

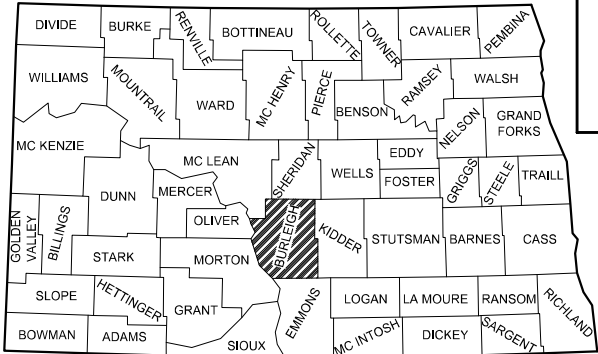
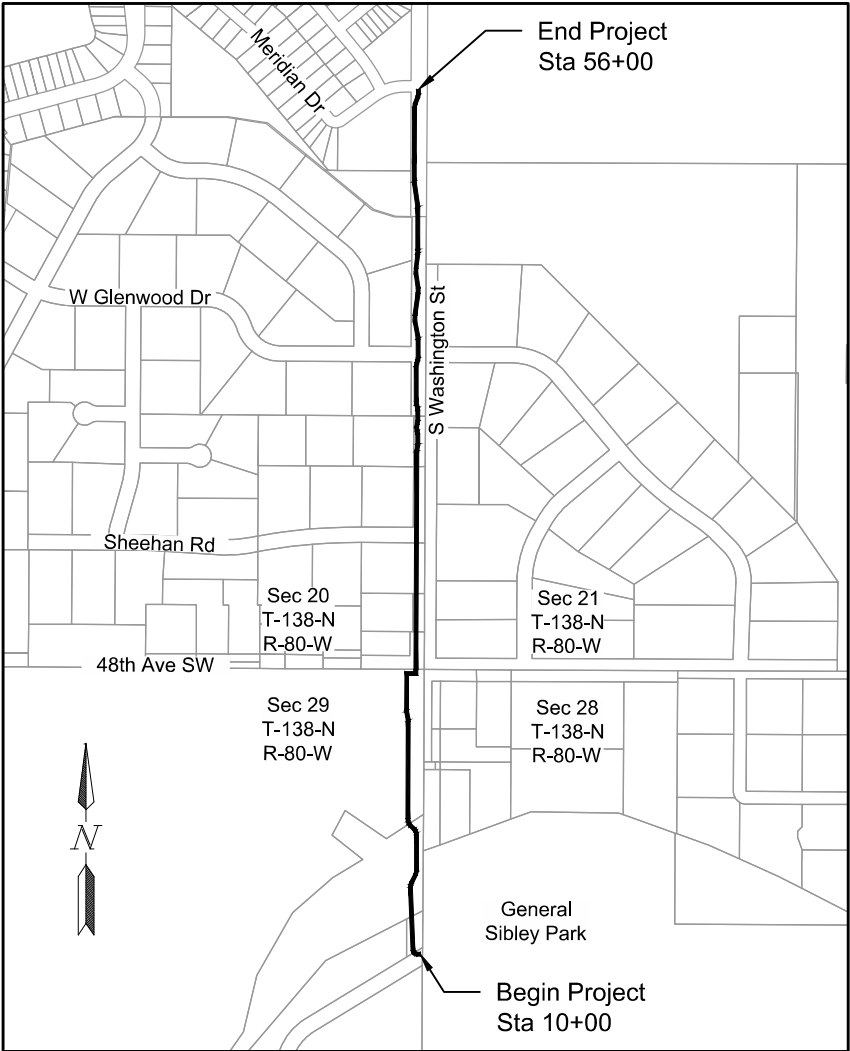
	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	23910	1	1

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
TAC-1-981(138)

Bismarck Parks and Recreation District
Burleigh County
South Washington Street from Meridian Drive to General Sibley Park
Grading, Culverts, Shared Use Path, Signing, & Pavement Marking

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2024
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
TAC-1-981(138)		
South Washington Street Trail	0.871	0.871

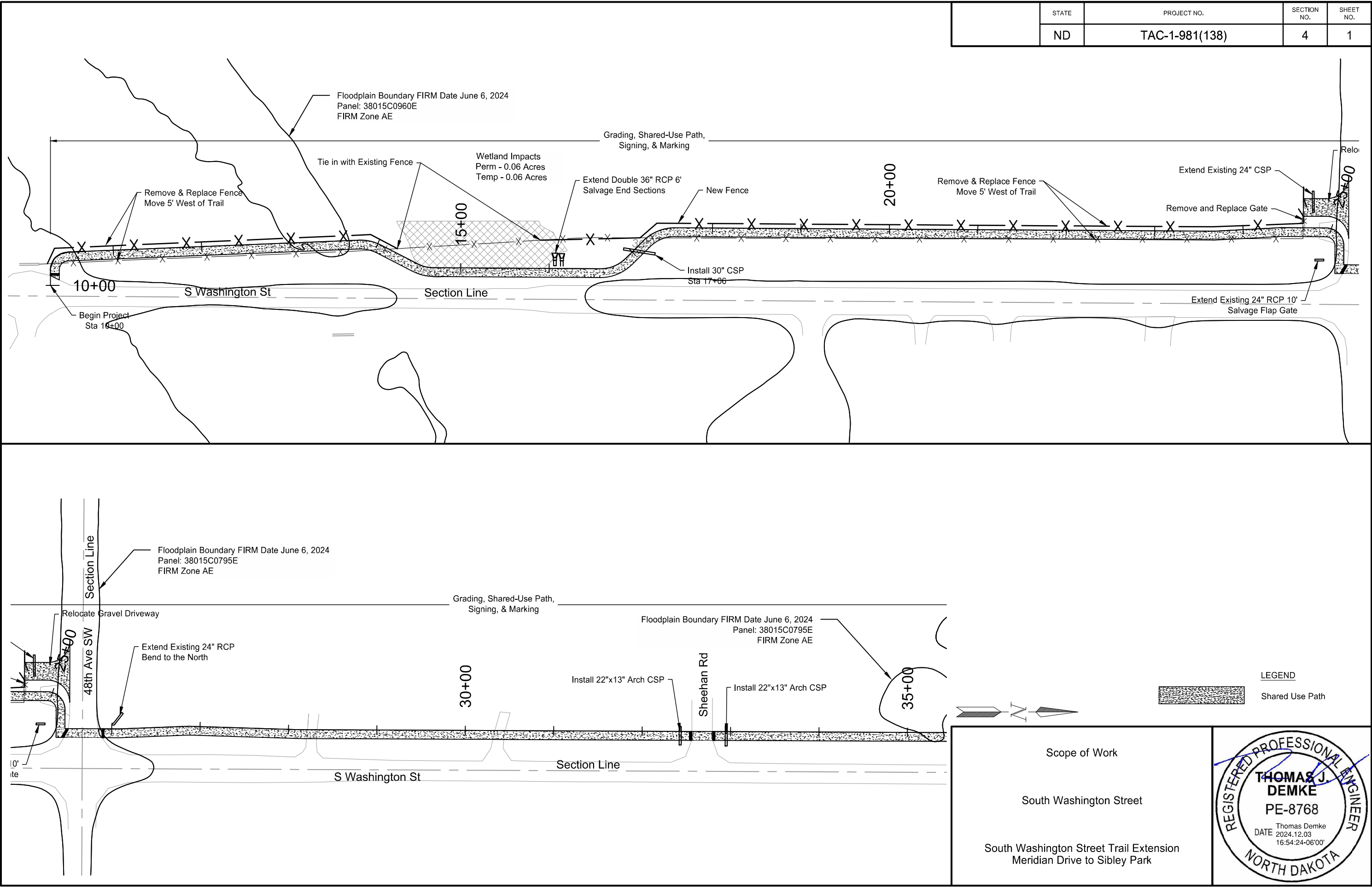


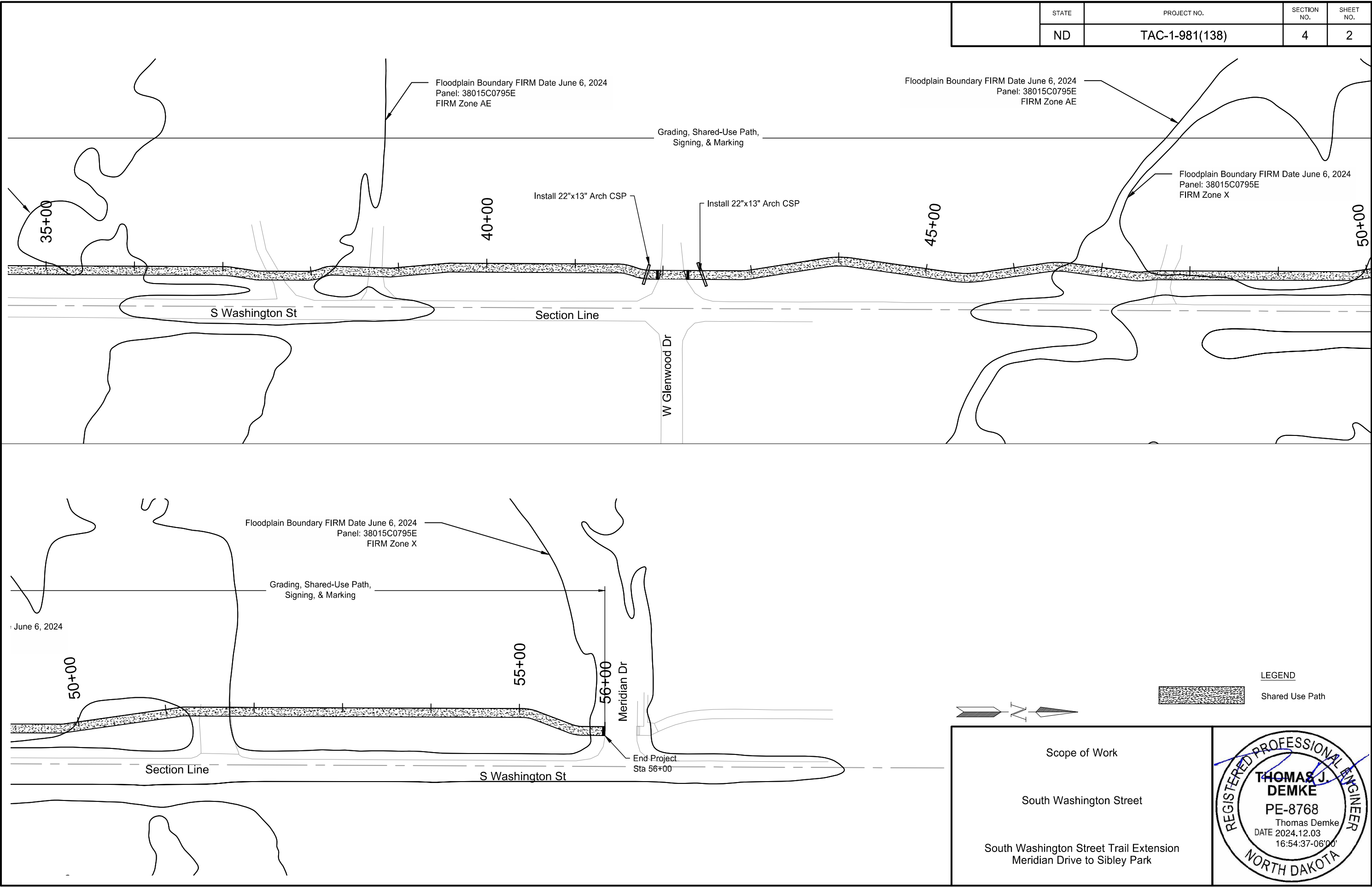
STATE COUNTY MAP

DESIGNER Thomas Demke, PE
DESIGNER Amanda Vetter, PE, PTOE
DESIGNER Derek Anderson, PE
DESIGNER Bryce Mathison
DESIGNER Ethan Haley

APEX ENGINEERING GROUP

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2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
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8	1	Quantities	D-260-1	Erosion And Siltation Controls - Silt Fence					
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			D-714-5	Corrugated Steel Pipe Arch Culverts And End Sections					
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			D-714-27	Pipe Installation Detail for Longitudinal Mainline Pipe or Pipe Not Under the Roadway					
			D-750-2	Sidewalk					
			D-750-3	Curb Ramp Retrofit Details					
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SPECIAL PROVISIONS									
Number	Description								
SSP 1	Temporary Erosion and Sediment Best Management Practices								
SP 237(24)	Commercial Grade Asphalt								
PSP 30(24)	Permits and Environmental Considerations								
REGISTERED PROFESSIONAL ENGINEER THOMAS J. DEMKE PE-8768 Thomas Demke DATE 2024.12.03 16:54:09-06'00' NORTH DAKOTA									



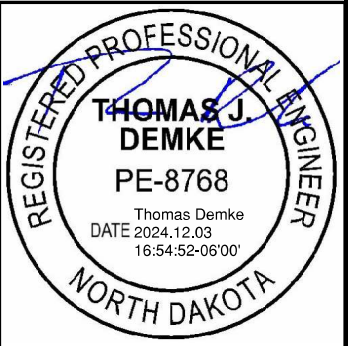


NOTES

GENERAL NOTES

- 100-P01 UTILITIES: All utility companies were notified to mark their services. All underground utilities shown were either marked by their owners in the field or taken from maps supplied to Apex Engineering Group Inc. by the utility owner at the time of the survey. Apex Engineering Group Inc. does not certify to the completeness and/or accuracy of these locations. Persons using this survey should contact each utility company to verify that all utilities.
- Take measures to protect all existing utilities. Repair any damage caused by work at contractor's expense.
- 107-500 PAVEMENT SWEEPING: Sweep the roadways adjacent to work area at the end of each day. Use a vacuum or pickup type sweeper.
- 107-P01 HAUL ROAD RESTRICTIONS: Follow all and any local road authority haul road restrictions.
- 107-P02 SITE ACCESS: Access construction zone from public road or right of way. Avoid using private driveways as access, any damage to roadway or private driveways shall be repaired at the contractor's expense. Maintain access to homes and businesses for duration of construction.
- 201-P01 CLEARING AND GRUBBING: Tree and Woody Vegetation Removal: Remove trees and woody vegetation as shown on plans. Required tree removal limits are at minimum 14 feet, 2 feet outside of each edge of path or Grade Tie limits shown in the plans, whichever is greater. Remove branches vertical of the trail to ensure construction operations can proceed. Any tree of 3" DBH or larger are to be removed during inactive season of the Northern Long-Eared Bat from November 1 to April 14th. This includes the removal of felled trees that can be considered habitat. Removal of all trees, woody vegetation and stumps and all other items associated with this shall be included in the bid price for "Clearing and Grubbing".
- 201-P02 Protect trees and roots of trees that are not removed.
- 202-P02 REMOVAL OF BITUMINOUS SURFFACING: Include the cost to sawcut asphalt in the unit price bid for "Removal of Bituminous Surfacing".
- 203-010 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.
- 203-P01 REMOVE AND SALVAGE TOPSOIL: There will be excess topsoil on the project. The salvaged topsoil will become the property of the Contractor and will be removed from the site. All costs associated with the excess topsoil will be included in the price bid for "Topsoil". The estimated excess topsoil is 256 CY.
- 203-P02 COMPACTION AND DENSITY CONTROL: Compact material as specified in Section 203.04 G.3, Compaction Control, Type B.

- 203-P03 MAINTAIN DRAINAGE: Maintain drainage throughout construction of project. Maintain drainage in a manner that does not inundate roadways, driveways, or adjacent properties.
- 251-P01 SEEDING CLASS III: Seed disturbed ground immediately after topsoil placement to promote early seed growing conditions. Use a seed mixture as follows:
- | | |
|--------------------|-------------------|
| Seed | Percent by Weight |
| Fairway Crested | 30% |
| Sheep Fescue | 30% |
| Perennial Ryegrass | 40% |
- Apply the above mix at 90 lbs./acre. Include all cost for labor, equipment, and materials necessary to complete the work in the price bid for "Seeding Class III."
- 430-P01 COMMERCIAL GRADE HOT MIX ASPHALT: Submit a mix design that meets FAA 43 for approval. The Hot Mix Asphalt used will be accepted by one random aggregate and mix sample representing the plan quantity for the project.
- 430-P02 ORDINARY COMPACTION OF HOT MIX ASPHALT: Compact asphalt in accordance with Section 430.04 I.3 of the Standard Specifications, modified as follows; Use one self-propelled roller such as a single drum or double drum steel roller of adequate size to obtain compaction without damage to the trail surface or subgrade.
- 714-P01 PIPE CONDUIT: All new Pipe Conduit installed are intended to be Corrugated Steel Pipe. Match existing Pipe Conduit material for Pipe Conduit Extensions.
- 714-P02 FLAP GATE: Include all costs associated with Remove and Relay Flapgate in the bid price for "Flap Gate – Relay All Sizes".
- 750-P01 SIDEWALK CONCRETE 6IN: Include the cost to sawcut and remove asphalt to provide a clean tie in edge for Concrete Sidewalk. Include the sawcut and removal in the unit price "Sidewalk Concrete 6IN".
- 752-P01 VEHICLE GATE: Salvage all mounting hardware and gates. Reset gate in location specified in the plan sheets. Include all costs associated with removing, salvaging, resetting, and all other items associated with resetting/installing the gate in the bid price for "Reset Vehicle Gate". See Section 20 for gate detail.
- 752-P02 FENCE: Resetting of fence will require additional corner posts. Include cost of corner posts and all costs associated with installing additional corner posts in the bid price for "Fence Remove and Reset".



ENVIRONMENTAL NOTES

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

EN-1 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Ben Holen by e-mail - bholen@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter).

EN-2 THREATENED AND ENDANGERED SPECIES: The project is located near/within suitable habitat for the species listed in the following

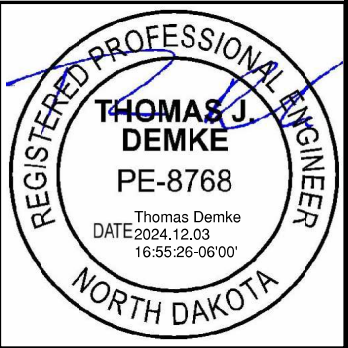
SPECIES	HABITAT	PRESENCE
Northern Long-Eared Bat	Forested/Wooded Areas/Bridges/Box Culverts/Caves/Mines	Active Season: April 15 - October 31* Inactive Season: Nov 1 – April 14*

*Time frames can differ slightly, depending on the year

If any of the above threatened and endangered species are identified within 1 mile of the project, the Contractor will notify the Engineer immediately and cease construction activities in the vicinity until an avoidance area is established. The Engineer will establish an avoidance area that is at least a 0.5 mile and immediately coordinate with the USFWS (701-355-8513), FHWA (701-221-9464), and NDDOT Environmental and Transportation Services (701-328-2592). The Contractor will not resume work within the avoidance area until the Engineer has confirmed with the agencies that work may proceed (either the species have left the area, or approved avoidance/minimization measures have been implemented).

- Marck tree removal limits according to plans prior to removal of trees. Stay within clearing limits.
- Do not remove documented Norther Long-Eared Bat roosts that are still suitable for roosting, or trees within 0.25 miles of roosts, or documented foraging habitat any time of year.

EN-3 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				
SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL
103	0100	CONTRACT BOND	L SUM	1
201	0330	CLEARING & GRUBBING	L SUM	1
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	72
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	1
203	0101	COMMON EXCAVATION-TYPE A	CY	835
203	0109	TOPSOIL	CY	1,153
203	0140	BORROW-EXCAVATION	CY	528
216	0100	WATER	M GAL	1
251	0300	SEEDING CLASS III	ACRE	4
253	0201	HYDRAULIC MULCH	ACRE	4
255	0103	ECB TYPE 3	SY	294
260	0100	SILT FENCE UNSUPPORTED	LF	233
260	0101	REMOVE SILT FENCE UNSUPPORTED	LF	233
261	0112	FIBER ROLLS 12IN	LF	1,315
261	0113	REMOVE FIBER ROLLS 12IN	LF	1,315
302	0120	AGGREGATE BASE COURSE CL 5	TON	1,162
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	1,080
702	0100	MOBILIZATION	L SUM	1
704	0100	FLAGGING	MHR	200
704	1000	TRAFFIC CONTROL SIGNS	UNIT	652
704	1054	SIDEWALK BARRICADE	EA	2
704	1060	DELINEATOR DRUMS	EA	24
704	1067	TUBULAR MARKERS	EA	20
714	0615	PIPE CONC REINF 24IN CL III	LF	28
714	0905	PIPE CONC REINF 36IN CL III	LF	12
714	4110	PIPE CONDUIT 30IN	LF	36
714	4216	PIPE CONDUIT ARCH 22IN X 13IN	LF	95
714	5035	PIPE CORR STEEL .064IN 24IN	LF	24
714	5820	END SECT CORR STEEL .064IN 24IN	EA	1
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	3
714	9925	FLAP GATE-RELAY ALL SIZES	EA	1
750	0115	SIDEWALK CONCRETE 4IN	SY	96
750	0140	SIDEWALK CONCRETE 6IN	SY	50
750	2115	DETECTABLE WARNING PANELS	SF	160
752	0922	FENCE REMOVE & RESET	LF	1,290
752	2110	RESET VEHICLE GATE	EA	1
752	2120	REMOVE VEHICLE GATE	EA	1
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	32
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	24
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	174
754	0592	RESET SIGN PANEL	EA	4
754	0593	RESET SIGN SUPPORT	EA	1
762	1307	PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED	LF	149
762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED	LF	33

Estimated Quantities

South Washington Street

South Washington Street Trail Extension
Meridian Drive to Sibley Park

REGISTERED PROFESSIONAL ENGINEER
THOMAS J. DEMKE
PE-8768
Thomas Demke
DATE 2024.12.03 16:55:48-06'00'
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Basis of Estimate
Aggregate Base Course CL 5 @ 1.875 Ton/CY
Commercial Hot Mix Asphalt @2.0 Ton/CY
Included: PG 58S-28 Asphalt Cement @ 6%
Tack Coat @ 0.05 Gal/SY
PG 58S-28 ASPHALT CEMENT @ 4.7%

Common Excavation
Any existing aggregate base is included in the Common Excavation quantity.
Payment shall be plan quantity.
25% additional volume is included for shrinkage in earth embankment.

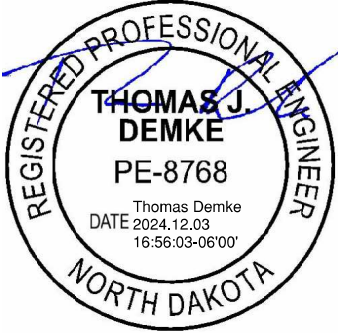
Borrow Excavation
25% additional quantity included in the bid item "Borrow Excavation" to Account for Shrinkage.

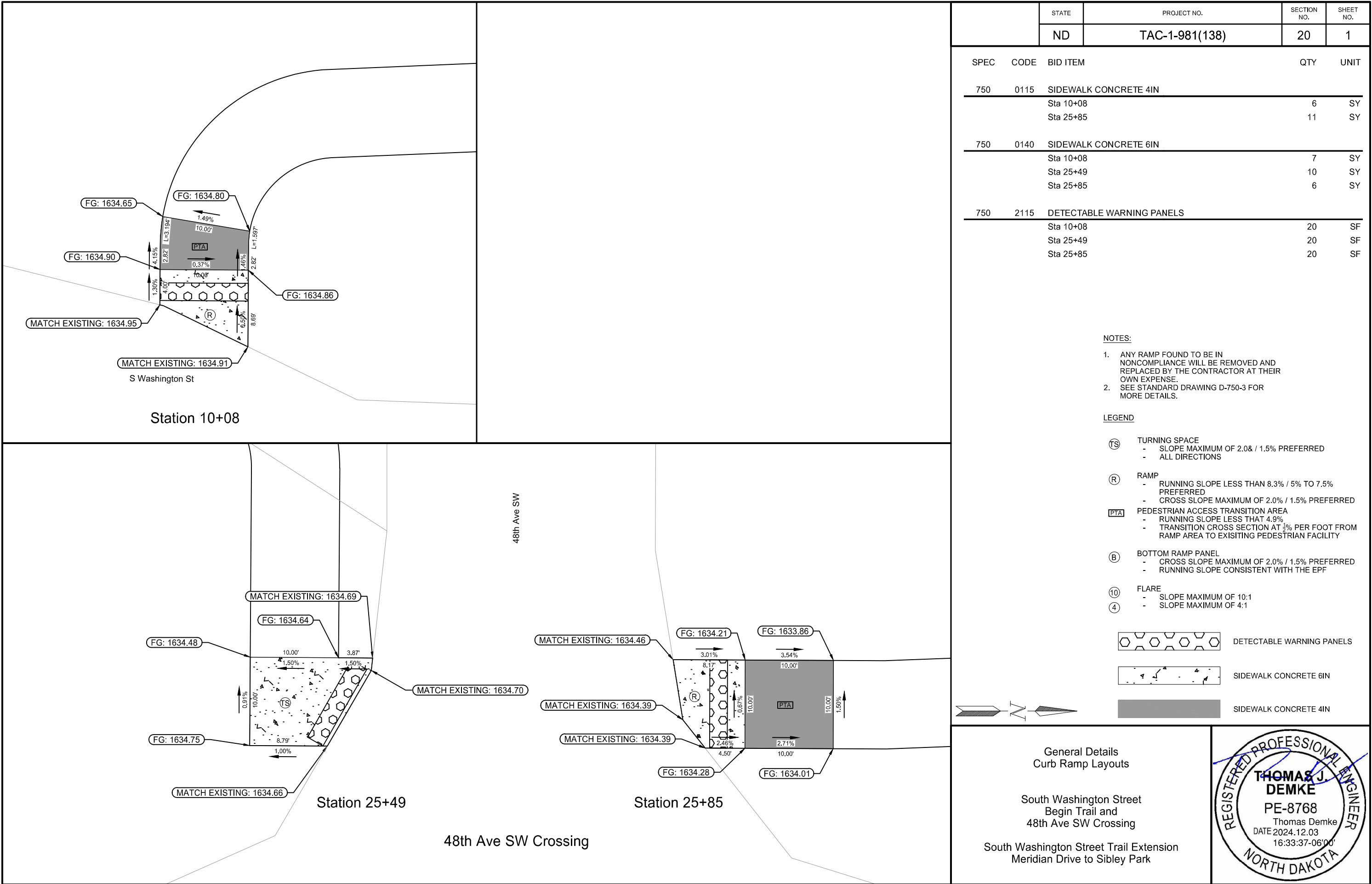
Water
It is assumed 10 gal/CY of water for Embankment, 20 gal/CY for aggregate, and water for dust control. Bid quantity is assumed to be 1 Mgal.

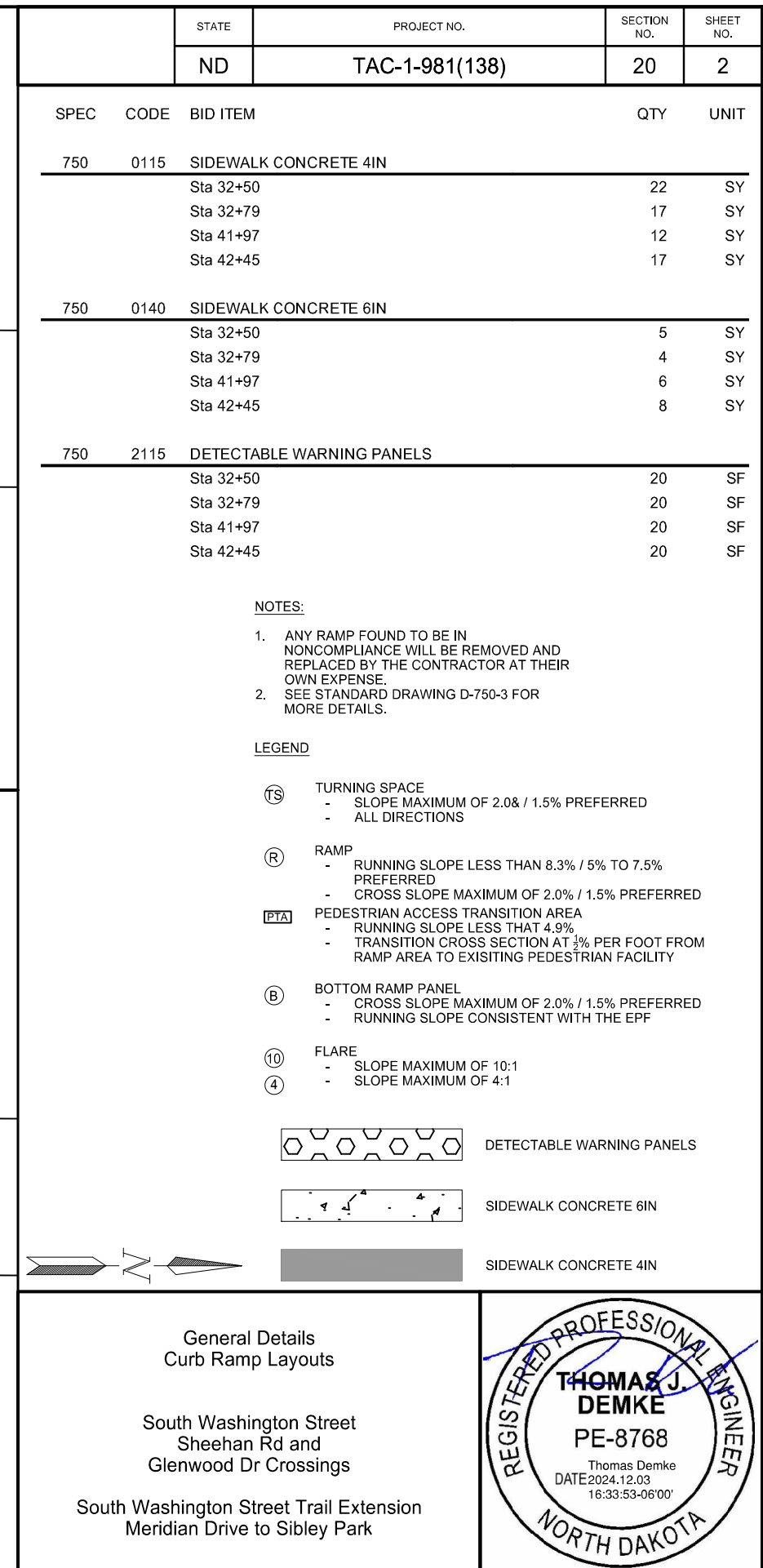
Basis of Estimate

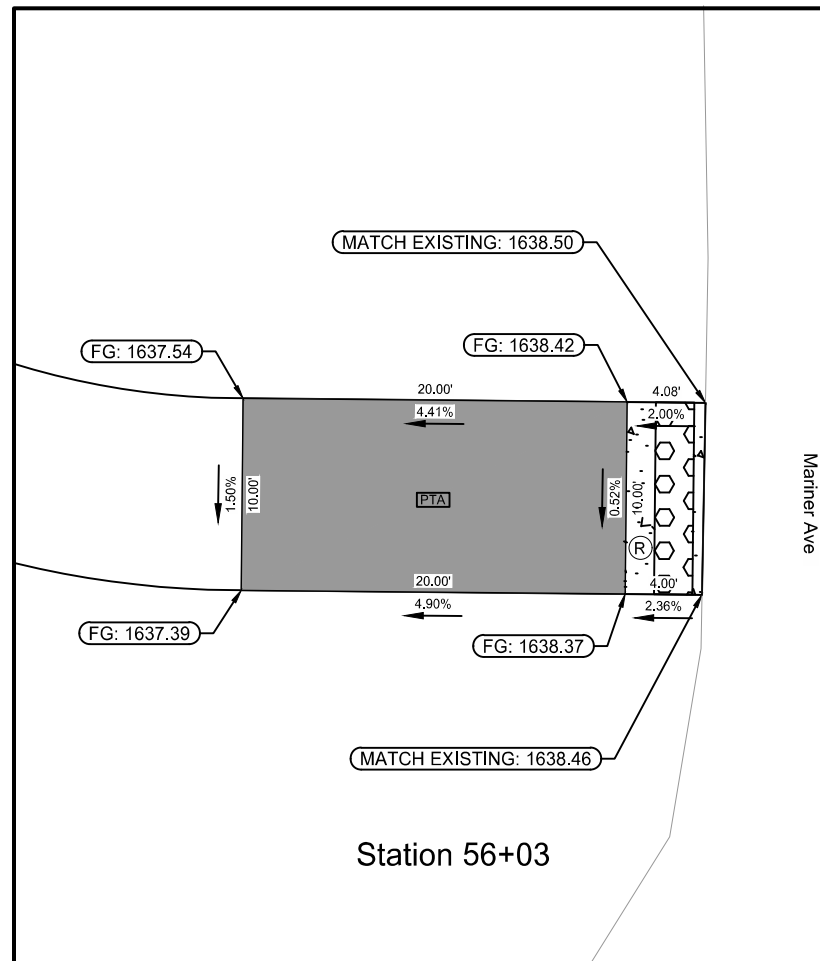
South Washington Street

South Washington Street Trail Extension
Meridian Drive to Sibley Park









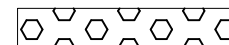
NOTES:

1. ANY RAMP FOUND TO BE IN NONCOMPLIANCE WILL BE REMOVED AND REPLACED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
2. SEE STANDARD DRAWING D-750-3 FOR MORE DETAILS.

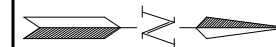
LEGEND

- (TS) TURNING SPACE
 - SLOPE MAXIMUM OF 2.0% / 1.5% PREFERRED
- RAMP
 - CROSS SLOPE MAXIMUM OF 2.0% / 1.5% PREFERRED
 - CROSS SLOPE MAXIMUM OF 2.0% / 1.5% PREFERRED
- (R) PEDESTRIAN ACCESS TRANSITION AREA
 - RUNNING SLOPE LESS THAN 4.9%
 - TRANSITION CROSS SECTION AT $\frac{1}{2}$ PER FOOT FROM RAMP AREA TO EXISTING TRANSITION FACILITY
- (PTA) PEDESTRIAN TRANSITION AREA
 - CROSS SLOPE MAXIMUM OF 2.0% / 1.5% PREFERRED
 - RUNNING SLOPE CONSISTENT WITH THE EPF
- (B) BOTTOM RAMP PANEL
 - CROSS SLOPE MAXIMUM OF 2.0% / 1.5% PREFERRED
 - RUNNING SLOPE CONSISTENT WITH THE EPF
- (10) FLARE
 - SLOPE MAXIMUM OF 10:1
 - SLOPE MAXIMUM OF 4:1
- (4) FLARE
 - SLOPE MAXIMUM OF 4:1

DETECTABLE WARNING PANELS



SIDEWALK CONCRETE 6IN



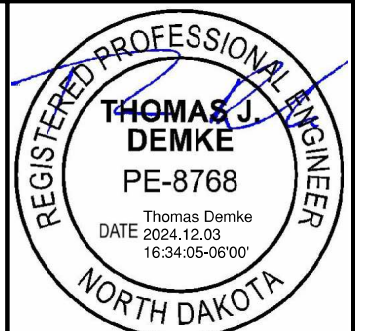
SIDEWALK CONCRETE 4IN

General Details

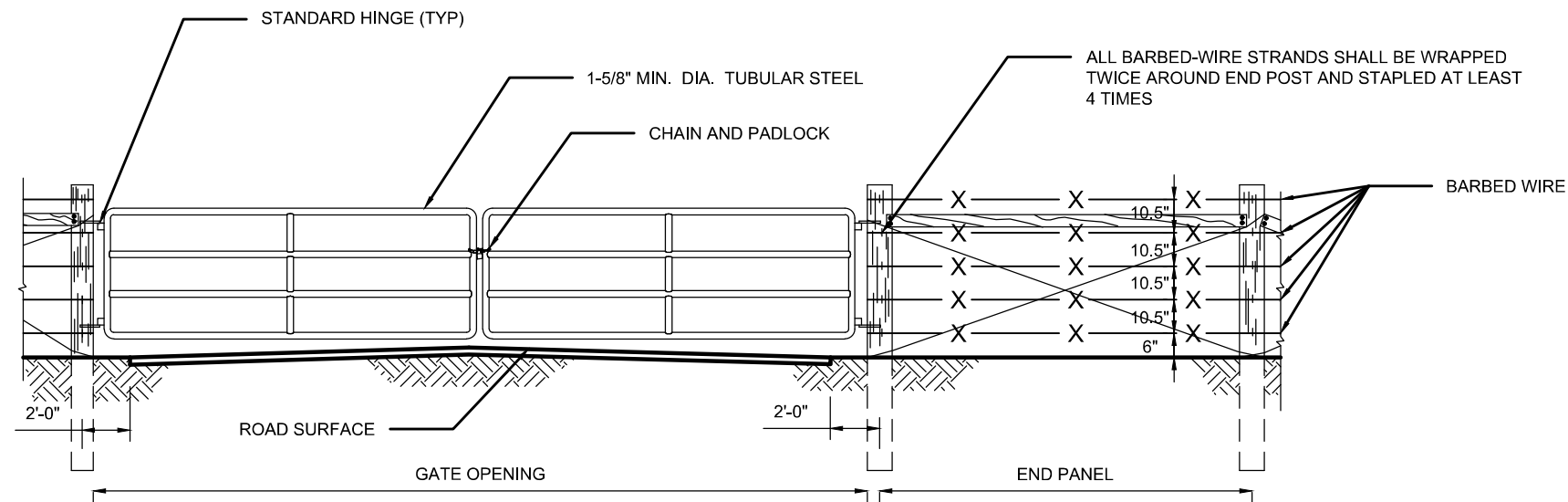
Curb Ramp Layouts

South Washington Street
Mariner Ave Crossing

South Washington Street Trail Extension
Meridian Drive to Sibley Park



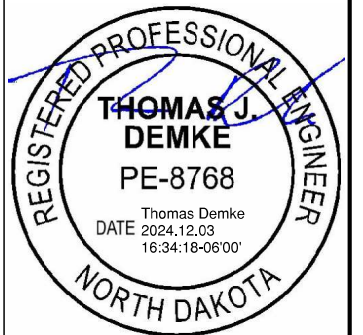
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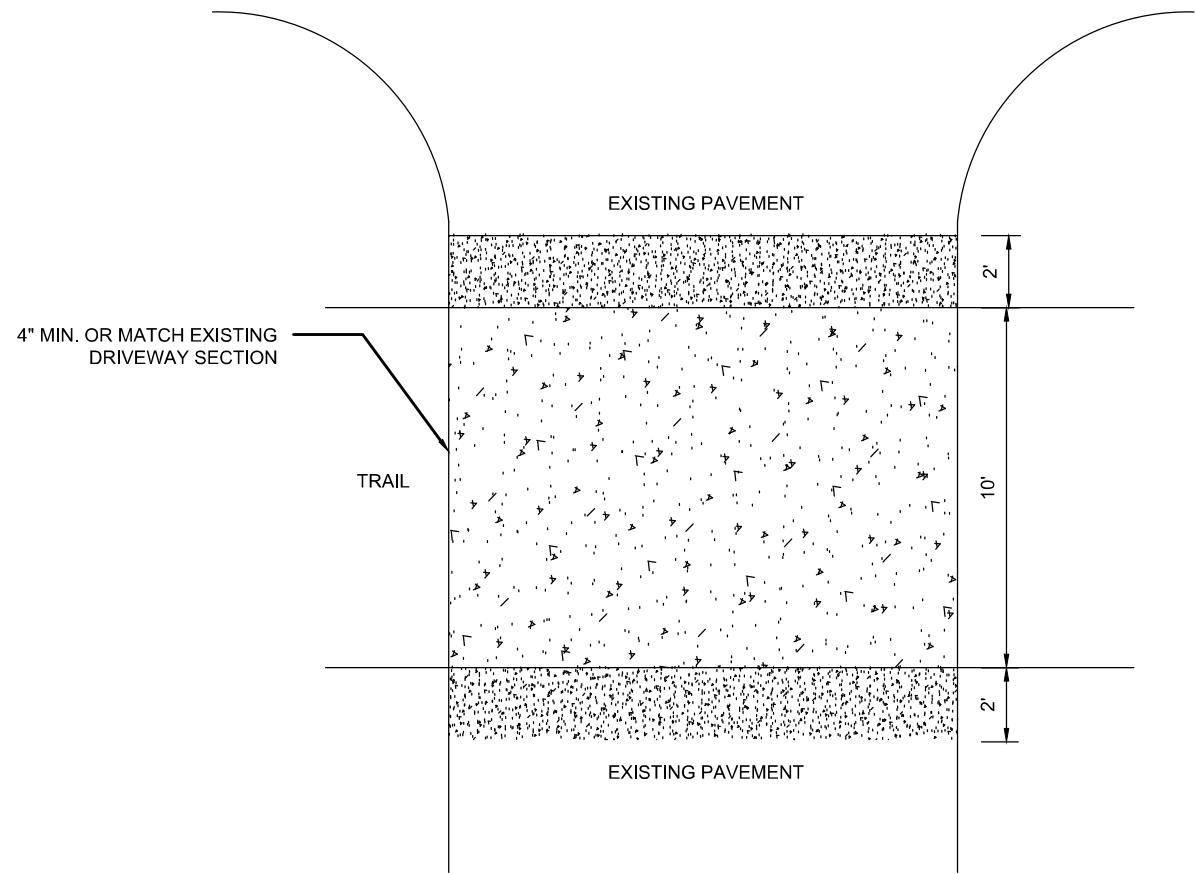
General Details
Typical Cattle-Panel Gate

South Washington Street

South Washington Street Trail Extension
Meridian Drive to Sibley Park



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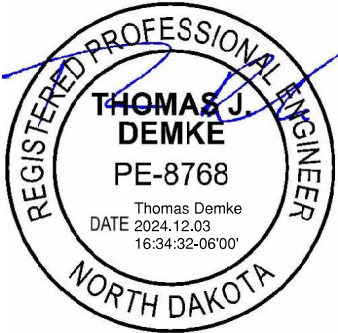


- NOTE:
1. REMOVE EXISTING PAVEMENT AT INTERSECTIONS 2 FEET OUTSIDE EDGE OF PATH.
 2. SLOPE TO MATCH PATH AND EXISTING DRIVEWAYS.

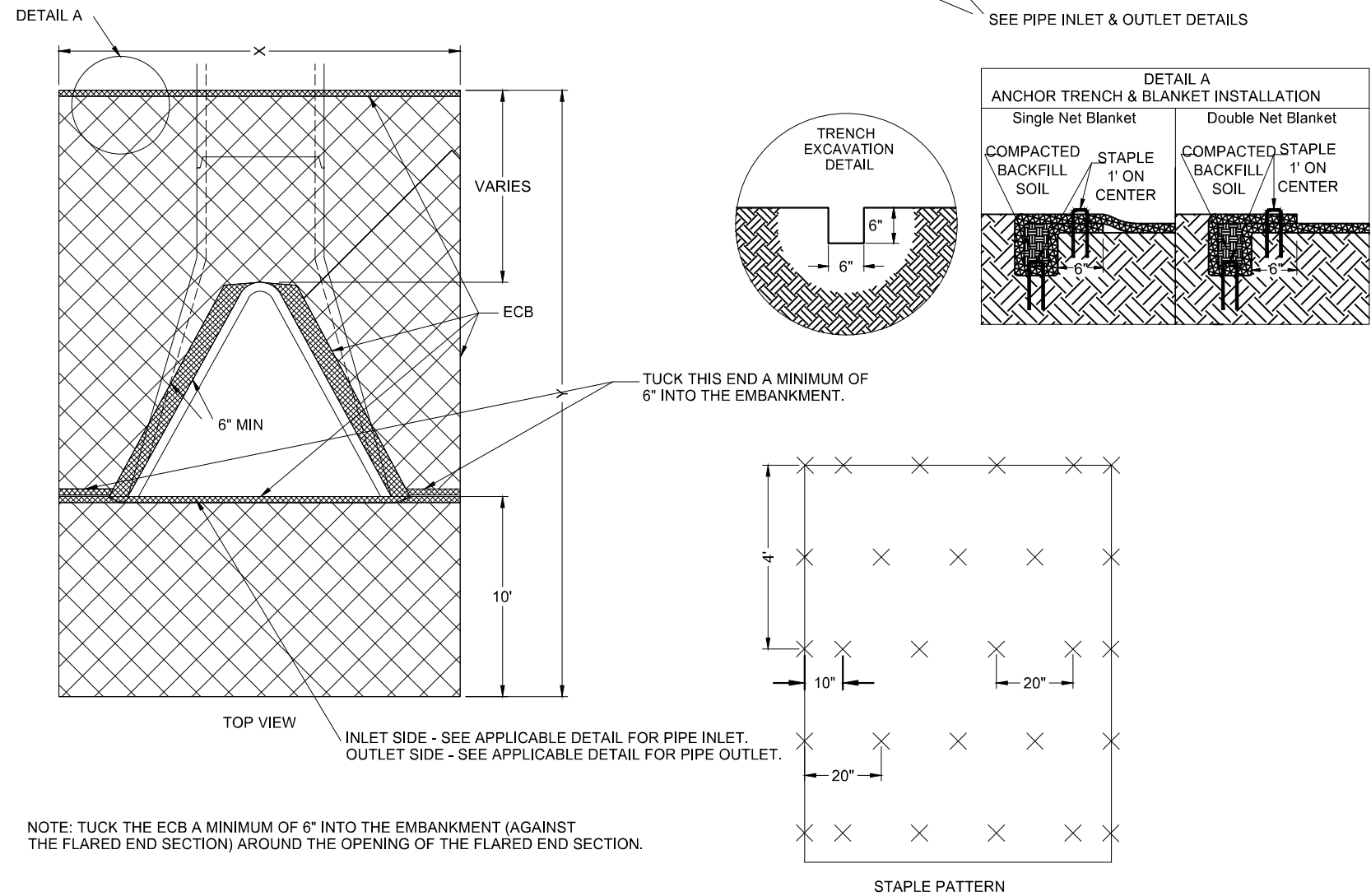
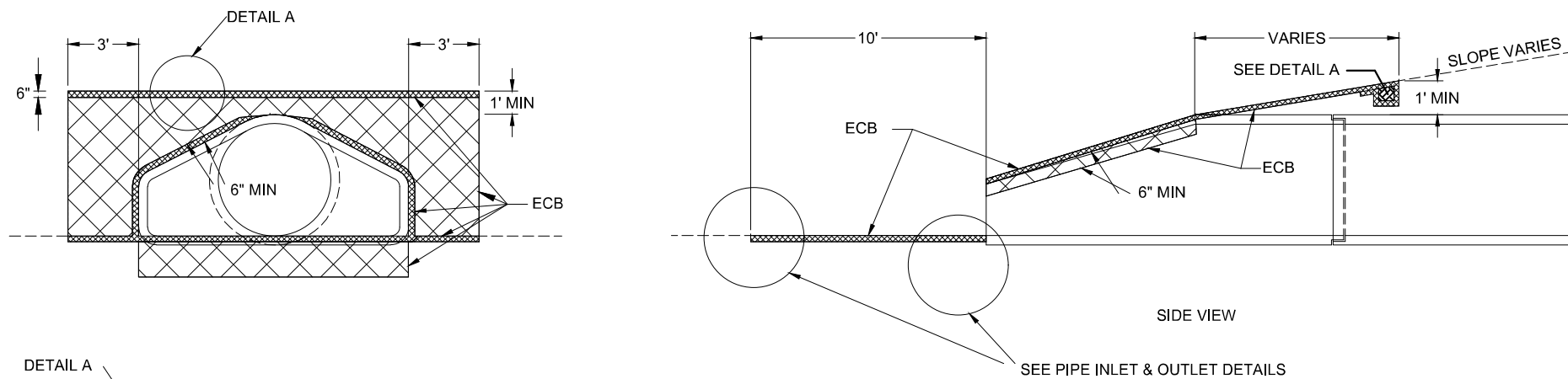
General Details
Typical Section at Driveway Crossings

South Washington Street

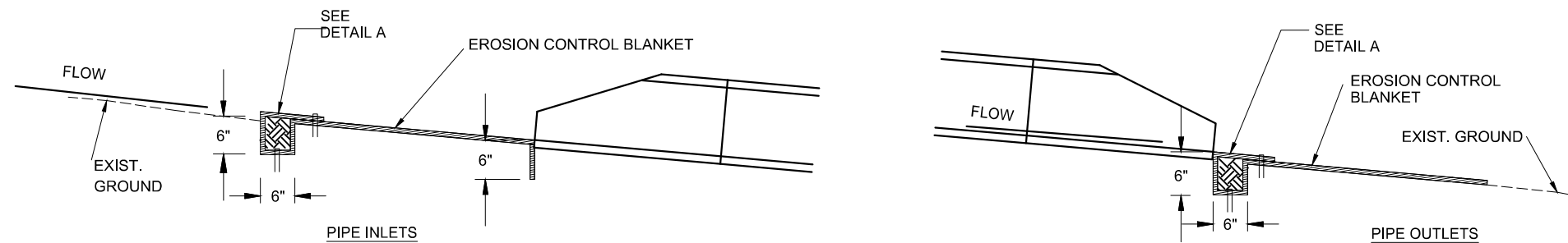
South Washington Street Trail Extension
Meridian Drive to Sibley Park



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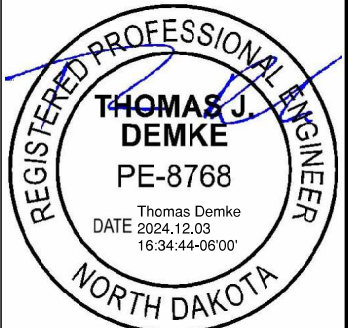
255 0103 ECB TYPE 3 CULVERTS							
		Pipe Diameter	No.	X	Y	Unit Quantity	Total Quantity
Station	Offset	(IN)		(FT)	(FT)	(SY)	(SY)
16+10	Rt	36	2	12.7	19.2	24	48
17+06	Lt & Rt	30	2	11.6	18.5	22	44
25+57	Lt	24	1	10.5	17.6	20	20
25+57	Rt	24	1	10.5	17.6	20	20
26+15	Lt	24	1	10.5	17.6	20	20
32+43	Lt & Rt	22x13	2	10.0	16.0	18	36
32+95	Lt & Rt	22x13	2	10.0	16.0	18	36
41+84	Lt & Rt	22x13	2	10.0	16.0	18	36
42+45	Lt & Rt	22x13	2	10.0	16.0	18	36
							294



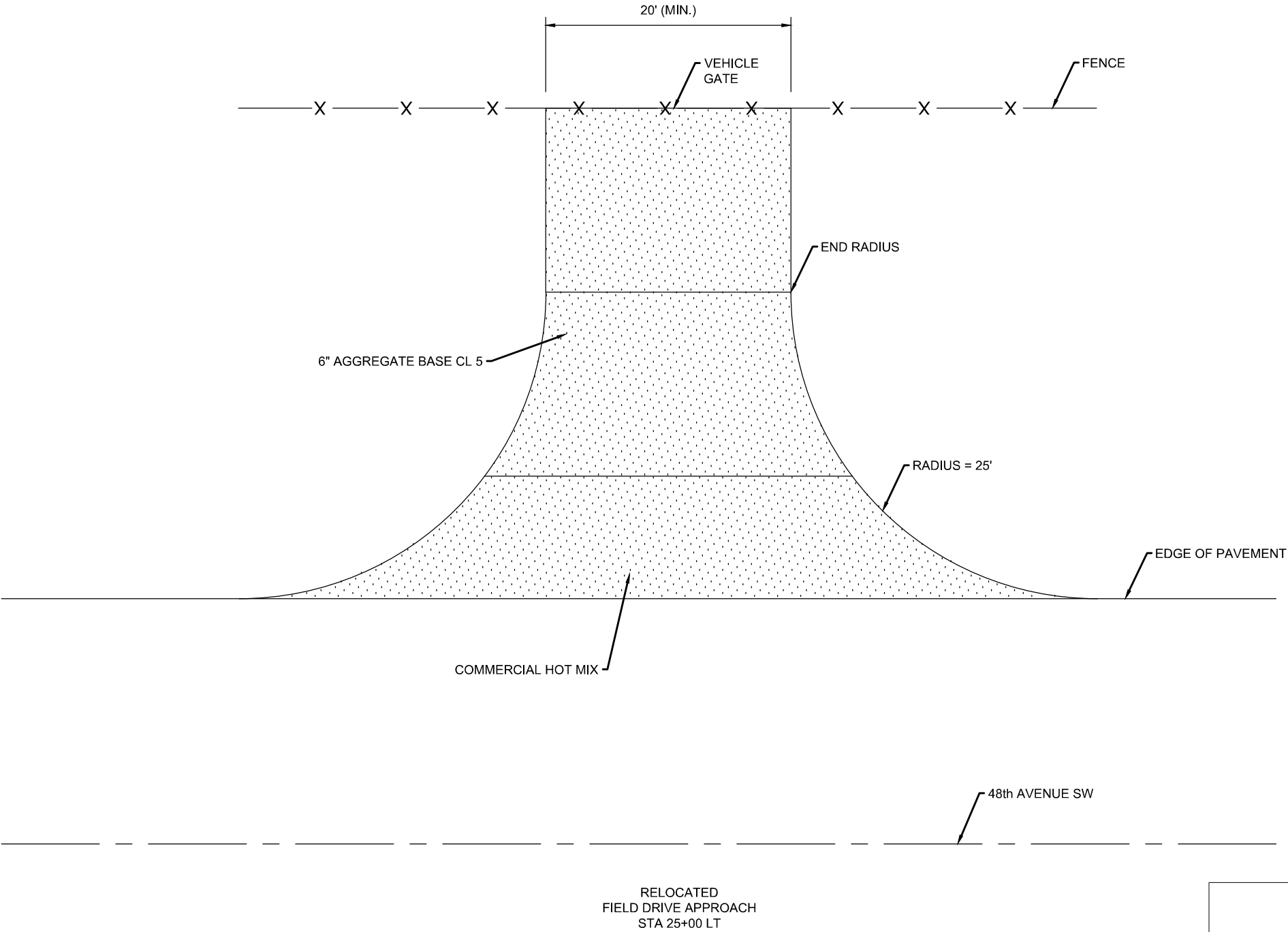
General Details
Culvert End Protection

South Washington Street

South Washington Street Trail Extension
Meridian Drive to Sibley Park



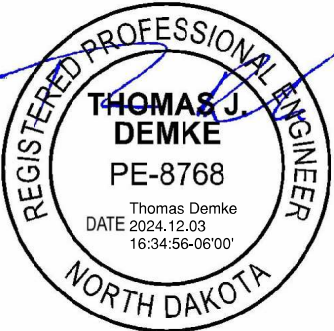
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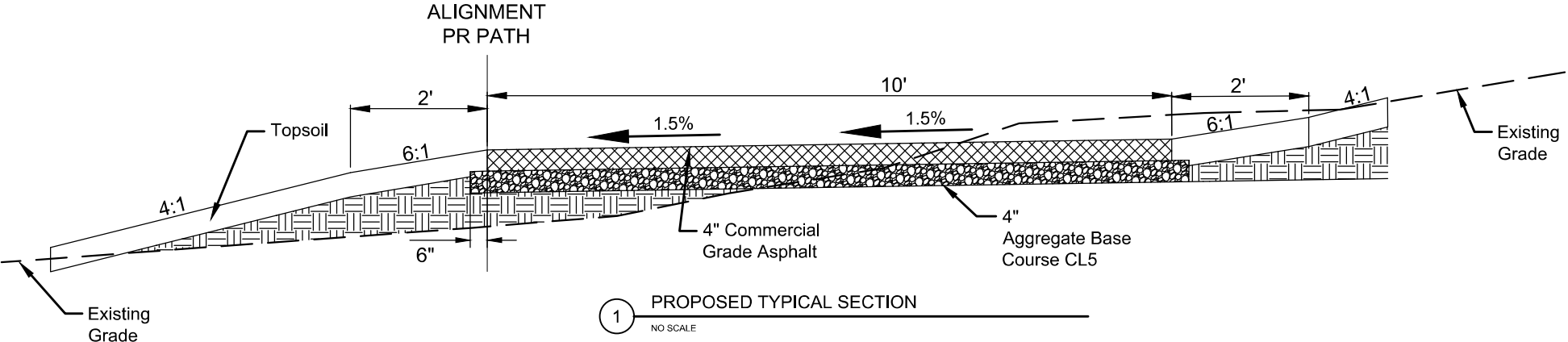
General Details
Field Drive Approach

South Washington Street

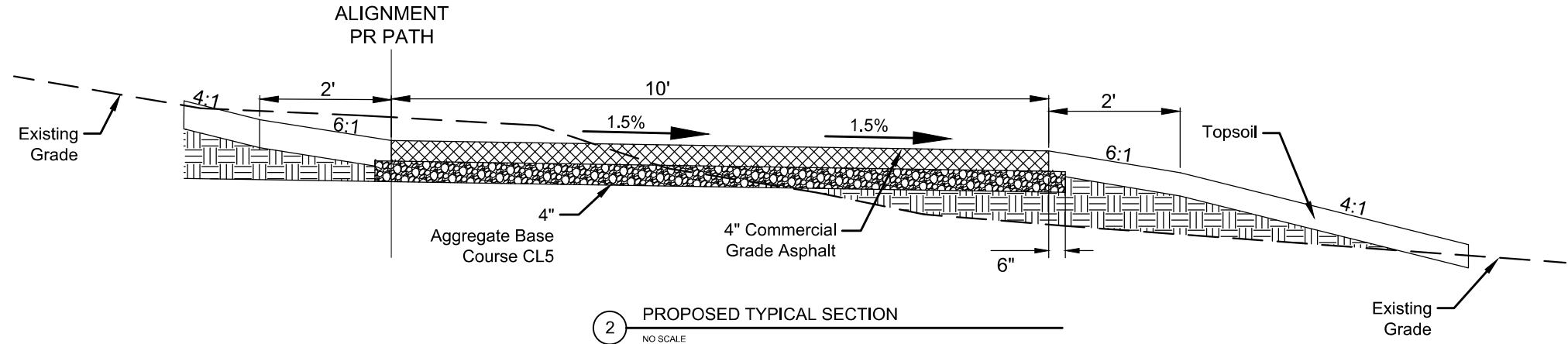
South Washington Street Trail Extension
Meridian Drive to Sibley Park



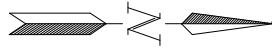
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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1 PROPOSED TYPICAL SECTION
NO SCALE



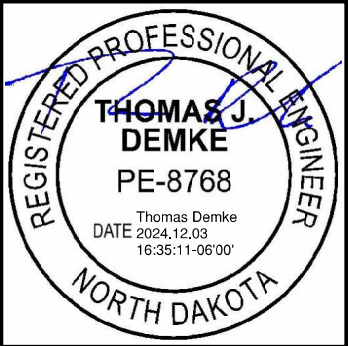
2 PROPOSED TYPICAL SECTION
NO SCALE

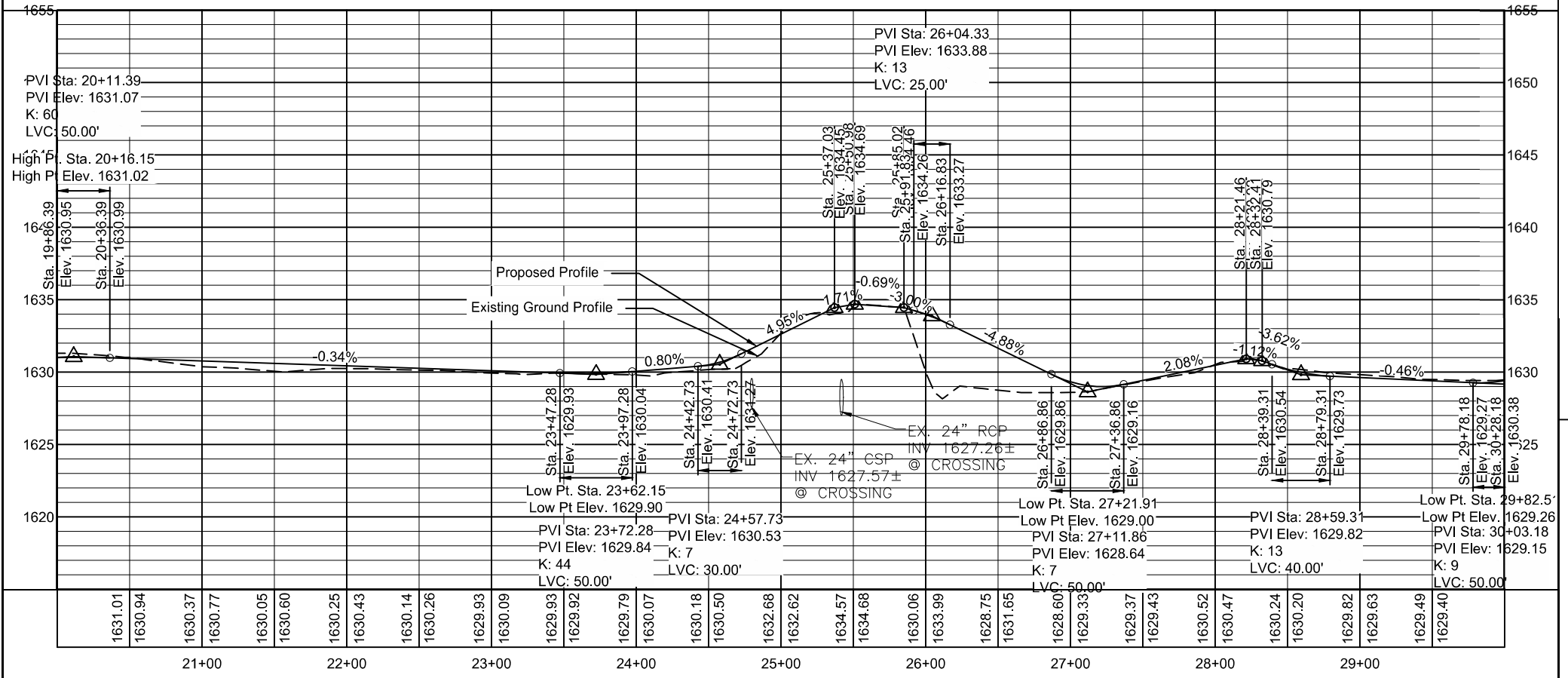
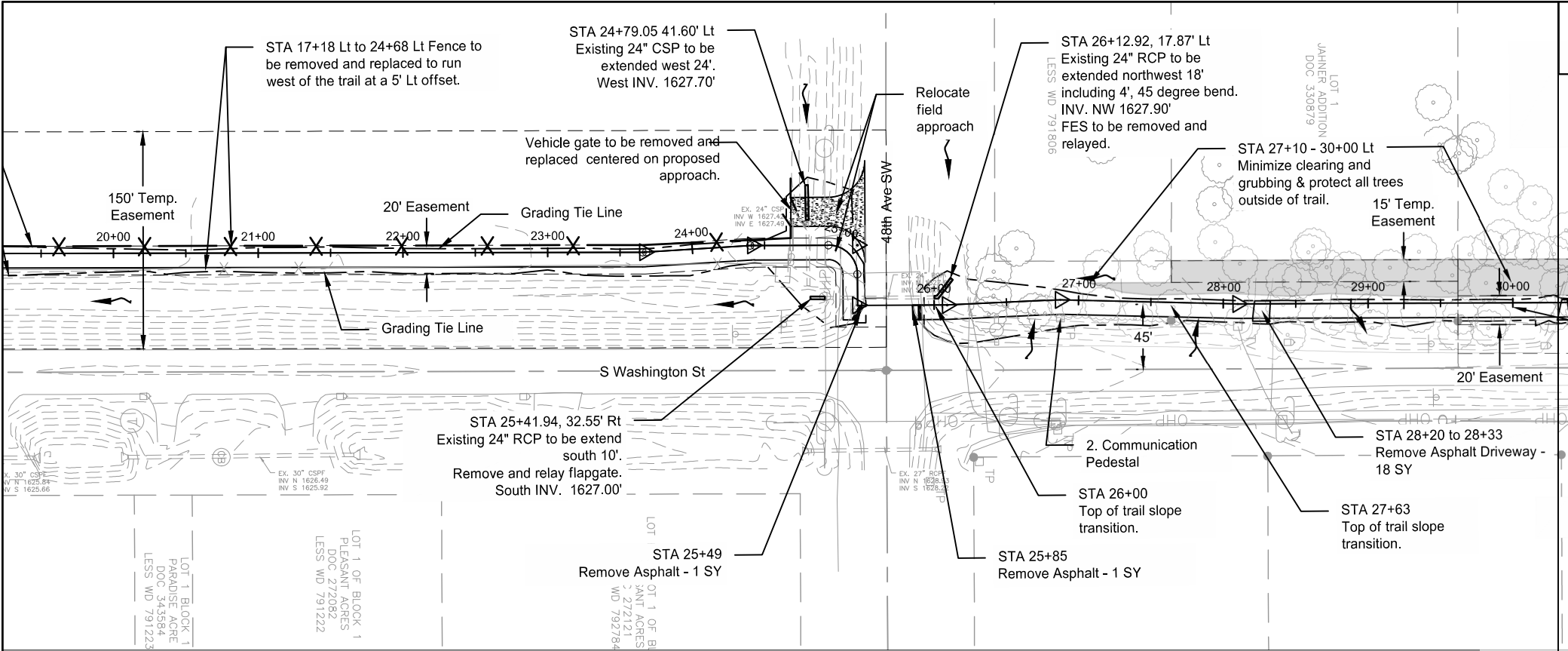


Typical Sections

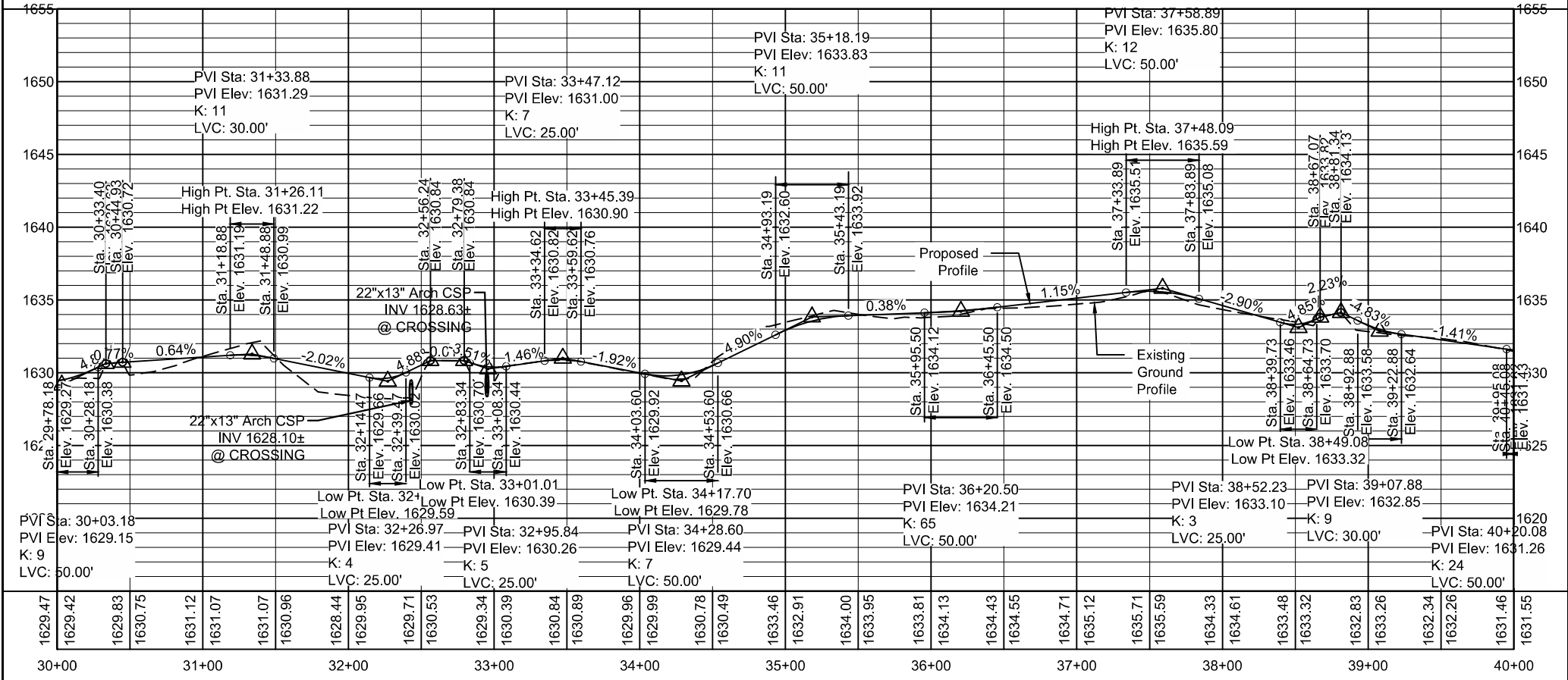
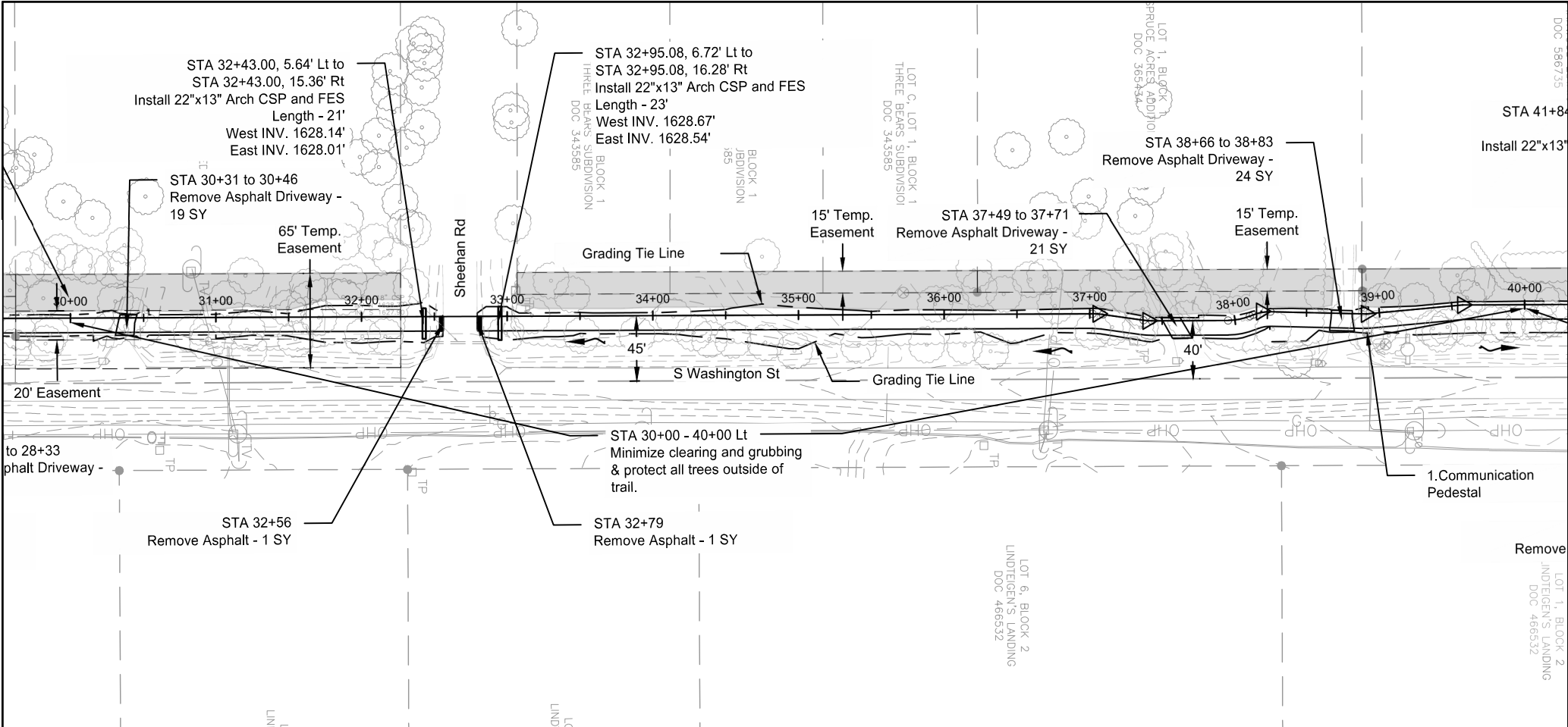
South Washington Street

South Washington Street Trail Extension
Meridian Drive to Sibley Park





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-1-981(138)	60	2
SPEC	CODE	BID ITEM	QTY	UNIT	
202	0132	REMOVAL OF BITUMINOUS SURFACING			
		Sta 25+49	1	SY	
		Sta 25+85	1	SY	
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES			
		Sta 24+79.05, 17.50' Lt - 24" CSP	1	EA	
302	0120	AGGREGATE BASE COURSE CL 5			
		Sta 20+00 to 30+00 including approach	287	TON	
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT			
		Sta 20+00 to 30+00	233	TON	
714	0615	PIPE CONC REINF 24IN CL III			
		Sta 25+41.91, 22.55' Lt - Sta 25+41.94, 32.55' Rt	10	LF	
		Sta 26+00.39, 5.34' Lt - 26+12.92, 17.87' Lt w/ 45 degree be	18	LF	
714	5035	PIPE CORR STEEL .064IN 24IN			
		Sta 24+79.49, 17.60' Lt - Sta 24+79.05, 41.60' Lt	24	LF	
714	5820	END SECT CORR STEEL .064IN 24IN			
		Sta 24+79.05, 41.60' Lt - 24" CSP	1	EA	
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES			
		Sta 26+12.92, 17.87' Lt - 24" RCP	1	EA	
714	9925	FLAP GATE-RELAY ALL SIZES			
		Sta 25+41.94, 32.55' Rt	1	EA	
752	0922	FENCE REMOVE & RESET			
		Sta 20+00 to 24+68 Lt	480	LF	
752	2110	RESET VEHICLE GATE			
		Sta 24+68 13.0'-33.0' Lt	1	EA	
752	2120	REMOVE VEHICLE GATE			
		Sta 24+68	1	EA	
NOTES:					
1. SEE SECTION 2 FOR CURB RAMP LAYOUTS.					
2. ADJUST PATH LOCATION, IF NECESSARY TO PROVIDE 2' MINIMUM DISTANCE BETWEEN COMMUNICATION PEDESTAL AND EDGE OF SHARED USE TRAIL.					
			0 50' 100' 200'		
			SCALE: 1 INCH = 100 FEET		
Plan & Profile					
Sta 20+00 to Sta 30+00					
South Washington Street Trail Extension Meridian Drive to Sibley Park					
			REGISTERED PROFESSIONAL ENGINEER THOMAS J. DEMKE PE-8768 Thomas Demke DATE 2024.12.03 16:36:18-06'00'		



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-1-981(138)	60	3

SPEC	CODE	BID ITEM	QTY	UNIT
202	0132	REMOVAL OF BITUMINOUS SURFACING		
		Sta 30+31 to 30+46	19	SY
		Sta 32+56	1	SY
		Sta 32+79	1	SY
		Sta 37+49 to 37+71	21	SY
		Sta 38+66 to 38+83	24	SY
302	0120	AGGREGATE BASE COURSE CL 5		
		Sta 30+00 to 40+00	239	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 30+00 to 40+00	231	TON
714	4216	PIPE CONDUIT ARCH 22IN X 13IN		
		Sta 32+43.00, 5.64' Lt - Sta 32+43.00, 15.36' Rt	21	LF
		Sta 32+95.08, 6.72' Lt - Sta 32+95.08, 16.28' Rt	23	LF

NOTES:

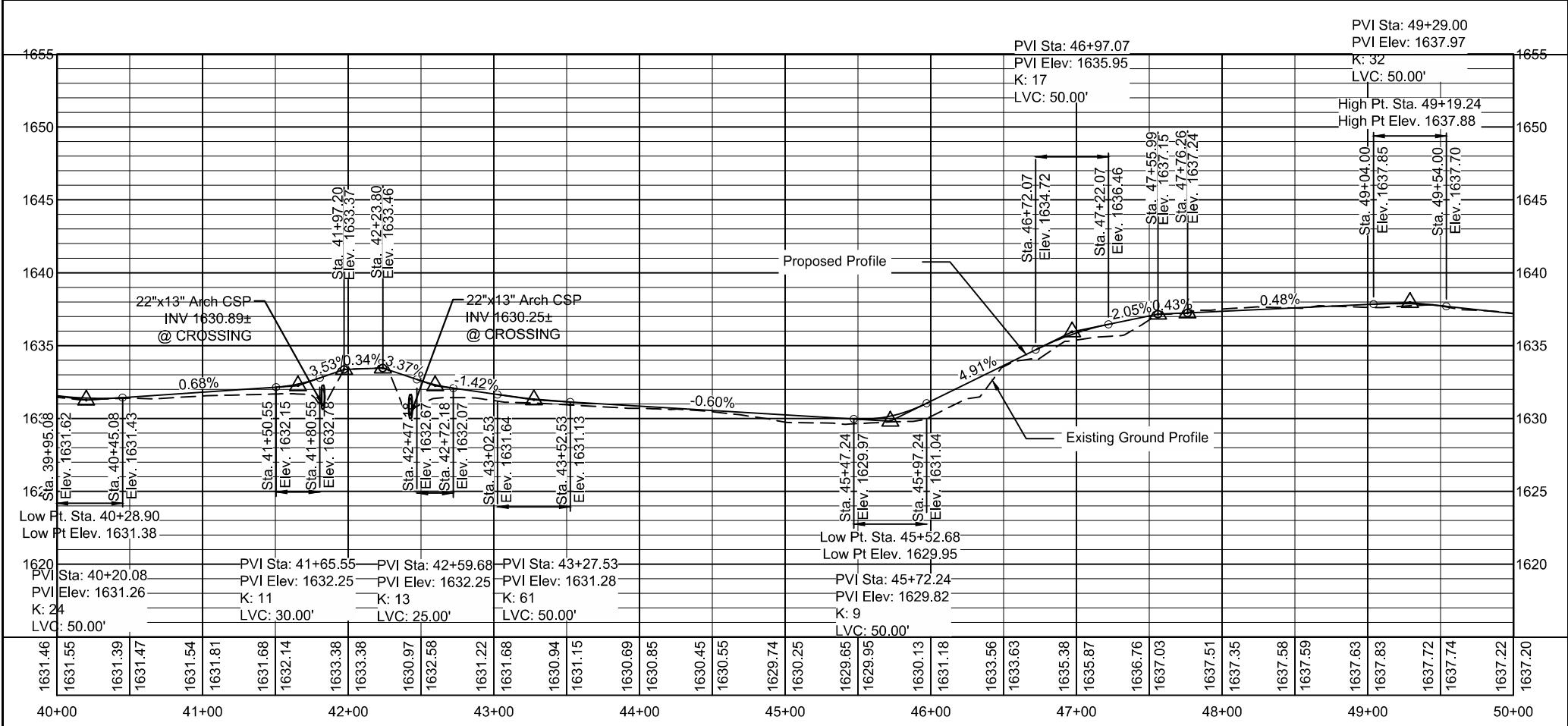
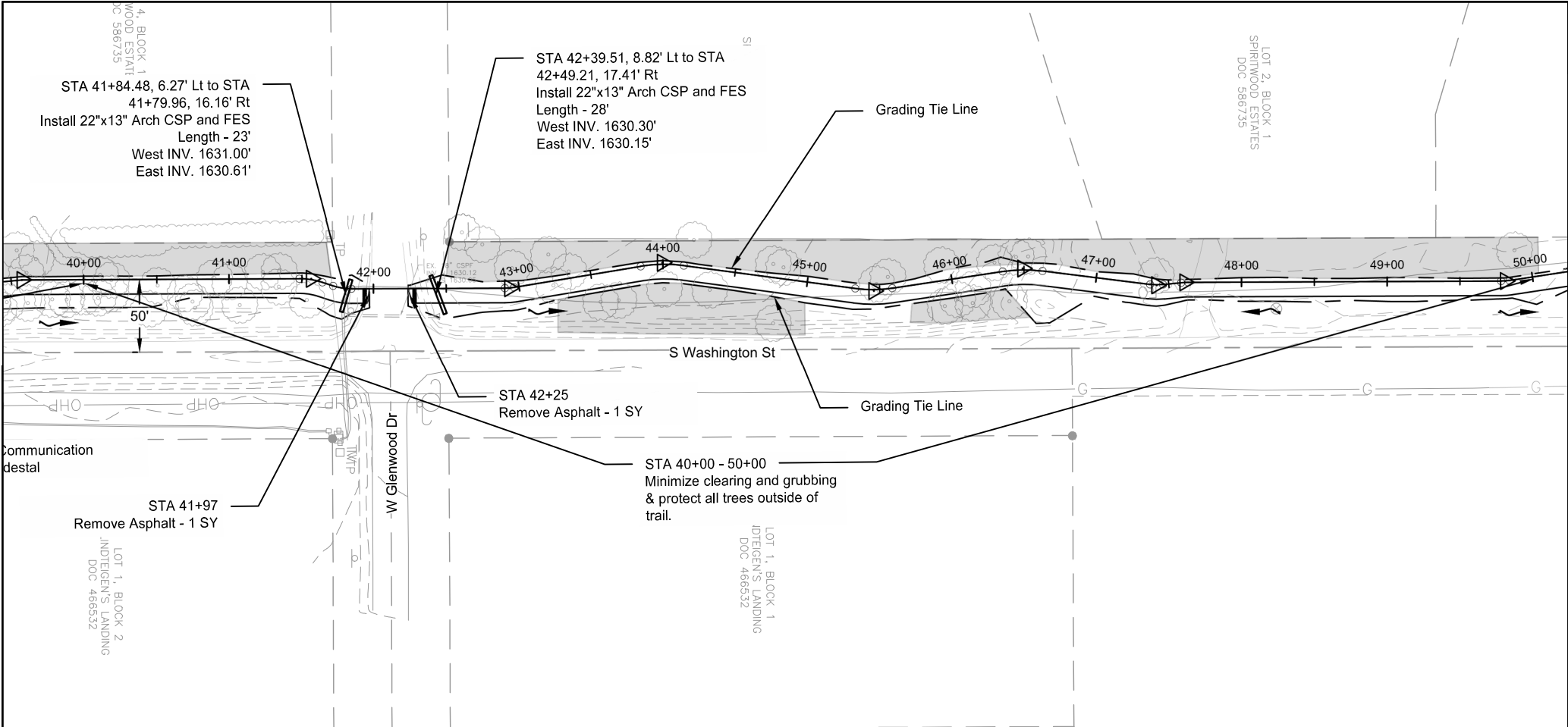
- ADJUST PATH LOCATION, IF NECESSARY TO PROVIDE 2' MINIMUM DISTANCE BETWEEN COMMUNICATION PEDESTAL AND EDGE OF SHARED USE TRAIL.

