US 85 DESIGN DATA				
Traffic	Average Daily			
Current 2024	Pass: 3460	Trucks: 705	Total: 4165	
Forecast 2044	Pass: 4950	Trucks: 1050	Total: 6000	
Clear Zone Distance: 22 FT		Design Speed: 55 MPH		
Minimum Sight Dist. for Stopping: N/A		Bridges: N/A		
Limited Access Control				
Pavement Design Life N/A				
Design Accumulated One-way N/A ESALs: N/A				

ND 68 DESIGN DATA				
Traffic	Average Daily			
Current 2024	Pass: 1460	Trucks: 580	Total: 2040	
Forecast 2044	Pass: 2090	Trucks: 865	Total: 2955	
Clear Zone Distance: 22 FT		Design Speed: 55 MPH		
Minimum Sight Dist. for Stopping: N/A		Bridges: N/A		
Sight Dist. for No Passing Zone: N/A				
Pavement Design Life N/A				
Design Accumulated One-way N/A ESALs: N/A				

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NH-7-085(132)145	24131	1	1

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

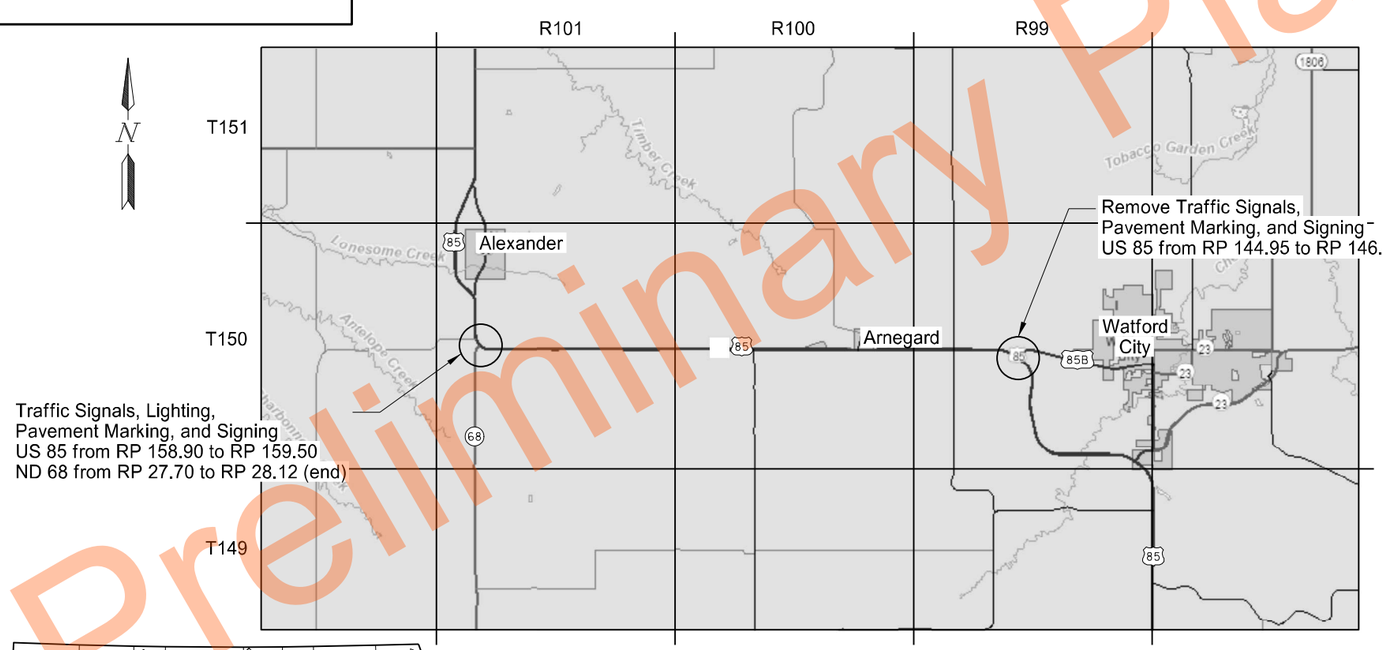
NH-7-085(132)145

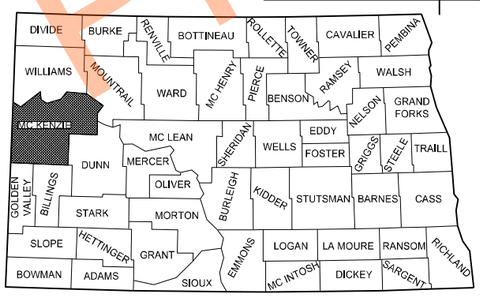
McKenzie County
US 85 & ND 68, US 85 & US 85B

Traffic Signals, Lighting, Pavement Marking and Signing

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2025
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION NET MILES GROSS MILES





STATE COUNTY MAP

DESIGNER
Spencer Ulvestad

DESIGNER
Travis Cork

DESIGNER

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Kirk Hoff
01/30/26

NDDOT DESIGN DIVISION

REGISTERED PROFESSIONAL ENGINEER
MICHAEL E. JOHNSON
PE-6389
DATE 01/30/26
NORTH DAKOTA

Preliminary Plans

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Number	Description
PSP 2	Permits and Environmental Considerations
SP 128(25)	Drilled Shaft Foundation
SP 272(25)	Utility Coordination

LIST OF STANDARD DRAWINGS

Number	Description
D-101-1, 2,3,4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31,32,33	Symbols
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-23	Short Term Urban Detour And Lane Closure On A Divided Highway Layouts
D-704-24	Shoulder Closures And Bridge Painting Layouts
D-754-1	Pipe Or W-Shape Assembly Details
D-754-7	Pipe Support And Sign Mounting Details
D-754-9	Letter and Arrow Details
D-754-11	State Highway Route Shield Detail
D-754-23	Perforated Tube Assembly Details
D-754-24, 25	Mounting Details Perforated Tube
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D-754-26, 27,29	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D-754-58, 64	Sign Punching, Stringer and Support Location Details - Route Marker Signs
D-754-80	Light Standard, Signal Standard, and Span Wire Mounted Sign Assembly Detail
D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-770-1	Concrete Foundations (Traffic Signals & Highway Lighting)
D-770-2	Feed Points (Roadway Lighting)
D-770-2A	Combination Feed Point Details
D-770-3	Pull Box Details
D-770-4	Lighting And Signal Details
D-770-5	Light Standard Details
D-772-1	Feed Point - Traffic Signals
D-772-2	Traffic Signal Standards
D-772-3	Traffic Signal Standards (Mast Arm Type)
D-772-4	Traffic Signal Head Mounting

Preliminary Plans

Docusign Envelope ID: 12CC3512-DA6A-4A2B-B201-E68DB10B1E44

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

GENERAL NOTES

704-P01 TRAFFIC CONTROL DEVICES: The Traffic Control Devices List has been developed using the traffic control layout sheets and the standard drawings listed below. They were developed using the following standard drawings.

1. Standard D-704-23, Type P, Lane Closure on Four Lane Divided Roadway.
2. Standard D-704-24, Type HH, Shoulder Closure on Four Lane Divided Roadway. Portable Median barriers are not needed.
3. Standard D-704-24, Type R, Shoulder Closure on Two Lane Roadway.

Traffic control devices quantities shown in the Section 100 layout sheets are based on one set up of the layouts for the US 85 and ND 68 intersection.

Traffic control devices quantities are based on one set up of Standard D-704-23, Type P, and Standard D-704-24, Type R, for the US 85 and US 85B/2nd Ave SW intersection.

Flagger hours and signs are provided for signal removal or installation when needed for both intersections.

704-P02 TRAFFIC CONTROL LAYOUTS: The traffic control layouts for the US 85 and ND 68 intersection are based on two layouts described below.

Layout 1
This phase will be used for installing northbound traffic signal standards and removing the existing span wire mounted traffic signals and poles.

The traffic control layouts include a lane closure for one direction of US Hwy 85. Ensure the lane closure is only in place on the day's the Contractor is actively working on this project.

Layout 2
This phase will be used for trenching and boring conduit, installing concrete foundations, pulling wires and installing the new cabinets.

The traffic control layouts include a shoulder and right turn lane closure for each direction of US Hwy 85.

SECTION 140

770-P01 BREAKAWAY LIGHT STANDARD: Provide light standards using the information below:

1. Ensure the bases for the light standards are the breakaway transformer type if specified in the plans.
2. Provide bases with a minimum of 4 anchor bolts.
3. Galvanize the light standards.
4. Provide davit style mast arms.

Include all costs associated with the light standard in the bid price for "Lighting System".

770-P02 LED LUMINAIRE: Provide one of the luminaires listed below or an approved alternative:

Conventional Luminaire	Catalog Number
American Electric Autobahn	ATB2-P601-MVOLT-R4-NR-NL ATB2-P601-MVOLT-R3-NR-NL
GE Current Evolve Series	ERL2-0-21-C4-40-GRAY-I-L-no photocell ERL2-0-21-C3-40-GRAY-I-L-no photocell

The lighting system was designed using these values:

Photometric Requirements		
Roadway	**US 85**	**ND 68**
Classification	Principal Arterial	Minor Arterial
Average Maintained Illuminance	0.8 foot-candles	0.7 foot-candles
Illuminance Uniformity Ratio	4.0:1	4.0:1
Minimum Illuminance	as uniformity allows	as uniformity allows
Light Loss Factor	0.81	0.81

Alternative luminaires must meet the requirements below:

Conventional Lighting Luminaire Requirements	
Light Source	LED
Color Temperature	4000K ±300K
Operating Temperature Range	-40°C to + 40°C
Luminaire Housing	Die Cast Aluminum
Vibration Testing	ANSI/NEMA C136.31 Level 2, 3 G
Surge Suppression Rating	ANSI/IEEE C62.41 Cat C
Outdoor rating for housing, wiring, and drivers	ANSI C136.25 IP-65
Photo Control on each luminaire	No
Tool-less Access	Yes
Buy America Compliant	Yes
NEMA Label	Yes
Qualified with DesignLights Consortium	Yes

Provide a NEMA label with black letters on a white background. Size of label is 3 in. x 3 in. and 1.25 in. letter height. Label should be two lines with the input wattage "XXX" on the top line and "LED" as the bottom line.

Include all cost associated with the LED luminaire in the bid price for "Lighting System".

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

Preliminary Plans

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NOTES

770-P03 REMOVAL ITEMS: Remove and salvage the existing luminaire from the solar wood pole light standard. Provide 24-hours' notice and deliver the luminaire to:

Bill Gathman
NDDOT Williston District
(701) 774-2734
bgathman@nd.gov

Include the costs for removal and delivery in the price bid for "Remove Lighting System".

SECTION 150

772-P01 SEEDING AND MULCHING: Regrade the topsoil after the work is completed. Ensure the soil around each foundation or disturbed ground areas, ties in with the original grade. Compact the soil and restore the trenched areas to the original grade.

Broadcast seed meeting NDDOT Specification 251.03 for Class II seed at the required seeding rate in all areas disturbed by this work. Rake or chain drag the soil over the seeds on the contours. After raking or dragging, install hydraulic mulch or Erosion Control Blanket Type II.

Include all cost associated with the seeding and mulching in the bid price for "Remove Lighting System", "Lighting System", "Remove Traffic Signal System", and "Traffic Signals System".

772-P02 TRAFFIC SIGNAL POLES & COMPONENTS: Provide signal poles and components that meet the requirements described below.

Signal Poles

- Ensure all signal standards with 50 ft. mast arms and larger meet the requirements of Fatigue Category I. All others should meet Fatigue Category II.
- Provide davit-type luminaire extensions for the combination signal and light standards.
- Provide traffic signal poles with at least 6 anchor bolts.
- Provide galvanized "T" transformer base type standards.

Signal Components

- Install signal heads level on all sides.
- Provide two-point mounting systems such as Astro Brackets, Sky Brackets, or approved equal for all mast arm mounted signals.
- Provide traffic signal backplates with a Type XI, 1 in. wide, yellow, retroreflective border around the perimeter of the face of the backplate.
- Provide traffic signal head housing in black.
- Provide signal head mounting hardware unpainted.

Include the cost of this item in the price bid for "Traffic Signals System".

772-P03 TRAFFIC SIGNAL CONTROLLER & CABINET: Provide equipment that meets the requirements below.

- ATC Style Cabinet and Controller.
- Install two additional 2 in. diameter conduits in the controller foundation. Cap the conduits at both ends with 2 in. expandable metal plugs. Label all conduits with the direction they are facing. Seal all conduits in the cabinet with duct seal.
- Provide a battery backup system with an Uninterruptible Power Supply. Provide a separate cabinet mounted on the outside of the signal cabinet.
- Obtain padlocks for the cabinet from the NDDOT Williston District.

Include all costs for this work in the price bid for the item "Traffic Signal System".

772-P04 EMERGENCY VEHICLE PRE-EMPTION: Provide an Emergency Vehicle Pre-emption System that includes Infrared and Strobe Traffic Pre-Emption Emitters.

Provide a confirmation light and install at the same location on the mast arm as the EVP detectors.

Include the cost of this item in the price bid for "Traffic Signals System".

Preliminary Plans

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	80	80
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,651	1,651
704	1052	TYPE III BARRICADE	EA	11	11
704	1060	DELINEATOR DRUMS	EA	314	314
704	1067	TUBULAR MARKERS	EA	128	128
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2	2
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	1,485	1,485
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	152	152
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	256	256
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	138	138
762	0111	EPOXY PVMT MK 12IN LINE	LF	596	596
762	0114	EPOXY PVMT MK 6IN LINE	LF	6,358	6,358
762	0115	EPOXY PVMT MK 8IN LINE	LF	504	504
770	0001	LIGHTING SYSTEM	EA	1	1
770	4567	REMOVE LIGHTING SYSTEM	EA	1	1
772	0001	TRAFFIC SIGNALS SYSTEM	EA	1	1
772	3125	REMOVE TRAFFIC SIGNAL SYSTEM	EA	2	2

Preliminary Plans

ESTIMATE NUMBER: 24819 ESTIMATE TYPE: FINAL FINALIZED: Y RUN DATE: 01/30/2026 TIME: 09:25:06

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - INTER.US 85/ND68 AND US85/US85B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-085(132)145	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
US 85 RP 142 (EX85RP142)			
Begin	7636+25.82	300,749.32	1,268,551.74
PC	7647+64.11	301,863.33	1,268,785.59
PI	7668+56.59	303,911.18	1,269,215.46
PT	7684+75.24	305,135.80	1,267,518.75
Station equation US 85 RP 142 (EX85RP142) and 2nd Ave SW (EX85BL)			
US 85	7690+75.21	305,486.92	1,267,032.27
2nd Ave SW	5054+78.37	305,486.92	1,267,032.27
PC	7699+15.02	305,978.42	1,266,351.30
PI	7711+08.04	306,676.63	1,265,383.93
PT	7722+32.24	306,722.60	1,264,191.79
End	7726+21.83	306,737.61	1,263,802.49
2nd Ave SW (EX85BL)			
Begin	5030+00.00	306,423.12	1,269,105.82
PC	5030+86.19	306,446.25	1,269,022.79
PI	5042+08.16	306,747.29	1,267,941.96
PT	5050+45.97	305,837.53	1,267,285.33
End/US 85	5054+78.37	305,486.92	1,267,032.27

CURVE DATA

ARC DEFINITION

US PUBLIC LAND SURVEY DATA

CORNER	IRN	NORTHING	EASTING

REFERENCE MARKERS

#	NORTHING	EASTING	STA	O/S	ALIGN
28	309548.46	1195567.65	1479+08	48' Rt	EX68
956	306381.55	1267873.57	5042+47	40' Rt	EX85BL
145	302698.36	1268899.93	7656+01	50' Rt	EX85RP142
145	302692.69	1268798.60	7656+01	51' Lt	EX85RP142
146	306395.26	1265488.42	7708+81	51' Lt	EX85RP142
146	306489.48	1265526.07	7708+81	50' Rt	EX85RP142
159	309457.02	1197090.94	8393+97	51' Rt	EX85RP145
159	309357.06	1197077.84	8393+97	50' Lt	EX85RP145

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STA	OFFSET	ALIGN	MONUMENT
PRIMARY CONTROL							
GPS 956	306,261.05	1,268,140.97	2,171.09	5040+36	172' Lt	EX85BL	5/8" Rebar w/ Alum cap stamped "NDDOT CONTROL"
GPS 953	304,002.44	1,282,337.85	2,143.84	N/A	N/A	EX85BL	2" Alum cap
GPS 11	321,416.08	1,197,262.73	2,163.63	N/A	N/A	EX85RP145	2" Alum cap stamped "GPS85-161 KLJ CONTROL"
GPS 10	309,238.27	1,198,647.77	2,241.02	N/A	N/A	EX85RP145	2" Alum cap stamped "GPS85-158.7 KLJ CONTROL"
SECONDARY CONTROL							
RTK 30359	309,532.22	1,197,497.60	2,258.26	8389+89	152' Rt	EX85RP145	3" Alum cap stamped "OBELISK 210536 GWTP"

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

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

☒ NAVD-88 ☐ _____

☐ GEOID12B ☐ _____
☒ GEOID18

Date Survey Completed 05/07/2025

☐ Assumed Coordinates

☒ All coordinates on this sheet are McKenzie County ground coordinates.
They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998485

REGISTERED PROFESSIONAL LAND SURVEYOR
Kristofer Johnson
LS-10169
DATE 06/19/25
NORTH DAKOTA

NOTES: Sheet 1 of 2

Alignments based from NDDOT project 7-085(089)152 and 7-085(138)079

Preliminary Plans

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - INTER.US 85/ND68 AND US85/US85B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-085(132)145	81	2

HORIZONTAL ALIGNMENT				CURVE DATA		US PUBLIC LAND SURVEY DATA			
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		CORNER	IRN	NORTHING	EASTING
US 85 RP 145 (EX85RP145)									
Begin	8380+29.90	309,342.56	1,198,449.90						
PI	8385+07.62	309,361.34	1,197,972.54						
TS	8390+33.12	309,382.00	1,197,447.46						
SC	8394+33.12	309,411.64	1,197,048.75						
Station equation US 85 RP 145 (EX85RP145) and Hwy 68 (EX68)									
US 85	8407+34.18	310,006.09	1,195,919.62						
ND 68	1484+94.72	310,006.09	1,195,919.62						
PI	8411+48.07	309,465.14	1,195,334.14						
Station equation US 85 RP 145 (EX85RP145) and Co Rd 15/ 27th St NW (EX27th)									
US 85	8417+24.88	310,872.17	1,195,461.79						
27TH St NW	10+00.09	310,872.17	1,195,461.79						
CS	8420+34.93	311,178.59	1,195,416.79						
ST	8424+34.93	311,578.39	1,195,418.86						
End	8429+61.32	312,104.36	1,195,439.95						
Hwy 68 (EX68)									
Begin	1465+44.31	308,251.19	1,195,286.02						
PC	1471+65.86	308,872.26	1,195,310.64						
PI	1477+59.21	309,465.14	1,195,334.14						
PT	1482+90.94	309,867.80	1,195,769.94						
End/US 85	1484+94.72	310,006.09	1,195,919.62						
Co Rd 15/ 27th St NW (EX27th)									
Begin	5+00.00	310,837.13	1,194,965.12						
PC	6+54.24	310,832.84	1,195,119.31						
PI	8+07.95	310,828.56	1,195,272.96						
PT	9+60.00	310,863.15	1,195,422.72						
End/US 85	10+00.09	310,872.17	1,195,461.79						

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

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

☒ NAVD-88 ☐ _____

☐ GEOID12B ☐ _____

☒ GEOID18

Date Survey Completed 05/07/2025

☐ Assumed Coordinates

☒ All coordinates on this sheet are McKenzie County ground coordinates.
They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998485

REGISTERED PROFESSIONAL LAND SURVEYOR
Kristofer Johnson
LS-10169
DATE 06/19/25
NORTH DAKOTA

NOTES: Sheet 2 of 2

Alignments based from NDDOT project 7-085(089)152 and 7-085(138)079

Preliminary Plans

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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		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**7**	**26**	**182**
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		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $150 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)**	**13**	**30**	**390**
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**6**	**10**	**60**
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	
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**	**6**	**35**	**210**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**2**	**35**	**70**
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**	**6**	**35**	**210**
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**	**2**	**35**	**70**
W20-7-48	**48"x48"**	**FLAGGER**	**4**	**35**	**140**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**4**	**5**	**20**
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		35	
W21-5a-48	**48"x48"**	**RIGHT or LEFT SHOULDER CLOSED**	**4**	**35**	**140**
W21-5b-48	**48"x48"**	**RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE**	**3**	**35**	**105**

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	48"x48"	RUMBLE STRIPS AHEAD		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	
SPECIAL SIGNS					
R3-6R-30	**30"x36"**	**THRU/RIGHT ARROW**	**3**	**18**	**54**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1651**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**80**
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**11**
704-1060	**DELINEATOR DRUMS**	**EACH**	**314**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**128**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	**SEQUENCING ARROW PANEL - TYPE C**	**EACH**	**2**
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

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/

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Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

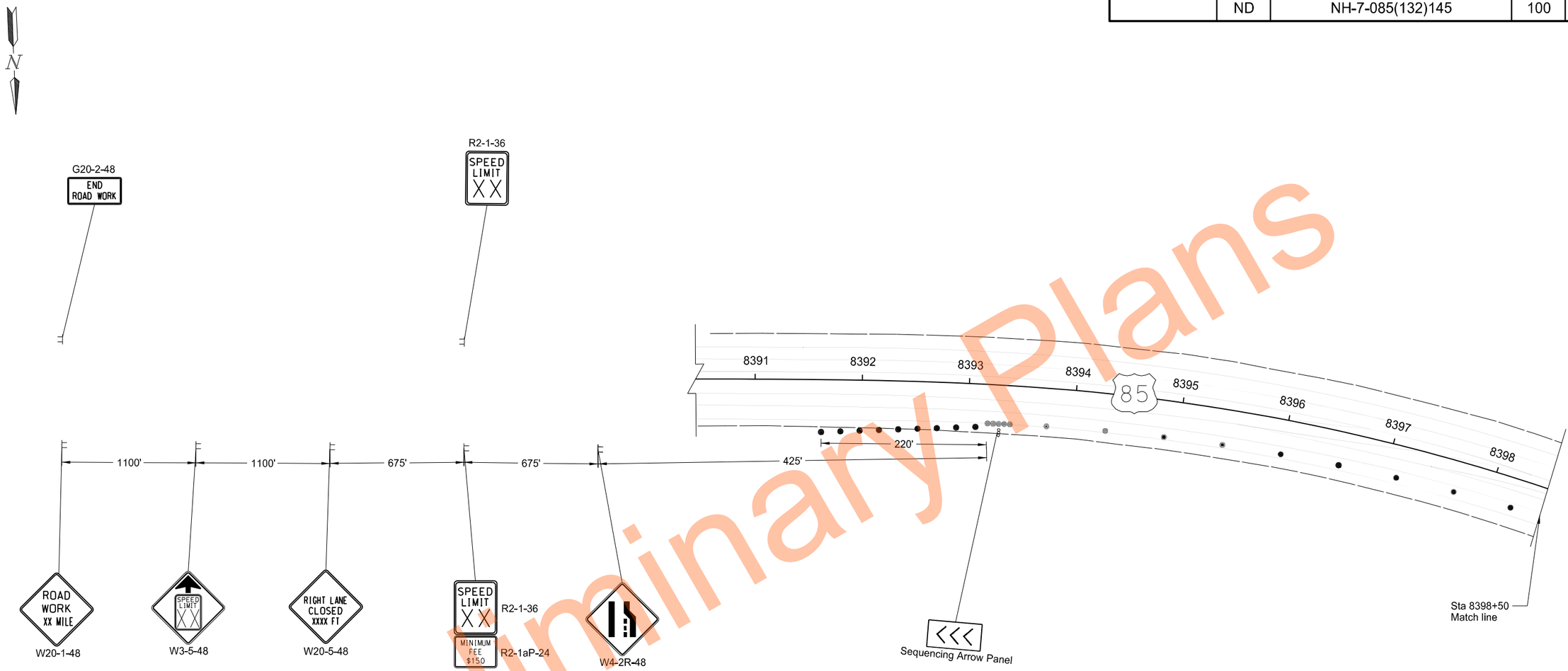
Traffic Control Devices List

US 85

Preliminary Plans

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	100	2



Preliminary Plans

KEY

- Type III Barricade
- Tubular Marker
- Delineator Drum

Work Zone Traffic Control Layout
Lane Closure

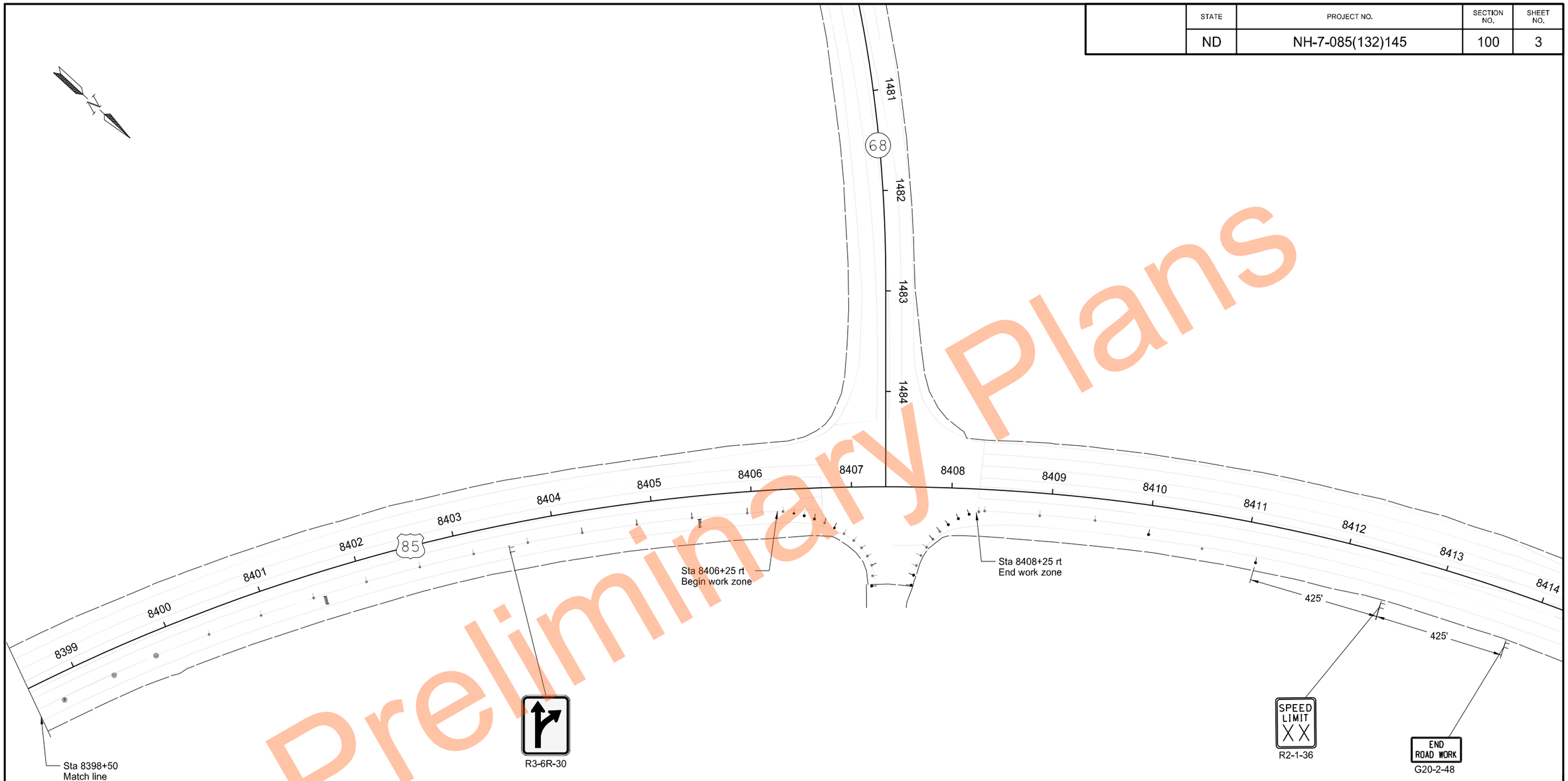
Layout 1

US 85 & ND 68 Intersection

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	100	3



Preliminary Plans

KEY

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- Tubular Marker
- Delineator Drum

Work Zone Traffic Control Layout
Lane Closure

Layout 1

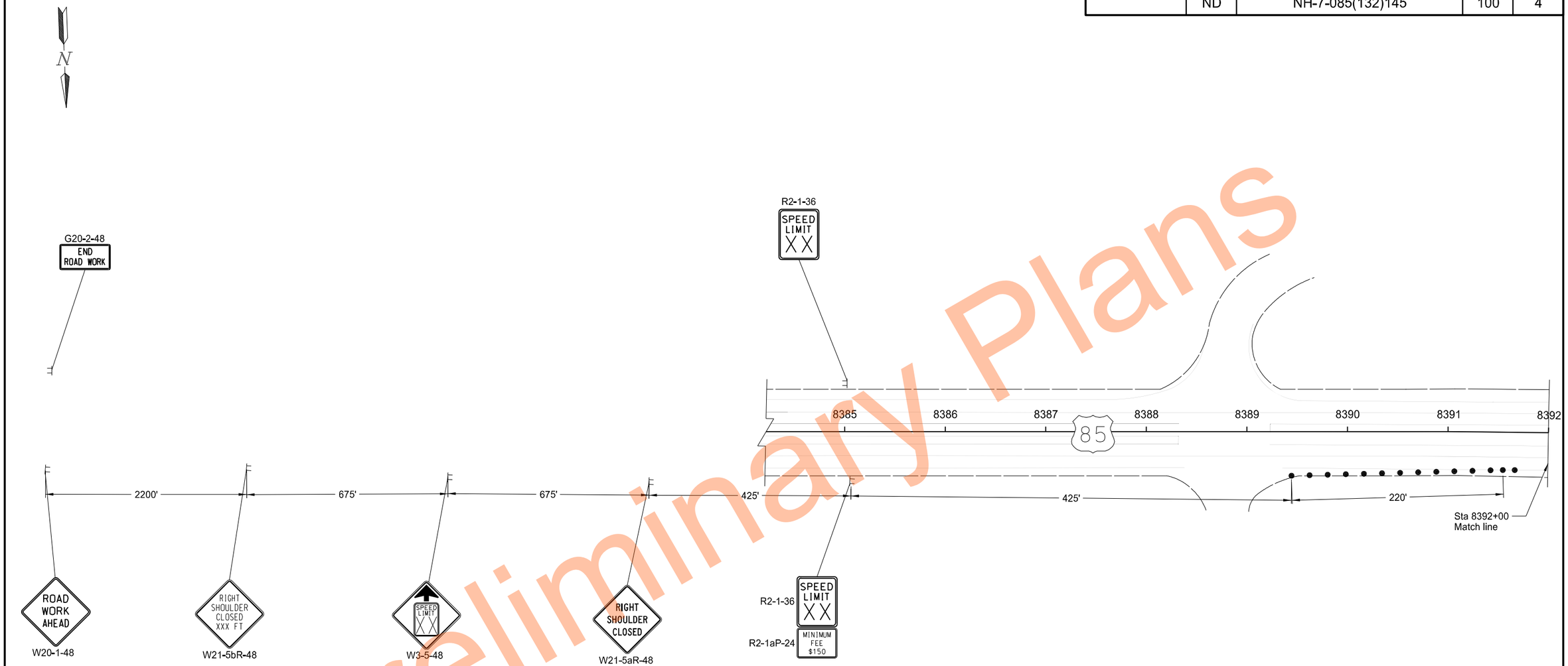
US 85 & ND 68 Intersection

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DATE 01/30/26
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	100	4



Preliminary Plans

KEY

- Type III Barricade
- Tubular Marker
- Delineator Drum

Work Zone Traffic Control Layout
Shoulder Closure

Layout 2

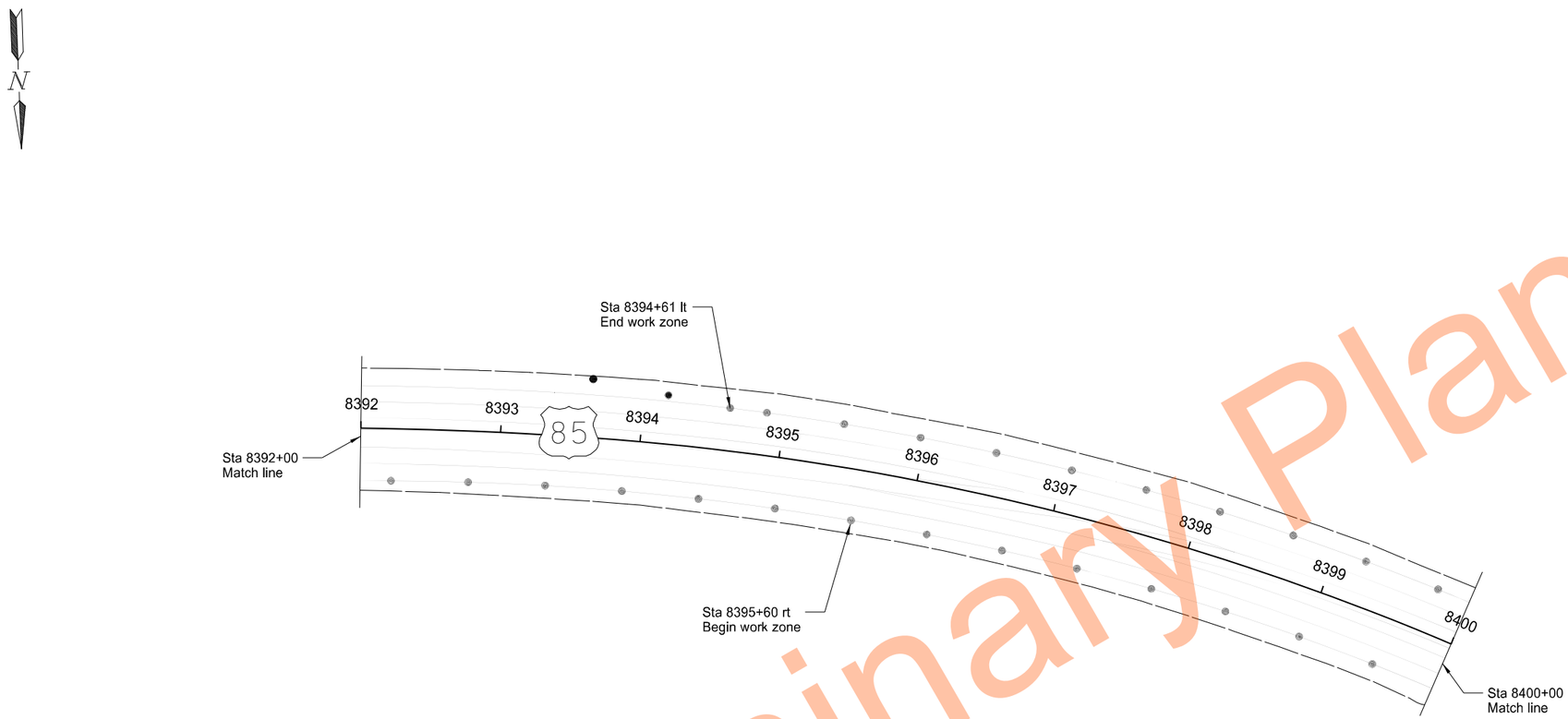
US 85 & ND 68 Intersection

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	ND	NH-7-085(132)145	100	5



Preliminary Plans

KEY

- Type III Barricade
- Tubular Marker
- Delineator Drum

Work Zone Traffic Control Layout
Shoulder Closure

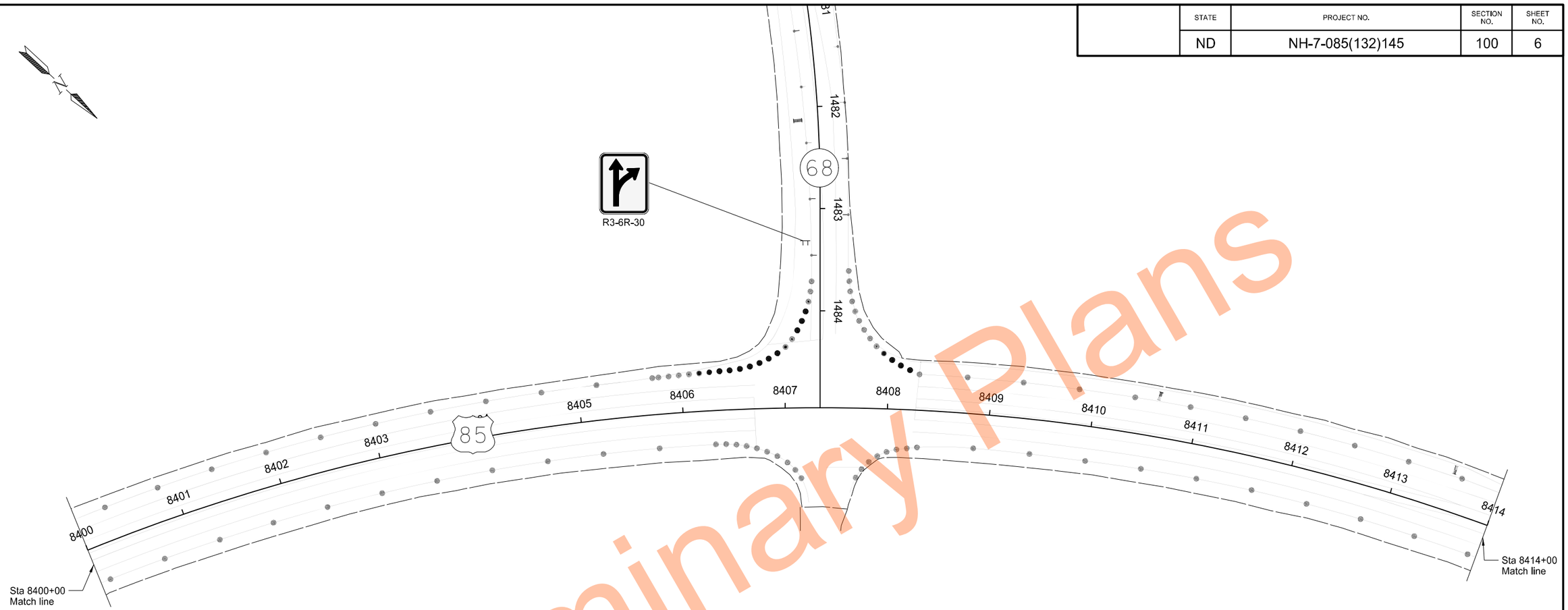
Layout 2

US 85 & ND 68 Intersection

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PE-6529
DATE 01/30/26
NORTH DAKOTA

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	ND	NH-7-085(132)145	100	6



Preliminary Plans

KEY

- Type III Barricade
- Tubular Marker
- Delineator Drum

Work Zone Traffic Control Layout
Shoulder Closure

Layout 2

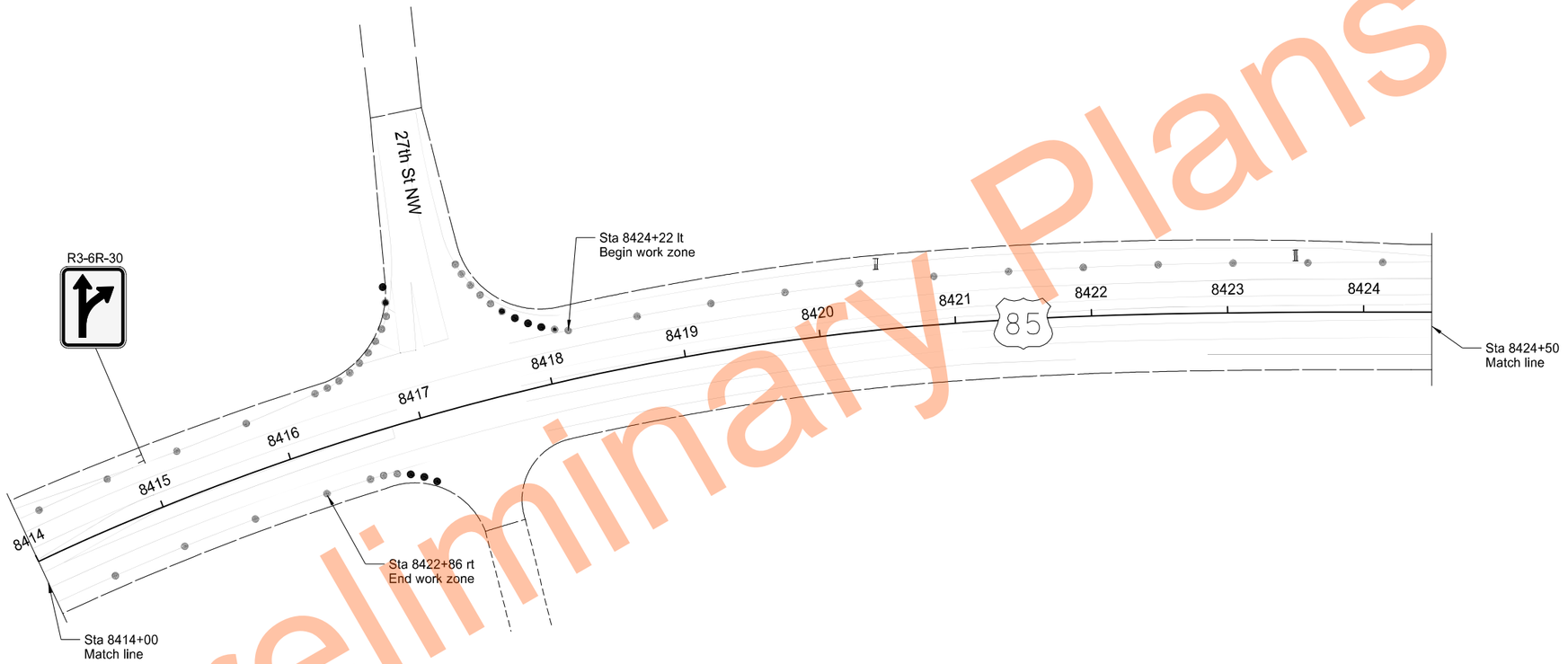
US 85 & ND 68 Intersection

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Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	100	7



Preliminary Plans

KEY

I Type III Barricade

Tubular Marker

Delineator Drum

Work Zone Traffic Control Layout
Shoulder Closure

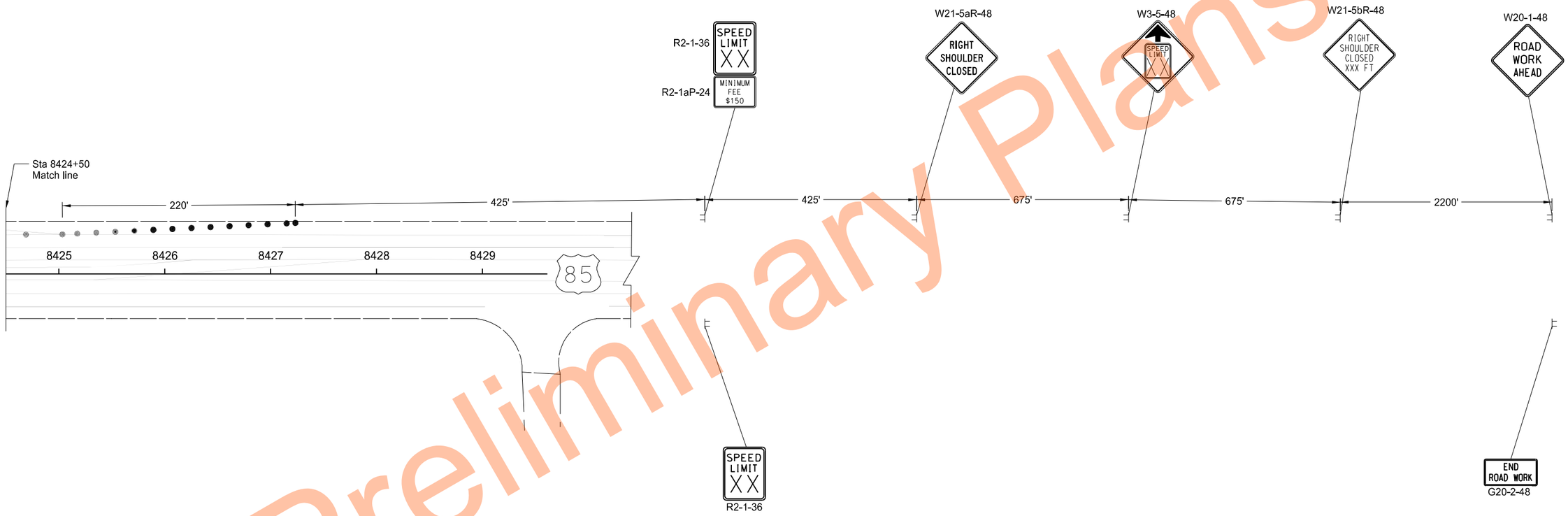
Layout 2

US 85 & ND 68 Intersection

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Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	100	8



Preliminary Plans

KEY

- Type III Barricade
- Tubular Marker
- Delineator Drum

Work Zone Traffic Control Layout
Shoulder Closure

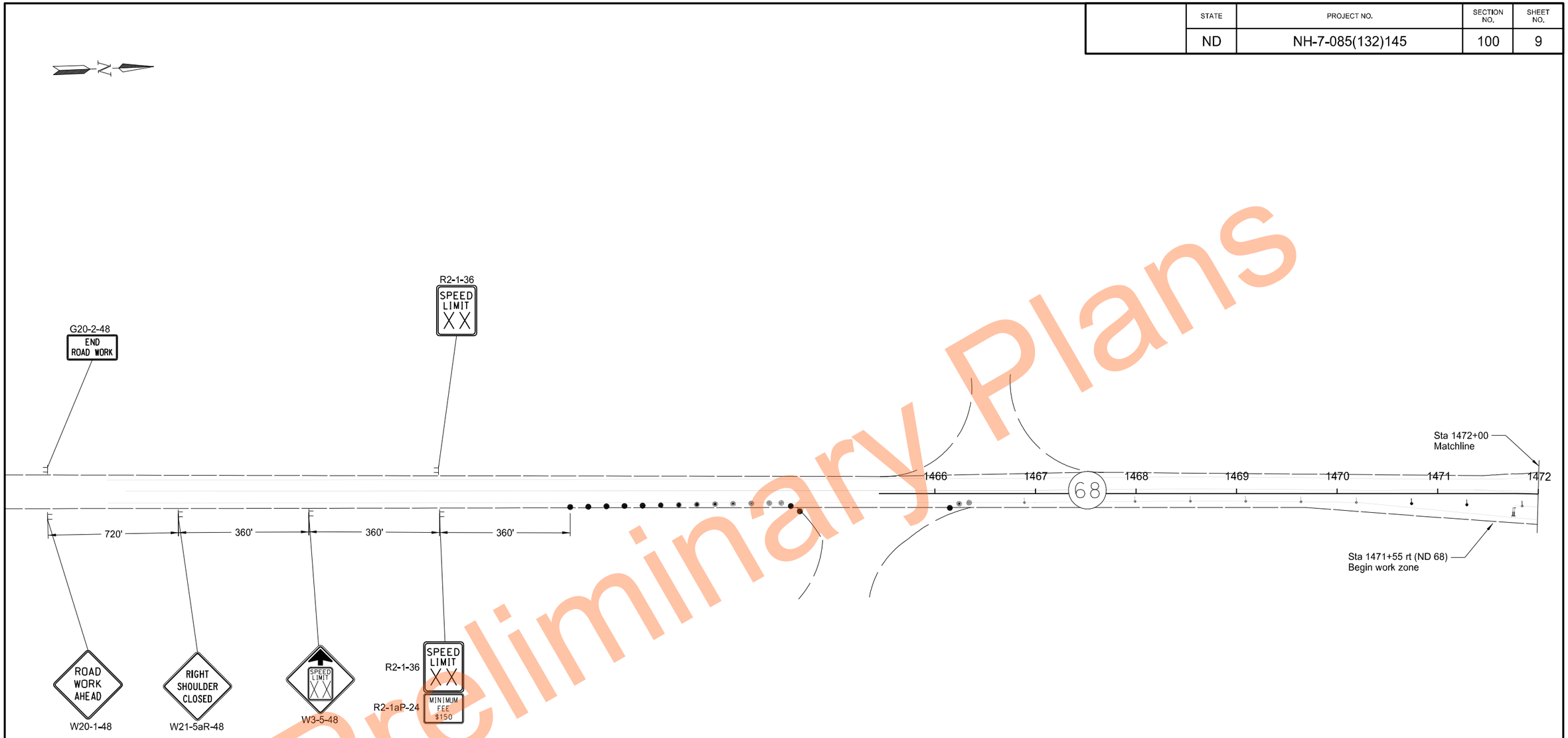
Layout 2

US 85 & ND 68 Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	100	9



Preliminary Plans

KEY

- Type III Barricade
- Tubular Marker
- Delineator Drum

Work Zone Traffic Control Layout
Shoulder Closure

Layout 2

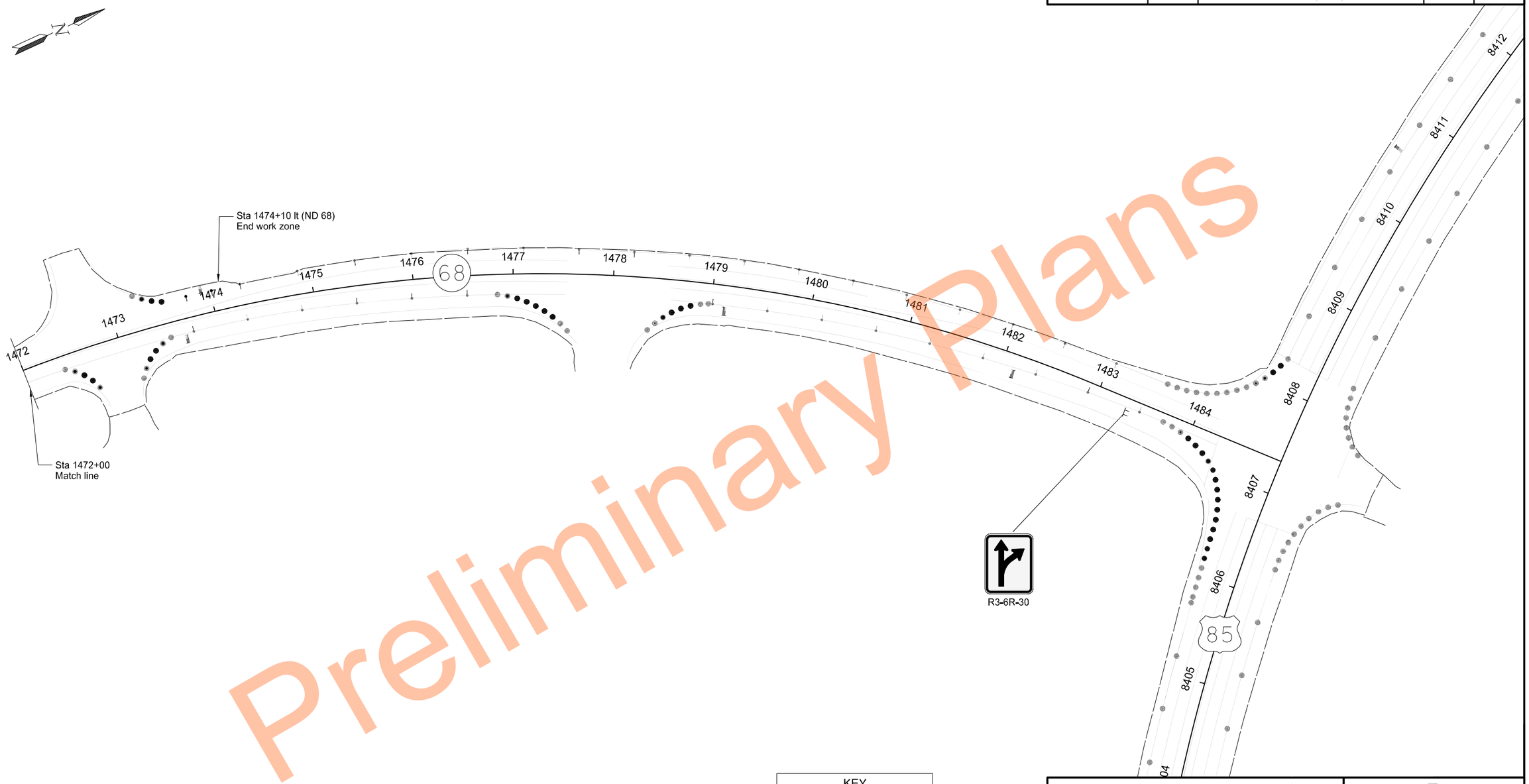
US 85 & ND 68 Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	100	10



