

DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 2010	Pass: 140	Trucks: 45	Total: 185	20
Forecast 2030	Pass: 140	Trucks: 45	Total: 185	20
Clear Zone Distance: _____		Design Speed: __		
Minimum Sight Dist. for Stopping: _____		Bridges: _____		
Minimum Sight Dist. for Safe Passing: _____				
Sight Dist. for No Passing Zone: _____				
Pavement Design Life __ (years)				

# JOB# 44 NORTH DAKOTA

## DEPARTMENT OF TRANSPORTATION

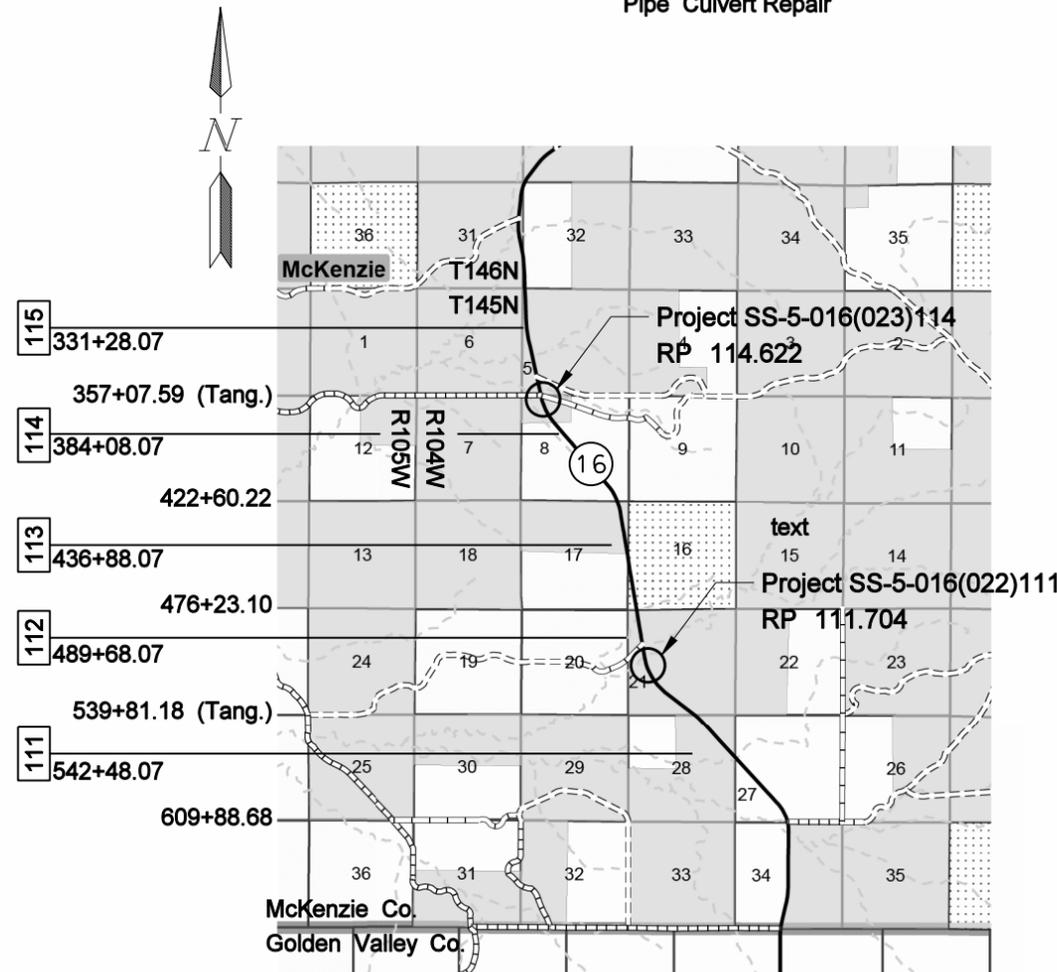
**SS-5-016(022)111**  
 Mc Kenzie County  
 ND Highway 16 RP 111.704  
 Correct Erosion Problem, Install Manhole, Beehive Inlet,  
 Pipe Conduit and Restore Slopes  
**SS-5-016(023)114**  
 Mc Kenzie County  
 ND Highway 16 RP 114.622  
 Pipe Culvert Repair

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SS-5-016(022)111	18235	1	1
	SS-5-016(023)114	18800		

**GOVERNING SPECIFICATIONS:**

Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-5-016(022)111	0.001	0.001
Correct erosion problem, install manhole, beehive inlet, pipe conduit and restore slopes.		
SS-5-016(023)114		
Pipe Culvert Repair.		



DESIGNERS
Reuben Hauck /S/
Brian Rosin /S/

APPROVED BY:	
Curtis Glasoe /s/	1-12-11
GRASSLANDS ENGINEER	DATE
DAKOTA PRAIRIE GRASSLANDS	
APPROVED DATE	1-12-11
Roger Weigel /s/	
for OFFICE OF PROJECT DEVELOPMENT	
ND DEPARTMENT OF TRANSPORTATION	

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 1-12-11

James Douglas Rath /s/  
 NDDOT DESIGN DIVISION

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(022)111 SS-5-016(023)114	2	1

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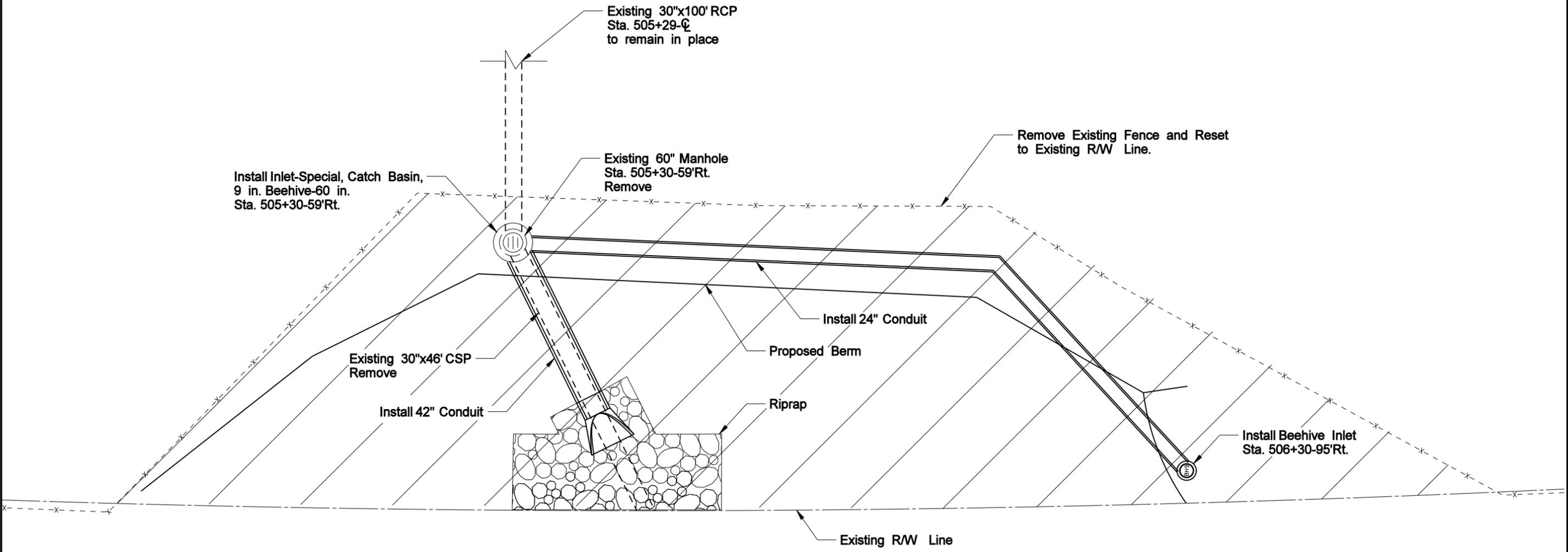
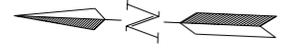
LIST OF STANDARD DRAWINGS

<u>Standard No.</u>	<u>Description</u>
D-20-1, 2, 3	NDDOT Abbreviations
D-20-10	NDDOT Utility Company Abbreviations
D-20-20, 21	Line styles
D-20-30, 31 & 32	Symbols
D-704-7 & 8	Breakaway Systems for Construction Zone Signs
D-704-9, 10, 11, 12 & 12a	Construction Sign Details
D-704-13	Barricade Details and Channelizing Devices
D-704-14, 15, 24	Construction Sign & Barricade Assembly Details
D-704-50	Portable Sign Supports
D-708-02	Erosion & Siltation Controls
D-708-05	Erosion & Siltation Control Blanket Installation
D-708-6	Erosion Control Median or Ditch Inlet Protection
D-708-7	Erosion Control Fiber Roll Staking Details
D-714-1	Reinforced Concrete Pipe & End Section
D-714-4	Corrugated Steel Pipe Culverts & End Sections
D-714-22	Concrete Pipe Ties
D-714-27	Pipe Backfill for Storm Drain
D-722-1A	Inlet – Catch Basin
D-722-1B	Inlet – Special
D-722-5	Manhole Details

Project SS-5-016(023)114

Permits and Environmental Considerations SP 518(08)

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(022)111	004	1



 Erosion Repair Area

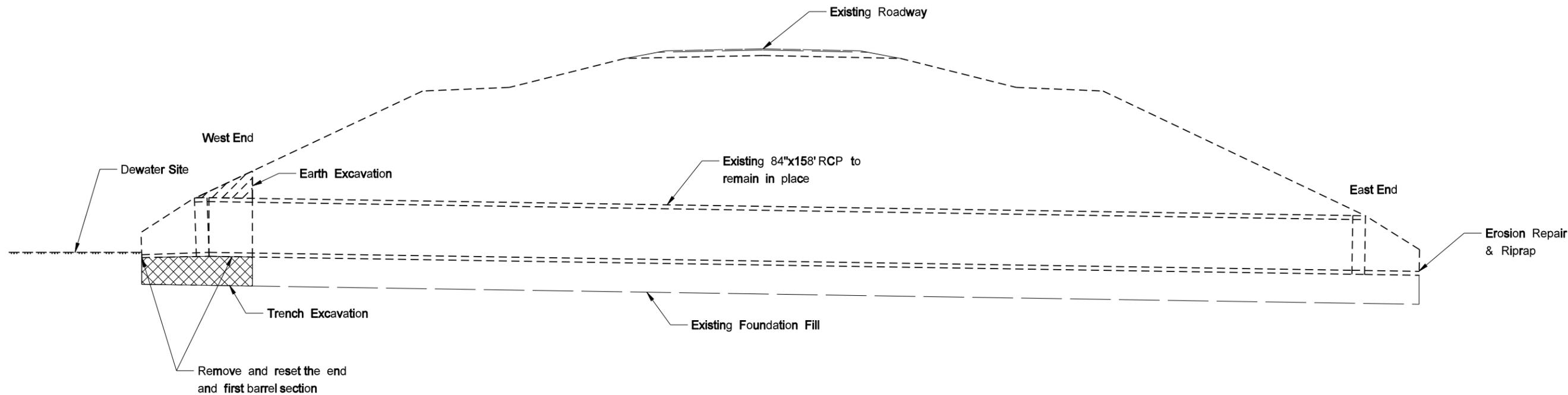
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Scope of Work

Drainage and Erosion Control

ND 16 - Mile 111

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(023)114	004	2



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Scope of Work

Pipe Culvert Repair

ND 16 - Mile 114

## NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(022)111	6	1

### GENERAL NOTES

203-P01 **DITCH EROSION REPAIR:** The contractor shall strip and stockpile the existing topsoil to its full depth from the erosion repair area, not to exceed 6 inches. Approximate estimated quantity 122 CY.

Construct a berm as shown on the berm layout, section 80, sheet 2 to redirect the flow of water from the north ditch beginning at sta. 504+75-98'Rt. to the inlet special catch basin at sta. 505+30-59'Rt. and the south ditch water from sta. 506+30-82'Rt. to the inlet special catch basin to prevent the water from flowing down the foreslope. The 9 inch beehive inlet installed at sta. 506+30-95'Rt. will catch the water from off the right of way. The material used to construct the berm will be compacted in accordance with Section 203.02 G of the Standard Specifications and compacted to 90% of the maximum dry density as determined by AASHTO T-180.

Any additional embankment material will be obtained outside the right of way by the contractor and shall be weed free. The contractor shall reshape the erosion repair area so it blends back in with the surrounding area. When reshaping of the erosion repair area is completed the contractor shall replace the topsoil, seed with a class II and class IV seed mixture in accordance with section 708.02 of the standard specifications, then apply a Turf Reinforcement Mat to the area disturbed. The construction of the berm, embankment material, water for compaction, reshaping of the erosion repair area, replacing topsoil and seeding will not be bid separately.

The cost of labor, equipment, and materials to perform the work will be included in the price bid for "Ditch Erosion Repair".

