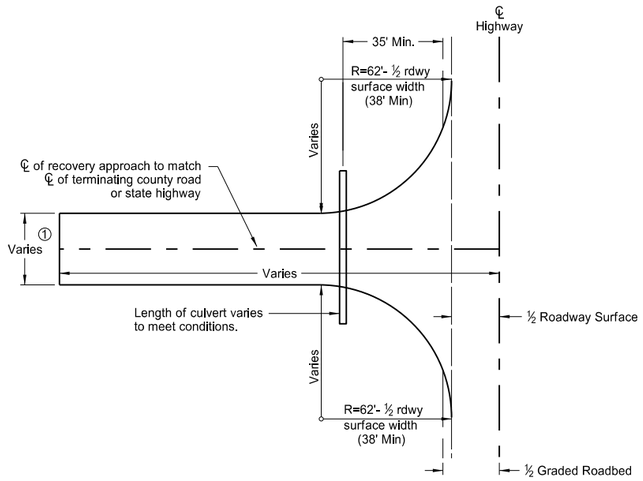


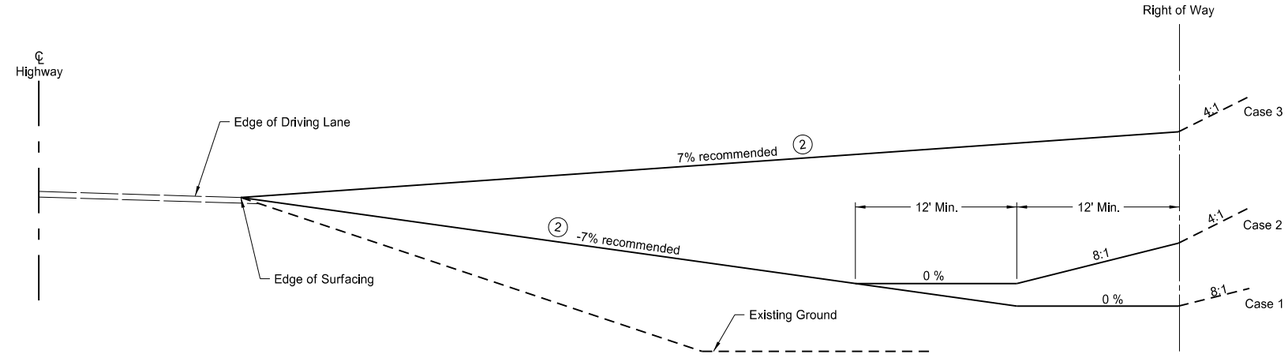
330+00

RECOVERY APPROACHES AT T-INTERSECTIONS

D-203-7



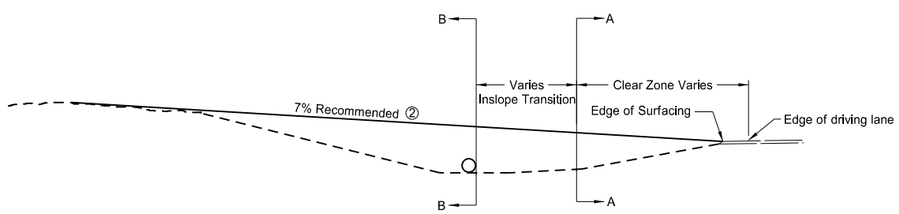
PLAN VIEW RECOVERY APPROACH



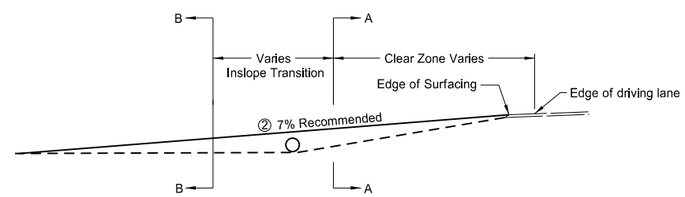
Case 1: Ties into existing back slope and within existing right of way. Existing Back Slope is 8:1 or flatter.

Case 2: Ties into existing back slope and within existing right of way. Existing Back Slope is 4:1 or flatter.

Case 3: Ties into existing back slope and within existing right of way. Existing Back Slope is 4:1 or flatter.



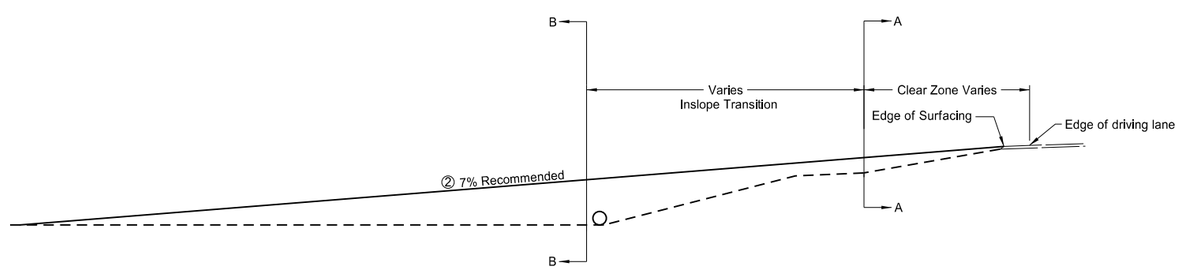
RECOVERY APPROACH GRADE ON CUT SECTION



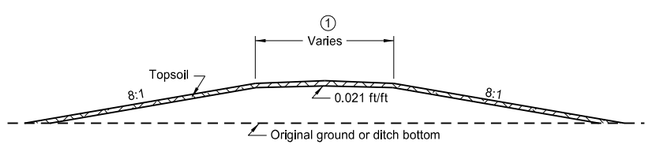
RECOVERY APPROACH GRADE ON FILL SECTON

FOOT NOTES

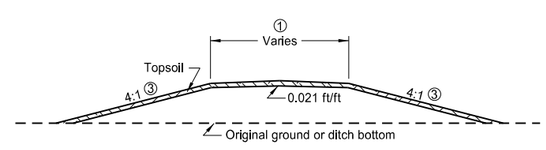
1. width of recovery approach to match width of terminating county road or state highway
2. 10% Max
3. 3:1 Slope - 20' to 30' fill
   2:1 Slope on fills over 30'



RECOVERY APPROACH GRADE ON DEEP FILL SECTON



SECTION A-A



SECTION B-B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE

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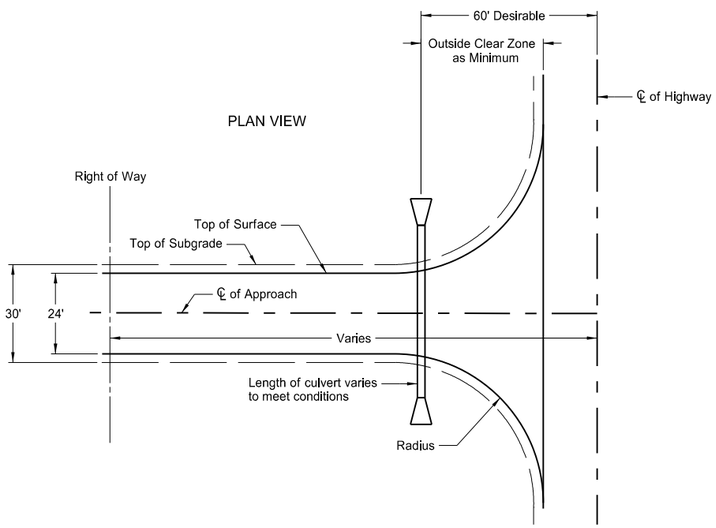
STANDARD RURAL APPROACHES

D-203-8

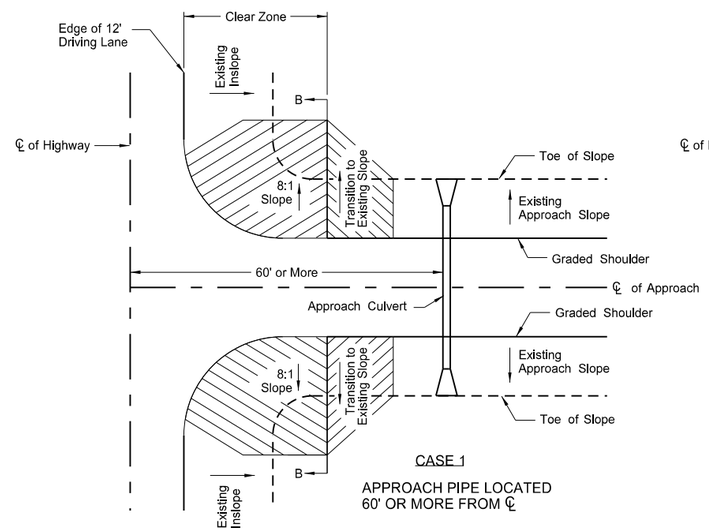
NOTES:

1. Max breakover between approach storage platform and highway shall not exceed 5%.
2. The approach slope shall be measured outside the area of mainline inslope influence.

PLAN VIEW

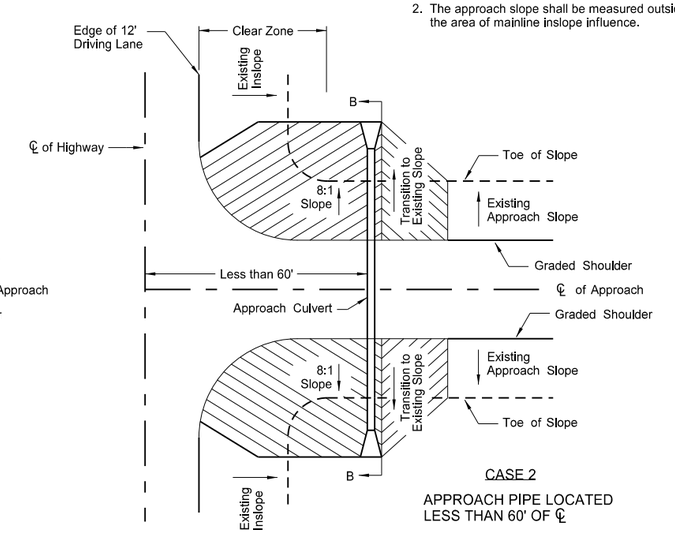


APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED 60' OR MORE FROM ℄

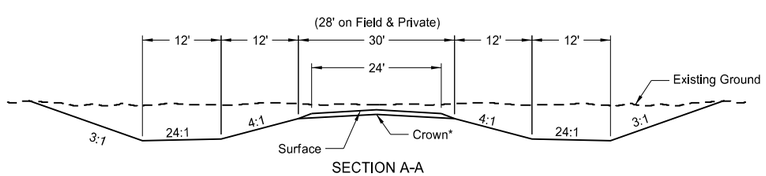


CASE 2

APPROACH PIPE LOCATED LESS THAN 60' OF ℄

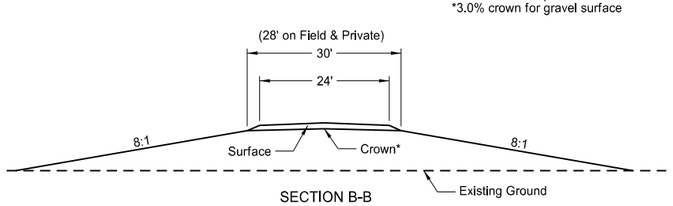
CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=24 ft	R=30 ft	R=40 ft
Maximum Grade	10%	7%	7%
Storage Platform	20 ft	24 ft	30 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)

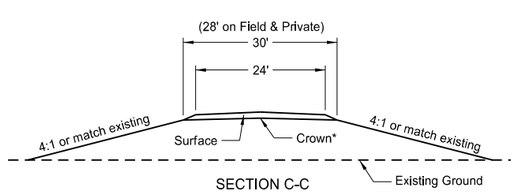


SECTION A-A

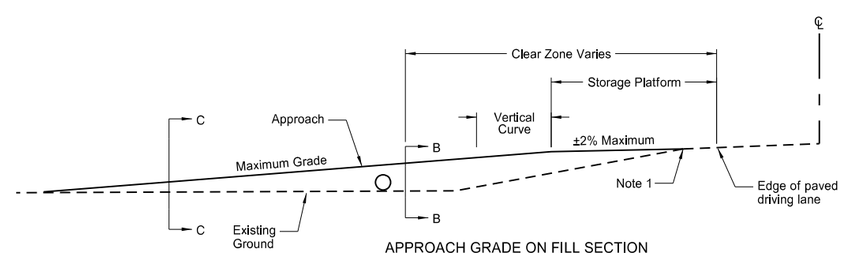
*2.1% crown for paved surface
*3.0% crown for gravel surface



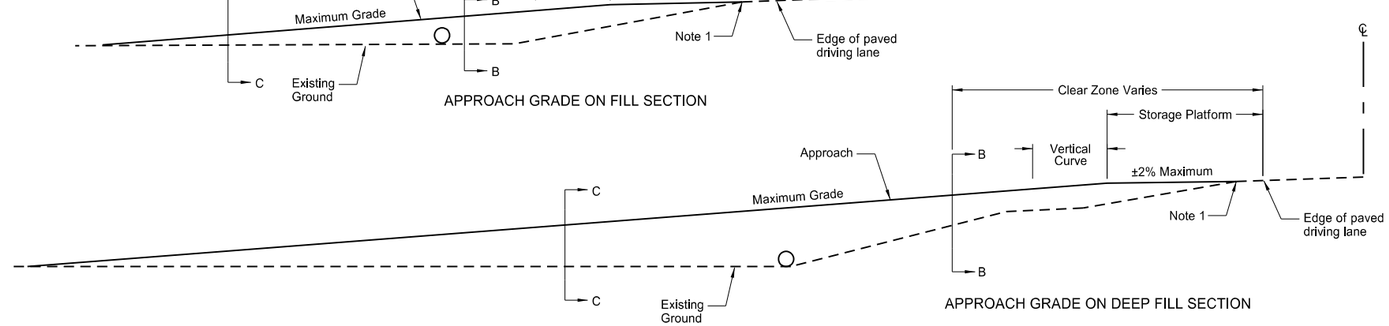
SECTION B-B



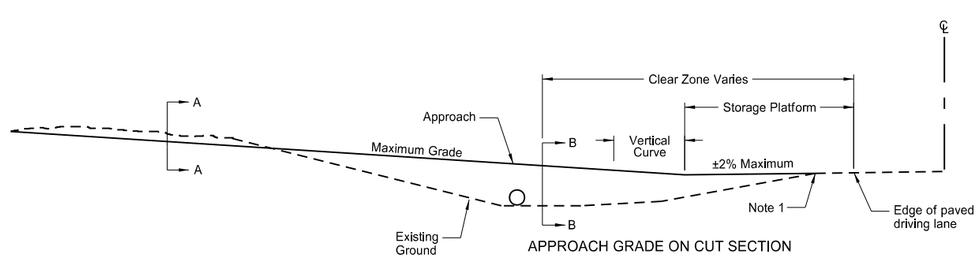
SECTION C-C



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION



APPROACH GRADE ON CUT SECTION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE

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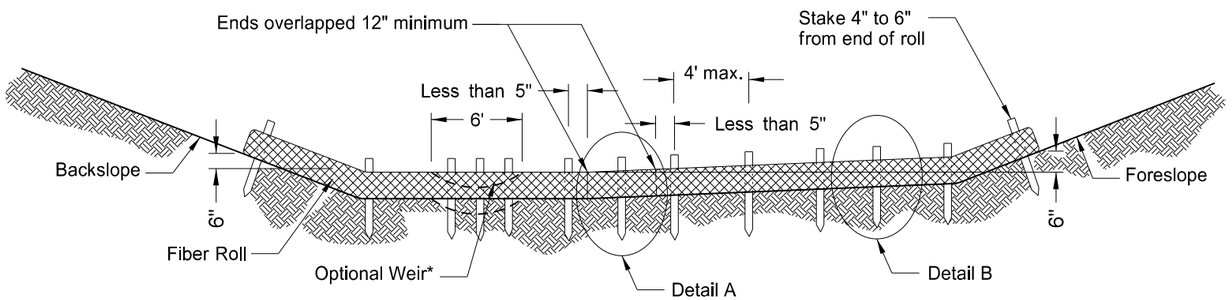
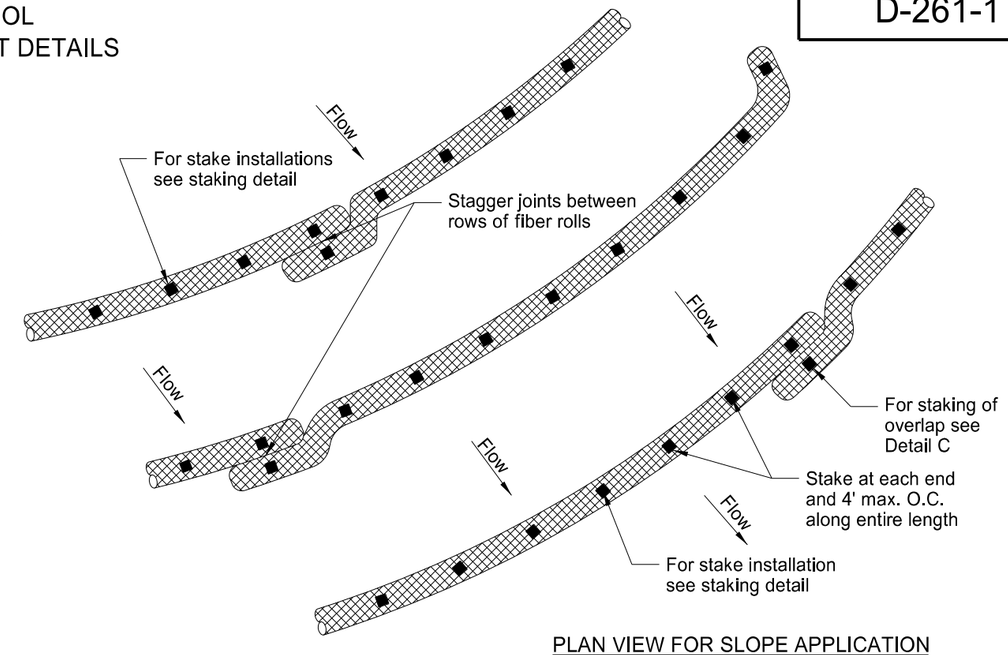
D-261-1