Preliminary Plans

KEY

- Type III Barricade
- Tubular Marker
- Delineator Drum

Work Zone Traffic Control Layout
Shoulder Closure

Layout 2

US 85 & ND 68 Intersection

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DATE 01/30/26
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	N.D.	NH-7-085(132)145	110	1

Station / RP	Sign / Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Panel For Signs IV SF	Panel For Signs XI SF	Overlay Panel IV SF	Overlay Panel XI SF	Vert Clear-ance FT	Galv Steel Sheet Standard Pipe 1st LF	Galv Steel Sheet Standard Pipe 2nd LF	Size	Galv Steel Post W-Shape Posts 1st LF	Galv Steel Post W-Shape Posts 2nd LF	Galv Steel Post W-Shape Posts 3rd LF	Max Post Len LF	Post Space FT	Revise Fuse Joint EA	Std Pipe Fdn Dia FT	Std Pipe Fdn Dep FT	Std Pipe Fdn Vol CY	W-Shape Pile LF	Remove Sign Fdns Conc Fdn EA	Remove Sign Fdns W-Shape Pile EA	Reset Sign Panel EA	Reset Sign Support EA	Stub Post EA	Multi Dir Base EA	Comments
Jct US 85 & ND 68																												
8403+00 Rt	S.A. C	20.3																										Mount on Existing Supports
8407+91 Rt	S.A. D	24.6																										Mount on Existing Supports
8410+31 Lt	S.A. C	20.3																										Mount on Existing Supports
Sub Total		65.2						Total	0.0			Total	0.0							0.0	0	0	0	0	0	0	0	
Grand Total		**65.2**						Total	**0.0**			Total	**0.0**							**0.0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	

Preliminary Plans

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DATE
01/30/26
NORTH DAKOTA

Sign Summary
Round Steel Pipe & W-Shape

US 85

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NH-7-85(132)145	110	2

Station / RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Vert Clear-ance FT	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
Jct US 85 & US 85 Business - US 85																							
7673+64 Rt		20		9.0	13.6				7.0	2.25 x 2.25 12 ga	14.7	4.5				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
7677+65 Lt		11		12.0	13.0				7.0	2.25 x 2.25 12 ga	14.3	4.4				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
7688+01 Lt	S.A. A		11.3																				Mount on Existing Supports
7693+00 Rt	S.A. A		11.3																				Mount on Existing Supports
7701+19 Rt		11		12.0	13.0				7.0	2.25 x 2.25 12 ga	14.3	4.4				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
Sub Total			22.6	33.0		**Total**	39.6										**Total**	12.0		0	0	3	
Jct US 85 & US 85 Business - US 85 Business																							
5038+24 Rt		19		6.3	12.8				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
5042+25 Rt			5.0																				Mount on Existing Supports
5046+25 Rt			5.0																				Mount on Existing Supports
7690+23 Rt		2		7.5					5.0														Mount on Light Standard
7691+33 Rt	S.A. E			9.5	14.2				5.0	2.25 x 2.25 12 ga	15.2	4.8				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
Sub Total			10.0	23.3		**Total**	27.0										**Total**	8.0		0	0	1	
Jct US 85 & US 85 Business - 130th Ave NW																							
7690+15 Lt	S.A. E			9.5	14.3				5.0	2.25 x 2.25 12 ga	15.2	4.8				2.5 x 2.5 12 ga	1	4	3 x 3 7 ga			1	
7690+47 Lt		19		6.3	12.5				5.0	2.5 x 2.5 12 ga	14.5						1	4	3 x 3 7 ga				
7691+32 Lt		2		7.5	12.3				5.0	2.5 x 2.5 10 ga	14.6						1	4	3 x 3 7 ga			1	
Sub Total			0.0	23.3		**Total**	39.1										**Total**	12.0		0	0	2	
Jct US 85 & ND 68 - US 85																							
8394+98 Rt	S.A. B		9.0																				Mount on Existing Supports
8405+46 Lt	S.A. A		11.3																				Mount on Existing Supports
8406+46 Lt	SN 1 & 4		45.5	16.0																			Mount on Mast Arm
8408+21 Rt	SN 2 & 4		45.5	16.0																			Mount on Mast Arm
8409+52 Rt	S.A. A		11.3																				Mount on Existing Supports
Sub Total			122.6	32.0		**Total**	0.0										**Total**	0.0		0	0	0	
Jct US 85 & ND 68 - ND 68																							
8406+94 Rt	SN 3 & 5		18.0	20.0																			Mount on Mast Arm
Sub Total			18.0	20.0		**Total**	0.0										**Total**	0.0		0	0	0	
Jct US 85 & ND 68 - Roughneck Rd																							
8408+03 Lt	SN 3 & 5		18.0	20.0																			Mount on Mast Arm
Sub Total			18.0	20.0		**Total**	0.0										**Total**	0.0		0	0	0	
Grand Total			**191.2**	**151.6**		**Total**	**105.7**										**Total**	**32**	**0**	**0**	**0**	**6**	

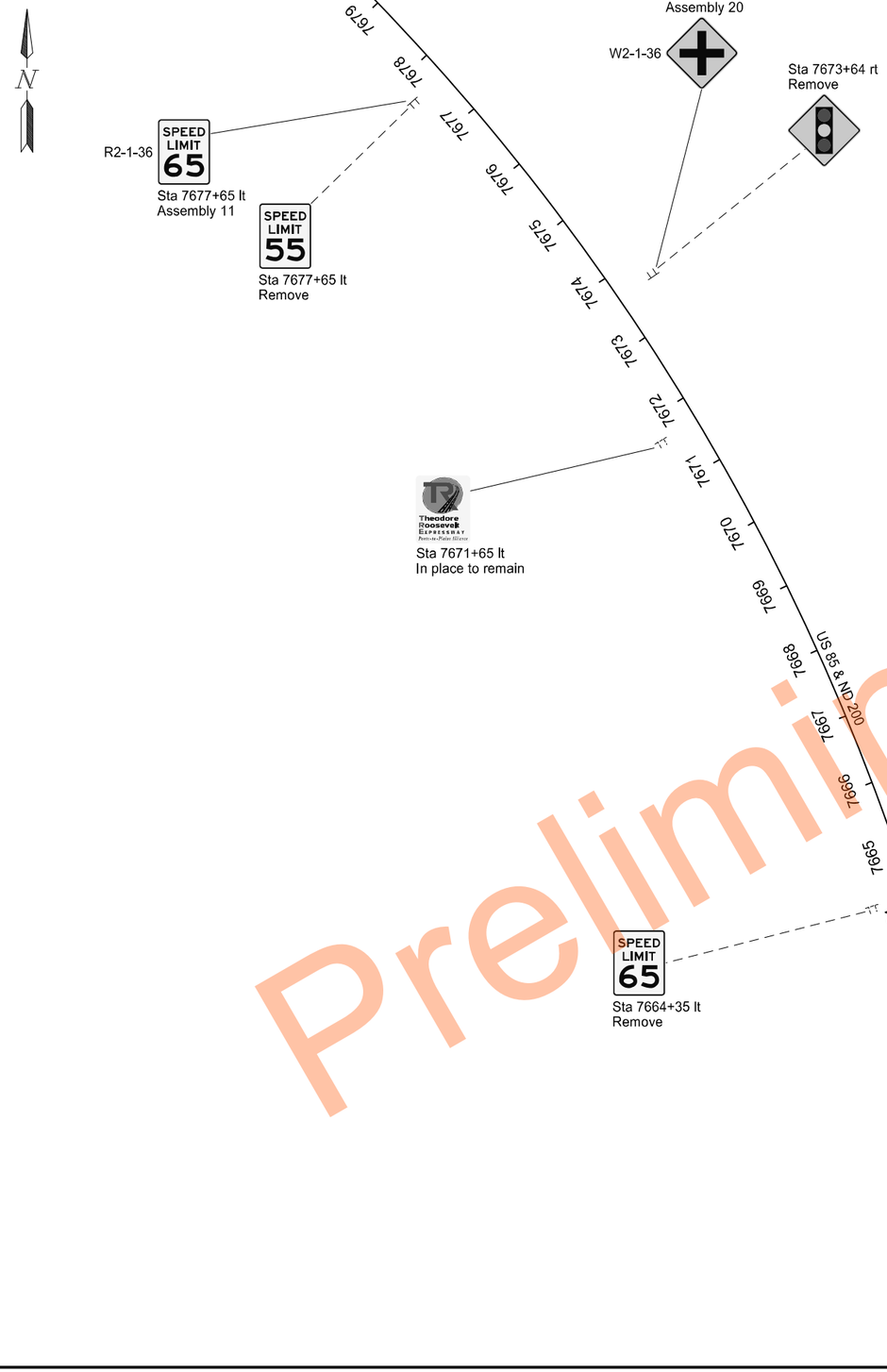
Preliminary Plans

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Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

Sign Summary
Perforated Tube

US 85

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	110	3



Preliminary Plans

Signing Layout

Jct US 85 & US 85 Business

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	110	4

N

Sta 7701+19 rt
Assembly 11
R2-1-36 SPEED LIMIT 65

Sta 7697+19 rt
In place to remain
Arnegard 5
Williston 43

Sta 7691+43 rt
In place to remain
US Hwy 85 | 130 Ave NW | US 85 Business
Back to back
US Hwy 85 | US 85 Business | 130 Ave NW

Sta 7691+33 rt
Special Assembly E
STOP R1-1-36
CROSS TRAFFIC DOES NOT STOP W4-4P-24

Sta 7693+00 rt
Install new sign on existing supports
Special Assembly A
Existing NORTH WEST Existing
Existing 85 NORTH DAKOTA 200 M1-5-45

Sta 7691+40 rt
Remove
STOP Hinged

Sta 7693+00 rt
Remove sign
N D 200

Sta 5046+25 rt
Install new sign on existing supports
Assembly 414
Existing 85 NORTH DAKOTA 200 M1-5-30
Existing

Sta 5044+25 rt
In place to remain
LEWIS AND CLARK TRAIL

Sta 5042+25 rt
Install new sign on existing supports
Assembly 396
JCT Existing
85 Existing
NORTH DAKOTA 200 M1-5-30

Sta 5042+25 rt
Remove
N D 200

Sta 5046+25 rt
Remove
N D 200

Sta 5048+29 rt
Remove
ONLY ONLY ONLY

Sta 5050+22 rt
In place to remain
Belfield
Williston

Sta 5052+12 rt
In place to remain
LEWIS AND CLARK TRAIL

Sta 5038+24 rt
Remove

Sta 5038+24 rt
Assembly 19
W3-1-30

US 85 Business

7705 7704 7703 7702 7701 7700 7699 7698 7697 7696 7695 7694 7693 7692 7691 7690 7689 7688 7687 7686 7685 7684 7683 7682 7681 7680

5041 5042 5043 5044 5045 5046 5047 5048 5049 5050 5051 5052 5053 5054 5055 5056 5057 5058 5059 5060 5061 5062 5063 5064

5032 5033 5034 5035 5036 5037 5038 5039 5040 5041

US 85 & ND 200

BUSINESS SOUTH 85 85
Sta 7702+15 lt
In place to remain

BE PREPARED TO STOP WHEN FLASHING
Sta 7698+40 lt
Remove

Sta 7690+47 lt
Remove

W3-1-30
Sta 7690+47 lt
Assembly 19

R1-1-36 STOP
Sta 7691+32 lt
Assembly 2

Hinged STOP
Sta 7690+20 lt
Remove

SPEED LIMIT 35
Sta 7691+05 lt
In place to remain

STOP R1-1-36
CROSS TRAFFIC DOES NOT STOP W4-4P-24
Sta 7690+15 lt
Special Assembly E

85 BUSINESS
NORTH DAKOTA 200 85
Sta 7690+33 lt
In place to remain

US Hwy 85 | 130 Ave NW | US 85 Business
Back to back
US Hwy 85 | US 85 Business | 130 Ave NW
Sta 7690+02 lt
In place to remain

N D 200
Sta 7688+01 lt
Remove sign

Existing SOUTH EAST Existing
Existing 85 NORTH DAKOTA 200 M1-5-45
Sta 7688+01 lt
Install new sign on existing supports
Special Assembly A

Sta 7690+10 rt
In place to remain
ONE WAY

Sta 5047+49 lt
In place to remain
SPEED LIMIT 55

Sta 5051+50 lt
In place to remain

Sta 5053+24 lt
In place to remain
BUSINESS 85

Sta 7690+23 rt
Lht std mounted
Assembly 2
STOP R1-1-36

Sta 7683+00 rt
Remove
BE PREPARED TO STOP WHEN FLASHING

Preliminary Plans

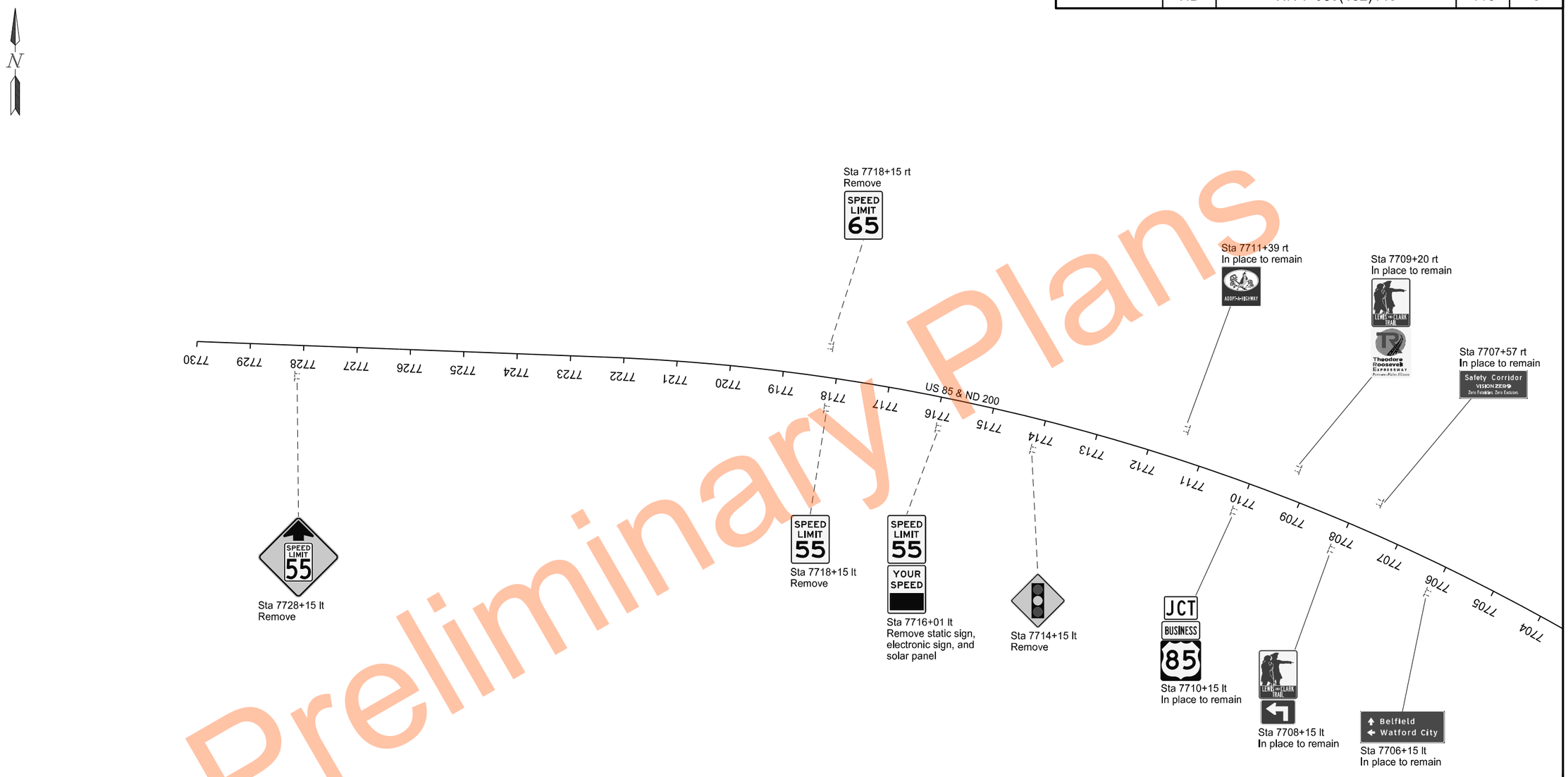
Signing Layout

Jct US 85 & US 85 Business

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	110	5



Preliminary Plans

Signing Layout

Jct US 85 & US 85 Business

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	110	6

Sather Dam Recreational Area 16 MILES
Sta 8416+25 lt
In place to remain

BE PREPARED TO STOP WHEN FLASHING
Sta 8414+60 lt
In place to remain

Arnegard 9
Watford City 17
Sidney 39
Sta 8412+31 lt
In place to remain

Sta 8411+50 rt
In place to remain
JCT
MCKENZIE 15 COUNTY

Sta 8409+52 rt
Remove sign
N 200 D

Sta 8409+52 rt
Install new sign on existing supports
Special Assembly A
Existing NORTH WEST Existing
Existing 85 NORTH DAKOTA 200 M1-5-45

Sta 8407+91 rt
Remove signs
N 68 D
N 200 D

Sta 8407+91 rt
Install new signs on existing
pipe and foundation
Special Assembly D
END Existing
NORTH DAKOTA 68 M1-5-36
Existing 85 NORTH DAKOTA 200 M1-5-45
Existing
Existing LEWIS AND CLARK TRAIL
M6-4P-30

Sta 8403+00 rt
Remove signs
N 68 D
N 200 D

Sta 8403+00 rt
Install new signs on existing
pipe and foundation
Special Assembly C
NORTH DAKOTA 68 M1-5-36
Existing
Existing 85 NORTH DAKOTA 200 M1-5-45
Existing Existing

Sta 8407+70 rt
In place to remain
STOP Hinged

Sta 8406+89 rt
Remove
ONE WAY

Sta 8401+20 rt
In place to remain
LEWIS AND CLARK TRAIL

Sta 8399+99 rt
In place to remain
BE PREPARED TO STOP WHEN FLASHING

Sta 8394+98 rt
Install new sign on existing support
Special Assembly B
JCT Existing
NORTH DAKOTA 68 M1-5-36

Sta 8397+59 rt
In place to remain
Alexander 2
Williston 29
Sidney 39

Sta 8394+98 rt
Remove sign
N 68 D

Sta 8393+01 rt
In place to remain

Sta 8391+02 rt
In place to remain
Sather Dam Recreational Area 16 MILES

M1-5-36 NORTH DAKOTA 68
Existing
Existing 85 NORTH DAKOTA 200 M1-5-45
Existing Existing
Sta 8410+31 lt
Install new signs on existing
pipe and foundation
Special Assembly C

N 68 D
N 200 D
Sta 8410+31 lt
Remove signs

ONE WAY
Sta 1484+03 lt
Remove

WEST
NORTH DAKOTA 68
Sta 1482+81 lt
In place to remain

STOP Hinged
Sta 1484+07 rt
In place to remain

Existing SOUTH EAST Existing
Existing 85 NORTH DAKOTA 200 M1-5-45
Sta 8405+46 lt
Install new sign on existing supports
Special Assembly A

N 200 D
Sta 8405+46 lt
Remove sign

Alexander 2
Williston 29
Watford City 17
Sta 1480+97 rt
In place to remain

SPEED LIMIT 55
Sta 1475+65 lt
In place to remain

STOP
Sta 1478+29 rt
In place to remain

Arnegard 9
Watford City 17
Sta 8400+98 lt
In place to remain

SPEED LIMIT 55
Sta 8395+02 lt
In place to remain

ENTRANCE ONLY
Sta 1473+16 lt
In place to remain

JCT JCT
85 NORTH DAKOTA 200
Sta 1473+67 rt
In place to remain

LEWIS AND CLARK TRAIL
Theodore Roosevelt Expressway
Sta 8391+99 lt
In place to remain

US 85 & ND 200
ND 68

Signing Layout

Jct US 85 & ND 68

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

Preliminary Plans

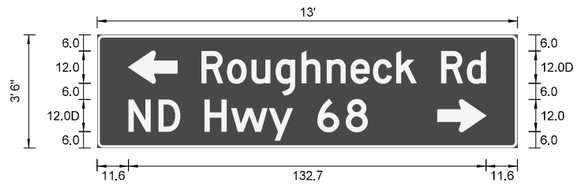
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-085(132)145	110	7

SIGN NUMBER	Sign 1
WIDTH X HEIGHT	13'-0" x 3'-6"
BORDER WIDTH	1" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Mast Arm
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_12IN_TYPE D	11.6	24.0	12.0	18.0	90.0
ND_12IN_TYPE D	126.4	6.0	12.0	18.0	270.0

STATION(S):
Sta 8406+46-66' lt

AREA: 45.5 Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Expwy_Street Name_Overhead.ssi

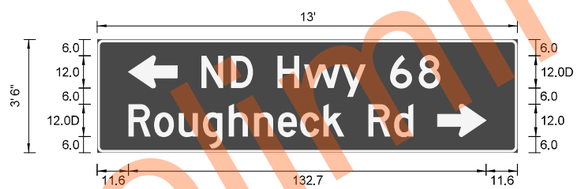
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
R	o	u	g	h	n	e	c	k		R	d									105.7	12.0/9.0	D 2000
38.6	48.1	57.2	66.2	75.8	85.2	94.1	102.4	111.0	118.7	127.7	137.2											
N	D		H	w	y		6	8												88.8	12.0/9.0	D 2000
11.6	22.7	30.8	39.8	49.7	63.7	72.7	81.7	92.3														

SIGN NUMBER	Sign 2
WIDTH X HEIGHT	13'-0" x 3'-6"
BORDER WIDTH	1" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Mast Arm
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE
ND_12IN_TYPE D	11.6	24.0	12.0	18.0	90.0
ND_12IN_TYPE D	126.4	6.0	12.0	18.0	270.0

STATION(S):
Sta 8408+21-61' rt

AREA: 45.5 Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Expwy_Street Name_Overhead.ssi

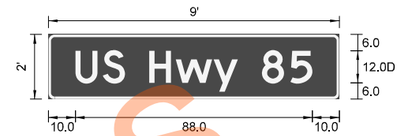
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
N	D		H	w	y		6	8												88.8	12.0/9.0	D 2000
38.6	49.7	57.8	66.8	76.7	90.7	99.7	108.7	119.3														
R	o	u	g	h	n	e	c	k		R	d									105.7	12.0/9.0	D 2000
11.6	21.1	30.2	39.2	48.8	58.2	67.1	75.4	84.0	91.7	100.7	110.2											

SIGN NUMBER	Sign 3
WIDTH X HEIGHT	9'-0" x 2'-0"
BORDER WIDTH	1" (inset 0")
CORNER RADIUS	2.25"
MOUNTING	Mast Arm
BACKGROUND	TYPE: IV Reflective
	COLOR: Green
LEGEND/BORDER	TYPE: IV Reflective
	COLOR: White

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
8406+94-69' rt
8408+03-84' lt

AREA: 18.0 Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Expwy_Street Name_Overhead.ssi

LETTER POSITION (X)									LENGTH	SIZE	SERIES
U	S		H	w	y		8	5	88.0	12.0/9.0	D 2000
10.0	20.2	28.4	37.4	47.2	61.3	70.3	79.3	89.8			

Note: These signs are shown on the signal standards in Section 150.

Sign Details

Jct US 85 & ND 68

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

Preliminary Plans

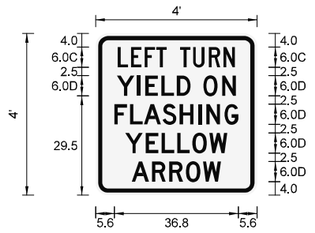
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	110	8

SIGN NUMBER	Sign 4
WIDTH X HEIGHT	4'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Mast Arm
BACKGROUND	TYPE: XI Reflective
	COLOR: White
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):
8406+46-66' lt
8408+21-61' rt

AREA: 16.0 Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Reg_48_Large.ssl

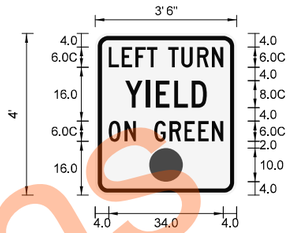
LETTER POSITION (X)																				LENGTH	SIZE	SERIES
L	E	F	T																	14.5	6.0	C 2000
6.6	10.5	14.6	18.0																			
T	U	R	N																	16.3	6.0	C 2000
25.1	29.0	33.7	38.0																			
Y	I	E	L	D	O	N														35.3	6.0	D 2000
6.4	12.4	14.8	19.6	24.2	32.0	37.6																
F	L	A	S	H	I	N	G													36.8	6.0	D 2000
5.6	10.2	14.3	19.9	25.0	30.5	32.9	38.3															
Y	E	L	L	O	W															30.3	6.0	D 2000
8.9	14.9	19.7	24.3	28.8	33.8																	
A	R	R	O	W																26.5	6.0	D 2000
10.8	16.8	21.9	26.9	31.9																		

SIGN NUMBER	Sign 5
WIDTH X HEIGHT	3'-6" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Mast Arm
BACKGROUND	TYPE: XI Reflective
	COLOR: White
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_BALL_GREEN	16.0	4.0	10.0	10.0	0.0

STATION(S):
8406+94-69' rt
8408+03-84' lt

AREA: 14.0 Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Reg_48_Large.ssl

LETTER POSITION (X)																				LENGTH	SIZE	SERIES
L	E	F	T	T	U	R	N													34.0	6.0	C 2000
4.0	7.9	12.0	15.4	21.7	25.6	30.3	34.7															
Y	I	E	L	D																24.2	8.0	C 2000
8.9	15.1	18.0	23.4	28.6																		
O	N	G	R	E	E	N														34.0	6.0	C 2000
4.0	8.7	17.6	22.1	26.5	30.6	34.7																

Preliminary Plans

Note: These signs are shown on the signal standards in Section 150.

Sign Details

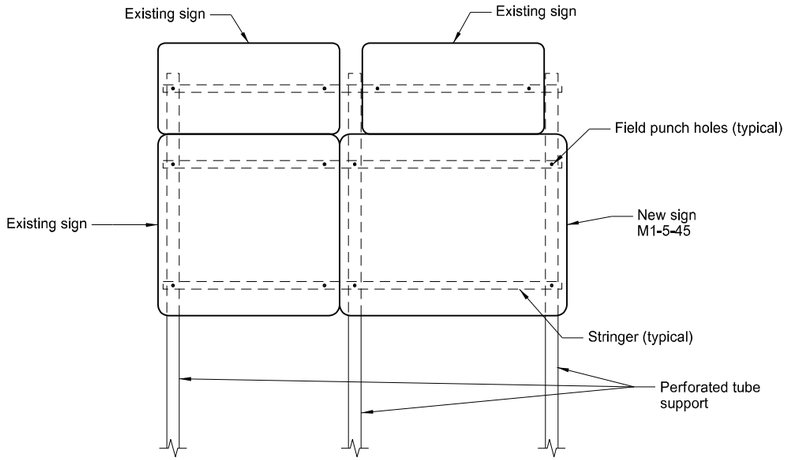
Jct US 85 & ND 68

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

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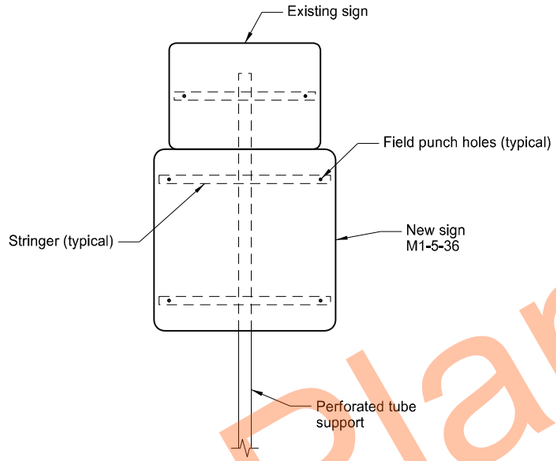
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	110	9



Special Assembly A
(Perforated Tube)

Sta 7688+01 lt
Sta 7693+00 rt
Sta 8405+46 lt
Sta 8409+52 rt

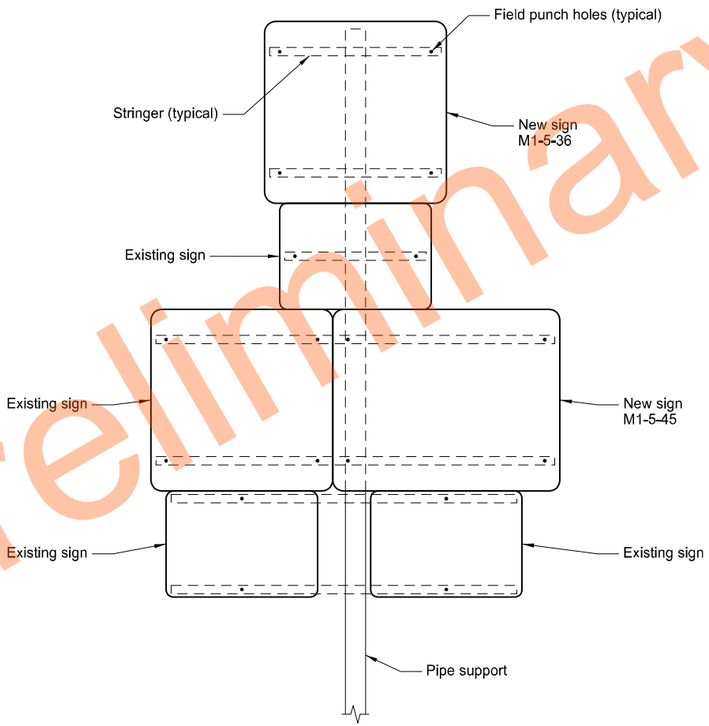
Pay Area: 11.3 SF



Special Assembly B
(Perforated Tube)

Sta 8394+98 rt

Pay Area: 9.0 SF



Special Assembly C
(Round Steel Pipe)

Sta 8403+00 rt
Sta 8410+31 lt

Pay Area: 20.3 SF

Notes:

1. See Standard D-754-7 and D-754-25 for sign mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Stringers for signs mounted on pipe supports shall be 1⅝" steel channel.
4. Stringers for signs mounted on perforated tubes shall be 1½" x 1½" perforated tube.
5. All holes shall be punched round for ⅜" bolt. See Bolt Mounting Detail on Standard D-754-25.

Preliminary Plans

Sign Details
Special Assemblies

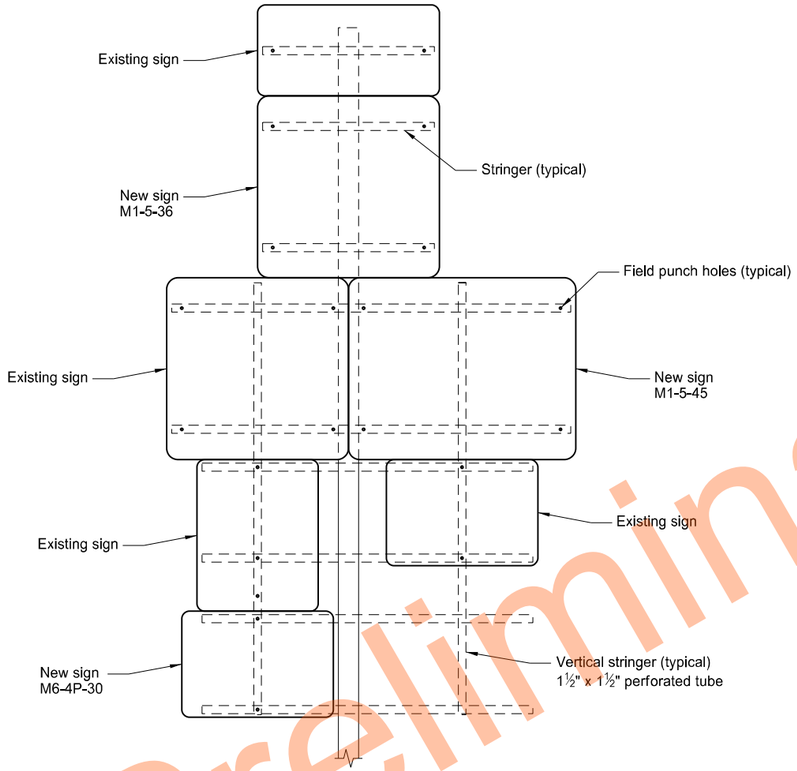
US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	110	10

Notes:

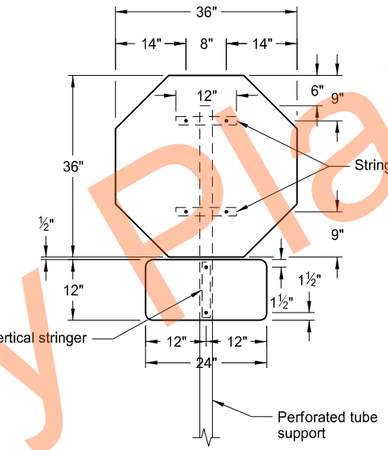
1. See Standard D-754-7 and D-754-25 for sign mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Stringers for signs mounted on pipe supports shall be 1⅝" steel channel.
4. Stringers for signs mounted on perforated tubes shall be 1½" x 1½" perforated tube.
5. All holes shall be punched round for ⅜" bolt. See Bolt Mounting Detail on Standard D-754-25.



Special Assembly D
(Round Steel Pipe)

Sta 8407+91 rt

Pay Area: 24.6 SF



Special Assembly E
(Perforated Tube)

Sta 7691+33 rt
Sta 7690+15 lt

Pay Area: 9.5 SF

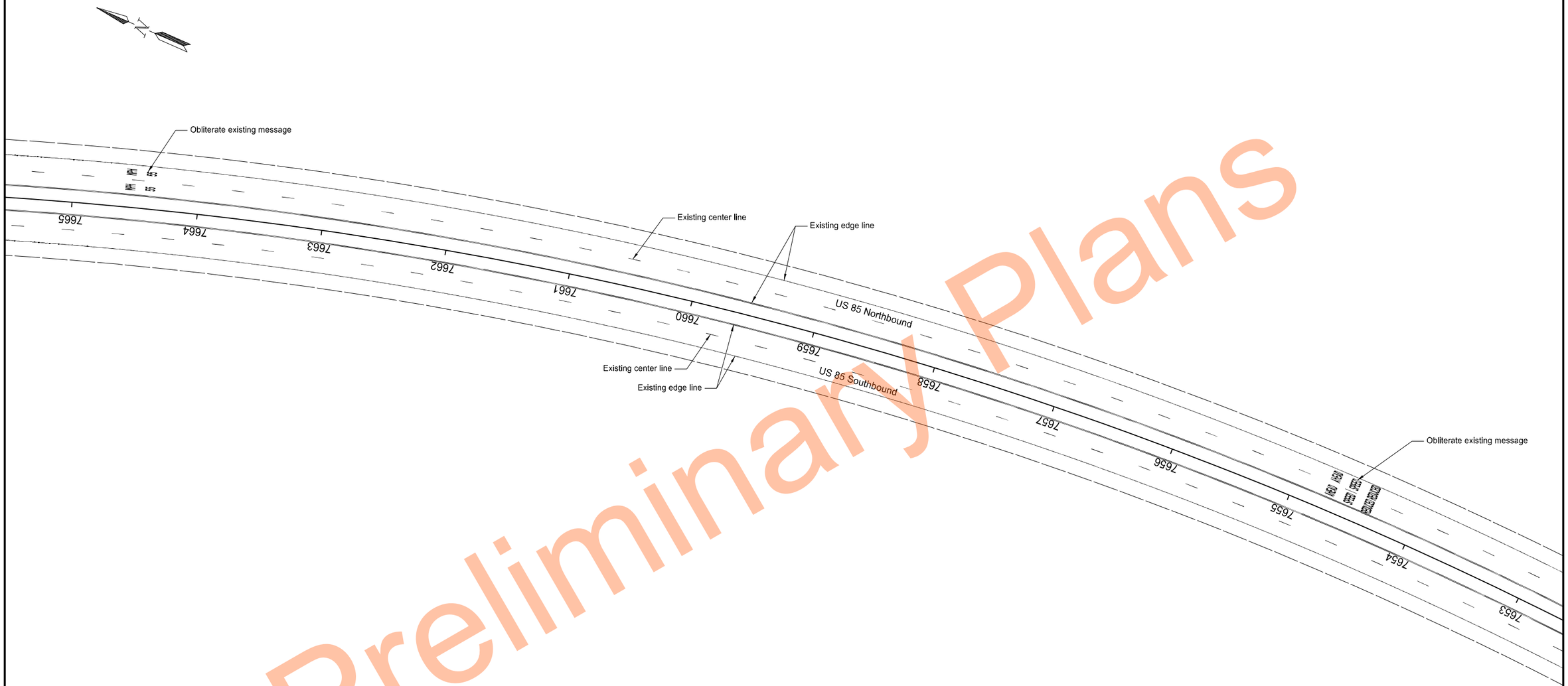
Preliminary Plans

Sign Details
Special Assemblies

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	120	1



Preliminary

SPEC	CODE	BID ITEM		QTY	UNIT
704	1500	Obliteration of pavement marking			
		REDUCED SPEED AHEAD (2 EA at 103 SF)		206	SF
		55 MPH (2 EA at 32 SF)		64	SF
			Total	270	SF

Pavement Marking Layout

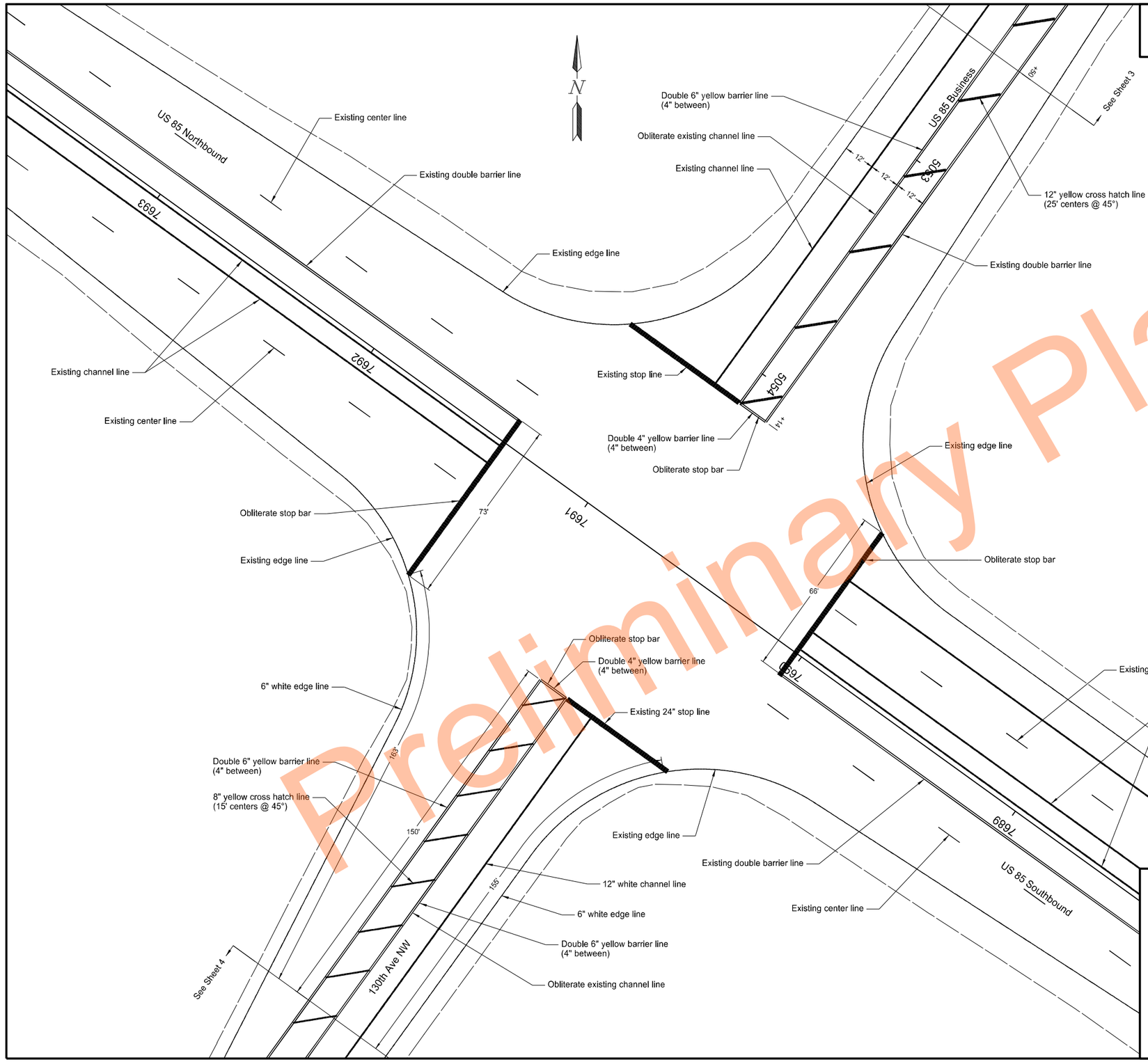
Jct US 85 & US 85 Business

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

1/29/2026 3:30:13 PM tcork R:\project\70085145.132\Traffic\Sheets\120MK_001_LPvmt_US85 and US85B.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	120	2



SPEC	CODE	BID ITEM	QTY	UNIT
704	1500	Obliteration of pavement marking		
		Stop line (US 85 southbound)	146	SF
		Stop line (US 85 northbound)	132	SF
		Stop line (US 85 Business)	24	SF
		Stop line (130th Ave NW)	24	SF
		Channel line (Sta 5052+50 to 5054+14)	109	SF
		Channel line (130th Ave NW)	100	SF
		Total	535	SF
762	0111	Epoxy pvmt mk 12in line		
		Yellow cross hatch line, 25' centers @ 45° (Sta 5052+50 to 5054+14)	81	LF
		White channel line (130th Ave NW)	150	LF
		Total	231	LF
762	0114	Epoxy pvmt mk 6in line		
		Double 6" yellow barrier line, 4" between (Sta 5052+50 to 5054+14)	352	LF
		White edge line (130th Ave NW)	318	LF
		Double 6" yellow barrier line, 4" between (130th Ave NW)	624	LF
		Total	1294	LF
762	0115	Epoxy pvmt mk 8in line		
		Yellow cross hatch line, 15' centers @ 45° (130th Ave NW)	119	LF

Preliminary Plans

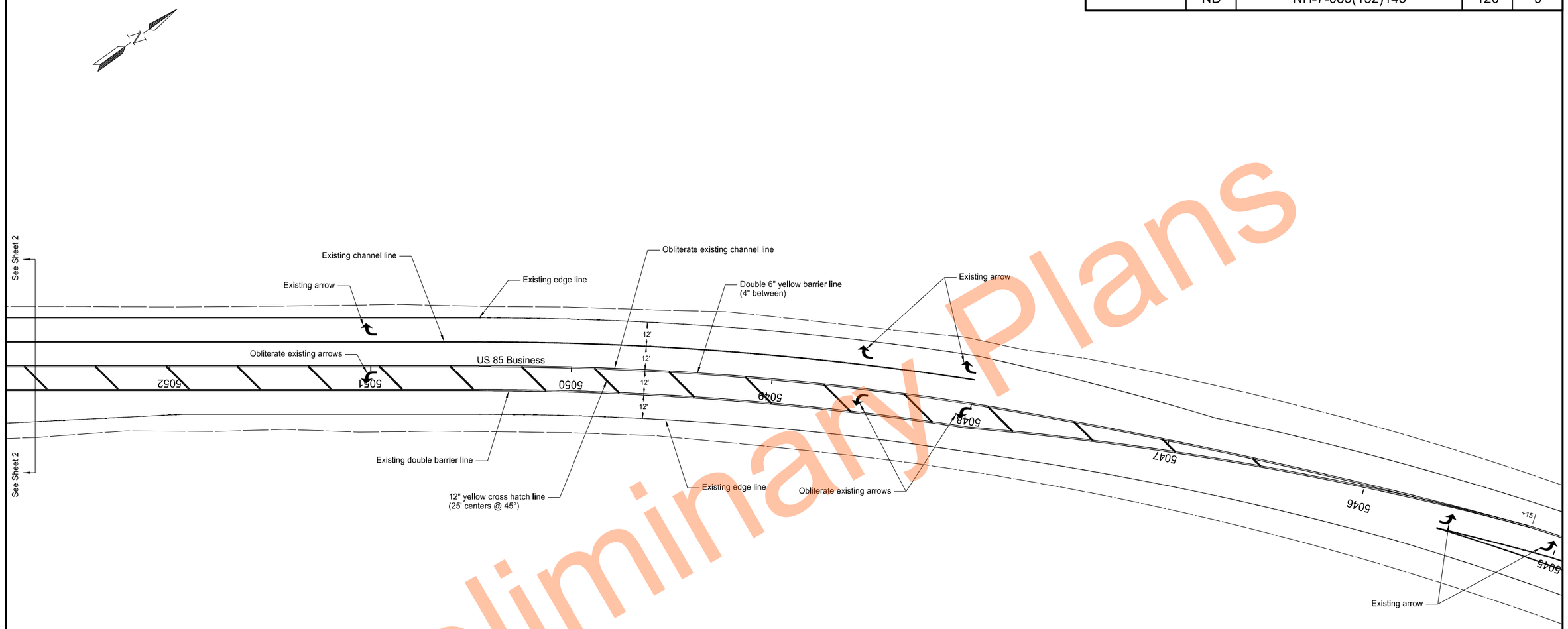
Pavement Marking Layout

Jct US 85 & US 85 Business

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	120	3



SPEC	CODE	BID ITEM	QTY	UNIT
704	1500	Obliteration of pavement marking		
		Left arrow (3 @ 16 SF)	48	SF
		Channel line (Sta 5048+00 to 5052+50)	300	SF
		Total	348	SF
762	0111	Epoxy pvmt mk 12in line		
		Yellow cross hatch line, 25' centers @ 45° (Sta 5045+15 to 5052+50)	255	LF
762	0114	Epoxy pvmt mk 6in line		
		Double 6" yellow barrier line, 4" between (Sta 5045+15 to 5052+50)	1470	LF