The cost of the Turf Reinforcement Mat will be included in the price bid for "TRM Type 2".

704-P01 **TRAFFIC CONTROL DEVICES:** The traffic control devices list has been developed using the following layouts on the Standard Drawing for traffic control:

D-704-24, Layout Type R if vehicles intrude on or near the shoulder, Type S for Placing Topsoil, Embankment Placement and Seeding.

D-704-15, Layout Type A if vehicles intrude on to the driving lane to load or unload equipment.

752-P01 **FENCE REMOVE AND RESET:** The existing barbed wire fence from Sta 504+70-Rt. to Sta 506+76-Rt. shall be removed for the inlet special catch basin, beehive inlet, pipe installations, and work on the inslope. The fence shall be reset in accordance with Standard D-752-1 upon completion of construction.

All costs associated with access through the fence for this project (including any temporary fence required) shall be included in the unit price bid for "Fence Remove & Reset".

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## NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(023)114	6	2

### GENERAL NOTES

- 704-P01 TRAFFIC CONTROL DEVICES: The traffic control devices list has been developed using the following layouts on the Standard Drawing for traffic control:
- D-704-24, Layout Type S for Placing Topsoil, Embankment Placement and Seeding.
- 714-P01 RELAYING PIPE AND END SECTIONS: Relaid concrete pipe and concrete end sections, west end shall be tied together and tied to the pipe left in place as shown on Standard D-714-22.
- Relaying the concrete pipe and end section, drilling the required holes and furnishing and installing the tie bolts, trench excavation, disposal of unsuitable excavated material, placement of base material, stripping of topsoil, placement of suitable excavated material on the inslope, inslope reshaping, replacing topsoil, and seeding with a class II and IV seed mixture will not be bid separately. The cost of labor, equipment, and materials to perform the work will be included in the price bid for "Remove and Relay Pipe - All Types & Sizes" and "Remove and Relay End Section - All Types & Sizes."
- East end, stripping of topsoil, placement of suitable excavated material on the inslope, inslope reshaping, replacing topsoil, and seeding with a class II and IV seed mixture will not be bid separately. The cost of labor, equipment, and materials to perform the work will be included in the price bid for "Riprap - Loose Rock".
- 752-P01 FENCE REMOVE AND RESET : All costs associated with access through the fence for this project (including any temporary fence required) will be included in the unit price bid for "Fence Remove & Reset".
- 930-P01 DEWATERING AT SITE: Existing water at west end of pipe shall be removed temporarily. All costs for removal will be included in the price bid for "Dewatering."

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## ENVIRONMENTAL COMMITMENTS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(022)111	6	3

**ENVIRONMENTAL COMMITMENTS:** The North Dakota Department of Transportation and the Federal Highway Administration have made several environmental commitments to various agencies and the public to secure approval of this project. The environmental commitments are as follows:

Wetland Number	Location	LONG / LAT (Dec. Deg.)	Cowardin Classification	Wetland Type	Wetland Feature	Wetland Size (acres)	Wetlands Protected Under E.O. 11990	USACE Jurisdictional Wetlands
*NO WETLANDS IN PROJECT AREA*								

## ENVIRONMENTAL COMMITMENTS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(023)114	6	4

**ENVIRONMENTAL COMMITMENTS:** The North Dakota Department of Transportation and the Federal Highway Administration 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:** Approximately 0.03 acres of wetlands will be impacted temporarily.

**ACTION TAKEN/REQUIRED**

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

Wetland Number	Location	LONG / LAT (Dec. Deg.)	Cowardin Classification	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands*	Wetland Impacts	
								Temp.	Perm.
1A	Sec. 5, T145N, R104W	-103.965676 W 47.404050 N	PEMC	Channel	0.06	Natural	X	0.00	0.00
1B	Sec. 5, T145N, R104W	-103.966683 W 47.403681 N	PEMC	Channel	0.07	Natural	X	0.03	0.00
<b>TOTALS</b>					<b>0.13</b>			<b>0.03</b>	<b>0.00</b>

**PERMITS REQUIRED:** A Section 404 Permit (US Army Corps. of Engineers).

# ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
<b>ND</b>	SS-5-016(022)111	<b>8</b>	1

SPEC CODE	ITEM DESCRIPTION	UNIT	SS-5-016 022)111	SS-5-016 023)114	TOTAL
-----	-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.615	0.385	1
202	0210 REMOVAL OF MANHOLES	EA	1		1
230	0113 DITCH EROSION REPAIR	L SUM	1		1
702	0100 MOBILIZATION	L SUM	0.6	0.4	1
704	0100 FLAGGING	MHR	50	50	100
704	1000 TRAFFIC CONTROL SIGNS	UNIT	193	193	386
704	1067 TUBULAR MARKERS	EA	15	15	30
708	1020 RIPRAP-LOOSE ROCK	CY	30	40	70
708	1430 FIBER ROLLS 12IN	LF	350	200	550
708	5652 ECB TYPE 3	SY		120	120
708	5661 TRM TYPE 2	SY	890		890
709	0600 GEOTEXTILE FABRIC-TYPE RR	SY	60	80	140
714	4105 PIPE CONDUIT 24IN	LF	115		115
714	4120 PIPE CONDUIT 42IN	LF	25		25
714	9659 REMOVE & RELAY PIPE-ALL TYPES & SIZES	LF		6	6
714	9660 REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA		1	1
722	3790 INLET SPECIAL CATCH BASIN 9IN BEEHIVE 60IN	EA	1		1
722	4020 INLET CATCH BASIN 9IN BEEHIVE	EA	1		1
752	0922 FENCE REMOVE & RESET	LF	246	200	446
930	0200 DEWATERING	L SUM		1	1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(022)111	050	1

Inlet  
Type Special Catch Basin 9 in Beehive 60 in.  
Sta. 505+30 - 59' Rt.  
Top Elev. 993.03  
Base Elev. 974.92  
Invert Elev. 975.3  
Outlet Elev. 975.2  
"H" Distance 17.44 Ft.

Inlet  
Type Catch Basin 9 In. Beehive  
Grate Style 9 In. Beehive  
Sta. 506+30 - 95' Rt.  
Top Elev. 993.36  
Base Elev. 988.69  
Invert Elev. 988.94  
"H" Distance 4.67 Ft.

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Inlet and Manhole Summary

Drainage and Erosion Control

ND 16 - Mile 111

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(022)111	051	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Length	Pipe Conduit Storm Drain Pay Size	Allowable Material	Required Diameter	Minimum Thickness	(A) End Sections		Applicable Backfill Detail
									Begin	End	
				LF	In		In	In	EA	EA	
505+30	59'Rt.	506+30	95'Rt.	115	24	Reinforced Concrete Pipe - Class III	24				D-714-27
						Polymeric Coated Steel (over zinc or aluminum coated steel)	24	0.064			
505+30	59'Rt.	505+41	83'Rt.	25	42	Reinforced Concrete Pipe - Class III	42			Y	N/A
						Polymeric Coated Steel (over zinc or aluminum coated steel)	42	0.064			

(A) Not paid for separately, to be included in the price bid for Pipe Conduit.

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Pipe List  
 Drainage and Erosion Control  
 ND 16 - Mile 111



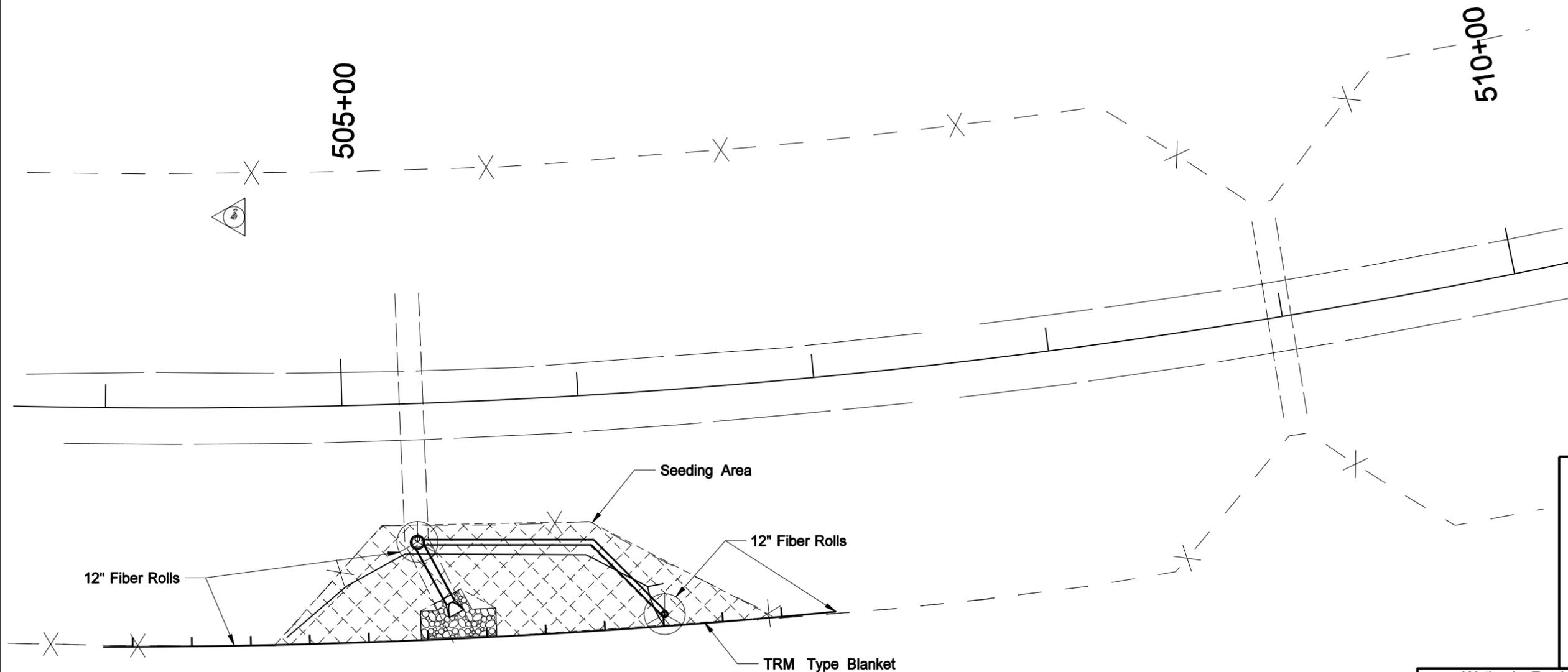


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(022)111	075	1



Fiber Rolls 12 in  
Sta. 504+00-Rt. to Sta. 507+00-Rt. 350 LF

TRM Type 2  
Sta. 504+00-Rt. to Sta. 507+00-Rt. 890 SY

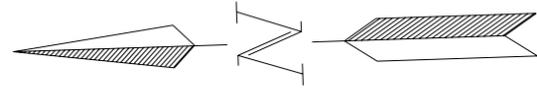


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Wetlands, Erosion Control, and Seeding

Drainage and Erosion Control

ND 16 - Mile 111



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(023)114	075	2

345+00

350+00

355+00

**Riprap-Loose Rock**

Sta. 351+00-Rt. to Sta. 352+00-Rt. 20 CY  
 Sta. 351+00-Lt. to Sta. 352+00-Lt. 20 CY

**Fiber Rolls 12"**

Sta. 351+00-Rt. to Sta. 352+00-Rt. 100 LF  
 Sta. 351+00-Lt. to Sta. 352+00-Lt. 100 LF

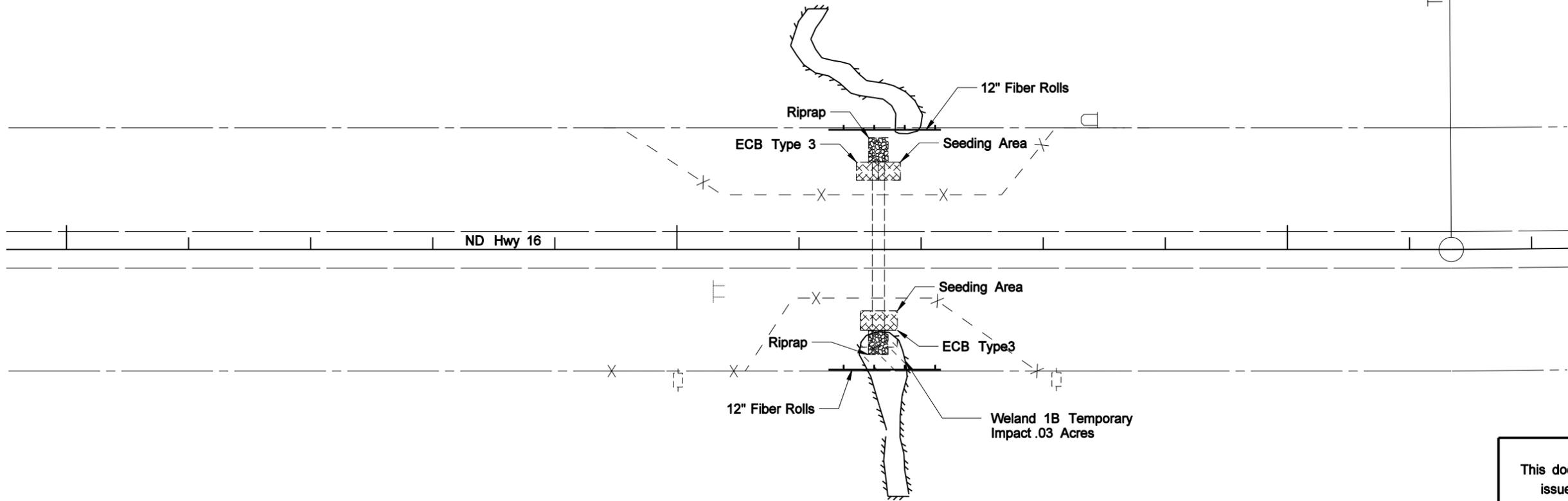
**ECB-Type 3**

Sta. 351+00-Rt. to Sta. 352+00-Rt. 60 SY  
 Sta. 351+00-Lt. to Sta. 352+00-Lt. 60 SY

