DESIGN DATA				
Traffic	Average Daily			
Current 2016	Pass: 620	Trucks: 220	Total: 840	
Forecast 2036	Pass: 760	Trucks: 300	Total: 1,060	
Clear Zone Distance: Existing		Design Speed: 45, 65		
Minimum Sight Dist. for Stopping: Existing		Bridges: NA		
Sight Dist. for No Passing Zone: Existing				
Pavement Design Life (years)				
Design Accumulated One-way ESALs: NA				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	21509	1	1

JOB # 15
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

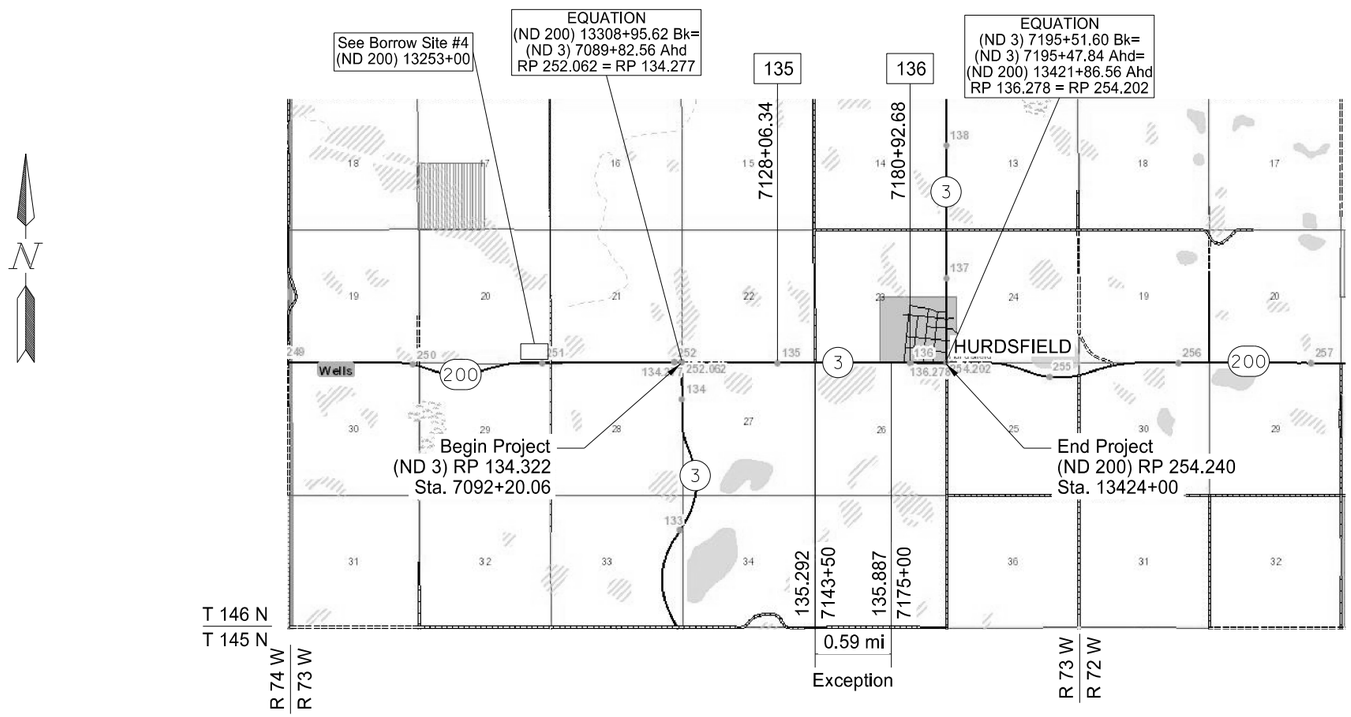
NH-1-003(048)134

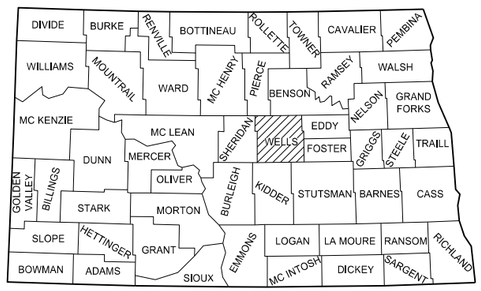
Wells County
ND 3, W Jct 200 E to Hurdsfield
Sliver Grading, Milling, RAP Overlay, and Pipe Extensions

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.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-1-003(048)134	1.407	1.997

0.59 miles deducted for exception.





STATE COUNTY MAP

DESIGNERS

Kristen Leier /s/

Brian J. Rosin /s/

APPROVED DATE 9/11/17

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 9/11/17

James Douglas Rath /s/
NDDOT DESIGN DIVISION

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6	3	Environmental Notes
8	1 - 2	Quantities
10	1	Basis of Estimate
11	1	Data Tables
20	1 - 5	General Details
30	1 - 3	Typical Sections
51	1	Allowable Pipe List
60	1 - 6	Plan & Profile
75	1 - 4	Wetland Impacts
76	1 - 3	Temporary Erosion Control
77	1 - 3	Permanent Erosion Control
81	1	Survey Coordinate and Curve Data
82	1 - 3	Survey Data Layouts
100	1 - 2	Work Zone Traffic Control
110	1 - 4	Signing
180	1 - 7	Pit Plats and Borrow Areas
200	1 - 18	Cross Sections

SPECIAL PROVISIONS

Number	Description
SP 003(14)	Temporary Erosion and Sediment Best Management Practices
SP 004(14)	Federal Migratory Bird Treaty Act
SP 452(14)	Flexible Pavement Surface Tolerance

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D-101-1, 2, 3	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31, 32	Symbols
D-203-5	Standard 90 Degree Flared Intersection-(No Center Left Turn Lane on Major Road)
D-203-7	Recovery Approaches At T-Intersections
D-203-8	Standard Rural Approaches
D-260-1	Erosion And Siltation Controls - Silt Fence
D-261-1	Erosion Control - Fiber Roll Placement Details
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement
D-704-5	Contractor Sign Detail
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11	Construction Sign Details - Warning Signs
D-704-12	Shoulder Closure Tapers
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-15	Road Closure Layouts
D-704-20	Terminal And Seal Coat Sign Layouts
D-704-24	Shoulder Closures And Bridge Painting Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-27	Traffic Control Plan For Moving Operations
D-704-30	Windrow Marking
D-704-50	Portable Sign Support Assembly
D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips
D-706-1	Bituminous Laboratory
D-708-6	Erosion And Siltation Controls - Median Or Ditch Inlet Protection
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections
D-714-8	4' X 6' Precast Concrete Cattle Pass
D-714-22	Concrete Pipe Or Precast Concrete Box Culvert Ties
D-714-25	Transverse Mainline Pipe Installation Detail for Pipes More Than 4 Feet Below Top of the Proposed Subgrade
D-752-4	Concrete Cattle & Stockpass Fencing Standard
D-754-23	Perforated Tube Assembly Details
D-754-24, 25	Mounting Details Perforated Tube
D-754-24A	Breakaway Coupler System For Perforated Tubes
D-754-26, 29	Sign Punching, Stringer And Support Location Details Regulatory, Warning, And Guide Signs
D-754-48	Sign Punching, Stringer And Support Location Details For Variable Length Signs
D-754-61	Sign Punching, Stringer And Support Location Details - Route Marker Signs
D-760-4	Rumble Strips Undivided Highways (Shoulders Less Than 4')
D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-762-5	Pavement Marking for Standard 90 Degree Flared Intersection-(No Center Left Turn Lane on Major Road)
D-762-11	Short-Term Pavement Marking

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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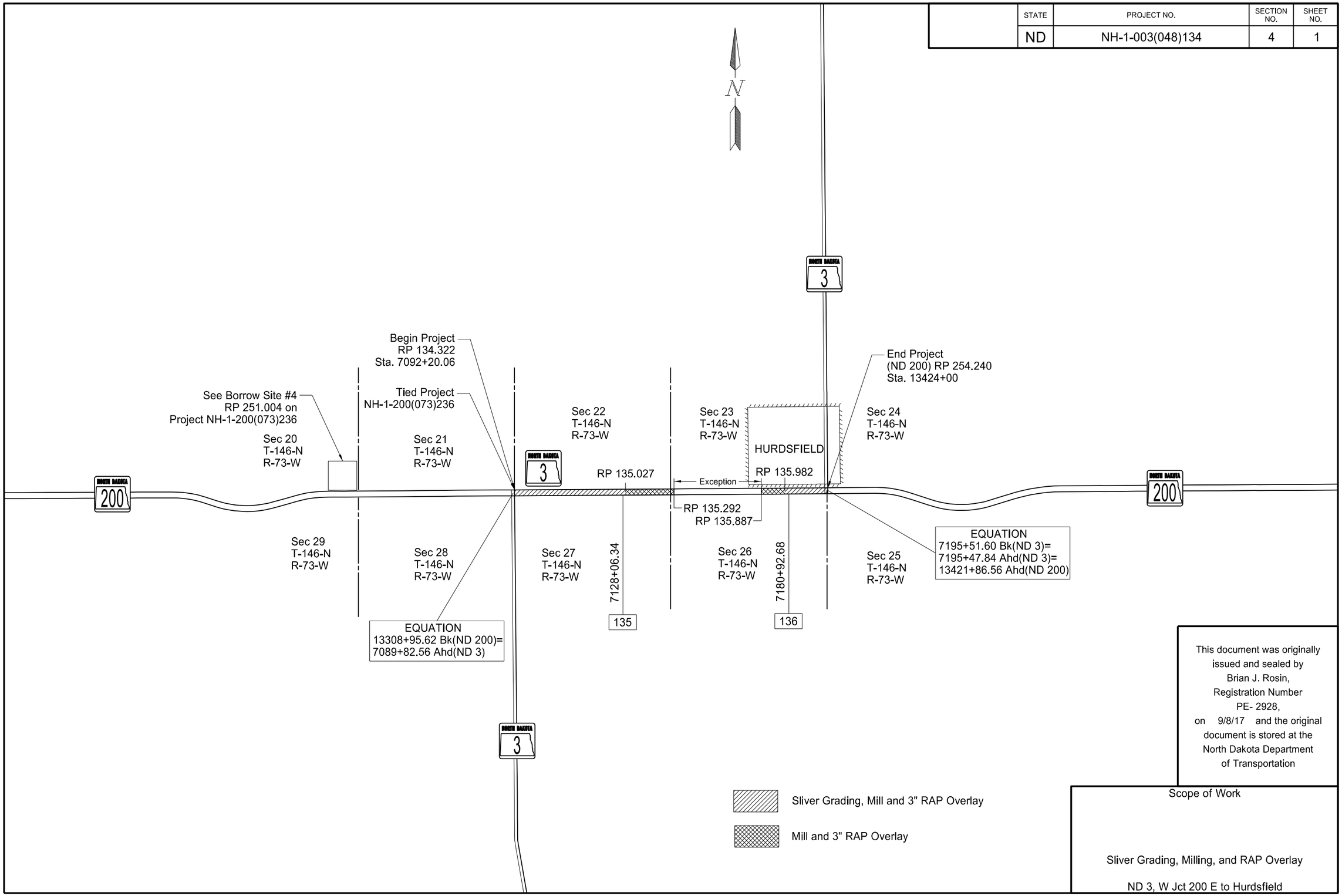

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Scope of Work

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	6	1

NOTES

GENERAL NOTES

100-P01 COORDINATION OF PROJECTS: Other projects scheduled to be under contract during the 2018 construction season: NH-1-200(074)213 between Mercer and McClusky and NH-3-200(025)254 between Hurdsfield and Jct US 52.

107-P01 MAINTAINING TRAFFIC –DROP-OFFS: If, at the end of the work day, drop-offs greater than 2 inches and less than 18 inches or slopes steeper than 4:1 exist between the edge of a traffic lane and the outside edge of the proposed roadway, perform one of the following actions:

- Construct a traversable wedge in the area of the drop-off or steep slope; or
- Close the lane adjacent to the drop-off or steep slope and provide 24-hour flagging or pilot car operations.

When constructing a wedge, construct a wedge composed of aggregate or earthen materials with a 4:1 or flatter slope along the entire length of the area. Compact materials using Type C compaction, as specified in 203.04 E.4, “Compaction Control Type C”.

Install stackable vertical panels that meet the requirements of Section 704.03 H, “Stackable Vertical Panels”, along the edge of the driving lane closest to the wedge.

The Engineer will measure stackable vertical panels as specified in Section 704.05, “Method of Measurement” and will pay for panels as specified in Section 704.06, “Basis of Payment”.

The Engineer will not measure material used to construct the wedge. Include the cost of materials, equipment, labor, and incidentals required for this operation in the price bid for “Aggregate Base Course Cl 5.”

Without a 4:1 or flatter wedge, provide 24 hour flagging or pilot car operations and associated traffic control at no additional cost to the Department.

The requirements of Section 704.04 O, “Traffic Control for Uneven Pavement” apply to drop-offs created by milling or the placement of hot mix asphalt.

202-P01 REMOVAL OF PAVEMENT: For the modification of flared intersection at Jct ND 200 and ND 3 (east intersection), include all costs to remove the existing pavement, reshape, and re-compact the aggregate slough in the unit price bid for “Removal of Bituminous Surfacing.” “Removal of Bituminous Surfacing” is at plan quantity.

202-P02 FLARED INTERSECTION WIDENING: Widening of the East Jct ND 3 and ND 200 intersection requires removal of some of the existing riprap, and placing fabric and replacing the riprap when the widening is complete. The engineer will measure the riprap removal and replacement by the CY in the truck. Include all costs to remove and replace the riprap in the unit price bid for “Remove and Replace Riprap.”

203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

203-P01 BORROW EXCAVATION: Furnish borrow needed to complete construction. The following location along the backslope of Hwy 3 is a borrow pit clue:

RP 134.5 – North side

This area is located just outside of NDDOT Right of Way. Obtain Certificate of Approval on all borrow sites in accordance with Section 107.05 of the Standard Specifications. If using this location, remove material from the backslope of the ROW (to match the borrow site) as “Borrow-Excavation”. Provide backslope at the right of way between 4:1 and 3:1 (within the right of way) and as dictated for utility locations. Do not operate earth moving equipment (scraper hauled dirt) on the highway. The engineer will measure erosion control required for operation in the right-of-way at correlating unit bid prices.

Leave a minimum elevation at the right of way of 2’ above the ditch bottom. Leave a maximum elevation at the right of way of 1’ above the existing roadway centerline. Maintain the existing drainage pattern. The engineer will measure material removed from within the right of way at this location as “Common Excavation-Type B.”

203-P02 COMPACTION AND DENSITY CONTROL: Compact material for sliver grading as specified in Section 203.04 E.3, Compaction Control, Type B.

261-P01 TEMPORARY EROSION CONTROL: In widened areas, use the existing topsoil to create an earthen berm at the bottom of the foreslope. Use the earthen berm, along with the grass remaining in the ditch, fiber rolls, or silt fence as the temporary erosion control. Include all costs to create, maintain, and dismantle the berm in the unit price bid for “Topsoil”.

Shape the berm uniformly to a 12” minimum height in such a way that it will not fail when pressure from stormwater is applied. When the foreslope reaches final grade, remove the earthen berm and spread the soil on the foreslope before the permanent seeding and mulching work begins. Place weirs intermittently as needed throughout the length of the berm to allow stormwater to drain through the berm. Restrict the weir widths to a maximum of 5 feet each and install fiber rolls across the weir on the downslope side of the berm. To create a weir during conditions that would allow stormwater to flow through immediately, install the fiber roll before the weir in the earthen berm. Include all costs for fiber rolls for this purpose in the “Fiber Rolls 12in” pay item; 100 LF provided.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

261-P02 PERMANENT FIBER ROLLS: If fiber rolls are to remain on the project, use fiber rolls that are composed of netting that meets either of the following:

- Plastic or natural fiber photodegradable netting that has a life expectancy between 12 to 24 months. If the photodegradable netting is plastic, the netting color must be either clear or green. Do not use black plastic netting.
- 100 percent biodegradable jute netting that has a life expectancy between 6 to 12 months.

411-P01 MILLING: “Milling Pavement Surface” is at plan quantity. The quantity shown includes the entire length of the project, excluding Sta. 7143+50 to Sta. 7175+00, at a width of 24 feet, even when no milling is required for cross-slope correction. Other milling, such as transitions, is also included as detailed.

411-P02 MILLED MATERIAL: An estimated 1548 Ton of milled material is available from the project; this would be enough for 25% RAP. Stockpile any milled material not used on this project at the State owned pit in Denhoff; located on the north side of ND 200 at RP 234.400. Material will meet a maximum size of 1 ½”, with 90% passing the 1” sieve. Upon stockpiling at the pit, the material becomes the property of the state.

704-P01 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary road closure, flagging, and a pilot car.

Traffic control device quantities are based on a 2 mile limitation and the list below. Provide additional devices at no additional cost to the Department.

1. Standard D-704-15, layout A;
2. Standard D-704-24, layouts S;
3. Standard D-704-26, layouts EE, and GG;
4. Standard D-704-30

Place flaggers and traffic control devices as shown on Standard D-704-15, layout A at the Jct ND 200 when the lane closure spans across.

714-P01 PIPE CLEANOUT: Clean out all centerline and approach culverts designated in the plans for extension before extending them. When necessary, remove material 50 feet beyond the end of the pipe. Include the cost of cleaning the extended pipes in the price bid for the appropriate pipe bid item.

762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, use plan quantity as the measurement for payment for pavement marking items.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	6	3

ENVIRONMENTAL NOTES

ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

EN-1 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	0.05	0.05
202	0130	REMOVAL OF CURB & GUTTER	LF	54	54
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	43	43
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	12	12
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	245	245
203	0109	TOPSOIL	CY	3,477	3,477
203	0140	BORROW-EXCAVATION	CY	4,329	4,329
216	0100	WATER	M GAL	175	175
251	0200	SEEDING CLASS II	ACRE	6.41	6.41
251	2000	TEMPORARY COVER CROP	ACRE	6.41	6.41
253	0101	STRAW MULCH	ACRE	12.82	12.82
255	0102	ECB TYPE 2	SY	592	592
256	0701	REMOVE AND REPLACE RIPRAP	CY	100	100
261	0112	FIBER ROLLS 12IN	LF	5,888	5,888
261	0113	REMOVE FIBER ROLLS 12IN	LF	3,760	3,760
262	0100	FLOTATION SILT CURTAIN	LF	268	268
262	0101	REMOVE FLOTATION SILT CURTAIN	LF	268	268
302	0120	AGGREGATE BASE COURSE CL 5	TON	4,086	4,086
401	0050	TACK COAT	GAL	2,602	2,602
401	0060	PRIME COAT	GAL	1,215	1,215
411	0105	MILLING PAVEMENT SURFACE	SY	19,746	19,746
430	0143	RAP - SUPERPAVE FAA 43	TON	4,615	4,615
430	1000	CORED SAMPLE	EA	34	34
430	5803	PG 58S-28 ASPHALT CEMENT	TON	198	198
702	0100	MOBILIZATION	L SUM	0.05	0.05
704	0100	FLAGGING	MHR	500	500
704	1000	TRAFFIC CONTROL SIGNS	UNIT	860	860
704	1067	TUBULAR MARKERS	EA	92	92
704	1081	VERTICAL PANELS-BACK TO BACK	EA	20	20
704	1185	PILOT CAR	HR	250	250
706	0500	AGGREGATE LABORATORY	EA	0.05	0.05
706	0550	BITUMINOUS LABORATORY	EA	0.05	0.05
706	0600	CONTRACTOR'S LABORATORY	EA	0.05	0.05

ESTIMATE NUMBER: 17793 RUN DATE: 09/11/2017 TIME: 05:52:03

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	150	150
714	0820	PIPE CONC REINF 30IN CL III	LF	10	10
714	4099	PIPE CONDUIT 18IN-APPROACH	LF	254	254
714	4106	PIPE CONDUIT 24IN-APPROACH	LF	258	258
714	5015	PIPE CORR STEEL .064IN 18IN	LF	80	80
714	5035	PIPE CORR STEEL .064IN 24IN	LF	74	74
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	14	14
720	0110	RIGHT OF WAY MARKERS	EA	15	15
720	0125	ALIGNMENT MONUMENTS	EA	4	4
720	0130	IRON PIN R/W MONUMENTS	EA	6	6
720	0135	IRON PIN REFERENCE MONUMENTS	EA	6	6
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	15	15
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	62	62
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	317	317
754	0592	RESET SIGN PANEL	EA	15	15
754	0593	RESET SIGN SUPPORT	EA	1	1
754	0805	OBJECT MARKERS - CULVERTS	EA	2	2
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	4	4
760	0007	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	2	2
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	21,904	21,904
762	1104	PVMT MK PAINTED 4IN LINE	LF	20,138	20,138
762	1108	PVMT MK PAINTED 8IN LINE	LF	61	61
762	1124	PVMT MK PAINTED 24IN LINE	LF	12	12

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BID ITEM	UNIT	Sta. 7092+20.06 to Sta. 7129+50.00 Sta. 7180+00.00 to Sta. 7195+47.84 Bk = Sta. 13421+86.56 Ahd to Sta. 13423+00 Total Stations = 52.78		Sta. 7129+50.00 to Sta. 7143+50.00 Sta. 7175+00.00 to Sta. 7180+00.00 Total Stations = 19.00	
		Width (ft)	Quantity per Station	Width (ft)	Quantity per Station
Milling Pavement Surface	SY	24	266.7	24	266.7
Aggregate Base Course Cl 5 @ 1.5 Ton/CY + 25%	TON	3' - 3'	40.3	3' - 3'	15.4
Prime Coat @ 0.25 Gal/SY	GAL	3' - 3'	16.7	3' - 3'	16.7
Tack Coat @ 0.05 Gal/SY (1st Lift)	GAL	24.7	13.7	26.4	14.7
Tack Coat @ 0.05 Gal/SY (2nd Lift)	GAL	29.1	16.2	29.1	16.2
RAP - Superpave FAA 43 @ 2.0 Ton/CY	TON	28	53.9	28	53.9
PG 58S-28 Asphalt Cement @ 4.3%	TON	-	2.32	-	2.32

HMA Cored Samples							
ND 200							
	A	B	C	D			
Specification Section	Distance (Ft)/2000	Lanes	Lifts	Sublots (A x B x C)	Quantity (D x 2)	Quantity (1 per mile)	Unit
430.04 I.2.b(1), "General"	4	2	2	16	32	N/A	EA
430.04 I.2.b(2), "Pavement Thickness Determination Cores"					N/A	2	EA
				Total	32	2	EA

Short Term 4IN LIne - Type NR			
Location	Basis	Quantity	
ND 3			
Centerline - Top of Milled Surface	Centerline Skips	1,623	LF
	Barrier Stripes	3,853	LF
Centerline - Top of 1st Lift	Centerline Skips	1,623	LF
	Barrier Stripes	3,853	LF
Centerline - Top of 2nd Lift	Centerline Skips	1,623	LF
	Barrier Stripes	3,853	LF
Centerline - Top of Fogged CL Mill	Centerline Skips	1,623	LF
	Barrier Stripes	3,853	LF

Approaches						
	Lt/Rt	Paved Section Line	Gravel Section Line	Paved Private Drive	Gravel Private Drive	Field Drive
134.53	Rt					1
134.61	Lt					1
134.76	Lt					1
134.99	Lt					1
135.1	Lt					1
135.28	Lt					1
135.28	Rt					1
135.95	Lt		1			
136.05	Rt				1	
136.08	Lt				1	
136.1	Lt		1			
136.11	Rt					1
136.13	Rt					1
136.17	Lt		1			
136.17	Rt				1	
136.2	Lt				1	
136.22	Rt				1	
136.24	Lt				1	

Permanent Pavement Marking			
Location - Type	Basis	Quantity	
ND 3			
Centerline - Pvmt MK 4IN Line	Centerline Skips	1,623	LF
	Barrier Stripes	3,853	LF
Edge Line - Pvmt MK 4IN Line	Edge Line	14,356	LF
ND 3/ND 200 Intersection			
Stop Bar - Pvmt MK 24IN Line	Stop Bar	12	LF
Dbl Barrier Stripe 4 IN Line - Pvmt MK 4 IN Line	Barrier Stripes	135	LF
Barrier Stripe 4 IN Line - Pvmt MK 4 IN Line	Barrier Stripes	452	LF
Edge Line - Pvmt MK 4IN Line	Edge Line	404	LF
8 IN Line - Pvmt MK 8 IN Line	Diagonal, 10' Spacing, 45°	61	LF

Centerline Barrier Stripe Locations				
Station		Station	Direction	Length
7095+27	to	7095+95	WB	68
7095+95		7097+70	DBL	350
7097+70		7106+98	EB	928
7106+98		7107+41	DBI	86
7107+41		7118+43	WB	1102
7183+16		7185+65	EB	249
7185+65		7190+32	DBL	934
7190+32		7191+68	WB	136

Water

25 MGal/Mile for Dust Palliative
20 Gal/Ton for Aggregates
10 Gal/CY for Embankment

Rumble Strips

Centerline 2 Miles
Shoulder 4 Miles

Culvert Markers	
Station:	#
7116+47	2

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Basis of Estimate

Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	11	1

EARTHWORK SUMMARY

Location	COMMON EXCAVATION	EMBANKMENT	203-0140 BORROW EXCAVATION
			Pay Item
	(CY)	(CY)	(CY)
	A	B	C = B - A
ND 3 Sliver Grading			
Sta. 7092+20.06 Sta. 7143+50 and Sta. 7175+00 to Sta. 7195+47.84	0	4,329	4,329
TOTAL	0	4,329	4,329

NOTES:
1. This computation report is not a balance sheet. The Contractor will calculate his own balance of materials.
2. An additional volume of 25% to allow for shrinkage is included in all embankment quantities.

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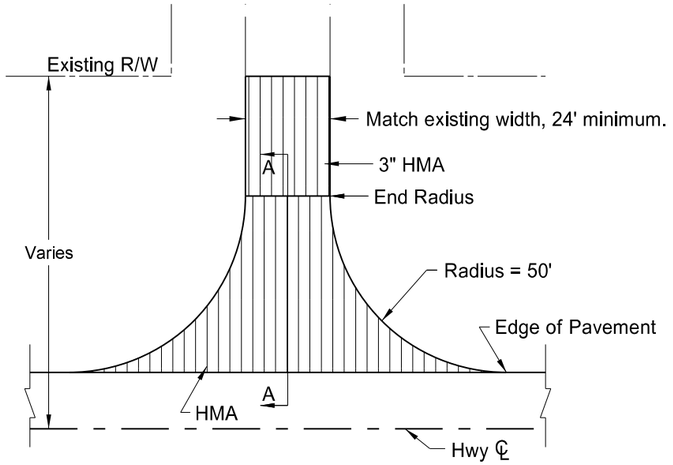
Earthwork Summary

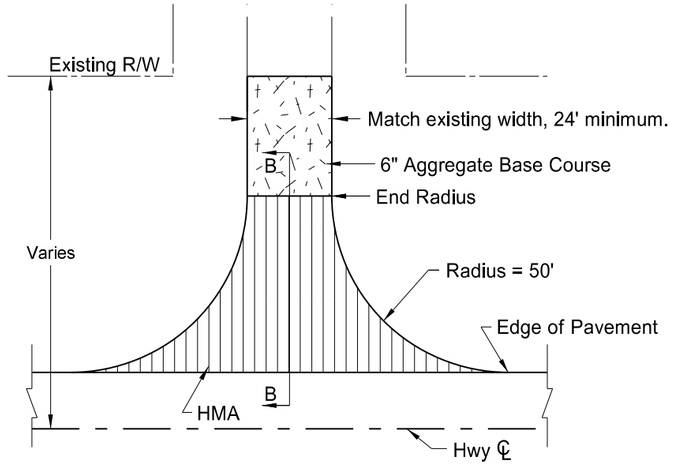
Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	20	1



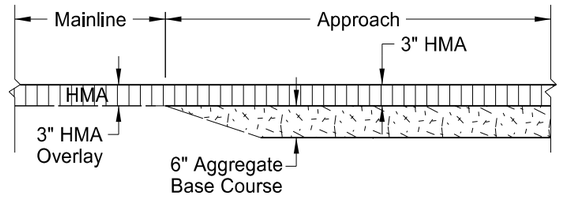
(1) Paved Section Line, County Road, or Street Approach



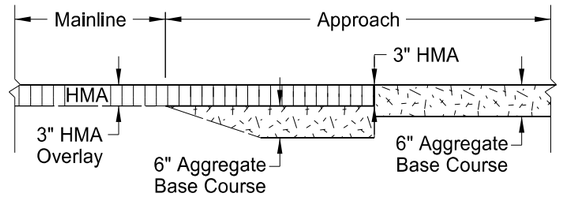
(2) Gravel Section Line, County Road, or Street Approach

Notes:

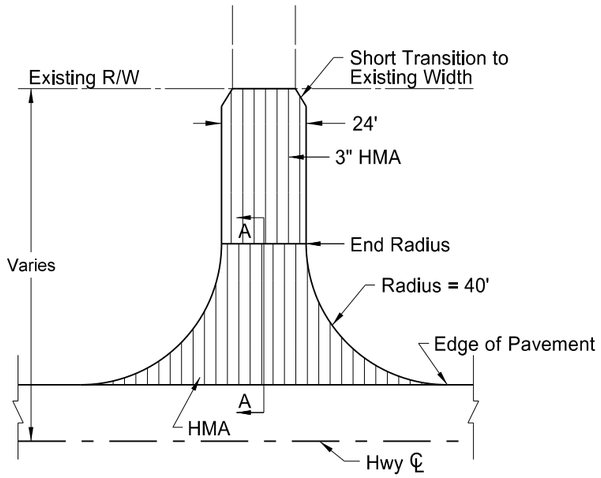
1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.



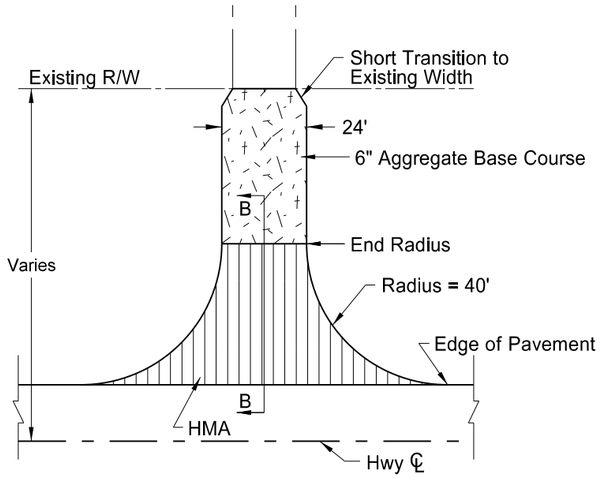
Section A-A
(not to scale)



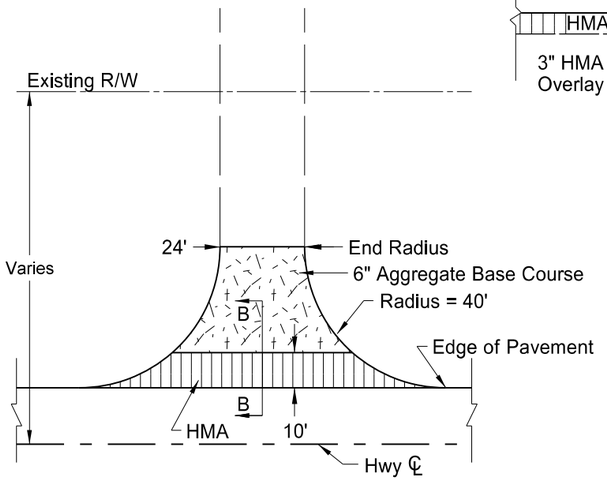
Section B-B
(not to scale)



(3) Paved Private Drive Approach



(4) Gravel Private Drive Approach



(5) Field Drive Approach

BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	(5)	
ITEM	UNIT	Paved Section Line	Gravel Section Line	Paved Private Drive	Gravel Private Drive	Field Drive	TOTALS
Number of Locations	#	0	3	0	6	9	18
Aggregate Base Course CL 5	TON	0	107.3	0	93.3	57.2	1396.5
Tack Coat	GAL	0	25.3	0	18.3	7.5	253.2
Superpave FAA 43	TON	0	42.1	0	30.5	12.6	422.7
PG 58S-28 Asphalt Cement	TON	0	1.8	0	1.3	0.5	17.7

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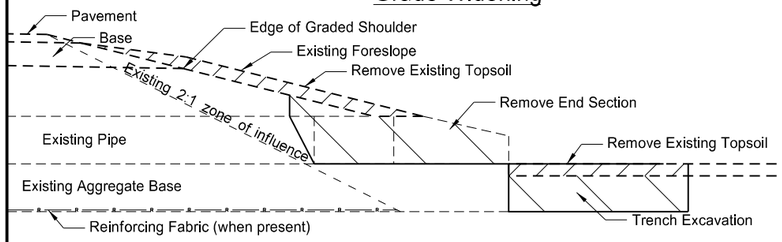
Approach Paving Details for
New or Regrading Rural Approaches

Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hursdfield

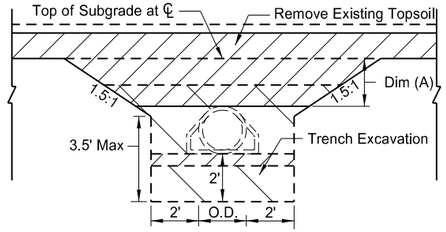
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	20	2

Grade Widening



Removal Section

Cross Section View

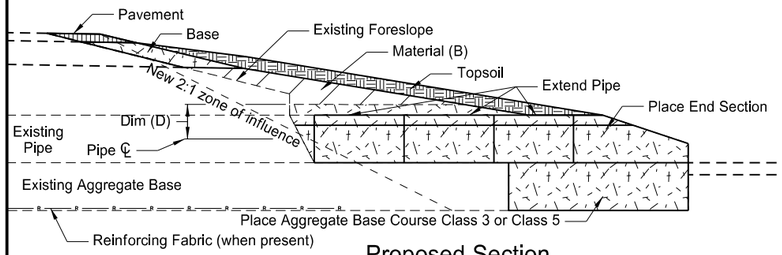


Removal Detail

Side View

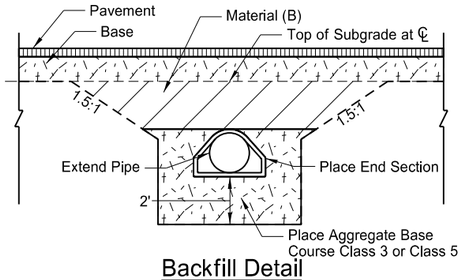
Pay Items
1) Pipe*
2) Remove & Relay Pipe - All Types & Sizes (when required)
3) Remove & Reset End Section or new End Section
4) Borrow Excavation (Compaction Control Type A) or Common Excavation-Type A
5) Topsoil
6) Seeding
7) Mulching

*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate Base Course Class 3 or Class 5



Proposed Section

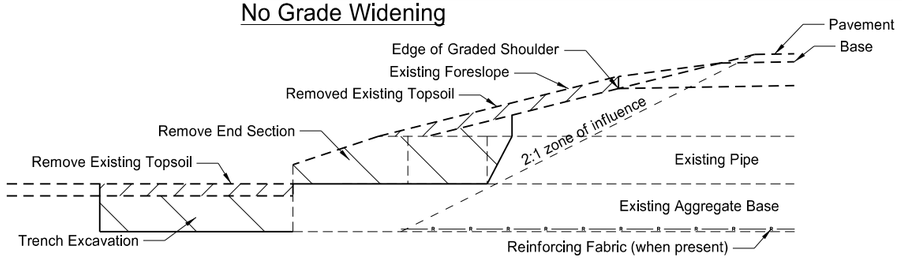
Cross Section View



Backfill Detail

Side View (Topsoil not shown)

No Grade Widening

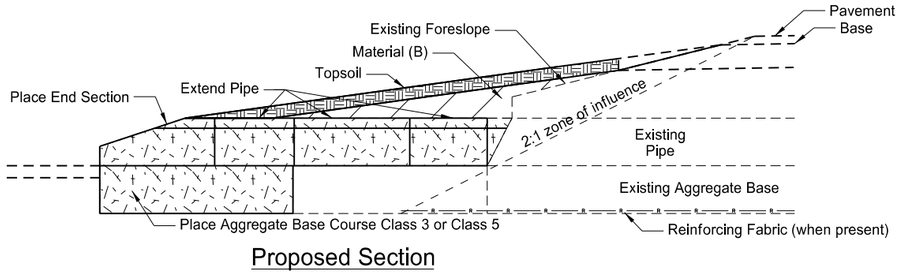


Removal Section

Cross Section View

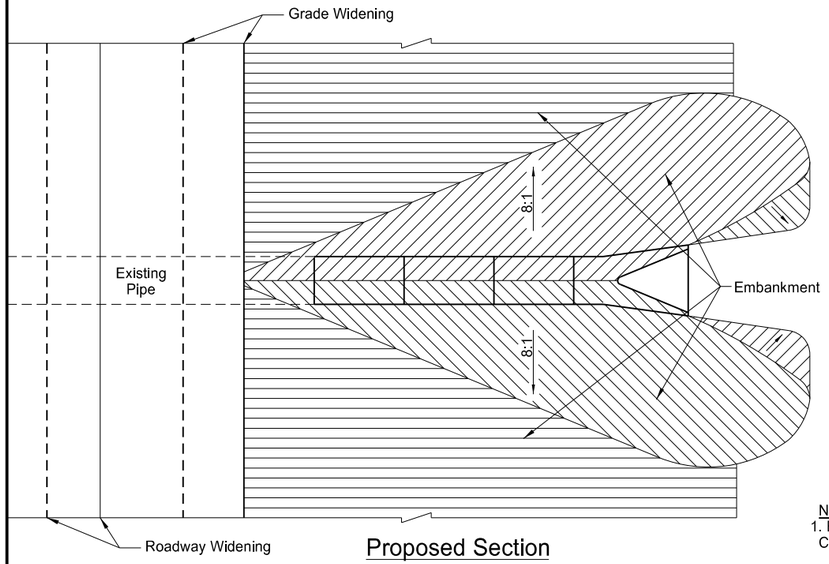
Pay Items
1) Pipe*
2) Remove & Reset End Section or Remove End Section and Place New End Section

*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate Base Course Class 3 or Class 5
4) Embankment (Compaction Control Type A)
5) Topsoil
6) Seeding
7) Mulch



Proposed Section

Cross Section View



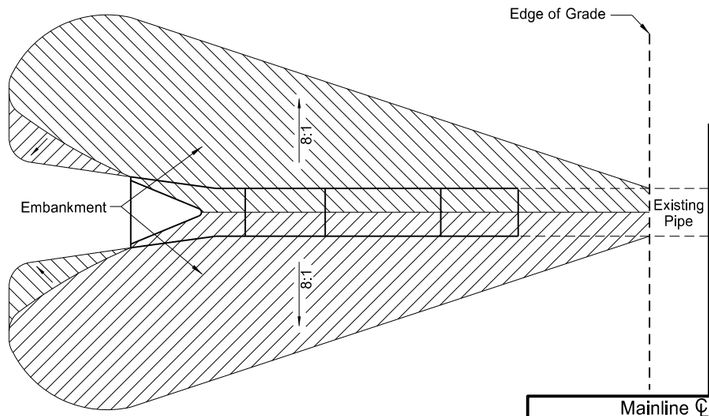
Proposed Section

Plan View

Pipe Materials	Dim (A)<=4 Feet Material (B)	Backfill Dimension Dim (D)
Concrete	Embank or Aggr	0.5 O.D.
Metal and Plastic	Embank or Aggr	0.5 O.D.

Pipe Materials	Dim (A)>4 Feet Material (B)	Backfill Dimension Dim (D)
Concrete	Embankment	0.5 O.D.
Metal and Plastic	Embankment	0.5 O.D.+1 Foot

NOTES:
1. Embankment may be either Borrow Excavation (Compaction Control - Type A) or Common Excavation - Type A.
2. Aggregate may be either Class 3 or Class 5 Aggregate Base Course.



Proposed Section

Plan View

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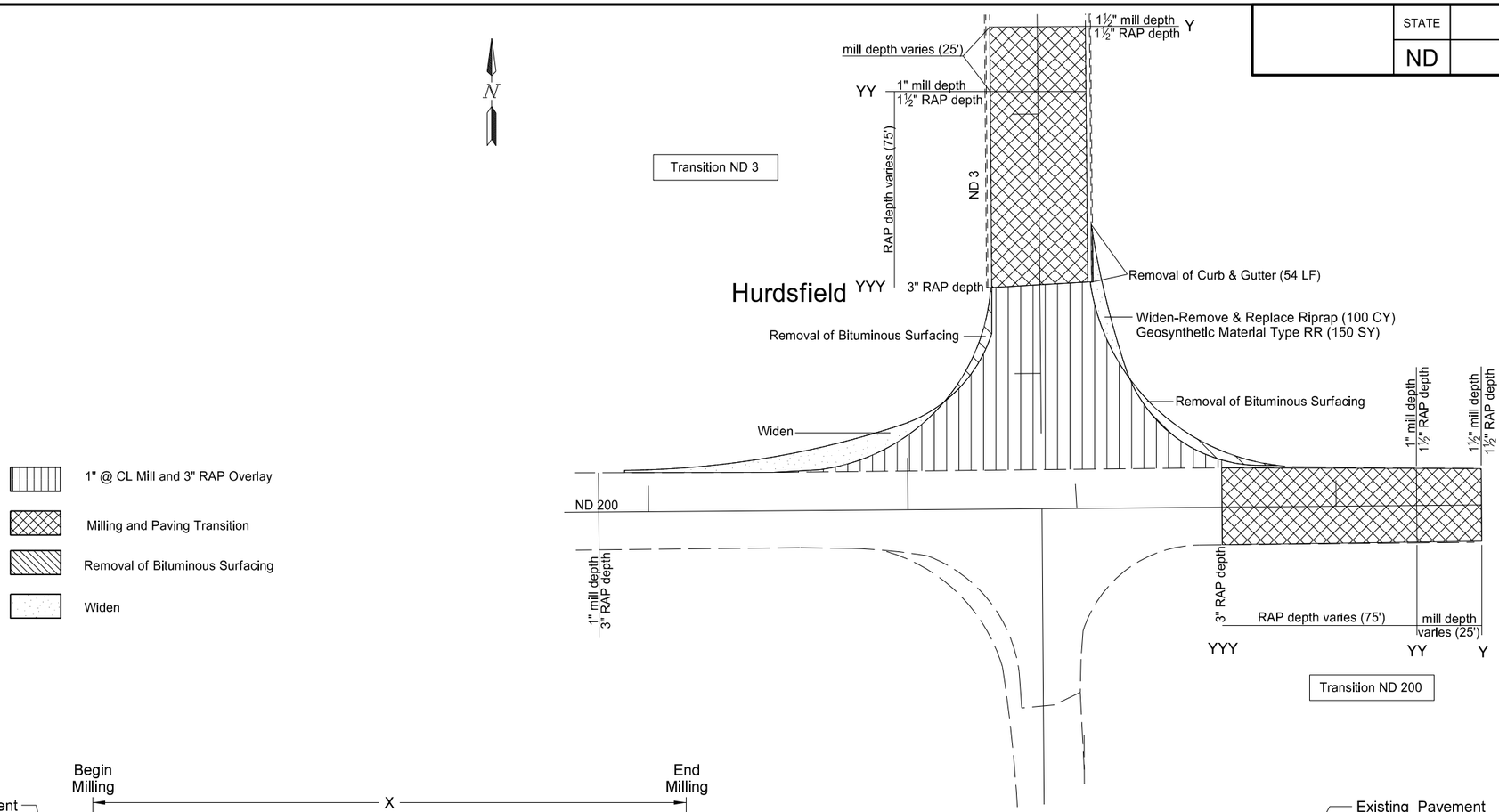
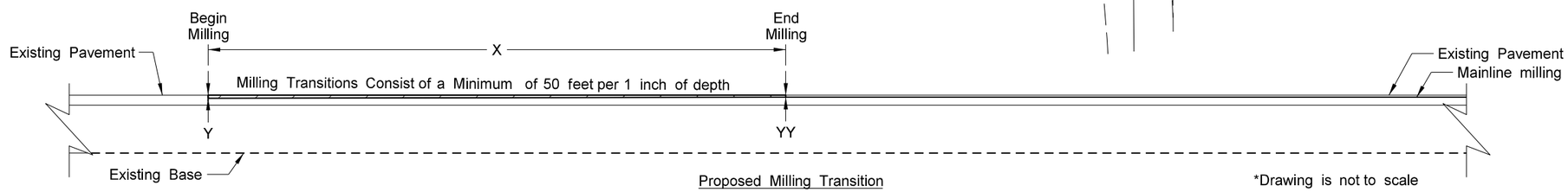
Mainline ℄ Pipe Extension Detail

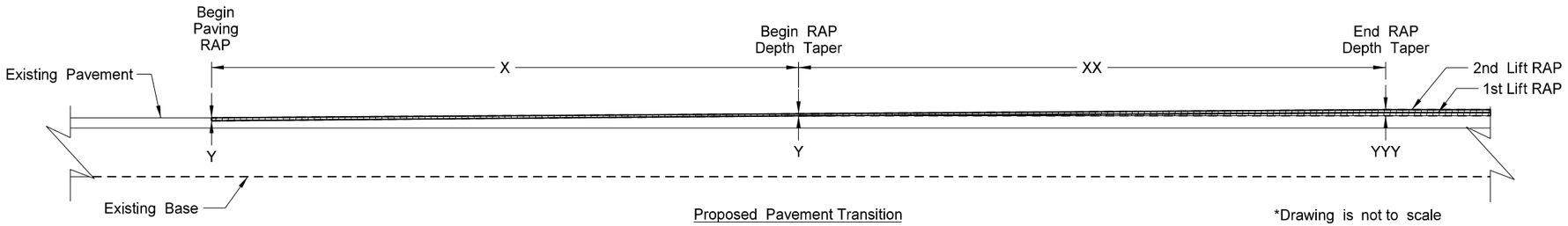
Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	20	3







Milling and Paving Transitions

Location	X	Begin Milling/Paving Station	Y	YY	End Milling Station	XX	YYY	End RAP Depth Taper Station	Mill (SY)	Tack (Gal)	RAP (Ton)	AC (Ton)	Removal of Bit. Surfacing (SY)	Aggr. Base Cl 5 (Ton)
Start of Exception	25 ft	7143+50	1.5 in	1 in	7143+25	75 ft	3.0 in	7142+50	66.7	27.2	35.7	1.5		
End of Exception	25 ft	7175+00	1.5 in	1 in	7175+25	75 ft	3.0 in	7176+00	66.7	27.2	35.7	1.5		
Transition ND 3	25 ft	7194+00	1.5 in	1 in	7194+75	75 ft	3.0 in	7194+00	102.8	26.0	86.5	3.7	43	24.5
Transition ND 200	25 ft	13424+00	1.5 in	1 in	13423+75	75 ft	3.0 in	13423+00	66.7	27.2	35.7	1.5		

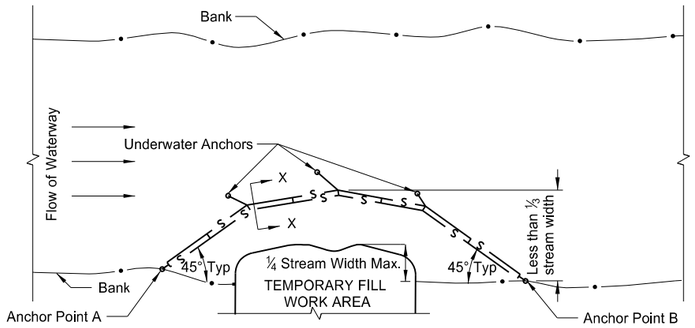
Milling and Paving End Transitions

Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	20	4

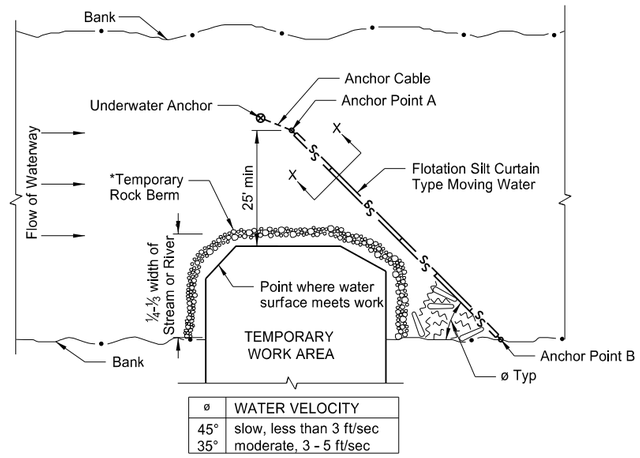
TYPICAL INSTALLATIONS
May vary with conditions



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE WORK AREA

DESIGN GUIDELINES:
When temporary work encroaches less than ¼ of the width of stream.



ø	WATER VELOCITY
45°	slow, less than 3 ft/sec
35°	moderate, 3 - 5 ft/sec

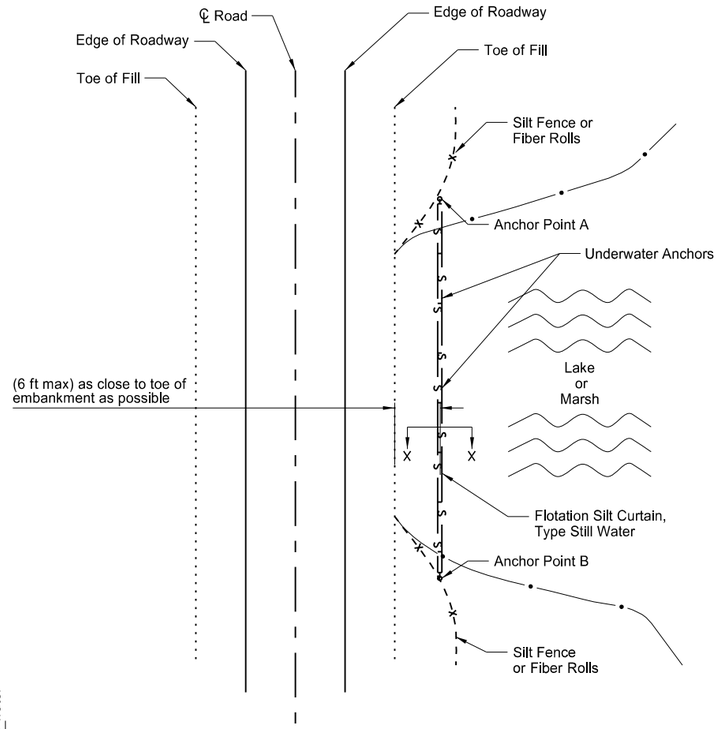
PLAN VIEW

FLOTATION SILT CURTAIN - TYPE MOVING WATER

DESIGN GUIDELINES:
When temporary work encroaches more than ¼ but less than ⅓ width of the stream.

For narrow waterways, the curtain may be placed 1 foot above the bottom of waterway to allow water flow.

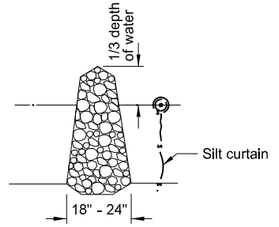
*In areas where the plans call for riprap at the bridge, provide a temporary rock berm. Include all costs for the temporary rock berm in price bid for the "Riprap".



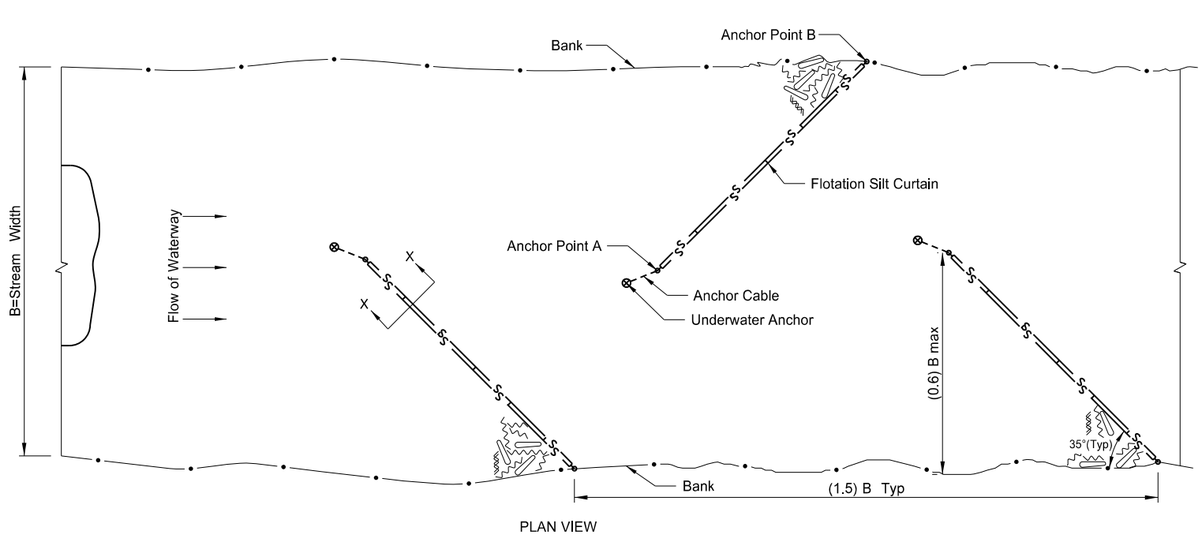
PLAN VIEW

FLOTATION SILT CURTAIN - TYPE STILL WATER

Extend silt curtain onto shore and anchor there also.



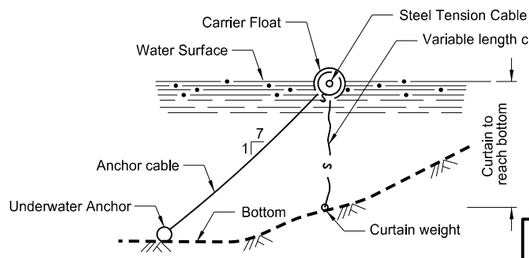
TEMPORARY ROCK BERM



PLAN VIEW

FLOTATION SILT CURTAIN - TYPE HERRING BONE PATTERN

DESIGN GUIDELINES:
When temporary work encroaches more than ⅓ width of the stream
Or where stream width doesn't allow use of Type Moving Water



SECTION X-X
FLOTATION SILT CURTAINS

Note:
Maximum water velocity for moving water = 5 ft/sec

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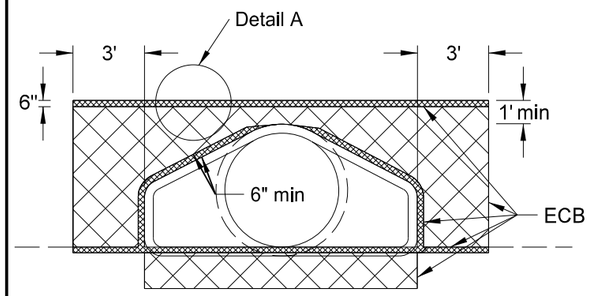
Temporary Erosion Control - Flotation Silt Curtain

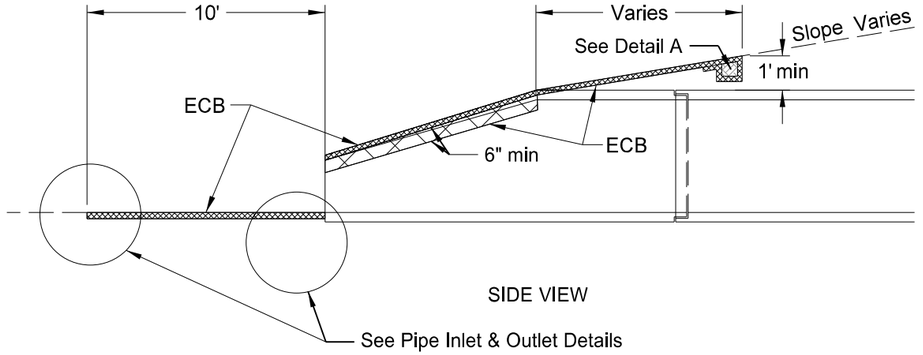
Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

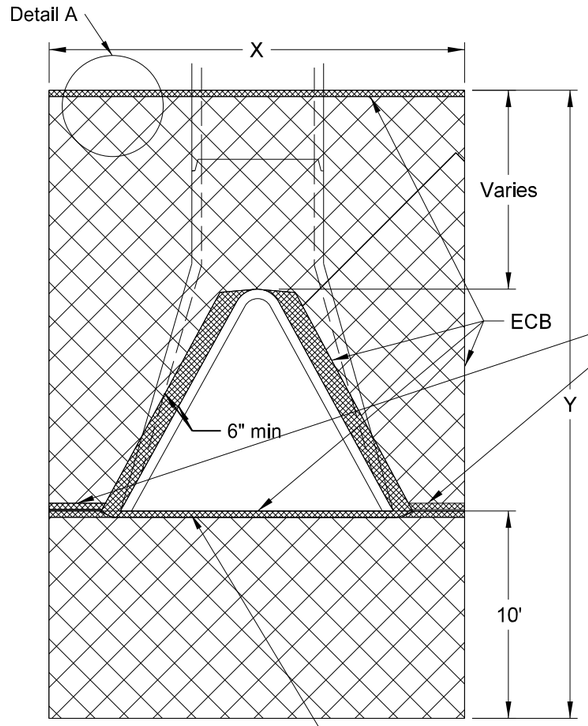
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	20	5



FRONT VIEW

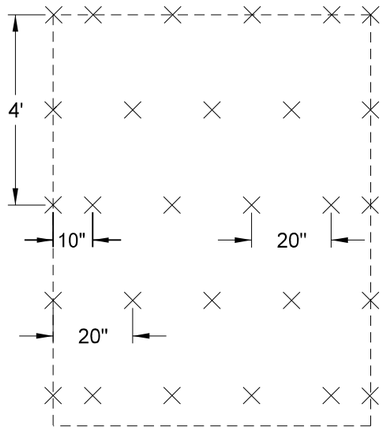


SIDE VIEW



TOP VIEW

NOTE: Tuck the ECB a minimum of 6" into the embankment (against the flared end section) around the opening of the flared end section.



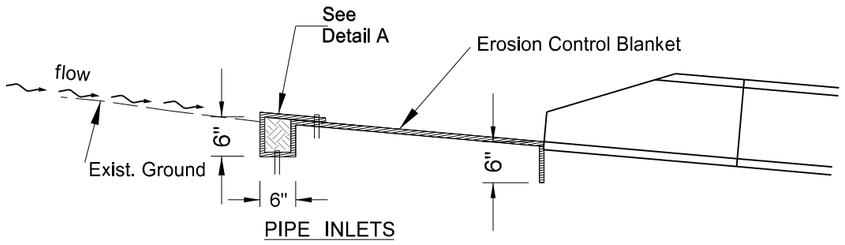
STAPLE PATTERN

Erosion Control Blanket (ECB)								
Location to be Protected	Culvert Type	Pipe Diam	No	Unit Quantity	Total Quantity			
Station	Appr/CL	(Inch)		(SY)	Type 1 (SY)	Type 2 (SY)	Type 3 (SY)	Type 4 (SY)
7103+14	Appr	18	2	22	00	44	00	00
7115+74	Appr	24	2	24	00	48	00	00
7116+47	CL	30	2	22	00	44	00	00
7127+93	Appr	18	2	22	00	44	00	00
7133+33	Appr	24	2	24	00	48	00	00
7178+55	Appr	24	2	22	00	48	00	00
7183+66	Appr	18	2	22	00	44	00	00
7186+23	Appr	24	2	24	00	48	00	00
7186+49	Appr	18	2	22	00	44	00	00
7186+60	Appr	18	2	22	00	44	00	00
7189+97	Appr	18	2	22	00	44	00	00
7191+54	Appr	18	2	22	00	44	00	00
7193+16	Appr	24	2	24	00	48	00	00
Total (SYs)					000	592	000	000

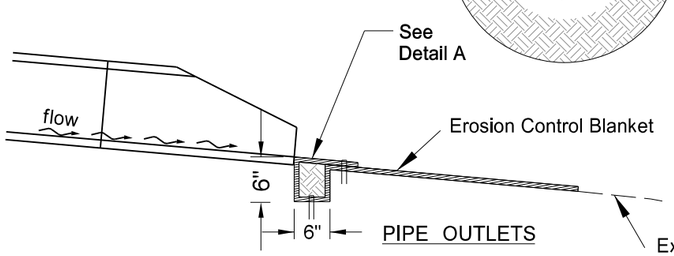
APPROACH CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
15	9.0	20.0	176.0	20
18	9.5	20.7	190.7	22
21	9.5	21.0	190.9	22
24	10.5	21.6	214.1	24
27	11.0	22.0	226.3	25
30	11.6	22.5	241.5	27
36	12.7	23.3	268.8	30
42	13.3	23.3	279.7	31
48	13.8	24.0	293.2	33
54	14.5	23.4	300.6	34
60	15.0	23.0	307.5	35
66	15.6	24.0	325.6	37
72	16.2	24.5	340.6	38
Note: Quantities based on 8:1 slope.				

CENTERLINE CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
24	10.5	19.6	193.1	22
27	11.0	20.0	204.3	23
30	11.6	20.5	218.3	25
36	12.7	21.2	242.1	27
42	13.3	21.2	251.8	28
48	13.8	22.0	265.6	30
54	14.5	21.5	273.7	31
60	15.0	21.0	278.3	31
66	15.6	22.0	295.7	33
72	16.2	22.5	309.2	35
Note: Quantities based on 6:1 slope.				

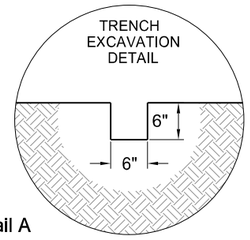
CENTERLINE CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
24	10.5	27.6	172.1	20
27	11.0	18.0	182.3	21
30	11.6	18.5	195.1	22
36	12.7	19.2	216.7	24
42	13.3	19.2	225.2	25
48	13.8	20.0	238.0	27
54	14.5	19.5	244.7	28
60	15.0	19.0	248.3	28
66	15.6	20.0	264.5	30
72	16.2	20.5	276.8	31
Note: Quantities based on 4:1 slope.				