Pavement Marking Layout

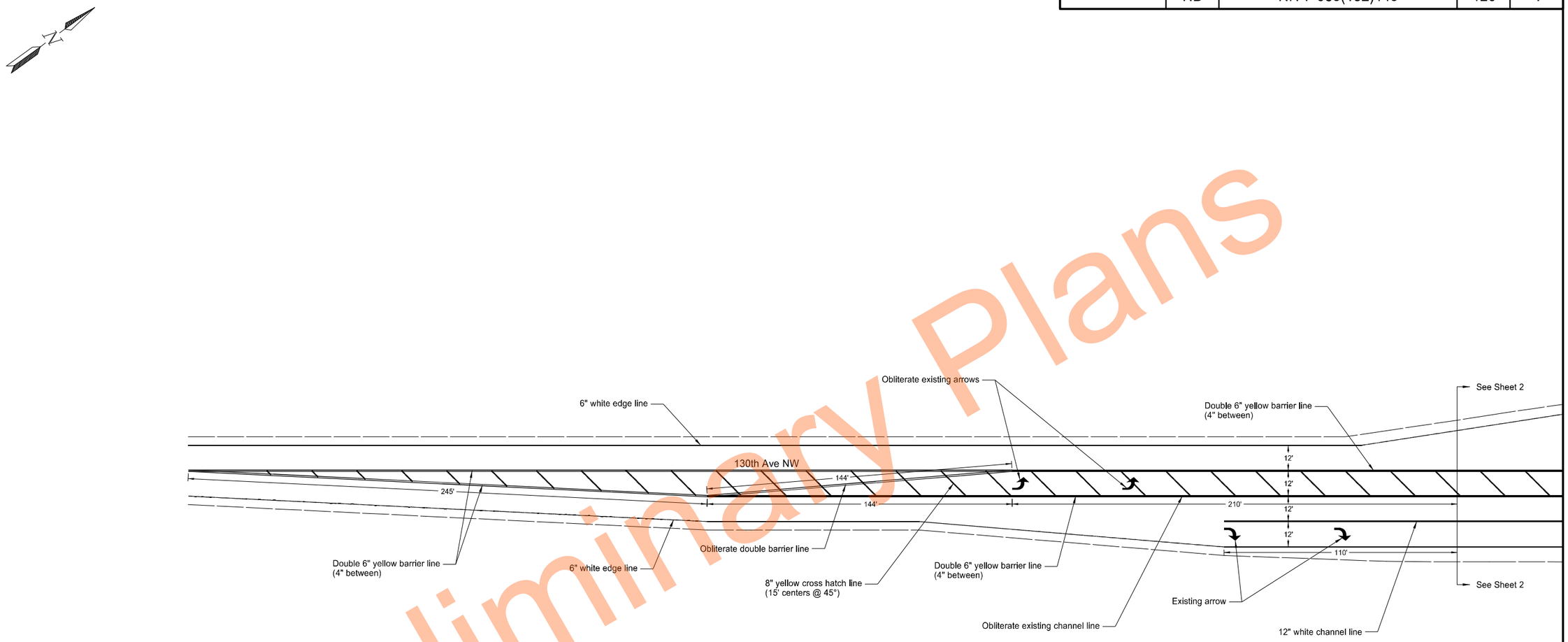
Jct US 85 & US 85 Business

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

Preliminary Plans

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	120	4



Preliminary Plans

SPEC	CODE	BID ITEM	QTY	UNIT
704	1500	Obliteration of pavement marking		
		Left arrow (2 @ 16 SF)	32	SF
		Channel line	140	SF
		Double barrier line	96	SF
		Total	268	SF
762	0111	Epoxy pvmt mk 12in line		
		White channel line	110	LF
762	0114	Epoxy pvmt mk 6in line		
		White edge line	1198	LF
		Double 6" yellow barrier line, 4" between	2396	LF
		Total	3594	LF
762	0115	Epoxy pvmt mk 8in line		
		Yellow cross hatch line, 15' centers @ 45°	385	LF

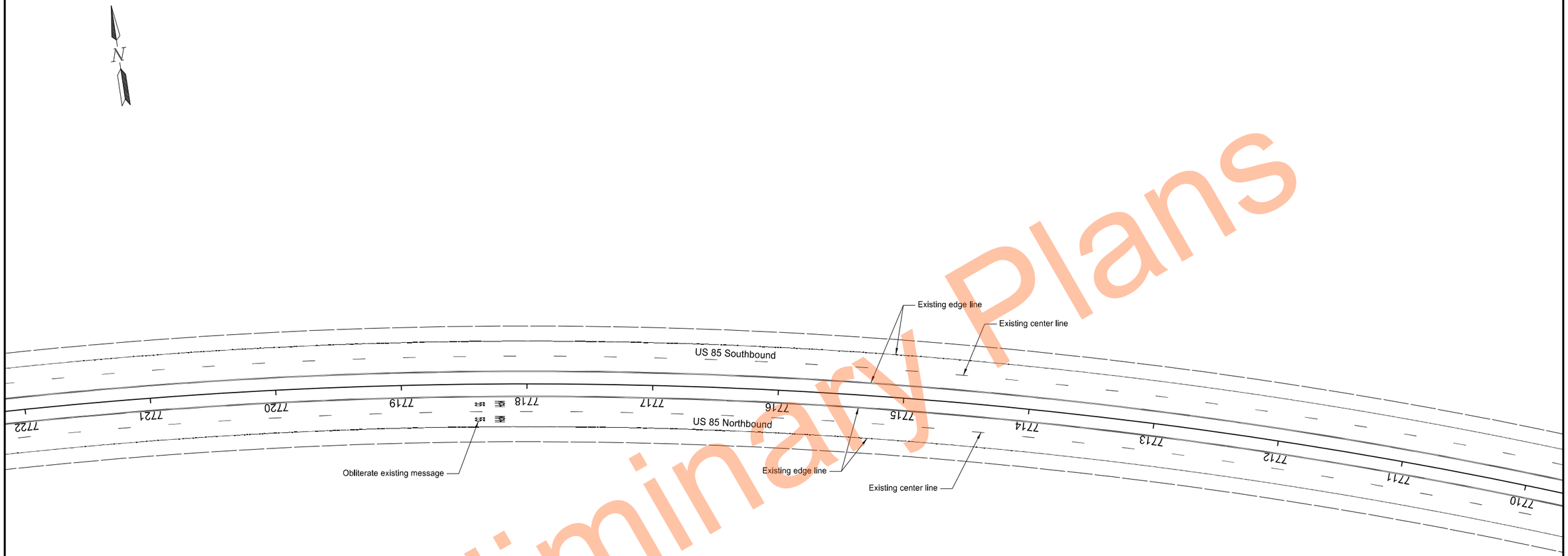
Pavement Marking Layout

Jct US 85 & US 85 Business

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	120	5



Preliminary Plans

SPEC	CODE	BID ITEM	QTY	UNIT
704	1500	Obliteration of pavement marking 55 MPH (2 EA at 32 SF)	64	SF

Pavement Marking Layout

Jct US 85 & US 85 Business

US 85

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	140	1

Sta 1478-72-55' rt (ND 68)
Remove wood pole lt std

Sta 1480+45-55' rt (ND 68)
Remove wood pole lt std

Sta 1482+34-49' rt (ND 68)
Remove wood pole lt std

Sta 8406+64-72' lt (US 85)
Remove wood pole combo
signal & lt std
(see section 150)

Sta 8408+03-72' lt (US 85)
Remove wood pole combo
signal & lt std
(see section 150)

Sta 8408+69-109' lt (US 85)
Remove lighting cabinet

Sta 8405+40-64' lt (US 85)
Remove wood pole lt std

Sta 8409+48-64' lt (US 85)
Remove wood pole lt std

Sta 8403+30-64' lt (US 85)
Remove wood pole lt std

Sta 8411+68-64' lt (US 85)
Remove wood pole lt std

Sta 8401+10-64' lt (US 85)
Remove wood pole lt std

Sta 8413+88-64' lt (US 85)
Remove wood pole lt std

Sta 8398+90-64' lt (US 85)
Remove wood pole lt std

Sta 8404+40-59' rt (US 85)
Remove wood pole lt std

Sta 8408+08-60' rt (US 85)
Remove wood pole combo
signal & lt std
(see section 150)

Sta 8402+20-59' rt (US 85)
Remove wood pole lt std

Sta 8396+70-64' lt (US 85)
Remove wood pole lt std

Sta 8412+78-59' rt (US 85)
Remove wood pole lt std

Sta 8400+10-59' rt (US 85)
Remove wood pole lt std

Sta 8406+59-60' rt (US 85)
Remove wood pole combo
signal & lt std
(see section 150)

Sta 8410+48-59' rt (US 85)
Remove wood pole lt std

Sta 8414+98-59' rt (US 85)
Remove wood pole lt std

Sta 8397+80-59' rt (US 85)
Remove wood pole lt std

Sta 8416+80-80' rt (US 85)
Remove destination
wood pole lt std with
solar equipment

Sta 8395+60-59' rt (US 85)
Remove wood pole lt std

Preliminary Plans

Lighting Removal Layout

US 85 & ND 68 Intersection

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 01/30/26
NORTH DAKOTA

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Remove Lighting System Quantities (A)		
Description	Unit	Qty
Remove 50 FT Wood Pole with Mast Arm and Luminaire (B)	EA	19
Remove 50 FT Destination Wood Pole with Mast Arm and Luminaire (C)	EA	1
Remove Span Wire and Stability Wire and hardware (D)	LSUM	1
Remove Lighting Cabinet and Foundation	EA	1
Seeding	SY	30

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	140	2

SPEC	CODE	BID ITEM	QTY	UNIT
770	4567	Remove Lighting System		
			1	EA

(A) Include these quantities in the price bid for the item "Remove Lighting System".

(B) This includes 50 ft wood poles with 12 ft mast arm and luminaire.

(C) This includes 50 ft wood pole with 12 ft mast arm, solar panels, solar cabinet, and salvage luminaire. See section 6 note.

(D) This includes all overhead wires, mounting hardware, and guy wires.

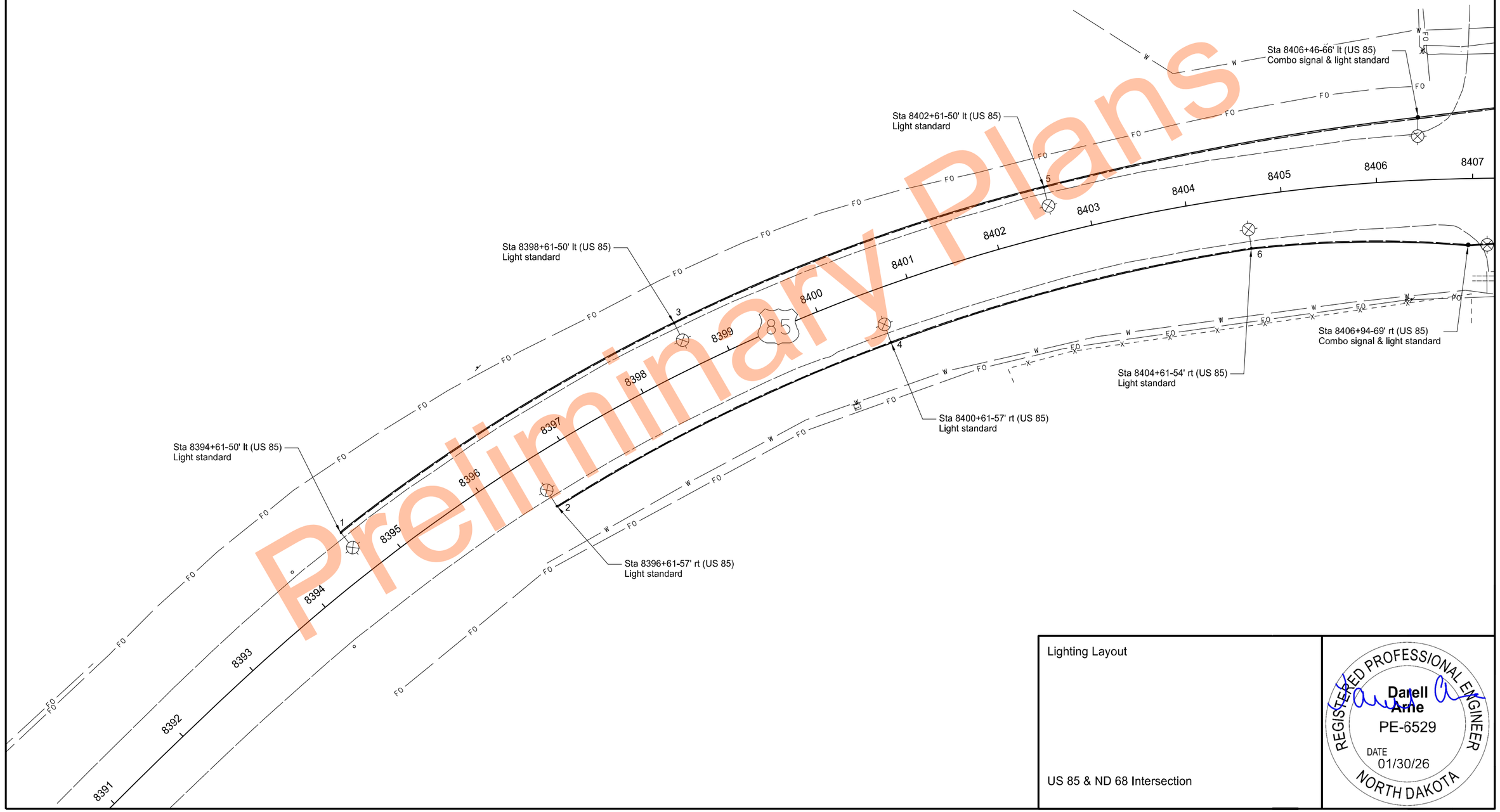
Preliminary Plans

Lighting Removal Quantities

US 85 & ND 68 Intersection

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	ND	NH-7-085(132)145	140	3



Preliminary Plans

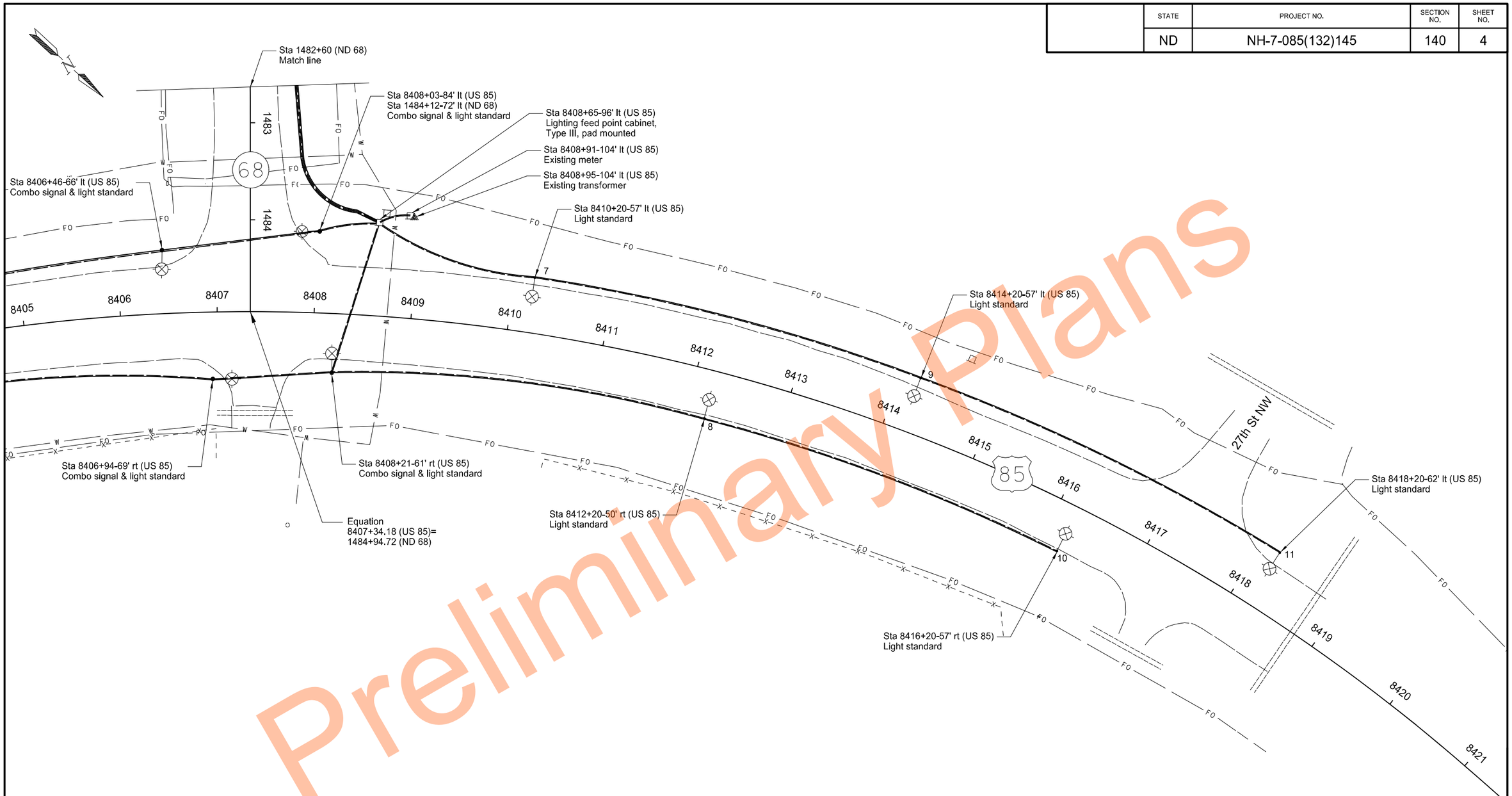
Lighting Layout

US 85 & ND 68 Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	140	4



Preliminary Plans

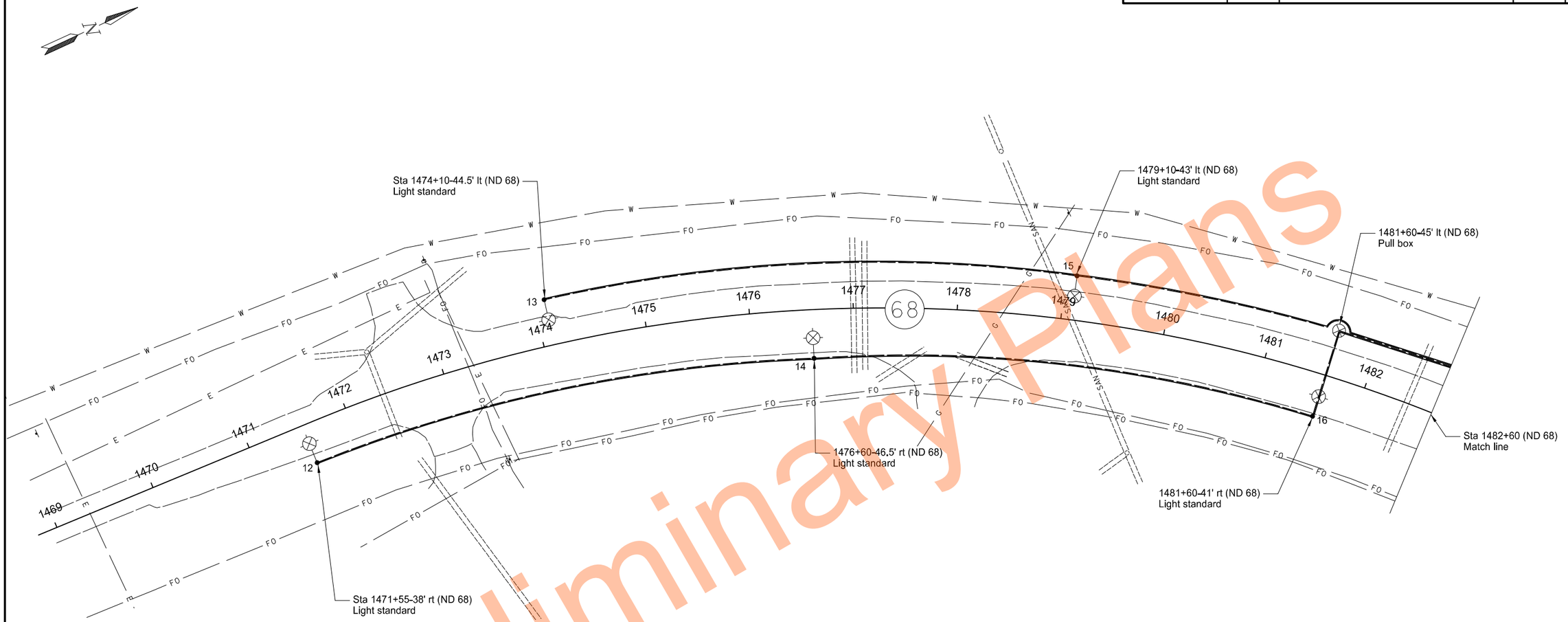
Lighting Layout

US 85 & ND 68 Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	140	5



Preliminary Plans

Lighting Layout

US 85 & ND 68 Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	140	6

SPEC	CODE	BID ITEM	QTY	UNIT
770	0001	Lighting System		
			1	EA

(A) Include these quantities in the price bid for the item "Lighting System".

Lighting Quantities (A)		
Description	Unit	Qty
Pull Box	EA	1
2" Diameter Conduit	LF	7067
Underground Conductor No 4 Type RHW	LF	110
Underground Conductor No 6 Type RHW	LF	14160
Underground Conductor No 6 Type THW	LF	7135
Light Std 12' MA 42' Pole Breakaway	EA	16
Concrete Foundation - Highway Lighting	EA	16
LED Luminaire	EA	16
Lighting Feed Point, Type III, Pad Mounted, and Foundation	EA	1
Seeding	SY	1500

Light Standard List							
No	Station	Circuit	Light Distribution Type	Wattage	Pole Height FT	Mast Arm FT	Breakaway Base
1	8394+61-50' lt (US 85)	1	4	170-180	42	12	X
2	8396+61-57' rt (US 85)	2	4	170-180	42	12	X
3	8398+61-50' lt (US 85)	1	4	170-180	42	12	X
4	8400+61-57' rt (US 85)	2	4	170-180	42	12	X
5	8402+61-50' lt (US 85)	1	4	170-180	42	12	X
6	8404+61-54' rt (US 85)	2	4	170-180	42	12	X
Combo	8406+46-66' lt (US 85)	1	4	170-180		12	
Combo	8406+94-69' rt (US 85)	2	4	170-180		12	
Combo	8408+03-84' lt (US 85)	1	4	170-180		12	
Combo	8408+21-61' rt (US 85)	2	4	170-180		12	
7	8410+20-57' lt (US 85)	1	4	170-180	42	12	X
8	8412+20-50' rt (US 85)	2	4	170-180	42	12	X
9	8414+20-57' lt (US 85)	1	4	170-180	42	12	X
10	8416+20-57' rt (US 85)	2	4	170-180	42	12	X
11	8418+20-62' lt (US 85)	1	4	170-180	42	12	X
12	1471+55-38' rt (ND 68)	3	3	170-180	42	12	X
13	1474+10-44.5' lt (ND 68)	3	3	170-180	42	12	X
14	1476+60-46.5' rt (ND 68)	3	3	170-180	42	12	X
15	1479+10-43' lt (ND 68)	3	3	170-180	42	12	X
16	1481+60-41' rt (ND 68)	3	3	170-180	42	12	X

Lighting Foundation Table				
Light Standard Height	Footing Depth			
	24" Dia	30" Dia	36" Dia	42" Dia
42'	6'	6'	5'	5'

Preliminary Plans

Lighting Quantities

US 85 & ND 68 Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	140	7

Lighting Cable & Conduit Runs - Circuit 1						
Run		Conduit		Cable		
No	Station (US 85)	Size IN	LF	# of Cables	Size/Type	LF
1	8394+61-50' lt to	2	414	2	Underground Conductor No 6-Type RHW	836
3	8398+61-50' lt			1	Underground Conductor No 6-Type THW	418
3	8398+61-50' lt to	2	414	2	Underground Conductor No 6-Type RHW	836
5	8402+61-50' lt			1	Underground Conductor No 6-Type THW	418
5	8402+61-50' lt to	2	413	2	Underground Conductor No 6-Type RHW	834
Combo	8406+46-66' lt			1	Underground Conductor No 6-Type THW	417
Combo	8406+46-66' lt to	2	155	2	Underground Conductor No 6-Type RHW	318
Combo	8408+03-84' lt			1	Underground Conductor No 6-Type THW	159
Combo	8408+03-84' lt to	2	74	2	Underground Conductor No 6-Type RHW	152
LT FP	8408+65-96' lt			1	Underground Conductor No 6-Type THW	76
11	8418+20-62' lt to	2	416	2	Underground Conductor No 6-Type RHW	840
9	8414+20-57' lt			1	Underground Conductor No 6-Type THW	420
9	8414+20-57' lt to	2	416	2	Underground Conductor No 6-Type RHW	840
7	8410+20-57' lt			1	Underground Conductor No 6-Type THW	420
7	8410+20-57' lt to	2	184	2	Underground Conductor No 6-Type RHW	372
LT FP	8408+65-96' lt			1	Underground Conductor No 6-Type THW	186
LT FP	8408+65-96' lt to	2	55	2	Underground Conductor No 4-Type RHW	110
Meter	8408+91-104' lt			1	Underground Conductor No 6-Type THW	55

Lighting Cable & Conduit Runs - Circuit 3						
Run		Conduit		Cable		
No	Station	Size IN	LF	# of Cables	Size/Type	LF
12	1471+55-38' rt (ND 68) to	2	494	2	Underground Conductor No 6-Type RHW	996
14	1476+60-46.5' rt (ND 68)			1	Underground Conductor No 6-Type THW	498
14	1476+60-46.5' rt (ND 68) to	2	489	2	Underground Conductor No 6-Type RHW	986
16	1481+60-41' rt (ND 68)			1	Underground Conductor No 6-Type THW	493
16	1481+60-41' rt (ND 68) to	2	383	2	Underground Conductor No 6-Type RHW	774
PB	1481+60-45' lt (ND 68) to			1	Underground Conductor No 6-Type THW	387
LT FP	8408+65-96' lt (US 85)					
13	1474+10-44.5' lt (ND 68) to	2	519	2	Underground Conductor No 6-Type RHW	1046
15	1479+10-43' lt (ND 68)			1	Underground Conductor No 6-Type THW	523
15	1479+10-43' lt (ND 68) to	2	538	2	Underground Conductor No 6-Type RHW	1080
LT FP	8408+65-96' lt (US 85)			1	Underground Conductor No 6-Type THW	540

Lighting Cable & Conduit Runs - Circuit 2						
Run		Conduit		Cable		
No	Station (US 85)	Size IN	LF	# of Cables	Size/Type	LF
2	8396+61-57' rt to	2	392	2	Underground Conductor No 6-Type RHW	792
4	8400+61-57' rt			1	Underground Conductor No 6-Type THW	396
4	8400+61-57' rt to	2	392	2	Underground Conductor No 6-Type RHW	792
6	8404+61-54' rt			1	Underground Conductor No 6-Type THW	396
6	8404+61-54' rt to	2	231	2	Underground Conductor No 6-Type RHW	470
Combo	8406+94-69' rt			1	Underground Conductor No 6-Type THW	235
Combo	8406+94-69' rt to	2	127	2	Underground Conductor No 6-Type RHW	254
Combo	8408+21-61' rt			1	Underground Conductor No 6-Type THW	127
10	8416+20-57' rt to	2	394	2	Underground Conductor No 6-Type RHW	796
8	8412+20-50' rt			1	Underground Conductor No 6-Type THW	398
8	8412+20-50' rt to	2	393	2	Underground Conductor No 6-Type RHW	794
Combo	8408+21-61' rt			1	Underground Conductor No 6-Type THW	397
Combo	8408+21-61' rt to	2	174	2	Underground Conductor No 6-Type RHW	352
LT FP	8408+65-96' lt			1	Underground Conductor No 6-Type THW	176

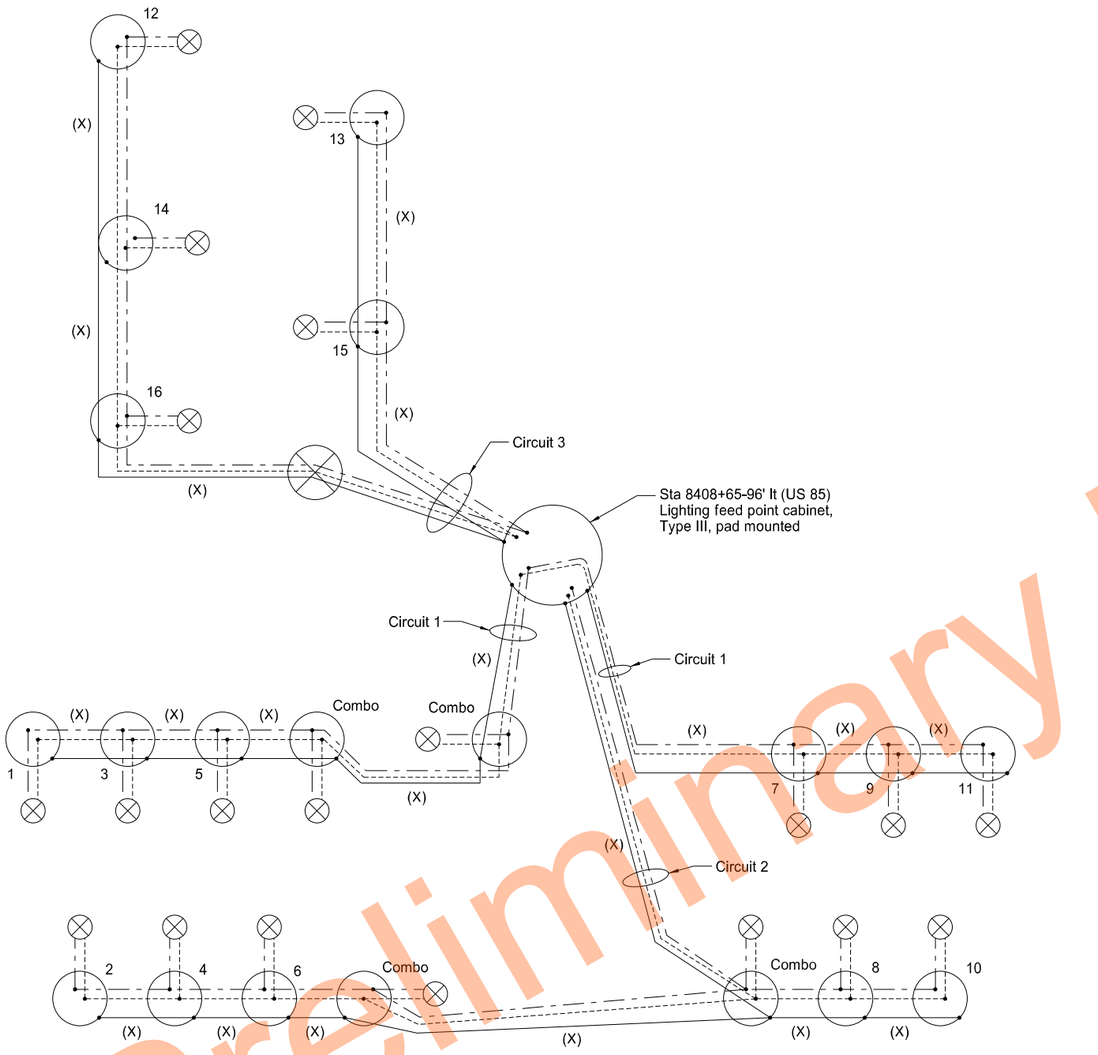
Preliminary Plans

Lighting Quantities

US 85 & ND 68 Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Preliminary Plans

LEGEND

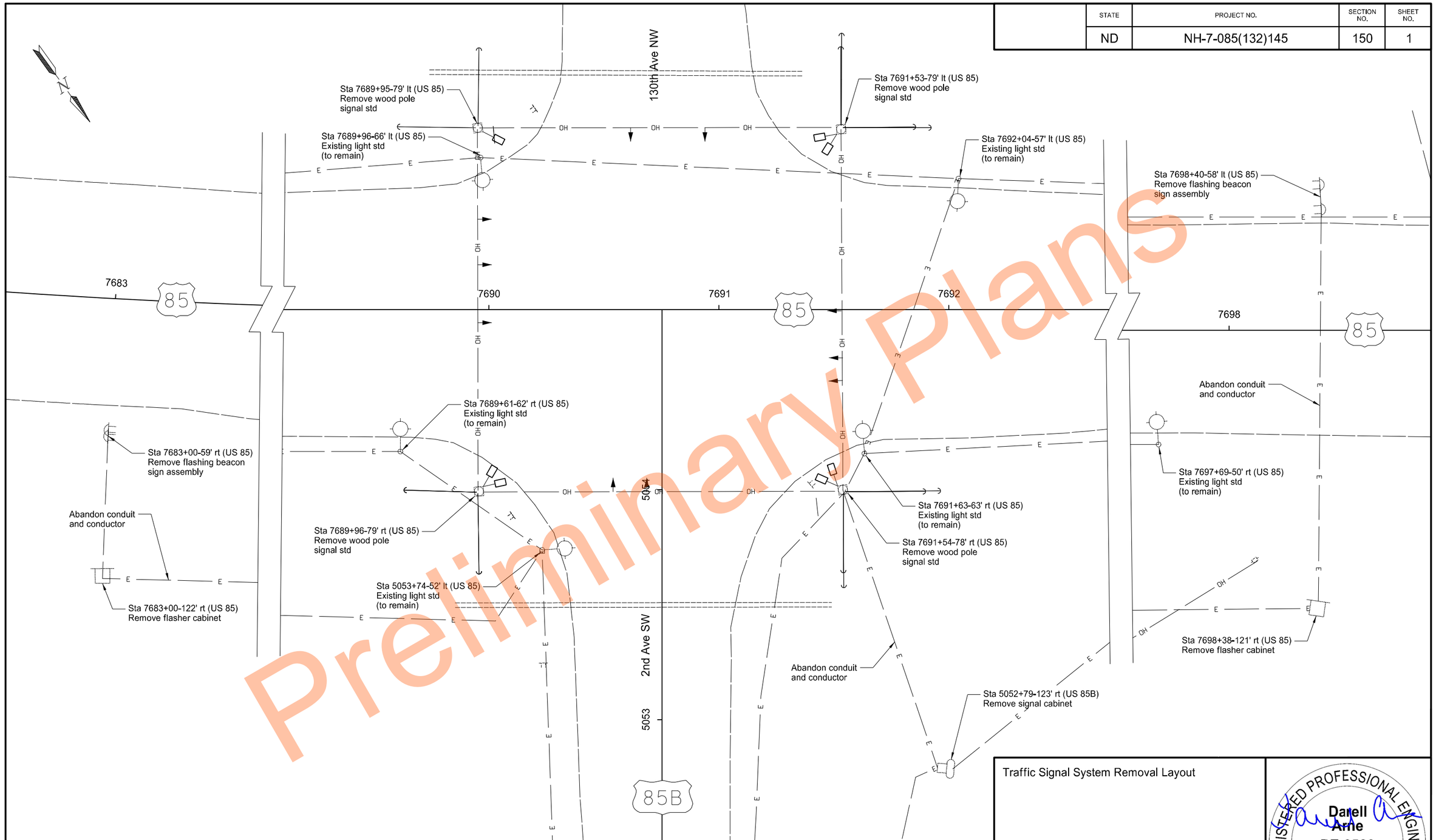
1	Light standard number		LED luminaire 120v x 240v operated on 240v		Proposed Pull Box
	Phase conductor		Proposed Light Standard		
	Neutral conductor				
	Ground conductor		Proposed Feed Point		
(X)	Underground Conductor (2) No 6 RHW & (1) No 6 THW				

Lighting Schematic

US 85 & ND 68 Intersection

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Preliminary Plans

Note: Ensure the existing lighting system remains operational and is not disturbed by the traffic signal removal.

Traffic Signal System Removal Layout

US 85 & US 85B Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	150	2

Remove Signal System & Flashing Beacon Quantities (A)		
Item Description	Unit	Qty
Remove 50FT Wood Pole Signal Std	EA	4
Remove Signal Heads & Mounting Hardware	EA	14
Remove Span Wire, Guy Lines, & Overhead Conductor	LSUM	1
Remove Cameras, EVP Detectors & Mounting Hardware	LSUM	1
Remove Signal Cabinet & Foundation (B)	EA	1
Remove Flashing Beacon Sign Assembly	EA	2
Remove Flasher Cabinet pipe stand mounted	EA	2
Seeding	SY	20

SPEC	CODE	BID ITEM	QTY	UNIT
772	3125	Remove Traffic Signal System		
			1	EA

(A) Include these quantities in the price bid for the item "Remove Traffic Signal System."

(B) Remove the signal cabinet and foundation. Disconnect the power to the signal cabinet.

Preliminary Plans

Traffic Signal Removal Quantities

US 85 & US 85B Intersection

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	ND	NH-7-085(132)145	150	3

(A) Remove the flashing beacons with the backplate and the visor.
The flashing beacon sign assemblies will remain in place.

Sta 8406+64-72' lt (US 85)
Remove wood pole combo
signal & lt std

Sta 8408+03-72' lt (US 85)
Remove wood pole combo
signal & lt std

Sta 8408+69-101' lt (US 85)
Remove signal cabinet

Sta 8414+65-96' lt (US 85)
Existing flasher cabinet
(to remain)

Sta 8414+65-69' lt (US 85)
Remove flashing beacons (A)

Sta 8400+00-63' rt (US 85)
Remove flashing beacons (A)

Sta 8406+64-60' rt (US 85)
Remove wood pole combo
signal & lt std

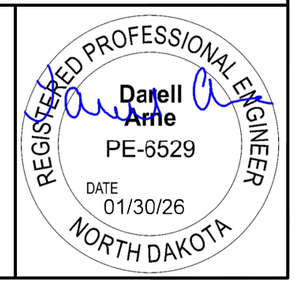
Sta 8408+08-60' rt (US 85)
Remove wood pole combo
signal & lt std

Sta 8400+00-108' rt (US 85)
Existing flasher cabinet
(to remain)

Preliminary Plans

Traffic Signal Removal Layout

US 85 & ND 68 Intersection



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	150	4

Remove Signal System & Flashing Beacon Quantities (A)		
Item Description	Unit	Qty
Remove 50FT Wood Pole Signal Std with Luminaire Extension	EA	4
Remove Signal Heads & Mounting Hardware	EA	13
Remove Span Wire, Guy Lines, & Overhead Conductor	LSUM	1
Remove Cameras & Mounting Hardware	LSUM	1
Remove & Salvage PTZ Camera (B)	EA	1
Remove Signal Cabinet & Foundation (B)	EA	1
Remove Flashing Beacon Head	EA	4
Seeding	SY	20

SPEC	CODE	BID ITEM	QTY	UNIT
772	3125	Remove Traffic Signal System	1	EA

(A) Include these quantities in the price bid for the item "Remove Traffic Signal System."

(B) Remove and salvage the PTZ camera mounted on the wood pole. Also salvage the 4G modem, POE Adapter, and Ethernet Switch in the cabinet.

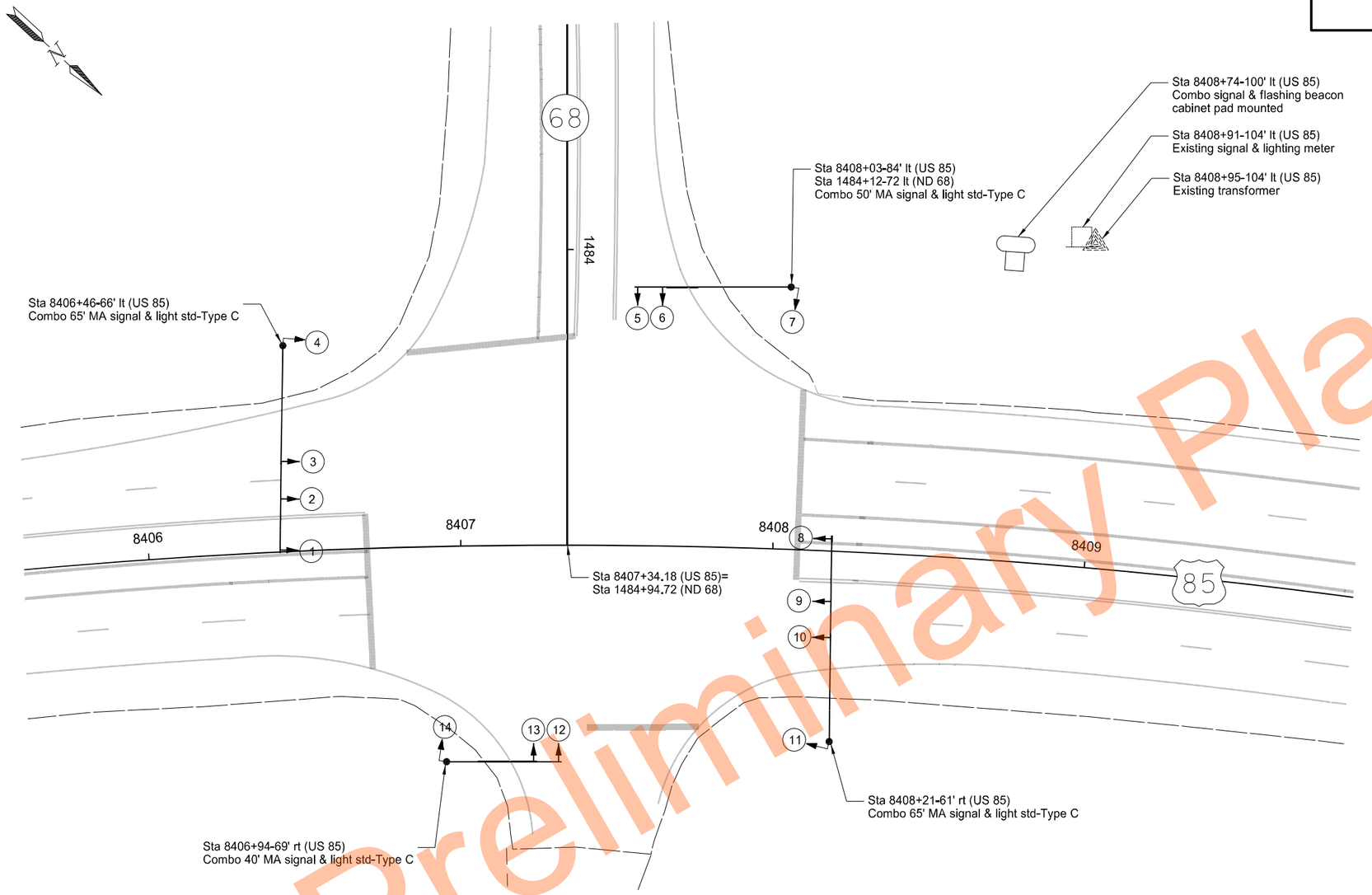
Preliminary Plans

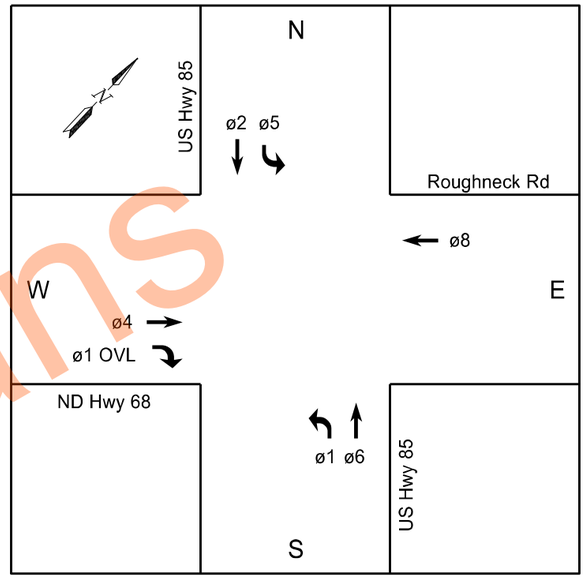
Traffic Signal Removal Quantities

US 85 & ND 68 Intersection

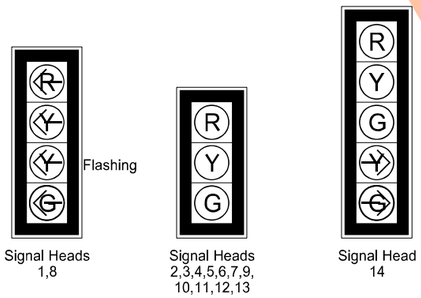
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Note: Install the signal cabinet facing towards roadway with the main door hinges on the right.



Legend

- Signal Cabinet
- Signal Head
- Feed Point
- Signal Standard

Traffic Signal Layout

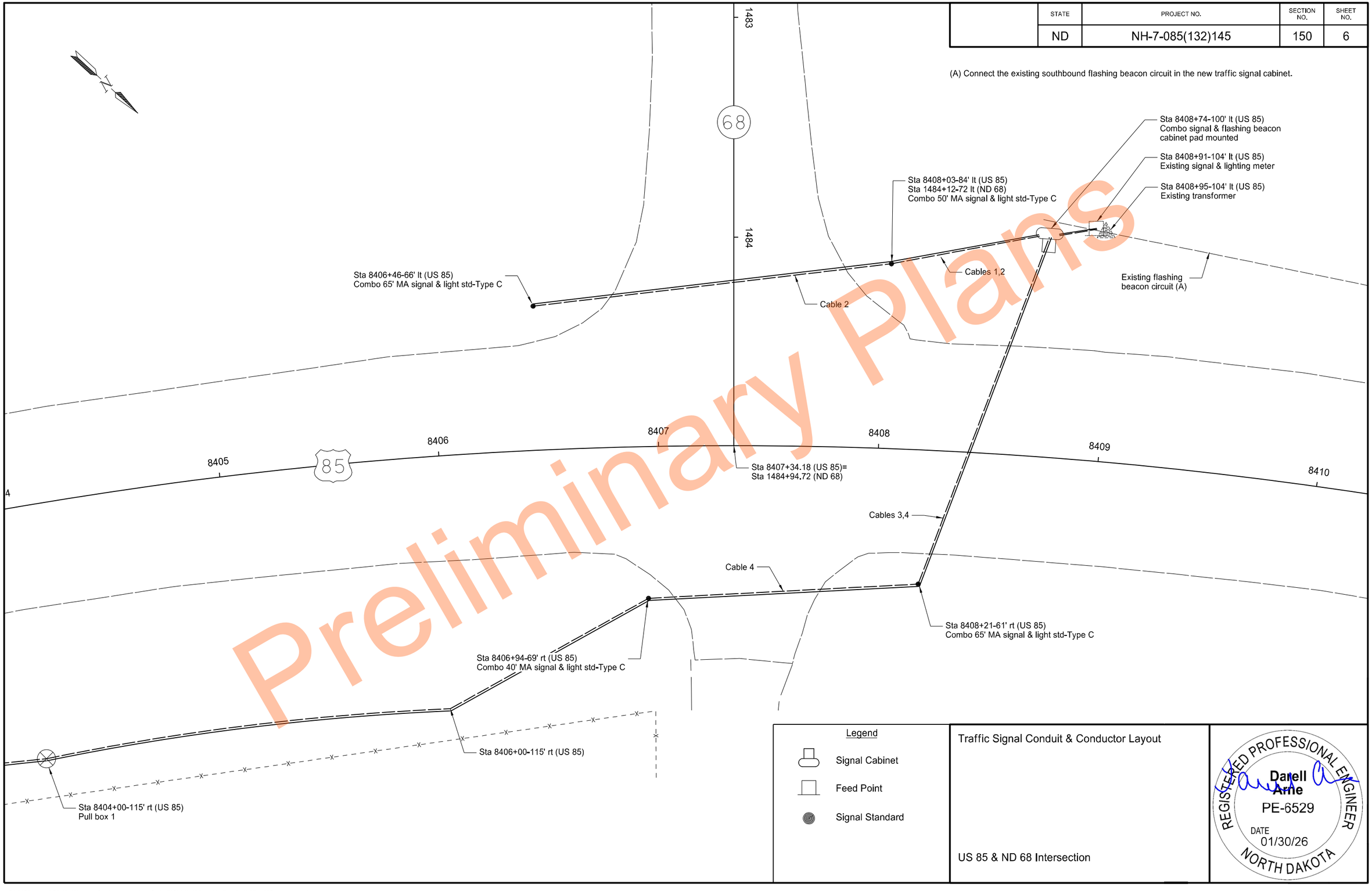
US 85 & ND 68 Intersection

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Preliminary Plans

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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(A) Connect the existing southbound flashing beacon circuit in the new traffic signal cabinet.



Preliminary Plans

Legend

- Signal Cabinet
- Feed Point
- Signal Standard

Traffic Signal Conduit & Conductor Layout

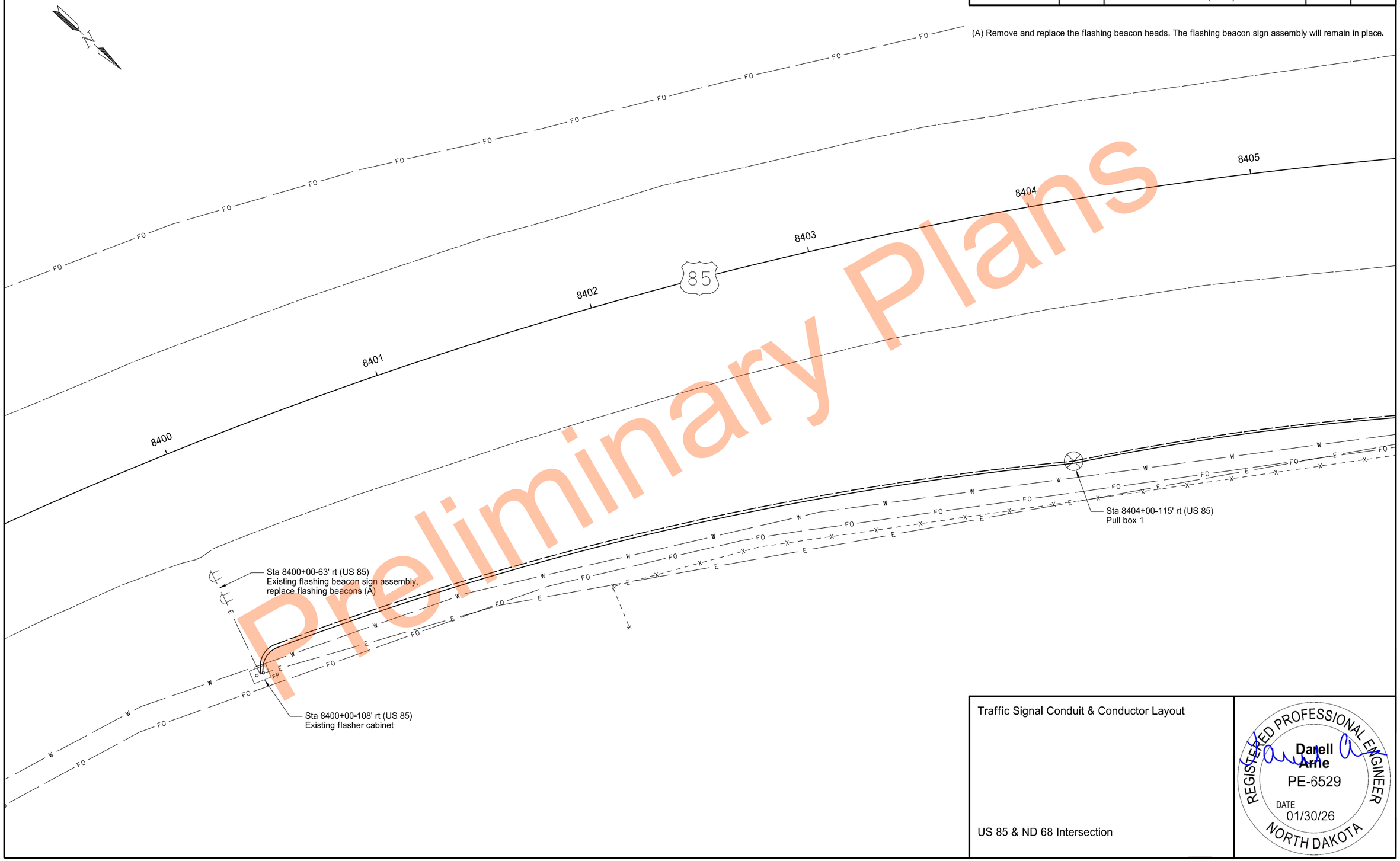
US 85 & ND 68 Intersection

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	ND	NH-7-085(132)145	150	7

(A) Remove and replace the flashing beacon heads. The flashing beacon sign assembly will remain in place.