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

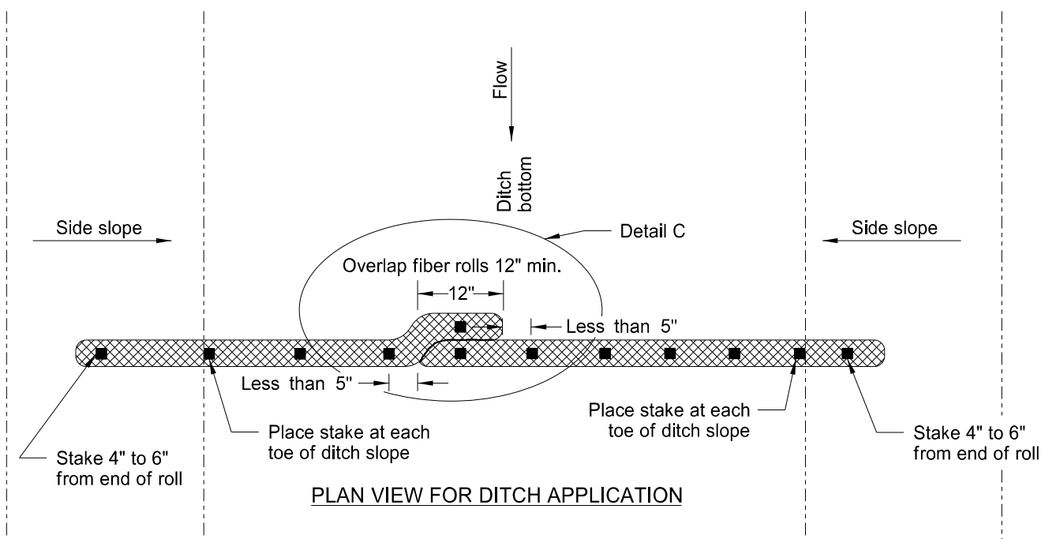


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

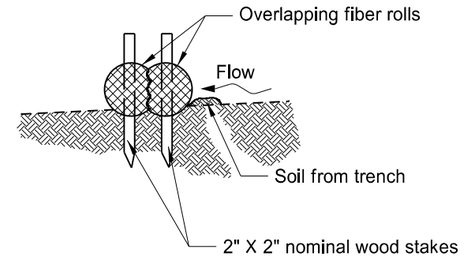
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



PLAN VIEW FOR SLOPE APPLICATION

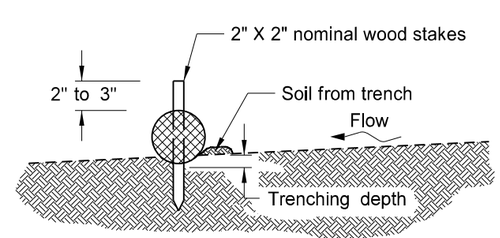


PLAN VIEW FOR DITCH APPLICATION



Detail A

Fiber Roll Overlapping Staking Detail



Detail B

Fiber Roll Staking Detail

FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NOTE: Runoff must not be allowed to run under or around roll.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

11-18-10

REVISIONS

DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.

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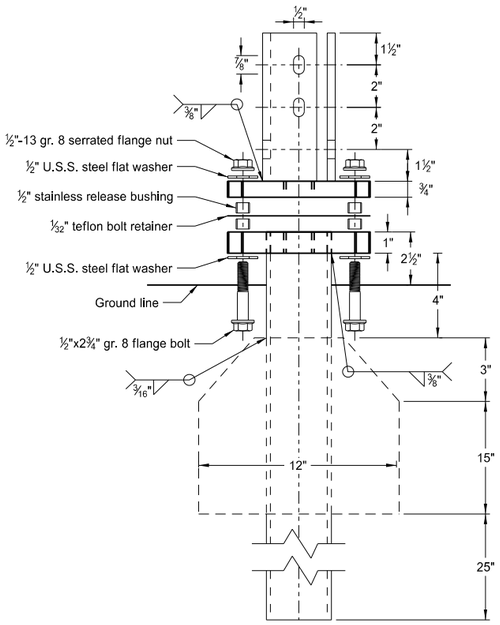
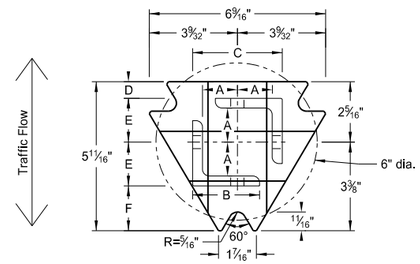
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

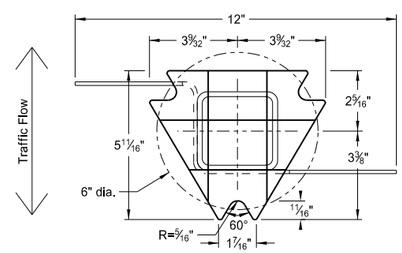
Perforated Tube



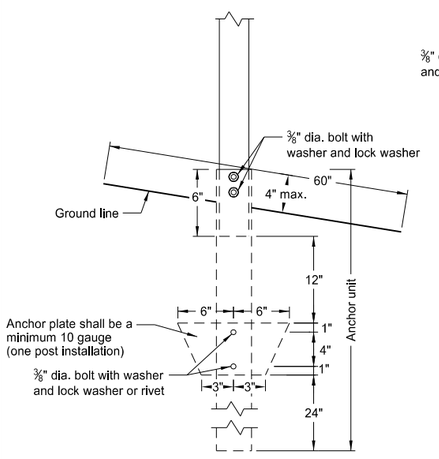
Multi-Directional
Slip Base Assembly



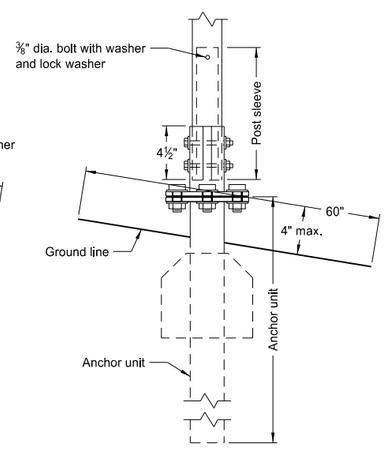
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



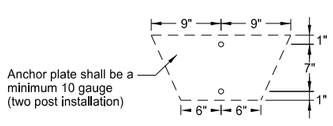
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

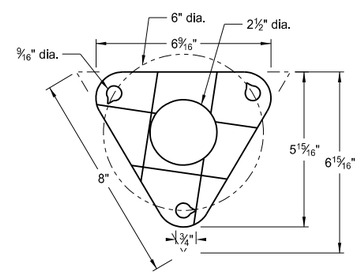


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





Bolt Retainer for Base Connection
Bolt Retainer- 1/32" Reprocessed Teflon

Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

Telescoping Perforated Tube

Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2 3/16	10	Yes	

(A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.

(B) The 2 3/16"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

Properties of Telescoping Perforated Tube

Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.^{4}	Cross Sec. Area in.^{2}	Section Modulus in.^{3}
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

Top Post Receiver Data Table

Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1⅞"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
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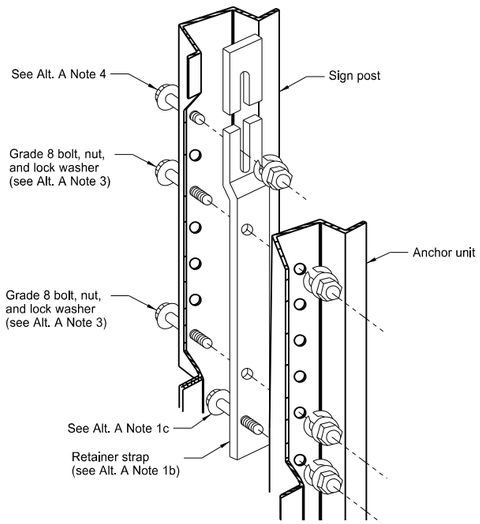
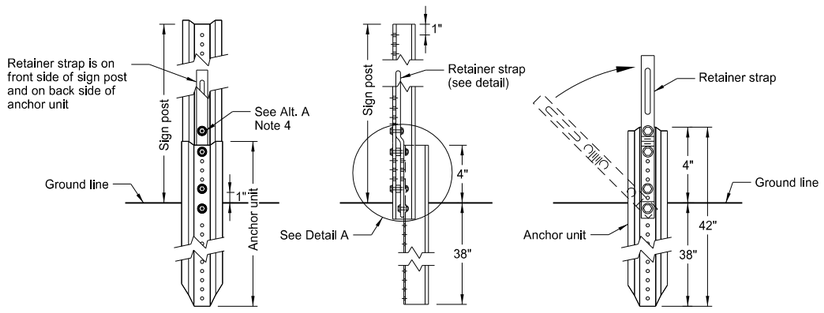
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



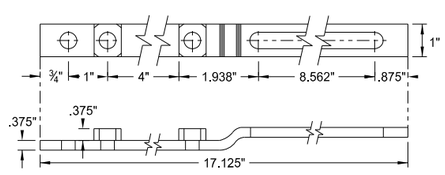
Detail A



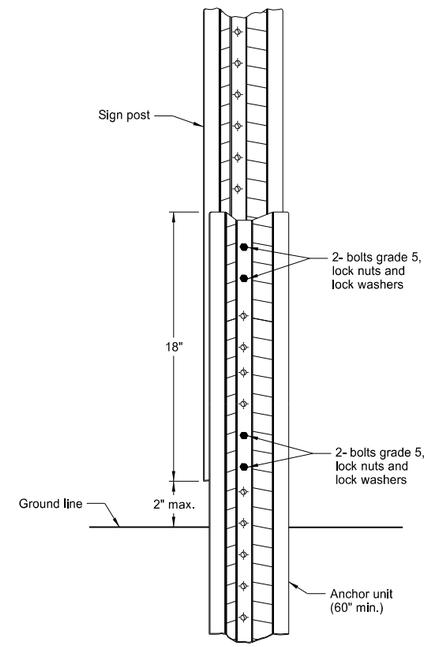
Front View | Side View | Back View

Breakaway U-Channel Detail
Alternate A

A maximum of 2 posts shall be installed within 7'.

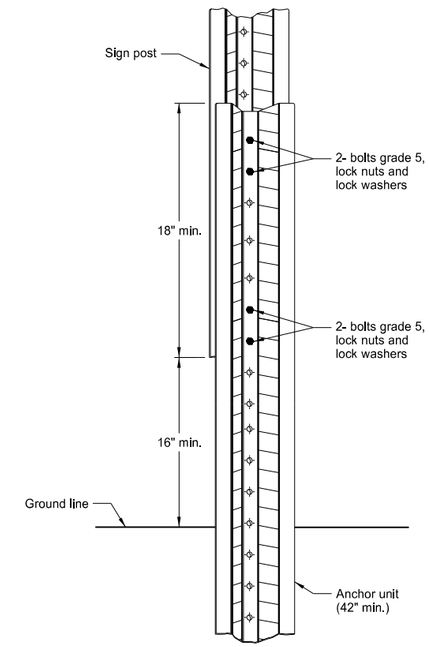


Retainer Strap Detail



Breakaway U-Channel Splice Detail
Alternate B
(2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.



Breakaway U-Channel Splice Detail
Alternate C
(2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

1. a) Drive anchor unit to within 12" of ground level.
   b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.
   c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
   d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.
   b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
   b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. The base post, strap and sign post shall be properly nested. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

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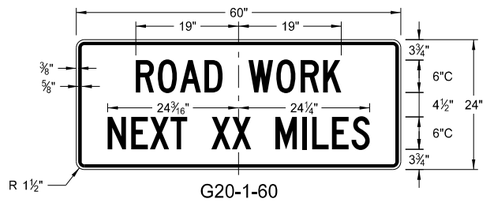
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



G20-1-60
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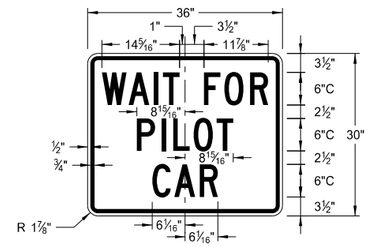
Background: orange



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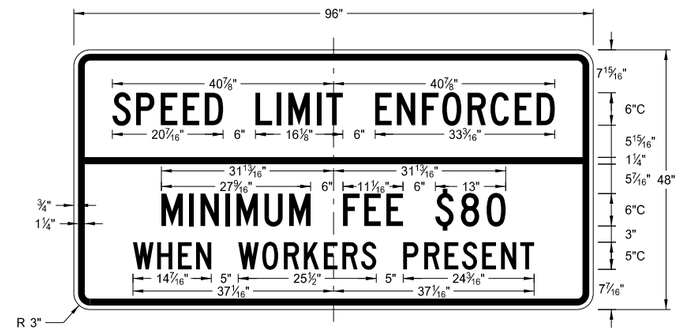

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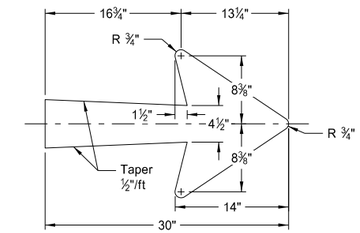
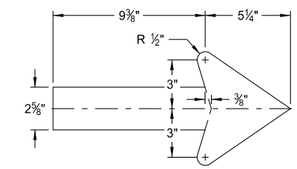
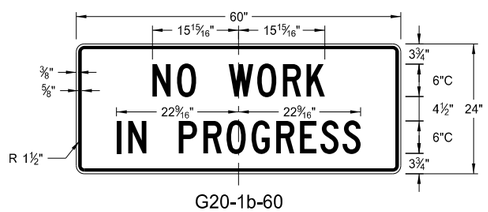


E5-1-48



G20-50a-72
G20-52a-72



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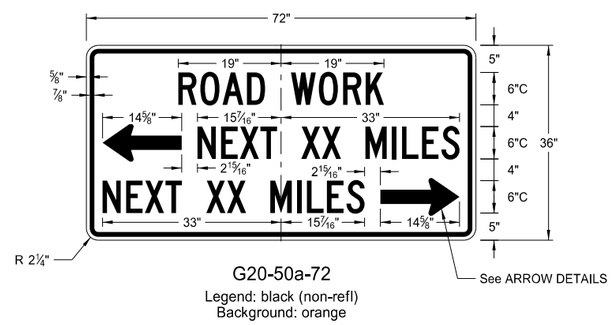

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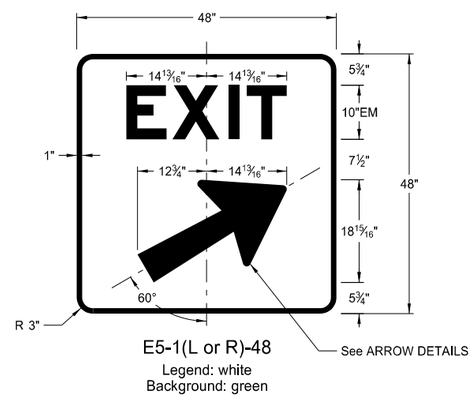

E5-1(L or R)-48
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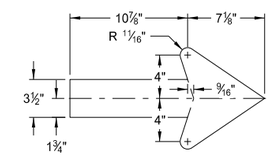
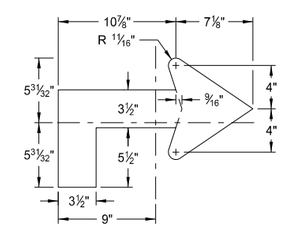
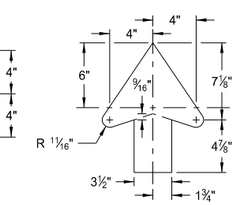


M4-9(L or R)-30
Right or Left

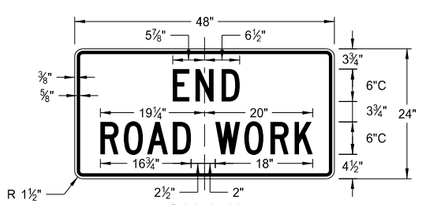


M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS



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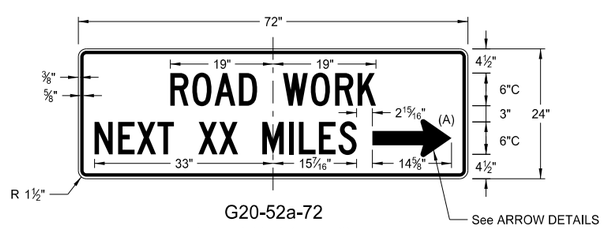

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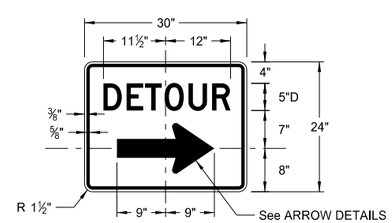

M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

NOTES:

(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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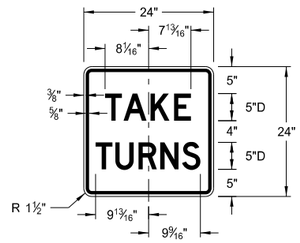
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



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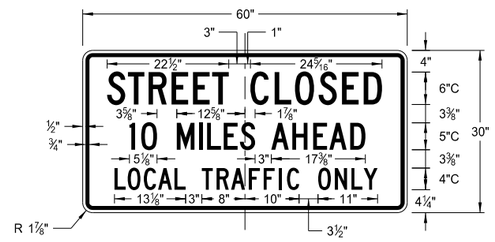

R11-3c-60
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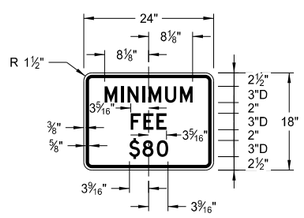