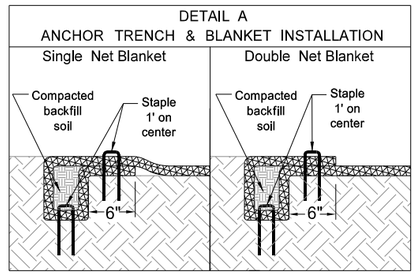


PIPE INLETS



PIPE OUTLETS





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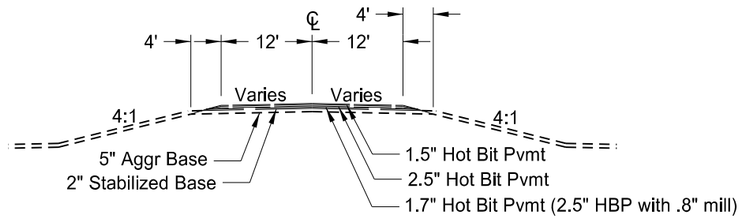
Erosion Control at Culvert Flared End Sections

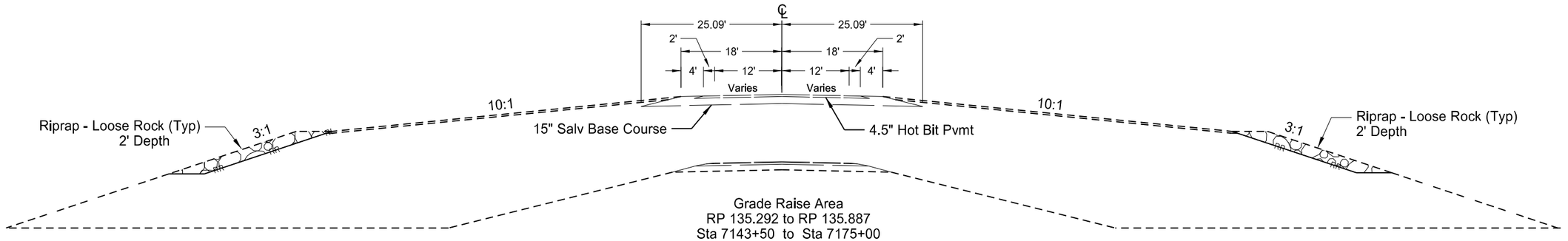
Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

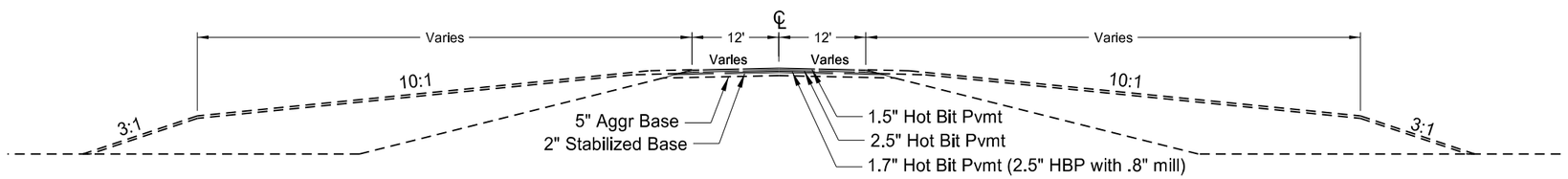
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	30	1



RP 134.322 to RP 135.027
Sta. 7092+20.06 to Sta. 7129+50
RP 135.982 to RP 136.278
Sta. 7180+00 to Sta. 7195+47.84



Grade Raise Area
RP 135.292 to RP 135.887
Sta 7143+50 to Sta 7175+00



Grade Transition
RP 135.027 to RP 135.292
Sta 7129+50 to Sta 7143+50
RP 135.887 to RP 135.982
Sta 7175+00 to Sta 7180+00

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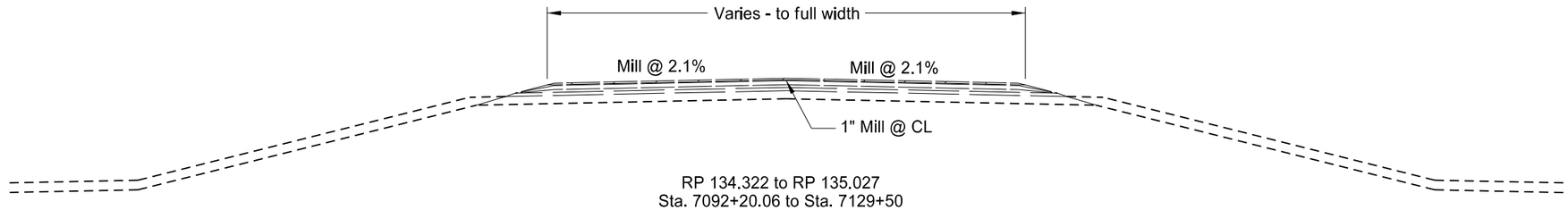
Existing Typical Sections

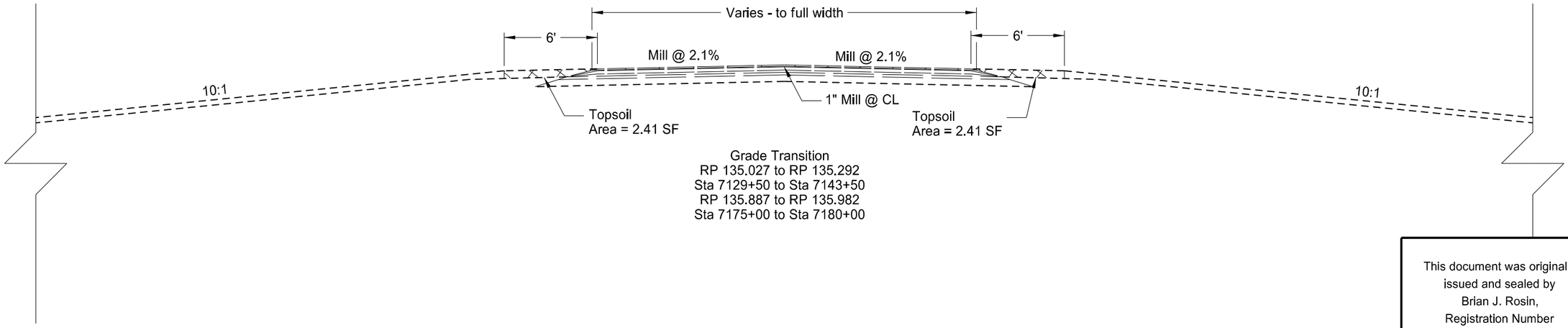
Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	30	2



RP 134.322 to RP 135.027
Sta. 7092+20.06 to Sta. 7129+50
RP 135.982 to RP 136.278
Sta. 7180+00 to Sta. 7195+47.84



Grade Transition
RP 135.027 to RP 135.292
Sta 7129+50 to Sta 7143+50
RP 135.887 to RP 135.982
Sta 7175+00 to Sta 7180+00

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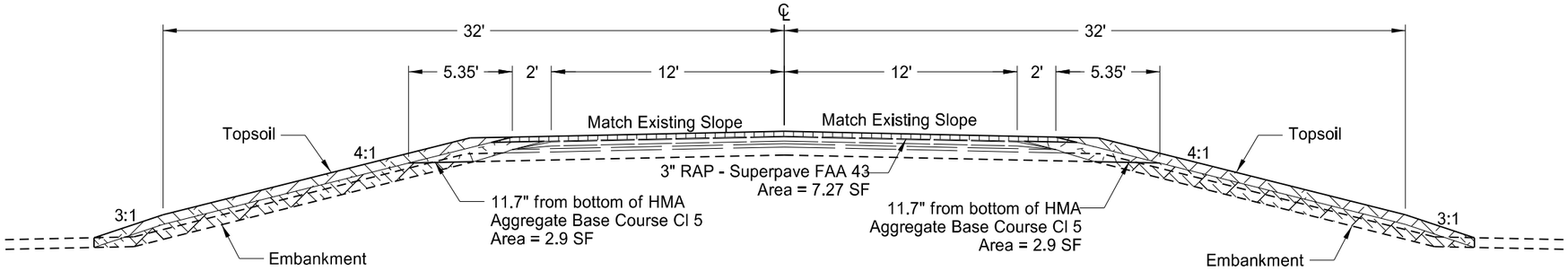
Milling Typical Sections

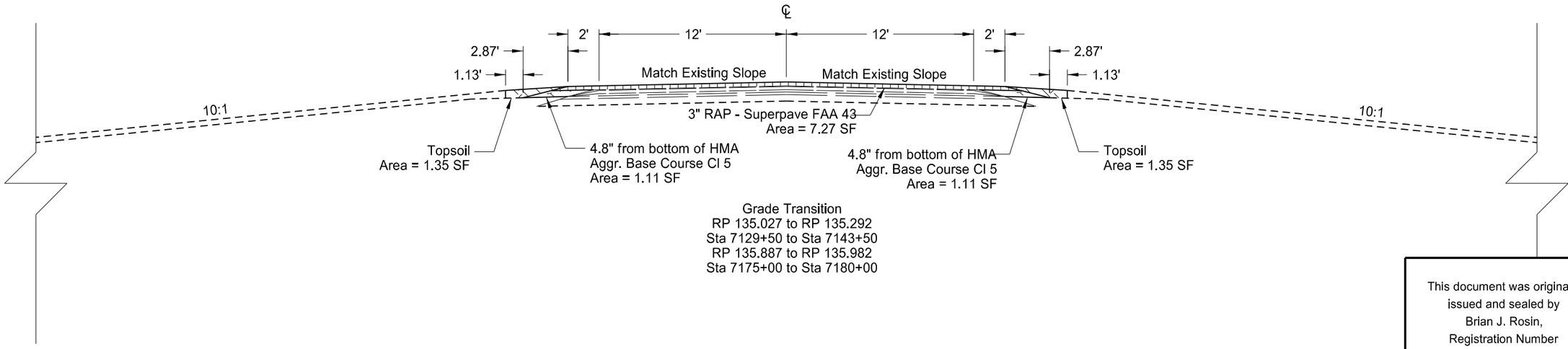
Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	30	3



RP 134.322 to RP 135.027
Sta. 7092+20.06 to Sta. 7129+50
RP 135.982 to RP 136.278
Sta. 7180+00 to Sta. 7195+47.84



Grade Transition
RP 135.027 to RP 135.292
Sta 7129+50 to Sta 7143+50
RP 135.887 to RP 135.982
Sta 7175+00 to Sta 7180+00

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Proposed Typical Sections

Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	R1 Fabric (Pay Item)	(*) End Sections		Applicable Backfill
													Begin	End	
				In	Bid Item	LF		In	Type		In	SY	EA	EA	
7102+70	39' Rt	7102+84	39' Rt	18	Pipe Corr. Steel .064IN 18IN (Extention)	14	Corrugated Steel Pipe	18	Z,A,P	2	0.064	N/A	Remove & Relay		See Section 20
7103+44	39' Rt	7103+56	39' Rt	18	Pipe Corr. Steel .064IN 18IN (Extention)	12	Corrugated Steel Pipe	18	Z,A,P	2	0.064	N/A		Remove & Relay	See Section 20
7115+24	60' Lt	7115+66	60" Lt	24	Pipe Corr. Steel .064IN 24IN (Extention)	22	Corrugated Steel Pipe	24	Z,A,P	2	0.064	N/A	Remove & Relay		See Section 20
7116+00	60' Lt	7116+20	60' Lt	24	Pipe Corr. Steel .064IN 24IN (Extention)	20	Corrugated Steel Pipe	24	Z,A,P	2	0.064	N/A		Remove & Relay	See Section 20
7116+47	38' Lt	7116+47	42' Lt	30	Pipe Conc. Reinf. CL III (Extension)	4'	Reinforced Concrete Pipe - Class III **(barrel length = 4 LF)**	30						Remove & Relay	See Section 20
7116+47	42' Rt	7116+47	48' Rt	30	Pipe Conc. Reinf. CL III (Extension)	6'	Reinforced Concrete Pipe - Class III **(barrel length = 6 LF)**	30					Remove & Relay		See Section 20
7127+42	42' Lt	7127+62	42' Lt	18	Pipe Corr. Steel .064IN 18IN (Extention)	20	Corrugated Steel Pipe	18	Z,A,P	2	0.064	N/A	Remove & Relay		See Section 20
7128+22	42' Lt	7128+32	42' Lt	18	Pipe Corr. Steel .064IN 18IN (Extention)	10	Corrugated Steel Pipe	18	Z,A,P	2	0.064	N/A		Remove & Relay	See Section 20
7132+98	54' Lt	7133+10	54' Lt	24	Pipe Corr. Steel .064IN 24IN (Extention)	12	Corrugated Steel Pipe	24	Z,A,P	2	0.064	N/A	Remove & Relay		See Section 20
7133+55	54' Lt	7133+63	54' Lt	24	Pipe Corr. Steel .064IN 24IN (Extention)	8	Corrugated Steel Pipe	24	Z,A,P	2	0.064	N/A		Remove & Relay	See Section 20
7178+06	60' Lt	7178+10	60' Lt	24	Pipe Corr. Steel .064IN 24IN (Extention)	4	Corrugated Steel Pipe	24	Z,A,P	2	0.064	N/A	Remove & Relay		See Section 20
7178+98	60' Lt	7179+06	60' Lt	24	Pipe Corr. Steel .064IN 24IN (Extention)	8	Corrugated Steel Pipe	24	Z,A,P	2	0.064	N/A		Remove & Relay	See Section 20
7183+23	46' Rt	7183+35	46' Rt	18	Pipe Corr. Steel .064IN 18IN (Extention)	12	Corrugated Steel Pipe	18	Z,A,P	2	0.064	N/A	Remove & Relay		See Section 20
7183+96	46' Rt	7184+08	46' Rt	18	Pipe Corr. Steel .064IN 18IN (Extention)	12	Corrugated Steel Pipe	18	Z,A,P	2	0.064	N/A		Remove & Relay	See Section 20
7185+87	72' Lt	7186+60	40' Lt	24	Pipe Conduit - Approach	80	Reinforced Concrete Pipe - Class III **(barrel length = 76 LF)**	24				N/A	FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	24	A, P	2	0.109				
							Corrugated Steel Pipe	24	P	3, 5	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.079				
7186+41	86' Lt	7186+56	51' Lt	18	Pipe Conduit - Approach	40	Reinforced Concrete Pipe - Class III **(barrel length = 36 LF)**	18				N/A	FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	18	A, P	2	0.109				
							Corrugated Steel Pipe	18	P	3, 5	0.064				
							Spiral Rib Steel Pipe	18	P	3/4, 1	0.079				
7186+26	40' Rt	7186+96	40' Rt	18	Pipe Conduit - Approach	70	Reinforced Concrete Pipe - Class III **(barrel length = 66 LF)**	18				N/A	FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	30	A, P	2	0.109				
							Corrugated Steel Pipe	18	P	3, 5	0.064				
							Spiral Rib Steel Pipe	18	P	3/4, 1	0.079				
7189+60	42' Lt	7190+34	42' Lt	18	Pipe Conduit - Approach	74	Reinforced Concrete Pipe - Class III **(barrel length = 70 LF)**	18				N/A	FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	18	A, P	2	0.109				
							Corrugated Steel Pipe	18	P	3, 5	0.064				
							Spiral Rib Steel Pipe	18	P	3/4, 1	0.079				
7191+19	44' Lt	7191+89	44' Lt	18	Pipe Conduit - Approach	70	Reinforced Concrete Pipe - Class III **(barrel length = 66 LF)**	18				N/A	FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	18	A, P	2	0.109				
							Corrugated Steel Pipe	18	P	3, 5	0.064				
							Spiral Rib Steel Pipe	18	P	3/4, 1	0.079				
7191+97	41' Rt	7192+83	41' Rt	24	Pipe Conduit - Approach	86	Reinforced Concrete Pipe - Class III **(barrel length = 82 LF)**	24				N/A	FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	24	A, P	2	0.109				
							Corrugated Steel Pipe	24	P	3, 5	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.079				
7192+70	46' Lt	7193+62	46' Lt	24	Pipe Conduit - Approach	92	Reinforced Concrete Pipe - Class III **(barrel length = 88 LF)**	24				N/A	FES	FES	Specification 714.04 A
							Corrugated Steel Pipe	24	A, P	2	0.109				
							Corrugated Steel Pipe	24	P	3, 5	0.064				
							Spiral Rib Steel Pipe	24	P	3/4, 1	0.079				

Coatings: **Z =** Zinc
A = Aluminum
P = Polymeric (over Zinc or Aluminum)

Corrug **2 =** 2-2/3"x1/2"
3 = 3"x1"
5 = 5"x1"

Spiral Ribs: **3/4 =** 3/4"x3/4"@7-1/2"
1 = 3/4"x1"@11-1/2"

(*) The price bid for "Pipe Conduit" bid items includes end sections. Pipe Extensions shall pay for end sections separately.
FES = Flared End Section
TES = Traversable End Section

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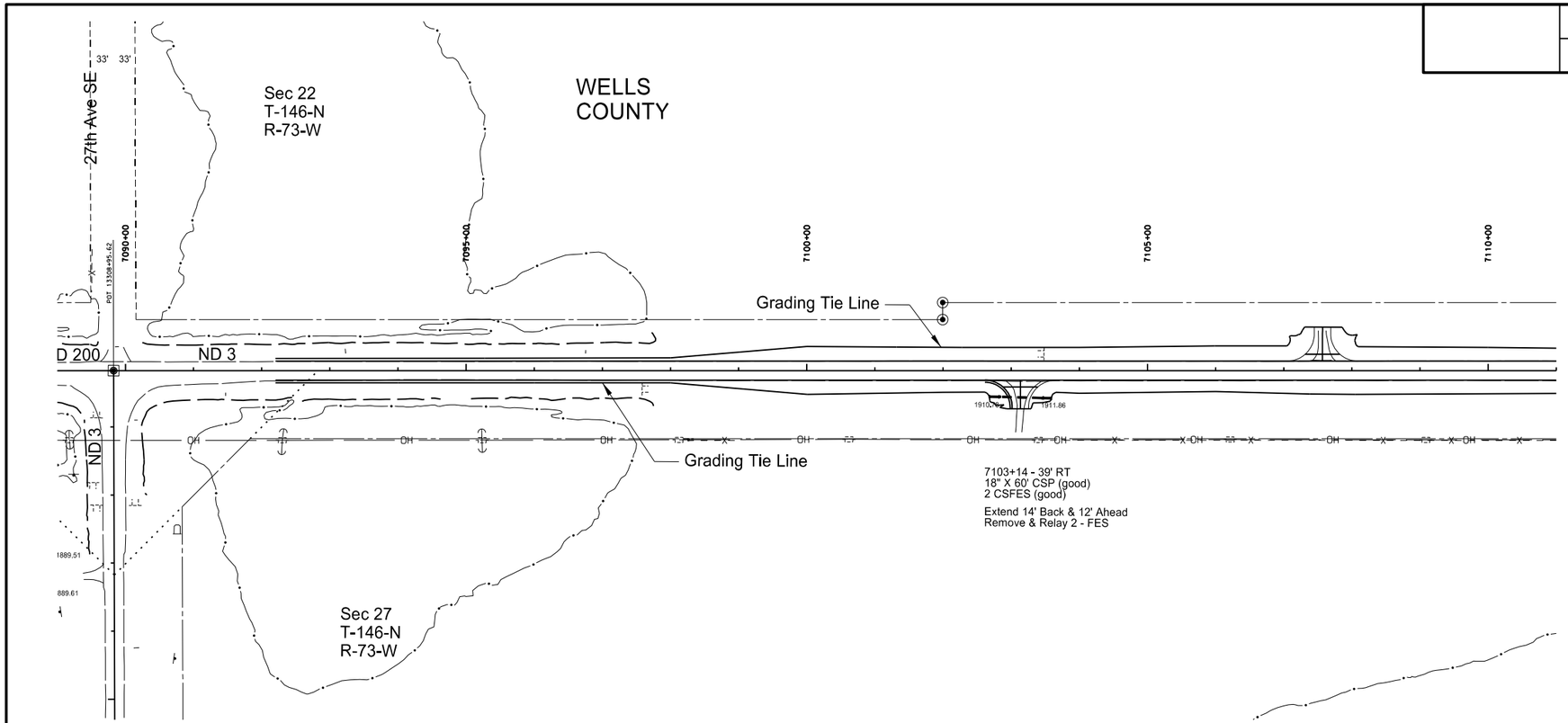
Allowable Pipe List

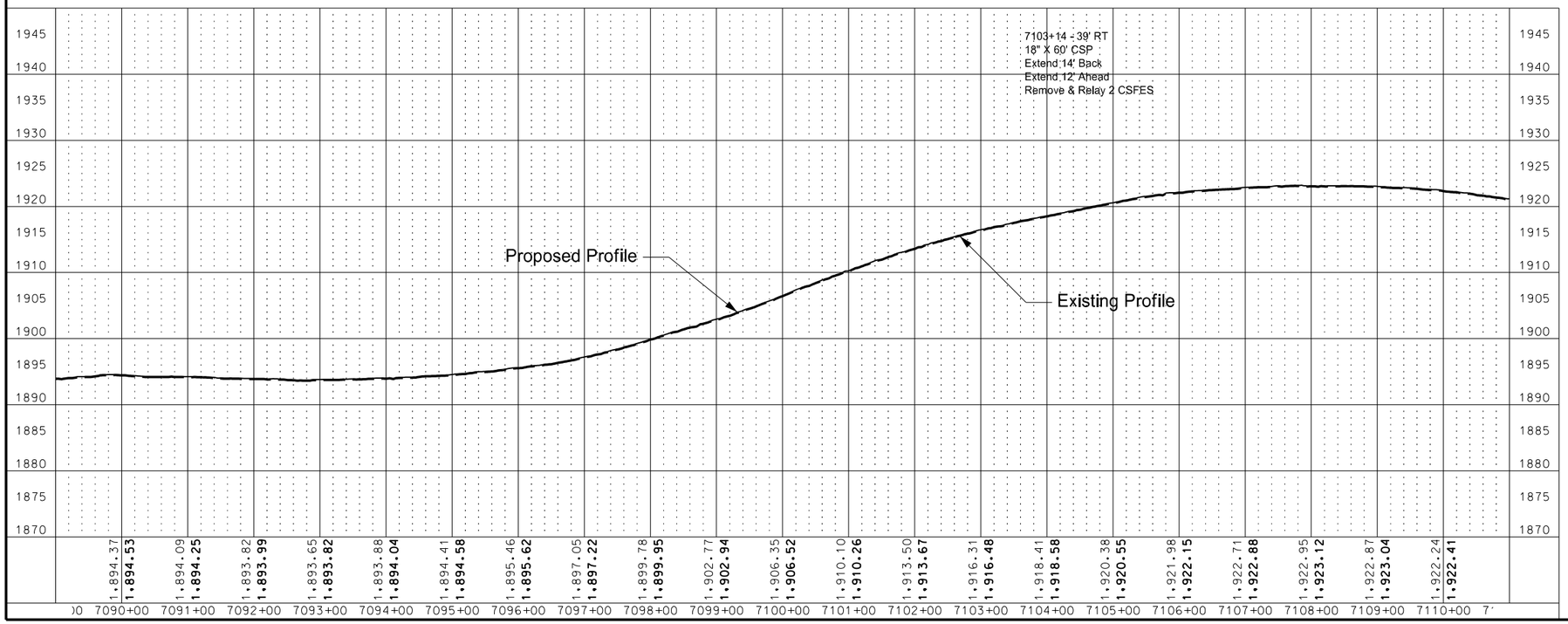
Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	60	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
714	5015	PIPE CORR STEEL .064IN 18IN		
		7102+84 - 39' RT	LF	14
		7103+44 - 39' RT	LF	12
714	9660	REMOVE & RELAY END SECTIONS-ALL TYPES & SIZES		
		7102+84 - 39' RT	EA	1
		7103+44 - 39' RT	EA	1





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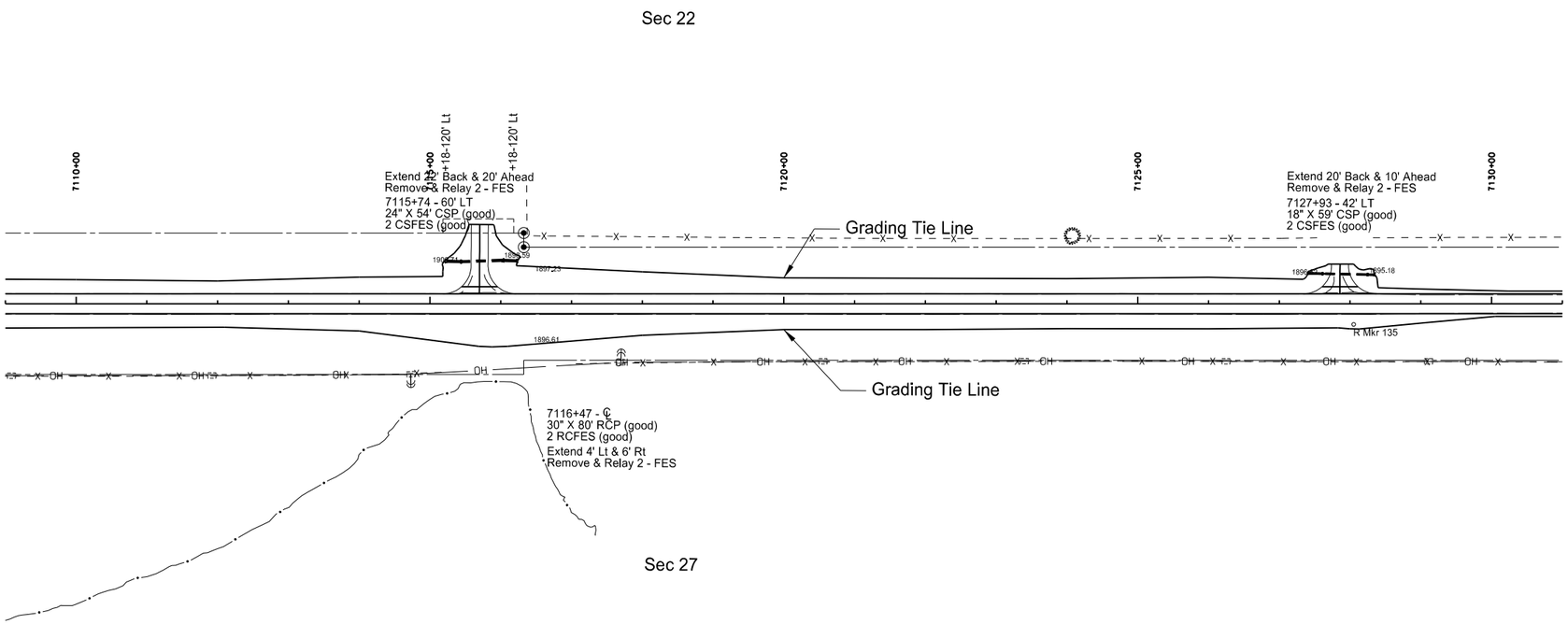
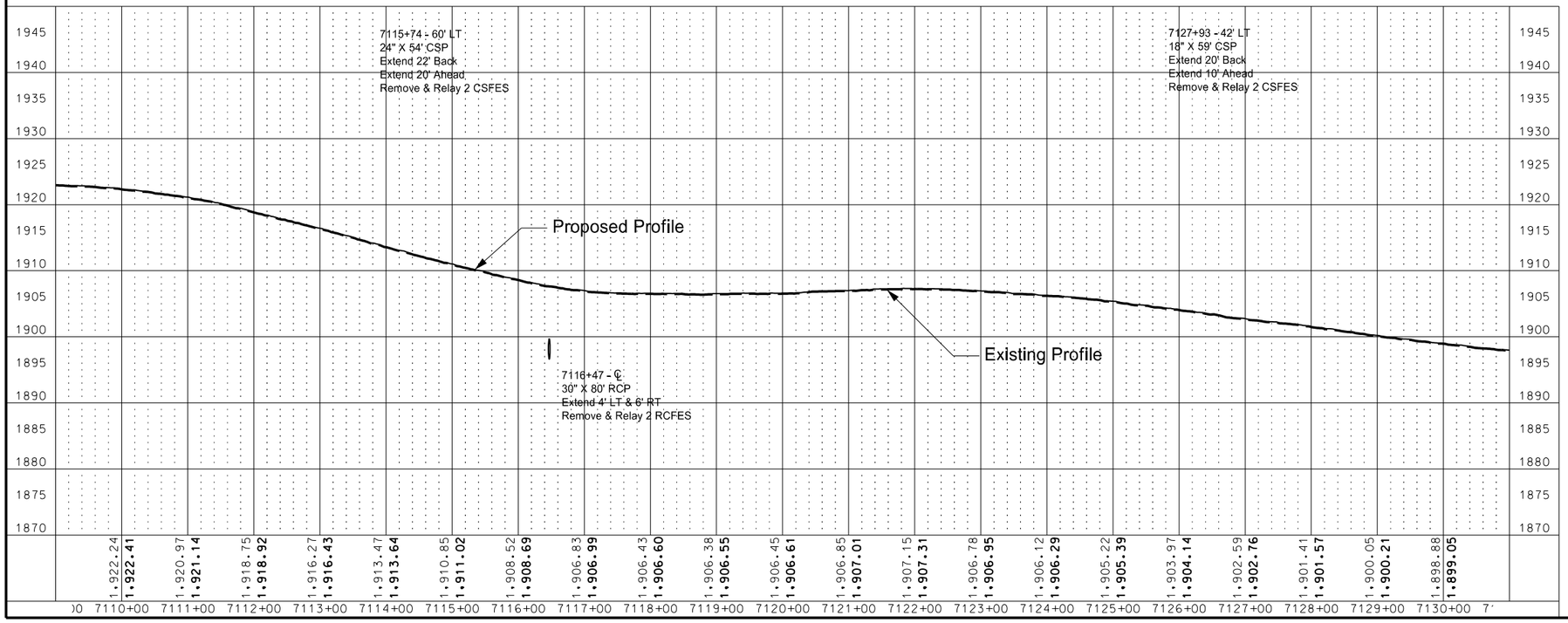
Sta 7092+20.06 to Sta 7110+00

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	60	2





SPEC	CODE	BID ITEM	UNIT	QUANTITY
714	0820	PIPE CONC REINF 30IN CL III		
		7116+47 - LT	LF	4
		7116+47 - RT	LF	6
714	5015	PIPE CORR STEEL .064IN 18IN		
		7127+62 - 42' LT	LF	20
		7128+32 - 42' LT	LF	10
714	5035	PIPE CORR STEEL .064IN 24IN		
		7115+66 - 60' LT	LF	22
		7116+00 - 60' LT	LF	20
714	9660	REMOVE & RELAY END SECTIONS-ALL TYPES & SIZES		
		7116+47 - LT & RT	EA	2
		7115+66 - 60' LT	EA	1
		7116+00 - 60' LT	EA	1
		7127+62 - 42' LT	EA	1
		7128+32 - 42' LT	EA	1

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Plan & Profile
Sta 7110+00 to Sta 7130+00

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

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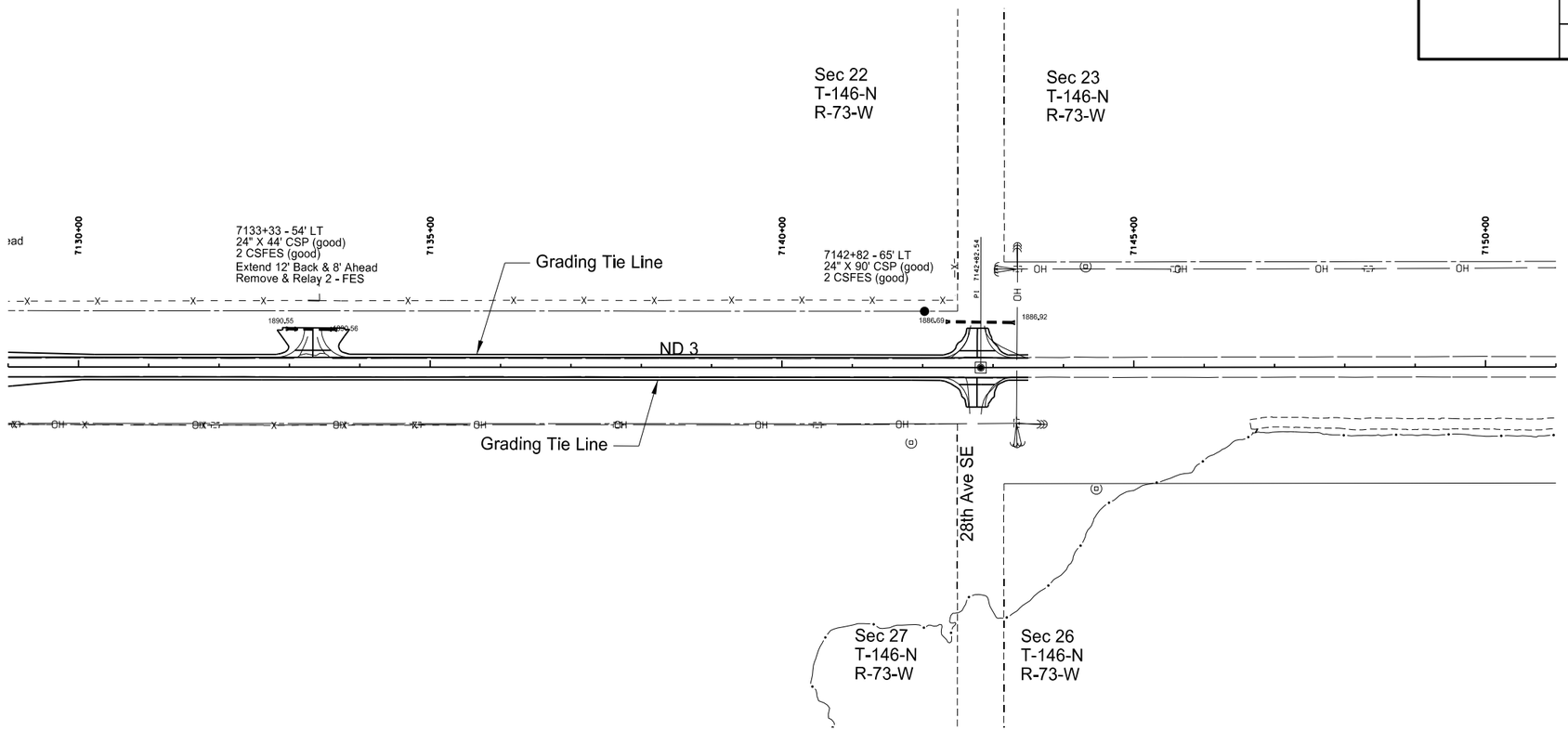
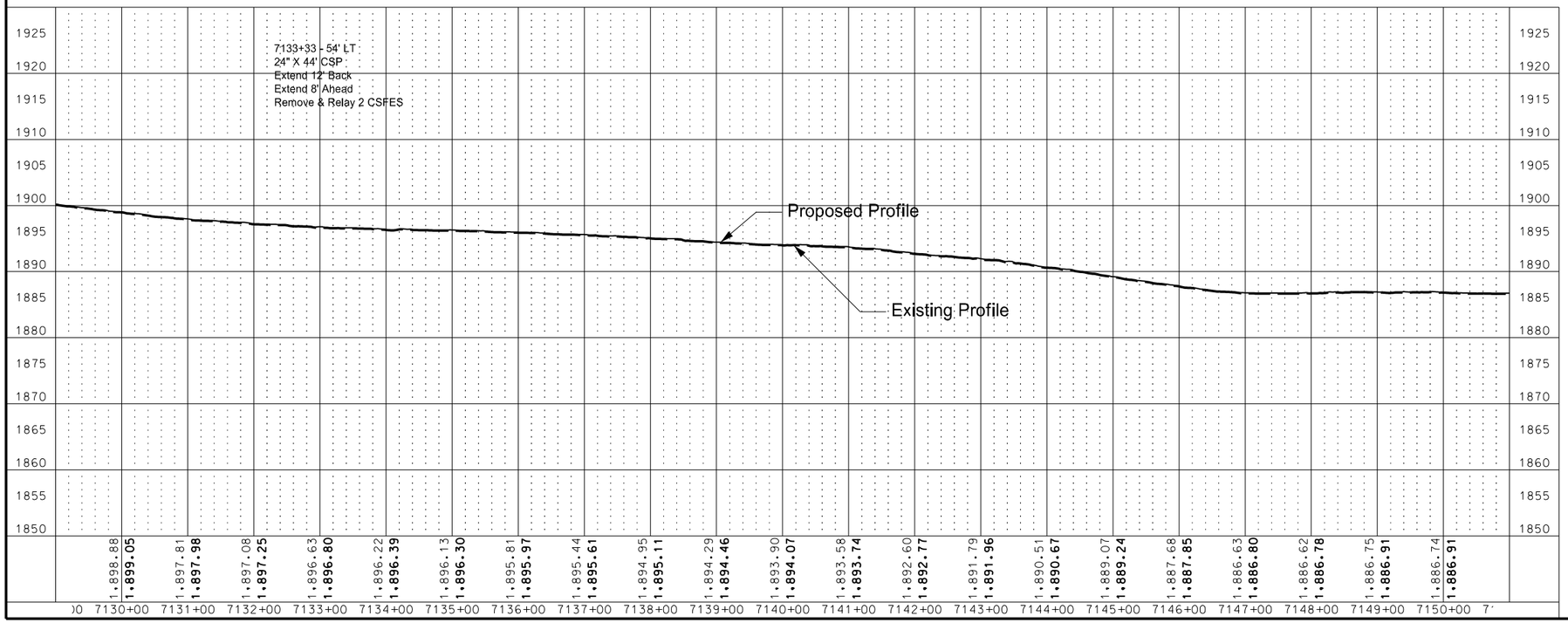
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	60	3





SPEC	CODE	BID ITEM	UNIT	QUANTITY
714	5035	PIPE CORR STEEL .064IN 24IN		
		7133+10 - 54' LT	LF	12
		7133+55 - 54' LT	LF	8
714	9660	REMOVE & RELAY END SECTIONS-ALL TYPES & SIZES		
		7133+10 - 54' LT	EA	1
		7133+55 - 54' LT	EA	1

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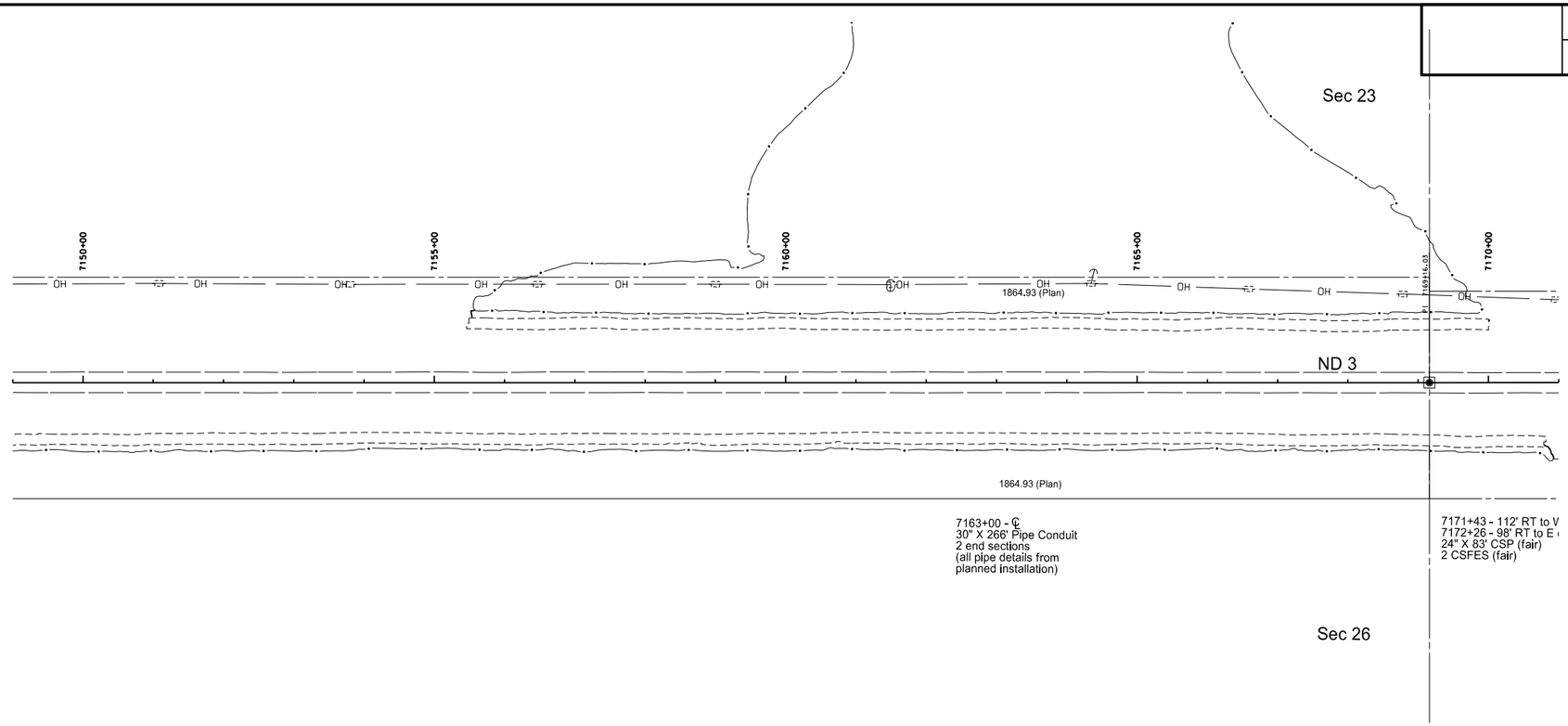
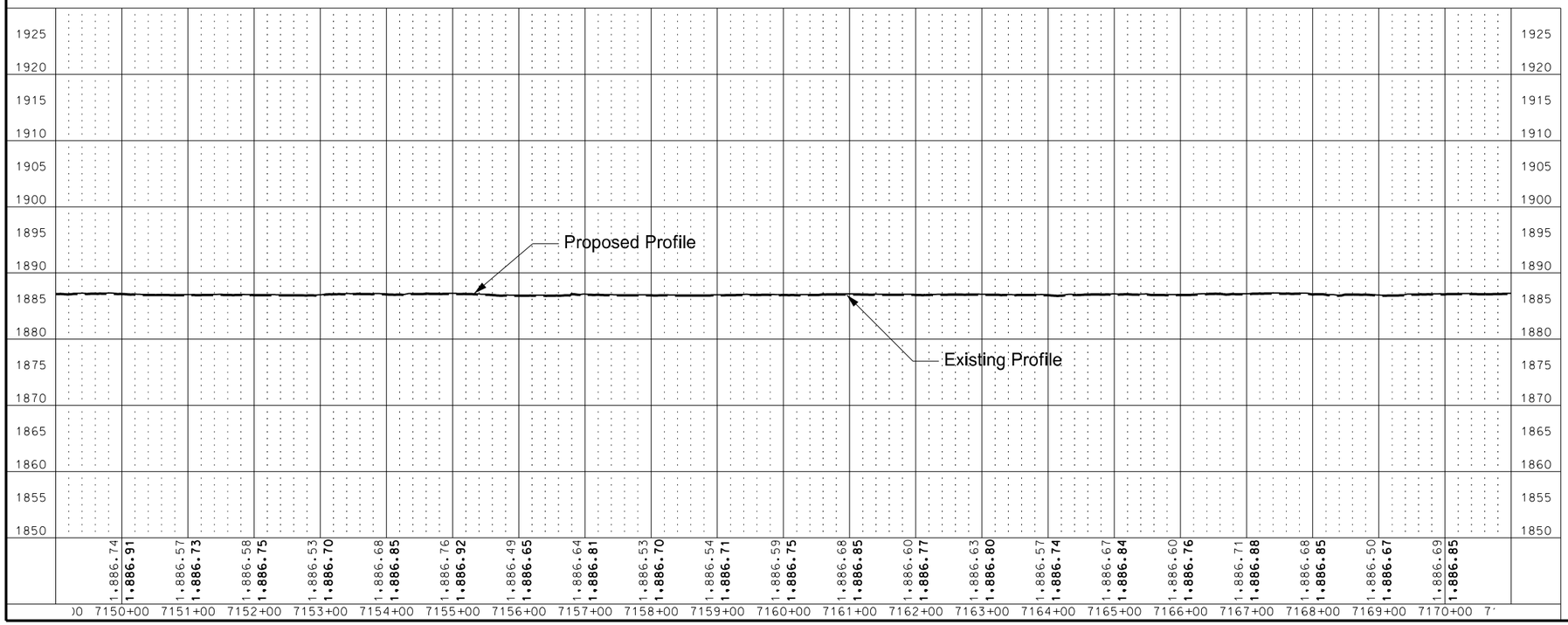
Sta 7130+00 to Sta 7150+00

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	60	4





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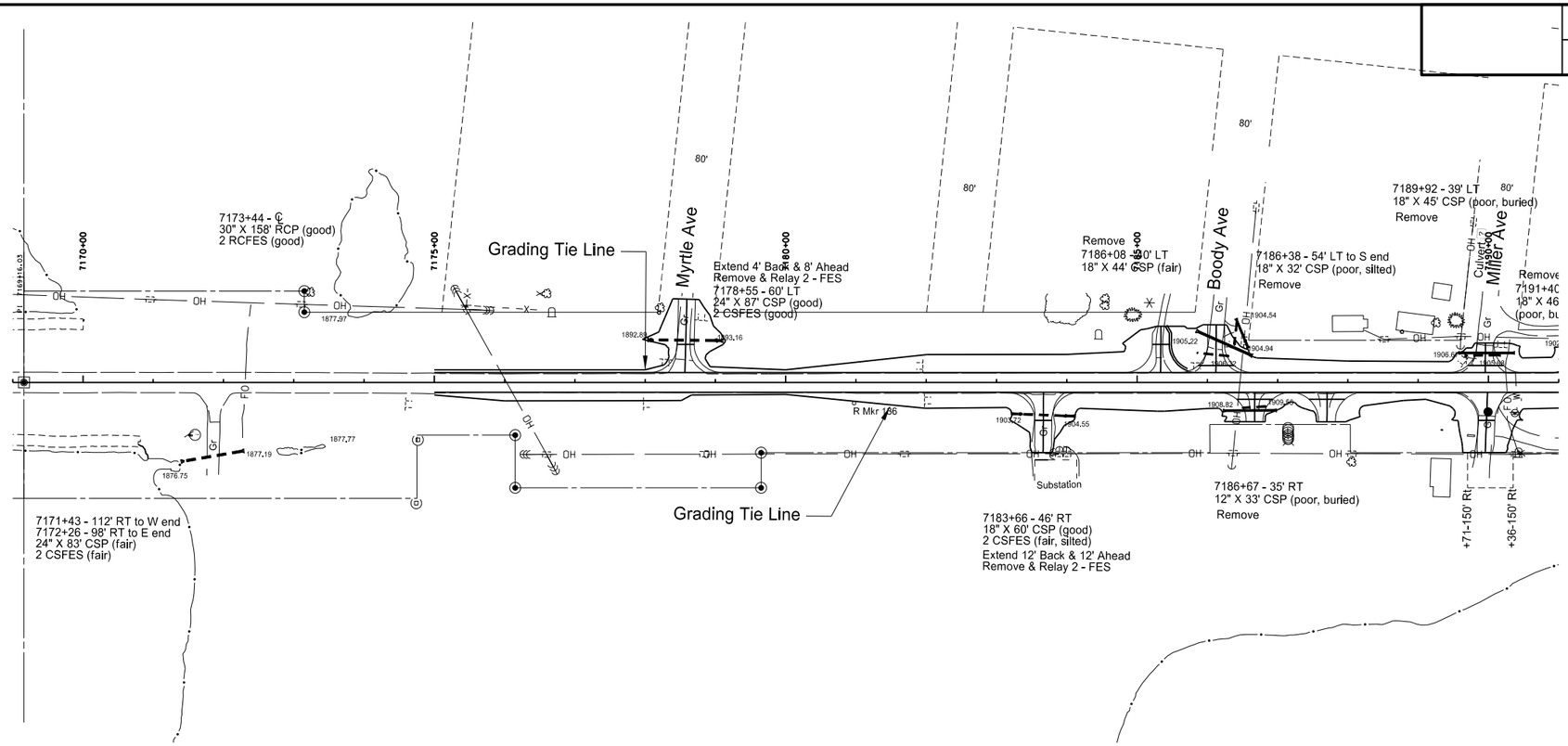
Sta 7150+00 to Sta 7170+00

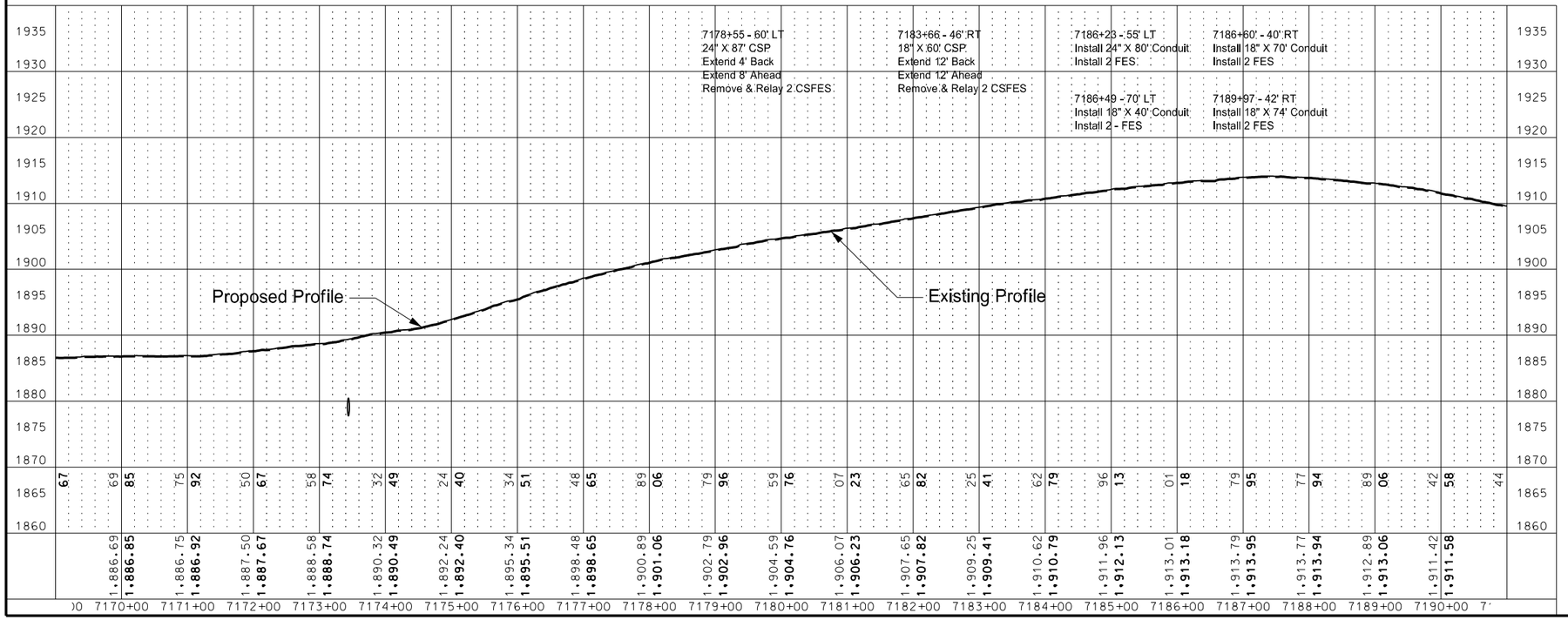
Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	60	5



SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
		7186+08- 40' LT (APPROACH PIPE)	EA	2
		7186+38 - 54' LT (APPROACH PIPE)	EA	2
		7186+67 - 35' RT (APPROACH PIPE)	EA	2
		7189+92 - 39' LT (APPROACH PIPE)	EA	2
202	0174	REMOVAL OF PIPE ALL TYPES & SIZES		
		7186+08- 40' LT (APPROACH PIPE)	LF	44
		7186+38 - 54' LT (APPROACH PIPE)	LF	32
		7186+67 - 35' RT (APPROACH PIPE)	LF	33
		7189+92 - 39' LT (APPROACH PIPE)	LF	45
714	4099	PIPE CONDUIT 18IN-APPROACH		
		7186+49 - LT	LF	40
		7186+60 - RT	LF	70
		7189+98 - LT	LF	74
714	4106	PIPE CONDUIT 24IN-APPROACH		
		7186+25 - LT	LF	80
714	5015	PIPE CORR STEEL .064IN 18IN		
		7183+35 - 46' RT	LF	12
		7183+96 - 46' RT	LF	12
714	5035	PIPE CORR STEEL .064IN 24IN		
		7178+10 - 60' LT	LF	4
		7178+98 - 60' LT	LF	8
714	9660	REMOVE & RELAY END SECTIONS-ALL TYPES & SIZES		
		7178+10 - 60' LT	EA	1
		7178+98 - 60' LT	EA	1
		7183+35 - 46' RT	EA	1
		7183+96 - 46' RT	EA	1



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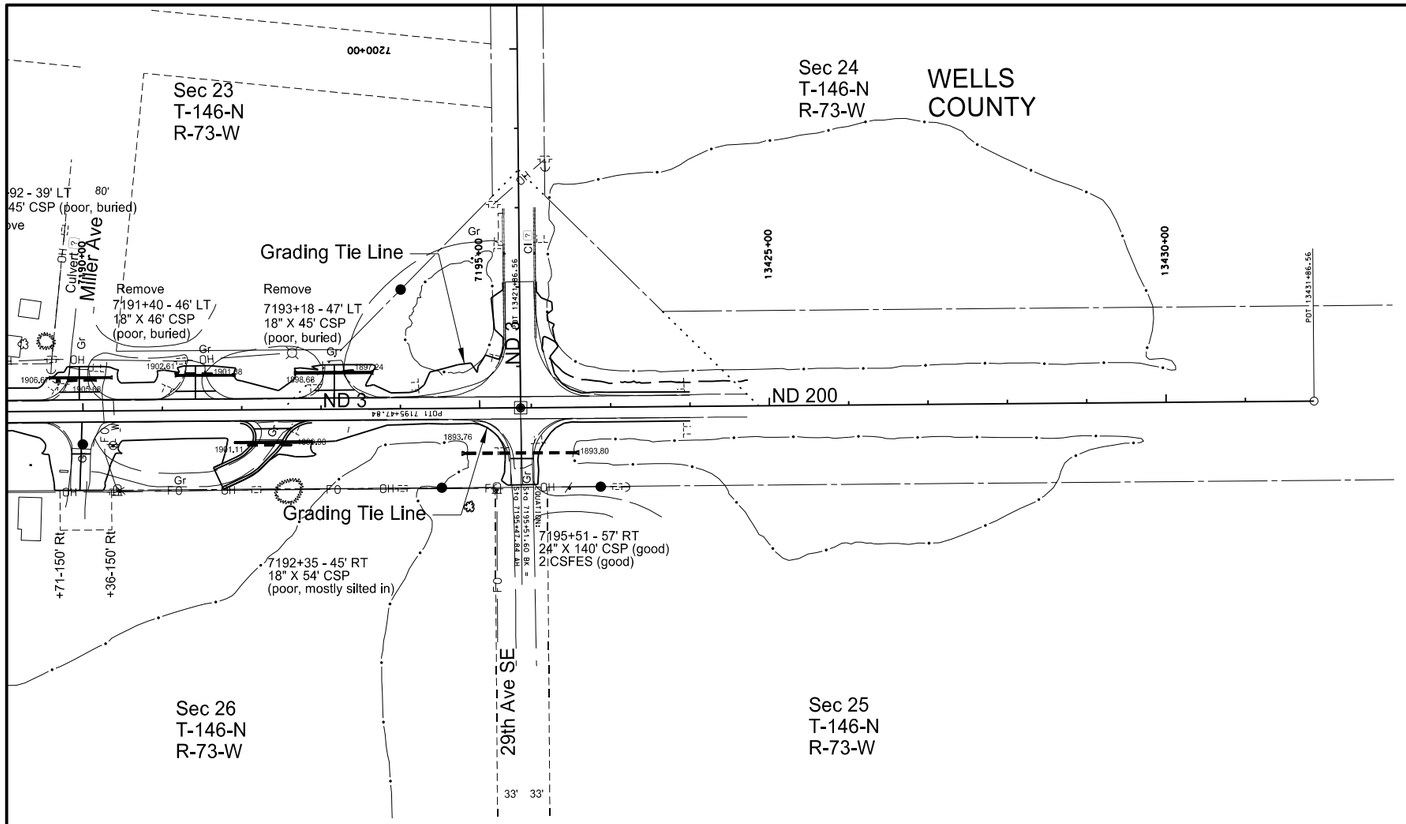
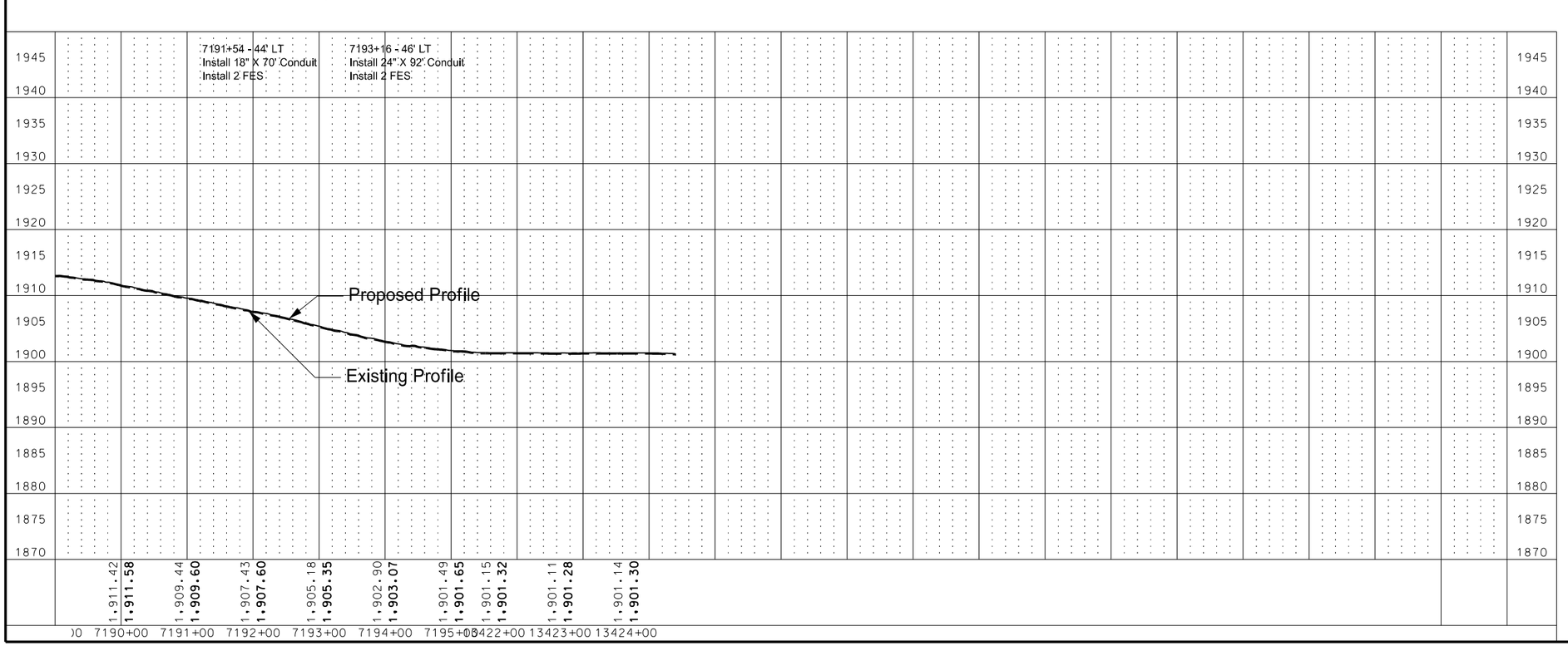
Sta 7170+00 to Sta 7190+00

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	60	6





CODE	BID ITEM	UNIT	QUANTITY
202 0169	REMOVAL OF END SECTION-ALL TYPES & SIZES		
	7191+40 - 46' LT (APPROACH PIPE)	EA	2
	7193+18 - 47' LT (APPROACH PIPE)	EA	2
202 0174	REMOVAL OF PIPE ALL TYPES & SIZES		
	7191+40 - 46' LT (APPROACH PIPE)	LF	46
	7193+18 - 47' LT (APPROACH PIPE)	LF	45
714 4099	PIPE CONDUIT 18IN-APPROACH		
	7191+54 - LT	LF	70
714 4106	PIPE CONDUIT 24IN-APPROACH		
	7193+16 - LT	LF	92
	7192+40 ' Rt	LF	86

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Sta 7190+00 to Sta 7195+47.84

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	75	1

PCN 21509 Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation								
									Mitigation Required			USACE/11990 Bank		Onsite			
					Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	Acres(s)	Mitigation Location; Ratio	Acre(s)	Constructed Site #	Constructed Size Acre(s)
1a	Sec. 22, T146N, R73W	Basin	Natural	Yes	0	0	0	0	Y	Y	N						
1b	Sec. 27, T146N, R73W	Basin	Natural	Yes	0	0	0	0	Y	Y	N						
2a	Sec. 22, T146N, R73W	Ditch	Artificial	No	0.01	0	0	0	N	N	N						
2b	Sec. 27, T146N, R73W	Basin	Artificial	No	0.03	0	0	0	N	N	N						
3a	Sec. 22, T146N, R73W	Basin	Natural	No	0	0	0	0	N	N	N						
3b	Sec. 22, T146N, R73W	Basin	Natural	No	0	0	0	0	N	N	N						
3c	Sec. 22, T146N, R73W	Ditch	Artificial	No	0	0	0	0	N	N	N						
4a	Sec. 23, T146N, R73W	Ditch	Artificial	No	0	0	0	0	N	N	N						
4d	Sec. 26, T146N, R73W	Ditch	Artificial	No	0	0	0	0	N	N	N						
4e	Sec. 23, T146N, R73W	Basin	Natural	No	0	0	0	0	N	N	N						
5	Sec. 23, T146N, R73W	Ditch	Artificial	No	0.01	0	0	0	N	N	N						
6	Sec. 26, T146N, R73W	Ditch	Artificial	No	0.01	0	0	0	N	N	N						
7	Sec. 23, T146N, R73W	Ditch	Artificial	No	0	0	0	0	N	N	N						
8	Sec. 23, T146N, R73W	Basin	Artificial	No	0.04	0.09	0	0	N	N	N						
9	Sec. 26, T146N, R73W	Basin	Natural	No	0	0	0	0	Y	N	N						
1a	Sec. 24, T146N, R73W	Basin	Natural	No	0.04	0.04	0	0	Y	N	N	Vollrath 16/17	0.04				
				Totals	0.10	0.09	0.00	0.00					0.04		0.00		0.00

Impact Summary Table

Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	**Total (Acres)**	**Wetland Type**	**Total (Acres/Lf)**
Natural/JD	0.00	**Temporary JD**	0.00
Natural/Non-JD	0.04	**Non-JD Temporary**	0.10
Artificial/JD	0.00	**Permanent JD > 0.10**	0.00
Artificial /Non-JD	0.09	**Permanent OW**	0.00
Total	**0.13**	**Temporary OW**	0.00

Mitigation Summary Table

	Location	Onsite Acre(s)	11990 Bank Acre(s)	USACE/1199 0 Bank Acre(s)	USFWS Bank Acre(s)
EO 11990 Only	Vollrath 16/17 Bank			0.04	
USACE/11990	Onsite	0.00			
	Total	**0.00**	**0**	**0.04**	**0**

Other Waters Impact Table

Other Waters							Impacts to Other Waters				Other Water Mitigation				
			Size				Acre(s)		Linear Feet		Mitigation Required			Mitigation Location; ratio	
Number	**Location**	**Type**	**Acre(s)**	**Linear Feet**	**Feature**	**USACE Jurisdictional[1]**					**EO 11990**	**USACE**	**USFWS**		**Method**
OW4b	Sec. 23, T146N, R73W	-	2.09	NA	Lake	No	0.00	0.00	0.00	0.00	N	N	N		
OW4c	Sec. 26, T146N, R73W	-	4.33	NA	Lake	No	0.00	0.00	0.00	0.00	N	N	N		
			6.42				**0.00**	**0.00**	**0.00**	**0.00**					

[1] A wetland Jurisdictional Determination was issued by the USACE on 12/29/2016; NWO-2011-1384-BIS & 1/12/2017; NWO-2010-2737-BIS.
[2] All impacts to natural wetlands (natural/jurisdictional and natural/non-jurisdictional), regardless of size, as well as impacts greater than 0.10 acre to artificial/jurisdictional wetlands require mitigation.
[3] All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), and temporary impacts do not require mitigation.