**Goetextile Fabric-Type RR**

Sta. 351+00-Rt. to Sta. 352+00-Rt. 40 SY  
 Sta. 351+00-Lt. to Sta. 352+00-Lt. 40 SY

TS 356+34.22



ND Hwy 16

551+65 -  $\phi$   
 84" X 158' RCP (Good)  
 2 RCES (Good)  
 To remain in place

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Wetlands, Erosion Control, and Seeding

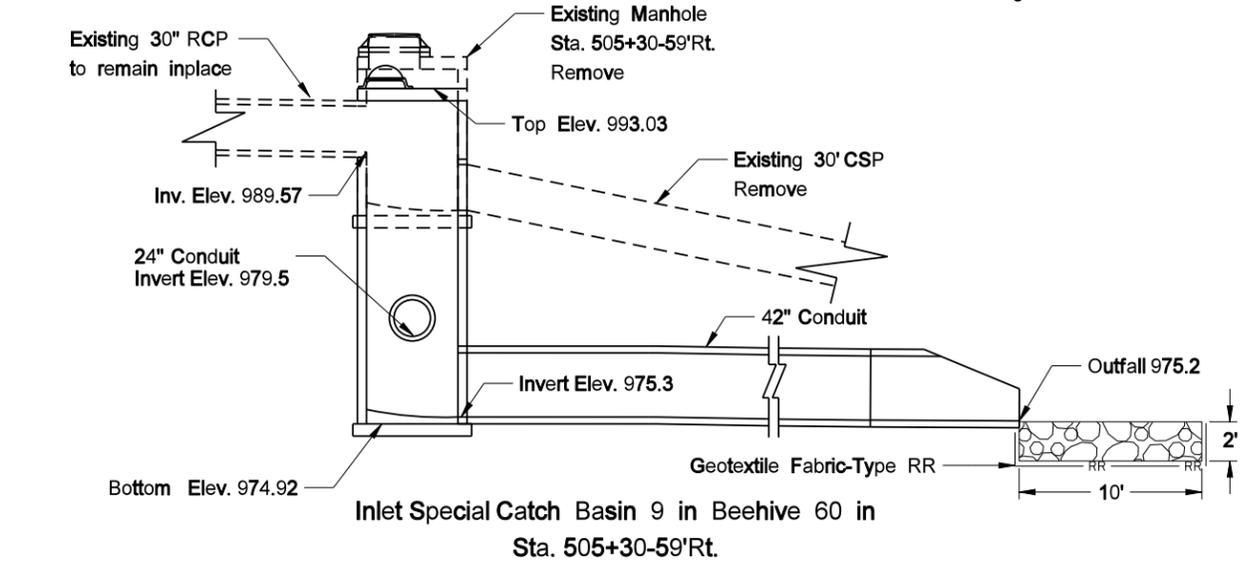
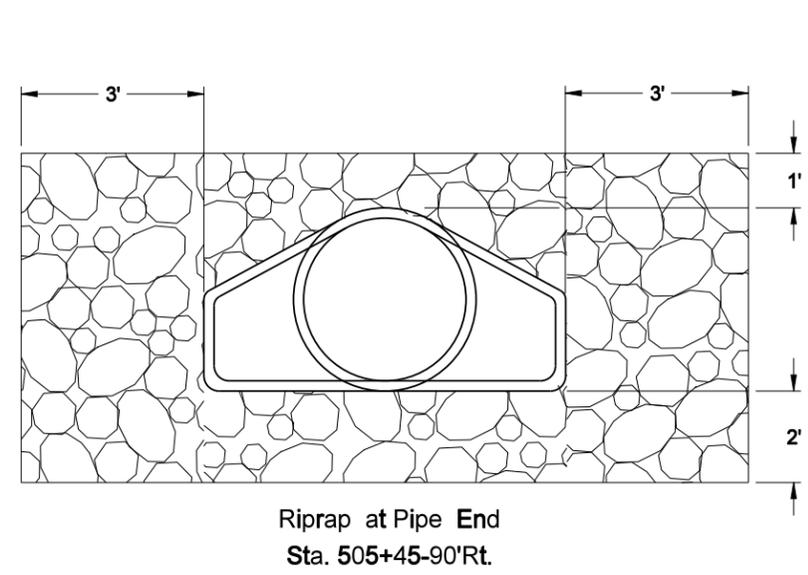
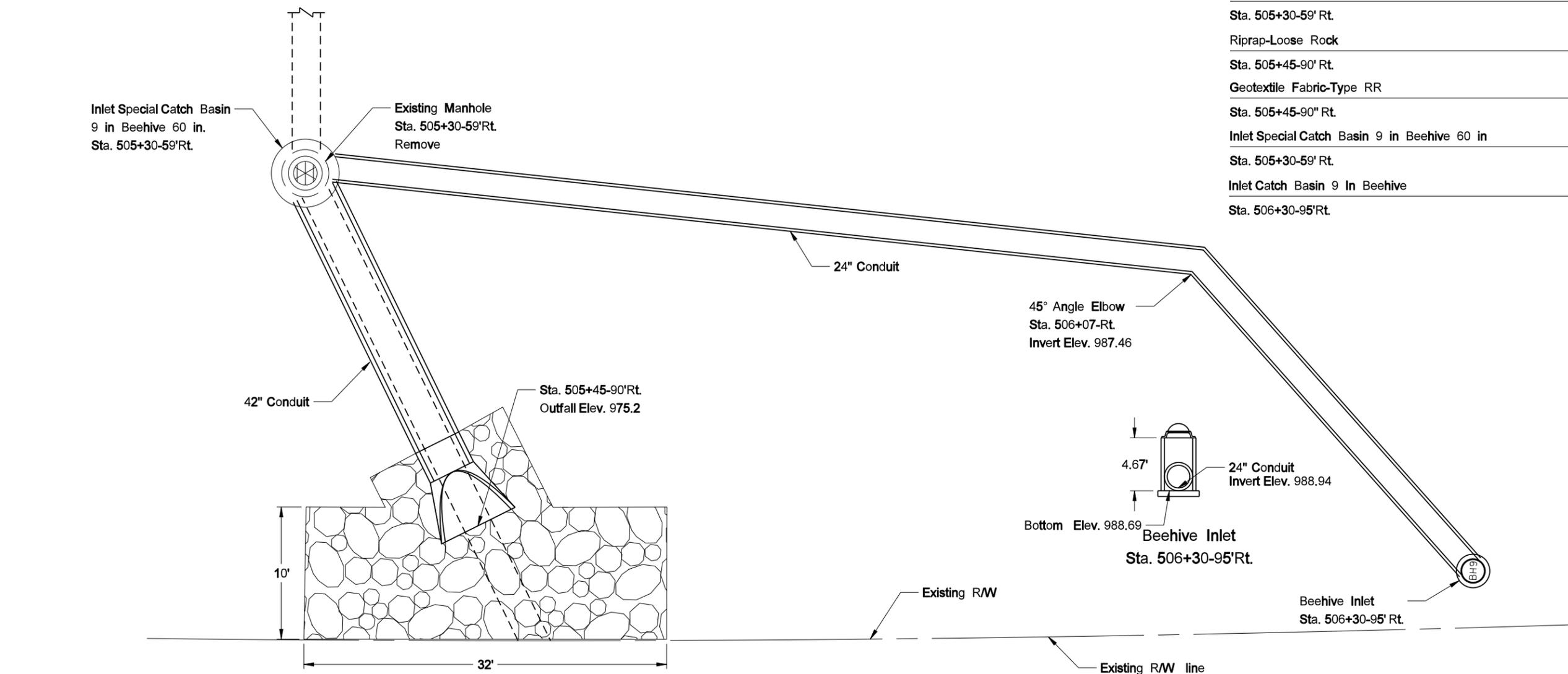
Pipe Culvert Repair

ND 16 - Mile 114

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(022)111	080	1

Removal of Manholes

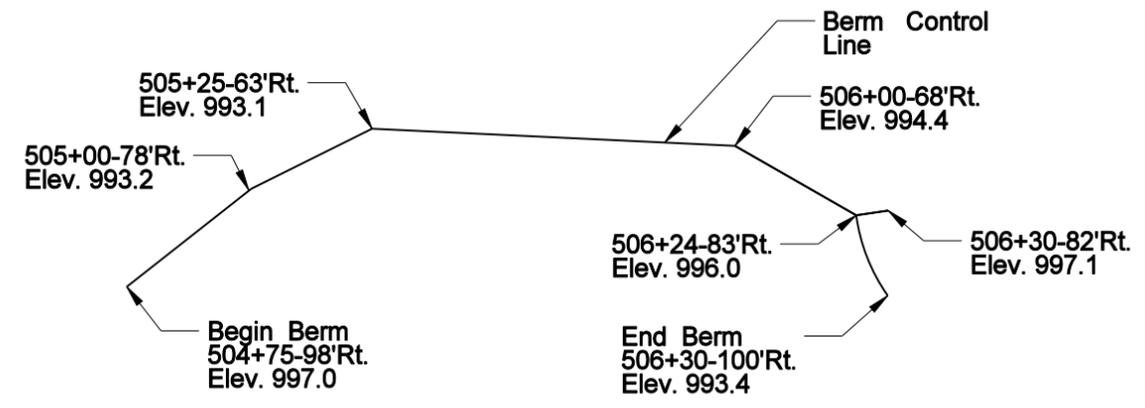
Sta. 505+30-59' Rt.	1 EA
Riprap-Loose Rock	
Sta. 505+45-90' Rt.	30 CY
Geotextile Fabric-Type RR	
Sta. 505+45-90' Rt.	60 SY
Inlet Special Catch Basin 9 in Beehive 60 in	
Sta. 505+30-59' Rt.	1 EA
Inlet Catch Basin 9 In Beehive	
Sta. 506+30-95' Rt.	1 EA



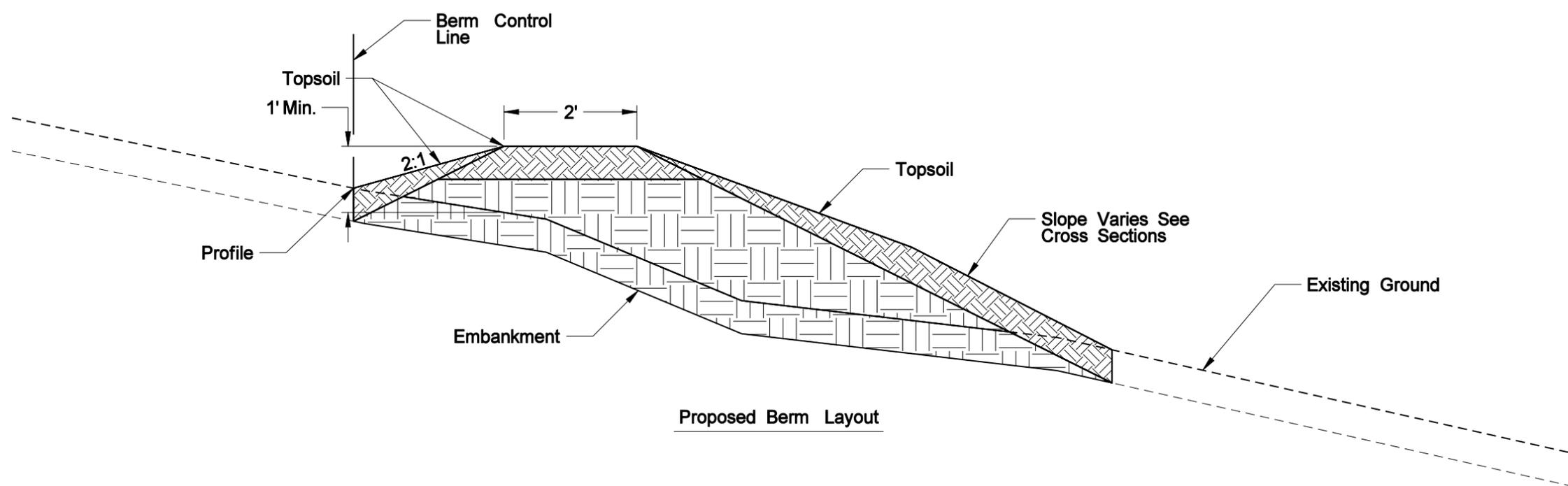
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Beehive Inlet, Pipe, and Riprap  
 Drainage and Erosion Control  
 ND 16 - Mile 111