Plan & Profile

Sta 30+00 to Sta 40+00

South Washington Street Trail Extension
Meridian Drive to Sibley Park

SCALE: 1 INCH = 100 FEET



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	60	4
SPEC	CODE	BID ITEM	QTY	UNIT
202	0132	REMOVAL OF BITUMINOUS SURFACING		
		Sta 41+97	1	SY
		Sta 42+95	1	SY
302	0120	AGGREGATE BASE COURSE CL 5		
		Sta 40+00 to 50+00	239	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 40+00 to 50+00	231	TON
714	4216	PIPE CONDUIT ARCH 22IN X 13IN		
		Sta 41+84.48, 6.27' Lt - Sta 41+79.96, 16.16' Rt	23	LF
		Sta 42+39.51, 8.82' Lt - Sta 42+49.21, 17.41' Rt	28	LF

Plan & Profile

Sta 40+00 to Sta 50+00

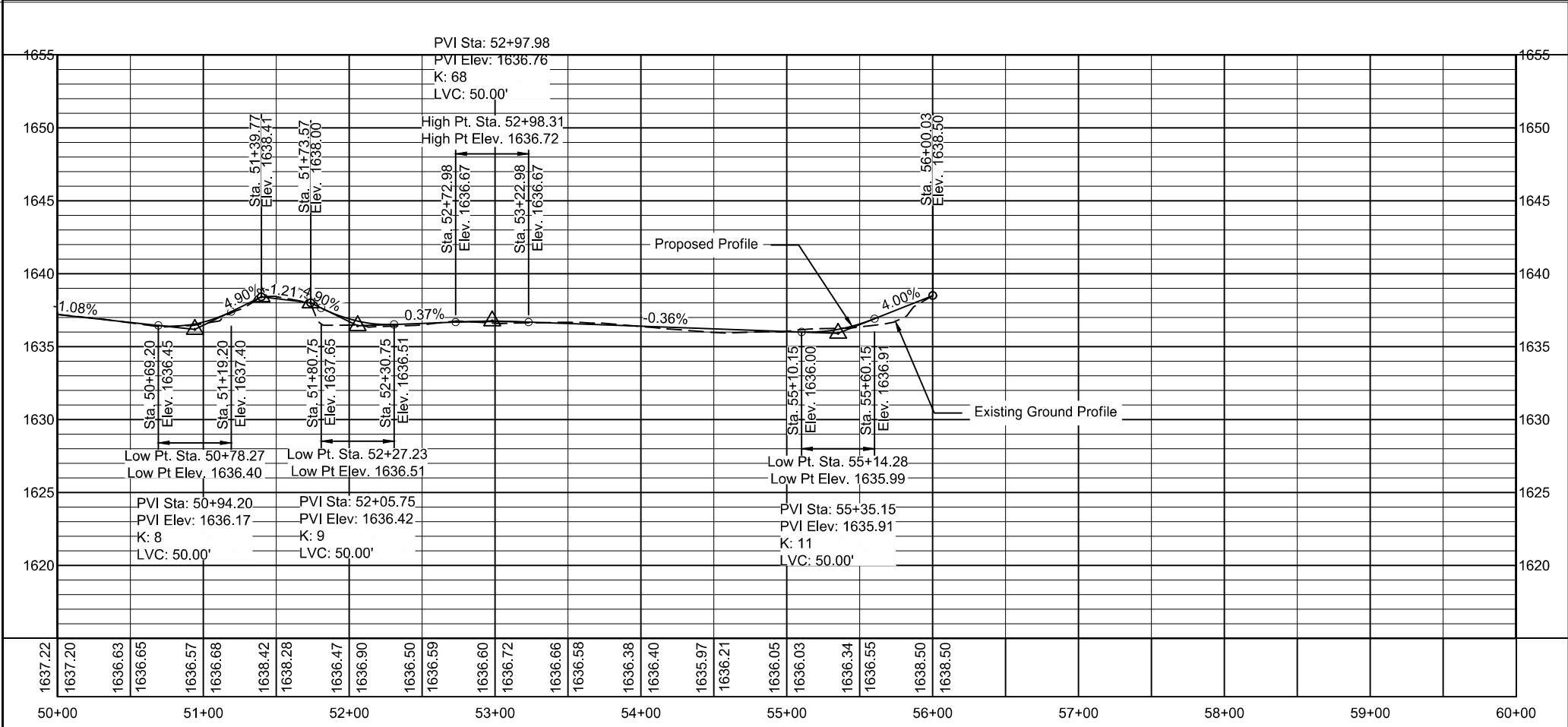
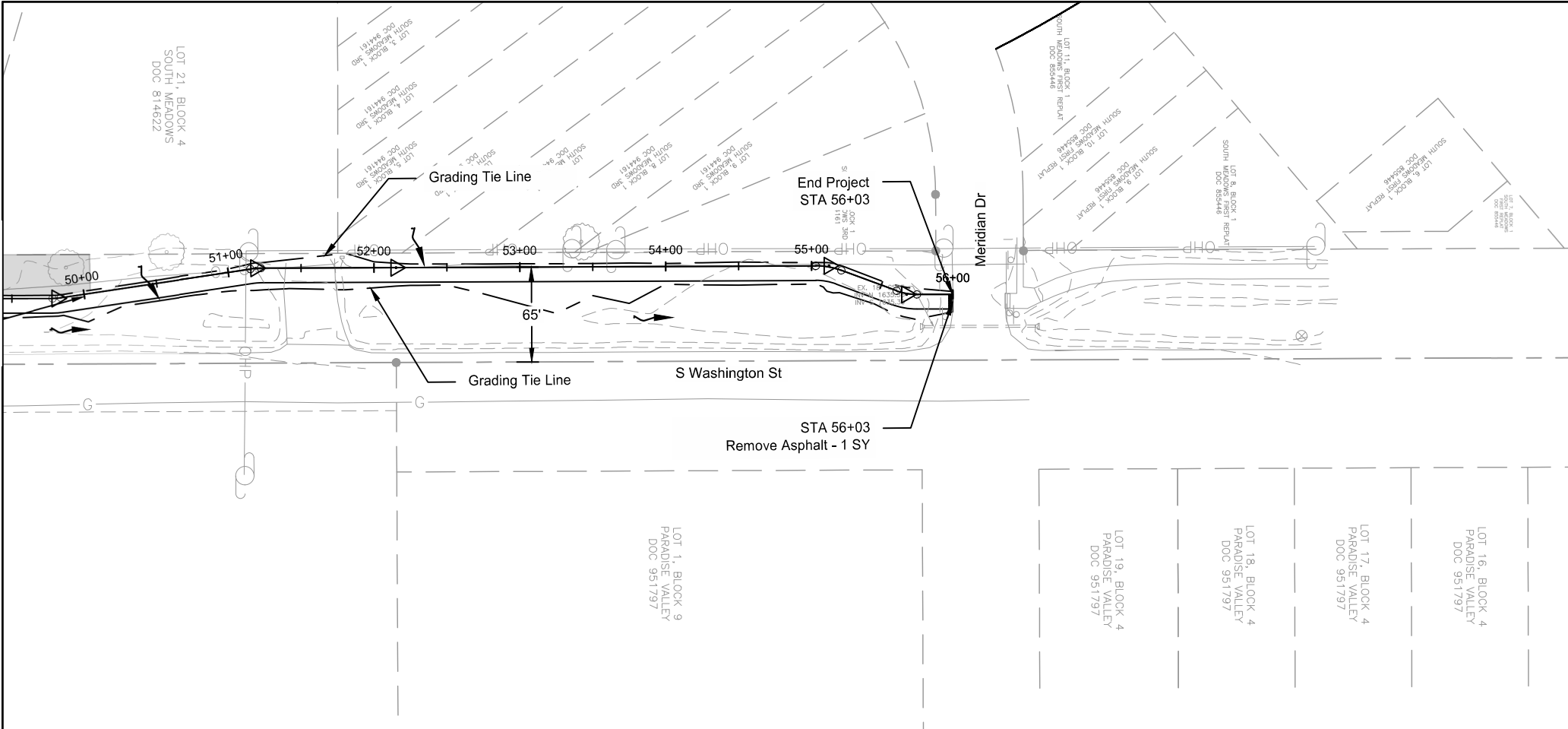
South Washington Street Trail Extension
Meridian Drive to Sibley Park

0 50' 100' 200'

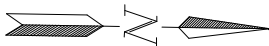
SCALE: 1 INCH = 100 FEET

REGISTERED PROFESSIONAL ENGINEER
THOMAS J. DEMKE
PE-8768
Thomas Demke
DATE 2024.12.03
16:36:46-06'00'

NORTH DAKOTA



		STATE	PROJECT NO.		SECTION NO.	SHEET NO.
		ND	TAC-1-981(138)		60	5
SPEC	CODE	BID ITEM			QTY	UNIT
202	0132	REMOVAL OF BITUMINOUS SURFACING				
Sta 56+03					1	SY
302	0120	AGGREGATE BASE COURSE CL 5				
Sta 50+00 to 56+03					147	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT				
Sta 50+00 to 56+03					143	TON



050'100'200'

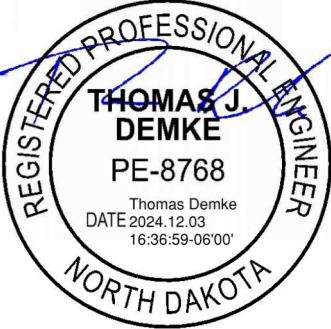


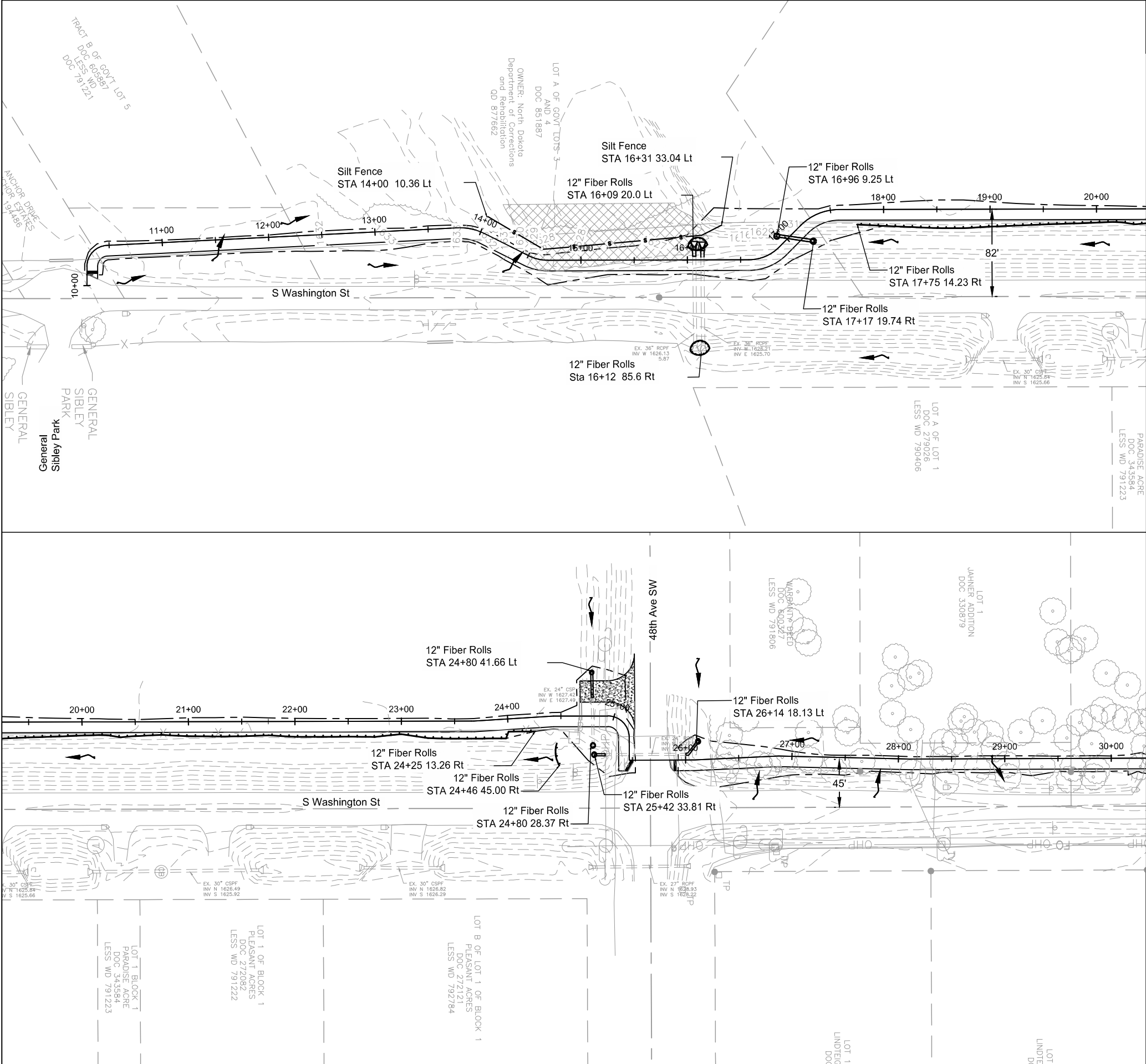
SCALE: 1 INCH = 100 FEET

Plan & Profile

Sta 50+00 to Sta 56+00

South Washington Street Trail Extension
Meridian Drive to Sibley Park





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	76	1
SPEC	CODE	BID ITEM	QTY	UNIT
260	0100	SILT FENCE UNSUPPORTED		
		Sta 14+00 to 16+31 Lt	233	LF
261	0101	REMOVE SILT FENCE UNSUPPORTED		
		Sta 14+00 to 16+31 Lt	233	LF
261	0112	FIBER ROLLS 12IN		
		Sta 16+09 Lt	50	LF
		Sta 16+12 Rt	50	LF
		Sta 16+96 Lt	20	LF
		Sta 17+17 Rt	20	LF
		Sta 17+75 to 24+25 Rt	655	LF
		Sta 24+46 Rt	25	LF
		Sta 24+80 Lt	15	LF
		Sta 24+80 Rt	15	LF
		Sta 25+42 Rt	15	LF
		Sta 26+14 Lt	15	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 16+09 Lt	50	LF
		Sta 16+12 Rt	50	LF
		Sta 16+96 Lt	20	LF
		Sta 17+17 Rt	20	LF
		Sta 17+75 to 24+25 Rt	655	LF
		Sta 24+46 Rt	25	LF
		Sta 24+80 Lt	15	LF
		Sta 24+80 Rt	15	LF
		Sta 25+42 Rt	15	LF
		Sta 26+14 Lt	15	LF

LEGEND

- Silt Fence
- Grading Tie Line
- 12IN Fiber Roll
- Flow

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

Temporary Erosion Control

Sta 10+00 to Sta 30+00

South Washington Street Trail Extension
Meridian Drive to Sibley Park

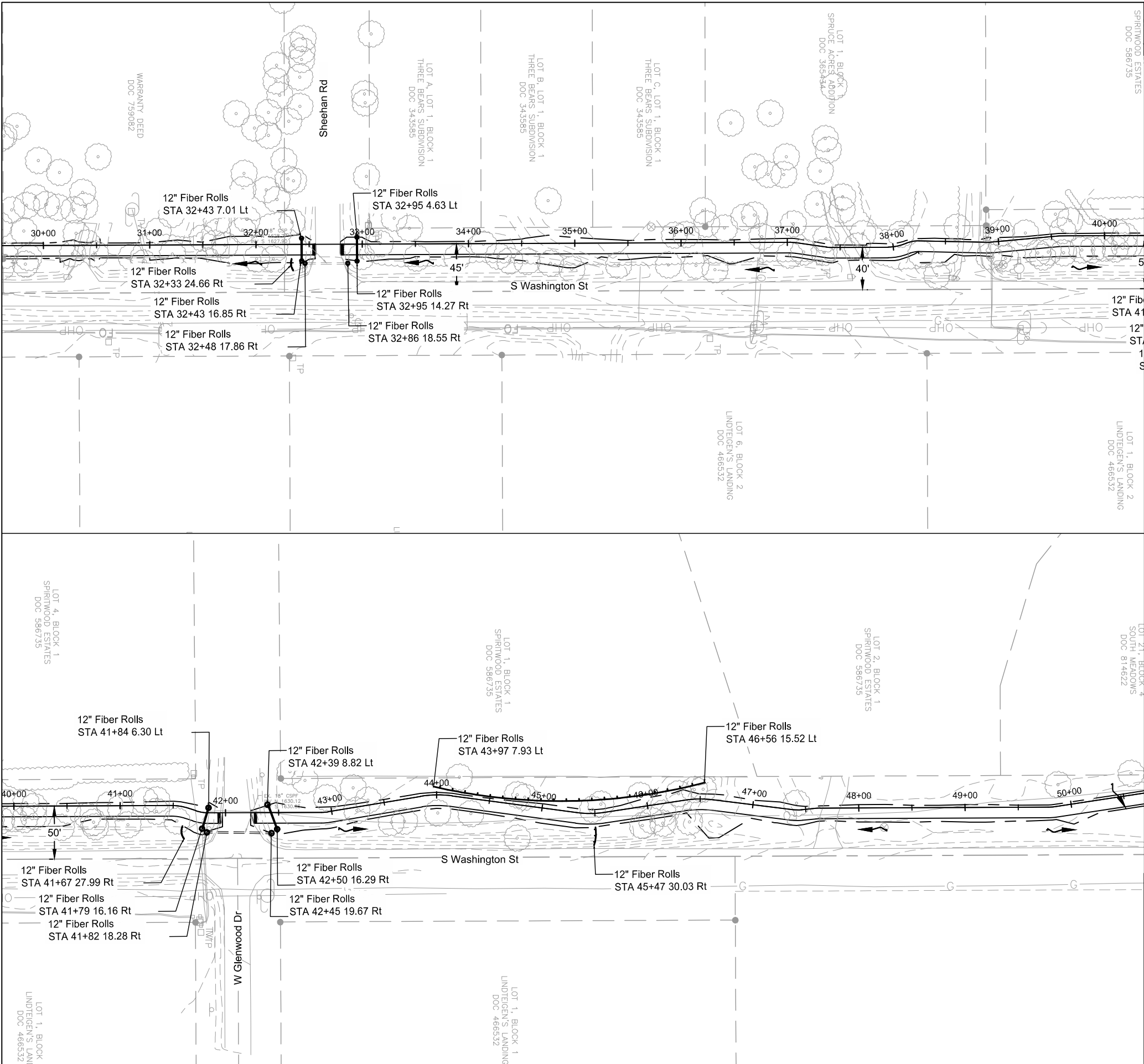
REGISTERED PROFESSIONAL ENGINEER

THOMAS J. DEMKE

PE-8768

Thomas Demke
DATE 2024.12.03
16:37:37-06'00"

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-1-981(138)	76	2
SPEC	CODE	BID ITEM		QTY	UNIT
714	4405	FIBER ROLLS 12IN			
		Sta 32+33 Rt		15	LF
		Sta 32+43 Lt		10	LF
		Sta 32+43 Rt		10	LF
		Sta 32+48 Rt		10	LF
		Sta 32+86 Rt		10	LF
		Sta 32+95 Lt		10	LF
		Sta 32+95 Rt		10	LF
		Sta 41+67 Rt		15	LF
		Sta 41+80 Rt		10	LF
		Sta 41+82 Rt		10	LF
		Sta 41+86 Lt		10	LF
		Sta 42+37 Lt		10	LF
		Sta 42+45 Rt		10	LF
		Sta 42+50 Rt		10	LF
		Sta 43+97 Lt to Sta 46+56 Lt		255	LF
		Sta 45+47 Rt		15	LF
261	0113	REMOVE FIBER ROLLS 12IN			
		Sta 32+33 Rt		15	LF
		Sta 32+43 Lt		10	LF
		Sta 32+43 Rt		10	LF
		Sta 32+48 Rt		10	LF
		Sta 32+86 Rt		10	LF
		Sta 32+95 Lt		10	LF
		Sta 32+95 Rt		10	LF
		Sta 41+67 Rt		15	LF
		Sta 41+80 Rt		10	LF
		Sta 41+82 Rt		10	LF
		Sta 41+86 Lt		10	LF
		Sta 42+37 Lt		10	LF
		Sta 42+45 Rt		10	LF
		Sta 42+50 Rt		10	LF
		Sta 43+97 Lt to Sta 46+56 Lt		255	LF
		Sta 45+47 Rt		15	LF

LEGEND

— s — s — s Silt Fence

- - - - - Grading Tie Line

————— 12IN Fiber Roll

→ → → Flow

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

Temporary Erosion Control

Sta 30+00 to Sta 50+00

South Washington Street Trail Extension
Meridian Drive to Sibley Park

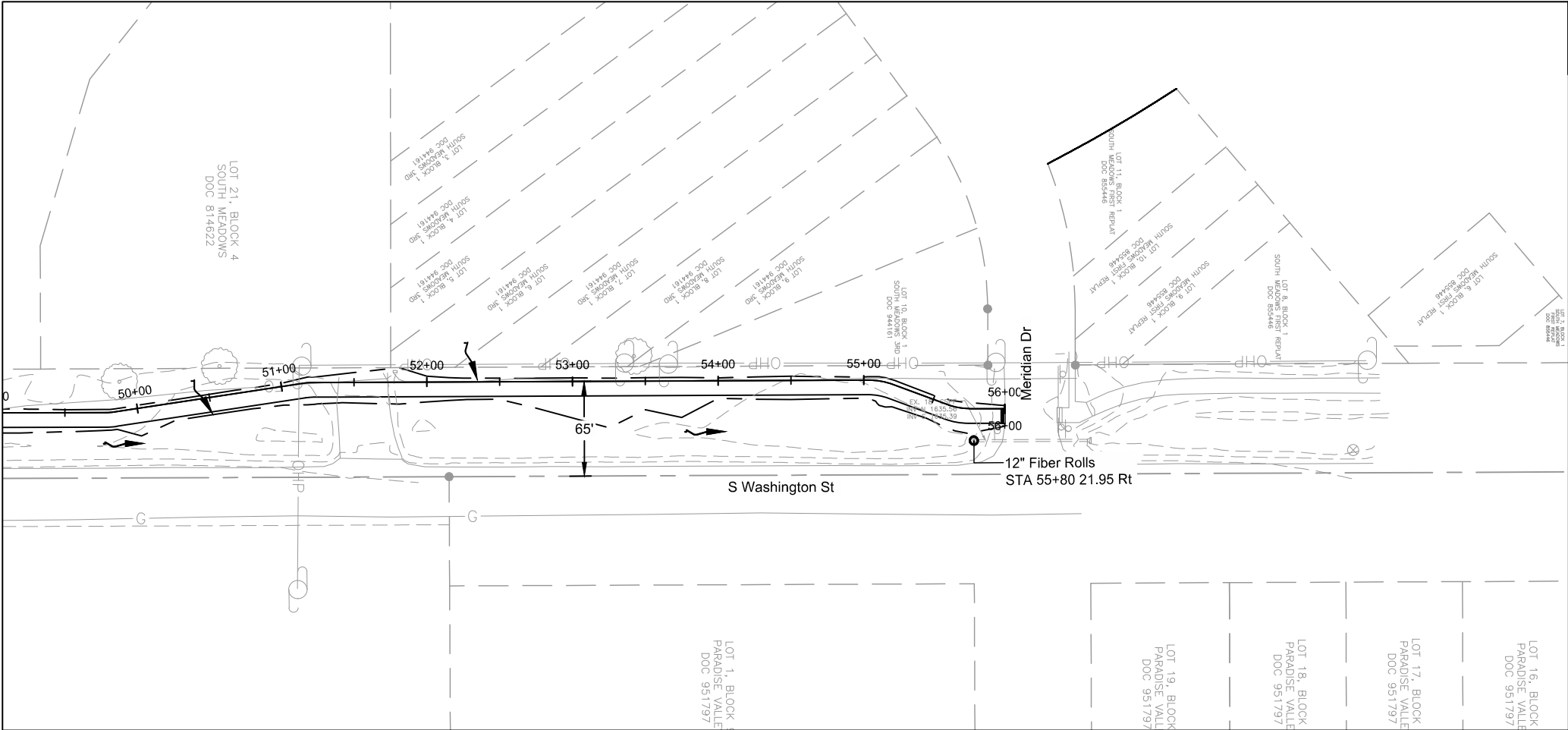
REGISTERED PROFESSIONAL ENGINEER

THOMAS J. DEMKE

PE-8768

Thomas Demke
DATE 2024.12.03
16:37:56-06'00"

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	76	3

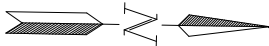
SPEC	CODE	BID ITEM	QTY	UNIT
261	0112	FIBER ROLLS 12IN		
		Sta 55+80 Rt	15	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 55+ 80 Rt	15	LF

LEGEND

- Silt Fence
- Grading Tie Line
- 12IN Fiber Roll
- Flow



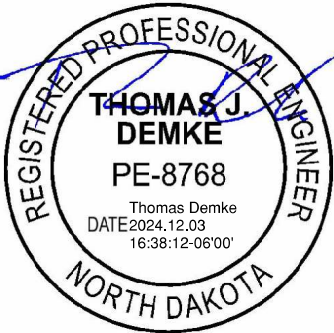
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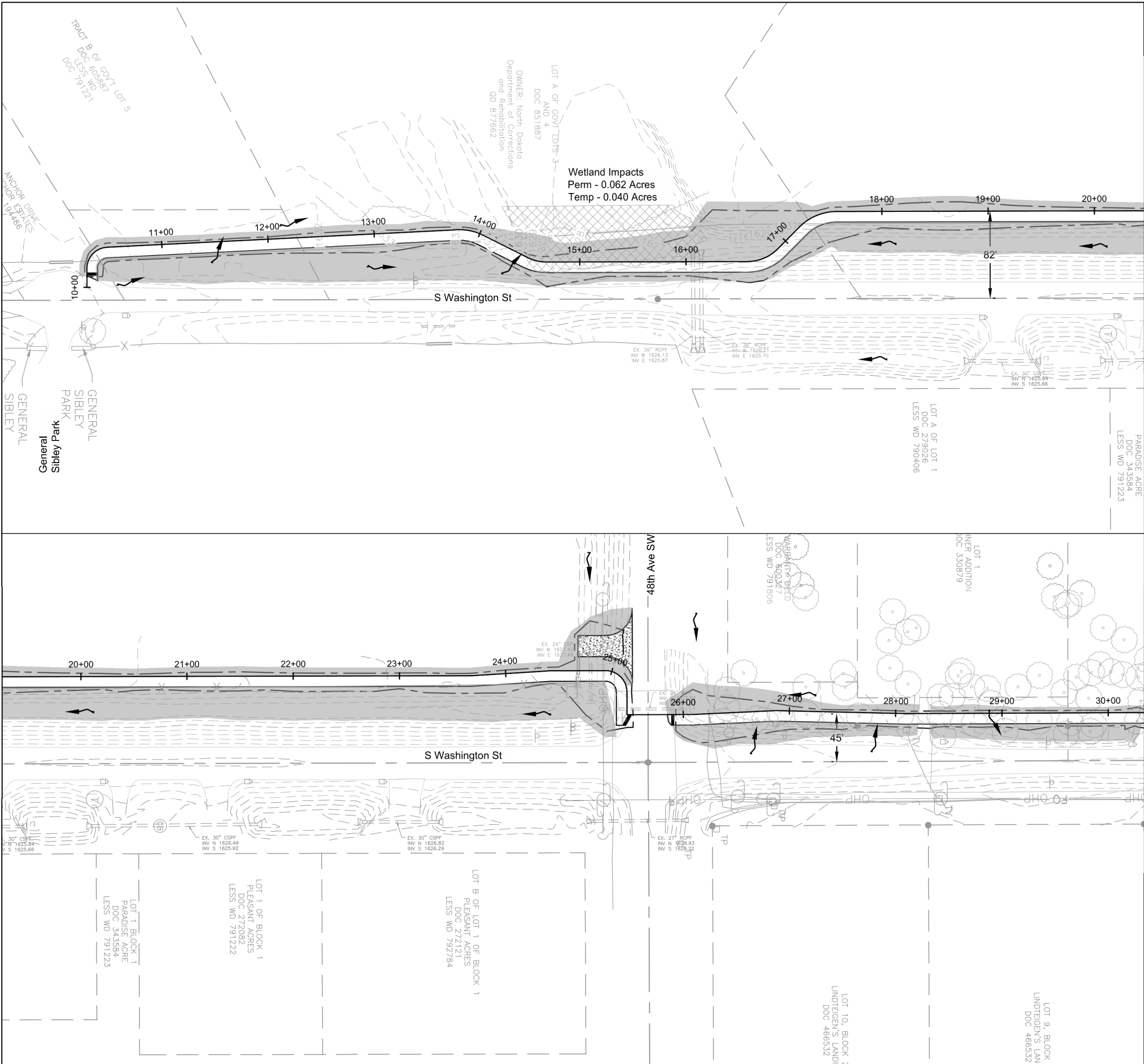


Temporary Erosion Control

Sta 50+00 to Sta 56+00

South Washington Street Trail Extension
Meridian Drive to Sibley Park





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-1-981(138)	77	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Sta 10+00 to Sta 30+00 Lt	0.80	ACRE
		Sta 10+00 to Sta 30+00 Rt	1.04	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 10+00 to Sta 30+00 Lt	0.80	ACRE
		Sta 10+00 to Sta 30+00 Rt	1.04	ACRE

LEGEND

----- Grading Tie Line

→ → Flow

Seeding Class III & Hydraulic Mulch

0 50' 100' 200'

SCALE: 1 INCH = 100 FEET

Permanent Erosion Control

Sta 10+00 to Sta 30+00

South Washington Street Trail Extension
Meridian Drive to Sibley Park

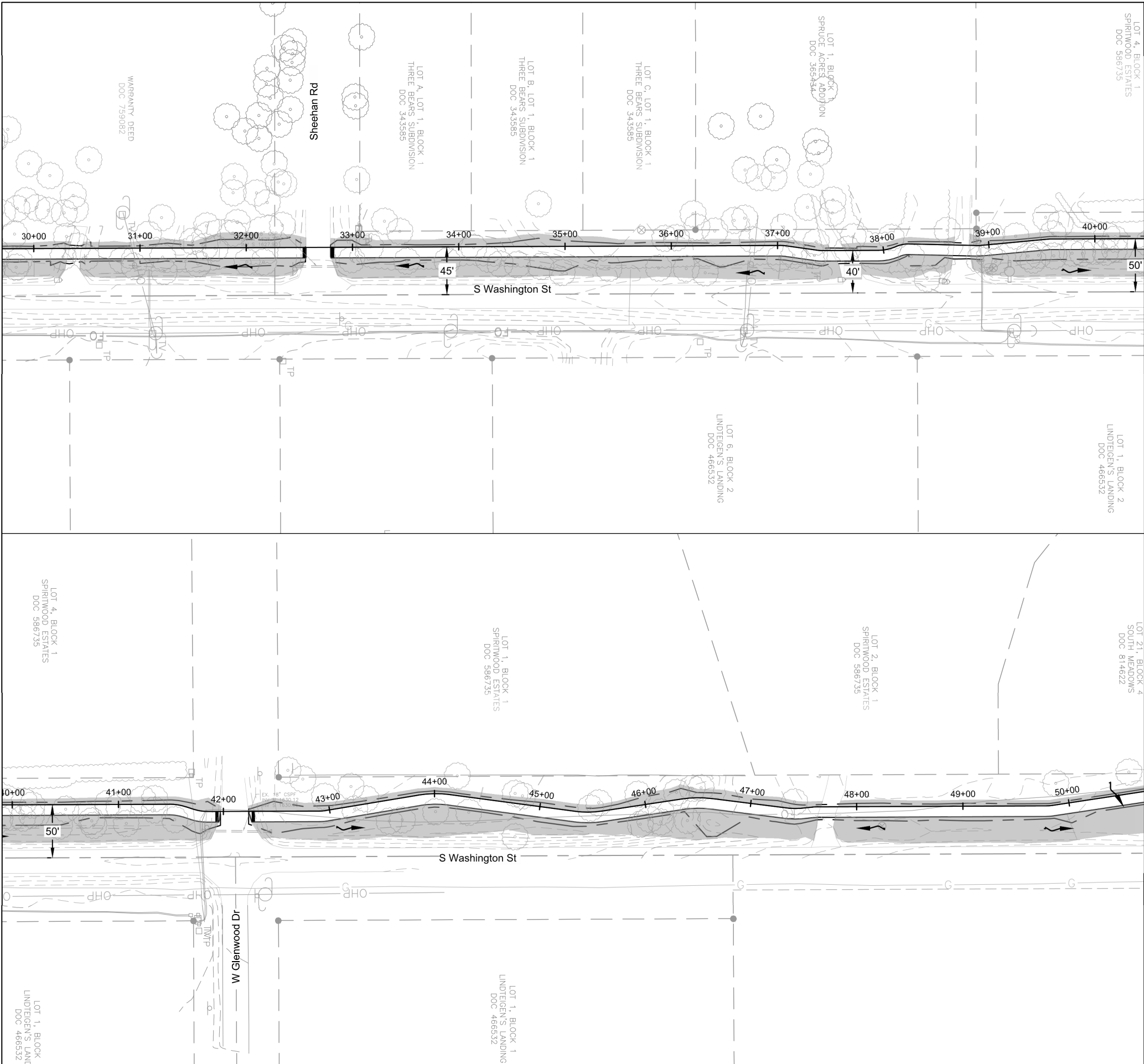
REGISTERED PROFESSIONAL ENGINEER

THOMAS J. DEMKE

PE-8768

Thomas Demke
DATE 2024.12.03
16:38:27-06'00"

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	77	2

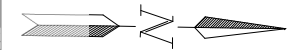
SPEC	CODE	BID ITEM	QTY	UNIT
251	0300	SEEDING CLASS III		
		Sta 30+00 to Sta 50+00 Lt	0.33	ACRE
		Sta 30+00 to Sta 50+00 Rt	0.88	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 30+00 to Sta 50+00 Lt	0.33	ACRE
		Sta 30+00 to Sta 50+00 Rt	0.88	ACRE

LEGEND

- Grading Tie Line
- Flow
- Seeding Class III & Hydraulic Mulch



SCALE: 1 INCH = 100 FEET



Permanent Erosion Control

Sta 30+00 to Sta 50+00

South Washington Street Trail Extension
Meridian Drive to Sibley Park

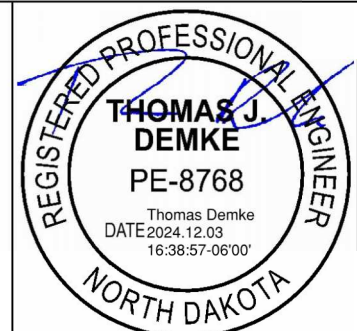
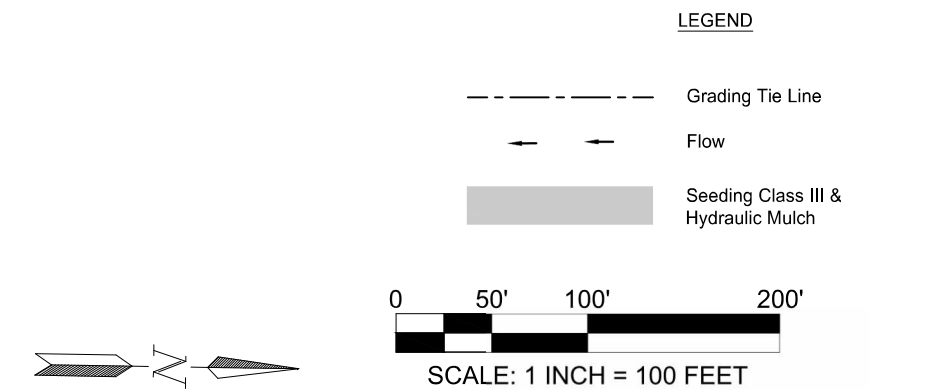
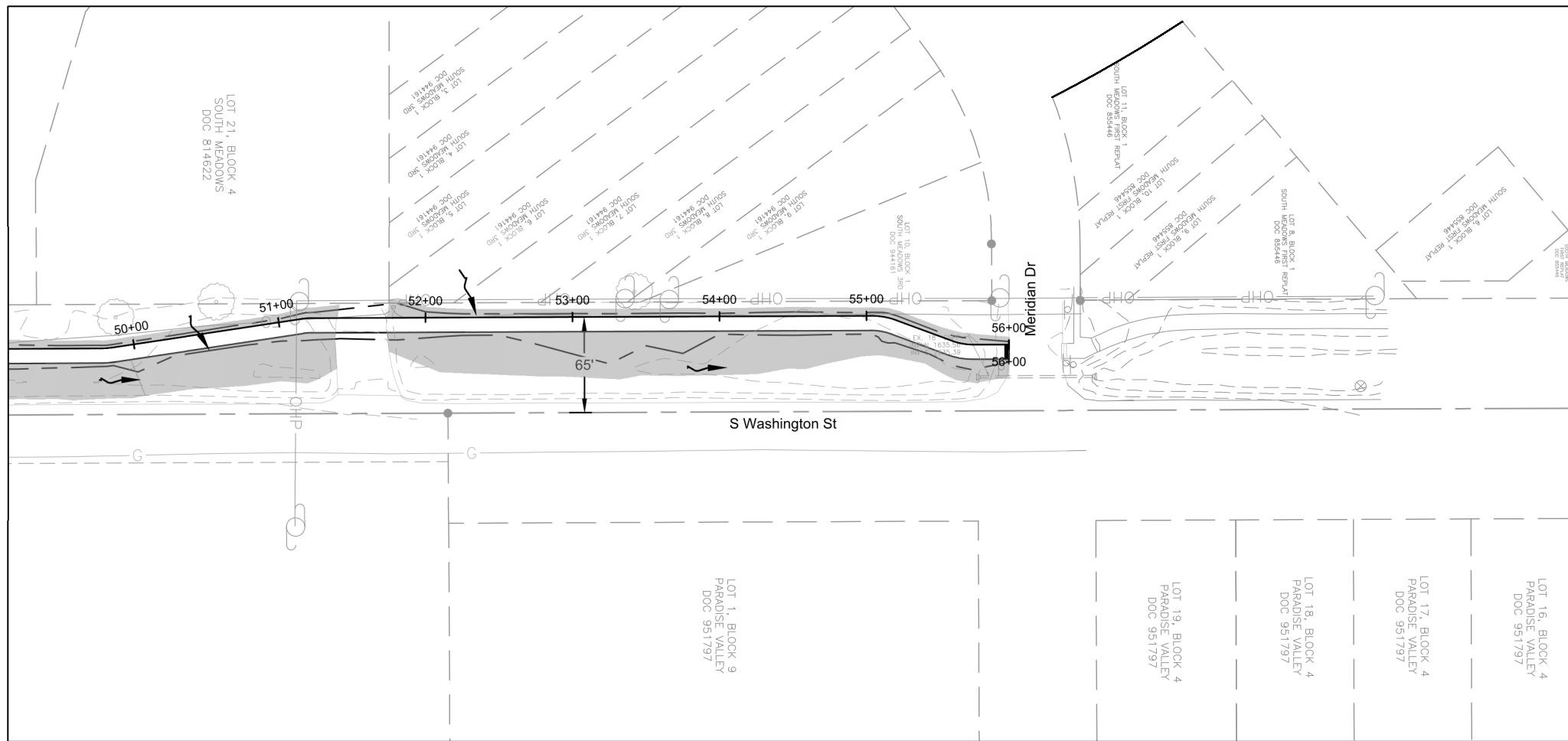
REGISTERED PROFESSIONAL ENGINEER

THOMAS J. DEMKE

PE-8768

Thomas Demke
DATE 2024.12.03
16:38:44-06'00'

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	81	1

Section Corners			
Northing	Easting	Description	Sec - T - R
398361.23	1894885.93	EQCOR #5 REBAR	20-138-80
401001.47	1894897.83	NESEC #5 REBAR	20-138-80
395720.95	1894873.97	SWSEC DEFACED AC	21-138-80
393077.26	1894856.71	WQCOR LS-27331 1IN PIPE	28-138-80
395739.29	1892231.30	NQCOR DEFACED 2IN AC	29-138-80
395758.32	1889596.78	NWSEC DEFACED 2IN AC	29-138-80
395709.96	1897495.72	SQCOR IRON PIPE WITH NAIL	21-138-80
395699.13	1900116.80	SESEC 2IN AC	21-138-80

Coordinate System

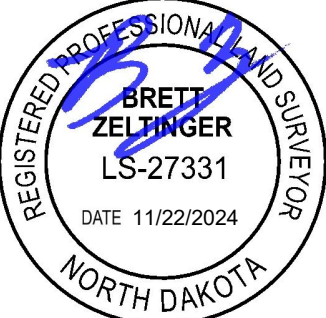
Coordinate System
Name:North Dakota Ground
Zone: North Dakota South
Datum: NAD 1983 (Conus)
Global reference datum: NAD83(2011)
Global reference epoch: 2010
Geoid:GEOID18 (Conus)
Vertical datum: NAVD 88
UNITS: INTERNATIONAL FEET

Calibrated site: Burleigh
Additional Coordinate System Details
Local Site Settings
Project latitude: N45°24'10.14699" Ground scale factor: 1.0001485221
Project longitude: W108°10'26.06000"False northing offset: 0.000 ft
Project height: 0.000 ft False easting offset: 0.000 ft

Survey Coordinate and Curve Data

South Washington Street

South Washington Street Trail Extension
Meridian Drive to Sibley Park



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-1-981(138)	100	1

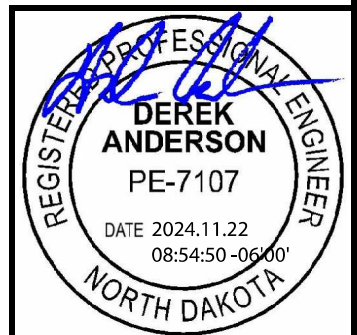
SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT ___ MILES	2	28	56
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	48"x24"	END ROAD WORK	2	26	52
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT ___ MILES RT & LT ARROWS	2	43	86
G20-52a-72	72"x24"	ROAD WORK NEXT ___ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
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 (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT ___ (Portable only)	2	30	60
R2-1-48	48"x60"	SPEED LIMIT ___	3	39	117
R2-1aP-24	24"x18"	MINIMUM FEE \$80 (Mounted on Speed Limit post)	2	10	20
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R9-9-24	24"x12"	SIDEWALK CLOSED (Mounted on Barricade)	2	3	6
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED ___ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		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		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or ___ FT or ___ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or ___ FT or ___ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	___ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	___ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	48"x48"	ROAD WORK AHEAD or ___ FT or ___ MILE	4	35	140
W20-2-48	48"x48"	DETOUR AHEAD or ___ FT or ___ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or ___ FT or ___ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or ___ FT or ___ MILE		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or ___ FT or ___ MILE		35	
W20-7-48	48"x48"	FLAGGER	2	35	70
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	2	5	10
W20-52P-54	54"x12"	NEXT ___ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or ___ FT or ___ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK	1	35	35
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	

[illegible][illegible]

SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	652

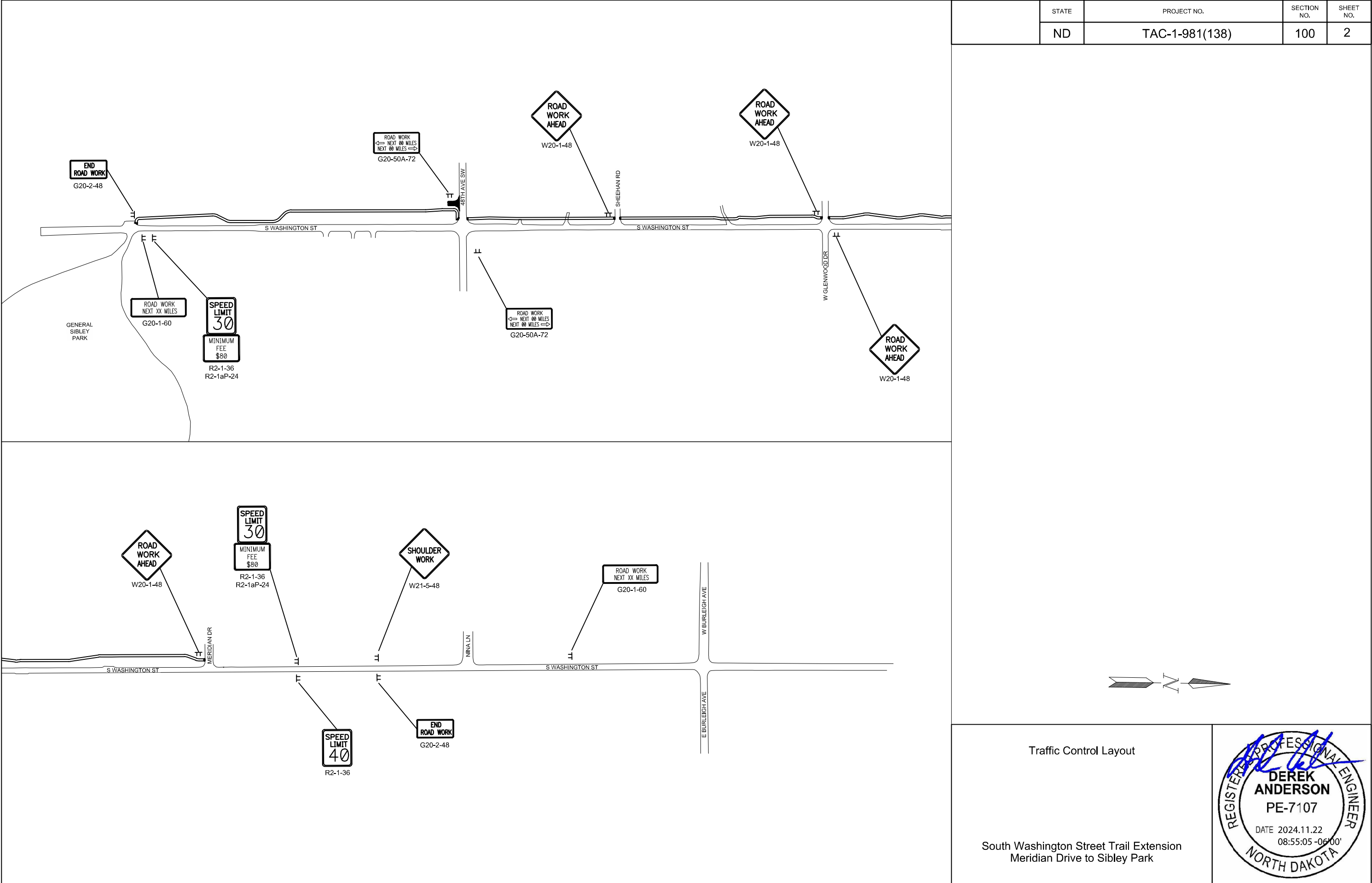
[illegible]

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
<http://www.dot.nd.gov/>



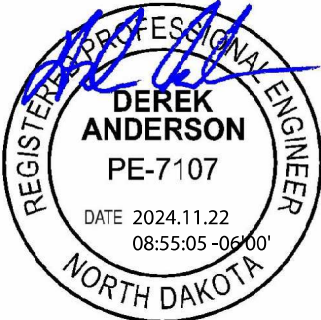
Traffic Control Devices List

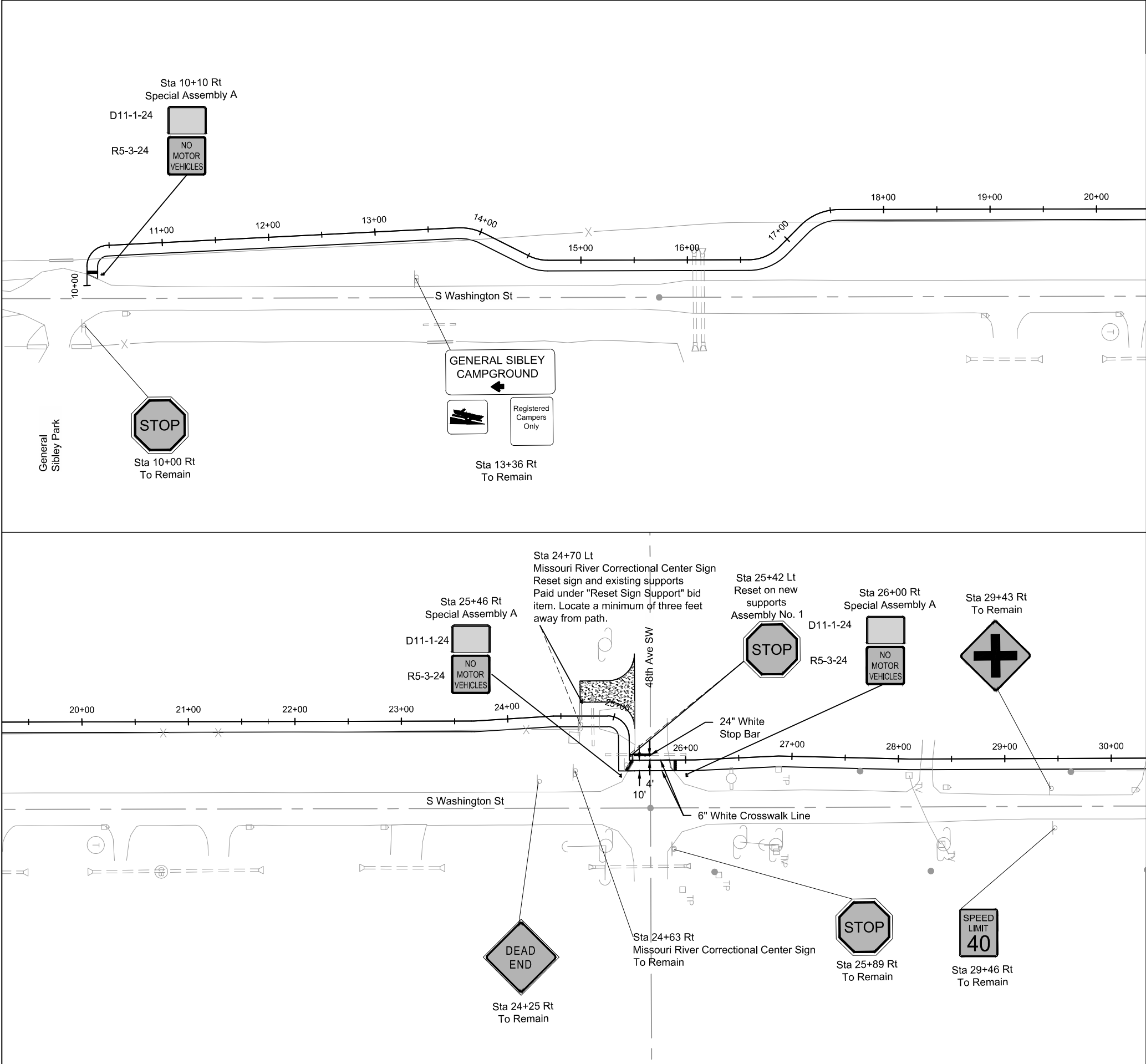
SouthWashington Street Trail Extension Meridain Drive to Sibley Park



Traffic Control Layout

South Washington Street Trail Extension
Meridian Drive to Sibley Park





STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		TAC-1-981(138)	110	2

SPEC	CODE	BID ITEM	QTY	UNIT
754	0593	RESET SIGN SUPPORT		
		Sta 24+70 Lt	1	EA
762	1307	PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED		
		48th Ave SW	77	LF
762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED		
		48th Ave SW	15	LF

Permanent Signing and Pavement Marking

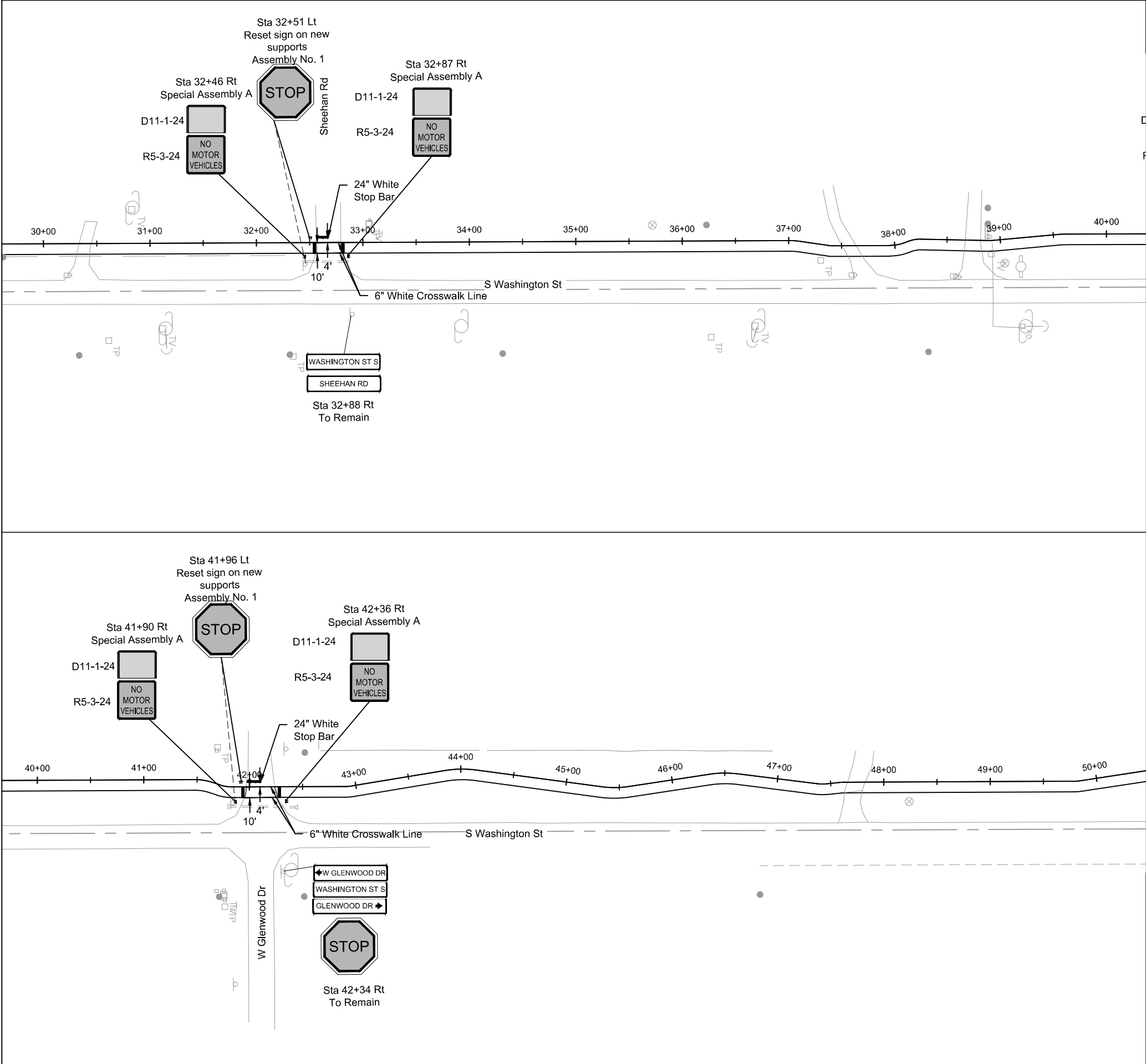
Sta 10+00 to Sta 30+00

South Washington Street Trail Extension
Meridian Drive to Sibley Park

0 50' 100' 200'

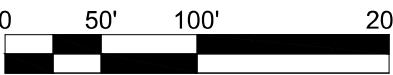
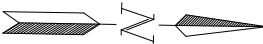
SCALE: 1 INCH = 100 FEET

REGISTERED PROFESSIONAL ENGINEER
DEREK ANDERSON
PE-7107
DATE 2024.11.22
08:56:30 -06'00'
NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-1-981(138)	110	3

SPEC	CODE	BID ITEM	QTY	UNIT
762	1307	PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED		
		Sheehan Rd	47	LF
		Glenwood Dr	58	LF
762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED		
		Sheehan Rd	12	LF
		Glenwood Dr	13	LF

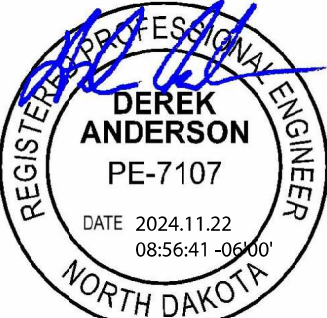


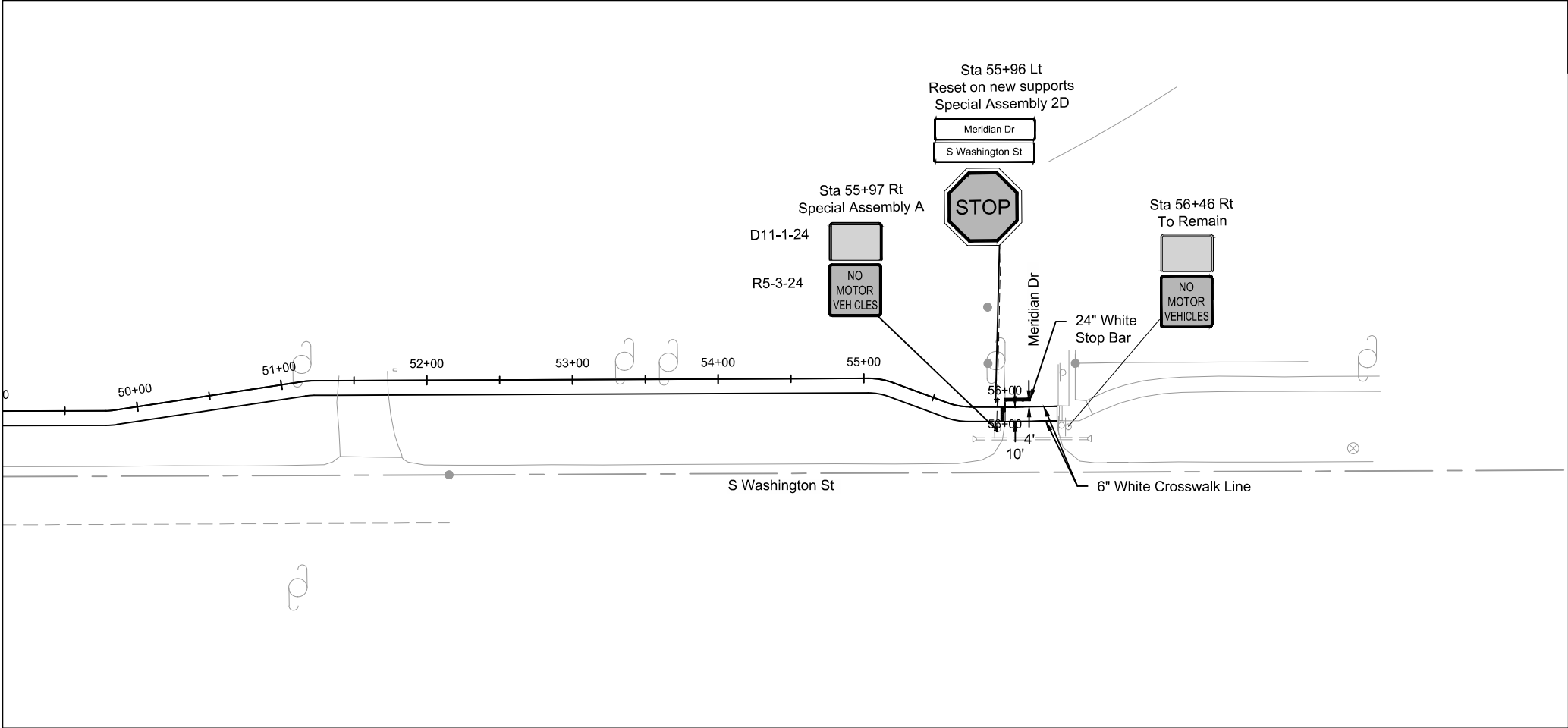
SCALE: 1 INCH = 100 FEET

Permanent Signing and Pavement Marking

Sta 30+00 to Sta 50+00

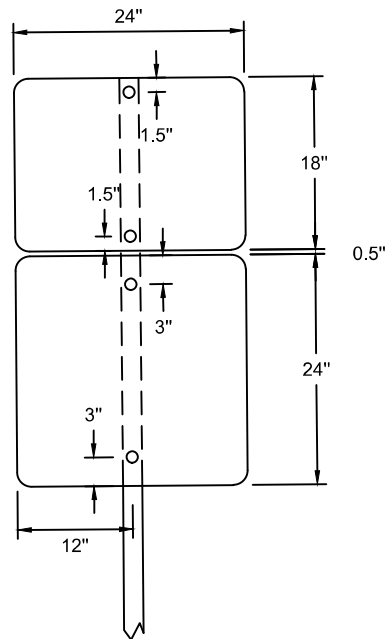
South Washington Street Trail Extension
Meridian Drive to Sibley Park





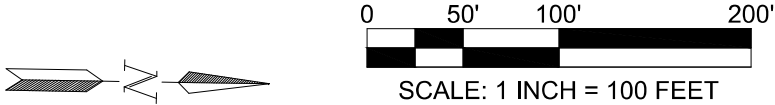
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	110	4

SPEC	CODE	BID ITEM	QTY	UNIT
762	1307	PREFORMED PATTERNED PVMT MK 6IN LINE-GROOVED		
		Meridian Dr	72	LF
762	1325	PREFORMED PATTERNED PVMT MK 24IN LINE-GROOVED		
		Meridian Dr	18	LF



Special Assembly A
Area = 7.0 SF
(Perforated Square Tube)

- Sta 10+10 Rt
- Sta 25+46 Rt
- Sta 26+00 Rt
- Sta 32+46 Rt
- Sta 32+87 Rt
- Sta 41+90 Rt
- Sta 42+36 Rt
- Sta 55+97 Rt



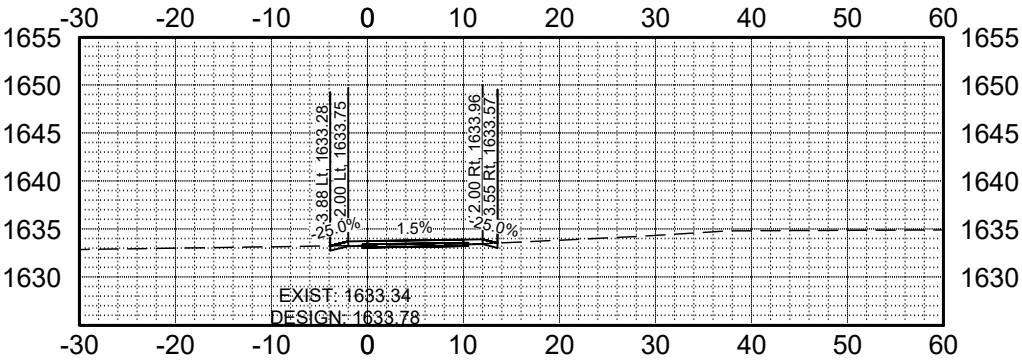
Permanent Signing and Pavement Marking

Sta 50+00 to Sta 56+18

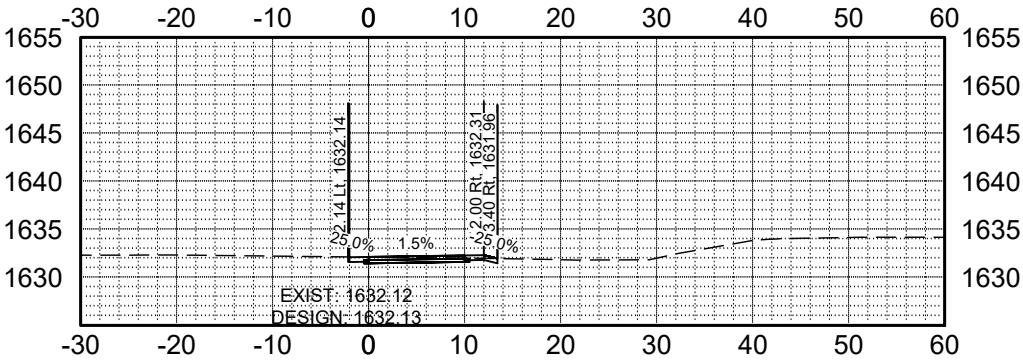
South Washington Street Trail Extension
Meridian Drive to Sibley Park

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	1

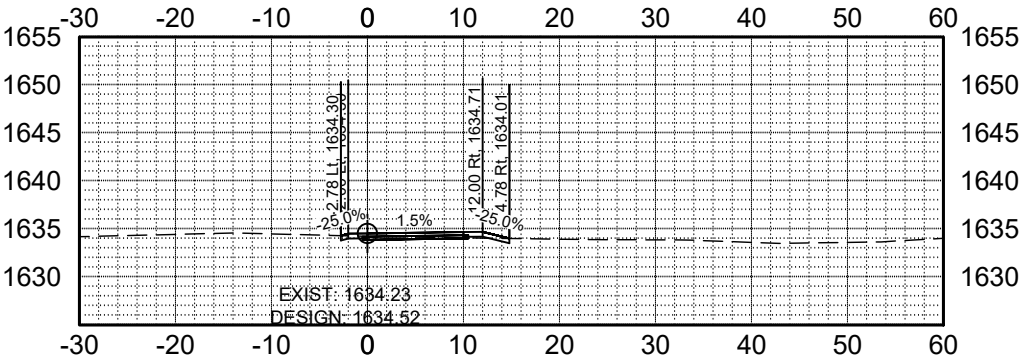
PR_Path STA 10+50.00



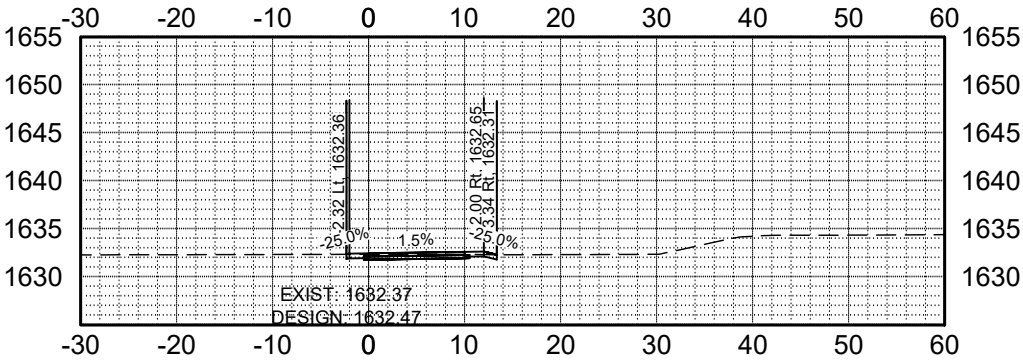
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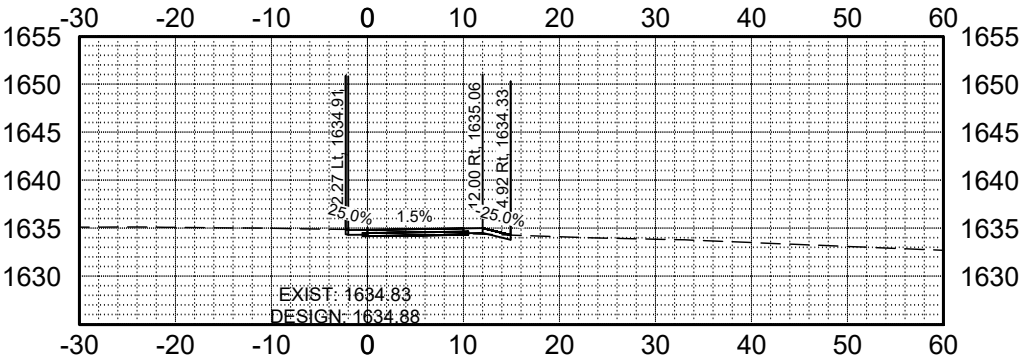
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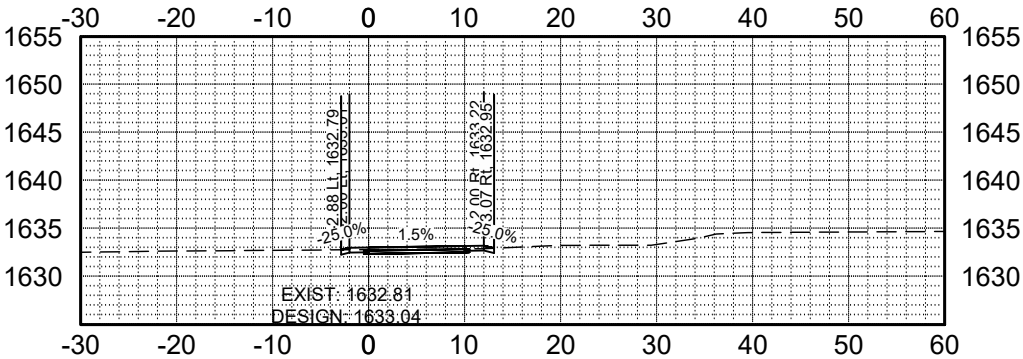
PR_Path STA 11+00.00