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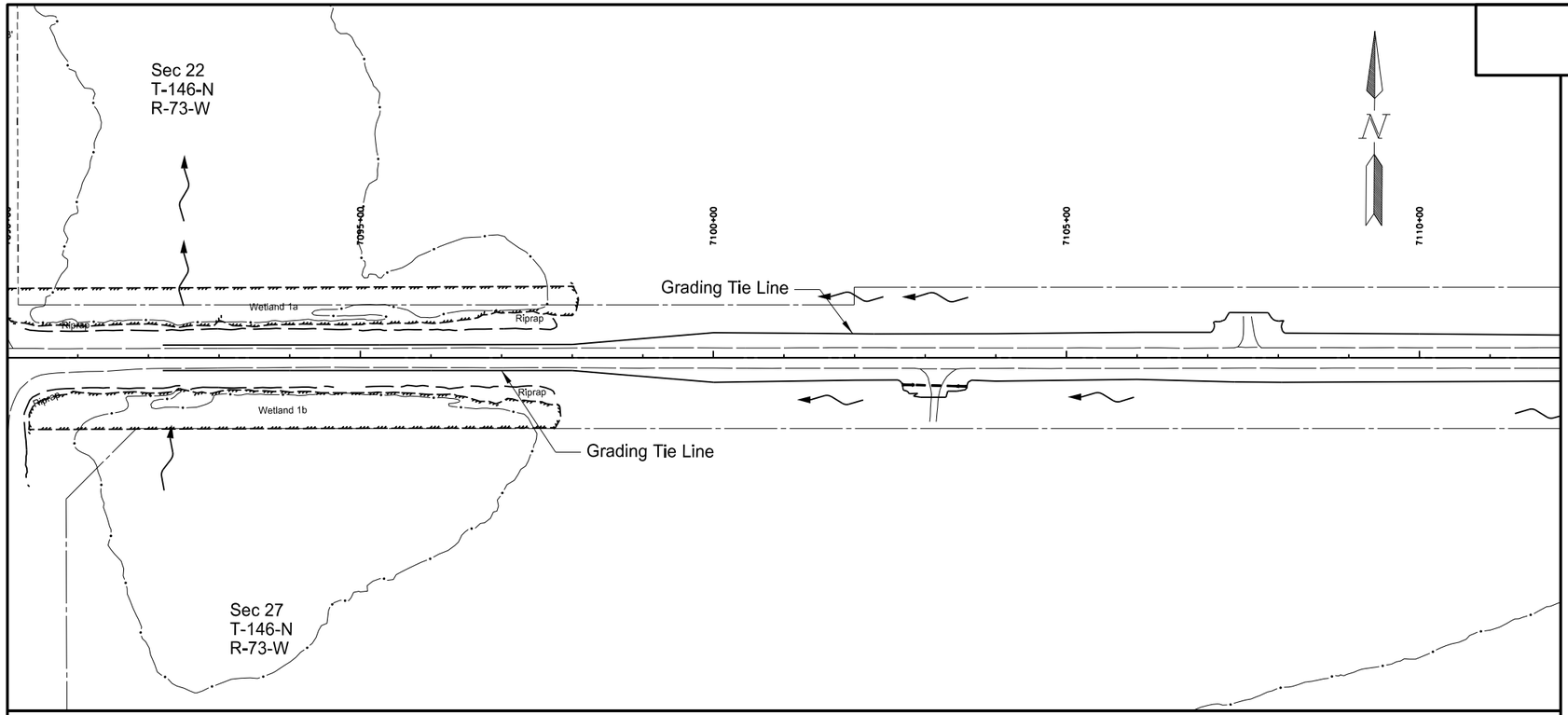
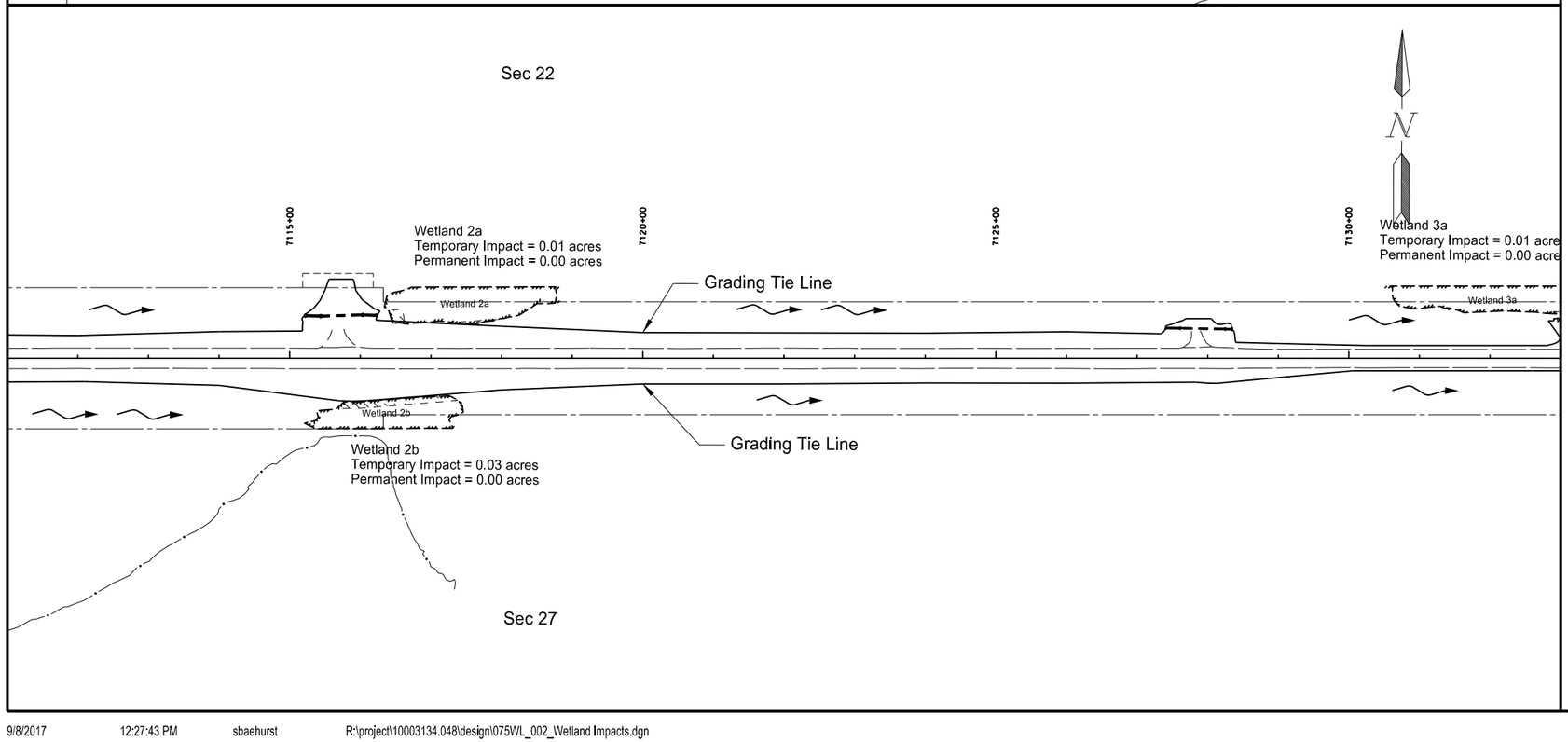
Wetland Impacts Table

Slliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	75	2





Temporary Wetland Impact

Permanent Wetland Impact

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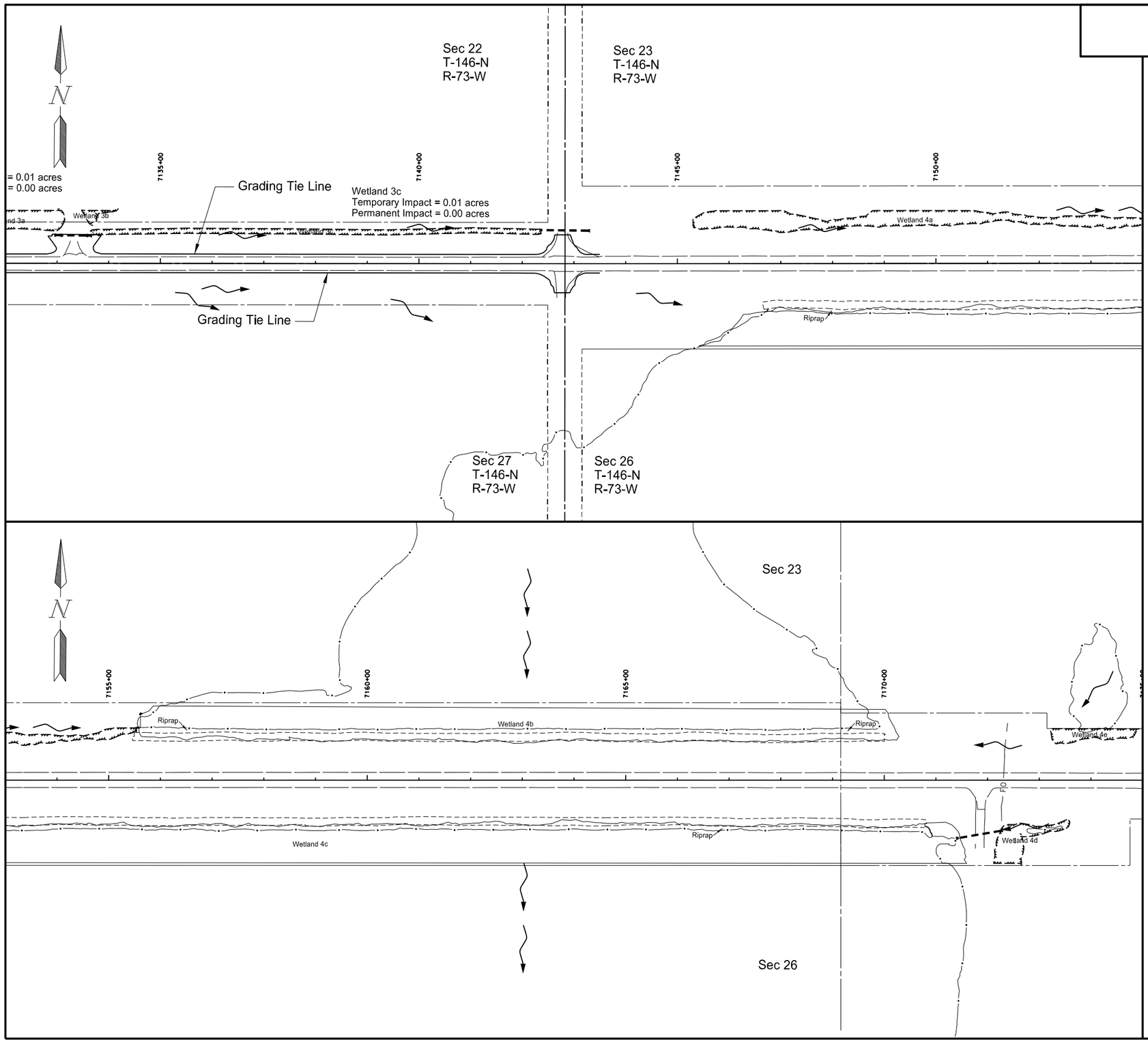
Wetland Impacts

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	75	3



Temporary Wetland Impact

Permanent Wetland Impact

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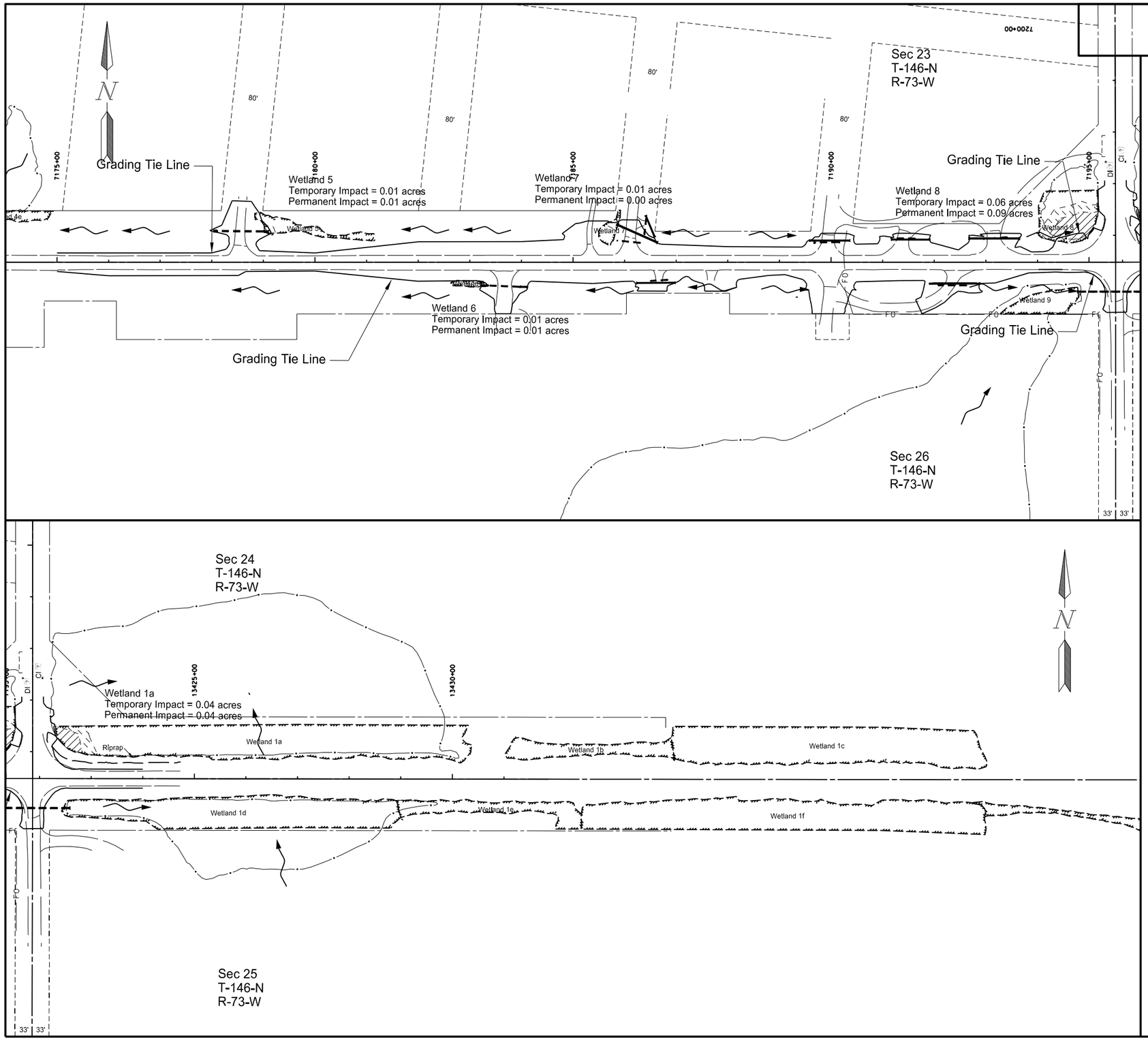
Wetland Impacts

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	75	4



Temporary Wetland Impact

Permanent Wetland Impact

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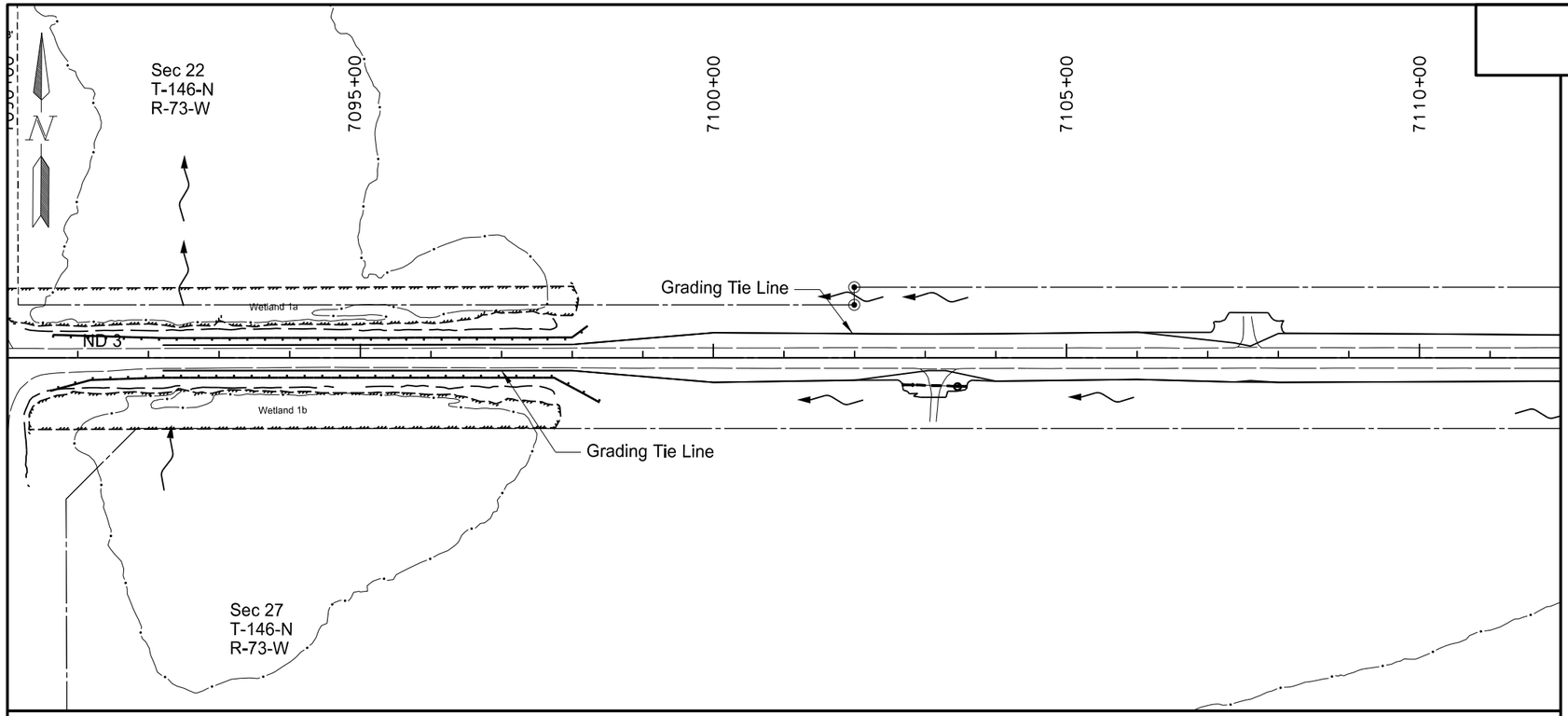
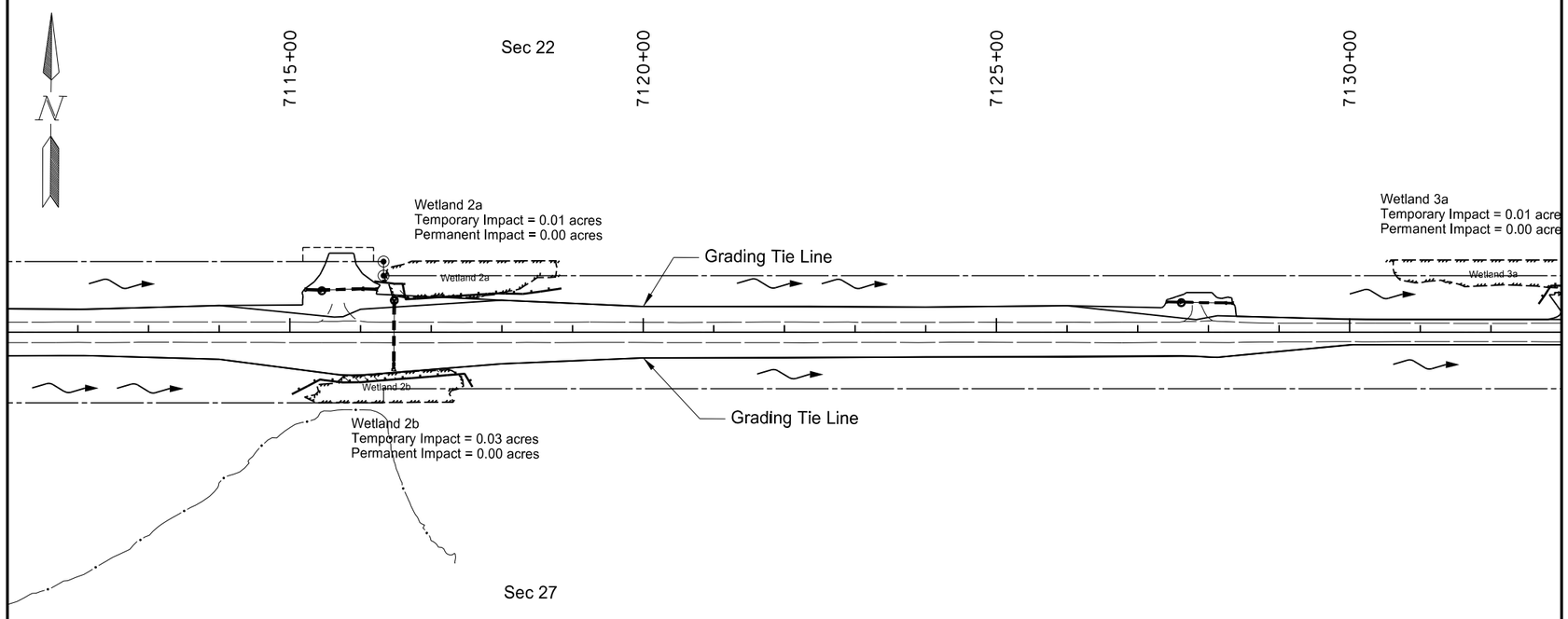
Wetland Impacts

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	76	1





Spec	Code	Description	Quantity
261	0112	Fiber Rolls 12IN	2230 LF
261	0113	Remove Fiber Rolls 12IN	2230 LF

Fiber Rolls 12 IN

s Flotation Silt Curtain

Silt Fence

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Temporary Erosion Control

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

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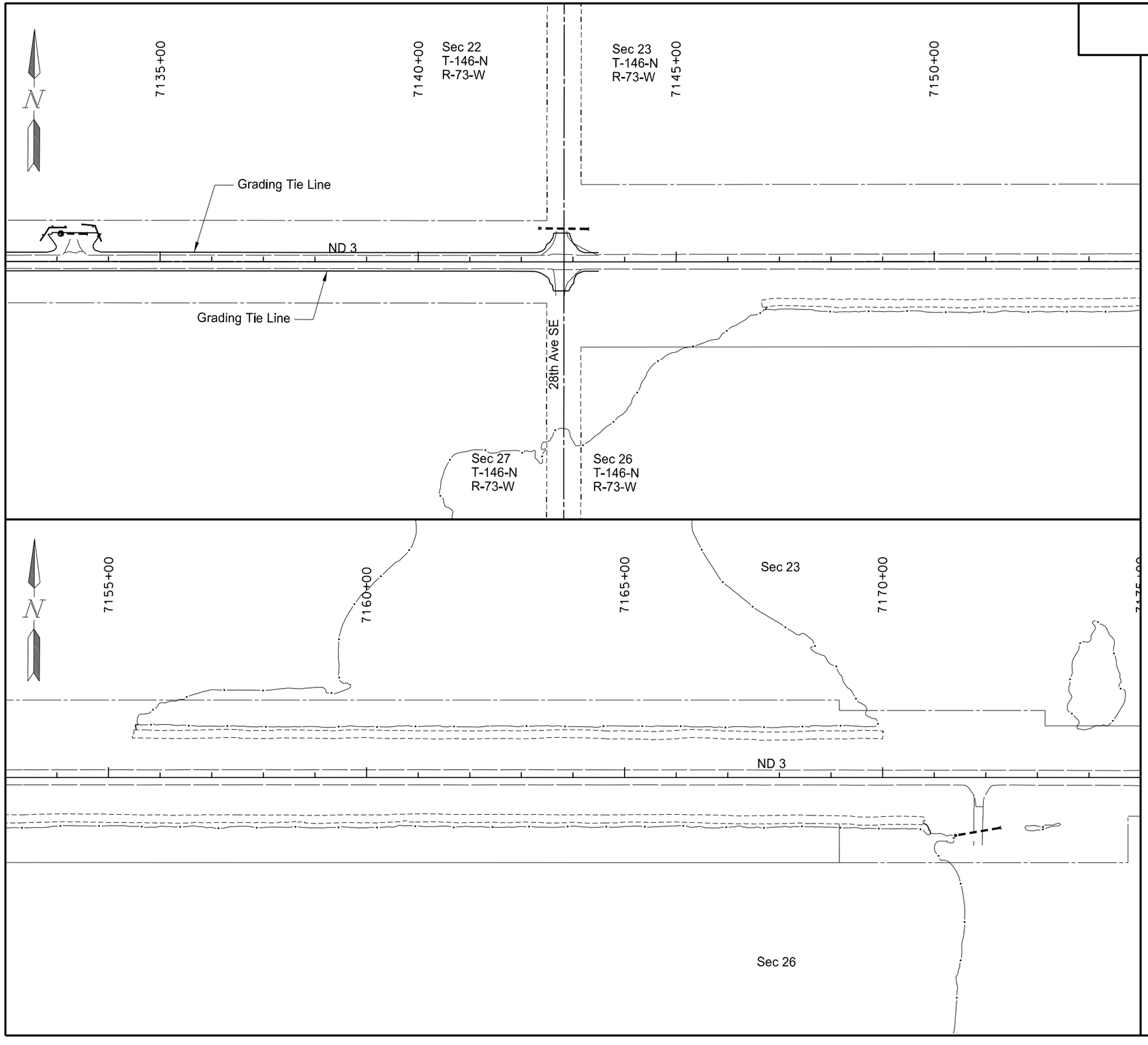
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	76	2



Spec	Code	Description	Quantity
261	0112	Fiber Rolls 12IN	156 LF
261	0113	Remove Fiber Rolls 12IN	156 LF

Fiber Rolls 12 IN

s Flotation Silt Curtain

Silt Fence

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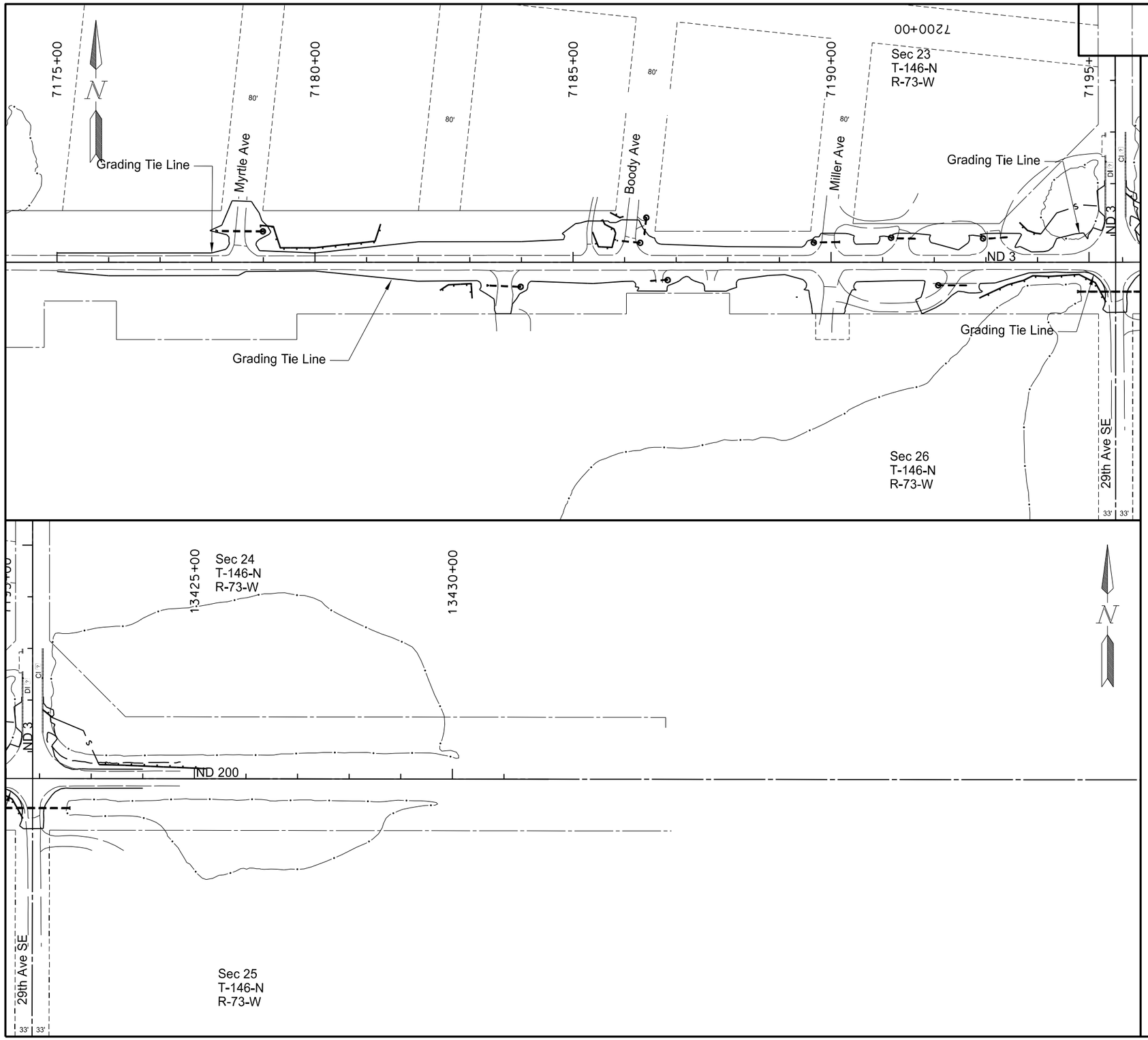
Temporary Erosion Control

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	76	3



Spec	Code	Description	Quantity
261	0112	Fiber Rolls 12IN	1374 LF
261	0113	Remove Fiber Rolls 12IN	1374 LF
262	0100	Flotation Silt Curtain	268 LF
262	0101	Remove Flotation Silt Curtain	268 LF

Fiber Rolls 12 IN

S Flotation Silt Curtain

Silt Fence

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Temporary Erosion Control

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

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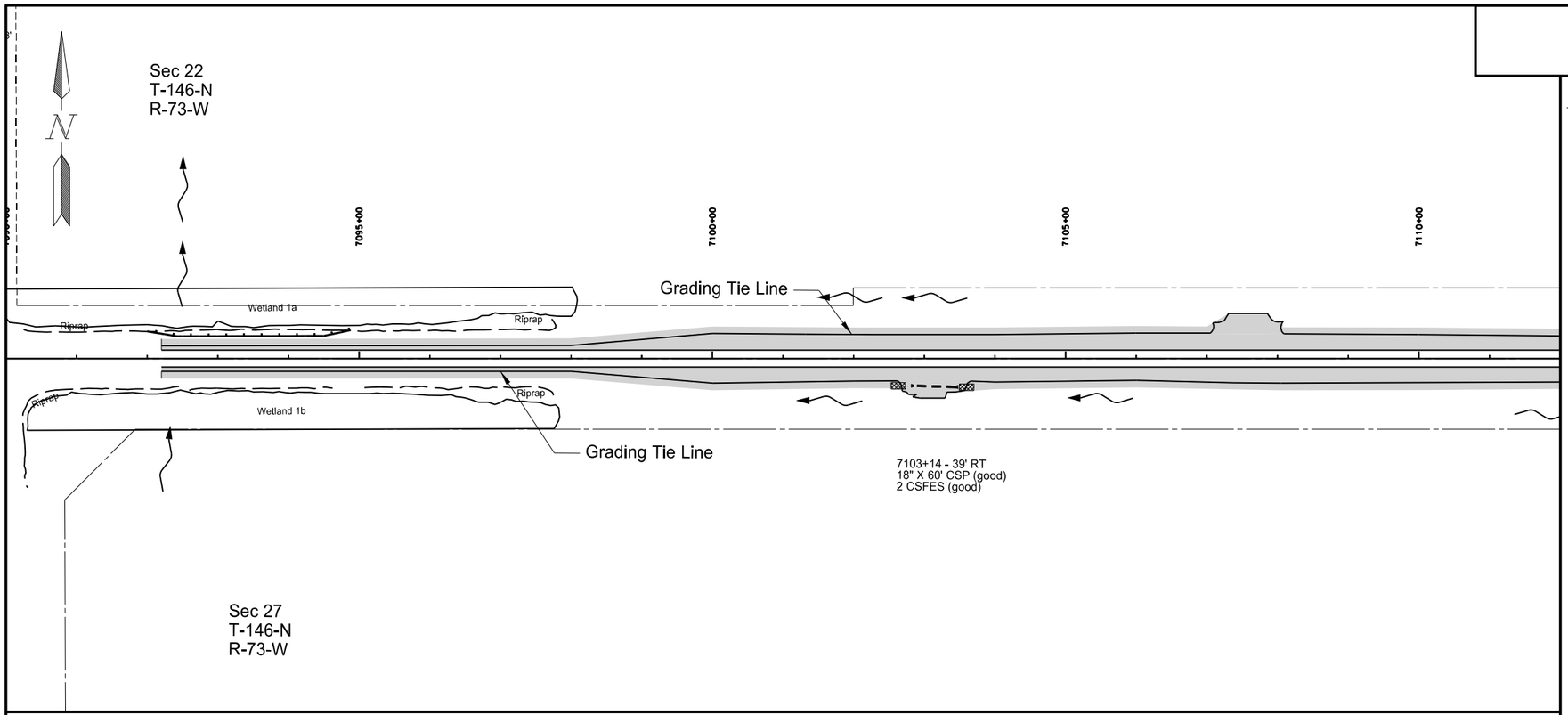
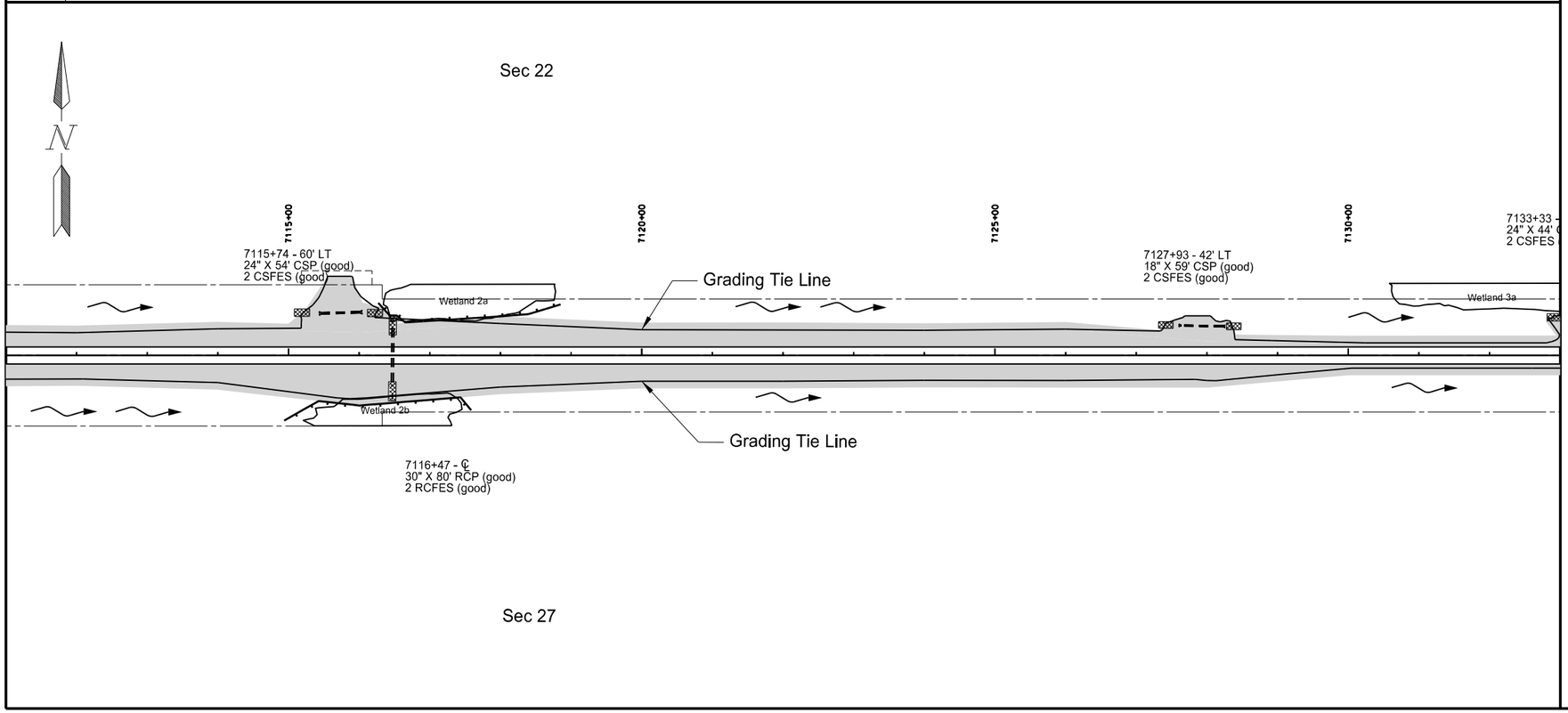
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	77	1

Spec	Code	Description	Quantity
251	0200	Seeding Class II	2.57 ACRE
255	0102	ECB Type 2	180 SY
261	0112	Fiber Rolls 12IN	843 LF





Seeding Class II

ECB Type 2

Fiber Rolls 12 IN

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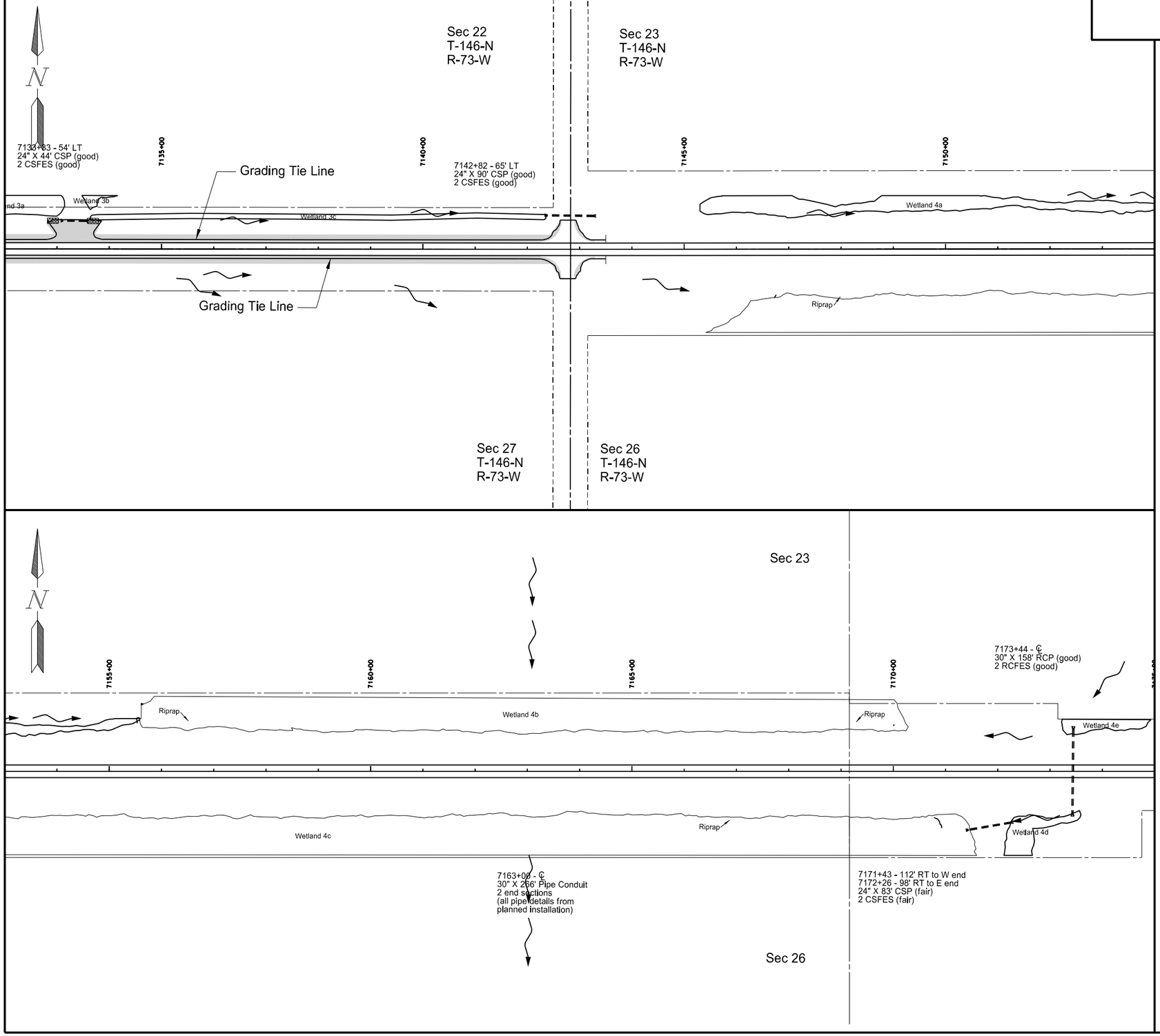
Permanent Erosion Control

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	77	2

Spec	Code	Description	Quantity
251	0200	Seeding Class II	0.81 ACRE
255	0102	ECB Type 2	48 SY



Seeding Class II

ECB Type 2

Fiber Rolls 12 IN

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Permanent Erosion Control

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

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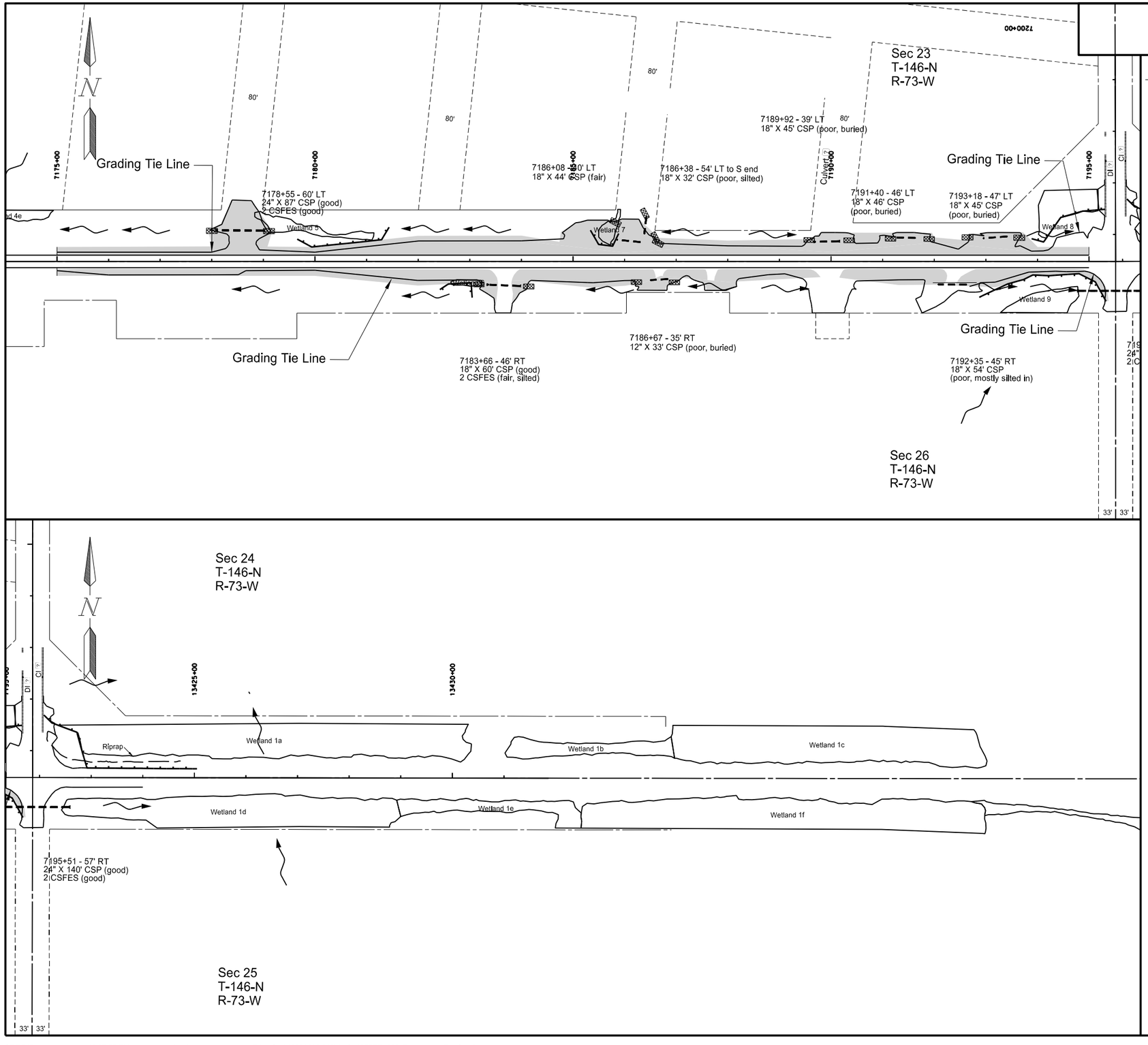
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	77	3

Spec	Code	Description	Quantity
251	0200	Seeding Class II	3.03 ACRE
255	0102	ECB Type 2	364 SY
261	0112	Fiber Rolls 12IN	1185 LF



Seeding Class II

ECB Type 2

Fiber Rolls 12 IN

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Permanent Erosion Control

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

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PRELIMINARY SURVEY COORDINATE AND CURVE DATA - ND 3, W JCT 200 E TO HURDSFIELD

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
ND 3 (Chain: SCL3)			
BEG	7051+29.31	158350.83	2100504.78
PC	7056+50.71	158836.46	2100314.99
PI C406	7061+77.03	159326.68	2100123.41
PT	7066+91.75	159852.98	2100118.59
Station equation	ND 3 (Chain: SCL3) at ND 200 (Chain: SCL200W)		
ND 200 Rec Sec Cor	13308+95.62	162143.69	2100097.59
ND 3 Rec Sec Cor	7089+82.56	162143.69	2100097.59
Rec Sec Cor	7142+82.54	162173.06	2105397.49
1/4 Cor	7169+16.03	162192.30	2108030.90
Station equation	ND 3 (Chain: SCL3) at ND 200 (Chain: SCL200E)		
ND 3 BK Rec Sec Cor	7195+51.60	162212.01	2110666.41
ND 3 AHD Rec Sec Cor	7195+47.84	162212.01	2110666.41
ND 200 Rec Sec Cor	13421+86.56	162212.01	2110666.41
1/4 Cor	7221+88.55	164852.60	2110640.77
Rec Sec Cor	7248+28.01	167491.94	2110615.57
ND 200 (Chain: SCL200W)			
Rec Sec Cor	13256+12.69	162098.61	2094814.84
Station equation	ND 200 (Chain: SCL200W) at ND 3 (Chain: SCL3)		
ND 200 Rec Sec Cor	13308+95.62	162143.69	2100097.59
ND 3 Rec Sec Cor	7089+82.56	162143.69	2100097.59
ND 200 (Chain: SCL200E)			
Station equation	ND 200 (Chain: SCL200E) at ND 3 (Chain: SCL3)		
ND 3 BK Rec Sec Cor	7195+51.60	162212.01	2110666.41
ND 3 AHD Rec Sec Cor	7195+47.84	162212.01	2110666.41
ND 200 Rec Sec Cor	13421+86.56	162212.01	2110666.41
POT	13431+86.56	162220.51	2111666.37

CURVE DATA

ARC DEFINITION

C406

PI STA= 7061+77.03

Delta = 20° 49' 15" RT

D_a = 2° 00' 00"

R = 2864.79'

T = 526.32'

L = 1041.04'

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
SW Cor Sec 20	T-146-N R-73-W	162072.17	2089508.76
SW Cor Sec 21	T-146-N R-73-W	162098.61	2094814.84
SW Cor Sec 22	T-146-N R-73-W	162143.69	2100097.59
SW Cor Sec 27	T-146-N R-73-W	156858.09	2100146.04
SW Cor Sec 34	T-146-N R-73-W	151573.08	2100194.65
SW Cor Sec 23	T-146-N R-73-W	162173.06	2105397.49
S 1/4 Cor 23	T-146-N R-73-W	162192.30	2108030.90
NW Cor Sec 24	T-146-N R-73-W	167491.94	2110615.57
E 1/4 Cor 23	T-146-N R-73-W	164852.60	2110640.77
SW Cor Sec 24	T-146-N R-73-W	162212.01	2110666.41
S 1/4 Cor 24	T-146-N R-73-W	162234.55	2113317.29

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
CONTROL POINT DESCRIPTION					
PRIMARY CONTROL ND 3					
GPS 12	162200.57	2097440.21	1930.33	7196+65	13226' LT
#6 Rebar					
GPS 13	162194.91	2113156.72	1893.81	7089+14	13059' RT
#6 Rebar					

REFERENCE MARKERS

R Mkr#	NORTHING	EASTING	STATION	OFFSET
135	162135.68	2103920.30	7128+05	29' RT
136	162171.63	2109212.37	7180+97	30' RT

NOTES: Sheet 1 of 1

Date Survey Completed 5/01/17

☐ Assumed Coordinates

☒ All coordinates on this sheet are Wells County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998895

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Station (OPUS)

☒ NAVD-88

☐ NGVD-29

☐ GEOID 09 ☐ _____

☒ GEOID 12B

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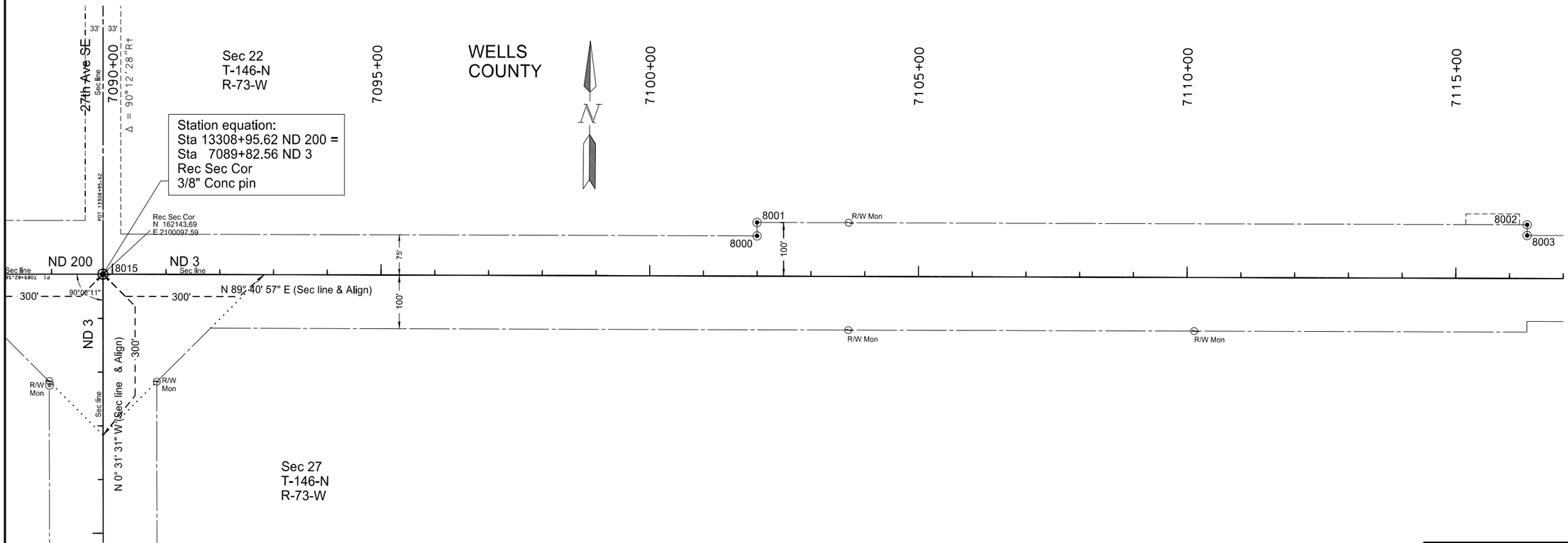
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	082	1



Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)	Iron Pin Reference Monument
8000	162,225.4352	2,101,314.1008	7101+99.51	75' Lt	X	X	
8001	162,250.4350	2,101,313.9623	7101+99.51	100' Lt	X	X	
8002	162,258.3743	2,102,746.9903	7116.32.56	100' Lt	X	X	
8003	162,238.3727	2,102,747.0997	7116+32.56	80' Lt	X	X	

Point	Northing	Easting	Station	Offset	Description	Monument per Standard D-720-1
8015	162,143.6943	2,100,097.5850	7089+82.56	0.00	Rec Sec Cor	X

SPEC	CODE	BID ITEM	UNIT	QUANTITY
720	0110	RIGHT OF WAY MARKERS	EA	4
720	0125	ALIGNMENT MONUMENTS	EA	1
720	0130	IRON PIN R/W MONUMENTS	EA	4

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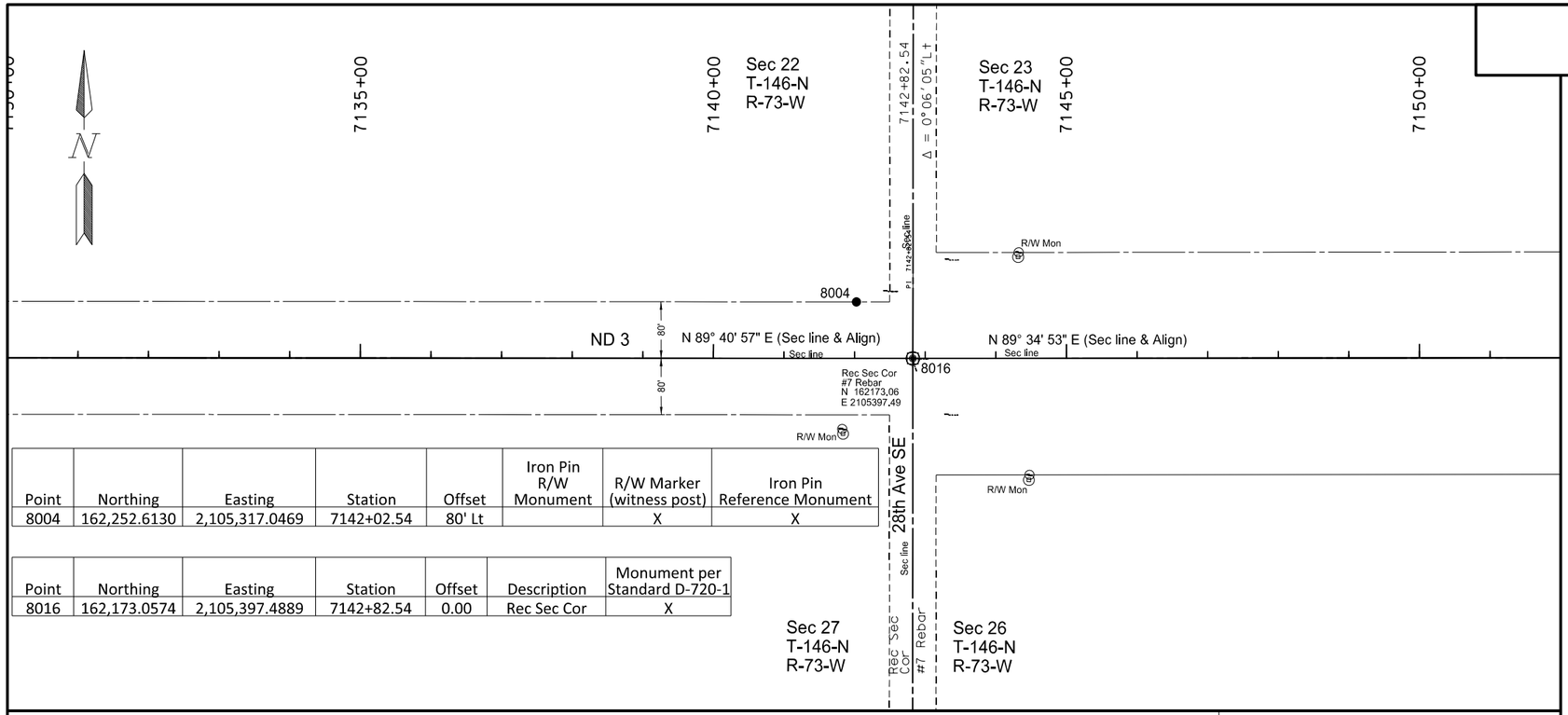
Survey Data Layouts

Sliver Grading, Milling and RAP Overlay

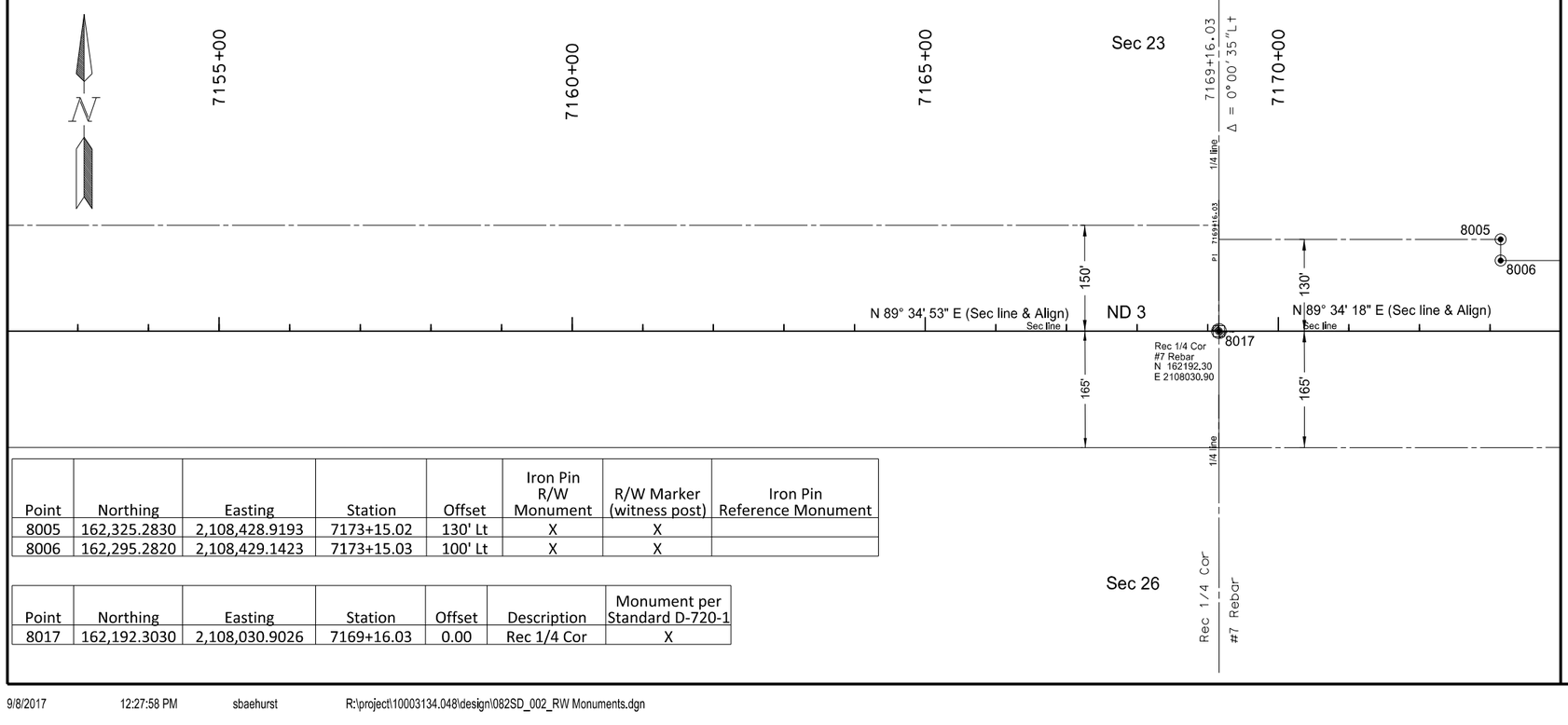
ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	082	2



Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)	Iron Pin Reference Monument
8004	162,252.6130	2,105,317.0469	7142+02.54	80' Lt		X	X

Point	Northing	Easting	Station	Offset	Description	Monument per Standard D-720-1
8016	162,173.0574	2,105,397.4889	7142+82.54	0.00	Rec Sec Cor	X



Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)	Iron Pin Reference Monument
8005	162,325.2830	2,108,428.9193	7173+15.02	130' Lt	X	X	
8006	162,295.2820	2,108,429.1423	7173+15.03	100' Lt	X	X	

Point	Northing	Easting	Station	Offset	Description	Monument per Standard D-720-1
8017	162,192.3030	2,108,030.9026	7169+16.03	0.00	Rec 1/4 Cor	X

SPEC	CODE	BID ITEM	UNIT	QUANTITY
720	0110	RIGHT OF WAY MARKERS	EA	3
720	0125	ALIGNMENT MONUMENTS	EA	2
720	0130	IRON PIN R/W MONUMENTS	EA	2
720	0135	IRON PIN REFERENCE MOUNMENTS	EA	1

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Survey Data Layouts

Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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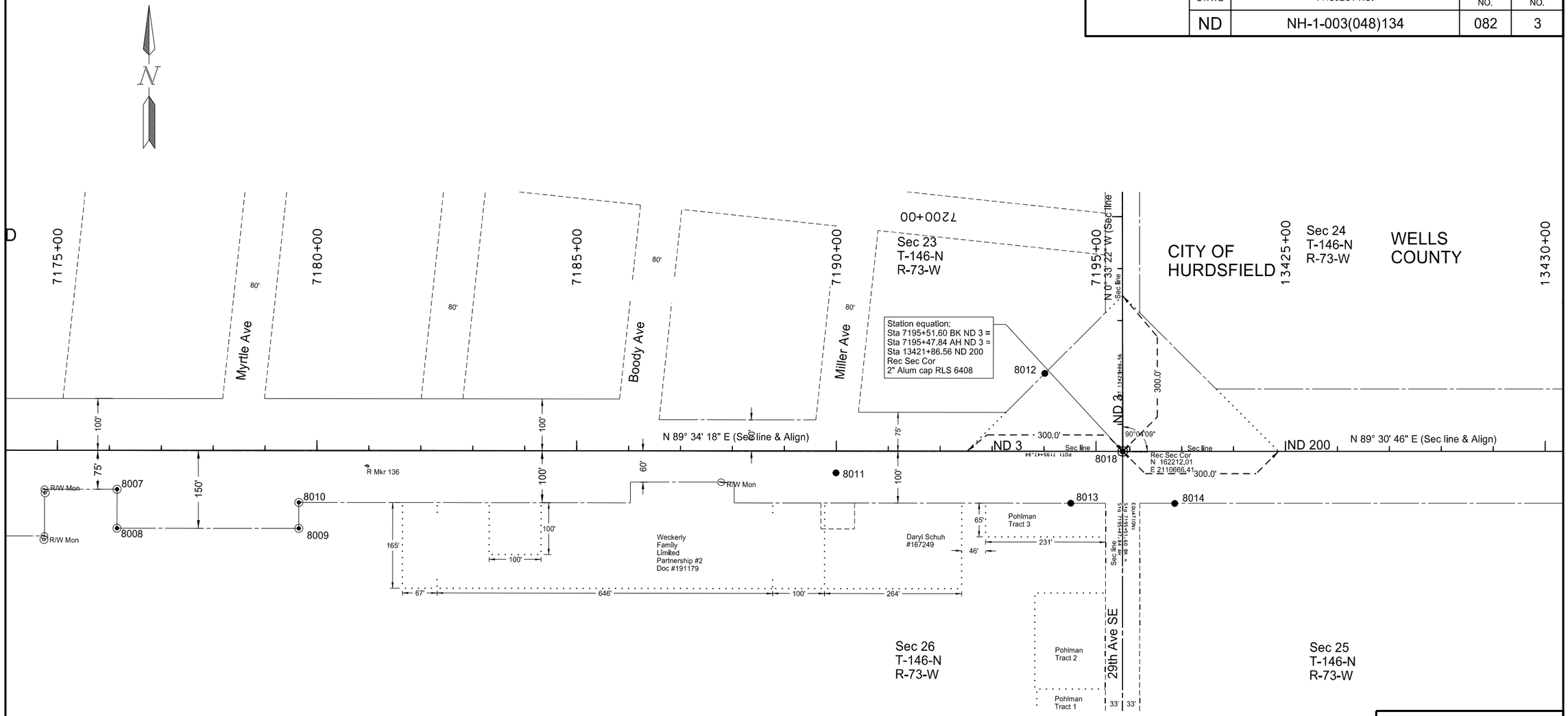

Point	Northing	Easting	Station	Offset	Iron Pin R/W Monument	R/W Marker (witness post)	Iron Pin Reference Monument
8007	162,122.5321	2,108,730.4439	7176+15.03	75' Rt	X	X	
8008	162,047.5342	2,108,731.0047	7176+15.03	150' Rt	X	X	
8009	162,050.1514	2,109,080.9949	7179+65.02	150' Rt	X	X	
8010	162,100.1500	2,109,080.6210	7179+65.02	100' Rt	X	X	
8011	162,165.9767	2,110,114.5872	7189+99.46	41.9' Rt		X	X
8012	162,361.0517	2,110,515.1196	7196+98.34	149.8' Lt		X	X
8013	162,111.2662	2,110,567.1565	7194+51.60	100' Rt		X	X
8014	162,112.5686	2,110,767.3470	13422+86.65	100' Rt		X	X

Point	Northing	Easting	Station	Offset	Description	Monument per Standard D-720-1
8018	162,212.0112	2,110,666.4059	7195+47.84	0.00	Rec Sec Cor	X

SPEC	CODE	BID ITEM	UNIT	QUANTITY
720	0110	RIGHT OF WAY MARKERS	EA	8
720	0125	ALIGNMENT MONUMENTS	EA	1
720	0130	IRON PIN R/W MONUMENTS	EA	4
720	0135	IRON PIN REFERENCE MOUNMENTS	EA	4

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Survey Data Layouts

Sliver Grading, Milling and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	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	
G20-1-60	**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)**	**4**	**26**	**104**
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**19**	**38**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**1**	**18**	**18**
G20-10-108	108"x48"	CONTRACTOR SIGN		64	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		37	
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**2**	**30**	**60**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
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		15	
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**	**2**	**5**	**10**
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		31	
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**	**2**	**35**	**70**
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**	**1**	**35**	**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**	**1**	**35**	**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.		35	
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**	**4**	**35**	**140**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
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**	**2**	**35**	**70**
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)**	**2**	**12**	**24**
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**	**1**	**35**	**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**	**1**	**35**	**35**
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**	**860**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**500**
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	
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**92**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	**VERTICAL PANELS - BACK TO BACK**	**EACH**	**20**
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	
704-1185	**PILOT CAR**	**HR**	**250**
704-1500	OBLITERATION OF PVMT MK	SF	
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**	**21904**
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/