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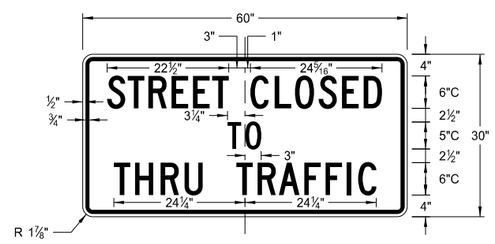

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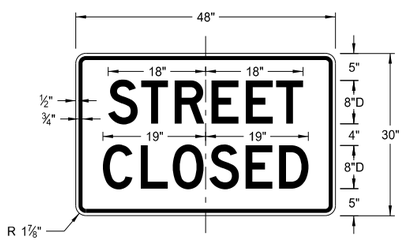

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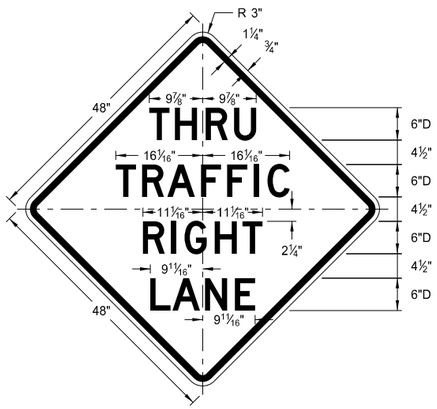
D-704-11

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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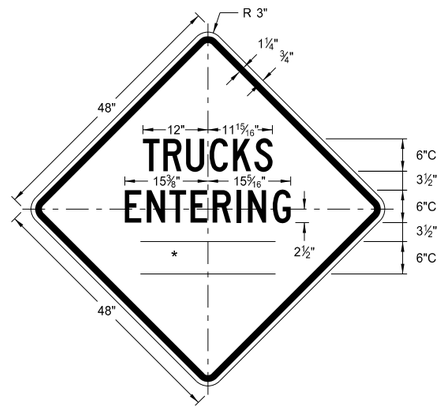

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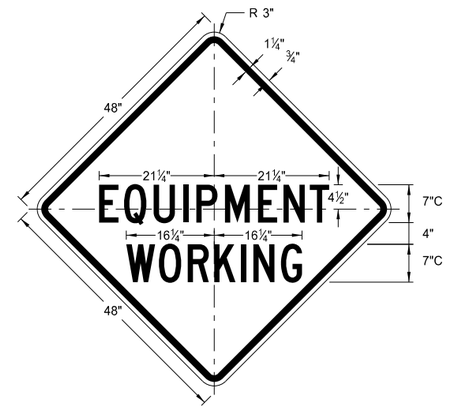

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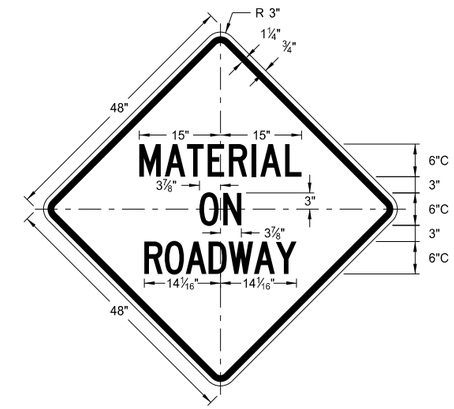
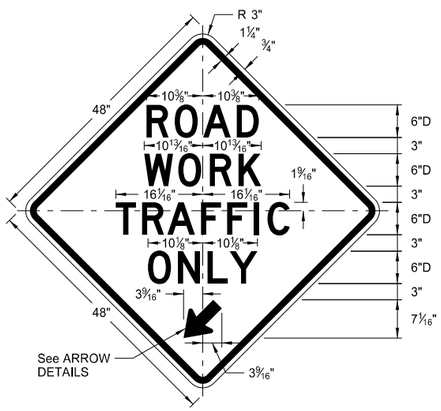


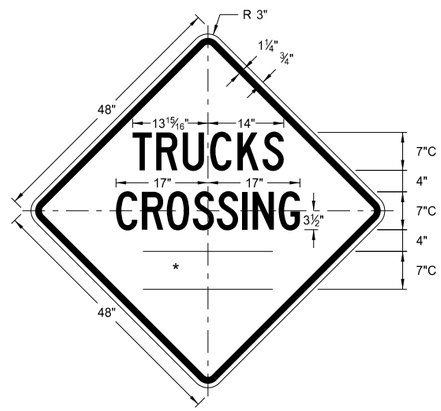
W21-51-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



W5-9-48
Legend: black (non-refl)
Background: orange



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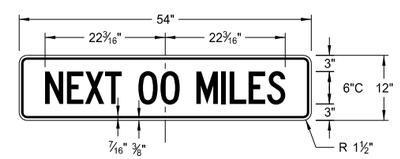

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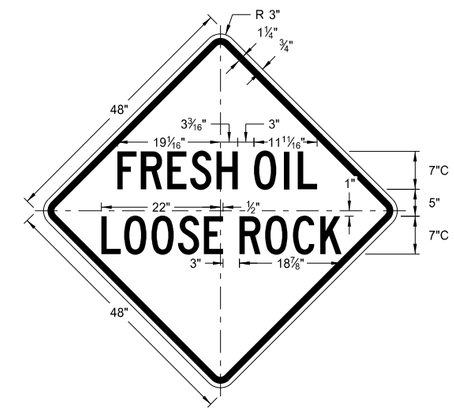

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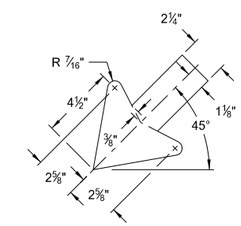
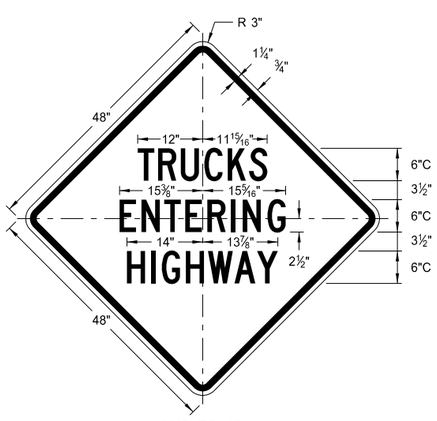
Background: orange



W5-9-48

ARROW DETAILS



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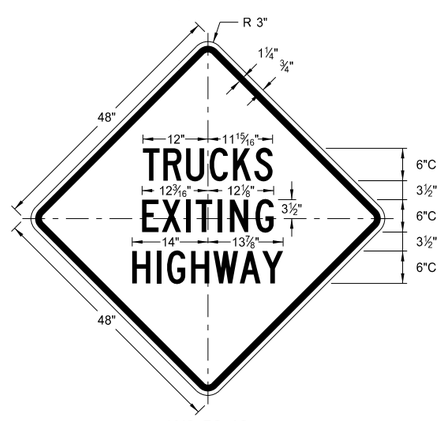

W8-56-48
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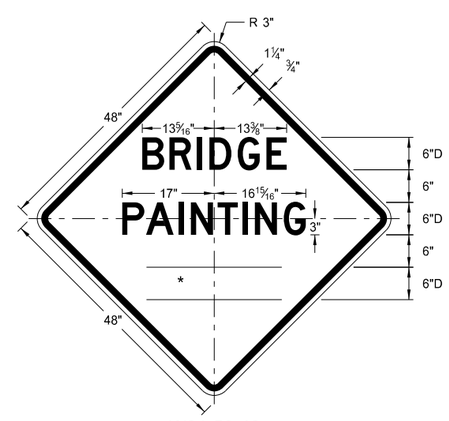
Background: orange



W21-50-48
Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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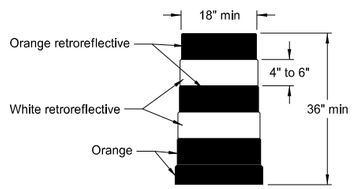
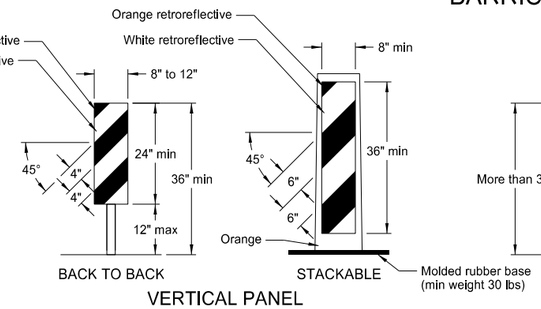
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



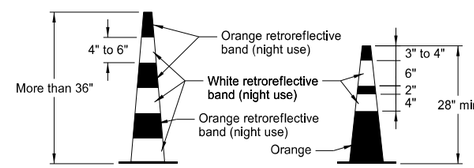
DELINEATOR DRUM

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.



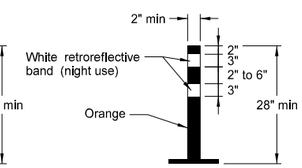
VERTICAL PANEL

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, a stripe width of 6 inches shall be used.



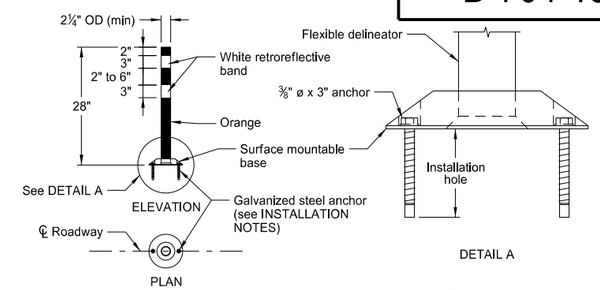
TRAFFIC CONE

Retroreflectorization of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized space between the orange and white stripes shall not exceed 3" wide.



TUBULAR MARKER

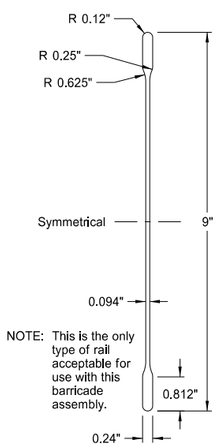
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

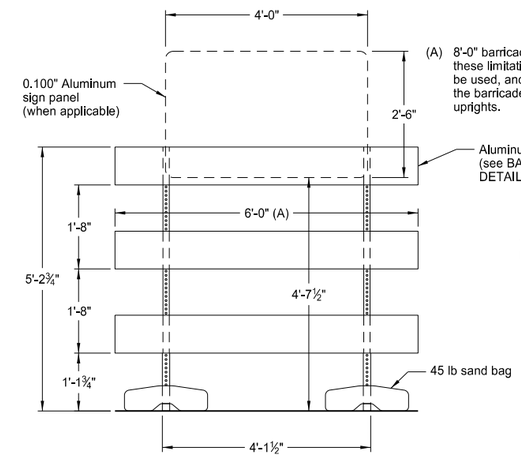
INSTALLATION NOTES:

1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.



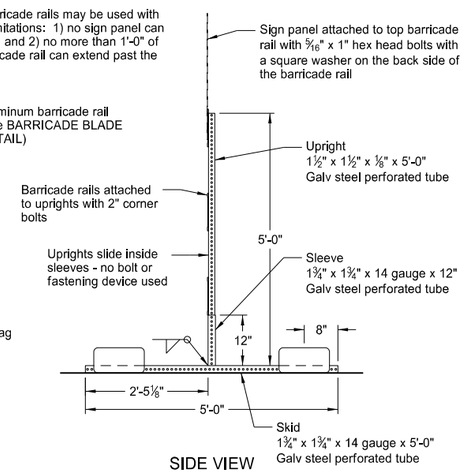
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



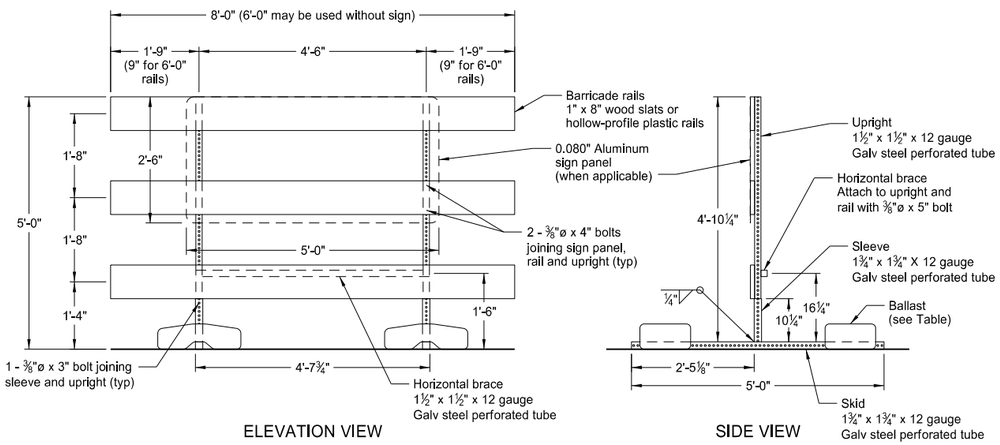
(A) 8'-0" barricade rails may be used with these limitations: 1) no sign panel can be used, and 2) no more than 1'-0" of the barricade rail can extend past the uprights.

ELEVATION VIEW



SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

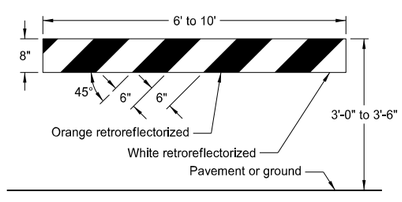


ELEVATION VIEW

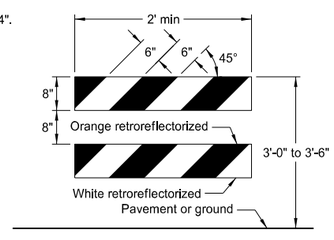
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

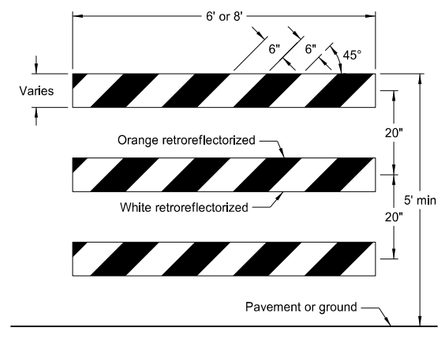
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".



TYPE I BARRICADE

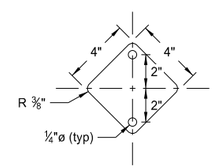


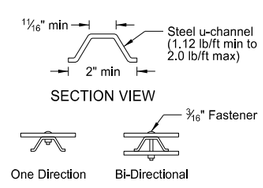
TYPE II BARRICADE

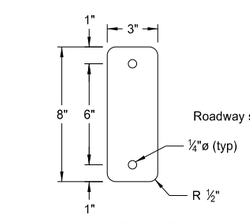


TYPE III BARRICADE

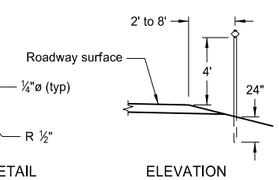
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

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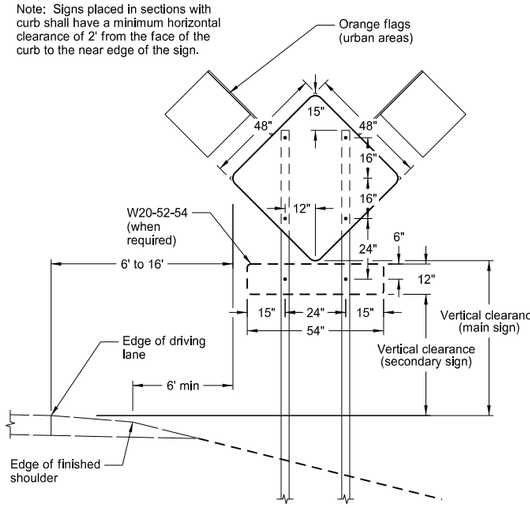
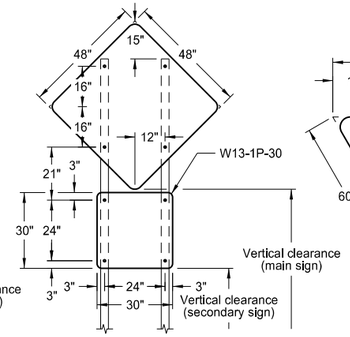
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

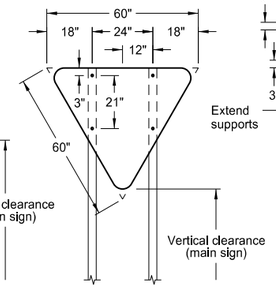
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



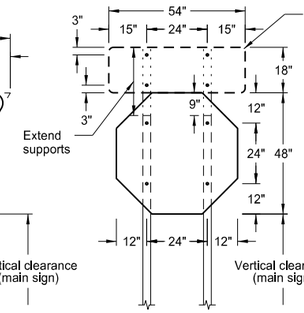
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



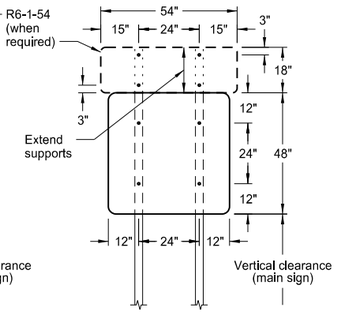
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



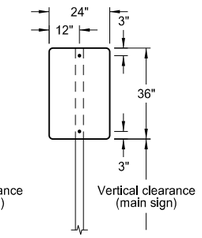
R1-2-60 - YIELD SIGN



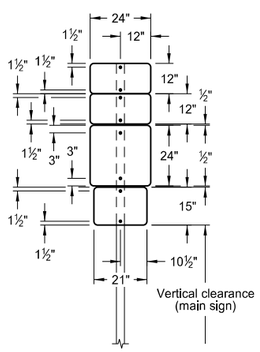
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