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-016(022)111	080	2



Berm Alignment and Profile Elevations



Proposed Berm Layout

BERM ESTIMATED QUANTITIES		
DESCRIPTION	UNIT	Sta. 504+75-98'Rt. to Sta. 506+22-113'Rt.
Embankment includes 25% additional volume for shrinkage.	CY	400
Water for Embankment at 10 Gal/CY	MGAL	4

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Proposed Berm Alignment and Profile Elevations

Drainage and Erosion Control

ND 16 - Mile 111

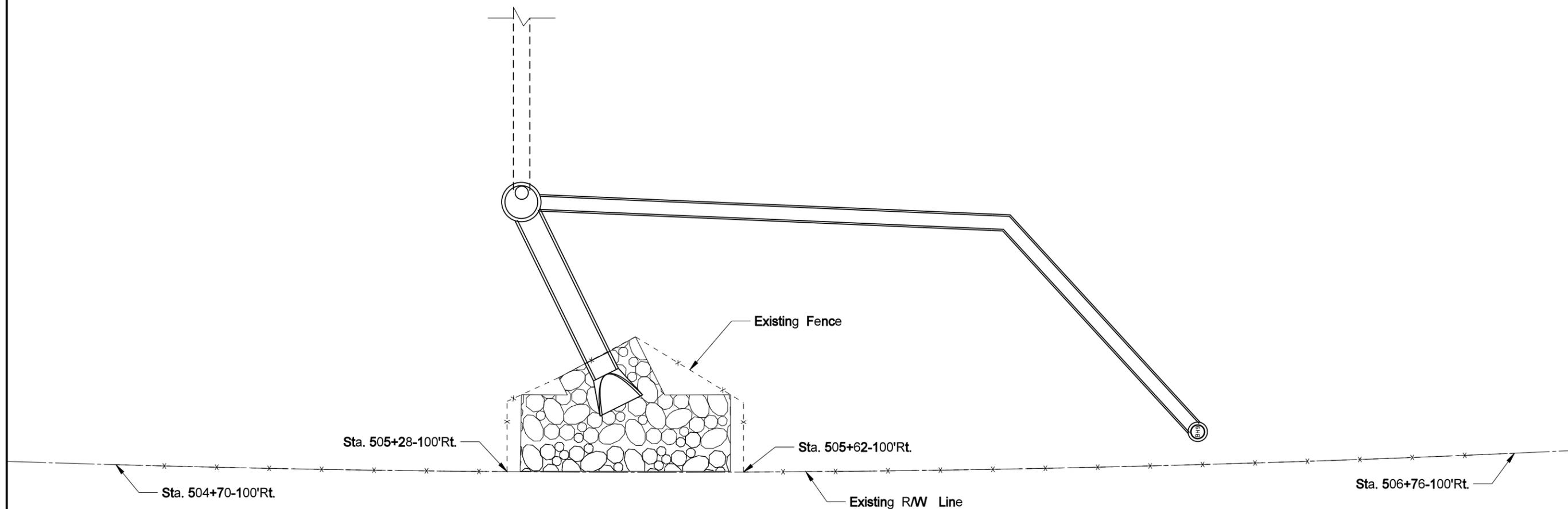
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(022)111	080	3



Fence Remove and Reset

Sta. 504+70-Rt. to 506+76-Rt.

246 LF



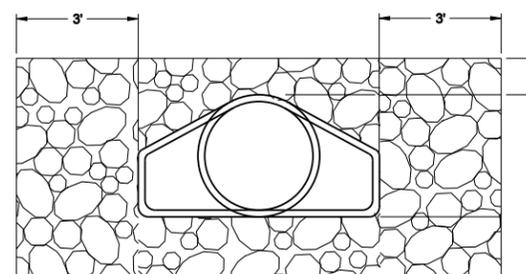
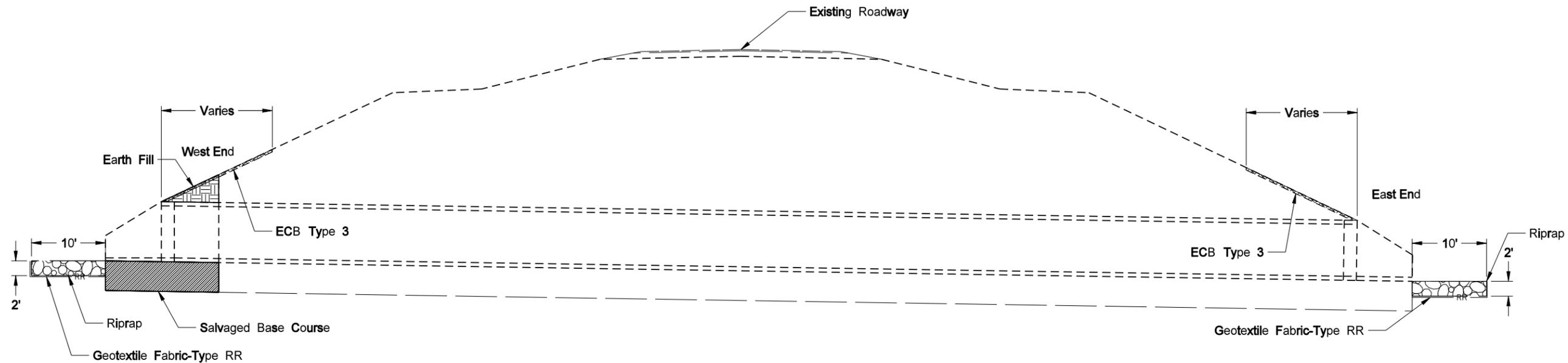
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Existing Fence Remove and Reset Layout

Drainage and Erosion Control

ND 16 - Mile 111

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-016(023)114	080	4



Riprap at Pipe Ends  
Sta. 351+65-0

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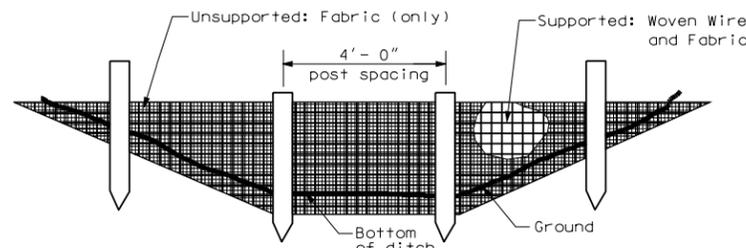
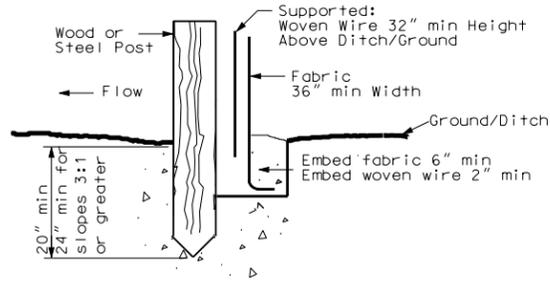
Pipe Culvert Repair Layout

Pipe Culvert Repair

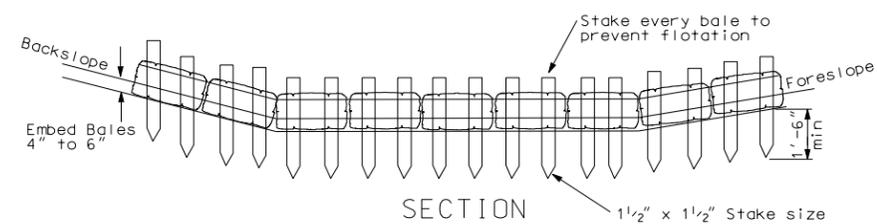
ND 16 - Mile 114



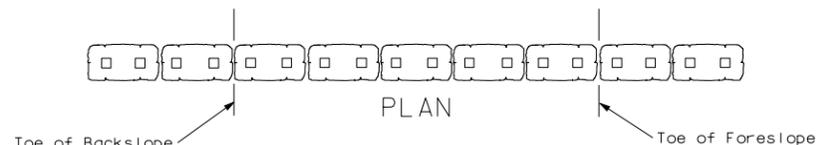
# EROSION AND SILTATION CONTROLS



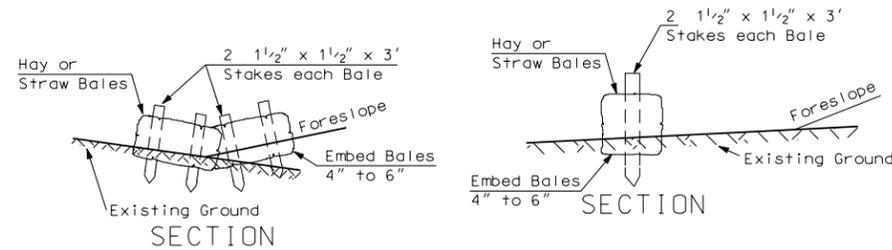
**SILT FENCE**  
Supported and Unsupported



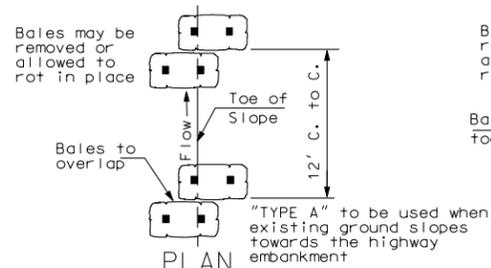
SECTION  
1 1/2" x 1 1/2" Stake size



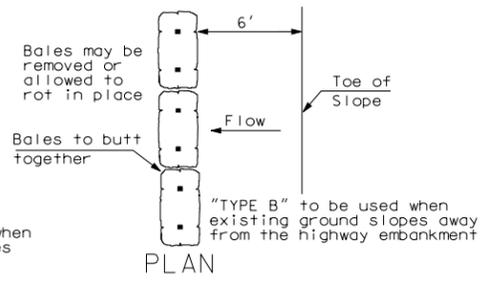
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SECTION

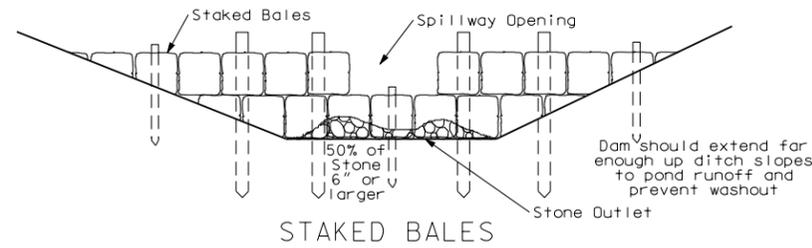


"TYPE B"

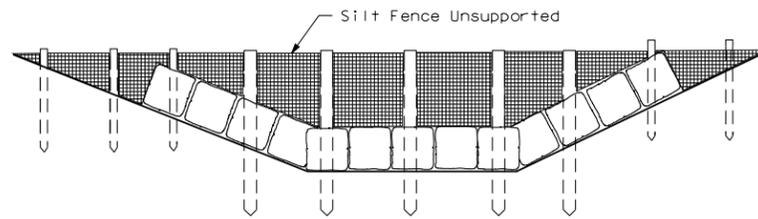


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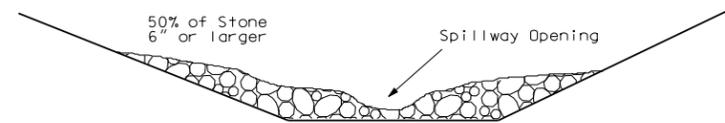
BALED HAY OR STRAW EROSION CHECKS