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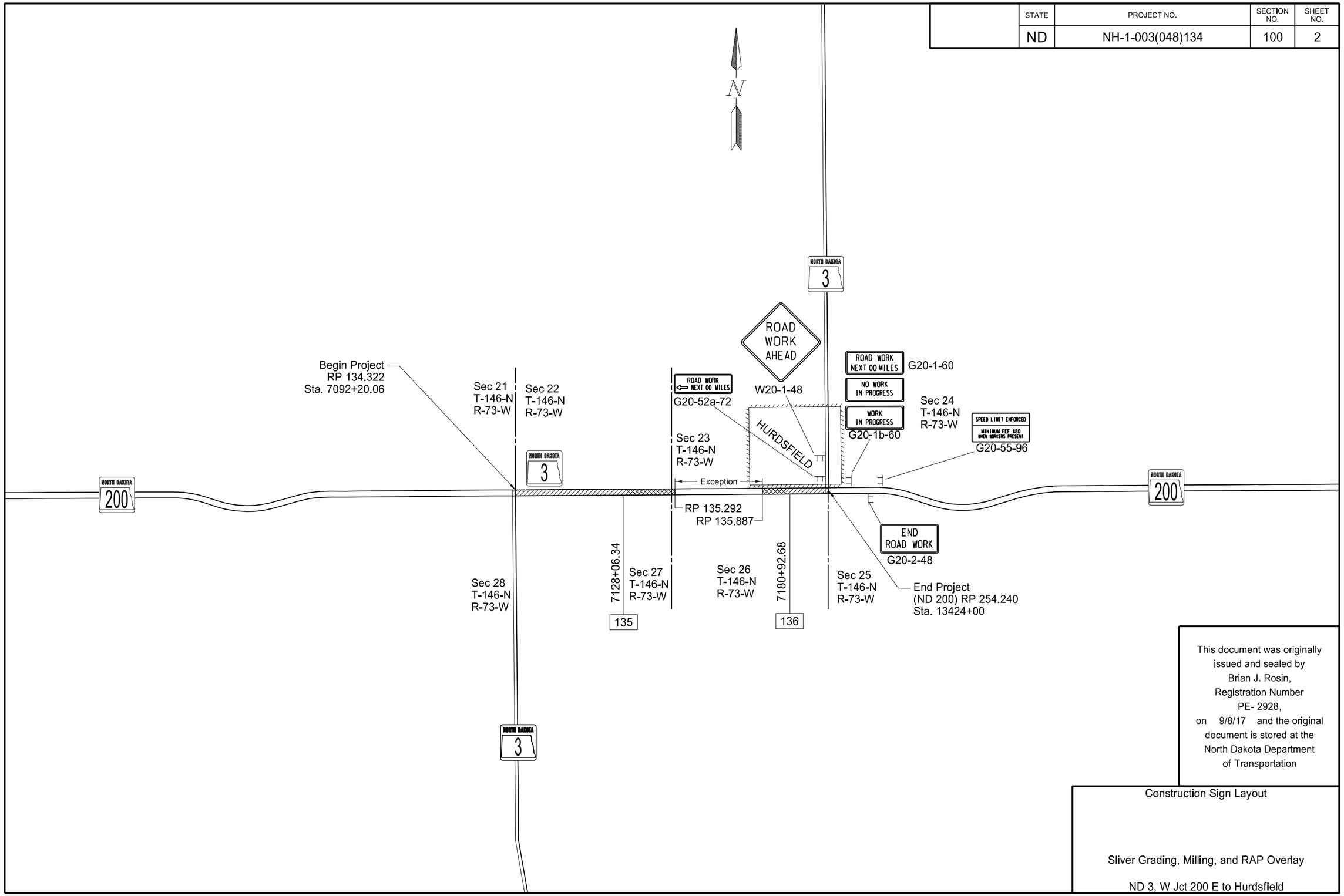
Traffic Control Devices List

Milling, Sliver Grading & RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	100	2



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Construction Sign Layout

Sliver Grading, Milling, and RAP Overlay

ND 3, W Jct 200 E to Hurdsfield

9/8/2017 12:28:00 PM sbaehurst R:\project\10003134.048\design\100WZ_002_Construction Sign Layout.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NH-1-003(048)134	110	1

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
7089+87 Lt					10.70				5.0	2.5 x 2.5 12 ga	11.3						1	4	3 x 3 7 ga	1			
7091+45 Rt			2.0		11.30				5.0	2.5 x 2.5 12 ga	12.3	3.7				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	
7093+22 Lt	SN 1		24.5		11.10	12.10			5.0	2.5 x 2.5 12 ga	13.2	3.1	4.1			2.25 x 2.25 12 ga	2	8	3 x 3 7 ga			2	
7096+76 Lt					11.60				5.0	2.5 x 2.5 12 ga	12.6	3.7				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	
7097+58 Rt		9		5.0	11.00				5.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
7174+59 Rt					9.80				5.0	2.5 x 2.5 12 ga	11.2						1	4	3 x 3 7 ga	1			
7177+99 Rt					9.90				5.0	2.5 x 2.5 12 ga	11.2						1	4	3 x 3 7 ga	1			
7179+29 Lt					12.00				5.0	2.25 x 2.25 12 ga	12.4	4.2				2 x 2 12 ga	1	4	3 x 3 7 ga	1		1	
7181+95 Lt					11.00				5.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga	1			
7181+95 Rt					11.00				5.0	2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga	1			
7185+85 Lt					11.00				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			
7189+66 Lt					11.00				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			
7189+69 Lt									5.0	2 x 2 12 ga										1	1		
7190+47 Rt		407	13.4		11.60				5.0	2.5 x 2.5 12 ga	12.6	3.7				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga			1	
7191+08 Lt		1		5.2	11.00				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
7192+64 Rt					11.00				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			
7192+91 Lt					11.00				5.0	2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga	1			
7193+34 Rt	SN 2		22.5		10.70	11.70			5.0	2.5 x 2.5 12 ga	14.0	2.3	3.3			2.25 x 2.25 12 ga	2	8	3 x 3 7 ga			2	
7194+23 Lt					10.60				5.0	2.5 x 2.5 12 ga	11.9	3.5				2.25 x 2.25 12 ga	1	4	3 x 3 7 ga	1		1	
7196+14 Lt				5.2	12.00				5.0	2.25 x 2.25 12 ga	12.4	4.2				2 x 2 12 ga	1	4	3 x 3 7 ga	1		1	
Sub Total			62.40	15.40		**Total**	233.10										**Total**	84		15	1	10	
Grand Total			**62.4**	**15.4**		**Total**	**233.10**										**Total**	**84**	**0**	**15**	**1**	**10**	

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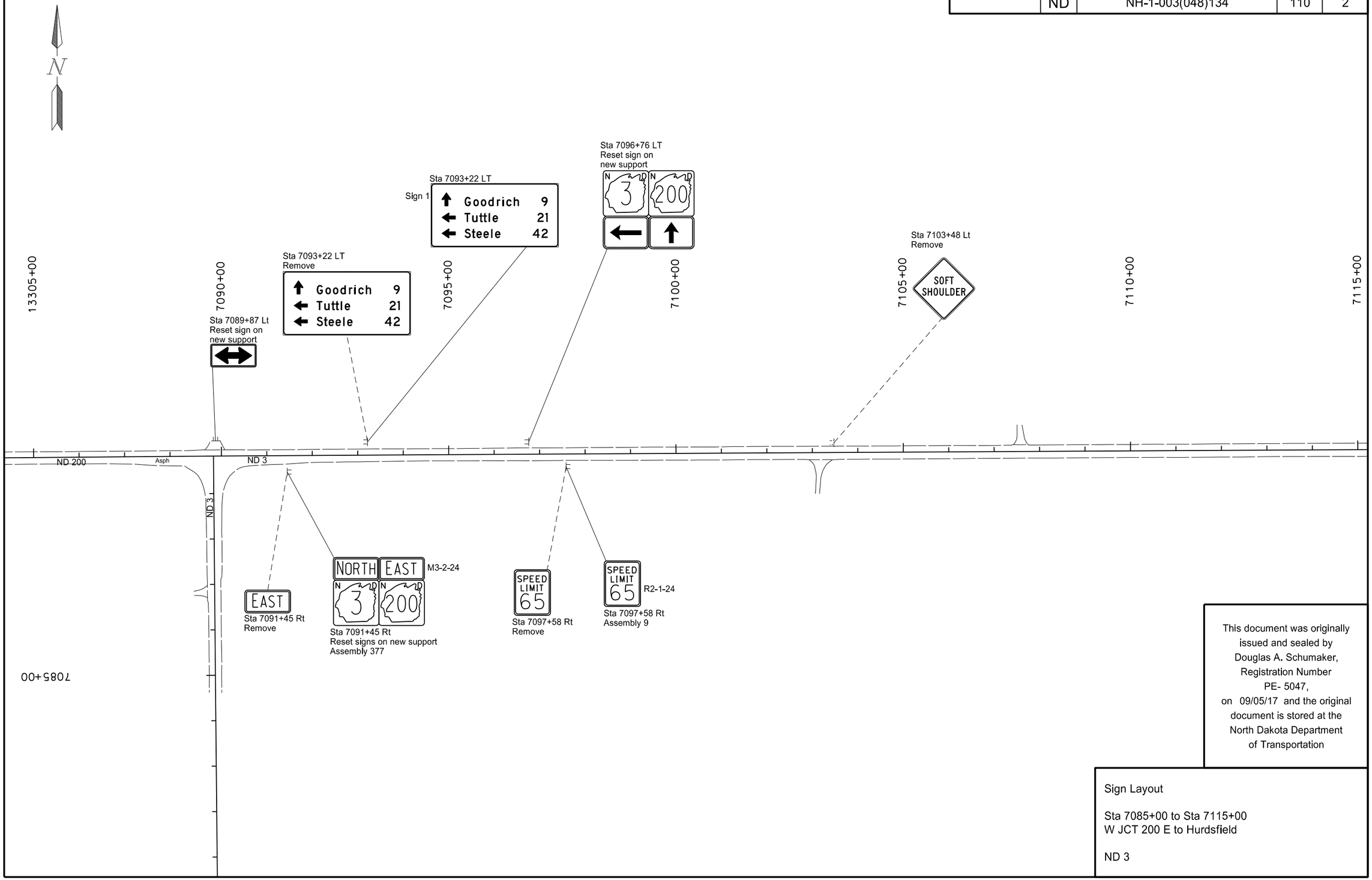
Sign Summary
Perforated Tube

W JCT 200 E to Hurdsfield

ND 3

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	110	2



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Sign Layout

Sta 7085+00 to Sta 7115+00
W JCT 200 E to Hurdsfield

ND 3

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	110	3

N

7175+00

Sta 7179+29 Lt
Reset sign on
new support
Myrtle Ave
Myrtle Ave
Hwy 200
Hwy 200
STOP

7180+00

Sta 7181+95 Lt
Reset sign on
new support
SPEED LIMIT 65

Sta 7185+85 Lt
Reset sign on
new support
STOP

7185+00

Sta 7189+66 Lt
Reset sign on
new support
STOP

Sta 7189+69 Lt
Reset sign and
support
HWY 200
HWY 200
Miller Ave
Miller Ave

7190+00

Sta 7191+08 LT
Assembly 1
R1-1-30
STOP

7200+00

Sta 7191+08 LT
Remove
STOP

Sta 7192+91 Lt
Reset sign on
new support
STOP

Sta 7194+23 Lt
Reset sign on
new support
SOUTH
WEST
N 3 D
N 200 D

7195+00

Sta 7196+14 Lt
Special Assembly 2E
HWY 3 Reset
HWY 3 Reset
HWY 200 Reset
HWY 200 Reset
R1-1-30
STOP

Sta 7196+14 Lt
Remove
STOP

7125+00

Sta 7174+59 Rt
Reset sign on
new support
SPEED LIMIT 45

Sta 7177+99 Rt
Reset sign on
new support
Hurdsfield

Sta 7181+95 Rt
Reset sign on
new support
SPEED LIMIT 45

Sta 7190+47 Rt
Remove
N 3 D
N 200 D

Sta 7190+47 Rt
Assembly 407
M1-5-24
NORTH DAKOTA 3
NORTH DAKOTA 200
M1-5-24
M6-1(L)-21
M6-3-21

Sta 7192+64 Rt
Reset sign on
new support
STOP

Sta 7193+34 Rt
Remove
Carrington 39
Harvey 23

Sign 2
Sta 7193+34 Rt
Carrington 39
Harvey 23

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Sign Layout

Sta 7112+00 to Project End
W JCT 200 E to Hurdsfield

ND 3

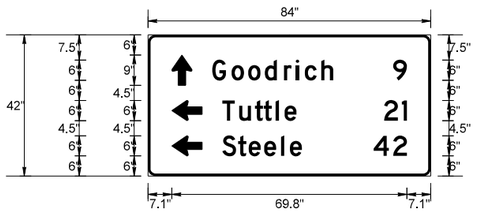
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	110	4

SIGN NUMBER	Sign 1
WIDTH X HEIGHT	7'-0" x 3'-6"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	7.1	27	6	9	0
ND_6IN_TYPE D	7.1	16.5	6	9	90
ND_6IN_TYPE D	7.1	6	6	9	90

STATION(S):
7093+22 Lt

AREA: 24.5 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Distance.ssl

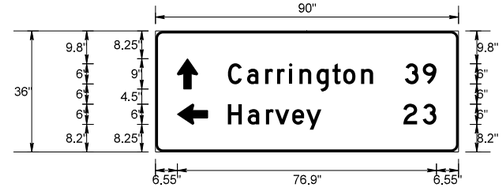
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
G	o	o	d	r	i	c	h													35.9	6/4.5	D 2000
19.1	24.8	29.8	34.7	40.4	43.9	46.6	51.5															
9																				4.1	6	D 2000
72.8																						
T	u	t	t	l	e															22	6/4.5	D 2000
22.1	27.1	31.8	34.4	37.9	40.6																	
2	1																			6.8	6	D 2000
70.1	75.4																					
S	t	e	e	l	e															23.6	6/4.5	D 2000
22.1	26.8	29.9	34.5	39.5	42.2																	
4	2																			9.9	6	D 2000
67	72.8																					

SIGN NUMBER	Sign 3
WIDTH X HEIGHT	7'-6" x 3'-0"
BORDER WIDTH	0.75" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_6IN_TYPE D	6.5	18.8	6	9	0
ND_6IN_TYPE D	6.5	8.3	6	9	90

STATION(S):
7193+34 Rt

AREA: 22.5 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Conv_Distance.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
C	a	r	r	i	n	g	t	o	n											43.1	6/4.5	D 2000
21.5	27.2	32.6	36.1	39.7	42.7	47.9	52.6	55.7	61.1													
3	9																			9.4	6	D 2000
74.1	79.4																					
H	a	r	v	e	y															27.8	6/4.5	D 2000
21.5	27.4	32.8	35.5	40.6	44.8																	
2	3																			9.8	6	D 2000
73.6	79.4																					

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Sign Details

W JCT 200 E to Hurdsfield

ND 3

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	180	1

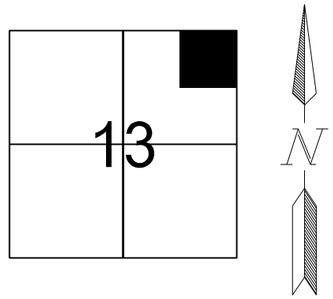
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

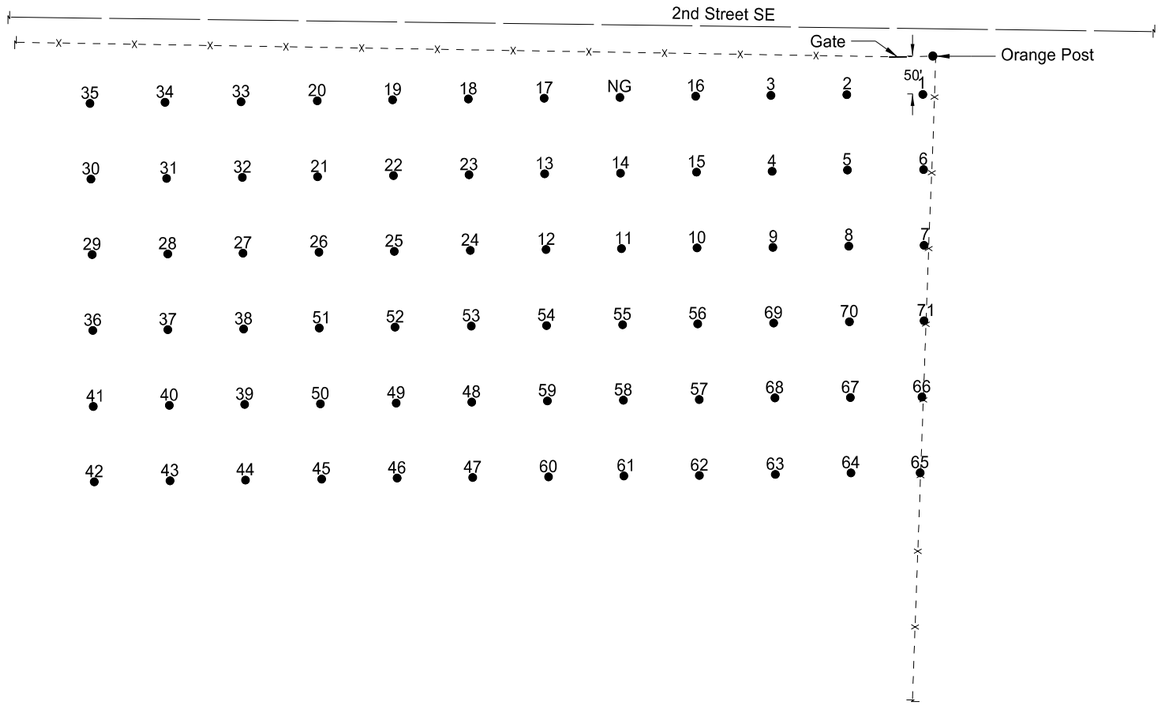
TEST HOLE PLAT

Location: NE1/4NE1/4 13-145-74 County: Sheridan

Ownership: Betty Mertz, John Mertz and Terry Mertz

LOCATION OF PIT IN SECTION





Area "A" consists of Test Holes 1 - 9
Area "B" consists of Test Holes 10 - 17
Area "C" consists of Test Holes 18 - 26
Area "D" consists of Test Holes 27 - 35
Area "E" consists of Test Holes 36 - 44
Area "F" consists of Test Holes 45 - 53
Area "G" consists of Test Holes 54 - 62
Area "H" consists of Test Holes 63 - 71

Legend:
gr = gravel
sd = sand
FS = fine sand
Fgr = fine gravel
CS = coarse sand
sh = shale
SiCl = silt clay
rk = rock
FeO = Iron oxide
CoS = Coal Slack
WL = water line
NG = no gravel
DM = disturbed material
CGr = course gravel

Scale 1"=200'

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	180	2

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	2.0	2.0 gr SiCl	0	8	19	30	SiCl
		1.0 sd SiCl					
2	1.0	11.0 Fgr	2	9	20	31	+gr
		1.0 FgrSiCl					
		1.0 Fgr					
		2.0 FgrSiCl					
		1.0 gr SiCl					
		2.0 gr					
		1.0 gr SiCl					
3	0.5	10.5 Fgr	0	3	8	14	+gr
		2.0 gr SiCl					
		7.0 gr					
4	1.0	5.0 FgrSiCl	0	0	6	11	+gr
		1.0 Fgr					
		1.0 FgrSiCl					
		10.0 Fgr					
		2.0 FgrSiCl					
5	1.0	3.0 gr	0	2	8	18	SiCl
		2.0 Fgr					
		3.0 gr					
		2.5 Fgr					
		1.5 FgrSiCl					
7	0.5	1.5 gr	0	0	5	11	SiCl
8	0.5	2.5 gr	0	5	13	22	+gr
		1.0 Fgr					
		1.0 gr					
		2.0 FgrSiCl					
		2.0 Fgr					
		2.0 FgrSiCl					
		5.0 Fgr					
		1.0 gr CoS					
		3.0 Fgr					
9	0.5	2.5 gr	0	13	24	34	+cave
		2.0 FS					
		2.0 Fgr					
		2.0 gr					
		1.0 gr CoS					
		1.0 gr					
		4.0 CGr					
10	0.5	2.5 gr	0	6	15	27	SiCl
		2.0 Fgr					
		1.0 gr					
		5.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
11	2.0	5.0 gr	0	10	20	30	+gr
		1.0 Fgr					
		4.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		2.0 FgrSiCl					
		3.0 Fgr					
12	2.0	1.0 gr	0	3	15	28	+gr
		10.0 Fgr					
		1.0 gr					
		1.0 FgrSiCl					
		5.0 Fgr					
13	0.5	5.5 Fgr	1	6	14	24	SiCl
		9.0 gr					
		3.0 Fgr					
14	2.0	3.0 Fgr	0	8	22	36	SiCl
		2.0 gr					
15	1.0	3.0 Fgr	0	1	4	7	SiCl
		3.0 sd sh					
		2.0 gr					
16	0.5	9.5 Fgr	0	4	11	19	SiCl
		2.0 gr					
17	1.0	3.0 Fgr	2	23	36	48	rk
		5.0 gr					
18	1.0	11.0 Fgr	0	3	8	17	SiCl
		1.0 gr					
19	1.5	11.5 Fgr	0	5	9	17	SiCl
20	0.5	19.5 Fgr	0	1	7	15	+gr
21	2.0	2.0 gr	0	10	19	27	+gr
		2.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		2.0 gr					
		5.0 Fgr					
		1.0 sd sh					
		1.0 Fgr					
		1.0 sd					
22	1.5	12.5 Fgr	0	3	9	18	SiCl
23	2.0	8.5 Fgr	0	2	8	15	SiCl
		0.5 sd					
		2.5 Fgr					
24	1.0	6.0 gr	3	11	22	34	+gr
		1.0 Fgr					
		6.0 gr					
		2.0 CGr					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
25	0.5	5.5 Fgr	2	12	23	34	+gr
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
		3.0 Fgr					
		3.0 gr					
		3.0 Fgr					
26	0.5	7.5 gr	0	11	19	30	+gr
		2.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 gr					
		5.0 Fgr					
27	0.5	6.5 gr	4	17	29	40	+gr
		5.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.5 Fgr sh					
		3.5 CGr					
28	0.5	4.5 Fgr	4	14	25	34	rk
		1.0 gr					
		6.0 Fgr					
		2.5 CGr					
30	2.0	9.0 Fgr	0	3	10	18	SiCl
		1.0 sd sh					
31	2.0	14.0 Fgr	0	2	9	17	SiCl
32	2.0	11.0 Fgr	0	4	12	21	SiCl
		1.0 sd					
		4.5 Fgr					
33	0.5	11.5 Fgr	0	0	3	10	SiCl
		1.0 Fgr sh					
		6.0 Fgr					
34	3.0	5.0 Fgr	0	2	6	12	+gr
		1.0 sd					
		3.0 Fgr					
		1.0 CS					
		3.0 Fgr					
		1.0 sd					
		3.0 Fgr					
35	2.0	10.0 Fgr	0	1	4	9	SiCl
36	2.0	12.0 Fgr	1	11	19	27	+gr
		1.0 FgrSiCl					
		2.0 sd sh					
		1.0 sd					
		2.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
37	1.0	5.0 gr	1	15	25	36	rk
		4.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		4.0 gr					
38	1.0	7.0 gr	0	9	19	28	SiCl
		4.0 Fgr					
		1.0 gr					
		4.0 Fgr					
		1.5 sd sh					
39	0.5	9.5 gr	1	8	18	27	+gr
		3.0 Fgr					
		2.0 gr					
		5.0 Fgr					
40	1.5	3.5 Fgr	0	5	13	22	+gr
		2.0 gr					
		10.0 Fgr					
		3.0 sd					
41	1.5	2.5 gr	0	4	13	21	+gr
		1.0 Fgr					
		2.0 gr					
		6.0 Fgr					
		2.0 Fgr sh					
		1.0 gr					
42	0.5	2.5 Fgr	0	3	10	16	+gr
		1.0 gr					
		6.0 Fgr					
		2.0 Fgr sh					
		1.0 Fgr					
		1.0 Fgr sh					
		1.0 FS					
		1.0 Fgr sh					
		0.5 Fgr					
		1.5 Fgr sh					
		2.0 sd					
43	1.0	4.0 Fgr	2	6	14	23	+gr
		3.0 gr					
		12.0 Fgr					

RANGE 74 **TWP** 145 **SEC** NE 1/4 13

COUNTY Sheridan May-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jun-17

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	180	3

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
44	1.0	6.0 gr	0	8	19	29	+gr
		2.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		2.0 gr					
		5.0 Fgr					
45	0.5	4.5 Fgr	0	10	20	31	+gr
		1.0 gr					
		8.0 Fgr					
		1.0 gr					
		5.0 Fgr					
46	1.0	8.0 gr	1	11	22	33	+gr
		1.0 Fgr					
		5.0 gr					
		5.0 Fgr					
47	0.5	2.5 Fgr	1	16	25	36	+gr
		5.0 gr					
		1.0 Fgr					
		1.0 gr					
		7.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		1.0 gr					
48	0.5	13.5 gr	1	12	23	35	+gr
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
49	0.5	2.5 gr	1	13	23	34	+gr
		1.0 Fgr					
		2.0 gr					
		5.0 Fgr					
		1.0 gr					
		4.0 Fgr					
		2.0 gr					
		2.0 Fgr					
50	0.5	7.5 gr	1	8	20	31	+gr
		1.0 Fgr					
		4.0 gr					
		7.0 Fgr					
51	0.5	5.5 gr	3	16	26	36	+gr
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		2.0 gr					
		5.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
52	0.5	10.5 gr	1	9	22	34	+gr
		2.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		2.5 gr					
		2.5 Fgr					
53	1.0	6.0 gr	2	11	25	37	+gr
		1.0 Fgr					
		5.0 gr					
		3.0 Fgr					
		4.0 gr					
54	1.0	2.0 Fgr	3	15	26	37	+gr
		4.0 gr					
		1.0 Fgr					
		9.0 gr					
		1.0 Fgr					
		2.0 gr					
55	0.5	19.5 gr	2	14	27	39	+gr
56	0.5	8.5 gr	3	14	27	39	+gr
		1.0 Fgr					
		3.0 gr					
		1.5 Fgr					
		0.5 gr					
		2.0 Fgr					
		3.0 gr					
57	0.5	19.5 gr	2	13	25	37	+gr
58	0.5	2.5 gr	2	12	25	36	+gr
		1.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		5.0 gr					
		2.5 Fgr					
		3.5 gr					
59	0.5	13.5 gr	0	14	27	39	+cave
60	0.5	5.5 gr	2	10	25	39	rk
		2.0 Fgr					
		3.0 gr					
61	2.0	18.0 gr	1	12	26	38	+gr
62	0.5	5.5 gr	2	14	26	37	+gr
		2.0 Fgr					
		3.5 gr					
		0.5 Fgr					
		3.0 gr					
		1.0 Fgr					
		4.0 gr					
63	3.0	17.0 gr	2	10	22	35	+gr

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
64	0.5	4.5 gr	2	16	26	38	+gr
		1.0 Fgr					
		8.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
65	0.5	9.5 gr	0	10	21	34	+gr
		1.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		2.0 gr					
		1.0 FgrSiCl					
		2.0 Fgr					
66	0.5	3.5 gr	0	3	12	23	+gr
		2.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		13.0 gr					
68	1.0	13.0 gr	3	13	30	39	+gr
		1.0 Fgr					
		5.0 gr					
69	1.0	7.0 gr	3	14	28	42	+gr
		1.0 Fgr					
		11.0 gr					
70	0.5	2.5 CGr	2	11	22	33	SiCl
		5.0 gr					
		2.0 Fgr					
		2.0 FgrSiCl					
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 Fgr					
71	0.5	3.5 gr	0	5	13	23	SiCl
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 Fgr					
		1.5 sd sh					
67	0.5	5.5 gr	0	13	23	35	+gr
		1.0 Fgr					
		13.0 gr					
		1.0 Fgr					
		11.0 gr					
		2.0 FgrSiCl					
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

RANGE 74 **TWP** 145 **SEC** NE 1/4 13

COUNTY Sheridan May-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jun-17

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-1-003(048)134	180	4

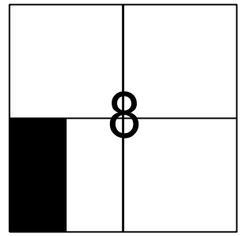
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

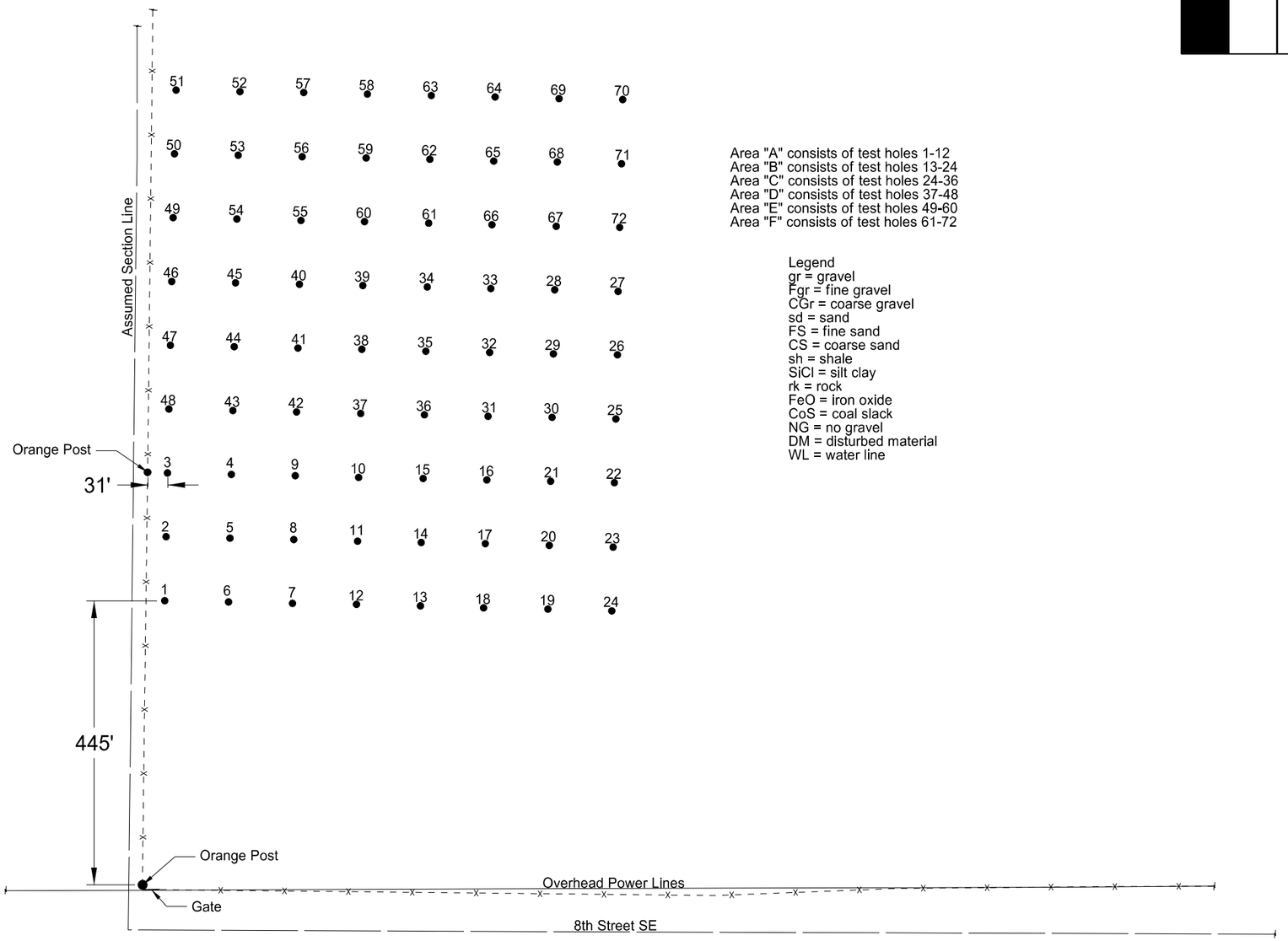
TEST HOLE PLAT

Location: W1/2SW1/4 8-144-71 County: Kidder

Ownership: Karen Hirchert

LOCATION OF PIT IN SECTION





Area "A" consists of test holes 1-12
Area "B" consists of test holes 13-24
Area "C" consists of test holes 24-36
Area "D" consists of test holes 37-48
Area "E" consists of test holes 49-60
Area "F" consists of test holes 61-72

Legend
gr = gravel
Fgr = fine gravel
CGr = coarse gravel
sd = sand
FS = fine sand
CS = coarse sand
sh = shale
SiCl = silt clay
rk = rock
FeO = iron oxide
CoS = coal slack
NG = no gravel
DM = disturbed material
WL = water line

Scale 1" = 200"

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	180	5

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	2.0	2.0 gr	2	11	21	29	+gr
		6.0 Fgr					
		2.0 gr					
		1.0 FS					
		1.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 gr					
		1.0 Fgr					
2	1.5	0.5 Fgr	5	18	27	35	+gr
		2.0 gr					
		1.0 FS					
		9.0 Fgr					
		1.0 CS					
		1.0 Fgr					
		1.0 gr					
		1.0 sd					
		1.0 Fgr					
		1.0 gr					
3	0.5	5.0 Fgr	3	13	23	32	+gr
		0.5 CS					
		4.0 Fgr					
		2.0 gr					
		3.0 Fgr					
		5.0 gr					
4	0.5	2.5 gr	4	13	22	32	+gr
		4.0 Fgr					
		2.0 gr					
		4.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		2.0 gr					
5	0.5	1.5 gr	3	13	23	31	+gr
		7.5 Fgr					
		0.5 FS					
		3.0 gr					
		1.0 Fgr					
		1.0 CS					
		2.0 gr					
		2.0 Fgr					
		1.0 CGr					
		1.0 gr					
6	2.0	1.0 gr	1	15	24	33	+gr
		6.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 sd					
		2.0 Fgr					
		1.0 gr					
		3.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
7	1.0	10.0 Fgr	3	18	29	39	+gr
		4.0 gr					
		3.0 Fgr					
		2.0 gr					
8	1.0	2.0 gr	3	17	22	31	+gr
		5.0 Fgr					
		6.5 gr					
		4.5 Fgr					
		1.0 gr					
9	1.5	1.5 gr	2	12	21	28	+gr
		2.0 sd					
		15.0 Fgr					
10	0.5	6.5 Fgr	1	9	17	26	+gr
		1.0 FS					
		1.0 gr					
		2.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.5 gr					
		0.5 sd					
		1.0 gr					
		1.0 Fgr					
11	1.5	3.5 Fgr	1	12	23	31	+gr
		3.0 sd					
		9.0 Fgr					
		3.0 gr					
12	0.5	2.5 gr	6	15	26	37	+gr
		4.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		5.0 gr					
		1.0 Fgr					
		2.0 gr					
		2.0 CGr					
13	1.0	2.0 gr	1	13	23	31	+gr
		5.5 Fgr					
		0.5 sd					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		1.0 sd					
		1.0 Fgr					
		1.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
14	1.0	2.0 gr	4	14	25	35	+gr
		1.0 Fgr					
		1.0 sd					
		3.0 Fgr					
		6.0 gr					
		3.0 Fgr					
		2.0 gr					
15	1.0	10.0 Fgr	1	13	25	35	+gr
		3.0 gr					
		3.0 Fgr					
		2.0 gr					
		1.0 Fgr					
16	1.5	1.5 gr	0	8	18	29	+gr
		5.0 Fgr					
		5.0 gr					
		6.0 Fgr					
		1.0 gr					
17	1.5	0.5 gr	0	11	23	33	+gr
		8.0 Fgr					
		5.0 gr					
		5.0 Fgr					
18	1.0	2.0 gr	0	6	15	24	+gr
		2.0 Fgr					
		1.0 FS					
		4.0 Fgr					
		4.0 gr					
		3.0 Fgr					
		2.0 gr					
		1.0 Fgr					
19	1.0	1.0 gr	2	15	25	35	+gr
		8.0 Fgr					
		3.0 gr					
		4.0 Fgr					
		1.0 Fgr					
		8.0 Fgr					
		3.0 gr					
		4.0 Fgr					
20	1.0	5.0 Fgr	1	9	21	31	+gr
		2.0 gr					
		2.0 Fgr					
		7.0 gr					
		2.0 CGr					
		1.0 gr					
21	1.5	0.5 gr	1	13	23	33	+gr
		5.5 Fgr					
		0.5 gr					
		6.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
22	1.0	8.0 Fgr	0	12	24	34	+gr
		6.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 FS					
23	1.5	1.5 gr	2	13	25	34	+gr
		4.0 Fgr					
		1.0 CS					
		3.0 Fgr					
		3.0 gr					
		2.0 CGr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
24	1.0	3.0 Fgr	2	10	20	29	+gr
		1.0 FS					
		3.0 Fgr					
		6.0 gr					
		1.0 Fgr					
		5.0 gr					
25	1.0	2.0 Fgr	1	10	22	31	+gr
		2.0 sd					
		7.0 Fgr					
		3.0 gr					
		5.0 Fgr					
26	1.0	1.0 Fgr	3	14	23	34	+gr
		2.0 gr					
		4.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		4.0 gr					

RANGE 71 **TWP** 144 **SEC** 8

COUNTY Kidder Aug-15

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Aug-15

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	180	6

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
27	2.0	2.0 Fgr	2	13	22	31	+gr
		1.0 gr					
		2.0 sd					
		4.5 Fgr					
		2.5 gr					
		4.0 Fgr					
		1.0 CGr					
		1.0 Fgr					
28	1.0	2.0 gr	1	13	23	34	+gr
		5.0 Fgr					
		1.0 sd					
		1.0 gr					
		2.0 Fgr					
		4.0 gr					
		1.0 CS					
		3.0 gr					
29	0.5	2.5 gr	0	14	26	38	+gr
		4.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		5.0 gr					
30	1.0	2.0 gr	4	13	25	37	+gr
		5.0 Fgr					
		12.0 gr					
31	1.0	8.5 Fgr	0	13	22	32	+gr
		0.5 sd					
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
		1.0 CGr					
		2.0 Fgr					
		2.0 gr					
32	1.0	2.0 gr	2	10	21	31	+gr
		2.0 Fgr					
		1.0 sd					
		1.0 Fgr					
		1.0 gr					
		1.0 sd					
		4.0 gr					
		1.0 Fgr					
		6.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
33	1.0	1.0 gr	1	13	26	37	+gr
		2.0 Fgr					
		1.0 sd					
		6.0 Fgr					
		1.0 gr					
		3.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 CGr					
		1.0 Fgr					
		2.0 gr					
34	1.5	2.5 gr	4	18	29	40	+gr
		1.5 FS					
		3.5 Fgr					
		7.0 gr					
		2.0 CGr					
		2.0 gr					
35	1.0	3.0 Fgr	2	16	25	35	+gr
		1.0 sd					
		5.0 Fgr					
		1.0 gr					
		3.0 Fgr					
		3.0 CGr					
		2.0 gr					
		1.0 Fgr					
36	1.0	1.0 gr	0	9	20	29	+gr
		2.0 Fgr					
		1.0 sd					
		3.0 Fgr					
		2.0 gr					
		1.0 CS					
		5.5 gr					
		1.5 FS					
		2.0 Fgr					
37	1.0	5.0 Fgr	1	15	27	37	+gr
		1.0 sd					
		4.0 gr					
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
38	0.5	1.5 gr	1	11	22	33	+gr
		5.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		2.0 gr					
		1.0 sd					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
39	2.0	7.0 Fgr	3	17	27	36	+gr
		2.0 gr					
		1.0 sd					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
		1.0 CGr					
		2.0 gr					
		1.0 Fgr					
40	2.0	2.0 Fgr	1	9	21	33	+gr
		1.0 sd					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		1.0 gr					
41	1.5	3.5 Fgr	1	12	23	34	+gr
		1.0 CS					
		1.0 Fgr					
		1.0 CS					
		1.0 Fgr					
		2.0 Fgr					
		1.0 gr					
42	1.0	3.0 gr	0	11	22	33	+gr
		4.0 Fgr					
		5.0 gr					
		1.0 FS					
		1.0 gr					
		2.0 Fgr					
		1.0 CGr					
		2.0 gr					
43	1.0	2.0 Fgr	0	13	24	33	+gr
		2.0 sd					
		8.0 Fgr					
		5.0 gr					
		2.0 Fgr					
44	1.0	2.0 gr	0	9	22	36	+gr
		2.0 Fgr					
		6.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		3.0 Fgr					
		3.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
45	1.0	2.0 gr	0	6	18	31	+gr
		3.0 Fgr					
		7.0 gr					
		4.0 Fgr					
		3.0 gr					
46	1.0	2.0 gr	2	17	26	34	+gr
		2.5 Fgr					
		0.5 sd					
		4.0 gr					
		2.0 Fgr					
		4.0 gr					
		3.0 Fgr					
		4.0 gr					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
47	0.5	2.5 gr	2	12	23	34	+gr
		3.0 Fgr					
		1.0 CS					
		1.0 Fgr					
		5.0 gr					
		1.0 CGr					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		2.0 gr					
48	1.0	1.0 gr	0	8	16	25	+gr
		2.0 Fgr					
		1.0 sd					
		9.0 Fgr					
		1.0 gr					
		5.0 Fgr					

RANGE 71 **TWP** 144 **SEC** 8

COUNTY Kidder Aug-15

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Aug-15

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-1-003(048)134	180	7

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
49	1.0	1.0 gr	0	9	20	32	+gr
		1.0 Fgr					
		2.0 FS					
		2.0 gr					
		2.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		5.0 gr					
		2.0 Fgr					
		1.0 gr					
50	1.0	7.0 Fgr	0	13	26	36	+gr
		2.0 gr					
		1.0 Fgr					
		4.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
51	1.0	4.0 Fgr	0	11	23	31	+gr
		2.0 gr					
		1.0 sd					
		2.0 Fgr					
		10.0 gr					
52	2.0	1.0 Fgr	1	16	26	35	+gr
		1.0 sd					
		15.0 Fgr					
		1.0 gr					
53	1.0	1.0 gr	1	13	23	33	+gr
		6.0 Fgr					
		4.0 gr					
		1.0 Fgr					
		7.0 gr					
54	2.0	5.0 Fgr	1	13	23	32	+gr
		2.0 gr					
		1.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
55	4.0	9.0 Fgr	0	11	22	31	+gr
		1.0 gr					
		3.0 Fgr					
		1.0 sd					
		1.0 gr					
		1.0 Fgr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
56	1.0	2.0 gr	2	14	25	35	+gr
		3.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		7.0 gr					
57	2.0	6.0 Fgr	0	9	21	30	+gr
		3.0 gr					
		1.0 sd					
		1.0 Fgr					
		2.0 sd					
		2.0 Fgr					
58	1.0	1.0 gr	0	10	20	31	+gr
		4.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		2.0 gr					
		2.0 CGr					
		6.0 gr					
59	1.0	4.0 Fgr	0	13	24	33	+gr
		1.0 sd					
		1.0 Fgr					
		1.0 FS					
		2.0 gr					
		5.0 Fgr					
		1.0 gr					
60	2.0	3.0 Fgr	1	9	20	30	+gr
		1.0 gr					
		2.0 Fgr					
		1.0 sd					
		8.0 gr					
		2.0 Fgr					
		1.0 gr					
61	3.0	1.0 gr	0	15	27	37	+gr
		7.0 Fgr					
		2.0 gr					
		2.0 Fgr					
62	1.0	2.0 gr	0	12	23	34	+gr
		2.0 Fgr					
		1.0 sd					
		14.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
63	1.0	9.0 Fgr	0	11	22	32	+gr
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
		4.0 Fgr					
		1.0 gr					
64	1.0	3.0 Fgr	0	12	20	30	+gr
		1.0 FS					
		3.0 Fgr					
		7.0 gr					
		3.0 Fgr					
		2.0 gr					
65	1.0	7.0 Fgr	0	11	22	31	+gr
		2.0 gr					
		1.0 Fgr					
		4.0 gr					
		4.0 Fgr					
		1.0 gr					
66	3.0	2.0 gr	0	8	19	30	+gr
		4.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		5.0 gr					
		1.0 Fgr					
		1.0 FS					
		1.0 gr					
67	0.5	9.5 Fgr	1	13	25	37	+gr
		5.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
68	0.5	2.5 gr	0	8	17	28	+gr
		1.0 sd					
		2.0 Fgr					
		1.0 sd					
		2.5 Fgr					
		0.5 CS					
		2.0 gr					
		1.0 Fgr					
		7.0 gr					
69	3.0	5.0 Fgr	1	16	28	38	+gr
		3.0 gr					
		1.0 sd					
		1.0 gr					
		3.0 Fgr					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
70	0.5	2.5 gr	0	10	18	28	+gr
		3.5 Fgr					
		0.5 FS					
		4.0 gr					
		2.0 FS					
		7.0 gr					
71	1.5	0.5 Fgr	0	10	21	31	+gr
		1.0 gr					
		7.0 Fgr					
		2.0 gr					
		6.0 Fgr					
		2.0 gr					
72	0.5	2.5 gr	1	12	22	32	+gr
		6.0 Fgr					
		6.0 gr					
		1.0 Fgr					
		4.0 gr					

RANGE 71 **TWP** 144 **SEC** 8

COUNTY Kidder Aug-15

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Aug-15

NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
A	ampere
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Az	azimuth
Bk	back
BF	back face
Bs	backsight
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
Brg	bearing
BI	beehive inlet
Beg	begin
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
Bd Ft	board feet
BH	bore hole
BS	both sides
Bot	bottom
Blvd	Boulevard
Bndry	boundary
BC	brass cap
Brkwy	breakaway
Br	bridge
Bldg	building
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
Cd	candela
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
Cl or ℄	centerline
Cm	centimeter
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Co S	coal slack
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSP	corrugated steel pipe
C	coulomb
Co	County
Crse	course
C Gr	course gravel
CS	course sand
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	Crossroad
Crn	crown
CF	cubic feet
M3	cubic meter
M3/s	cubic meters per second
CY	cubic yard
Cy/mi	cubic yards per mile
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
CS	curve to spiral
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Deg or D	degree
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia	diameter
Dir	direction
Dist	distance
DM	disturbed material
DB	ditch block
DG	ditch grade
Dbl	double
Dn	down
Dwg	drawing
Dr	drive
Drwy	driveway
DI	drop inlet
D	dry density
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Eq	equation
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
F	Fahrenheit
FS	far side
F	farad
Fed	Federal
FP	feed point
Ft	feet/foot
Fn	fence
Fn P	fence post
FO	fiber optic
FB	field book
FD	field drive
F	fill
FAA	fine aggregate angularity
FS	fine sand
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fs	foresight
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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NDDOT ABBREVIATIONS

D-101-2

FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed
Gal	gallon
Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Geod	geodetic
GIS	Geographical Information System
G	giga
GPS	Global Positioning System
Gov	government
Grd	graded/grade
Gr	gravel
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ha	hectare
Ht	height
HI	height of instrument
Hel	helical
H	henry
Hz	hertz
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
HMA	hot mix asphalt
Hr	hour(s)
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
In or "	inch
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IM	iron monument
I Pn	Iron Pin
IP	iron Pipe
Jt	joint
J	joule
Jct	junction
K	kelvin
Kn	kilo newton
Kpa	kilo pascal
Kg	kilogram
Kg/m3	kilogram per cubic meter
Km	kilometer
K	Kip(s)
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
Ln	lane
Lg	large
Lat	latitude
Lt	left
L	length of curve
Lens	lenses
Lvl	level
LB	level book
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Lig Co	lignite coal
Lig Sl	lignite slack
LF	linear foot
Liq	liquid
LL	liquid limit
L	litre
Lm	loam
Loc	location
LC	long chord
Long.	longitude
Lp	loop
LD	loop detector
Lm	lumen
Lum	luminaire
L Sum	lump sum
Lx	lux
ML	main line
M Hr	man hour
MH	manhole
Mkd	marked
Mkr	marker
Mkg	marking
MA	mast arm
Matl	material
Max	maximum
MC	meander corner
Meas	measure
Mdn	median
MD	median drain
MC	medium curing
M	mega
Mer	meridian
M	meter
M/s	meters per second
M	mid ordinate of curve
Mi	mile
MM	mile marker
MP	mile post
Ml	milliliter
Mm	millimeter
Mm/hr	millimeters per hour
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Mun	municipal
N	nano
NGS	National Geodetic Survey
NS	near side
Neop	neoprene
Ntwk	network
N	newton
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number
Obsc	obscure(d)
Obsn	observation
Ocpd	occupied
Ocpy	occupy
Off Loc	office location
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PK	Parker-Kalon nail
Pa	pascal
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl	plate
Pt	point
PCC	point of compound curve
PC	point of curve
PI	point of intersection
PRC	point of reverse curvature
PT	point of tangent
POC	point on curve
POT	point on tangent
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
Lb or #	pounds
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd	preformed
Prep	preperation
Press.	pressure
PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions

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NDDOT ABBREVIATIONS

Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
RTP	random traverse point
Rge or R	range
RC	rapid curing
Rec	record
Rcy	recycle
RAP	recycled asphalt pavement
RPCC	recycled portland cement concrete
Ref	reference
R Mkr	reference marker
RM	reference monument
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
Reinf	reinforcement
Res	reservation
Ret	retaining
Rev	reverse
Rt	right
R/W	right of way
Riv	river
Rd	road
Rdbd	road bed
Rdwy	roadway
RWIS	roadway weather information system
Rk	rock
Rt	route
Salv	salvage(d)
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
San	sanitary sewer line
Sc	scoria
Sec	seconds
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sh	shale
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw	sidewalk
S	siemens
SD	sight distance
SN	sign number
Sig	signal
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam
Sgl	single
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SC	spiral to curve
ST	spiral to tangent
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
SF	square feet
Km2	square kilometer
M2	square meter
SY	square yard
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Sta	station
Sta Yd	station yards
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SE	superelevation
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical
SI	systems international
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	tesla
T	thinwall tube sample
T/mi	tons per mile
Ts	topsoil
Twp or T	township
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
TB	transit book
Trans	transition
TT	transmission tower
Trans	transverse
Trav	traverse
TP	traverse point
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
TP	turning point
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VC	vertical curve
VCP	vitrified clay pipe
V	volt
Vol	volume
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
W	watt
Wrng	wearing
Wb	weber
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner
WGS	world geodetic system
Z	zenith

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users Incorporated
AGC	Assiociated General Contractors of America
All PI	Alliance Pipeline
ALL SEAS WU	All Seasons Water Users Association
AMOCO PI	Amoco Pipeline Company
AMRDA HESS	Amerada Hess Corporation
AT&T	AT&T Corporation
B PAW	Bear Paw Energy Incorporated
BAKER ELEC	Baker Electric
BASIN ELEC	Basin Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative
BELLE PL	Belle Fourche Pipeline Company
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe Railway
BOEING	Boeing
BRNS RWD	Barnes Rural Water District
BURK-DIV ELEC	Burke-Divide Electric Cooperative
BURL WU	Burleigh Water Users
Cable One	Cable One
CABLE SERV	Cable Services
CAP ELEC	Capital Electric Cooperative Incorporat
CASS CO ELEC	Cass County Electric Cooperative
CASS RWU	Cass Rural Water Users Incorporated
CAV ELEC	Cavalier Rural Electric Cooperative
CBLCOM	Cablecom Of Fargo
CENEX PL	Cenex Pipeline
CENT PL WATER DIST	Central Pipe Line Water District
CENT PWR ELEC	Central Power Electric Cooperative
COE	Corps of Engineers
CONS TEL	Consolidated Telephone
CONT RES	Continental Resource Inc
CPR	Canadian Pacific Railway
D O E	Department Of Energy
DAK CARR	Dakota Carrier Network
DAK CENT TEL	Dakota Central Telephone
DAK RWD	Dakota Rural Water District
DGC	Dakota Gasification Company
DICKEY R NET	Dickey Rural Networks
DICKEY RWU	Dickey Rural Water Users Association
DICKEY TEL	Dickey Telephone
DNRR	Dakota Northern Railroad
DOME PL	Dome Pipeline Company
DVELEC	Dakota Valley Electric Cooperative
DVMW	Dakota, Missouri Valley & Western
ENBRDG	Enbridge Pipelines Incorporated
ENVENTIS	Enventis Telephone
FALK MNG	Falkirk Mining Company
FHWA	Federal Highway Administration
G FKS-TRL WD	Grand Forks-traill Water District
GETTY TRD & TRAN	Getty Trading & Transportation
GLDN W ELEC	Golden West Electric Cooperative
GRGS CO TEL	Griggs County Telephone
GT PLNS NAT GAS	Great Plains Natural Gas Company
HALS TEL	Halstad Telephone Company
IDEA1	Idea1
INT-COMM TEL	Inter-Community Telephone Company
KANEB PL	Kaneb Pipeline Company
KEM ELEC	Kem Electric Cooperative Incorporated
KOCH GATH SYS	Koch Gathering Systems Incorporated
LKHD PL	Lakehead Pipeline Company
LNGDN RWU	Langdon Rural Water Users Incorporated
LWR YELL R ELEC	Lower Yellowstone Rural Electric
MCKNZ CON	McKenzie Consolidated Telcom
MCKNZ ELEC	McKenzie Electric Cooperative
MCKNZ WRD	McKenzie County Water Resource District
MCLEOD	McLeod USA
MCLN ELEC	McLean Electric Cooperative
MCLN-SHRDN R WAT	McLean-Sheridan Rural Water
MDU	Montana-dakota Utilities
MID-CONT CABLE	Mid-Continent Cable
MIDSTATE TEL	Midstate Telephone Company
MINOT CABLE	Minot Cable Television
MINOT TEL	Minot Telephone Company
MISS W W S	Missouri West Water System
MNKOTA PWR	Minnkota Power
MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative
MRE LBTY TEL	Moore & Liberty Telephone
MUNICIPAL	City Water And Sewer
MUNICIPAL	City Of '.....'
N CENT ELEC	North Central Electric Cooperative
N VALL W DIST	North Valley Water District
ND PKS & REC	North Dakota Parks And Recreation
ND TEL	North Dakota Telephone Company
NDDOT	North Dakota Department of Transportation
NDSU SOIL SCI DEPT	NDSU Soil Science Department
NEMONT TEL	Nemont Telephone
NODAK R ELEC	Nodak Rural Electric Cooperative
NOON FRMS TEL	Noonan Farmers Telephone Company
NPR	Northern Plains Railroad
NSP	Northern States Power
NTH PRAIR RW	Northern Prairie Rural Water Association
NTHN BRDR PL	Northern Border Pipeline
NTHN PLNS ELEC	Northern Plains Electric Cooperative Incorporated
NTHWSTRN REF	Northwestern Refinery Company
NW COMM	Northwest Communication Cooperation
ONEOK	Oneok gas
OSHA	Occupational Safety and Health Administration
OTTR TL PWR	Otter Tail Power Company
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
PVT ELEC	Private Electric
QWEST	Qwest Communications
R&T W SUPPLY	R & T Water Supply Association
RAMSEY R SEW	Ramsey Rural Sewer Association
RAMSEY RW	Ramsey Rural Water Association
RAMSEY UTIL	Ramsey County Rural Utilities
RED RIV TEL	Red River Rural Telephone
RESVTN TEL	Reservation Telephone
ROBRTS TEL	Roberts Company Telephone
R-RIDER ELEC	Roughrider Electric Coop
RRVW	Red River Valley & Western Railroad
RSR ELEC	R.S.R. Electric Cooperative
S E W U	South East Water Users Incorporated
SCOTT CABLE	Scott Cable Television Dickinson
SHERDN ELEC	Sheridan Electric Cooperative
SHEYN VLY ELEC	Sheyenne Valley Electric Cooperative
SKYTECH	Skyland Technologies Incorporated
SLOPE ELEC	Slope Electric Cooperative Incorporated
SOURIS RIV TELCOM	Souris River Telecommunications
ST WAT COMM	State Water Commission
STATE LN WATER	State Line Water Cooperative
STER ENG	Sterling Energy
STUT RWU	Stutsman Rural Water Users
SW PL PRJ	Southwest Pipeline Project
T M C	Turtle Mountain Communications
TCI	TCI of North Dakota
TESORO HGH PLNS PL	Tesoro High Plains Pipeline
TRI-CNTY WU	Tri-County Water Users Incorporated
TRL CO RWU	Traill County Rural Water Users
UNTD TEL	United Telephone
UPPR SOUR WUA	Upper Souris Water Users Association
US SPRINT	U.S. Sprint
USAF MSL CABLE	U.S.A.F. Missile Cable
USFWS	US Fish and Wildlife Service
USW COMM	U.S. West Communications
VRNDRY ELEC	Verendrye Electric Cooperative
W RIV TEL	West River Telephone Incorporated
WEB	W. E. B. Water Development Association
WILLI RWA	Williams Rural Water Association
WILSTN BAS PL	Williston Basin Interstate Pipeline Company
WLSH RWD	Walsh Water Rural Water District
WOLVRTN TEL	Wolverton Telephone
XLENER	Xcel Energy
YSVR	Yellowstone Valley Railroad

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Line Styles

D-101-20

Existing Topography

- Existing Ground Void
- Existing Cemetary Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter

- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break

Proposed Topography

- 3-Cable w Posts
- Flow
- Fence
- Remove Line
- Wall
- Retaining Wall (Plan View)
- W-Beam w Posts

Existing Utilities

- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Existing Culvert
- Existing Telephone Line
- Existing TV Line
- Existing Water or Steam Line
- Existing Under Drain
- Existing Slotted Drain
- Existing Conduit
- Existing Conductor
- Existing Down Guy Wire Down Guy
- Existing Underground Vault or Lift Station

Proposed Utilities

- 24 Inch Pipe
- Reinforced Concrete Pipe
- Under Drain
- Edge Drain

Traffic Utilities

- Conductor
- Fiber Optic
- Existing Loop Detector
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Micro Loop Detector
- Micro Loop Detector
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm

Sign Structures

- Existing Overhead Sign Structure
- Existing Overhead Sign Structure Cantilever
- Overhead Sign Structure Cantilever

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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09-23-16	Added and Revised Items, Organized by Functional Groups

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Line Styles

D-101-21

Right Of Way

- Easement
- Existing Easement
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Existing Right of Way Not State Owned
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines
- Sight Distance Triangle Line
- Dimension Leader

Boundary Control

- Existing City Corporate Limits or Reservation Boundary
- Existing State or International Line
- Existing Township
- Existing County
- Existing Section Line
- Existing Quarter Section Line
- Existing Sixteenth Section Line
- Existing Centerline
- Tangent Line

Cross Sections and Typicals

- Existing Ground
- Existing Topsoil (Cross Section View)
- Existing Ground Void (Not Surveyed) (void — void — void — v)
- Existing Concrete
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar

Geotechnical

- Geotextile Fabric Type D (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement
- Failure Line

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

- Centerline Pavement Marking
- Barrier with Centerline Pavement Marking
- Barrier Pavement Marking
- Stripe 4 IN Dotted Extension White
- Stripe 8 IN Dotted Extension White
- Stripe 8 IN Lane Drop

Pavement Joints

- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Tie Bar at Random Spacing

Bridge Details

- Hidden Object
- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Centerline Main
- Centerline
- Existing Ground (Details)
- Existing Conditions
- Sheet Piling

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

- Wetland Mitigation
- Existing Wetland Easement USFWS
- Existing Wetland Jurisdictional
- Existing Wetland
- Tree Row

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Symbols

D-101-30

North Arrow (Half Scale)

Truck Mounted Attenuator

Type I Barricade

Type II Barricade

Type III Barricade

Catch Basin

Cairn or Stone Circle

Video Detection Camera

Storm Drain Cap or Stub

Corrugated Metal End Section 18 Inch

Corrugated Metal End Section 24 Inch

Corrugated Metal End Section 30 Inch

Corrugated Metal End Section 36 Inch

Corrugated Metal End Section 42 Inch

Corrugated Metal End Section 48 Inch

Concrete Foundation

Ground Connection Conductor

Neutral Connection Conductor

Phase 1 Connection Conductor

Phase 2 Connection Conductor

Traffic Cone

Signal Controller

Pad Mounted Signal Controller

Alignment Data Point

Emergency Vehicle Detector

Attenuation Device

Diamond Grade Delineator Type A

Diamond Grade Delineator Type B

Diamond Grade Delineator Type C

Diamond Grade Delineator Type D

Diamond Grade Delineator Type E

Flexible Delineator

Flexible Delineator Type A

Flexible Delineator Type B

Flexible Delineator Type C

Flexible Delineator Type D

Flexible Delineator Type E

Delineator Type A

Delineator Type A Reset

Delineator Type B

Delineator Type B Reset

Delineator Type C

Delineator Type D

Delineator Type E

Delineator Drums

Spot Elevation

Existing Access Control Arrow

Existing Artifact

Existing Flashing Beacon

Existing Benchmark

Existing Railroad Battery Box

Existing Bush or Shrub

Existing Gas Cap or Stub

Existing Sanitary Cap or Stub

Existing Storm Drain Cap or Stub

Existing Water Cap or Stub

Existing Sanitary Cleanout

Existing Concrete Foundation

Existing Traffic Signal Controller

Existing Pad Mounted Signal Controller

Existing Sixteenth Section Corner

Existing Quarter Section Corner

Existing Section Corner

Existing Railroad Crossbuck

Existing Satellite Dish

Existing Fuel Dispensers

Existing Flexible Delineator Type A

Existing Flexible Delineator Type B

Existing Flexible Delineator Type C

Existing Flexible Delineator Type D

Existing Flexible Delineator Type E

Existing Delineator Type A

Existing Delineator Type B

Existing Delineator Type C

Existing Delineator Type D

Existing Delineator Type E

Existing EFB Misc

Existing Flashing Beacon

Existing Pipe Mounted Flasher

Existing Pad Mounted Feed Point

Existing Pipe Mounted Feed Point with Pad

Existing Pole Mounted Feed Point

Existing Railroad Frog

Existing Snow Gate 18

Existing Snow Gate 28

Existing Snow Gate 40

Existing Headwall

Existing Pedestrian Head with Number

Existing Signal Head

Existing Sprinkler Head

Existing Fire Hydrant

Existing Catch Basin Drop Inlet

Existing Curb Inlet

Existing Manhole Inlet

Existing Junction Box

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Symbols

D-101-31

- Existing Light Standard
- Existing High Mast Light Standard 10 Luminaire
- Existing High Mast Light Standard 3 Luminaire
- Existing High Mast Light Standard 4 Luminaire
- Existing High Mast Light Standard 5 Luminaire
- Existing High Mast Light Standard 6 Luminaire
- Existing High Mast Light Standard 7 Luminaire
- Existing High Mast Light Standard 8 Luminaire
- Existing High Mast Light Standard 9 Luminaire
- Existing Overhead Sign Structure Load Center
- Existing Luminaire
- Existing Light Standard Luminaire
- Existing Federal Mailbox
- Existing Private Mailbox
- Existing Meander Section Corner
- Existing Meter
- Existing Electrical Manhole
- Existing Gas Manhole
- Existing Sanitary Manhole
- Existing Sanitary Force Main Manhole
- Existing Sanitary Manhole with Valve
- Existing Storm Drain Manhole
- Existing Force Main Storm Drain Manhole
- Existing Force Main Storm Drain Manhole with Valve
- Existing Telephone Manhole
- Existing Manhole with Valve Water
- Existing Water Manhole
- Existing Mile Post Type A
- Existing Mile Post Type B
- Existing Mile Post Type C
- Existing Reference Marker
- Existing RW Marker
- Existing Utility Marker
- Iron Monument Found
- Iron Pin R/W Monument
- Existing Object Marker Type I
- Existing Object Marker Type II
- Existing Object Marker Type III
- Existing Electrical Pedestal
- Existing Telephone Pedestal
- Existing Fiber Optic Telephone Pedestal
- Existing TV Pedestal
- Existing Fiber Optic TV Pedestal
- Existing Fuel Filler Pipes
- Existing Traverse PI Aerial Panel
- Existing Pole
- Existing Power Pole
- Existing Power Pole with Transformer
- Existing Telephone Pole
- Existing Wood Pole
- Existing Post
- Existing Pedestrian Push Button Post
- Existing Control Point CP
- Existing Control Point GPS-RTK
- Existing Control Point TRI
- Existing Reference Marker Point NGS
- Existing Pull Box
- Existing Intelligent Transportation Pull Box
- Existing Water Pump
- Existing Slotted Reinforced Concrete Pipe
- Existing RR Profile Spot
- Existing Fuel Leak Sensors
- Existing Highway Sign
- Existing Miscellaneous Spot
- Existing Lighting Standard Pole
- Existing Traffic Signal Standard
- Existing Transformer
- Existing Large Evergreen Tree
- Existing Small Evergreen Tree
- Existing Large Tree
- Existing Small Tree
- Existing Tree Trunk
- Existing Pad Mounted Traffic Signal Control Box
- Existing Undefined Manhole
- Existing Undefined Pull Box
- Existing Undefined Pedestal
- Existing Undefined Valve
- Existing Undefined Pipe Vent
- Existing Gas Valve
- Existing Water Valve
- Existing Fuel Pipe Vent
- Existing Gas Pipe Vent
- Existing Sanitary Pipe Vent
- Existing Storm Drain Pipe Vent
- Existing Water Pipe Vent
- Existing Weather Station
- Existing Ground Water Well Bore Hole
- Existing Windmill or Tower
- Existing Witness Corner
- Flashing Beacon
- Flagger
- Pipe Mounted Flasher
- Sanitary Force Main with Valve