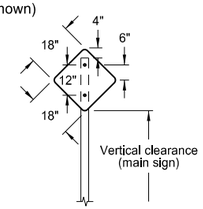
48" x 48" SIGN
(with R6-1-54 sign as required)



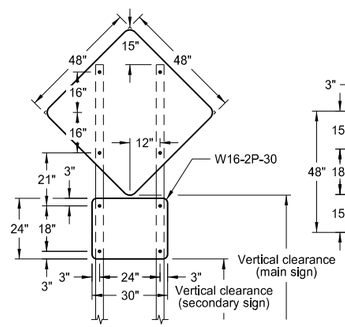
24" x 36" SIGN



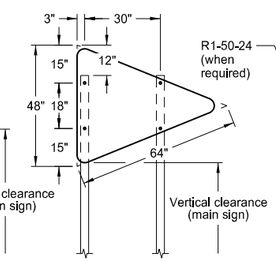
24" x 24"
ROUTE MARKER
ASSEMBLY



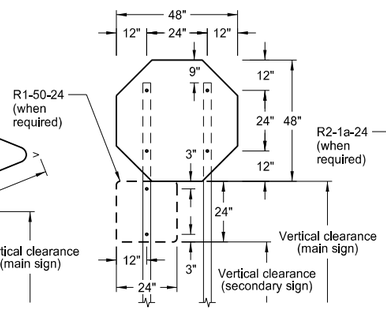
18" x 18"
DIAMOND SIGN



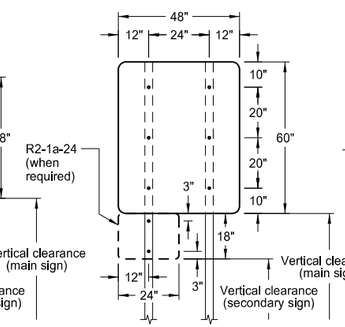
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



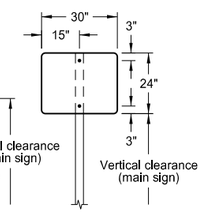
W14-3-64 - PENNANT SIGN



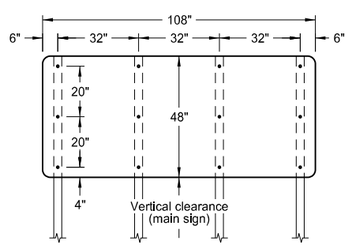
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



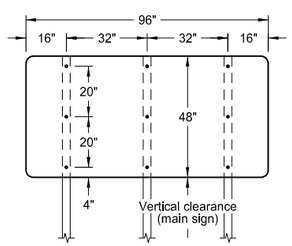
48" x 48" SIGN
(with R2-1a-24 sign as required)



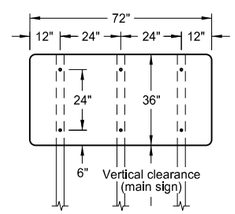
30" x 24" SIGN



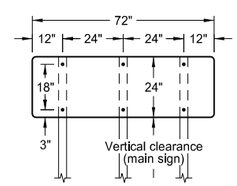
108" x 48" SIGN



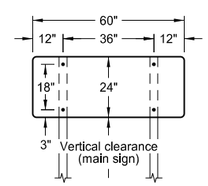
96" x 48" SIGN



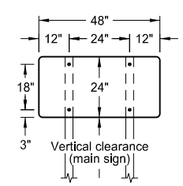
72" x 36" SIGN



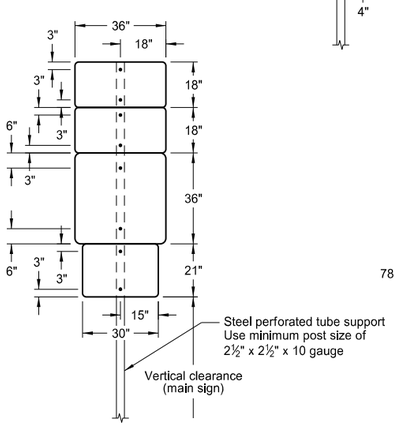
72" x 24" SIGN



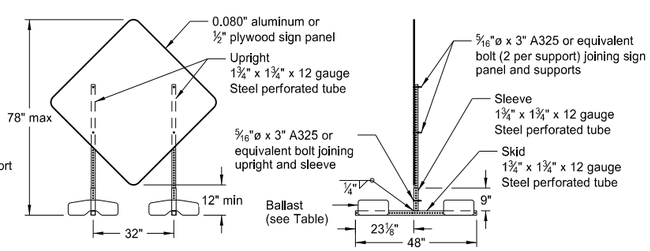
60" x 24" SIGN



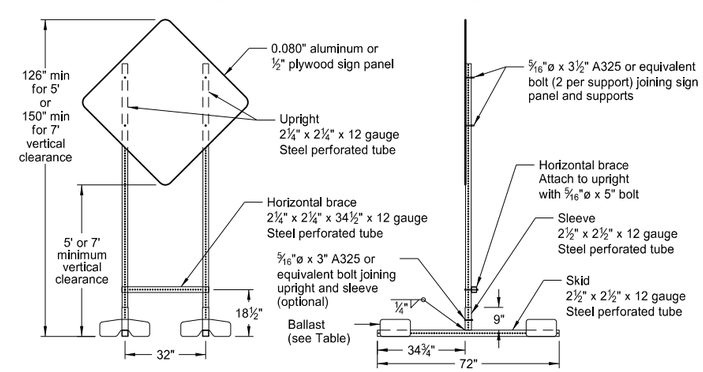
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Supports shall be galvanized or painted. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

   Signs over 50 square feet should be installed on 2½" x 2½" perforated tube supports as a minimum.

   Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

   Interstate - white legend on blue background
   Interstate Business Loop - white legend on green background
   US and State - black legend on white background
   County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

   The vertical clearance to secondary signs is 1'-0" less than the vertical clearance as stated above.

   Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

6. Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.

   When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

   Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

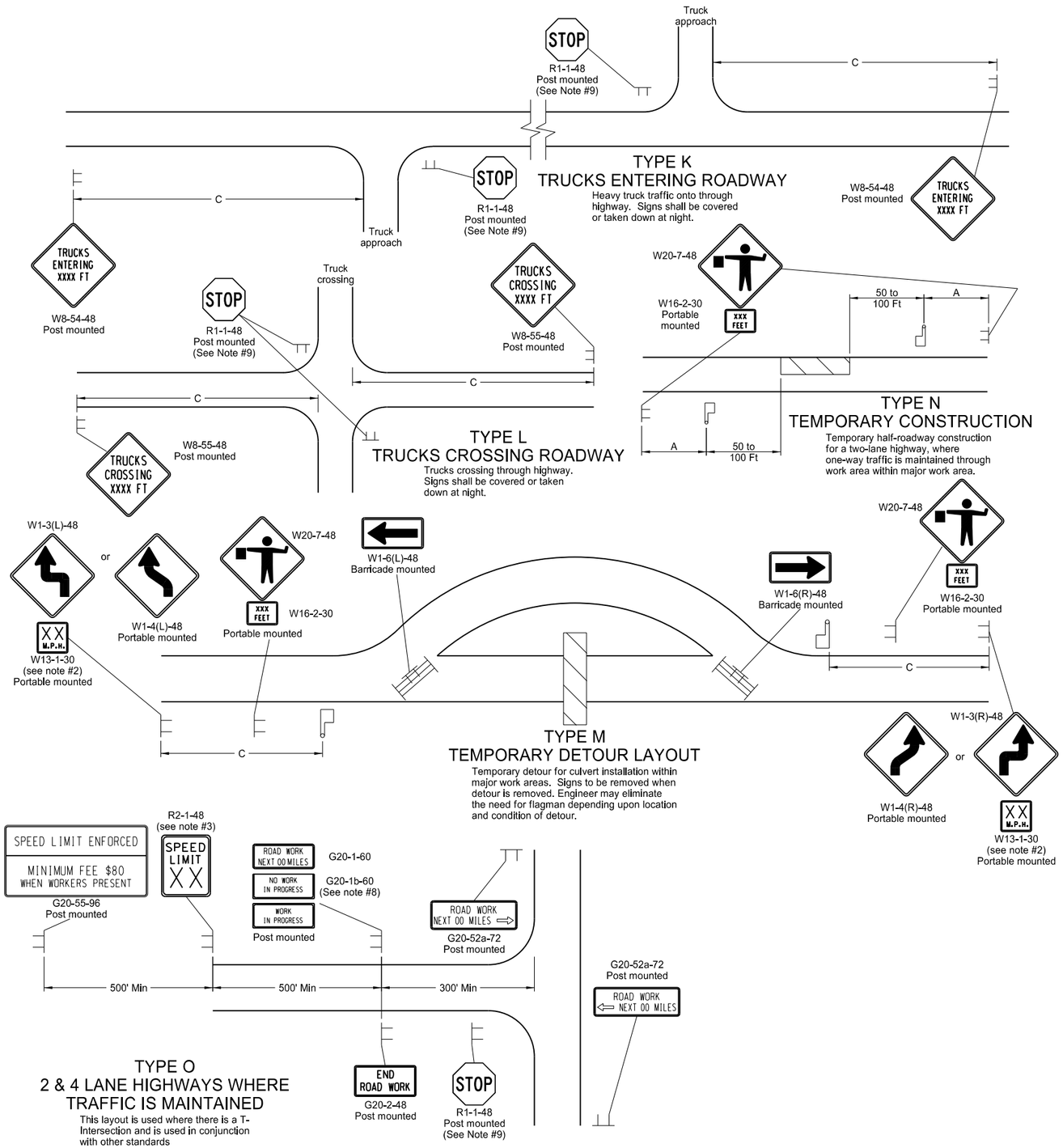
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 11/14/13 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. Where necessary, safe speed to be determined by the Engineer.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.

KEY

Type III barricade — Work area

Sign — Flagger

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

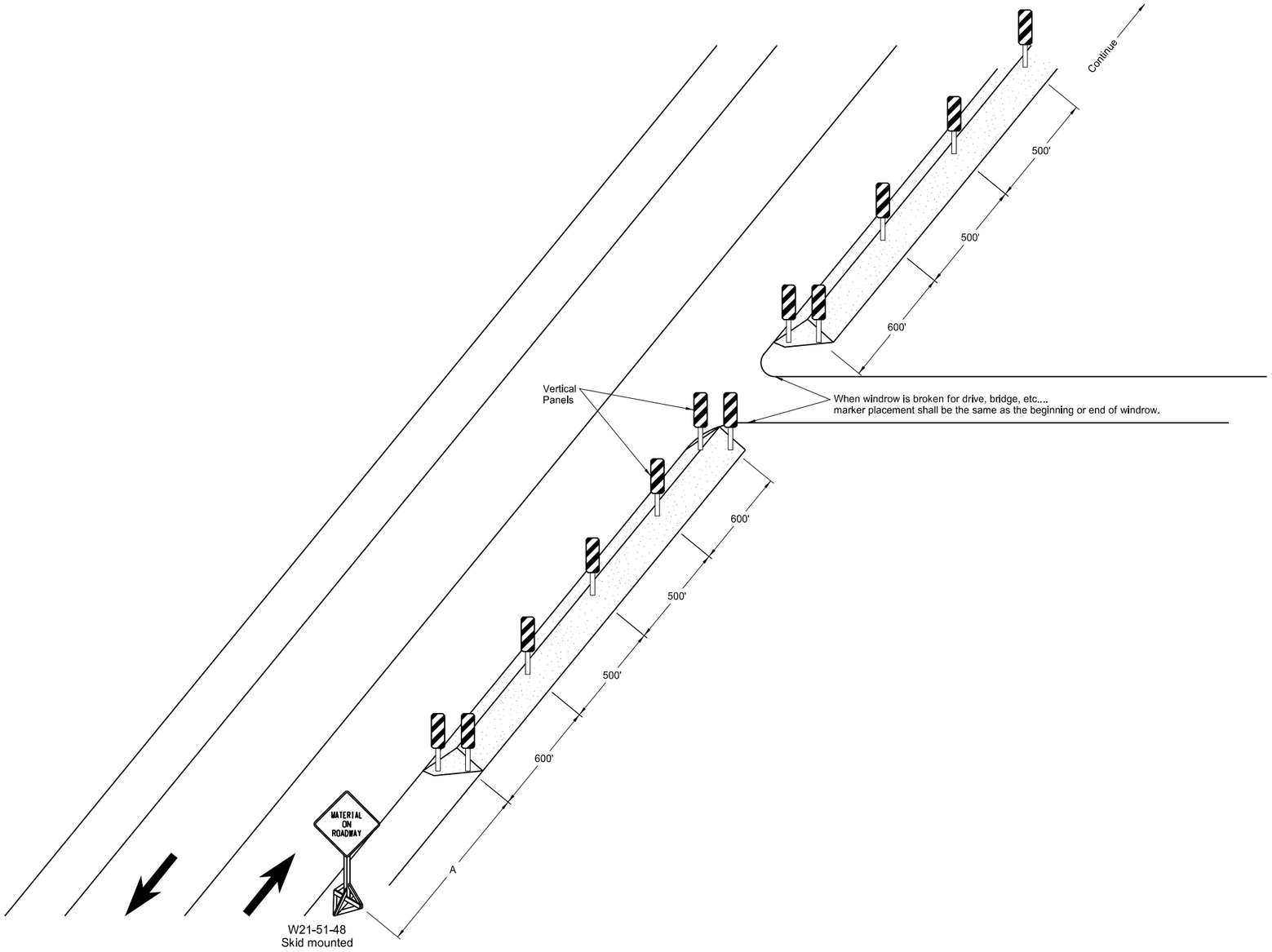
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 09/27/13 and the original document is stored at the North Dakota Department of Transportation

WINDROW MARKING

D-704-30

Notes:
The contractor has the option of using portable sign supports in lieu of post mounted sign in accordance with the NDDOT Standard Specifications.



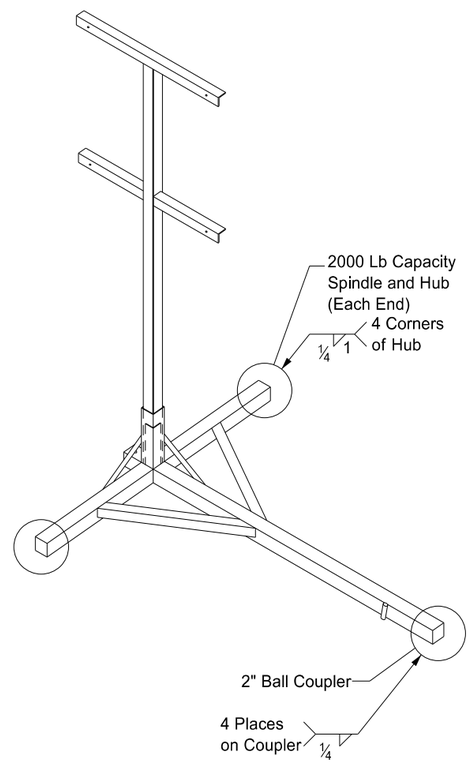
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (55 mph to 60 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

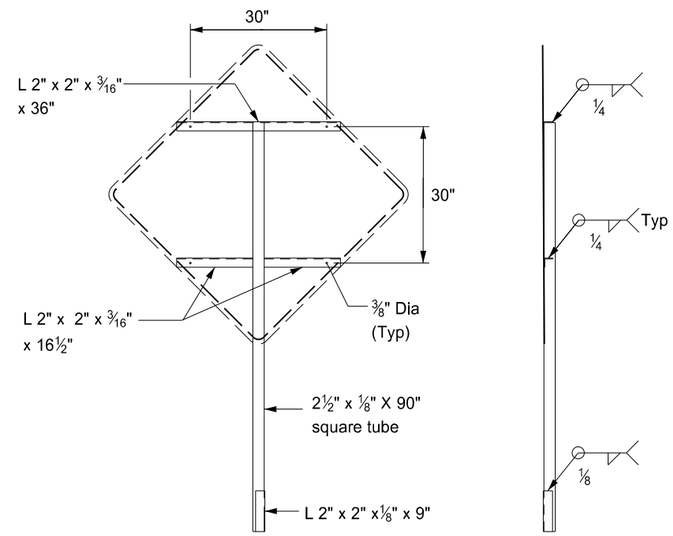
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-24-14	Revised Note

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 06/24/14 and the original document is stored at the North Dakota Department of Transportation

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

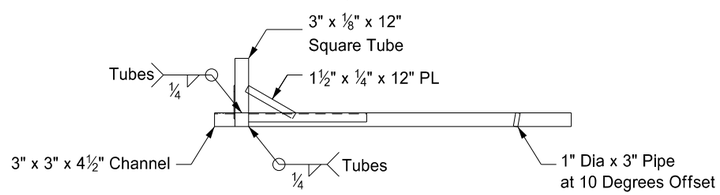




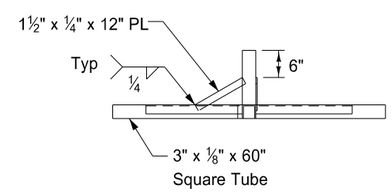
FRONT

RIGHT

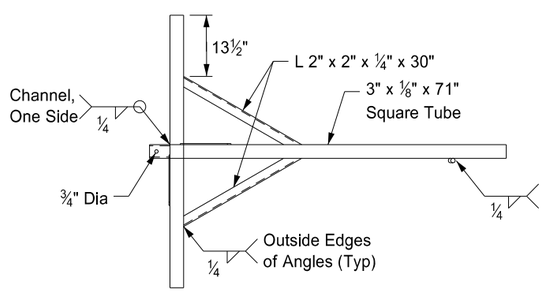
SIGN SUPPORT



FRONT



RIGHT



TOP

TRAILER

Notes:

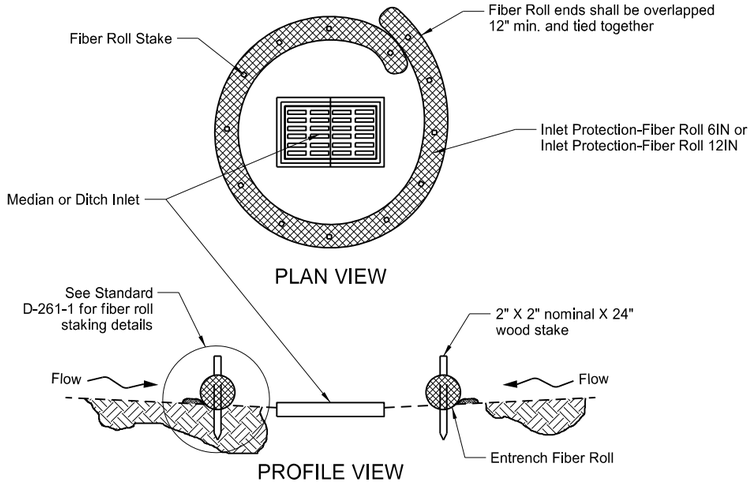
1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

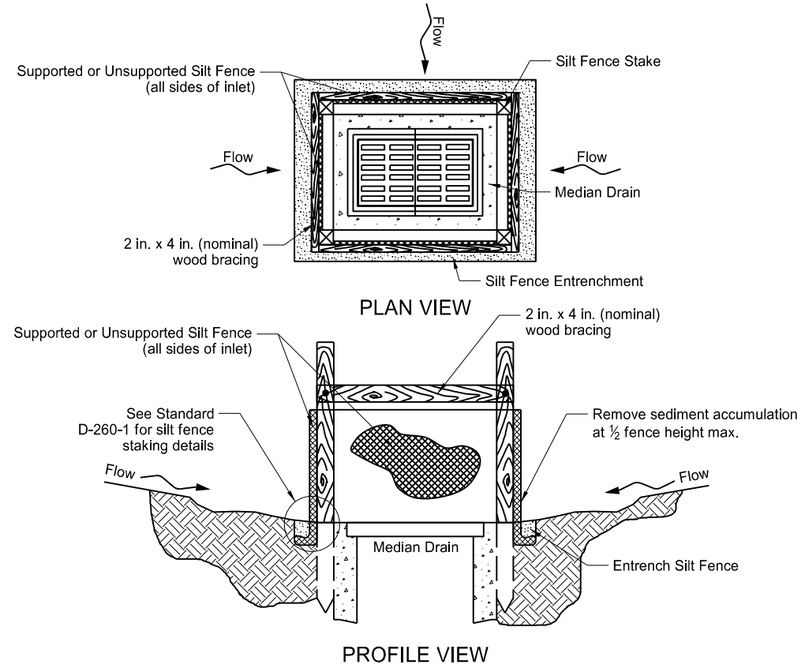
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930 , on 11/23/10 and the original document is stored at the North Dakota Department of Transportation

EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION

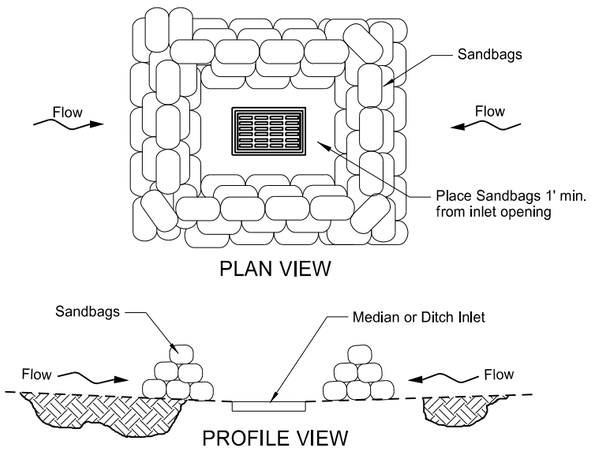
D-708-6



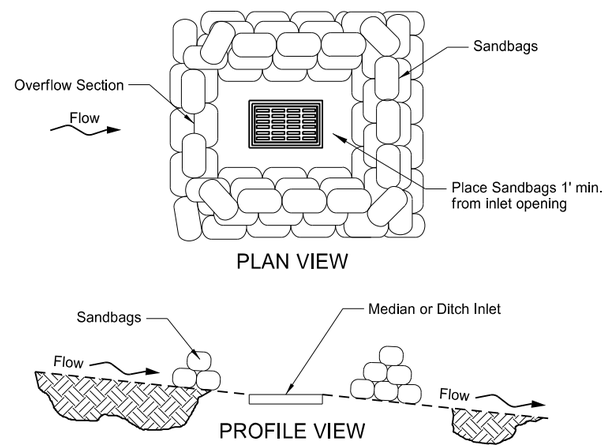
FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



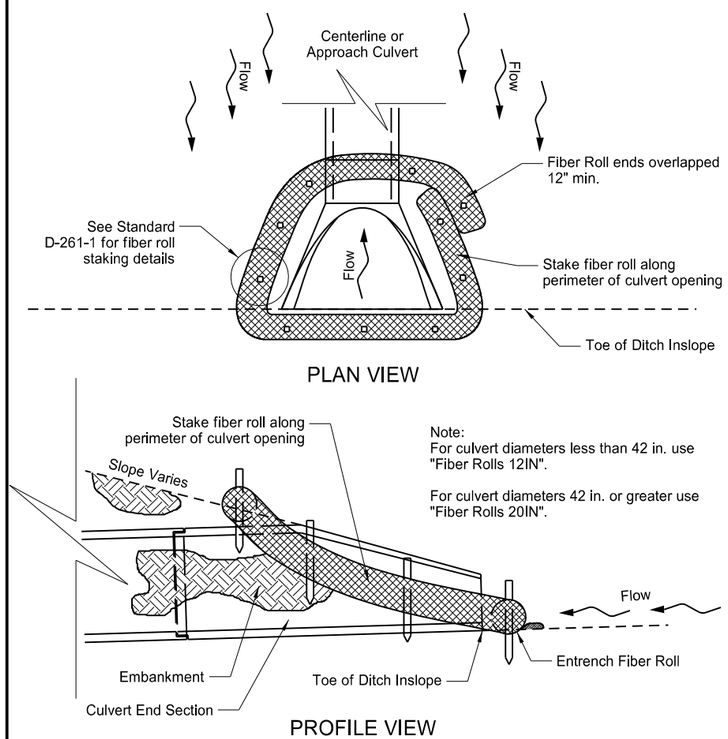
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



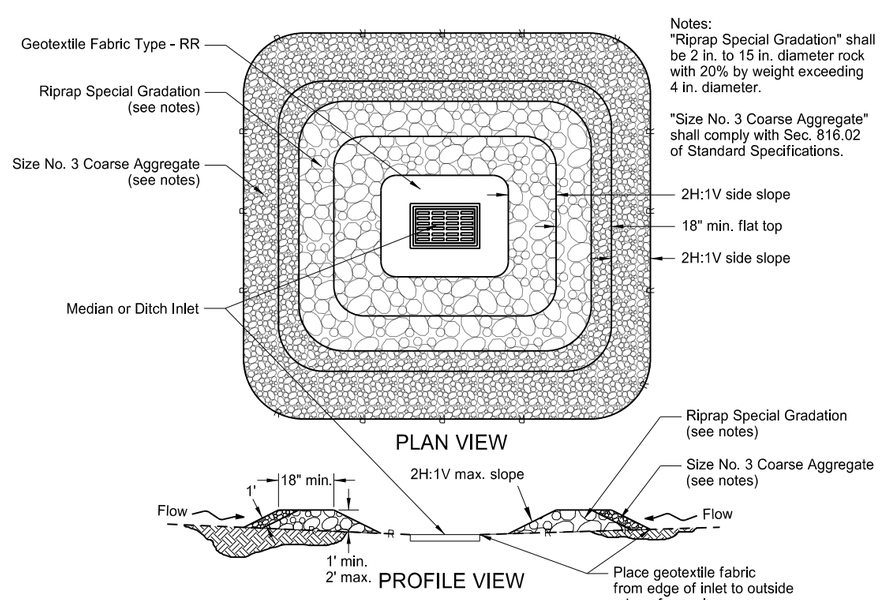
SANDBAG PROTECTION (LOW POINT)



SANDBAG PROTECTION (ON SLOPE)



FIBER ROLL PROTECTION (INLET OF CULVERT)



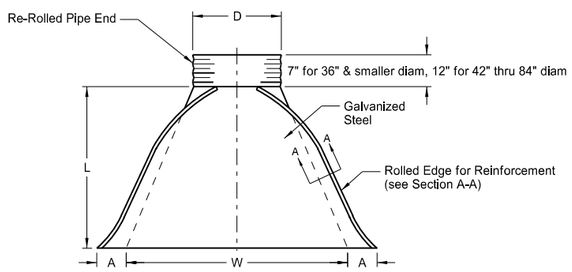
GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.

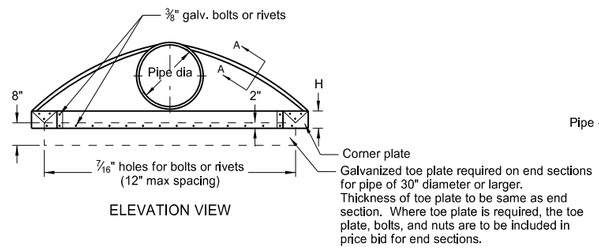
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 10/01/14 and the original document is stored at the North Dakota Department of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

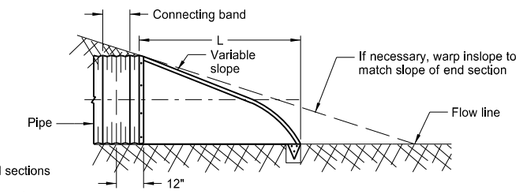
D-714-4



PLAN VIEW



ELEVATION VIEW



TYPICAL CROSS SECTION
(showing connector section)

* * PIPE DIA.	GALV. THICK.	END SECTION DIMENSIONS					APPROX. SLOPE	BODY
		A	B	H	L	W		
IN	IN	IN	IN	IN	IN	IN	RATE	PIECE
15	0.064	7	8	6	26	30	2½:1	1
18	0.064	8	10	6	31	36	2½:1	1
24	0.064	10	13	6	41	48	2½:1	1
30	0.079	12	16	8	51	60	2½:1	1 or 2
36	0.079	14	19	9	60	72	2½:1	2
42	0.109	16	22	11	69	84	2½:1	2
48	0.109	18	27	12	78	90	2½:1	2
54	0.109	18	30	12	84	102	2:1	2
* 60	0.109	18	33	12	87	114	1¾:1	3
* 66	0.109	18	36	12	87	120	1½:1	3
* 72	0.109	18	39	12	87	126	1 1/3 :1	3
* 78	0.109	18	42	12	87	132	1¼:1	3
* 84	0.109	18	45	12	87	138	1 1/6 :1	3

* These sizes have 0.109" sides and 0.138" center panels.

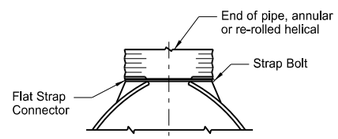
* * Pipe diameter is equal to dimension "D" of end section.

Manufacturers tolerances of above dimensions will be allowed.

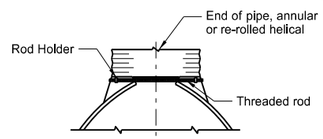
Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with ⅜" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

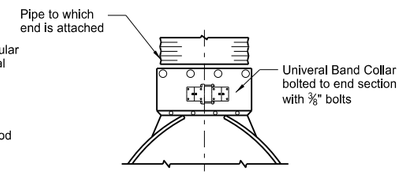
SECTION A-A



TYPE #1
For circular pipes with diameter 24" & smaller



TYPE #2
For circular pipes with diameter 30" through 36"

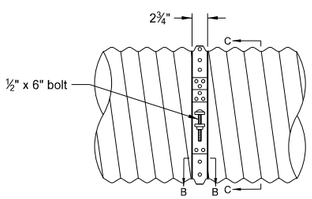


TYPE #3
For all pipe sizes

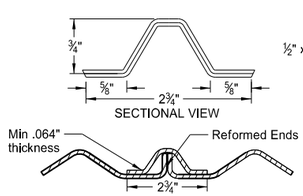
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2⅔" x ½"	12" - 48"	2¾"	.064"
Annular Band	2⅔" x ½"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
	3" x 1"	48" - 120"	14"	.052"
Hugger Band	2⅔" x ½" Rerolled End	12" - 72"	10½"	.052"
		78" - 84"	10½"	.079"
	3" x 1" Rerolled End	48" - 120"	10½"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"

NOTES:

1. Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
2. Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x ¼" galv. angle for 60" through 72" dia. and 2½" x 2½" x ¼" galv. angle for 78" and 84" dia.. Angles to be attached by galv. ⅜" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
3. Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
4. Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
5. ½" x 8" bolts may be used as a substitute for the ½" x 6" bolts shown in the details.
6. Coupling bands wider than 14" may be used if a minimum of four ½" bolts with maximum spacing of 5½" are used for the connection.
7. Length of spot welds shall be minimum ½".



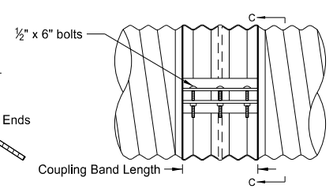
SIDE VIEW



SECTIONAL VIEW

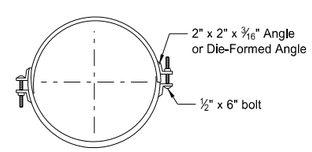
SECTION B-B

HAT BAND FOR FLANGED END PIPE

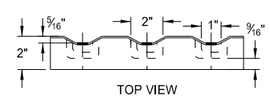


SIDE VIEW

ANNULAR BAND

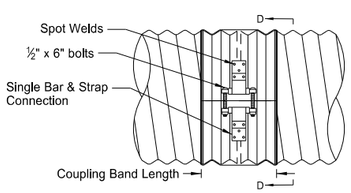


SECTION C-C
Angle Connection

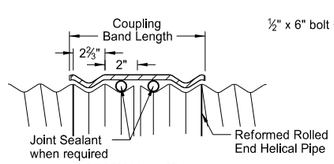


TOP VIEW

Die-Formed Angle Connector

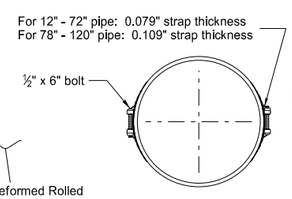


SIDE VIEW

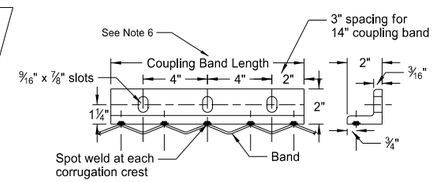


SECTIONAL VIEW

HUGGER COUPLING BAND

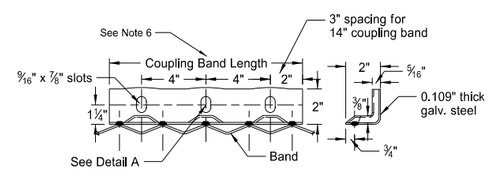


SECTION D-D
Bar & Strap Connection



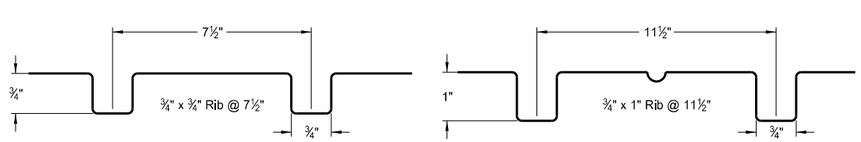
SIDE VIEW
END VIEW

2" x 2" x 3/16" Angle Connector

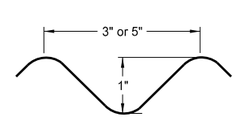


SIDE VIEW
END VIEW

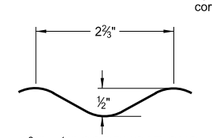
Die-Formed Angle Connector



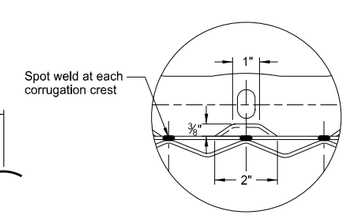
SPIRAL RIB CORRUGATIONS



3" x 1" CORRUGATIONS or
5" x 1" CORRUGATIONS



2⅔" x ½" CORRUGATIONS



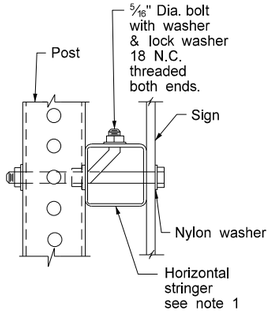
Detail A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-06-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail

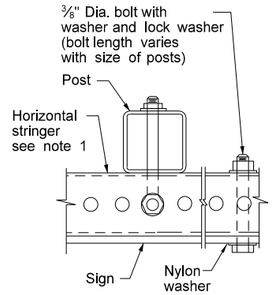
This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674 , on 02/27/2014 and the original document is stored at the North Dakota Department of Transportation

Mounting Details Perforated Tube

D-754-25

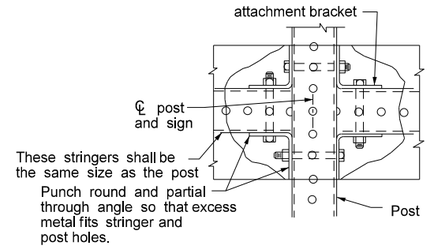


Side View

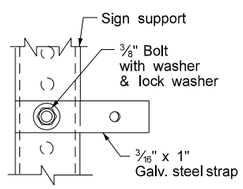


Top View

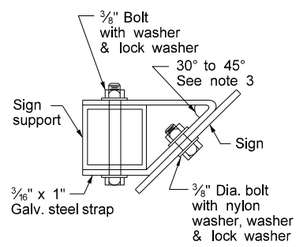
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



STREET NAME SIGNS
AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR
BACK TO BACK MOUNTING