PR_Path STA 10+13.41

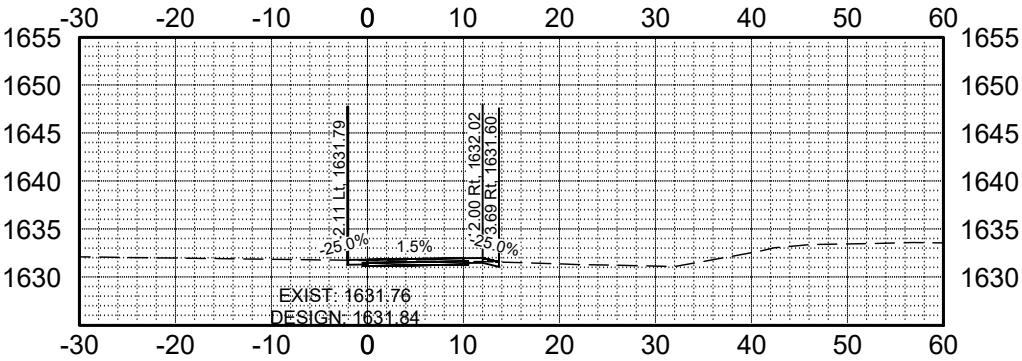


PR_Path STA 10+75.00

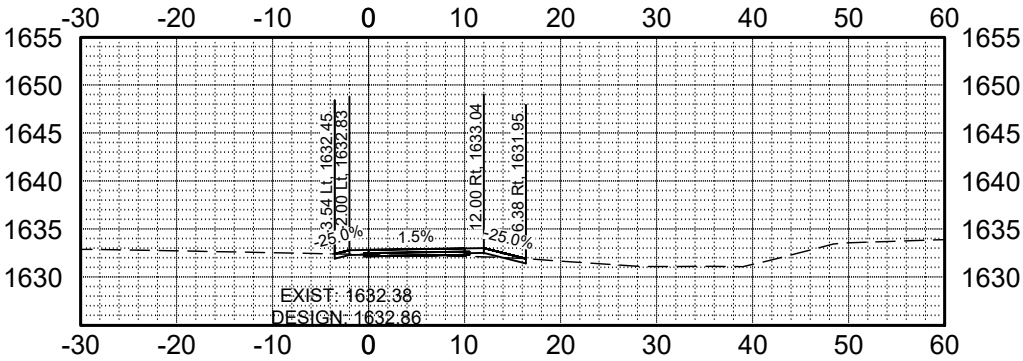


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	2

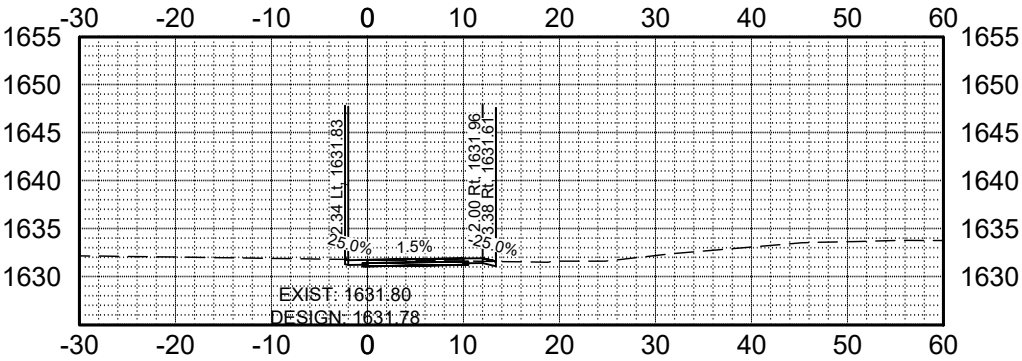
PR_Path STA 12+00.00



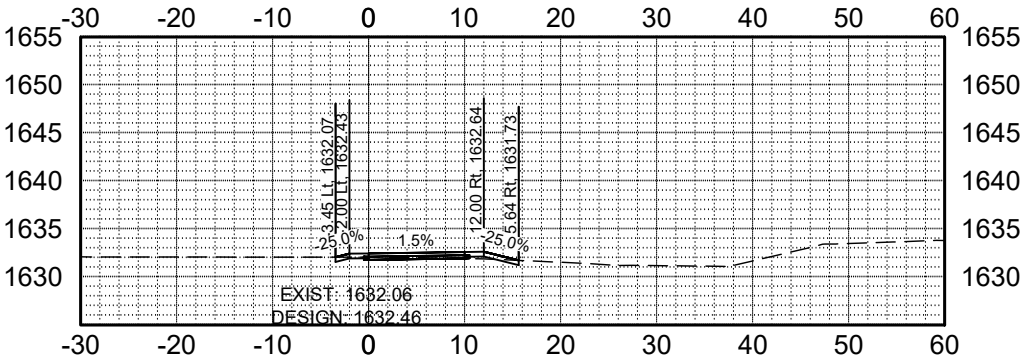
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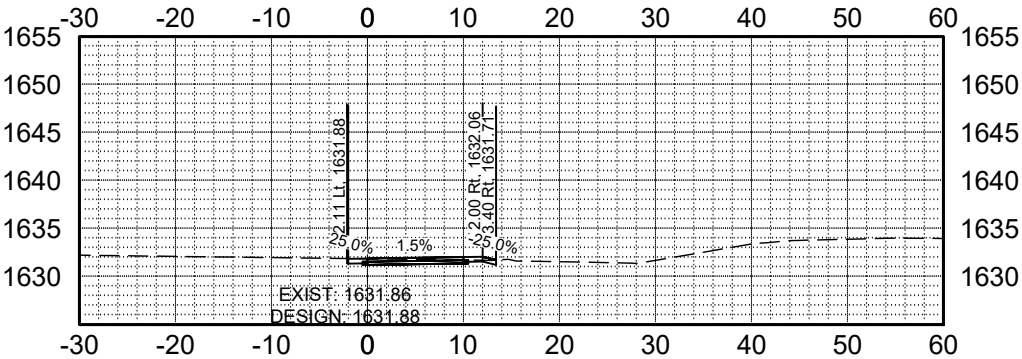
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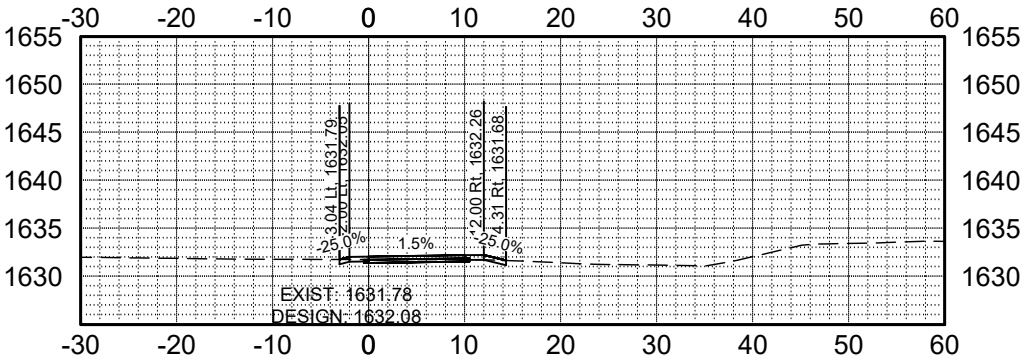
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PR_Path STA 11+50.00

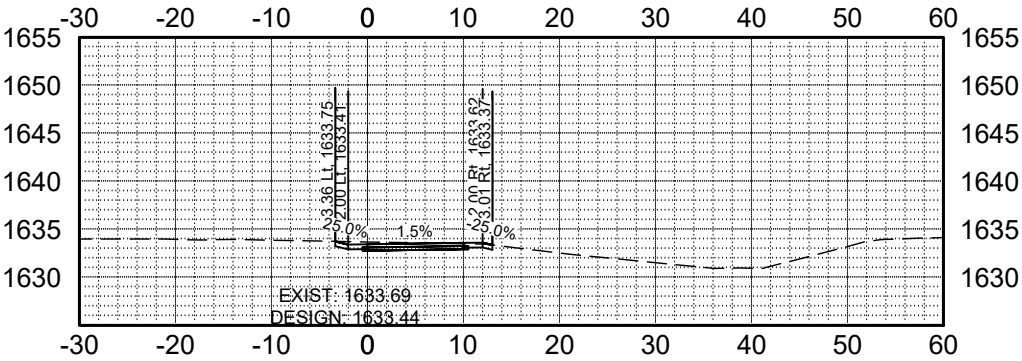


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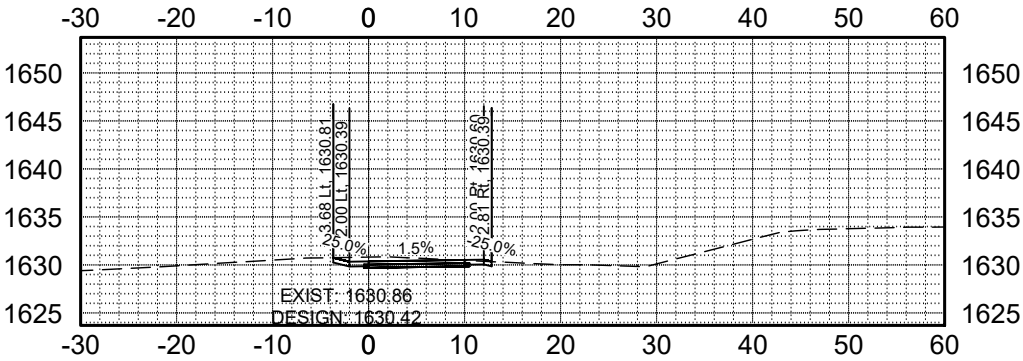


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	3

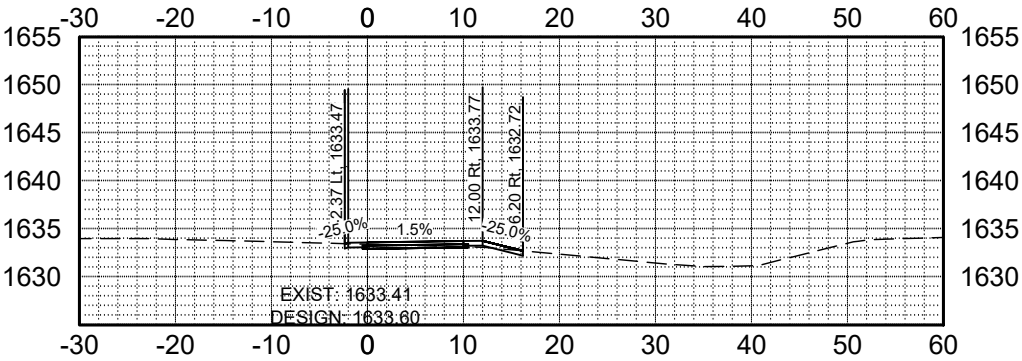
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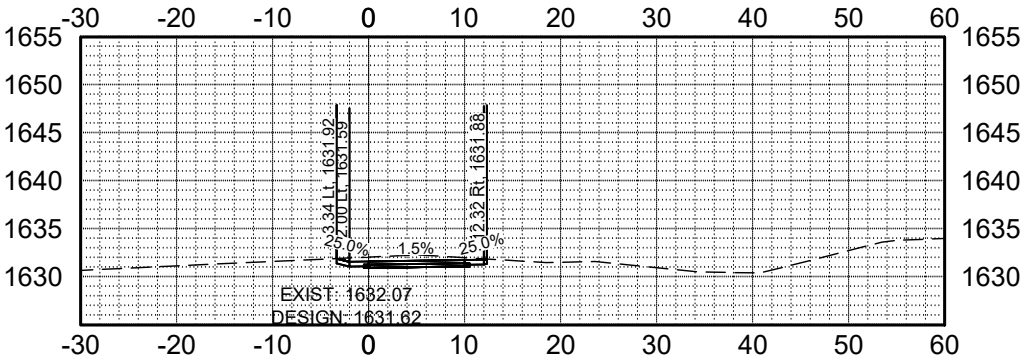
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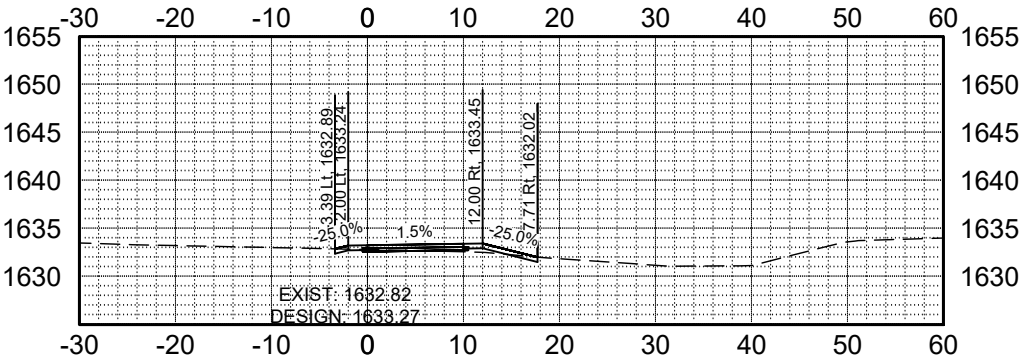
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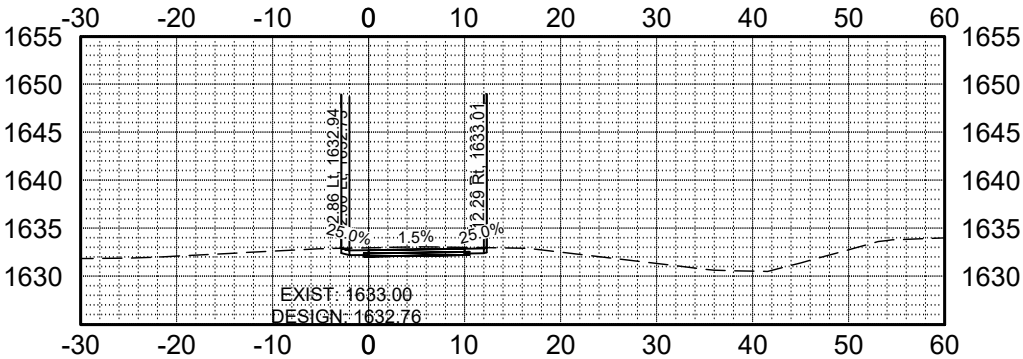
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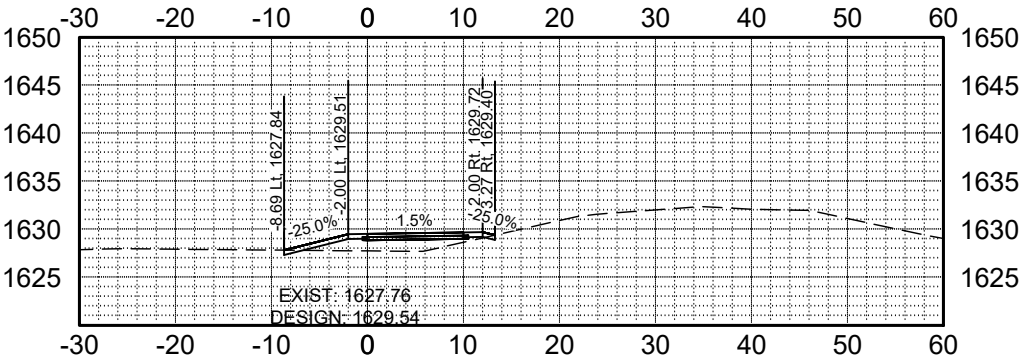


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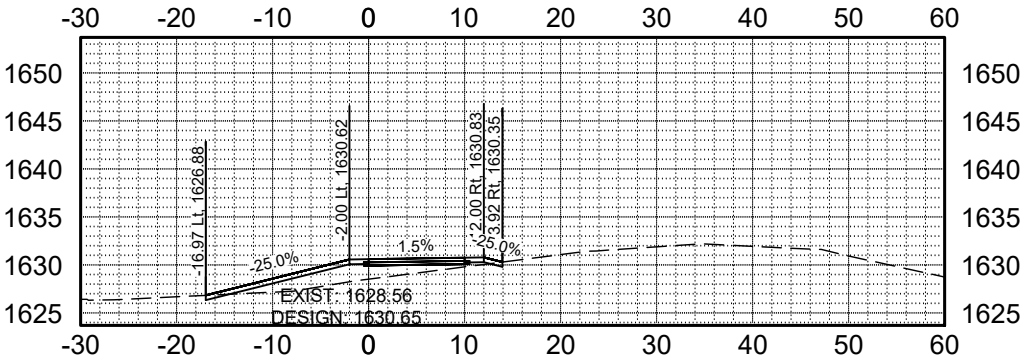


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	4

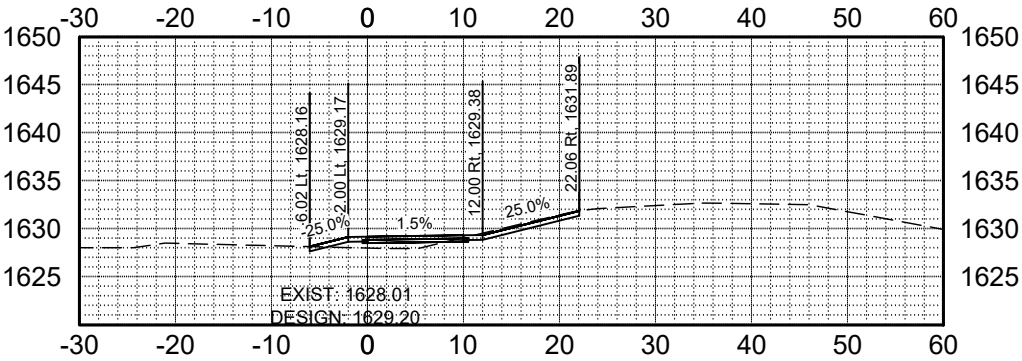
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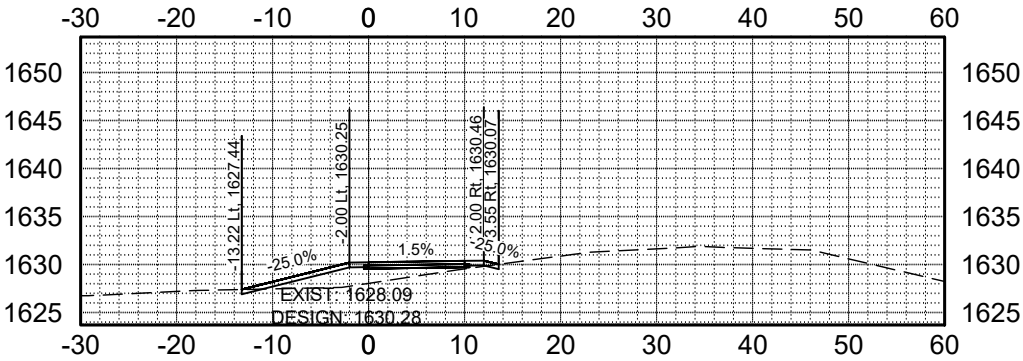
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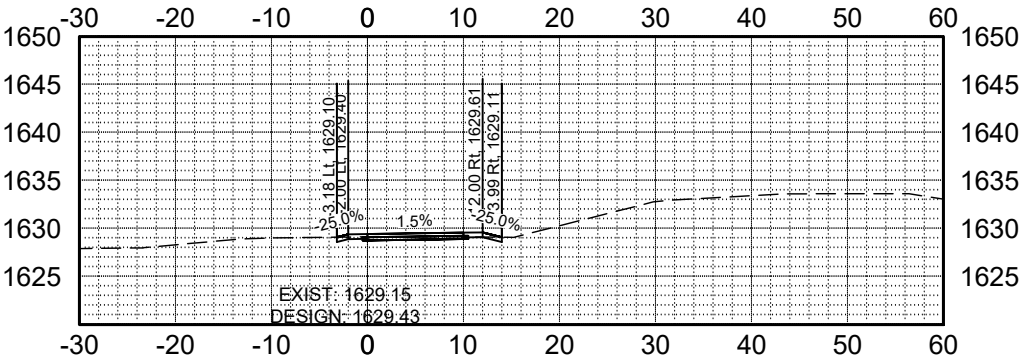
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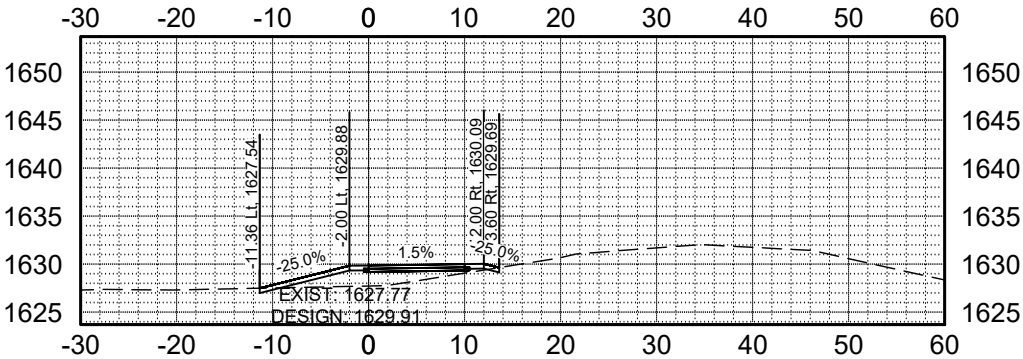
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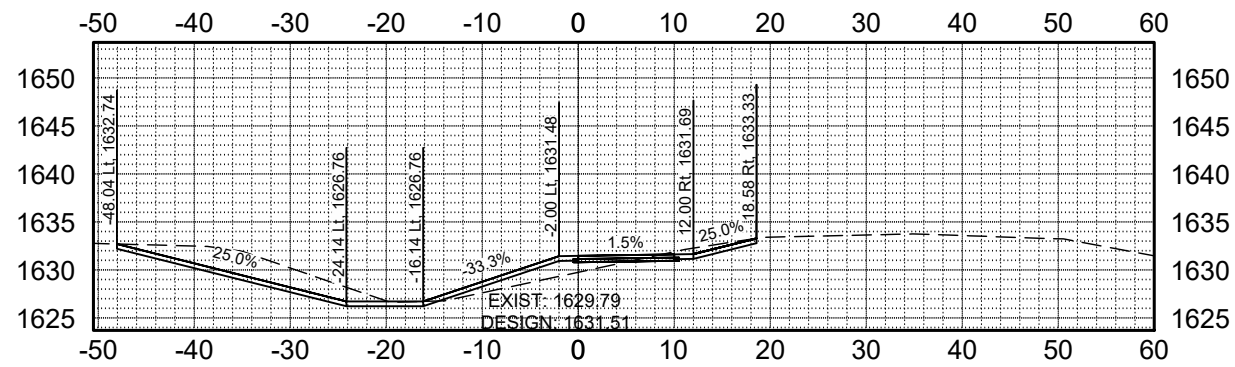


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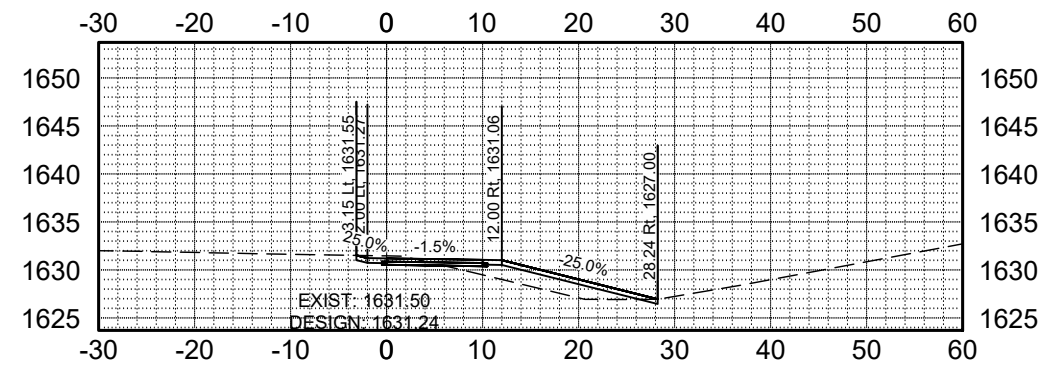


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	5

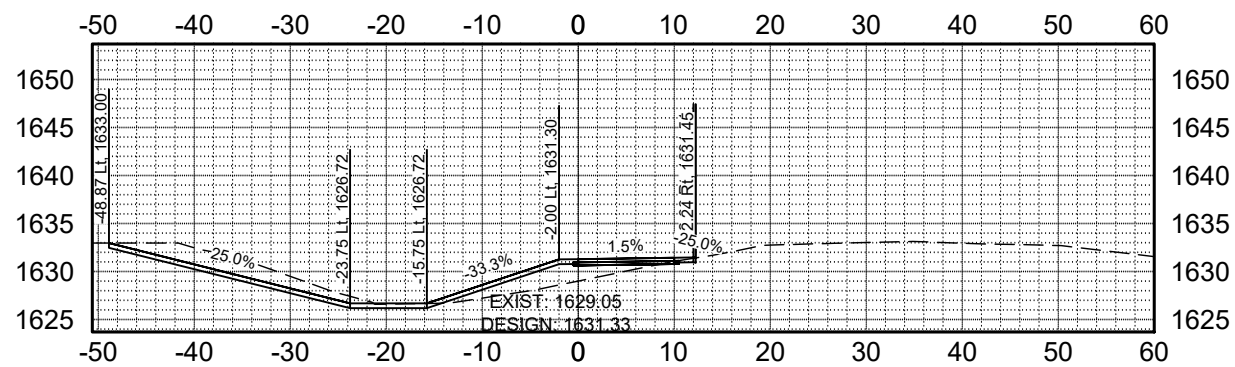
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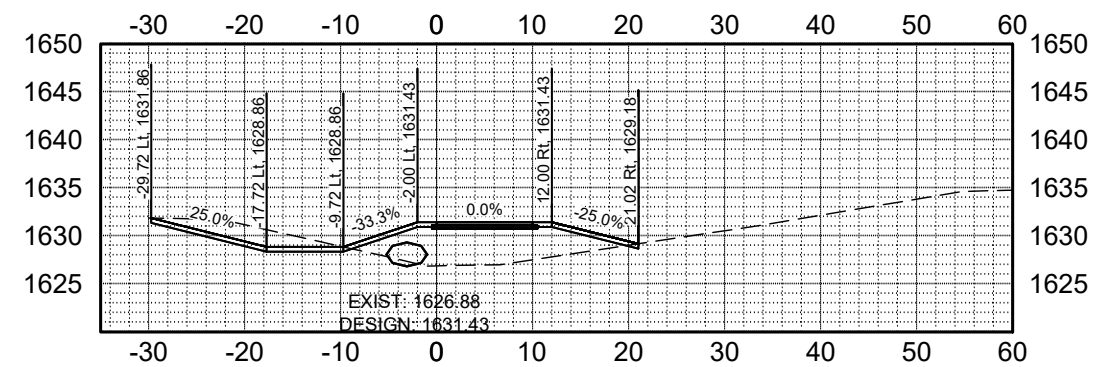
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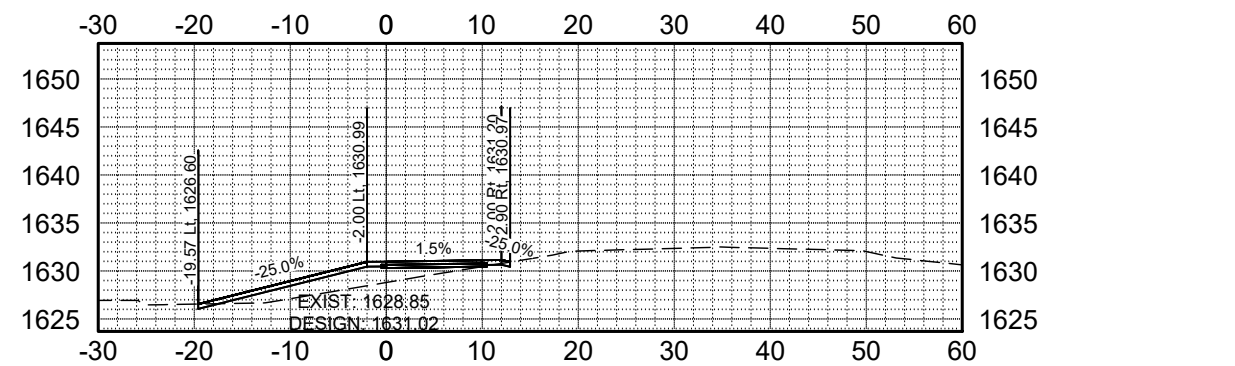
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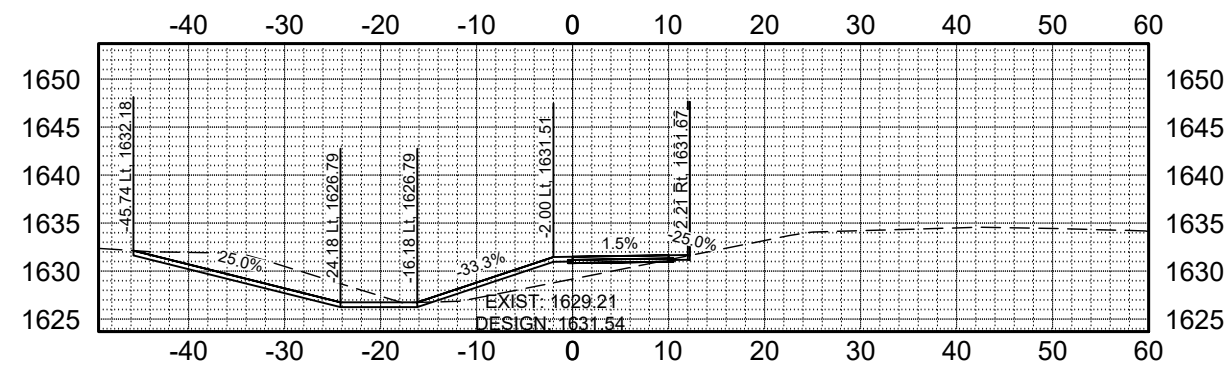
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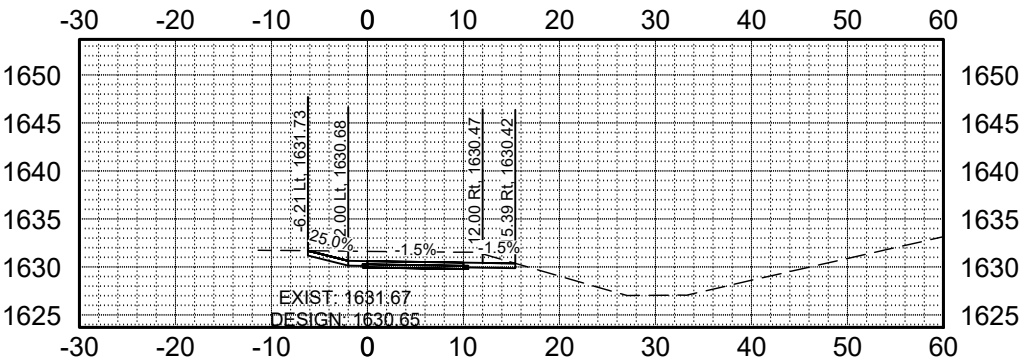


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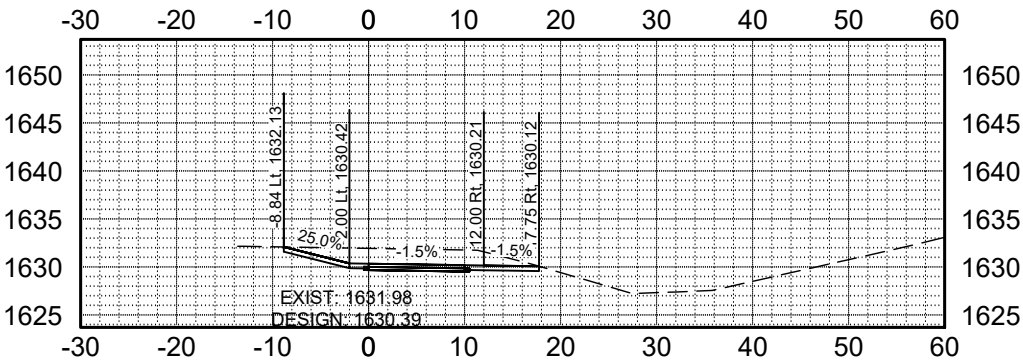


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	6

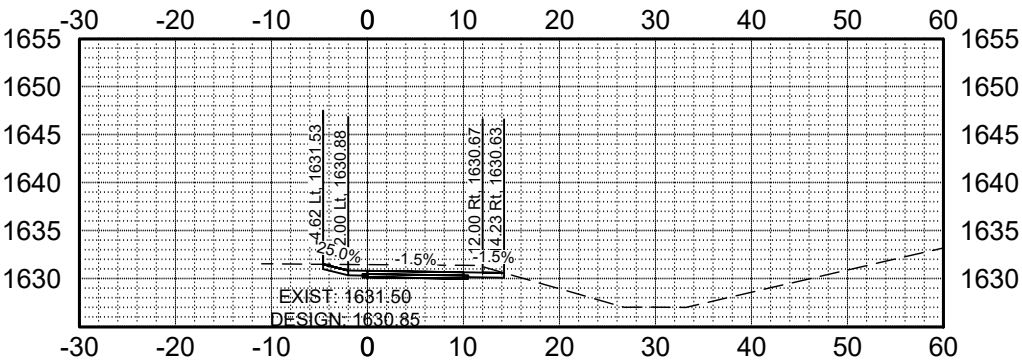
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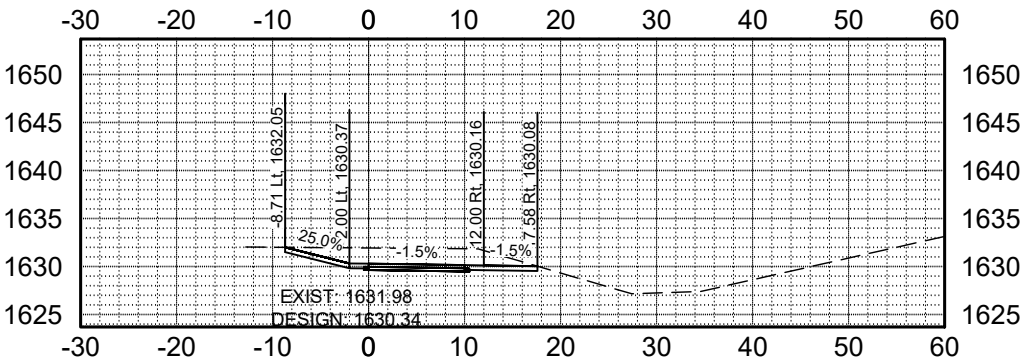
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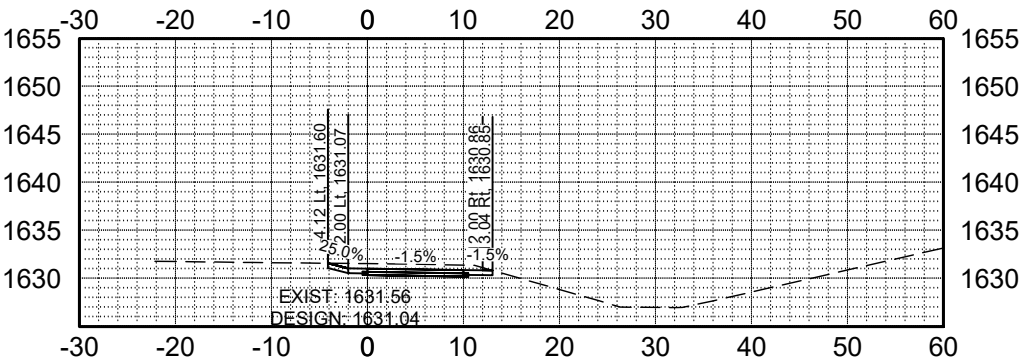
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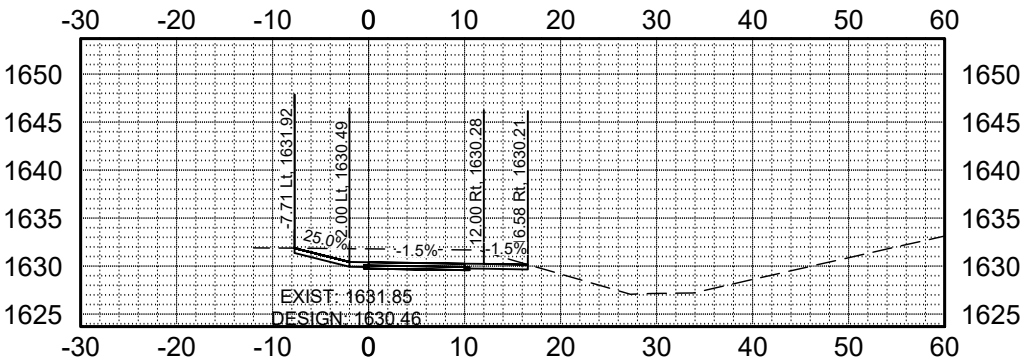
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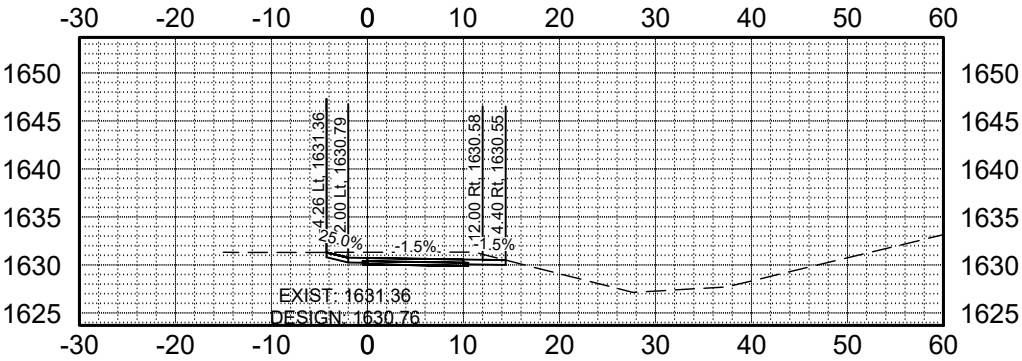


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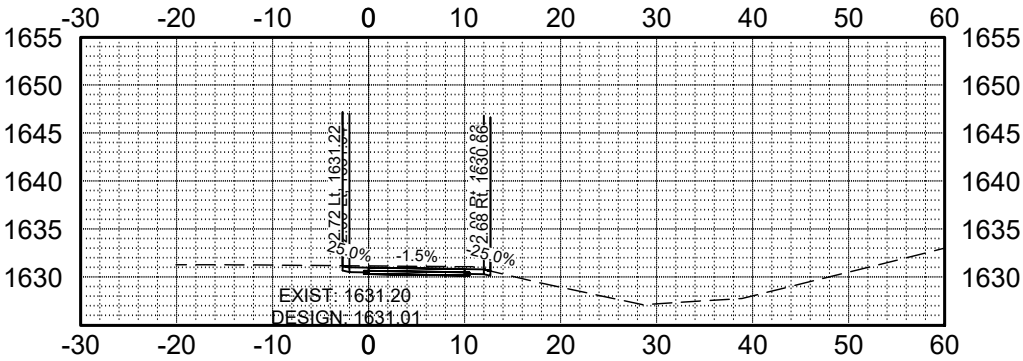


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	7

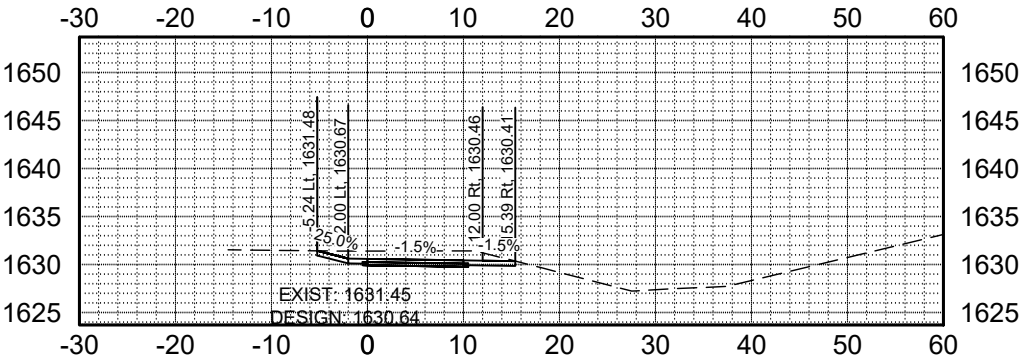
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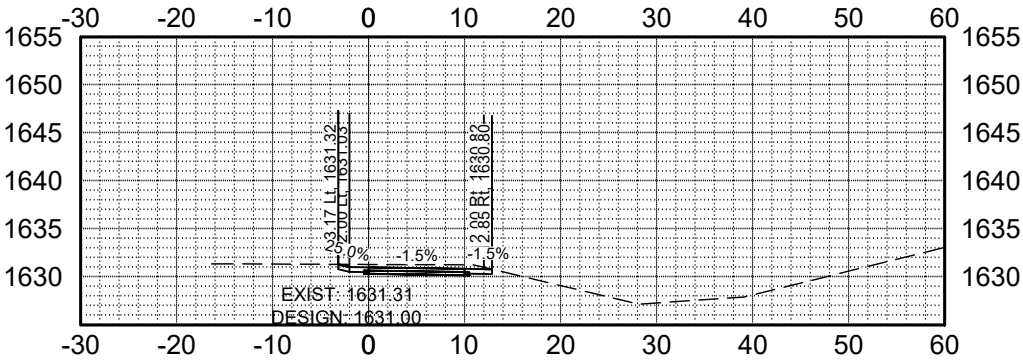
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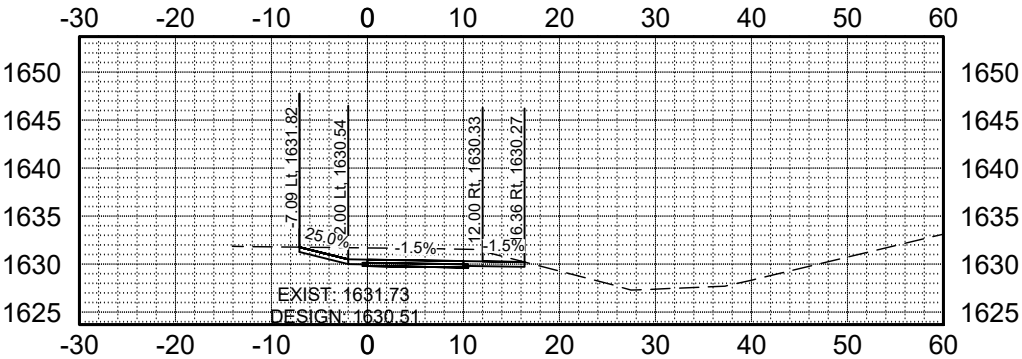
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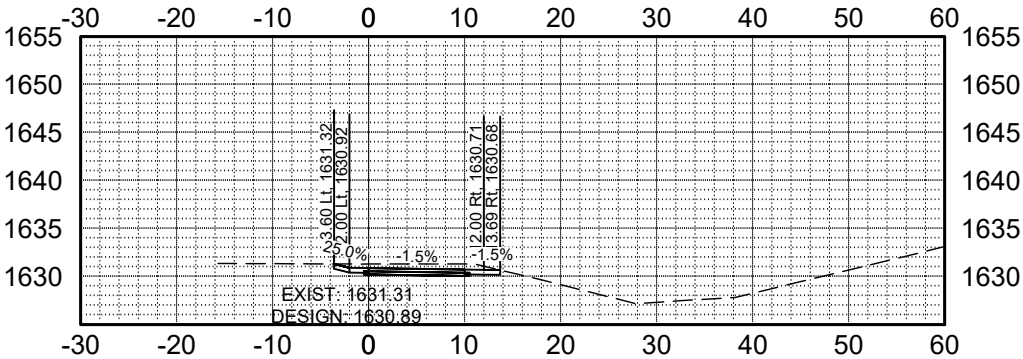
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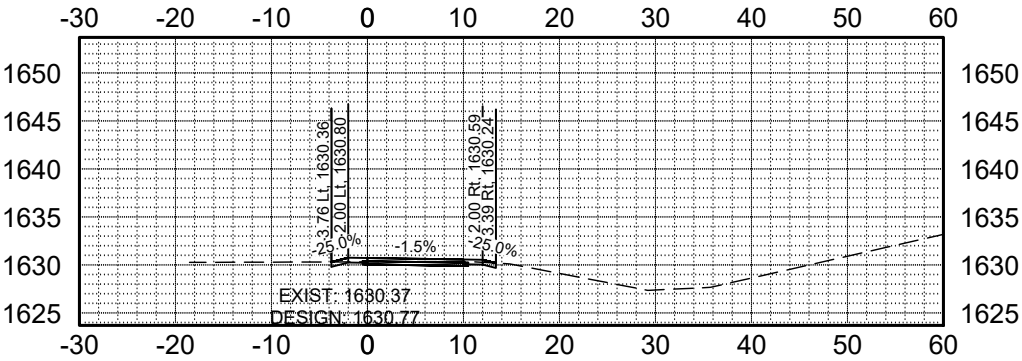


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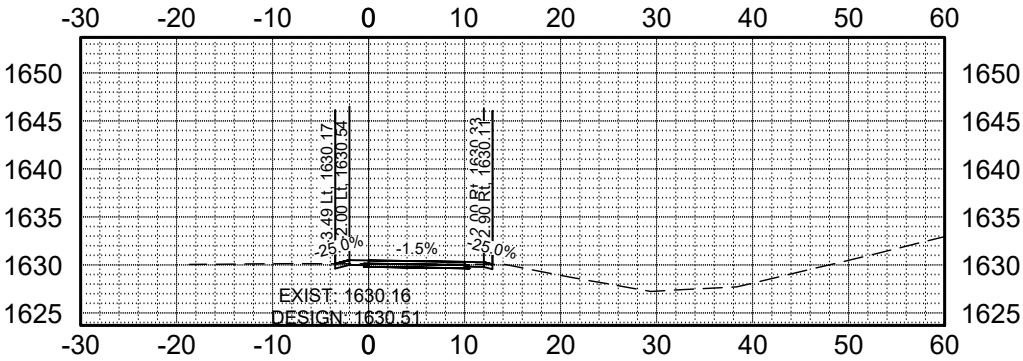


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	8

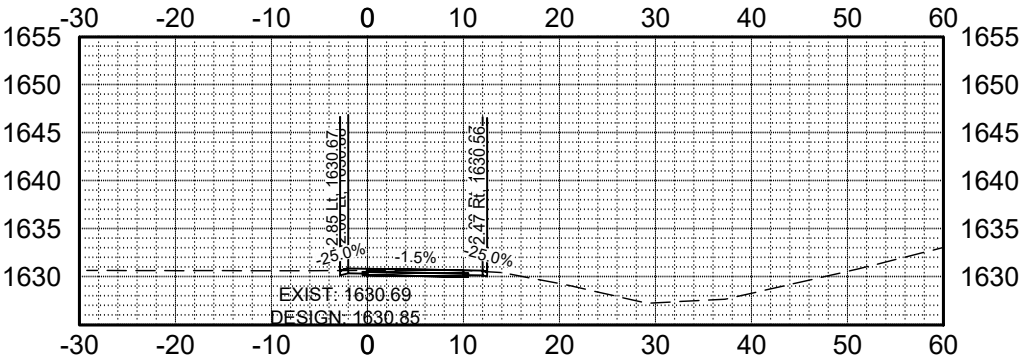
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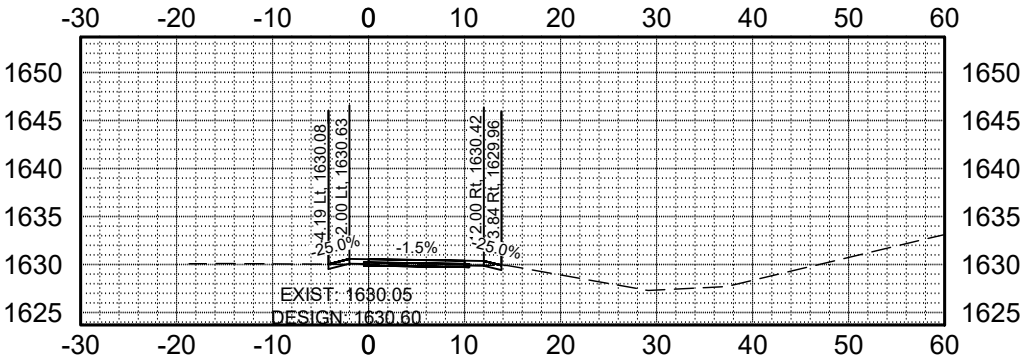
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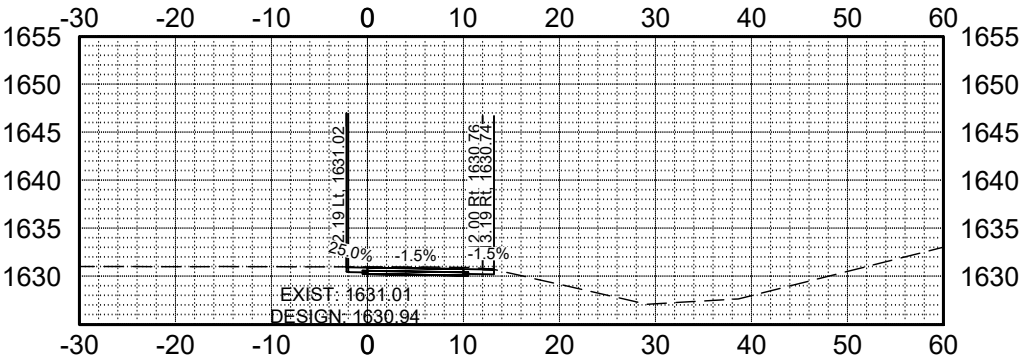
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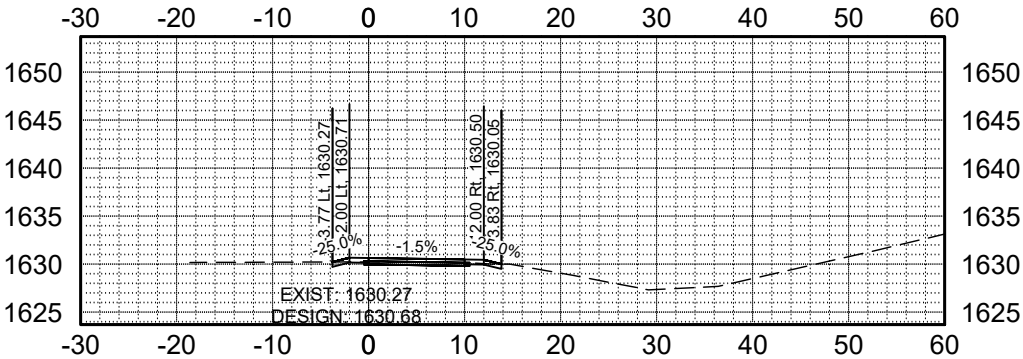
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PR_Path STA 20+50.00

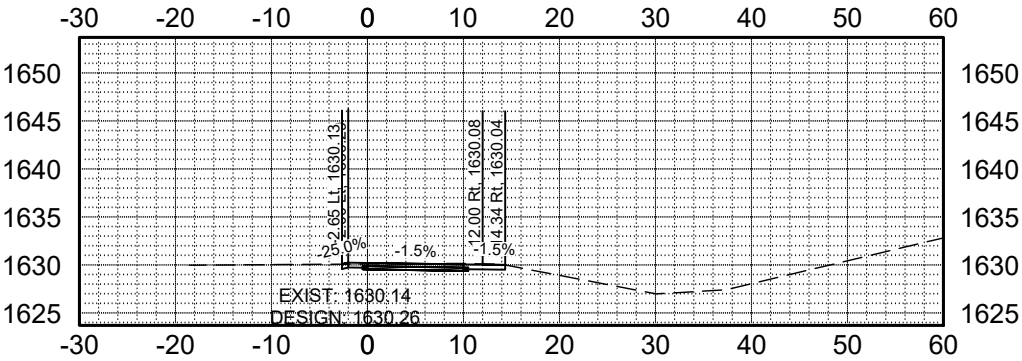


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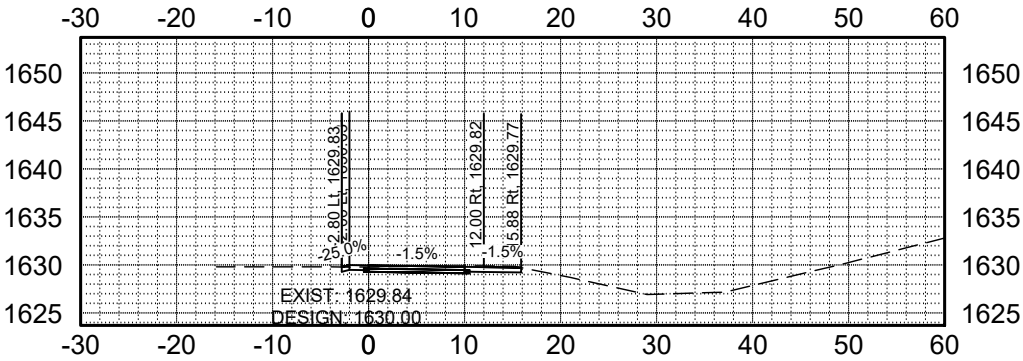


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	9

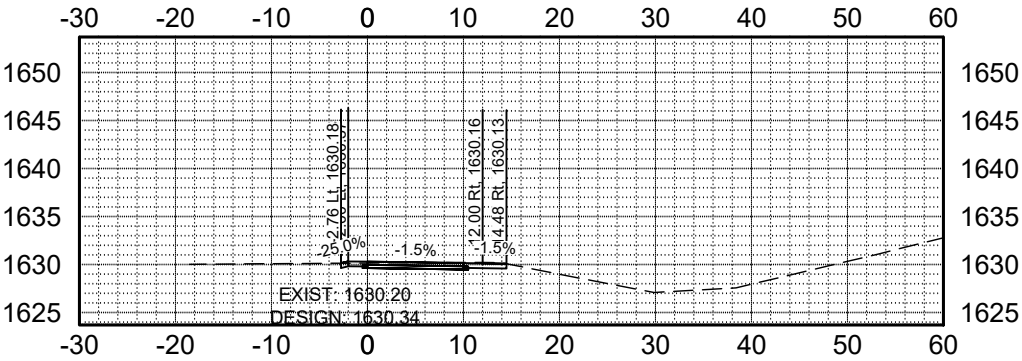
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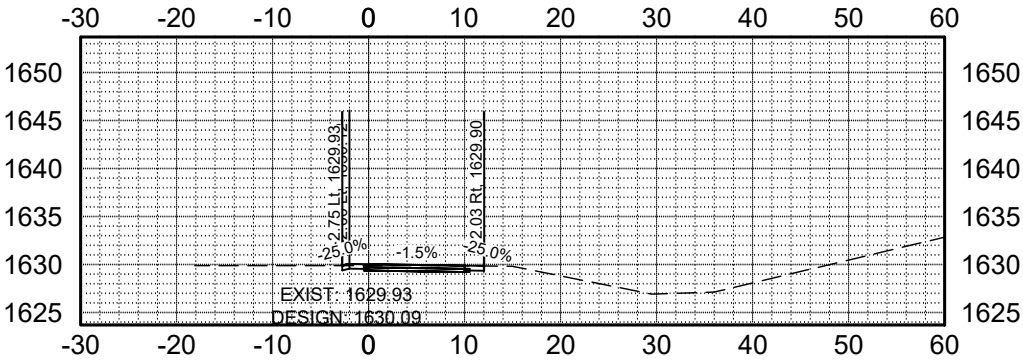
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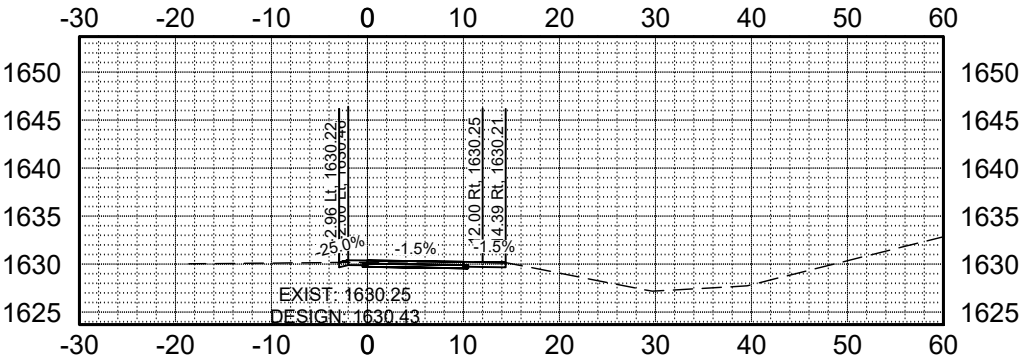
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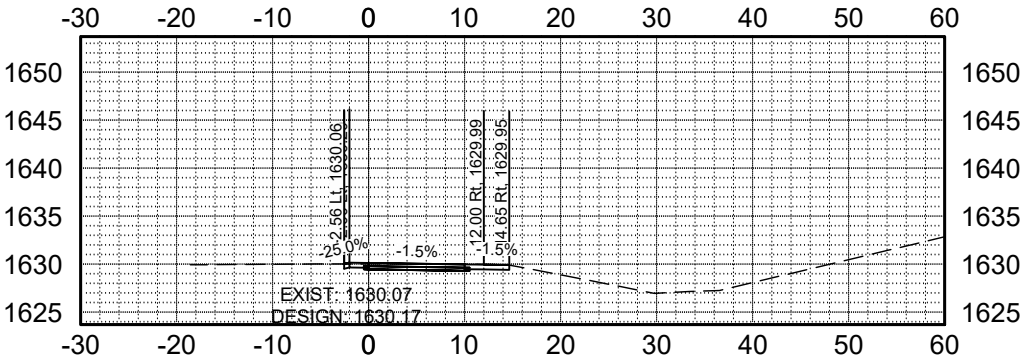
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PR_Path STA 22+00.00

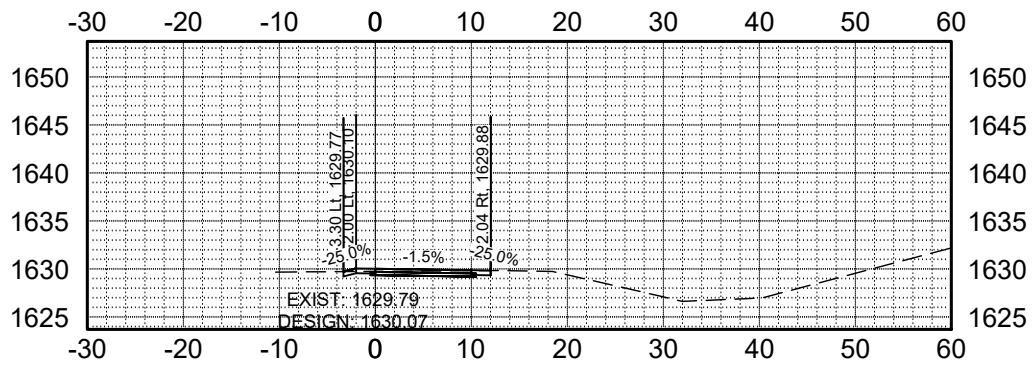


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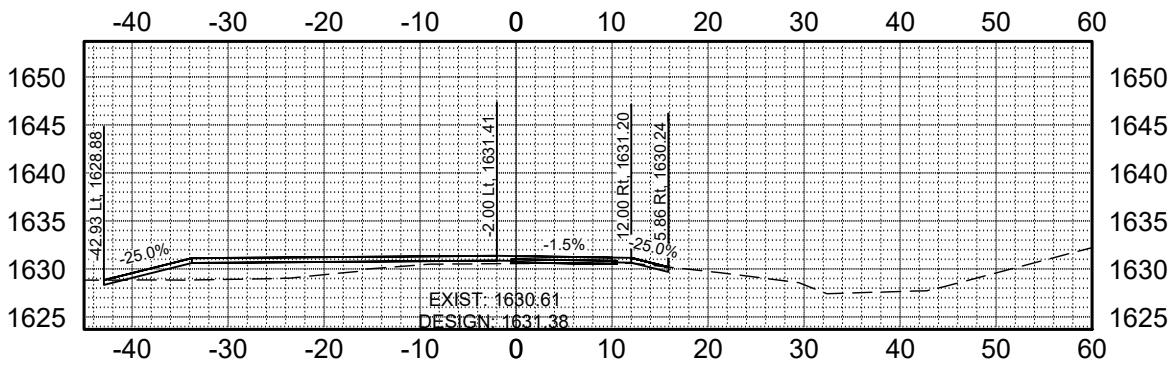


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	ND	TAC-1-981(138)	200	10

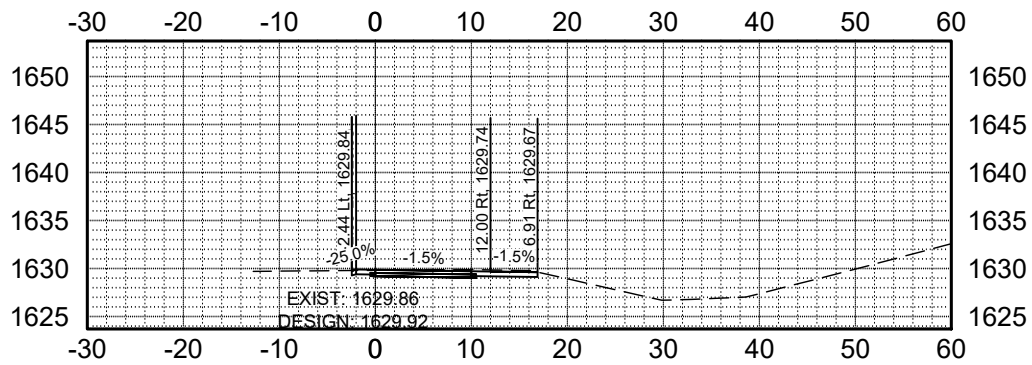
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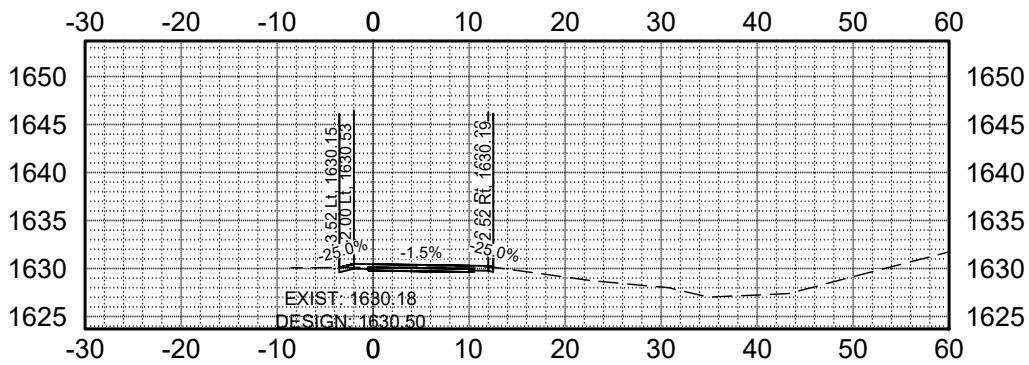
PR_Path STA 24+75.00



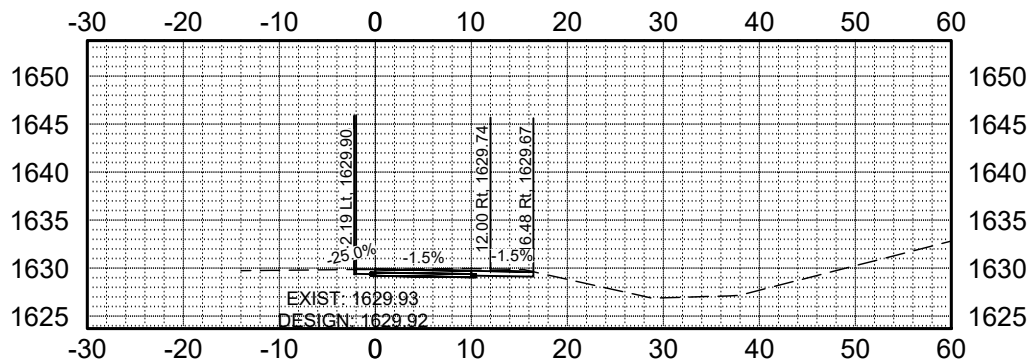
PR_Path STA 23+75.00



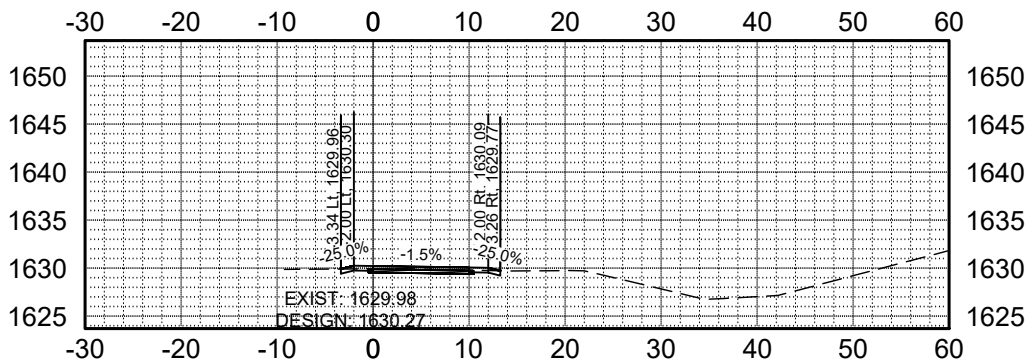
PR_Path STA 24+50.00



PR_Path STA 23+50.00

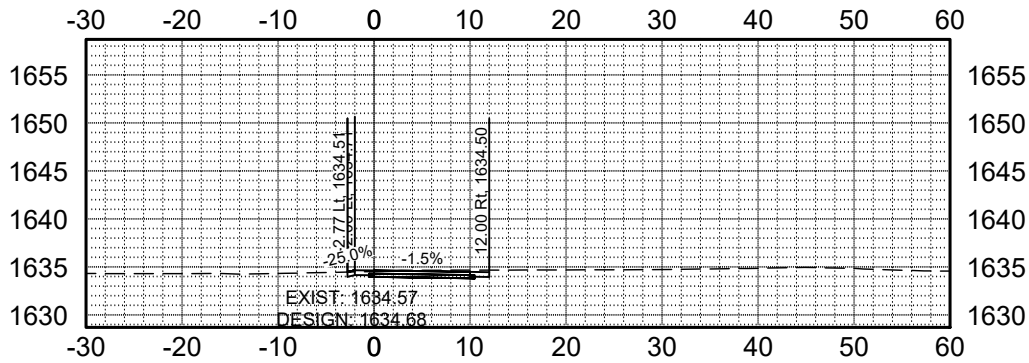


PR_Path STA 24+25.00

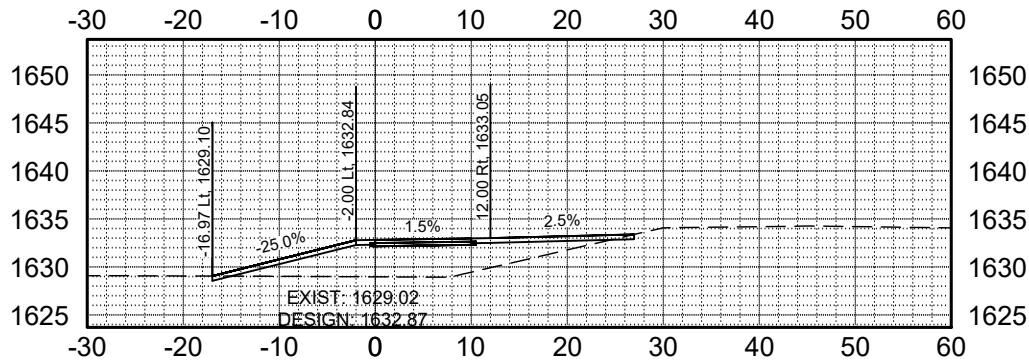


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	11

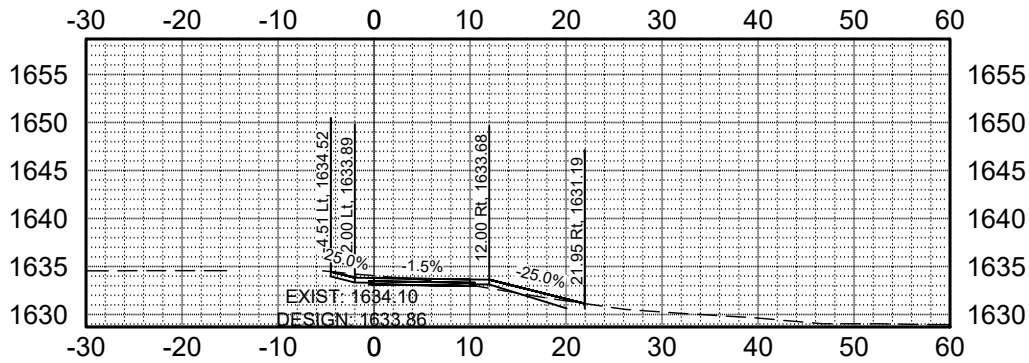
PR_Path STA 25+50.00



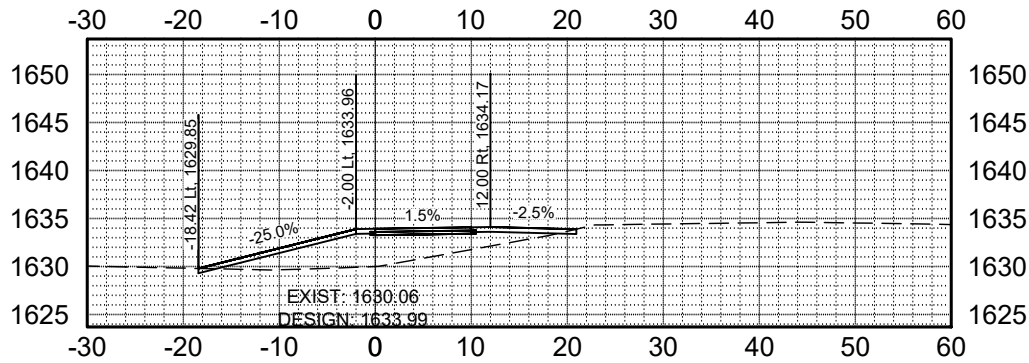
PR_Path STA 26+25.00



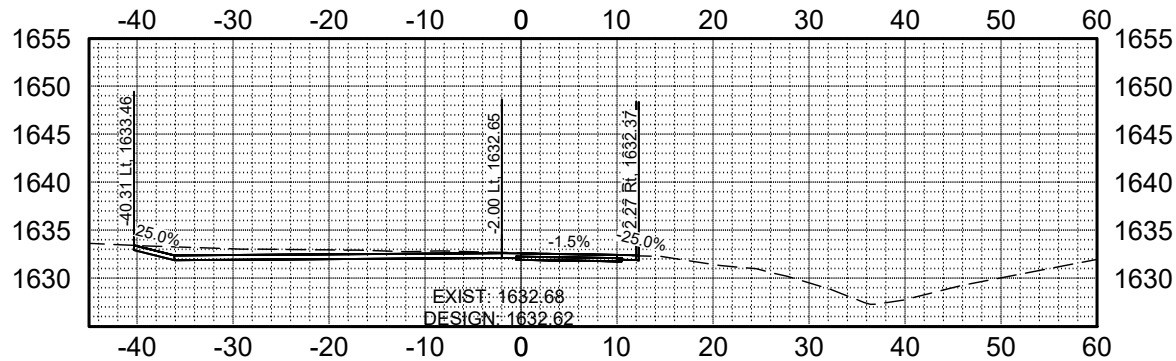
PR_Path STA 25+25.00



PR_Path STA 26+00.00

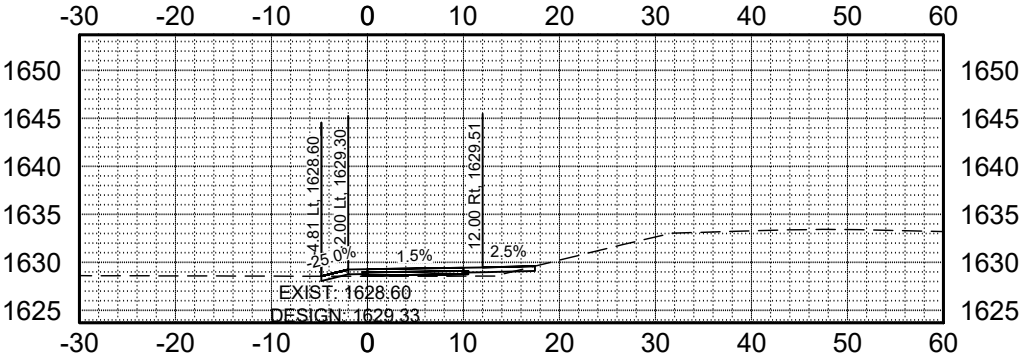


PR_Path STA 25+00.00

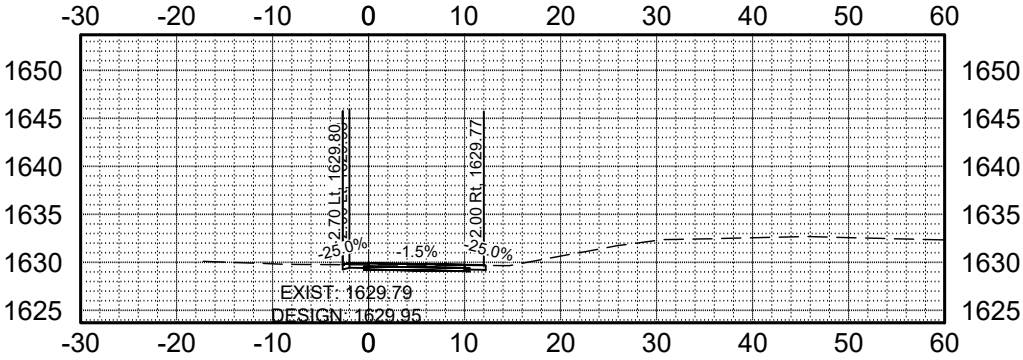


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	12

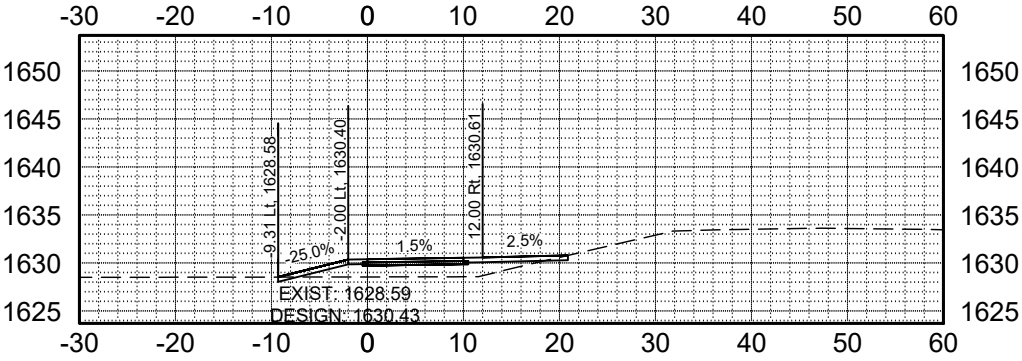
PR_Path STA 27+00.00



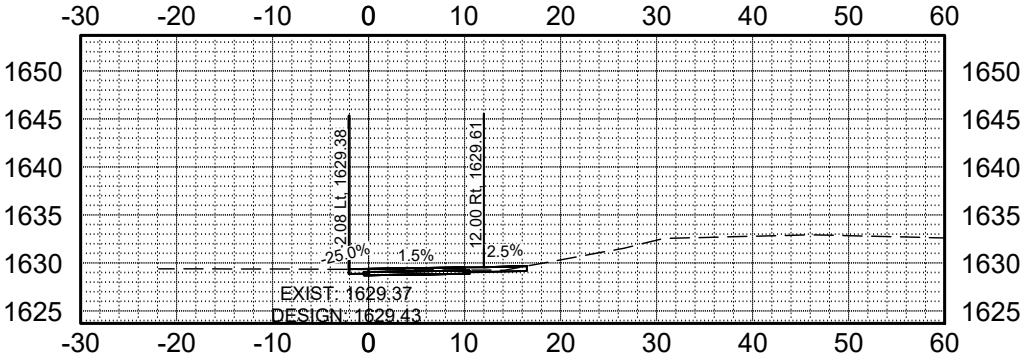
PR_Path STA 27+75.00



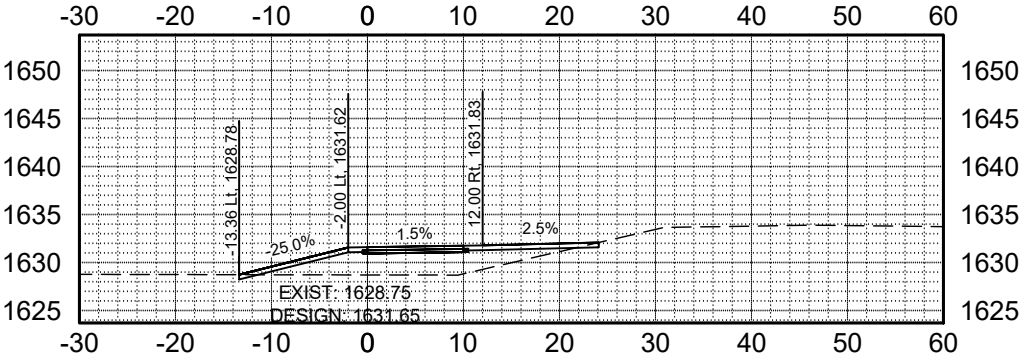
PR_Path STA 26+75.00



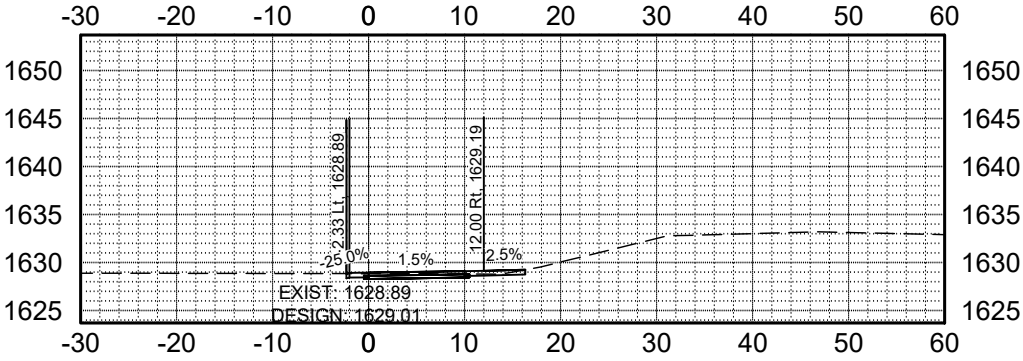
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PR_Path STA 26+50.00