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Symbols

D-101-32

- Pad Mounted Feed Point
- Pipe Mounted Feed Point with Pad
- Pole Mounted Feed Point
- Headwall
- Double Headwall with Vegitation Barrier
- Single Headwall with Vegitation Barrier
- Pole Mounted Head
- Sprinkler Head
- Fire Hydrant
- Inlet Type 1
- Inlet Type 2
- Double Inlet Type 2
- Inlet Grate Type 2
- Junction Box
- High Mast Light Standard 10 Luminaire
- High Mast Light Standard 3 Luminaire
- High Mast Light Standard 4 Luminaire
- High Mast Light Standard 5 Luminaire
- High Mast Light Standard 6 Luminaire
- High Mast Light Standard 7 Luminaire
- High Mast Light Standard 8 Luminaire
- High Mast Light Standard 9 Luminaire
- Relocate Light Standard
- Overhead Sign Structure Load Center
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 175 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Manhole
- Manhole 48 Inch
- Sanitary Force Main Manhole
- Sanitary Sewer Manhole
- Storm Drain Manhole
- Storm Drain Manhole with Inlet
- Reset Mile Post
- Mile Post Type A
- Mile Post Type B
- Mile Post Type C
- Right of Way Marker
- Tubular Marker
- Alignment Monument
- Iron Pin Reference Monument
- Object Marker Type I
- Object Marker Type II
- Object Marker Type III
- Caution Mode Arrow Panel
- Back to Back Vertical Panel Sign
- Double Direction Arrow Panel
- Left Directional Arrow Panel
- Right Directional Arrow Panel
- Sequencing Arrow Panel
- Truck Mounted Arrow Panel
- Power Pole
- Wood Pole
- Pedestrian Push Button Post
- Property Corner
- Pull Box
- Intelligent Transportation Pull Box
- Sanitary Pump
- Storm Drain Pump
- Reinforced Pavement
- Reinforced Concrete End Section 15 Inch
- Reinforced Concrete End Section 18 Inch
- Reinforced Concrete End Section 24 Inch
- Reinforced Concrete End Section 30 Inch
- Reinforced Concrete End Section 36 Inch
- Reinforced Concrete End Section 42 Inch
- Reinforced Concrete End Section 48 Inch
- Reinforced Concrete End Section 54 Inch
- Reset Right of Way Marker
- Reset USGS Marker
- Right of Way Markers
- Riser 30 Inch
- Continuous Split Barrel Sample (CSB)
- Flight Auger Sample (FA)
- Split Barrel Sample (SB)
- Thinwall Tube Sample
- Highway Sign
- SNOW GATE 18 FT
- SNOW GATE 28 FT
- SNOW GATE 40 FT
- Standard Penetration Test (N)
- Transformer
- Inclinometer Tube (Incl)
- Underdrain Cleanout
- Excavation Unit
- Water Valve

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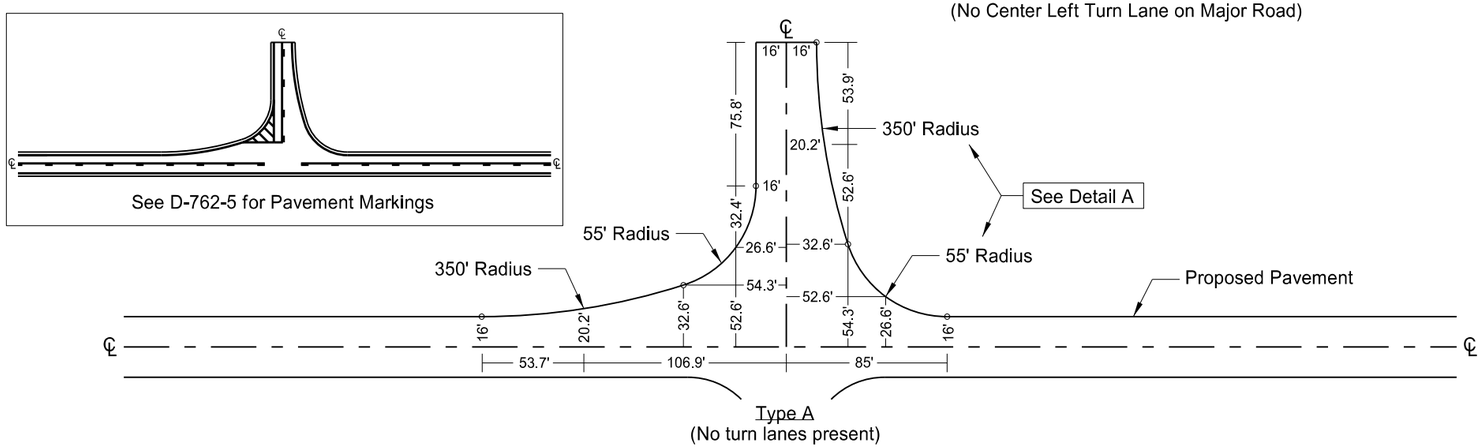
STANDARD 90 DEGREE FLARED INTERSECTION

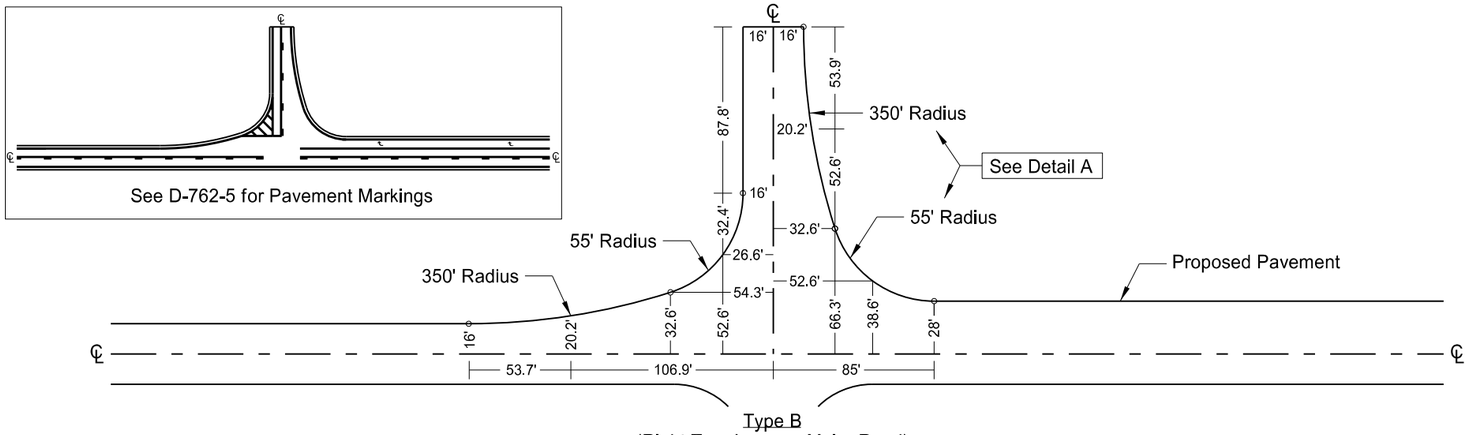
(No Center Left Turn Lane on Major Road)

D-203-5



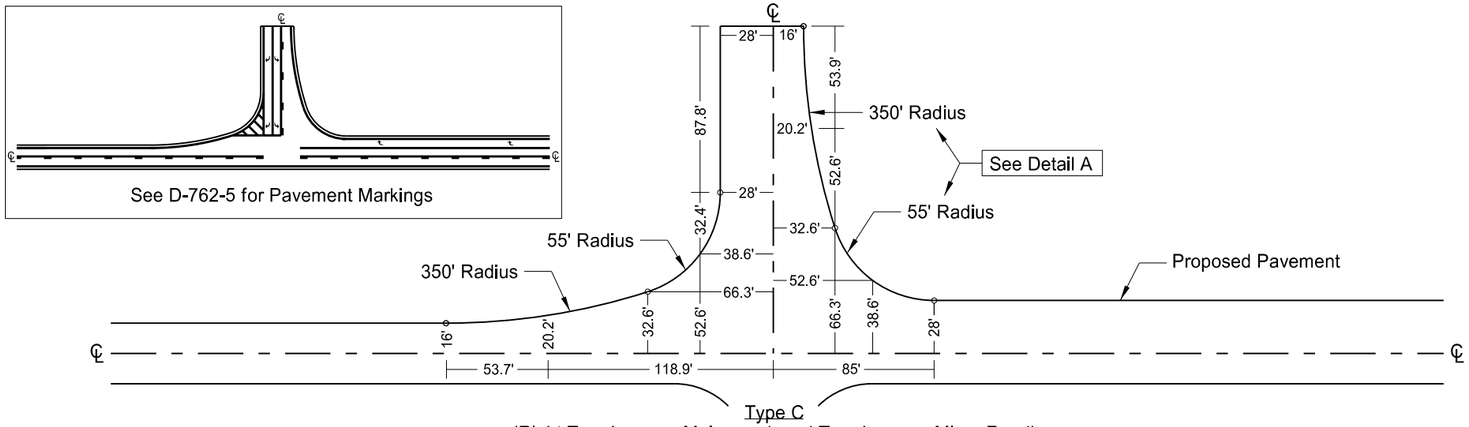
Type A

(No turn lanes present)



Type B

(Right Turn Lane on Major Road)

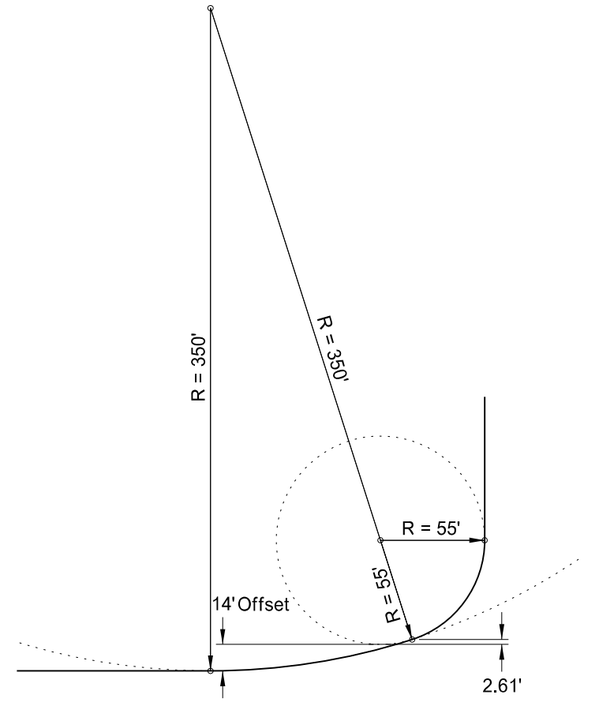


Type C

(Right Turn Lane on Major road, and Turn Lane on Minor Road)

Detail A

Compound Curve (350' Radius, 55' Radius, 14' Offset)



- ◦ Radius Tangent Point
- ⊢xx.x'⊣ Pavement widths
- ——— Proposed Pavement

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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8-17-17	Corrected Pvmt Mkg Std reference

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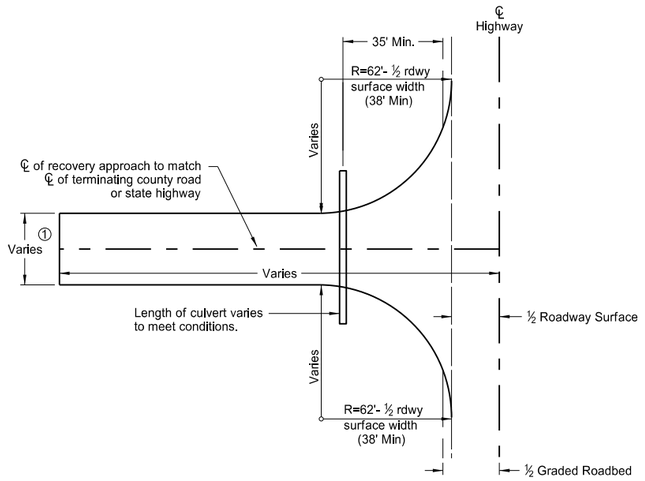
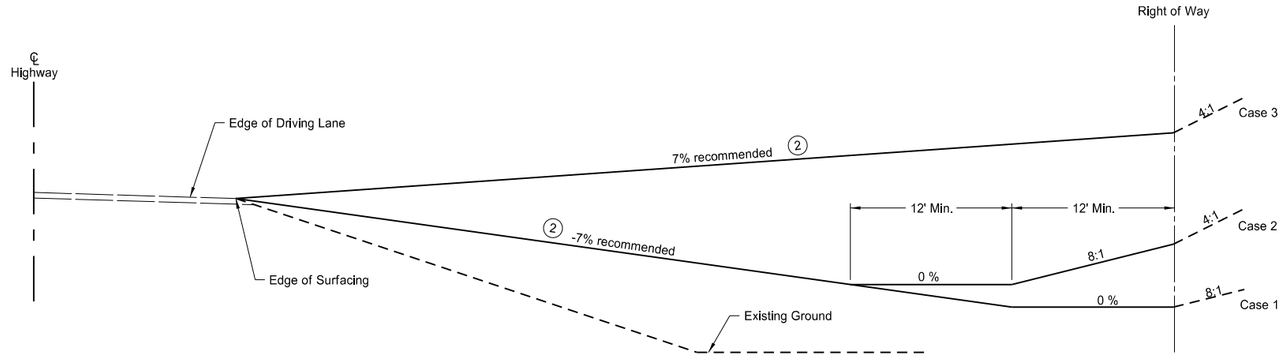
RECOVERY APPROACHES AT T-INTERSECTIONS

D-203-7



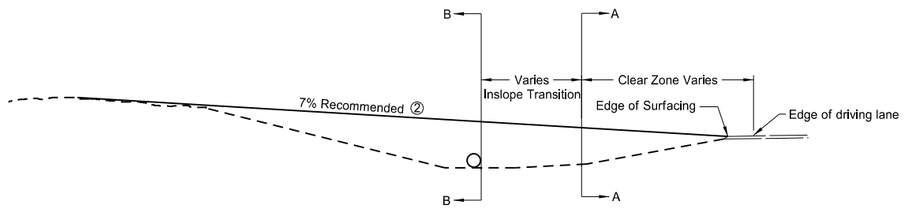
PLAN VIEW RECOVERY APPROACH



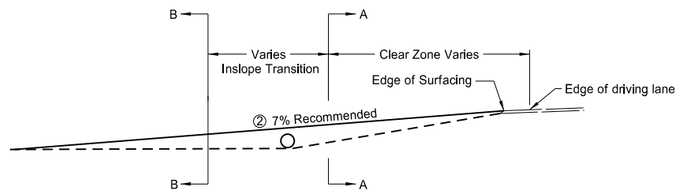
Case 1: Ties into existing back slope and within existing right of way. Existing Back Slope is 8:1 or flatter.

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



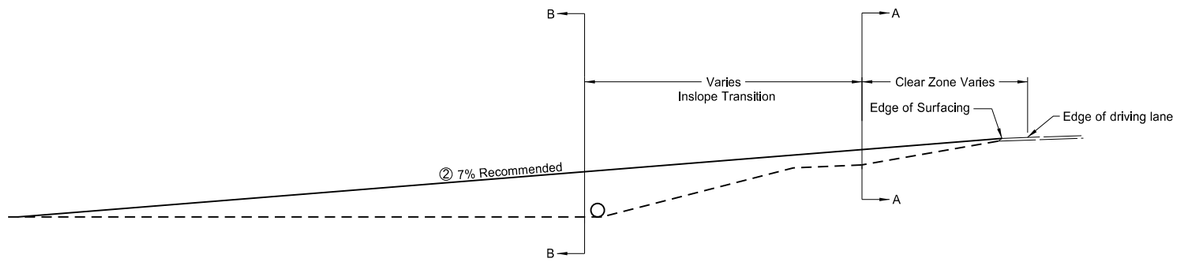
RECOVERY APPROACH GRADE ON FILL SECTON

FOOT NOTES

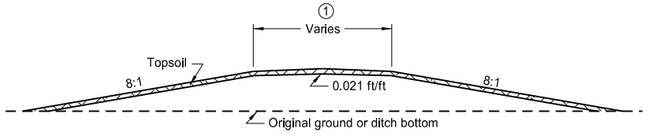
① width of recovery approach to match width of terminating county road or state highway

② 10% Max

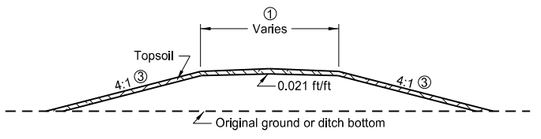
③ 3:1 Slope - 20' to 30' fill
2:1 Slope on fills over 30'



RECOVERY APPROACH GRADE ON DEEP FILL SECTON



SECTION A-A



SECTION B-B

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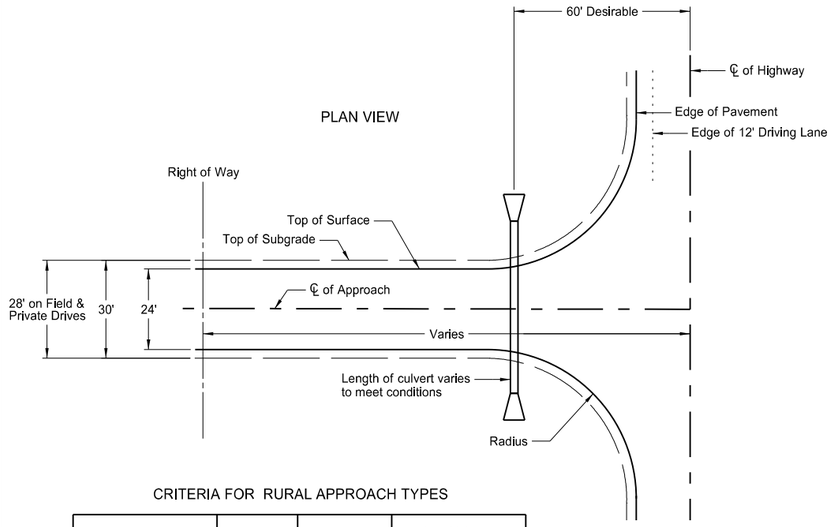
STANDARD RURAL APPROACHES

D-203-8

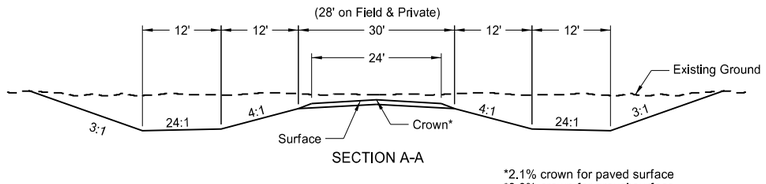
NOTES:

1. 5% Max Rollover between approach storage platform and highway.



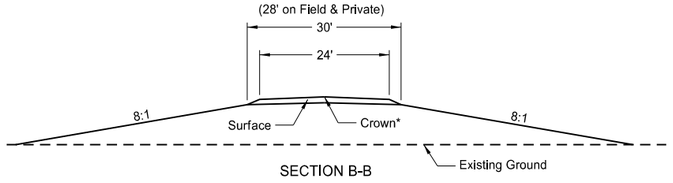
CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=40 ft	R=40 ft	R=50 ft
Maximum Grade	10%	7%	7%
Storage Platform	24 ft	24 ft	50 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)

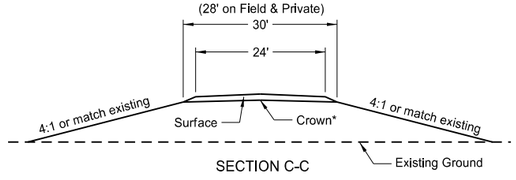


SECTION A-A

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

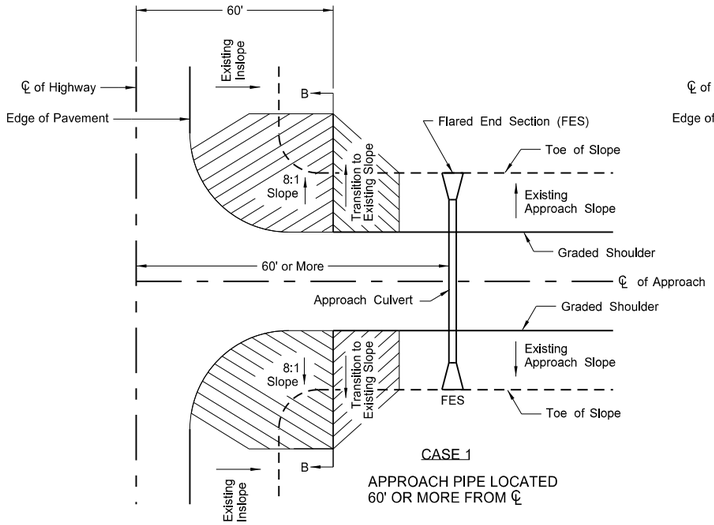


SECTION B-B



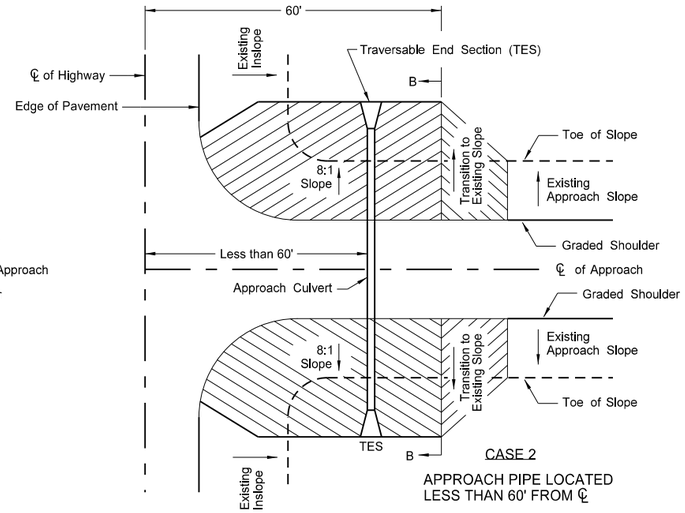
SECTION C-C

APPROACH INSLOPES



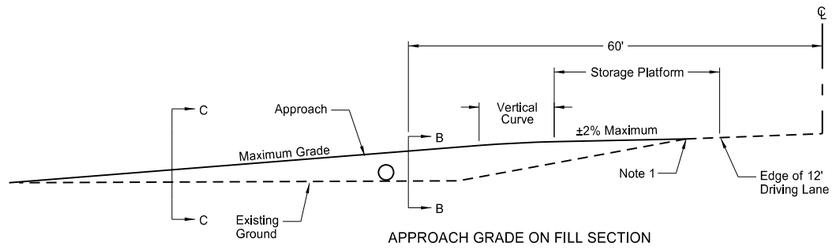
CASE 1

APPROACH PIPE LOCATED 60' OR MORE FROM ℄

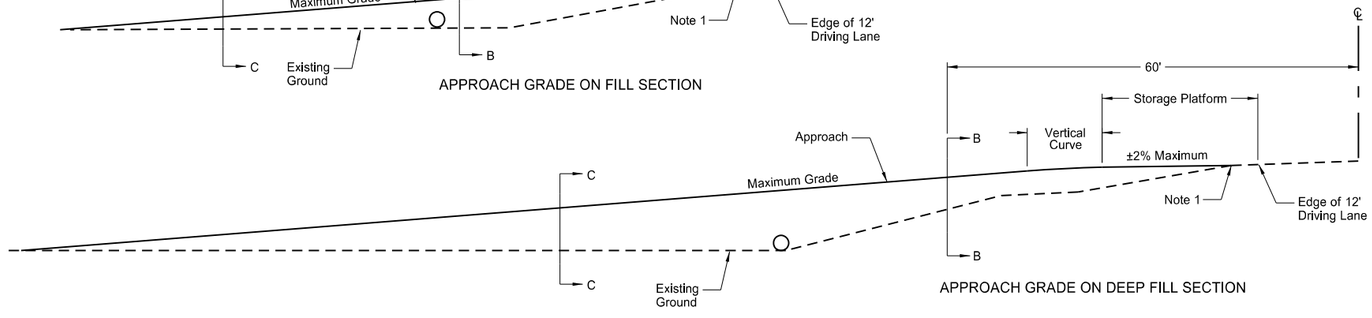


CASE 2

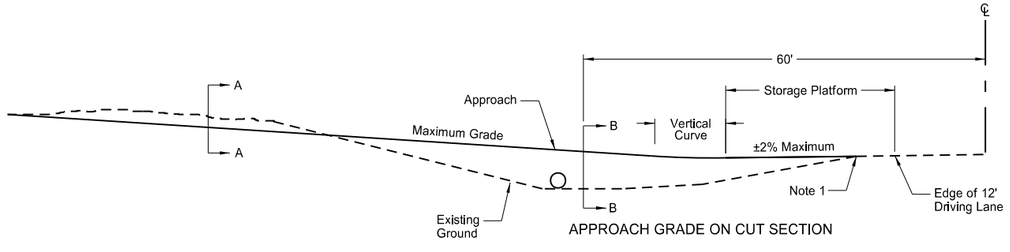
APPROACH PIPE LOCATED LESS THAN 60' FROM ℄



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION



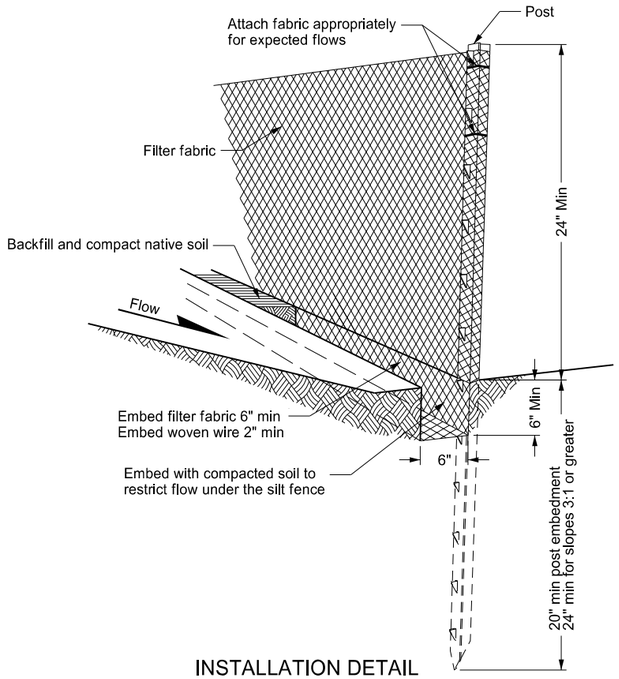
APPROACH GRADE ON CUT SECTION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE
6-30-2017	Revised Radius, Storage Platform, Inslope dimensions, and Note 1.

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 06/30/17 and the original document is stored at the North Dakota Department of Transportation

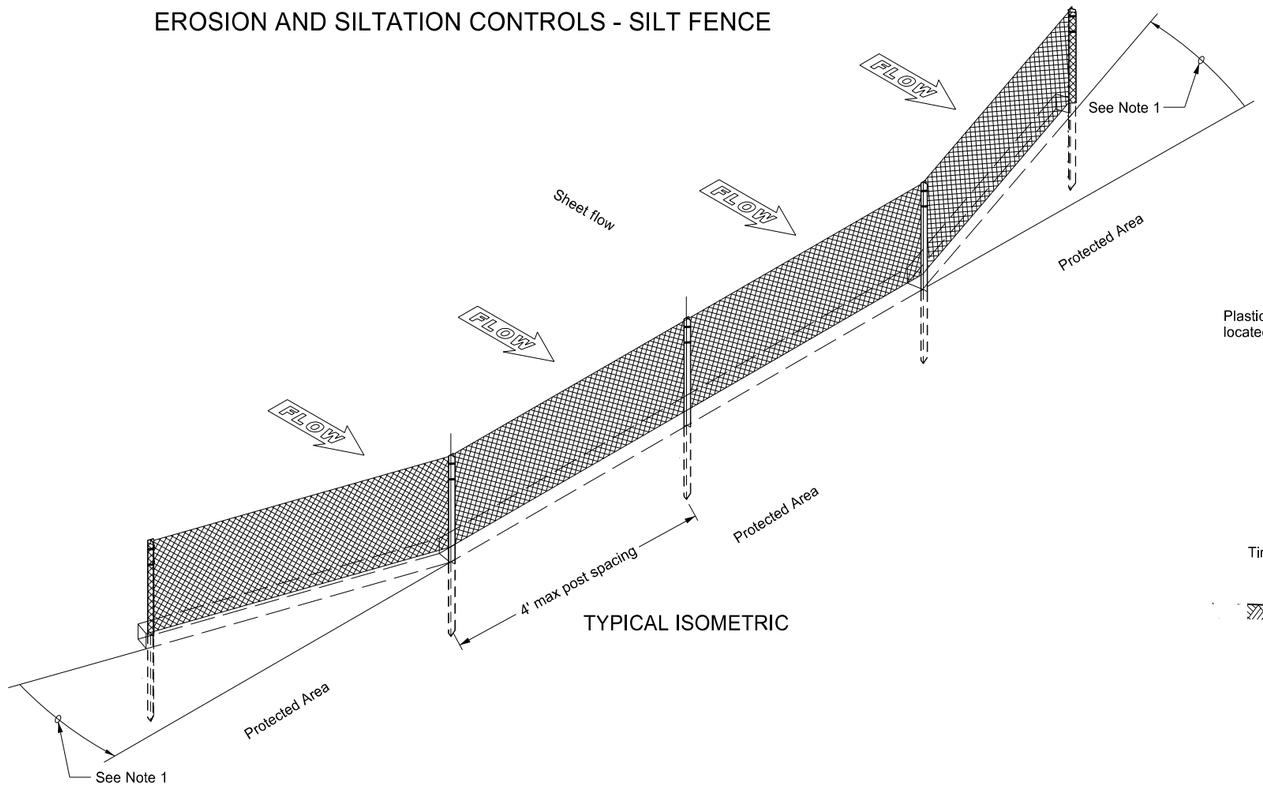
EROSION AND SILTATION CONTROLS - SILT FENCE

D-260-1

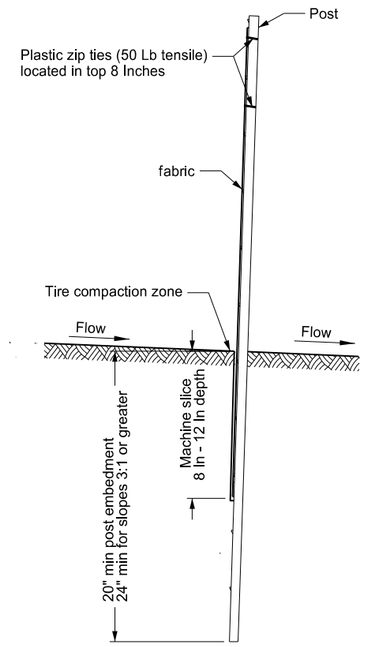


INSTALLATION DETAIL

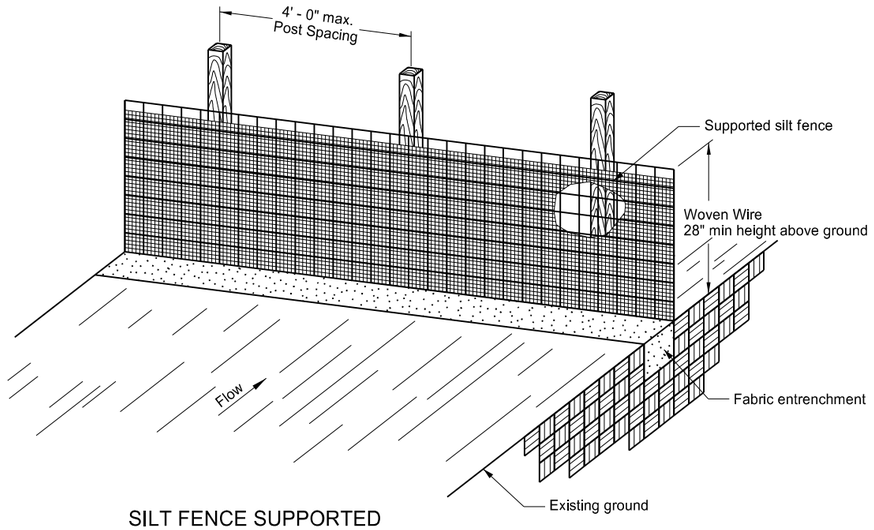
Minimize disturbance of ground around trench and smooth surface after excavation to avoid concentrating flows. Compact to prevent undercutting flows.



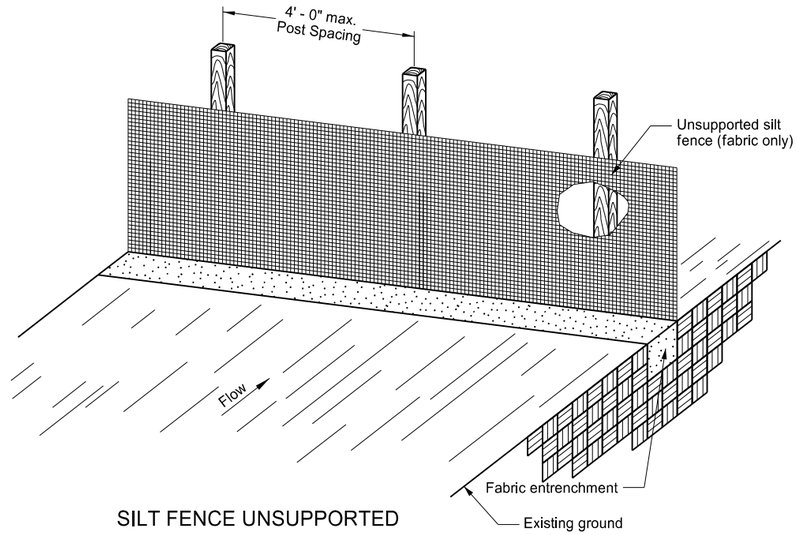
TYPICAL ISOMETRIC



MACHINE SLICED SILT FENCE



SILT FENCE SUPPORTED



SILT FENCE UNSUPPORTED

NOTES:
1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
2. Place splices outside low spots.
3. Install silt fencing parallel to contour lines.
4. Do not embed silt fence when placed in standing water.
5. Silt fence material does not need to reach the top of woven wire support.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing resulted from splitting standard D-708-2.
06-27-16	Revised details & added new ones.

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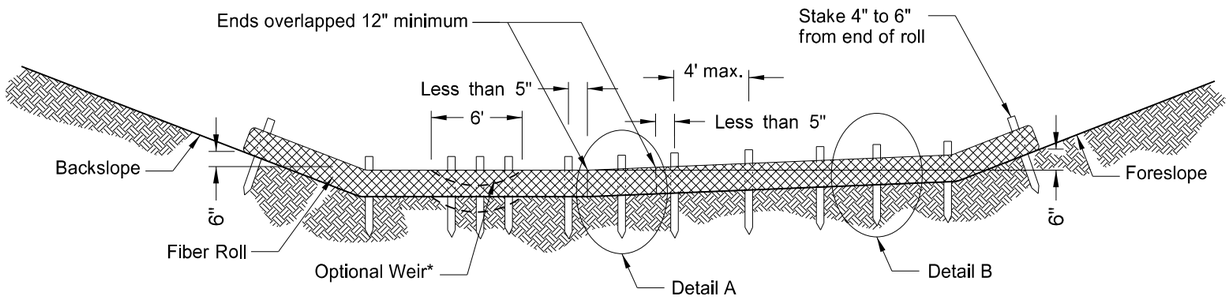
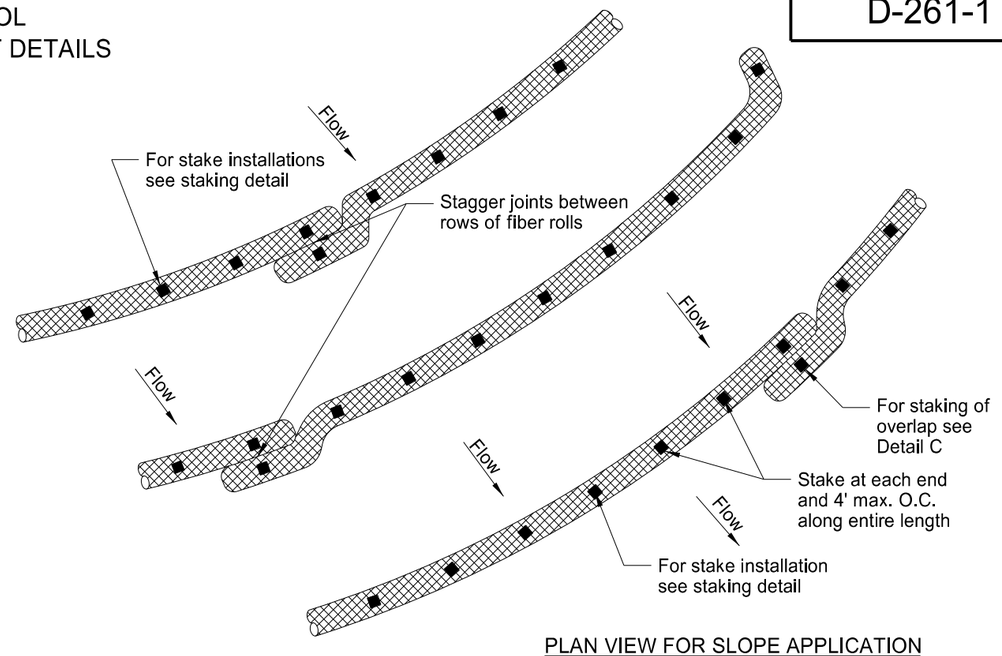
D-261-1

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

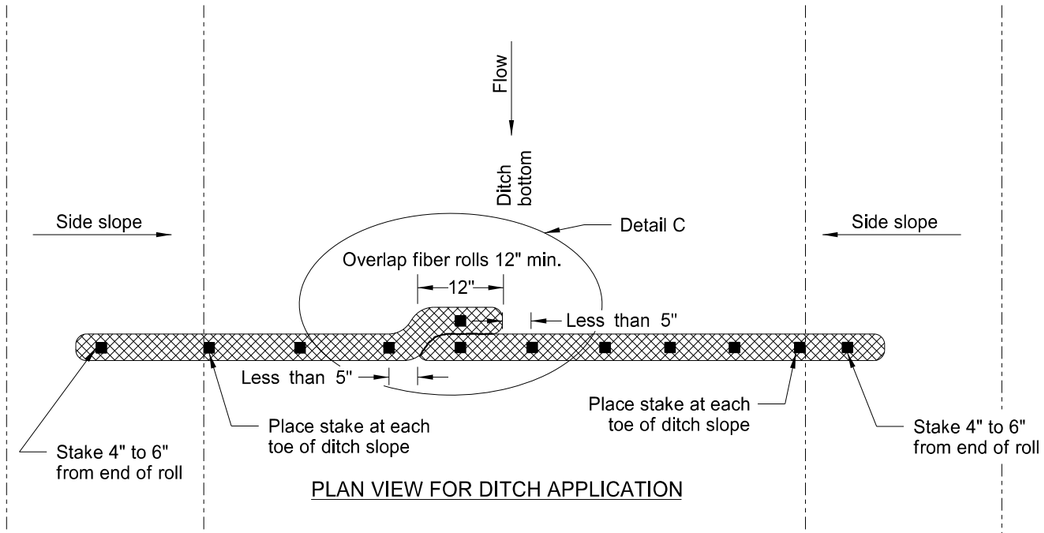


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up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

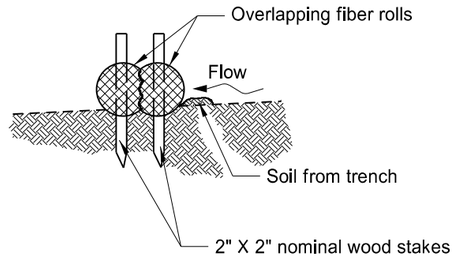
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



PLAN VIEW FOR SLOPE APPLICATION

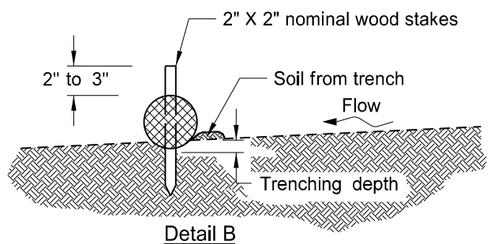


PLAN VIEW FOR DITCH APPLICATION



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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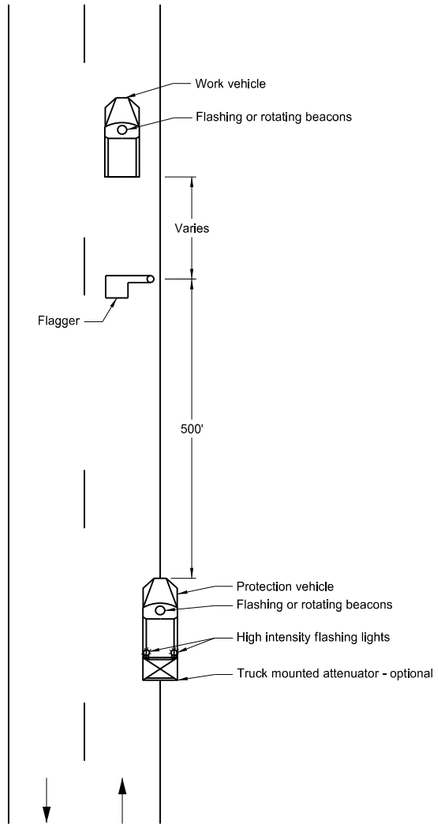
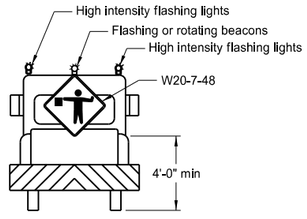
TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

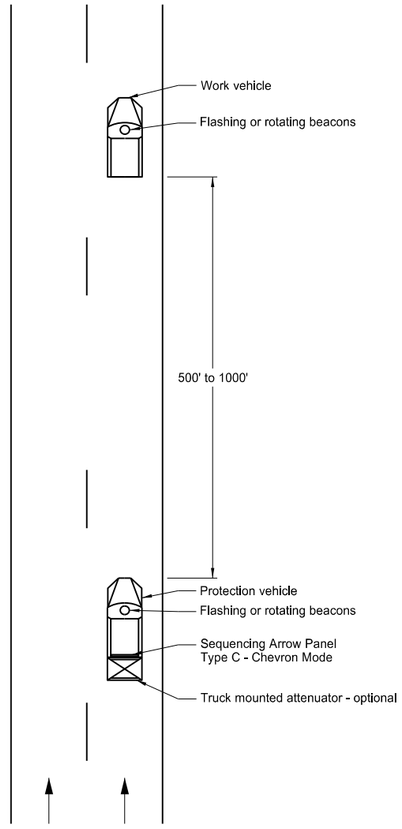
Two Lane, Two Way Roadways

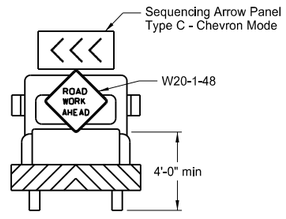




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

1. The working vehicle shall display a 360 degree rotating, flashing, oscillating or strobe light.
2. The shadow vehicle shall display a 360 degree rotating, flashing, oscillating or strobe light. The shadow vehicle for Multilane Roadway shall also have a sequencing arrow panel Type C operated in the chevron mode.
3. This application is for use during daylight hours and in areas of good visibility only.
4. Two lane, two way roadway, a flagger shall be used to protect the work area and warn oncoming traffic.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 9/25/2012 and the original document is stored at the North Dakota Department of Transportation

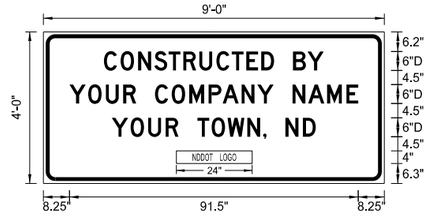
CONSTRUCTION SIGN DETAIL

D-704-5

SIGN NUMBER	G20-10-108
WIDTH x HEIGHT	9'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Refl
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
	42.1	6.2	24	4	0

STATION(S): AREA: 36.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
C	O	N	S	T	R	U	C	T	E	D		B	Y						69.7	6	D 2000
19.2	24.5	30	35.1	39.7	44.3	49.4	54.8	59.7	64.3	69	73.1	79.1	83.7								
Y	O	U	R		C	O	M	P	A	N	Y		N	A	M	E			91.5	6	D 2000
8.3	14.2	19.8	25.3	29.4	35.4	40.7	46.2	52.4	56.8	62.8	67.8	72.9	78.9	83.9	89.9	96					
Y	O	U	R		T	O	W	N	,		N	D							64.6	6	D 2000
21.7	27.6	33.2	38.7	42.8	48.8	53.3	58.4	64.6	69.6	70.7	76.7	82.2									

Notes:

1. Sign shall be placed a distance of ½A following the End Road Work (G20-2a-48) sign. There shall be a maximum of 2 signs per project.
2. Sign shall be post mounted.
3. Sign required on rural projects with a 30 day or longer duration and it is not required on seal coat projects or other short duration projects.
4. Sign shall not be placed in urban areas or within city limits.

Advance Warning Sign Spacing (A)			
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 (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revise sheeting to type IV

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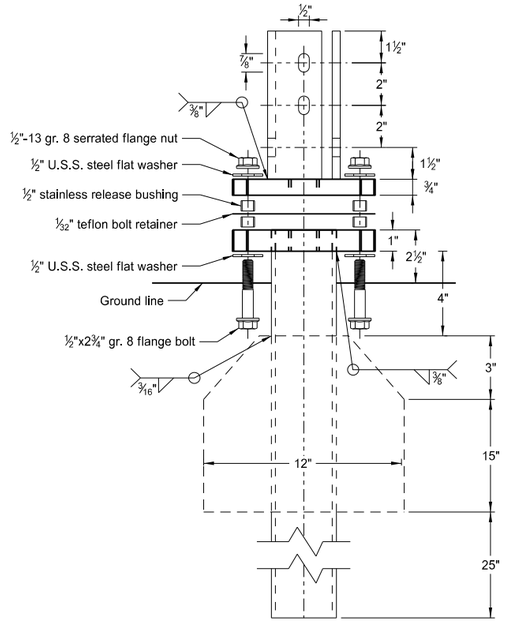
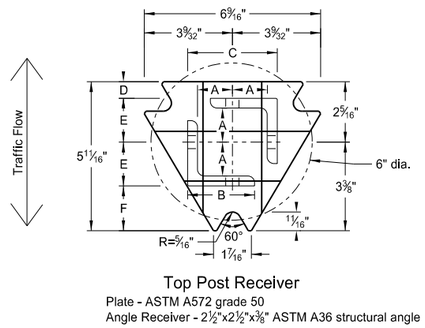
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

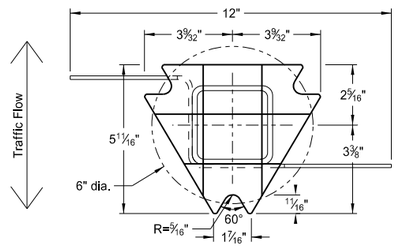


Multi-Directional
Slip Base Assembly

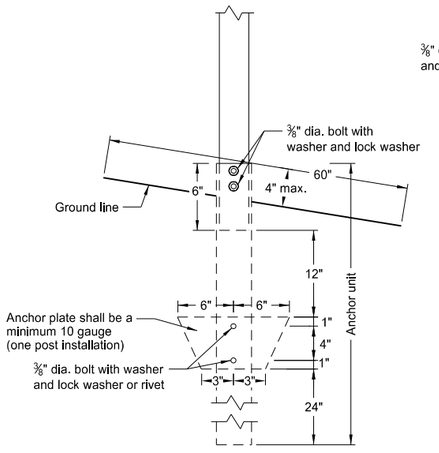
Perforated Tube



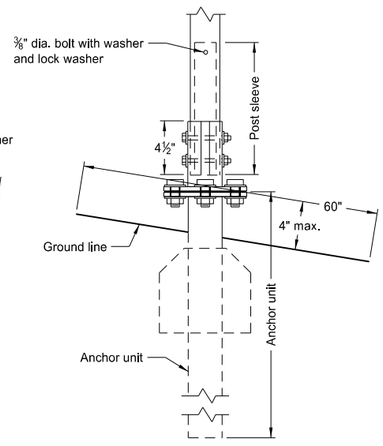
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



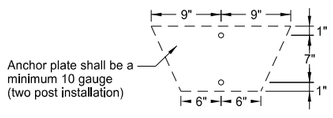
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

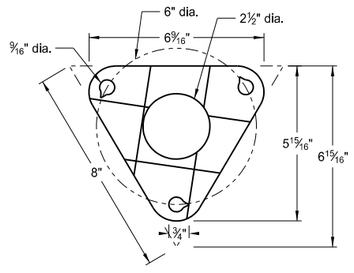


Anchor Unit and Post Assembly



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	2³⁄₁₆	10	Yes	

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
2³⁄₁₆ x 2³⁄₁₆	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
2³⁄₁₆"x10 ga.	1⁹⁄₆₄"	2½"	3¹⁄₃₂"	25⁄₃₂"	1³³⁄₆₄"	1⅞"
2½"x10 ga.	1⁹⁄₃₂"	2½"	3⁵⁄₁₆"	⅝"	1²¹⁄₃₂"	1¾"

(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 2³⁄₁₆"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE

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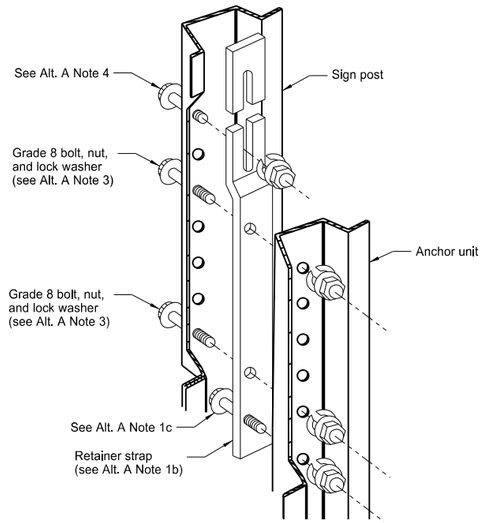
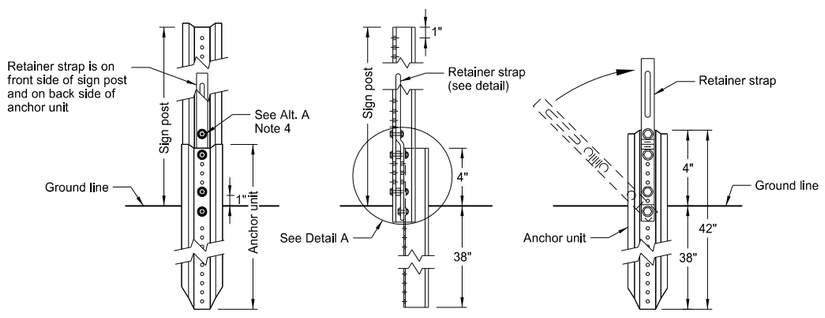
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



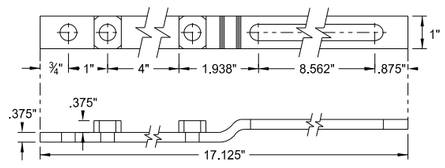
Detail A



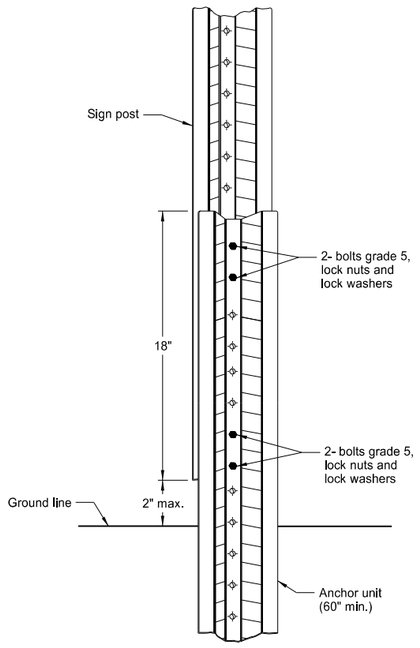
Front View | Side View | Back View

Breakaway U-Channel Detail
Alternate A

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

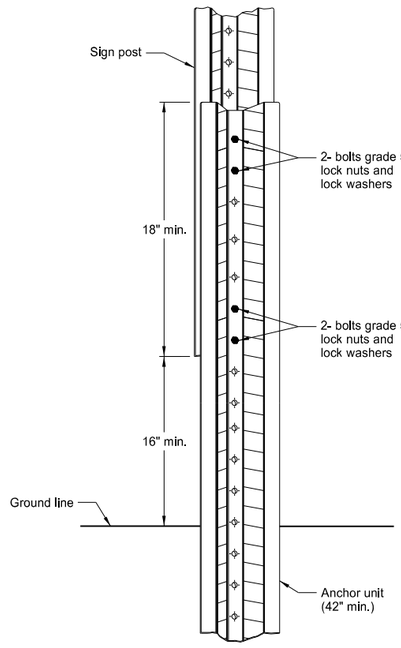


Retainer Strap Detail



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.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE

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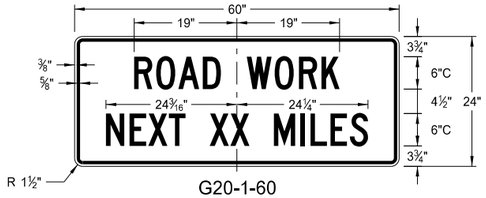
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



G20-1-60
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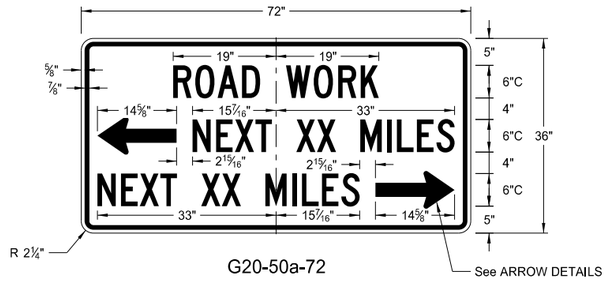
Background: orange



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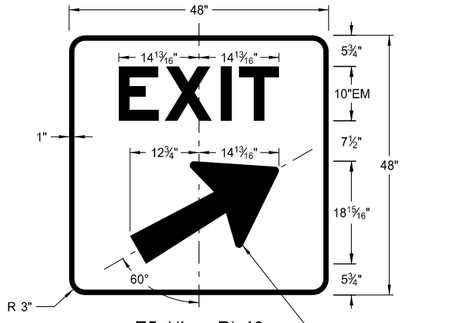
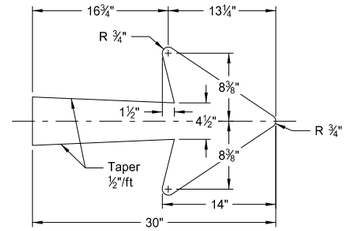
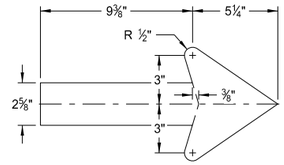


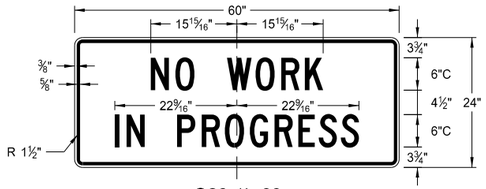
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



E5-1-48



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



G20-1b-60
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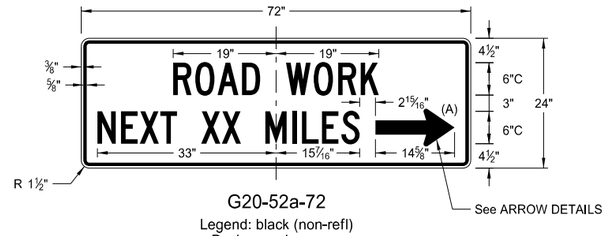

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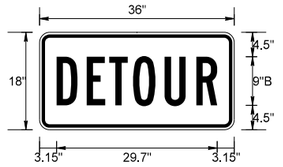

M4-8-36
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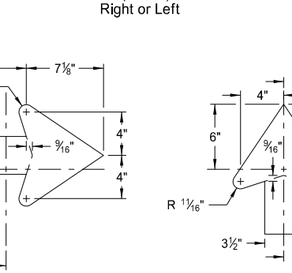
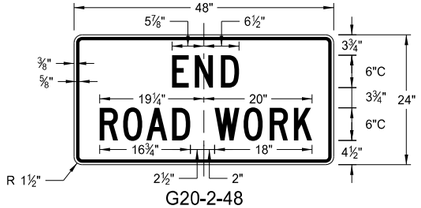
Background: orange



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



G20-2-48
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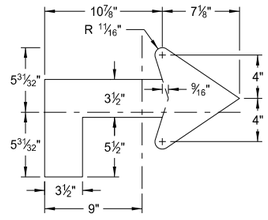
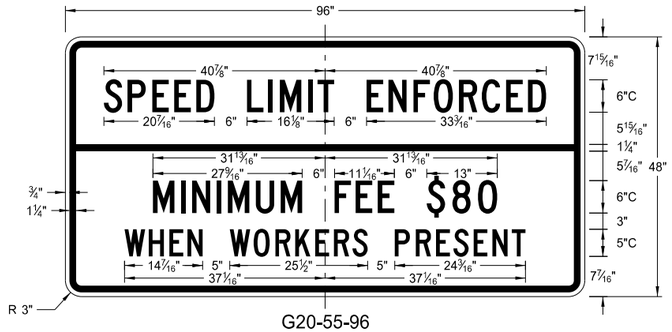
Background: orange



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

M4-9-30
Straight



G20-55-96
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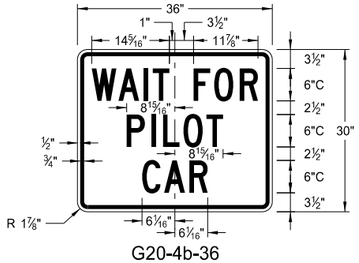

G20-4b-36
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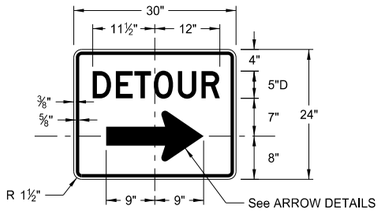

M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

ARROW DETAILS

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
8-17-17	Added sign & background color

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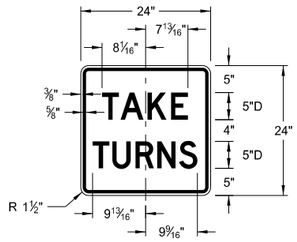
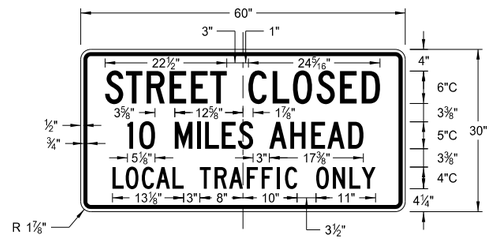
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



R1-50P-24
Legend: black (non-refl)
Background: white



R11-3c-60
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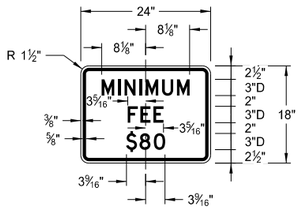
Background: white



R2-1aP-24
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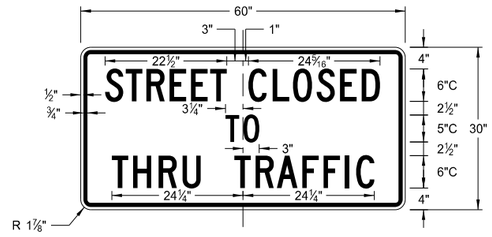

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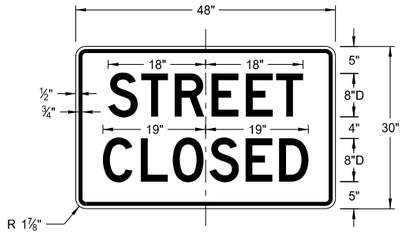

R11-2a-48
Legend: black (non-refl)
Background: white

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number

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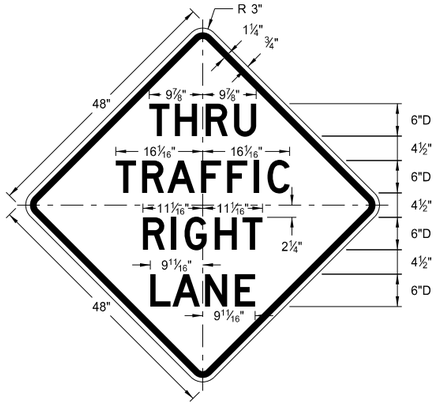
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



W5-8-48
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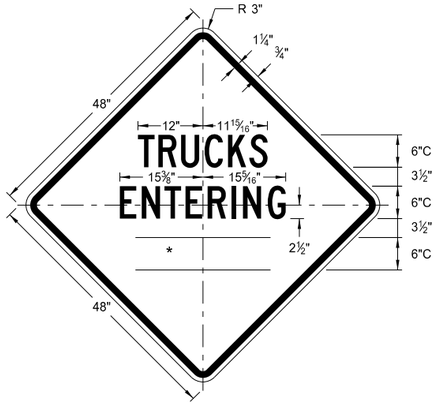
Background: orange



W8-54-48
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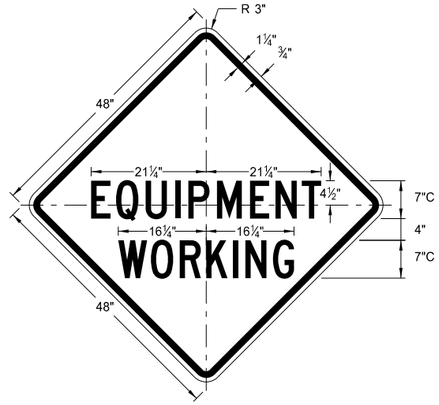
Background: orange



W20-51-48
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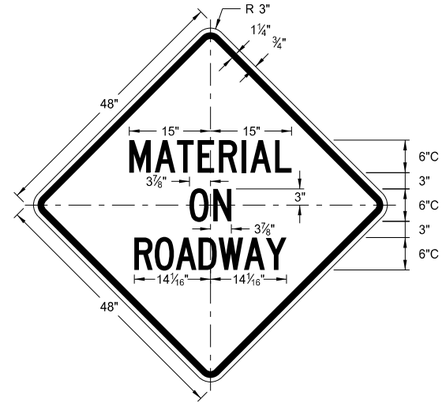
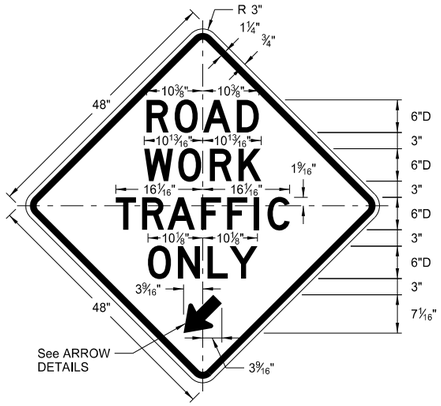
Background: orange



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
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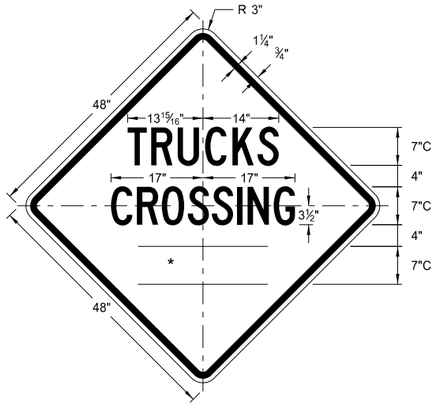
Background: orange



W8-55-48
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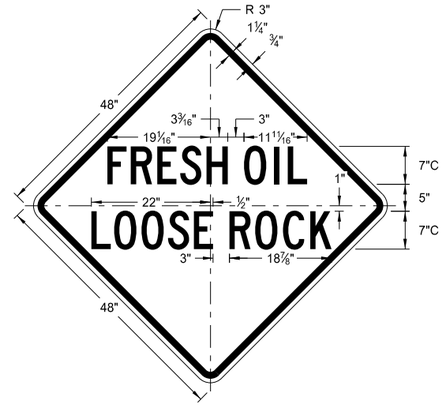
Background: orange

W20-52P-54
Legend: black (non-refl)
Background: orange



W22-8-48
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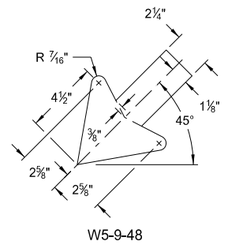
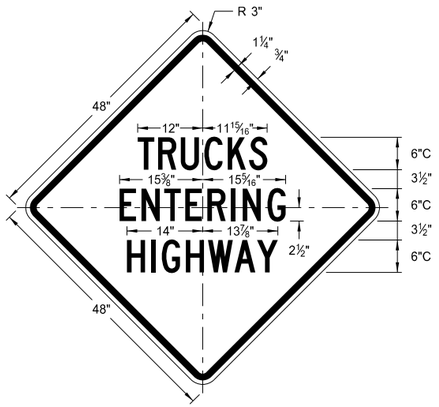


W5-9-48

ARROW DETAILS



W8-53-48
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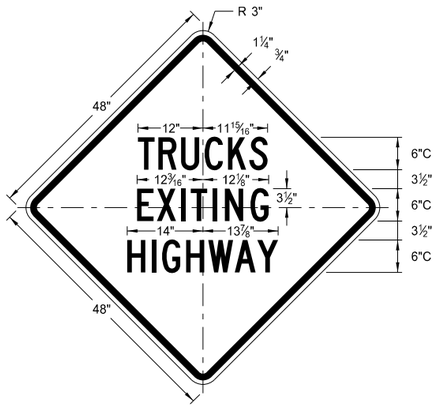
Background: orange



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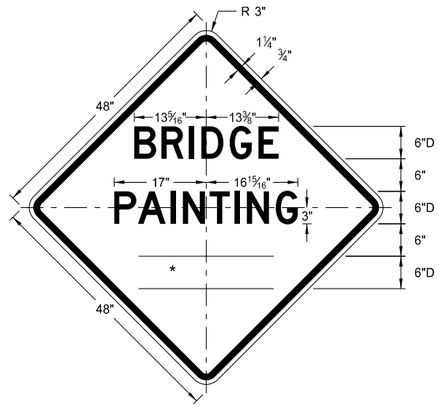
Background: orange



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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number

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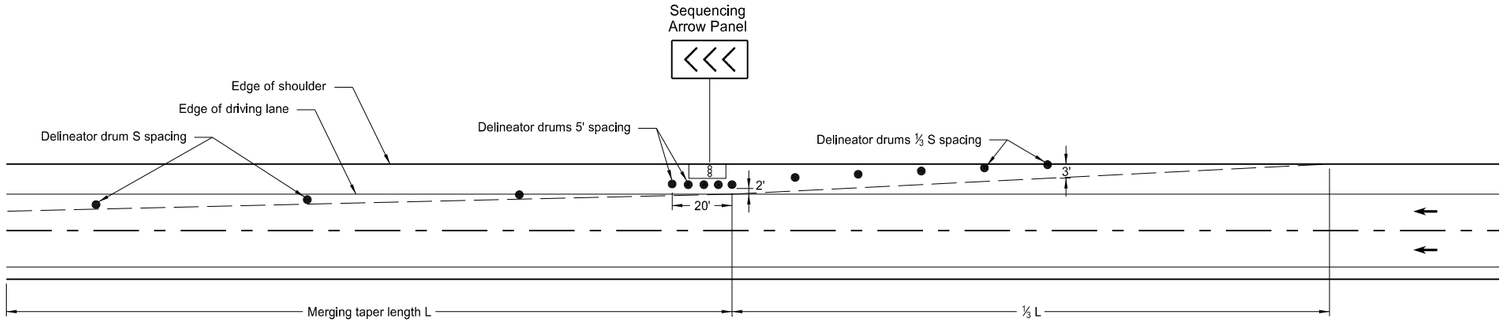
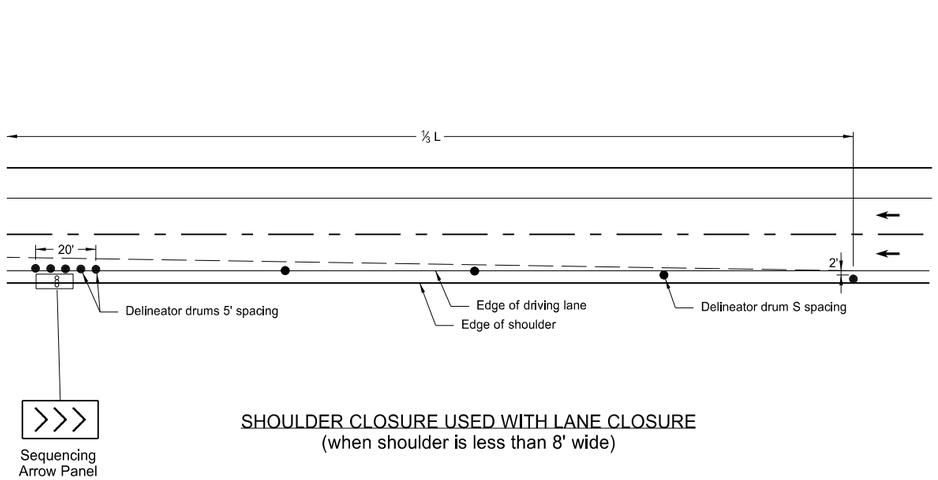
SHOULDER CLOSURE TAPERS

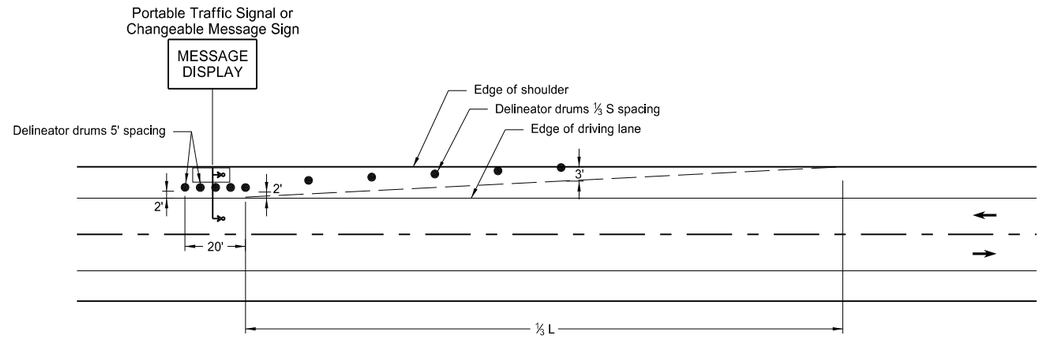
D-704-12



SHOULDER CLOSURE WITH LANE CLOSURE
(when shoulder is 8' or wider)



SHOULDER CLOSURE USED WITH LANE CLOSURE
(when shoulder is less than 8' wide)



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY

● Delineator Drum	∞ Sequencing Arrow Panel
° Message Display	Portable Traffic Signal

Notes:

1. S = Posted Speed Limit in mph
   W = Width of offset in feet
   L = Taper length in feet
   L = $WS^2/60$ (40mph or less)
   L = WS (45mph or more)
2. If a shoulder taper is used, it should have a length of approximately ⅓L. If a shoulder is used as a travel lane, a normal merging or shifting taper should be used.
3. When paved shoulders of 8 foot width or more are closed, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct vehicular traffic to remain within the traveled way.