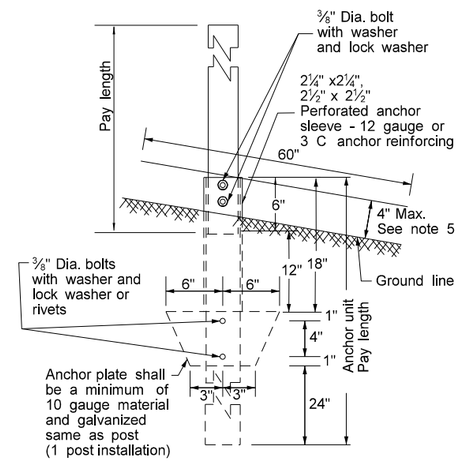


Side View



Top View

STRAP DETAIL



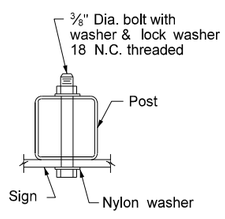
ANCHOR UNIT AND
POST ASSEMBLY

Note:

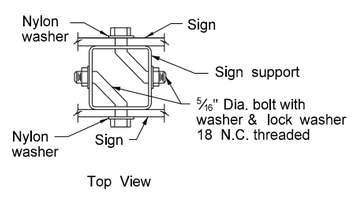
1. Horizontal stringers - In lieu of perforated tubes, the contractor may substitute z bar stringers. The z bar stringers shall be 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel.
2. Metal washers used on sign face shall have a minimum outside diameter of 15/16" ± 1/16" and 10 gauge thickness.
3. No Parking Signs: All no parking signs with directional arrows shall be placed at a 30 to 45 degree angle with the line of traffic flow. No parking signs required at the above angles may have the support turned to the correct angle. If the no parking sign is placed with another sign that has to be placed at a 90 degree angle with the line of traffic flow, the detailed angle strap should be used to mount the no parking sign. Flat washers and lock washers shall be used with all nylon washers.
4. In lieu of using the bent bolt to attach the post to the stringer, the contractor may choose to punch the sign backing and place the bolt through the sign, the stringer and the post.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - The 2½", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

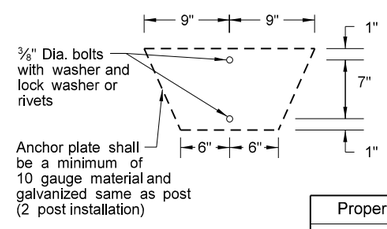


BOLT MOUNTING



Top View

BACK TO BACK
MOUNTING



Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.^{4}	Cross Sect. area In.^{2}	Section Modulus In.^{3}
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans.
The 2½" size is shown as 2.51" size on the plans.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

8-6-09

REVISIONS

DATE	CHANGE
7-8-14	Revised Note 3

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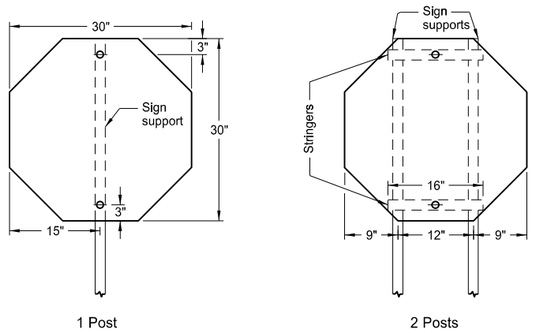
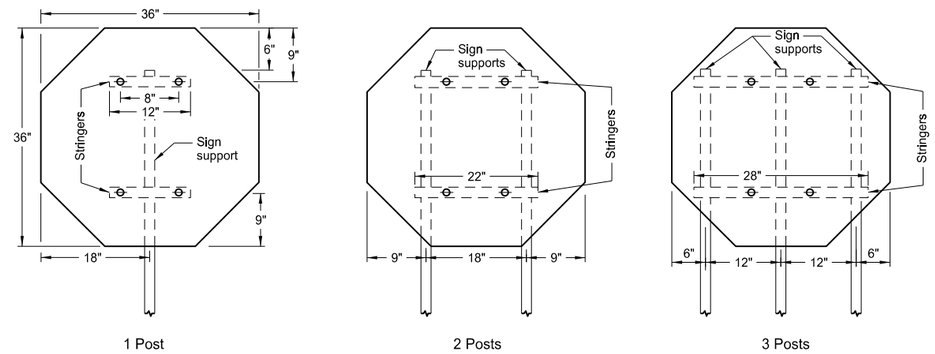
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-26



Assembly No. 1



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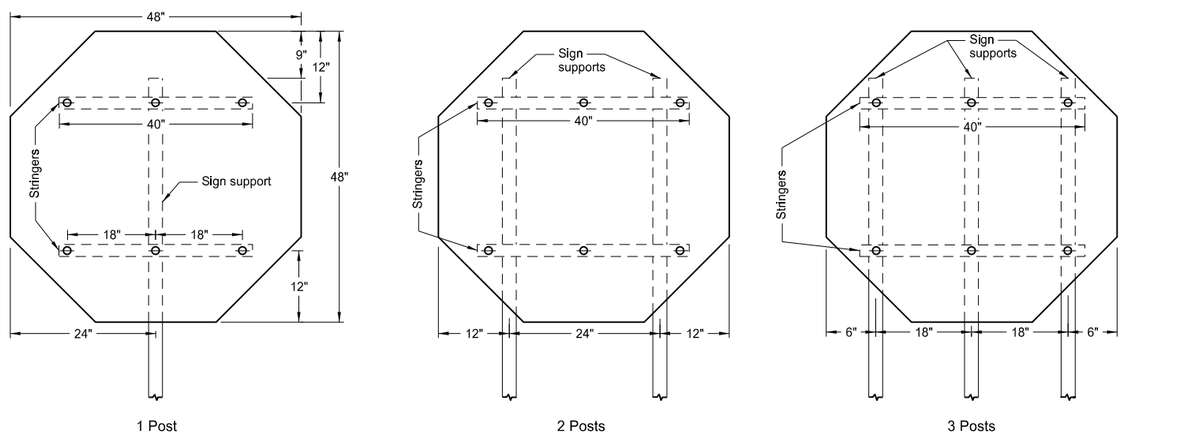

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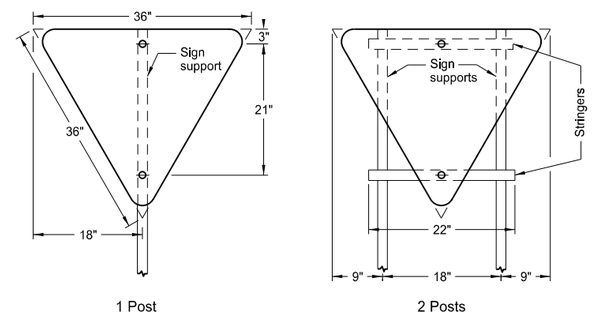

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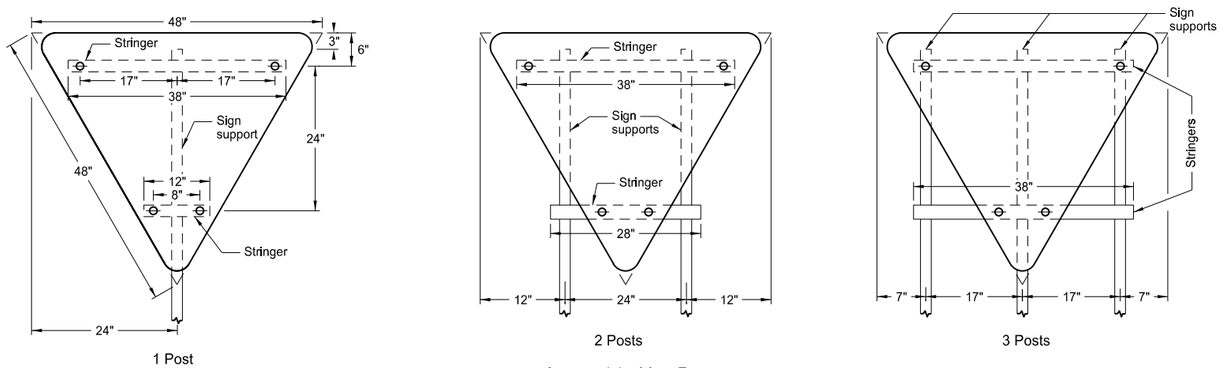

Assembly No. 5

Notes:

1. See Standard D-754-25 for mounting details.

2. The minimum sign backing material thickness shall be 0.100 inch.

3. Perforated square tube stringer shall be 1½" x 1½".

4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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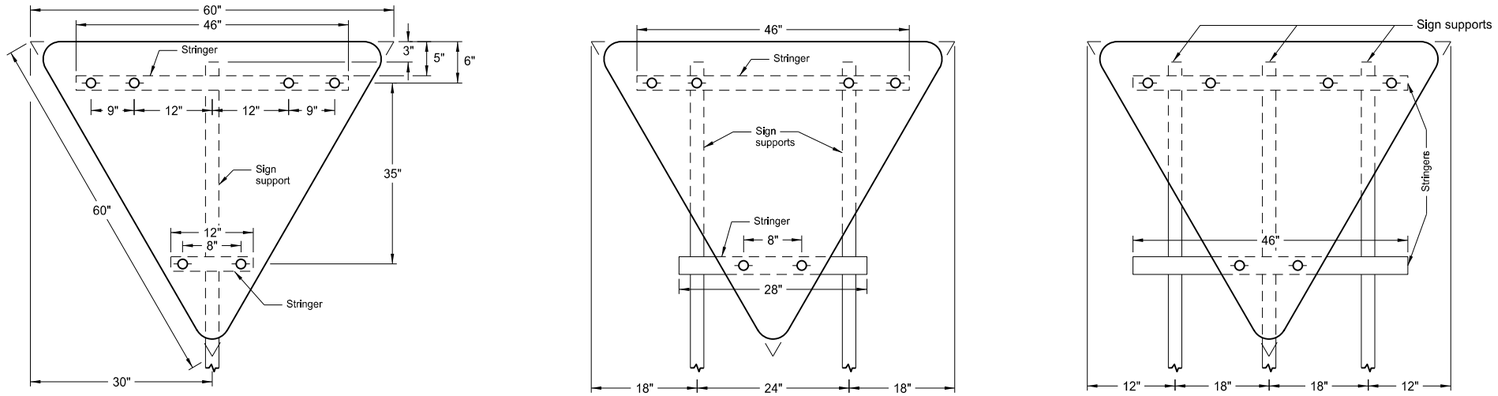
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

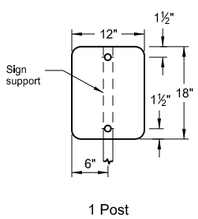
D-754-27



Assembly No. 6

Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.



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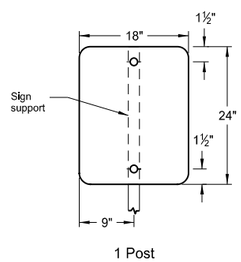

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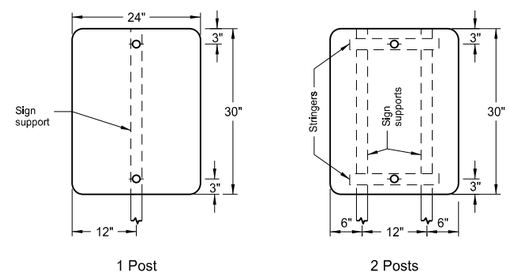

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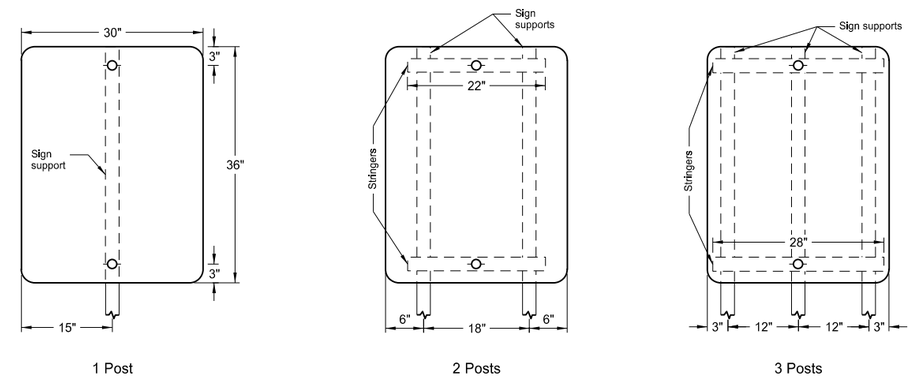

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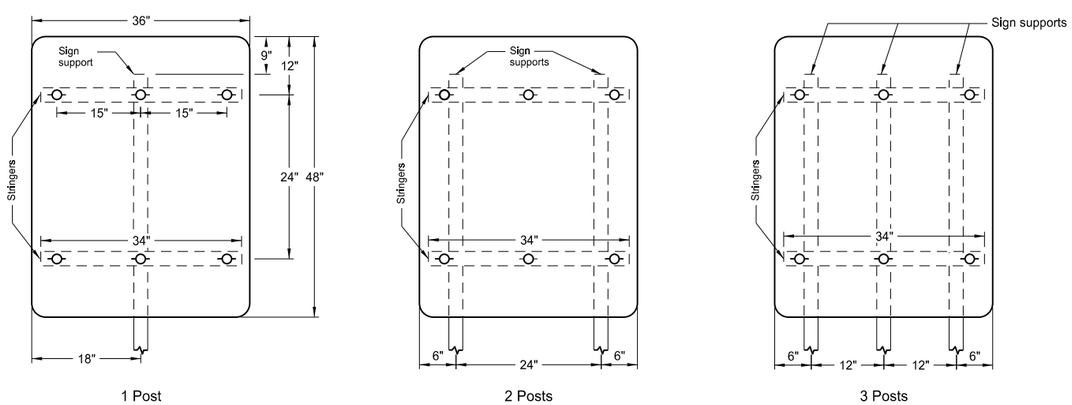

Assembly No. 11

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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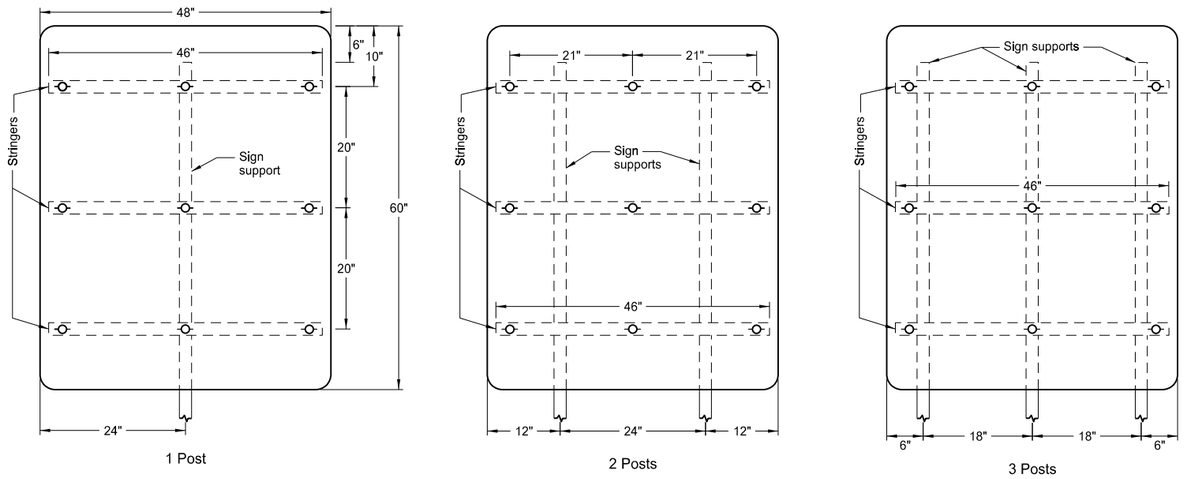
D-754-28

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS



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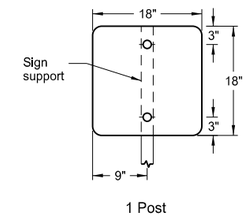

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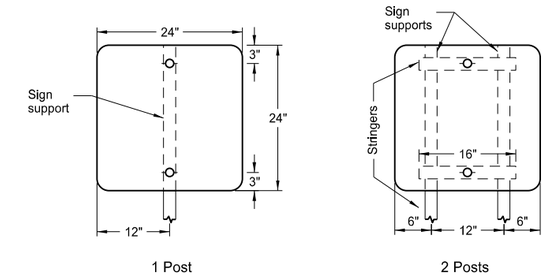

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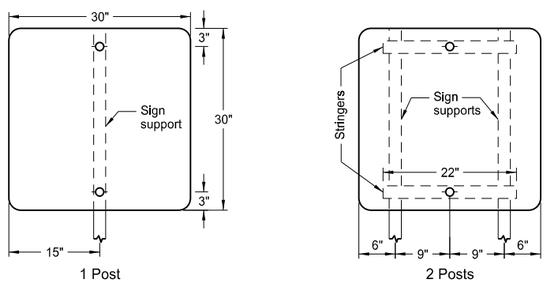

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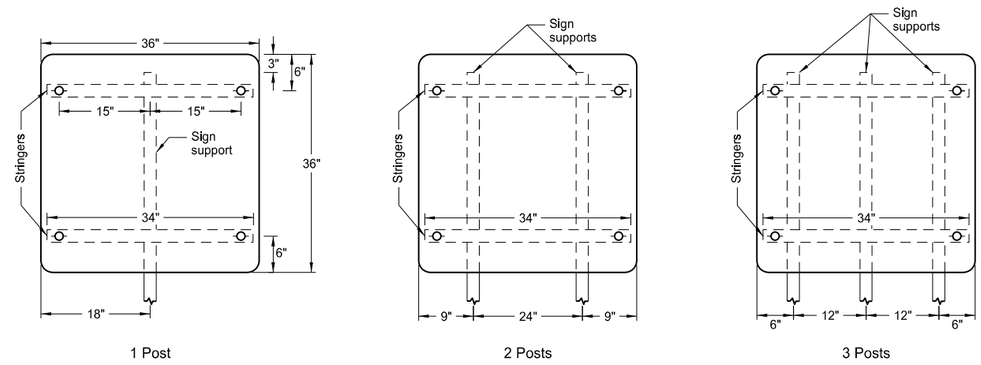