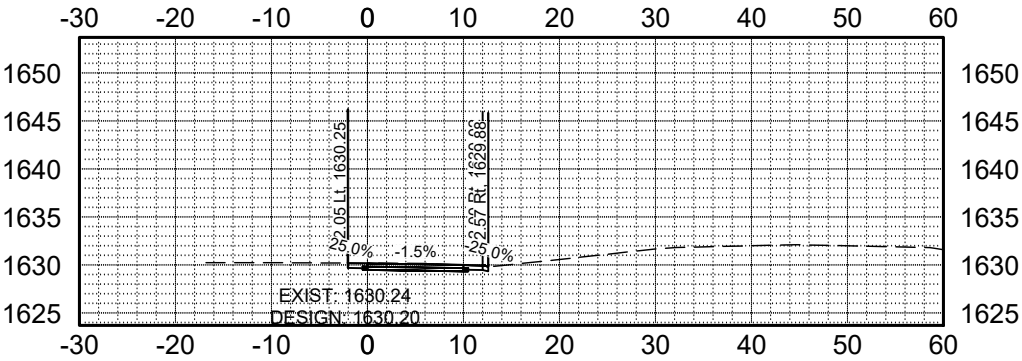


PR_Path STA 27+25.00

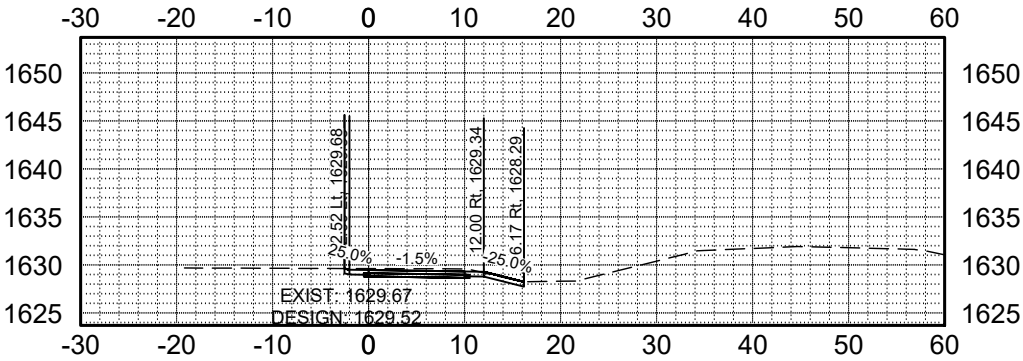


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	13

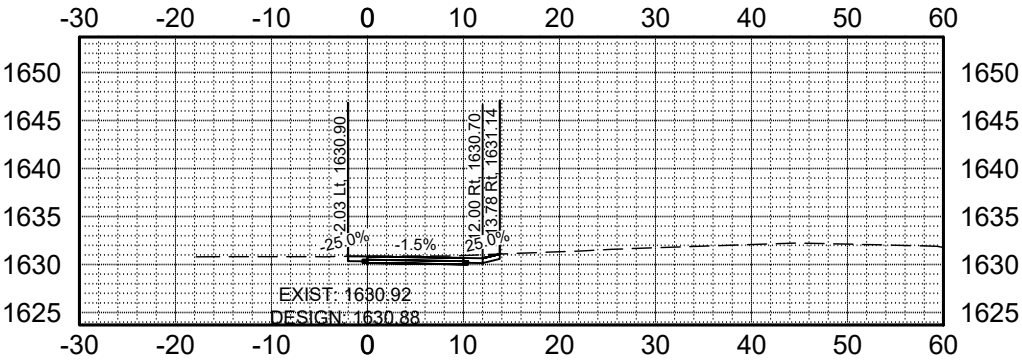
PR_Path STA 28+50.00



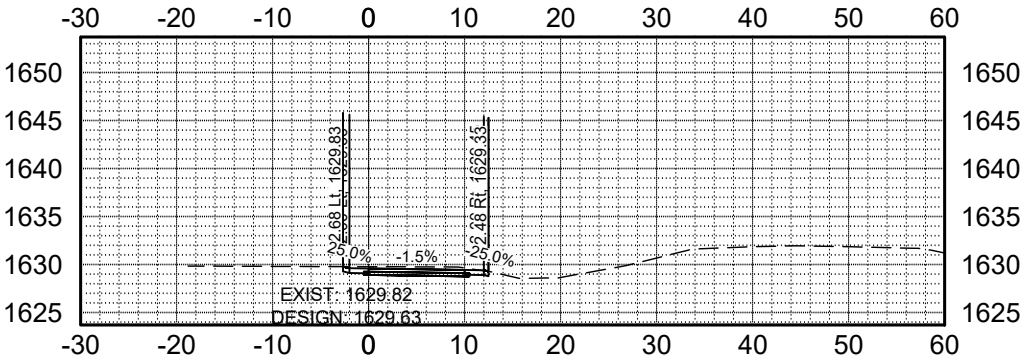
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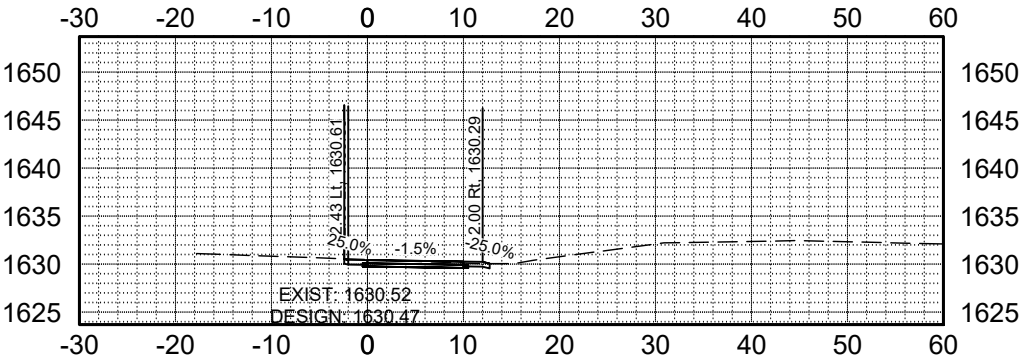
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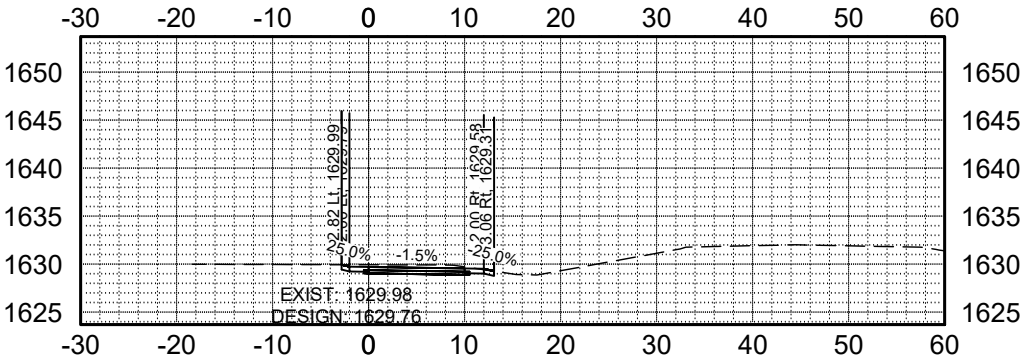
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PR_Path STA 28+00.00

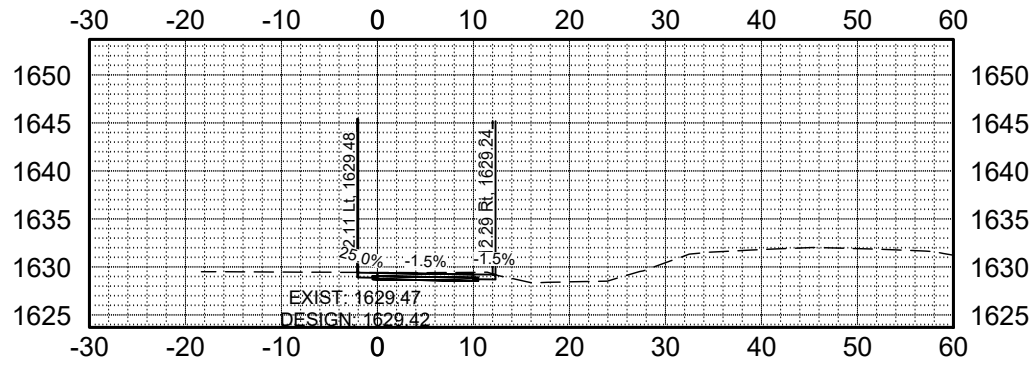


PR_Path STA 28+75.00

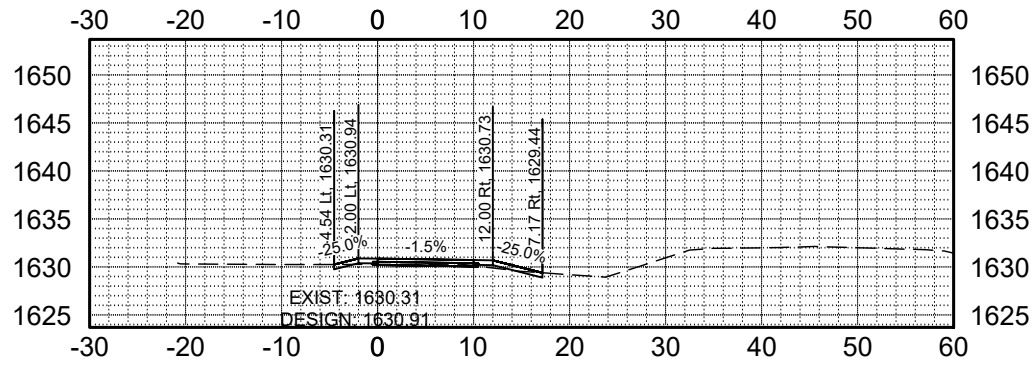


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	14

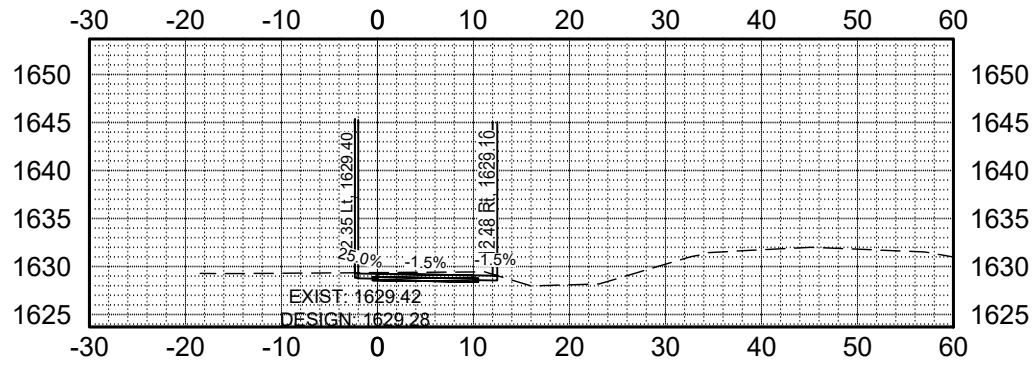
PR_Path STA 30+00.00



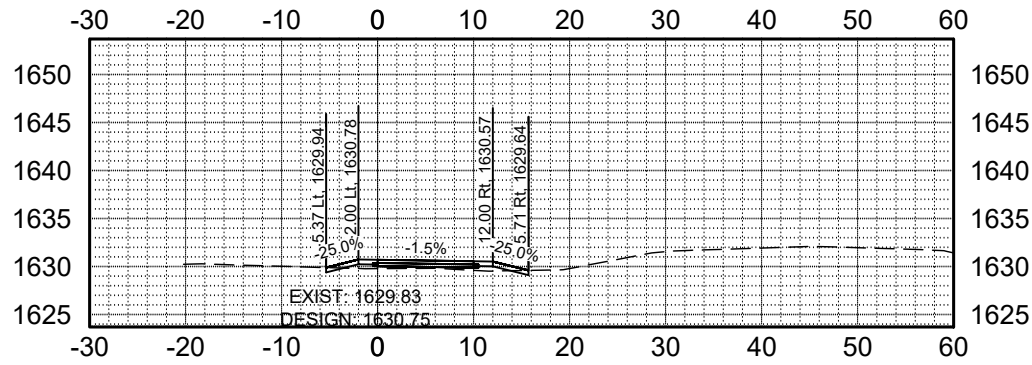
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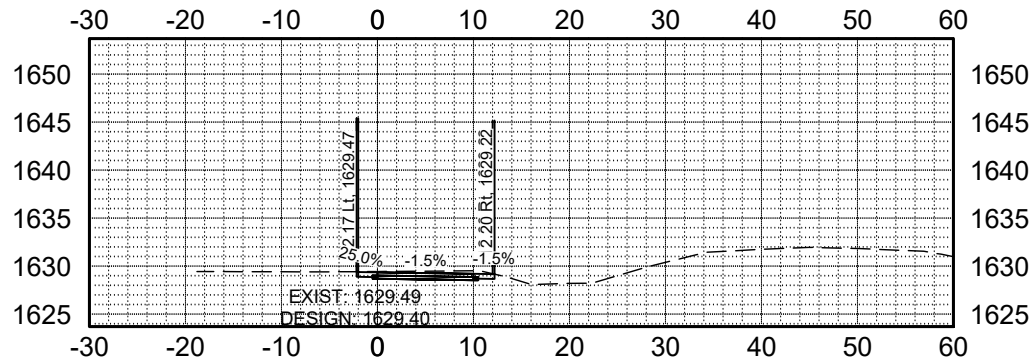
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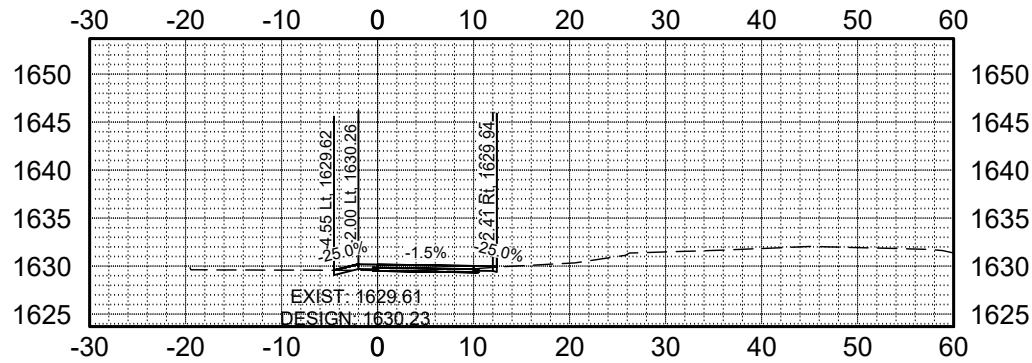
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PR_Path STA 29+50.00

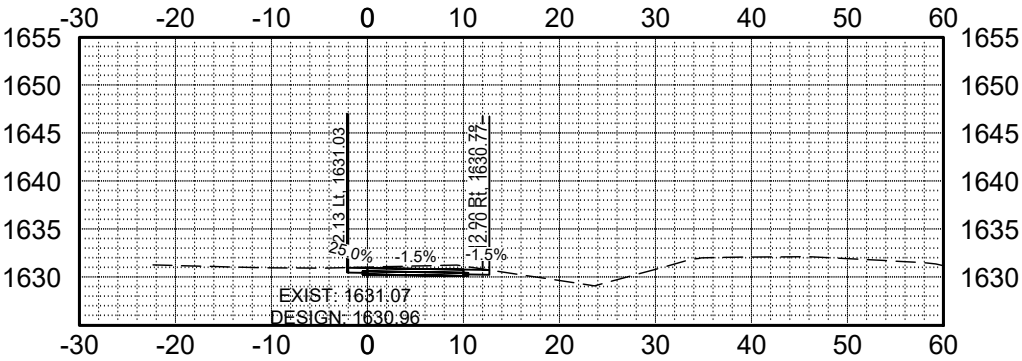


PR_Path STA 30+25.00

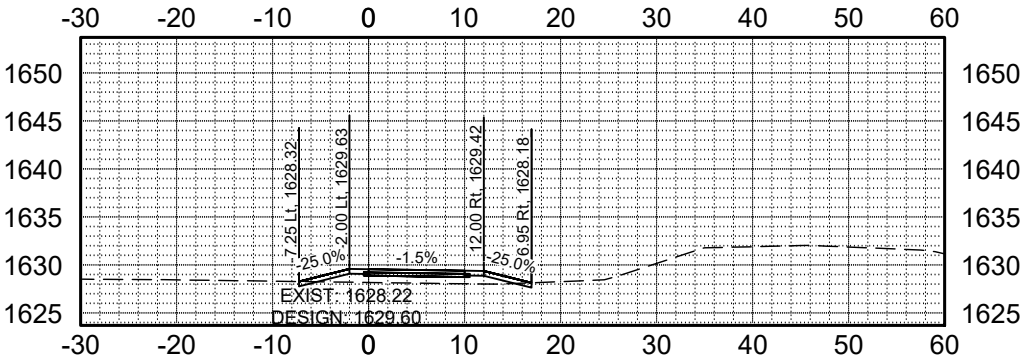


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	15

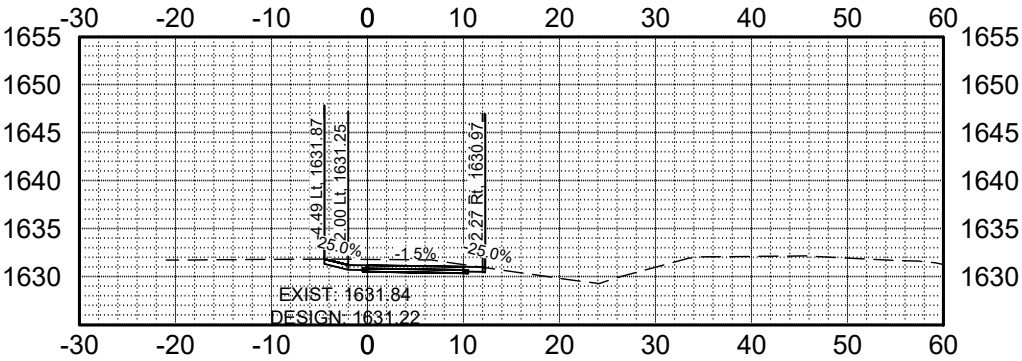
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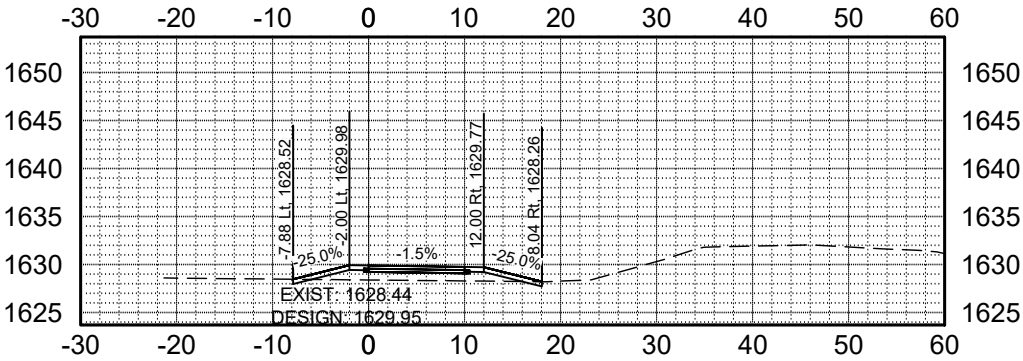
PR_Path STA 32+25.00



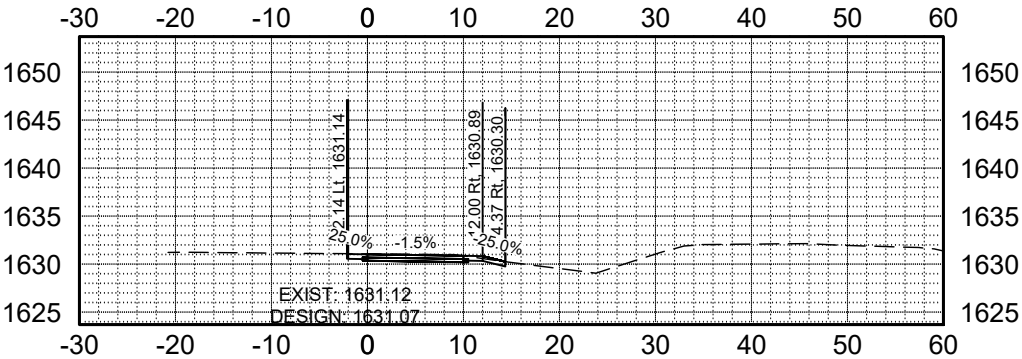
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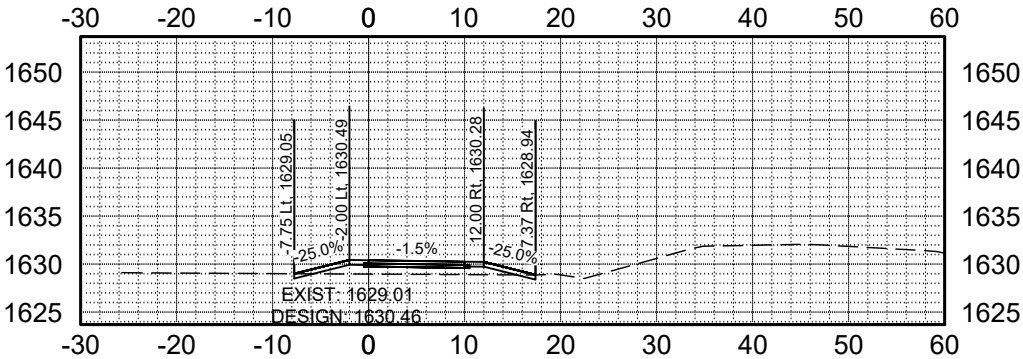
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PR_Path STA 31+00.00

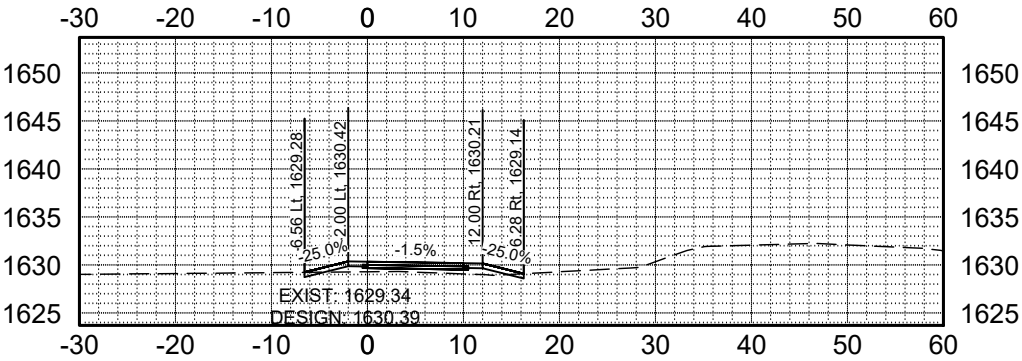


PR_Path STA 31+75.00

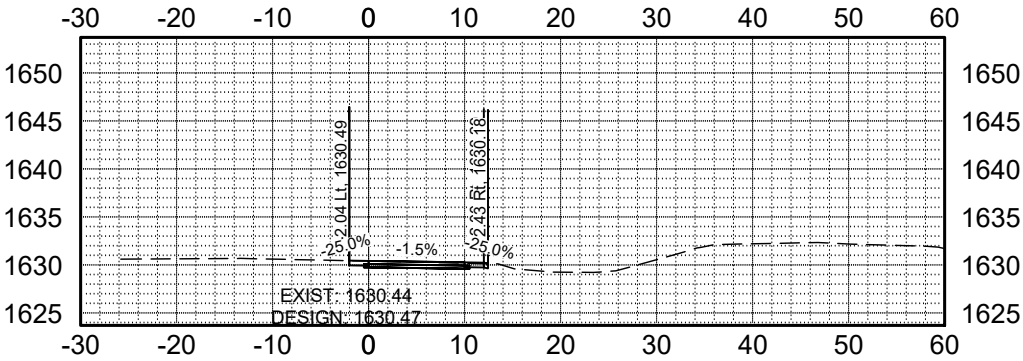


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	16

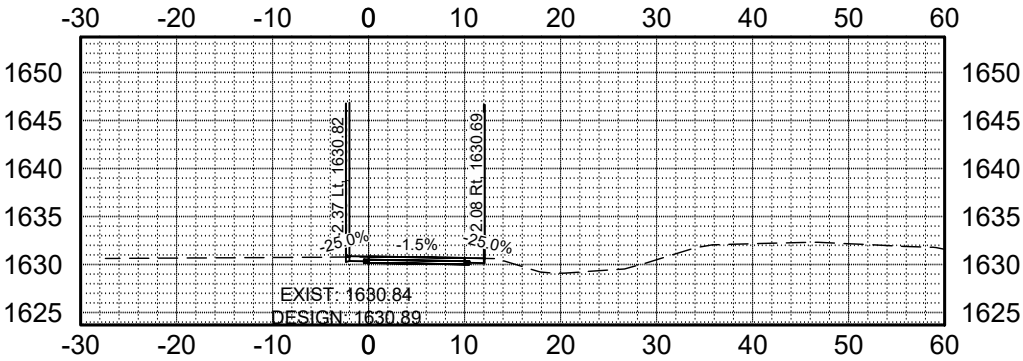
PR_Path STA 33+00.00



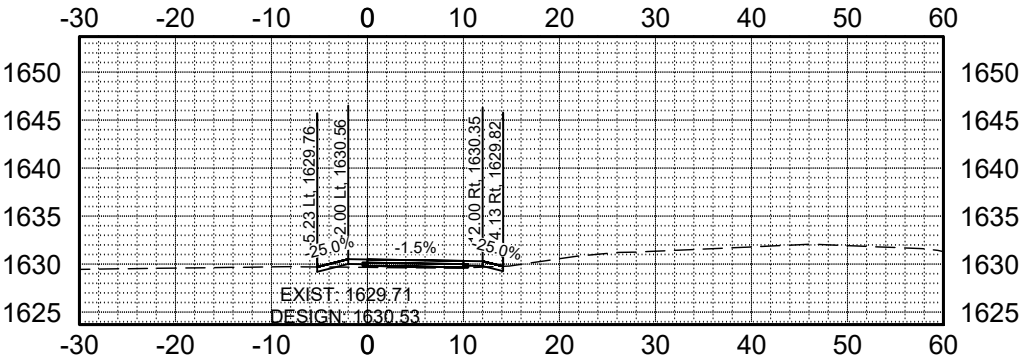
PR_Path STA 33+75.00



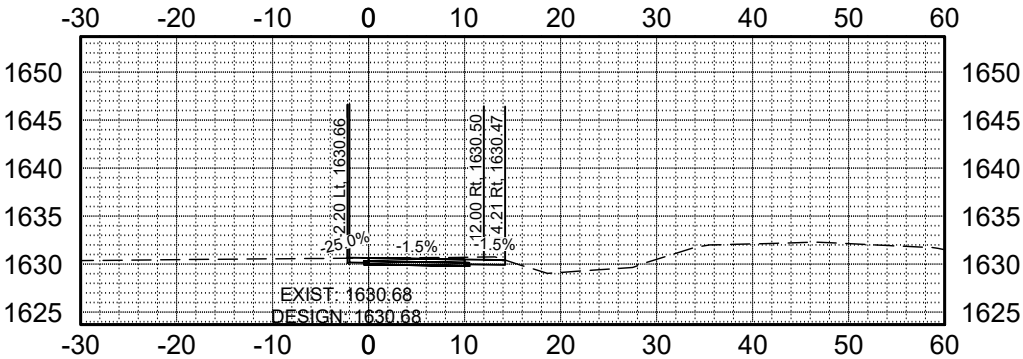
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PR_Path STA 32+50.00

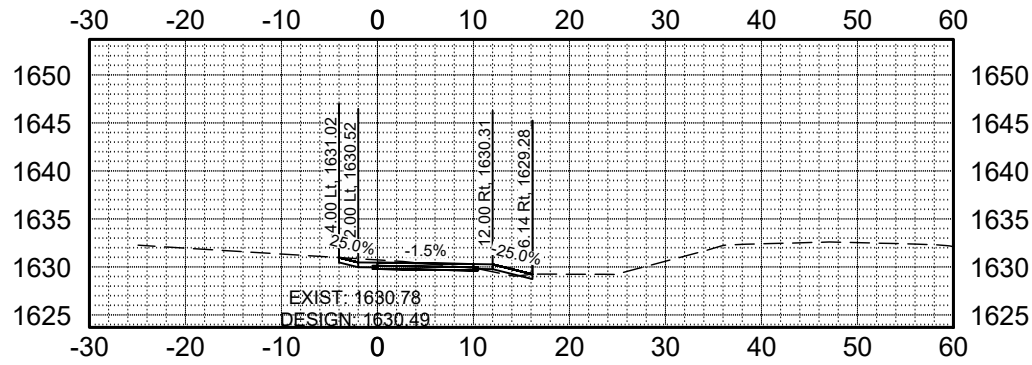


PR_Path STA 33+25.00

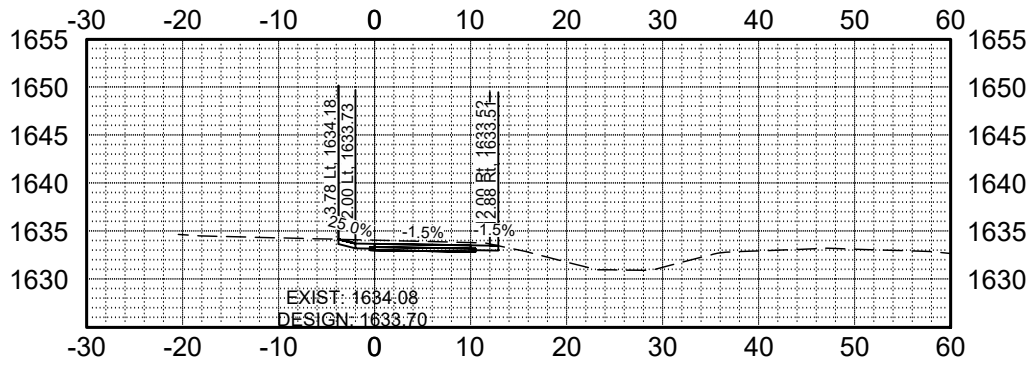


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	17

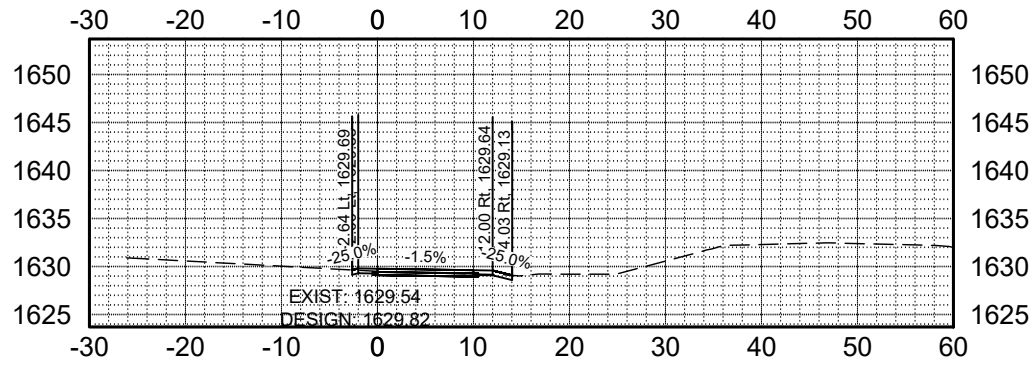
PR_Path STA 34+50.00



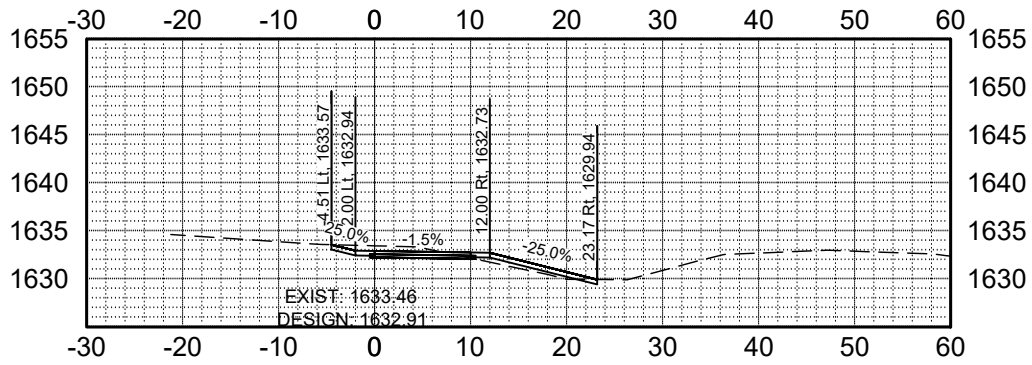
PR_Path STA 35+25.00



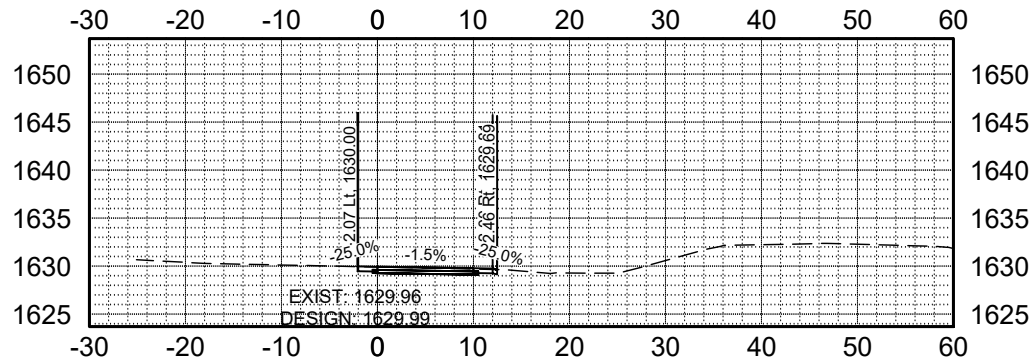
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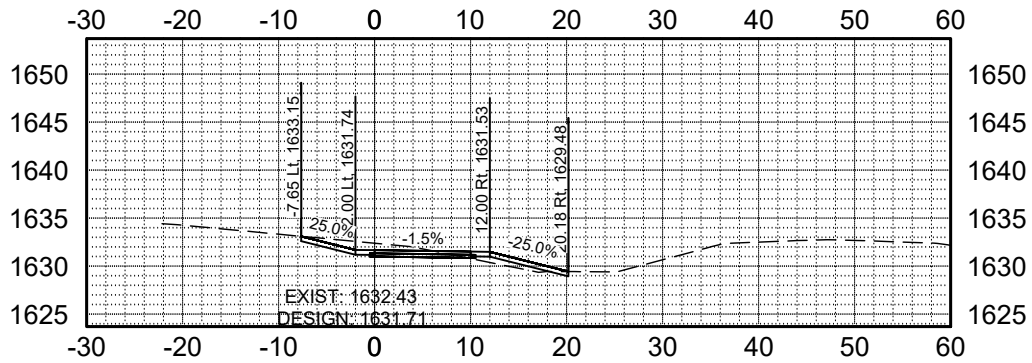
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PR_Path STA 34+00.00

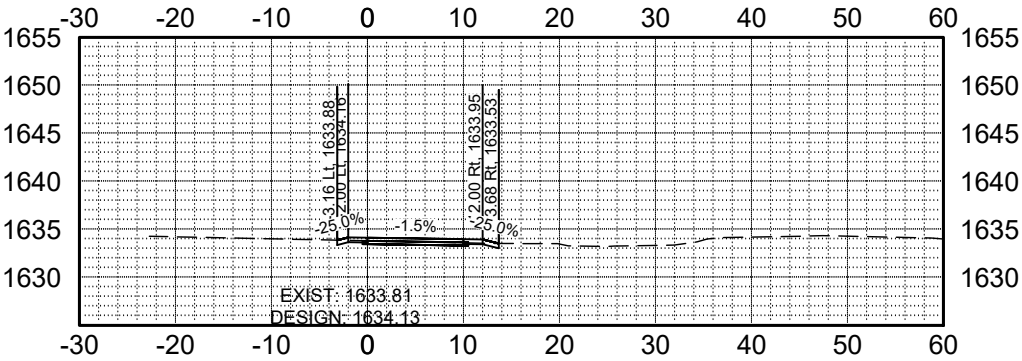


PR_Path STA 34+75.00

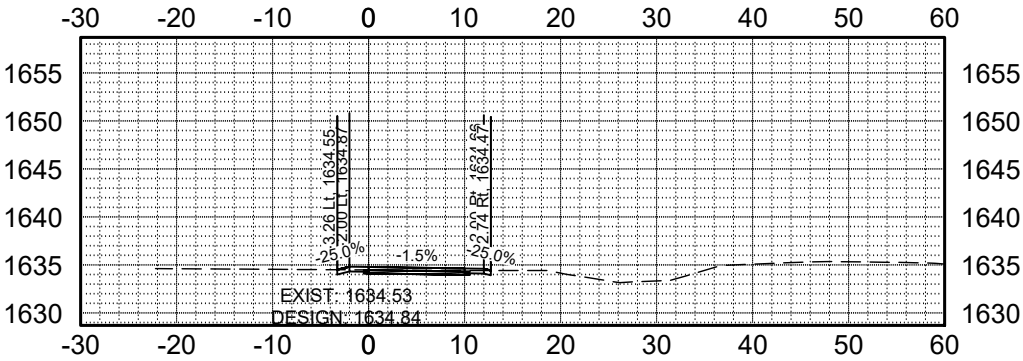


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	18

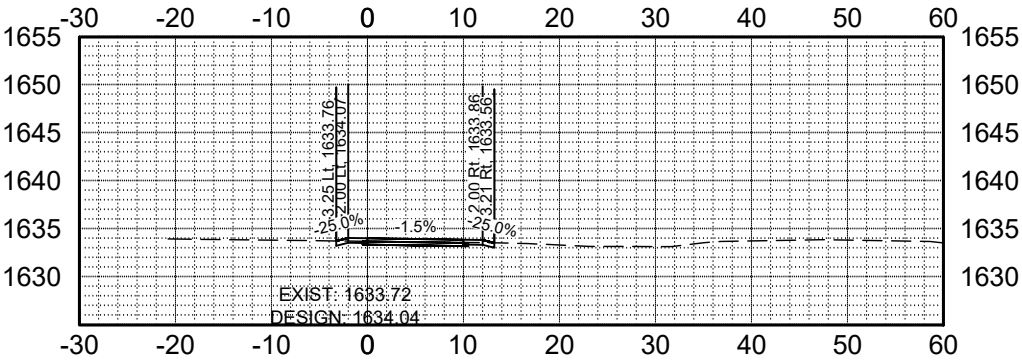
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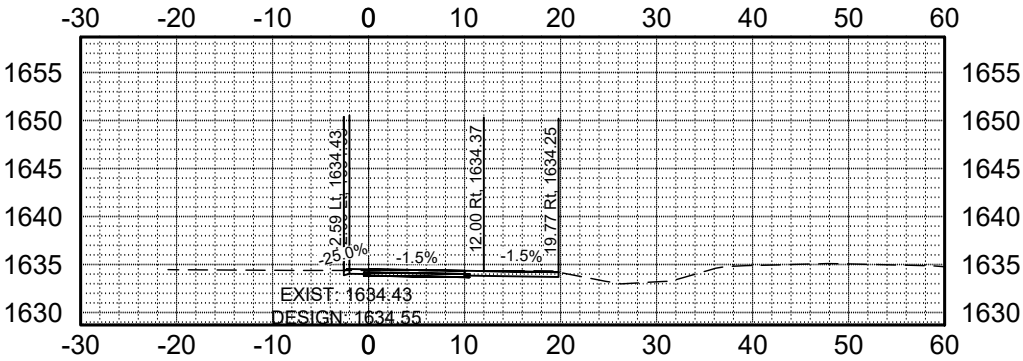
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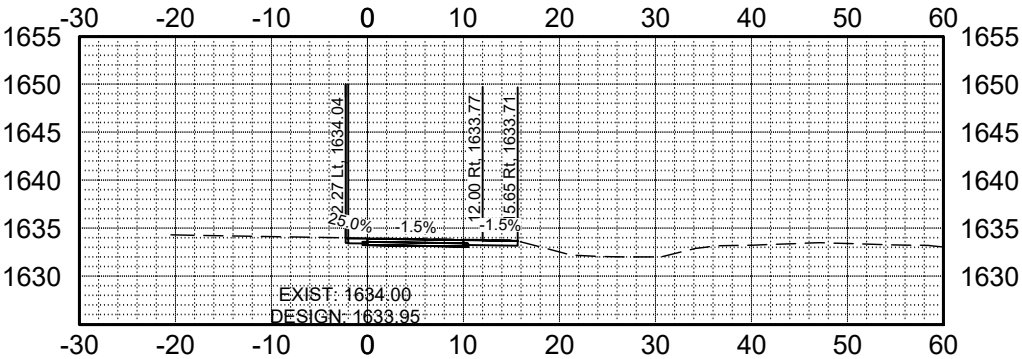
PR_Path STA 35+75.00



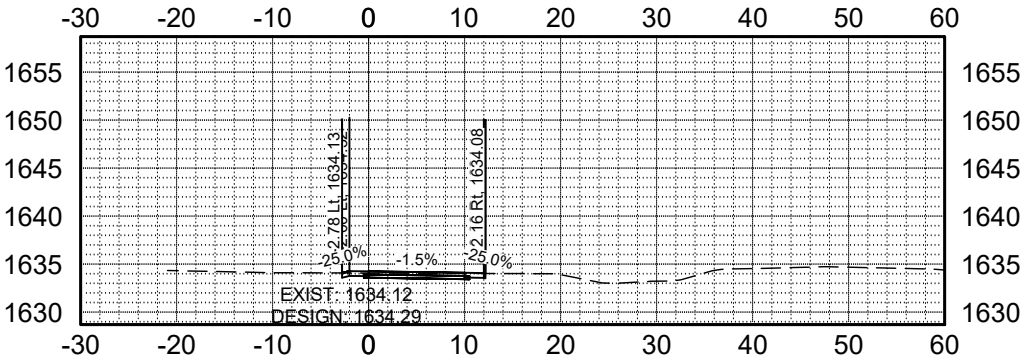
PR_Path STA 36+50.00



PR_Path STA 35+50.00

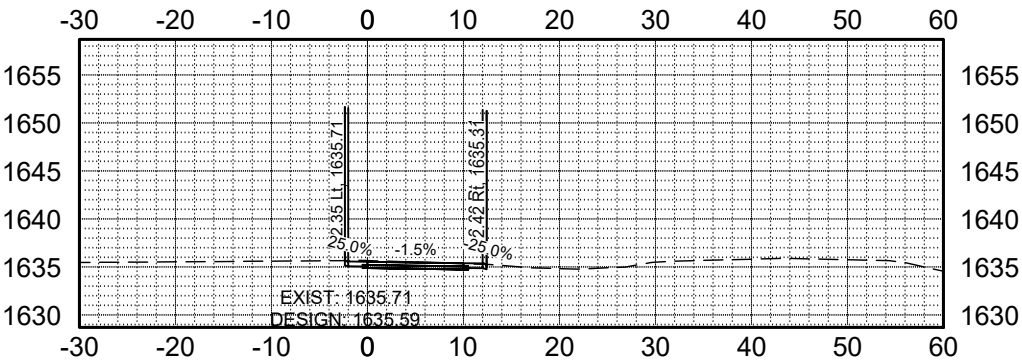


PR_Path STA 36+25.00

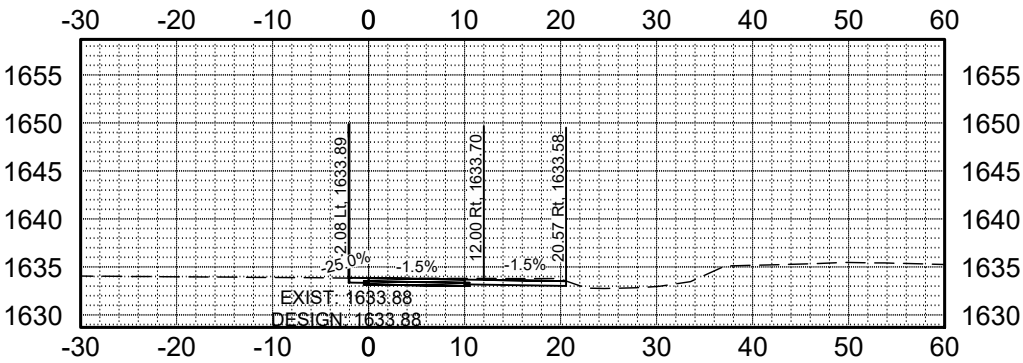


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	19

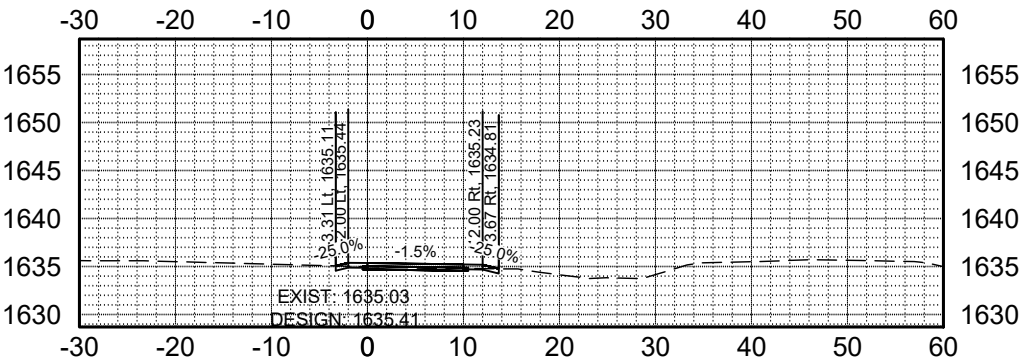
PR_Path STA 37+50.00



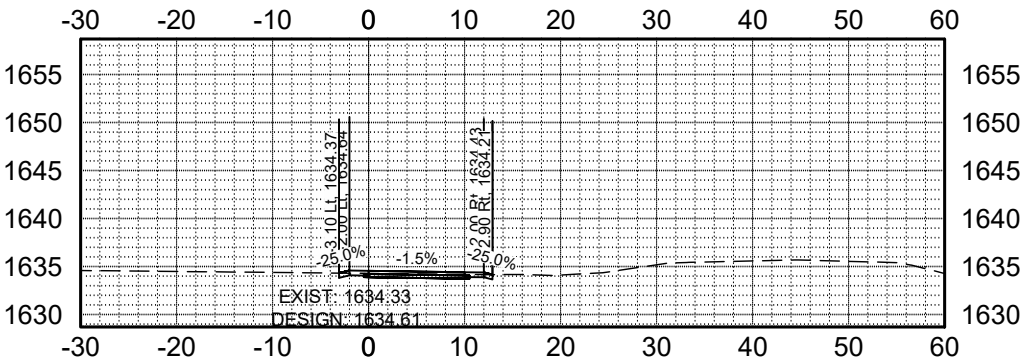
PR_Path STA 38+25.00



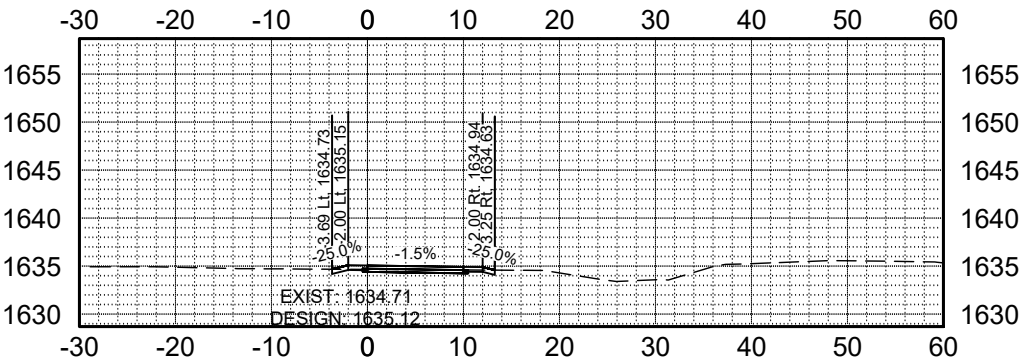
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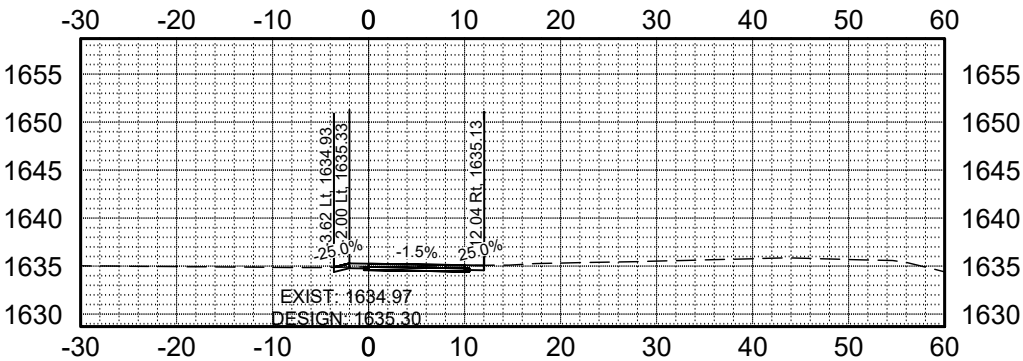
PR_Path STA 38+00.00



PR_Path STA 37+00.00

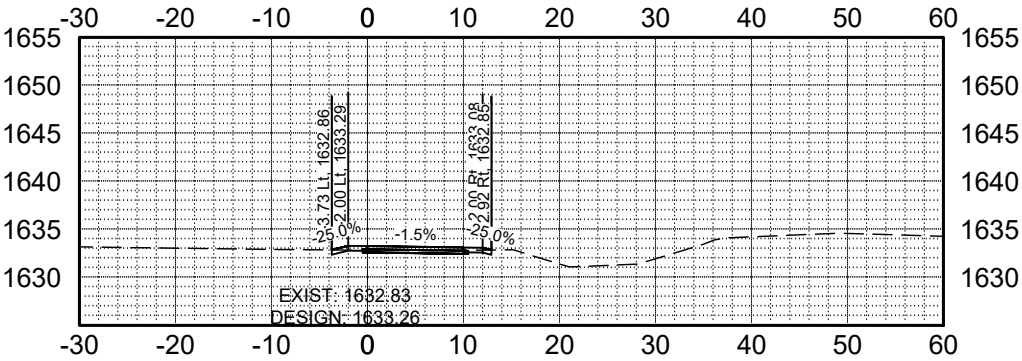


PR_Path STA 37+75.00

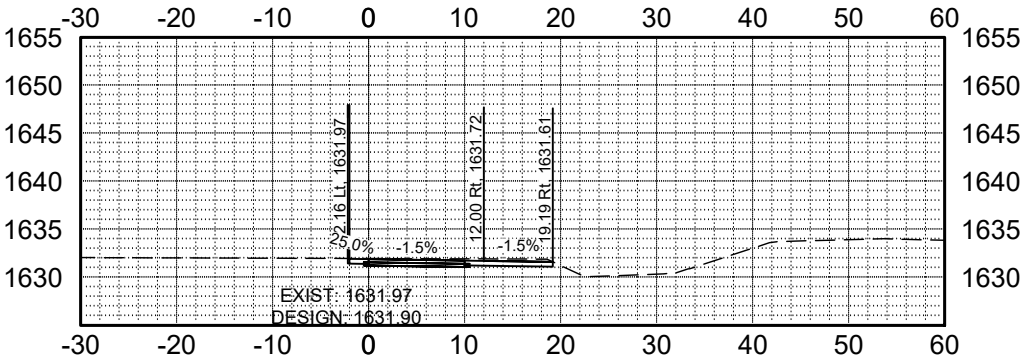


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	20

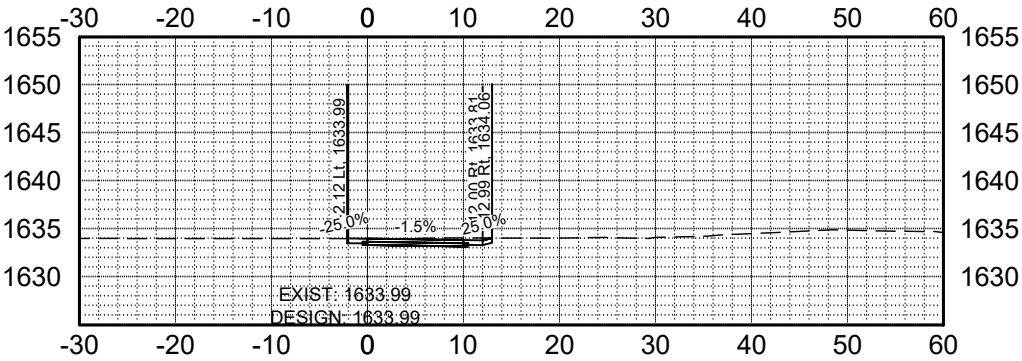
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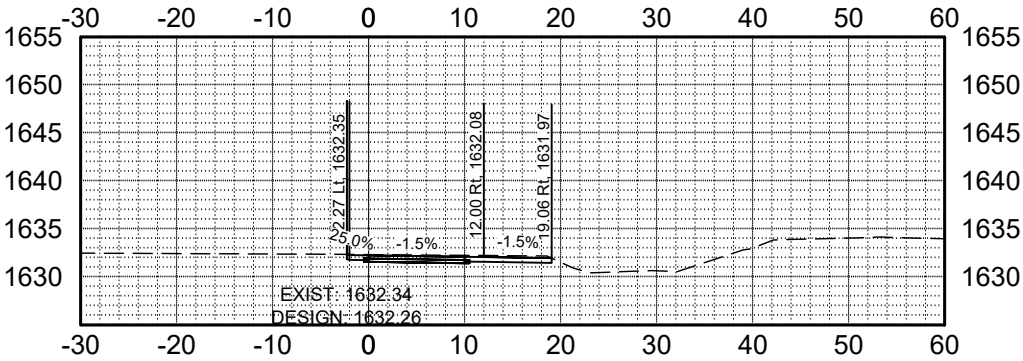
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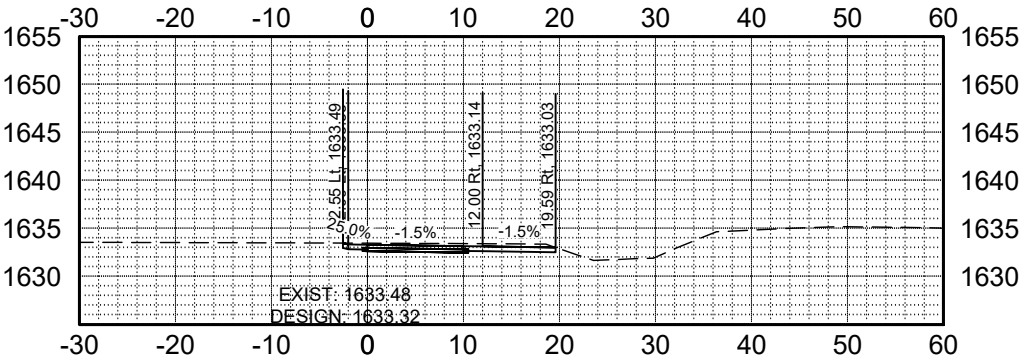
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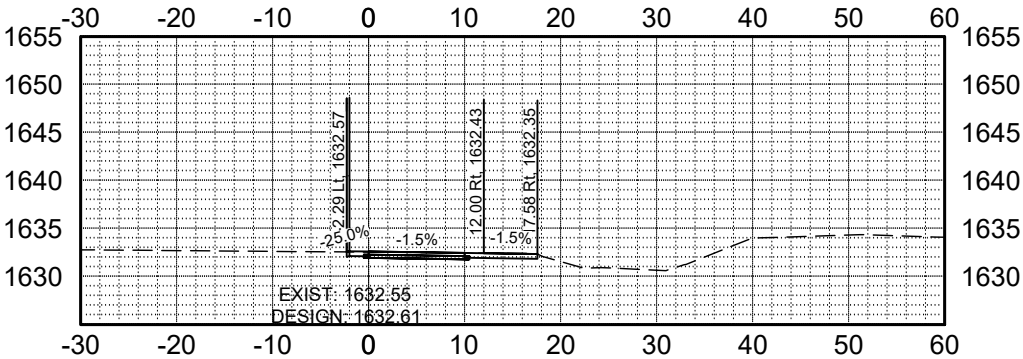
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PR_Path STA 38+50.00

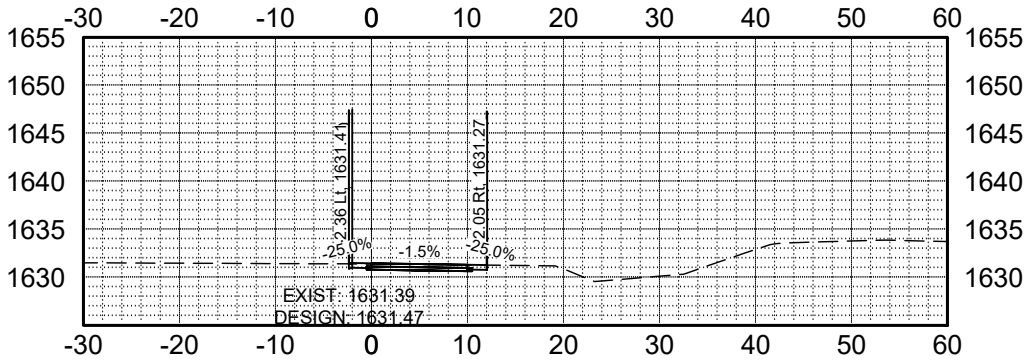


PR_Path STA 39+25.00

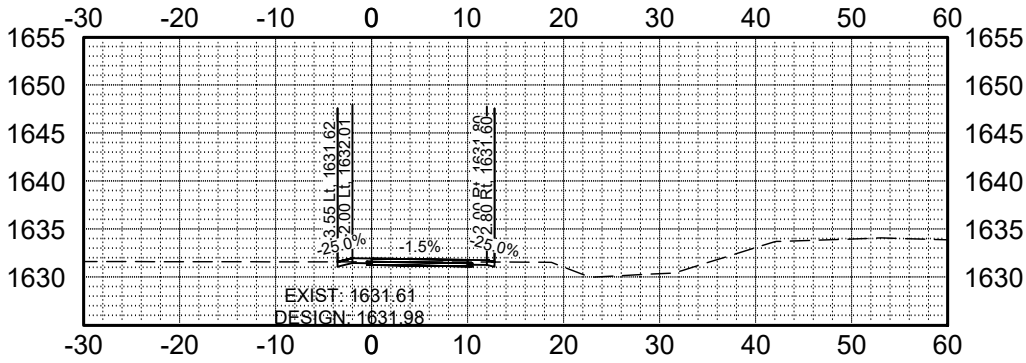


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	21

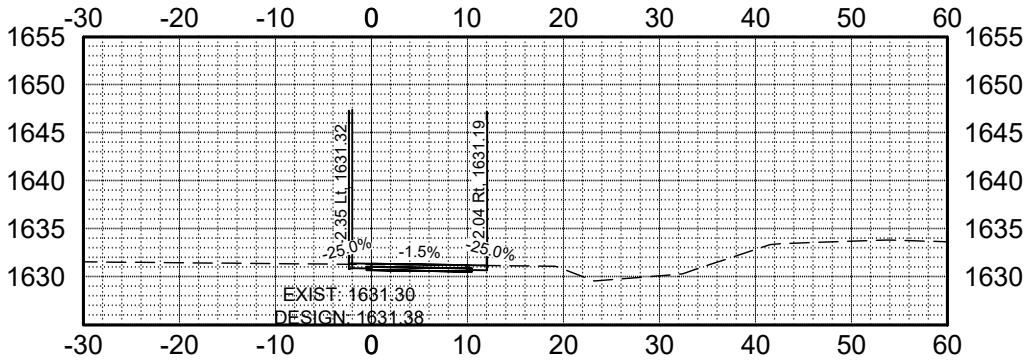
PR_Path STA 40+50.00



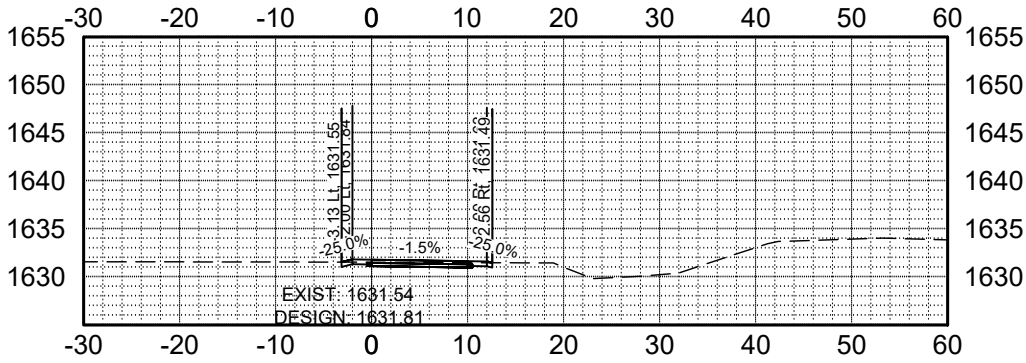
PR_Path STA 41+25.00



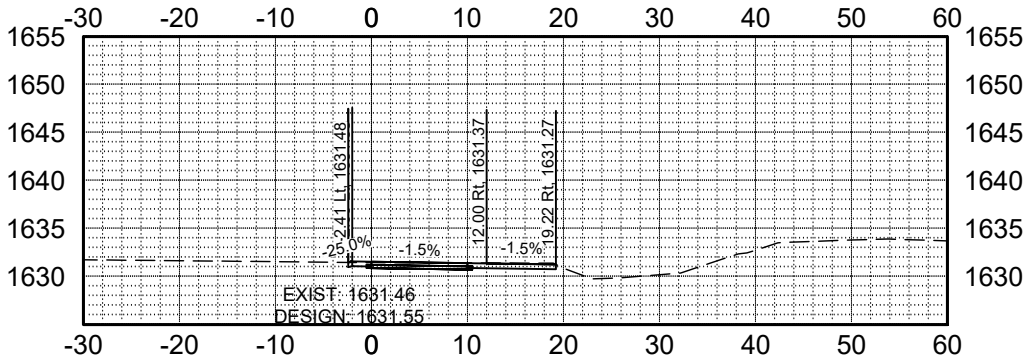
PR_Path STA 40+25.00



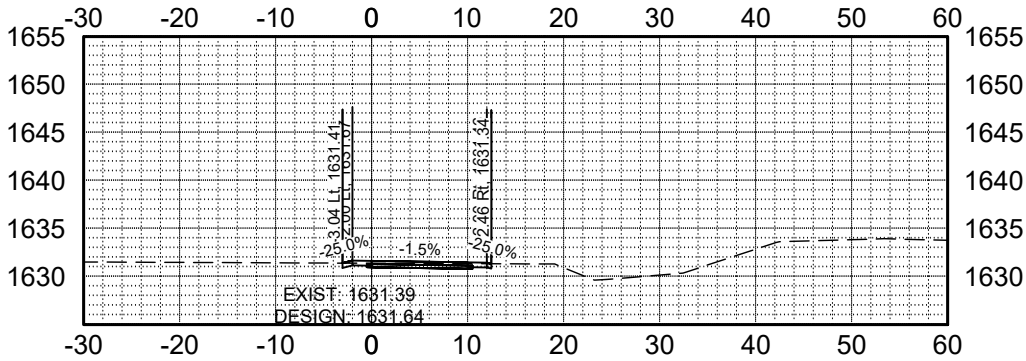
PR_Path STA 41+00.00



PR_Path STA 40+00.00

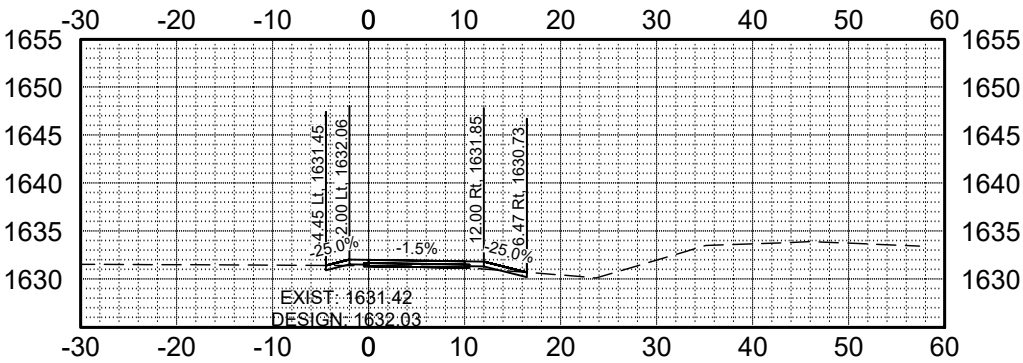


PR_Path STA 40+75.00

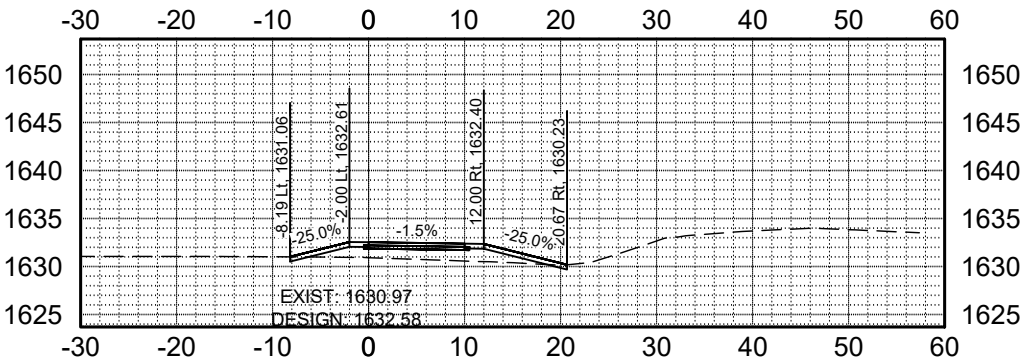


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	22

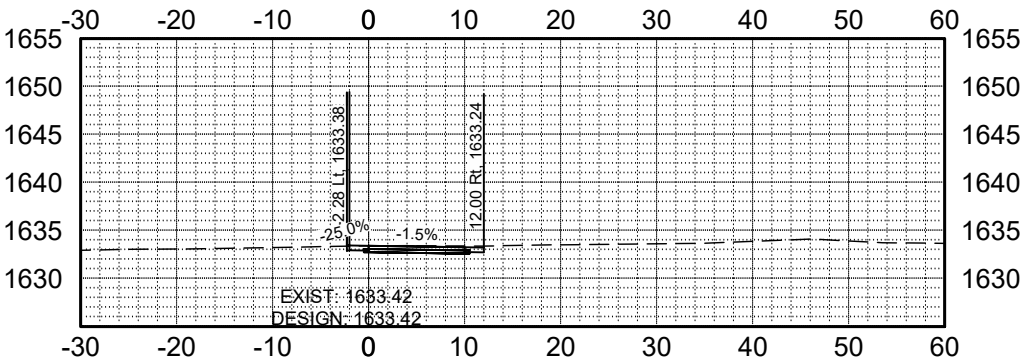
PR_Path STA 42+75.00



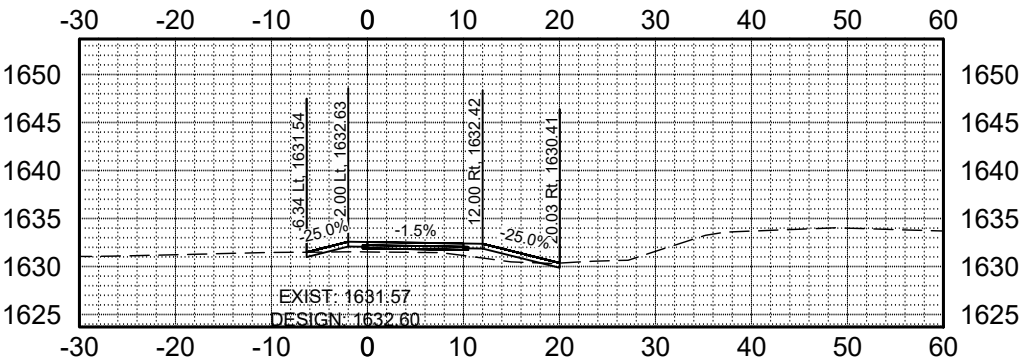
PR_Path STA 42+50.00



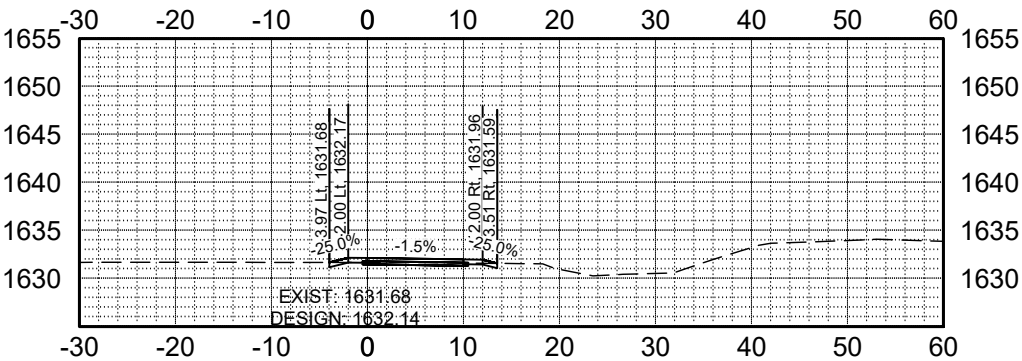
PR_Path STA 42+25.00



PR_Path STA 41+75.00

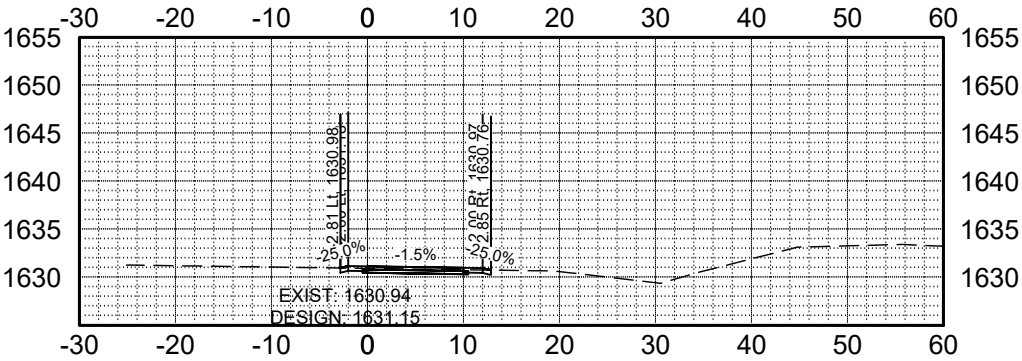


PR_Path STA 41+50.00

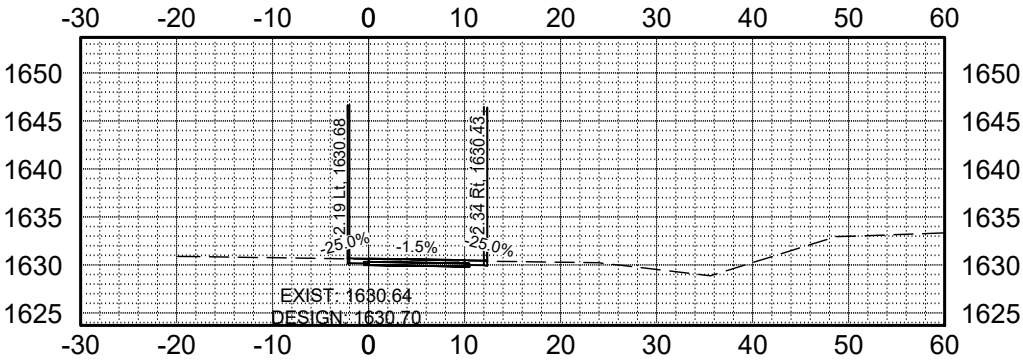


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	23

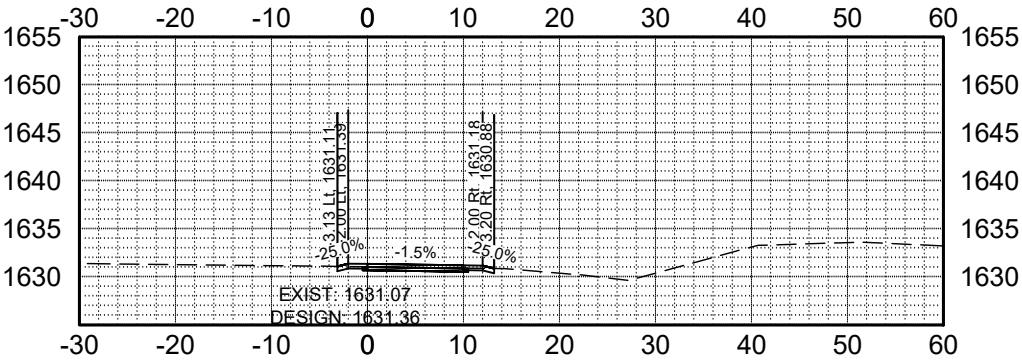
PR_Path STA 43+50.00



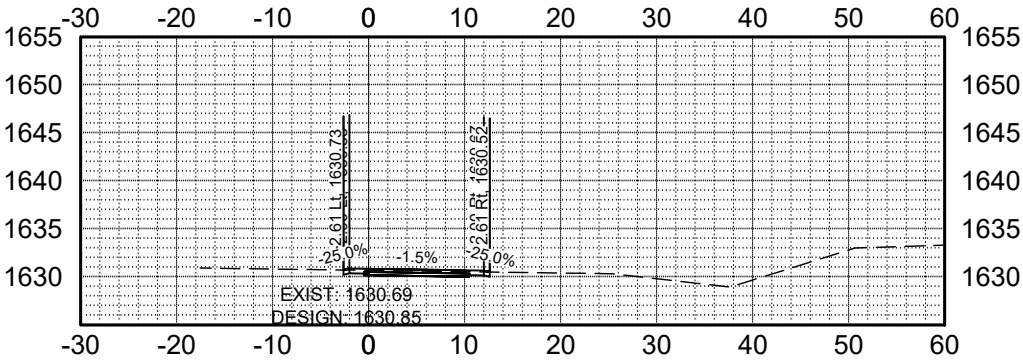
PR_Path STA 44+25.00



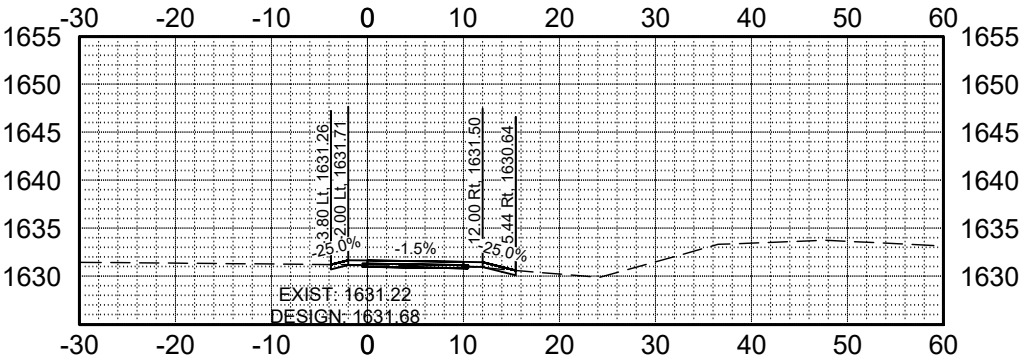
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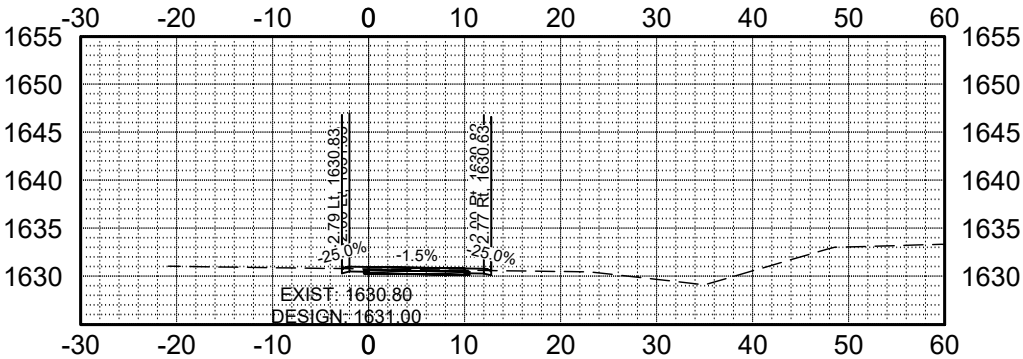
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PR_Path STA 43+00.00