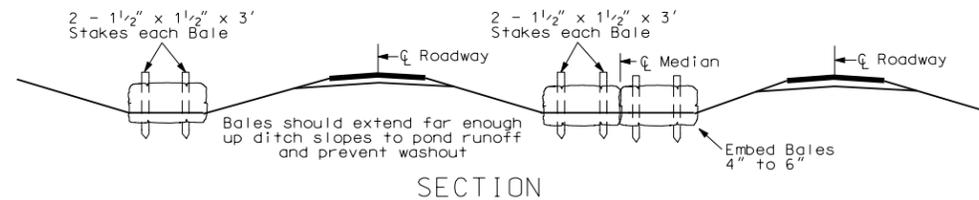
STAKED BALES



FENCE-BACKED BALES

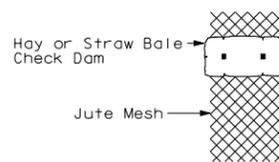


GRADED STONE  
DITCH EROSION DAMS

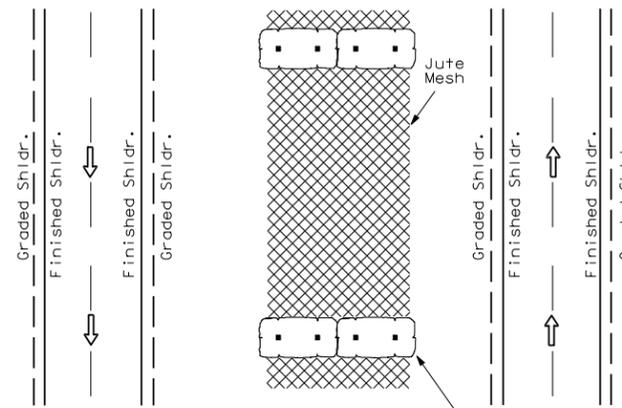


SECTION

MEDIAN OR DITCH PROTECTION  
AT STREAM CROSSING



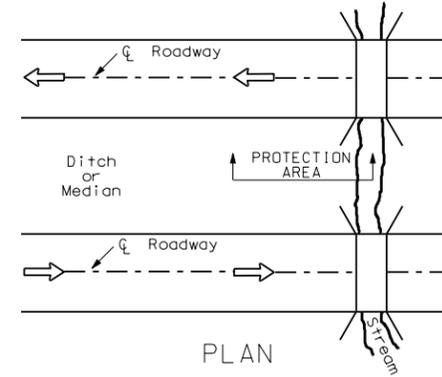
ROADSIDE DITCH



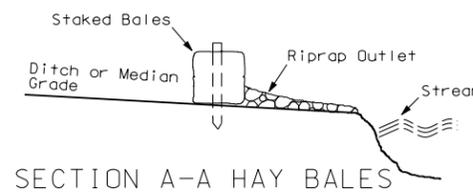
PLAN

MEDIAN DITCH

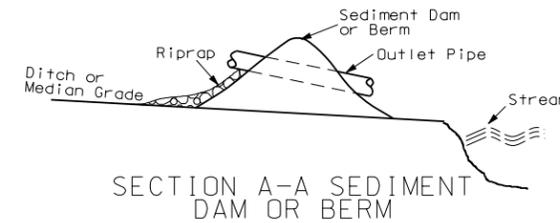
STONE, JUTE, MESH, OR SOD  
DITCH & MEDIAN EROSION CONTROL



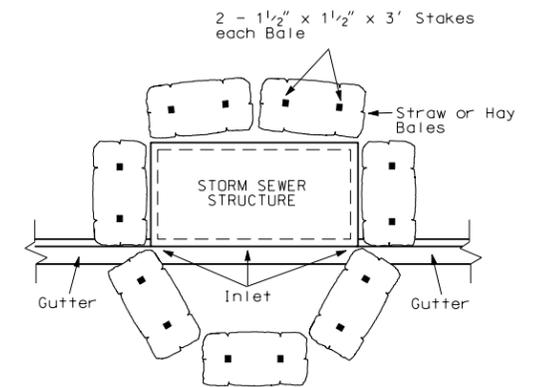
PLAN



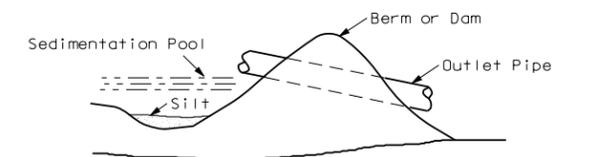
SECTION A-A HAY BALES



SECTION A-A SEDIMENT  
DAM OR BERM



STORM SEWER INLET  
EROSION & SILTATION  
BARRIER

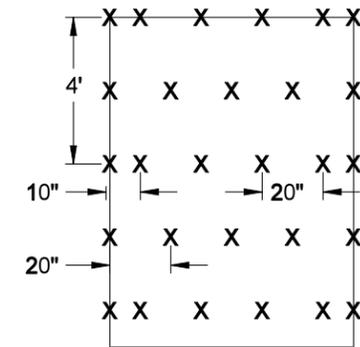
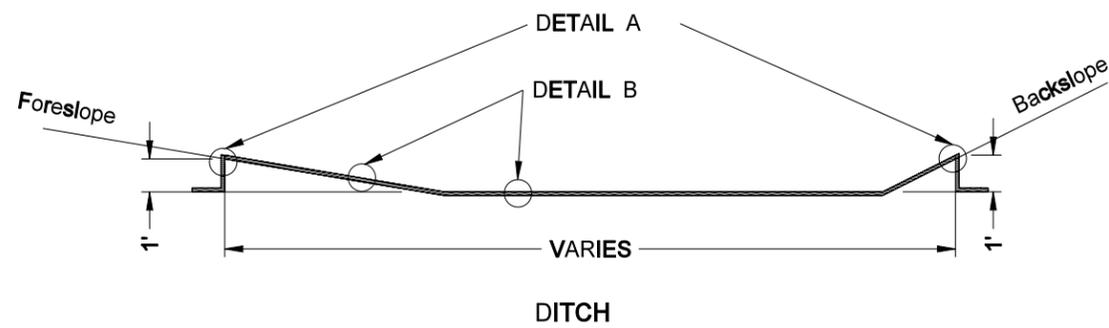


SMALL SEDIMENT DAM OR BERM

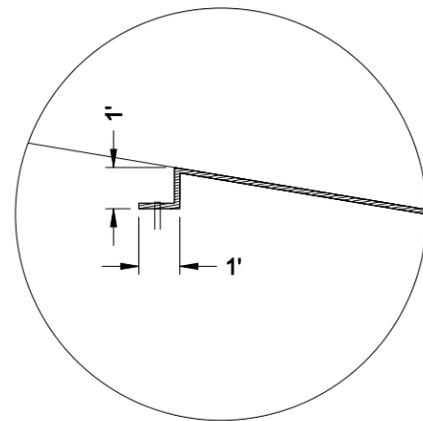
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
09-04-92	Ditch check
09-16-92	Sediment cont. fencing
01-31-95	General revisions
10-09-02	Sediment fence
01-24-04	Silt fence
02-06-04	Rev silt fence details
12-01-04	PE Stamp added

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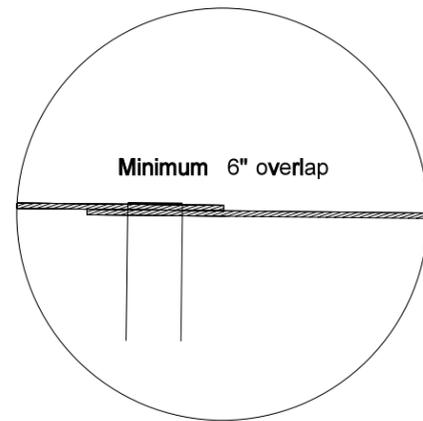
EROSION AND SILTATION CONTROL  
BLANKET INSTALLATION



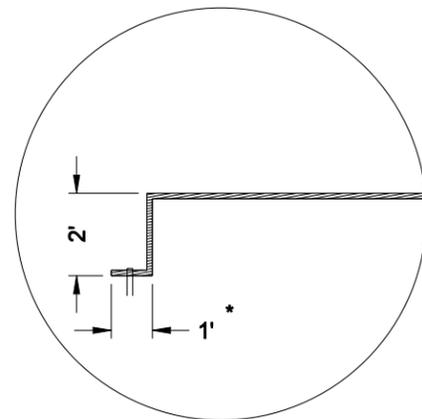
STAPLE PATTERN: 3.8 staples per square yard using 8-inch 11 gauge wire "u" staples.



DETAIL A

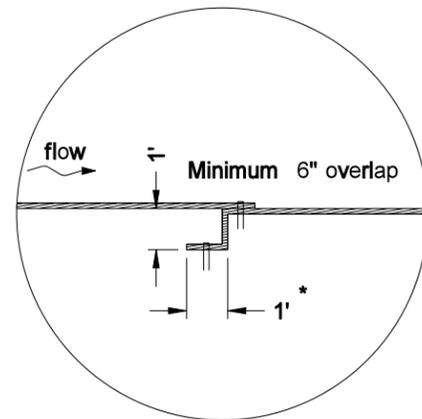


DETAIL B

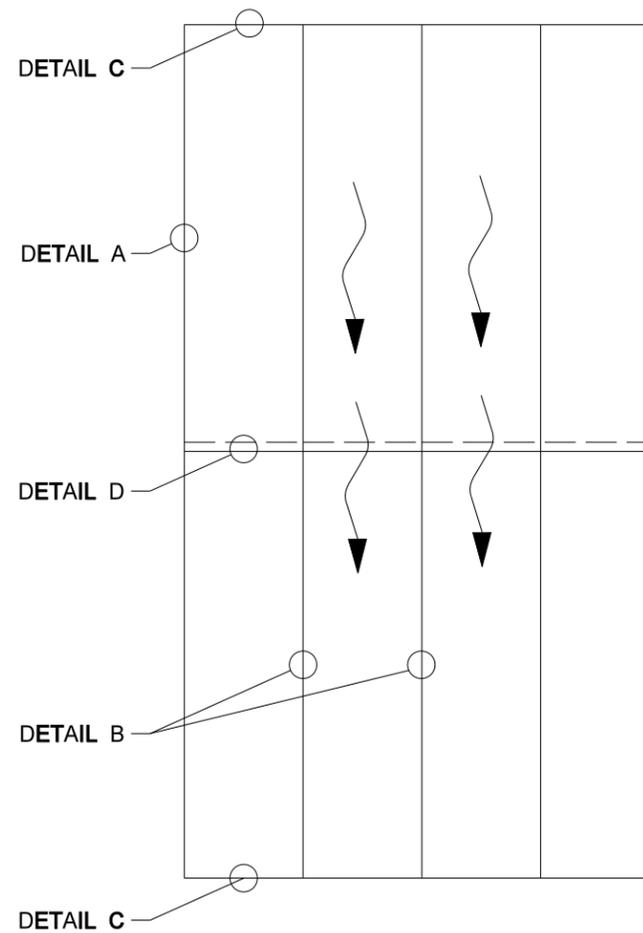


DETAIL C

\* This tie may be placed ahead or back.

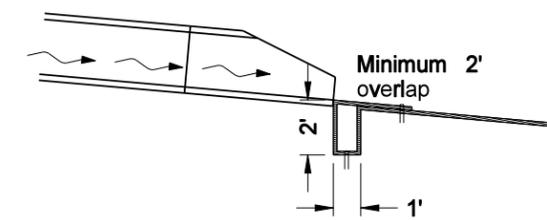


DETAIL D

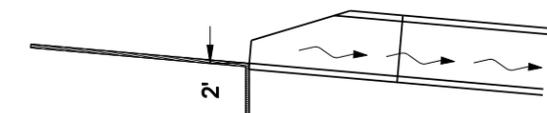


BLANKET LAYOUT

Note: Beginning and ending of erosion control blanket areas shall be installed as DETAIL C.