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

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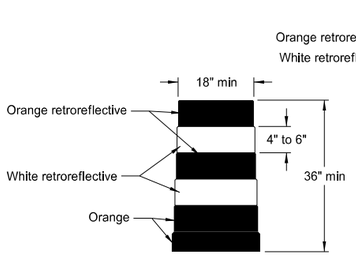
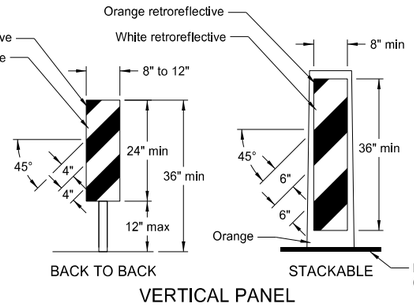
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



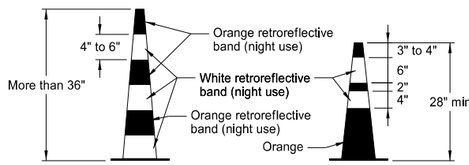
DELINEATOR DRUM

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.



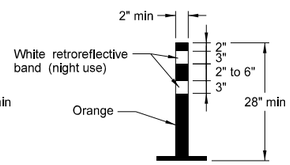
VERTICAL PANEL

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.



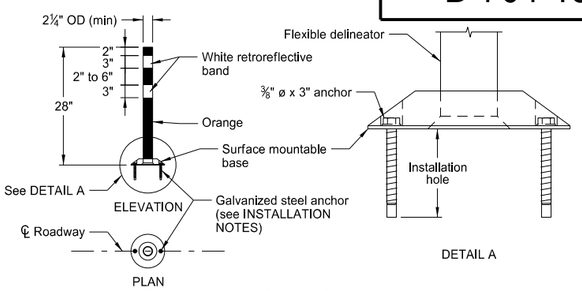
TRAFFIC CONE

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

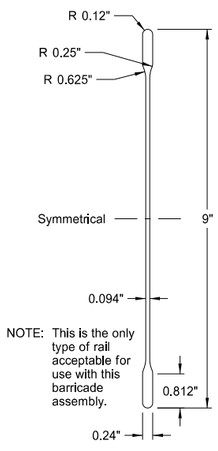
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

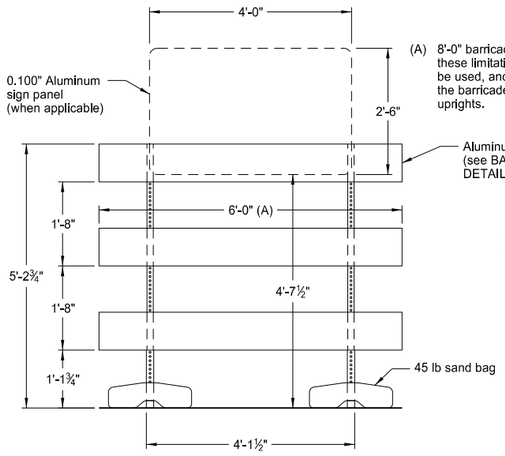
INSTALLATION NOTES:

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.



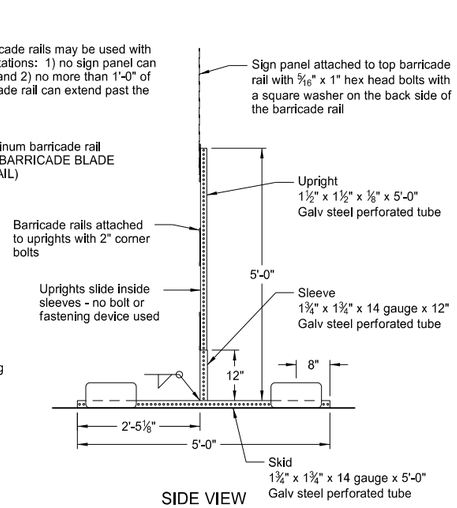
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



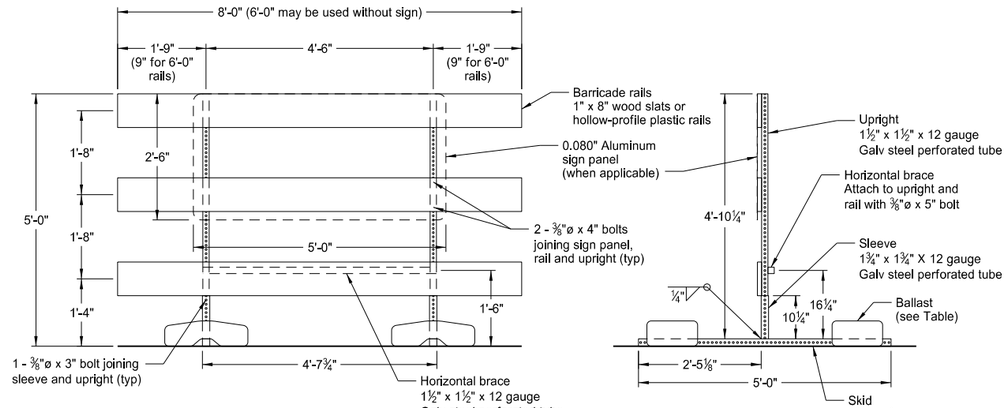
(A) 8'-0" barricade rails may be used with these limitations: 1) no sign panel can be used, and 2) no more than 1'-0" of the barricade rail can extend past the uprights.

ELEVATION VIEW



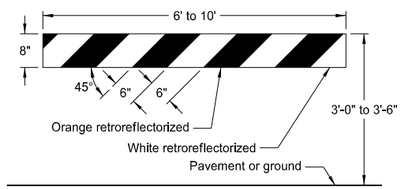
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

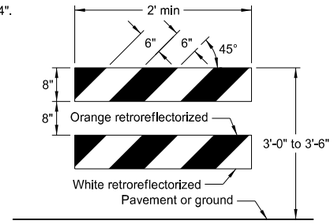


BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

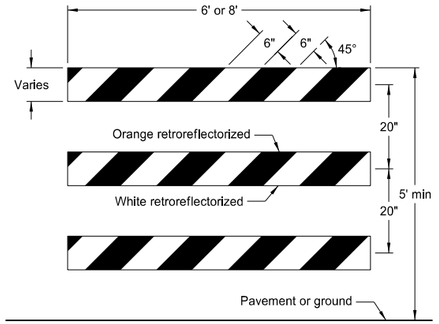
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular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



TYPE I BARRICADE

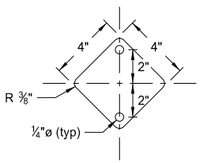


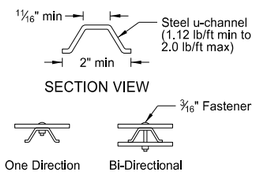
TYPE II BARRICADE

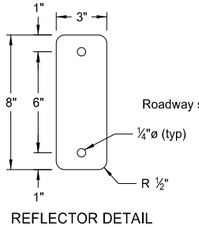


TYPE III BARRICADE

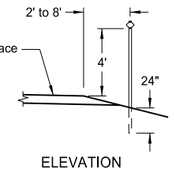
BARRICADE RAIL DETAILS







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.

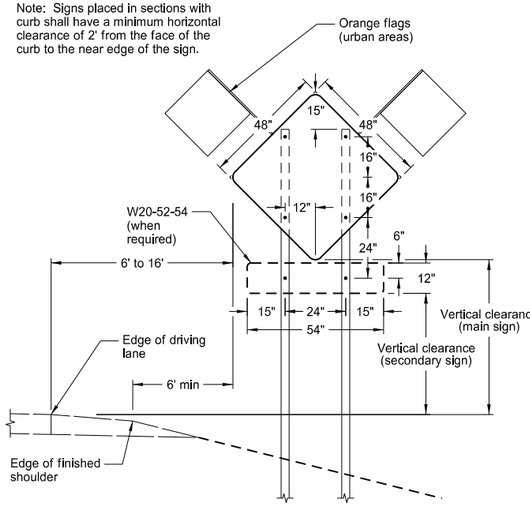
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 10/3/13 and the original document is stored at the North Dakota Department of Transportation

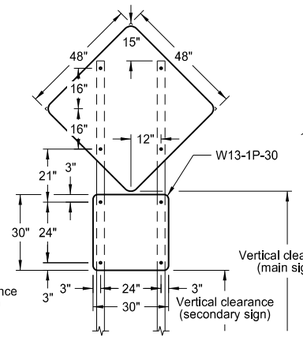
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

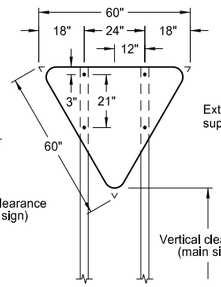
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



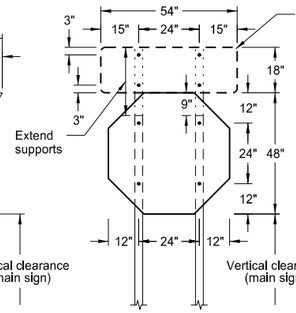
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



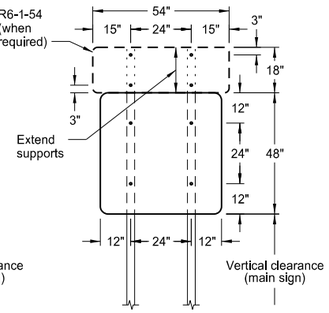
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



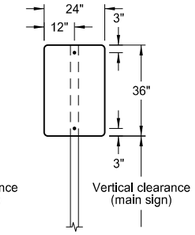
R1-2-60 - YIELD SIGN



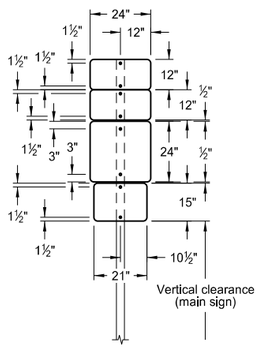
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



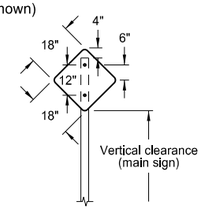
48" x 48" SIGN
(with R6-1-54 sign as required)



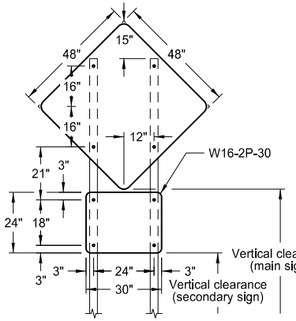
24" x 36" SIGN



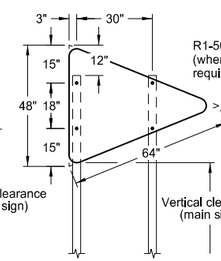
24" x 24"
ROUTE MARKER
ASSEMBLY



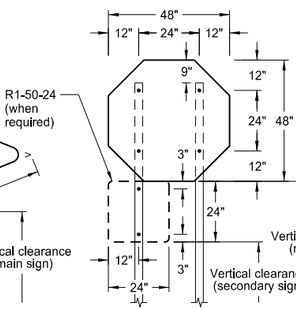
18" x 18"
DIAMOND SIGN



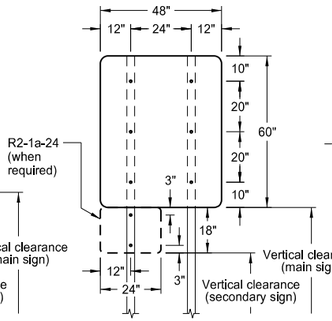
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



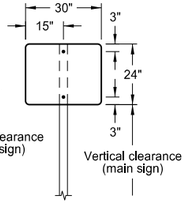
W14-3-64 - PENNANT SIGN



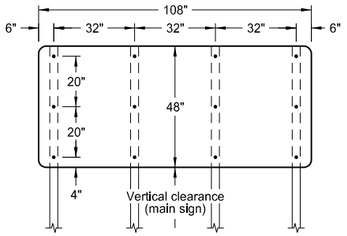
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



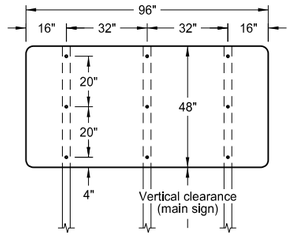
48" x 48" SIGN
(with R2-1a-24 sign as required)



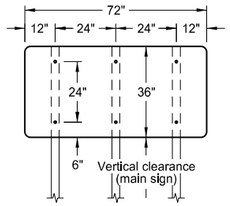
30" x 24" SIGN



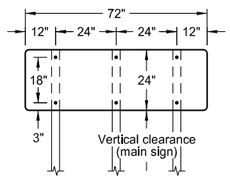
108" x 48" SIGN



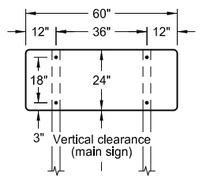
96" x 48" SIGN



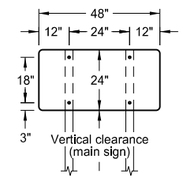
72" x 36" SIGN



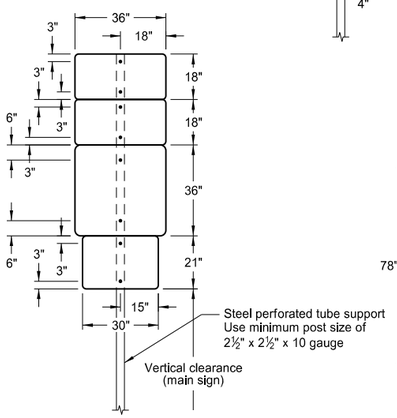
72" x 24" SIGN



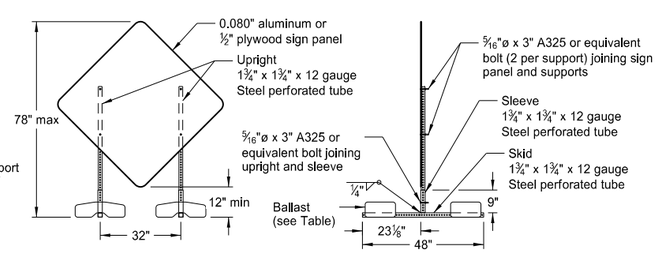
60" x 24" SIGN



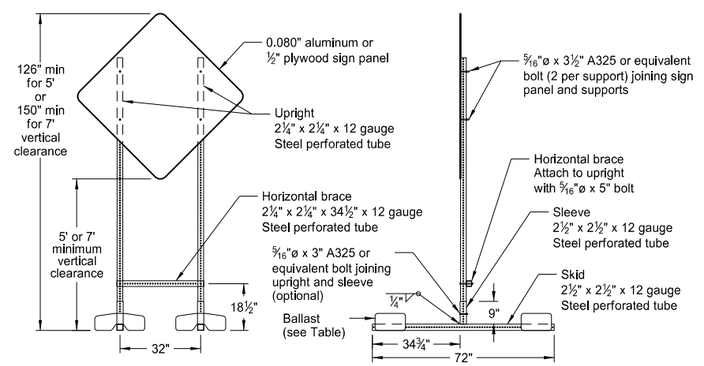
48" x 24" SIGN



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)

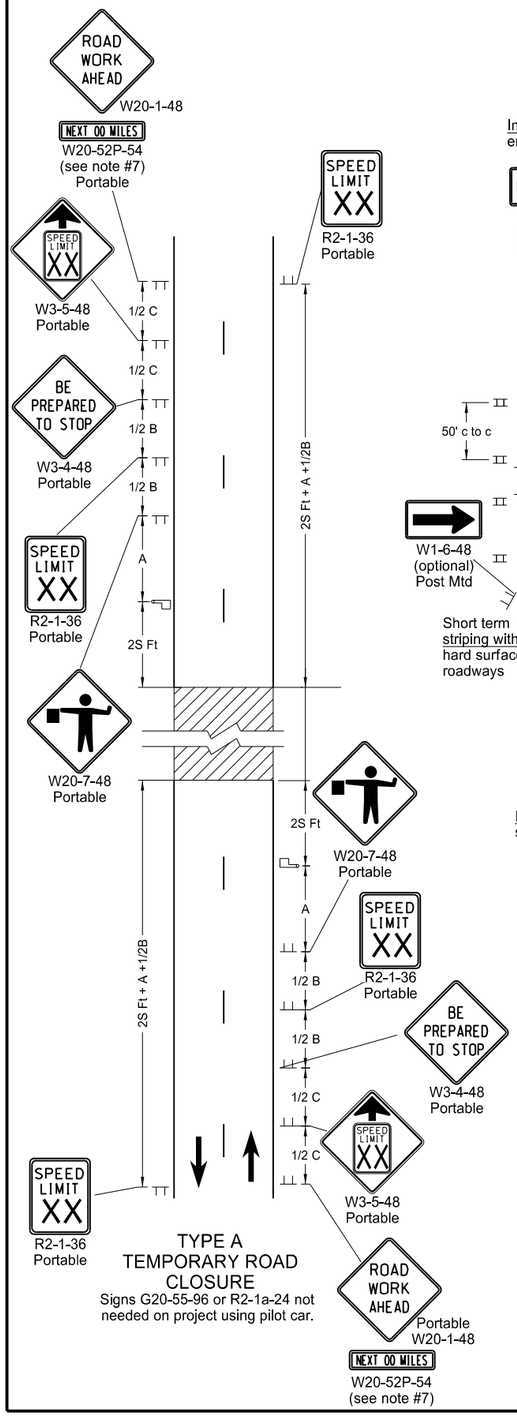
Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

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.

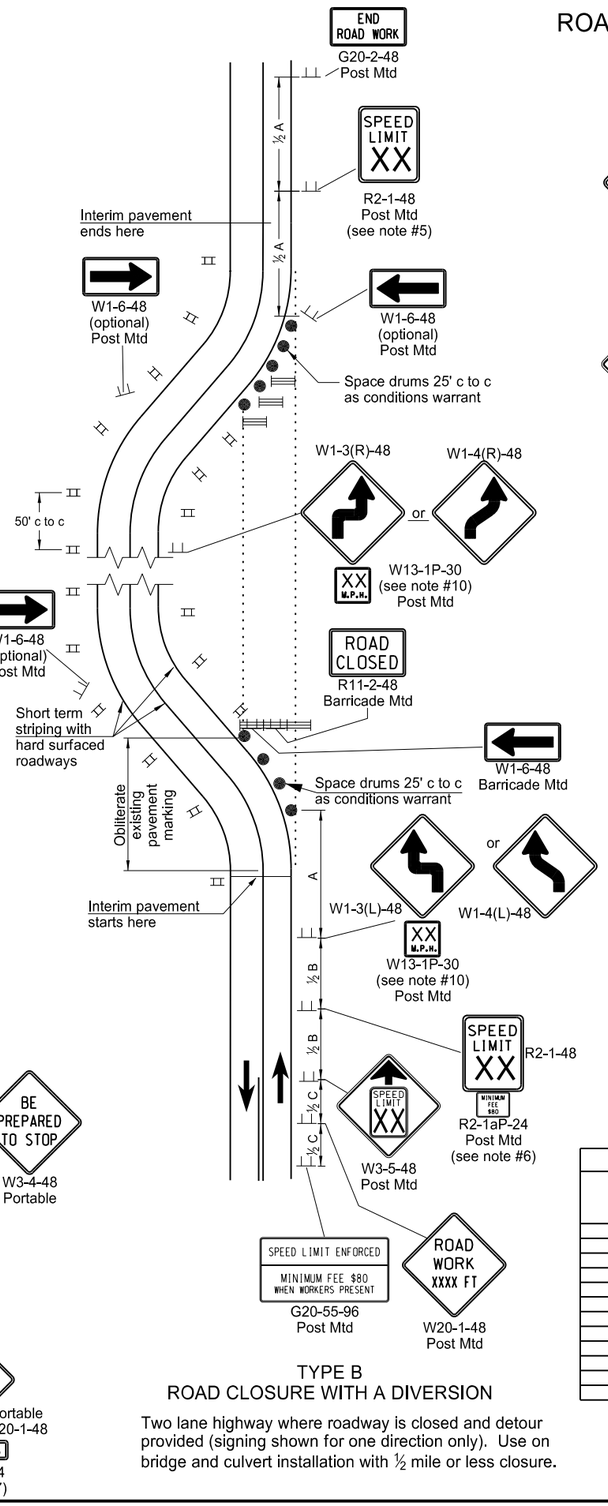
This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 11/14/13 and the original document is stored at the North Dakota Department of Transportation

ROAD CLOSURE LAYOUTS



TYPE A
TEMPORARY ROAD CLOSURE

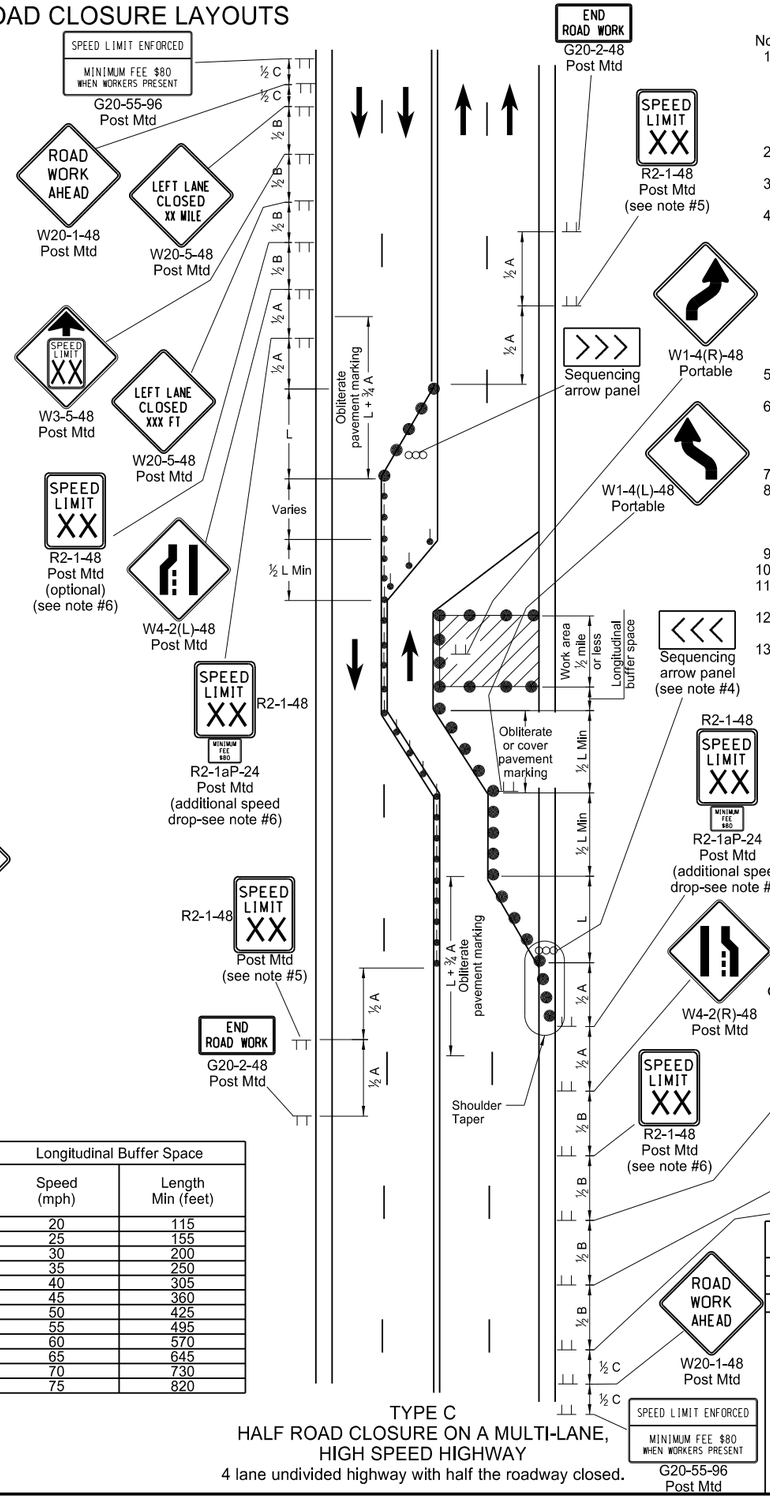
Signs G20-55-96 or R2-1a-24 not needed on project using pilot car.



TYPE B
ROAD CLOSURE WITH A DIVERSION

Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with ½ mile or less closure.

Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820



TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY

4 lane undivided highway with half the roadway closed.

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Use when work area is 1 mile or longer.
8. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
9. Cover existing speed limit signs within reduced speed zones.
10. Where necessary, engineer will determine safe speed.
11. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
12. Sign G20-55-96 is not required if this standard is part of other traffic control, or the work is less than 15 days.
13. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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 (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY

- Type III barricade
- Sign
- Delineator drum
- Tubular markers
- Work area
- Flagger
- Sequencing arrow panel
- Vertical panels back to back

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

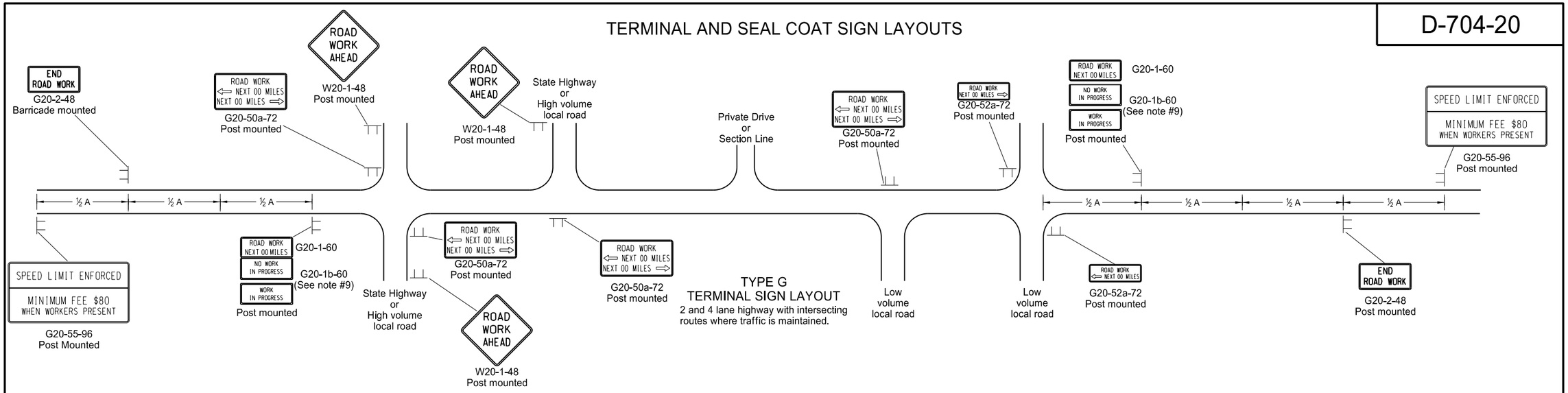
REVISIONS

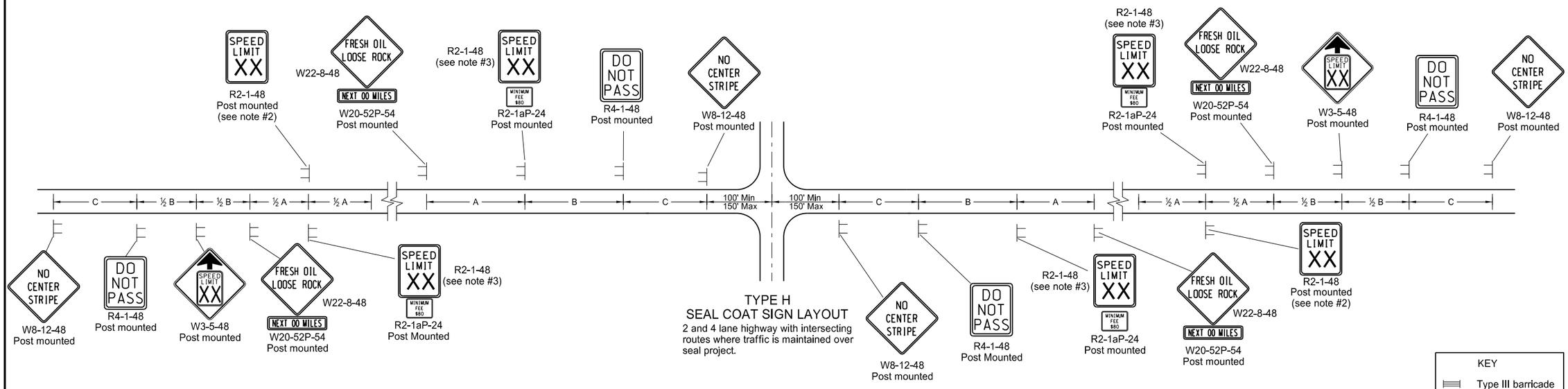
DATE	CHANGE
8-17-17	Updated notes & Speed Limit signs

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20





1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Determine the exact speed limit in the field, based on location and conditions.
3. Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
9. Install sign G20-1b-60 when work is suspended for winter.
10. Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
11. Sign G20-55-96 is not required if work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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 (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

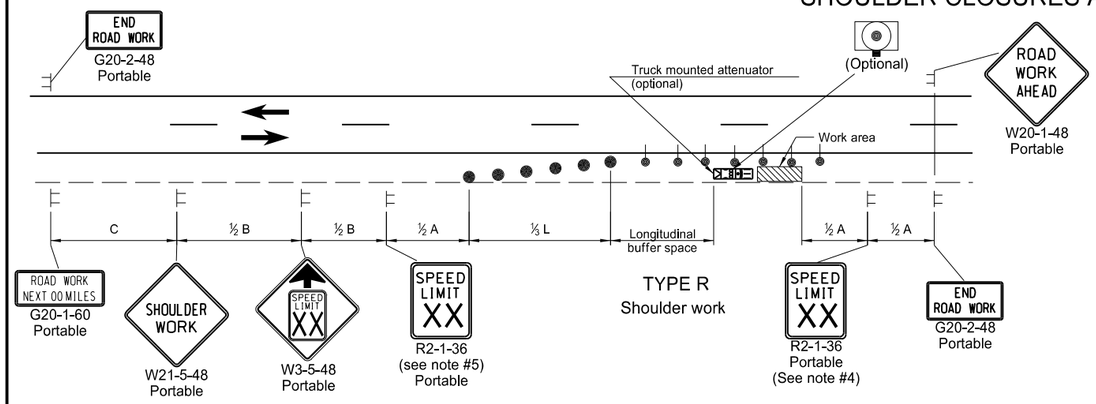
REVISIONS

DATE	CHANGE
8-17-17	Updated notes & sign numbers

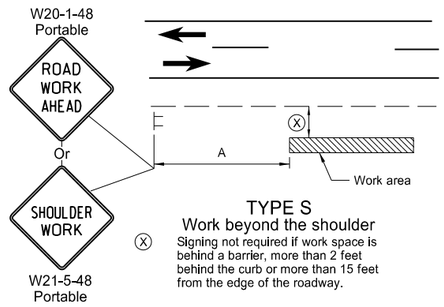
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

D-704-24

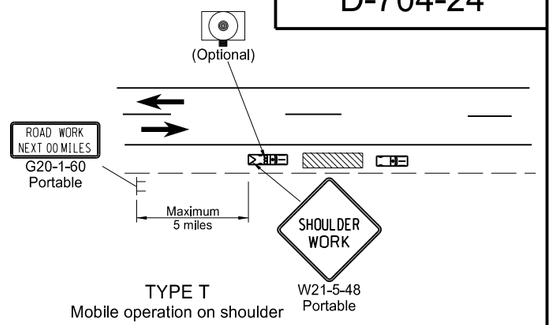


TYPE R
Shoulder work

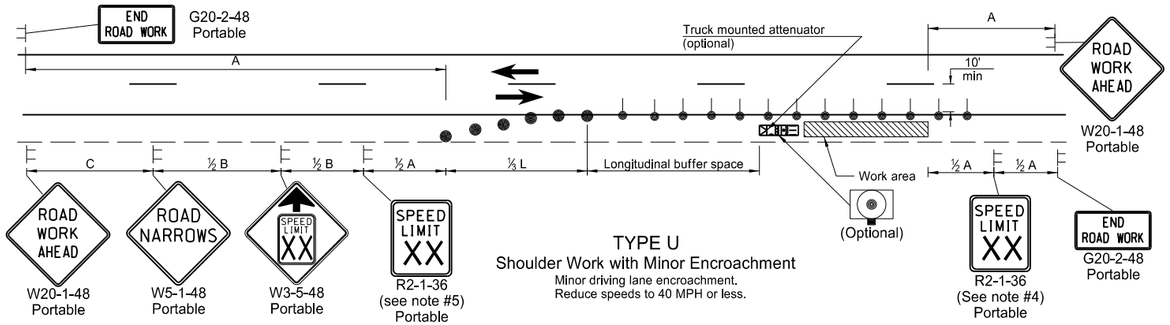


TYPE S
Work beyond the shoulder

Signing not required if work space is behind a barrier, more than 2 feet behind the curb or more than 15 feet from the edge of the roadway.



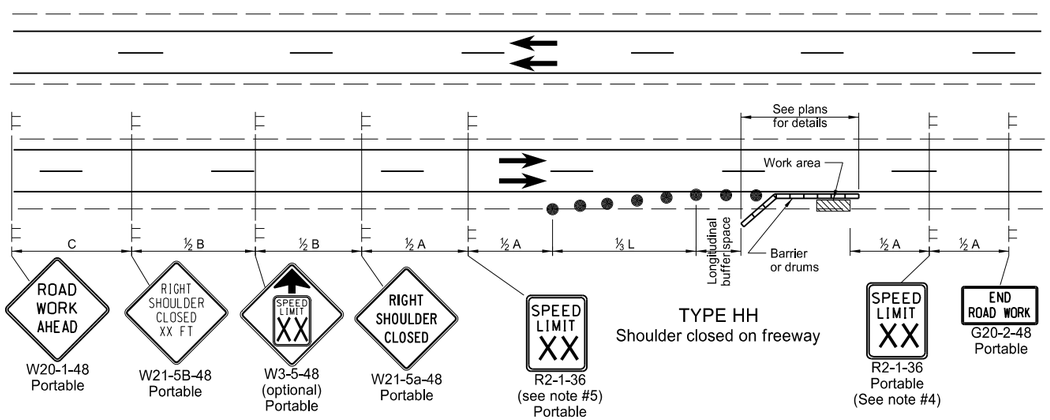
TYPE T
Mobile operation on shoulder



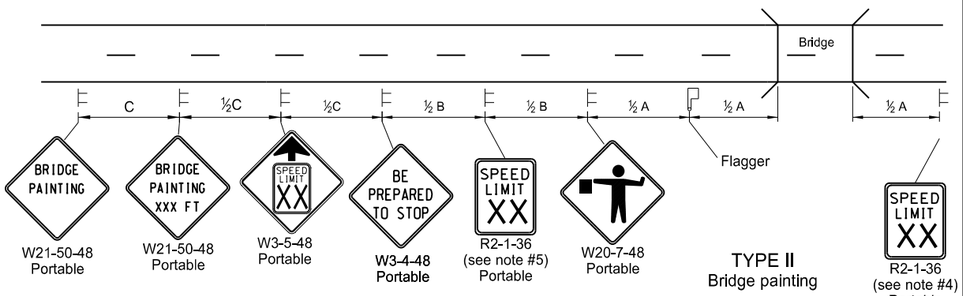
TYPE U
Shoulder Work with Minor Encroachment

Minor driving lane encroachment.
Reduce speeds to 40 MPH or less.

Notes
1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of the taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
3. Sequencing Arrow Panels
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   UseType B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
6. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
7. Cover existing speed limit signs within a reduced speed zone.
8. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
9. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.



TYPE HH
Shoulder closed on freeway



TYPE II
Bridge painting

KEY

Sign	Work area
Delineator Drum	Tubular Marker
Sequencing Arrow Panel (Caution Mode)	

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 (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space

Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
9-27-13

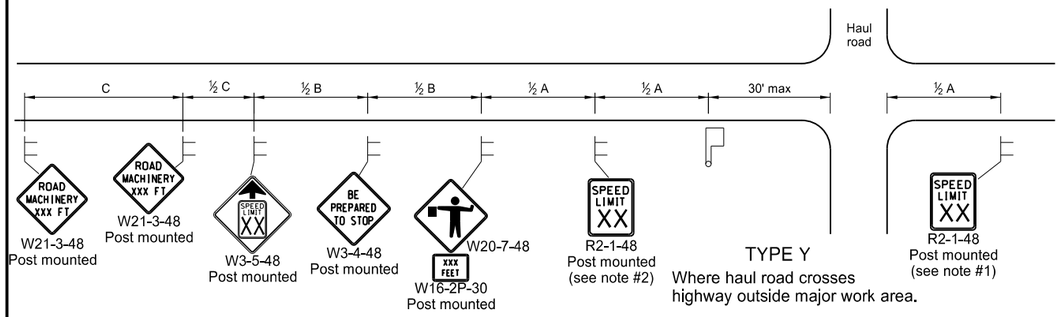
REVISIONS

DATE	CHANGE
8-17-17	Updated notes & revised signs

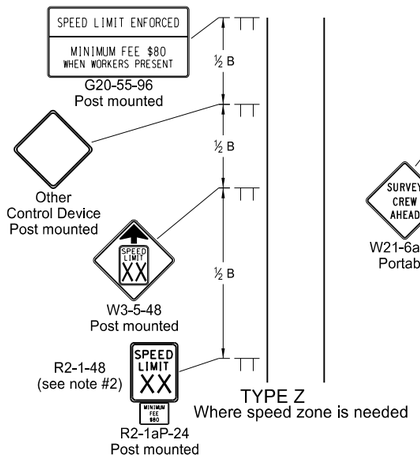
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

MISCELLANEOUS SIGN LAYOUTS

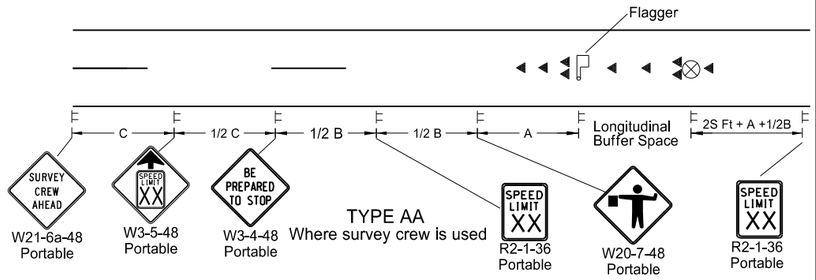
D-704-26



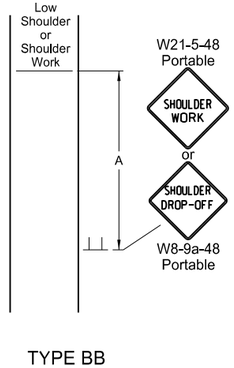
TYPE Y
Where haul road crosses highway outside major work area.



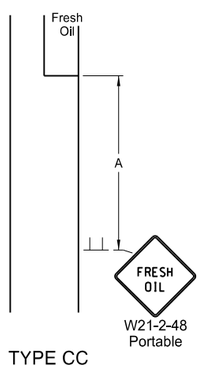
TYPE Z
Where speed zone is needed



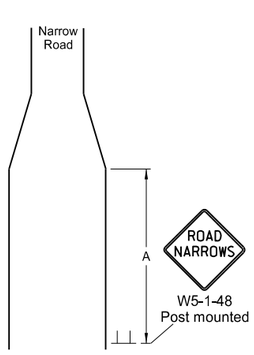
TYPE AA
Where survey crew is used



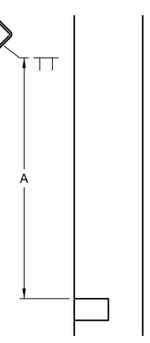
TYPE BB
Within major work area where sign conditions exist



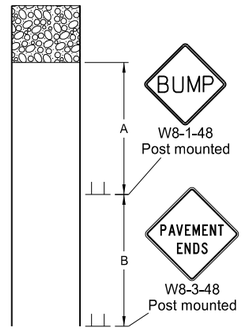
TYPE CC
Where sign conditions exist



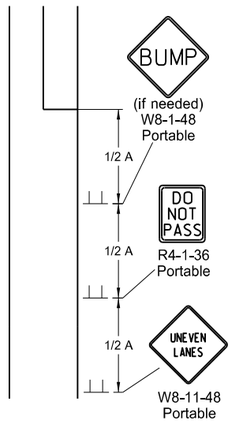
TYPE DD
Where sign conditions exist



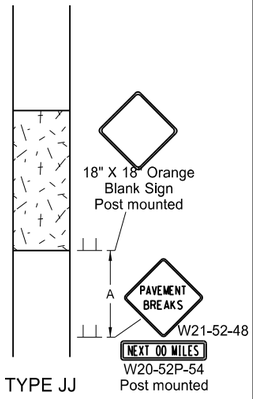
TYPE EE
Where sign conditions exist



TYPE FF
Where sign conditions exist



TYPE GG
Where elevation difference exists between lanes

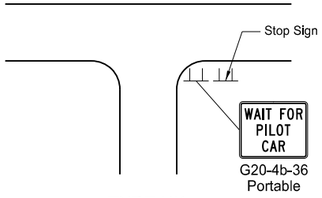


TYPE JJ
For break in pavement.
Install signs when conditions exist and remove when not applicable.

KEY

Sign Flagger Cones

S = Numerical value of speed limit or 85th percentile.



TYPE KK
At major intersections within pilot car control area

Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
3. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
4. Cover existing speed limit signs within reduced speed zones.
5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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 (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

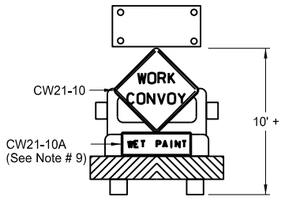
* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers

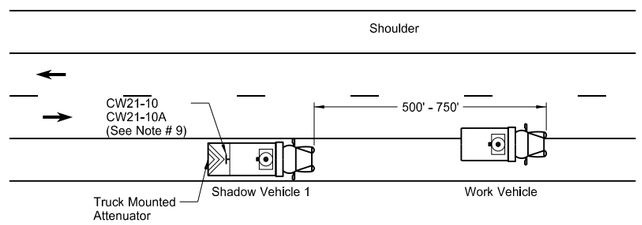
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

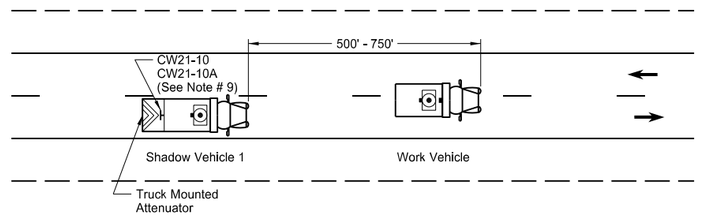
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday



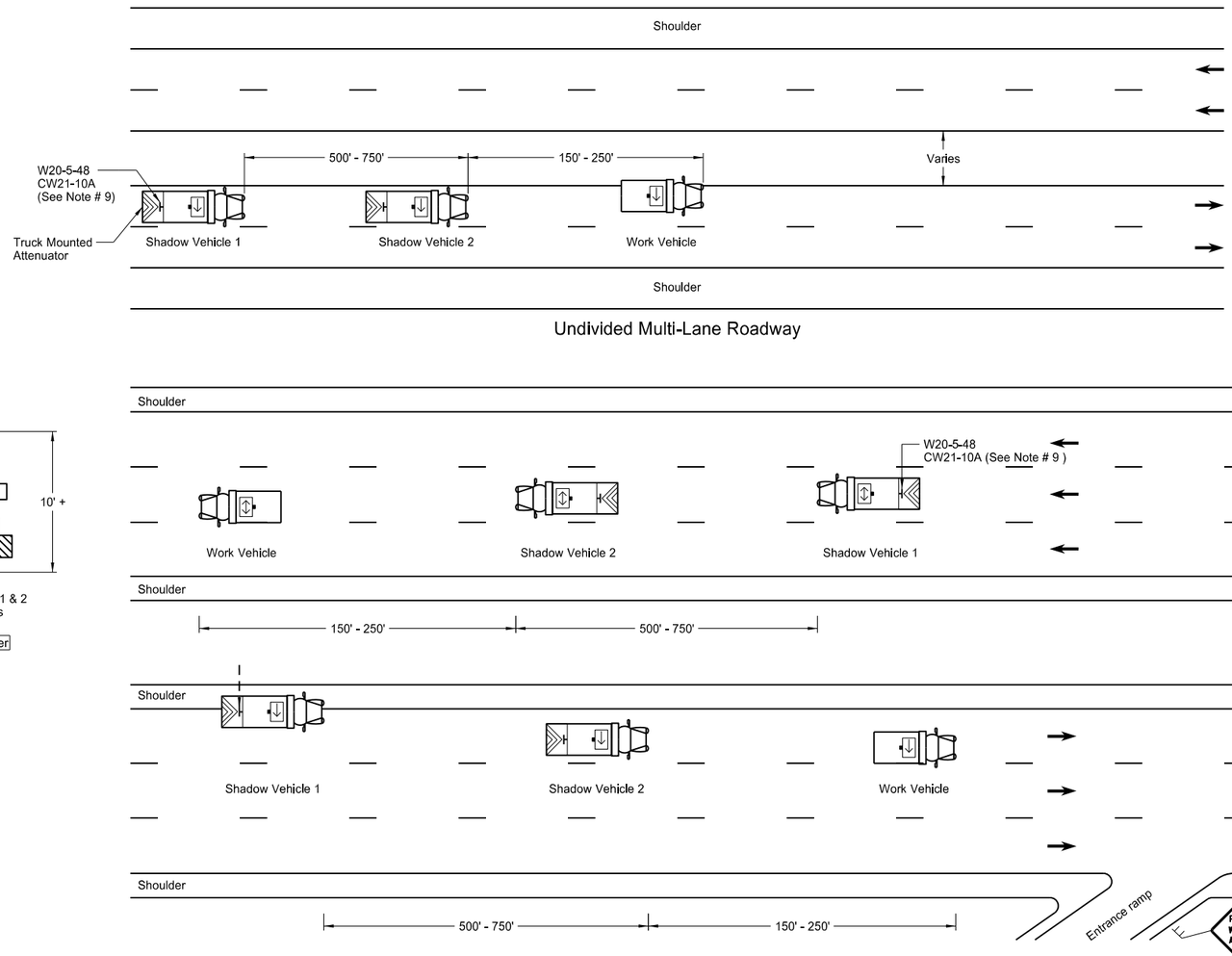
Two-Way Roadway with Paved Shoulders



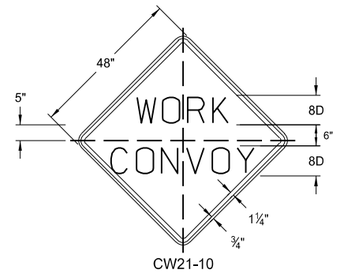
Two-Way Roadway without Paved Shoulders

Notes

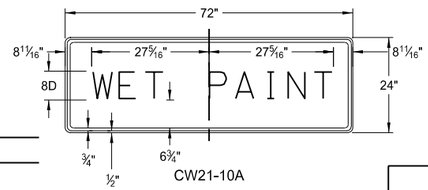
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractor's expense.
2. Shadow and work vehicles shall display yellow rotating beacons or strobe lights unless otherwise stated elsewhere in the plans.
3. Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
4. Each vehicle shall have two-way electronic communication capability.
5. When work convoys must change lanes, shadow vehicle 1 should change lanes first to shadow other convoy vehicles.
6. Vehicle spacing between the shadow vehicle 1 and shadow vehicle 2 will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the trail vehicle in time to slow down and/or change lanes as they approach the shadow vehicle.
7. Sign Colors
   Letters = Black
   Border = Black
   Background = Orange
8. Shadow vehicle 2 may be used as the paint tender vehicle.
9. Sign CW21-10A shall only be used during a painting operation.
10. On two lane - two way roadways, the work and shadow vehicles should pull over periodically to allow motor vehicle traffic to pass.



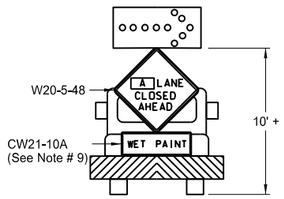
Sign Details



CW21-10



CW21-10A



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center

KEY

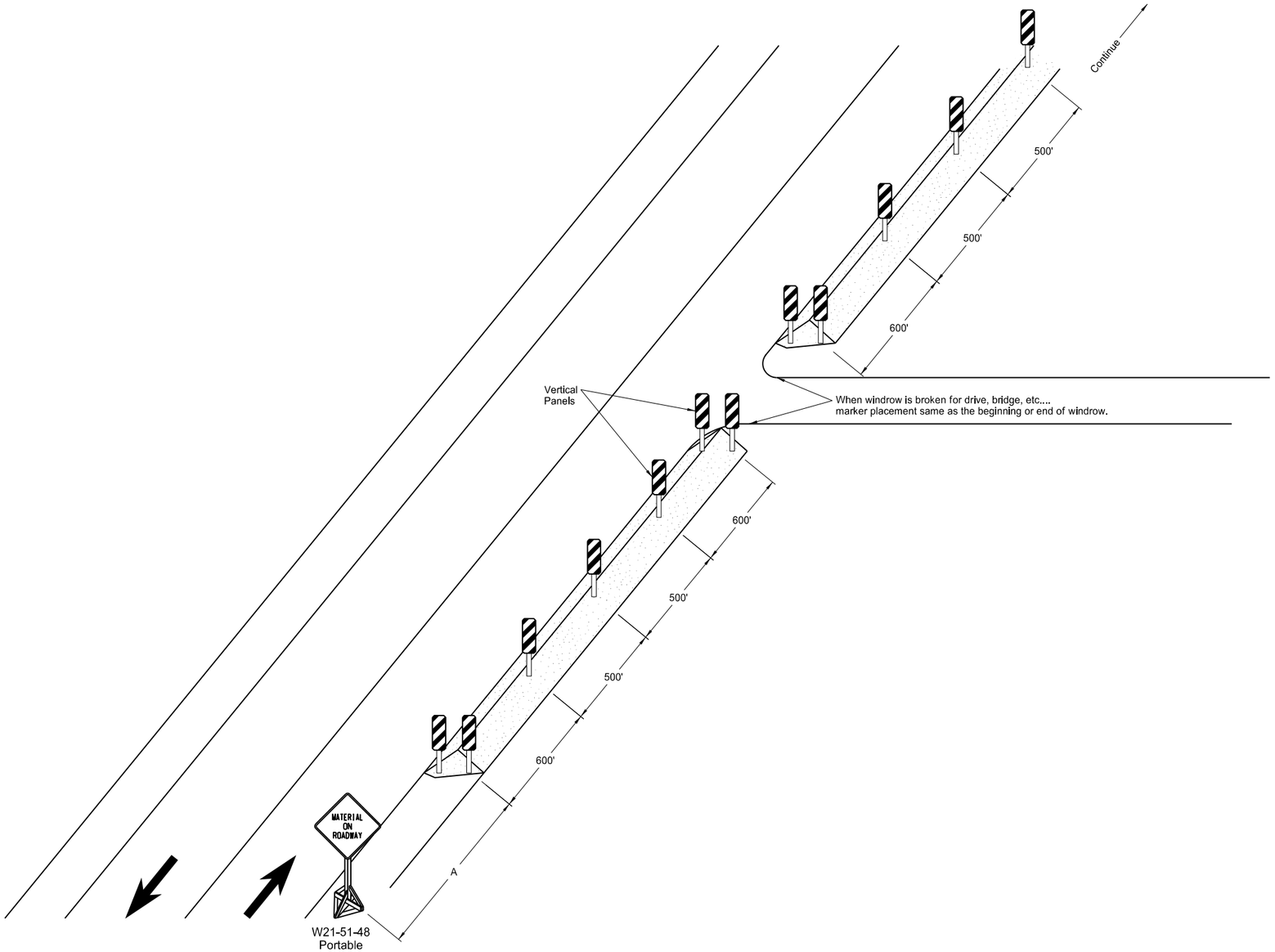
- Sign
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 06/18/14 and the original document is stored at the North Dakota Department of Transportation

WINDROW MARKING

D-704-30



ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
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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

Notes:
As an option, use portable sign supports in lieu of post mounted sign in accordance with NDDOT Standard Specifications.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

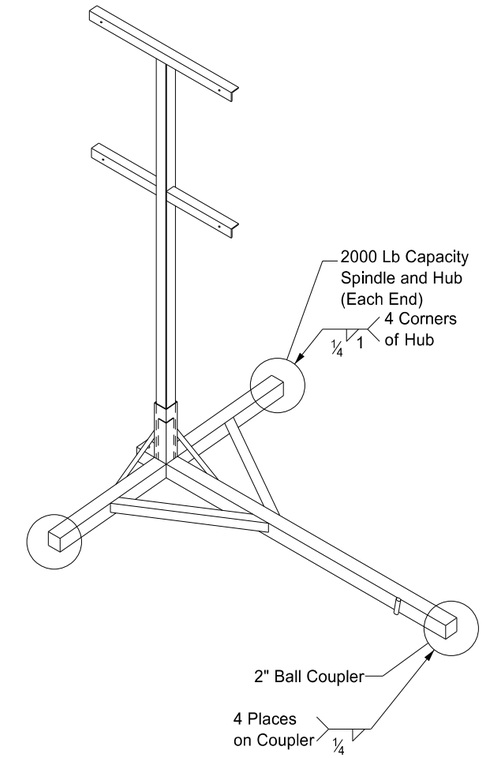
REVISIONS

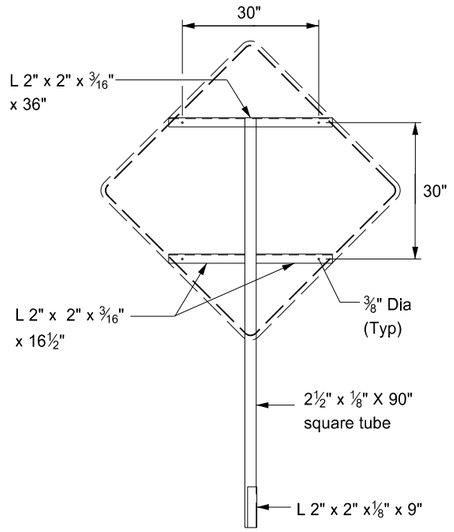
DATE	CHANGE
6-24-14	Revised Note
8-17-17	Updated notes & sign support

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

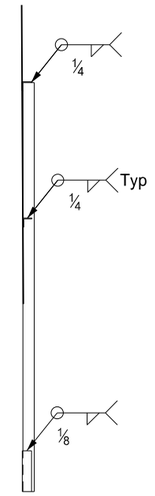
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



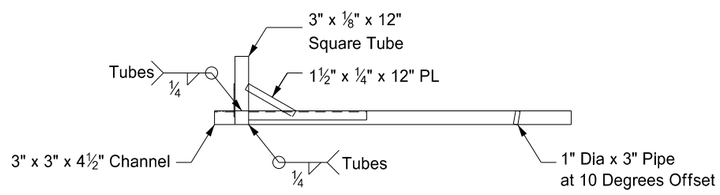


FRONT

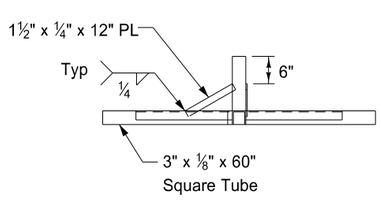


RIGHT

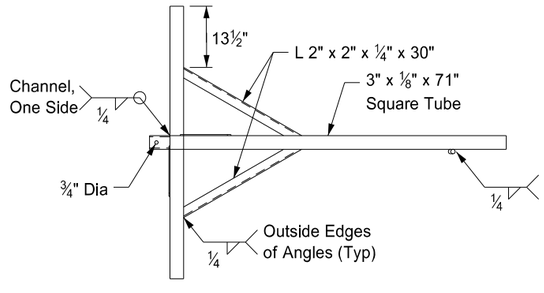
SIGN SUPPORT



FRONT



RIGHT



TOP

TRAILER

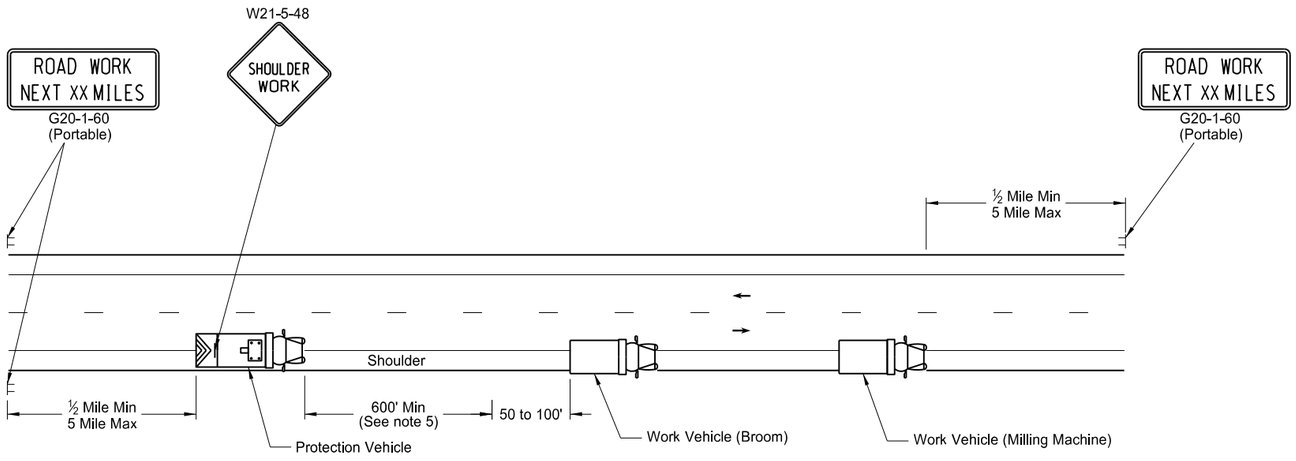
Notes:

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.

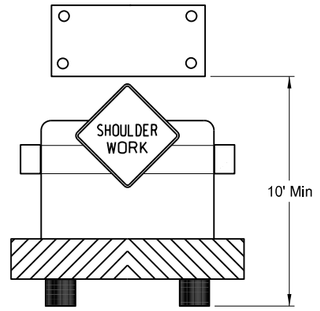
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

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

MOBILE OPERATION
Grinding Shoulder Rumble Strips



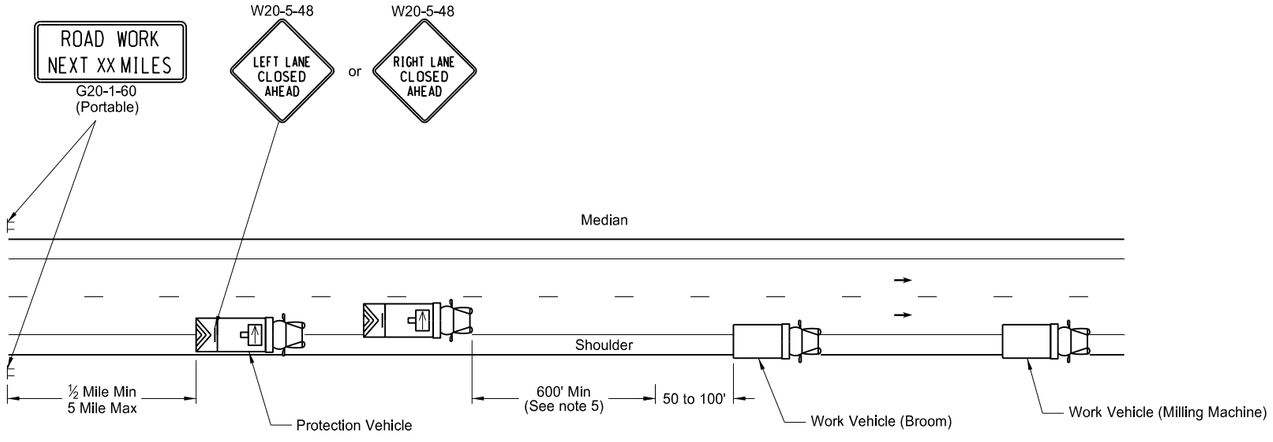
TWO LANE - TWO WAY ROADWAY



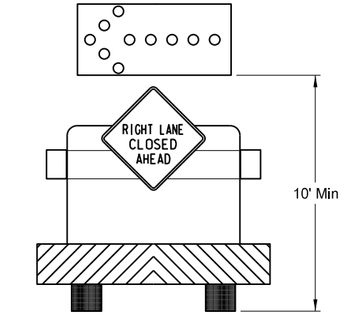
TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with Flashing Arrow Panel In Caution Mode

Notes:
1. Provide truck mounted attenuators on additional vehicles in the convoy, at no additional cost.
2. Provide rotating, flashing, oscillating, or strobe lights on vehicles.
3. Provide Type B or Type C flashing arrow panels that are controlled from inside the vehicle.
4. Provide two - way electronic communication capability in each vehicle.
5. Vary vehicle spacing between the protection vehicle and work vehicle depending on sight distance restrictions. Keep the spacing of the convoy vehicles such that motorists approaching the work convoy can see the protection vehicle in time to slow down and safely pass the work vehicles.
6. Move advance Road Work Ahead signs as the work area moves through the construction zone.