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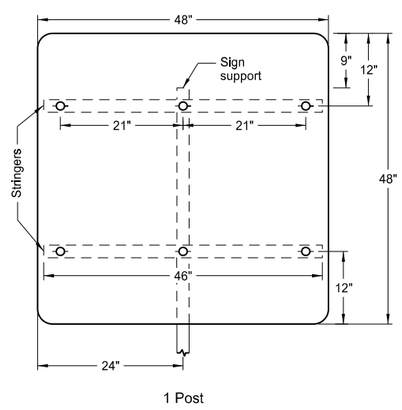

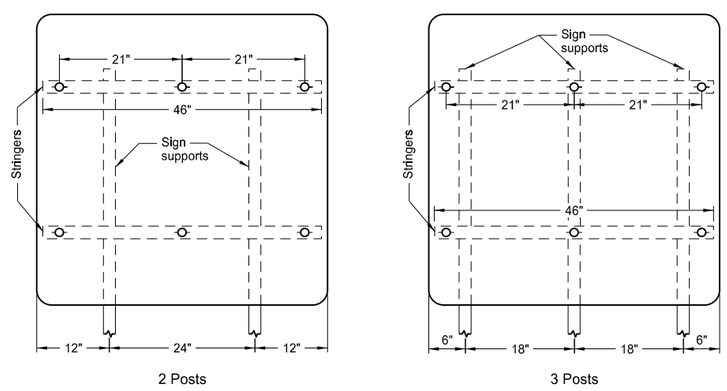

Assembly No. 17

Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
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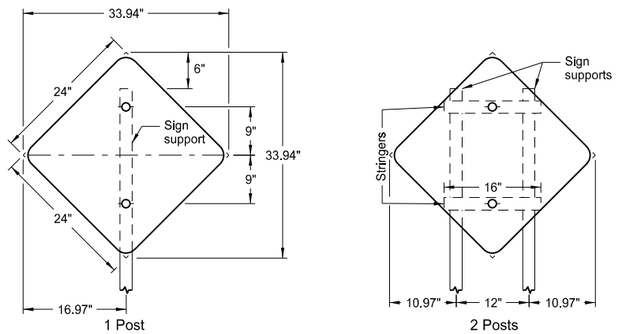
D-754-29

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS



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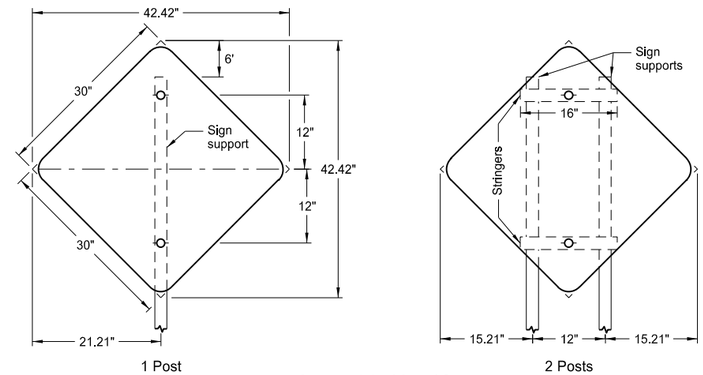
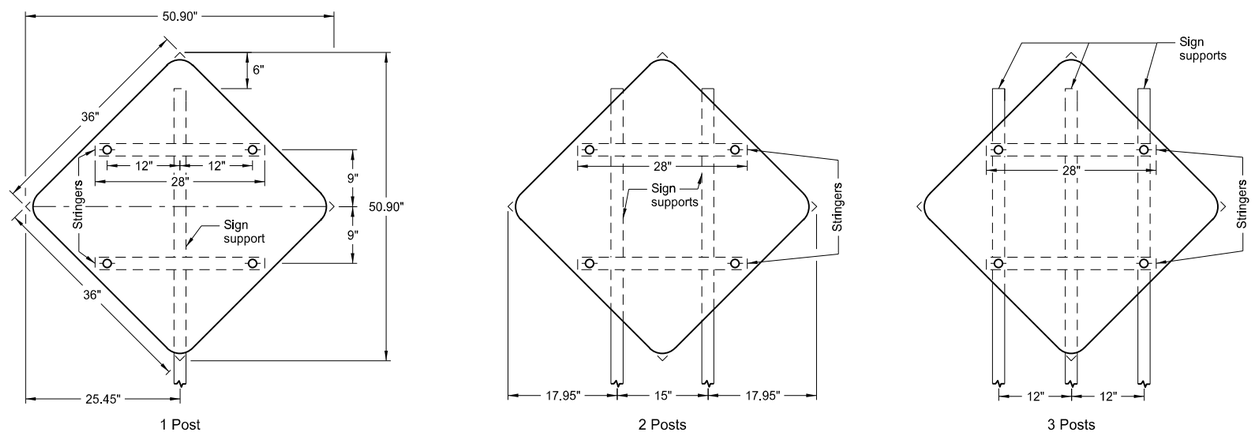
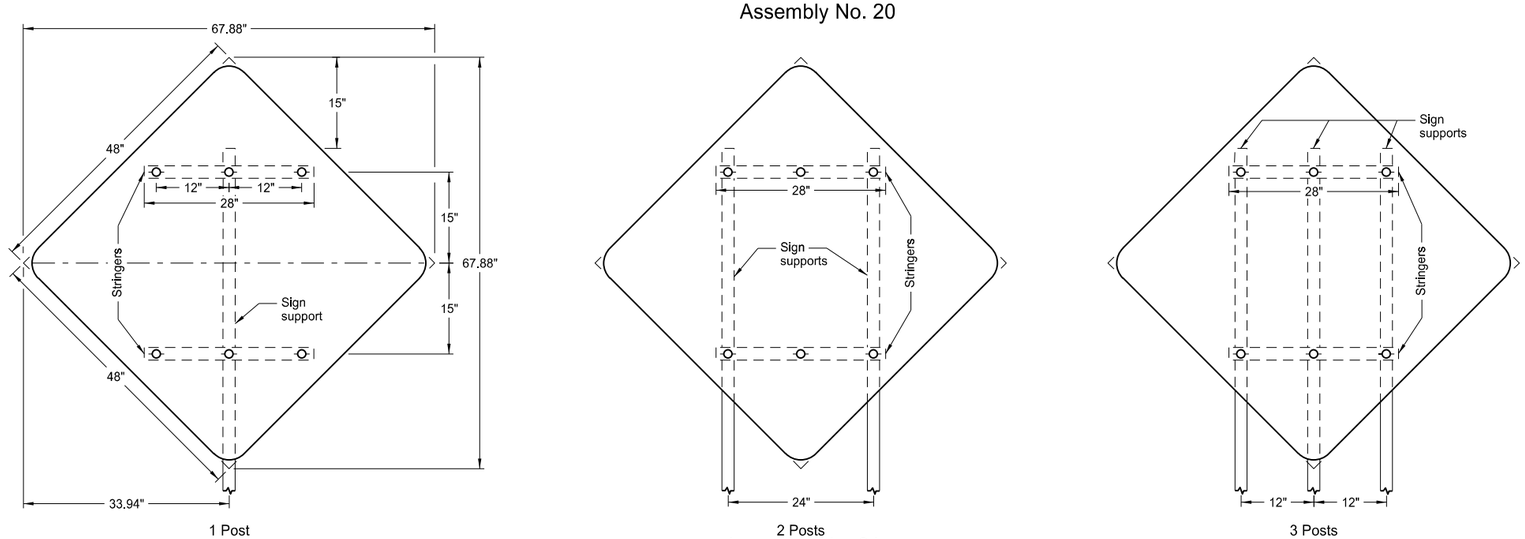


Assembly No. 19



Assembly No. 20



Assembly No. 21

Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
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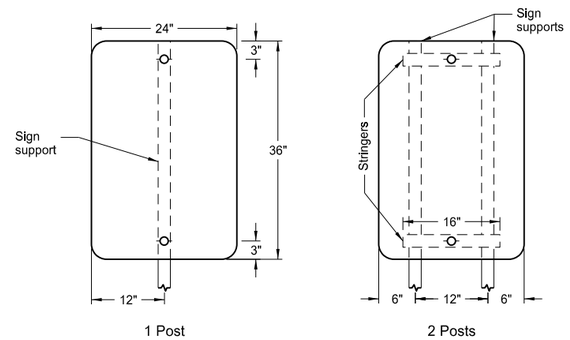
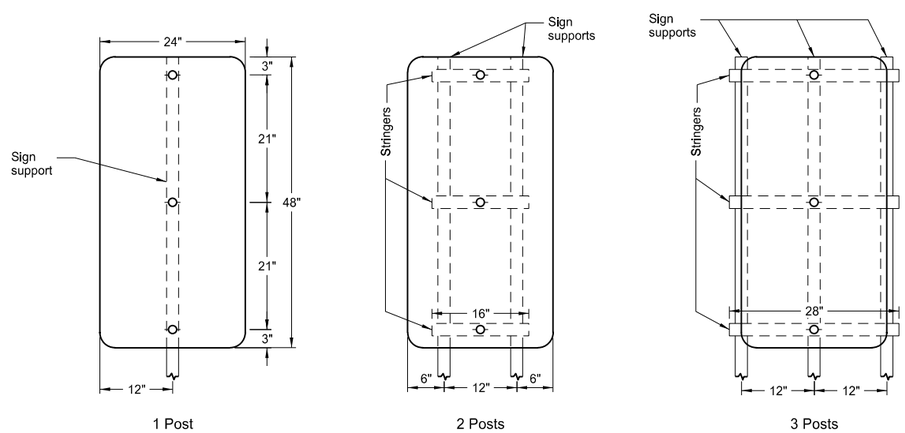
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-30



Assembly No. 22



Assembly No. 23

Notes:

1. See Standard D-754-25 for mounting details.

2. The minimum sign backing material thickness shall be 0.100 inch.

3. Perforated square tube stringer shall be 1½" x 1½".

4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
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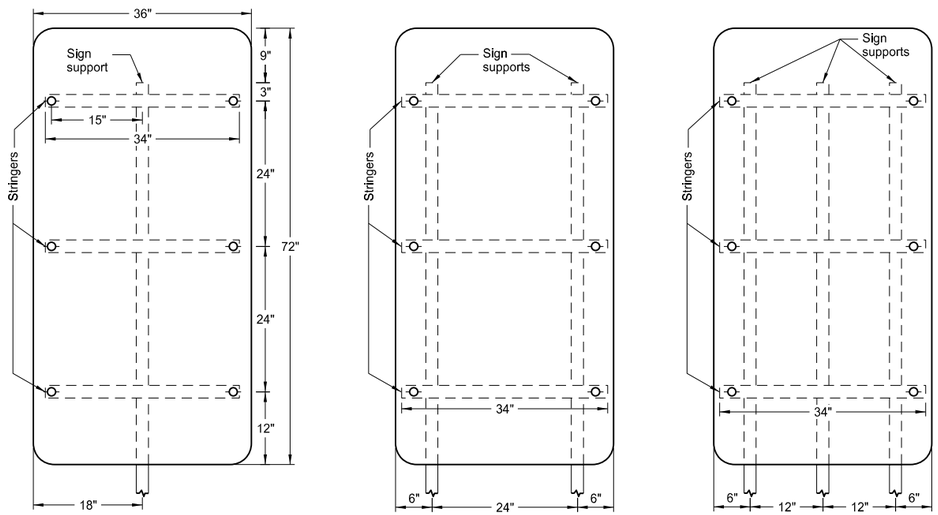
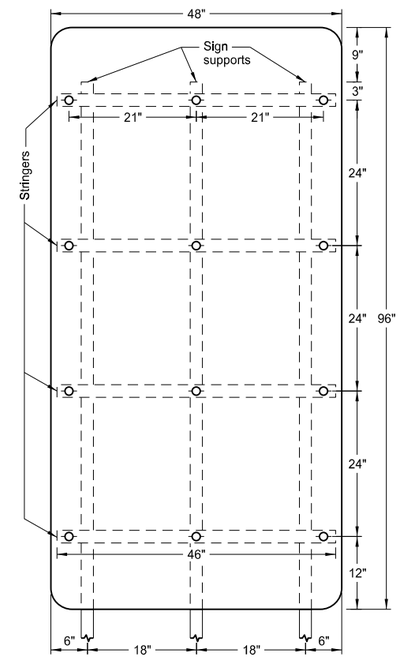
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-31



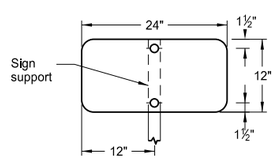
1 Post 2 Posts 3 Posts

Assembly No. 24



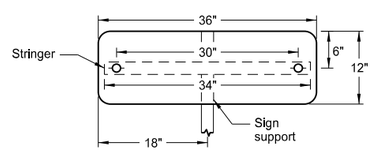
3 Posts

Assembly No. 25



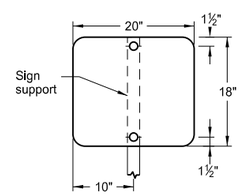
1 Post

Assembly No. 26



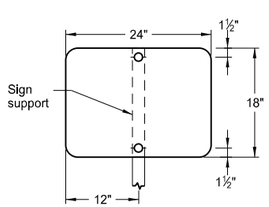
1 Post

Assembly No. 27



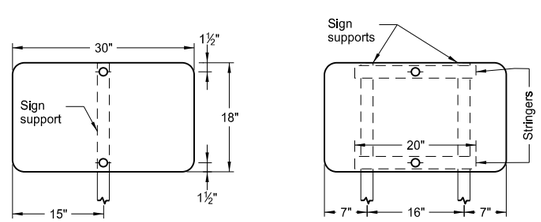
1 Post

Assembly No. 28



1 Post

Assembly No. 29



1 Post 2 Posts

Assembly No. 30

Notes:

1. See Standard D-754-25 for mounting details.

2. The minimum sign backing material thickness shall be 0.100 inch.

3. Perforated square tube stringer shall be 1½" x 1½".

4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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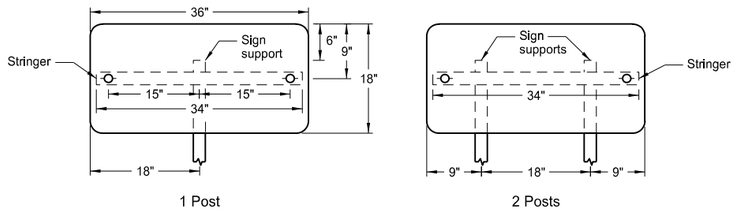
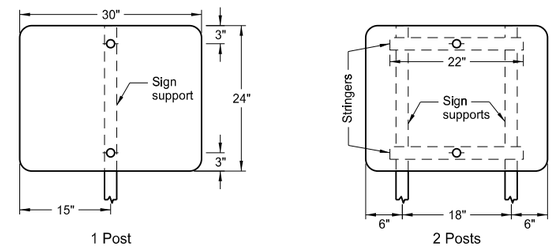
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-32



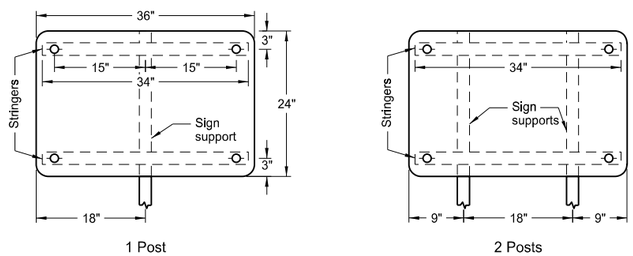
Assembly No. 31



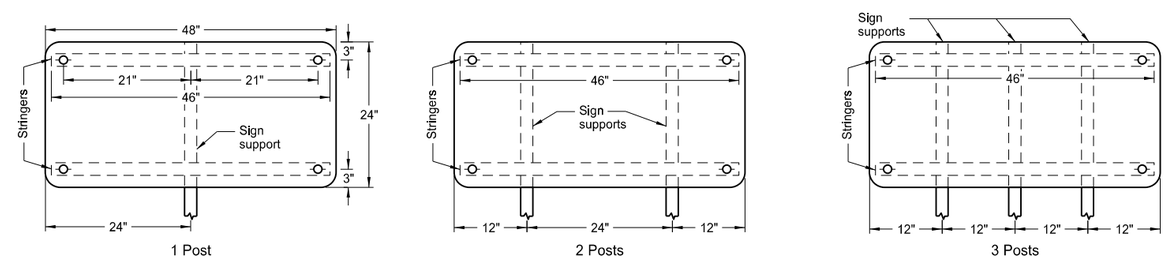
Assembly No. 32

Notes:

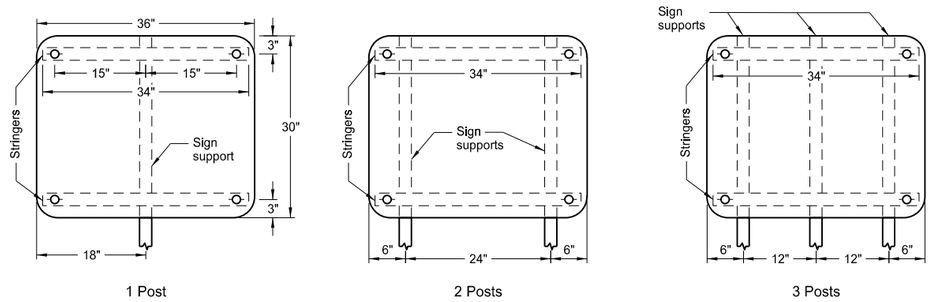
1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.