PIPE OUTLETS



PIPE INLETS

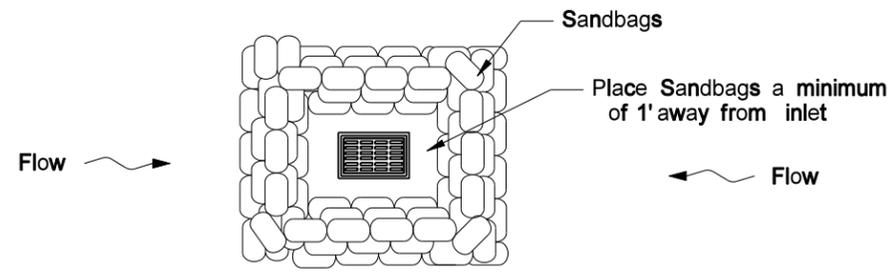
INSTALLATION AT PIPE ENDS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-13-06	
REVISIONS	
DATE	CHANGE

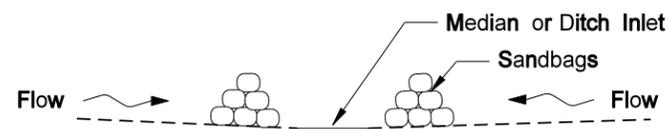
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EROSION CONTROL  
MEDIAN OR DITCH INLET PROTECTION

D-708-6

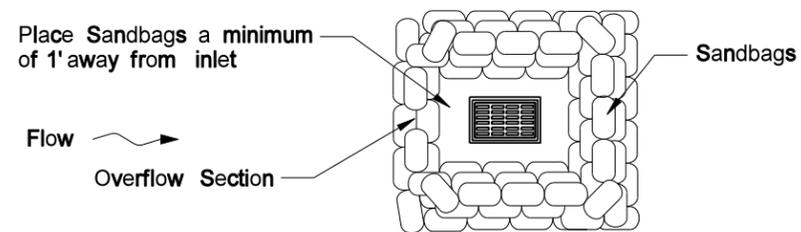


Plan View

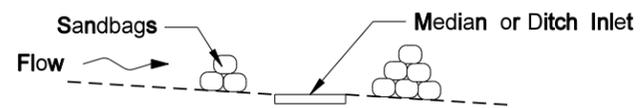


Profile View

SANDBAG PROTECTION  
LOW POINT

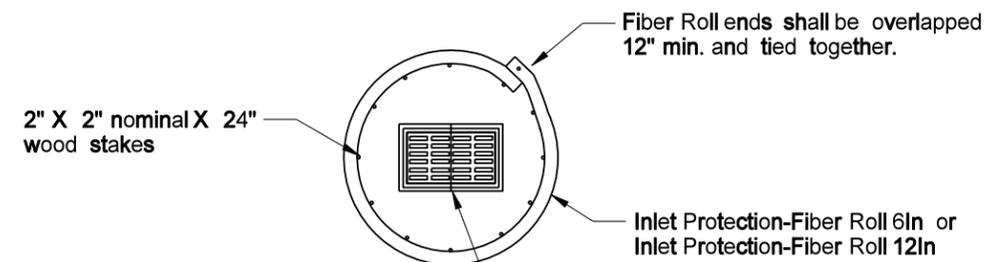


Plan View

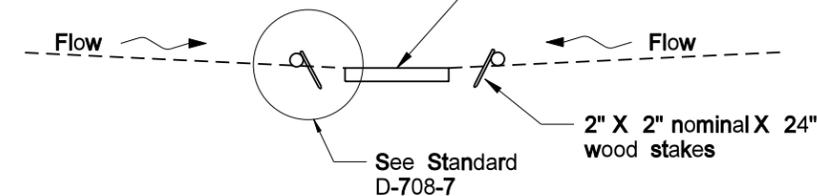


Profile View

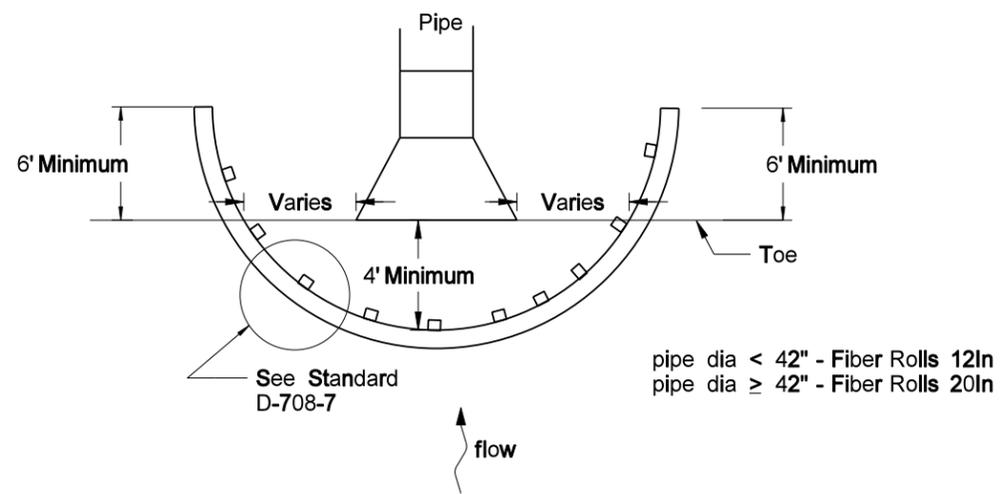
SANDBAG PROTECTION  
ON SLOPE



Plan View



Profile View



FIBER ROLL PROTECTION  
INLET OF PIPE END

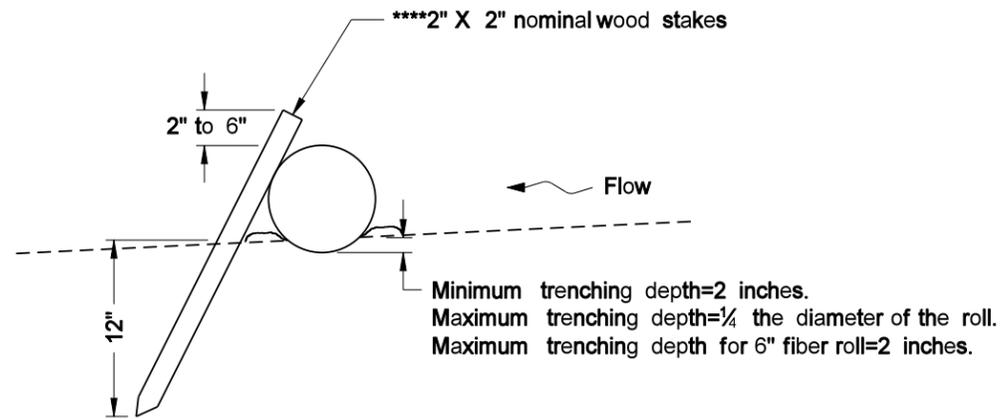
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-13-06	
REVISIONS	
DATE	CHANGE

12-14-07 Added 12" Fiber roll overlap, option of butting fiber roll ends removed.

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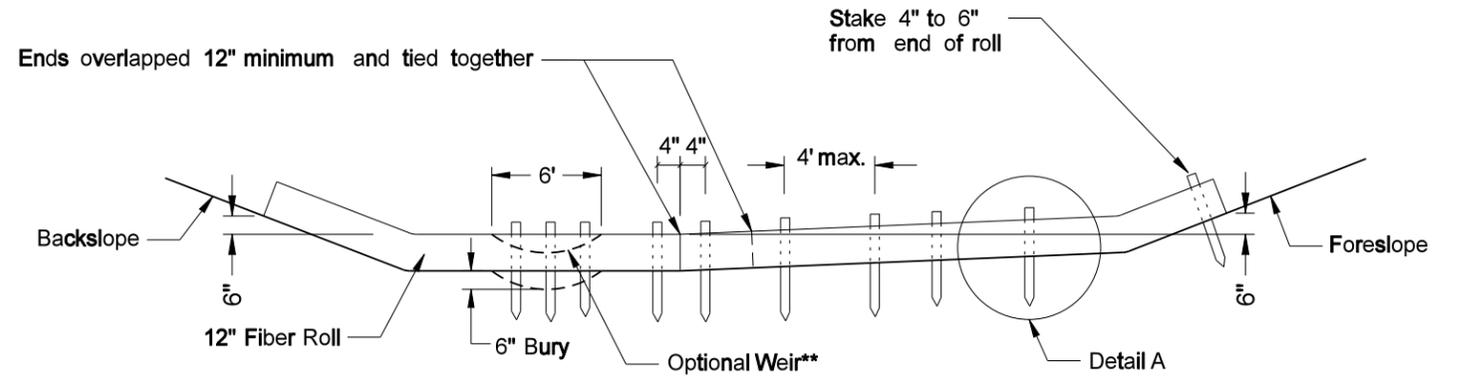
EROSION CONTROL  
FIBER ROLL STAKING DETAILS

D-708-7



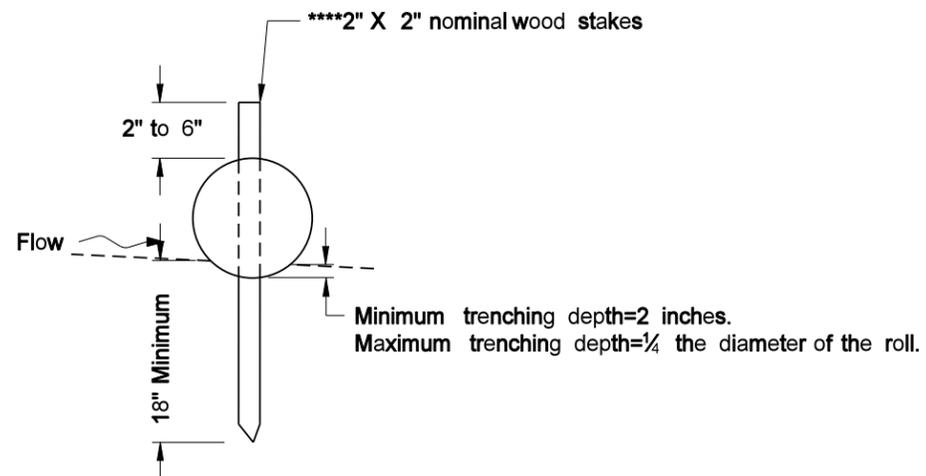
**\*DETAIL A**  
6" or 12" Fiber Roll Staking Detail

\*Manufacturer may require stake through center of fiber roll.  
\*\*\*\*Stakes spaced every 3-4 feet.

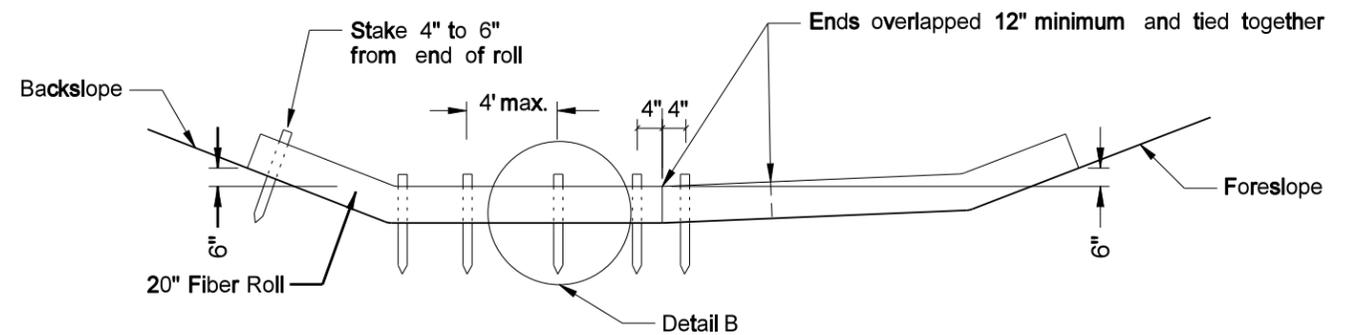


\*\*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property.

**12 INCH FIBER ROLL - DITCH BOTTOM**



**DETAIL B**  
20" Fiber Roll Staking Detail



**\*\*\*20 INCH FIBER ROLL - DITCH BOTTOM**

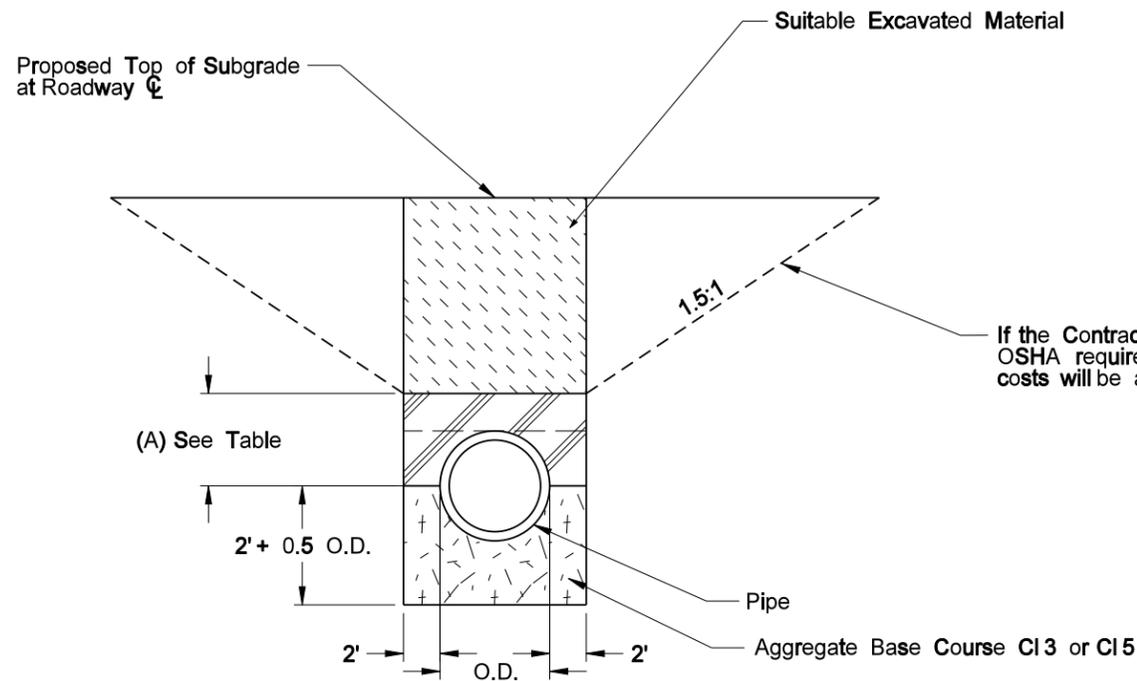
\*\*\*Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