Preliminary Plans

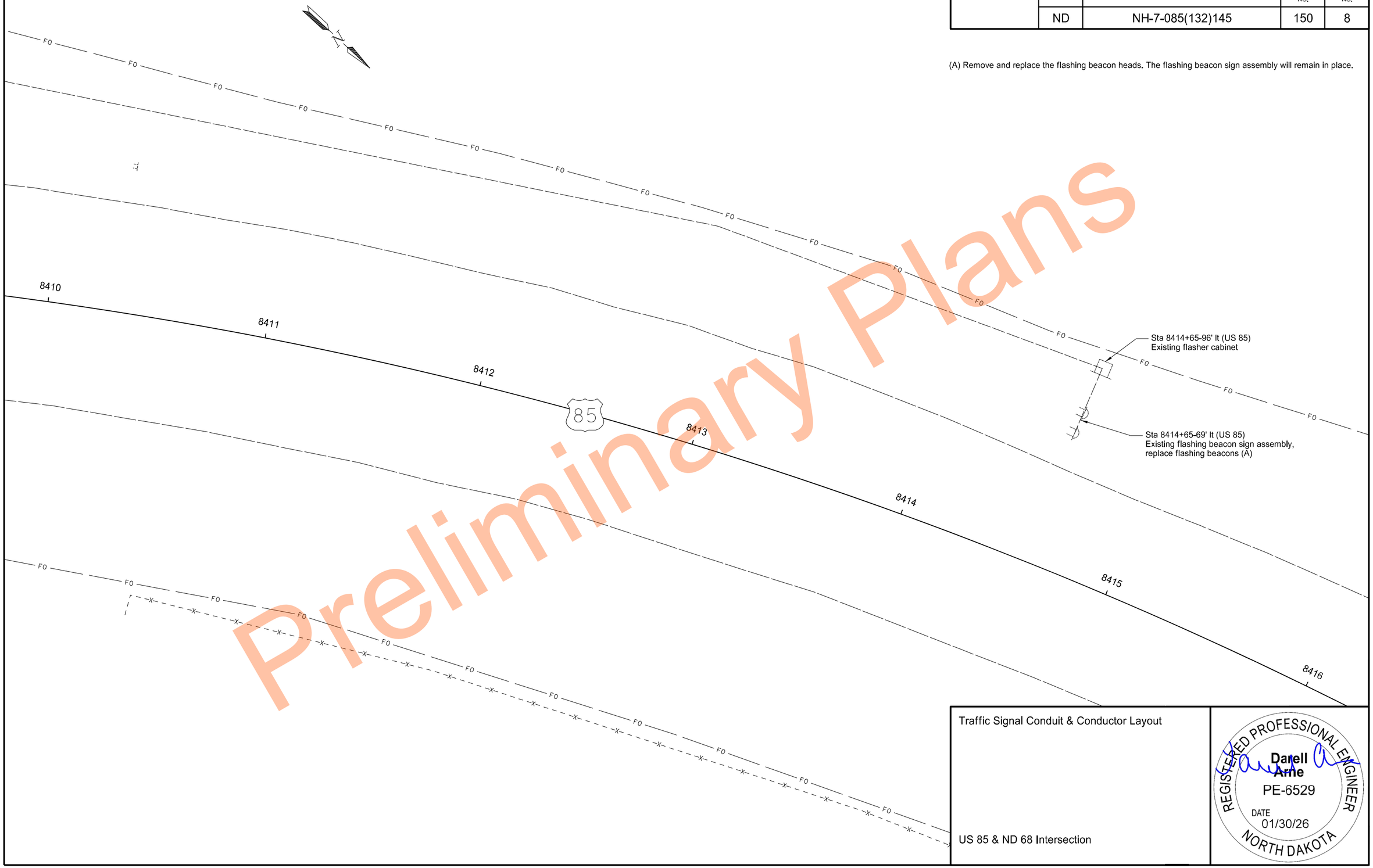
Traffic Signal Conduit & Conductor Layout

US 85 & ND 68 Intersection

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	ND	NH-7-085(132)145	150	8

(A) Remove and replace the flashing beacon heads. The flashing beacon sign assembly will remain in place.



Preliminary Plans

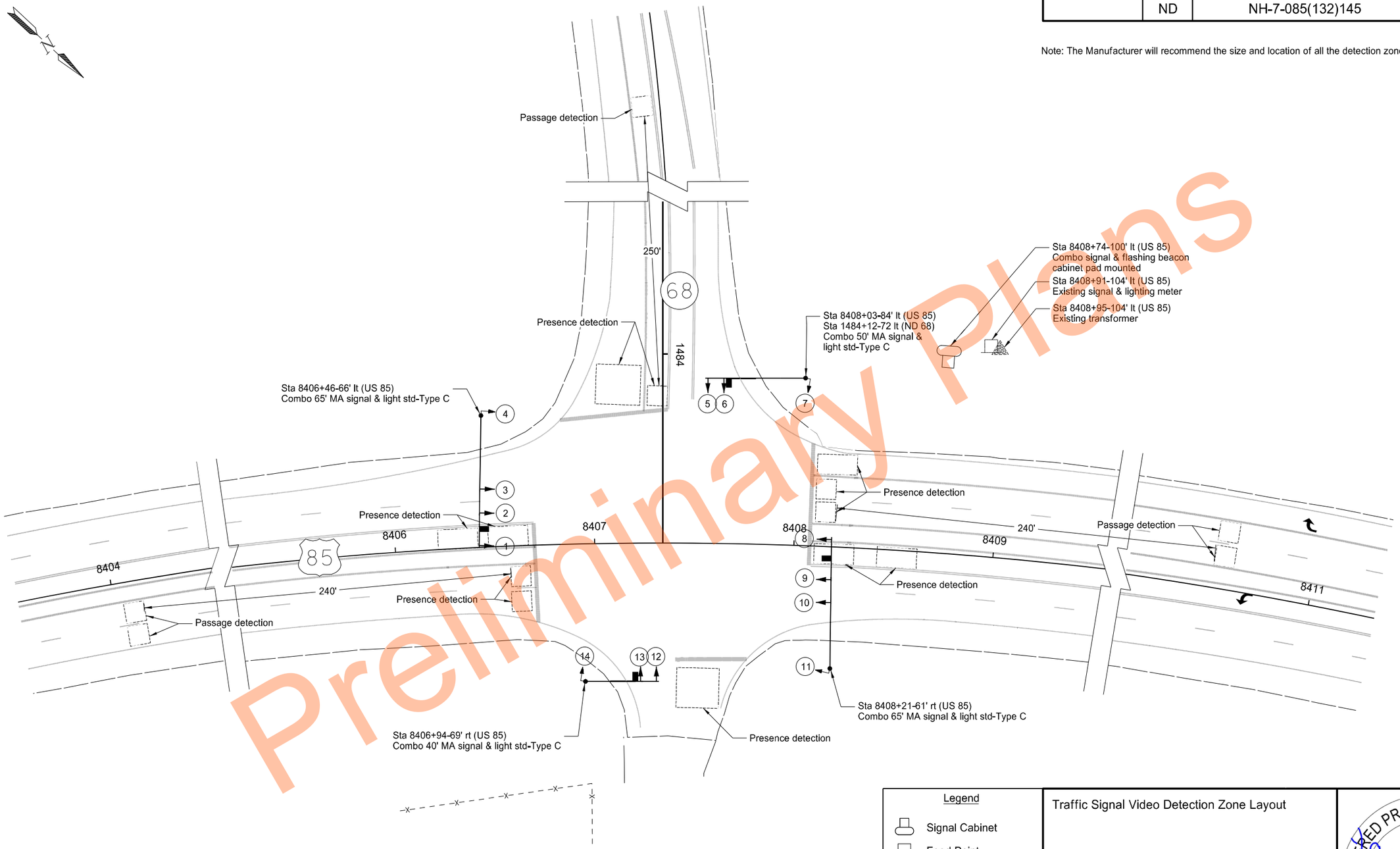
Traffic Signal Conduit & Conductor Layout

US 85 & ND 68 Intersection

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	150	9

Note: The Manufacturer will recommend the size and location of all the detection zones.



Preliminary Plans

Legend

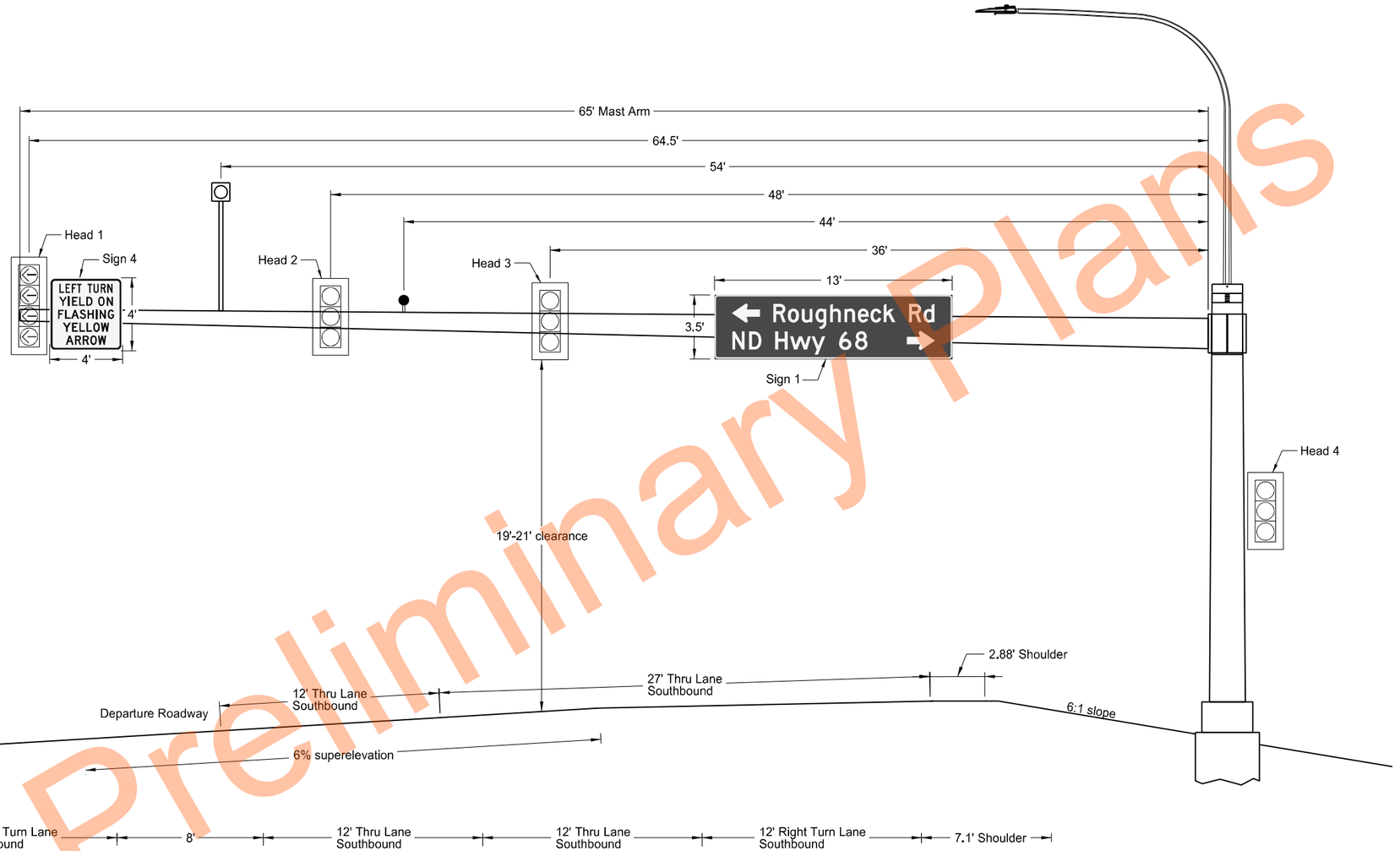
- Signal Cabinet
- Feed Point
- Signal Head
- Video Detection Unit
- Signal Standard

Traffic Signal Video Detection Zone Layout

US 85 & ND 68 Intersection

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Legend

- Emergency Vehicle Preemption Detector and Lamp
- Video Detection Camera

Traffic Signal Standard Elevation View
Southbound, Sta 8406+46-66' lt

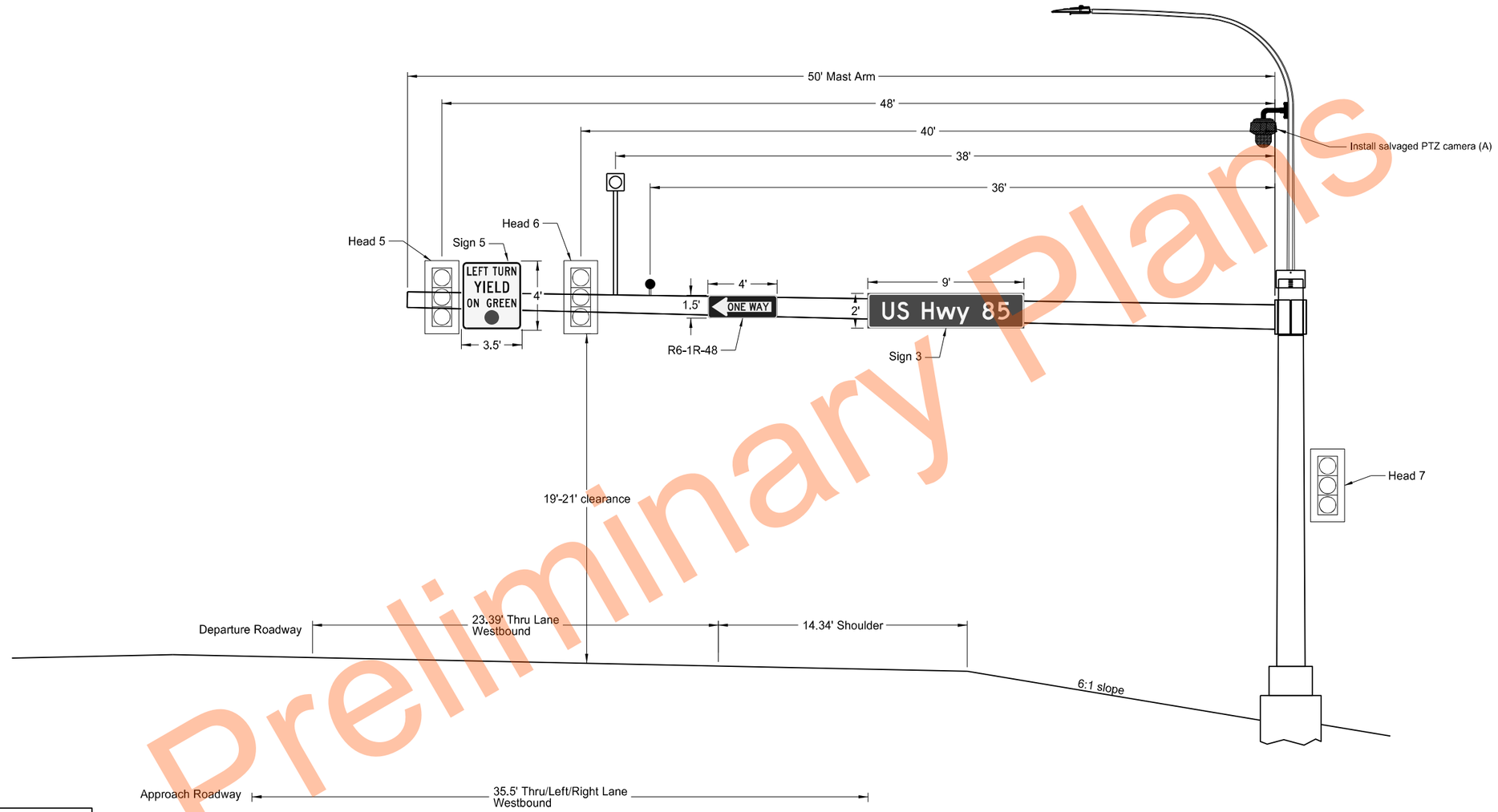
US 85 & ND 68 Intersection

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(A) Orient the camera to allow a clear view of all roadways.



Legend

- Emergency Vehicle Preemption Detector and Lamp
- Video Detection Camera

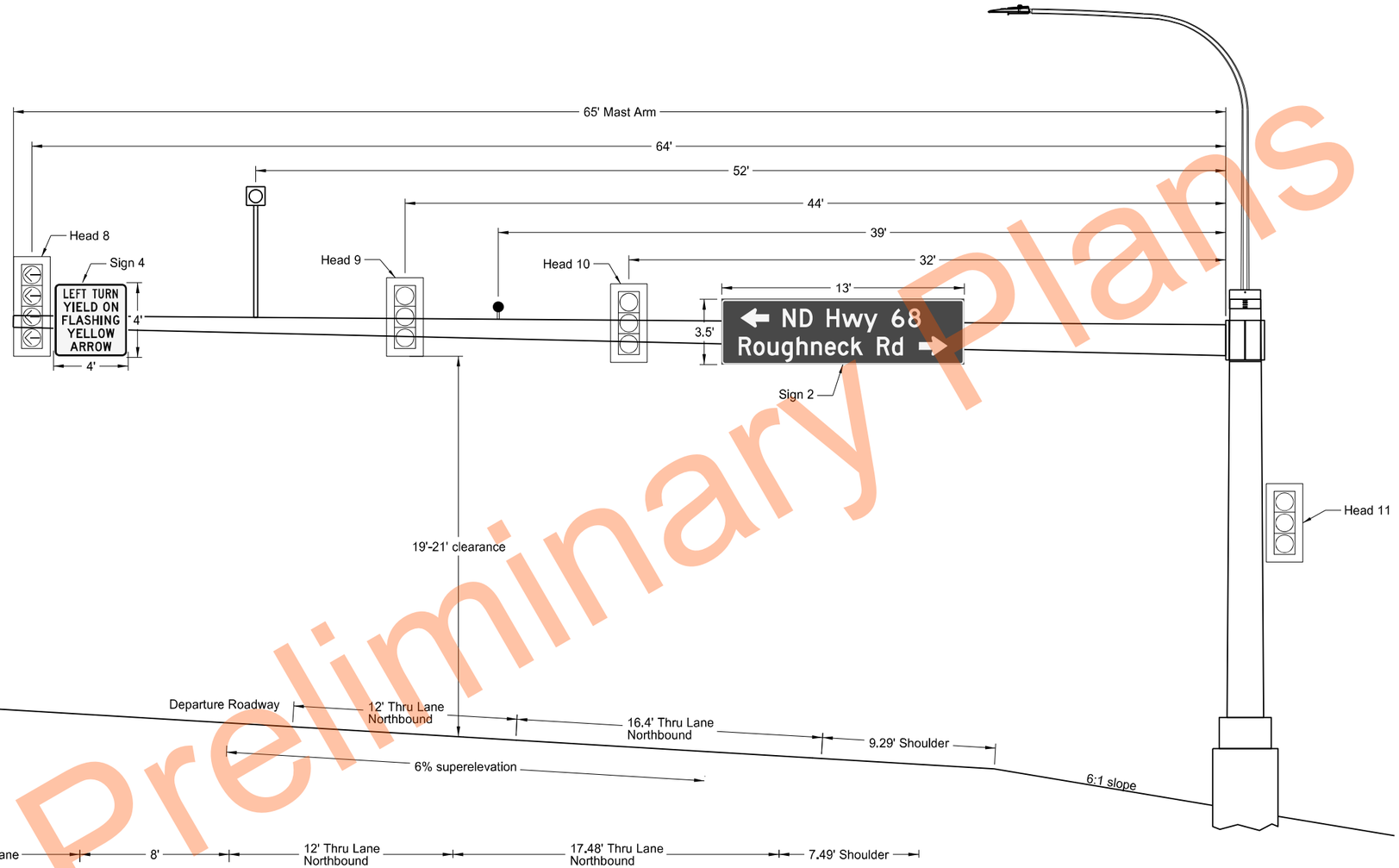
Traffic Signal Standard Elevation View
Westbound, Sta 8408+03-84' lt

US 85 & ND 68 Intersection

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Legend

- Emergency Vehicle Preemption Detector and Lamp
- Video Detection Camera

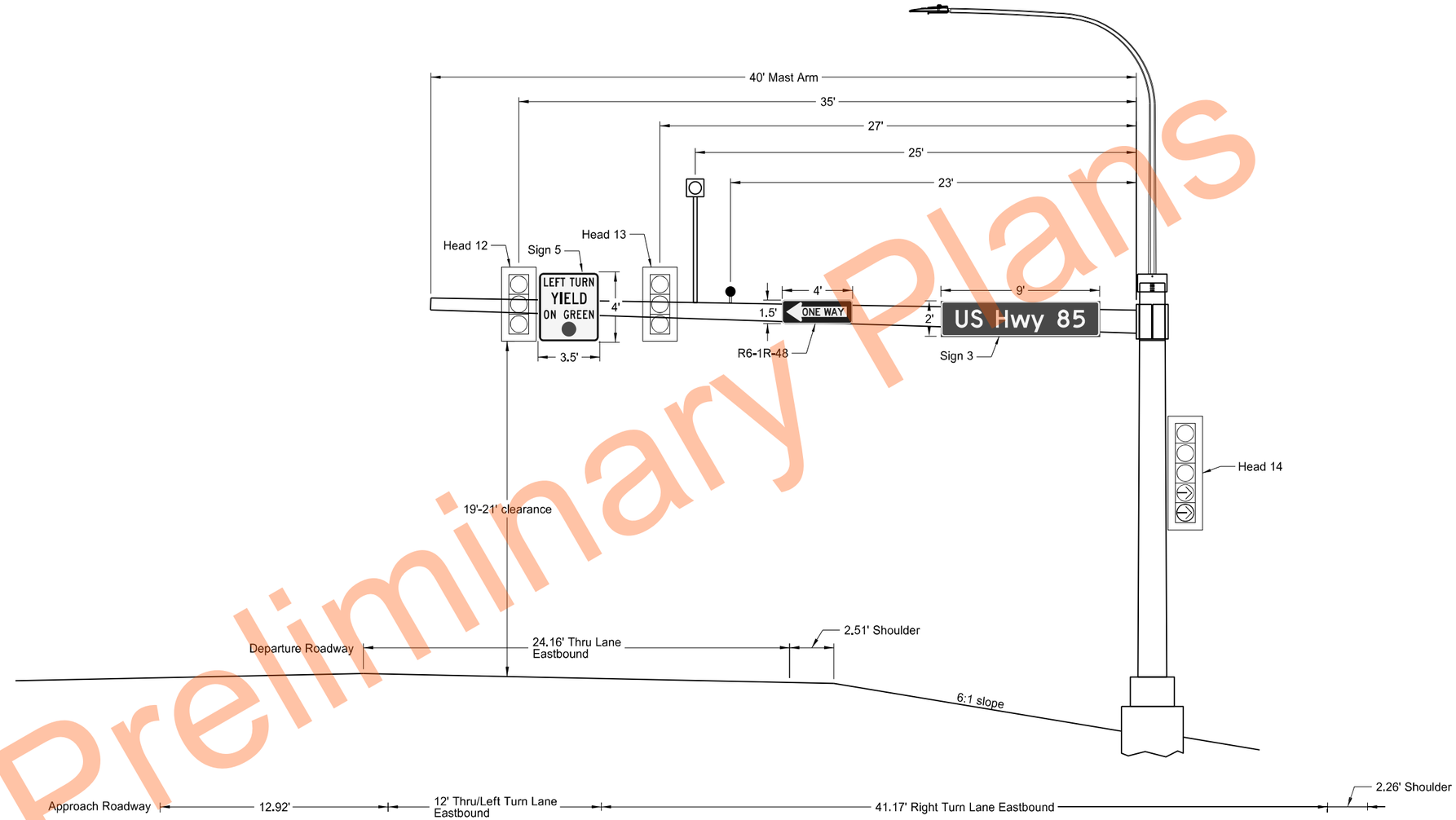
Traffic Signal Standard Elevation View
Northbound, Sta 8408+21-61' rt

US 85 & ND 68 Intersection

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PE-6529
DATE 01/30/26
NORTH DAKOTA

Preliminary Plans

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-085(132)145	150	13



Legend

- Emergency Vehicle Preemption Detector and Lamp
- Video Detection Camera

Traffic Signal Standard Elevation View
Eastbound, Sta 8406+94-69' rt

US 85 & ND 68 Intersection

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SPEC	CODE	BID ITEM	QTY	UNIT
772	0001	Traffic Signals System	1	EA

Signal System Quantities (A)		
Item Description	Unit	Qty
Pull Box	EA	1
Concrete Foundation-Signal Cabinet	EA	1
Drilled Shaft Concrete Foundation-Traffic Signals	EA	4
2" Diameter Conduit	LF	1,821
Underground Conductor No 4 Type RHW	LF	80
Underground Conductor No 6 Type RHW	LF	1,984
Underground Conductor No 6 Type THW	LF	1,032
Underground Conductor No 12 Type THW (B)	LF	569
No 14 AWG 2 Conductor Cable	LF	1,097
No 14 AWG 5 Conductor Cable	LF	821
No 14 AWG 12 Conductor Cable	LF	801
Emergency Vehicle Detection Cable	LF	1,097
Video Detection Cable	LF	1,144
OSP Cat 6 Cable (C)	LF	83
Combo 40 FT MA Signal & Light Std - Type C	EA	1
Combo 50 FT MA Signal & Light Std - Type C	EA	1
Combo 65 FT MA Signal & Light Std - Type C	EA	2
12" Yellow LED Flashing Beacon Head with Back Plate and Visor (D)	EA	4
1-Way 3 Sec Head W/12IN Lens-Post Mtd	EA	3
1-Way 3 Sec Head W/12IN Lens-MA Mtd	EA	8
1-Way 4 Sec Head W/12IN Lens-MA Mtd	EA	2
1-Way 5 Sec Head W/12IN Lens-Post Mtd	EA	1
ATC Signal Cabinet Pad Mounted (E)	EA	1
Controller	EA	1
Uninterruptible Power Supply	EA	1
Video Detection Camera	EA	4
Video Detection Processor	EA	1
Emergency Vehicle Pre-emption Detector & Lamp (EVP)	EA	4
Emergency Vehicle Pre-emption Processor	EA	1
Install salvaged PTZ Camera	EA	1
Install salvaged 4G Modem, POE Adapter, and Ethernet Switch (F)	EA	1
LED Luminaire	EA	4
Seeding	SY	470

(A) Include these quantities in the price bid for the item "Traffic Signals System".

(B) This is for tracer wire.

(C) This cable is for the PTZ Camera.

(D) Install new flashing beacons, backplates, and visors on the existing flashing beacon sign assemblies.

(E) The traffic signal cabinet will house the signal controller and related equipment along with the flashing beacon controller for the advance flashing beacons.

(F) Install the salvaged 4G modem, POE Adapter, and Ethernet Switch in the traffic signal cabinet.

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Traffic Signal Quantities

US 85 & ND 68 Intersection

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Signal Cable & Conduit Runs							
Run		Conduit			Cable		
Item	Station (US 85)	# Conduit Runs	Size IN	LF	# of Cables	Size/Type	LF
Meter Signal Cabinet	8408+91-104' lt to 8408+74-100' lt	1	2	40	2 1	Underground Conductor No 4-Type RHW Underground Conductor No 6-Type THW	80 40
Signal Cabinet NW Combo Signal Standard	8408+74-100' lt to 8408+03-84' lt	2	2	160	2 1 2 2 2 1	Cables 1,2 Underground Conductor No 12-Type THW 14 AWG 2 Conductor Cable Emergency Vehicle Detection Cable Video Detection Cable OSP Cat 6 Cable	151 83 166 166 166 83
NW Combo Signal Standard SW Combo Signal Standard	8408+03-84' lt to 8406+46-66' lt	2	2	336	1 1 1 1 1	Cable 2 Underground Conductor No 12-Type THW 14 AWG 2 Conductor Cable Emergency Vehicle Detection Cable Video Detection Cable	174 174 174 174 174

Signal Cable & Conduit Runs							
Run		Conduit			Cable		
Item	Station (US 85)	# Conduit Runs	Size IN	LF	# Cables	Size/Type	LF
Signal Cabinet NE Combo Signal Standard	8408+74-100' lt to 8408+21-61' rt	2	2	352	2 1 2 2 2 2 1	Cables 3,4 Underground Conductor No 12-Type THW 14 AWG 2 Conductor Cable Emergency Vehicle Detection Cable Video Detection Cable Underground Conductor No 6-Type RHW Underground Conductor No 6-Type THW	343 179 358 358 358 356 178
NE Combo Signal Standard SE Combo Signal Standard	8408+21-61' rt to 8406+94-69' rt	2	2	254	1 1 1 1 1 2 1	Cable 4 Underground Conductor No 12-Type THW 14 AWG 2 Conductor Cable Emergency Vehicle Detection Cable Video Detection Cable Underground Conductor No 6-Type RHW Underground Conductor No 6-Type THW	133 133 133 133 133 262 131
SE Combo Signal Standard Pull Box 1 Flasher Cabinet	8406+94-69' rt to 8406+00-115' rt to 8404+00-115' rt to 8400+00-108' rt	1	2	679	2 1	Underground Conductor No 6-Type RHW Underground Conductor No 6-Type THW	1366 683

Internal Mast Arm/Standard Signal Head Cable				
Origin	Destination	# of Cables	Size/Type	LF
SW Combo Signal Std Transformer Base	Vehicle Head 1	1	14 AWG 5 Conductor Cable	96
	Video Detection Camera	1	Video Detection Cable	90
	Vehicle Head 2	1	14 AWG 5 Conductor Cable	79
	EVP Lamp	1	14 AWG 2 Conductor Cable	75
	EVP Detector	1	Emergency Vehicle Detection Cable	75
	Vehicle Head 3	1	14 AWG 5 Conductor Cable	67
	Vehicle Head 4	1	14 AWG 5 Conductor Cable	18
NW Combo Signal Std Transformer Base	Vehicle Head 5	1	14 AWG 5 Conductor Cable	79
	Vehicle Head 6	1	14 AWG 5 Conductor Cable	71
	Video Detection Camera	1	Video Detection Cable	74
	EVP Lamp	1	14 AWG 2 Conductor Cable	67
	EVP Detector	1	Emergency Vehicle Detection Cable	67
	Vehicle Head 7	1	14 AWG 5 Conductor Cable	18
NE Combo Signal Std Transformer Base	Vehicle Head 8	1	14 AWG 5 Conductor Cable	95
	Video Detection Camera	1	Video Detection Cable	88
	Vehicle Head 9	1	14 AWG 5 Conductor Cable	75
	EVP Lamp	1	14 AWG 2 Conductor Cable	70
	EVP Detector	1	Emergency Vehicle Detection Cable	70
	Vehicle Head 10	1	14 AWG 5 Conductor Cable	63
	Vehicle Head 11	1	14 AWG 5 Conductor Cable	18
SE Combo Signal Std Transformer Base	Vehicle Head 12	1	14 AWG 5 Conductor Cable	66
	Vehicle Head 13	1	14 AWG 5 Conductor Cable	58
	Video Detection Camera	1	Video Detection Cable	61
	EVP Lamp	1	14 AWG 2 Conductor Cable	54
	EVP Detector	1	Emergency Vehicle Detection Cable	54
	Vehicle Head 14	1	14 AWG 5 Conductor Cable	18

Preliminary Plans

Traffic Signal Quantities & Runs

US 85 & ND 68 Intersection

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Conductor			Cable 1 (No 14 AWG 12)		Cable 2 (No 14 AWG 12)		Cable 3 (No 14 AWG 12)		Cable 4 (No 14 AWG 12)	
Base		Tracer	Head	Indication	Head	Indication	Head	Indication	Head	Indication
1	Black			Walk		Walk		Walk		Walk
2	White			Neutral		Neutral		Neutral		Neutral
3	Red		5,6,7	Red	2,3,4	Red	9,10,11	Red	12,13,14	Red
4	Green			Ground		Ground		Ground		Ground
5	Orange		5,6,7	Yellow	2,3,4	Yellow	9,10,11	Yellow	12,13,14	Yellow
6	Blue		5,6,7	Green	2,3,4	Green	9,10,11	Green	12,13,14	Green
7	White	Black		Don't Walk		Don't Walk		Don't Walk		Don't Walk
8	Red	Black		Red Left Arrow	1	Red Left Arrow	8	Red Left Arrow		Red Left Arrow
9	Green	Black		Flashing Yellow Left Arrow	1	Flashing Yellow Left Arrow	8	Flashing Yellow Left Arrow		Flashing Yellow Left Arrow
10	Orange	Black		Yellow Left Arrow	1	Yellow Left Arrow	8	Yellow Left Arrow		Yellow Left Arrow
11	Blue	Black		Green Left Arrow	1	Green Left Arrow	8	Green Left Arrow	14	Green Right Arrow
12	Black	White		Spare		Spare		Spare	14	Yellow Right Arrow

Preliminary Plans

Traffic Signal Cables

US 85 & ND 68 Intersection

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Actuated Traffic Signal Timing (A)								
Phase	**Ø1**	**Ø2**	**Ø3**	**Ø4**	**Ø5**	**Ø6**	**Ø7**	**Ø8**
Basic Intervals								
Minimum Green/Initial	5	15		5	5	15		5
Vehicle Extension/Passage Time	2	5		3	2	5		3
Maximum Green	20	45		30	20	45		30
Yellow Change	3.0	5.0		3.0	3.0	5.0		3.0
Red Clearance	2.0	3.0		1.0	2.0	3.0		1.0
Delay Green		5		5		5		5
Walk		N/A		N/A		N/A		N/A
Pedestrian Clearance		N/A		N/A		N/A		N/A
Time Waiting Gap Reduction Options								
Time Before Reduction		25				25		
Time to Reduce to Minimum Gap		5				5		
Minimum Gap		3				3		
Locking Memory								
Non-Locking Memory	X	X		X	X	X		X
Phase Recall	None	Minimum		None	None	Minimum		None
Dual Entry Enabled		X		X		X		X
Simultaneous Gap Out Enabled		X		X		X		X
Flashing-Normal & Conflict Monitor	R	R		R	R	R		R
Start Up Phasing	R	G		R	R	G		R
Emergency Vehicle Pre-emption	X	X		X	X	X		X

(A) Note: All times are shown in seconds.

(B) Longitudinal reinforcing replaces the longitudinal reinforcing shown in D-770-1 "Light & Signal Foundation".

Emergency Vehicle Pre-emption Phasing			
			
Phase 1&6	Phase 2&5	Phase 8	Phase 4
Northbound	Southbound	Westbound	Eastbound

On Phase	Non-Conflicting Phase Allowed to Time Concurrently
1	6
2	5 or 6
3	
4	8
5	2
6	1 or 2
7	
8	4

Traffic Signal Foundation Table				
Footing Diameter (IN)	Mast Arm Lengths for Combination Traffic Signals (FT)			
	40	50	65	65
	Sta 8406+94-69' Rt	Sta 8408+03-84' Lt	Sta 8406+46-66' Lt	Sta 8408+21-61' Rt
	Footing Depths (FT)			
30	16	17.5	25	23.5
36	15	17.5	24	22.5
42	15	17.5	23.5	22

Traffic Signal Foundation Reinforcing Table	
Diameter (IN)	Longitudinal Reinforcing (B)
30	8 - #8 bars
36	10 - #9 bars
42	12 - #9 bars

Traffic Signal Charts

US 85 & ND 68 Intersection

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Preliminary Plans

Docusign Envelope ID: 60E6D5C0-46BC-49CB-8E0F-CBA6AC9DB3C4

NDDOT ABBREVIATIONS

D-101-1

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

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04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

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NDDOT ABBREVIATIONS

D-101-2

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

Preliminary Plans

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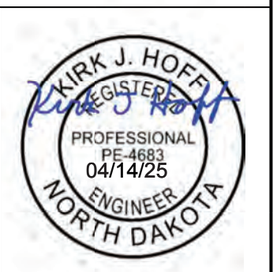
D-101-3

Salv	salvage(d)
San	sanitary sewer line
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw or Sdwk	sidewalk
SD	sight distance
SN	sign number
Sig	signal
Sgl	single
SRCP	slotted reinforced concrete pipe
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	Southeast
SW	Southwest
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical

Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	thinwall tube sample
Ts	topsoil
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
Trans	transition
TT	transmission tower
TES	traversable end section
Trans	transverse
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VCP	vitrified clay pipe
Vol	volume
VSFS	vehicle speed feedback sign
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
Wrng	wearing
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without

Preliminary Plans

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NDDOT ABBREVIATIONS

D-101-4

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
CC	closing corner
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
MC	meander corner
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
SC	standard corner
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
WC	witness corner
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

Preliminary Plans

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3
4-14-25	General Revisions

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

Preliminary Plans

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

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LINE STYLES

D-101-20

Existing Topography

- Existing Ground Void
- Existing Cemetary Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter
- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break
- 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

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

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

- 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 (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

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

Preliminary Plans

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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

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

Preliminary Plans

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SYMBOLS

D-101-31

- Flexible Delineator
- Flexible Delineator Type A (Exst, Ppsd)
- Flexible Delineator Type B (Exst, Ppsd)
- Flexible Delineator Type C (Exst, Ppsd)
- Flexible Delineator Type D (Exst, Ppsd)
- Flexible Delineator Type E (Exst, Ppsd)
- Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type C (Exst, Ppsd, Diamond Grade)
- Delineator Type D (Exst, Ppsd, Diamond Grade)
- Delineator Type E (Exst, Ppsd, Diamond Grade)
- Barricade (Type I, Type II, Type III}
- Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)
- Attenuation Device
- Truck Mounted Attenuator
- Delineator Drums
- Flagger
- Tubular Marker
- Traffic Cone
- Back to Back Vertical Panel Sign

- Highway Sign (Exst, Ppsd)
- Mile Post Type A (Exst-Ppsd-Reset)
- Mile Post Type B (Exst, Ppsd)
- Mile Post Type C (Exst, Ppsd)
- Object Marker Type I (Exst, Ppsd)
- Object Marker Type II (Exst, Ppsd)
- Object Marker Type III (Exst, Ppsd)
- Existing Reference Marker
- Road Closure Gate 18 Ft (Exst, Ppsd)
- Road Closure Gate 28 Ft (Exst, Ppsd)
- Road Closure Gate 40 Ft (Exst, Ppsd)
- Existing Railroad Battery Box
- Existing RR Profile Spot
- Existing Railroad Crossbuck
- Existing Railroad Frog
- Existing Mailbox (Private, Federal)

Preliminary Plans

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SYMBOLS

D-101-32

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

Preliminary Plans

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)

Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)

Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)

Force Main Storm Drain Manhole (Exst, Exst with Valve)

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

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 Vegitation Barrier, Ppsd Double with Vegitation Barrier)

Cap or Stub
Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water

Existing Pedestal
Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined

Existing Pipe Vent
Gas, Fuel, Sanitary, Storm Drain, Water, Undefined

Valve
Exst Gas, Exst Water, Ppsd Water, Exst Undefined

Pump
Sanitary, Storm Drain, Exst Water

Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

Preliminary Plans

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

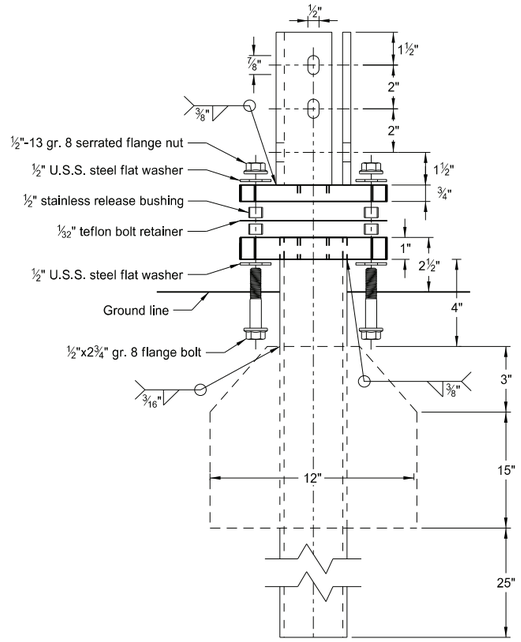
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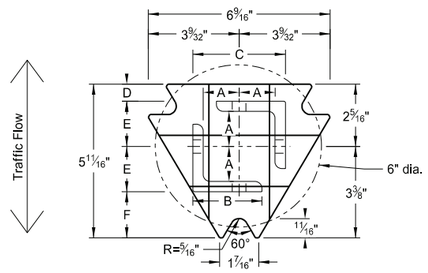
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

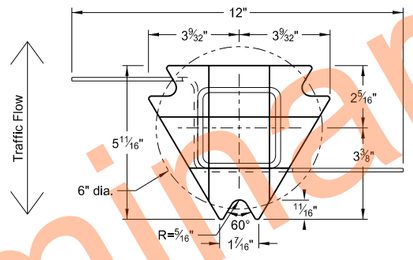


Multi-Directional
Slip Base Assembly

Perforated Tube



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



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

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.

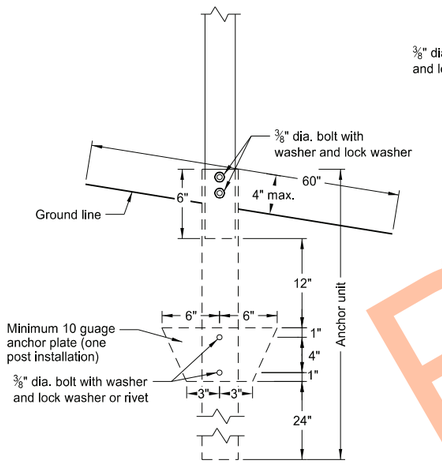
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½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

(A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

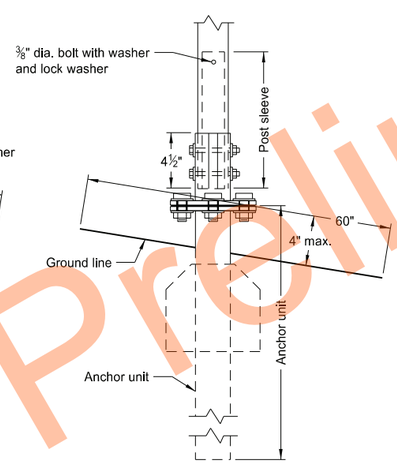
(B) For additional wind load, insert the 2 3/16"x10 ga. into 2½"x10 ga.

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

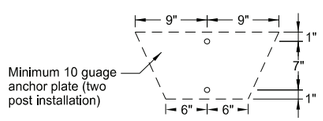
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1 7/8"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

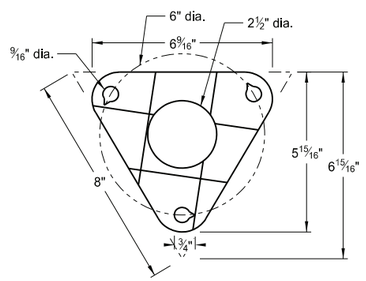


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/01/24

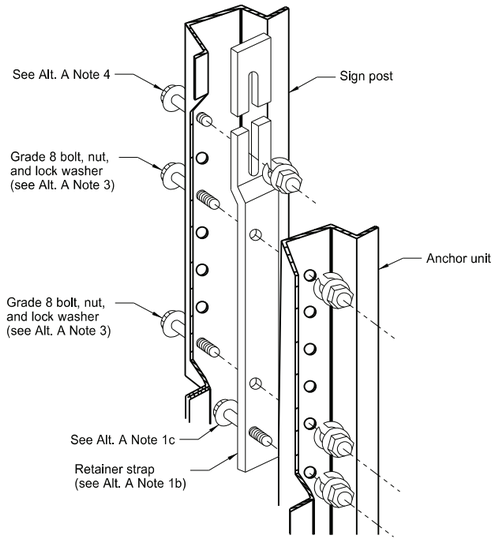
Preliminary Plans

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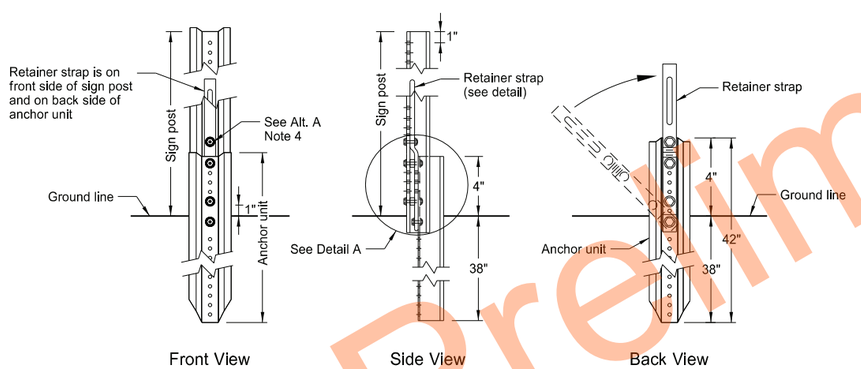
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



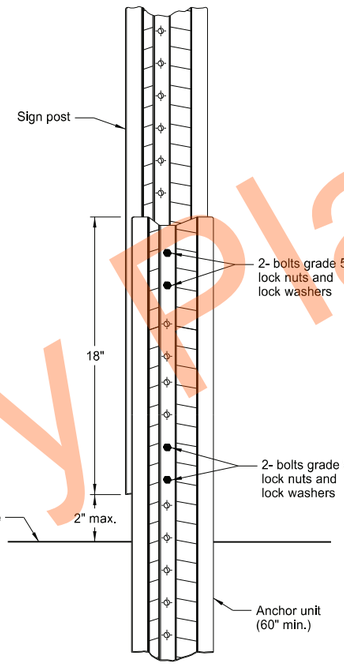
Detail A



Front View | Side View | Back View

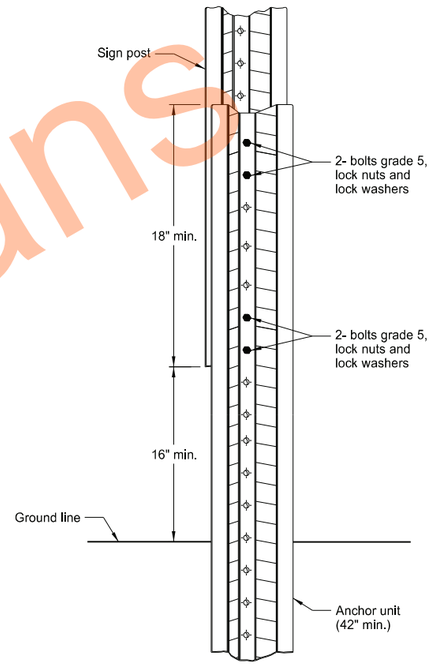
Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.



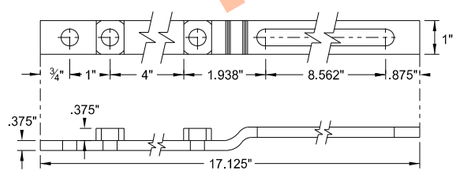
Breakaway U-Channel Splice Detail Alternate B (2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.



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

Install a maximum of 3 posts within 7'.