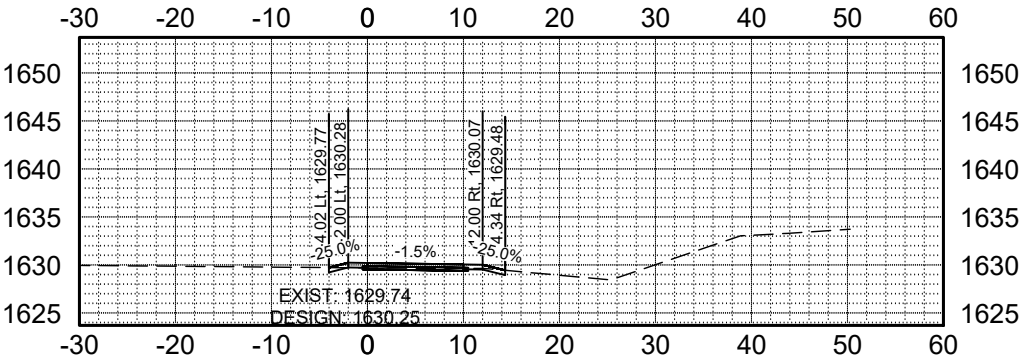


PR_Path STA 43+75.00

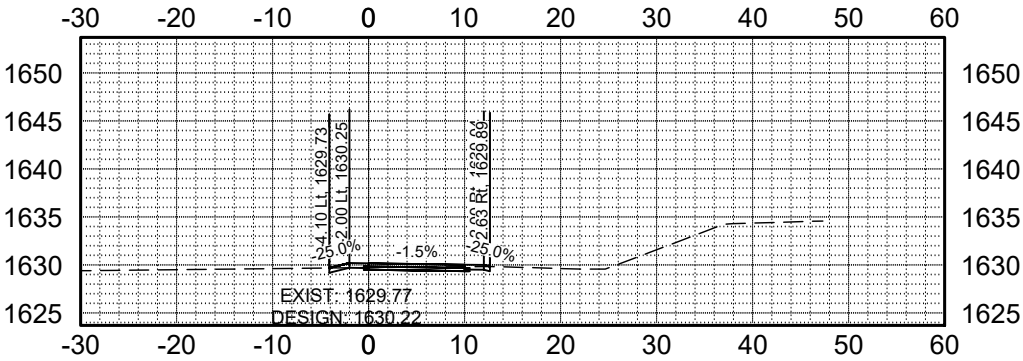


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	24

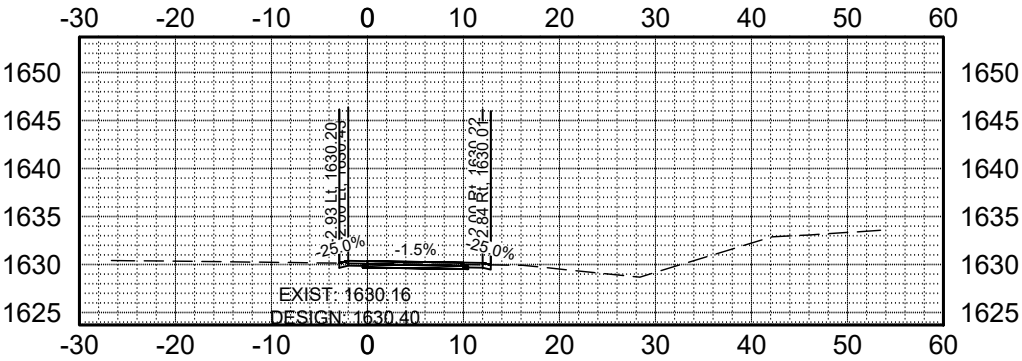
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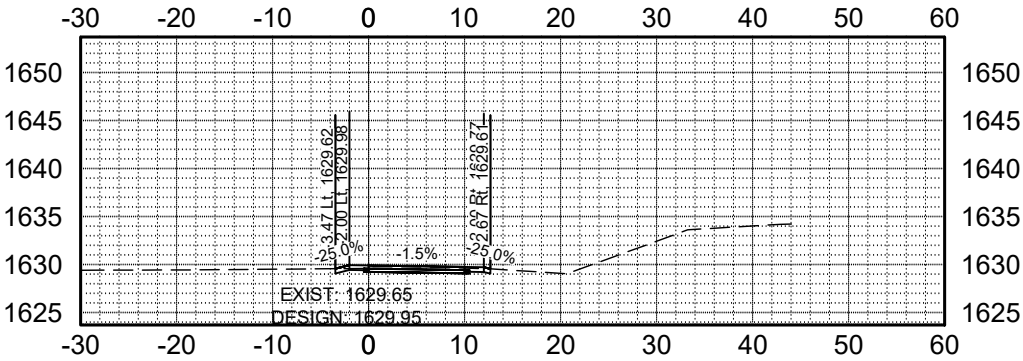
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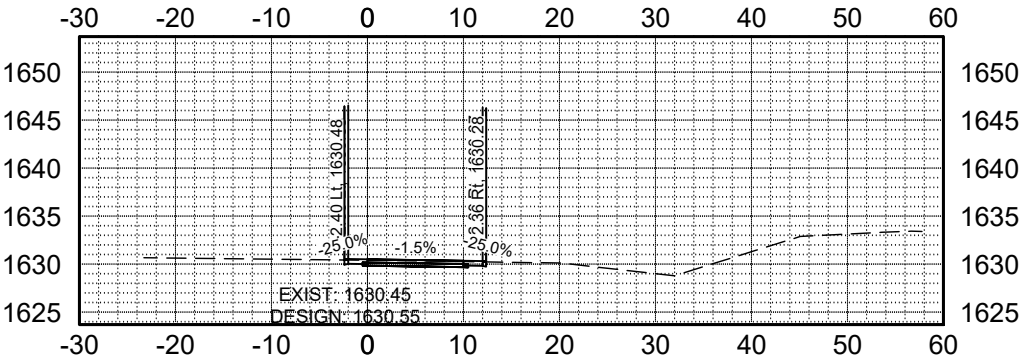
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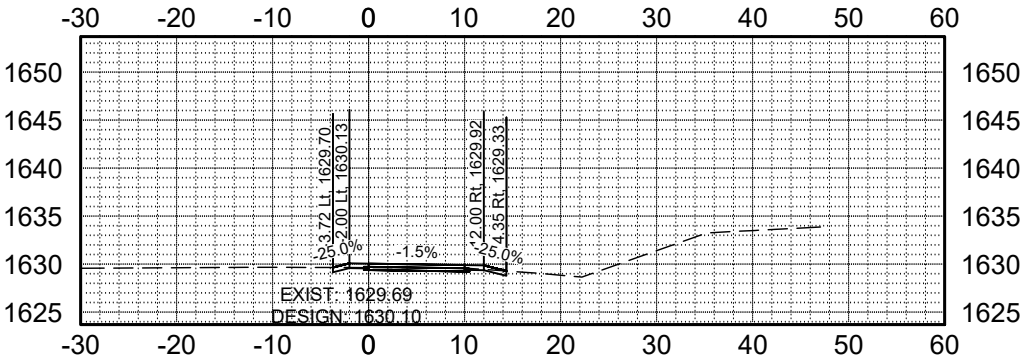
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PR_Path STA 44+50.00

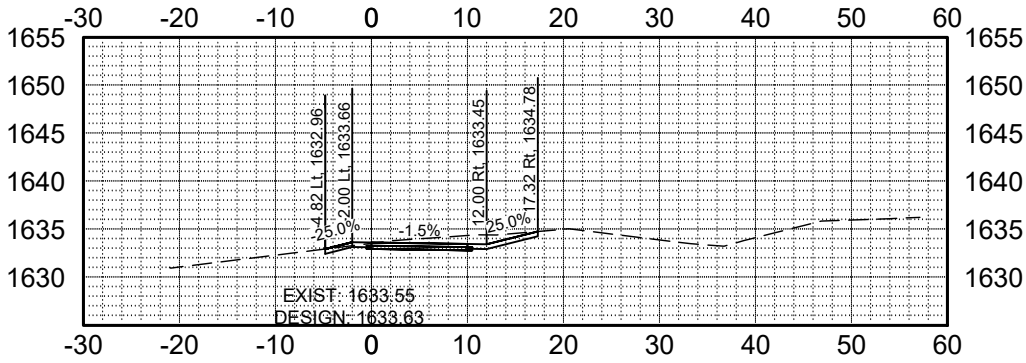


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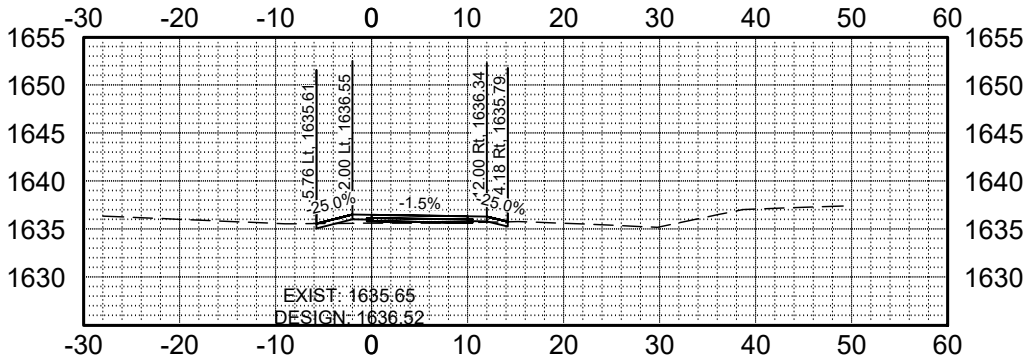


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	25

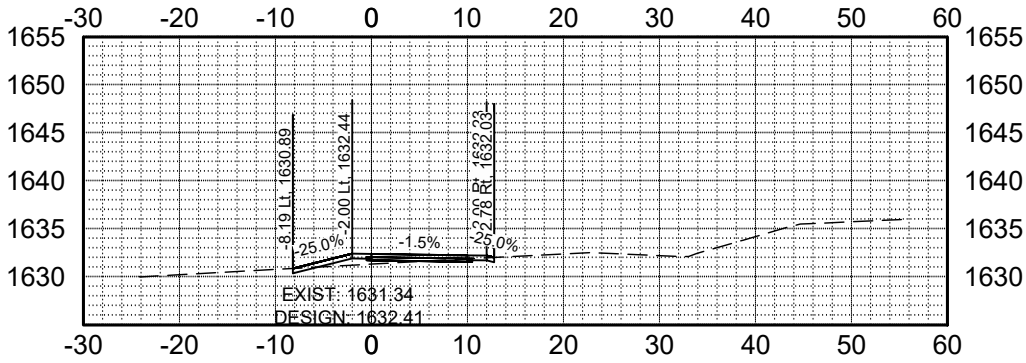
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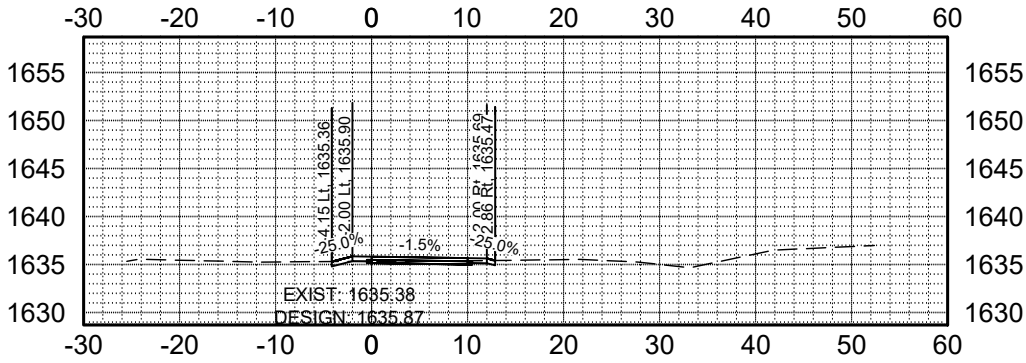
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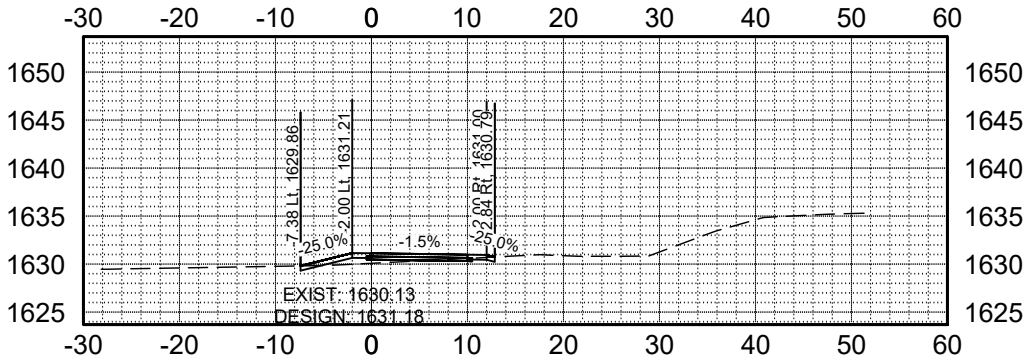
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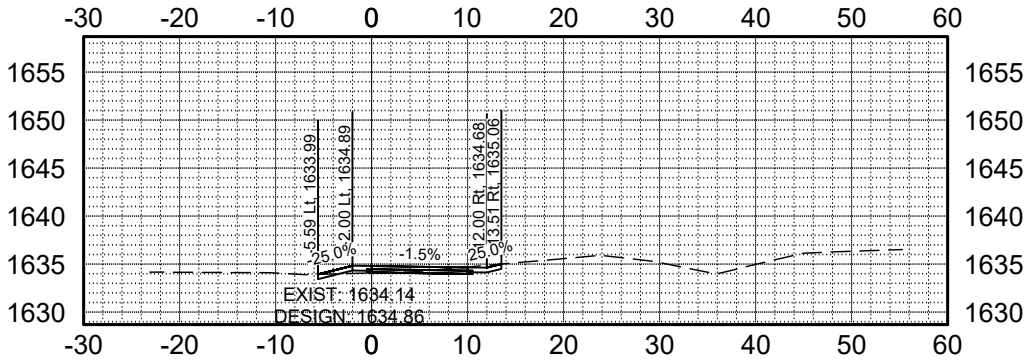
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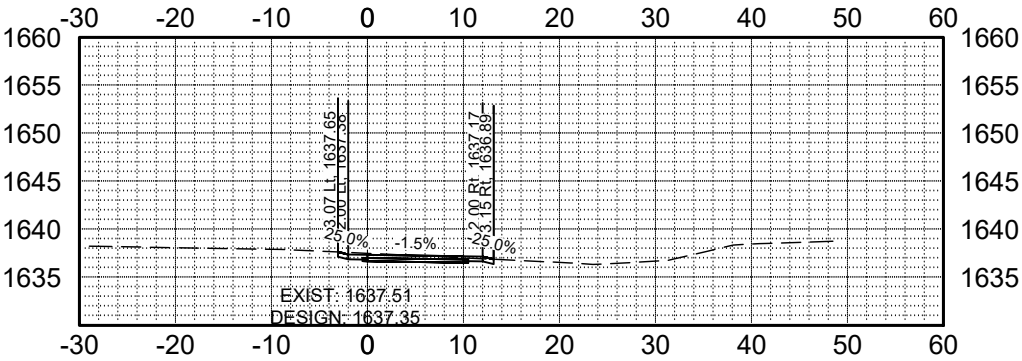


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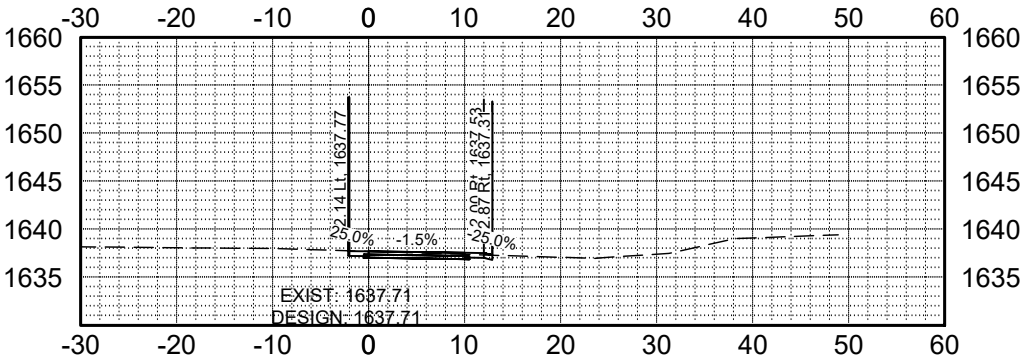


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	26

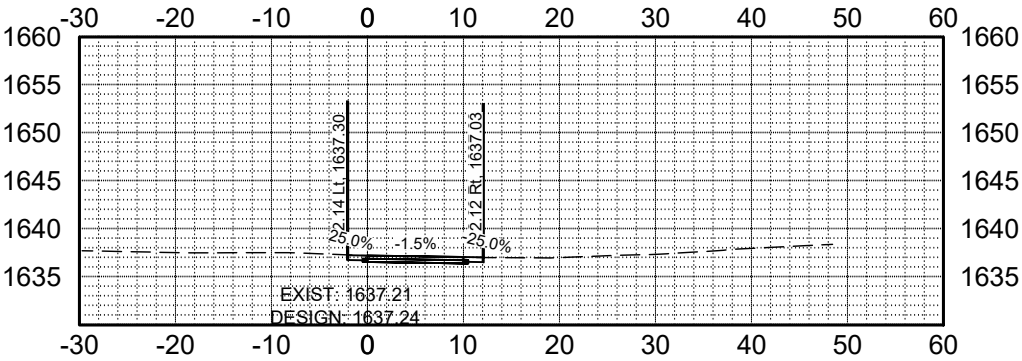
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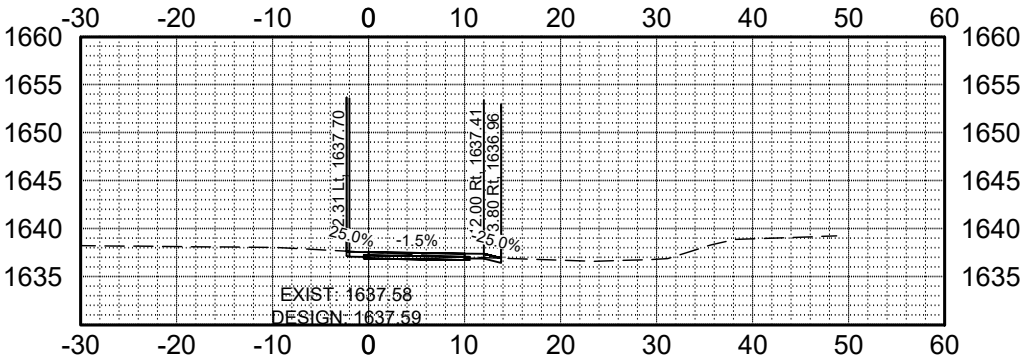
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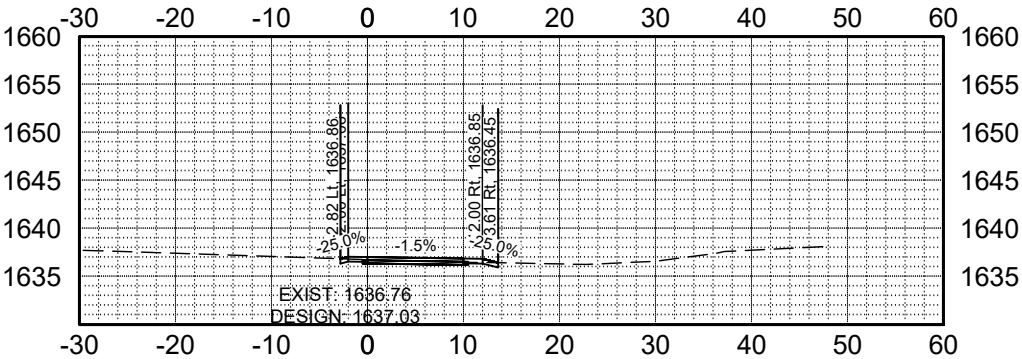
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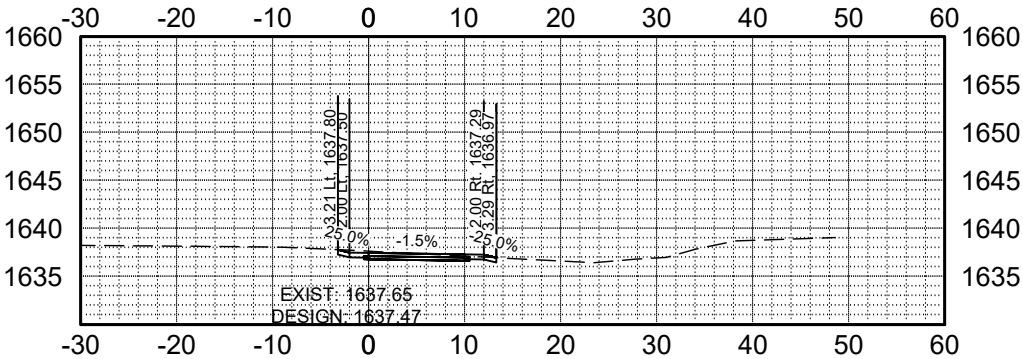
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PR_Path STA 47+50.00

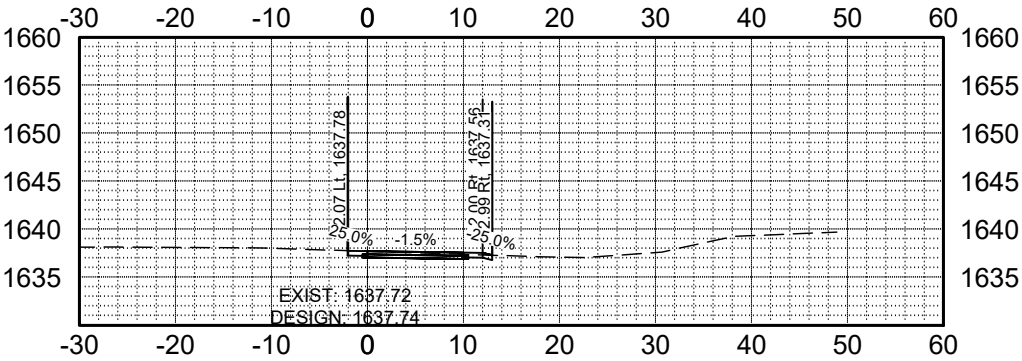


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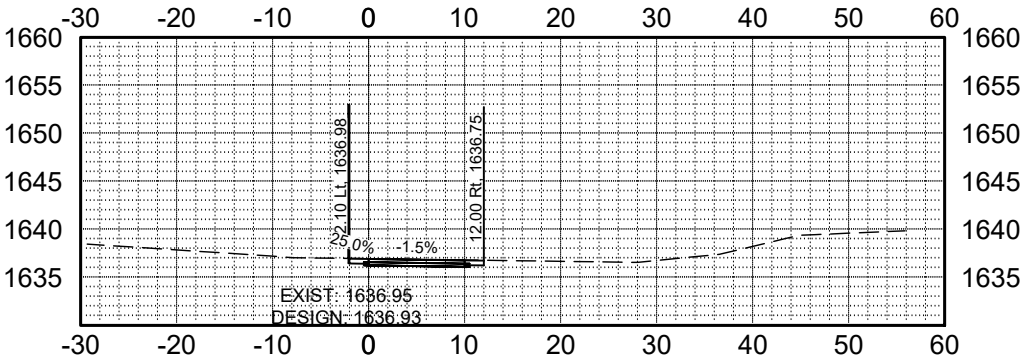


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	27

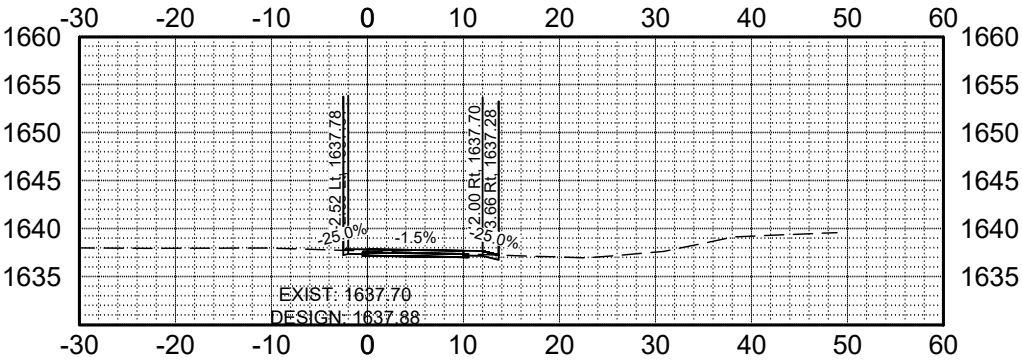
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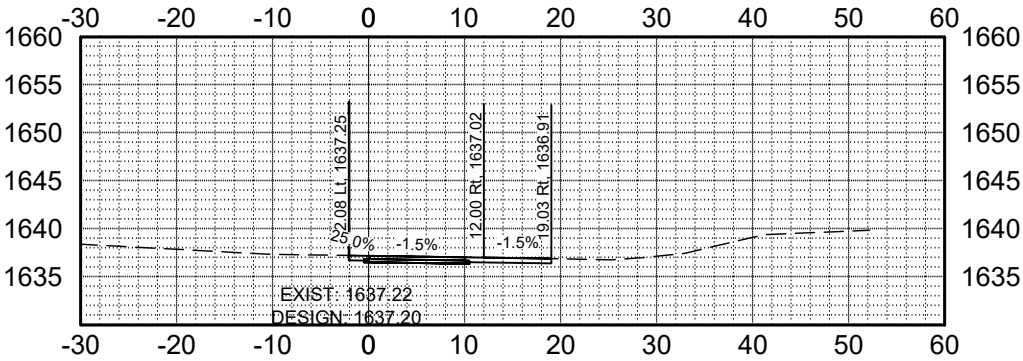
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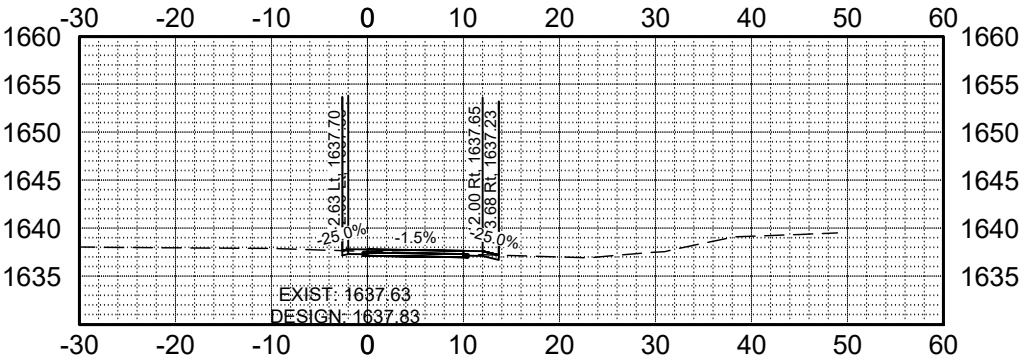
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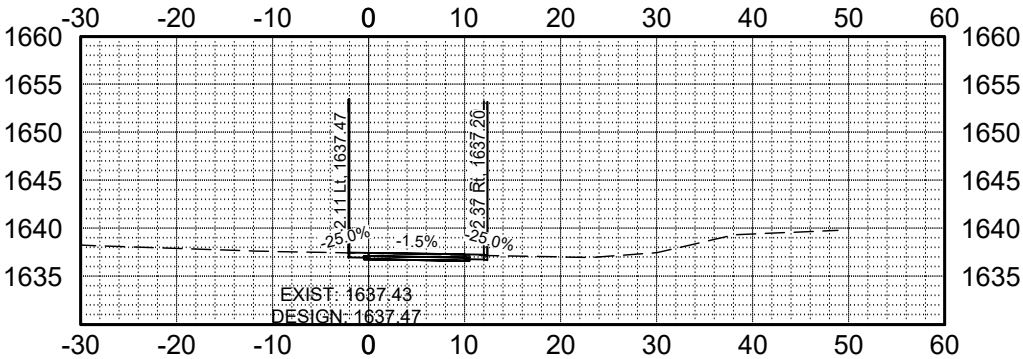
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PR_Path STA 49+00.00

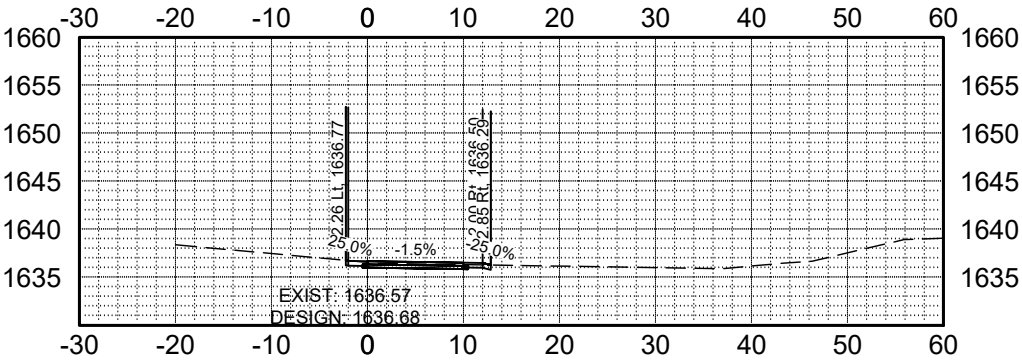


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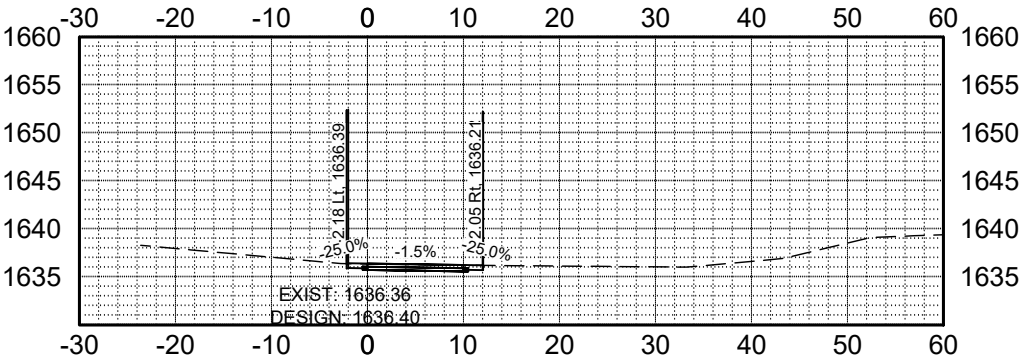


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	28

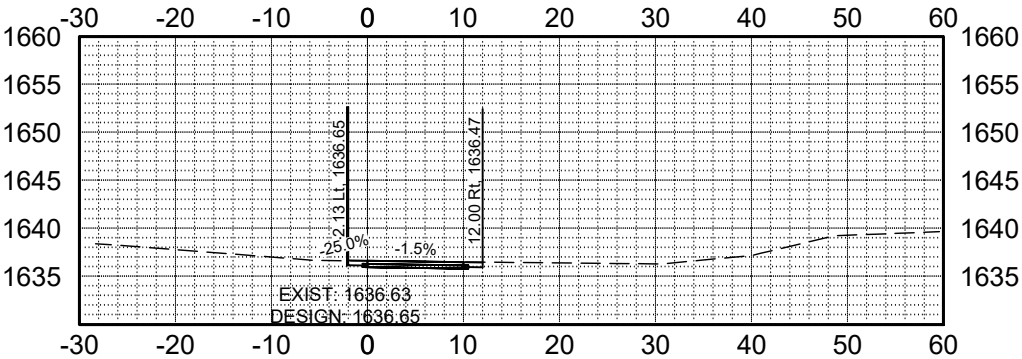
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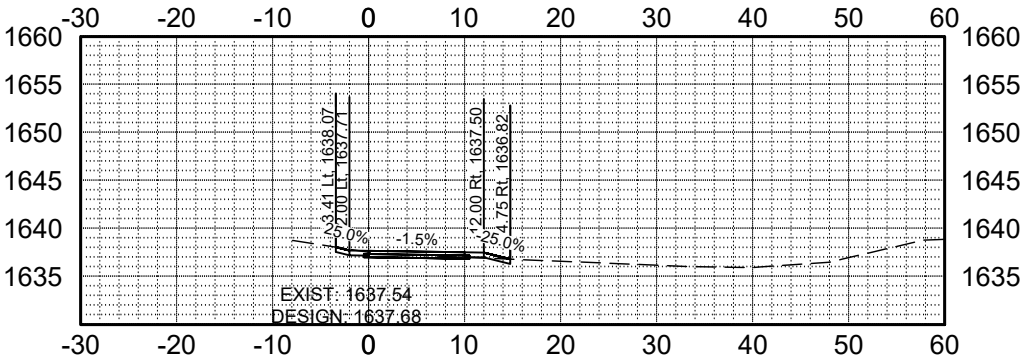
PR_Path STA 50+75.00



PR_Path STA 50+50.00

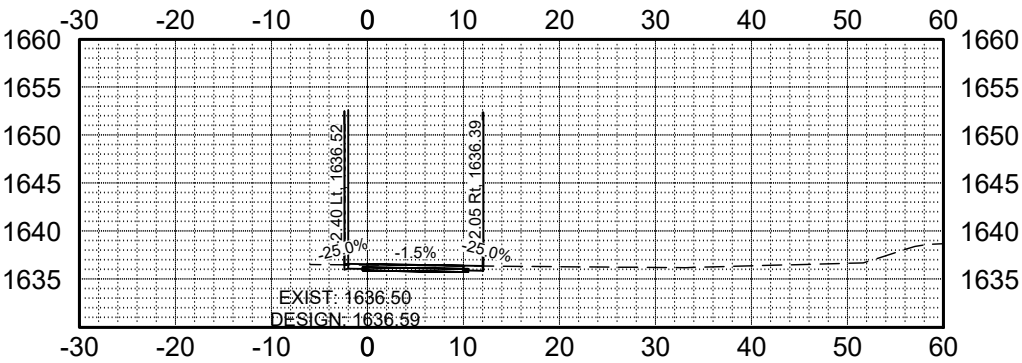


PR_Path STA 51+25.00

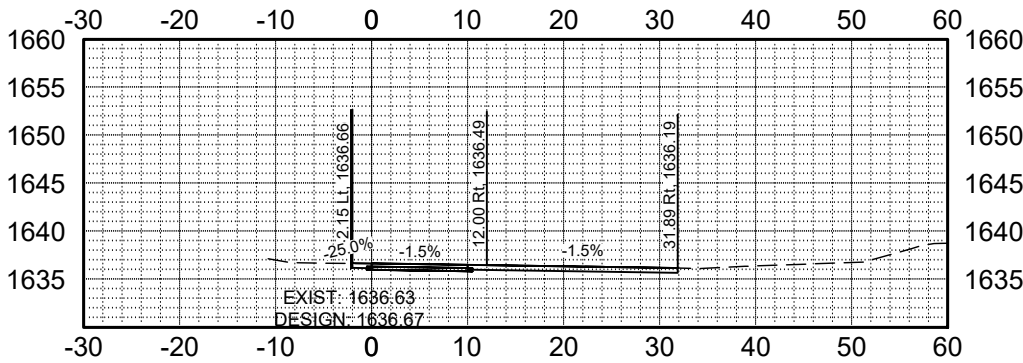


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	29

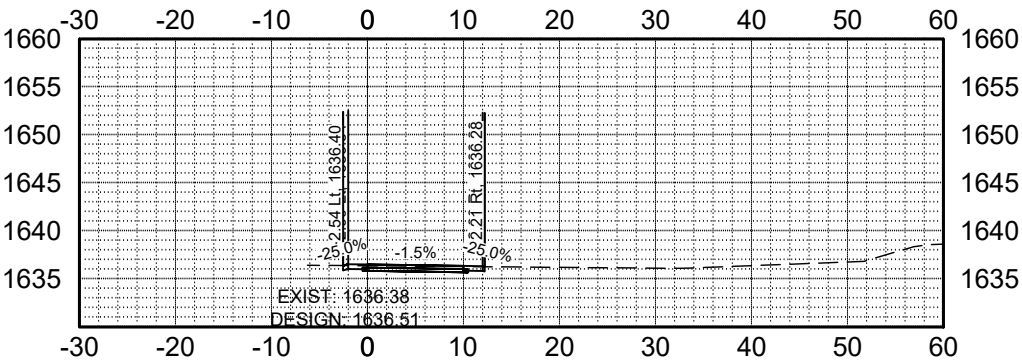
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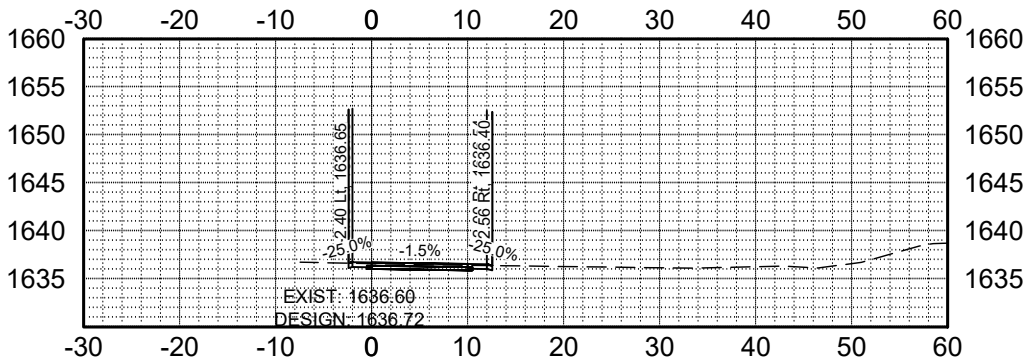
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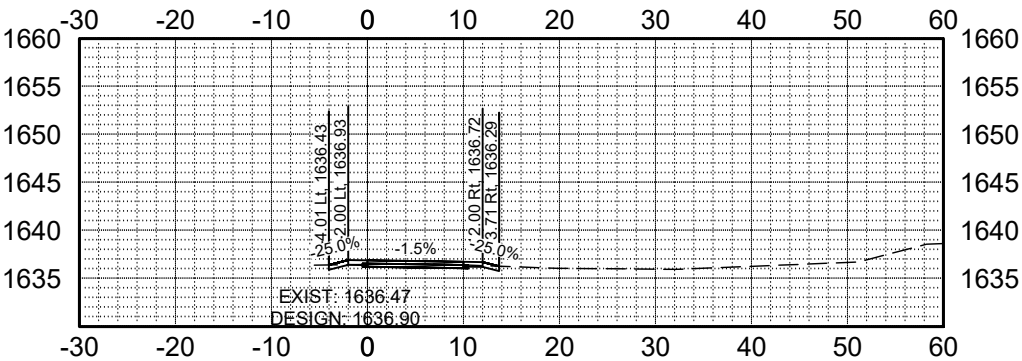
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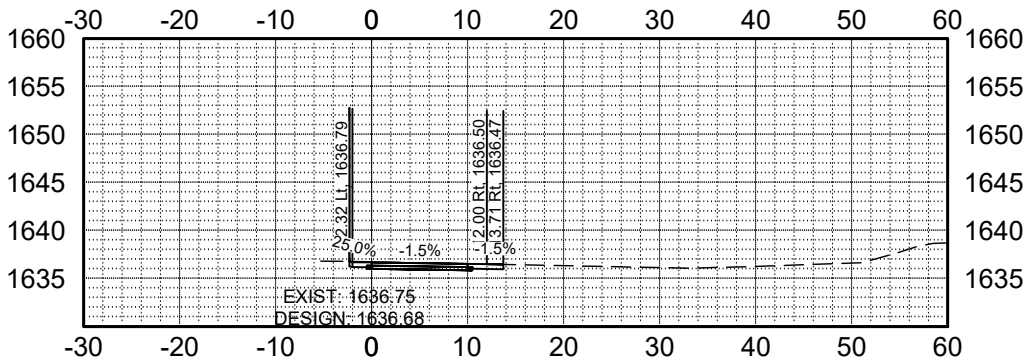
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PR_Path STA 52+00.00

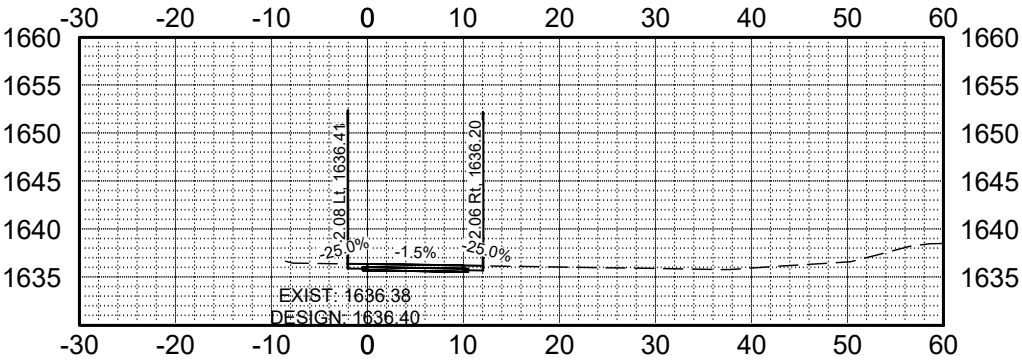


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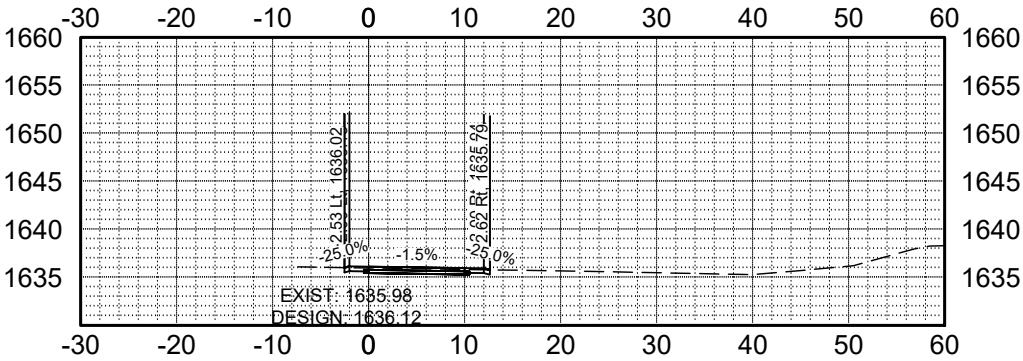


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	30

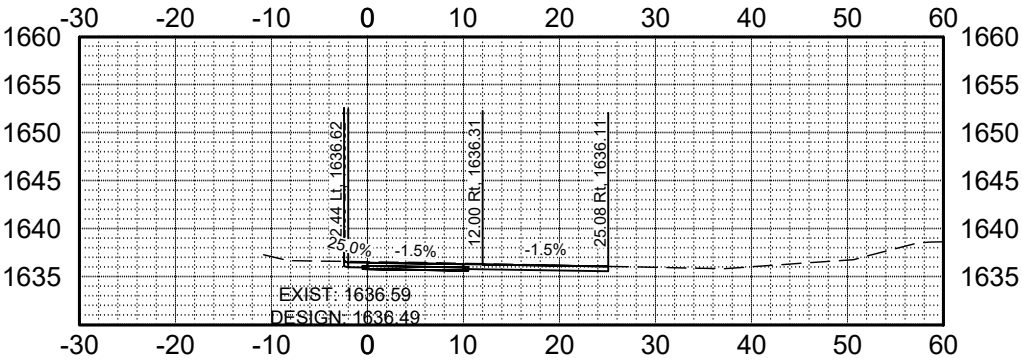
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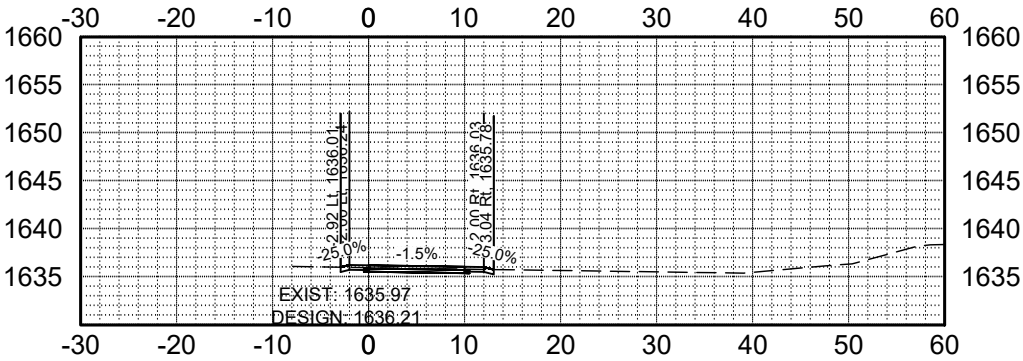
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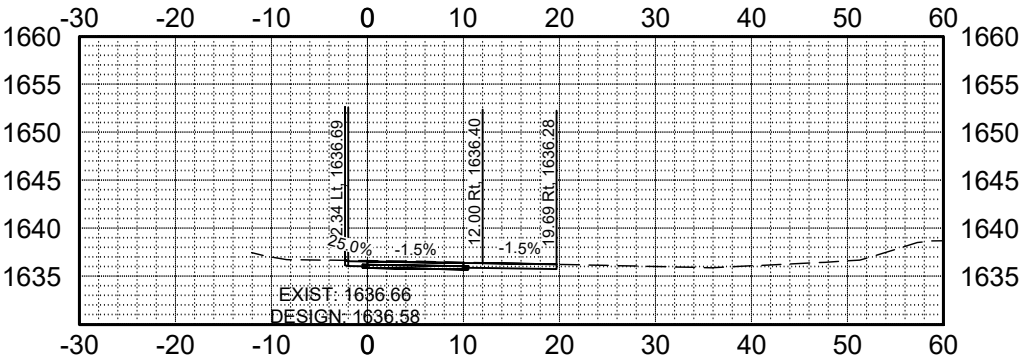
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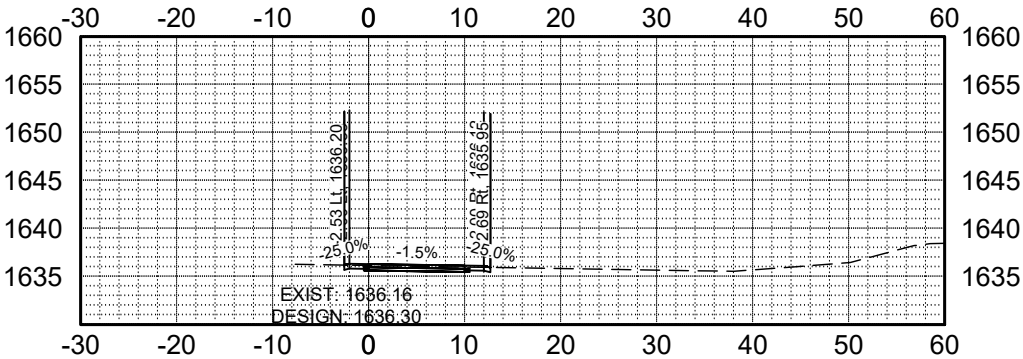
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PR_Path STA 53+50.00

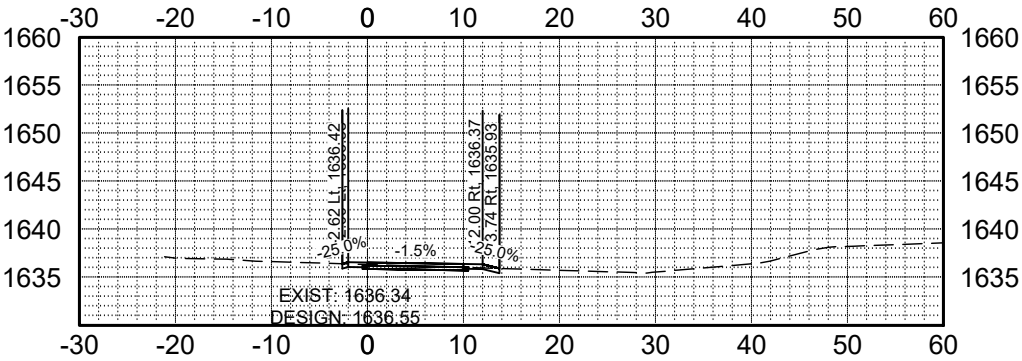


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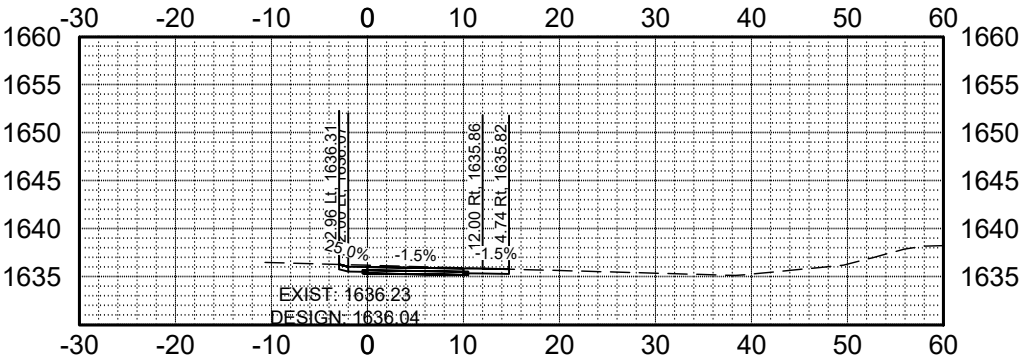


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-1-981(138)	200	31

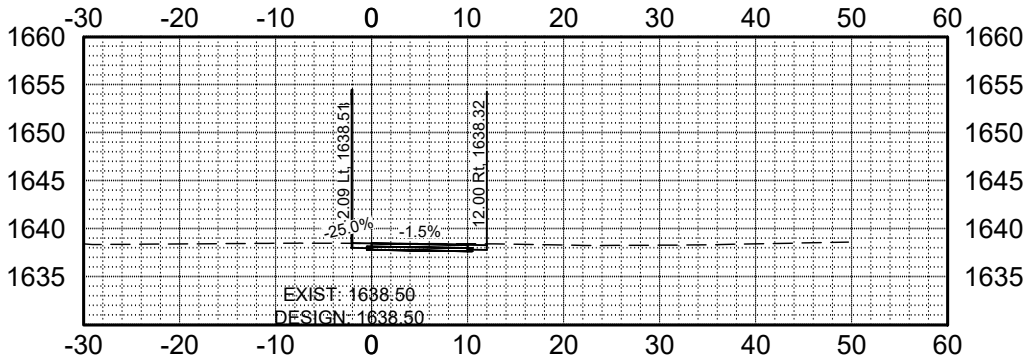
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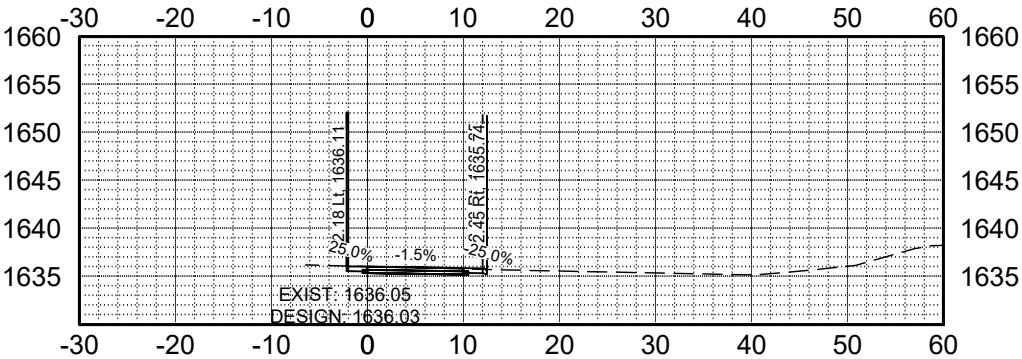
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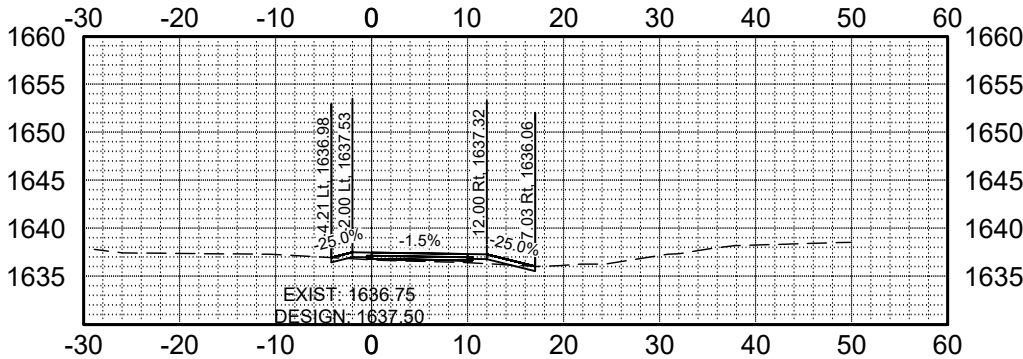
PR_Path STA 56+00.00



PR_Path STA 55+00.00



PR_Path STA 55+75.00



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.	C Gdrl	cable guardrail	Culv	culvert	FOS	factor of safety
Abn	abandoned	Calc	calculate	C&G	curb & gutter	Fed	Federal
Abut	abutment	CIP	cast iron pipe	CI	curb inlet	FP	feed point
Adj	adjusted	CB	catch basin	CR	curb ramp	Fn	fence
Aggr	aggregate	CRS	cationic rapid setting	C	cut	Fn P	fence post
Ahd	ahead	C Gd	cattle guard	Dd Ld	dead load	FO	fiber optic
ARV	air release valve	C To C	center to center	Defl	deflection	FD	field drive
Align	alignment	CL or $\varnothing$	centerline	Defm	deformed	F	fill
Al	alley	Ch	chain	DInt	delineate	FAA	fine aggregate angularity
Alt	alternate	Chnlk	chain-link	DIntr	delineator	FH	fire hydrant
Alum	aluminum	Ch Blk	channel block	Depr	depression	FI	flange
ADA	Americans with Disabilities Act	Ch Ch	channel change	Desc	description	FIRD	flared
&	and	Chk	check	Det	detail	FES	flared end section
Appr	approach	Chsld	chiseled	DWP	detectable warning panel	F Bcn	flashing beacon
Approx	approximate	Cir	circle	Dtr	detour	FA	flight auger sample
ACP	asbestos cement pipe	Cl	class	Dia or $\varnothing$	diameter	FL	flow line
Asph	asphalt	Clnt	clean-out	Dir	direction	Ftg	footing
AC	asphalt cement	Clr	clear	Dist	distance	FM	force main
Assmd	assumed	Cl&gr	clearing & grubbing	DM	disturbed material	Fnd	found
@	at	Comb.	combination	DB	ditch block	Fdn	foundation
Atten	attenuation	Coml	commercial	DG	ditch grade	Frac	fractional
ATR	automatic traffic recorder	Compr	compression	Dbl	double	Frwy	freeway
Ave	Avenue	CADD	computer aided drafting & design	Dn	down	Frt	front
Avg	average	Conc	concrete	Dwg	drawing	FF	front face
ADT	average daily traffic	CECB	concrete erosion control blanket	Dr	drive	F Disp	fuel dispenser
		Cond	conductor	Drw	driveway	FFP	fuel filler pipes
		Const	construction	DI	drop inlet	FLS	fuel leak sensor
		Cont	continuous	D	dry density	Furn	furnish/ed
		CSB	continuous split barrel sample				
		Contr	contraction				
		Contr	contractor				
Bk	back	CP	control point				
BF	back face	Coord	coordinate	Ea	each		
Balc	balcony	Cor	corner	Esmt	easement		
B Wire	barbed wire	Corr	corrected	E	East		
Barr	barricade	CAES	corrugated aluminum end section	EB	Eastbound		
Btry	battery	CAP	corrugated aluminum pipe	Elast	elastomeric		
BI	beehive inlet	CMES	corrugated metal end section	EL	electric locker		
Beg	begin	CMP	corrugated metal pipe	E Mtr	electric meter		
BG	below grade	CPVCP	corrugated poly-vinyl chloride pipe	Elec	electric/al		
BM	bench mark	CSES	corrugated steel end section	EDM	electronic distance meter		
Bkwy	bikeway	CSFES	corrugated steel flared end section	Elev or El	elevation		
Bit	bituminous	CSP	corrugated steel pipe	Ellipt	elliptical		
Blk	block	CSTES	corrugated steel traversable end section	Emb	embankment		
BH	bore hole	Co	County	Emuls	emulsion/emulsified		
Bot	bottom	Crse	course	ES	end section		
Blvd	Boulevard	Ct	Court	Engr	engineer		
Bndry	boundary	Xarm	cross arm	ESS	environmental sensor station		
Brkwy	breakaway	Xbuck	cross buck	Eq	equal		
Br	bridge	Xsec	cross sections	Evgr	evergreen		
Bldg	building	Xing	crossing	Exc	excavation		
Bus.	business	Xrd	crossroad	Exst	existing		
BV	butterfly valve	Crn	crown	Exp	expansion		
Byp	bypass			Expy	Expressway		
				E	external of curve		
				Extru	extruded		

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09-20-18	General Revisions
12-10-20	General Revisions
08-16-22	General Revisions



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NDDOT ABBREVIATIONS

D-101-2

Galv	galvanized	Ln	lane	Obsc	obscure(d)	Qty	quantity
Gar	garage	Lg	large	Ocpd	occupied	Qtr	quarter
Gs L	gas line	Lat	latitude	Ocpy	occupy		
G Reg	gas line regulator	Lt	left	O/s	offset		
GMV	gas main valve	Lens	lenses	OC	on center	Rad or R	radius
G Mtr	gas meter	Lvl	level	C	one dimensional consolidation	RR	railroad
GSV	gas service valve	LvIng	leveling	OC	organic content	Rlwy	railway
GVP	gas vent pipe	Lht	light	Orig	original	Rsd	raised
GV	gate valve	LP	light pole	O To O	out to out	RC	rapid curing
Ga	gauge	Ltg	lighting	OD	outside diameter	Rec	record
Gov	government	Liq	liquid	OH	overhead	Rcy	recycle
Grd	graded/grade	LL	liquid limit			RAP	recycled asphalt pavement
Grnd	ground	Loc	location			RPCC	recycled portland cement concrete
GWM	ground water monitor	Long.	longitude	PMT	pad mounted transformer	Ref	reference
Gdrl	guardrail	Lp	loop	Pg	pages	R Mkr	reference marker
Gtr	gutter	LD	loop detector	Pntd	painted	RM	reference monument
		Lum	luminaire	Pr	pair	RP	reference point
				Pnl	panel	Refl	reflectorized
H Plg	H piling			Pk	park	RCB	reinforced concrete box
Hdwl	headwall	Mb	mailbox	PSD	passing sight distance	RCES	reinforced concrete end section
Ht	height	ML	main line	Pvmt	pavement	RCFES	reinforced concrete flared end section
Hel	helical	MH	manhole	Ped	pedestal	RCP	reinforced concrete pipe
HDPE	high density polyethylene	Mkd	marked	Ped	pedestrian	RCPS	reinforced concrete pipe sewer
HM	high mast	Mkr	marker	PPP	pedestrian pushbutton post	RCTES	reinforced concrete traversable end section
HP	high pressure	Mkg	marking	Pen.	penetration	Reinf	reinforcement
HPS	high pressure sodium	MA	mast arm	Perf	perforated	Res	reservation
HTCG	high tension cable guardrail	Matl	material	Per.	perimeter	Res	residence
Hwy	highway	Max	maximum	Perm	permanent	Ret	retaining
Hor	horizontal	MC	meander corner	PL	pipeline	Rev	reverse
HBP	hot bituminous pavement	Meas	measure	PI	place	Rt	right
HMA	hot mix asphalt	Mdn	median	P&P	plan & profile	R/W	right of way
Hyd	hydrant	MD	median drain	PL	plastic limit	Riv	river
Ph	hydrogen ion content	MC	medium curing	Pl or PL	plate	Rd	road
		MGS	Midwest Guardrail System	Pt	point	Rdbd	road bed
		MM	mile marker	PE	polyethylene	Rdwy	roadway
Id	identification	MP	mile post	PVC	polyvinyl chloride	RWIS	roadway weather information system
Incl	inclinometer tube	Min	minimum	PCC	Portland Cement concrete	Rk	rock
IMH	inlet manhole	Misc	miscellaneous	PP	power pole	Rt	route
ID	inside diameter	Mon	monument	Preempt	preemption		
Inst	instrument	Mnd	mound	Prefab	prefabricated		
Intchg	interchange	Mtbl	mountable	Prfmd or Pref	preformed		
Intmdt	intermediate	Mtd	mounted	Prep	preperation		
Intscn	intersection	Mtg	mounting	Press.	pressure		
Inv	invert	Mk	muck	PRV	pressure relief valve		
IP	iron pipe			Prestr	prestressed		
				Pvt	private		
				PD	private drive		
Jt	joint			Prod.	production/produce		
Jct	junction	Neop	neoprene	Prog	programmed		
		Ntwk	network	Prop.	property		
		N	North	Prop Ln	property line		
		NE	North East	Ppsd	proposed		
		NW	North West	PB	pull box		
		NB	Northbound				
		No. or #	number				

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NDDOT ABBREVIATIONS

D-101-3

Salv	salvage(d)	Tel	telephone
San	sanitary sewer line	Tel B	Telephone Booth
Sec	section	Tel P	telephone pole
SL	section line	Tv	television
Sep	separation	Temp	temperature
Seq	sequence	Temp	temporary
Serv	service	TBM	temporary bench mark
Sht	sheet	T	thinwall tube sample
Shtng	sheeting	Ts	topsoil
Shldr	shoulder	Traf	traffic
Sw or Sdwk	sidewalk	TSCB	traffic signal control box
SD	sight distance	Tr	trail
SN	sign number	Transf	transformer
Sig	signal	Trans	transition
Sgl	single	TT	transmission tower
SRCP	slotted reinforced concrete pipe	TES	traversable end section
SC	slow curing	Trans	transverse
SS	slow setting	Trtd	treated
Sm	small	Trmt	treatment
S	South	Qc	triaxial compression
SE	South East	TERO	tribal employment rights ordinance
SW	South West	Tpl	triple
SB	Southbound	Typ	typical
Sp	spaces		
Spcl	special	Qu	unconfined compressive strength
SA	special assembly	Ugrnd	underground
SP	special provisions	Util	utility
G	specific gravity		
Spk	spike		
SB	split barrel sample	VG	valley gutter
SH	sprinkler head	Vap	vapor
SV	sprinkler valve	Vert	vertical
Sq	square	VCP	vitrified clay pipe
Stk	stake	Vol	volume
Std	standard	VSFS	vehicle speed feedback sign
N	standard penetration test		
Std Specs	standard specifications	Wkwy	walkway
Stm L	steam line	W	water content
SEC	steel encased concrete	WGV	water gate valve
SMA	stone matrix asphalt	WL	water line
SSD	stopping sight distance	WM	water main
SD	storm drain	WMV	water main valve
St	street	W Mtr	water meter
SPP	structural plate pipe	WSV	water service valve
SPPA	structural plate pipe arch	WW	water well
Str	structure	Wrng	wearing
Subd	subdivision	WIM	weigh in motion
Sub	subgrade	W	west
Sub Prep	subgrade preparation	WB	westbound
Ss	subsoil	Wrng	wiring
SS	supplement specification	W/	with
Supp	supplemental	W/o	without
Surf	surfacing	WC	witness corner
Surv	survey		
Sym	symmetrical		

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MEASUREMENTS

ac	acres
A	ampere
Bd Ft	board feet
Cd	candela
cm	centimeter
C	coulomb
CF	cubic feet
m3	cubic meter
m3/s	cubic meters per second
CY	cubic yard
CY/mi	cubic yards per mile
D or Deg	degree
F	Fahrenheit
F	farad
ft	feet/foot
Gal	gallon
G	giga
Ha	hectare
H	henry
Hz	hertz
hr	hour(s)
in	inch
J	joule
K	kelvin
kN	kilo newton
kPa	kilo pascal
kg	kilogram
kg/m3	kilogram per cubic meter
km	kilometer
K	Kip(s)
LF	linear foot
L	litre
Lm	lumen
L sum	lump sum
Lx	lux
M Hr	man hour
M	mega
m	meter
m/s	meters per second
mi	mile
mL	milliliter
mm	millimeter
mm/hr	millimeters per hour
n	nano
N	newton
Pa	pascal
lb	pounds
sec	seconds
S	siemens
SF	square feet
km2	square kilometer
m2	square meter
SY	square yard
Sta Yd	station yards
SI	Systems International

T	tesla
T/mi	tons per mile
V	volt
W	watt
Wb	weber

SURVEY DESCRIPTIONS

Az	azimuth
Bs	backsight
Brg	bearing
BP Cap	blue plastic cap
BS	both sides
BC	brass cap
CS	curve to spiral
Eq	equation
E	external of curve
FS	far side
FB	field book
Fs	foresight
Geod	geodetic
GIS	Geographical Information System
GPS	Global Positioning System
HI	height of instrument
IM	iron monument
I Pn	iron pin
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
L	length of curve
LC	long chord
LB	level book
Mer	meridian
M	mid ordinate of curve
NGS	National Geodetic Survey
NS	near side
Obsn	observation
Off Loc	office location
OP Cap	orange plastic cap
PK	Parker-Kalon nail
P Cap	plastic cap
PP Cap	pink plastic cap
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
RTP	random traverse point
Rge	range
RP Cap	red plastic cap
SC	spiral to curve
ST	spiral to tangent
Sta	station
SE	superelevation
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Twp	township
TB	transit book
TP	traverse point
TP	turning point
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
VC	vertical curve
WGS	World Geodetic System
YP Cap	yellow plastic cap
Z	zenith

SOIL TYPES

Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Co S	coal slack
C Gr	coarse gravel
CS	coarse sand
FS	fine sand
Gr	gravel
Lig Co	lignite coal
Lig Sl	lignite slack
Lm	loam
Rk	rock
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
Sc	scoria
Sh	shale
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3

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PE-4683

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NORTH DAKOTA

12 18 2020

NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-10-20	General Revisions
08-16-22	General Revisions

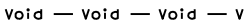
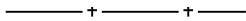
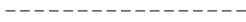
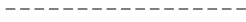
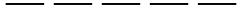


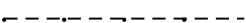
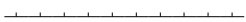
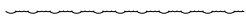
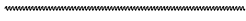
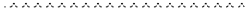
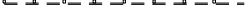
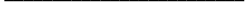
08/16/22

LINE STYLES

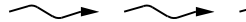
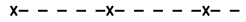
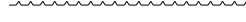
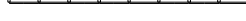
D-101-20

Existing Topography

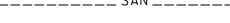
	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable
	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
	Existing High Tension Cable Guardrail
	Existing High Tension Cable Guardrail with Posts

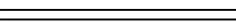
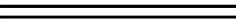
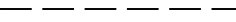
Proposed Topography

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

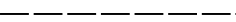
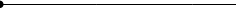
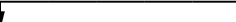
Existing Utilities

	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

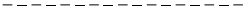
	Existing Overhead Sign Structure
	Existing Overhead Sign Structure Cantilever
	Overhead Sign Structure Cantilever

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		
07-01-14 REVISIONS		
DATE	CHANGE	
09-23-16 12-18-20	Added and Revised Items, Organized by Functional Groups General Revisions	
		12 18 2020

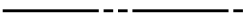
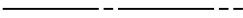
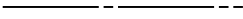
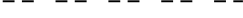
LINE STYLES

D-101-21

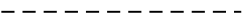
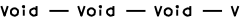
Right Of Way

	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)
	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
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S

	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

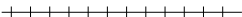
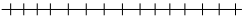
Profile

	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

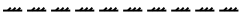
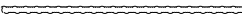
Bridge Details

	Small Hidden Object
	Large Hidden Object
	Phantom Object
	Existing Conditions Object
	Centerline Main
	Centerline Secondary
	Excavation Limits
	Proposed Ground
	Sheet Piling

Erosion Control

	Limits of Const Transition Line
	Bale Check
	Rock Check
	Floating Silt Curtain
	Silt Fence
	Excavation Limits
	Fiber Rolls

Environmental

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
09-23-16	Added and Revised Items, Organized by Functional Groups General Revisions
12-18-20	

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NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-30



North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

Existing Section Corner (Full, Quarter, Sixteenth, Meander)

Existing Witness Corner

Existing Control Point (CP, GPS-RTK, TRI)

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

Continuous Split Barrel Sample

Flight Auger Sample

Split Barrel Sample

Thinwall Tube Sample

Standard Penetration Test

Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	General Revisions

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NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-31

	Flexible Delineator		Highway Sign (Exst, Ppsd)
	Flexible Delineator Type A (Exst, Ppsd)		Mile Post Type A (Exst-Ppsd-Reset)
	Flexible Delineator Type B (Exst, Ppsd)		Mile Post Type B (Exst, Ppsd)
	Flexible Delineator Type C (Exst, Ppsd)		Mile Post Type C (Exst, Ppsd)
	Flexible Delineator Type D (Exst, Ppsd)		Object Marker Type I (Exst, Ppsd)
	Flexible Delineator Type E (Exst, Ppsd)		Object Marker Type II (Exst, Ppsd)
	Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)		Object Marker Type III (Exst, Ppsd)
	Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)		Existing Reference Marker
	Delineator Type C (Exst, Ppsd, Diamond Grade)		Road Closure Gate 18 Ft (Exst, Ppsd)
	Delineator Type D (Exst, Ppsd, Diamond Grade)		Road Closure Gate 28 Ft (Exst, Ppsd)
	Delineator Type E (Exst, Ppsd, Diamond Grade)		Road Closure Gate 40 Ft (Exst, Ppsd)
	Barricade (Type I, Type II, Type III)		Existing Railroad Battery Box
	Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)		Existing RR Profile Spot
	Attenuation Device		Existing Railroad Crossbuck
	Truck Mounted Attenuator		Existing Railroad Frog
	Delineator Drums		Existing Mailbox (Private, Federal)
	Flagger		
	Tubular Marker		
	Traffic Cone		
	Back to Back Vertical Panel Sign		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions



12 18 2020

SYMBOLS

D-101-32

	Existing Luminaire			High Mast Light Standard 3 Luminaire (Exst, Ppsd)		Existing Traffic Signal Standard			
	Luminaire LED			High Mast Light Standard 4 Luminaire (Exst, Ppsd)				Pull Box (Exst-Ppsd-Undefined)	
	Existing Light Standard Luminaire			High Mast Light Standard 5 Luminaire (Exst, Ppsd)				Intelligent Transportation Pull Box (Exst, Ppsd)	
	Relocate Light Standard			High Mast Light Standard 6 Luminaire (Exst, Ppsd)				Transformer (Exst, Ppsd)	
	Light Standard Light LED Luminaire			High Mast Light Standard 7 Luminaire (Exst, Ppsd)				Power Pole (Exst-Ppsd-with Transformer)	
	Light Standard 35 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 8 Luminaire (Exst, Ppsd)				Wood Pole (Exst, Ppsd)	
	Light Standard 50 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 9 Luminaire (Exst, Ppsd)				Pedestrian Push Button Post (Exst, Ppsd)	
	Light Standard 70 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 10 Luminaire (Exst, Ppsd)				Existing Pole	
	Light Standard 100 Watt High Pressure Sodium Vapor Luminaire			Overhead Sign Structure Load Center (Exst, Ppsd)				Existing Telephone Pole	
	Light Standard 150 Watt High Pressure Sodium Vapor Luminaire			Traffic Signal Controller (Exst, Ppsd)				Existing Post	
	Light Standard 200 Watt High Pressure Sodium Vapor Luminaire			Pad Mounted Traffic Signal Controller (Exst, Ppsd)					Connection Conductor (Ground, Neutral, Phase 1, Phase 2)
	Light Standard 250 Watt High Pressure Sodium Vapor Luminaire			Flashing Beacon (Exst, Ppsd)					
	Light Standard 310 Watt High Pressure Sodium Vapor Luminaire			Concrete Foundation (Exst, Ppsd)					
	Light Standard 400 Watt High Pressure Sodium Vapor Luminaire			Pipe Mounted Flasher (Exst, Ppsd)					
	Light Standard 700 Watt High Pressure Sodium Vapor Luminaire			Pad Mounted Feed Point (Exst, Ppsd)					
	Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire			Pipe Mounted Feed Point with Pad (Exst, Ppsd)					
	Emergency Vehicle Detector			Pole Mounted Feed Point (Exst, Ppsd)					
	Video Detection Camera			Junction Box (Exst, Ppsd)					
				Existing Pedestrian Head with Number					
				Existing Signal Head					
				Pole Mounted Head					
				Existing Lighting Standard Pole					

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions



12 18 2020

SYMBOLS

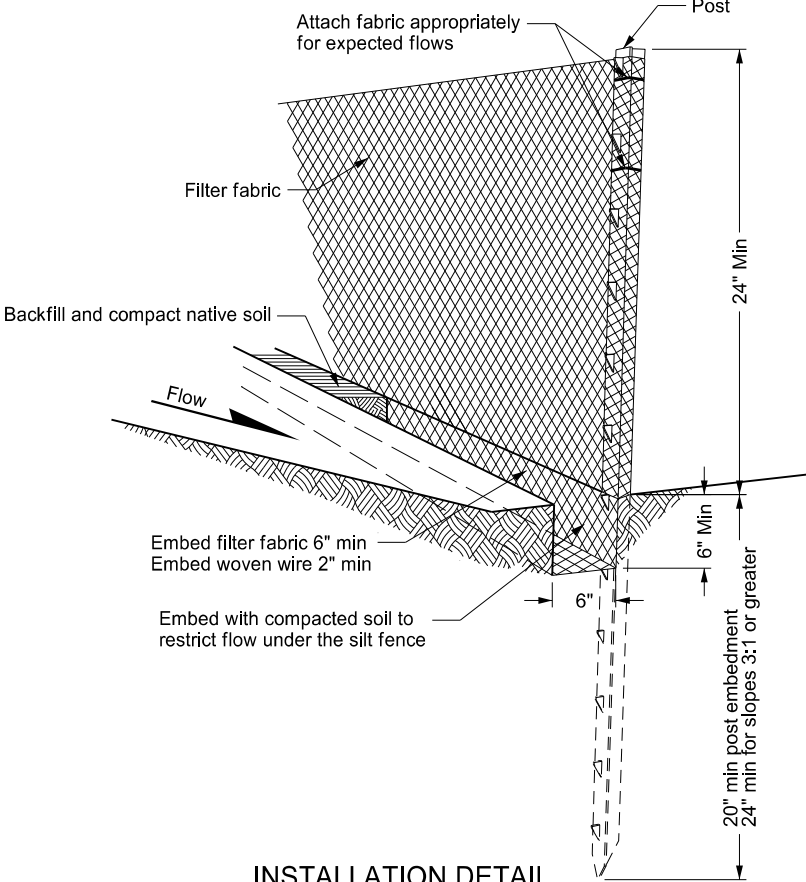
D-101-33

			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)		Existing Pipe Vent Gas, Fuel, Sanitary, Storm Drain, Water, Undefined
			Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)		Valve Exst Gas, Exst Water, Ppsd Water, Exst Undefined
			Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)		Pump Sanitary, Storm Drain, Exst Water
			Force Main Storm Drain Manhole (Exst, Exst with Valve)		Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)		Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Existing Water Appurtenance		Existing Utility Marker
			Sprinkler Head (Exst, Ppsd)		Existing Meter
			Fire Hydrant (Exst, Ppsd)		Existing Fuel Dispensers
			Cleanout (Exst Sanitary, Underdrain)		Existing Fuel Filler Pipes
			Existing Catch Basin Inlet (Round, Square)		Existing Fuel Leak Sensors
			Existing Curb Inlet (Round, Square)		
			Existing Slotted Reinforced Concrete Pipe		
			Catch Basin (Riser 30 Inch, Beehive, Type A)		
			Inlet Mountable Curb (Type A, Type B)		
			Inlet Saddle Base (Type 1, Type 2)		
			Inlet Special (Catch Basin, Type 1, Type A)		
			Inlet (Tee, Type 1, Type 2, Type 2 Double)		
			Median Drain		
			Headwall (Exst, Ppsd, Ppsd Single with Vegetation Barrier, Ppsd Double with Vegetation Barrier)		