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

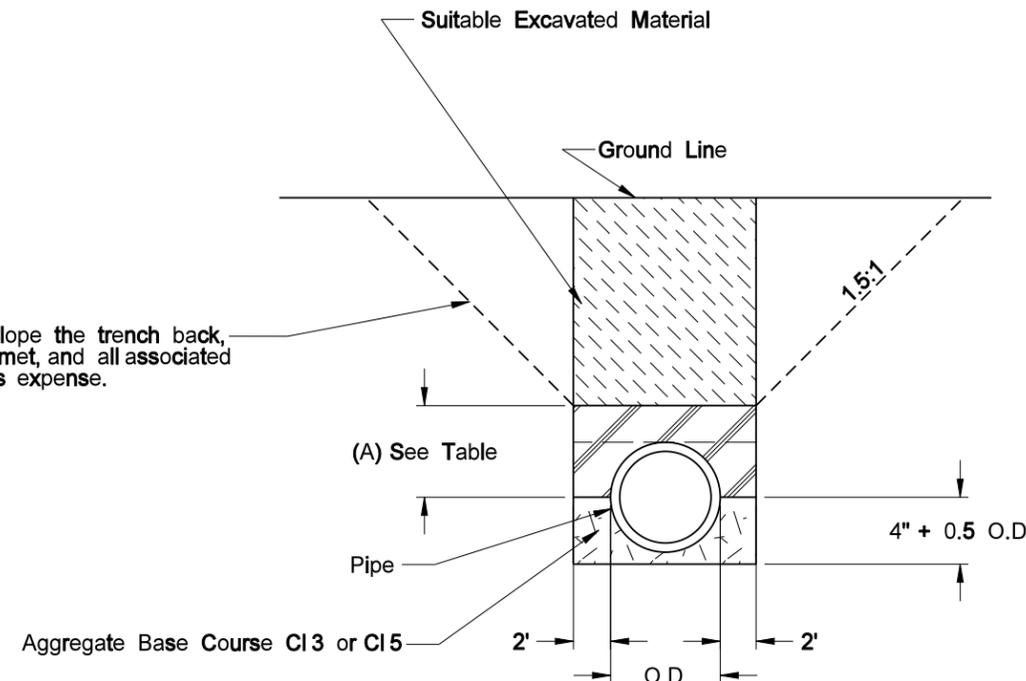
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 11/18/10 and the original document is stored at the North Dakota Department of Transportation

PIPE BACKFILL FOR STORM DRAIN UNDER ROADWAYS OF 40 MPH OR LESS AND PIPE NOT UNDER ROADWAY



BEDDING AND BACKFILL FOR STORM DRAIN UNDER ROADWAY



BEDDING AND BACKFILL FOR STORM DRAIN NOT UNDER ROADWAY

Included in Pipe Pay Item

- 1) Pipe
- 2) Trench excavation
- 3) Disposal of unsuitable excavated material and placement of suitable excavated material.
- 4) Backfill of suitable excavated material
- 5) Aggregate Base Course CI 3 or CI 5

Pay Items

- 1) Pipe
- 2) Surfacing removal

Backfill Requirements		
Pipe Material	Dimension (A)	Backfill
Concrete	0.5 O.D.	Approved Backfill (Note 2)
Metal	0.5 O.D. + 1'	CI 3 or CI 5
PVC/HDPE	0.5 O.D. + 1'	CI 3 or CI 5

**NOTES:**

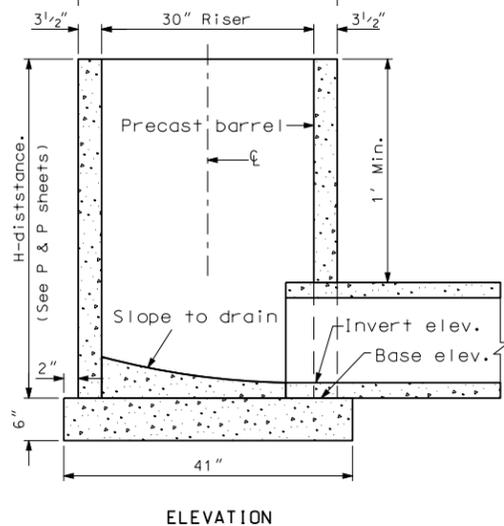
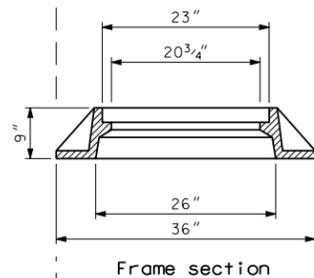
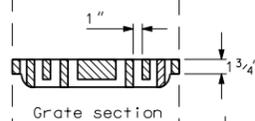
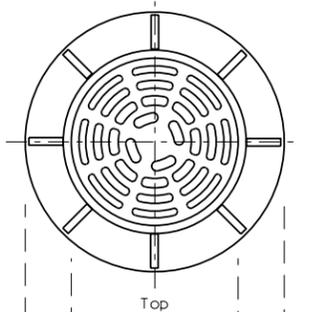
- 1. This drawing corresponds to Storm Drain Pipe only. It does not include pipes in approaches.
- 2. Approved backfill shall meet the requirements of AASHTO M 145 for A-1, A-2, and A-3 soils.
- 3. Compaction requirements for all materials associated with the trench installation shall meet 90% of AASHTO T-180. Maximum thickness of any one lift shall not exceed 6 inches.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-08-08	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674 , on 12/08/2008 and the original document is stored at the North Dakota Department of Transportation

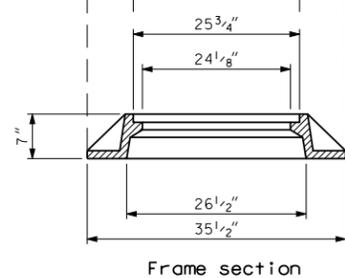
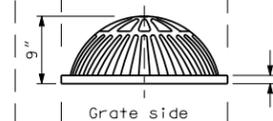
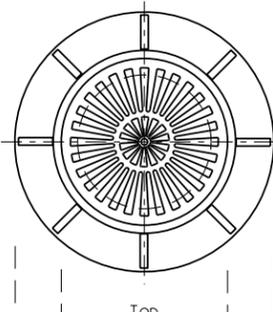
INLET - CATCH BASIN

Type - A  
(Waterway area - 1.1 SF)

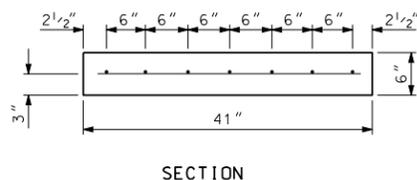
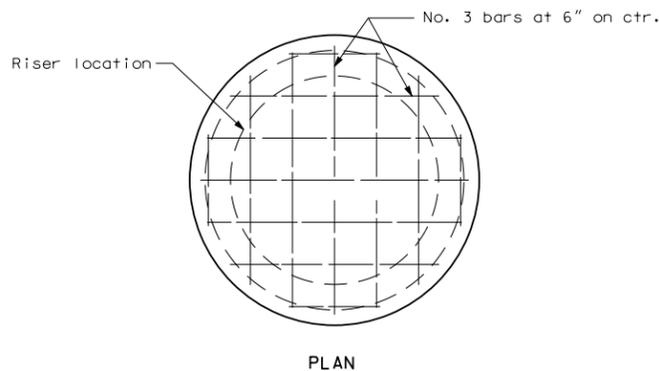


Casting weight - 420 lbs.

Beehive



Casting weights  
6" - 285 lbs.  
9" - 300 lbs.



NOTES:

1. Other castings, similar in dimension and of equal or greater weight than that shown, may be used if accepted by the engineer in writing. The grate style shall be as specified on the plans.
2. Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B.
3. The contractor shall have the option of using precast or poured in place bases. Class of concrete shall be AE. The aggregate size shall be approved by the engineer in the field. Construction shall be in accordance with section 722.03 of the Standard Specifications.
4. Precast risers shall be constructed in accordance with AASHTO M-199.
5. On projects with P.C.C pavement all inlet risers or barrels shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after the paving. Adjustment may be done with adjusting rings, masonry, or cast-in-place. All costs for this adjustment shall be included in the price bid for the inlet.

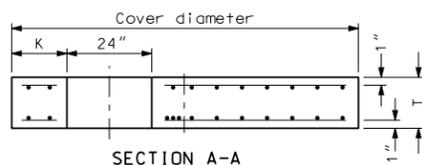
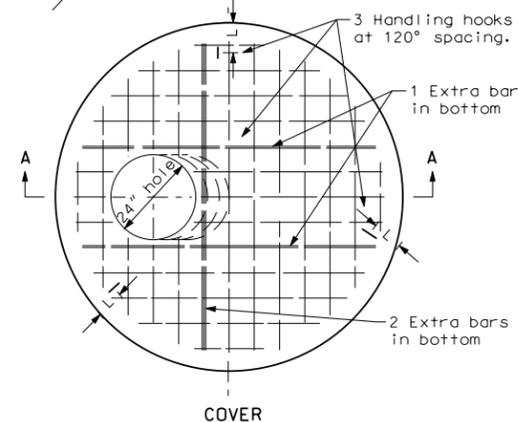
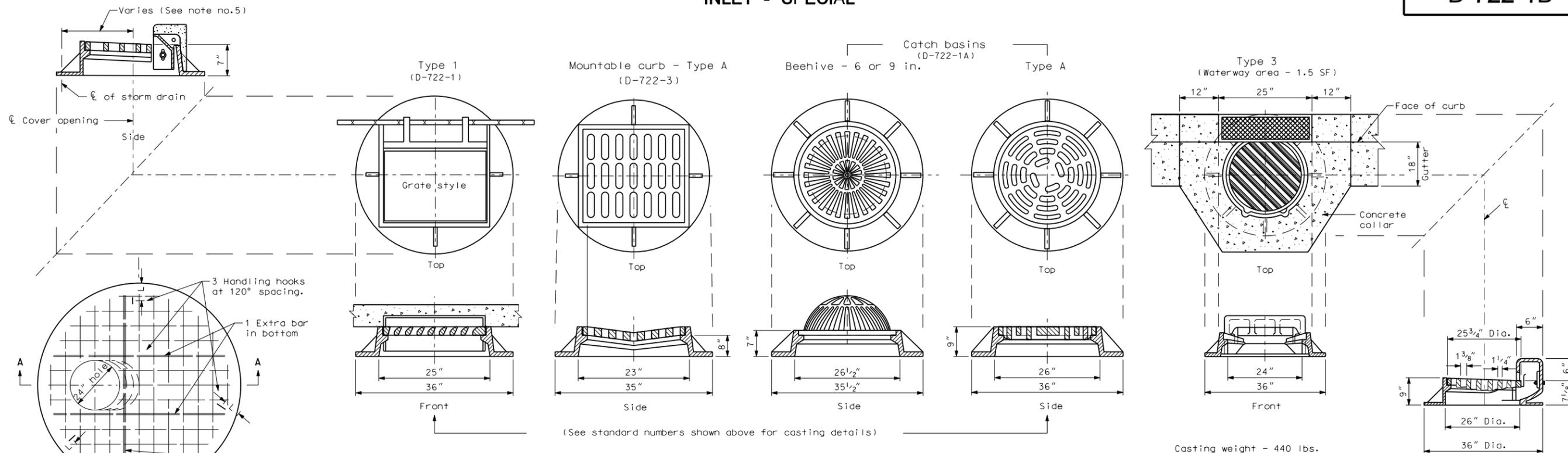
PAY ITEM

- Inlet - Catch basin, Type A . . . . . Ea.
- Inlet - Catch basin, 6 in. beehive . . . Ea.
- Inlet - Catch basin, 9 in. beehive . . . Ea.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-01-89	
REVISIONS	
DATE	CHANGE
11-90 12-01-04	Note 5 added PE Stamp added