Retainer Strap Detail

Alternate A Steps of Installation:

1. 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.
2. a) Drive anchor unit to 4" above ground.
   b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
   b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. 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	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

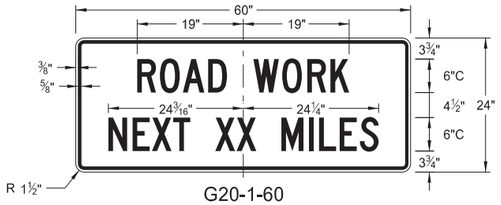
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/01/24

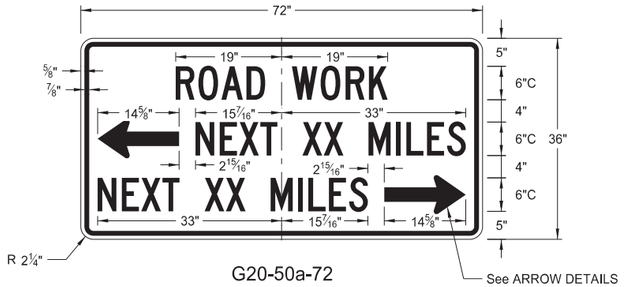
Preliminary Plans

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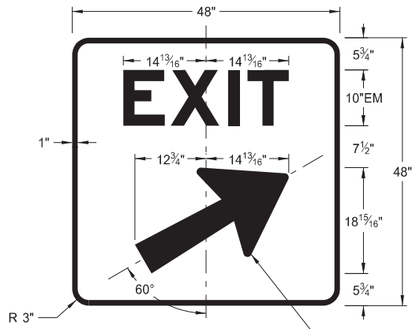
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



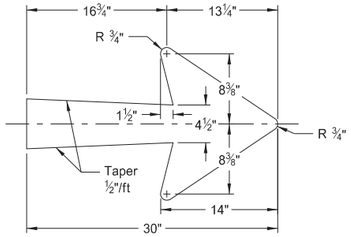
G20-1-60
Legend: black (non-refl)
Background: orange



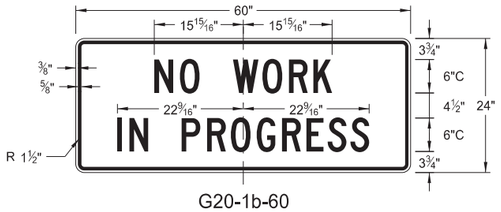
G20-50a-72
Legend: black (non-refl)
Background: orange



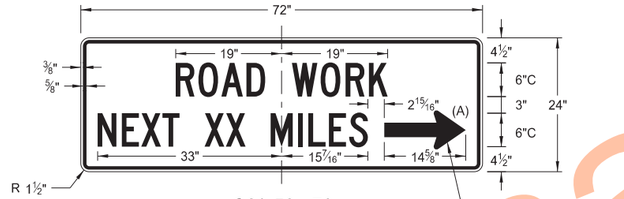
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



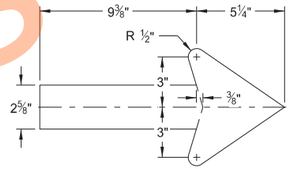
E5-1-48



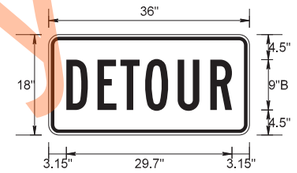
G20-1b-60
Legend: black (non-refl)
Background: orange



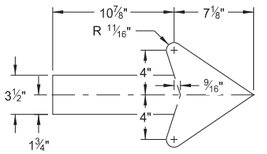
G20-52a-72
Legend: black (non-refl)
Background: orange



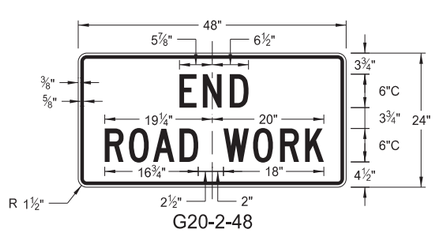
G20-50a-72
G20-52a-72



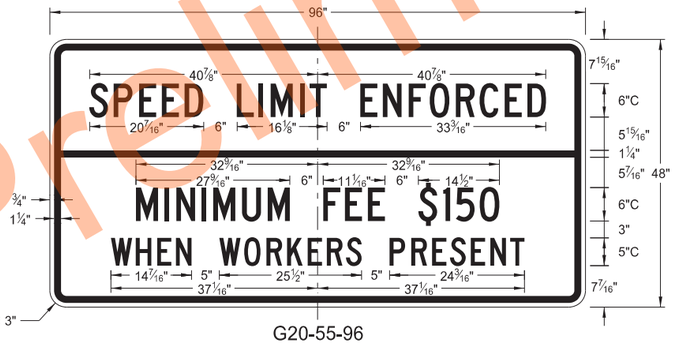
M4-8-36
Legend: black (non-refl)
Background: orange



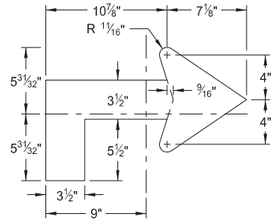
M4-9(L or R)-30
Right or Left



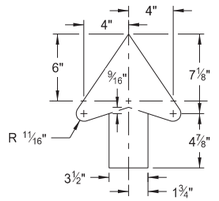
G20-2-48
Legend: black (non-refl)
Background: orange



G20-55-96
Legend: black (non-refl)
Background: orange



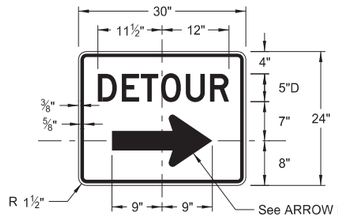
M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight



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



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

ARROW DETAILS

NOTES:

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

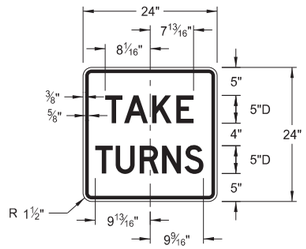
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

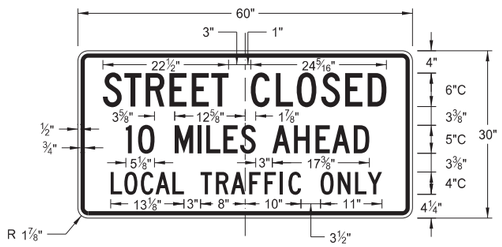
Preliminary Plans

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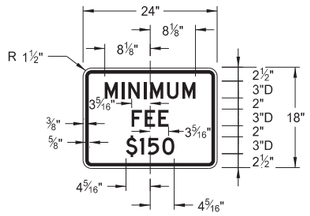
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



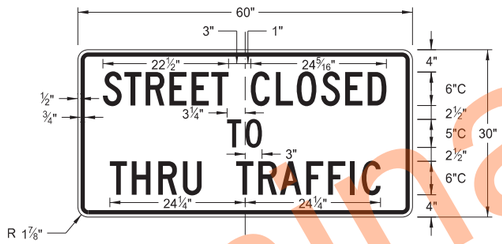
R1-50P-24
Legend: black (non-refl)
Background: white



R11-3c-60
Legend: black (non-refl)
Background: white



R2-1aP-24
Legend: black (non-refl)
Background: white



R11-4a-60
Legend: black (non-refl)
Background: white



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

Preliminary Plans

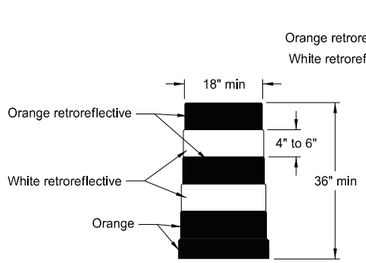
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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06/30/25
ENGINEER
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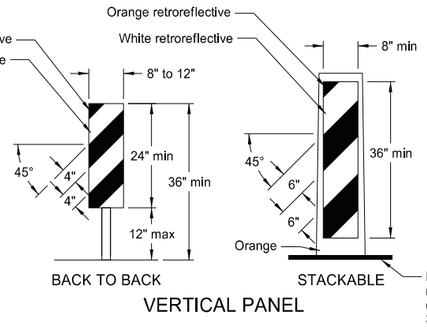
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



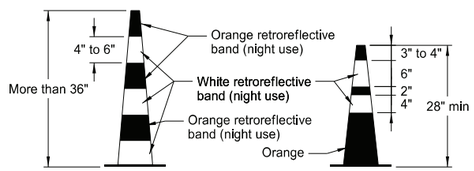
DELINEATOR DRUM

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.



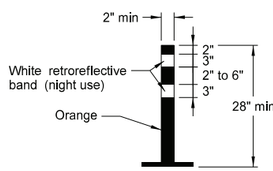
VERTICAL PANEL

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.



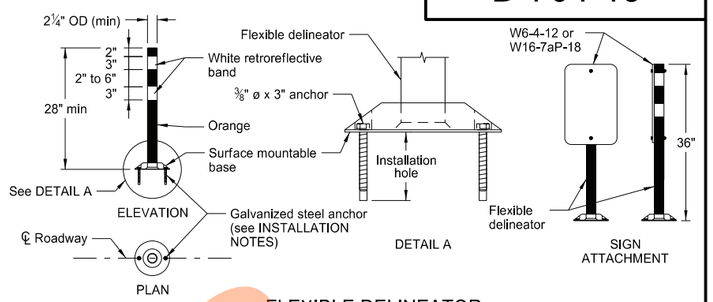
TRAFFIC CONE

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.



TUBULAR MARKER

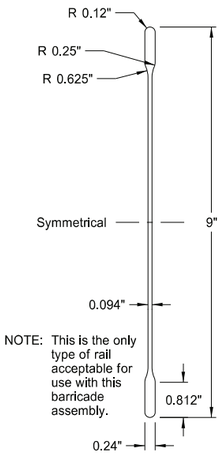
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

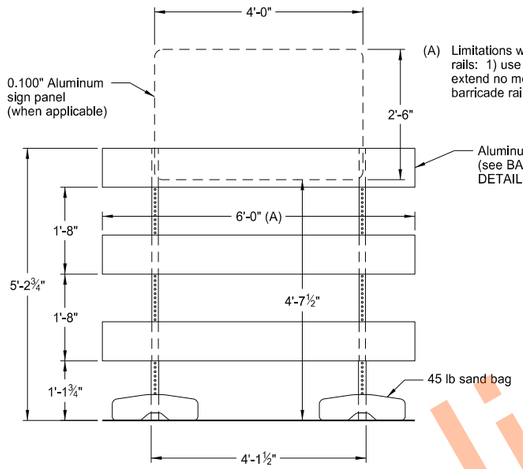
INSTALLATION NOTES:

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.



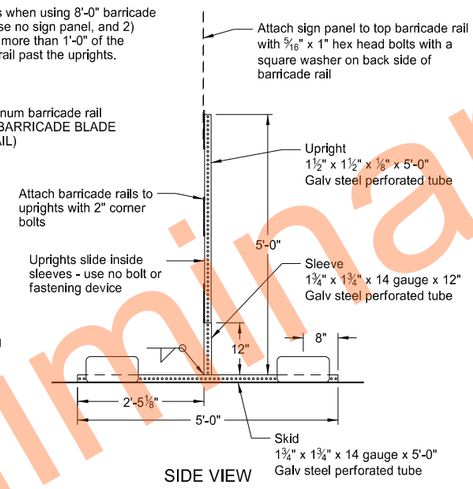
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



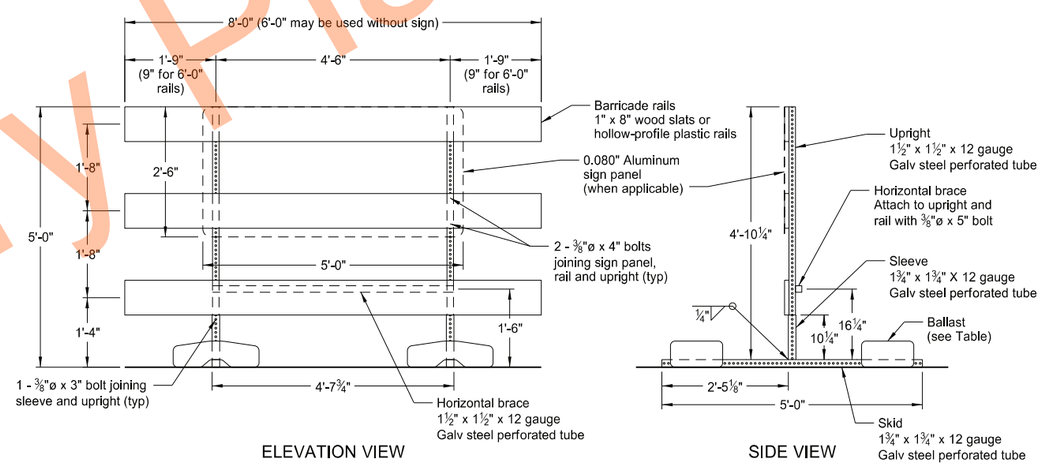
(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.

ELEVATION VIEW



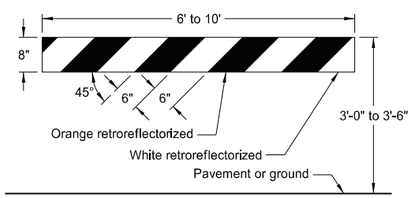
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

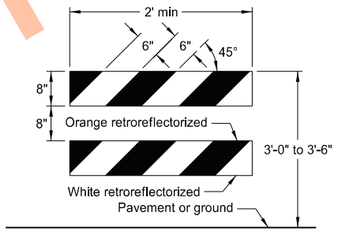


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

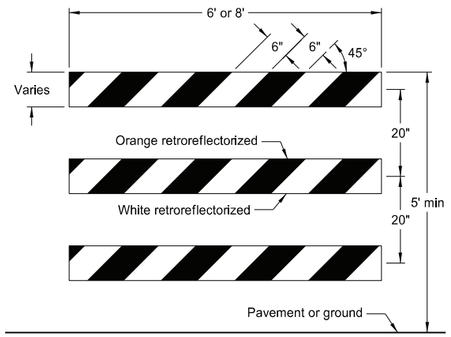
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

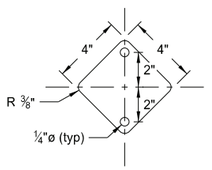


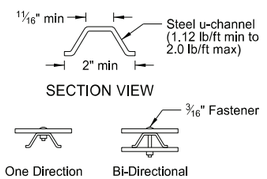
TYPE II BARRICADE

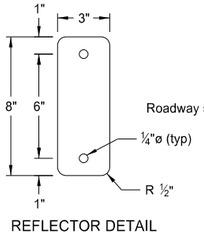


TYPE III BARRICADE

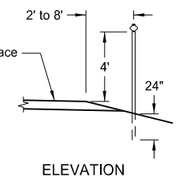
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

Note: 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	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature

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

08/01/24

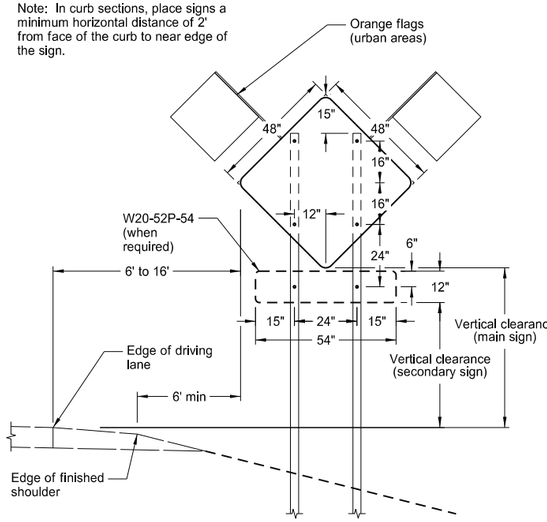
Preliminary Plans

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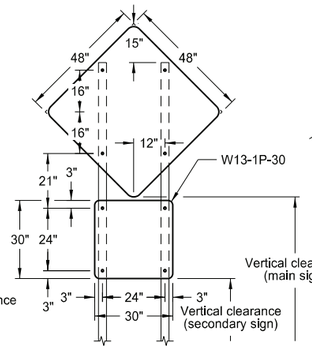
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

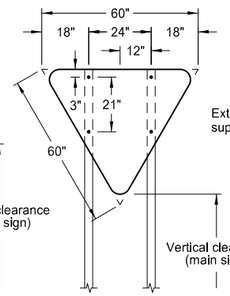
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



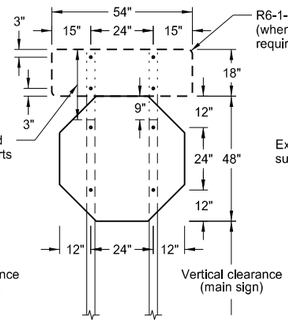
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



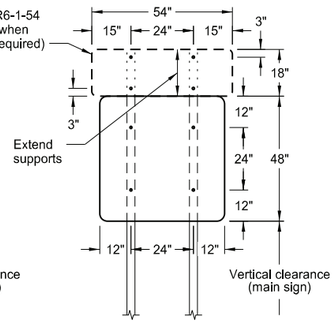
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



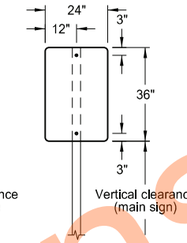
R1-2-60 - YIELD SIGN



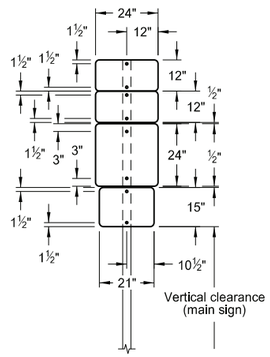
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



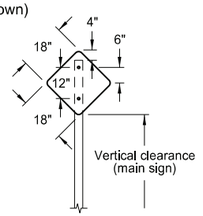
48" x 48" SIGN
(with R6-1-54 sign as required)



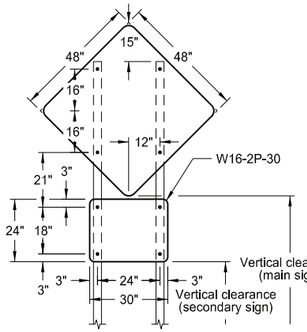
24" x 36" SIGN



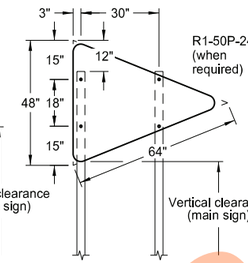
24" x 24"
ROUTE MARKER
ASSEMBLY



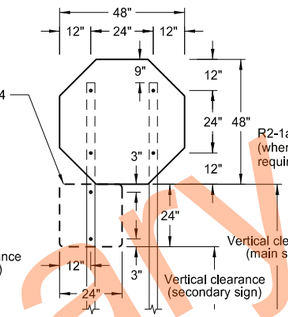
18" x 18"
DIAMOND SIGN



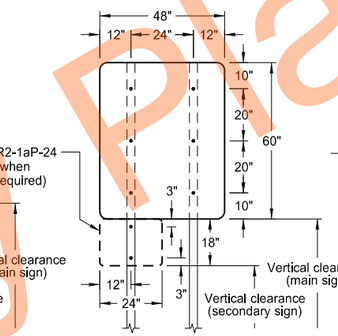
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



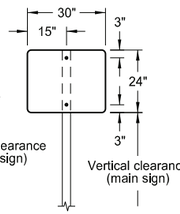
W14-3-64 - PENNANT SIGN



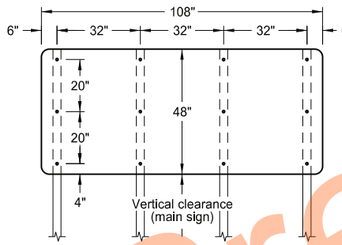
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



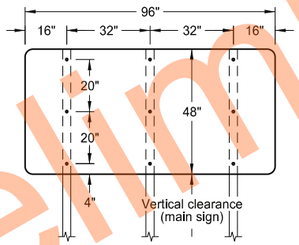
48" x 48" SIGN
(with R2-1aP-24 sign as required)



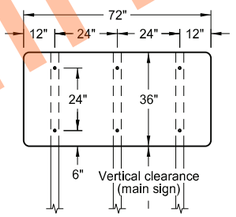
30" x 24" SIGN



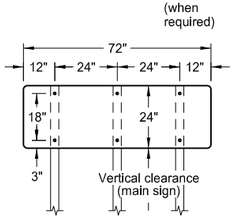
108" x 48" SIGN



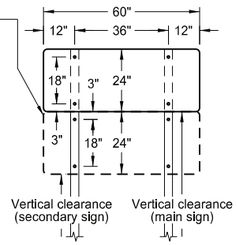
96" x 48" SIGN



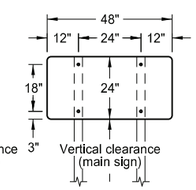
72" x 36" SIGN



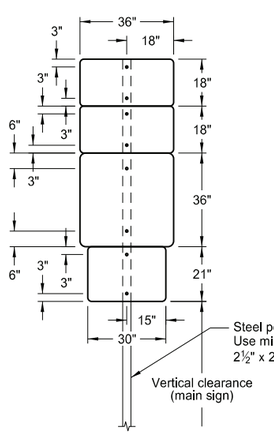
72" x 24" SIGN



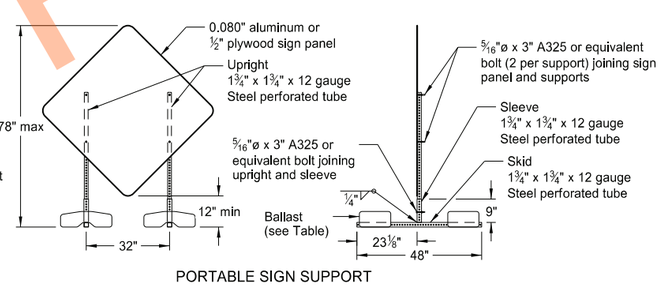
60" x 24" SIGN



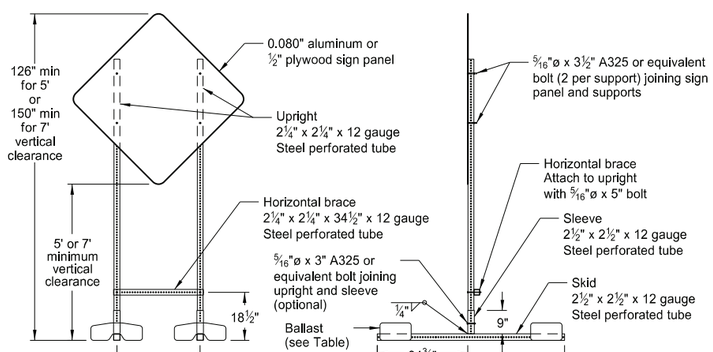
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: 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 ⅜" 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 unforseen 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.

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
8-01-24	Electronic Stamp/Signature

KIRK J. HOFFA
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

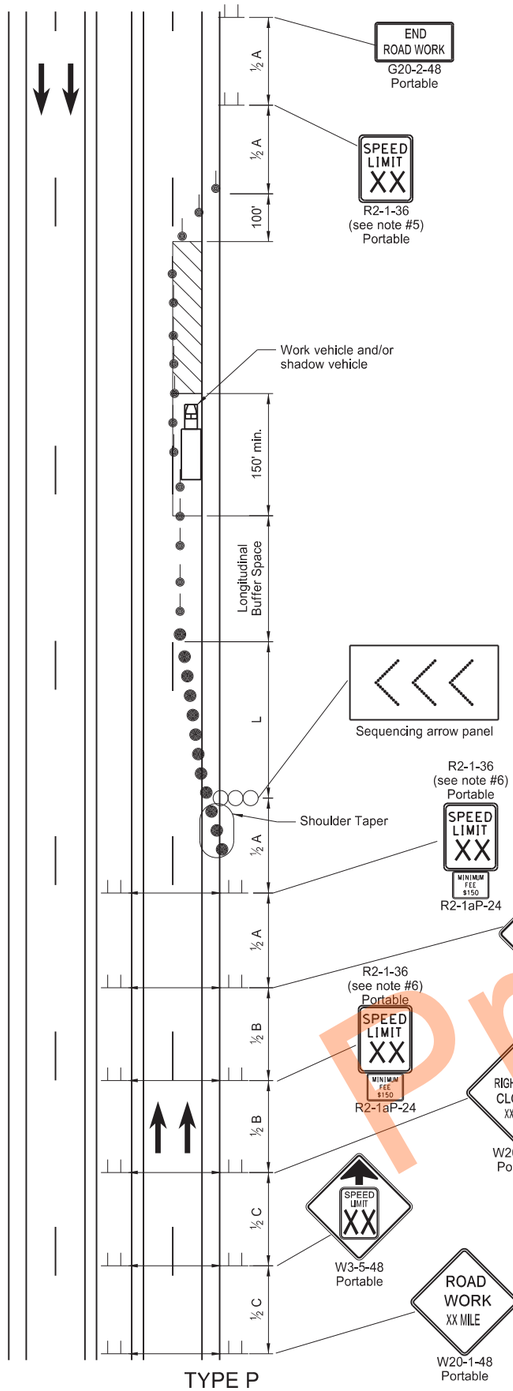
08/01/24

Preliminary Plans

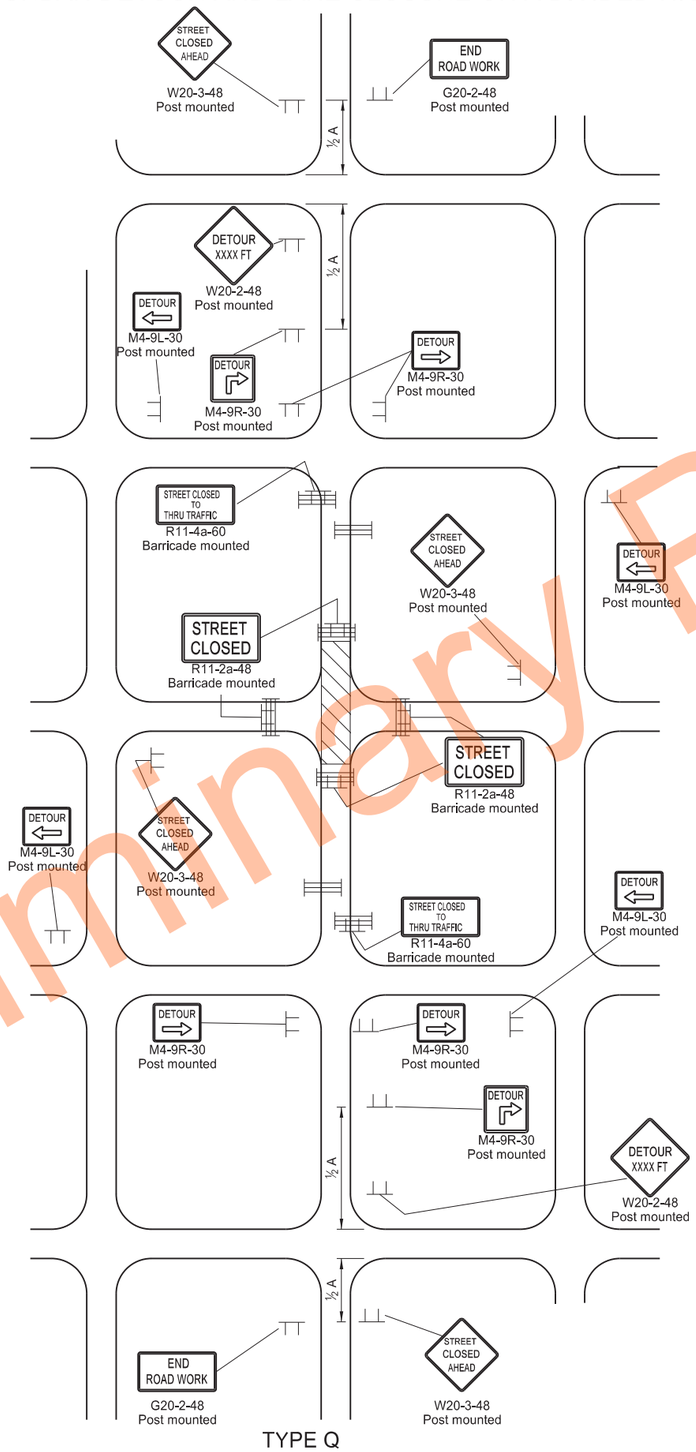
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SHORT TERM URBAN DETOUR AND LANE CLOSURE ON A DIVIDED HIGHWAY LAYOUTS

D-704-23



TYPE P
STATIONARY LANE CLOSURE ON A DIVIDED HIGHWAY
4 lane divided roadway where ½ of roadway is closed.
Short-term (more than 1 hour within a single daylight period.)



TYPE Q
DETOUR FOR A CLOSED STREET
Where city streets are used for detouring traffic.
Urban projects do not require the G20-55-96 and R2-1aP-24 signs.

Notes:

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet
   L = Minimum length of taper, S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or
   W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
4. Place Sequencing Arrow Panels at the beginning of taper. Where shoulder width does not provide sufficient room, move panel closer to the work area and place on roadway surface.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-established speed limit. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
8. Cover existing speed limit signs within a reduced speed zone.
9. Covered (when approved by engineer) or obliterated payment marking measured as as Obliteration of Pavement Marking.
10. Change intersection control on detour for Type Q when determined necessary by the engineer.
11. Engineer to determine safe speed where necessary. When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Recommend using 40 mph speed limit in vicinity of workers for Layout Type P, unless location and conditions dictate otherwise.

KEY

Type III barricade	Work area
Sign	Sequencing arrow panel
Delineator Drum	Tubular Markers

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space

Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Removed speed limit signs, & updated notes & sign numbers
11-01-19	Revised sign numbers & note
12-08-21	Added Dollars At Work sign
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

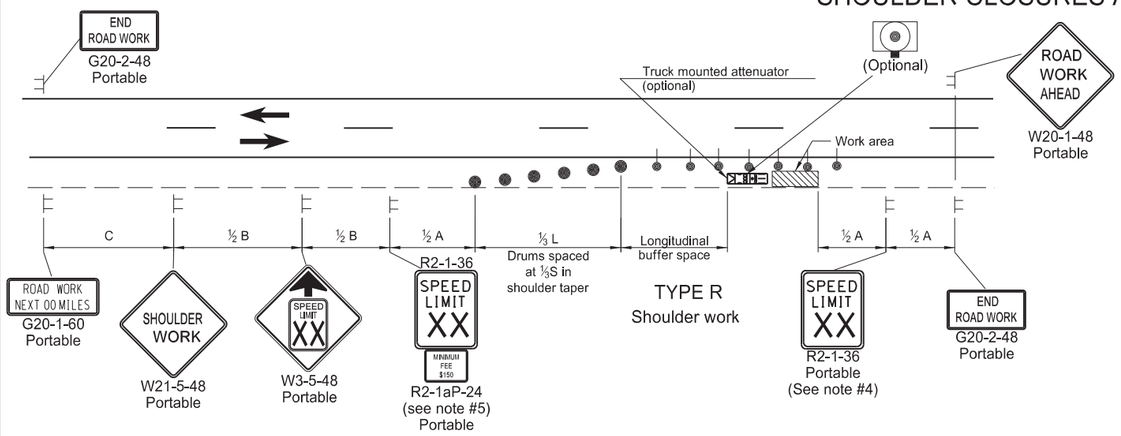
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

Preliminary

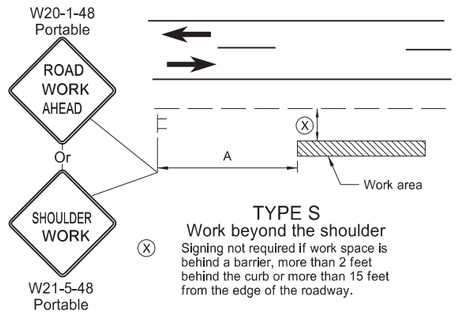
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SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

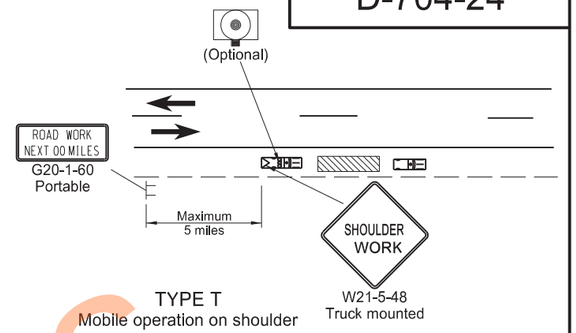
D-704-24



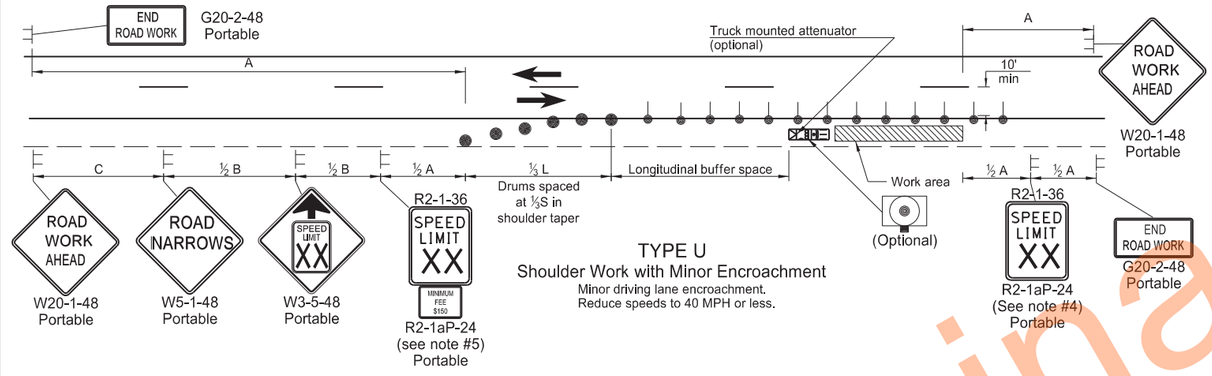
TYPE R
Shoulder work



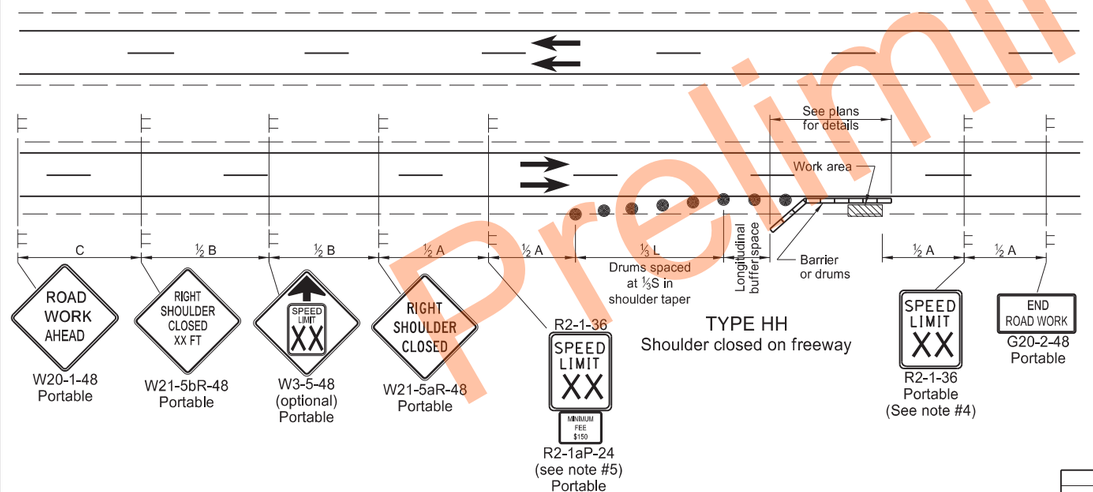
TYPE S
Work beyond the shoulder
Signing not required if work space is behind a barrier, more than 2 feet behind the curb or more than 15 feet from the edge of the roadway.



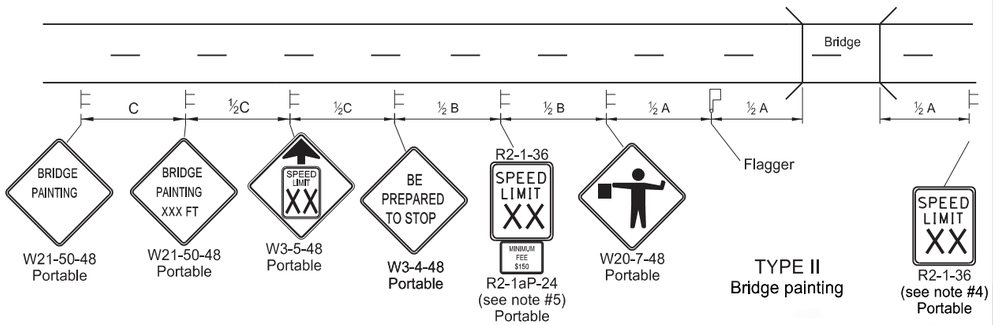
TYPE T
Mobile operation on shoulder



TYPE U
Shoulder Work with Minor Encroachment
Minor driving lane encroachment.
Reduce speeds to 40 MPH or less.



TYPE HH
Shoulder closed on freeway



TYPE II
Bridge painting

Notes
1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of the taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
3. Sequencing Arrow Panels
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   UseType B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
6. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
7. Cover existing speed limit signs within a reduced speed zone.
8. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
9. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

KEY

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

ADVANCE WARNING SIGN SPACING

Road Type	Distance Between Signs Min. (ft) A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space

Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
9-27-13
REVISIONS

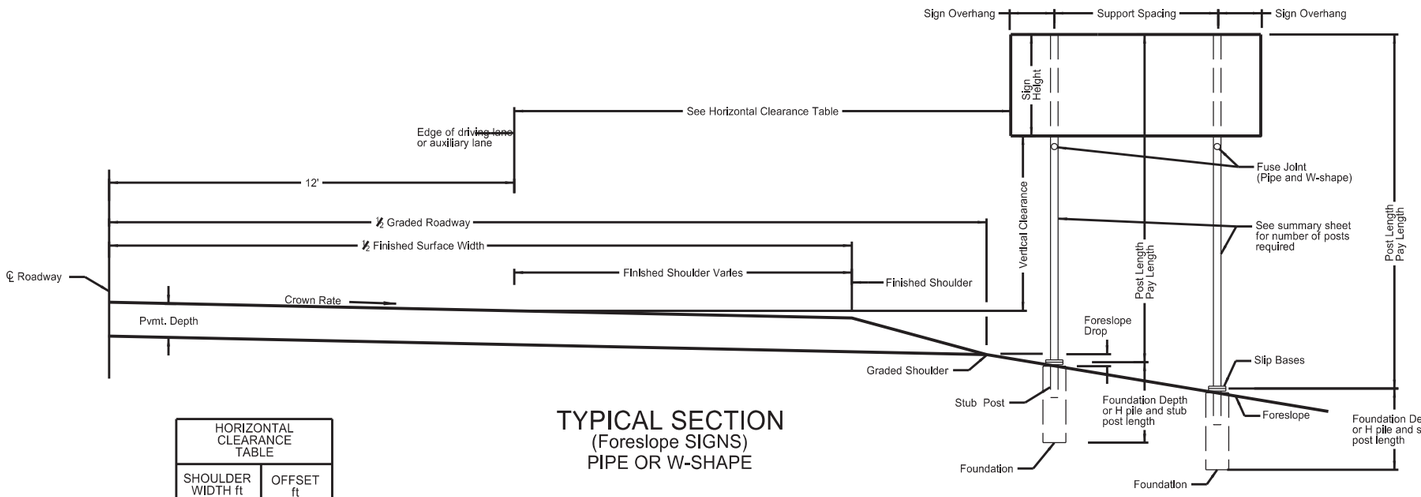
DATE	CHANGE
08-17-17	Updated notes & revised signs
11-01-19	Revised drum spacing & signs nos
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

Preliminary Plans

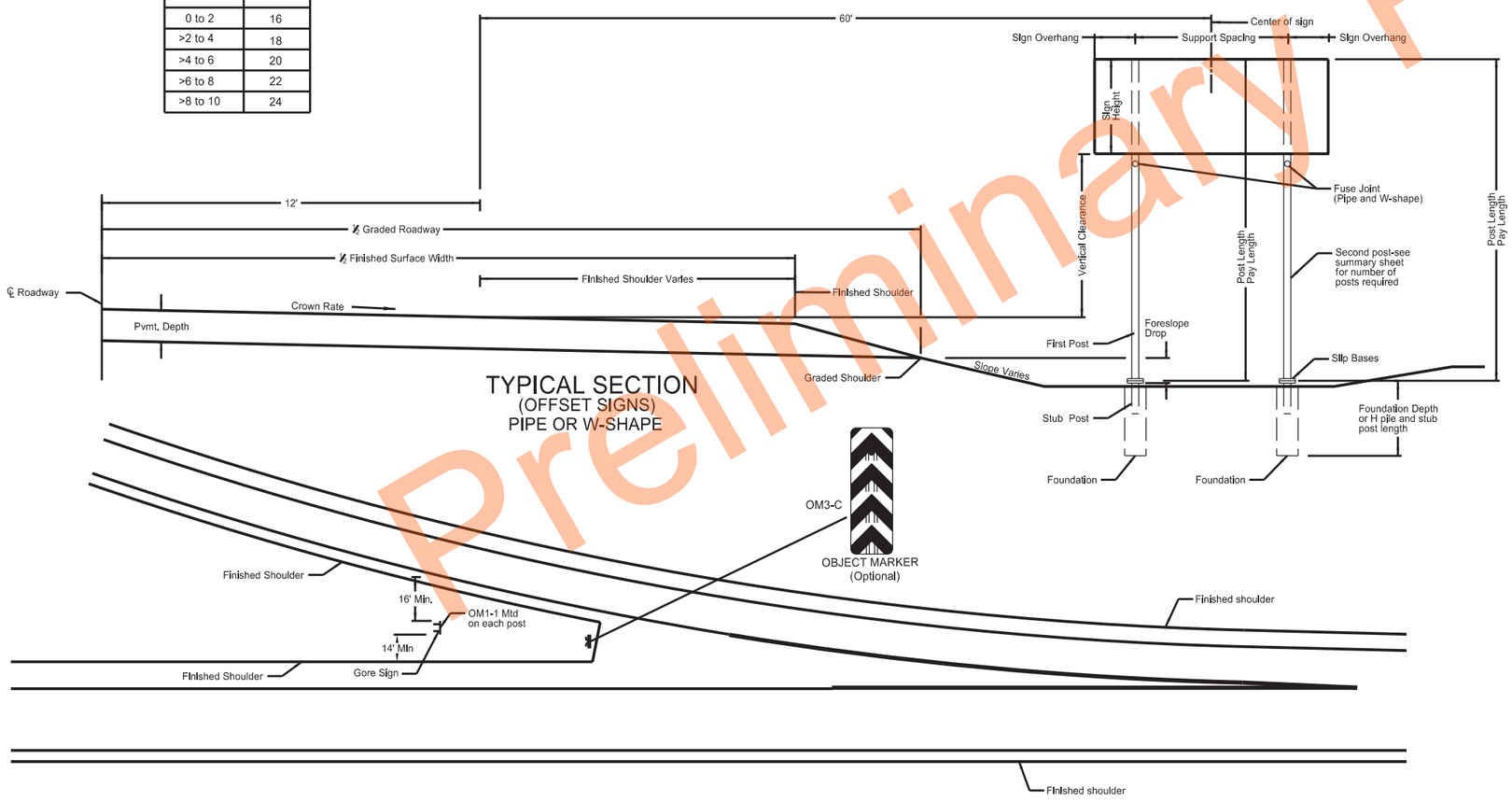
PIPE OR W-SHAPE ASSEMBLY DETAILS

D-754-1



TYPICAL SECTION
(Foreslope SIGNS)
PIPE OR W-SHAPE

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



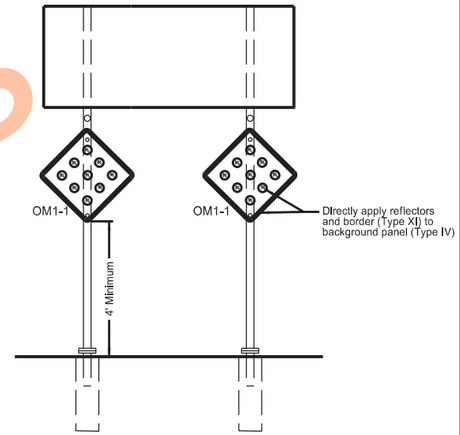
EXIT RAMP
GORE SIGN PLACEMENT

NOTES:

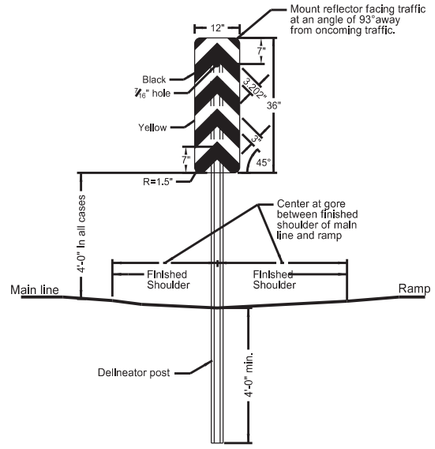
MINIMUM VERTICAL CLEARANCE:
Install signs with a minimum 5 foot vertical clearance from bottom of sign to top edge of the driving lane or auxiliary lane in rural locations. Provide a minimum 7 foot vertical clearance where parking or pedestrian movements occur. Install signs with a minimum 7 foot vertical clearance on freeways, expressways, and multi-lane conventional roadways.

A vertical clearance of 5 feet is acceptable where signs are placed a minimum of 30 feet from the edge of the traveled way.

Place signs a maximum of 6" above the vertical clearance specified above.



GORE SIGN OBJECT MARKER INSTALLATION



OBJECT MARKER INSTALLATION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
7-18-14	Modify notes and update reflective sheeting for object marker. Add correct section number for object marker post.
8-30-18	Updated notes to active voice.
11-26-21	Revised Object Marker signs.

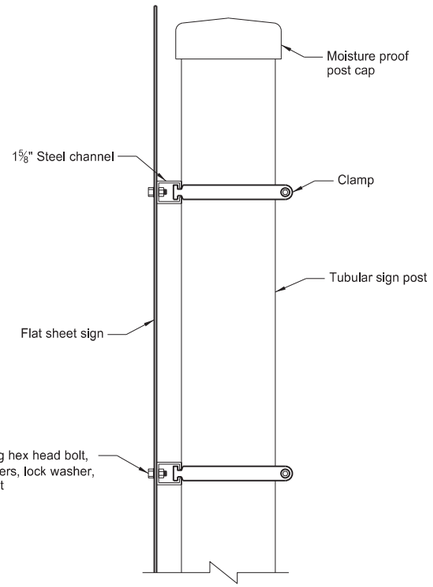
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11/26/21

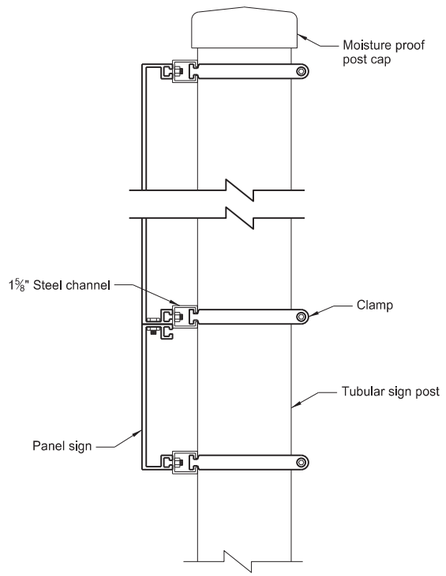
Preliminary Plans

PIPE SUPPORT AND SIGN MOUNTING DETAILS

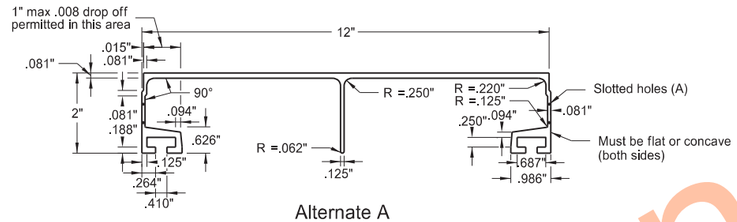
D-754-7



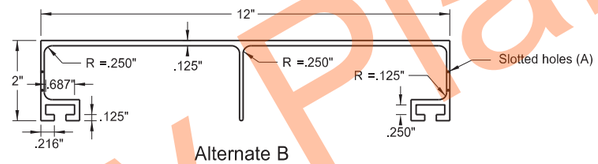
Side View



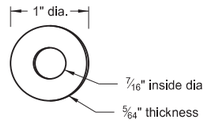
Side View



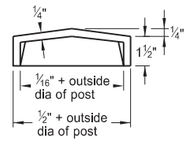
Alternate A
12" Extruded Panel



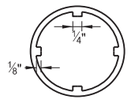
Alternate B
12" Extruded Panel



Flat Washer Detail



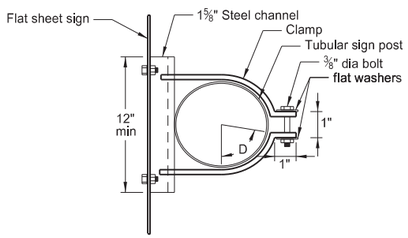
Side View



Top View

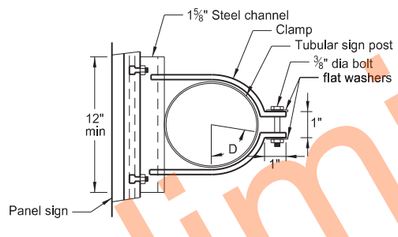
Post Cap Detail

Furnish post caps for all steel or aluminum posts or weld a ⅛" plate all around.



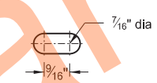
Top View

Flat Sheet Sign Clamp Mounting Details

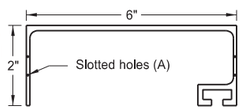


Top View

Panel Sign Clamp Mounting Details



Slotted Hole Detail



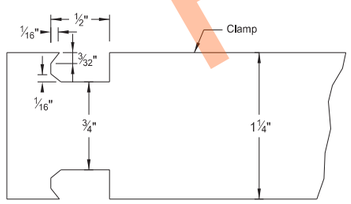
6" Extruded Panel

Aluminum Panel Details

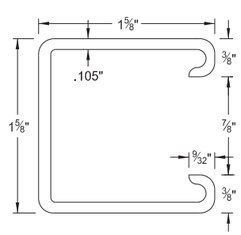
(A) Punch slotted holes in aluminum panels at 1'-0" on center, space from end as listed below:

12" even length panels	4'-0" etc.
9" odd + 6" length panels	5'-6" etc.
6" odd length panels	5'-0" etc.
3" even + 6" length panels	4'-6" etc.

Wall thickness = .078" unless specified otherwise.
All inside and outside corners = .031" radius unless specified otherwise.



Clamp Detail



Steel Channel Detail

Post Size dia	Clamp Gauge min
3½" to 5"	11
6" to 12"	10

Post Size dia (in)	D (in)
3½	3
4	3 3/16
5	5⅛
6	7 7/16
8	13 1/16
10	20¾
12	29⅝

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-21-14	
REVISIONS	
DATE	CHANGE
08-30-18	Updated to active voice, defined bolt & washer for fastening sign.
08-29-19	New Design Engineer PE Stamp.
10-19-22	Added washers to clamp.

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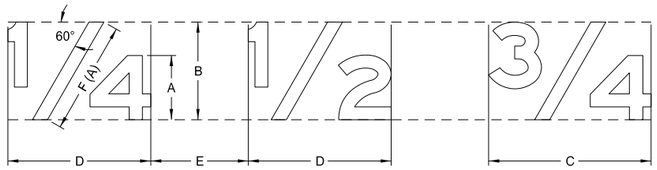
10/20/22

Preliminary Plans

DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

LETTER AND ARROW DETAILS

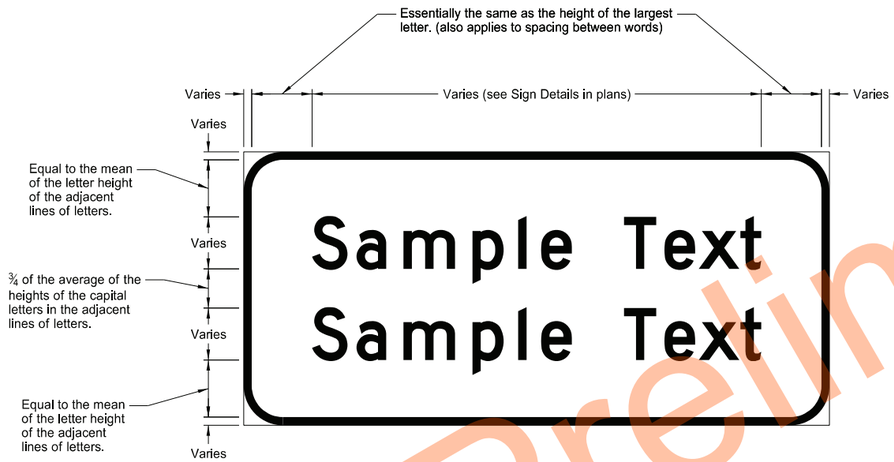
D-754-9



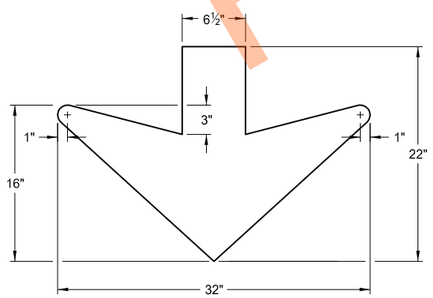
DETERMINE SIZE OF THE FRACTION AS FOLLOWS:

SYMBOL	TITLE	RATIO TO HEIGHT OF CAPITAL OR UPPER CASE
A	Letter height	1.0 of capital or upper case
B	Fraction height	1.5 X A
C	Fraction width	2.5 X A
D	Fraction width	2 X A
E	Space to next character	1 to 1.5 X A
F(A)	Length of diagonal	1.75 X A

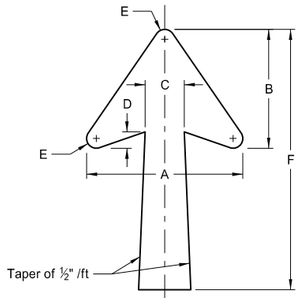
(A) Center diagonal stroke of fraction optically.