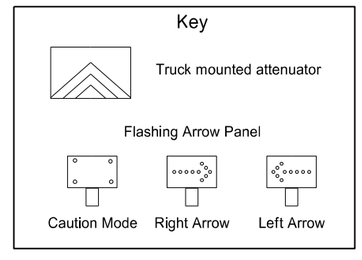


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow Panel In Flashing Arrow Mode



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs

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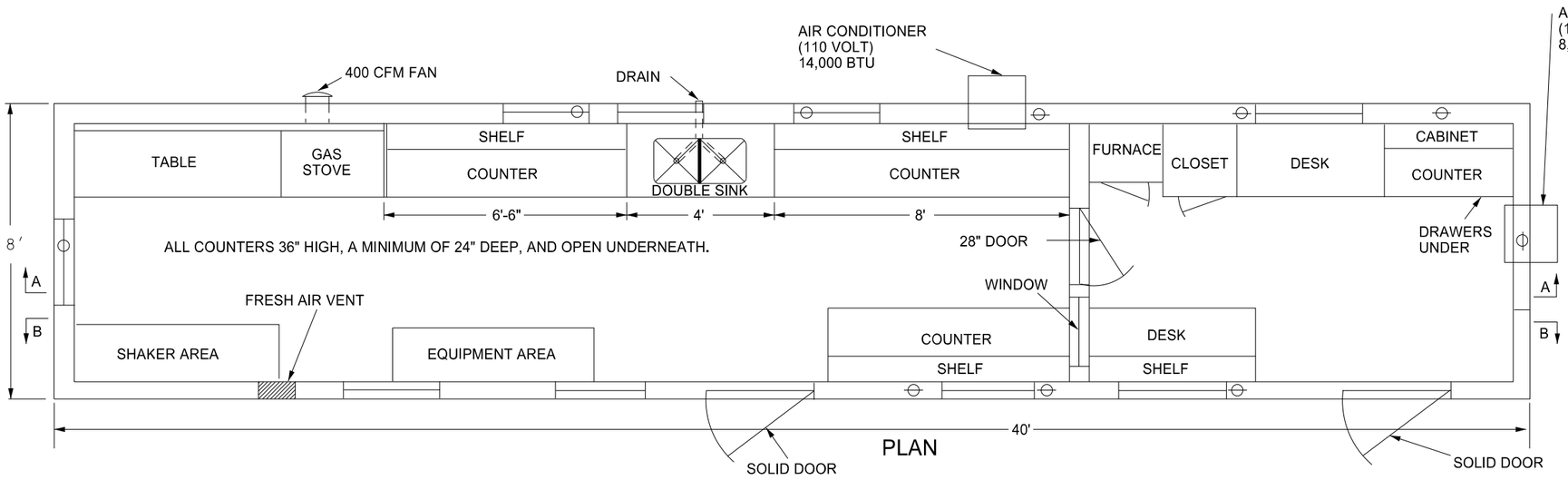
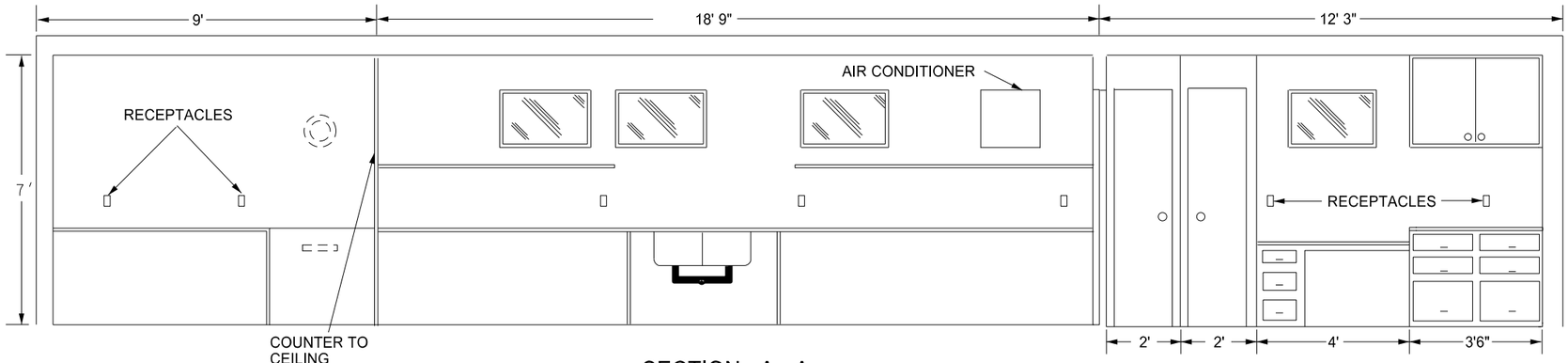
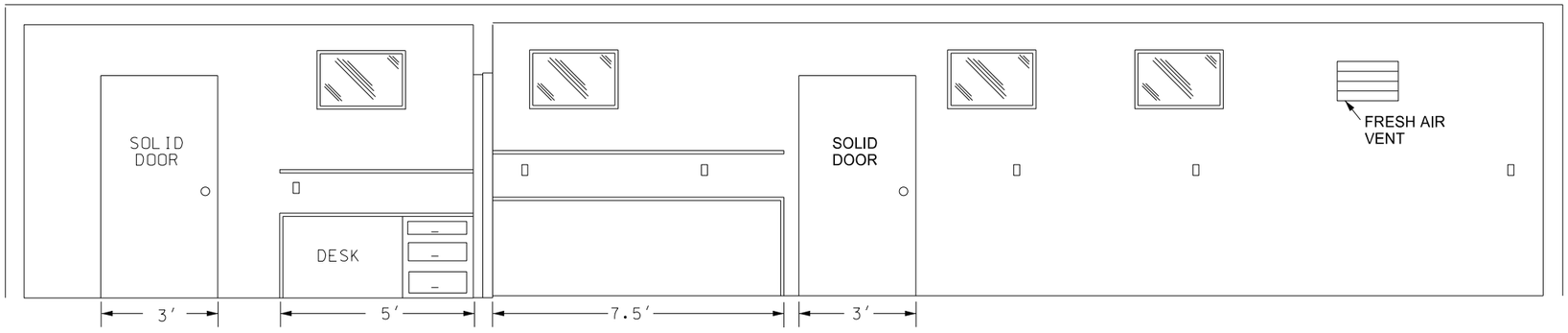
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

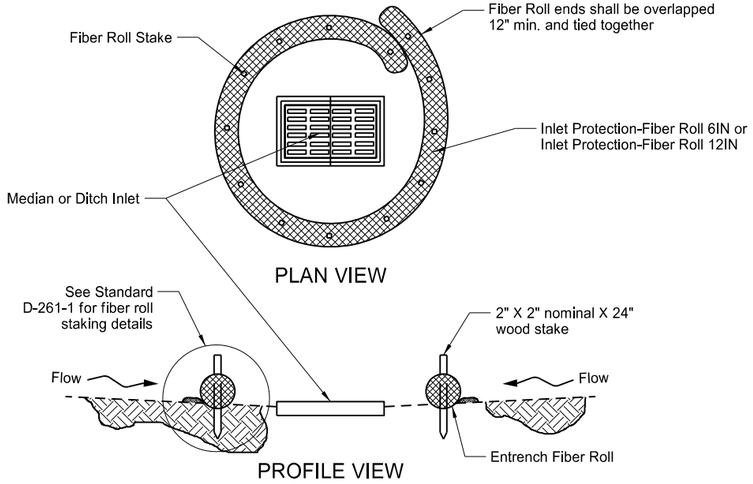
Provide a laboratory with the following:

1. A 1'x1' shelf at 36" above the regular countertop.
2. Double compartment stainless steel sink, with each compartment a minimum of 16"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of ½ inch.
3. An exhaust fan capable of removing inside air at a rate of 400 CFM.
4. Fresh air vent hinged to open or close manually.
5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.
6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.
7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.
8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.
9. The steel cable tie downs and ground anchors at each corner of the lab.
10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.

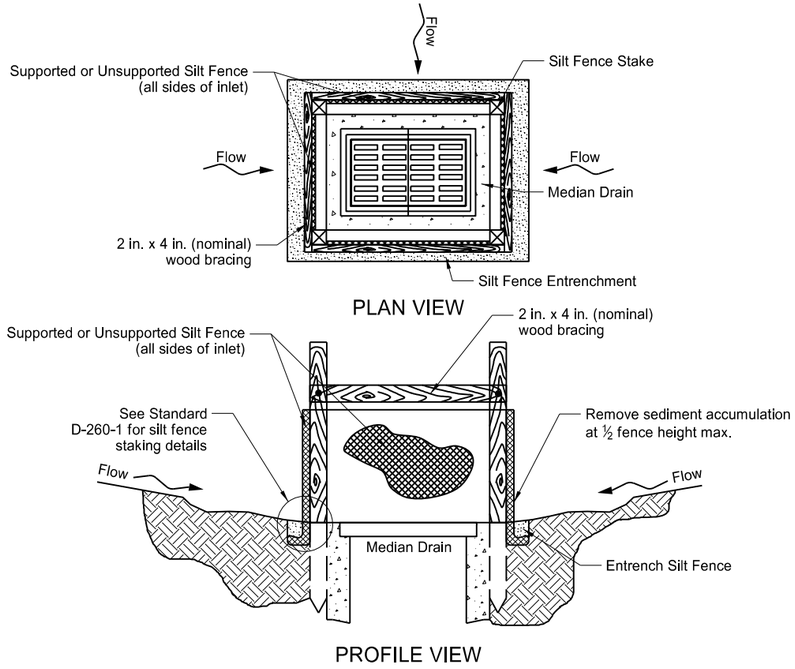
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 01/11/16 and the original document is stored at the North Dakota Department of Transportation

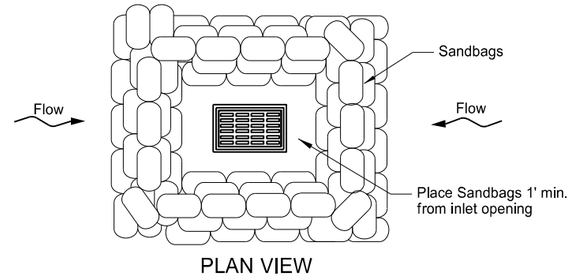
EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION



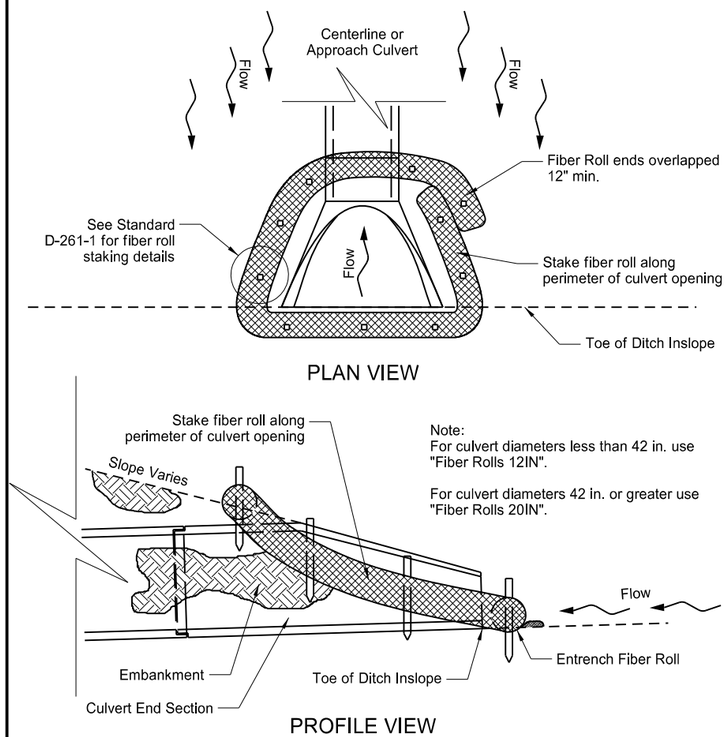
FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



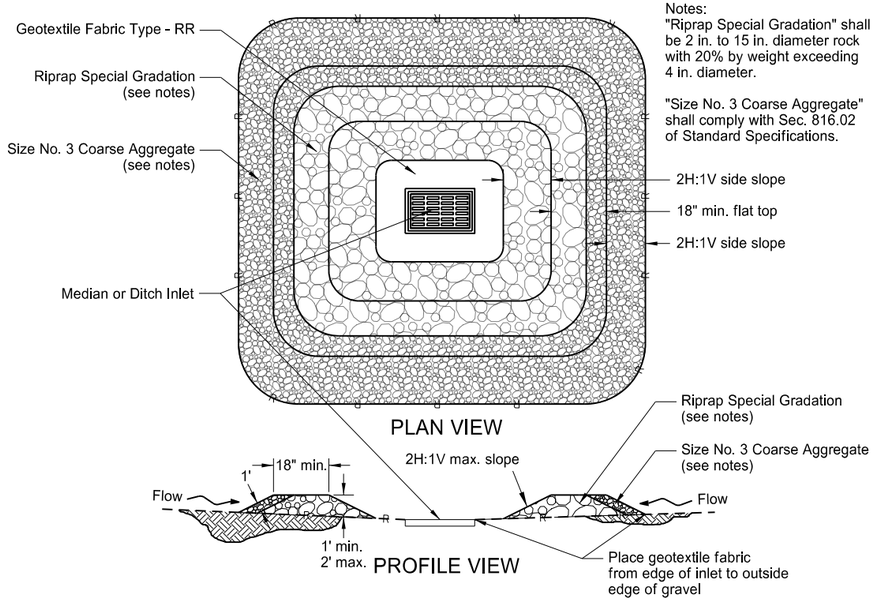
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



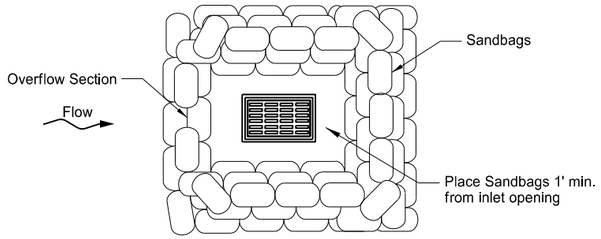
SANDBAG PROTECTION (LOW POINT)



FIBER ROLL PROTECTION (INLET OF CULVERT)



GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)

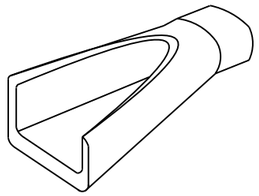


SANDBAG PROTECTION (ON SLOPE)

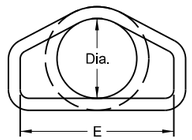
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.

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

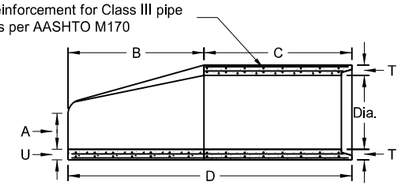
REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS
(Round Pipe)



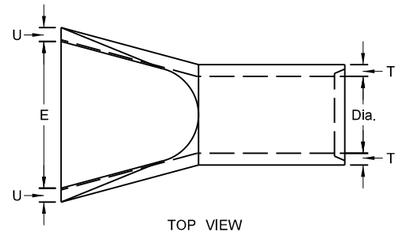
PERSPECTIVE



END VIEW



SIDE VIEW



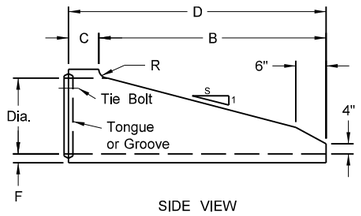
TOP VIEW

REINFORCED CONCRETE PIPE - FLARED END SECTION

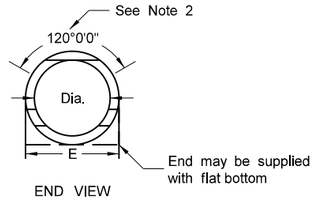
Reinforcement to be equivalent to Class III RCP

FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0⅞"	6'-0⅞"	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2¼"
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2¾"
24	0'-9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3"
27	0'-10½"	4'-0"	2'-1½"	6'-1½"	4'-6"	3¼"
30	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3½"
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4½"
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9¼"	8'-2¼"	7'-6"	5½"
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5½"
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6½"
84	3'-0"	7'-6½"	1'-9"	9'-3½"	10'-0"	6½"
90	3'-5"	7'-3½"	2'-0"	9'-3½"	11'-0"	6½"

TRAVERSABLE END SECTION							
DIA	B	C	D	E	F	R	S
15"	4'	9"	4'-9"	1'-7½"	2¼"	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	2½"	3"	6
24"	6'	1'	7'	2'-6"	3"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3½"	3½"	4
36"	7'-3"	15"	8'-6"	3'-8"	4"	3"	4



SIDE VIEW



END VIEW

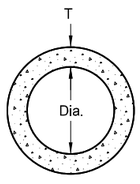
NOTES (Traversable End Section):

1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

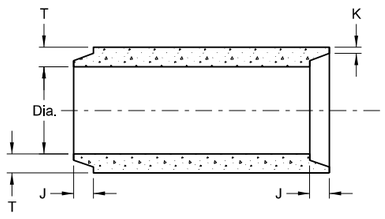
REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION

Reinforcement to be equivalent to Class III RCP

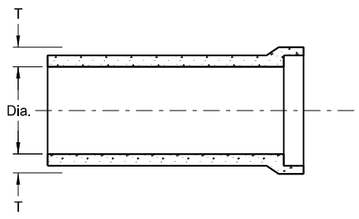
All Classifications of Round Concrete Pipe					
Internal Dia of pipe in Inches	Cross-Sectional Water Area	Weight per lin. foot of Pipe Std. Wall	Joint J Groove End Min./Max.	Joint K Tongue End Min.	Minimum Wall Thickness (T)
Dia	Sq. ft.	Lbs.	In.	In.	In.
12	0.79	92	1⅛-2⅛	¾	2
15	1.23	127	1¾-2¾	⅞	2¼
18	1.77	168	1⅞-2⅛	1	2½
21	2.40	214	1⅞-3⅛	1⅛	2¾
24	3.14	265	2⅛-3¼	1⅛	3
27	3.98	322	2¾-4	1¼	3¼
30	4.91	384	3¼-4¼	1¼	3½
33	5.94	452	3¼-4¼	1½	3¾
36	7.07	524	3½-4¼	1½	4
42	9.62	685	3¾-4¾	1¾	4½
48	12.57	685	3⅞-4¾	1⅞	5
54	15.90	1070	4⅛-5¼	2	5½
60	19.63	1296	4½-5½	2¼	6
66	23.76	1542	5-6	2⅝	6½
72	28.27	1810	5⅝-6¾	2⅝	7
78	33.18	2098	6¼-7¼	2⅝	7½
84	38.48	2410	5⅝-7¾	3⅜	8
90	44.18	2793	6¾-8½	3⅛	8½
96	50.27	3092	7-8¾	3½	9
102	56.75	3466	7-8¾	3½	9½
108	63.62	3864	7¼-8½	3¾	10



END VIEW



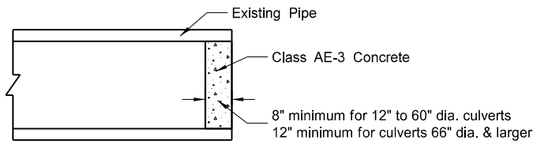
TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

CIRCULAR PIPE

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

NOTES:

1. All reinforcing steel shall meet AASHTO M170 requirements.
2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
3. Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet
   66" to 108" (incl.) = not less than 6 feet
4. Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
5. For Class IV and Class V reinforced concrete pipe and end section sizes which do not have reinforcement specified by AASHTO M170, shop drawings and design calculations shall be prepared and sealed by a Professional Engineer and submitted for the Engineer's review.

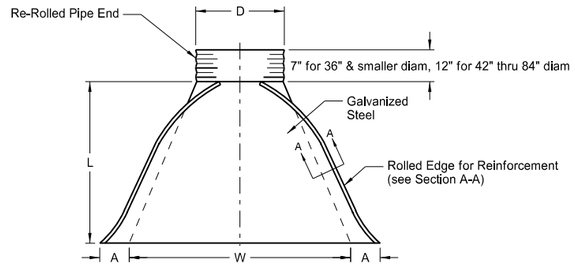
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5
11-21-16	Revised End Section Dimensions

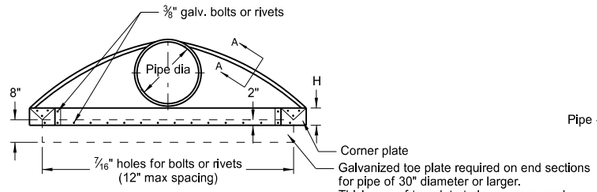
This document was originally issued and sealed by Jon Ketterling Registration Number PE-4684, on 11/21/16 and the original document is stored at the North Dakota Department of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

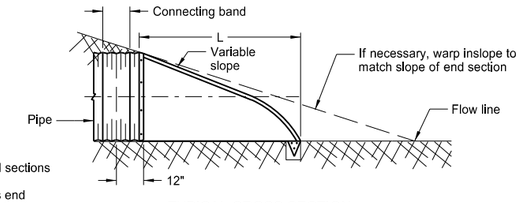
D-714-4



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	2¼:1	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

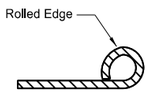
* These sizes have 0.109" sides and 0.138" center panels.

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

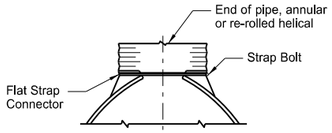
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

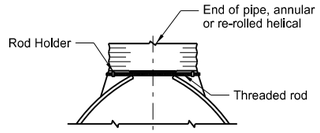
Multiple panel bodies shall have lap seams which are to be tightly joined with ⅜" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.



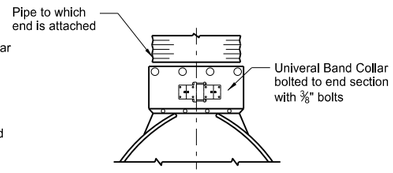
SECTION A-A



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



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

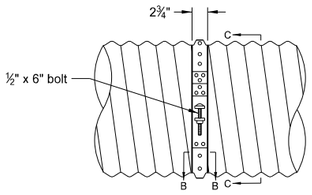


TYPE #3
For all pipe sizes

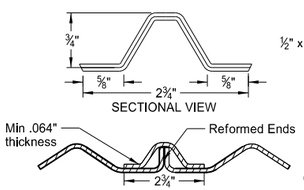
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2⅔" x ½"	12" - 48"	2¾"	.064"
Annular Band	2⅔" x ½"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
	3" x 1"	48" - 120"	14"	.052"
Hugger Band	2⅔" x ½" Rerolled End	12" - 72"	10½"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

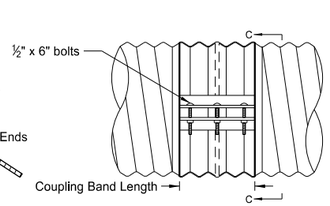


SIDE VIEW

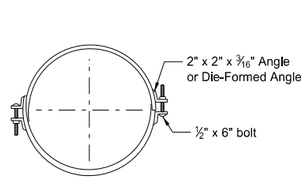


SECTION B-B

HAT BAND FOR FLANGED END PIPE

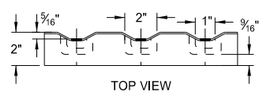


SIDE VIEW

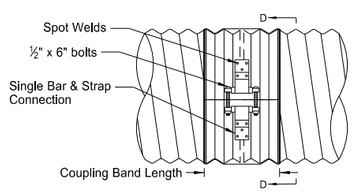


SECTION C-C
Angle Connection

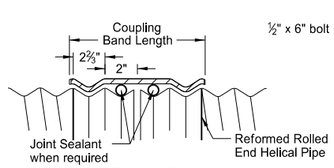
ANNULAR BAND



TOP VIEW
Die-Formed Angle Connector

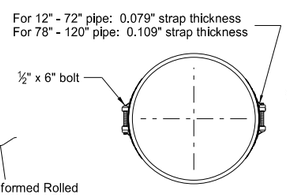


SIDE VIEW

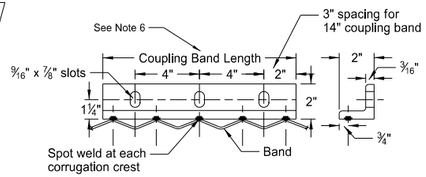


SECTIONAL VIEW

HUGGER COUPLING BAND



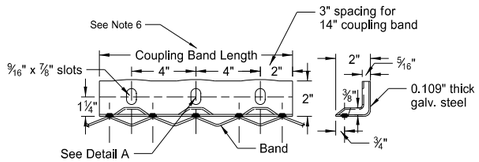
SECTION D-D
Bar & Strap Connection



SIDE VIEW

END VIEW

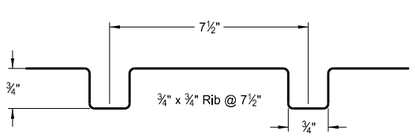
2" x 2" x 3/16" Angle Connector

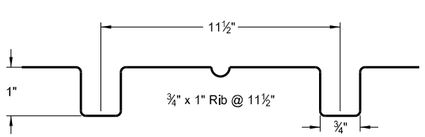


SIDE VIEW

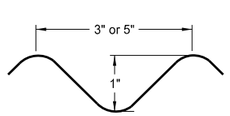
END VIEW

Die-Formed Angle Connector

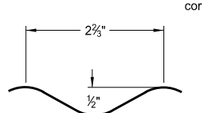




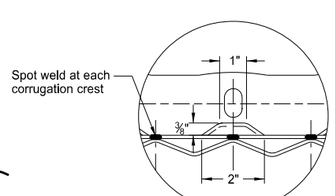
SPIRAL RIB CORRUGATIONS



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



2⅔" x ½" CORRUGATIONS



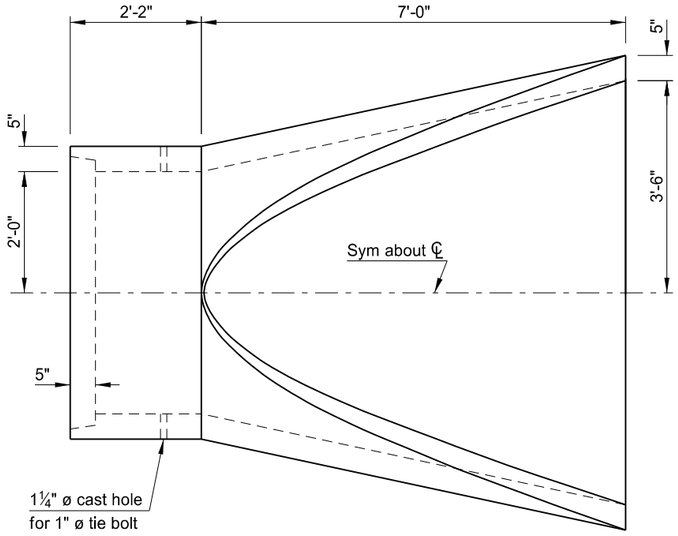
Detail A

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

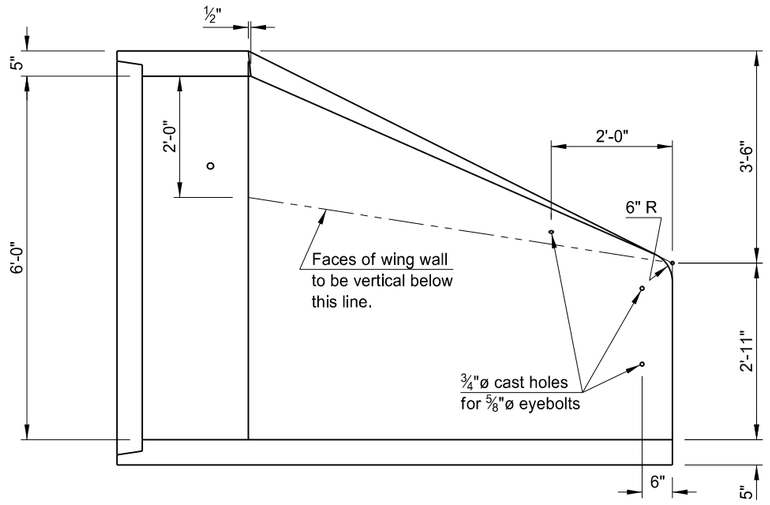
This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674 , on 02/27/2014 and the original document is stored at the North Dakota Department of Transportation

D-714-8

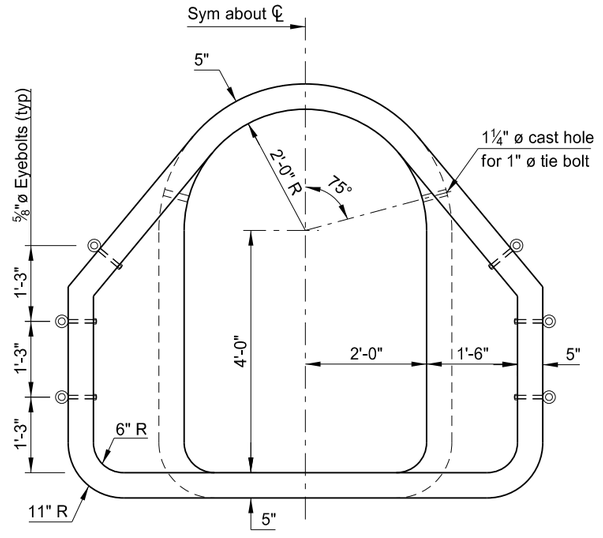
4' X 6' PRECAST CONCRETE CATTLE PASS



TOP VIEW



LONGITUDINAL SECTION ON ℄



END VIEW

(REINFORCING NOT SHOWN)

DETAILS OF FLARED END SECTION

NOTES:

Fill over top of cattle pass; 2' min, 15' max.

Design of flared end section shall conform to the intermediate section. Rounded edge permitted on sloped end.

Four foot lengths shall be used only to secure the required length of the cattle pass. Short sections shall be installed near ends. Not more than two 4' sections permitted in the structure.

All joints, including the end sections, shall be tied with 1" ø tie bolts as shown on Standard Drawing D-714-22. Ties shall be inserted from the inside with the nuts on the outside. The joints should fit as tightly as possible, with a maximum of ¾" between sections.

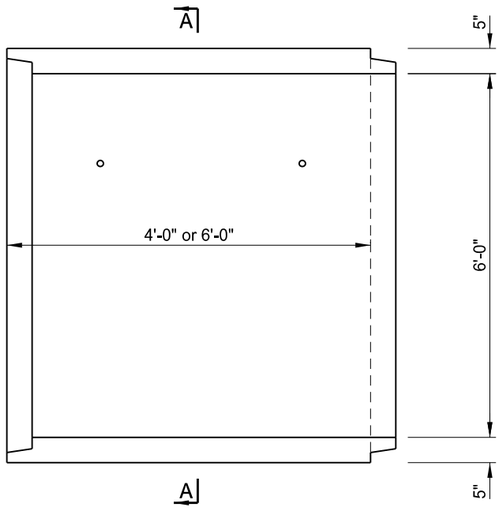
Longitudinal reinforcement denoted as As3 and As4 must be placed in all slabs and walls and must be 0.11 sq. in./ft. min.

Welded steel wire fabric shall conform to AASHTO M 55.

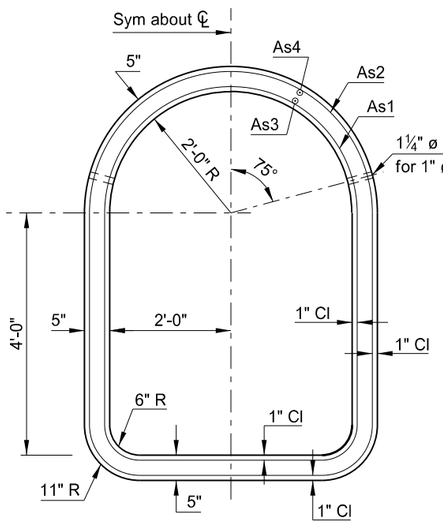
If the splices are not electrically welded, the reinforcement shall be lapped not less than 40 diameters. If the splices are electrically welded, the members at either a welded splice or intersection shall develop a tensile strength across the weld not less than the minimum required strength of the fabric. Welders shall be properly certified.

Cost of furnishing and installing eyebolts shall be included the unit price bid for "End Section Conc Cattle Pass". Eyebolts shall be galvanized according to AASHTO M 232.

All hardware embedded in the intermediate sections and end sections and all hardware used to fasten the intermediate sections and end sections together shall be included in the bid item "Cattle Pass Conc Intermed Section".

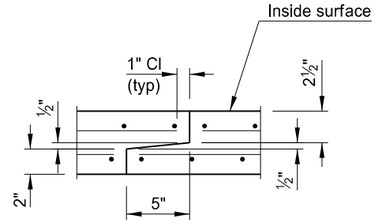


LONGITUDINAL SECTION ON ℄



A-A

DETAILS OF INTERMEDIATE SECTION



TONGUE AND GROOVE
JOINT DETAIL

DESIGN STRENGTHS:

f'c = 5,000 psi ~ Precast Concrete
fy = 65,000 psi ~ Welded Wire Fabric Reinforcement

Load & Resistance Factor Design

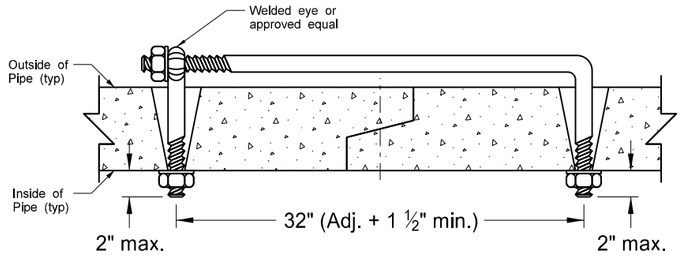
STEEL AREA (SQ IN PER LIN FT)			
As1	As2	As3	As4
0.26	0.27	0.11	0.11

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
06-30-14	
REVISIONS	
DATE	CHANGE

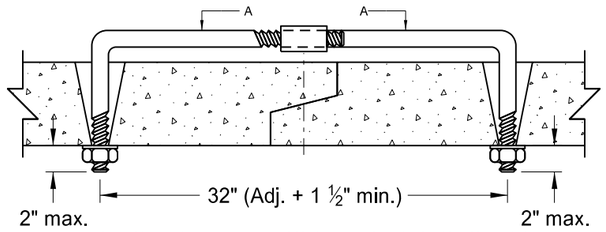
This document was originally issued and sealed by Terrence R. Udland Registration Number PE- 2674, on 07/07/14 and the original document is stored at the North Dakota Department of Transportation

CONCRETE PIPE, CATTLE PASS, OR PRECAST CONCRETE BOX CULVERT TIES

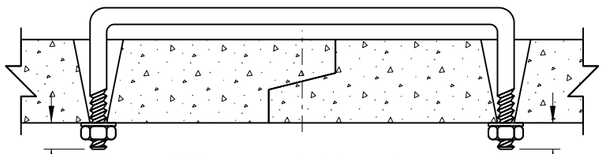
D-714-22



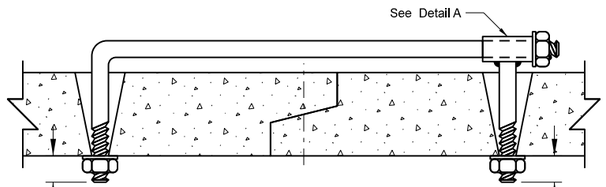
EYE BOLT TIE (PIPES ONLY)



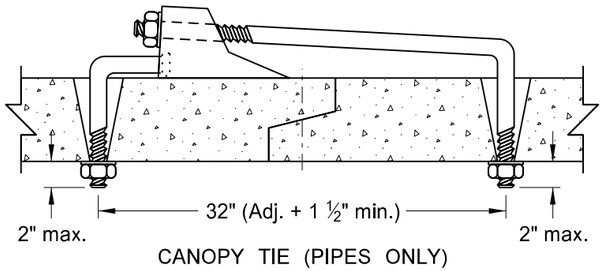
ADJUSTABLE TIE (RCB AND PIPES ONLY)



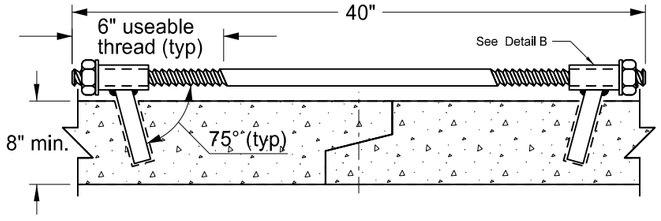
U BOLT TIE (RCB, PIPES, OR CATTLE PASSES)



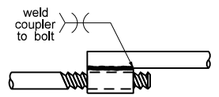
WELDED TIE (RCB AND PIPES ONLY)



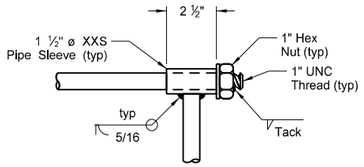
CANOPY TIE (PIPES ONLY)



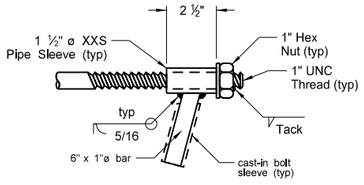
HIDDEN TIE (RCB ONLY)



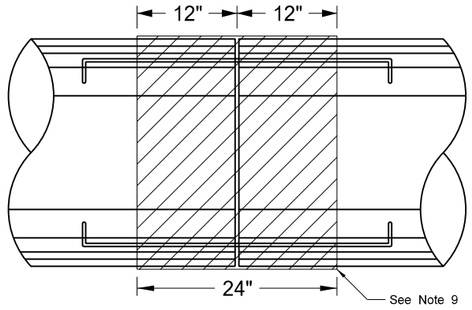
SECTION A-A



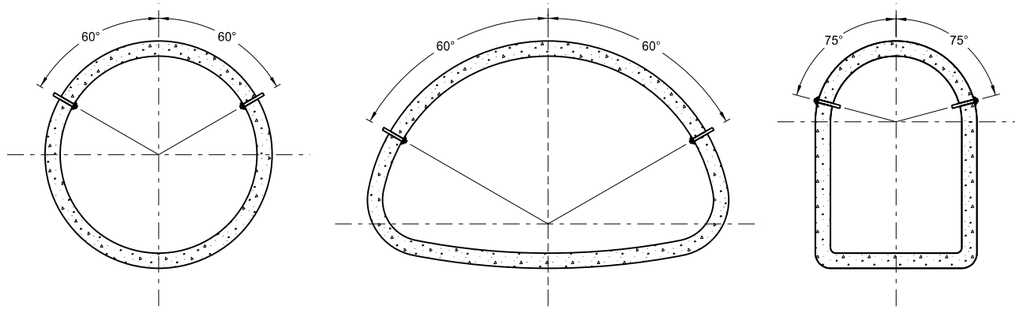
DETAIL A



DETAIL B



PLAN VIEW



END VIEW

REQUIRED SIZE OF TIE BOLTS		
Pipe Size	Thread ø	XXS Pipe Sleeve Inner ø
18" - 24"	⅝" See note 2	¾"
30" - 66"	¾"	1"
72" - 78"	1"	1 ¼"
RCB/Cattle Pass		

NOTES:

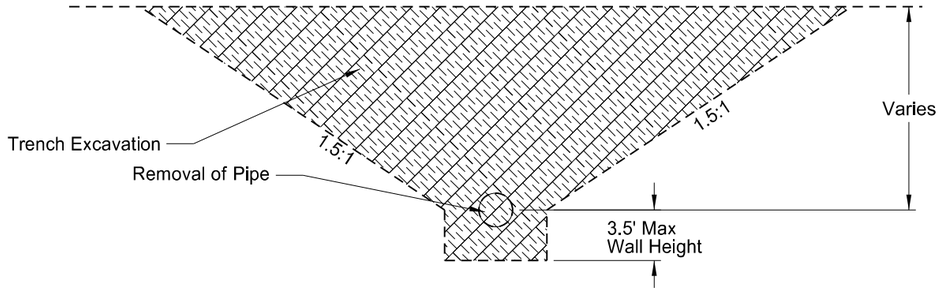
1. The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
2. Cattle Pass and Jacked and Bored pipes shall have pipe ties inserted from the inside of the pipes and grouted into place. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
3. Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Where nuts and washers are not used, the tie bars shall be inserted and grouted into place.
4. Ties are only for holding pipe or RCB sections together, not for pulling sections tight.
5. Tie bolt assembly shall be hot dip galvanized in accordance with AASHTO M232.
6. Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Holes shall have a diameter ¼" larger than the diameter of the thread. Holes in precast RCB's shall contain cast-in bolt sleeves with an inside diameter of 1 ¼".
7. The contractor has the option of selecting the type of tie bolt used from those shown.
8. The cost of precasting or drilling the required holes and furnishing and installing the tie bolts shall be included in the price bid for the appropriate conduit or RCB pay item.
9. All centerline and approach RCP culvert joints shall be tied. Storm drain systems shall have the first three joints including the end section of all free ends tied. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
10. Place joint wrap prior to installing ties. Overlap the joint by 12" in both directions.
11. Tie bolts shall conform to ASTM A 36. Nuts shall be be heavy hex and conform to ASTM A 563. Washers shall conform to ASTM F 436, Type 1. Welded pipe sleeves and cast-in bolt sleeves shall conform to ASTM A 53, Grade B.
12. RCB tie locations shall be as shown on the plans.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11, Table, Title, Lables

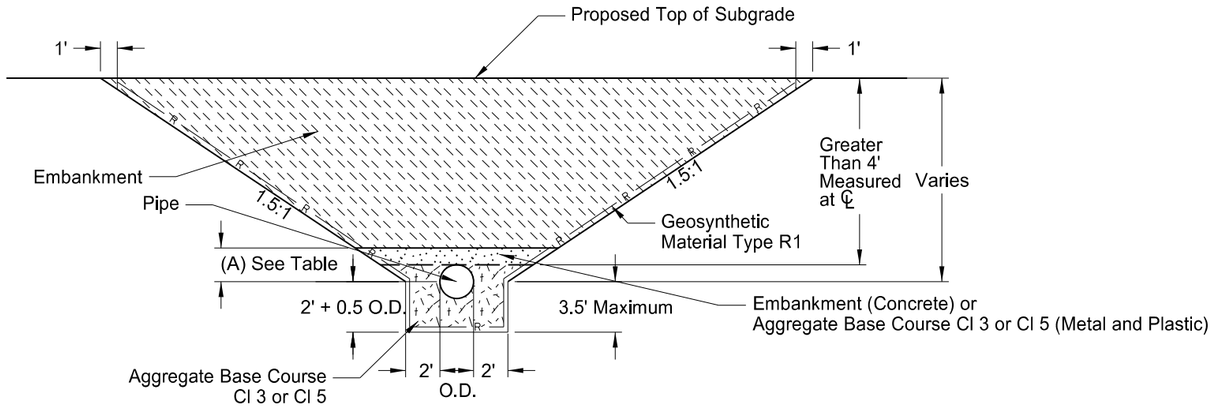
This document was originally issued and sealed by Jonathan David Ketterling, Registration Number PE-4684, on 6/6/2017 and the original document is stored at the North Dakota Department of Transportation

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
PIPES MORE THAN 4 FEET BELOW TOP OF SUBGRADE

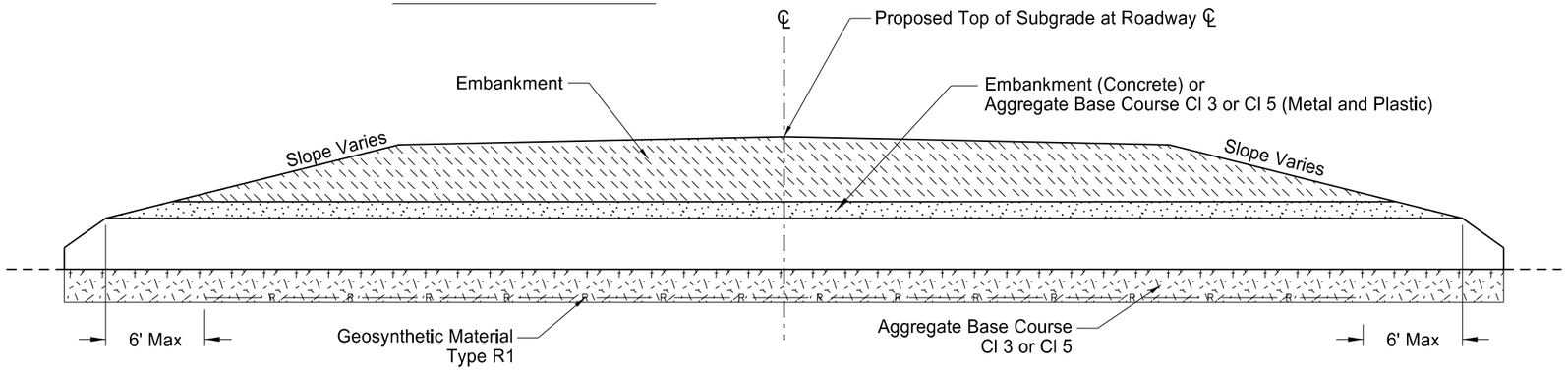
D-714-25



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

Pay Items
1) Pipe*
2) Geosynthetic Material Type R1
3) Removal of Pipe (if required)

*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate Base Course Cl 3 or Cl 5
4) Embankment

NOTES:

1) This drawing applies to new/replaced mainline and paved intersection roadways (including ramps). It does not include pipes in approaches.
2) Embankment may be either Borrow Excavation or Common Excavation - Type A

Backfill Dimensions	
Pipe Materials	Dimension (A)
Concrete	0.5 O.D.
Metal and Plastic	0.5 O.D. + 1 Foot

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

7-26-13

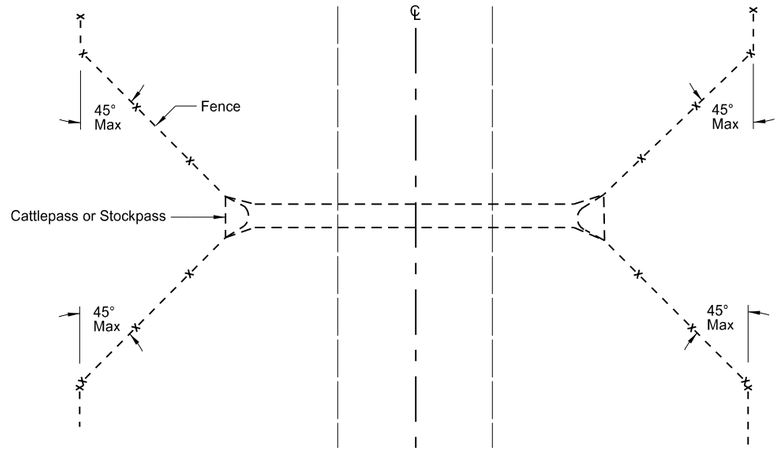
REVISIONS

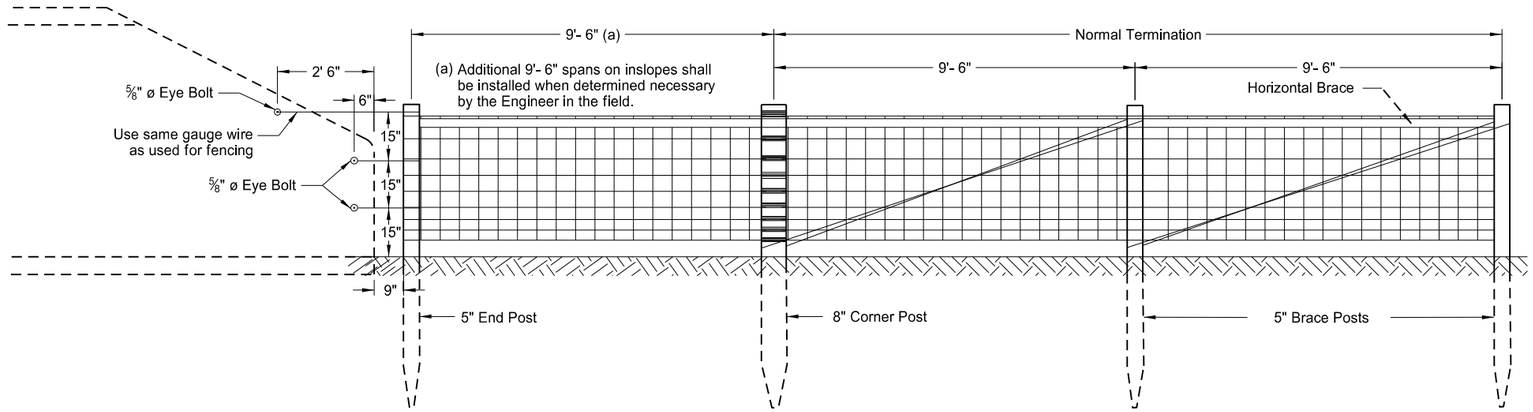
DATE	CHANGE
10-15-13	Label Formatting
1-21-14	Nomenclature
9-18-15	Title Rewording
12-10-15	Added Plastic Pipe

This document was originally issued and sealed by Ron Horner, Registration Number PE- 2087, on 12/10/2015 and the original document is stored at the North Dakota Department of Transportation

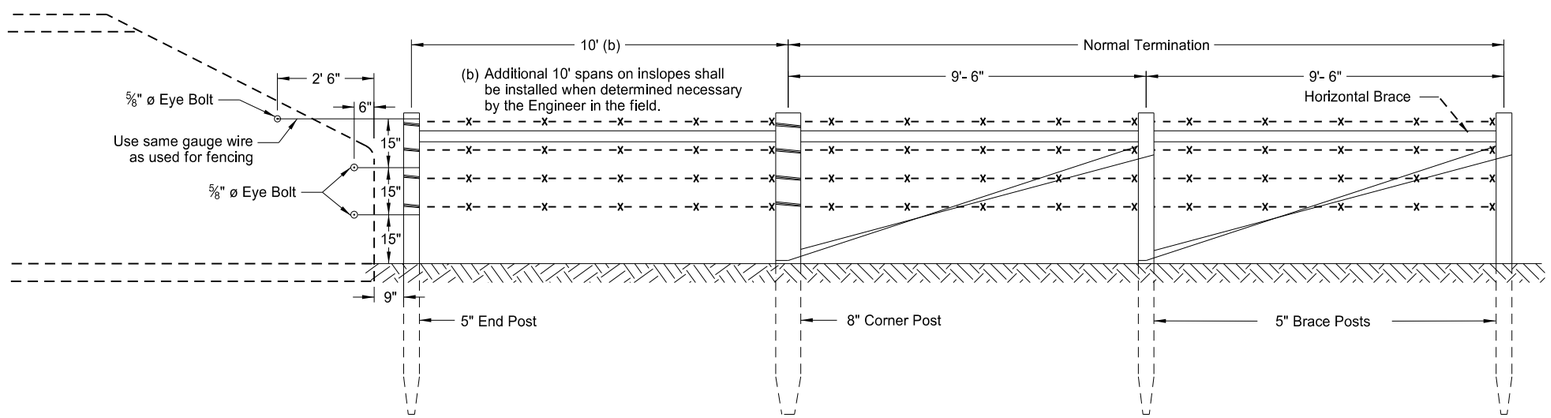
CONCRETE CATTLE & STOCKPASS FENCING STANDARD

D-752-4





Fence Terminal Standard Woven Wire Fence



Fence Terminal Barbed Wire Fence

NOTES:

1. See Standard Drawings D-752-1 BARBED WIRE FENCE and D-752-3 STANDARD WOVEN WIRE FENCE for fencing details.

2. Cost of furnishing and installing inserts, eyebolts, and wire shall be included in the unit price bid for fencing bid items. Eyebolts shall be galvanized according to AASHTO designation M-30; inserts of corrosion resistant material need not be galvanized. Concrete inserts shall be of such design that, when installed in the concrete, will be capable of developing the full strength of the 5/8" diameter threaded eyebolt.

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 10/04/13 and the original document is stored at the North Dakota Department of Transportation

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

1. Curbed Roadways: The clearance from the face of the curb should be 3' except where right of way or sidewalk width is limited, a minimum clearance of 2' shall be provided. The horizontal clearance may need to be increased to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

2. Minimum vertical clearance: Signs installed at the side of the road in rural districts shall be at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane. Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 7'.

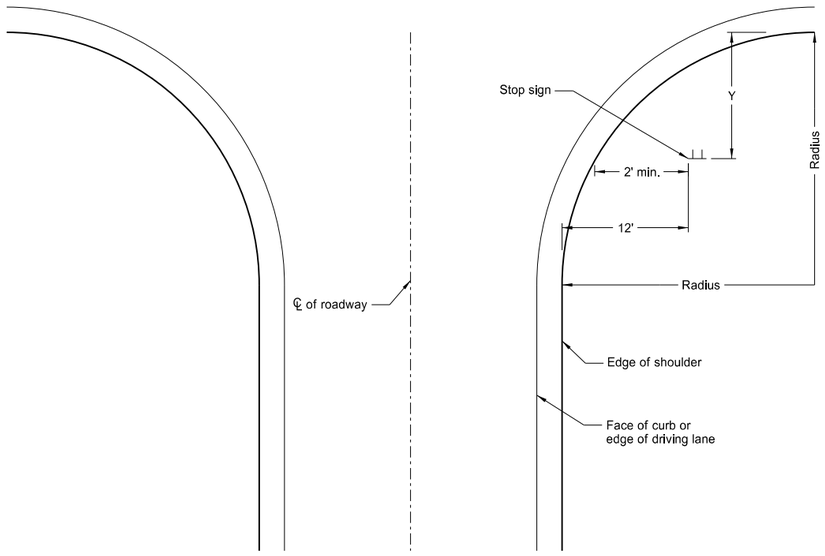
   Signs on expressways shall be installed with a minimum height of 7'.

   Adopt-a-highway signs installed on Freeways shall be at least 7' above the edge of the driving lane.

   The vertical clearance shall have a maximum height of 6" above the vertical clearance specified above.

3. Offset signs: Where signs are placed at least 30 feet or more from the edge of the traveled way, the height to the bottom of such sign shall be 5' above the edge of the driving lane.

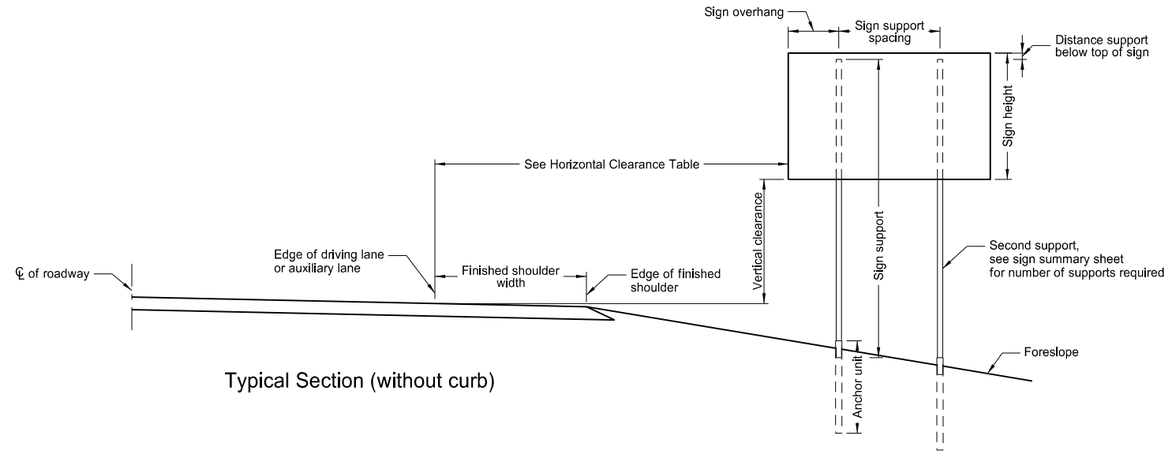
4. The clearance from edge of shared use path to edge of sign should be 3' except where width is limited, a minimum clearance of 2' shall be provided.



Stop Sign Location
Wide Throat Intersection

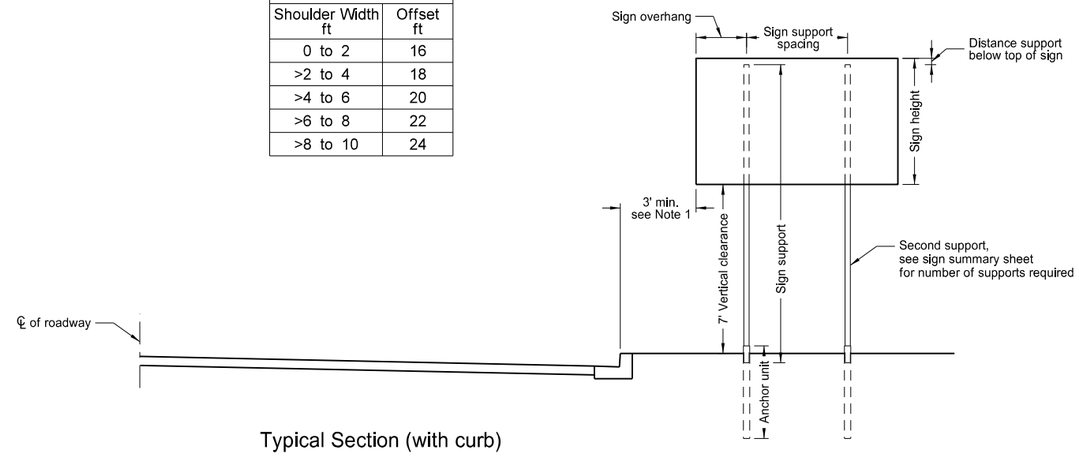
This layout is to be used for the placement of "Stop" signs.

Radius ft.	Y-max. ft.	Y-min. ft.
40	50	15
45	50	18
50	50	21
55	50	25
60	50	28
65	50	32
70	50	35
75	50	39
80	50	43



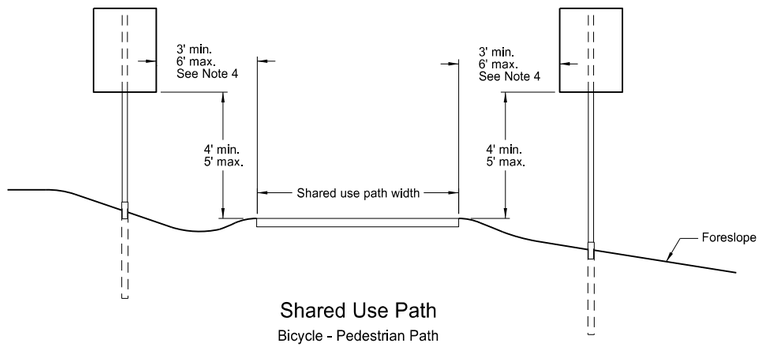
Typical Section (without curb)

Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24



Typical Section (with curb)

Residential or Business District



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.

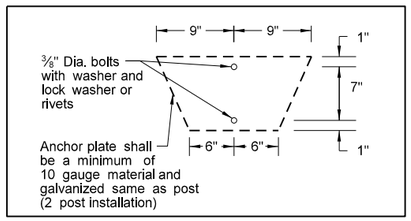
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 7/8/14 and the original document is stored at the North Dakota Department of Transportation

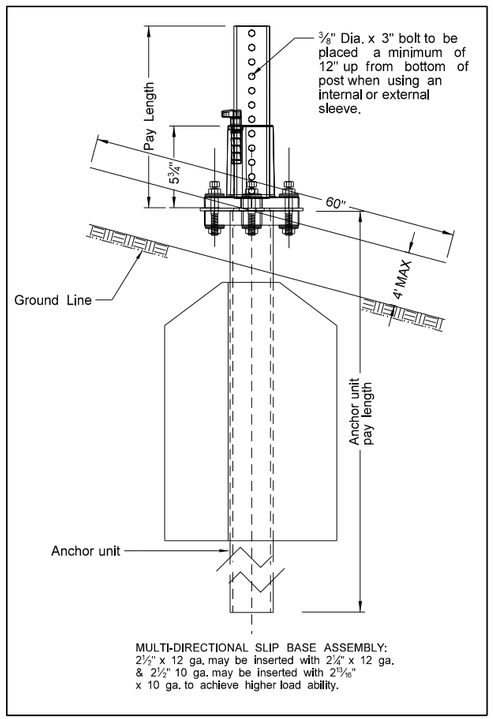
Mounting Details Perforated Tube

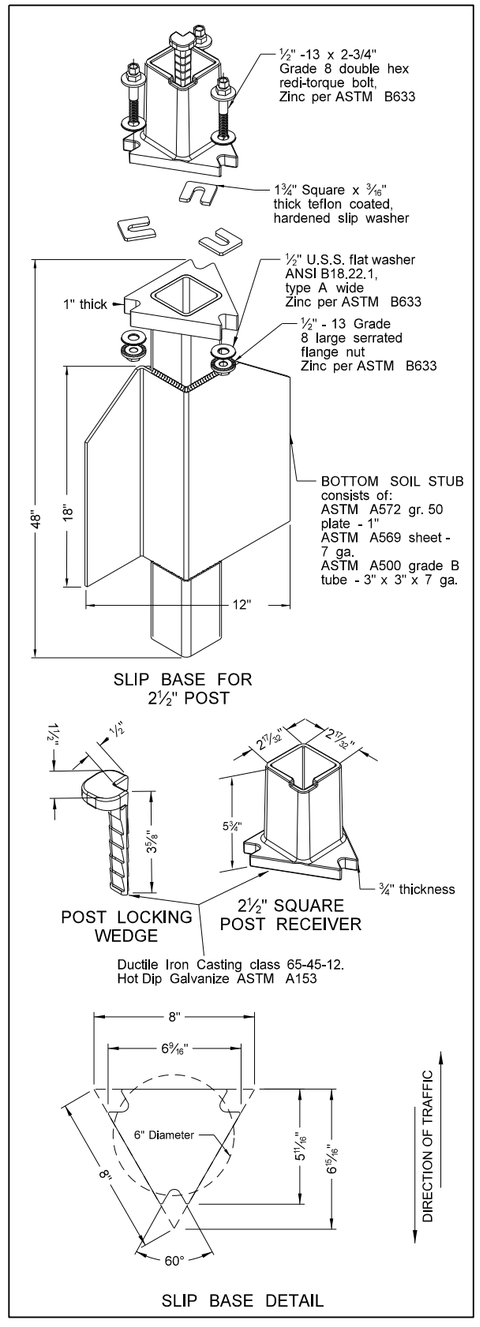
D-754-24

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	2⁹⁄₁₆	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.





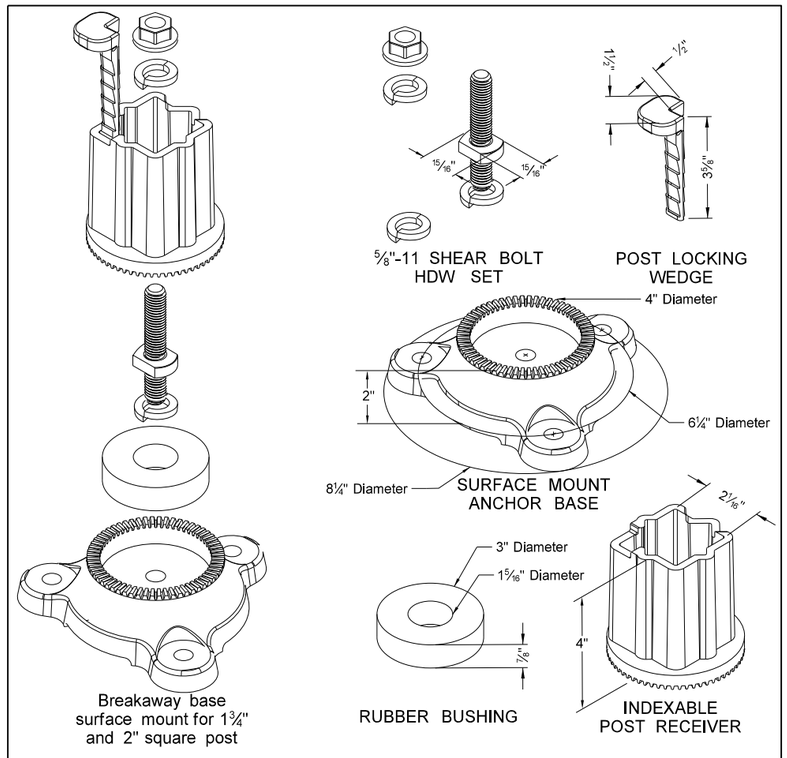


Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.⁴	Cross Sect. Area In.²	Section Modulus In.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2⅜ x 2⅜	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 ¾" size 10 gauge is shown as 2.19" size on the plans; The 2½" size is shown as 2.51" size on the plans.