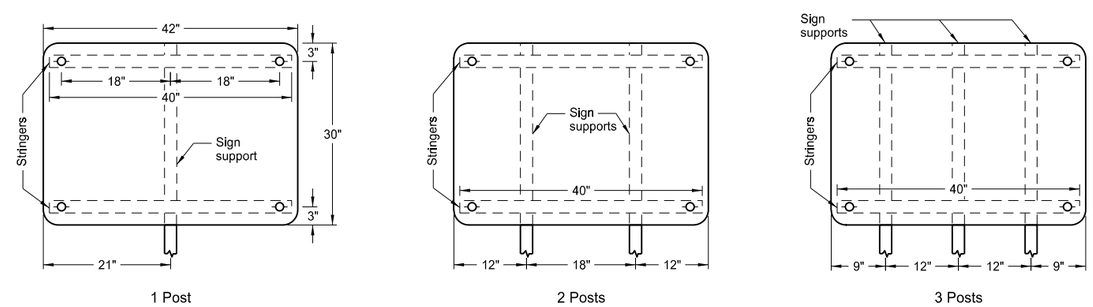
Assembly No. 33



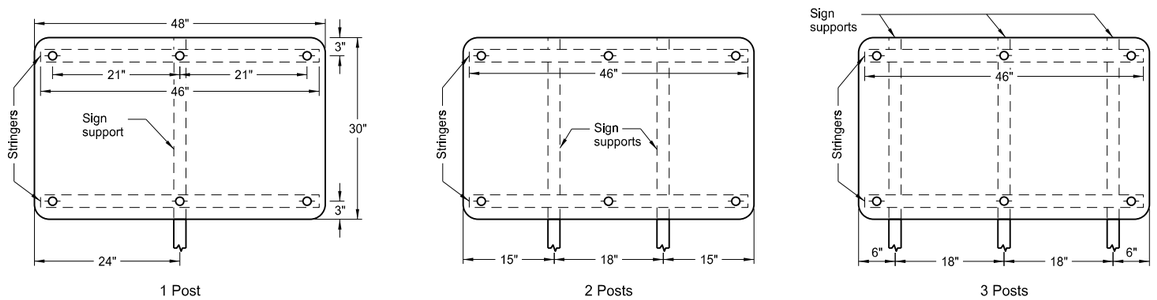
Assembly No. 34



Assembly No. 35



Assembly No. 36



Assembly No. 37

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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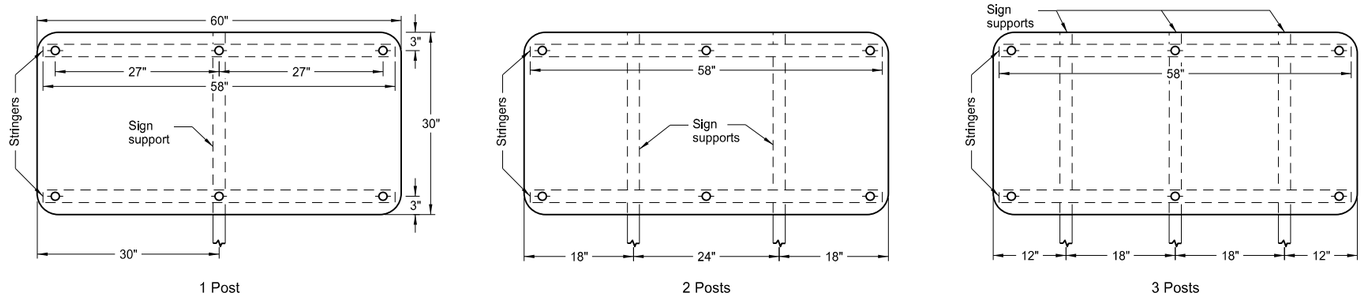
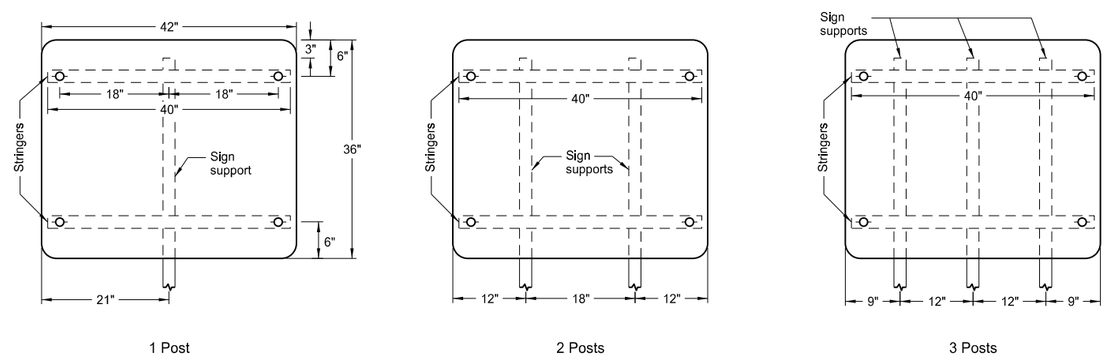
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

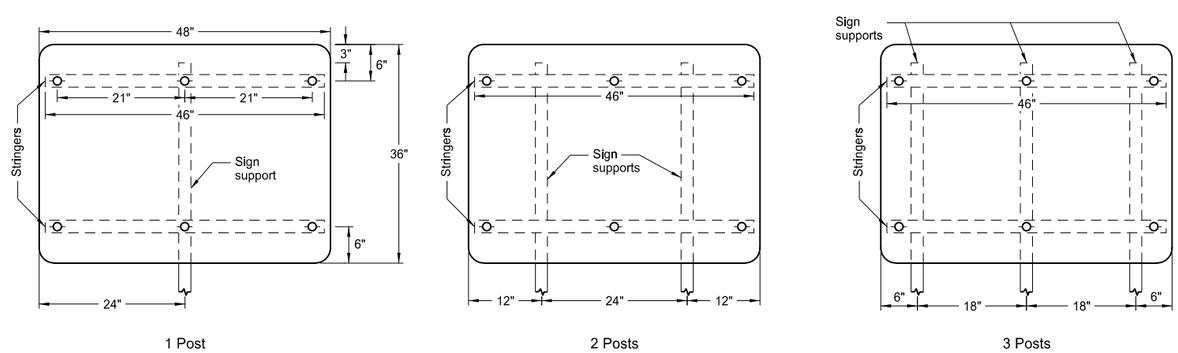
D-754-33



Assembly No. 38



Assembly No. 39



Assembly No. 40

Notes:

1. See Standard D-754-25 for mounting details.

2. The minimum sign backing material thickness shall be 0.100 inch.

3. Perforated square tube stringer shall be 1½" x 1½".

4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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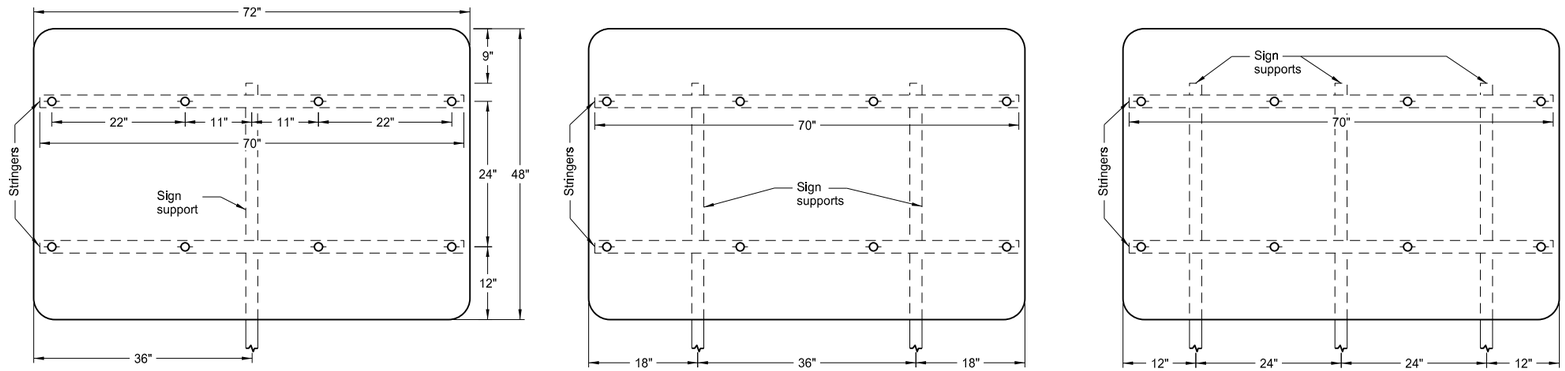
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-34

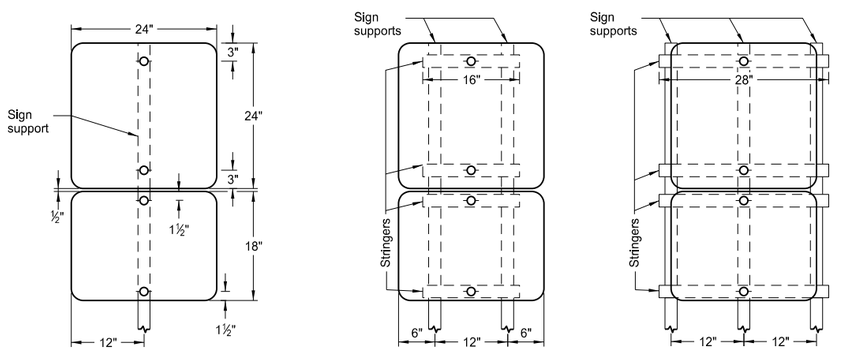


1 Post 2 Posts 3 Posts

Assembly No. 41

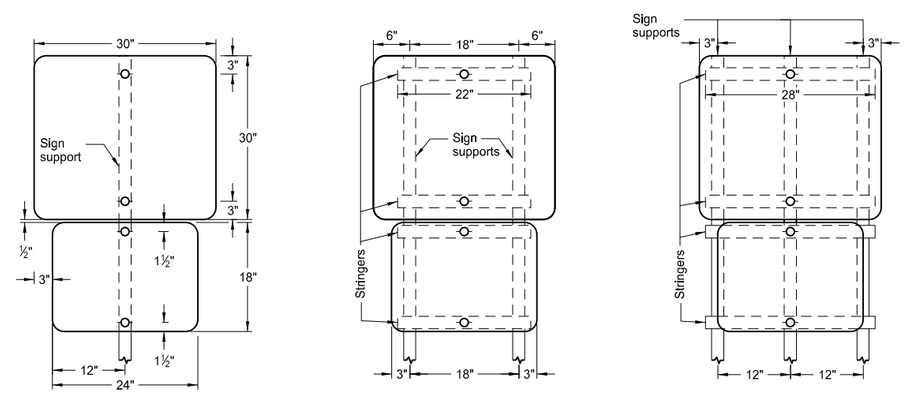
Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.



1 Post 2 Posts 3 Posts

Assembly No. 42



1 Post 2 Posts 3 Posts

Assembly No. 43

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
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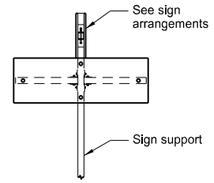
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

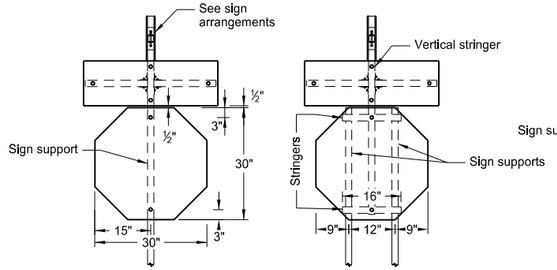
D-754-87

A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



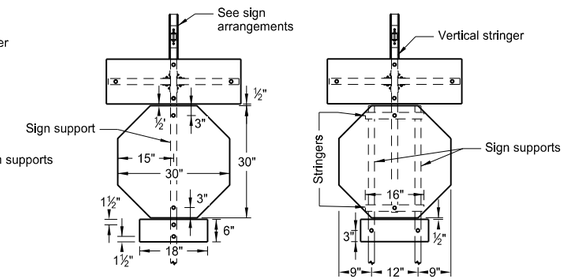
1 Post

Special Assembly 1 (A, B, C, D or E)



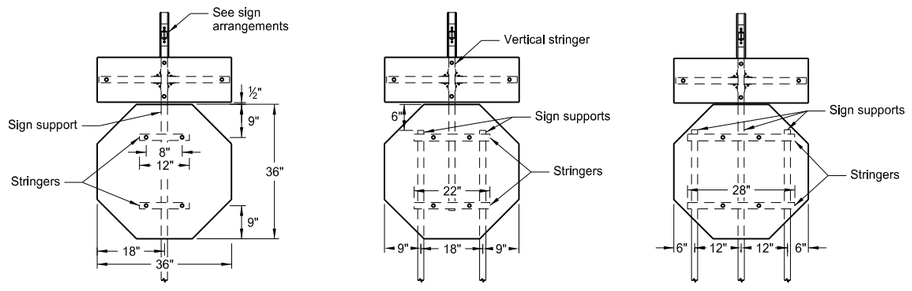
1 Post 2 Posts

Special Assembly 2 (A, B, C, D or E)



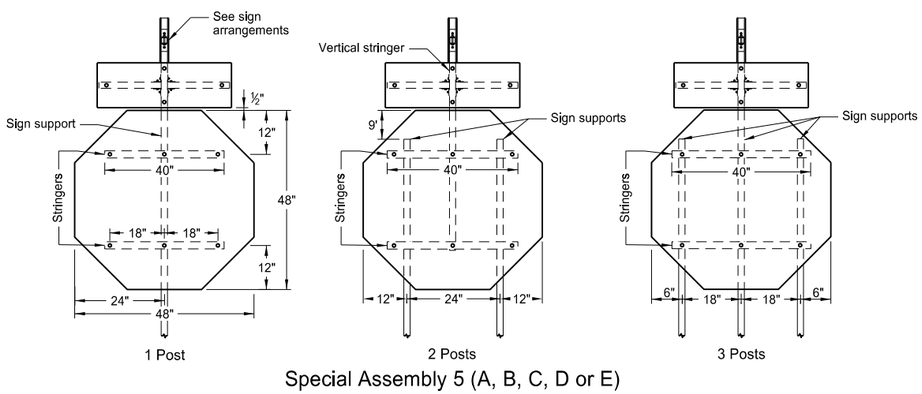
1 Post 2 Posts

Special Assembly 3 (A, B, C, D or E)



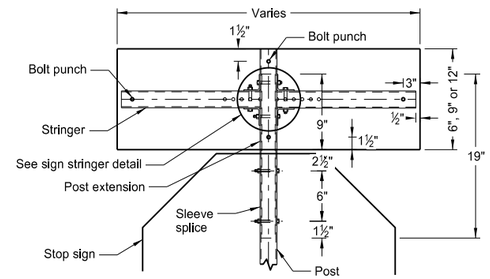
1 Post 2 Posts 3 Posts

Special Assembly 4 (A, B, C, D or E)



1 Post 2 Posts 3 Posts

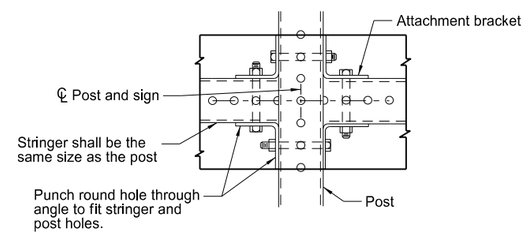
Special Assembly 5 (A, B, C, D or E)



Front View

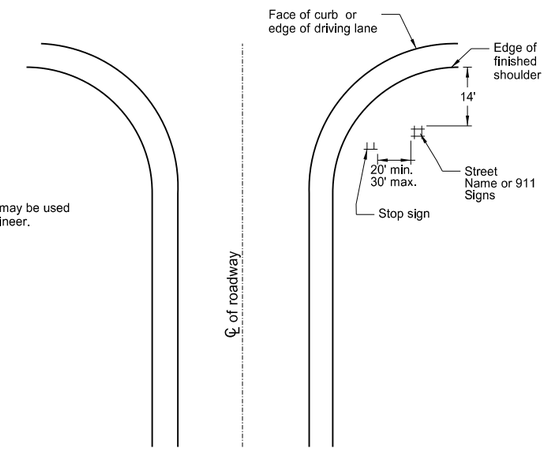
Sleeve Splice Detail

Note: The splice method may be used upon approval of the engineer.



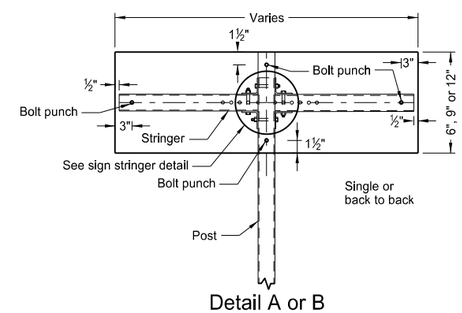
Sign Stringer Detail

Note: See Standard Drawing D-754-86 for 911 support information and sign layout details.

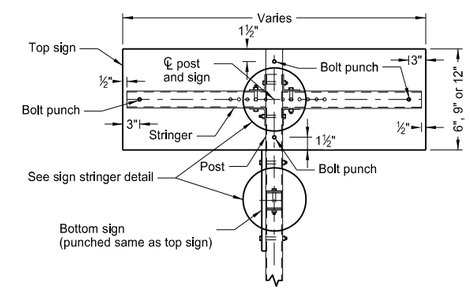


Intersection Layout

Note: This layout is to be used for street name signs or 911 signs that are used with Special Assembly 1 .

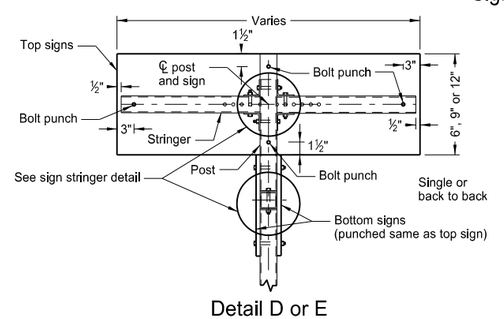


Detail A or B



Detail C

Sign Arrangements



Detail D or E

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