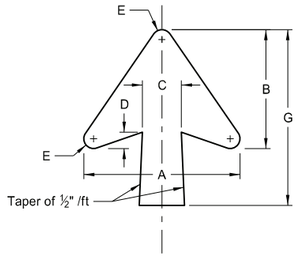
TYPICAL SPACING



DOWN ARROW



TYPE A

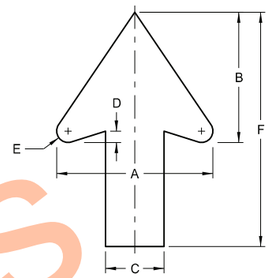


TYPE B

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G
ND_6IN	6"	12"	9.125"	3"	1"	0.625"	20"	13.5"
ND_8IN	8"	15.125"	11.563"	3.75"	1.313"	0.813"	25"	17"
ND_10IN	10"	18.25"	14"	4.5"	1.5"	0.75"	30"	20"
ND_12IN	12"							
ND_13IN	13.3"							
ND_16IN	16"	22.25"	17"	5.375"	1.75"	1"	35"	25"
ND_20IN	20"							

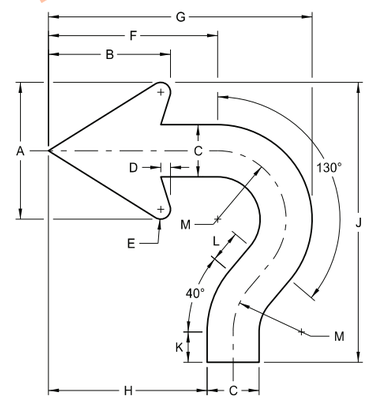
NOTE: Arrow size on gore signs is based on the letter size of "EXIT".

NOTE: Measure rotation angle of arrows counterclockwise from positions shown in details.

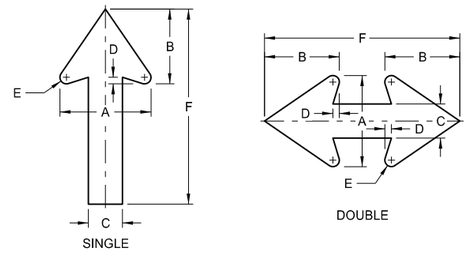


TYPE D

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F
ND_2IN	2"	2"	1.625"	0.75"	0.125"	0.125"	3"
ND_4IN	4"	4"	3.313"	1.5"	0.25"	0.25"	6"
ND_6IN	6"	6"	4.875"	2.25"	0.375"	0.375"	9"
ND_8IN	8"	8"	6.625"	3"	0.5"	0.5"	12"
ND_10IN	10"	10"	8.375"	3.75"	0.75"	0.75"	15"
ND_12IN	12"	12"	10"	4.5"	0.875"	0.875"	18"



ROUNDABOUT



SPECIAL

DESIGNATION	A	B	C	D	E	F	USES
ND_0.75IN	2"	1.625"	0.75"	0.125"	0.125"	7.75"	Parking Signs (Regulatory)
ND_2.625IN	7"	5.75"	2.625"	0.5"	0.5"	15"	Frontage Road Signs

DESIGNATION	LETTER SIZE (Upper Case)	A	B	C	D	E	F	G	H	J	K	L	M
ND_6IN	6"	5.25"	4.688"	2"	0.375"	0.375"	6.5"	10.125"	6.094"	10.75"	1.168"	1.25"	2.625"
ND_8IN	8"	7"	5.75"	2.625"	0.5"	0.5"	8.688"	13.5"	8.166"	14.333"	1.557"	1.667"	3.5"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

8-3-11

REVISIONS

DATE	CHANGE
7-8-14	Revised gore sign and added 4" D & D arrow
5-4-16	Revised Distance & Destination and Typical Spacing details
4-23-18	Revised arrow details
8-30-18	Updated notes to active volce.
8-29-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

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ENGINEER
NORTH DAKOTA

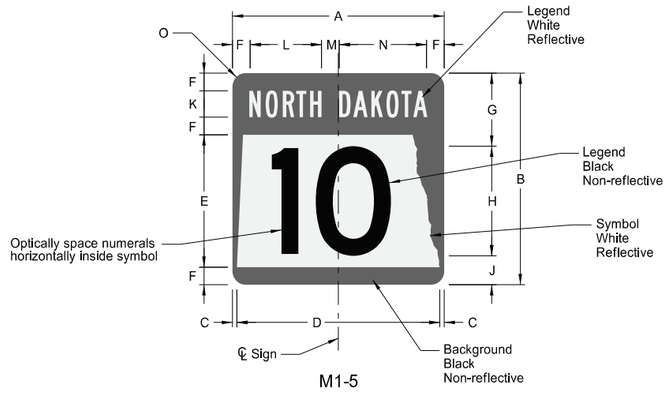
08/05/24

Preliminary Plans

DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

STATE HIGHWAY ROUTE SHIELD DETAIL

D-754-11

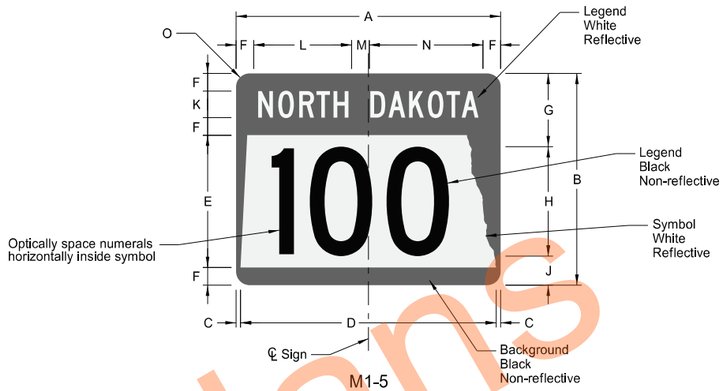


M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
1, 2 digits	18*	18*	0.38	17.25	11.25	1.5	6.38	9 D**	2.63	2.25 B	6.1	1.5	7.4	1.5
1, 2 digits	24	24	0.5	23	15	2	8.5	12 D**	3.5	3 B	8.1	2	9.9	1.5
1, 2 digits	36	36	0.75	34.5	22.5	3	12.75	18 D**	5.25	4.5 B	12.1	3	14.9	2.25
1, 2 digits	48*	48*	1	46	30	4	17	24 D**	7	6 B	16.2	4	19.8	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%



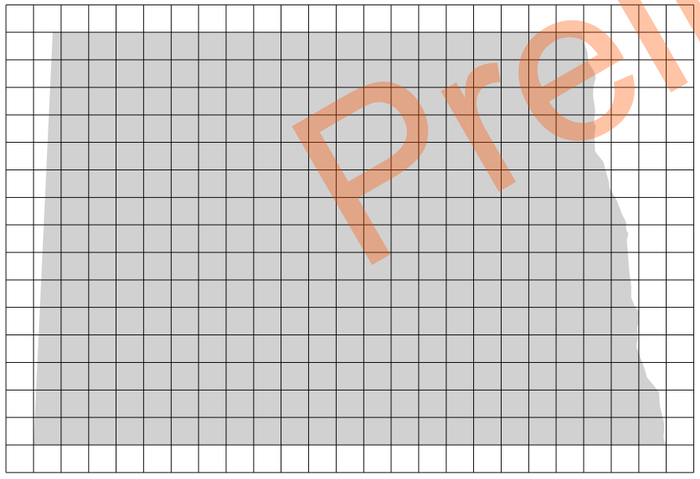
M1-5

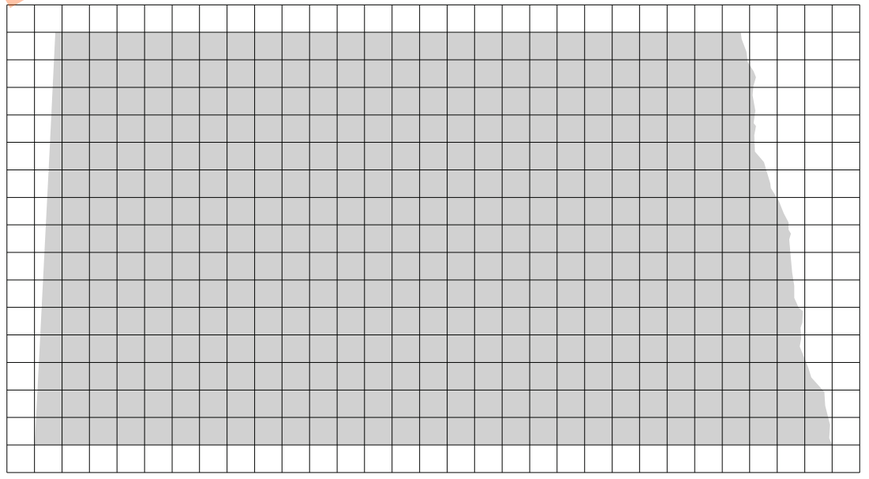
STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
3 digits	24*	18*	1.13	21.75	11.25	1.5	6.38	9 C**	2.63	2.25 C	8.8	2	10.2	1.5
3 digits	30	24	0.5	29	15	2	8.5	12 C**	3.5	3 C	10.7	2.5	12.8	1.5
3 digits	45	36	0.75	43.5	22.5	3	12.75	18 C**	5.25	4.5 C	16.1	3.8	19.1	2.25
3 digits	60*	48*	1	58	30	4	17	24 C**	7	6 C	21.5	5	25.5	3
4 digits	24*	18*	1.13	21.75	11.25	1.5	6.38	9 B***	2.63	2.25 C	8.8	2	10.2	1.5
4 digits	30	24	0.5	29	15	2	8.5	12 B***	3.5	3 C	10.7	2.5	12.8	1.5
4 digits	45	36	0.75	43.5	22.5	3	12.75	18 B***	5.25	4.5 C	16.1	3.8	19.1	2.25
4 digits	60*	48*	1	58	30	4	17	24 B***	7	6 C	21.5	5	25.5	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%
*** Reduce numeral spacing by 50%

Preliminary Plans





Note: North Dakota symbol graphics file may be obtained from the Design Division of North Dakota Department of Transportation.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

4-23-18

REVISIONS

DATE	CHANGE
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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ENGINEER
NORTH DAKOTA

08/05/24

DocuSign Envelope ID: 3BB6949C-35F3-4834-B8EF-90A4185B6E25

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

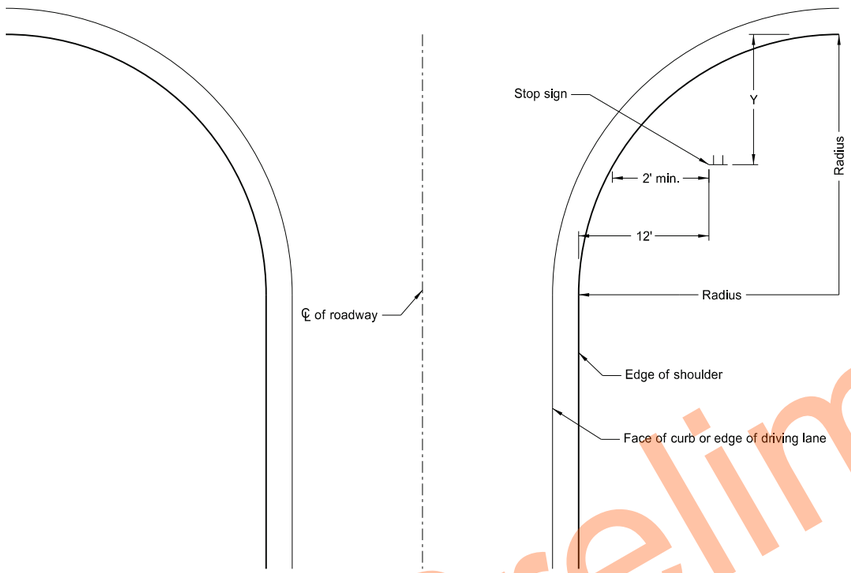
Notes:

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.

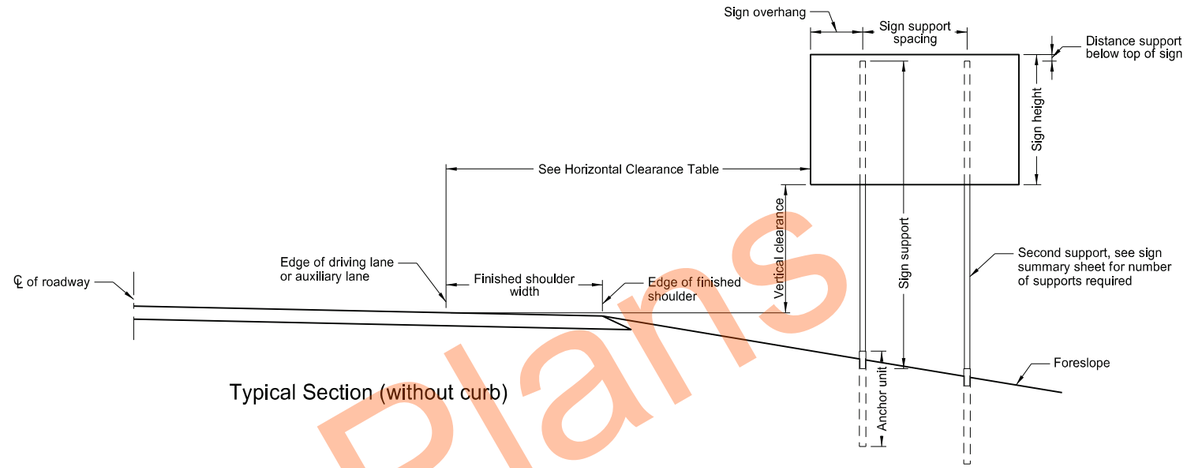
   Maximum vertical clearance is 6" greater than the minimum vertical clearance.
3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

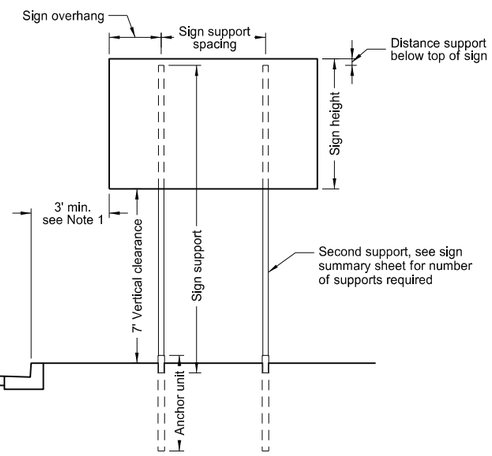
Use layout for the placement of "Stop" signs.

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



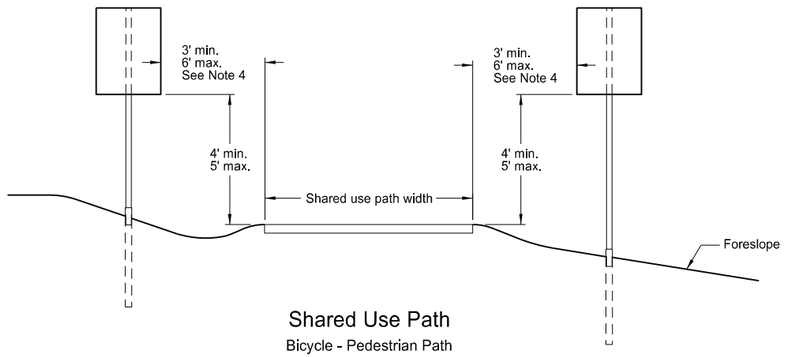
Typical Section (without curb)

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



Typical Section (with curb)

Residential or Business District



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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NORTH DAKOTA

08/05/24

Preliminary Plans

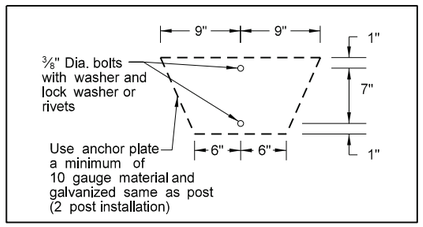
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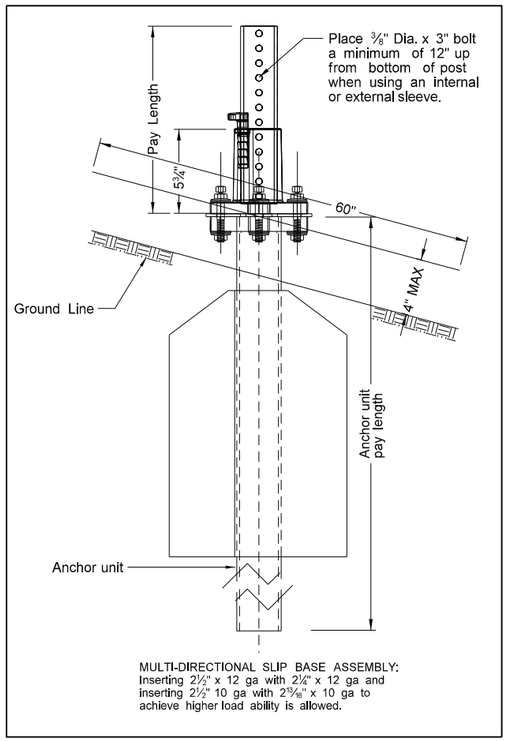
Mounting Details Perforated Tube

D-754-24

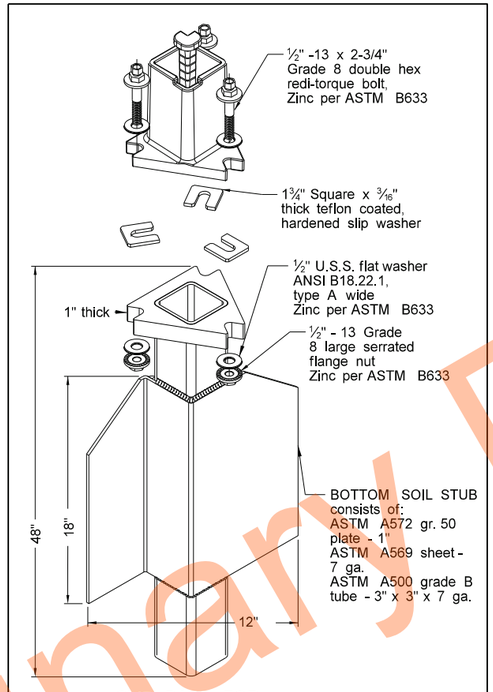
Number of Posts	Telescoping Perforated Tube: Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2⅜16	10	Yes		7

(B) - Provide a shim as specified by the manufacturer when placing 2½", 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) - 2½" x 12 ga. x 18" minimum length external sleeve required.

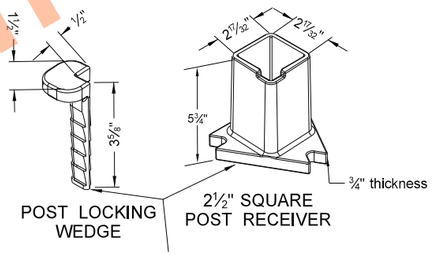


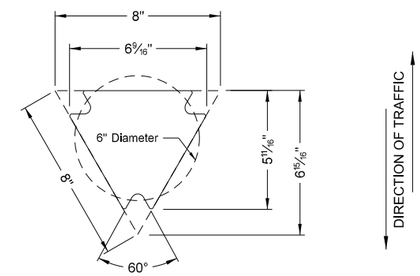


MULTI-DIRECTIONAL SLIP BASE ASSEMBLY: Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2⅜16" x 10 ga to achieve higher load ability is allowed.



SLIP BASE FOR 2½" POST





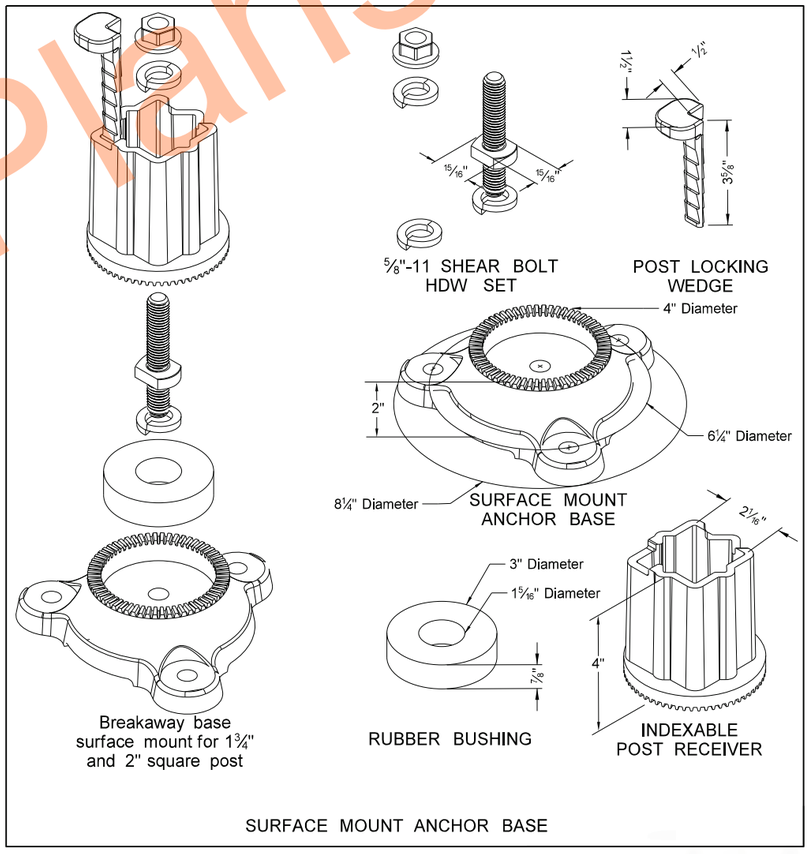
SLIP BASE DETAIL

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 Modulud 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
2⅜16 x 2⅜16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 ⅜16" size 10 gauge is shown as 2.19" size on the plans; The 2½" size is shown as 2.51" size on the plans.

NOTE:

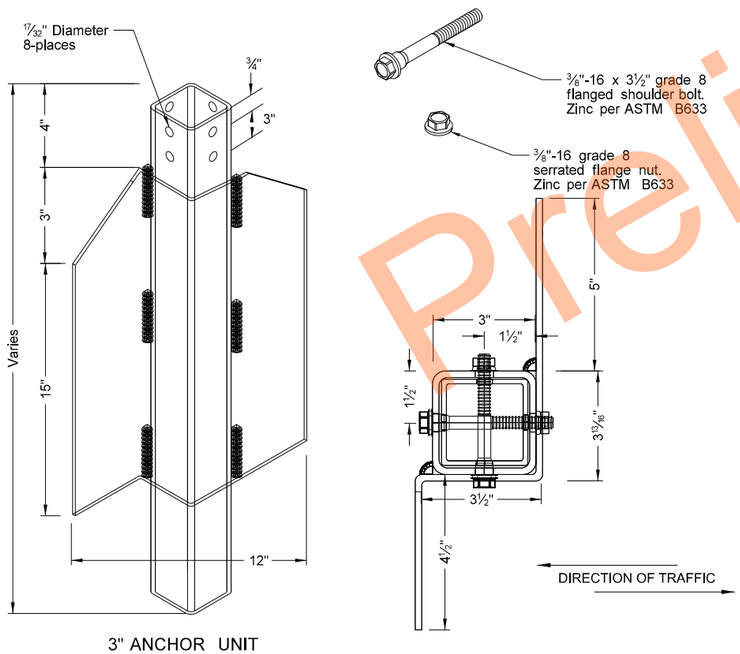
1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Provide 7 guage HRPO commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
3. Eliminate wings when anchor is used in concrete sidewalk.
4. Provide a minimum 8' distance between the first and fourth post on four post signs.
5. Install in accordance with manufacturers recommendation.
6. Use a minimum ½" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.



SURFACE MOUNT ANCHOR BASE

SHOULDER BOLT

Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(use standard ⅜" diameter grade 8 bolt with proper shim)



3" ANCHOR UNIT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active volce & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

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

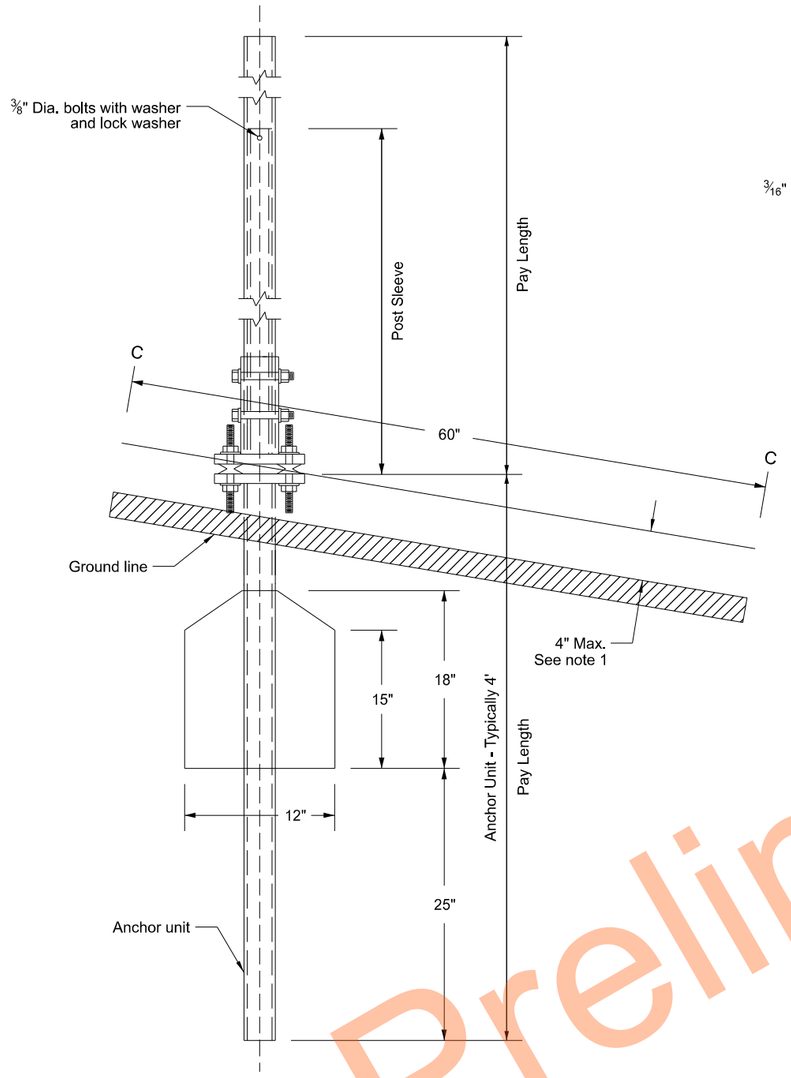
08/05/24

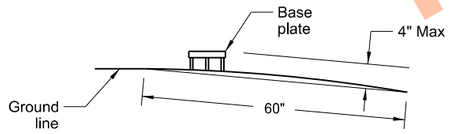
Preliminary Plans

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Breakaway Coupler System for Perforated Tubes

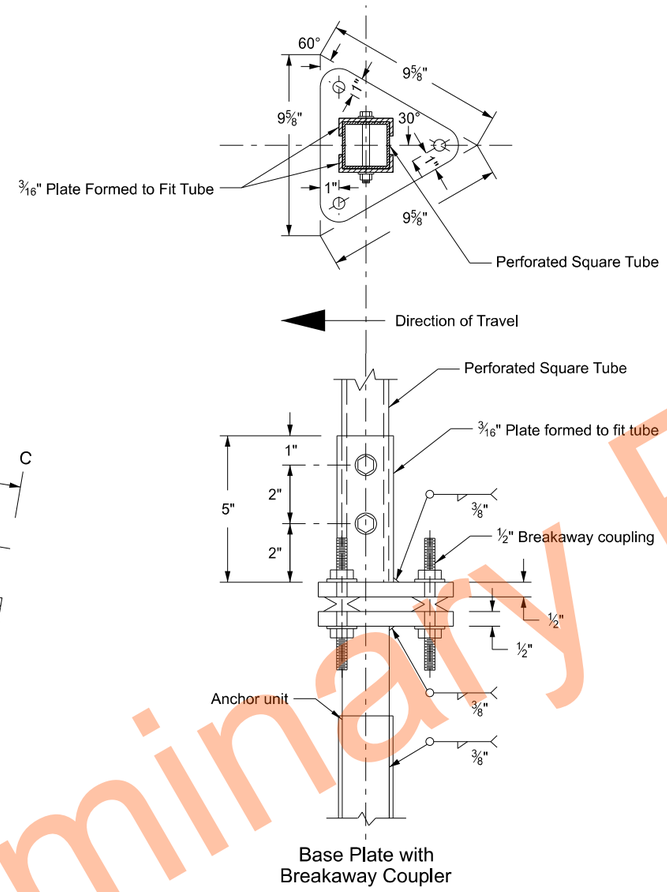
D-754-24A



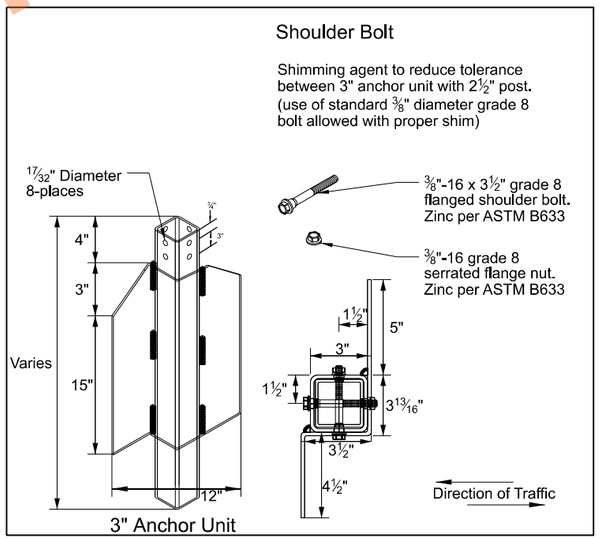


Section C-C

Max projection 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.



Base Plate with Breakaway Coupler



3" Anchor Unit

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	2 3/16	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

Preliminary Plans

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-3-2013

REVISIONS

DATE	CHANGE
08-30-18	Updated notes to active voice.
08-30-19	New Design Engr PE Stamp.
08-05-24	Electronic Stamp/Signature.
07-22-25	Corrected "typo" in C-C note.

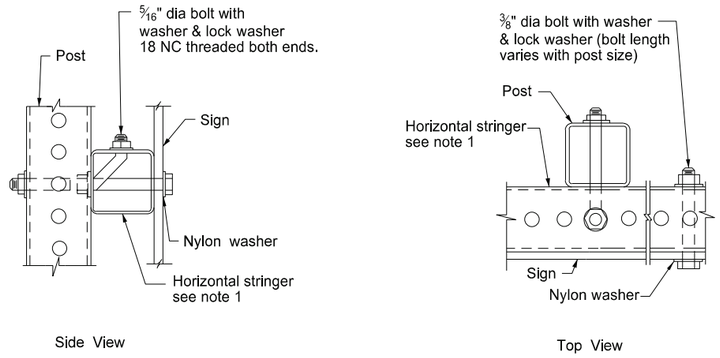
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

07/22/25

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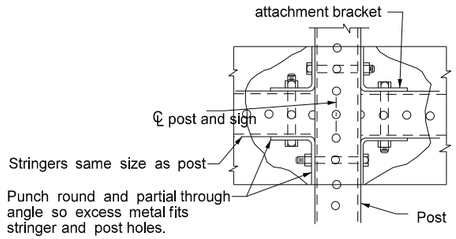
Mounting Details Perforated Tube

D-754-25



Side View Top View

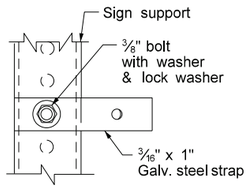
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



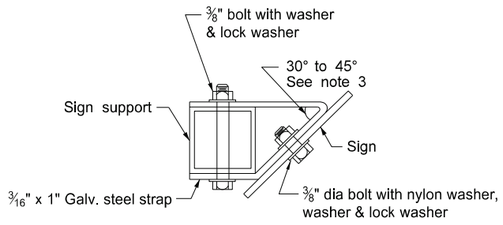
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

Note:

1. Horizontal stringers - Use perforated tubes or 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter 15/16" ±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.

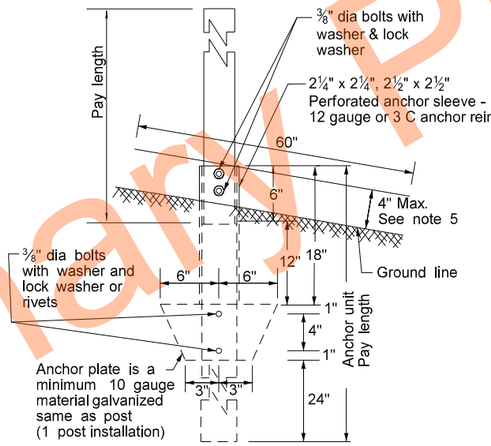


Side View



Top View

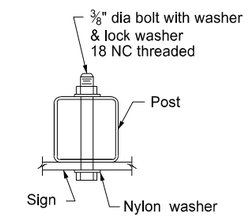
STRAP DETAIL



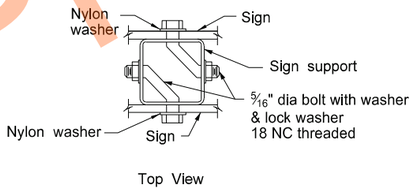
ANCHOR UNIT AND POST ASSEMBLY

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

(B) - When placing 2½", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

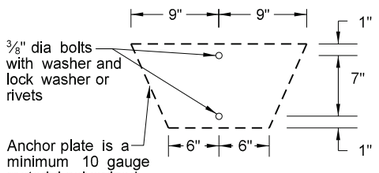


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.
8-05-24	Electronic Stamp/Signature.

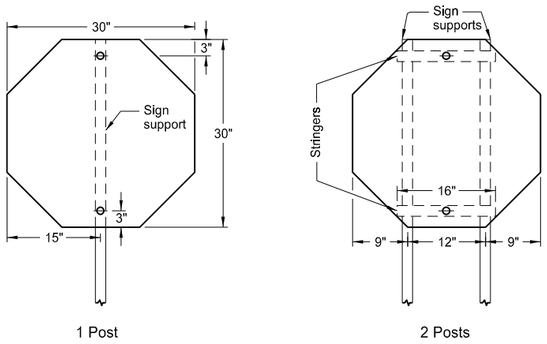
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/05/24

Preliminary Plans

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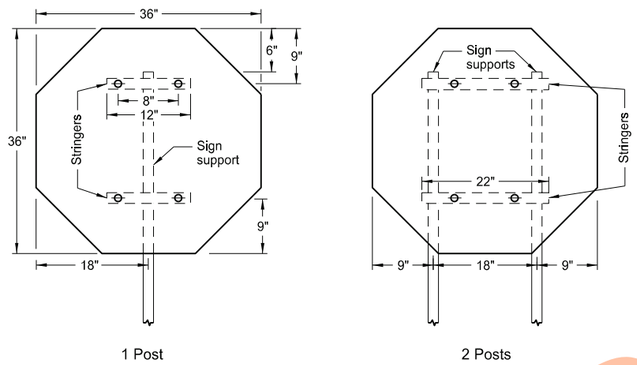
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-26



1 Post 2 Posts

Assembly No. 1

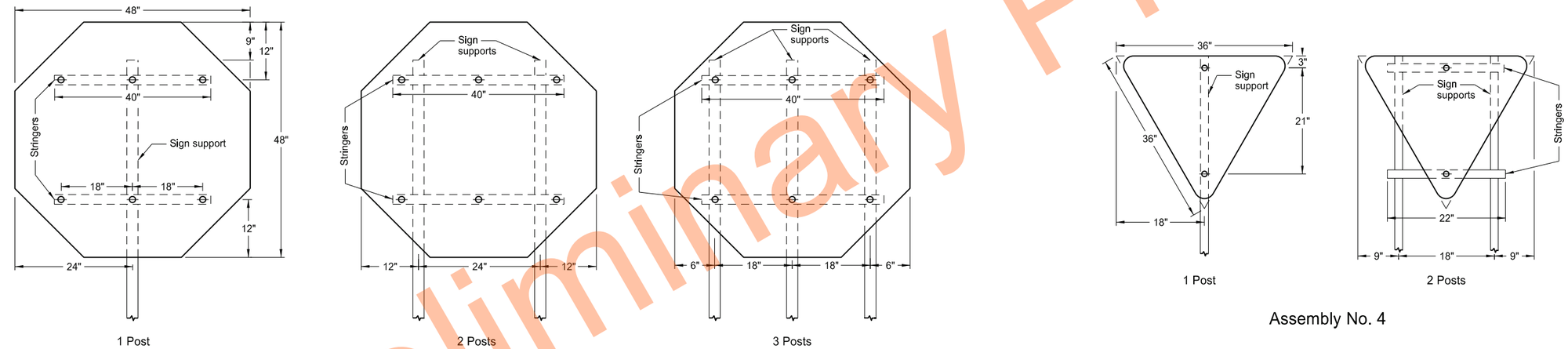


1 Post 2 Posts 3 Posts

Assembly No. 2

Notes:

1. 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.

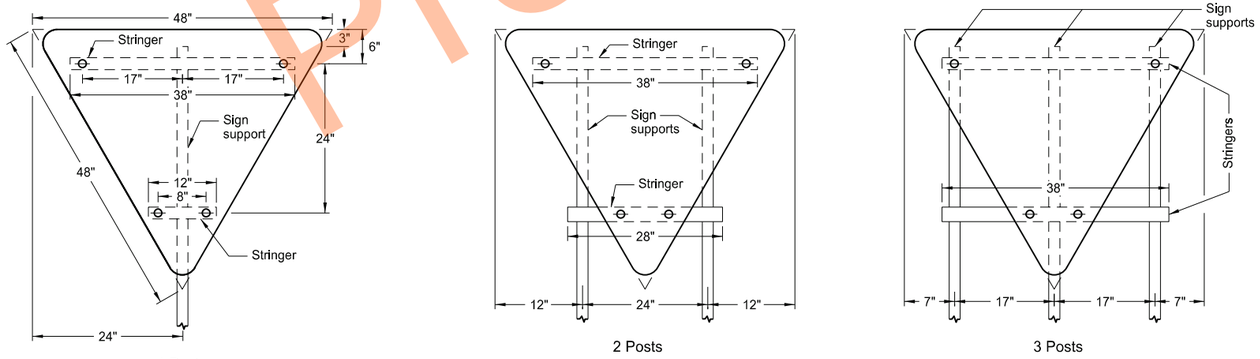


1 Post 2 Posts 3 Posts

Assembly No. 3

1 Post 2 Posts

Assembly No. 4



1 Post 2 Posts 3 Posts

Assembly No. 5

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19 8-05-24	Updated notes to active voice. New Design Engineer PE Stamp. Electronic Stamp/Signature.

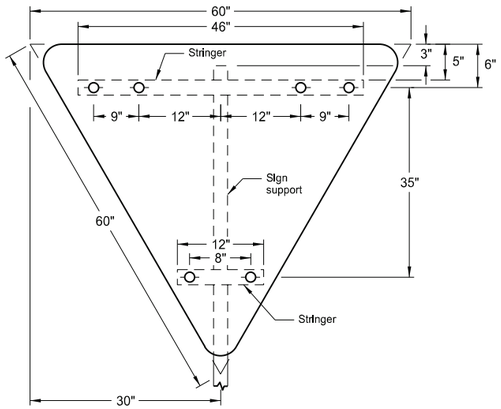
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/05/24

Preliminary Plans

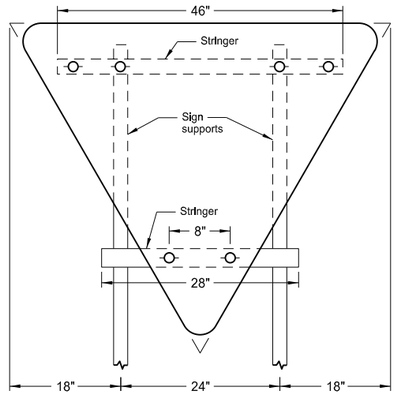
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-27

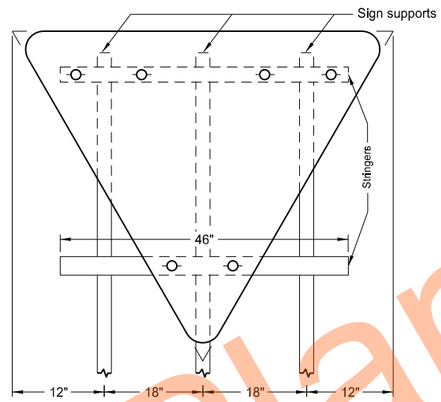


1 Post



2 Posts

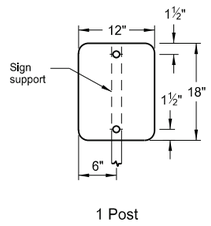
Assembly No. 6



3 Posts

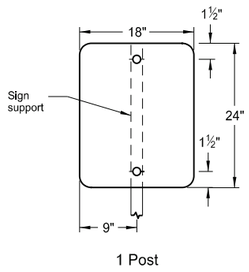
Notes:

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.



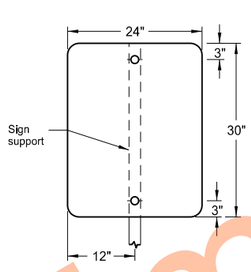
1 Post

Assembly No. 7

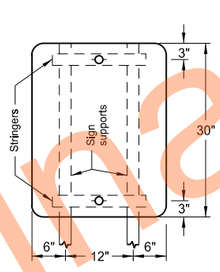


1 Post

Assembly No. 8

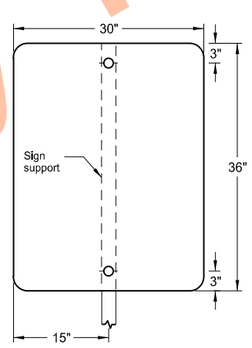


1 Post

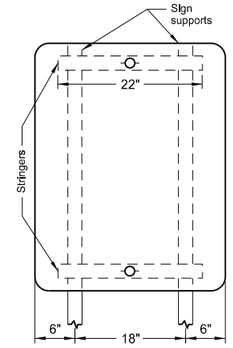


2 Posts

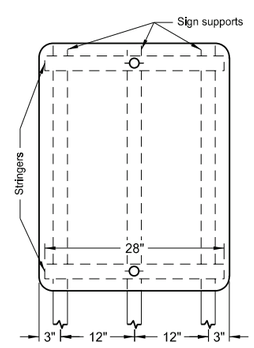
Assembly No. 9



1 Post

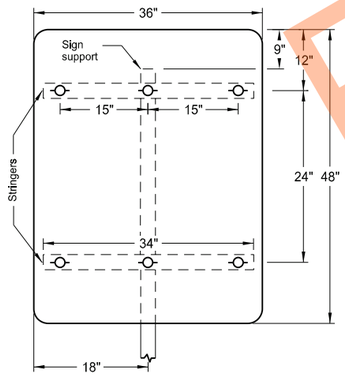


2 Posts

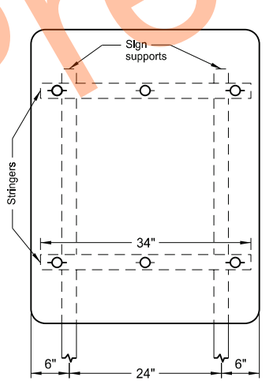


3 Posts

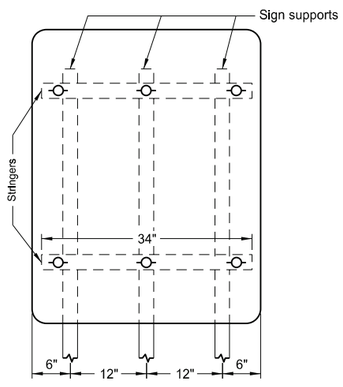
Assembly No. 10



1 Post



2 Posts



3 Posts

Assembly No. 11

Preliminary Plans

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

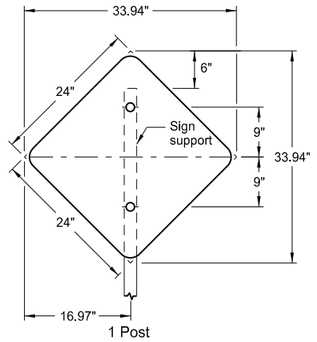
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/06/24

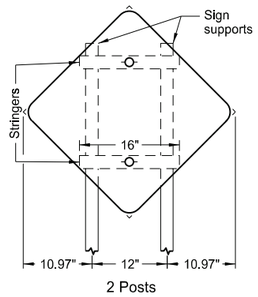
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D-754-29

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

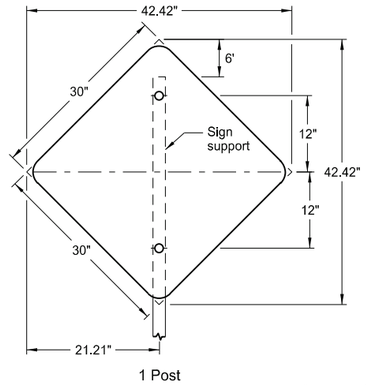


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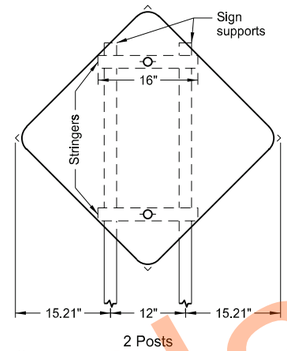


2 Posts

Assembly No. 18

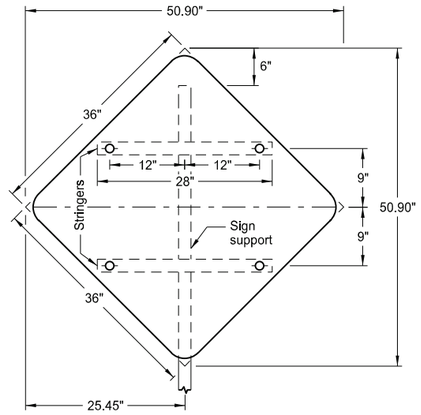


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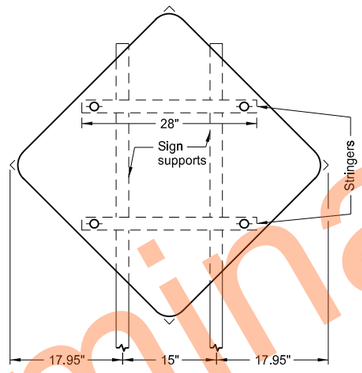


2 Posts

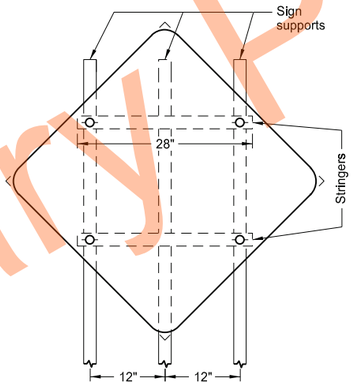
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1 Post

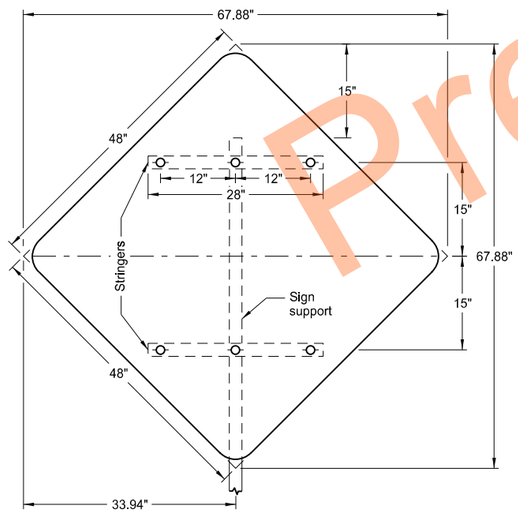


2 Posts

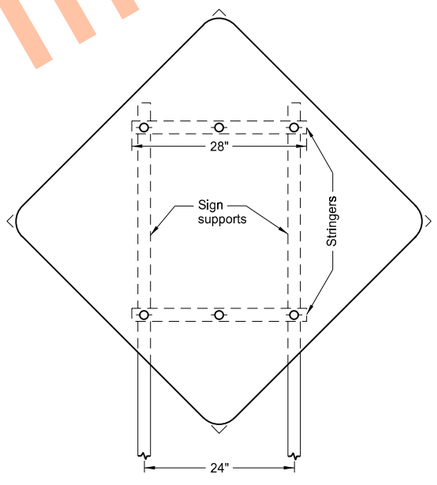


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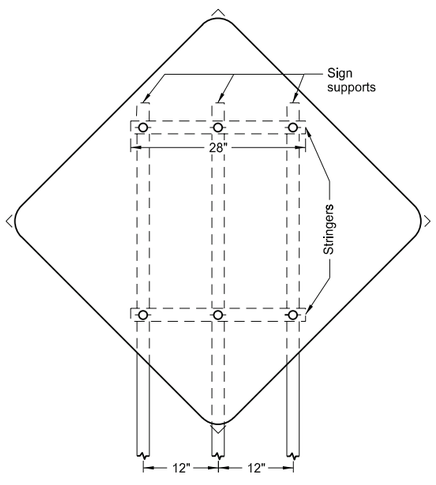
Assembly No. 20



1 Post



2 Posts



3 Posts

Assembly No. 21

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 notes to active voice.
8-30-19	New Design Engineer PE Stamp.
8-06-24	Electronic Stamp/Signature.