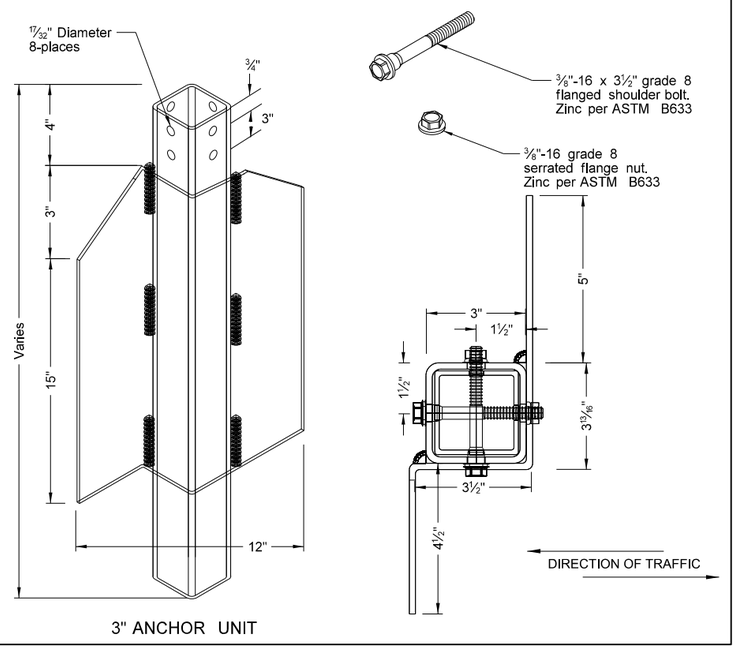
NOTE:

1. 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.
2. Anchor material shall be 7 guage H.R.P.O. Commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B. Anchor shall have a yield strength 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/153. All tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
3. When used in concrete sidewalk, anchor shall be the same concept without the wings
4. Four post signs shall have over 8' between the first and fourth posts.
5. Installation procedures as per manufacturers recommendation.
6. Concrete fasteners for surface mount breakaway base shall be a minimum ½" diameter x 4" grade 8.



SHOULDER BOLT

Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(standard ⅞" diameter grade 8 bolt may be used with proper shim)



3" ANCHOR UNIT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE

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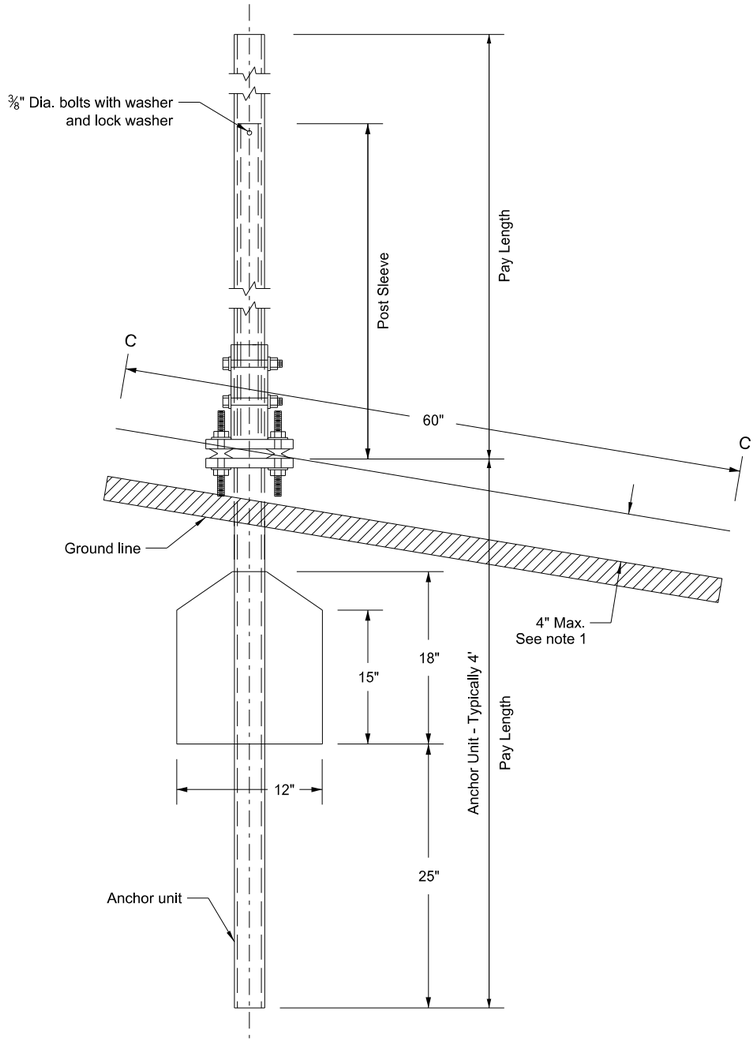
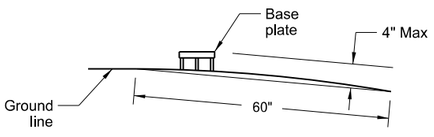
D-754-24A

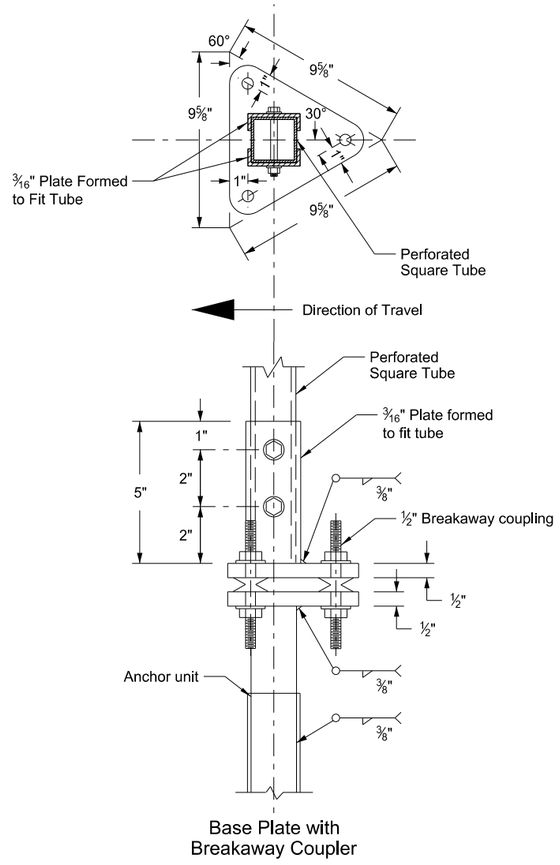




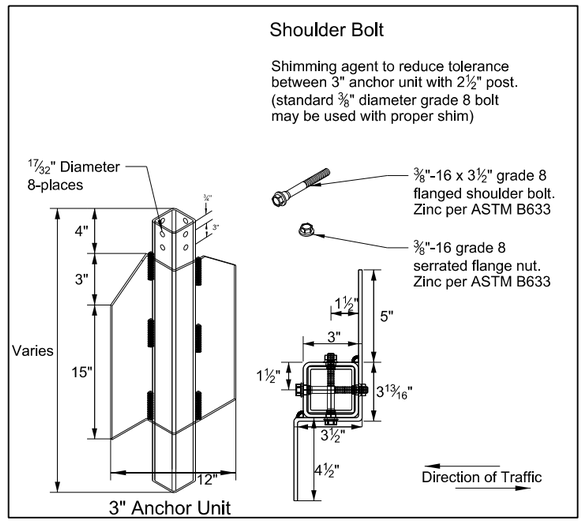
Section C-C

Max. protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.

Breakaway Coupler System for Perforated Tubes



Base Plate with Breakaway Coupler



3" Anchor Unit

Notes:

1. 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.
2. Anchor unit shall be the same size as the post and shall have the same specification as the post.
3. Four post signs shall have over 8' between the first and fourth post.
4. In lieu of the breakaway base system on standard D-754-24 the breakaway coupling system may be used. The breakaway coupler system shall be manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements as specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

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 Thickness Guage
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	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	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	2	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. 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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE

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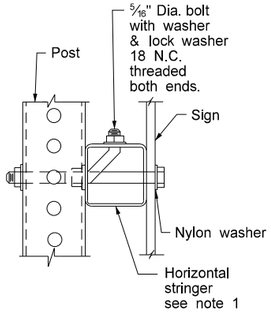
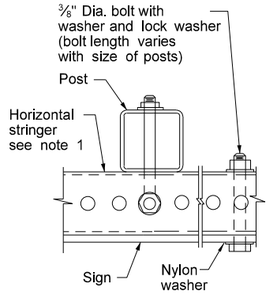
Mounting Details Perforated Tube

D-754-25

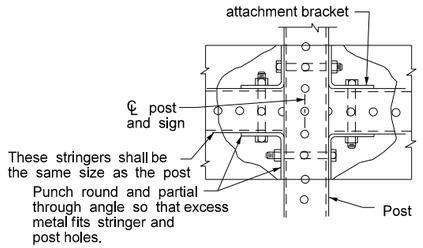


Side View



Top View

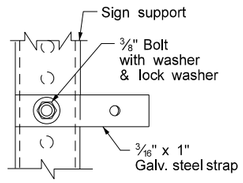
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



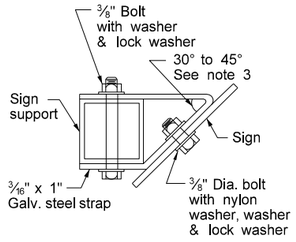
STREET NAME SIGNS
AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR
BACK TO BACK MOUNTING

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.

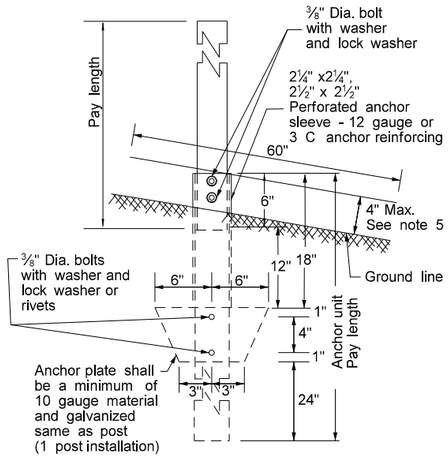


Side View



Top View

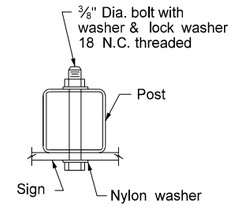
STRAP DETAIL



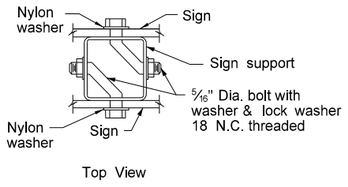
ANCHOR UNIT AND
POST ASSEMBLY

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.

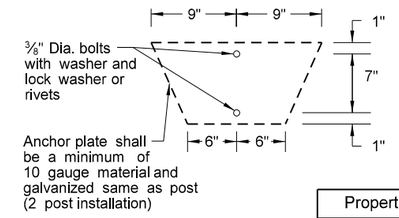


BOLT MOUNTING



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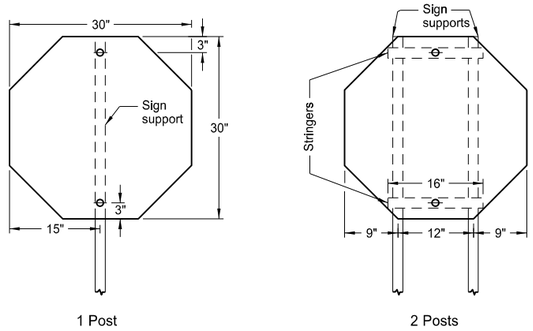
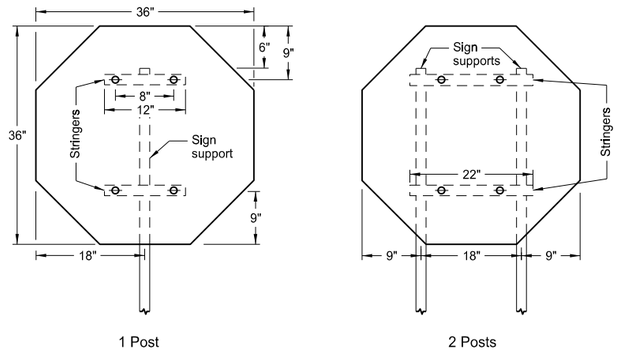
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-26



1 Post 2 Posts

Assembly No. 1



1 Post 2 Posts 3 Posts

Assembly No. 2

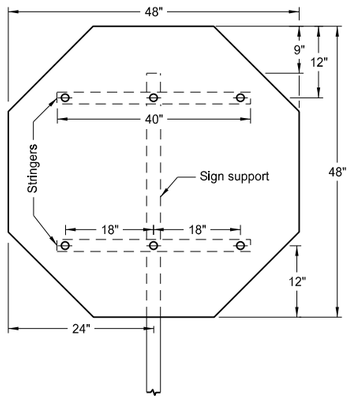
Notes:

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

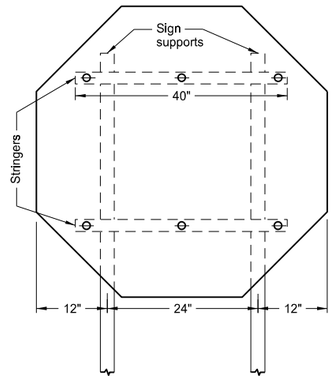
2. The minimum sign backing material thickness shall be 0.100 inch.

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

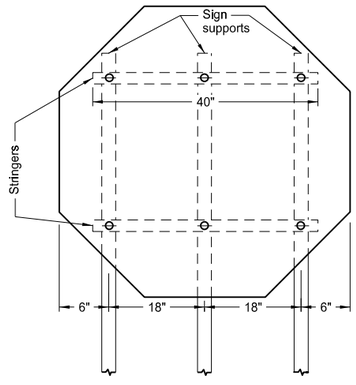
4. All holes shall be punched round for ⅜" bolt.



1 Post

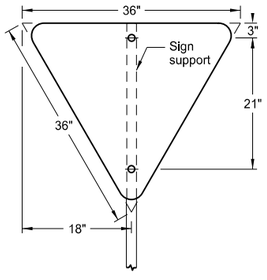


2 Posts

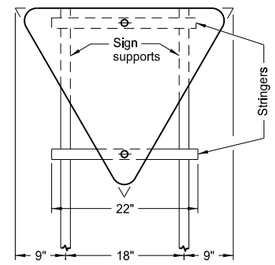


3 Posts

Assembly No. 3

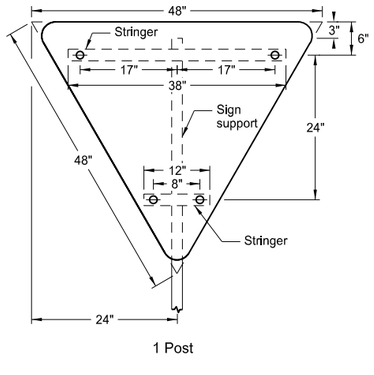


1 Post



2 Posts

Assembly No. 4



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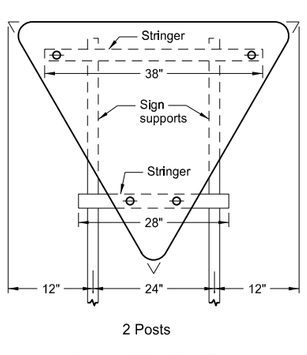
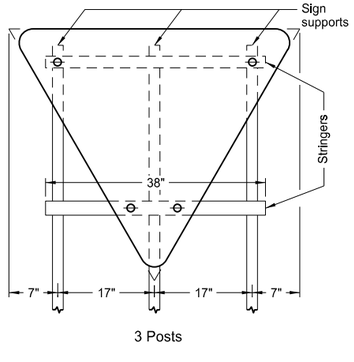


2 Posts



3 Posts

Assembly No. 5

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

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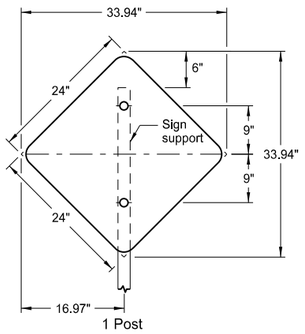
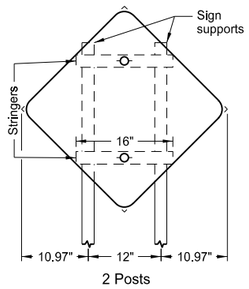
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

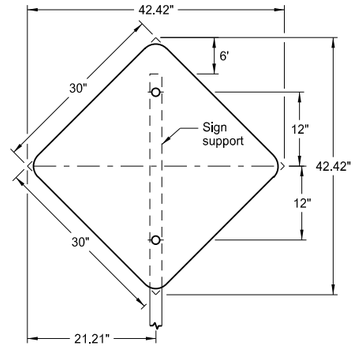


1 Post

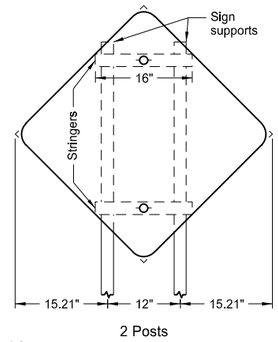


2 Posts

Assembly No. 18

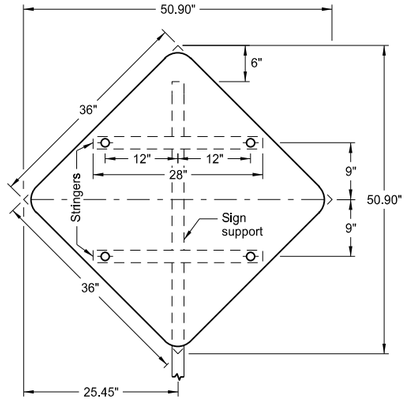


1 Post

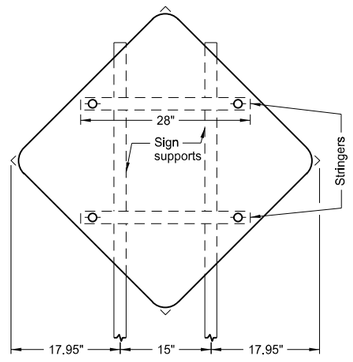


2 Posts

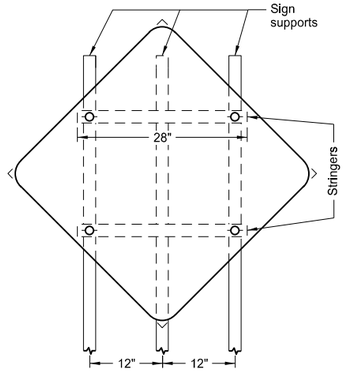
Assembly No. 19



1 Post

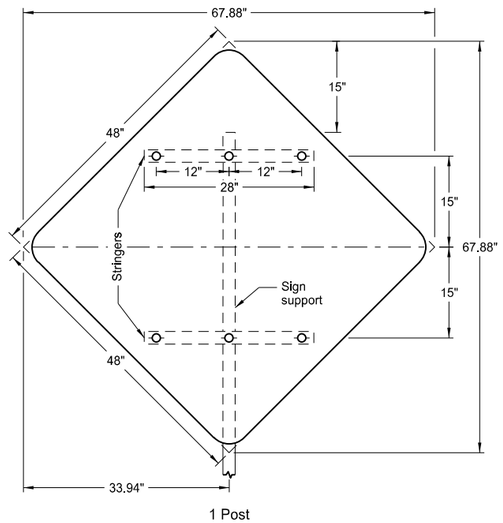


2 Posts

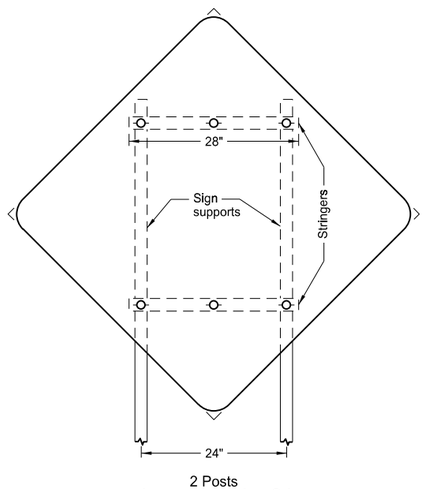


3 Posts

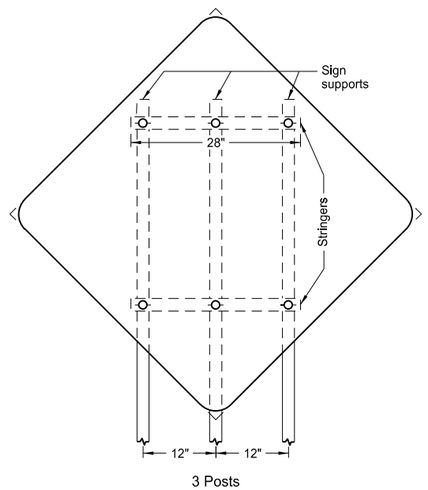
Assembly No. 20



1 Post



2 Posts



3 Posts

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	
DATE	CHANGE

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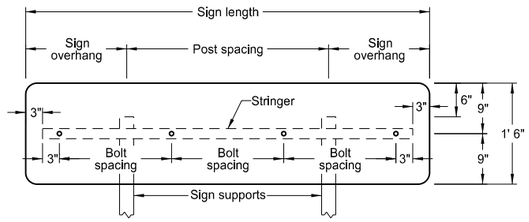
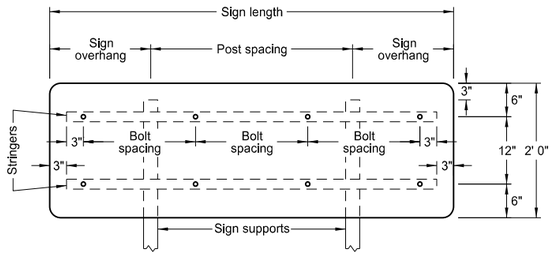
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR VARIABLE LENGTH SIGNS

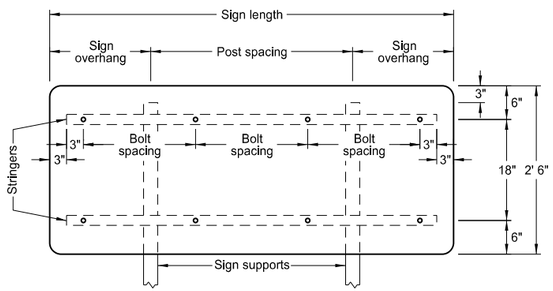
D-754-48



VARIES X 1'-6"



VARIES X 2'-0"



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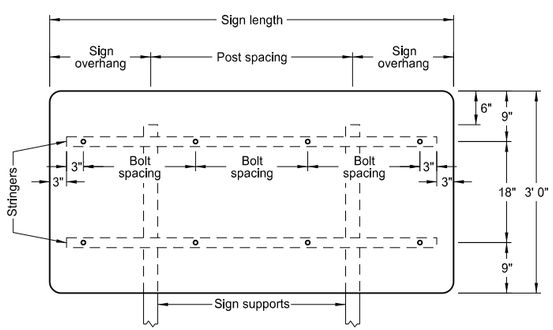
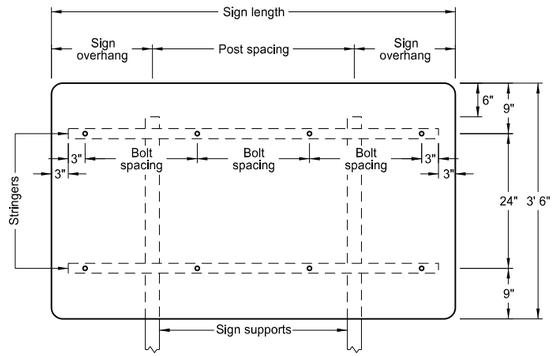
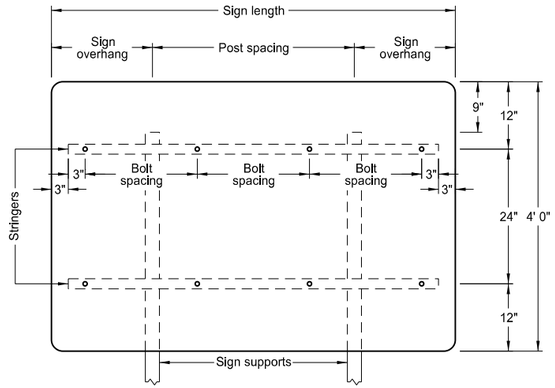


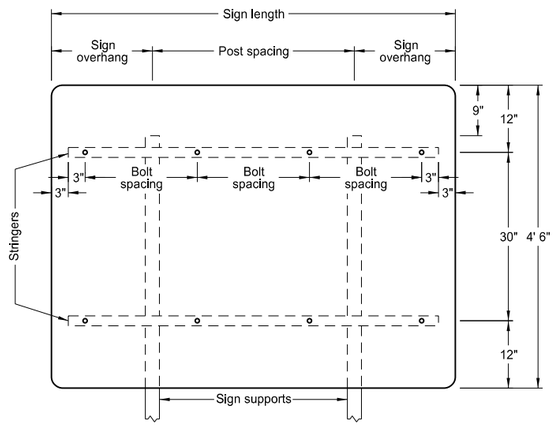
VARIES X 3'-0"



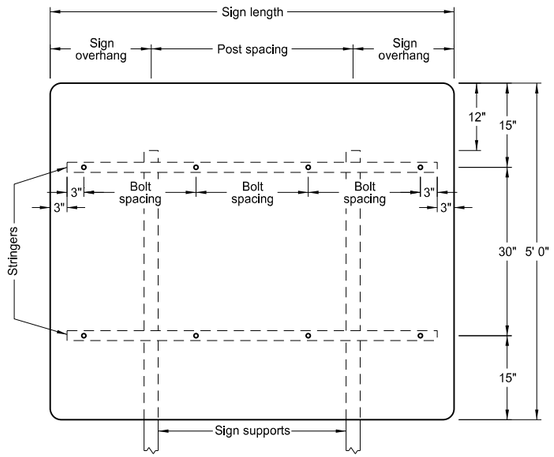
VARIES X 3'-6"



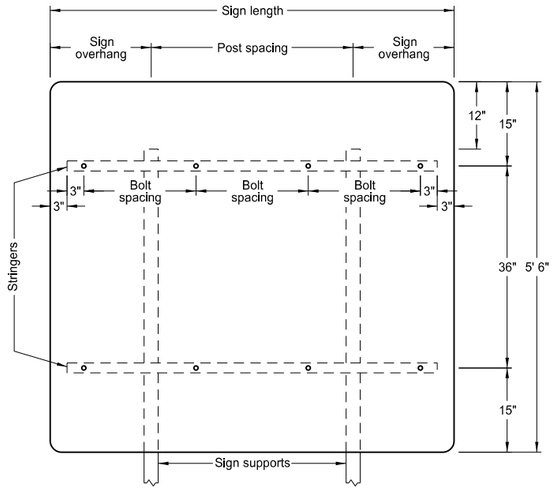
VARIES X 4'-0"



VARIES X 4'-6"



VARIES X 5'-0"



VARIES X 5'-6"

2 POSTS			
Sign Length	Sign Overhang	Post Spacing	Bolt Spacing
4'-0"	1'-0"	2'-0"	18"
4'-6"	1'-3"	2'-0"	21"
5'-0"	1'-0"	3'-0"	24"
5'-6"	1'-3"	3'-0"	18"
6'-0"	1'-6"	3'-0"	20"
6'-6"	1'-3"	4'-0"	22"
7'-0"	1'-6"	4'-0"	24"
7'-6"	1'-9"	4'-0"	2-20" & 2-19"
8'-0"	2'-0"	4'-0"	21"
8'-6"	1'-9"	5'-0"	2-22" & 2-23"
9'-0"	2'-0"	5'-0"	24"
9'-6"	1'-9"	6'-0"	4-20" & 1-22"
10'-0"	2'-0"	6'-0"	2-21" & 3-22"
10'-6"	2'-3"	6'-0"	4-23" & 1-22"
11'-0"	2'-6"	6'-0"	24"
11'-6"	2'-9"	6'-0"	21"
12'-0"	2'-0"	8'-0"	22"
12'-6"	2'-3"	8'-0"	23"
13'-0"	2'-6"	8'-0"	24"
13'-6"	2'-9"	8'-0"	3-22" & 4-21"
14'-0'	3'-0"	8'-0"	2-23" & 5-22"
14'-6"	3'-3"	8'-0"	6-23" & 1-24"
15'-0"	3'-6"	8'-0"	24"
15'-6"	2'-9"	10'-0"	6-22" & 2-21"
16'-0"	3'-0"	10'-0"	4-23" & 4-22"
16'-6"	3'-3"	10'-0"	6-23" & 2-24"
17'-0"	3'-6"	10'-0"	24"
17'-6"	3'-9"	10'-0"	22"
18'-0"	3'-0"	12'-0"	6-23" & 3-22"
18'-6"	3'-3"	12'-0"	6-23" & 3-24"
19'-0"	3'-6"	12'-0"	24"
19'-6"	3'-9"	12'-0"	8-22" & 2-23"
20'-0"	4'-0"	12'-0"	8-23" & 2-22"

Notes:

1. The minimum sign backing material thickness shall be 0.100 inch.
2. Perforated square tube stringer shall be 1½" x 1½".
3. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE

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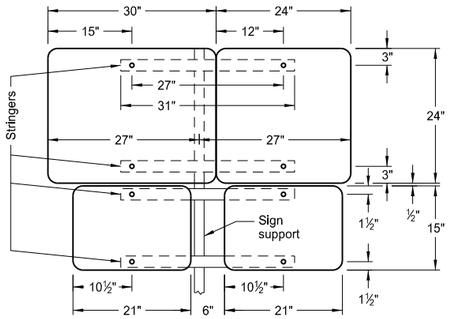
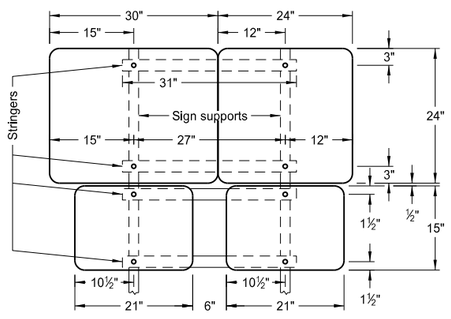
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

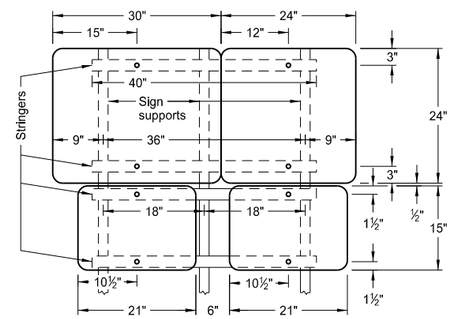
D-754-61



1 Post



2 Posts

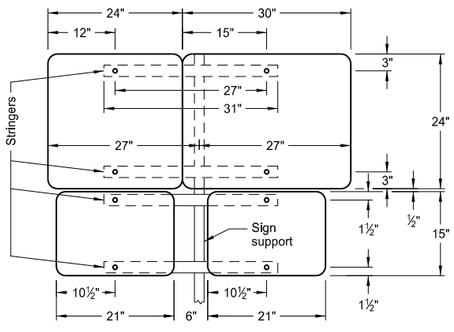


3 Posts

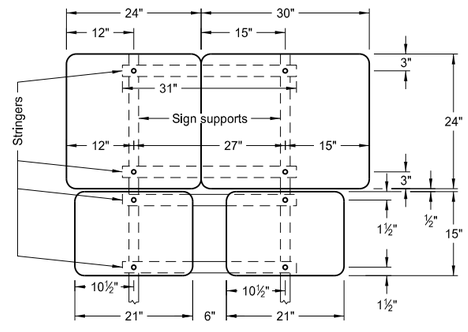
ASSEMBLY 406

Notes:

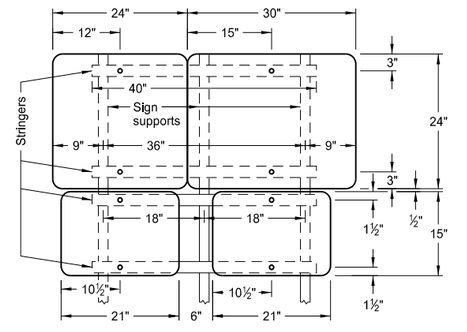
1. The minimum sign backing material thickness shall be 0.100 inch.
2. Perforated square tube stringer shall be 1½"x1½".
3. All holes shall be punched round for ⅜" bolt.



1 Post

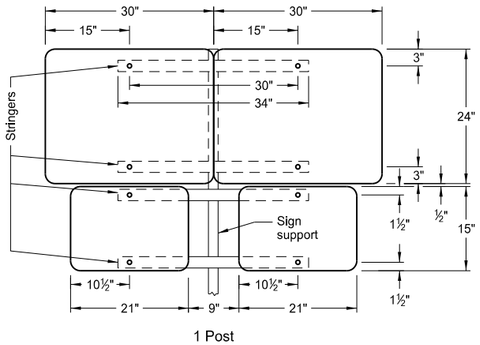


2 Posts

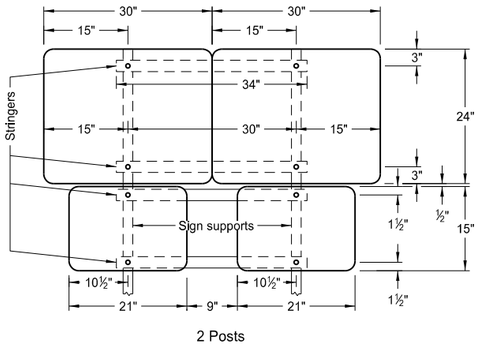


3 Posts

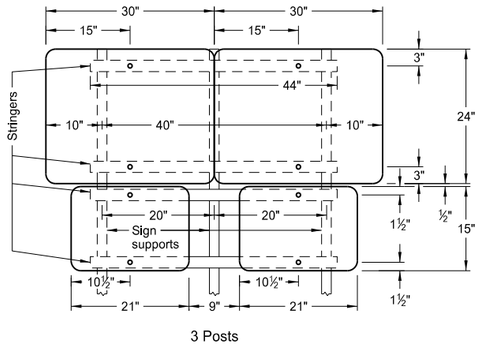
ASSEMBLY 407



1 Post



2 Posts



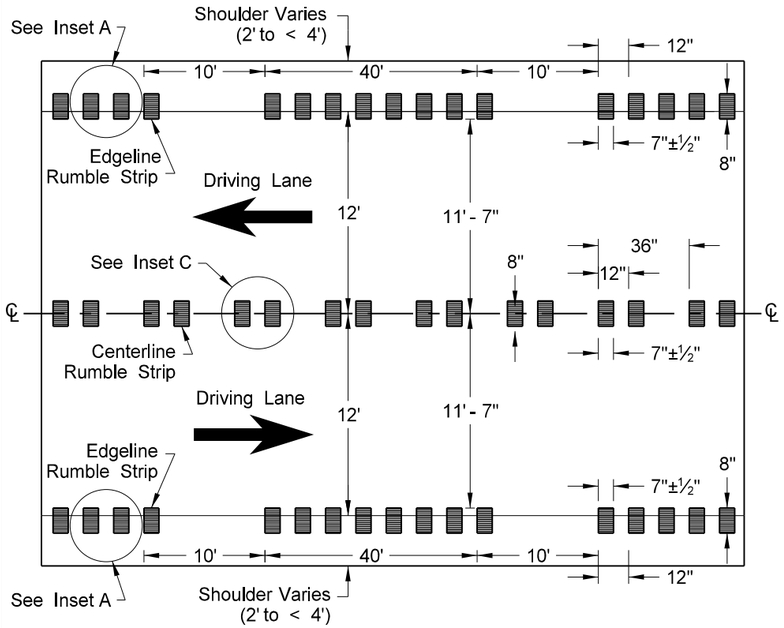
3 Posts

ASSEMBLY 408

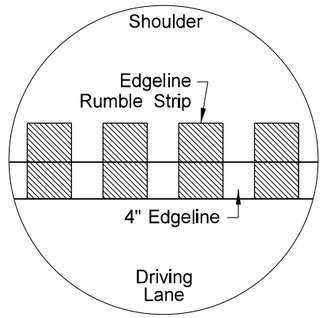
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 8/22/12 and the original document is stored at the North Dakota Department of Transportation

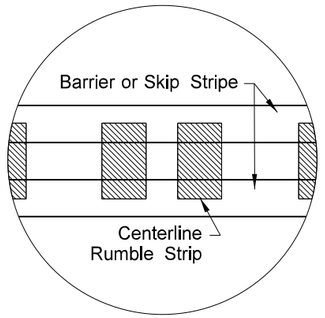
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')



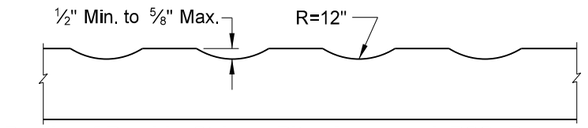
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



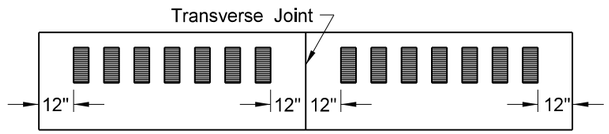
Inset A - Edgeline Rumble Strip



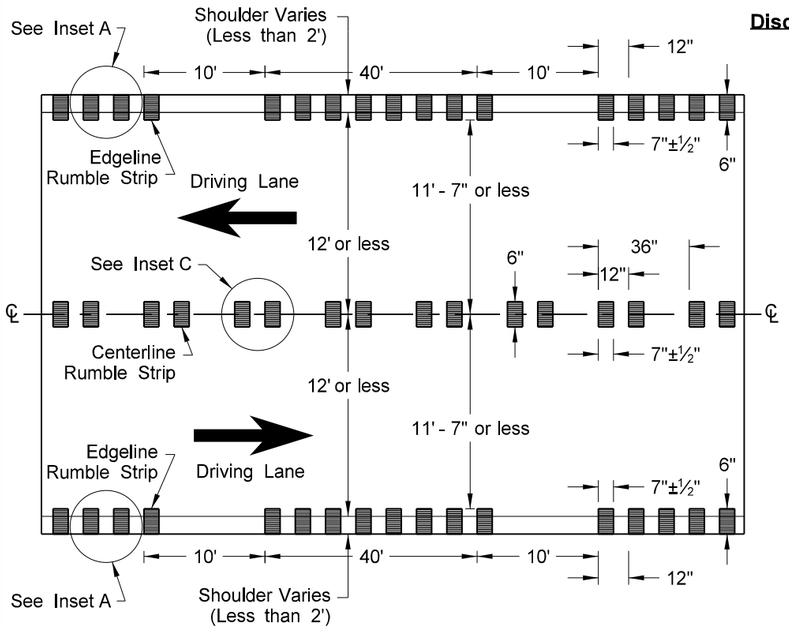
Inset C - Centerline Rumble Strip



Profile of Rumble Strips - Bituminous and PCC Pavements



Discontinue rumble strip approx. 12" on both sides of PCC transverse joint

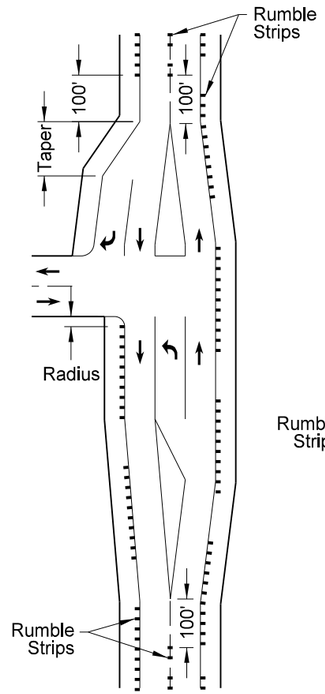


Undivided Highways (12' Driving Lanes or less & Shoulders Less than 2')

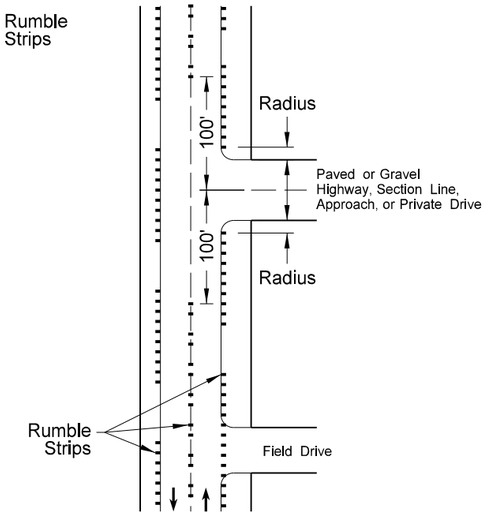
NOTES:

1) Discontinue edgeline rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.

2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, 100' before and after a paved or gravel highway, section line, approach, or private drive.



Turn Lane
(Right & Left)



Entrance Roadways

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-8-11	Revised Notes and D-760-4.
1-26-12	Revised details for rumble strip widths and dimensions.

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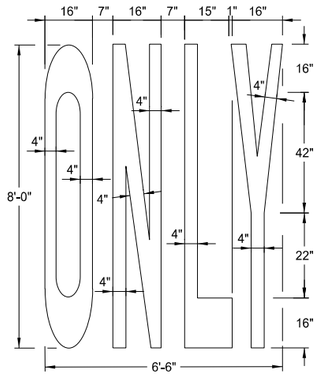
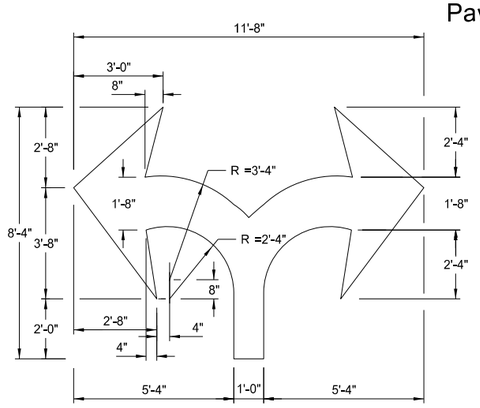
Pavement Marking Message Details

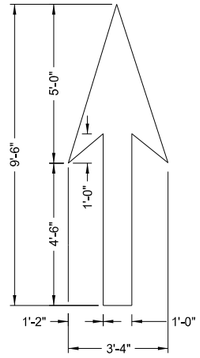
D-762-1



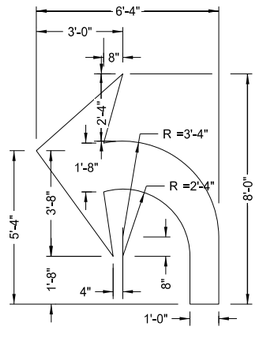
22 S. F.



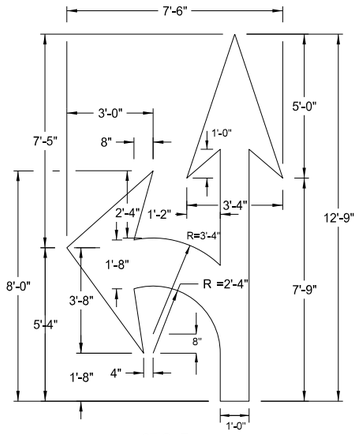
29 S. F.



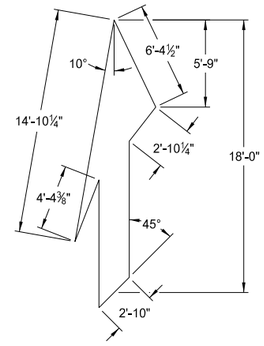
12 S. F.



16 S. F.

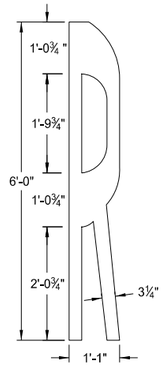


27 S. F.

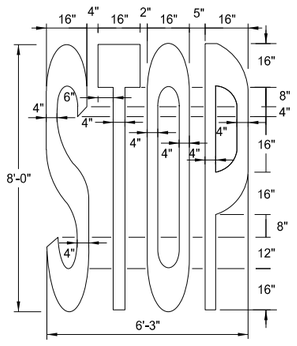


41 S. F.

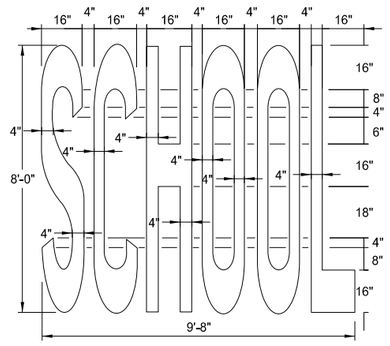
Note:
The merge arrow shall be rotated 20° from the edge of the roadway.



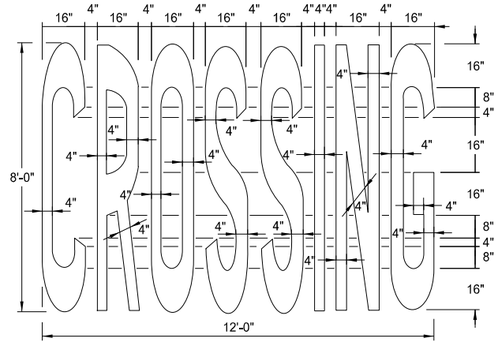
4 S. F.



22 S. F.



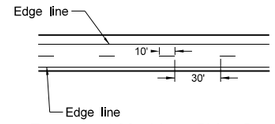
34.5 S. F.



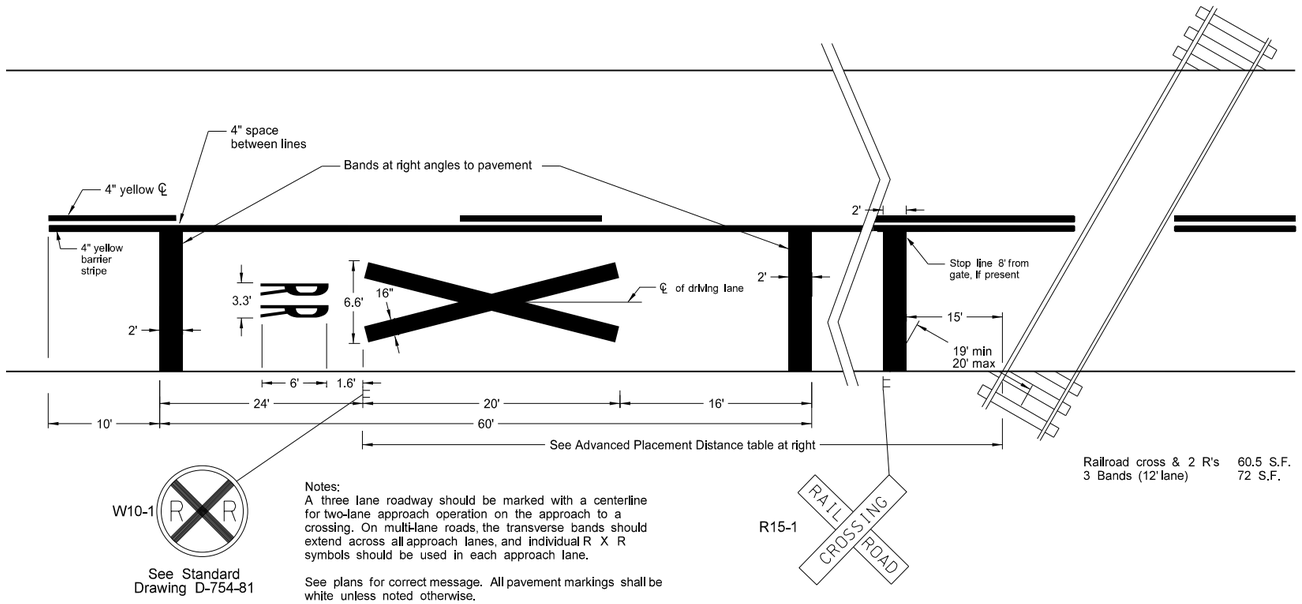
46 S. F.

Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Chevron Crosshatching Table



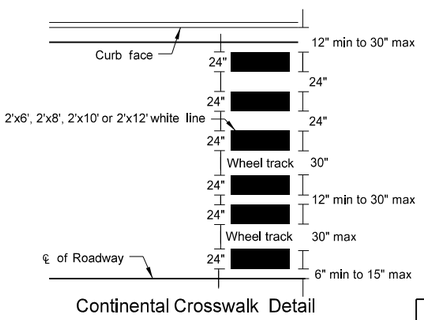
Centerline Pavement Marking Skip Spacing Detail



Railroad cross & 2 R's 60.5 S.F.
3 Bands (12' lane) 72 S.F.

Notes:
A three lane roadway should be marked with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, the transverse bands should extend across all approach lanes, and individual R X R symbols should be used in each approach lane.

See plans for correct message. All pavement markings shall be white unless noted otherwise.



Continental Crosswalk Detail

Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE

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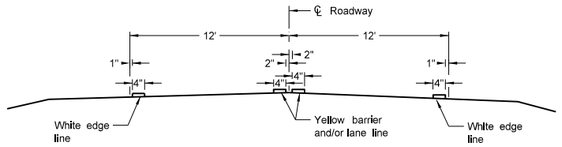
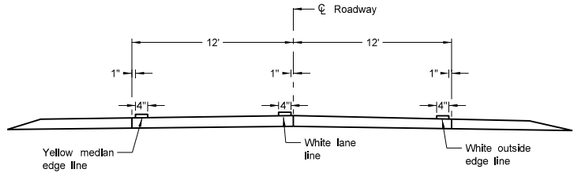
PAVEMENT MARKING

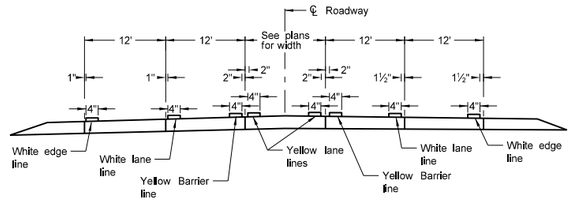
D-762-4



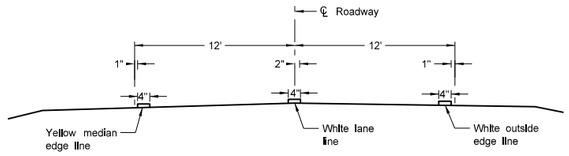
Two Lane Two Way
RURAL ROADWAY



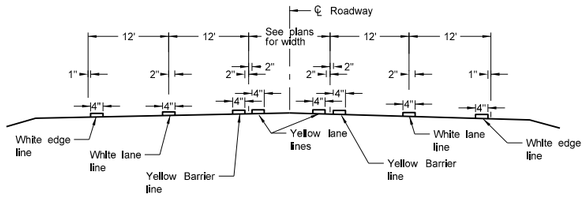
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



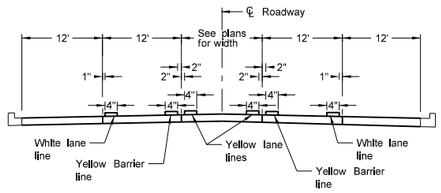
RURAL FIVE LANE ROADWAY
Concrete Section



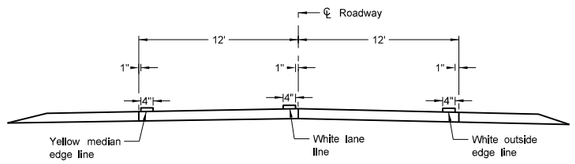
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



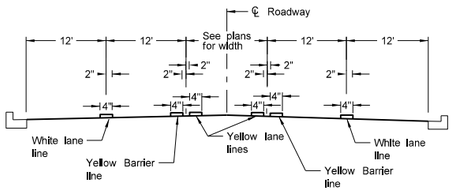
RURAL FIVE LANE ROADWAY
Asphalt Section



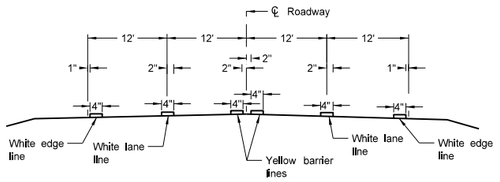
URBAN FIVE LANE SECTION
Concrete Section



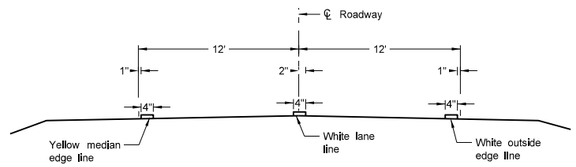
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



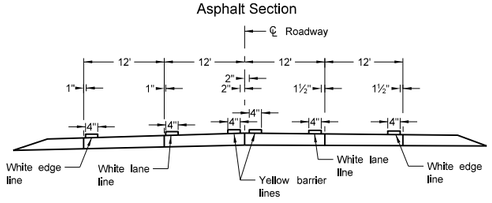
URBAN FIVE LANE SECTION
Asphalt Section



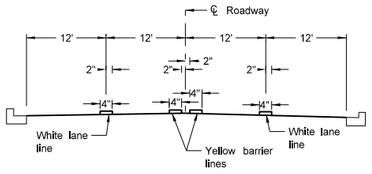
RURAL FOUR LANE ROADWAY
Asphalt Section



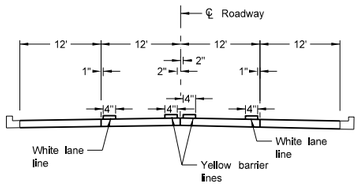
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



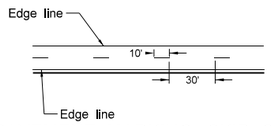
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

1. Edge lines shall be continued through private drives and field drives and broken for intersections.

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

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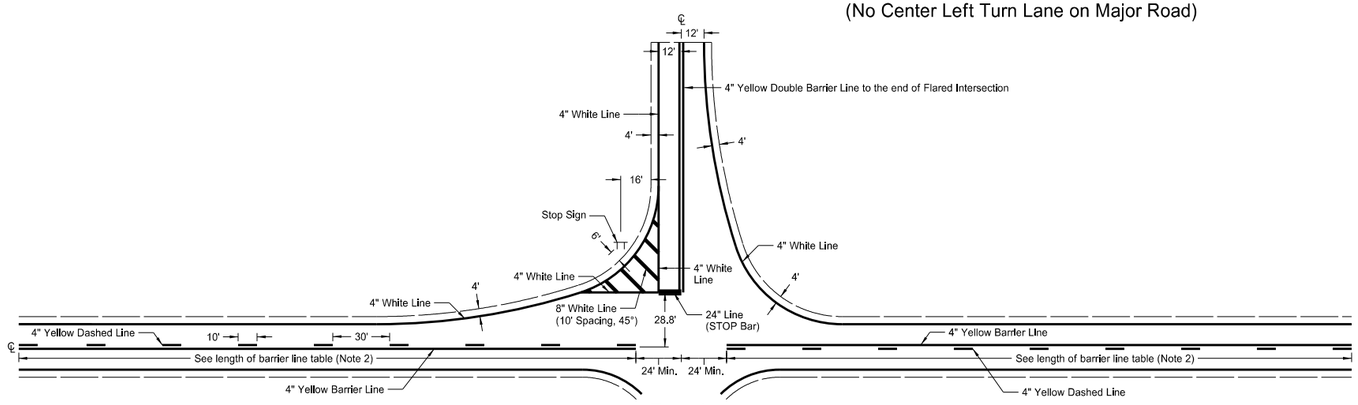
PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

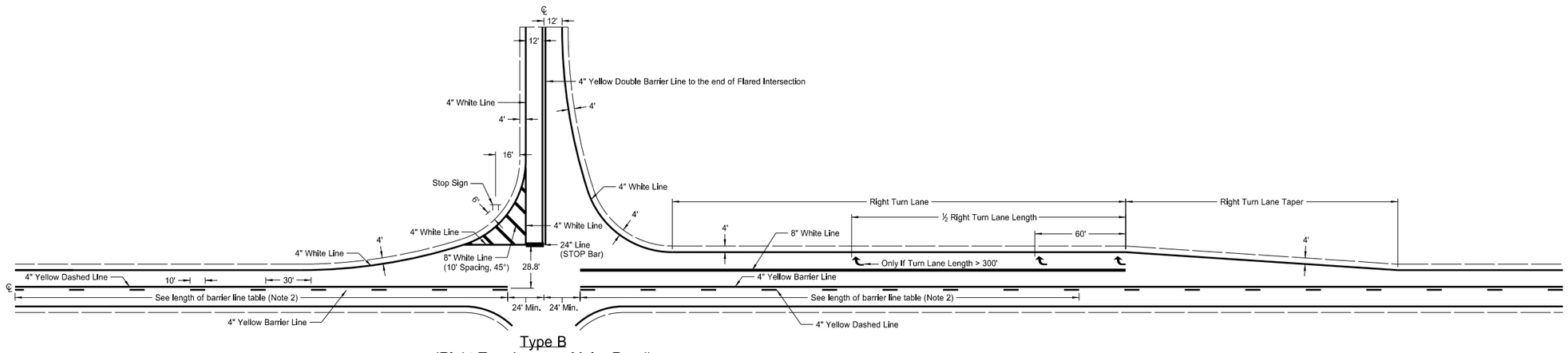
(No Center Left Turn Lane on Major Road)

D-762-5



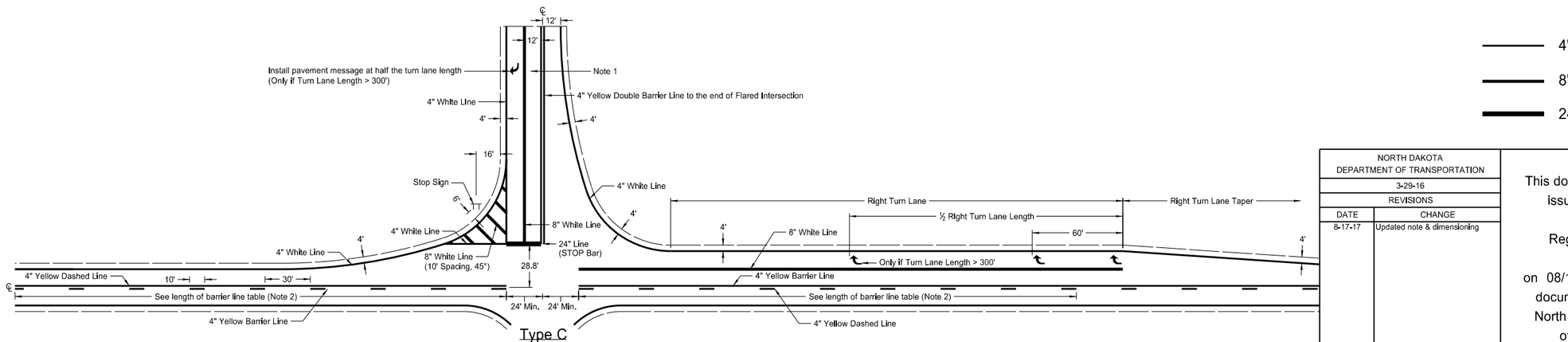
Type A

(No turn lanes present)



Type B

(Right Turn Lane on Major Road)



Type C

(Right Turn Lane on Major Road, and Turn Lane on Minor Road)

Notes

1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
2. The barrier lines have variable distances dependent on speed limit. Obtain barrier line length from table below (stopping sight distance.)

Table for Length of Barrier Line									
Speed Limit (mph)	30	35	40	45	50	55	60	65	70
Minimum Length	200'	250'	305'	360'	425'	495'	570'	645'	730'

4" Marking

8" Marking

24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Updated note & dimensioning

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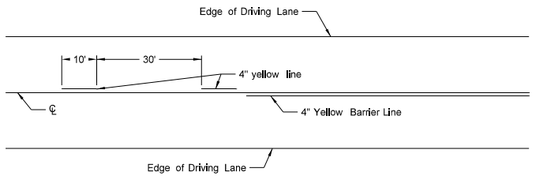
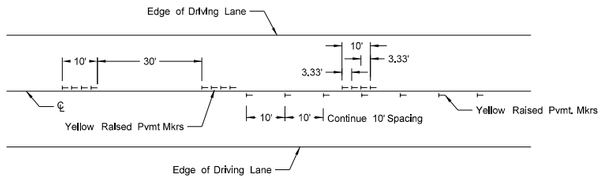
SHORT-TERM PAVEMENT MARKING

D-762-11

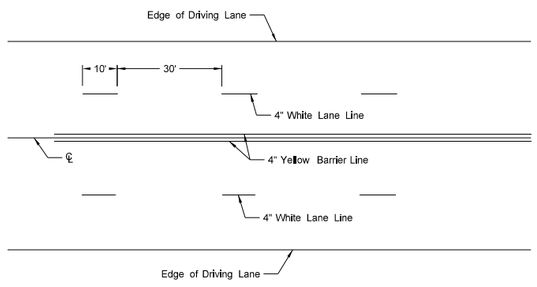


Painted or Tape Lines

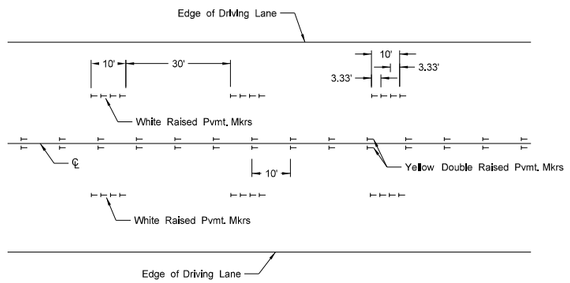


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

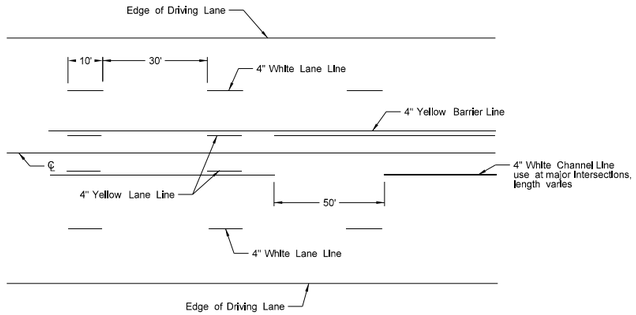


Painted or Tape Lines

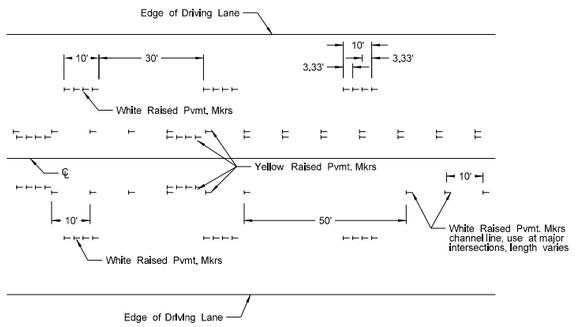


Raised Pavement Markers

FOUR LANE ROADWAY

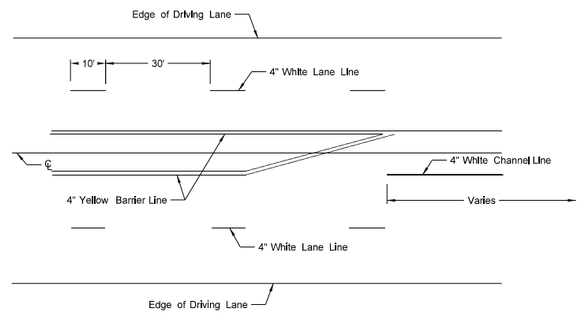


Painted or Tape Lines

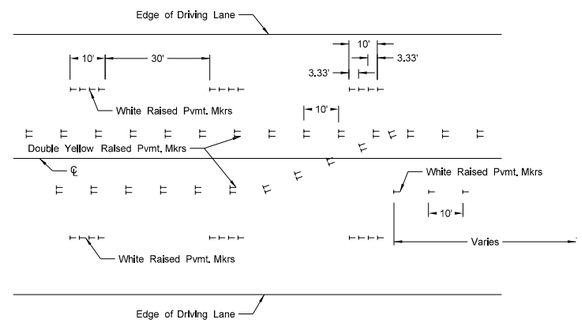


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Two-lane two-way roadways shall have no passing zones placed as shown. No passing zone signs may be placed in lieu of short term no passing zone pavement markings. These signs will be allowed to remain in place for three days, at which time the short term no passing zone pavement marking shall be placed.

2. Short term center line stripe (paint) on top lift shall be carefully placed with exact spacing so that the permanent stripe will match when applied.

3. Raised markers and tape markings shall be removed after permanent pavement marking has been installed. Removed markings shall become the property of the contractor.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)

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