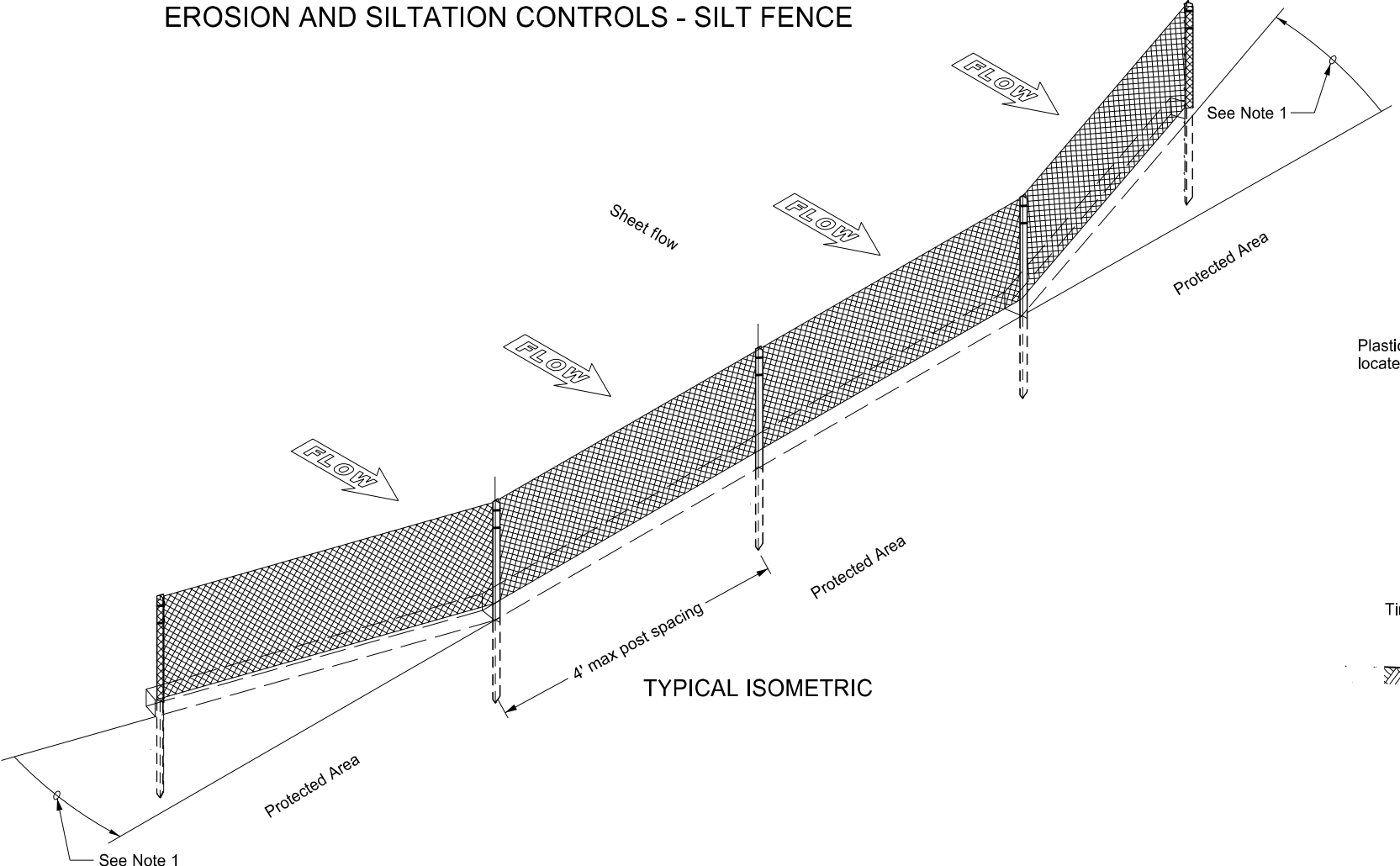
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 18 2020

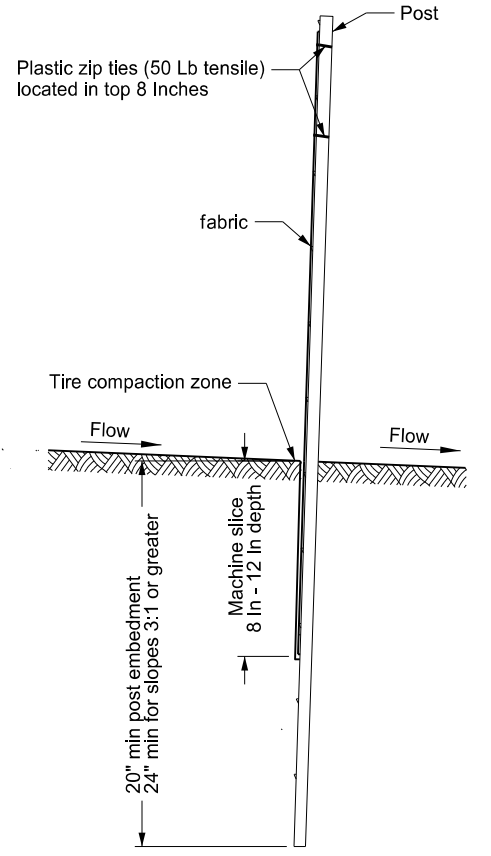
EROSION AND SILTATION CONTROLS - SILT FENCE



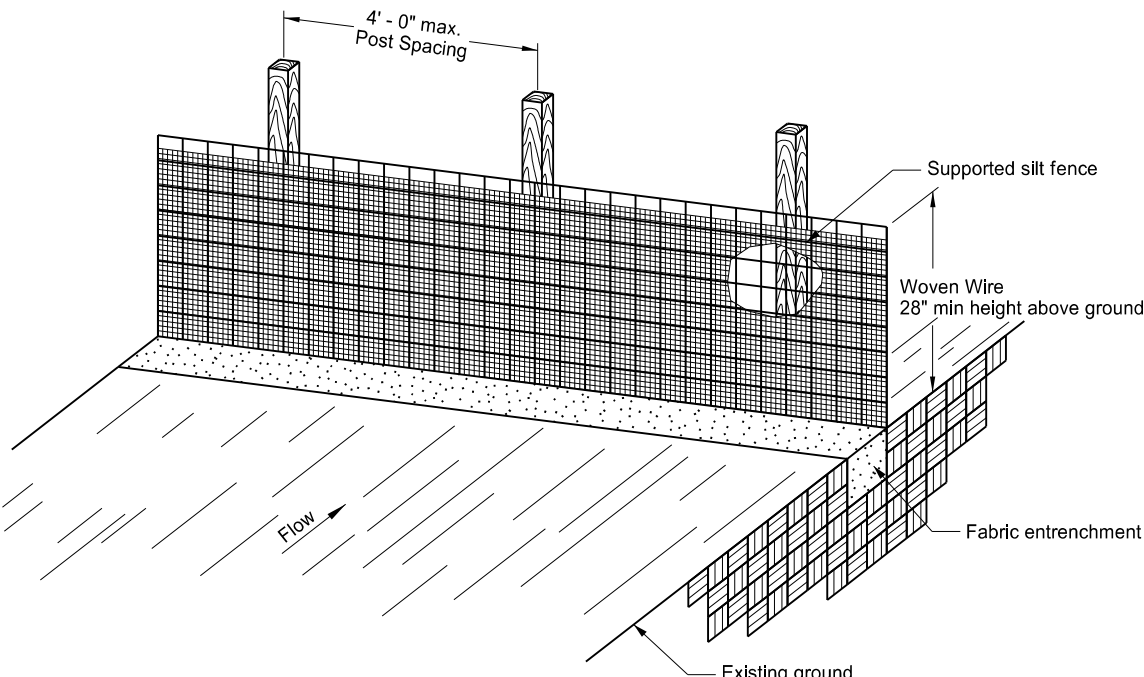
INSTALLATION DETAIL



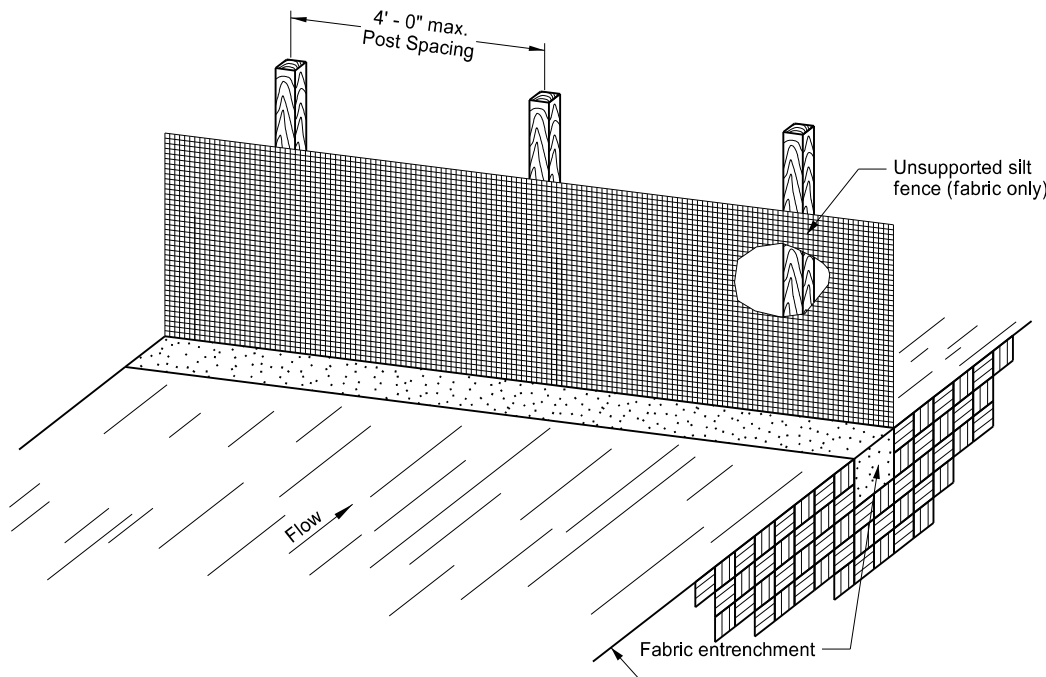
TYPICAL ISOMETRIC



MACHINE SLICED SILT FENCE



SILT FENCE SUPPORTED



SILT FENCE UNSUPPORTED

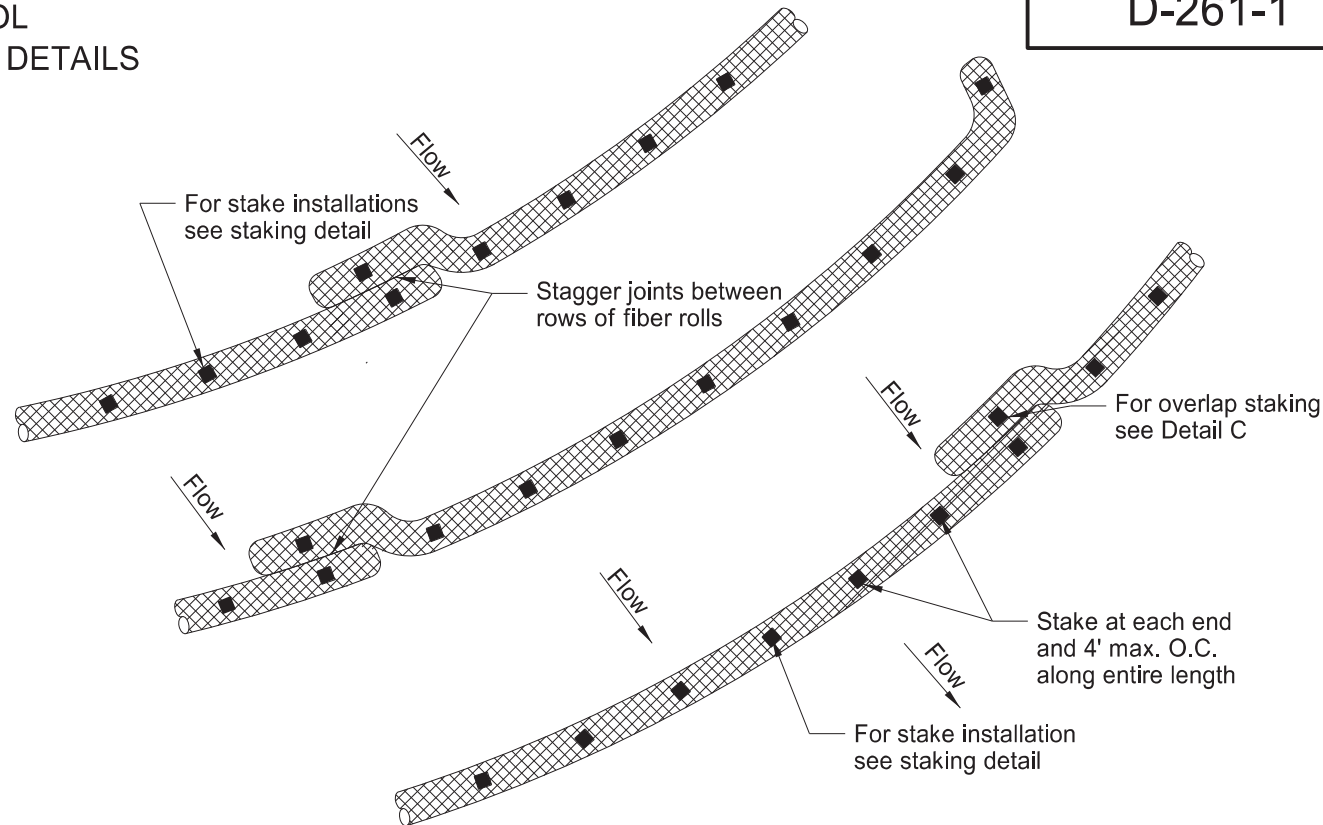
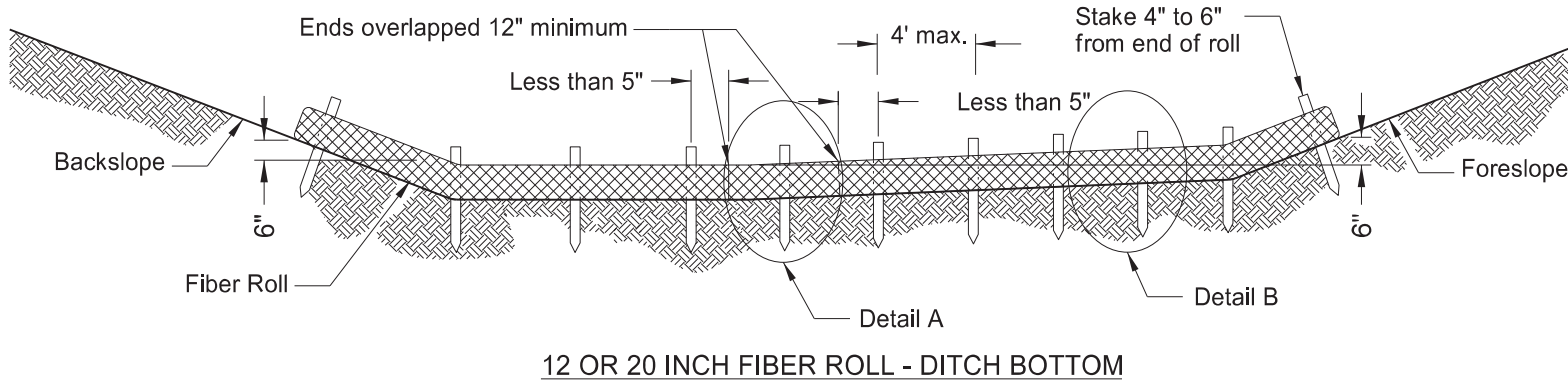
- NOTES:
1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
 2. Place splices outside low spots.
 3. Install silt fencing parallel to contour lines.
 4. Do not embed silt fence when placed in standing water.
 5. Silt fence material 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 08-27-19	Revised details & added new ones. New Design Engineer PE Stamp.

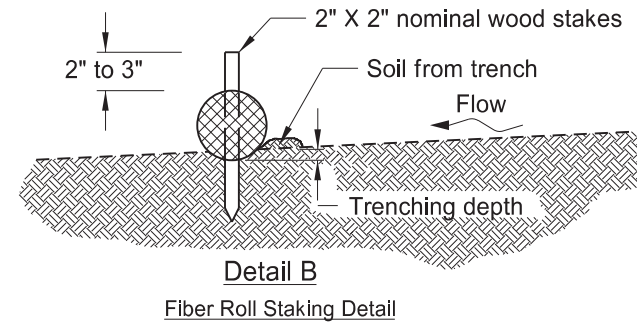
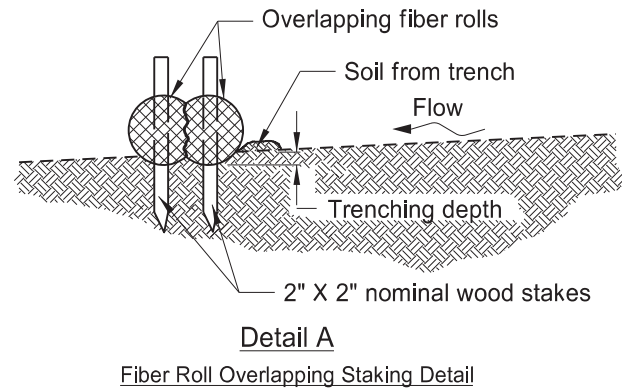
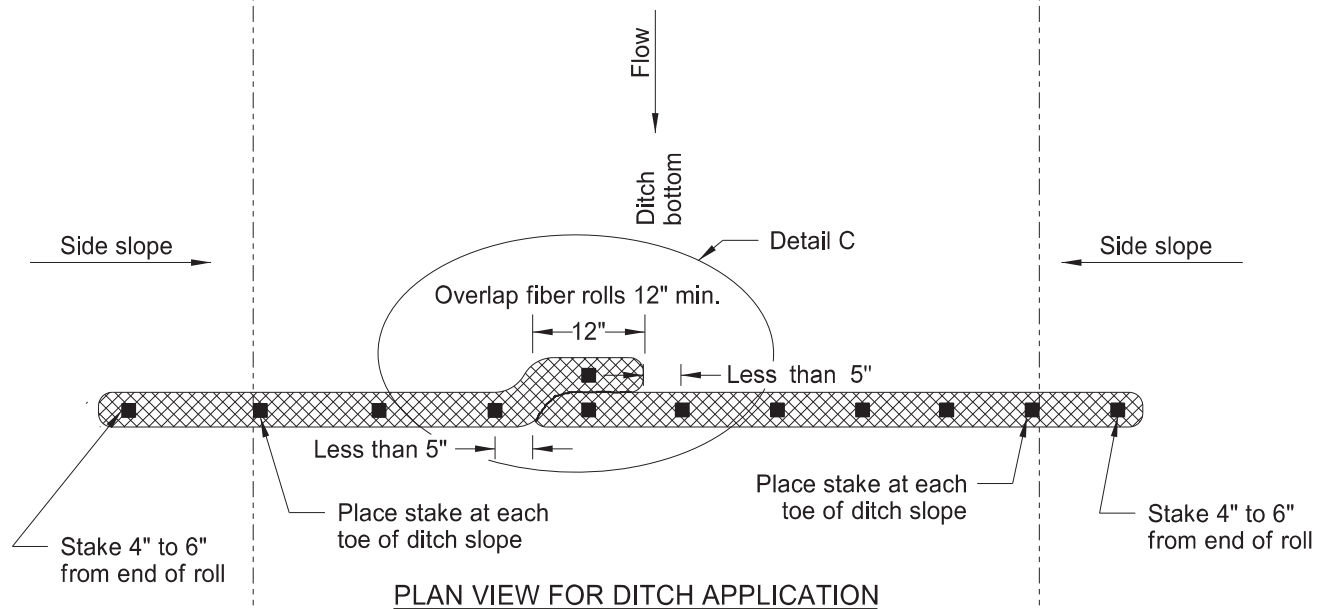
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North Dakota Department
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EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1



PLAN VIEW FOR SLOPE APPLICATION
Ensure fiber rolls are placed along the contours of the slope.



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.

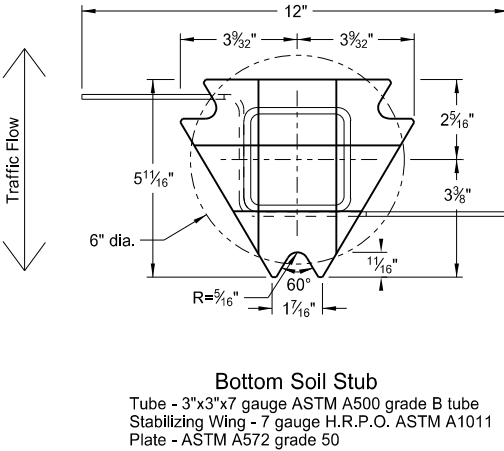
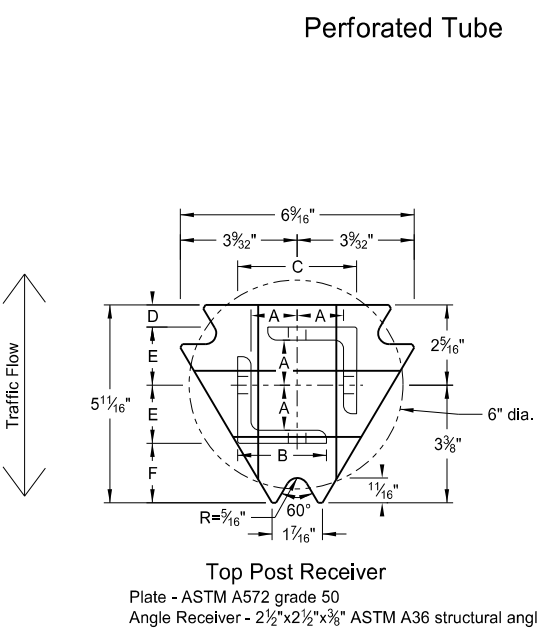
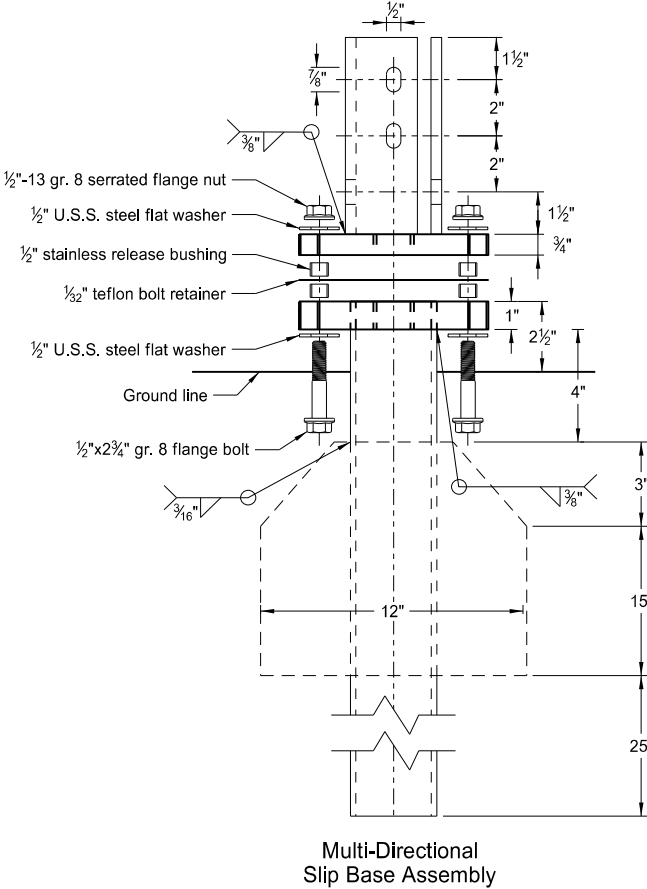
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp
04-22-24	Slope Plan View-Overlap Change.



04/22/24

Perforated Tube

- Notes:
1. Torque slip base bolts as specified by manufacturer.
 2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
 3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
 4. In concrete sidewalk, use same anchor without wings.
 5. Provide more than 7' between the first and fourth posts of a four post sign.

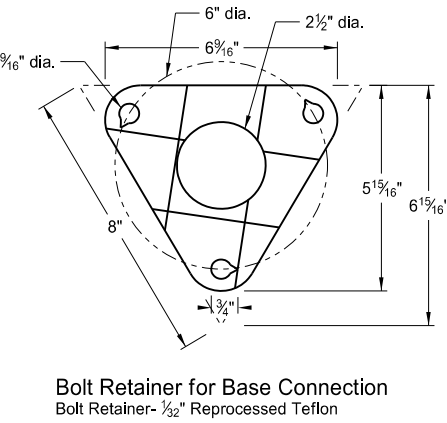
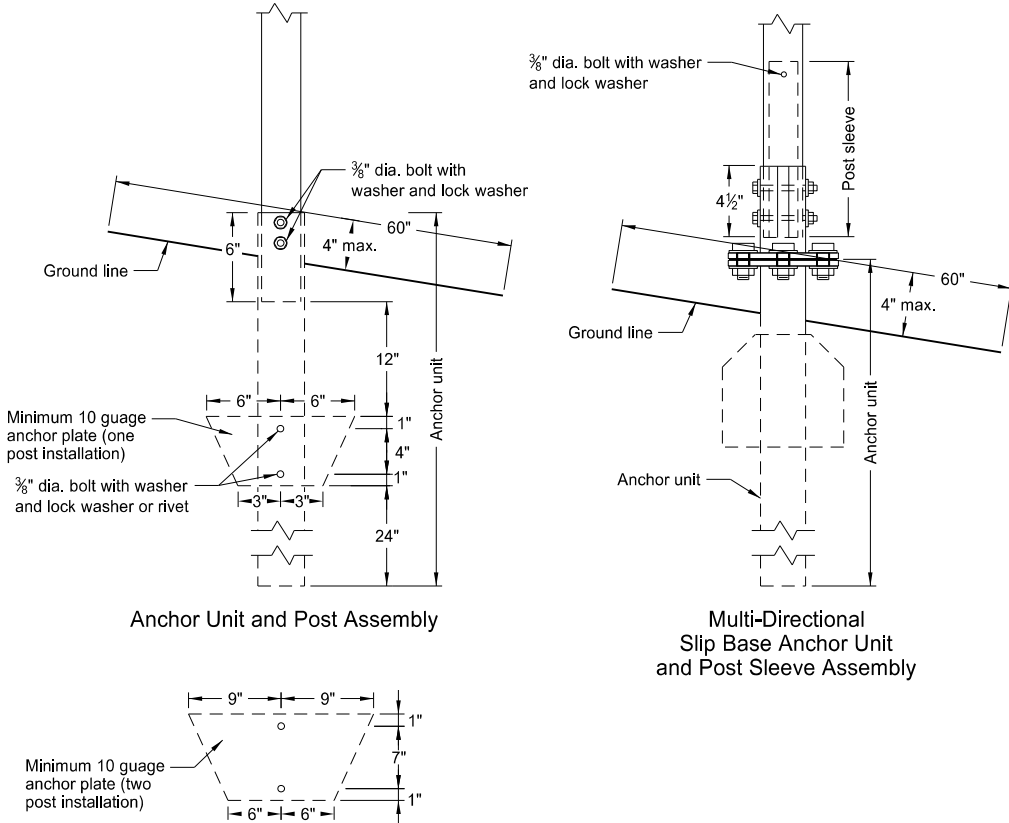


Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	12			Yes	
2	2 1/4	10	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	10	2 3/16	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
1 1/2 x 1 1/2	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
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

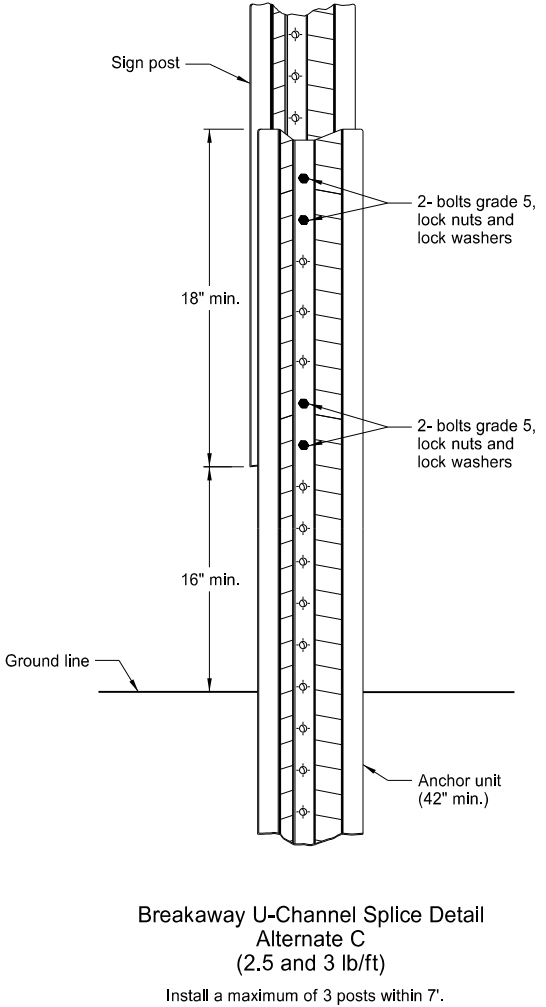
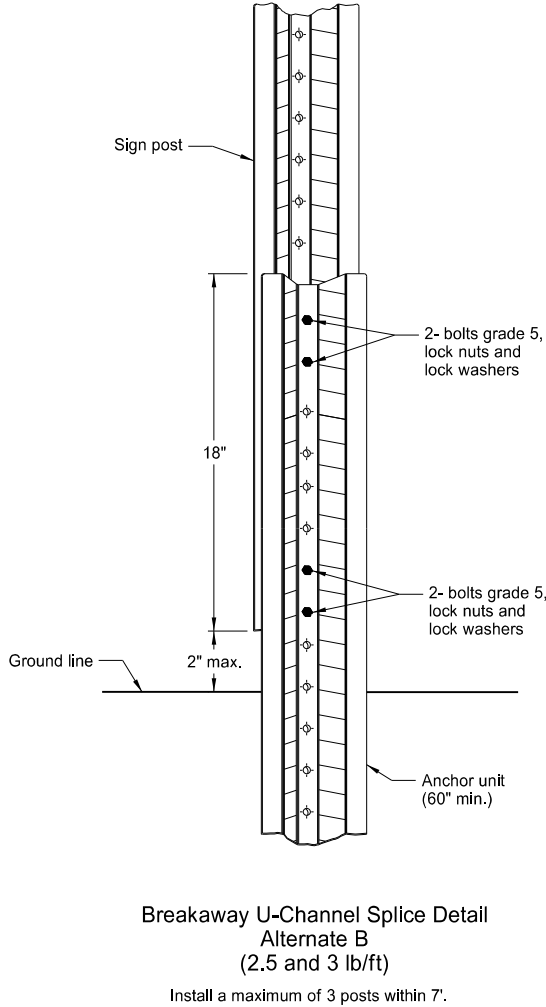
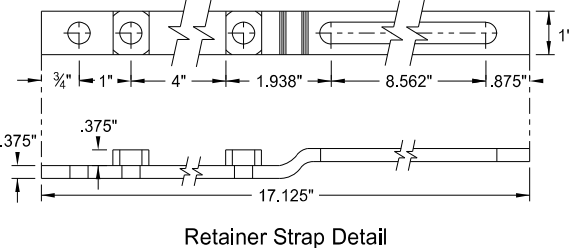
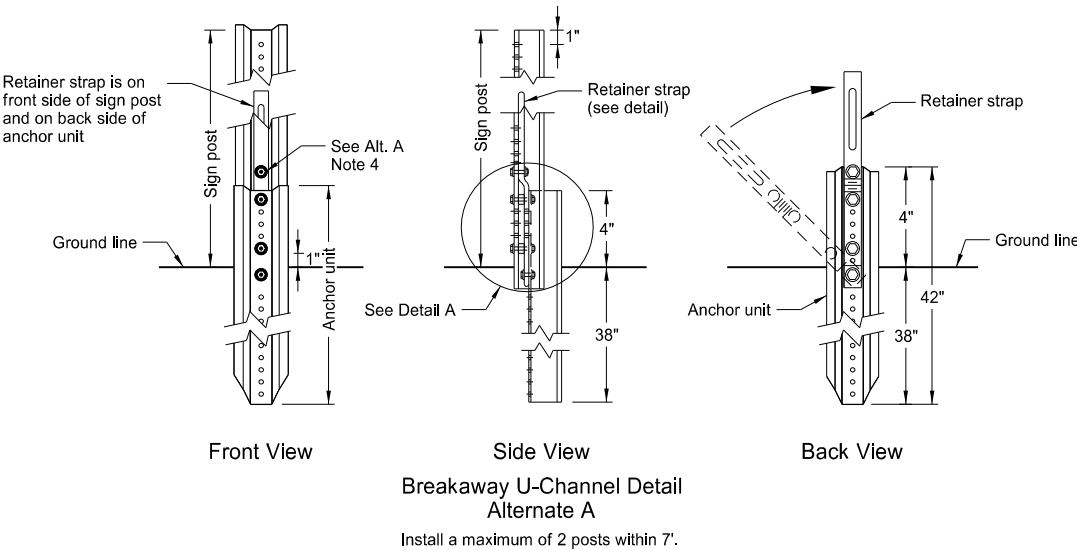
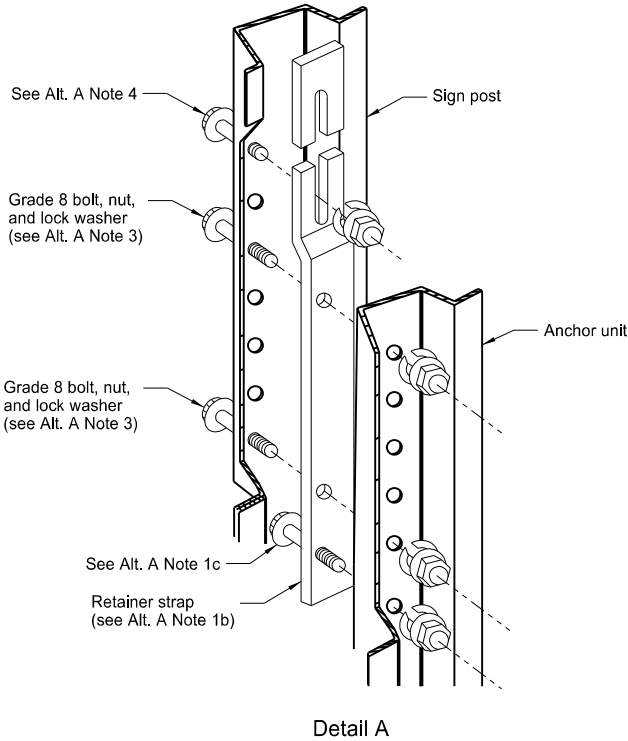
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 5/16"	2 1/2"	3 1/2"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 3/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

- (A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.
- (B) For additional wind load, insert the 2 3/8"x10 ga. into 2 1/2"x10 ga.



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2-28-14		
REVISIONS		
DATE	CHANGE	
9-27-17 10-03-19	Updated to active voice New Design Engr PE Stamp	

U-Channel Post



Alternate A Steps of Installation:

- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 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.
- a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
- 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.
- Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
- Properly nest base post, strap, and sign post. 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.

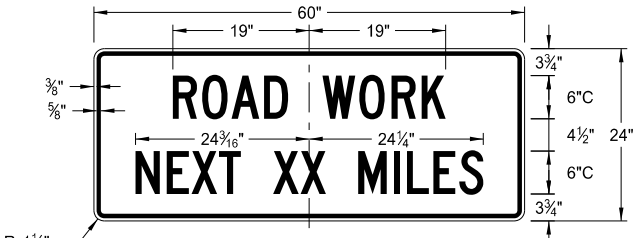
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17 10-03-19	Updated to active voice New Design Engr PE Stamp

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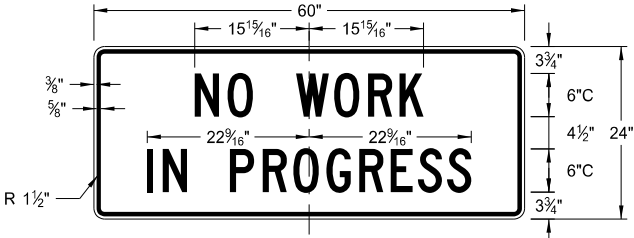
Kirk J Hoff,
Registration Number
PE- 4683,
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of Transportation

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

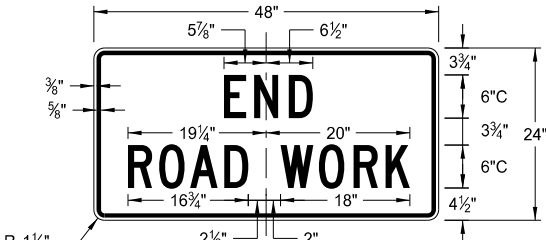
D-704-9



G20-1-60
Legend: black (non-refl)
Background: orange



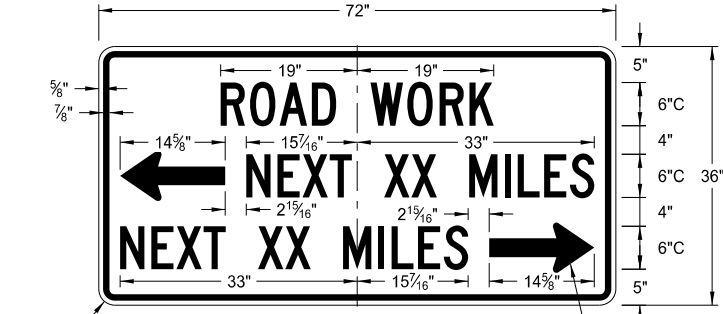
G20-1b-60
Legend: black (non-refl)
Background: orange



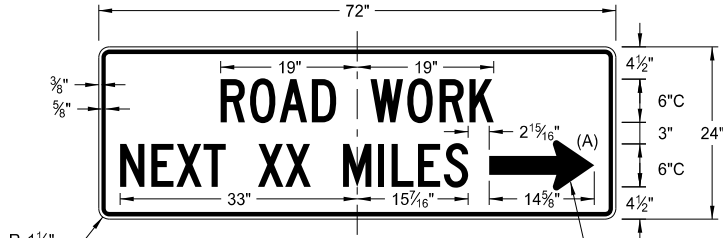
G20-2-48
Legend: black (non-refl)
Background: orange



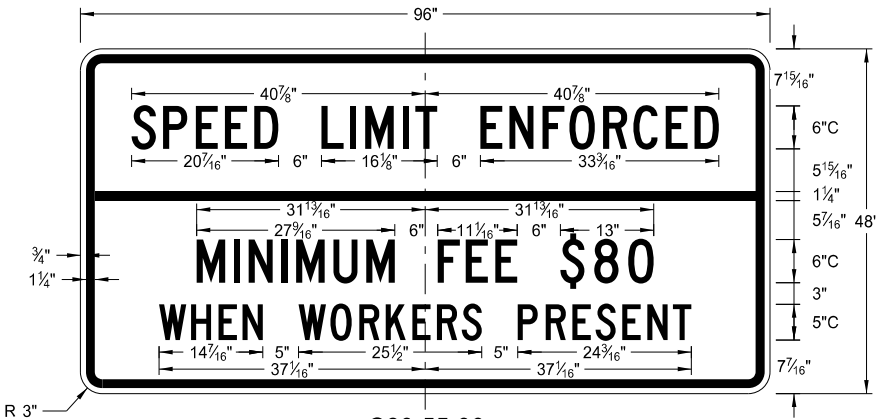
G20-4b-36
Legend: black (non-refl)
Background: orange



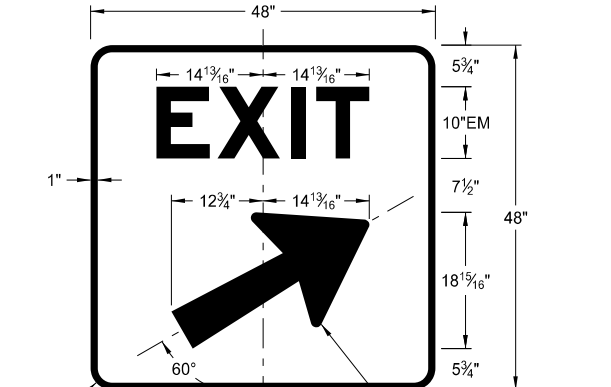
G20-50a-72
Legend: black (non-refl)
Background: orange



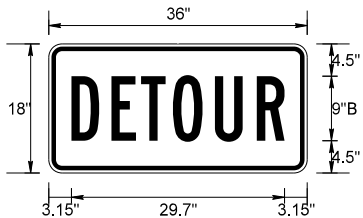
G20-52a-72
Legend: black (non-refl)
Background: orange



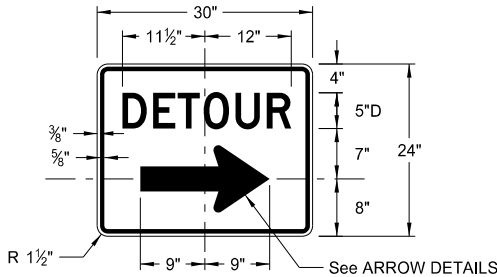
G20-55-96
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Background: orange



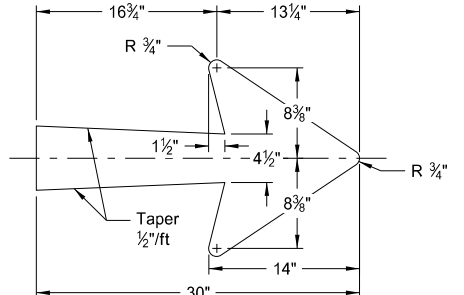
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



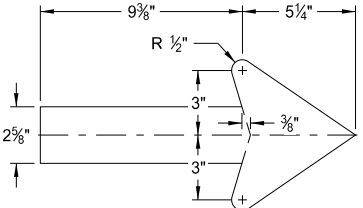
M4-8-36
Legend: black (non-refl)
Background: orange



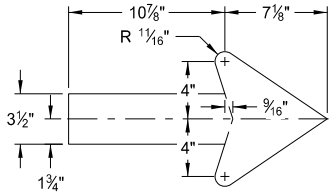
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



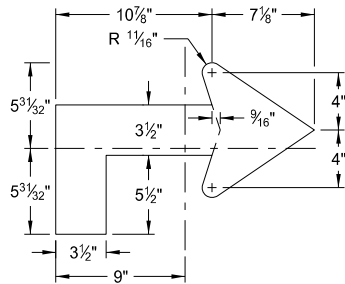
E5-1-48



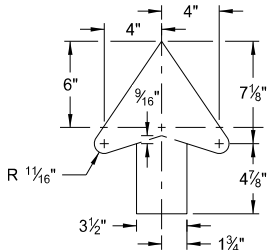
G20-50a-72
G20-52a-72



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



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



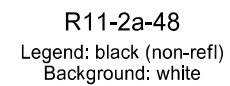
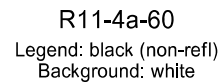
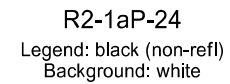
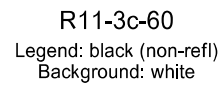
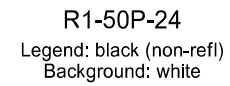
M4-9-30
Straight

ARROW DETAILS

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 10-03-19	Added sign & background color New Design Engineer PE Stamp

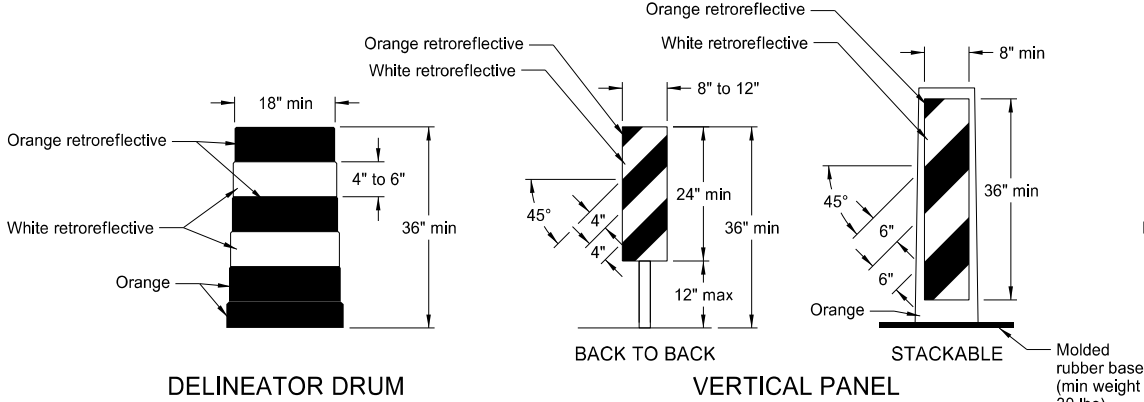
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Revised sign number New Design Engineer PE Stamp

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 of Transportation

BARRICADE AND CHANNELIZING DEVICE DETAILS

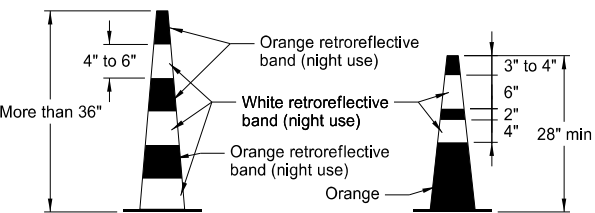


DELINEATOR DRUM

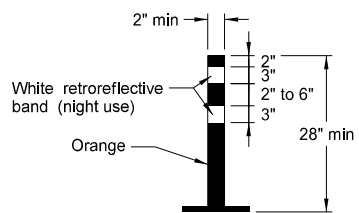
VERTICAL PANEL

STACKABLE

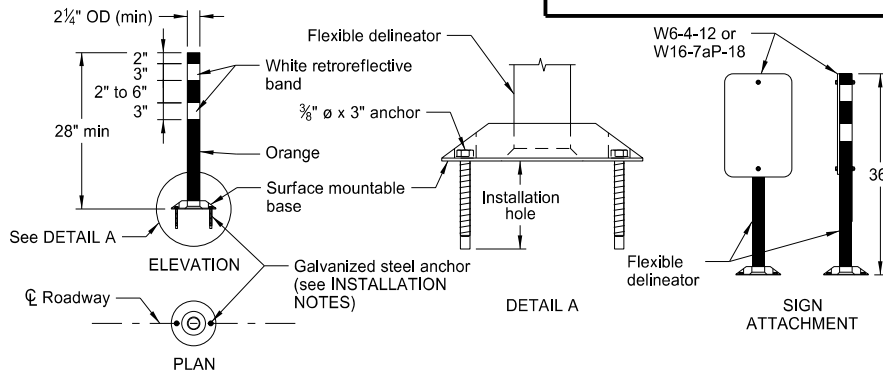
Molded rubber base (min weight 30 lbs)



TRAFFIC CONE



TUBULAR MARKER



FLEXIBLE DELINEATOR

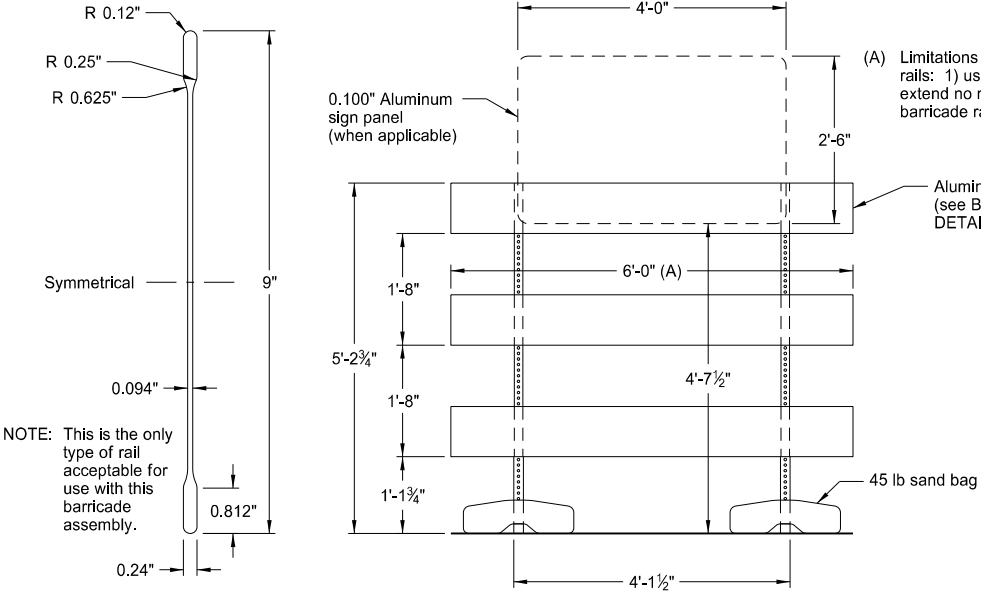
Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and white stripes. Avoid placement of stripes on drum ribs or indentations. Use closed top drums that will not allow collection of debris. Do not place ballast on the top of drum.

Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with 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, use a stripe width of 6 inches.

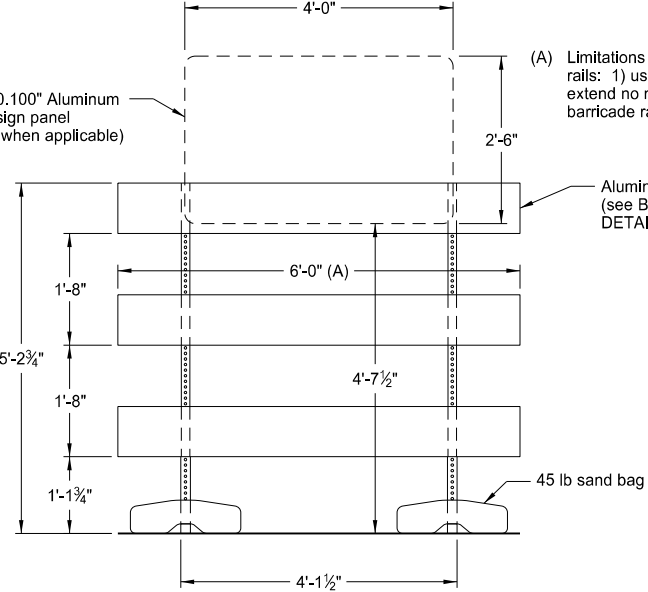
Provide retroreflectORIZATION of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectORIZED space between the orange and white stripes.

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

- INSTALLATION NOTES:
1. Drill installation holes to diameter and depth 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, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close as possible to pavement surface.

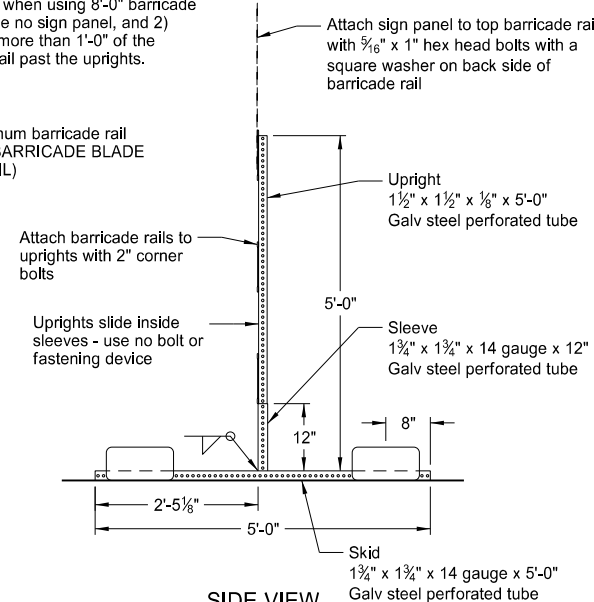


BARRICADE BLADE DETAIL

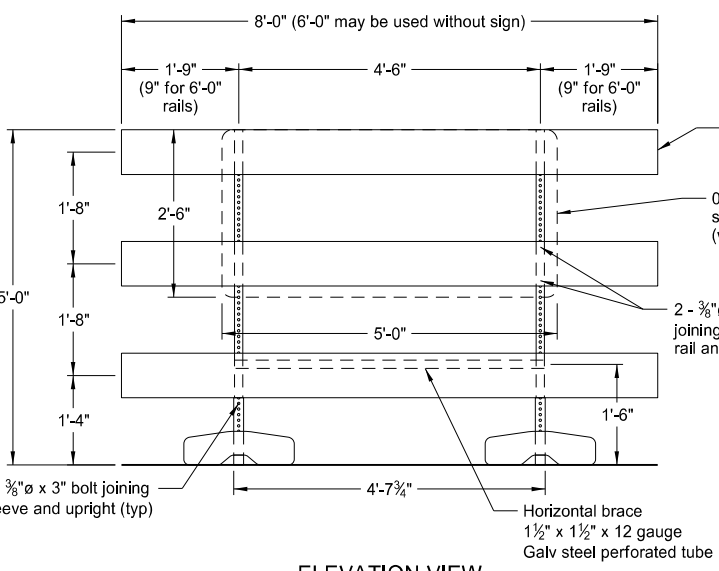


ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

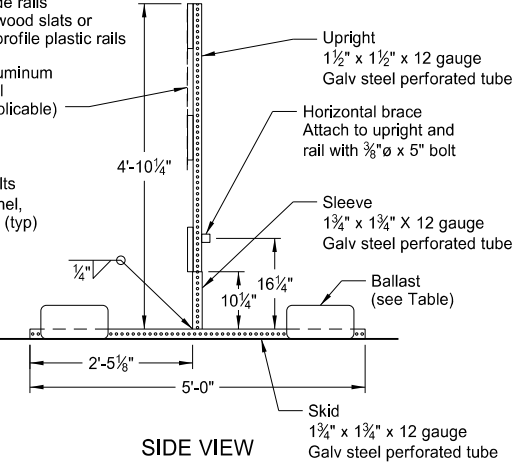


SIDE VIEW



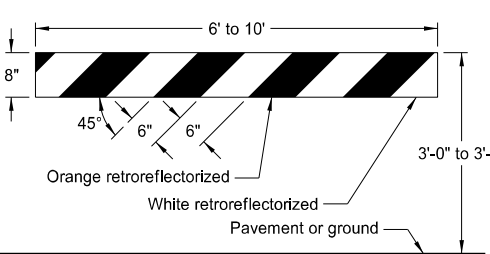
ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

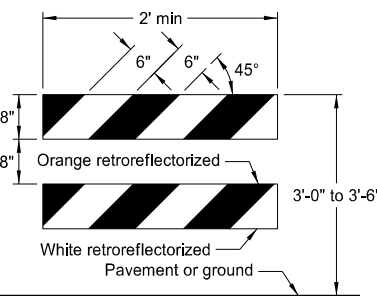


SIDE VIEW

NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", use a rail stripe width of 4".

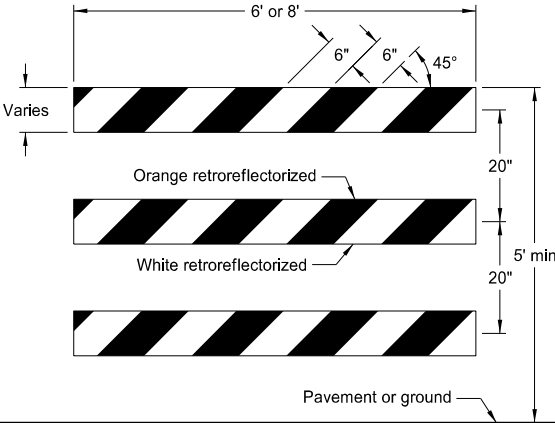


TYPE I BARRICADE

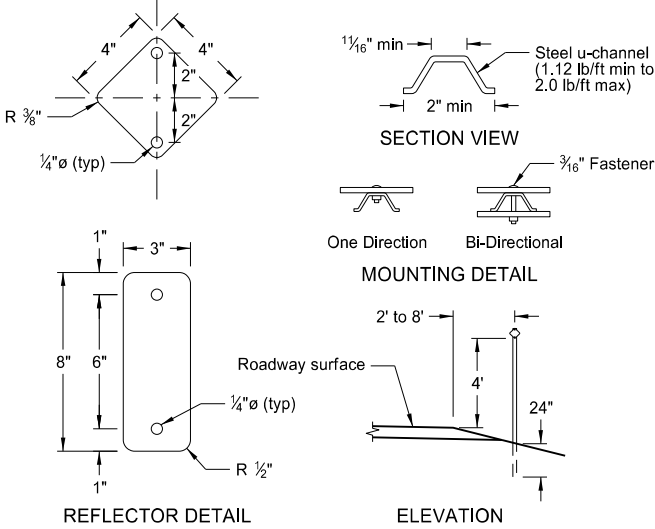


TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

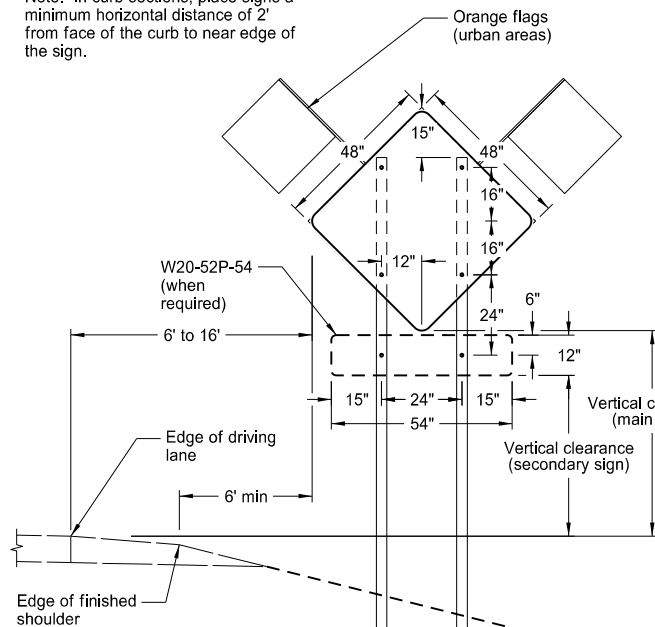
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

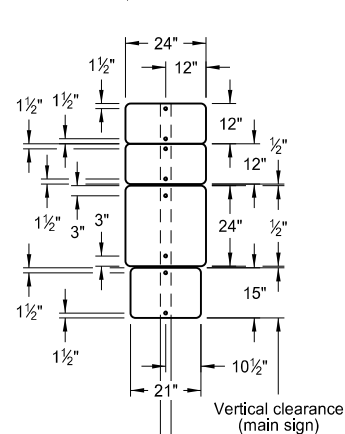
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

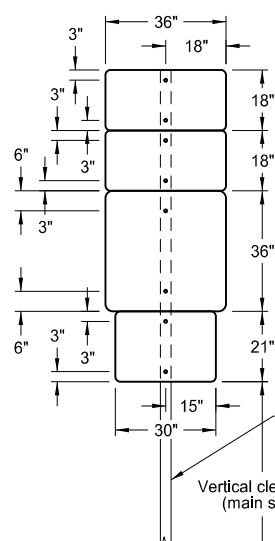
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



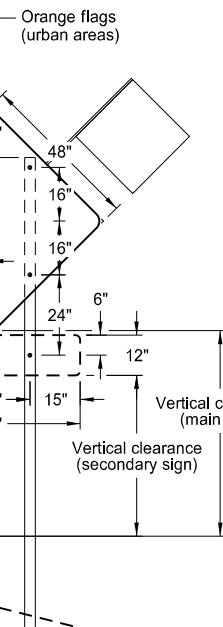
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



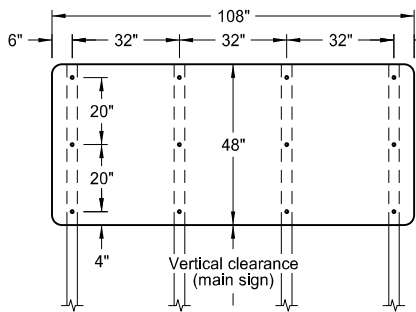
24" x 24"
ROUTE MARKER
ASSEMBLY



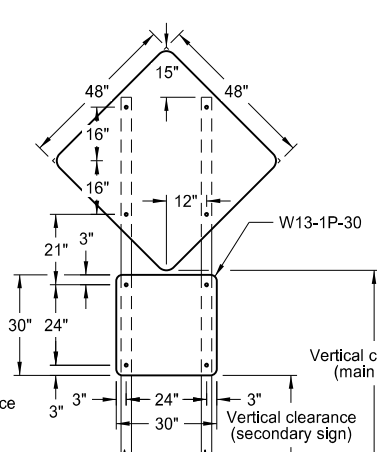
36" x 36"
ROUTE MARKER
ASSEMBLY



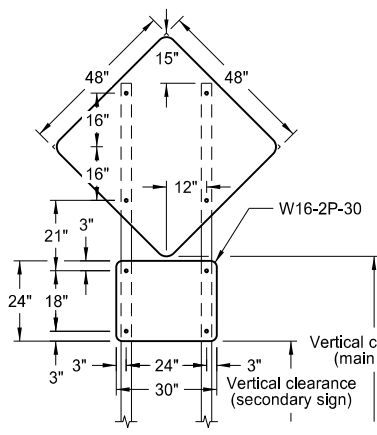
18" x 18"
DIAMOND SIGN



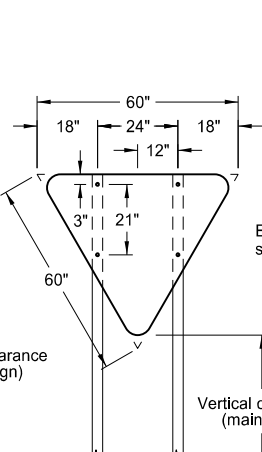
108" x 48" SIGN



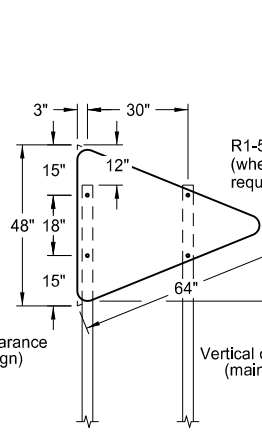
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



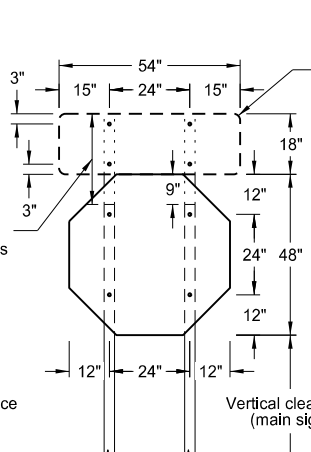
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



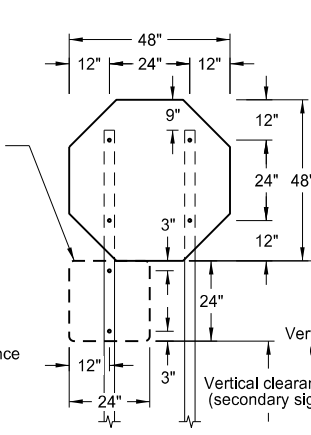
R1-2-60 - YIELD SIGN



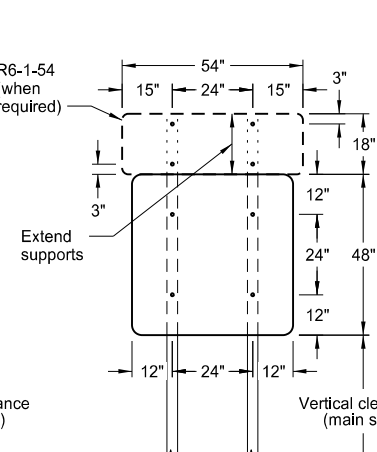
W14-3-64 - PENNANT SIGN



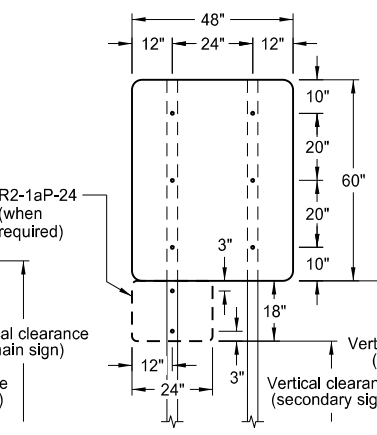
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



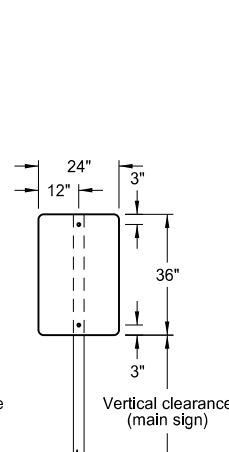
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



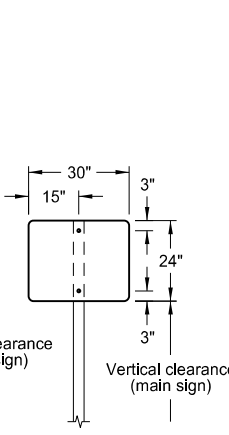
48" x 48" SIGN
(with R6-1-54 sign as required)



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



24" x 36" SIGN



30" x 24" SIGN

NOTES:

1. Sign Supports: Galvanize or paint supports. 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, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.

Place signs over 50 square feet on 2½" x 2½" perforated tube supports as a minimum.

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.
3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on 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 stated above.

Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

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

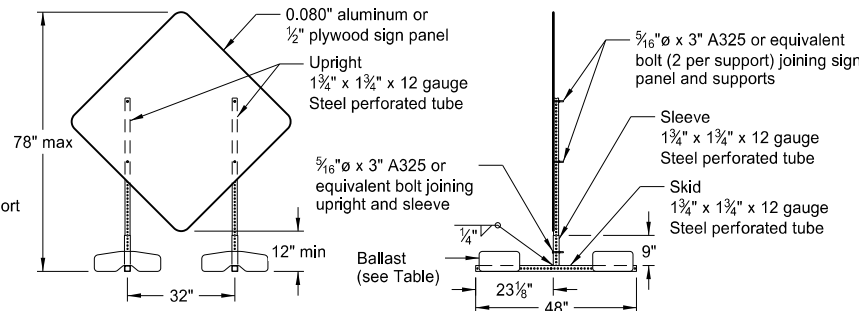
Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period.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

Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to a maximum surface area of 16 square feet.

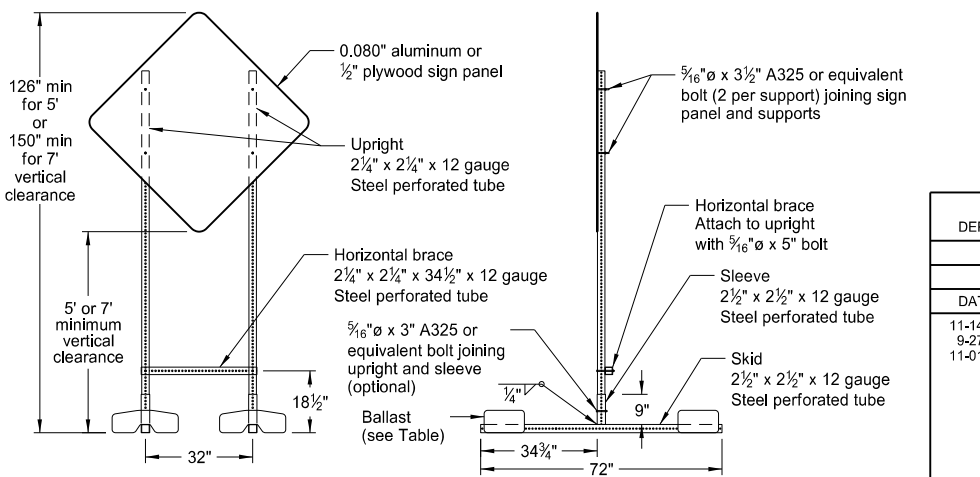
MINIMUM BALLAST
(For each side of sign support base)

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. Place sandbags at or near the ends of skids.



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

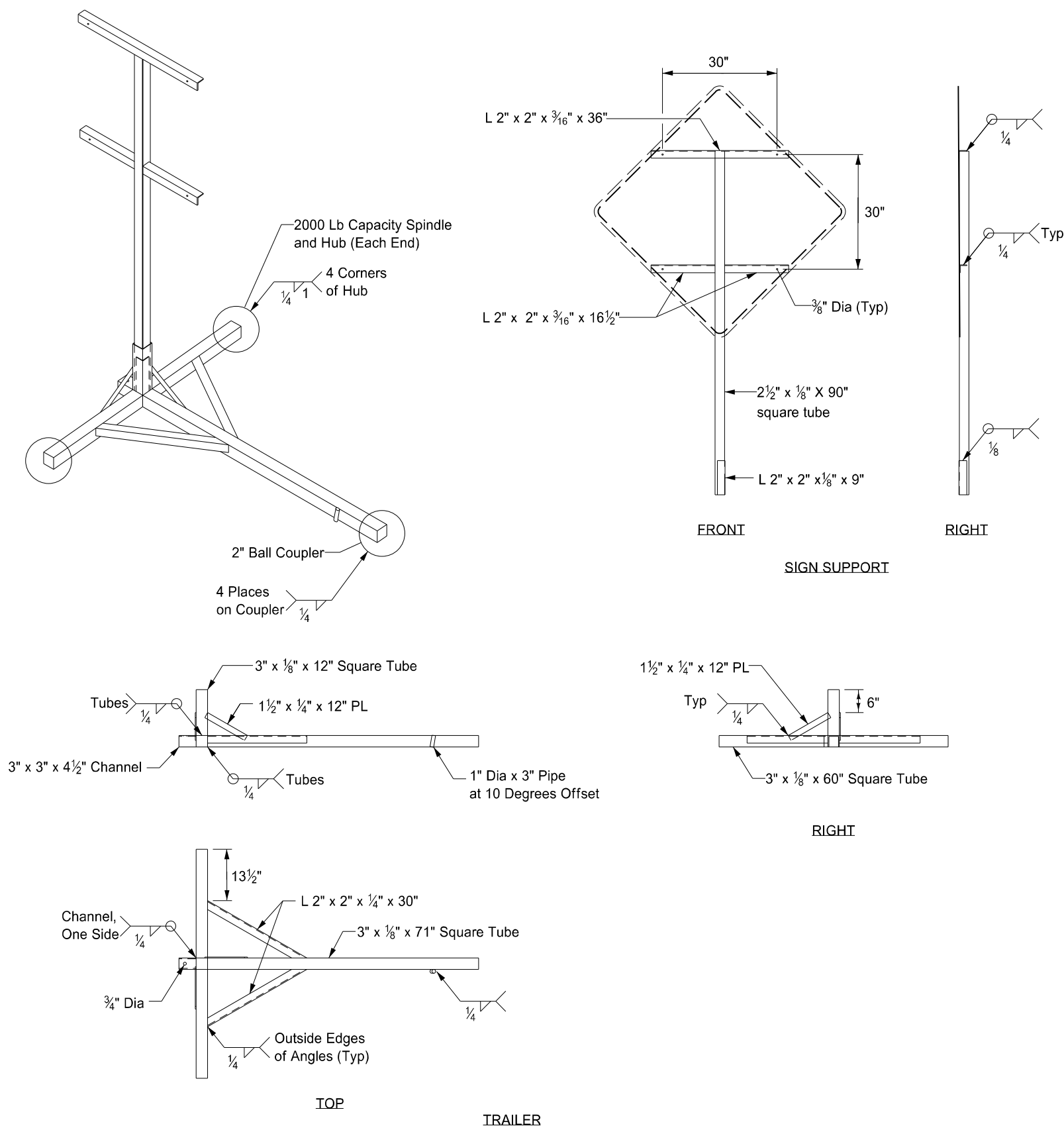
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail

This document was originally issued and sealed by

Kirk J Hoff,
Registration Number
PE-4683,
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



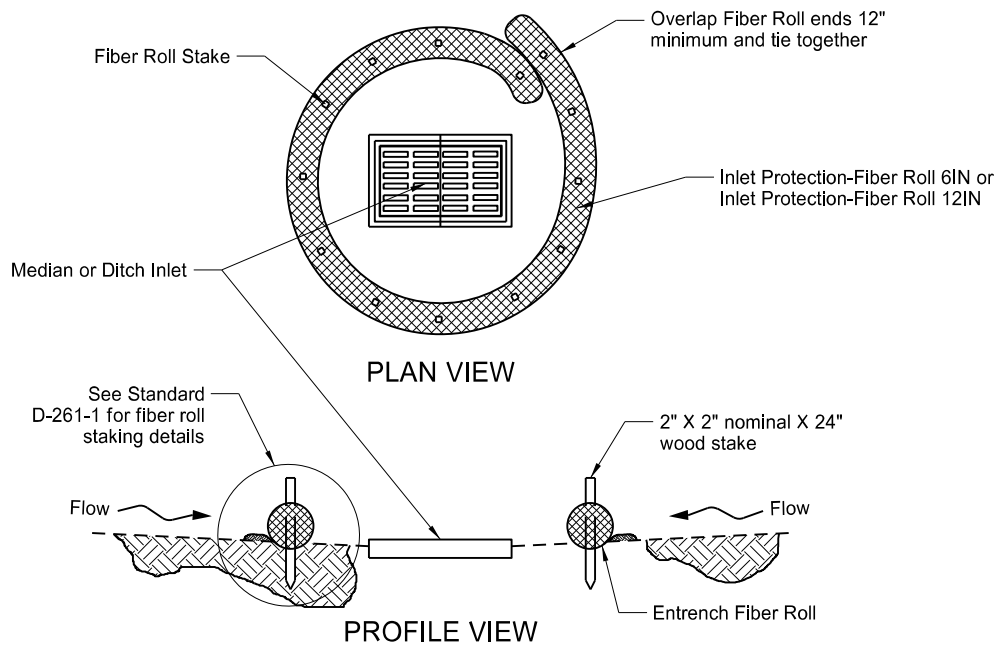
Notes:

1. Maximum 250 pound weight of assembly.
2. Use a 14" wheel and tire.
3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

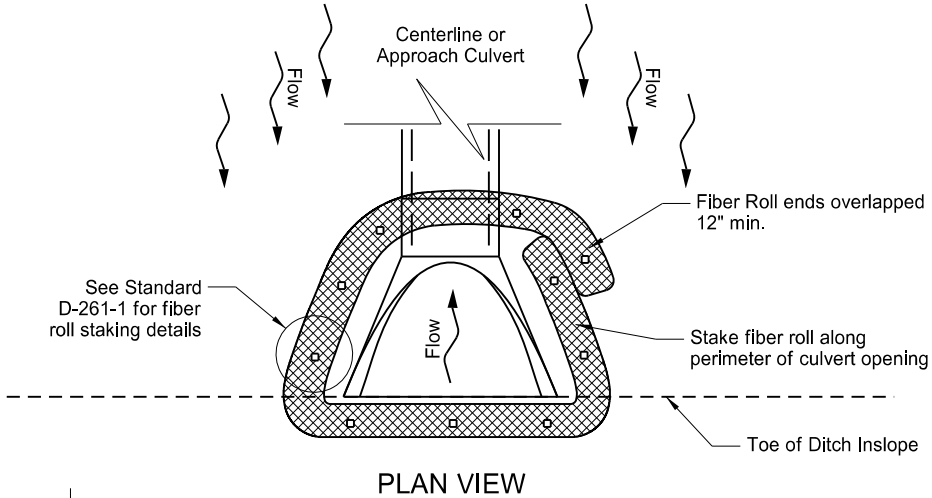
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.