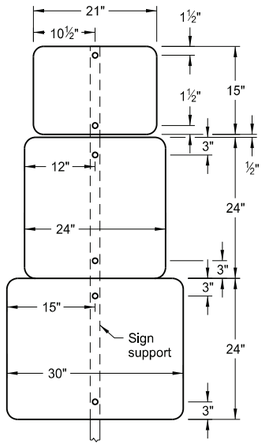
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/06/24

Preliminary Plans

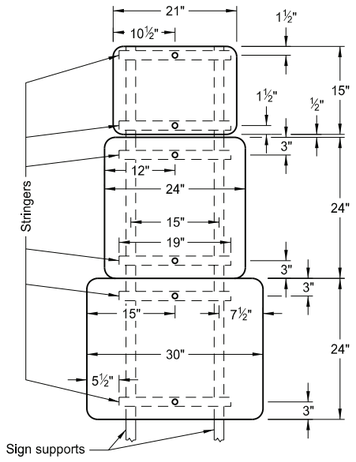
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

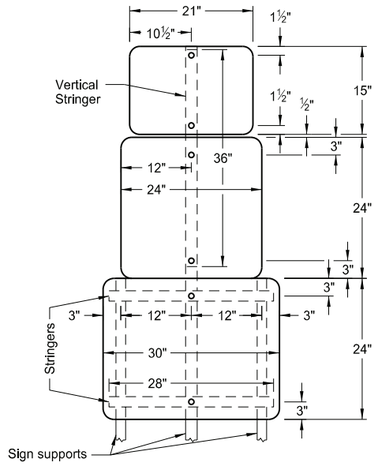
D-754-58



1 Post

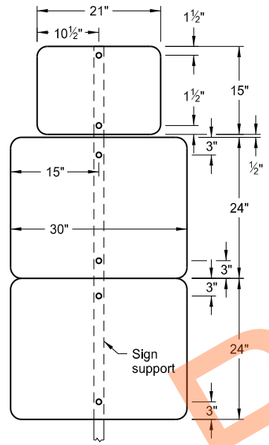


2 Posts

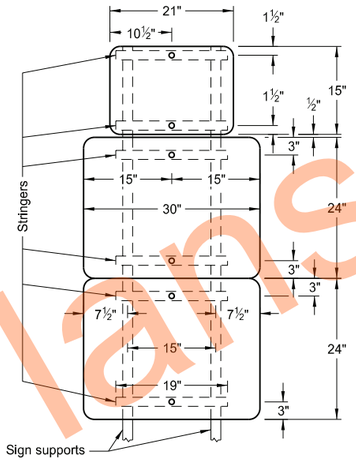


3 Posts

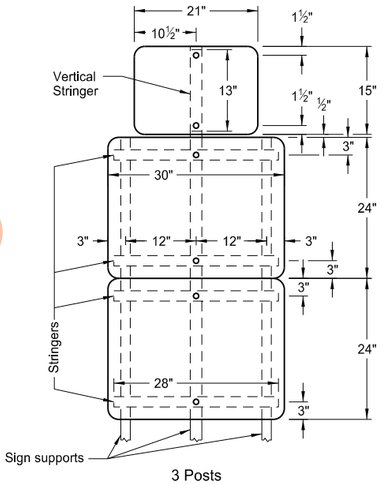
ASSEMBLY 396



1 Post

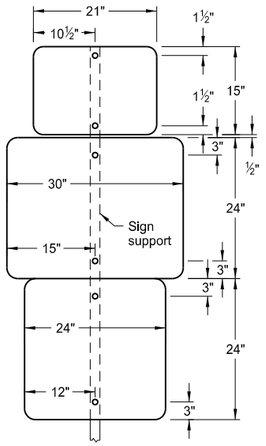


2 Posts

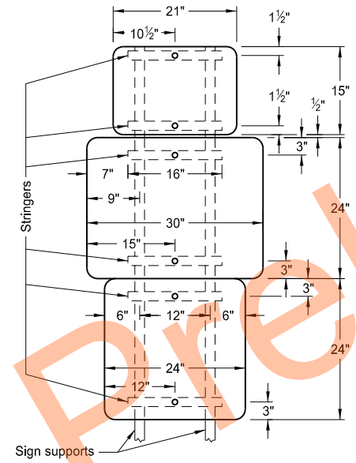


3 Posts

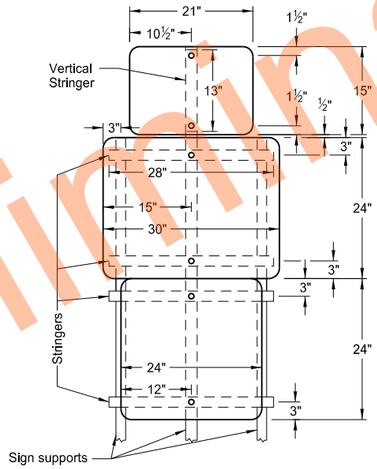
ASSEMBLY 397



1 Post

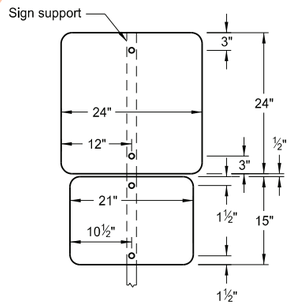


2 Posts

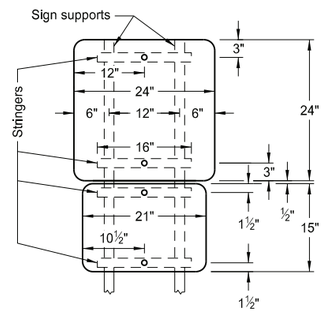


3 Posts

ASSEMBLY 398



1 Post



2 Posts

ASSEMBLY 399

Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & added Assembly 398 dimension.
9-04-19	New Design Engineer PE Stamp.
8-07-24	Electronic Stamp/Signature.

KIRK J. HOFFMAN REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

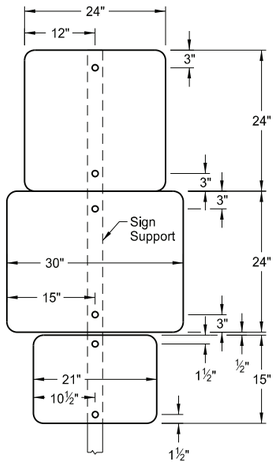
08/07/24

Preliminary Plans

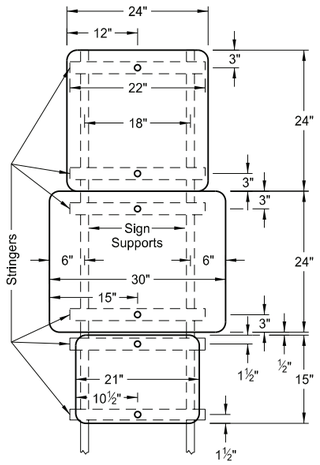
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

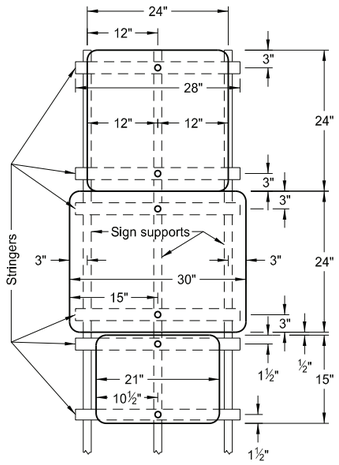
D-754-64



1 Post

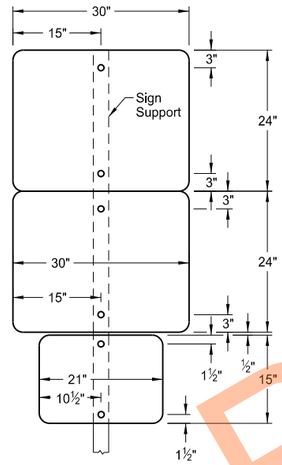


2 Posts

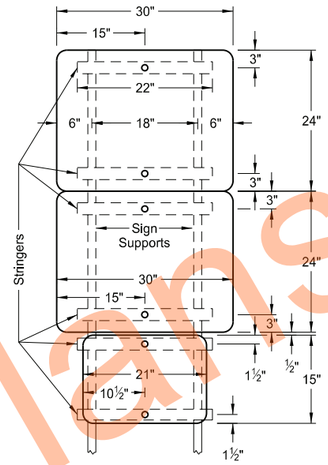


3 Posts

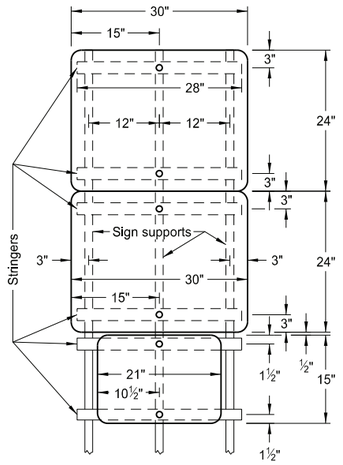
ASSEMBLY NO. 414



1 Post

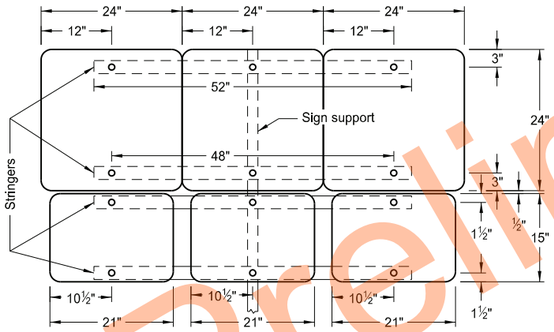


2 Posts

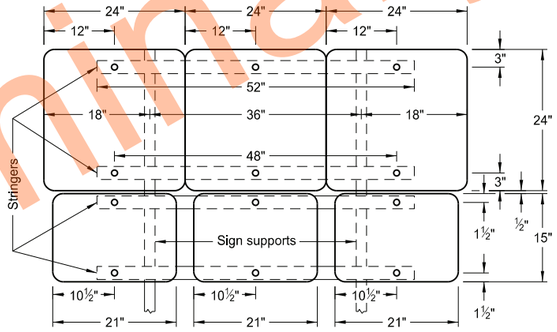


3 Posts

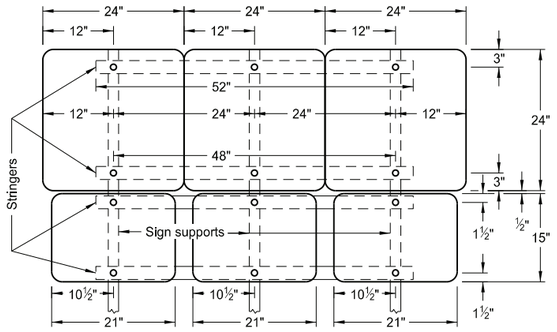
ASSEMBLY NO. 415



1 Post



2 Posts



3 Posts

ASSEMBLY NO. 416

Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringer.
3. Punch holes round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp
8-07-24	Electronic Stamp/Signature.

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

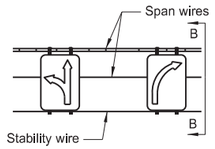
08/07/24

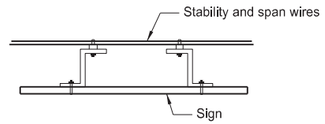
Preliminary Plans

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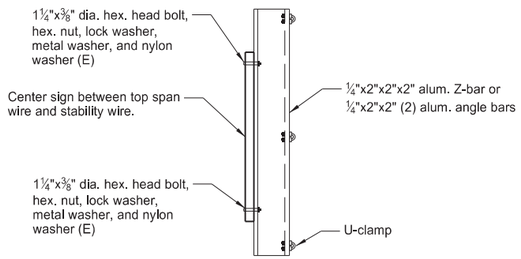
D-754-80

LIGHT STANDARD, SIGNAL STANDARD, AND SPAN WIRE MOUNTED SIGN ASSEMBLY DETAIL

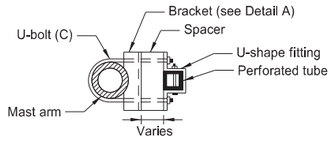




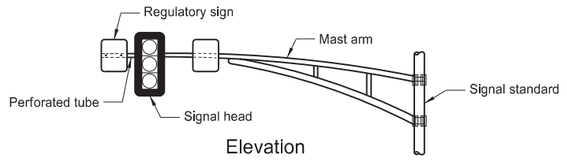
Plan



Section B-B
Span Wire Mounted Sign Detail



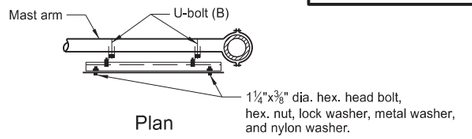
Section A-A



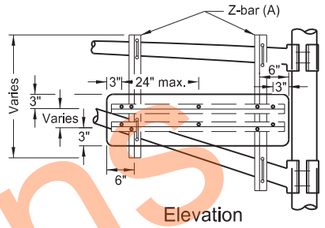
Elevation



Plan

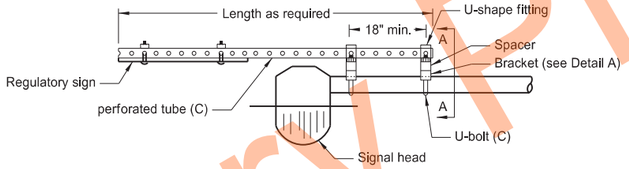


Plan

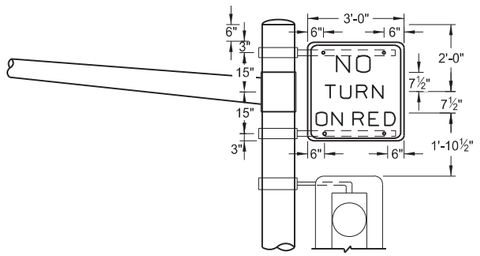


Elevation

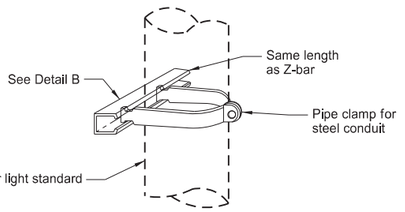
Mast Arm Mounted Street Name Sign Detail



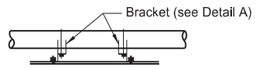
Sign Mounted Beyond End of Mast Arm Detail



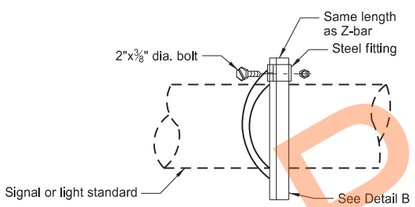
Signal Standard Mounted Sign Attachment Detail



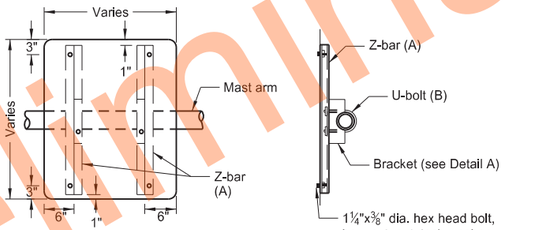
Vertical Mounting
(Use 2 clamps per sign)



Plan

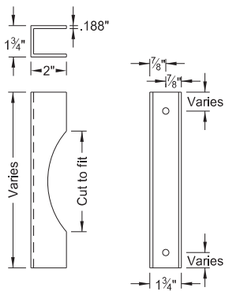


Horizontal Mounting
alternate clamp mounting
(Use 2 clamps per sign)

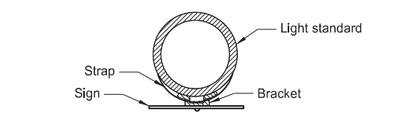


Elevation Side View

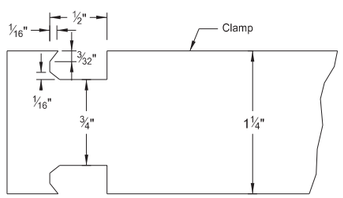
Mast Arm Mounted Regulatory Sign Detail



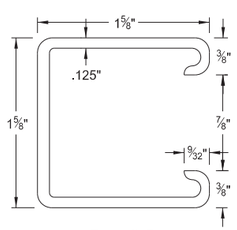
Detail A



Light Standard Mounted Sign Bracket Detail
Max. 24"x30" signs (D)



Clamp Detail



Detail B
Steel Channel

Post Size dia.	Clamp Gauge min.
3½" to 5"	11
6" to 12"	10

Clamp	
Post Size dia. in.	D in.
3½	3
4	3 3/16
5	5 1/8
6	7 7/16
8	13 1/16
10	20 3/4
12	29 5/8

Notes:

(A) Use 1¾"x3/16" thick 1.08 lb/ft aluminum alloy Z-bar. In place of Z-bar, use two 1¾"x1¾"x3/16" angles bolted together or a 1¾"x2"x.188" channel.

(B) ⅜" U-bolt, hex. nut, lock washer, and bracket (U-bolt length depends on dia. of mast arm.)

(C) ⅜" U-bolt, hex. nut, lock washer, and bracket (U-bolt length depends on dia. of mast arm.)

Maximum perforated tube lengths for mounting signs beyond end of mast arm:
2"x2" maximum support length 9.9'
2½"x2½" maximum support length 12.6'
2½"x2½" maximum support length 15.7'

(D) Use galv. steel strap and sign attachment bracket similar to the one shown in the detail. Include all costs of bracket assembly in the price bid for flat sheet signs. Punch as shown on Standard Drawings. Provide a 7' minimum vertical clearance to the bottom of signs mounted on light standards.

(E) Use metal washers and nylon washers with a minimum outside dia. of 15/16" ± 1/16" and 10 gauge thickness on sign face.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.
8-08-24	Electronic Stamp/Signature.

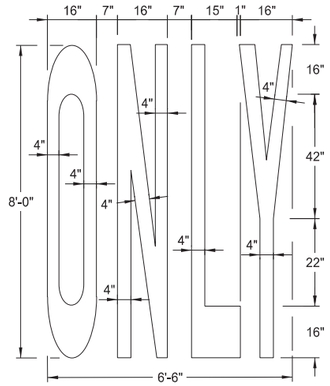
KIRK J. HOFFA
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/08/24

Preliminary Plans

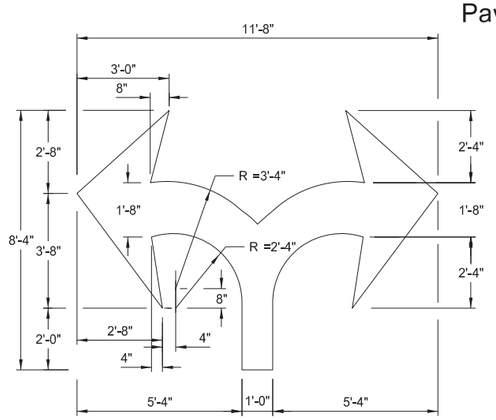
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Pavement Marking Message Details

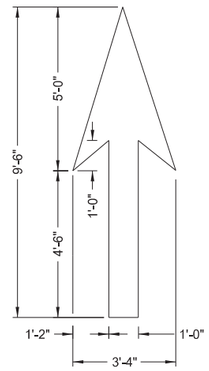
D-762-1



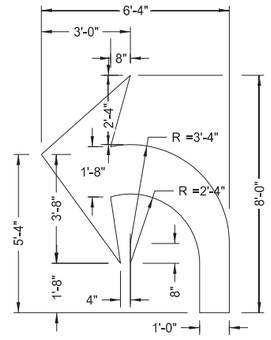
22 S. F.



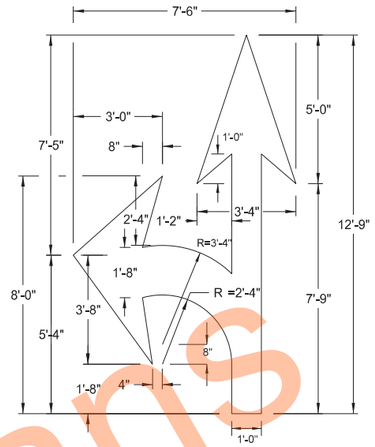
29 S. F.



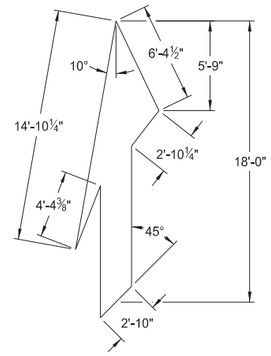
12 S. F.



16 S. F.

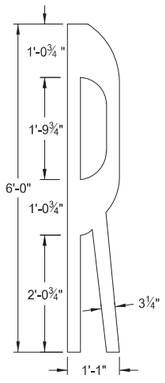


27 S. F.

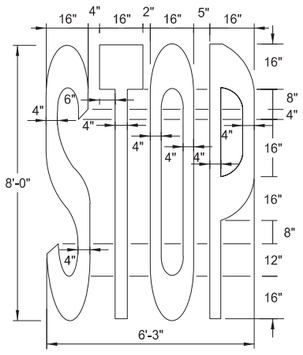


41 S. F.

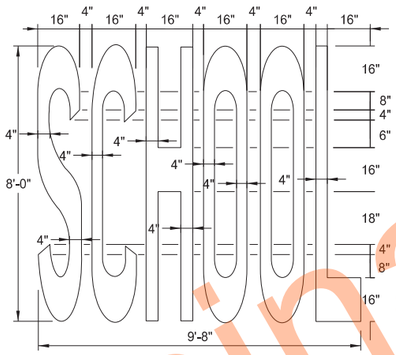
Note: Rotate merge arrow 20° from edge of roadway.



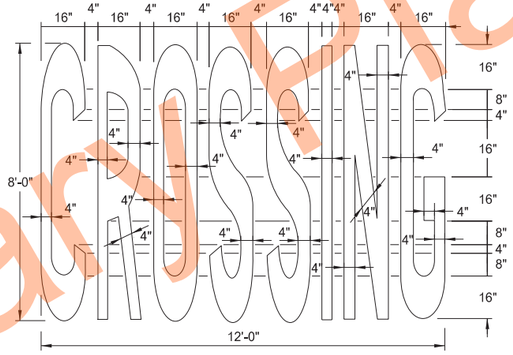
4 S. F.



22 S. F.



34.5 S. F.



46 S. F.

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

Chevron Crosshatching Table

Centerline Pavement Marking Skip Spacing Detail

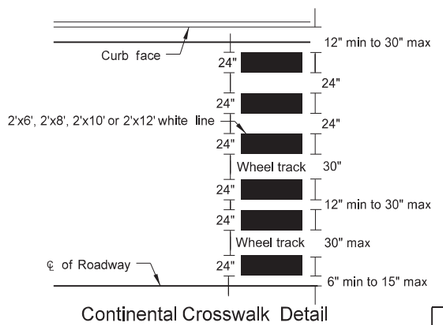
Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

See plans for correct message. Use white pavement markings unless noted otherwise.

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

*Stop Bar nearest crossing - 8' from gate or 26' to nearest rail - Use whichever is further from tracks.

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



Continental Crosswalk Detail

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.

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.

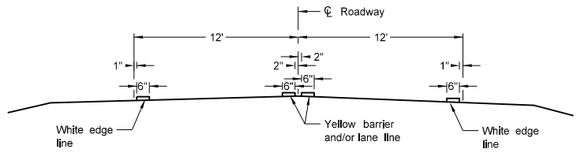
KIRK J. HOFFMANN REGISTERED PROFESSIONAL PE-4683 11/22/23 ENGINEER NORTH DAKOTA

Preliminary Plans

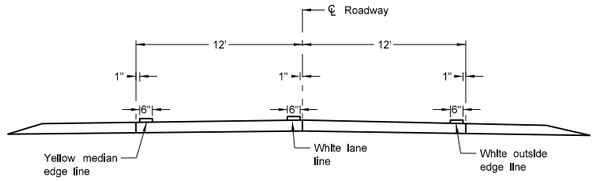
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PAVEMENT MARKING

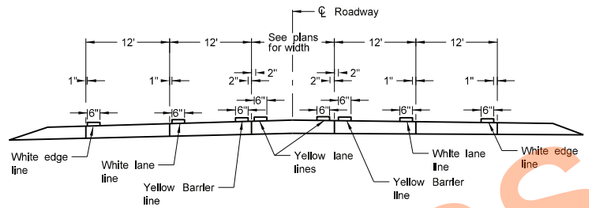
D-762-4



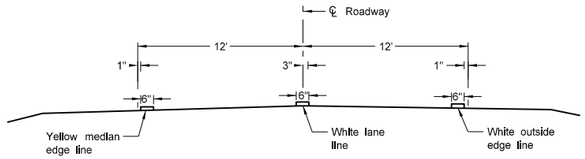
Two Lane Two Way
RURAL ROADWAY



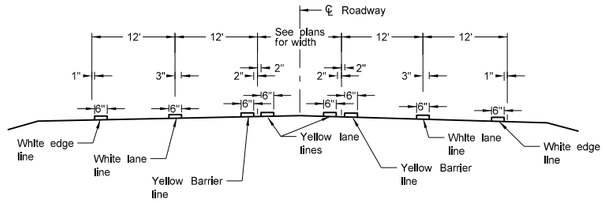
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



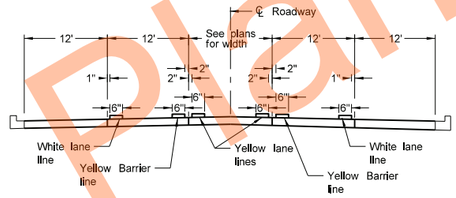
RURAL FIVE LANE ROADWAY
Concrete Section



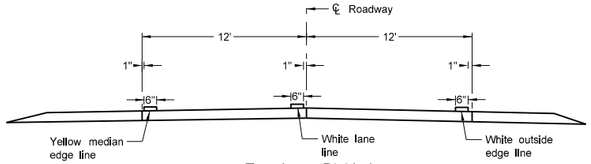
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



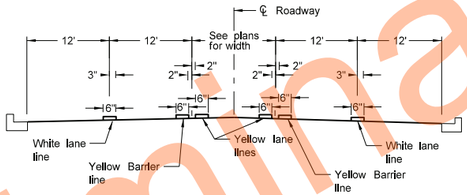
RURAL FIVE LANE ROADWAY
Asphalt Section



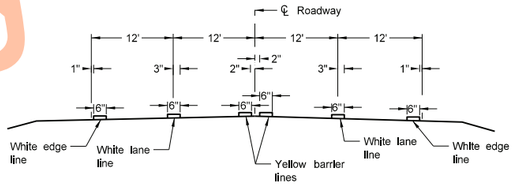
URBAN FIVE LANE SECTION
Concrete Section



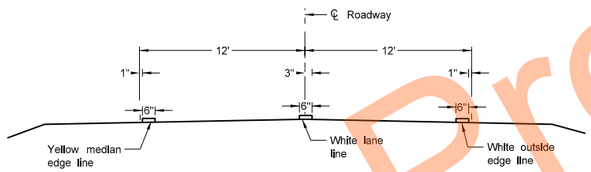
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



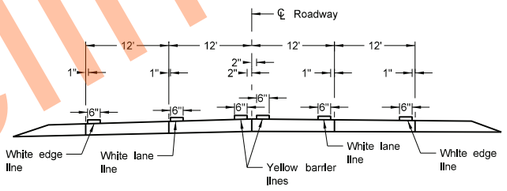
URBAN FIVE LANE SECTION
Asphalt Section



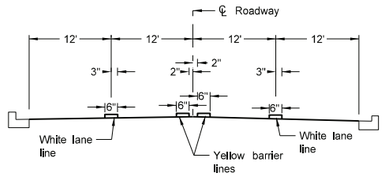
RURAL FOUR LANE ROADWAY
Asphalt Section



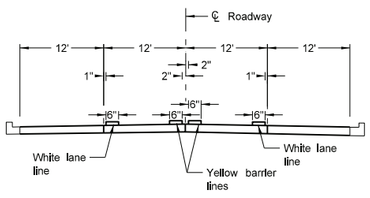
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



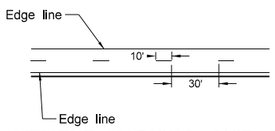
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

1. Continue edge lines through private drives and field drives. Break edge lines for intersections.

   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.

3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.

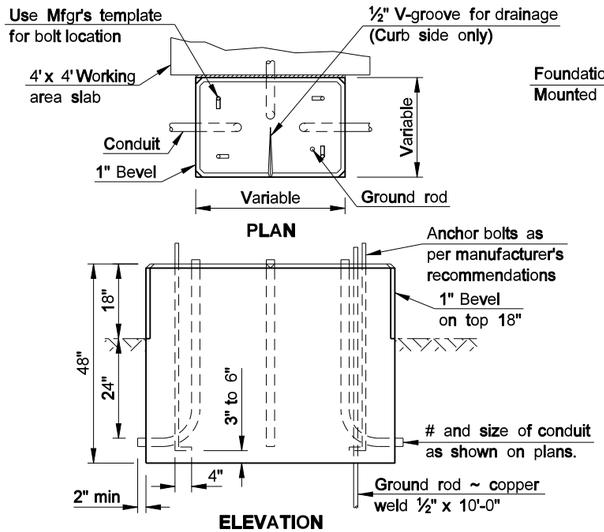
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
07/09/24
ENGINEER
NORTH DAKOTA

Preliminary Plans

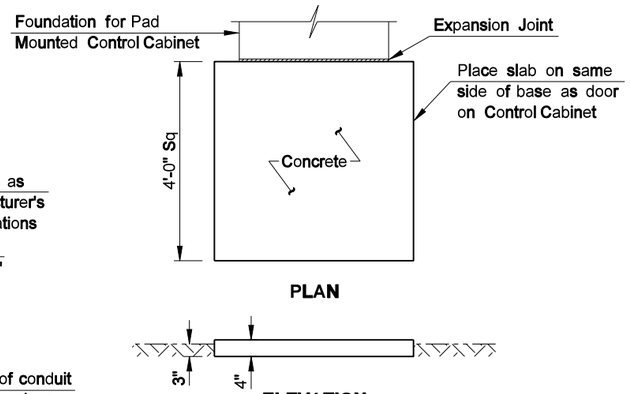
CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

D-770-1



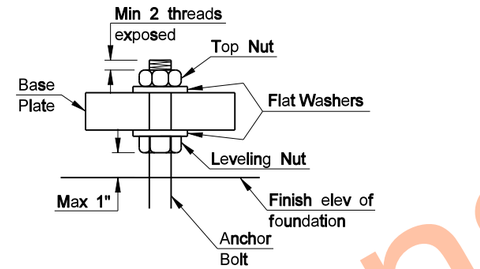
CONTROLLER CABINET FOUNDATION PAD MOUNT

The Controller Cabinet Foundation shall be bid as Concrete Foundation - Traffic Signals.

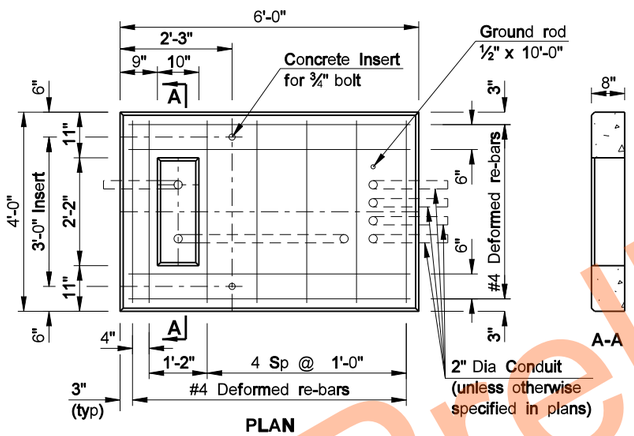


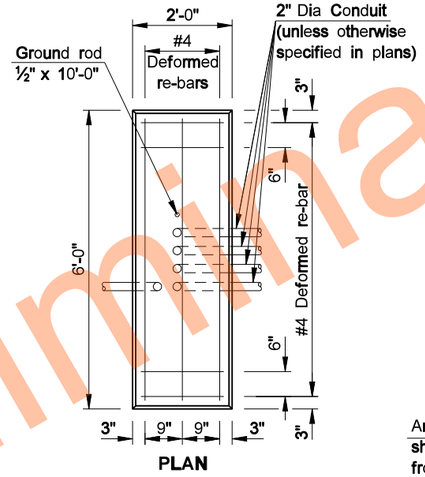
WORKING AREA SLAB

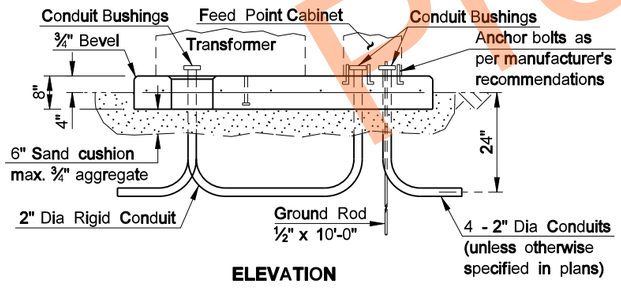
The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



ANCHOR BOLT DETAIL

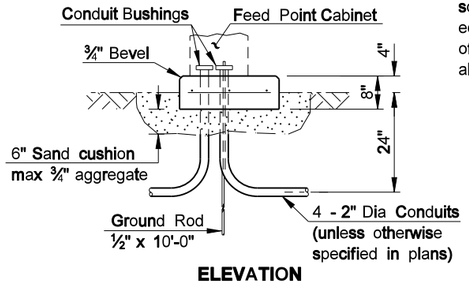






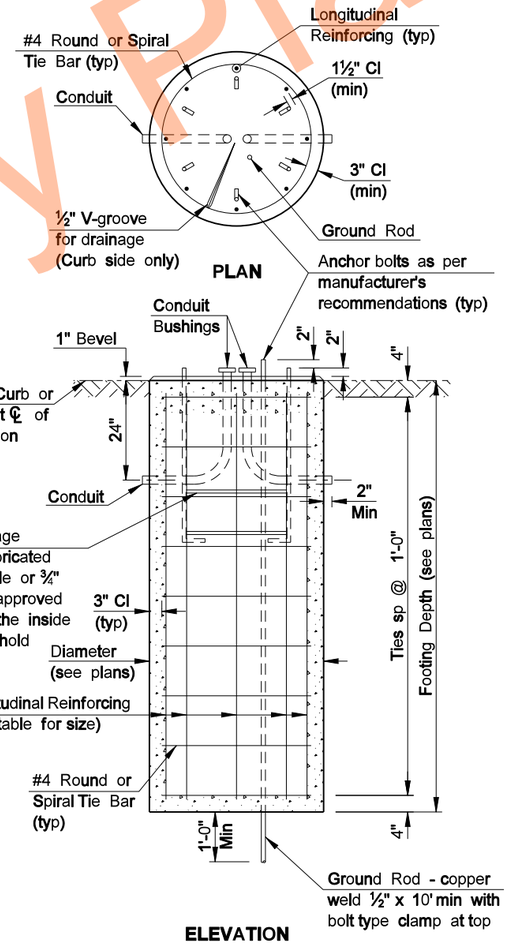
TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNT

The Transformer & Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type A.



FEED POINT CABINET FOUNDATION PAD MOUNT

The Feed Point Cabinet Foundation Pad Mount shall be bid as Concrete Foundation ~ Feed Point ~ Type B.



LIGHT & SIGNAL STANDARD FOUNDATION

NOTES:

LIGHT & SIGNAL STANDARD FOUNDATIONS: See plans for conduit size, number of bends and correct position for each foundation. When conduit does not continue beyond the foundation, conduit with a 105° bend and bushings on both ends may be substituted for the 90° bends shown. See plans for correct size & location of foundations. The grade and exact location shall be established by the Engineer in the field. All reinforcing shall be Grade 60. Tie bars shall have a minimum of a 12" lap. Reinforcing may be omitted for Type I, II, V, VI & VII signal standard foundations if the anchor bolts extend to within 3" to 6" above the bottom of the foundation. A minimum of 6 anchor bolts shall be used for cantilevered structures.

CONTROLLER CABINET FOUNDATION PAD MOUNT FOUNDATION: See plans for the number of 90° bends per foundation and correct positioning. The foundation for Pad Mounted Controller Cabinet shall be of sufficient size so that there is a minimum of 3" of clearance from the outside edge of cabinet to the outside edge of the foundation on any side. The contractor shall ensure a water-tight seal between the controler cabinet and the foundation by caulking, except for V-groove.

WORKING AREA SLAB: The materials and preparation of this slab shall be as approved by the Engineer in the field.

TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

FEED POINT CABINET FOUNDATION PAD MOUNTED: The foundation shall have a wood float finish. All conduits shown shall be installed. Conduit that is not used at this time shall be plugged with an expandable plug.

LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-15-10	
REVISIONS	
DATE	CHANGE

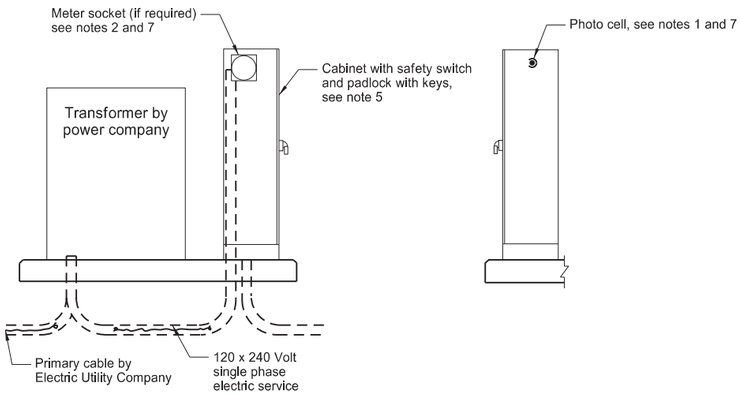
This document was originally issued and sealed by Terrence R. Udland Registration Number PE- 2674 , on 6/15/10 and the original document is stored at the North Dakota Department of Transportation

Preliminary Plans

Docusign Envelope ID: 98D18526-2204-423D-9746-A270B873E215

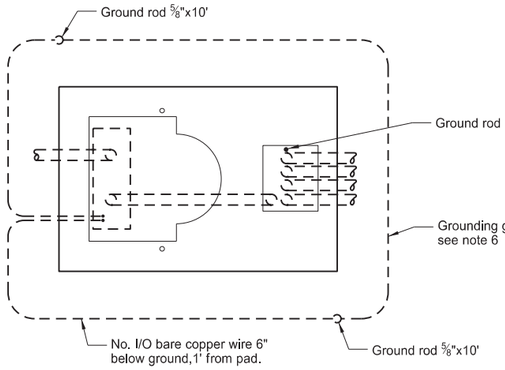
FEED POINTS
(ROADWAY LIGHTING)

D-770-2



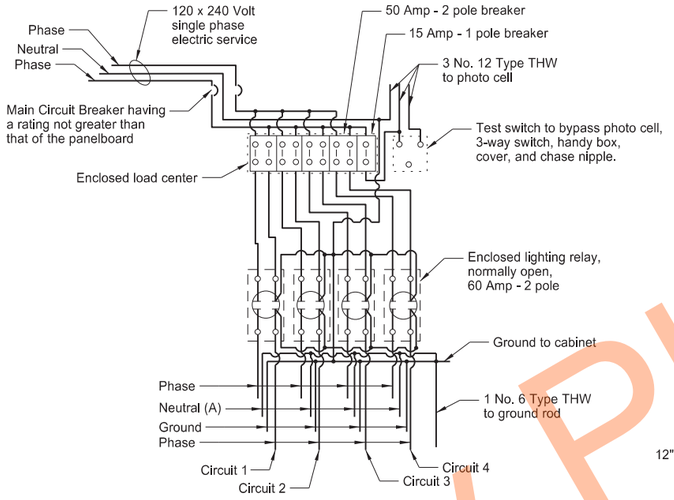
Elevation

Photo Cell
Mounting Detail



Plan

Transformer and Feed Point Cabinet Pad Mounted



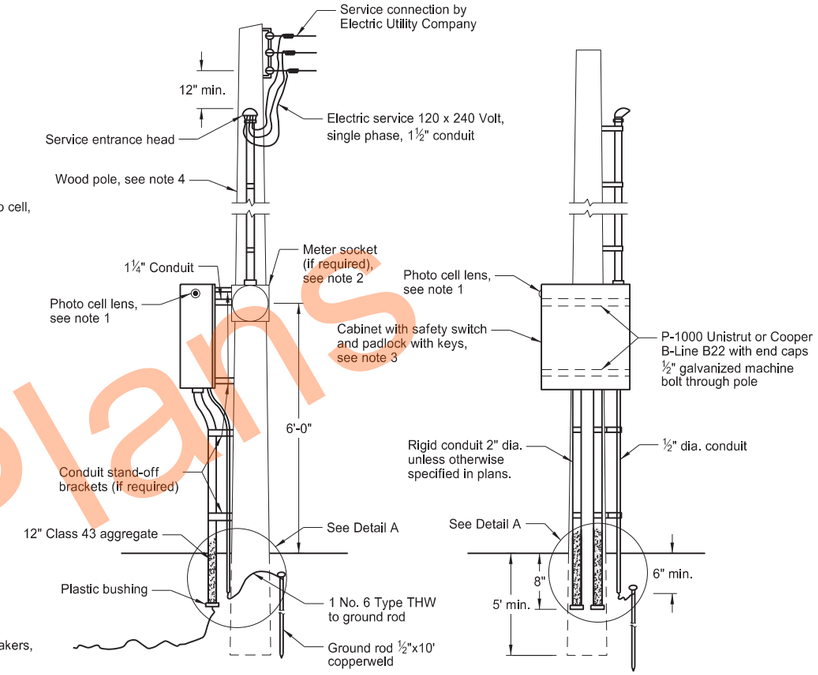
Feed Point Type IV

Provide Type I feed point similar to Type IV, except with one electrical circuit, one 50 Amp - 2 pole breakers, and one lighting relay, normally open.

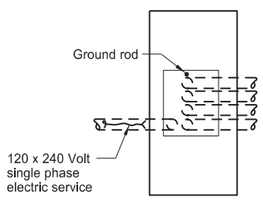
Provide Type II feed point similar to Type IV, except with two electrical circuit, two 50 Amp - 2 pole breakers, and two lighting relays, normally open.

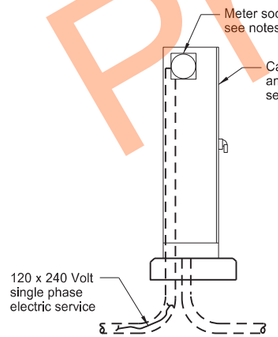
Provide Type III feed point similar to Type IV, except with three electrical circuits, three 50 Amp - 2 pole breakers, and three lighting relays, normally open.

(A) Install when festoon circuit is required.



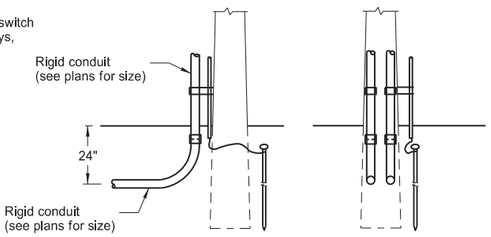
Feed Point Pole Mounted





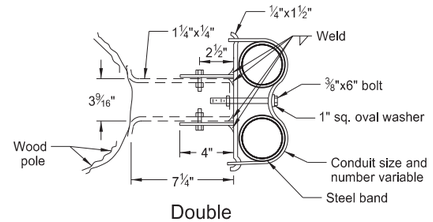
Plan Elevation

Feed Point Cabinet Pad Mounted

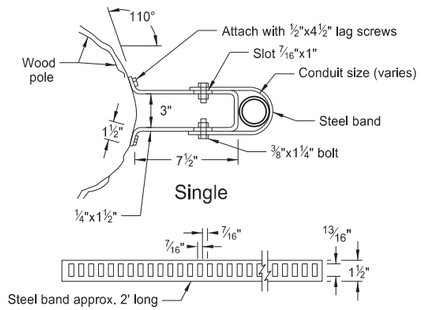


Detail A

Use this detail for a continuous run of conduit from the feed point to the first light standard.



Double



Single

Conduit Standoff Bracket

Omission of conduit standoff brackets allowed when not required by local utility company.

Notes:

1. Photo Cell: Furnish and install the photoelectric cell. Face photo lens north.
2. Meter Socket: Install meter socket and trim if the meter is required by local Utility Company. Meter furnished and installed by Utility Company.
3. Pole Mounted Cabinet: Provide cabinet with lock drip shield, factory installed steel backing, stainless steel hardware, and side hinge door. Shop coat cabinet with one coat of primer and two coats of exterior gray enamel.

   Provide 30" high x 24" wide x 8" deep Type I and II feed points. Provide 30" high x 42" wide x 10" deep or 36" high x 36" wide x 10" deep Type III and IV feed points.
4. Wood Pole: Provide minimum 20' Class VII full length penta pressure treated wood pole. (if required, see layout sheets)
5. Pad Mounted Cabinet: Provide 56" high x 26" wide x 14" deep weatherproof cabinet. Minimum 12 gauge steel or aluminum with provisions for padlock.
6. Grounding Grid: Provide grounding grid with a maximum ground resistance of 25 ohms, using one or more ⅝"x10' copperweld ground rods in parallel or series at two corners. Provide a minimum distance between ground unit assemblies of 6'0".
7. Meter Location: Do not mount the meter (if required) on the same side of the cabinet as the photo cell.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
07-08-14	Revised note 3
10-17-17	Updated to active voice
08-28-19	New Design Engineer PE Stamp
11-01-24	Revised note 5
09-12-25	Revised date to match

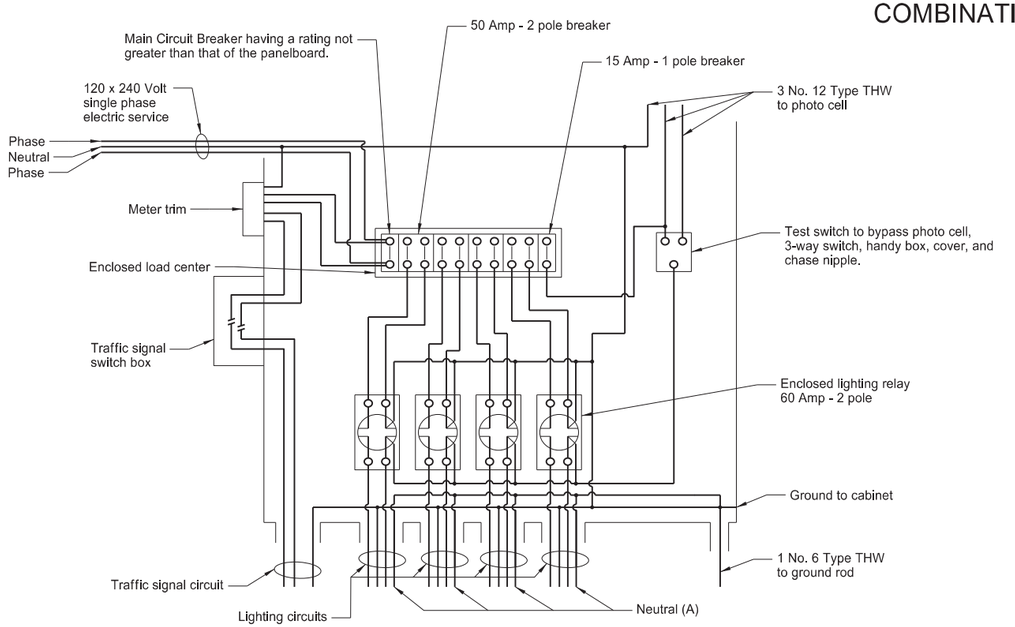
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09/12/25
ENGINEER
NORTH DAKOTA

Preliminary Plans

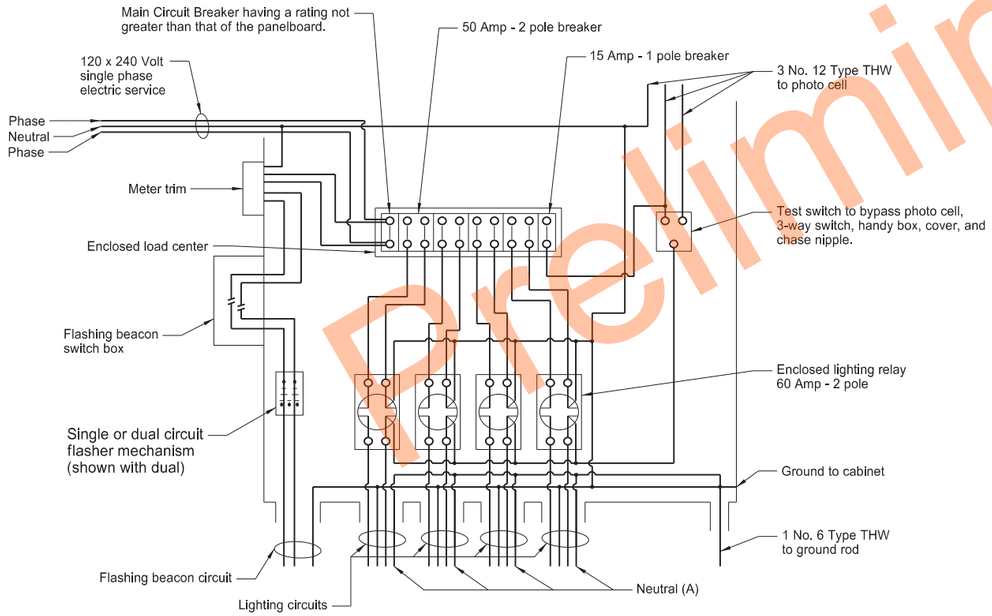
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COMBINATION FEED POINT DETAILS

D-770-2A



Combination Lighting and Signal
Feed Point Type IV



Combination Lighting and Flashing Beacon
Feed Point Type IV

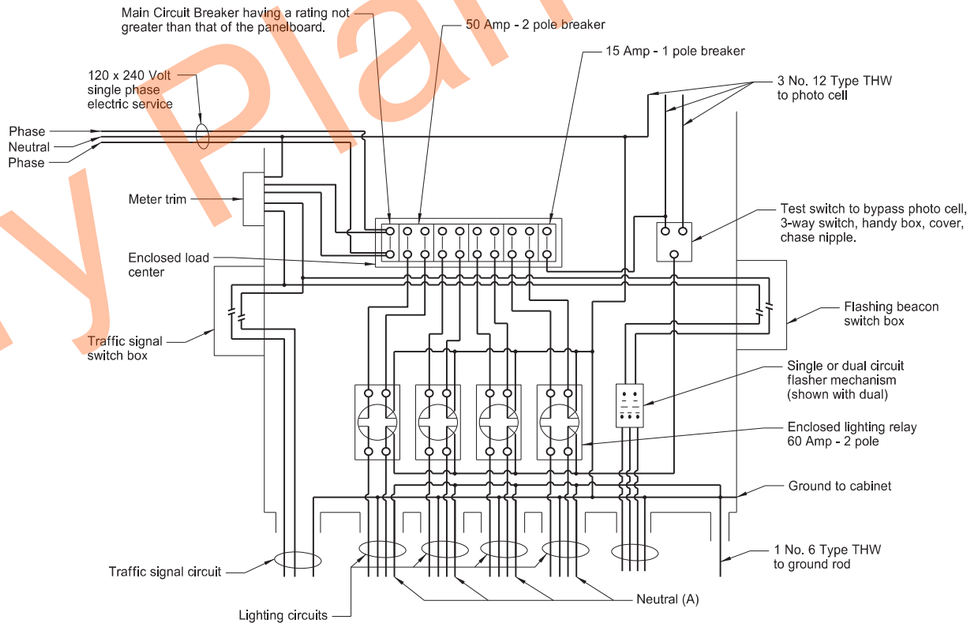
Notes:

Install Type I feed point similar to Type IV, except with one electrical circuit, one 50 Amp - 2 pole breaker, and one lighting relay, normally open.