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INLET - SPECIAL



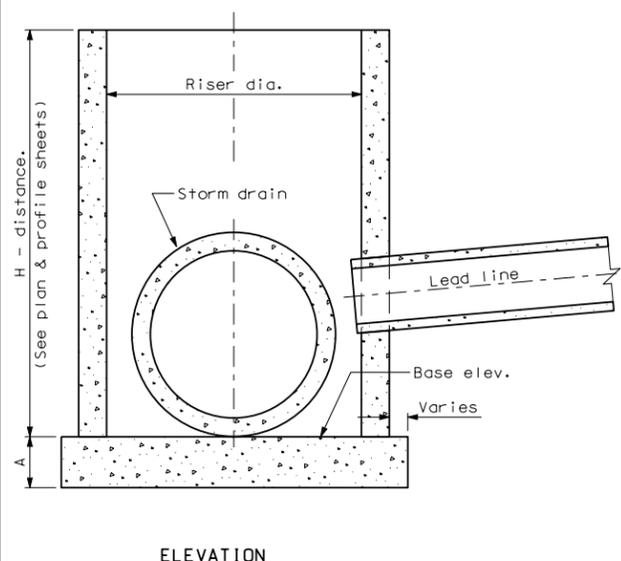
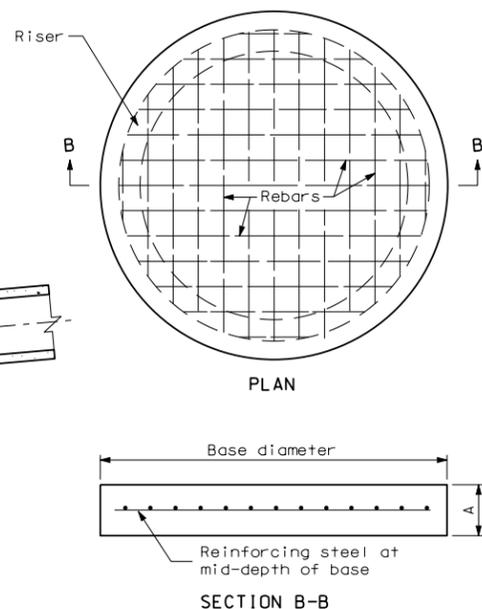
RISER COVERS									RISER BASES		
RISER DIA.	COVER DIA.	WEIGHT OF SECTION (lbs)	T	K	L	TOP BARS	BOTTOM BARS	BASE DIA.	WEIGHT OF SECTION (lbs)	A	BARS
48"	58"	1110	6"	6"	8"	#4 at 6"	#4 at 6"	66"	1785	6"	#3 at 6"
60"	72"	2470	8"	7"	9"	#3 at 6"	#4 at 6"	78"	3320	8"	#3 at 6"

NOTES:

- Other castings, similar in dimension and of equal or greater weight than that shown, may be used if accepted by the engineer in writing. The grate style shall be as specified on the plans and included in the price bid for "Inlet - Special (casting type & riser size)".
- Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35B.
- The contractor shall have the option of using precast or poured in place bases. Class of concrete shall be AE. The aggregate size shall be approved by the engineer in the field. Construction shall be in accordance with section 722.03 of the Standard Specifications.
- Precast barrels shall be constructed in accordance with AASHTO M-199.
- The distance between the ℓ of the cover opening and the storm drain shall be noted on the P & P sheets.
- Ladder rungs shall be provided for riser sections whenever the Type 3 casting is specified. Rungs shall also be required when other castings are used and is noted on the P & P sheets.
- On projects with P.C.C pavement all inlet risers or barrels shall be constructed 4 to 5 inches below final elevation and adjusted to final grade after the paving. Adjustment may be done with adjusting rings, masonry, or cast-in-place. All costs for this adjustment shall be included in the price bid for the inlet.
- For Inlet - Special, Mountable - Type B details see Standard D-722-3.

PAY ITEM

48 in. riser	Inlet - Special, Type 1 - 48 in. . . . .	Ea.
	Inlet - Special, Type 2 - 48 in. . . . .	Ea.
	Inlet - Special, Mountable, Type A - 48 in. . . . .	Ea.
	Inlet - Special, Mountable, Type B - 48 in. . . . .	Ea.
	Inlet - Special, Catch basin, 6 in. beehive - 48 in. . . . .	Ea.
	Inlet - Special, Catch basin, 9 in. beehive - 48 in. . . . .	Ea.
60 in. riser	Inlet - Special, Catch basin, Type A - 48 in. . . . .	Ea.
	Inlet - Special, Type 3 - 48 in. . . . .	Ea.
	Inlet - Special, Type 1 - 60 in. . . . .	Ea.
	Inlet - Special, Type 2 - 60 in. . . . .	Ea.
	Inlet - Special, Mountable, Type A - 60 in. . . . .	Ea.
	Inlet - Special, Mountable, Type B - 60 in. . . . .	Ea.
72 in. riser	Inlet - Special, Catch basin, 6 in. beehive - 60 in. . . . .	Ea.
	Inlet - Special, Catch basin, 9 in. beehive - 60 in. . . . .	Ea.
	Inlet - Special, Catch basin, Type A - 60 in. . . . .	Ea.
	Inlet - Special, Type 3 - 60 in. . . . .	Ea.
	Inlet - Special, Type 1 - 72 in. . . . .	Ea.
	Inlet - Special, Type 2 - 72 in. . . . .	Ea.
72 in. riser	Inlet - Special, Mountable, Type A - 72 in. . . . .	Ea.
	Inlet - Special, Mountable, Type B - 72 in. . . . .	Ea.
	Inlet - Special, Catch basin, 6 in. beehive - 72 in. . . . .	Ea.
	Inlet - Special, Catch basin, 9 in. beehive - 72 in. . . . .	Ea.
	Inlet - Special, Catch basin, Type A - 72 in. . . . .	Ea.
	Inlet - Special, Type 3 - 72 in. . . . .	Ea.

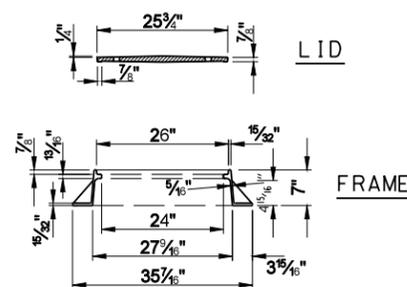
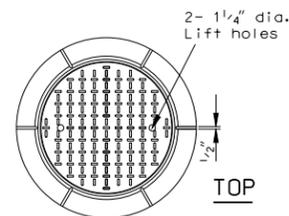
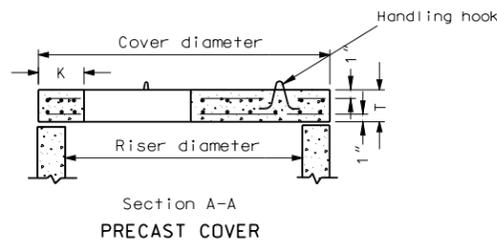
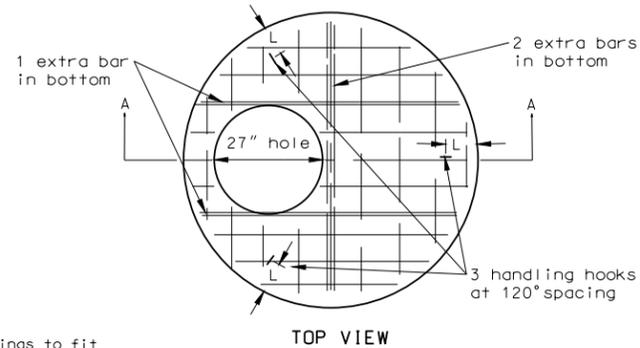
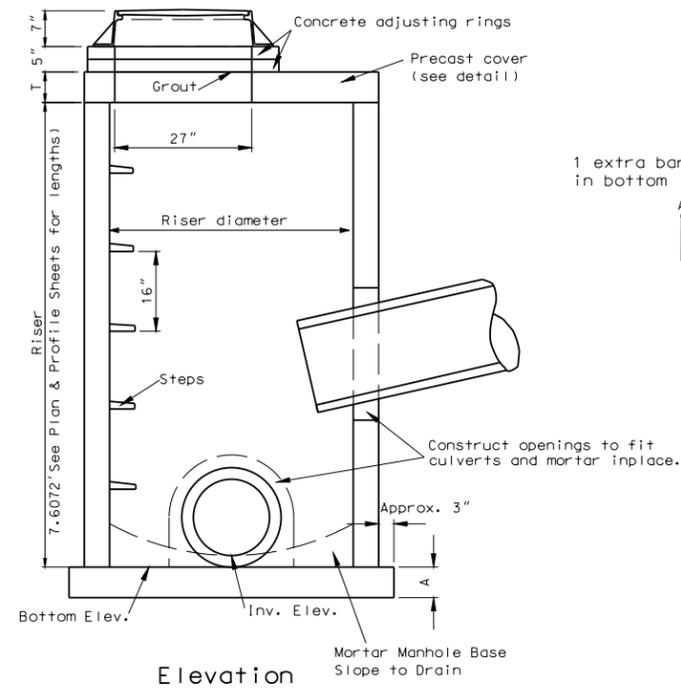


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-01-89	
REVISIONS	
DATE	CHANGE
11-01-90	Note 7 added
08-28-02	Added pay items
10-22-02	Added note
12-01-04	PE Stamp added

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# MANHOLE DETAILS

D-722-5



**MANHOLE CAST IRON RING & COVER**  
Lid - Wt. 118 Lbs.  
Frame - Wt. 131 Lbs.

PRECAST MANHOLE COVERS							
PIPE DIAMETER	COVER DIAMETER	WEIGHT OF SECTION	T	K	L	BOTTOM BARS	TOP BARS
42"	51"	800#	6"	6"	7"	#4 at 6"	
48"	58"	1110#	6"	6"	8"	#4 at 6"	
54"	65"	1950#	8"	6"	8"	#4 at 6"	
60"	72"	2470#	8"	7"	9"	#4 at 6"	#3 at 6"
66"	79"	3050#	8"	7"	9"	#4 at 6"	#3 at 6"
72"	86"	3680#	8"	8"	10"	#4 at 6"	#3 at 6"
78"	93"	4360#	8"	8"	10"	#4 at 4"	#3 at 4"
84"	100"	5100#	8"	9"	11"	#4 at 4"	#3 at 4"
90"	107"	5890#	8"	9"	11"	#4 at 4"	#3 at 4"
96"	114"	6730#	8"	9"	11"	#4 at 4"	#3 at 4"
102"	121"	7630#	8"	9"	12"	#4 at 4"	#3 at 4"
108"	128"	12460#	12"	10"	12"	#4 at 4"	#3 at 4"
120"	140"	15500#	12"	11"	13"	#4 at 4"	#3 at 4"

Top and bottom bars run in both directions.

**Note:** Method of measurement for manholes shall be as follows: The contract unit price bid for manholes shall include the furnishing and installing the following:

1. Cast iron ring and cover or beehive casting & cover
2. Precast cover
3. Concrete base
4. Concrete adjusting rings

The item "Manhole Riser" shall include the furnishing & installing of the required length of riser & cast iron steps.

Mortar to be included in the price bid for manholes.

**Notes:** Bottoms of manholes shall be cut or precast square to fit the base grout joint between base and wall with cement mortar. The contractor may, if he so desires, construct the manholes lower than plan grade and bring the casting to grade using precast adjusting rings in a manner satisfactory to the engineer in the field.

The contractor shall have the option of using precast or poured in place bases.

Precast bases shall be reinforced as shown in listing for each size base.

The aggregate size shall be approved by the engineer.

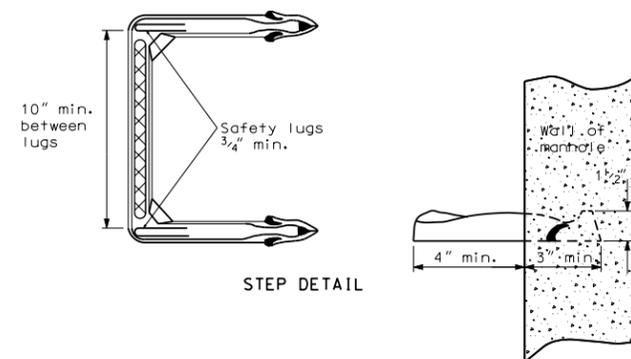
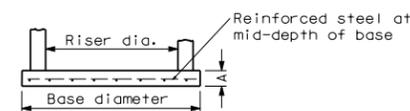
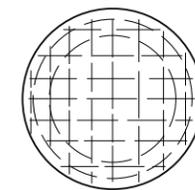
Precast barrels and risers shall be constructed in accordance with AASHTO M-199.

Manhole steps shall be corrosion resistant and shall have a minimum vertical load resistance of 400 pounds and a pull-out resistance of up to 1000 pounds. Configuration of the steps shall be approved by the engineer.

The contractor may, if he so elects, construct manholes of solid concrete block or brick. The materials shall be approved by the engineer in writing. The type of construction shall be as specified in section 722 of the Standard Specifications.

Other castings, similar in dimension and of equal or greater weight than that shown may be used if accepted by the engineer in writing.

Metal used in the manufacture of castings shall conform to AASHTO M-105, Class 35 B.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-03-87	Note
06-10-93	Manhole frame & cover
06-26-03	Layout revision
12-01-04	PE stamp added
06-13-06	Revised manhole frame & cover

This document was originally issued and sealed by **MARK S. GAYDOS** Registration Number **PE- 4518**, on **06/13/06** and the original document is stored at the **North Dakota Department of Transportation**