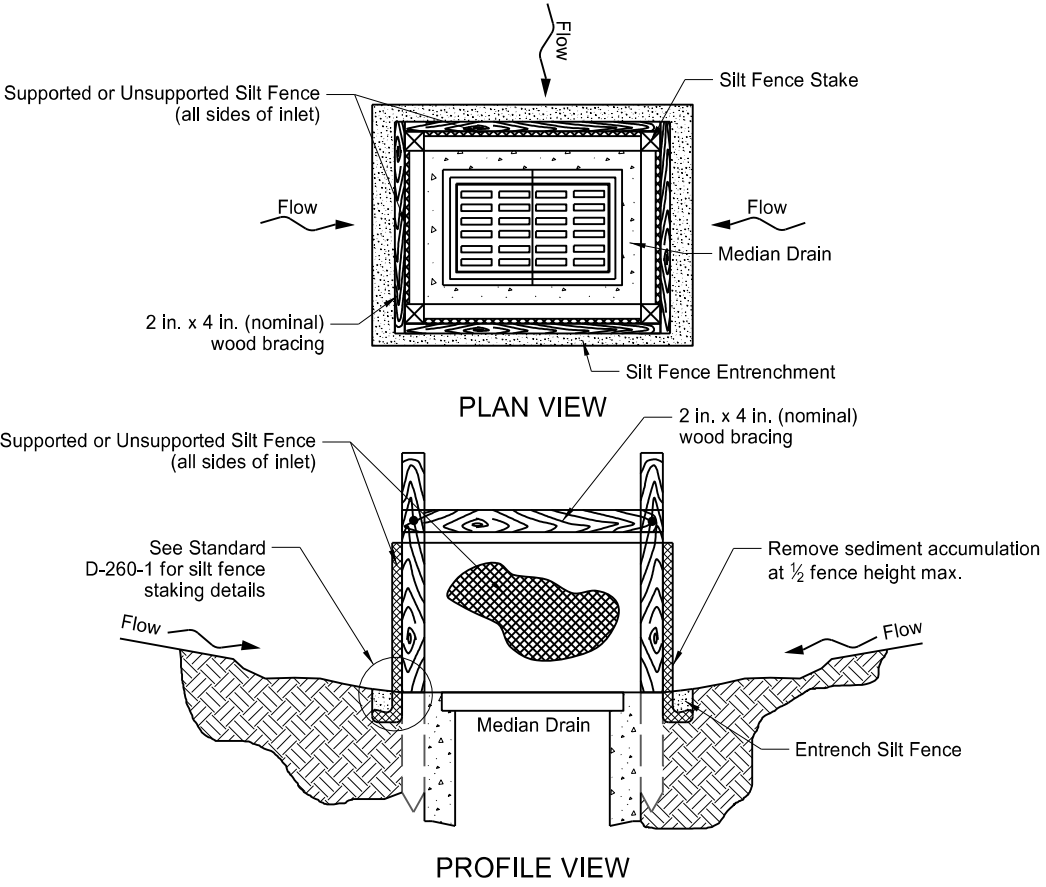
EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION



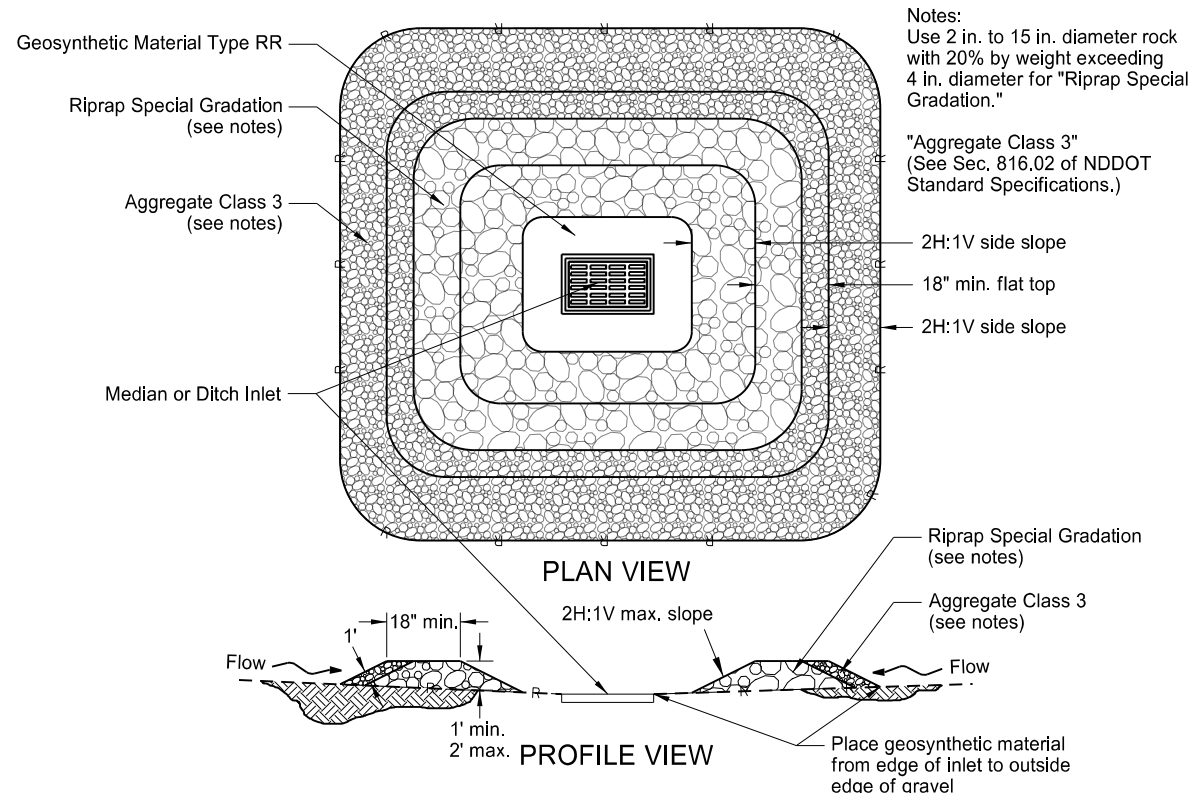
FIBER ROLL PROTECTION
(MEDIAN OR DITCH INLET)



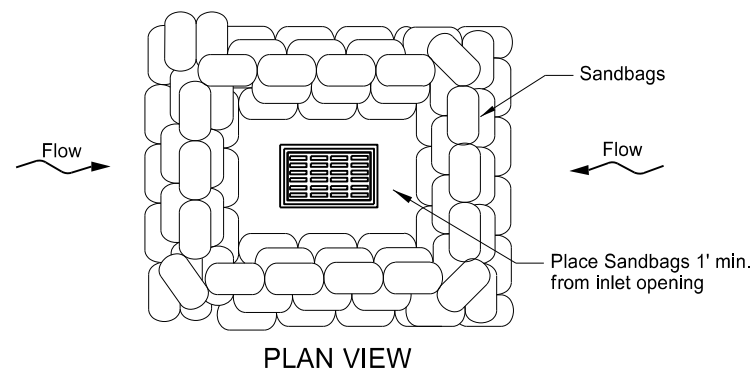
FIBER ROLL PROTECTION
(INLET OF CULVERT)



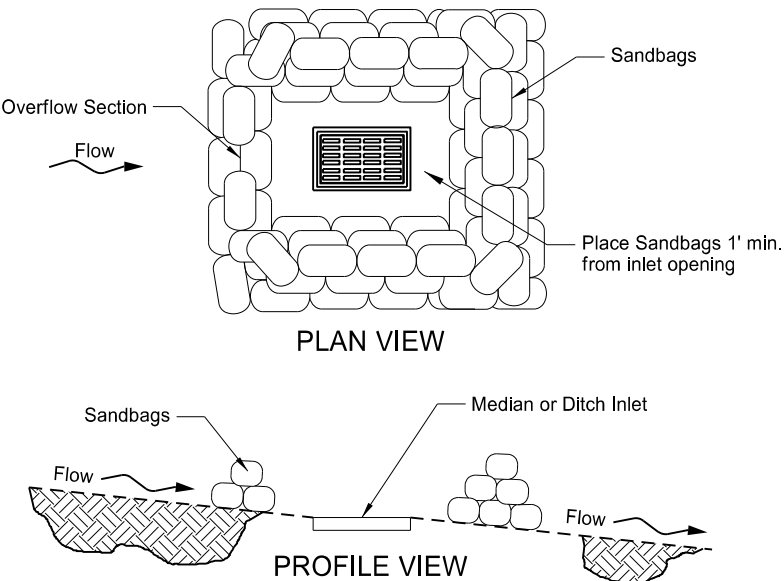
SILT FENCE PROTECTION
(MEDIAN OR DITCH INLET)



GRAVEL INLET PROTECTION
(MEDIAN OR DITCH INLET)



SANDBAG PROTECTION
(LOW POINT)

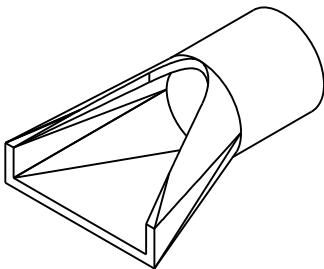


SANDBAG PROTECTION
(ON SLOPE)

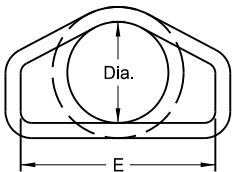
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 8-27-19 and the original document is stored at the
North Dakota Department
of Transportation

FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0 ⁷ / ₈ "	6'-0 ⁷ / ₈ "	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2 ¹ / ₄ "
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2 ¹ / ₂ "
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2 ³ / ₄ "
24	0'-9 ¹ / ₂ "	3'-7 ¹ / ₂ "	2'-6"	6'-1 ¹ / ₂ "	4'-0"	3"
27	0'-10 ¹ / ₂ "	4'-0"	2'-1 ¹ / ₂ "	6'-1 ¹ / ₂ "	4'-6"	3 ¹ / ₂ "
30	1'-0"	4'-6"	1'-7 ³ / ₄ "	6'-1 ³ / ₄ "	5'-0"	3 ¹ / ₂ "
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4 ¹ / ₂ "
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9 ¹ / ₂ "	8'-2 ¹ / ₄ "	7'-6"	5 ¹ / ₂ "
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5 ¹ / ₂ "
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6 ¹ / ₂ "
84	3'-0"	7'-6 ¹ / ₂ "	1'-9"	9'-3 ¹ / ₂ "	10'-0"	6 ¹ / ₂ "
90	3'-5"	7'-3 ¹ / ₂ "	2'-0"	9'-3 ¹ / ₄ "	11'-0"	6 ¹ / ₂ "

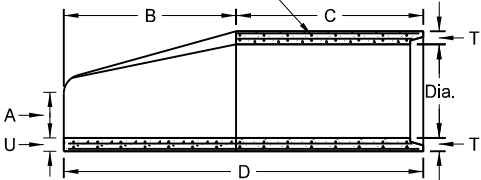


PERSPECTIVE

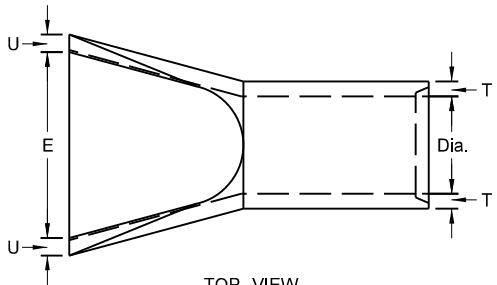


END VIEW

Standard Reinforcement for Class III pipe reinforced as per AASHTO M170



SIDE VIEW



TOP VIEW

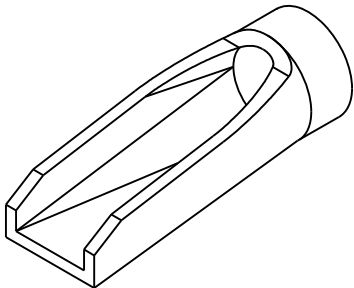
NOTES:

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.

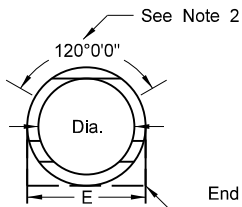
REINFORCED CONCRETE PIPE - FLARED END SECTION

Reinforcement to be equivalent to Class III RCP

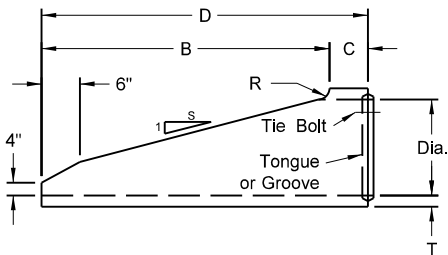
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7 ¹ / ₂ "	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3 ¹ / ₂ "	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



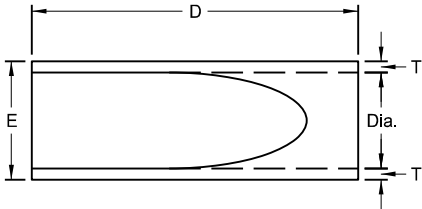
PERSPECTIVE



END VIEW



SIDE VIEW



TOP VIEW

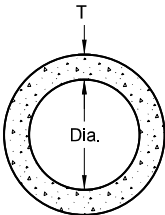
NOTES (Traversable End Section):

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

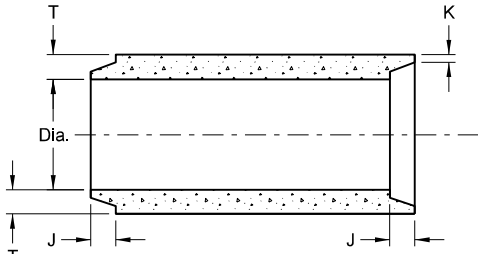
Reinforcement to be equivalent to Class III RCP

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 Min.	Minimum Wall Thickness (T)	
Dia	Sq. ft.	Lbs.	In.	In.	In.	
12	0.79	92	1 ⁵ / ₈ -2 ³ / ₈	3/4	2	
15	1.23	127	1 ³ / ₄ -2 ¹ / ₄	7/8	2 ¹ / ₄	
18	1.77	168	1 ¹ / ₂ -2 ¹ / ₂	1	2 ¹ / ₂	
21	2.40	214	1 ¹ / ₂ -3 ¹ / ₈	1 ¹ / ₈	2 ³ / ₄	
24	3.14	265	2 ³ / ₄ -3 ¹ / ₄	1 ¹ / ₈	3	
27	3.98	322	2 ³ / ₄ -4	1 ¹ / ₄	3 ¹ / ₄	
30	4.91	384	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₄	3 ¹ / ₂	
33	5.94	452	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	3 ³ / ₄	
36	7.07	524	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	4	
42	9.62	685	3 ³ / ₄ -4 ³ / ₄	1 ³ / ₄	4 ¹ / ₂	
48	12.57	685	3 ³ / ₄ -4 ³ / ₄	1 ³ / ₄	5	
54	15.90	1070	4 ¹ / ₂ -5 ¹ / ₄	2	5 ¹ / ₂	
60	19.63	1296	4 ¹ / ₂ -5 ¹ / ₂	2 ¹ / ₄	6	
66	23.76	1542	5-6	2 ³ / ₈	6 ¹ / ₂	
72	28.27	1810	5 ⁵ / ₈ -6 ³ / ₄	2 ³ / ₈	7	
78	33.18	2098	6 ¹ / ₄ -7 ¹ / ₄	2 ³ / ₈	7 ¹ / ₂	
84	38.48	2410	5 ⁵ / ₈ -7 ³ / ₄	3 ³ / ₈	8	
90	44.18	2793	6 ³ / ₄ -8 ¹ / ₂	3 ³ / ₈	8 ¹ / ₂	
96	50.27	3092	7-8 ¹ / ₄	3 ¹ / ₂	9	
102	56.75	3466	7-8 ¹ / ₄	3 ¹ / ₂	9 ¹ / ₂	
108	63.62	3864	7 ¹ / ₄ -8 ¹ / ₂	3 ³ / ₄	10	

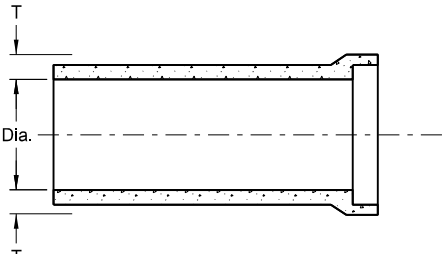


END VIEW

CIRCULAR PIPE

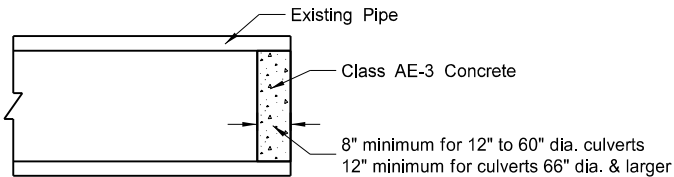


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

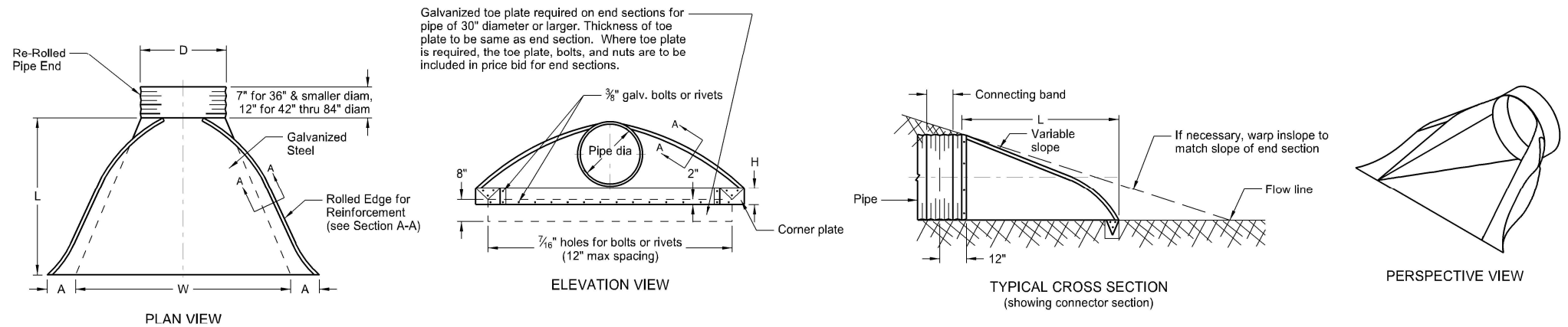
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5
11-21-16	Revised End Section Dimensions
09-18-19	Updated Perspective View Details

This document was originally issued and sealed by
Jon Ketterling
Registration Number
PE- 4684 ,
on 9/18/19 and the original document is stored at the
North Dakota Department
of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



* * PIPE DIA. IN	GALVANIZED THICKNESS IN	END SECTION DIMENSIONS						APPROX. SLOPE RATE	BODY PIECE
		A	B	H	L	W	IN		
15	0.064 - 0.079	7	8	6	26	30	2 1/2:1		1
18	0.064 - 0.109	8	10	6	31	36	2 1/2:1		1
24	0.064 - 0.109	10	13	6	41	48	2 1/2:1		1
30	0.064 - 0.109	12	16	8	51	60	2 1/2:1		1 or 2
36	0.064 - 0.109	14	19	9	60	72	2 1/2:1		2
42	0.064 - 0.138	16	22	11	69	84	2 1/2:1		2
48	0.064 - 0.168	18	27	12	78	90	2 1/2:1		2
54	0.064 - 0.168	18	30	12	84	102	2:1		2
* 60	0.064 - 0.168	18	33	12	87	114	1 1/2:1		3
* 66	0.064 - 0.168	18	36	12	87	120	1 1/2:1		3
* 72	0.064 - 0.168	18	39	12	87	126	1 1/2:1		3
* 78	0.064 - 0.168	18	42	12	87	132	1 1/2:1		3
* 84	0.064 - 0.168	18	45	12	87	138	1 1/2:1		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.

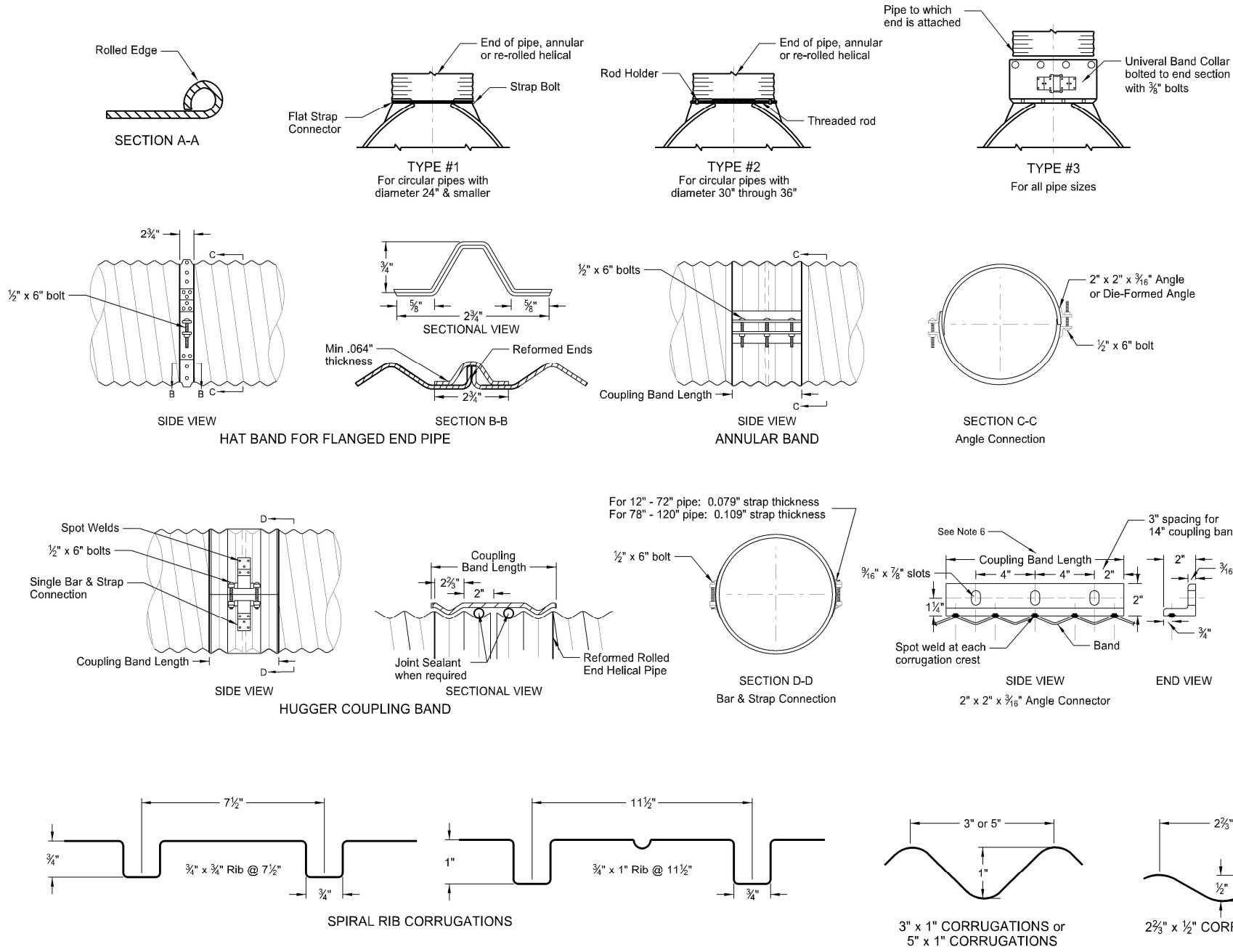
Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

NOTES:

- Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
- 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 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
- 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.
- 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.
- 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
- Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection.
- Length of spot welds shall be minimum 1/2".

COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 3/8" x 1/2"	12" - 48"	2 3/4"	.064"
Annular Band	2 3/8" x 1/2"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
Hugger Band	2 3/8" x 1/2" Rerolled End	12" - 72"	10 1/2"	.052"
		78" - 84"	10 1/2"	.079"
	3" x 1" Rerolled End	48" - 120"	10 1/2"	.052"
		48" - 120"	12"	.064"

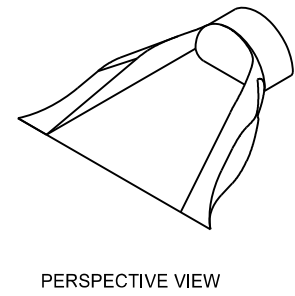
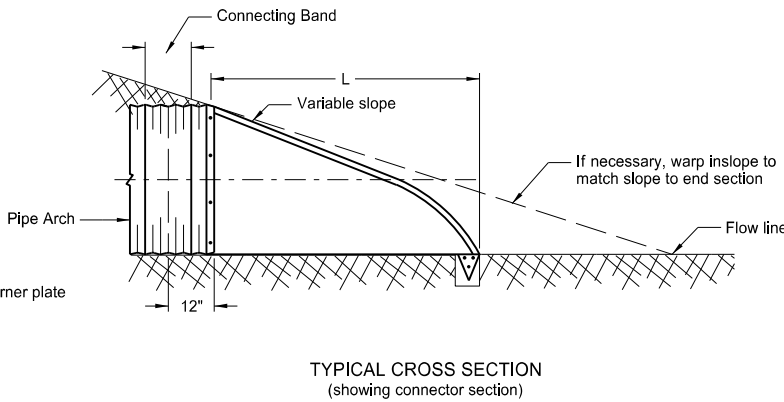
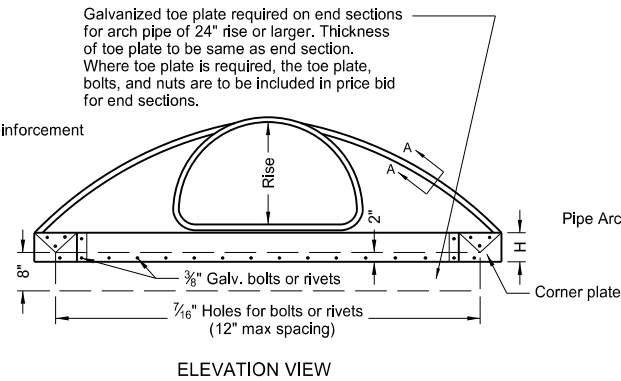
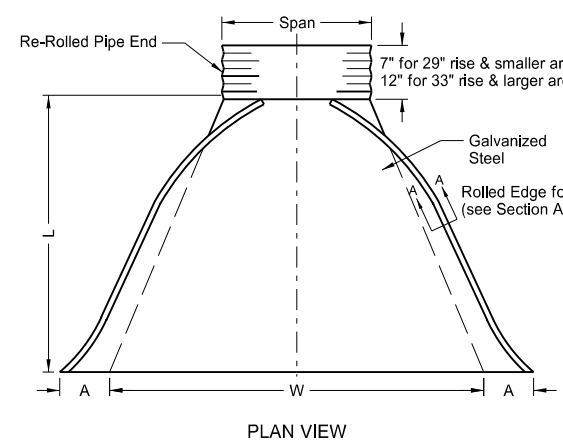


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-16-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail
09-18-19	Added Perspective View Detail
09-23-22	Galvanized Thickness Table

Professional Engineer Seal for Nathan D Ketterling, State of North Dakota, License No. PE-4684, dated 09/23/22.

CORRUGATED STEEL PIPE ARCH CULVERTS AND END SECTIONS

D-714-5



PIPE ARCH DIMENSION		GALV. THICK.	END SECTION DIMENSIONS						APPROX. SLOPE	BODY
SPAN	RISE		A	B	H	L	W			
IN	IN	IN	IN	IN	IN	IN	IN	RATE	PIECE	
17	13	0.064	7	9	6	19	30	2½:1	1	
21	15	0.064	7	10	6	23	36	2½:1	1	
24	18	0.064	8	12	6	28	42	2½:1	1	
28	20	0.064	9	14	6	32	48	2½:1	1	
35	24	0.079	10	16	6	39	60	2½:1	1 or 2	
42	29	0.079	12	18	8	46	75	2½:1	1 or 2	
49	33	0.109	13	21	9	53	85	2½:1	2	
57	38	0.109	18	26	12	63	90	2½:1	2	
64	43	0.109	18	30	12	70	102	2½:1	2	
* 71	47	0.109	18	33	12	77	114	2½:1	3	
* 77	52	0.109	18	36	12	77	126	2:1	3	
* 83	57	0.109	18	39	12	77	138	2:1	3	

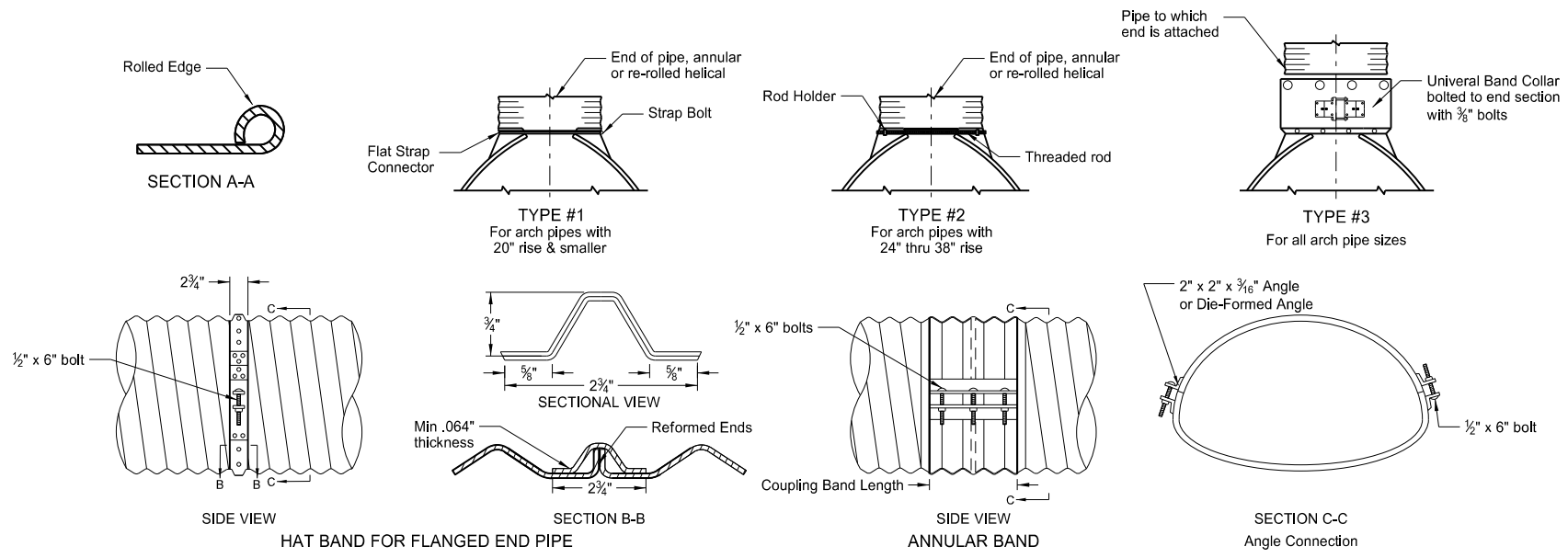
* These sizes have 0.109" sides and 0.138" center panels.

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 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

① Applicable to equivalent sizes of 3"x1" corrugations.



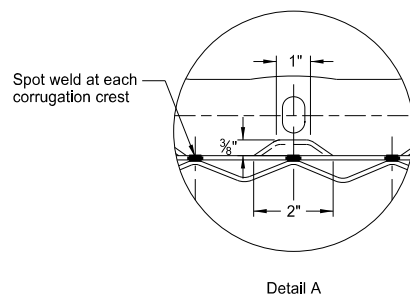
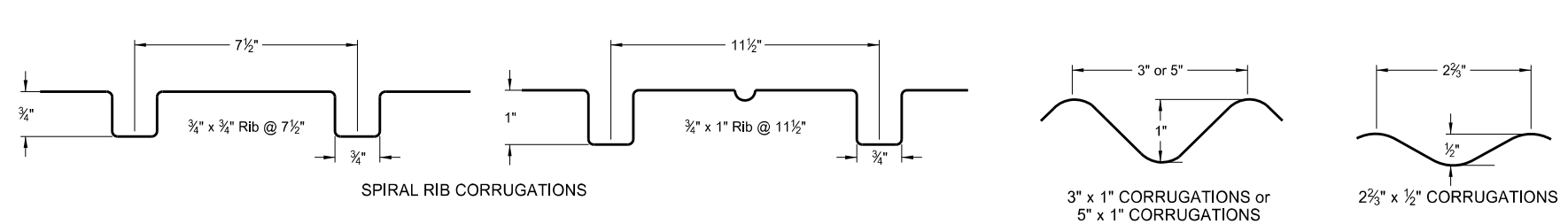
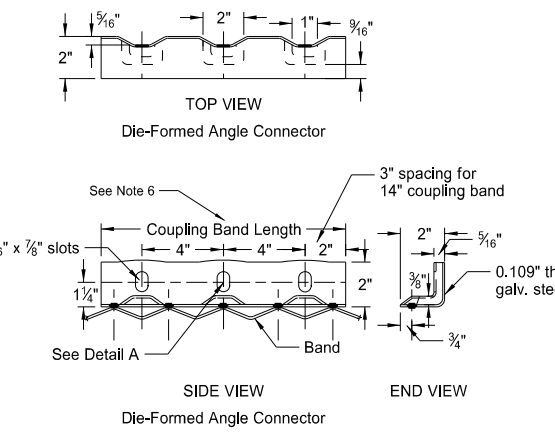
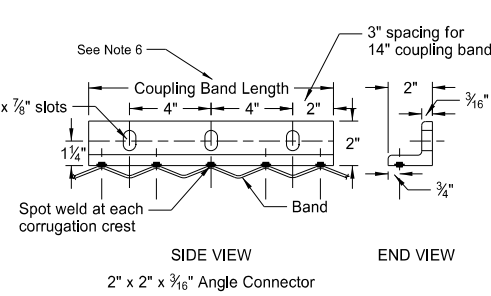
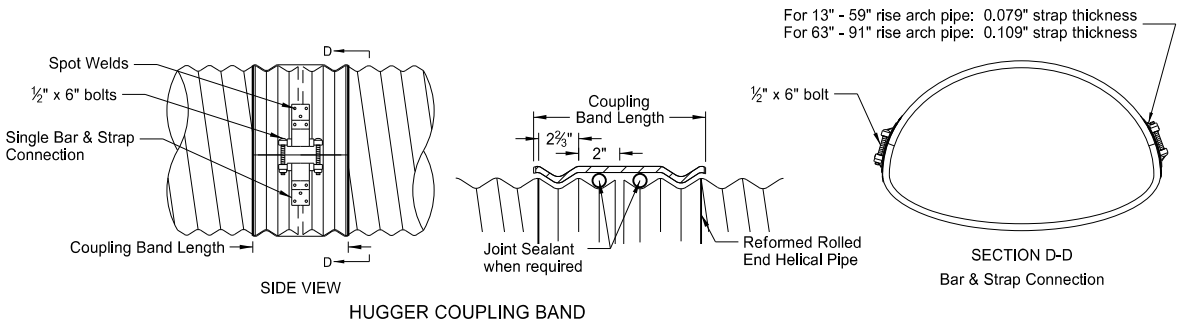
2 1/2" x 1/2" CORRUGATIONS			EQUIV PIPE DIA.
SPAN	RISE	IN	
17	13	15	
21	15	18	
24	18	21	
28	20	24	
35	24	30	
42	29	36	
49	33	42	
57	38	48	
64	43	54	
71	47	60	
77	52	66	
83	57	72	

3" x 1" CORRUGATIONS			EQUIV PIPE DIA.
SPAN	RISE	IN	
53	41	48	
60	46	54	
66	51	60	
73	55	66	
81	59	72	
87	63	78	
95	67	84	
103	71	90	
112	75	96	
117	79	102	
128	83	108	
137	87	114	
142	91	120	

For pipe arches use the same width band as for circular pipe of equal periphery.

COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	ARCH PIPE RISE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 3/8" x 1/2"	13" - 38"	2 3/4"	.064"
Annular Band	2 3/8" x 1/2"	13" - 57"	12"	.052"
	3" x 1"	41" - 91"	14"	.052"
Hugger Band	2 3/8" x 1/2" Rerolled End	13" - 57"	10 1/2"	.052"
		63" - 67"	10 1/2"	.079"
	3" x 1" Rerolled End	41" - 91"	10 1/2"	.052"
	5" x 1" Rerolled End	41" - 91"	12"	.064"

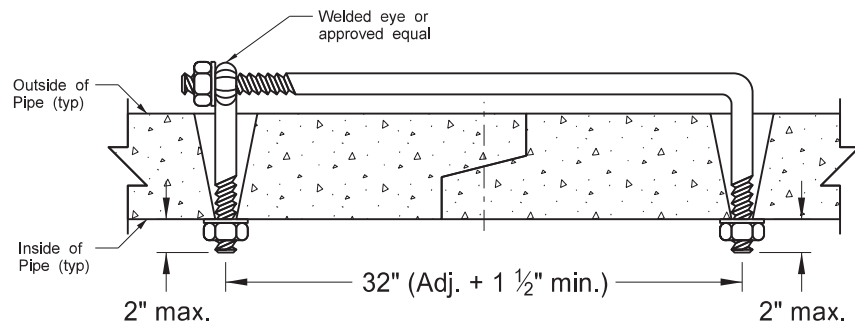
- NOTES:
- Pipe and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
 - Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" 1/4" galv. angle for 77"x52" and 83"x57" sizes. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
 - Coupling bands shall be two-piece for all arch pipes.
 - 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
 - Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection
 - Length of spot welds shall be minimum 1/2".



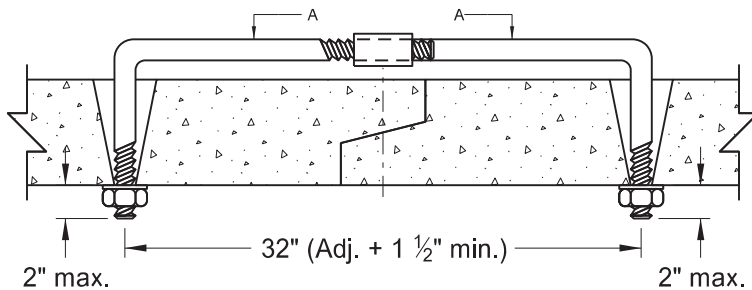
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Jon Ketterling Registration Number PE- 4684 , on 9/18/19 and the original document is stored at the North Dakota Department of Transportation
08-16-13		
REVISIONS		
DATE	CHANGE	
01-07-14	End Section Plan View	
02-27-14	3" x 1" Corrugation Detail	
09-18-19	Added Perspective View Detail	

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

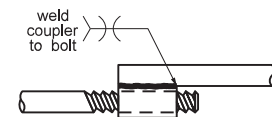
D-714-22



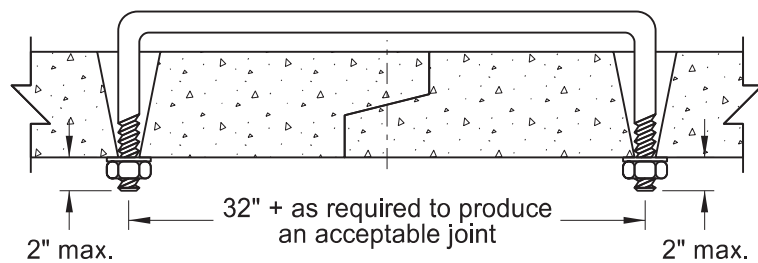
EYE BOLT TIE (PIPES ONLY)



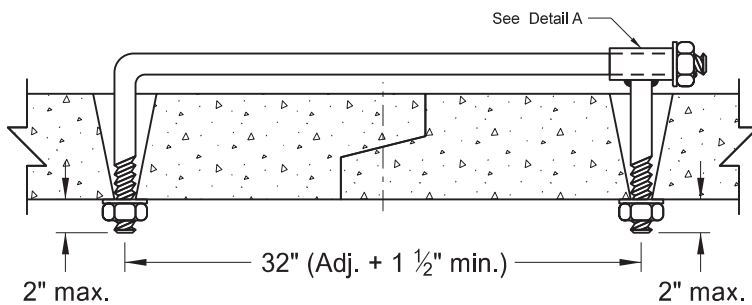
ADJUSTABLE TIE (RCB AND PIPES ONLY)



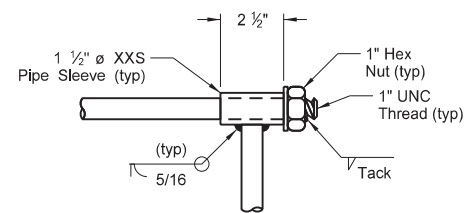
SECTION A-A



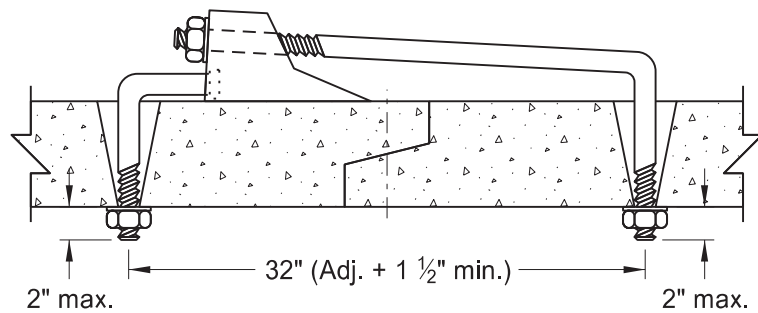
U BOLT TIE (RCB, PIPES, OR CATTLE PASSES)



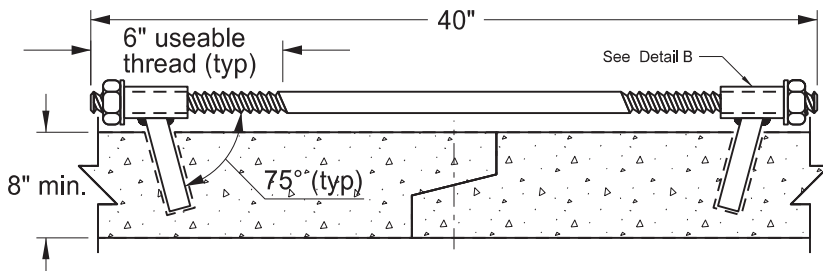
WELDED TIE (RCB AND PIPES ONLY)



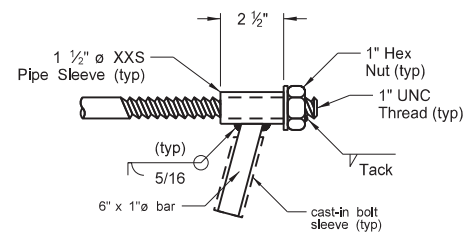
DETAIL A



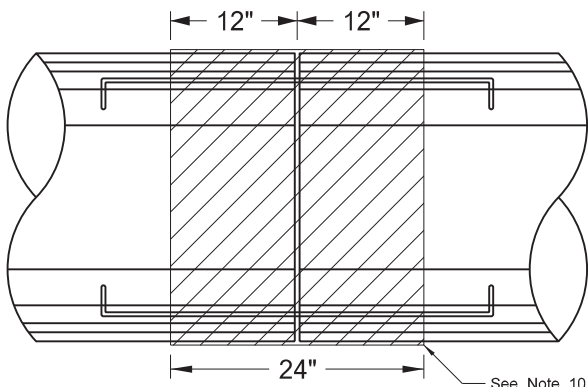
CANOPY TIE (PIPES ONLY)



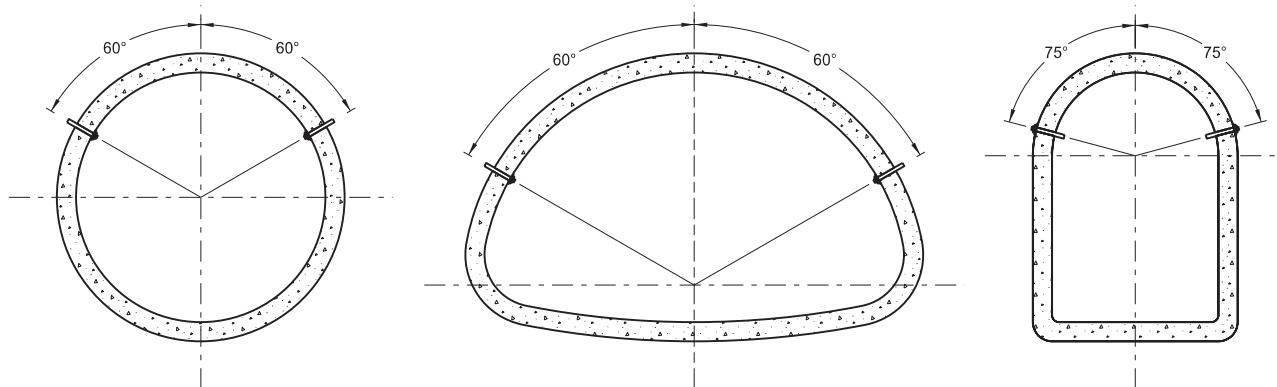
HIDDEN TIE (RCB ONLY)



DETAIL B



PLAN VIEW (PIPES ONLY)



END VIEW

REQUIRED SIZE OF TIE BOLTS		
Pipe Size	Thread ϕ	XXS Pipe Sleeve Inner ϕ
18" - 24"	$\frac{5}{8}$ " See note 3	$\frac{3}{4}$ "
30" - 66"	$\frac{3}{4}$ "	1"
72" - 120"	1"	1 $\frac{1}{4}$ "
RCB/Cattle Pass		

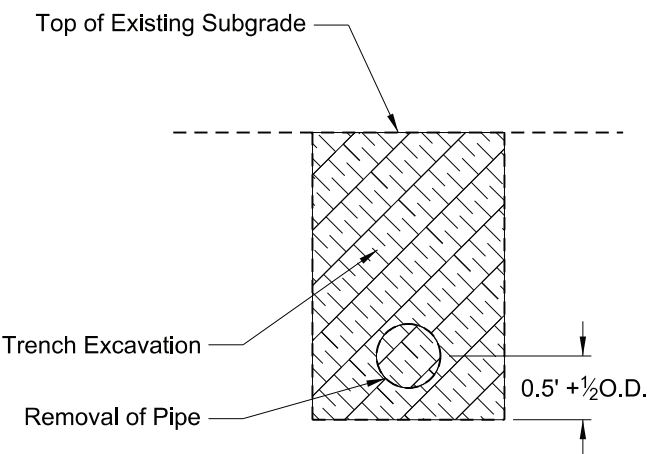
NOTES:

- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
- Insert pipe ties from the inside of the pipes and grout in place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
- Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Insert and grout tie bars into place where nuts and washers are not used.
- Do not use pipe ties to pull the pipe or RCB sections tight. The ties are only for holding sections together.
- Use only tie bolt assemblies that have been hot dip galvanized in accordance with ASTM A 153.
- Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Use holes that have a diameter $\frac{1}{4}$ " larger than the diameter of the thread. In precast RCB's, use holes that contain cast-in bolt sleeves with an inside diameter of 1 $\frac{1}{4}$ ".
- Select the type of tie bolt used from those shown.
- Include the cost of precasting or drilling the required holes and furnishing and installing the tie bolts in the price bid for the appropriate conduit or RCB pay item.
- Tie all centerline and approach RCP culvert joints. Tie the first three joints including the end section of all free ends of storm drain systems. 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.
- Place joint wrap prior to installing ties. Firmly secure the wrap around the full perimeter. For concrete pipes, overlap the joint by 12" in both directions. For box culverts, use a waterproof membrane that meets ASTM C877 (Type III). Provide a membrane that is a minimum of 12" wide and center it at the joint. Provide a minimum overlap of 2.5" at the seams.
- Use tie bolts that conform to ASTM A 36. Use heavy hex nuts that conform to ASTM A 563. Use washers that conform to ASTM F 436, Type 1. Use welded pipe sleeves and cast-in bolt sleeves that conform to ASTM A 53, Grade B.
- Tie RCB's at locations shown on the plans.

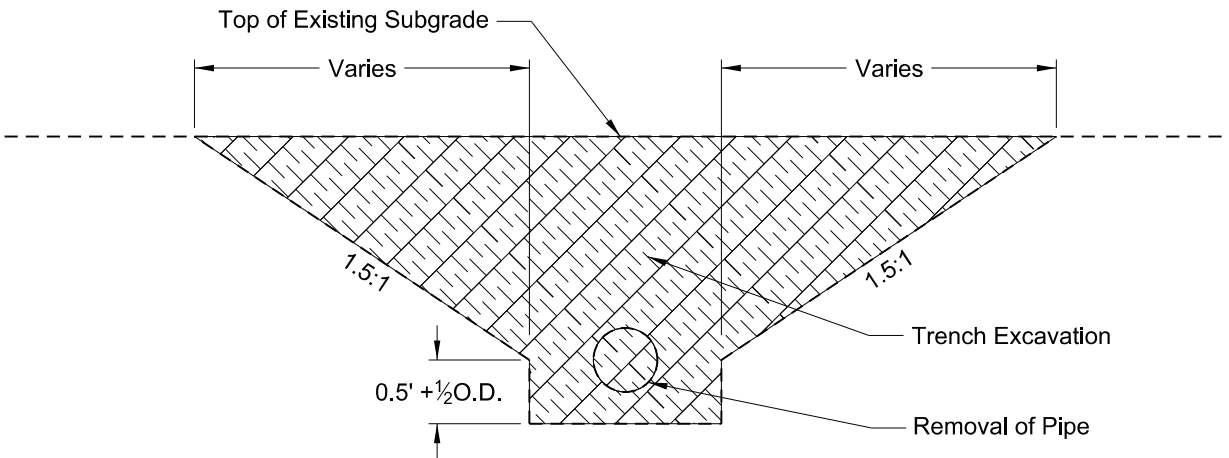
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8
6-8-17	Notes 2-11, Table, Title, Labels
8-11-21	Notes 2-12, Table, Label



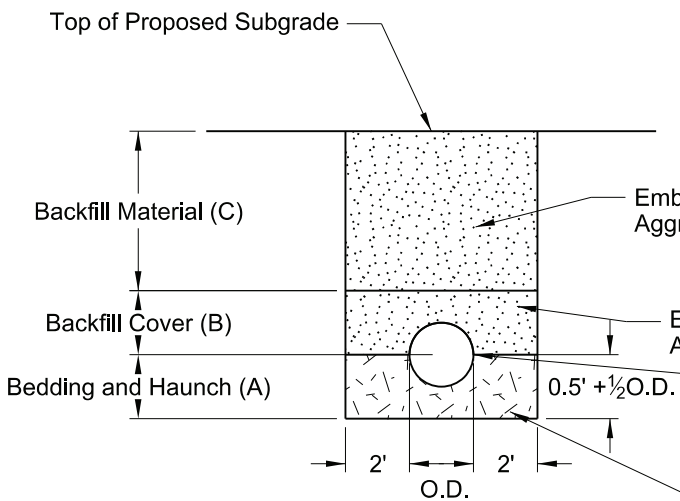
PIPE INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE OR PIPE NOT UNDER THE ROADWAY



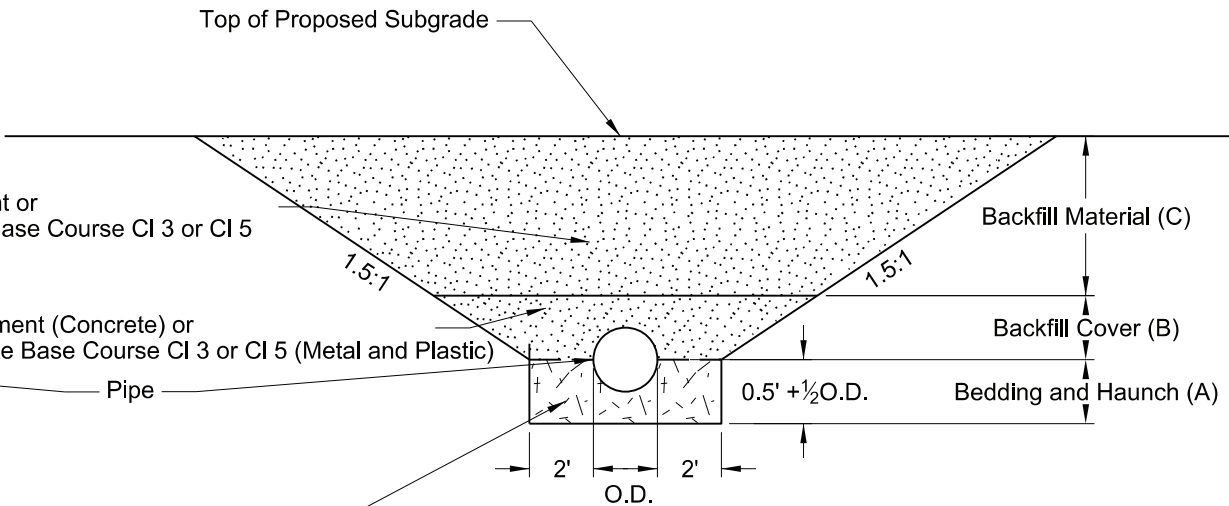
EXCAVATION DETAIL A



EXCAVATION DETAIL B



BACKFILL DETAIL A



BACKFILL DETAIL B

Pay Items

- 1) Pipe*
- 2) Removal of Pipe (if required)

*Included in Pipe Pay Item

- 1) Pipe
- 2) Trench excavation
- 3) Aggregate base course CI 3 or CI 5
- 4) Embankment

NOTES:

- 1) This drawing does not apply to pipes in approaches.
- 2) It is the contractor's option to select Detail A or B.
- 3) Embankment may be either Borrow Excavation or Common Excavation - Type A

Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 0.5 Feet
Pipes Under the Roadway = 0.5 O.D. + 0.5 Feet
Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal and Plastic = 0.5 O.D. + 1 Foot
Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course CI3 or CI 5
Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A
Pipe Not Under Roadway = Common Excavation - Type B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting
1-21-15	Nomenclature
12-10-15	Added Plastic Pipe
5-27-20	Changed bedding depth and updated table



SIDEWALK

D-750-2

NOTES:

1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.

Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.

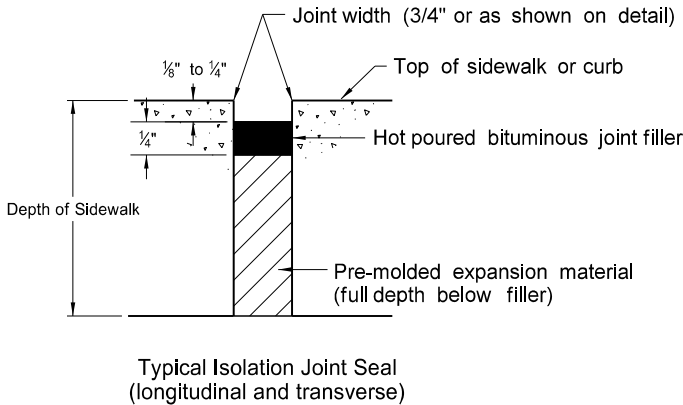
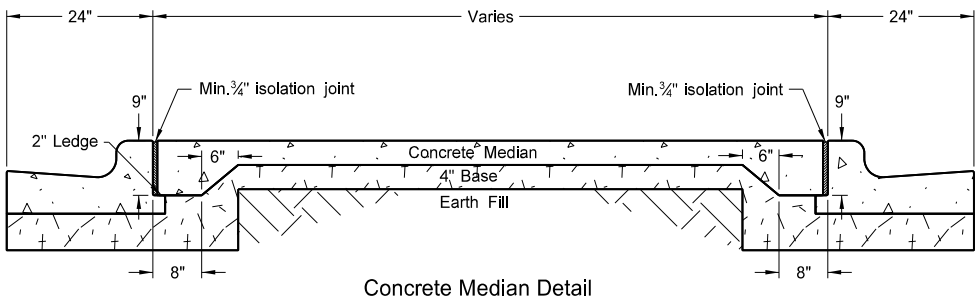
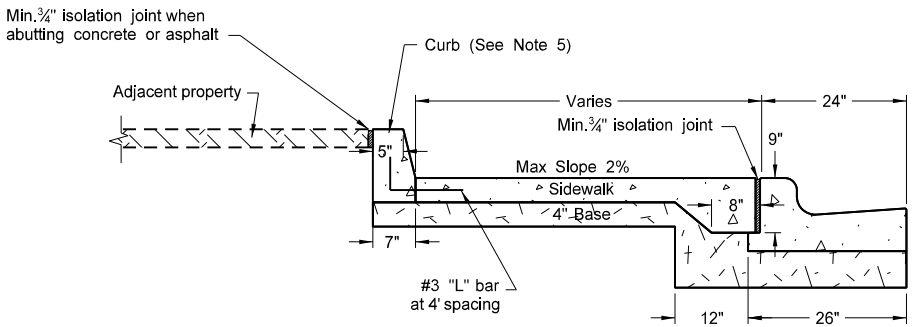
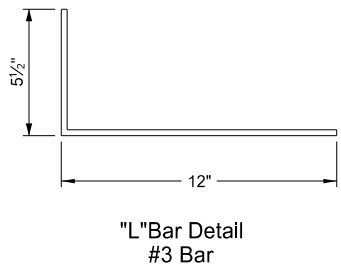
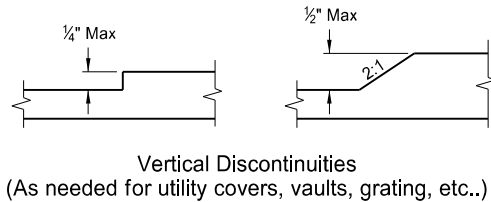
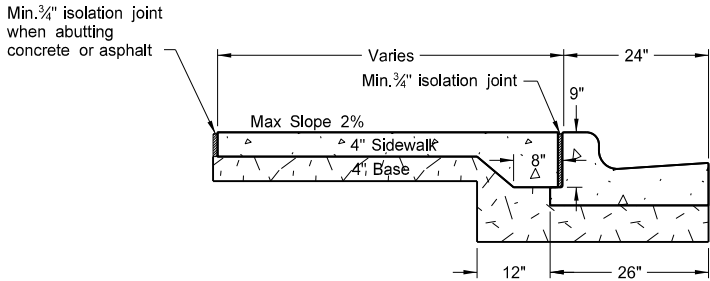
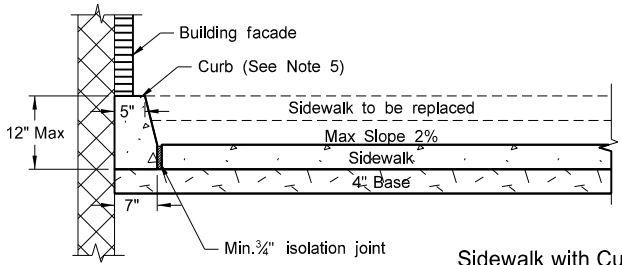
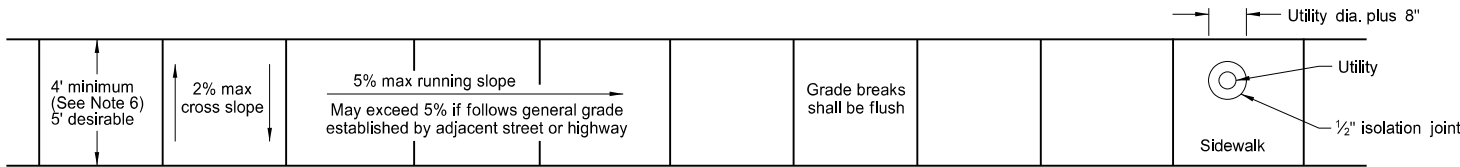
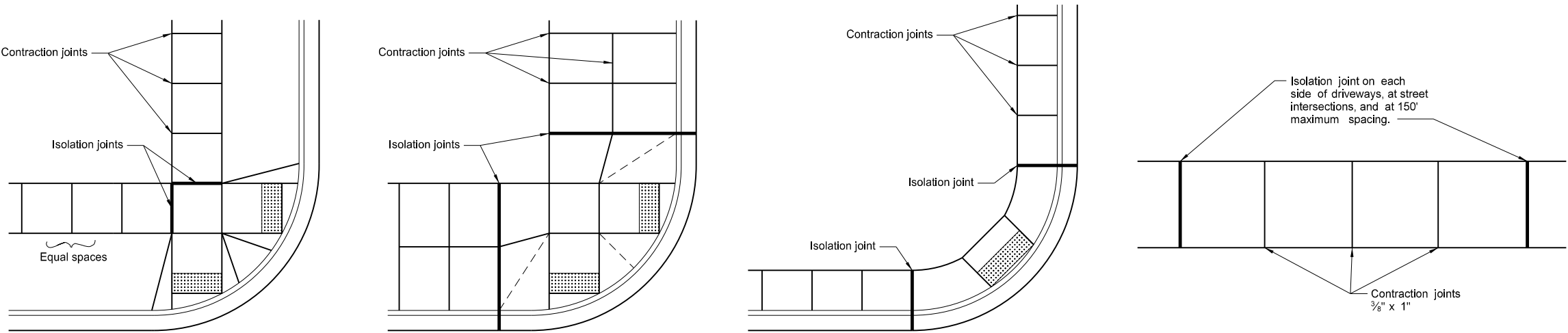
Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.

Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."

Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.

When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.

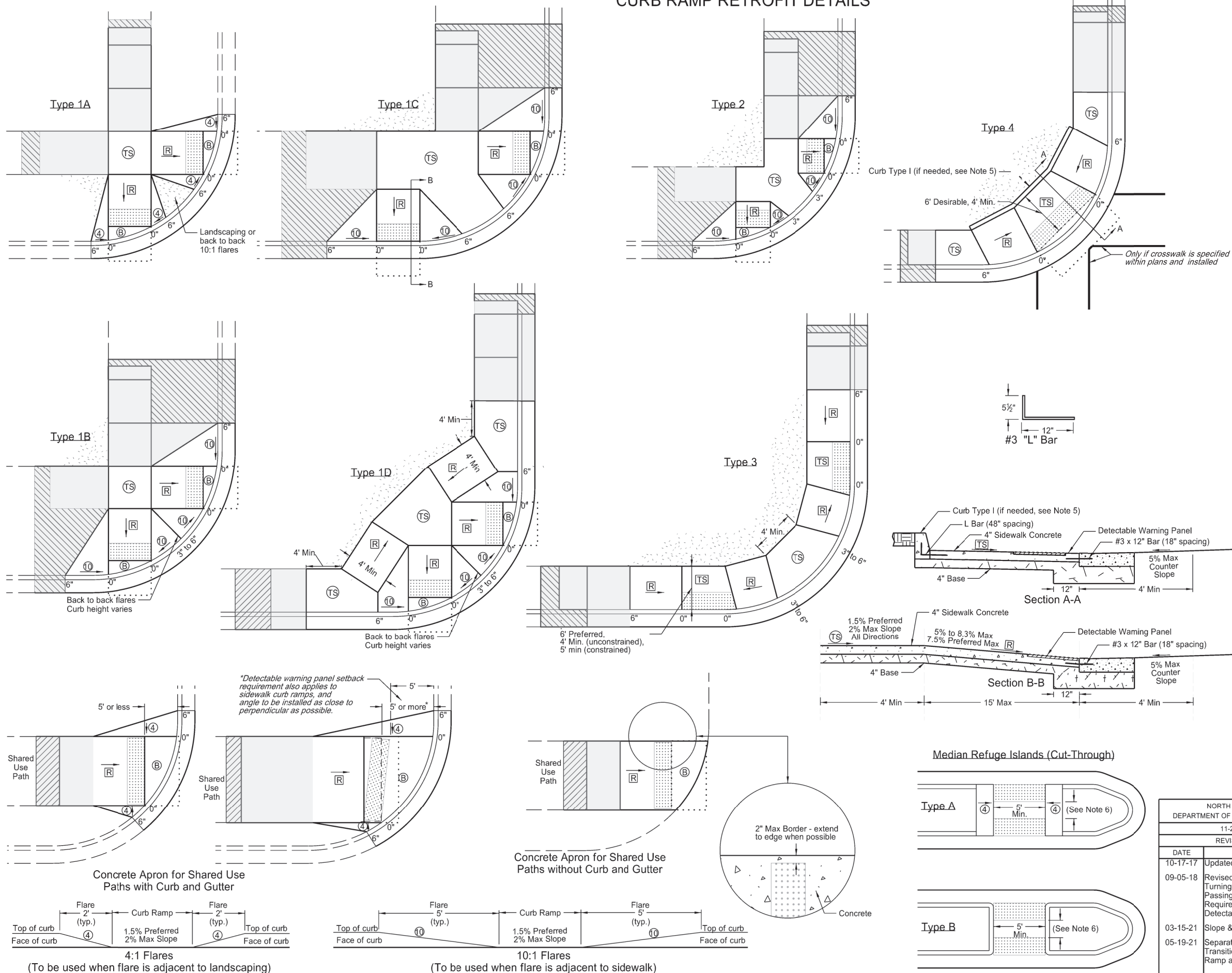


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width and grade and passing lane requirements.
08-27-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 08/27/19 and the original document is stored at the
North Dakota Department
of Transportation

CURB RAMP RETROFIT DETAILS

D-750-3



- NOTES:
1. Ramp width is the useable portion of the ramp, excluding flares. Match curb ramp width to Existing Pedestrian Facility (EPF) width (4' minimum or 5' for island ramps.) Match ramp width to existing shared use path width. Maximum ramp length is 15'.
 2. Provide turning space with desirable 5' x 5' size or larger and minimum 4' x 4' unconstrained size, for any change of direction. Provide landing 5' long x width of path at the bottom and top of parallel ramps and at the top of perpendicular ramps. Turning spaces and Landings may overlap.
 3. Match detectable warning panel width to ramp width. Radial panels are allowed. Place detectable warning panel within the lower turning space.
 4. Provide a continuous 4' minimum width EPF with 1.5% preferred cross slope and max 2% constructed cross slope.
 5. Modify existing ground slope with landscaping, as needed. If not possible, use a vertical curb as detailed on Standard D-750-2. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
 6. Islands: If the profile of the island curb ramp is 2% or less, provide a minimum distance of 2' between warning panels. If the profile of the island curb ramp is steeper than 2%, provide a turning space between the ramps.
 7. Provide generally planar vertical alignments. Provide grade breaks, perpendicular to the direction of the pedestrian travel, at the top and bottom of curb ramps (1.5% preferred, 2% max constructed cross slope).
 8. See Curb Ramp Retrofit Transition Details Standard D-750-4 for additional information. Also See PROWAG for full compliance in the curb ramp area.
 9. Grade transitions shall be flush.

LEGEND:

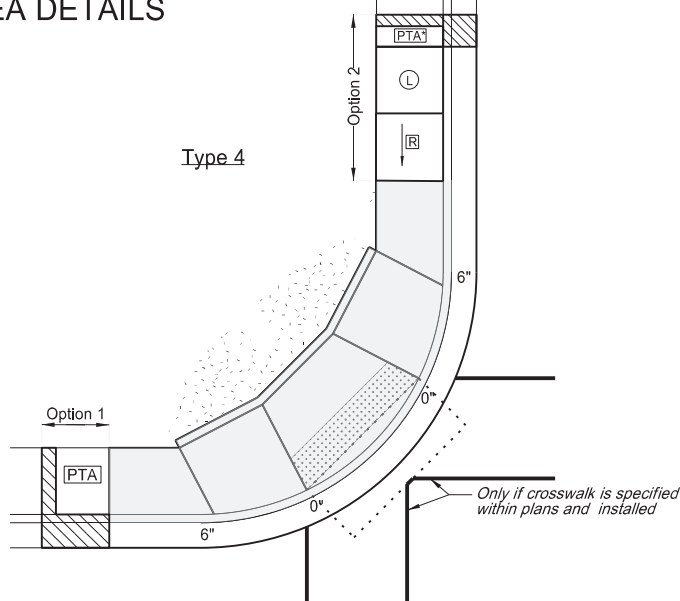
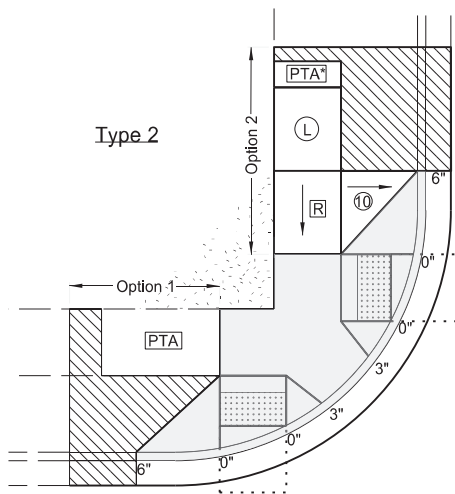
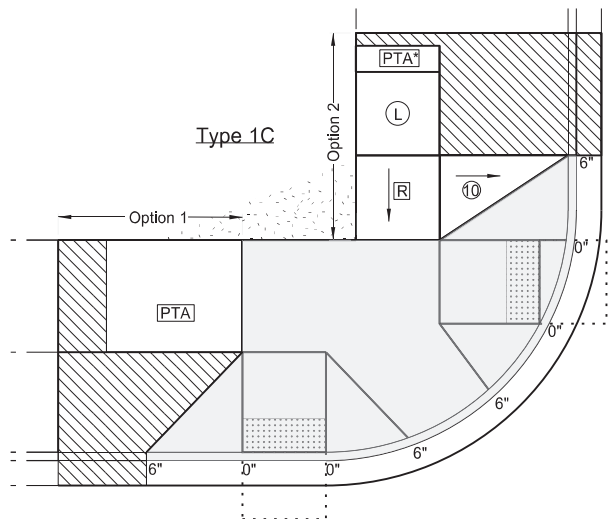
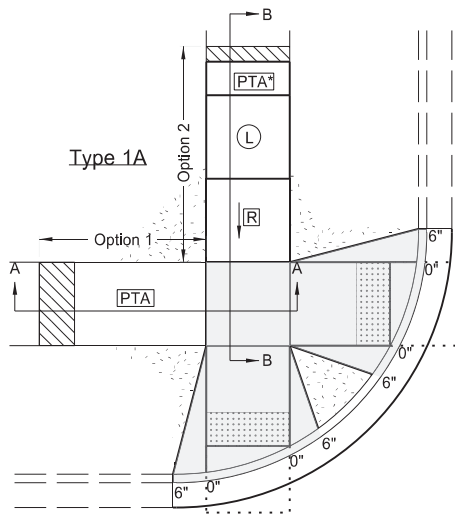
- [Pattern] : Detectable Warning Panel.
- [Pattern] : Landscaping.
- [Pattern] : Transitional tie-in to nearest joint, if needed.
- [Pattern] : Curb Ramp Retrofit Transitional Area (See Standard Drawing D750-4)
- [Pattern] : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running and counter slope 5% maximum running and counter slope
- (TS) : Turning Space Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
- (R) : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2%.
- (B) : 1.5% preferred cross slope 2% maximum constructed cross slope running slope consistent with the EPF 4.7% preferred max counter slope 5.0% max constructed counter slope
- (10) : 10:1 maximum constructed slope.
- (4) : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Revised Notes, Revision for Turning Space, Added Passing Space Requirements, Turned Detectable Warning Panel
03-15-21	Slope & other clarifications.
05-19-21	Separate Curb Ramp Transition Area from Curb Ramp area

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
05 19 2021

CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

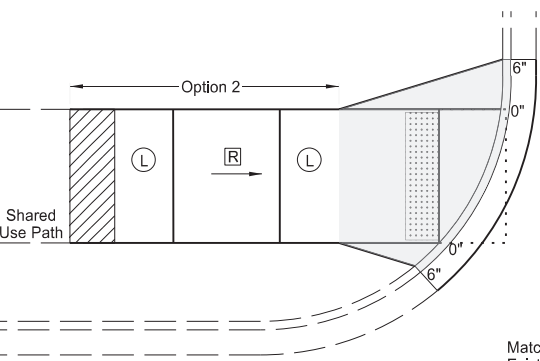
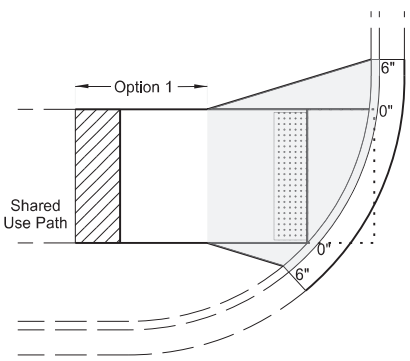
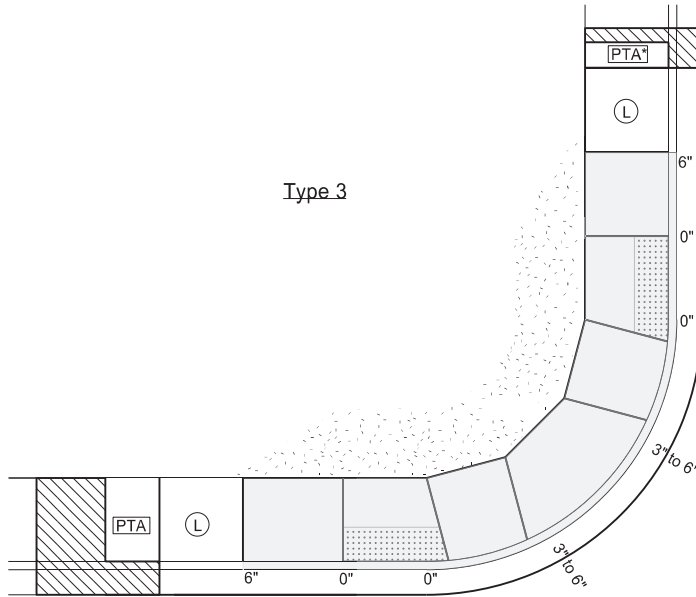
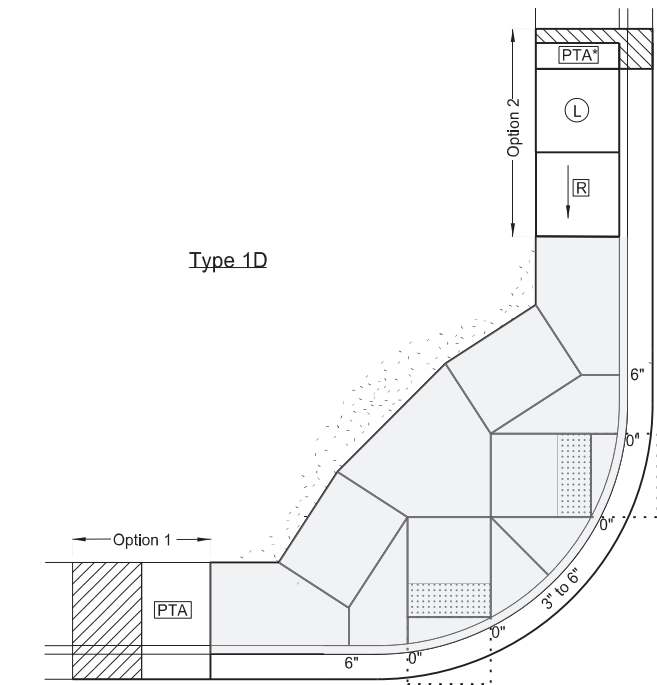
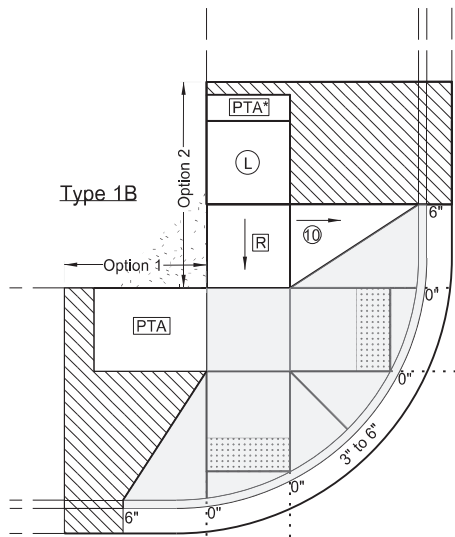
D-750-4



NOTES:

1. Curb Ramp Transitional Areas are to transition from the Curb Ramp area into the Existing Pedestrian Facility (EPF). Each layout shows example transitions. Use any combination for transitions from the Ramp Area into the EPF that allows for similar or gentler slopes to that of the existing condition, yet transitions in the shortest distance possible. In some cases, if grades allow, the Ramp area can immediately transition into the EPF and no transitional area is needed.
2. Option 1: Use this transition when existing running slope grades are less than 5%. Transition from the ramp area to the EPF using the Pedestrian Access Transition Area (PTA) transition rates and in less than 20 feet.
3. Option 2: Use this transition when existing running slopes are greater than 5% and option 1 is not able to be met.

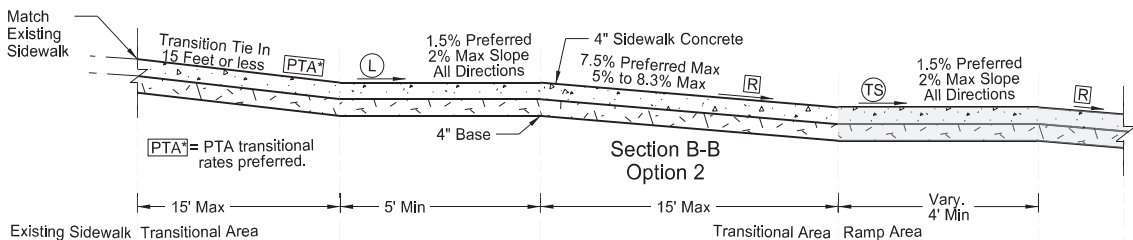
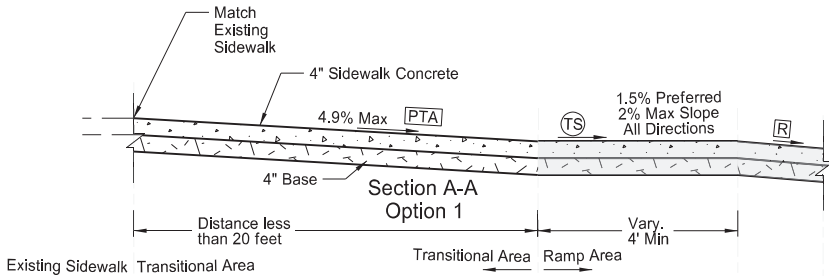
Add a ramp and a landing immediately after the ramp area. Then transition from the compliant landing into the EPF using the PTA rates (preferred), or in less than 15 feet (which ever is shorter).
4. Transitional Areas for Shared Use Paths can be concrete or asphalt.
5. See Curb Ramp Retrofit Details Standard D-750-3 for additional information.



Transition Areas for Shared Use Paths

LEGEND:

- : Detectable Warning Panel.
- : Landscaping.
- : Transitional tie-in to nearest joint, if needed.
- : Curb Ramp Retrofit Area (See Standard Drawing D750-3)
- : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel.
1.5% preferred cross slope
2% maximum cross slope
4.7% preferred running slope
5% maximum running slope
- : Pedestrian Access Transition Area
Running Slope less than 4.9%.
Transition Cross Section at 1/2 percent per foot from the from Ramp Area to EPF.
- : Turning Space/Landing
Use at top of ramp or when changing directions.
1.5% preferred slope (2% maximum) all directions.
- : Preferred Ramp Grade = 5% to 7.5%.
Maximum Constructed Grade = 8.3%.
Preferred Cross Slope = 1.5%.
Maximum Constructed Cross Slope = 2%.
Maximum Length = 15 feet
- : 10:1 maximum constructed slope.
- : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.