Install Type II feed point similar to Type IV, except with two electrical circuits, two 50 Amp - 2 pole breakers, and two lighting relays, normally open.

Install Type III feed point similar to Type IV, except with three electrical circuits, three 50 Amp - 2 pole breakers, and three lighting relays, normally open.

(A) Install when festoon circuits are required



Combination Lighting, Signal, and Flashing Beacon
Feed Point Type IV

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17 8-28-19 8-09-24	Updated to active voice. New Design Engineer PE Stamp. Electronic Stamp/Signature.

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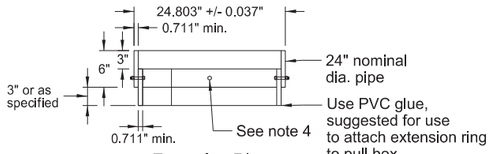
08/09/24

Preliminary Plans

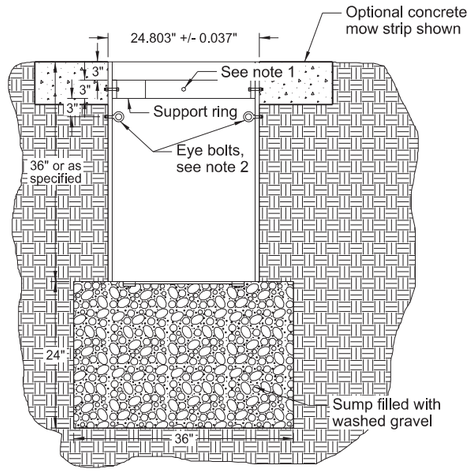
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PULL BOX & TRENCHING DETAILS

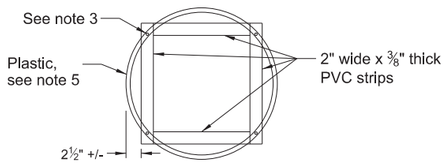
D-770-3



Extension Ring
(future adjustment)

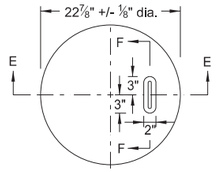


Elevation

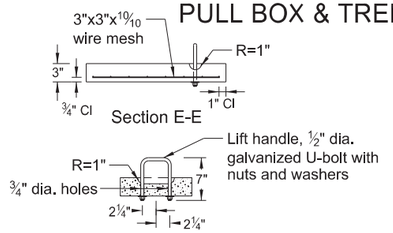


Bottom View

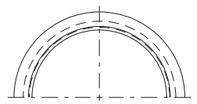
PVC Pull Box



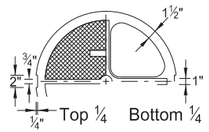
Top View

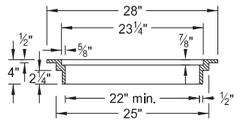


Concrete Cover

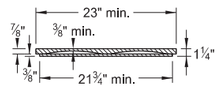


Half Top View



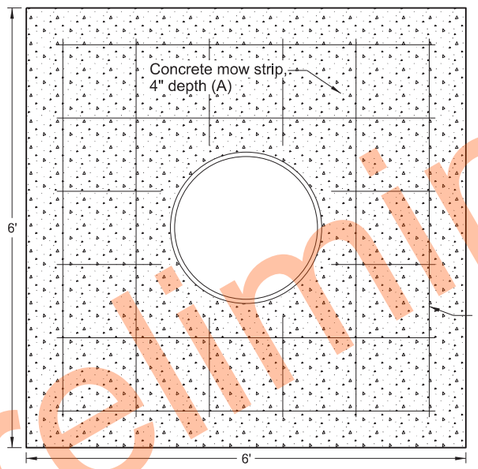


Section Frame



Section Cover

Cast Iron Frame and Cover



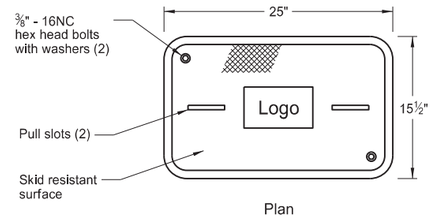
Top View
with optional concrete mow strip

PVC Pull Box Notes:

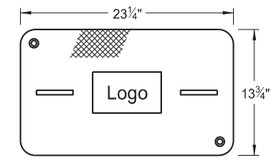
1. Attach split 24" nominal diameter PVC cover support ring with four ⅜" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
2. Two type 2 shoulder eye bolts, ⅜" dia. x 1¼" shank length with hex nuts 180 degrees apart (for lifting pull box and supporting electric cable).
3. Four ¼" x 1¼" long galvanized lag screws. Screw assembly together.
4. Attach split 24" nominal diameter PVC cover support extension ring with four ⅜" dia. x 2" long stainless steel hex head bolts with nuts at 90 degrees apart.
5. Bolt assembly together.
6. Size conduit holes located in barrel section no more than 1" larger than size of conduit being used.
7. After pull box and conduit installation, install water tight seal for inside walls and cover.
8. PVC pipe to meet requirements of ASTM F679 or equal.
9. Provide Austenitic Stainless Steel Hex Head bolts and nuts. Other fasteners to be galvanized as per ASTM A153.
10. Install an epoxy coating on the top and sides of the concrete cover. Provide an epoxy protective coating that is light gray, clear, or neutral in color and apply as recommended by the pull box manufacturer. Before application, clean with a wire brush and dry the surfaces of the concrete to which the epoxy protective coating is applied.
11. If a Cast Iron cover is provided, use grey iron as per AASHTO M 306.

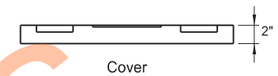
General Pull Box Notes:

1. Duct seal all conduits entering and exiting pull boxes.
2. Ensure all pull boxes are UL listed.

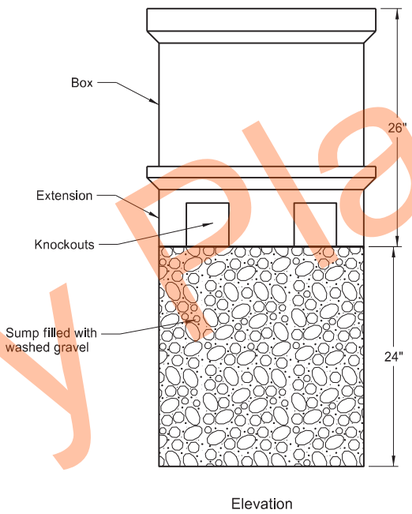


Plan

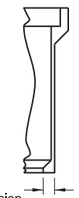




Cover



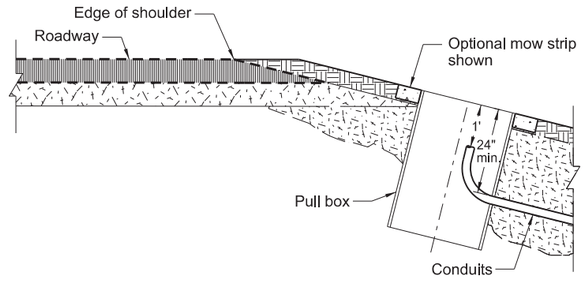
Elevation



Polymer Concrete Pull Box Notes:

1. Place top of pull box flush with surfaced area and approximately one inch above earth or sodded areas on level surfaces.
2. Provide at least one knockout per side in pull box.
3. Provide Polymer Concrete pull box meeting Tier 22 as per ANSI / SCTE 77.
4. Ensure the pull box constructed of polymer concrete reinforced by a heavy weave fiberglass.

Polymer Concrete Pull Box



Pull Box Installation Details

Note: The location of pull box will vary, refer to layout sheets for actual location.

When required, install a mow strip around the pull box. Place expansion material between the foundation and the mow strip. Ensure the mow strip is 4" depth and 2' width from the foundation. Use #4 deformed bars in the mow strip. Space the bars 6" from the outside edge. Place the bars in a grid pattern at 1' apart.

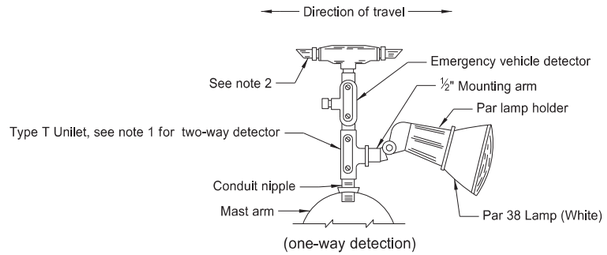
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
11-01-24	Updated PVC pull box, trenching
09-12-25	Revised date to match

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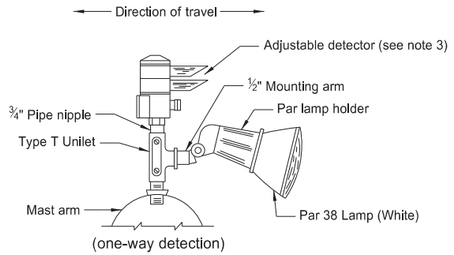
Preliminary Plans

Docusign Envelope ID: 98D18526-2204-423D-9746-A270B873E215

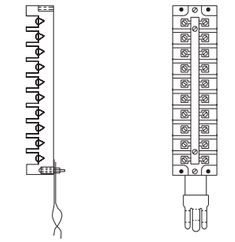
LIGHTING AND SIGNAL DETAILS



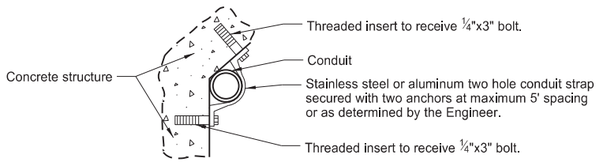
Emergency Vehicle Detector Detail



Alternate Emergency Vehicle Detector Detail (adjustable)

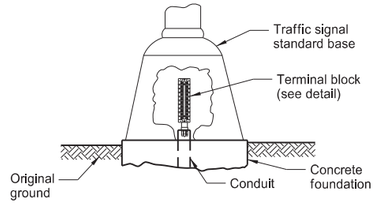


Terminal Block Detail

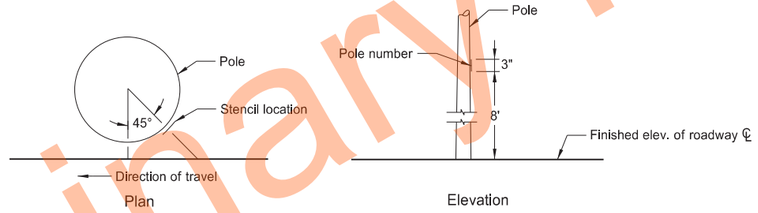


Bridge Mounted Conduit Hanger

Notes:
1. Use Type X Unilet with two Par lamp holders and lamps for Two-way Detectors. (one in each direction).
2. Plug unused end of One-way Detector with metal pipe plug.
3. Rotate detector lens to face direction of travel on Two-way Detectors.

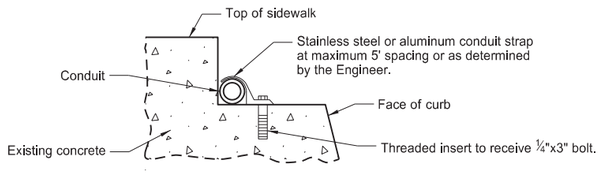


Terminal Block
(rigid mounted)

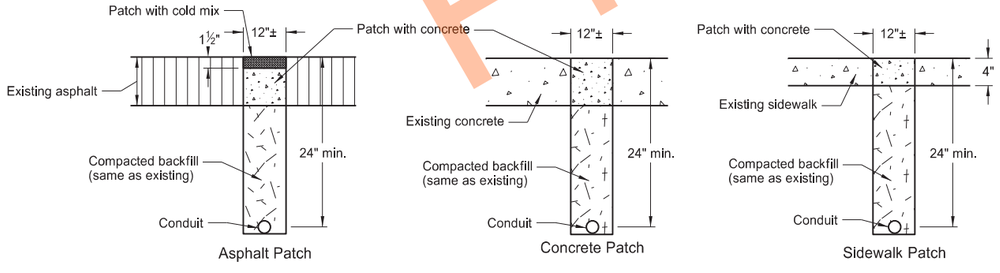


Light Standard Numbering

Note: On the roadway side of each light standard, stencil the pole number using contrasting color paint or an adhesive coated plastic such as Scotchcal by 3M or as approved by the Engineer. See layout sheets for pole numbers.

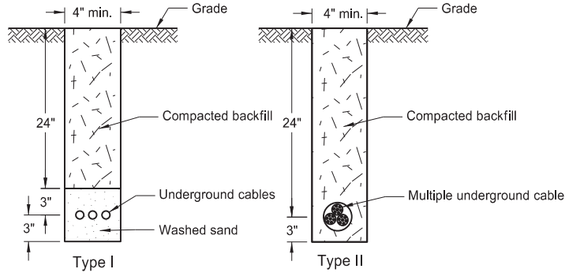


Bridge Curb Mounted Conduit



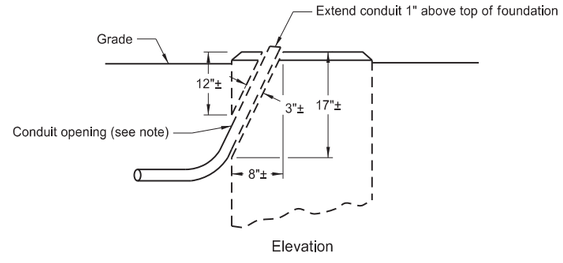
Surface Patch Details

Note: Saw cut trenches. Use PCC pavement for replacement concrete with the coarse aggregate gradation, maximum size and method of curing as approved by the Engineer. Immediately prior to pouring replacement concrete, paint all surfaces with an approved epoxy compound.



Cable Trench

Note: Seed entire area disturbed by trenching.



Revise Concrete Foundation

Note: Jackhammer or drill to remove material and provide a location for conduit. Make opening no larger than necessary. Place conduit, fill with concrete and finish foundation to original appearance.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
10-25-19	Removed conduit under RR detail
11-01-24	Updated bridge hanger detail
09-12-25	Revised date to match

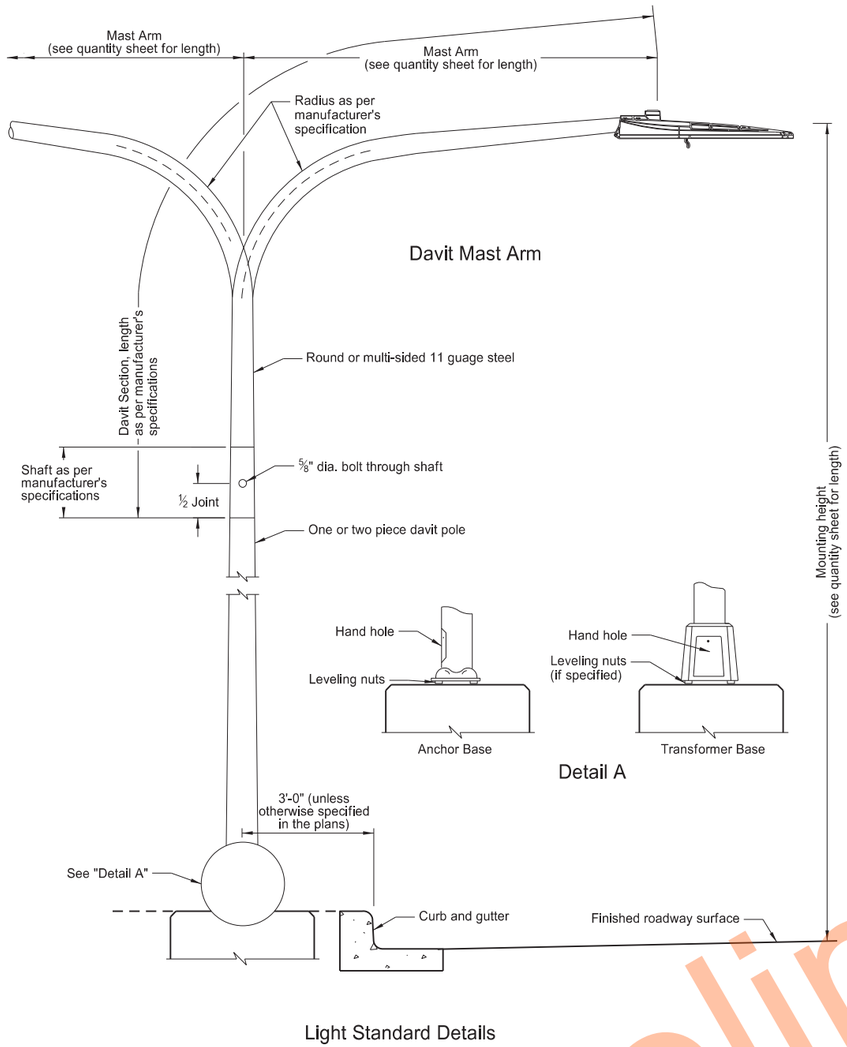
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ENGINEER
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Preliminary Plans

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LIGHT STANDARD DETAILS

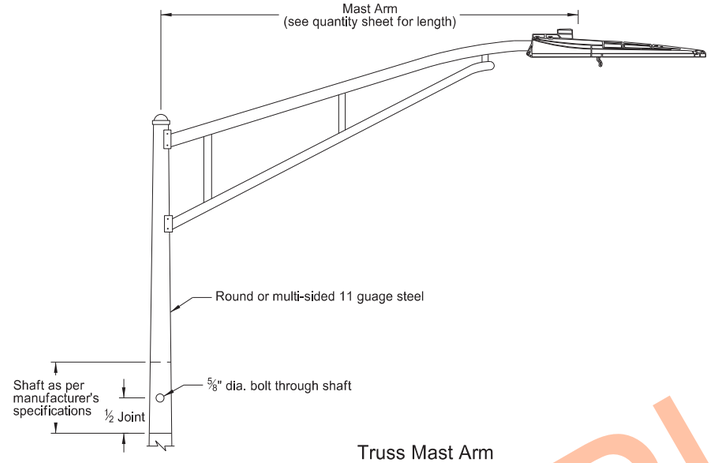
D-770-5



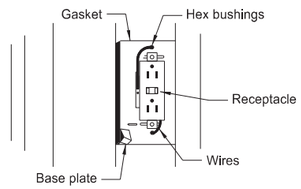
Davit Mast Arm

Detail A

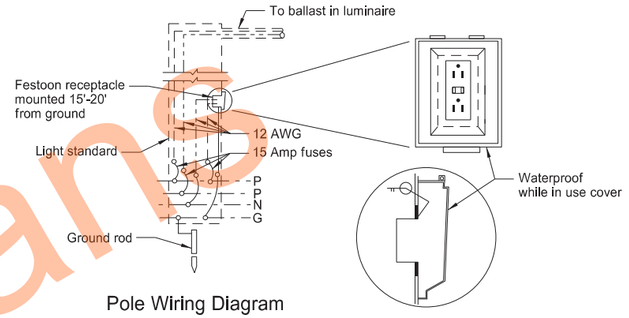
Light Standard Details



Truss Mast Arm



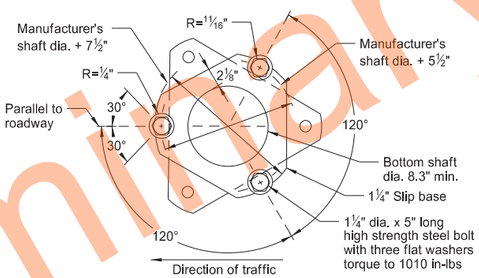
Optional: Festoon receptacle
mounted on multi-sided pole.



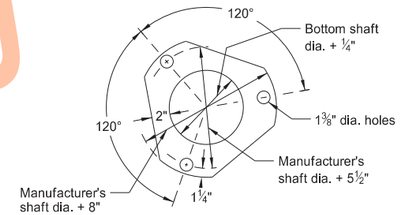
Pole Wiring Diagram

Receptacle Mounting Detail (B)

(B) Mount receptacle on side of pole that faces the street.
Install Festoon Receptacle only when specified in the plans.



Top View



Plan View

Keeper Plate Detail (A)

(A) ASTM A446 Grade "A" 28 gauge keeper plate on top of middle flat washer. Galvanize Keeper plate after fabrication.

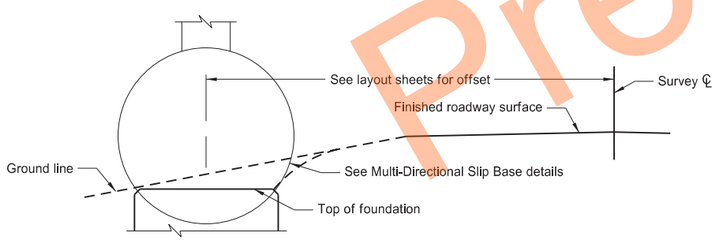
Notes:

Light Standard Locations: The minimum offset distance from the curb face is 3 feet. Offset light standards at least 3 feet in urban areas and where speeds are less than 30 mph. Where speeds are 30 mph or more, place light standards at least 16 feet from the driving lane.

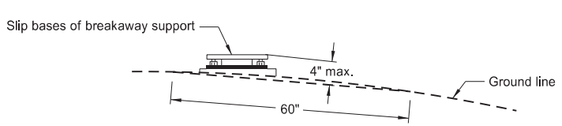
Steel Standards: Touch up marred or scratched areas after erection.

Luminaire: Use internal ballast-constant wattage 120x240 voltage. See layout sheets for type of luminaire, wattage, I.E.S. distribution, and operating system.

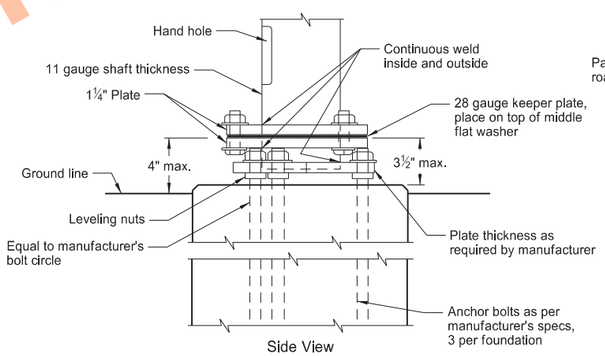
Fusing: Fusing in base, see specifications.



Concrete Foundation Location

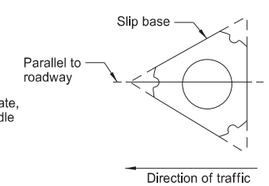


Breakaway Support Stub Clearance Diagram

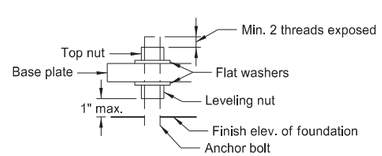


Side View

Steel Base Detail



Slip Base Placement Detail



Anchor Bolt Detail

Multi-Directional Slip Base

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
08-28-19	New Design Engineer PE Stamp
11-01-24	Revised luminaire details/notes
09-12-25	Revised date to match

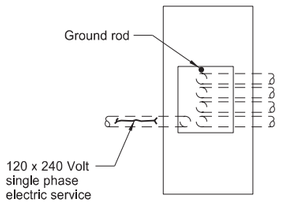
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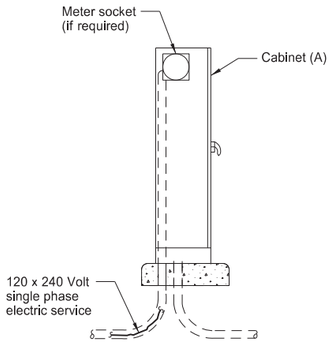
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FEED POINT - TRAFFIC SIGNALS

D-772-1



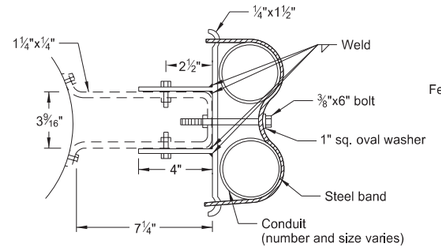
Plan

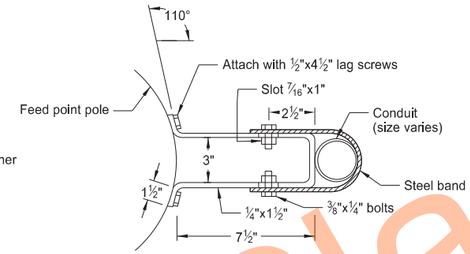


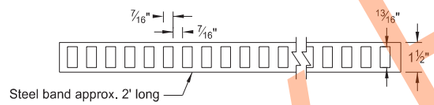
Elevation

Circuit Breaker Cabinet Pad Mounted

(A) Provide weatherproof cabinet, 56 in. high x 26 in. wide x 14 in. deep, 12 gauge steel (min.) or aluminum with provisions for padlock. Place one coat of primer and two coats of exterior dark green enamel on steel cabinet.

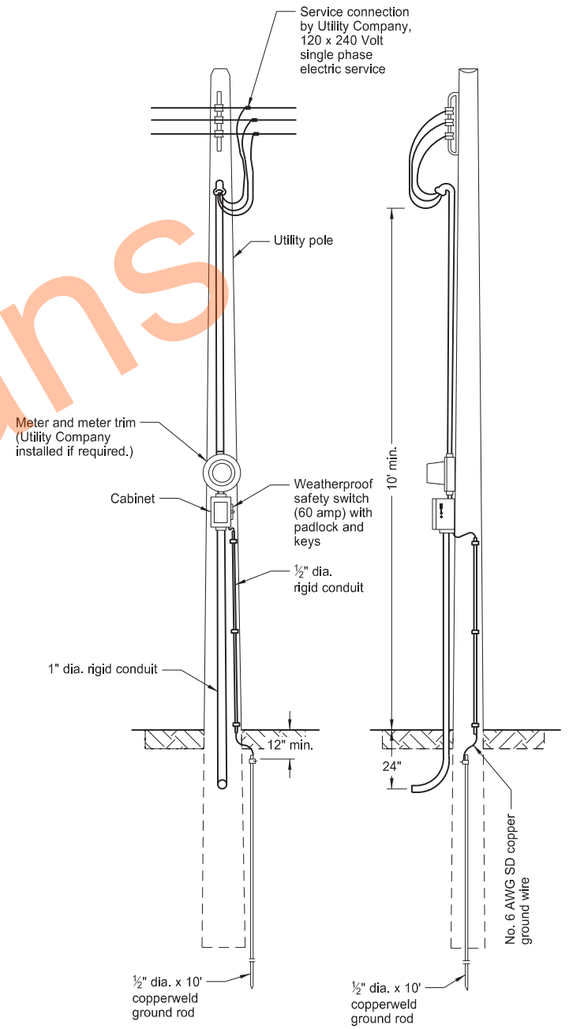






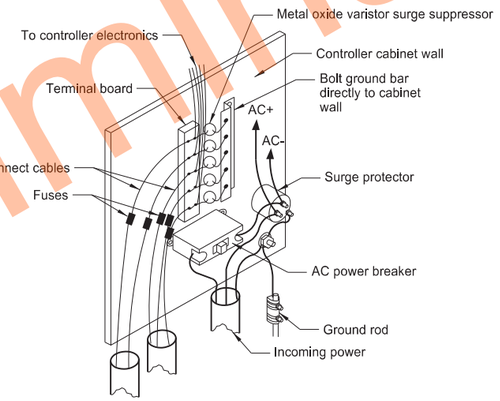
Conduit Standoff Bracket

Use when required by local Utility Company.

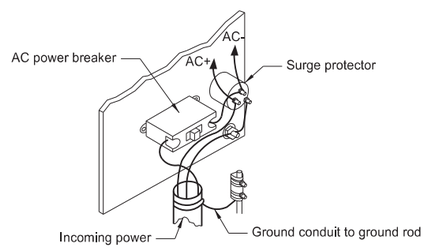


Front View

Side View



Controller Cabinet
Interconnect and Power Cable
Lightning Protection



Feed Point Cabinet
Lightning Protection

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-14-13	
REVISIONS	
DATE	CHANGE
10-17-17 8-28-19 8-09-24	Updated to active voice. New Design Engineer PE Stamp. Electronic Stamp/Signature.

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ENGINEER
NORTH DAKOTA

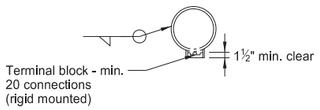
08/09/24

Preliminary Plans

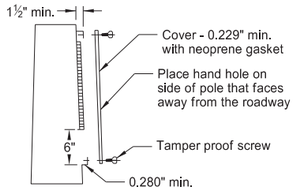
Docusign Envelope ID: CBA567C7-C11B-4F0B-89AF-E47B33997859

TRAFFIC SIGNAL STANDARDS

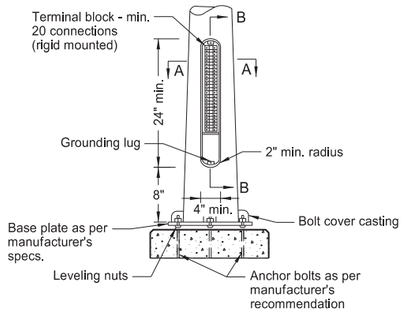
D-772-2



Section A-A

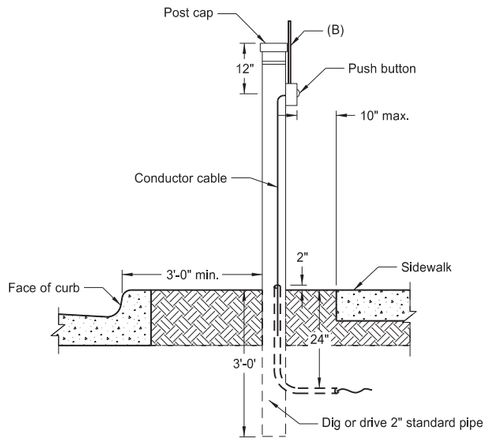


Section B-B

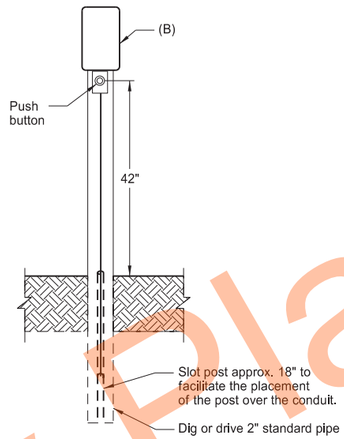


Alternate Signal Standard Base

For use only with Type V, VI, and VII signal standards.

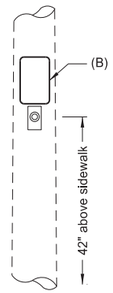


Side View

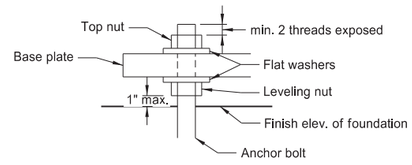


Front View

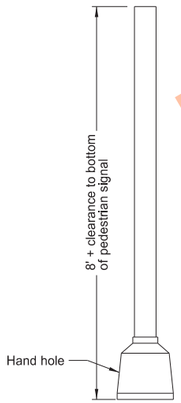
Pedestrian Push Button Post Details (A)



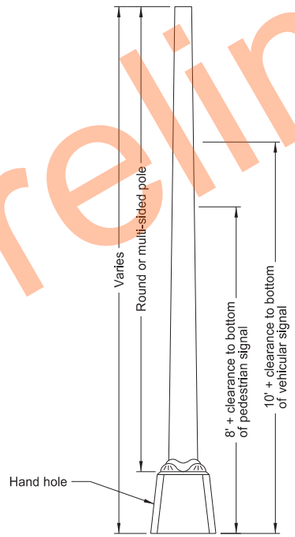
Signal Standard Mounted
Pedestrian Push Button Detail



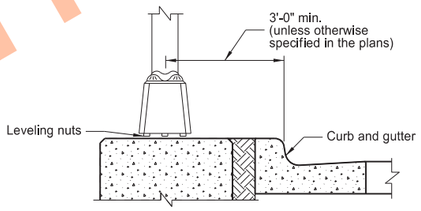
Anchor Bolt Detail

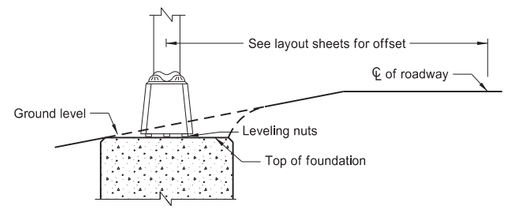


Type II



Type V, VI, VII





Signal Standard
Minimum Clearance Details

(A) Use positioning of the sign, pushbutton, and direction of arrow to clearly indicate which crosswalk is actuated by the push button. Place type of sign based on the jurisdiction in which placed.

(B) Attach sign to post using rust resistant 0.081 aluminum bracket and banding. See Standard Signs book for dimensions and legend series. See plans for type of sign.

Notes:

Signal Heads: See traffic signal layout for correct mounting position, number, size, and arrangement of lenses.

Steel Standards: Place signal standard a minimum of 3 ft. from the face of the curb to center of signal standard, unless shown otherwise on layout sheets.

Paint: See note sheet for required color of paint.

Transformer Base: In lieu of transformer base use alternate signal standard base.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-14-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
10-25-19	Added 10" dim for ped pushbutton
08-20-25	Added physical stamp & signature

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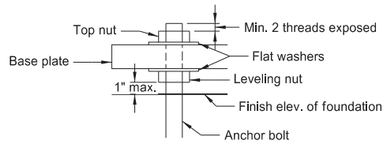
08/20/25

Preliminary Plans

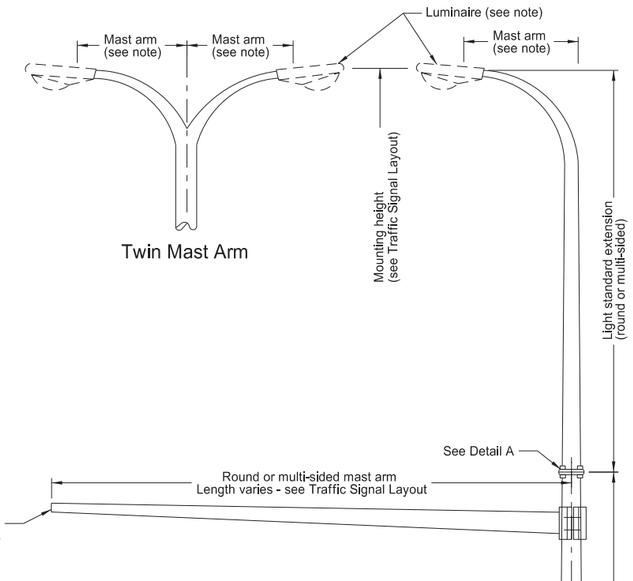
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TRAFFIC SIGNAL STANDARDS
(MAST ARM TYPE)

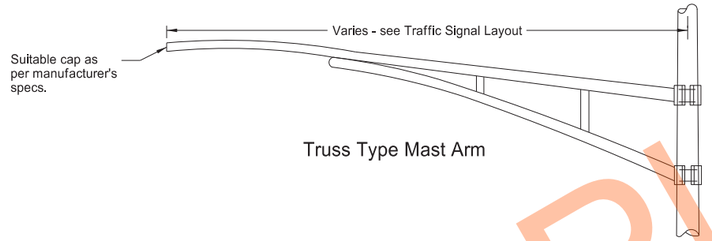
D-772-3



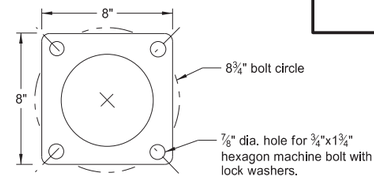
Anchor Bolt Detail



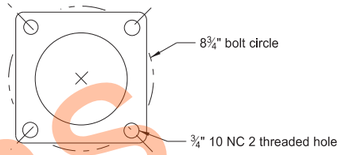
Twin Mast Arm



Truss Type Mast Arm



¾" Top Plate



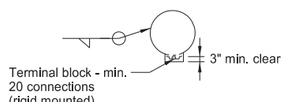
¾" Bottom Plate

Detail A

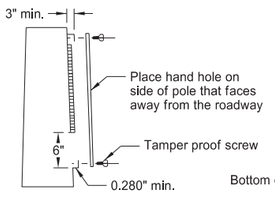
Note: In lieu of the plate type connection, use a telescoping clamp type extension.

Combination Signal and Light Standard			
Signal Standard Type	Luminaire Mounting height (ft)	Install Light Standard Extension and Luminaire	Luminaire Mast Arm
A	30	yes	single
B	30	(A)	single
C	40	yes	single
D	40	(A)	single
E	30	yes	twin
F	30	(A)	twin
G	40	yes	twin
H	40	(A)	twin
I	50	yes	single
J	50	yes	twin

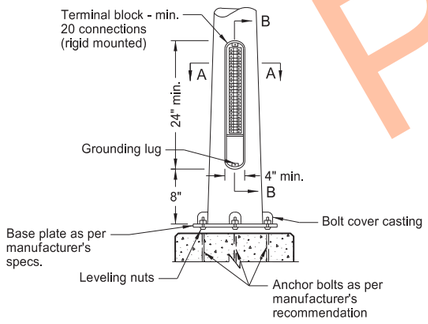
(A) Install the light standard extension for these signal standards at a later date under a separate contract.



Section A-A

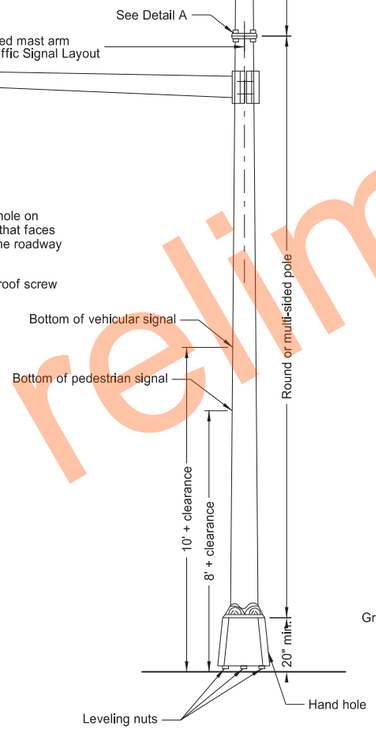


Section B-B

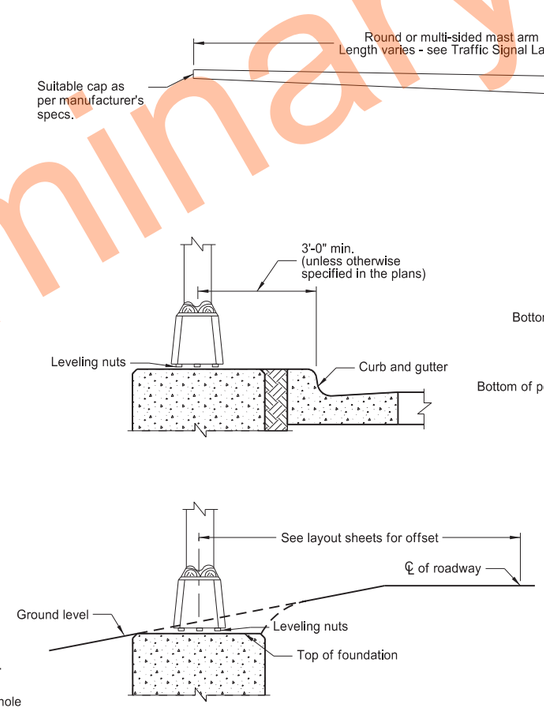


Alternate Signal Standard Base

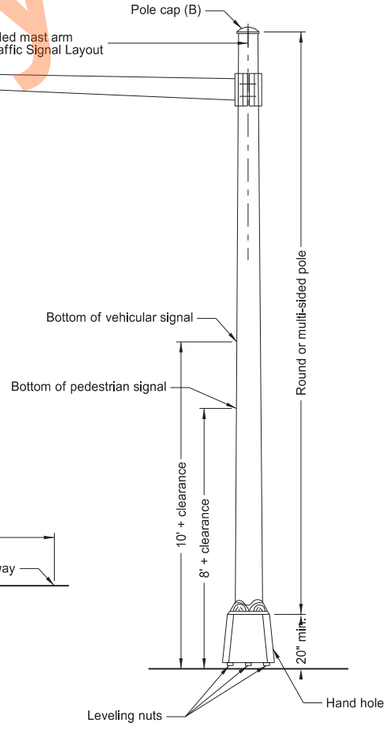
Note: For use with Type IV and combination signal standards only



Combination Signal and Light Standard



Signal Standard Minimum Clearance Detail



Type IV Signal Standard

(B) On combination signal and light standards Type B, D, F, and H, and on all Type IV signal standards install a suitable pole cap as per manufacturer's specifications.

Notes:

Light standard extension: Mast arm is 6 ft. unless otherwise noted on the plans. Use light standard extension galvanized in accordance with ASTM A 123.

Luminaire: Use internal ballast - constant wattage 120 x 240 voltage luminaires. See layout sheets for type of luminaire, wattage, and I.E.S. distribution.

Signal head: See Traffic Signal Layout for correct mounting position, number, size, and arrangement of lenses. Place mast arm mounted signal heads with a clearance between 17 ft. and 19 ft. from the ℄ of the roadway to the bottom of signal heads.

Multi-sided poles: Provide a means, other than friction, that will not allow the mast arm to be rotated by wind forces. Fabricate the pole so the mast arm is rotatable. This feature to be as approved by the Engineer.

Transformer base: In lieu of the transformer base, use the alternate signal standard base.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

11-14-13

REVISIONS

DATE	CHANGE
10-17-17	Updated to active voice
08-28-19	New Design Engineer PE Stamp
08-20-25	Added physical stamp & signature

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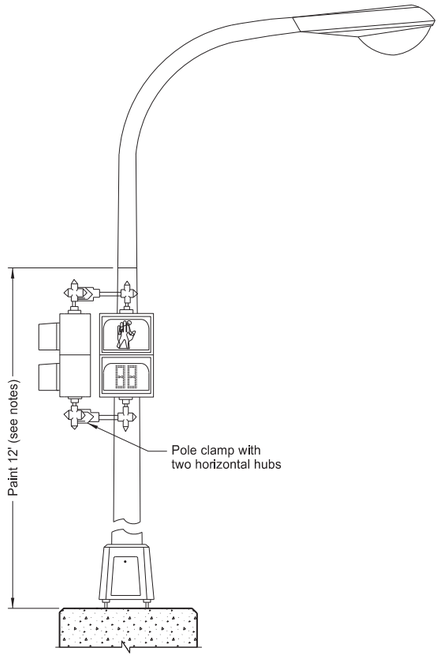
08/20/25

Preliminary Plans

Docusign Envelope ID: CBA567C7-C11B-4F0B-89AF-E47B33997859

TRAFFIC SIGNAL HEAD MOUNTING

D-772-4

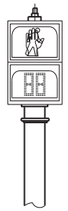


Light Standard Mounted
Pedestrian Signal Head (A)



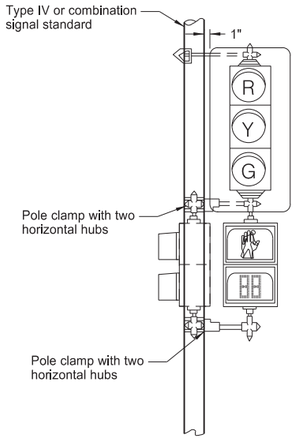
Pedestrian countdown timer

(A) See plans for the appropriate orientation and type of pedestrian signal head to use.



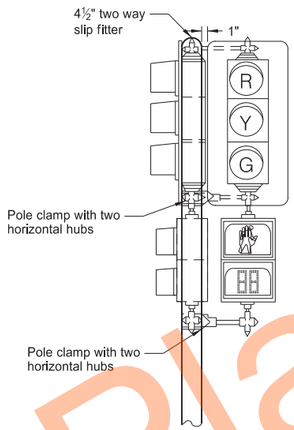
Type II

Pedestal Mounted - Pedestrian (A)



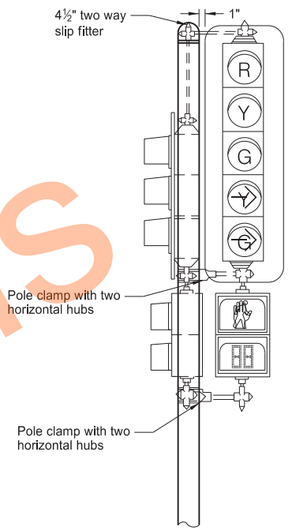
Type IV

Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



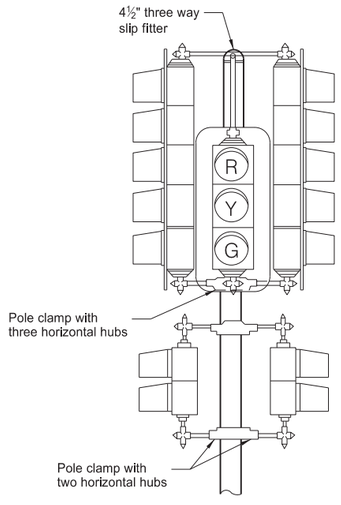
Type V

Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



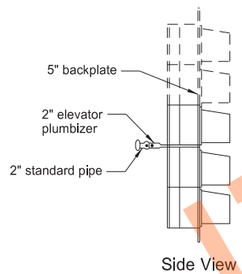
Type VI

Post Mounted - Vehicular
Post Mounted - Pedestrian (A)



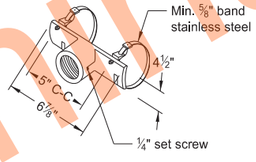
Type VII

Post Mounted - Vehicular
Post Mounted - Pedestrian (A)

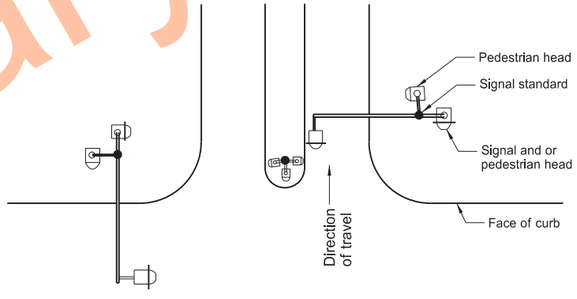


Side View

Mid-Span Mounted and
Mast Arm Rigid Mounted
Signal Heads

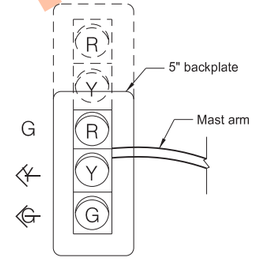


Mast Arm Signal
Head Bracket

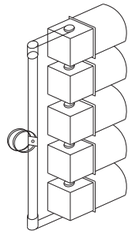


Plan Layout
(typical)

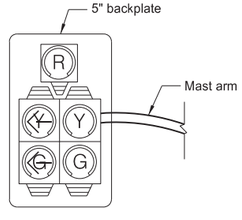
Note: Place signal heads behind the face of the curb.



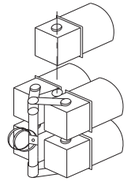
Front View



Isometric View



Front View



Isometric View

End Mounted and Mast Arm Rigid Mounted
Signal Heads

Notes:

Reinforcing Plates: Install reinforcing plates where mounting hardware attaches to signal heads when using polycarbonate signal heads. Where a plumbizer is used, place reinforcing plates on each side of the plumbizer.

Clearance: Place the bottom of post or pedestal mounted vehicular signal heads a minimum of 10 ft. and pedestrian signal heads a minimum of 8 ft. above the ground line or sidewalk.

Signal Heads: See traffic signal layout for correct mounting position, numbers, size, and arrangement of lenses.

Pole Clamps: A pole plate with suitable banding material, as approved by the Engineer, is allowed in place of pole clamps. Where traffic signal heads and pedestrian signal heads are mounted one above the other, one pole clamp assembly is allowed.

Paint: Paint signal housing yellow and backplates dull black. Paint pole clamps and signal head mounting hardware the same color as the signal standard shaft.

When pedestrian heads are light standard mounted, paint the lower 12 ft. the same color as the other traffic signal standards.

Mounting Details: All signal heads shown viewed from direction of travel.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-14-13	
REVISIONS	
DATE	CHANGE
07-08-14	Added reinforcing plate note
10-17-17	Updated to active voice
08-28-19	New Design Engineer PE Stamp
08-20-25	Added physical stamp & signature

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

08/20/25

Preliminary Plans