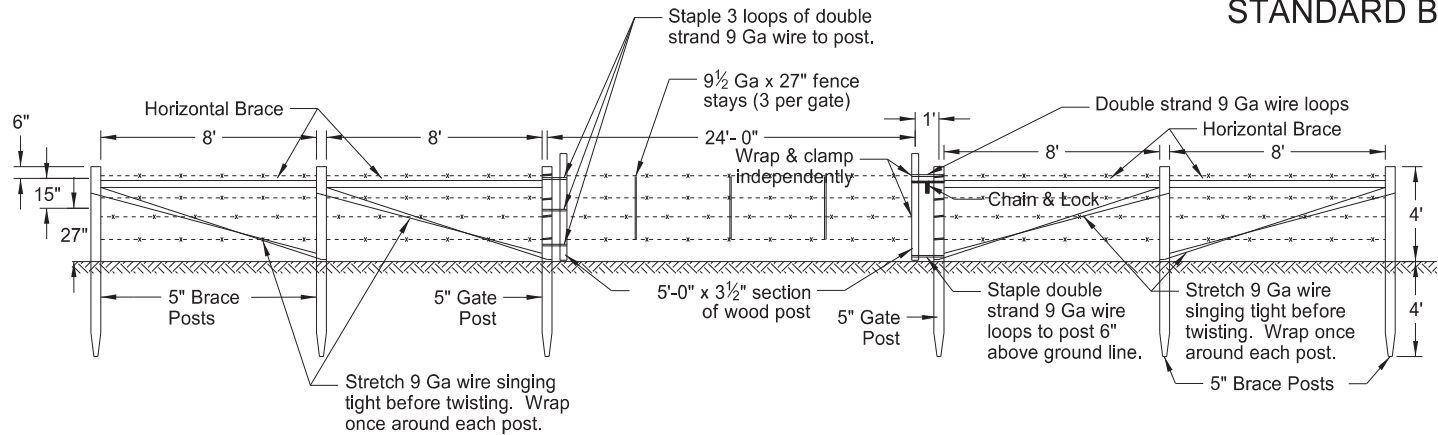
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-19-21	
REVISIONS	
DATE	CHANGE



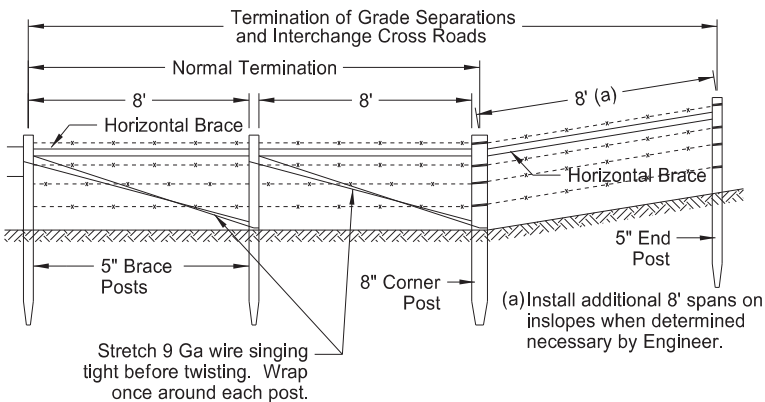
STANDARD BARBED WIRE FENCE

NOTES

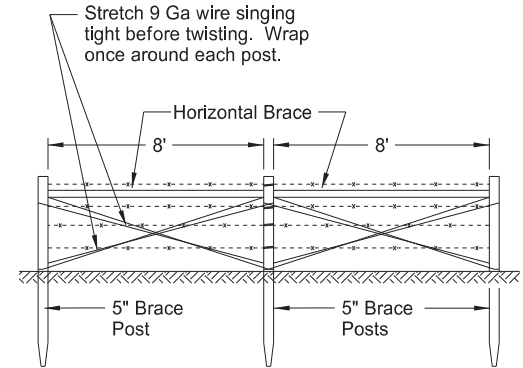
1. No deduction in measured pay length of fence made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Include all costs for abutment fencing in the price bid for fencing bid items.
2. Install double brace assemblies at locations shown on the plans or established by the Engineer. Place adjacent fence terminals, corner assemblies, or double brace assemblies at a maximum spacing of 1,320 feet.
3. Include all costs of furnishing and installing inserts and eyebolts in the unit price bid for fencing bid items. Use eyebolts galvanized according to AASHTO designation M-30; inserts of corrosion resistant material do not require galvanization. Use concrete inserts capable of developing the full strength of the 5/8" diameter threaded eyebolt, when installed in concrete.
4. Determine post type used, either wood or steel, unless otherwise specified in the plans.
5. Include the cost of bracing at vehicle gates in the price bid for "Vehicle Gate."



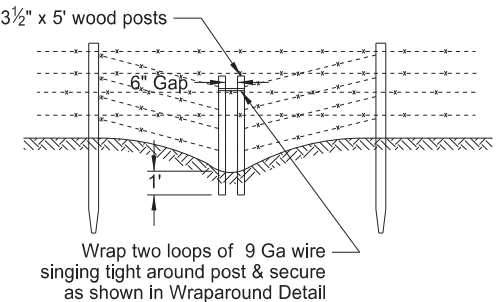
VEHICLE GATE



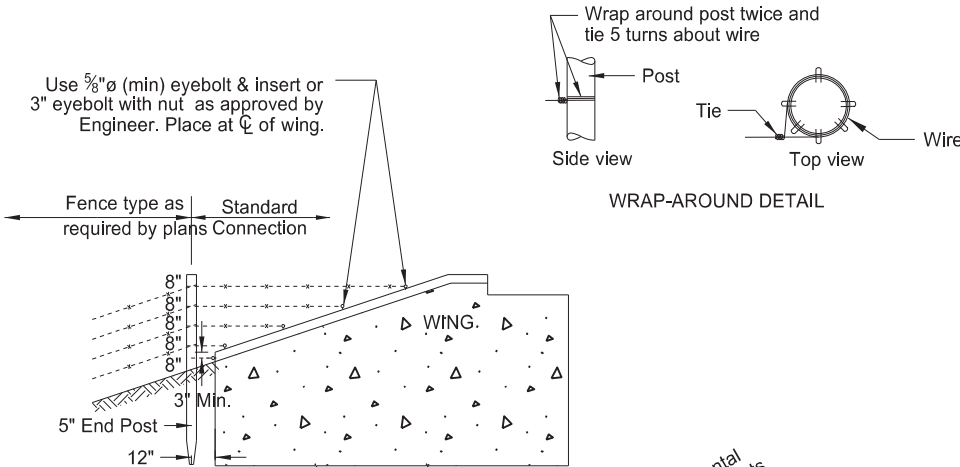
FENCE TERMINAL



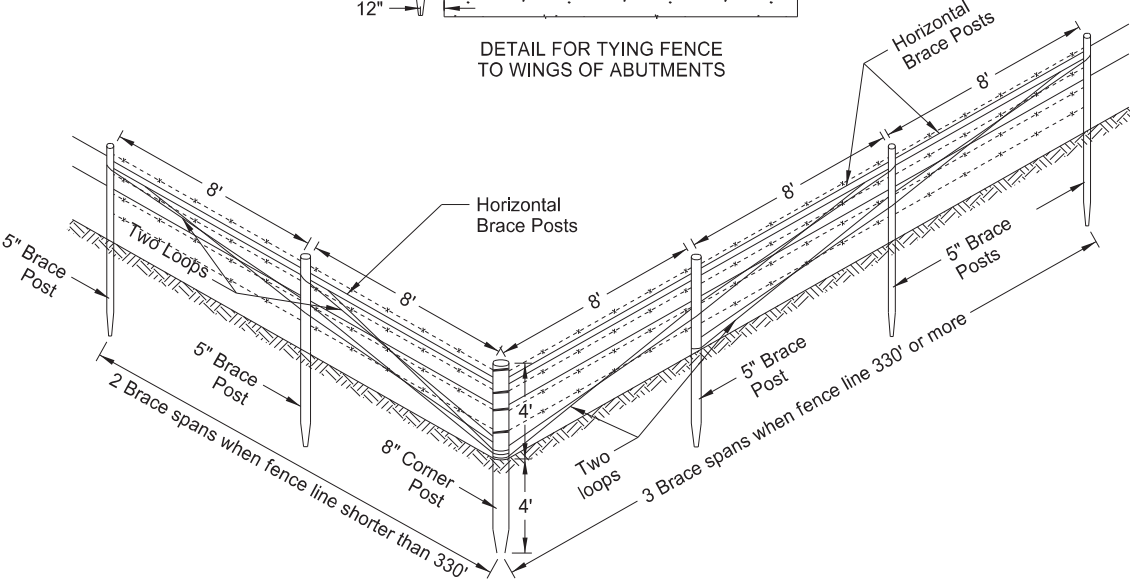
DOUBLE BRACE ASSEMBLY



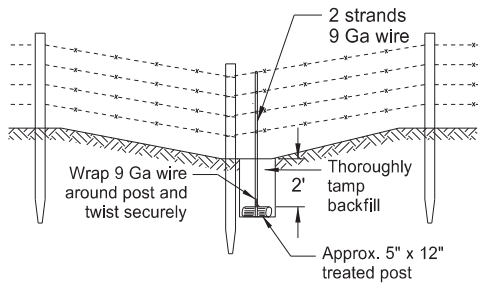
BREAK-AWAY FENCE FOR NARROW DEPRESSIONS SUBJECT TO FLOODING



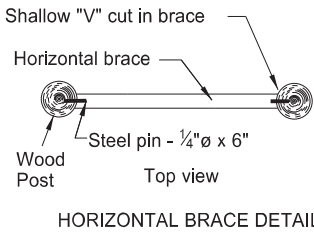
WRAP-AROUND DETAIL



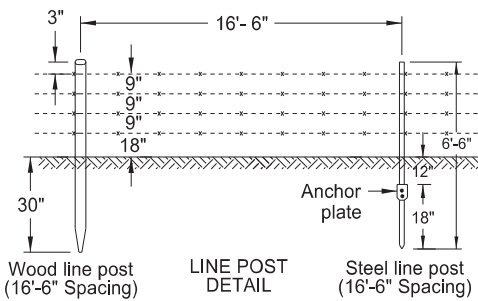
CORNER ASSEMBLY



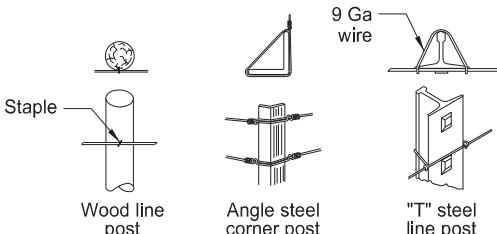
DETAIL FOR ANCHORING FENCES IN DEPRESSIONS*
*Determine locations in the field and include in price bid for fencing. Use other methods of anchoring fence if approved by the Engineer.



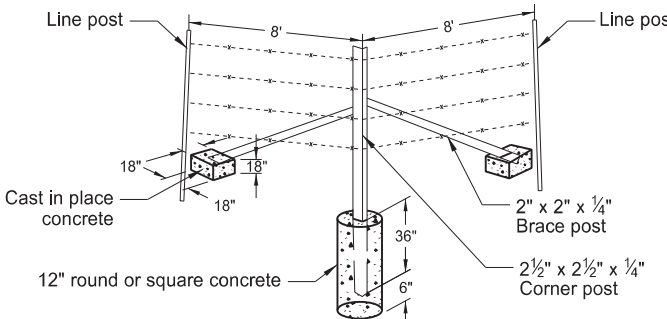
HORIZONTAL BRACE DETAIL



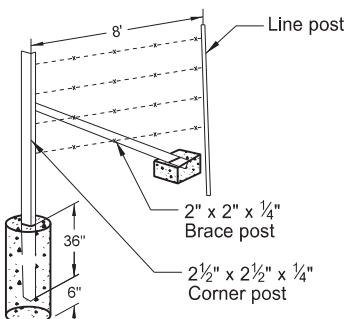
LINE POST DETAIL



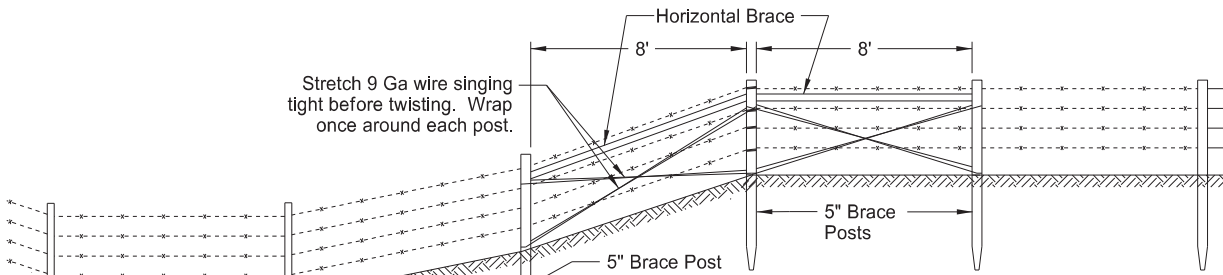
FASTENING TO POSTS



CORNER AND DOUBLE BRACE ASSEMBLY STEEL POSTS



FENCE TERMINAL STEEL POSTS



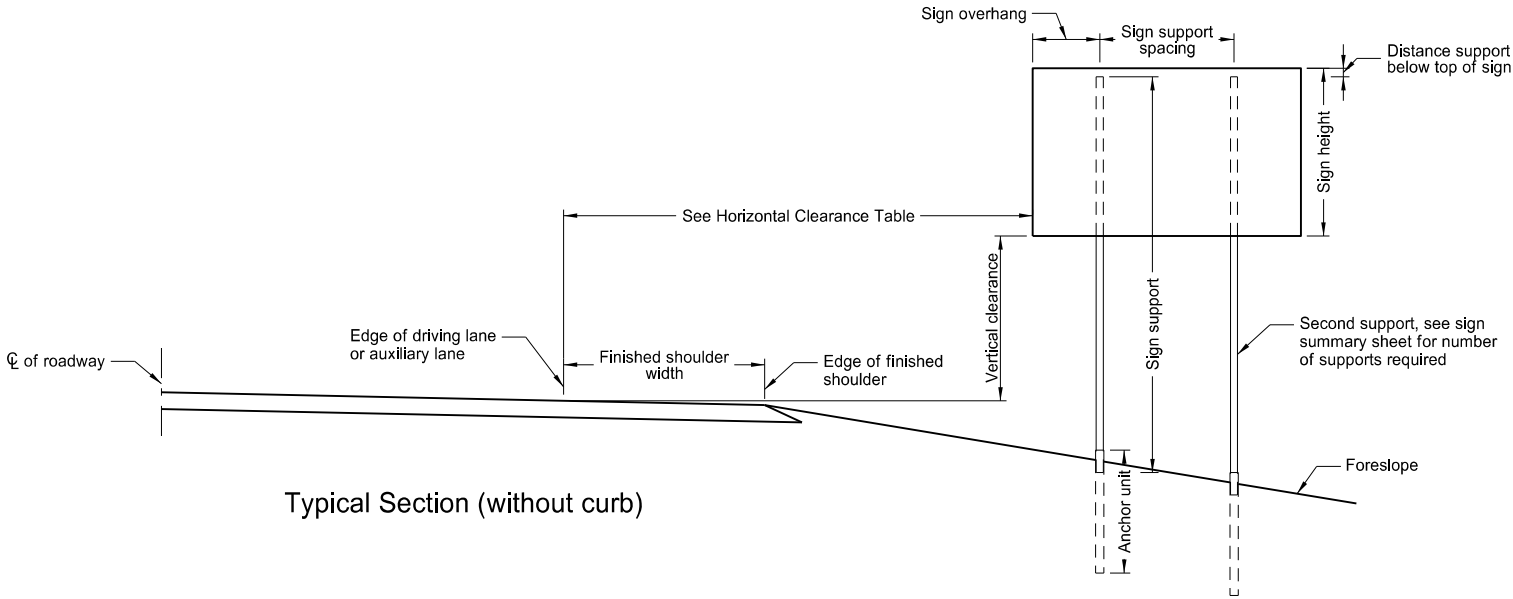
FENCING FOR WIDE DEPRESSIONS
Use double brace installation, as shown, on opposite side of depression.
Decrease line post spacing as needed due to terrain.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-2-10	
REVISIONS	
DATE	CHANGE
10-02-12	Notes, steel assemblies/posts.
11-25-13	Revised Vehicle Gate.
10-17-17	Updated to active voice.
02-23-23	Revised post spacing/brace size.



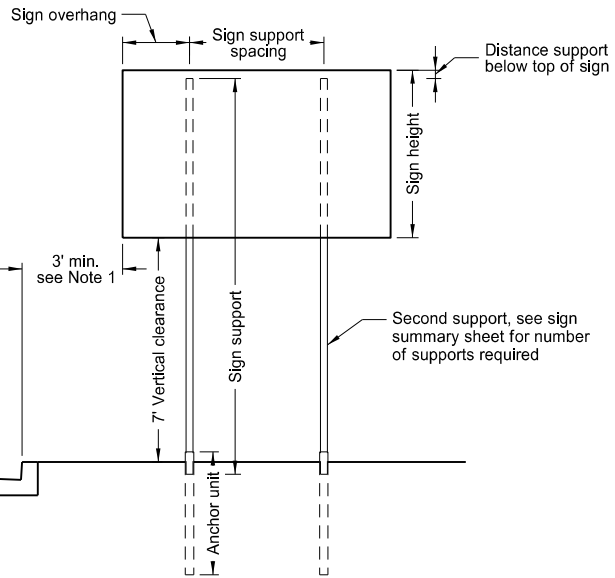
Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.
- Install signs on expressways a minimum height of 7'.
- Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.
- Maximum vertical clearance is 6" greater than the minimum vertical clearance.
3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.

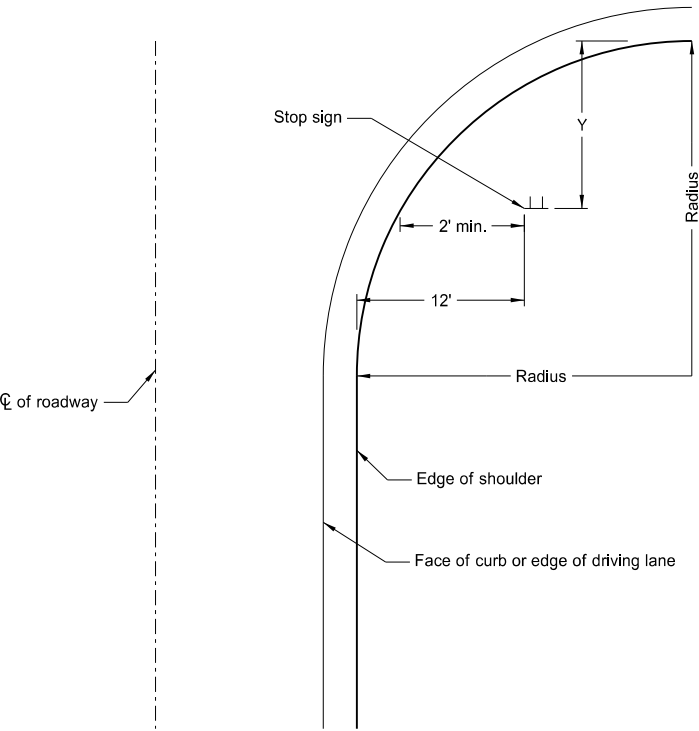


Typical Section (without curb)

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

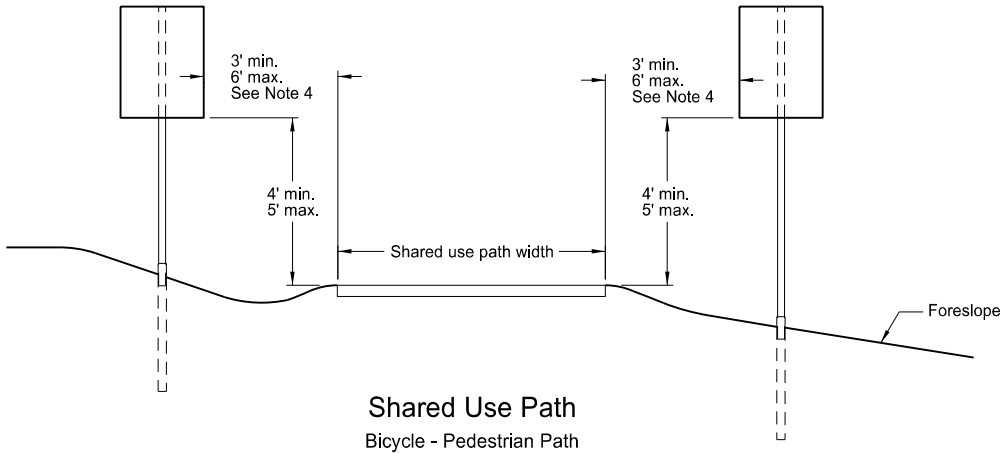


Typical Section (with curb)
Residential or Business District



Stop Sign Location
Wide Throat Intersection
Use layout 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



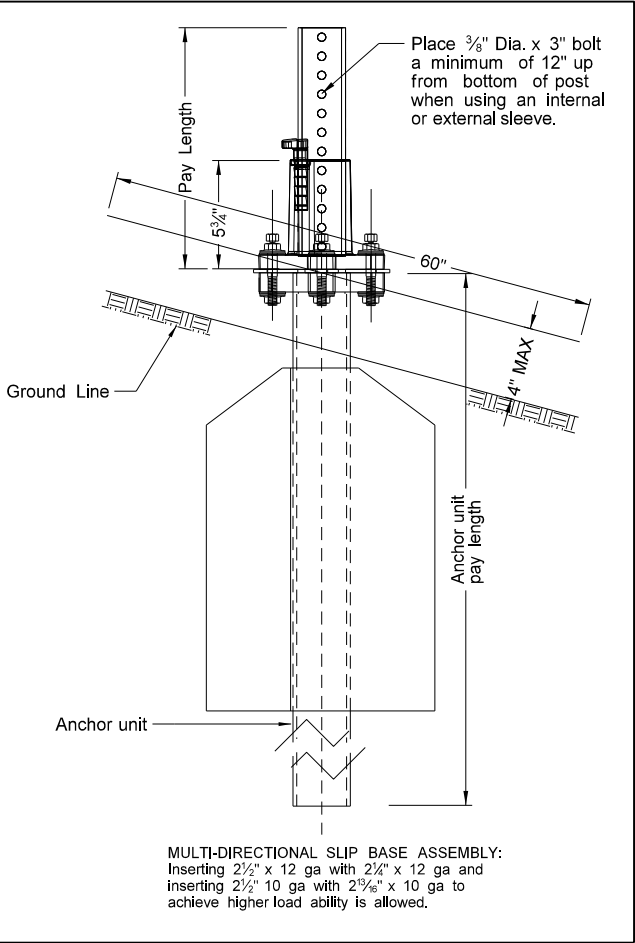
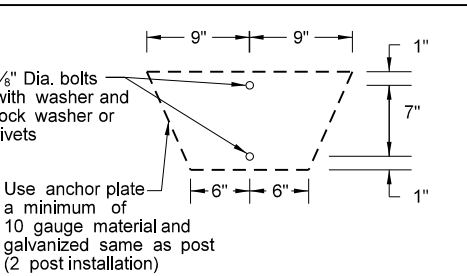
Shared Use Path
Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on **8/29/19** and the original document is stored at the North Dakota Department of Transportation

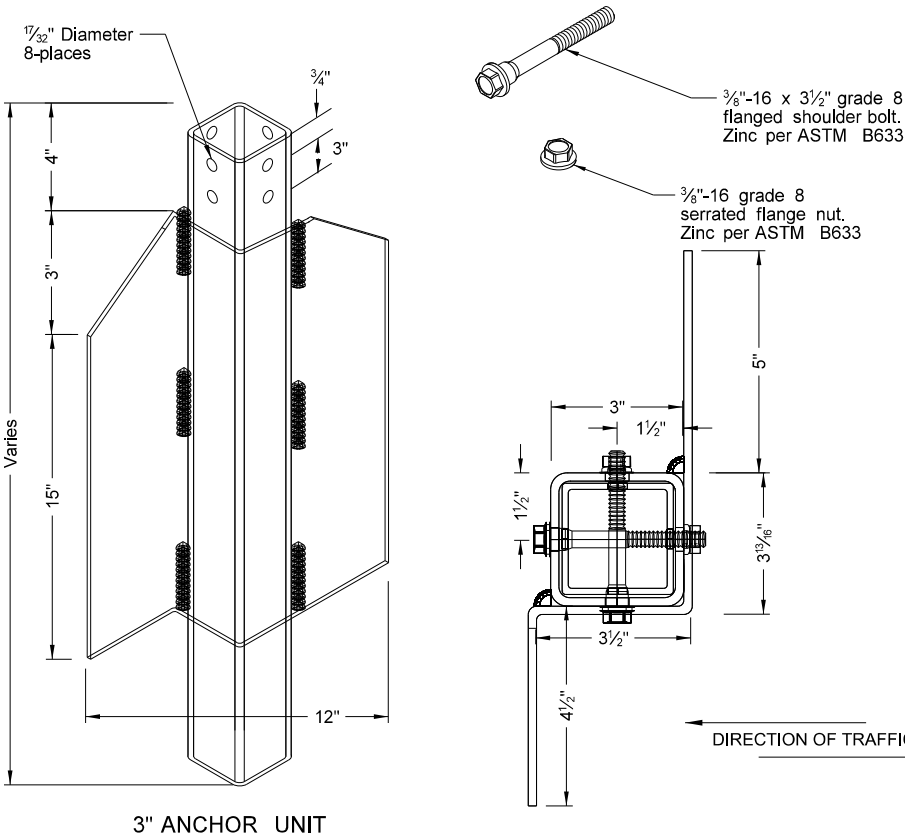
Telescoping Perforated Tube							
Number of Posts	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2 1/2	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2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

(B) - Provide a shim as specified by the manufacturer when placing 2 1/2", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

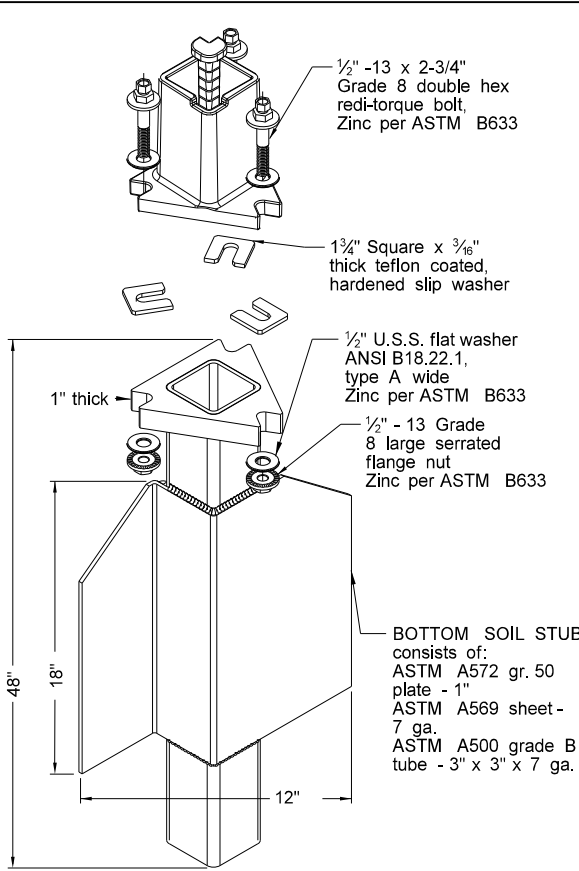


SHOULDER BOLT

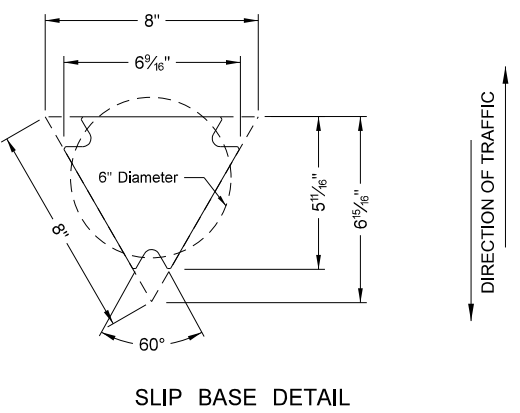
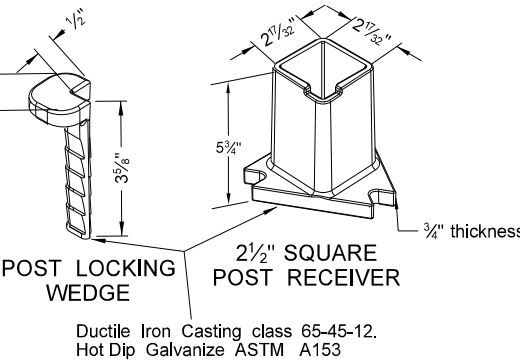
Shimming agent to reduce tolerance between 3" anchor unit and 2 1/2" post.
(use standard 3/8" diameter grade 8 bolt with proper shim)



Mounting Details Perforated Tube



SLIP BASE FOR 2 1/2" POST

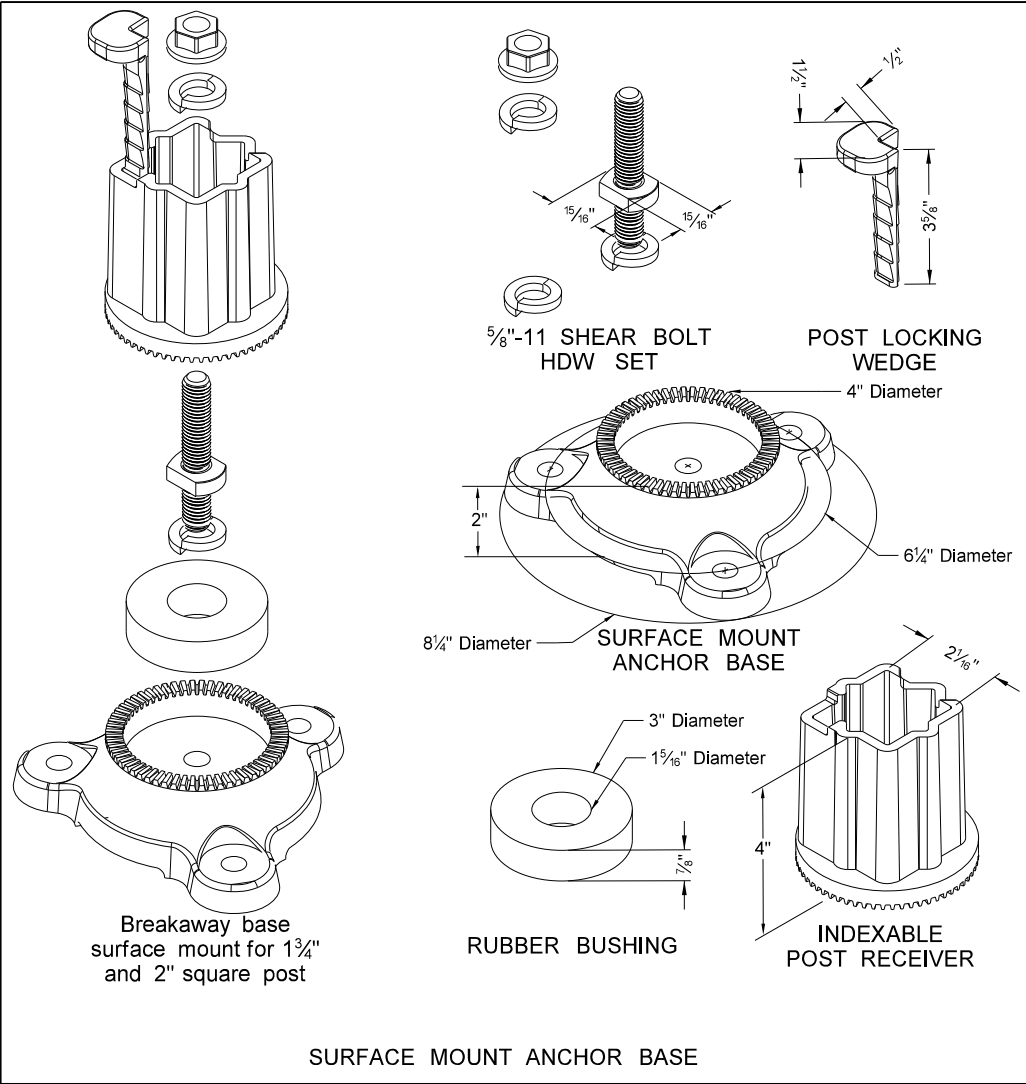


Properties of Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. Area In. ²	Section Modulus In. ³	
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172	
2 x 2	0.105	12	2.416	0.372	0.590	0.372	
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499	
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590	
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643	
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783	

The 2 3/8" size 10 gauge is shown as 2.19" size on the plans;
The 2 1/2" size is shown as 2.51" size on the plans.

NOTE:

- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
- Provide 7 gauge HRPO commercial quality ASTM A569 and 3" x 3" x 7" gauge ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
- Eliminate wings when anchor is used in concrete sidewalk.
- Provide a minimum 8" distance between the first and fourth post on four post signs.
- Install in accordance with manufacturers recommendation.
- Use a minimum 1/2" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683
on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

Breakaway Coupler System
for Perforated Tubes

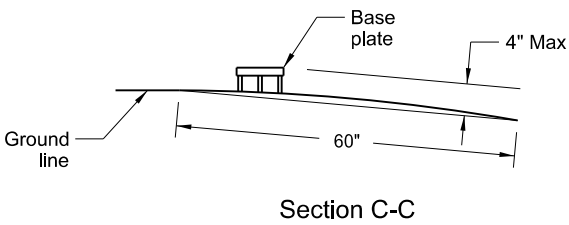
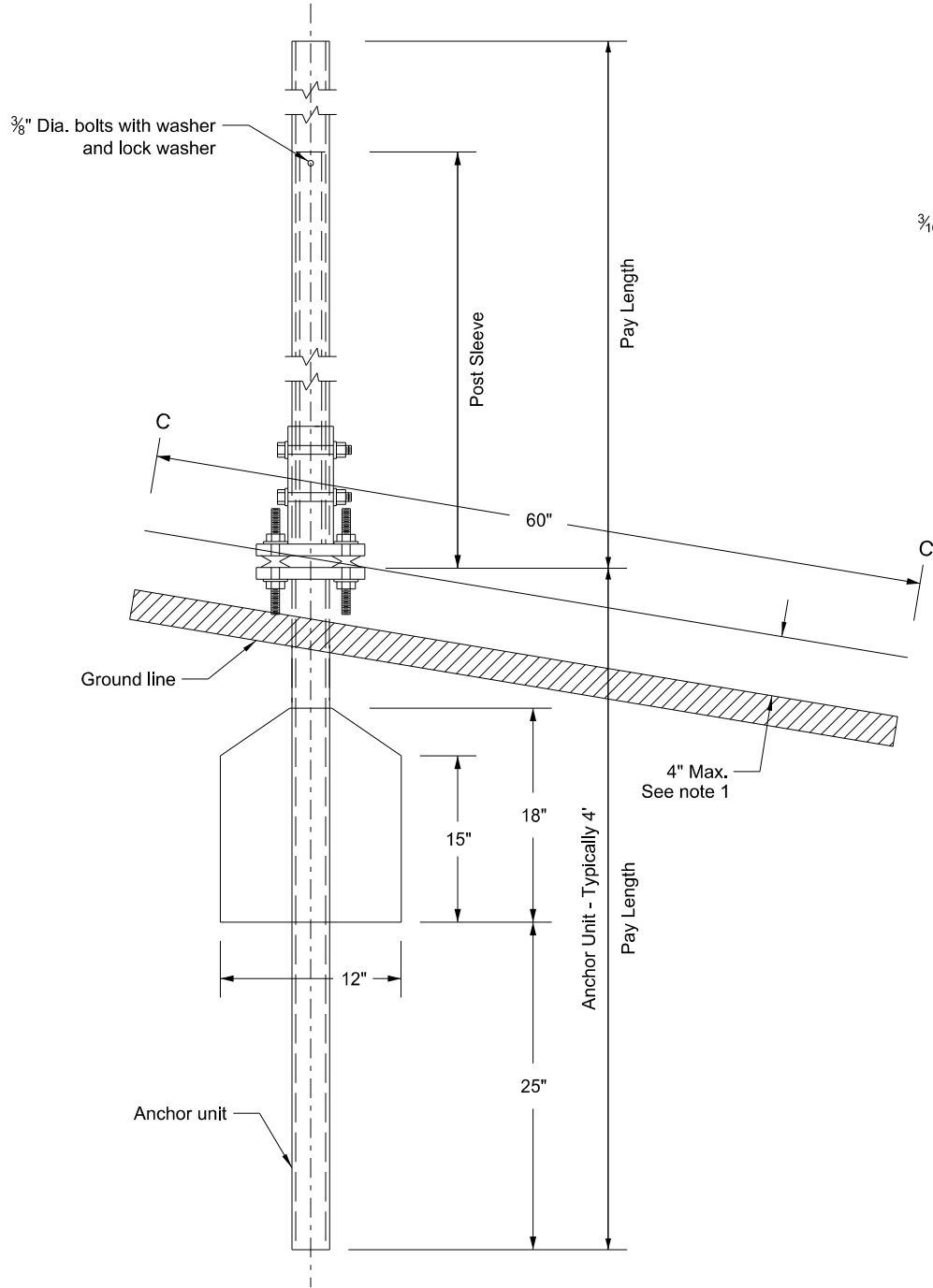
Notes:

- 1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
- 2. Use anchor unit of the same size and specification as the post.
- 3. Provide a minimum 8' distance between the first and fourth post on four post signs.
- 4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

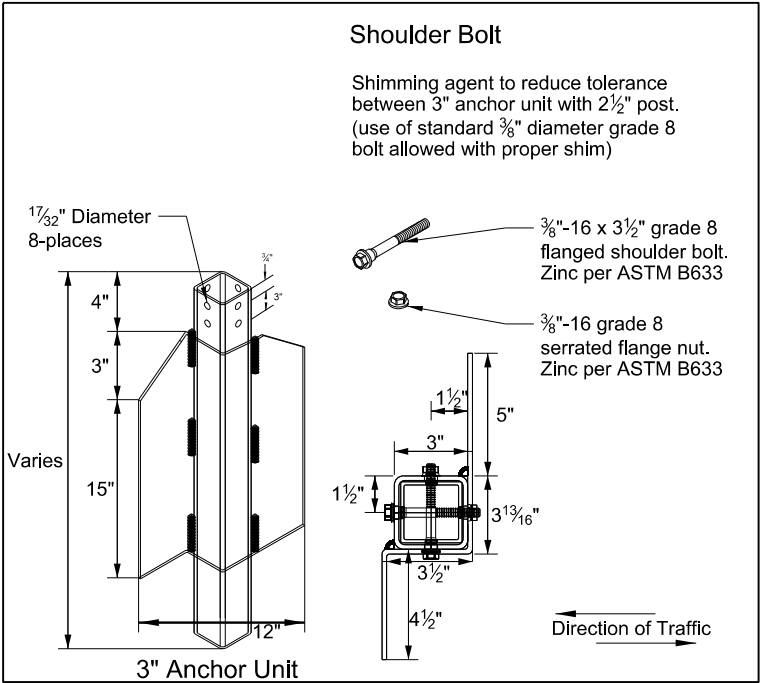
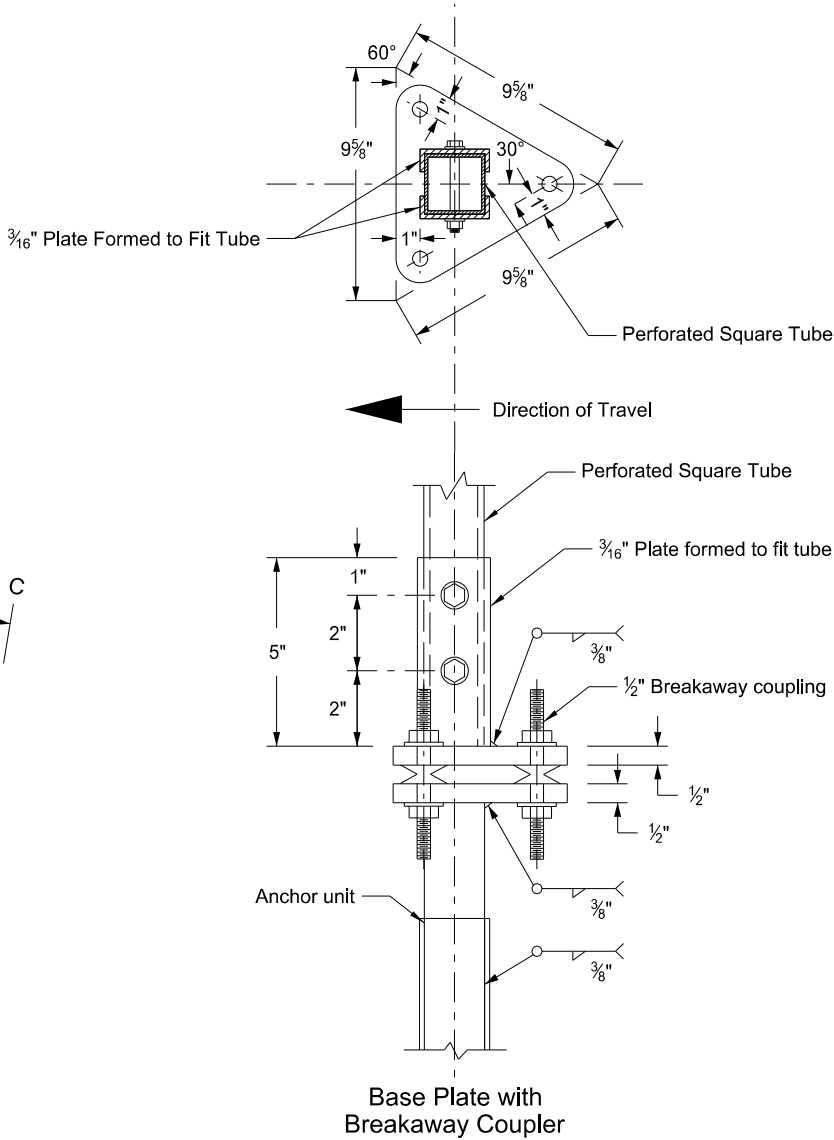
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Guage
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	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	2¾	10	Yes		7

(B) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

(C) - 3" anchor unit

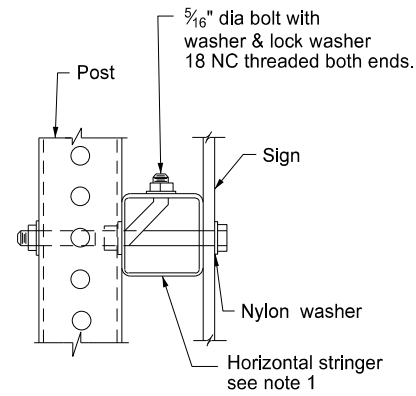


Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.

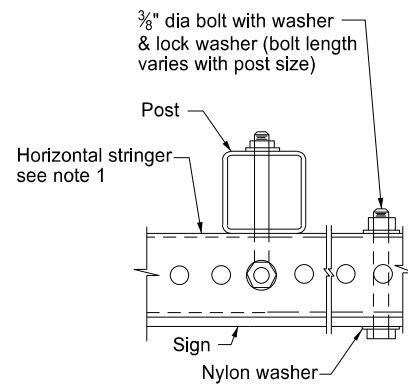


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation
10-3-2013		
REVISIONS		
DATE	CHANGE	
8-30-18 8-30-19	Updated notes to active voice. New Design Engr PE Stamp.	

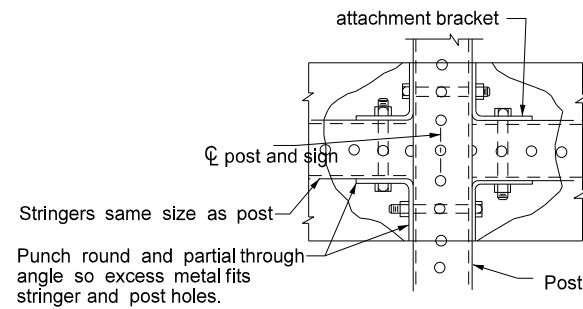
Mounting Details Perforated Tube



Side View



Top View

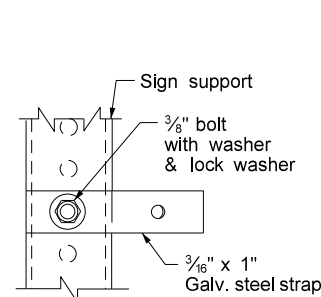


STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

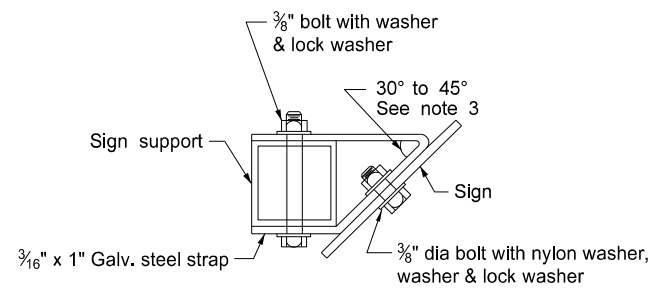
Note:

1. Horizontal stringers - Use perforated tubes or $1\frac{3}{4}" \times \frac{3}{16}"$ thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter $\frac{15}{16}" \pm \frac{1}{16}"$ and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

STRINGER MOUNTING (WITH STRINGER IN FRONT OF POST)

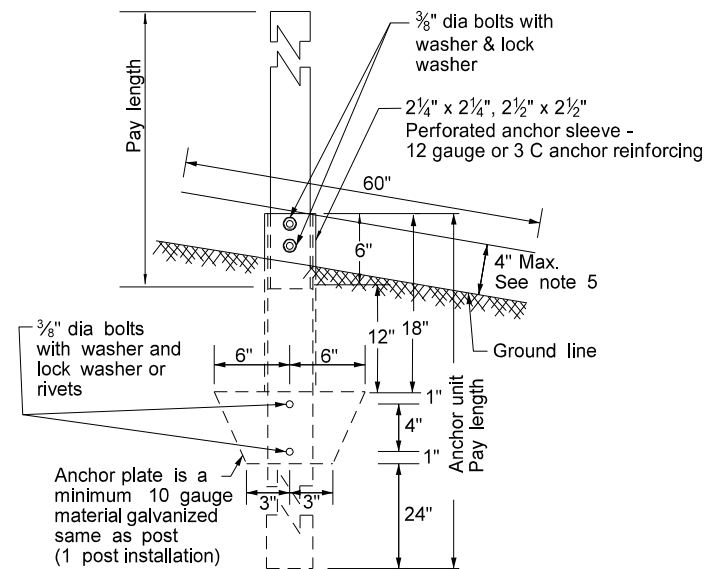


Side View

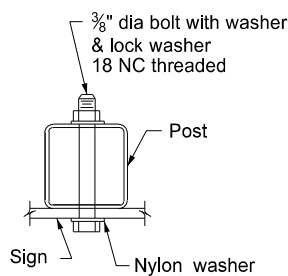


Top View

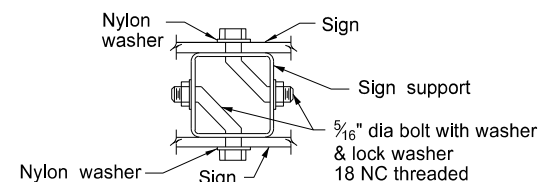
STRAP DETAIL



ANCHOR UNIT AND POST ASSEMBLY

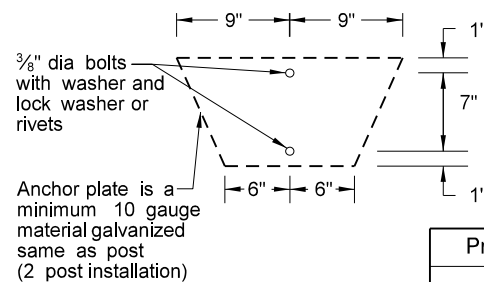


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



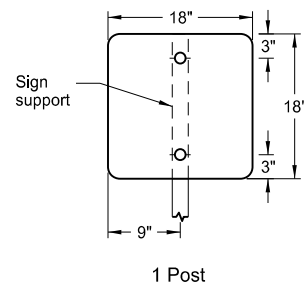
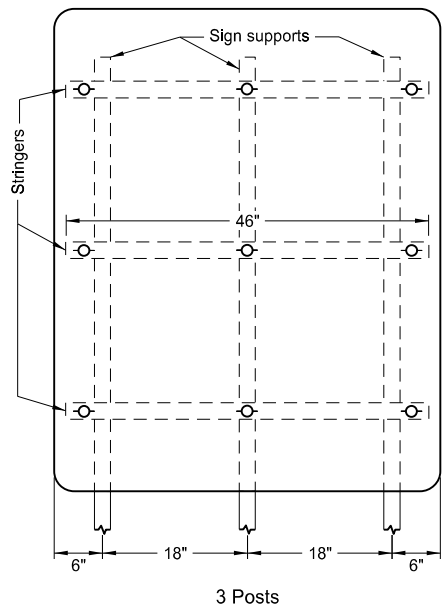
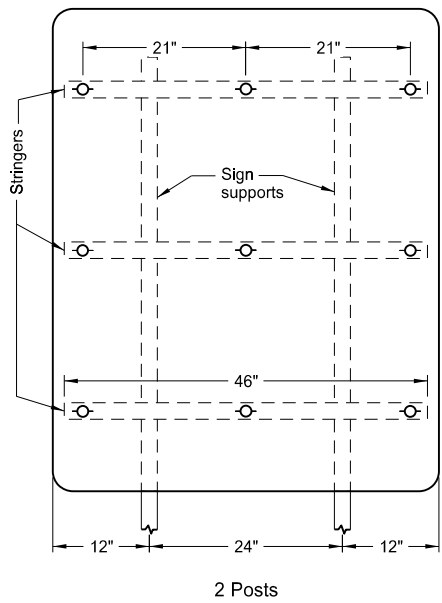
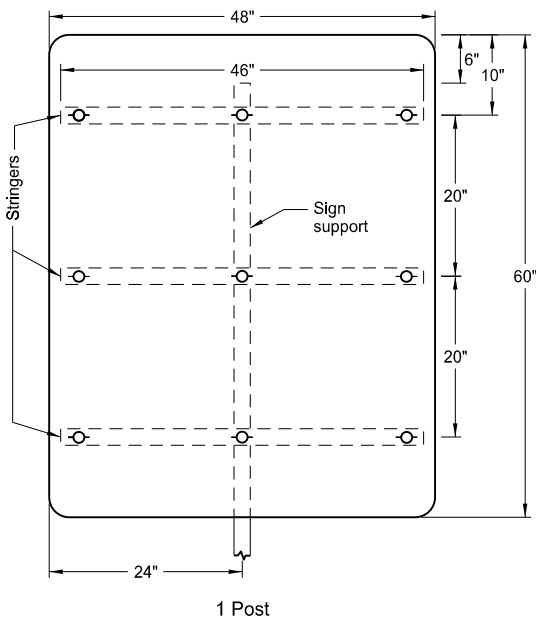
Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. area In. ²	Section Modulus In. ³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2¾ ₁₆ x 2¾ 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	4.066	0.979	1.010	0.783

The 2 $\frac{3}{16}$ " size 10 gauge is shown as 2.19" size on the plans.
The 2 $\frac{1}{2}$ " size is shown as 2.51" size on the plans.

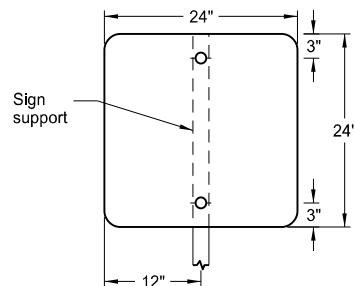
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14 8-30-18 8-30-19	Revised Note 3. Updated notes to active voice. New Design Engr PE Stamp.

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Kirk J Hoff,
Registration Number
PE- 4683 ,
on 8/30/19 and the original document is stored at the
North Dakota Department
of Transportation

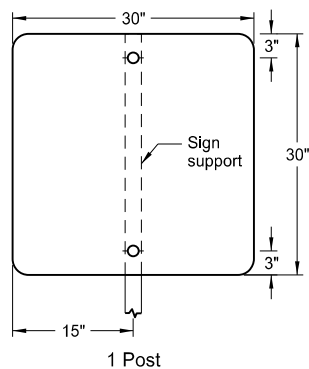
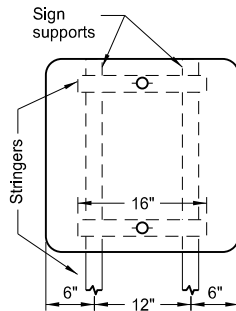
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



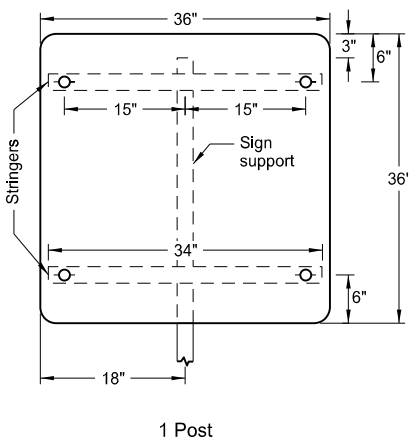
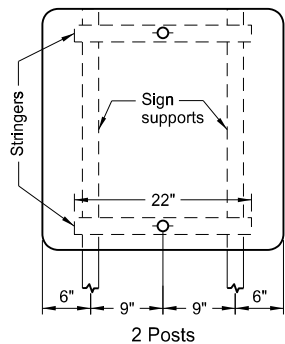
Assembly No. 13



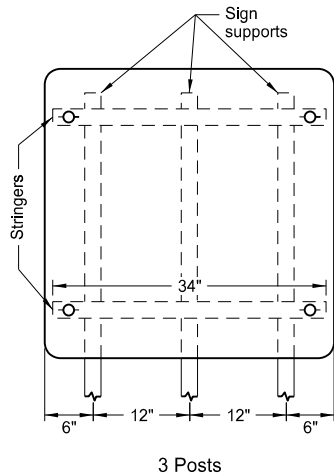
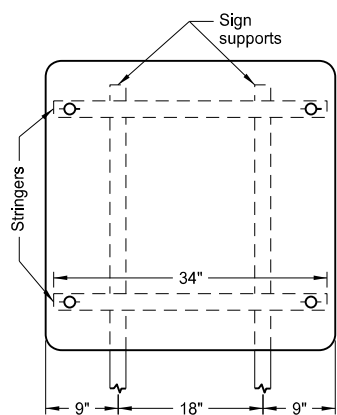
Assembly No. 14



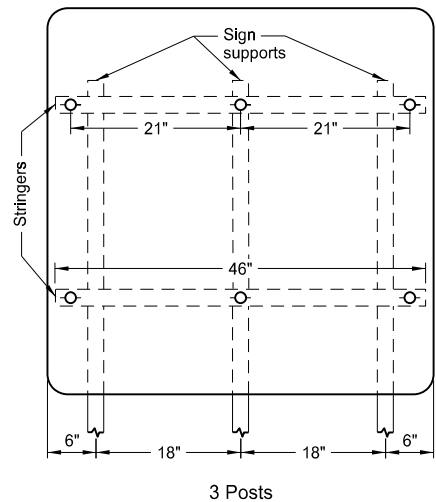
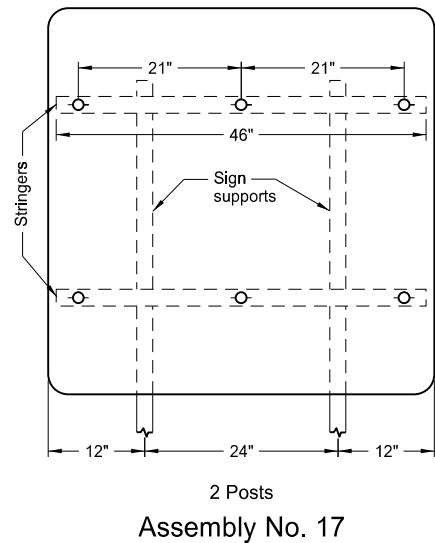
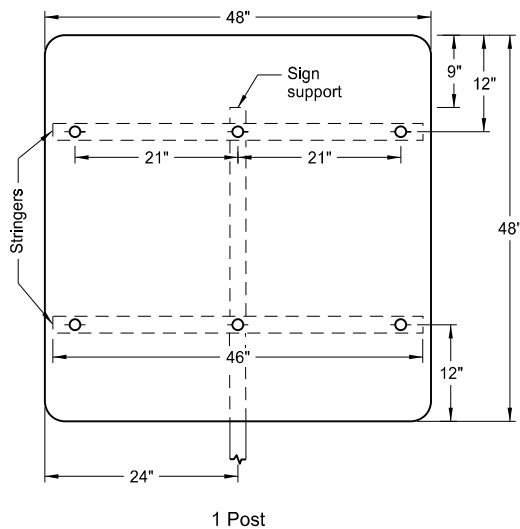
Assembly No. 15



Assembly No. 16



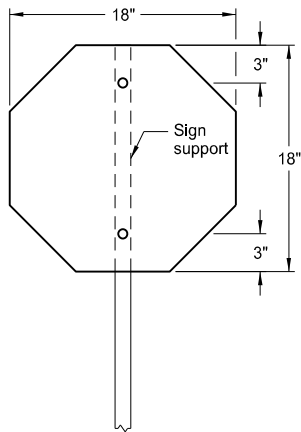
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1½" x 1½" perforated square tube stringers.
 3. Punch holes round for ⅜" bolt.



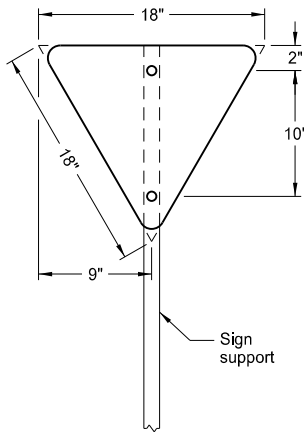
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & changed Assembly 16 post spacing.
8-30-19	New Design Engineer PE Stamp.

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Registration Number
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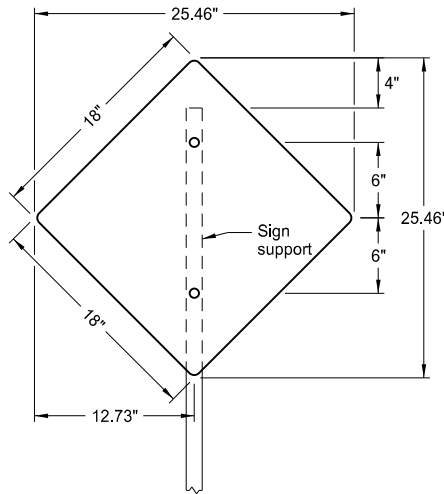
PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS
FOR REGULATORY, WARNING AND GUIDE BIKE ROUTE SIGNS



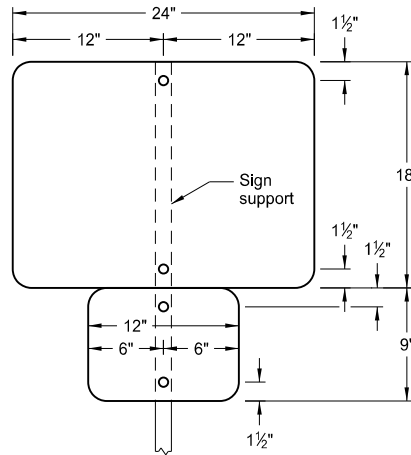
1 Post
Assembly No. 100



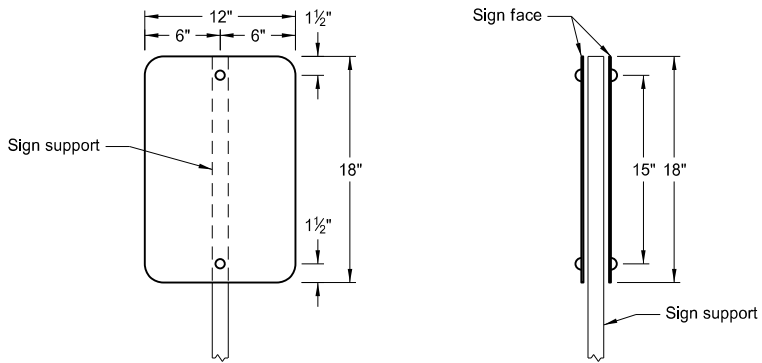
1 Post
Assembly No. 101



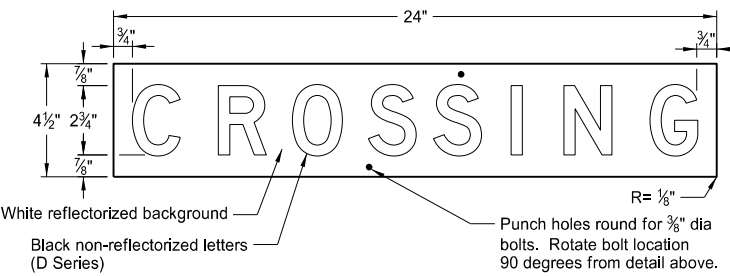
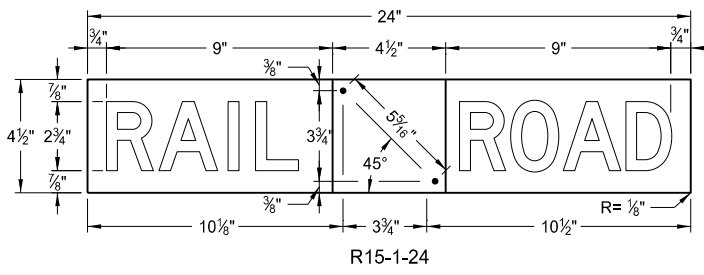
1 Post
Assembly No. 102



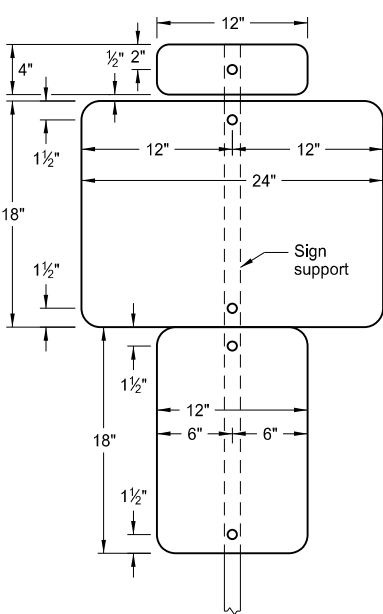
1 Post
Assembly No. 103



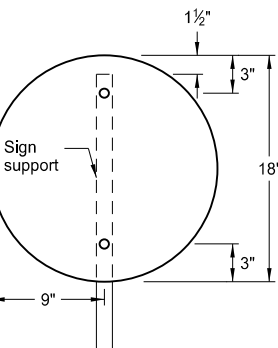
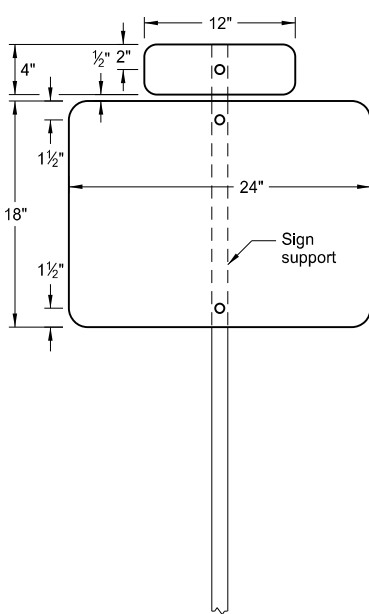
1 Post
back to back
Assembly No. 104



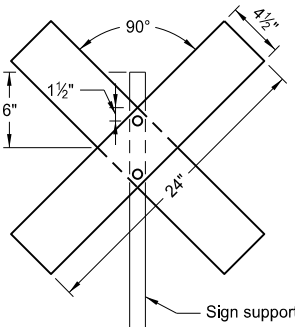
Railroad Crossing Sign Details



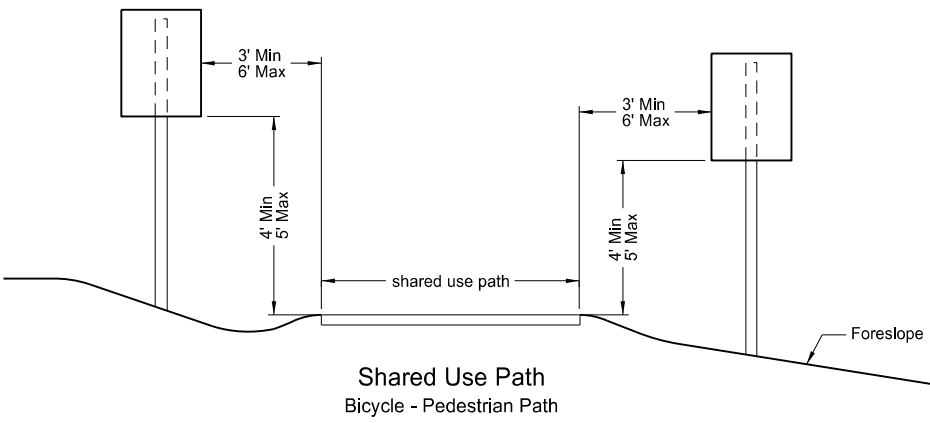
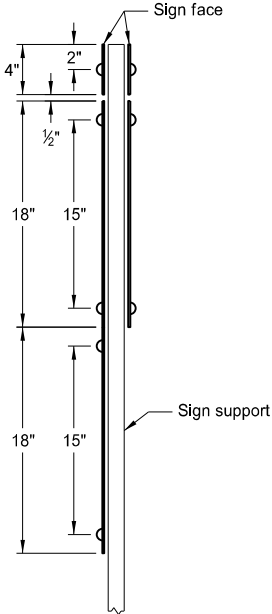
1 Post
back to back
Assembly No. 105



1 Post
Assembly No. 106



1 Post
Assembly No. 107



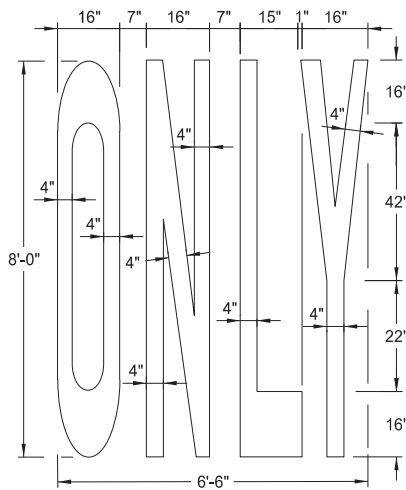
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Punch holes round for 3/8" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
9-18-15	Revised Title Name.
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.

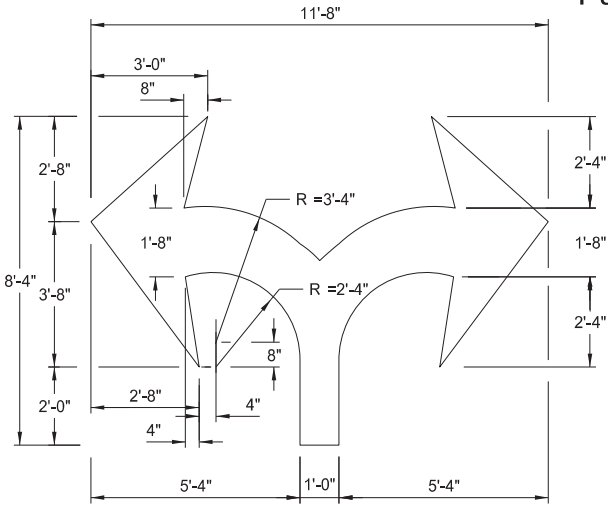
This document was originally
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PE- 4683,
on 9/04/19 and the original
document is stored at the
North Dakota Department
of Transportation

Pavement Marking Message Details

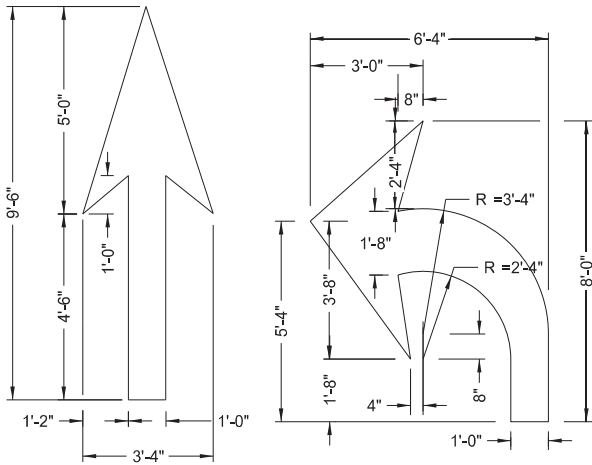
D-762-1



22 S. F.

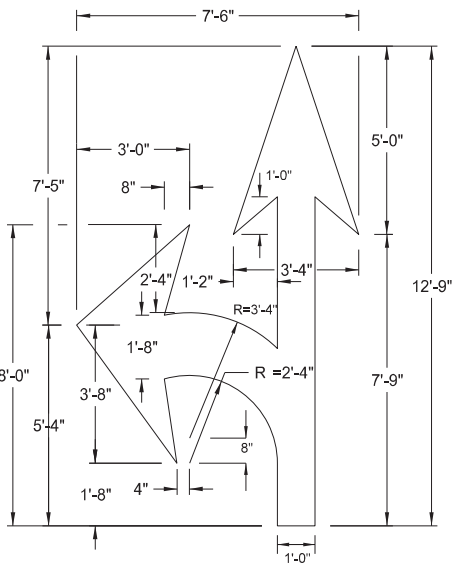


29 S. F.

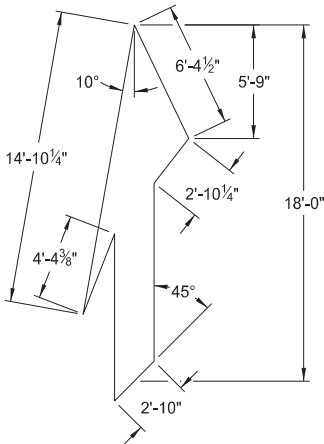


12 S. F.

16 S. F



27 S. F.

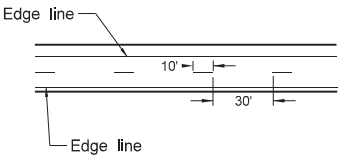


41 S. F.

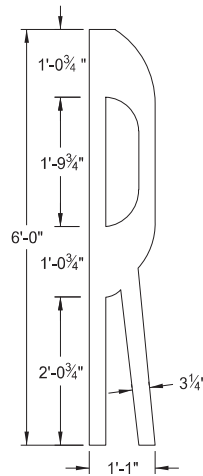
Note: Rotate merge arrow
20° from edge of roadway

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'

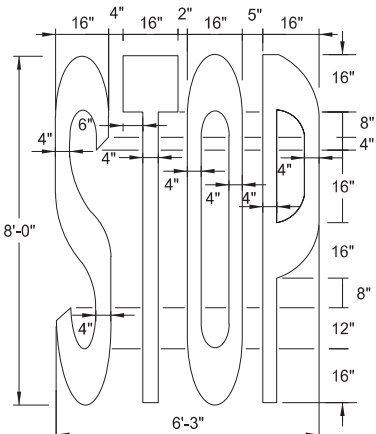
Chevron Crosshatching Table



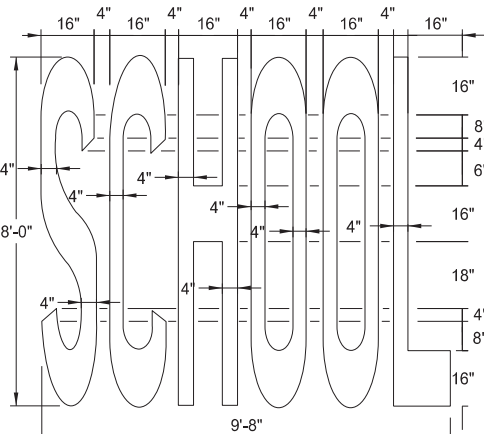
Centerline Pavement Marking Skip Spacing Detail



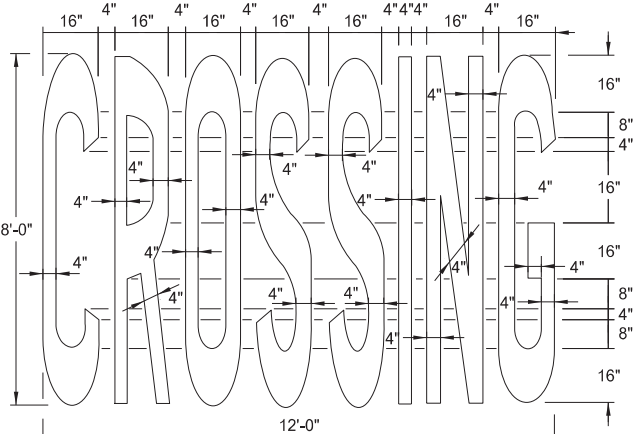
4 S. F.



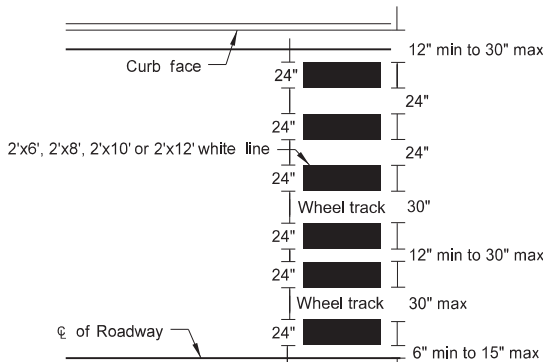
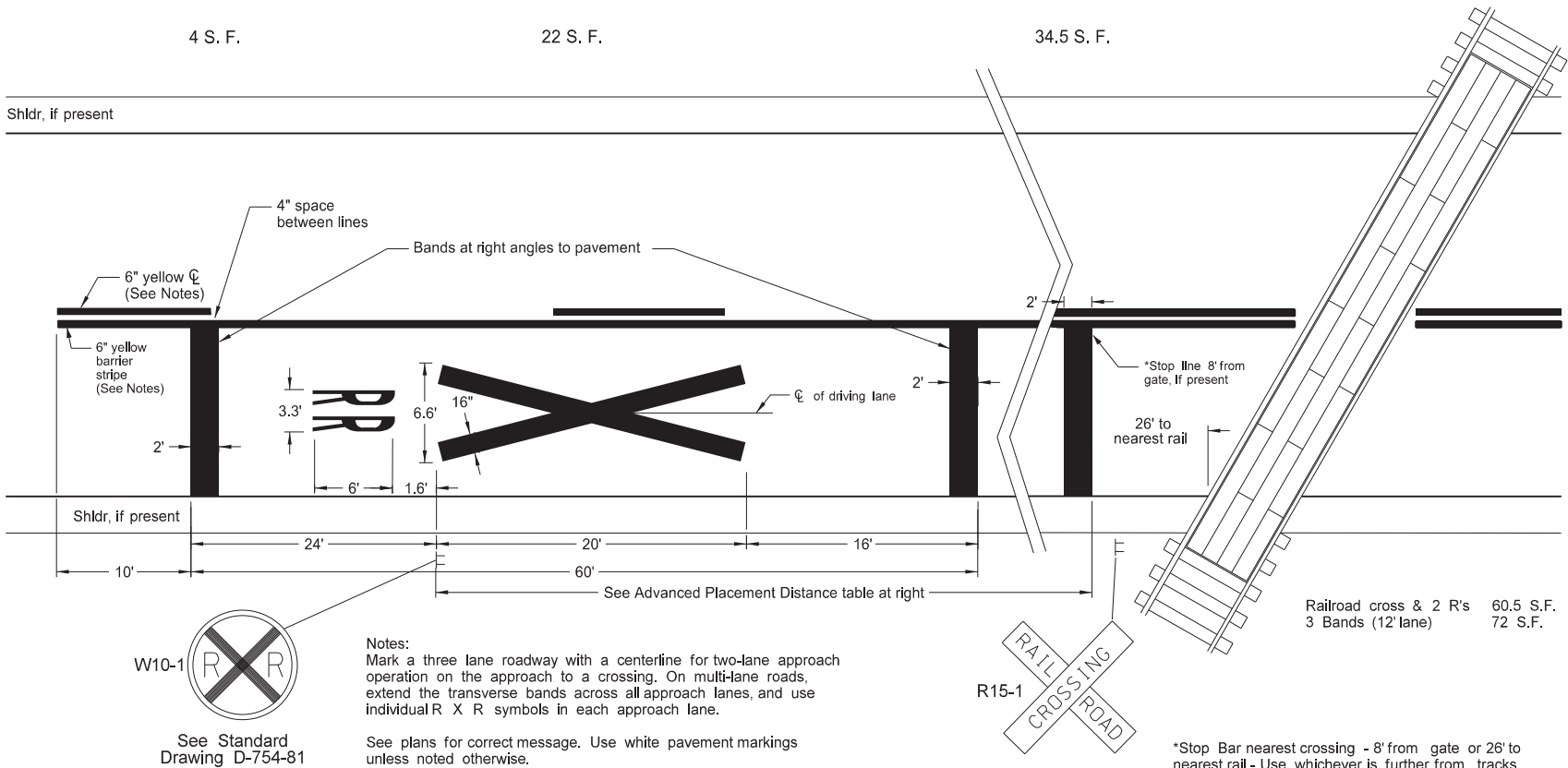
22 S. F.



34.5 S. F.



46 S. F.



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
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
01-28-2020	Revised min Stop Bar distance to rail.
11-22-2023	Revised pavement marking widths.



NOTES:

1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,
2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.