DESIGN DATA				
Traffic	Average Daily			
Current 2015	Pass:	Trucks:	Total: 2725	
Forecast 2035	Pass:	Trucks:	Total: 3525	
Clear Zone Distance: 2'		Design Speed: 25 MPH		
Minimum Sight Dist. for Stopping: 155'		Bridges: None		
Sight Dist. for No Passing Zone:				
Pavement Design Life (years)				
Design Accumulated One-way ESALs:				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	20812	1	1

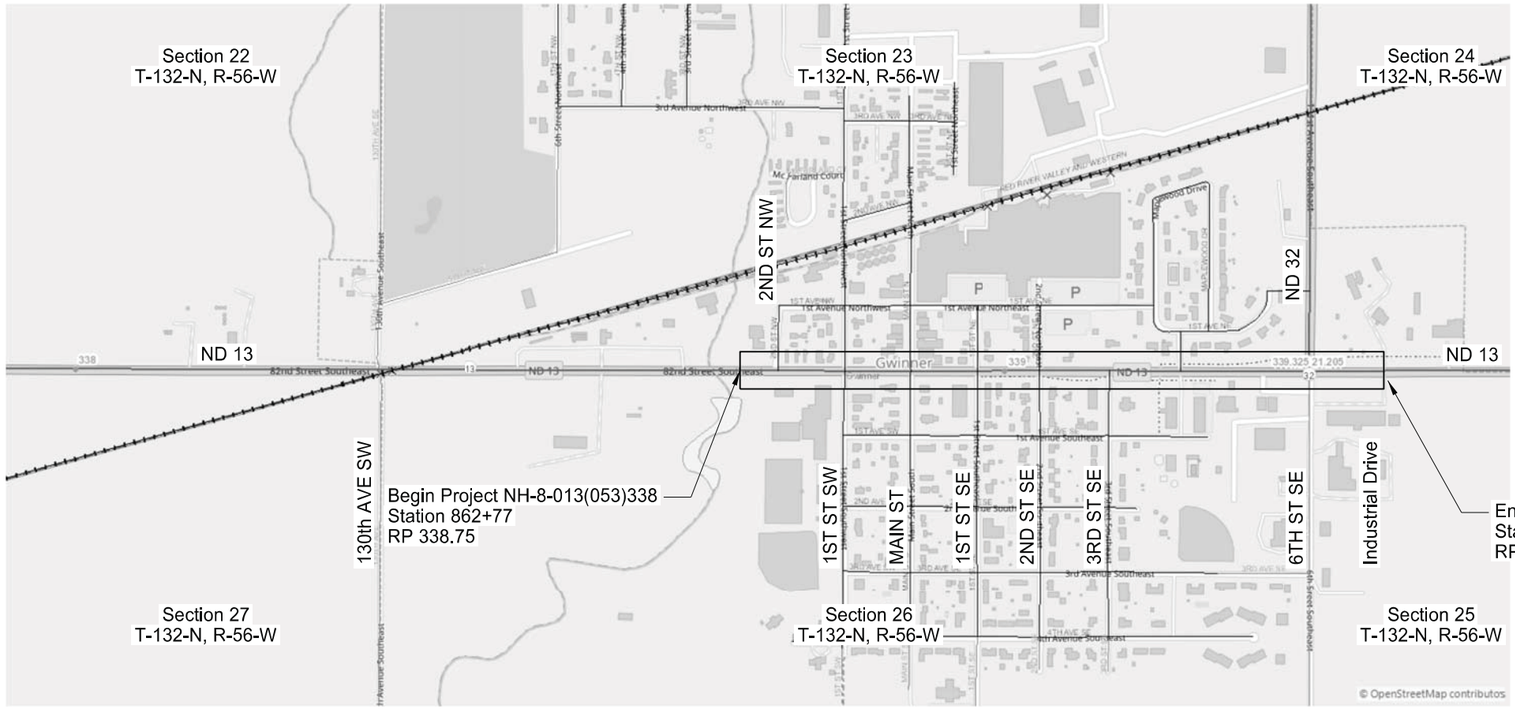
JOB # 45
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

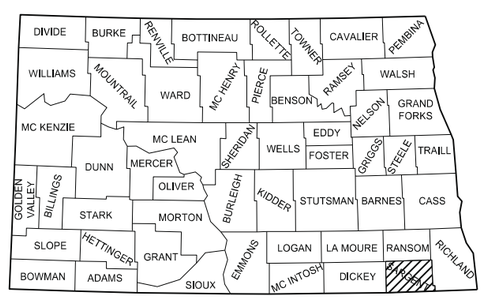
Lighting System Reconstruction

FHWA Project of Division Interest (PODI)
Sargent County
City of Gwinner
From 190' West of 2ND ST NW East to Industrial Drive
RP 338.75 to RP 339.45

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-8-013(053)338	0.713	0.713





STATE COUNTY MAP

DESIGNERS

Randy Pope

Tim Pearson

Shelley Terfehr

Kevin Kroke - LKA Engineers

APPROVED DATE 8-29-2017

for Roger Weigel /s/

OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

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

APPROVED DATE 8-24-17

Randall A. Pope /s/

NDDOT DIV-DIST OR CONSULTANT FIRM

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

INTERSTATE ENGINEERING

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	2	1

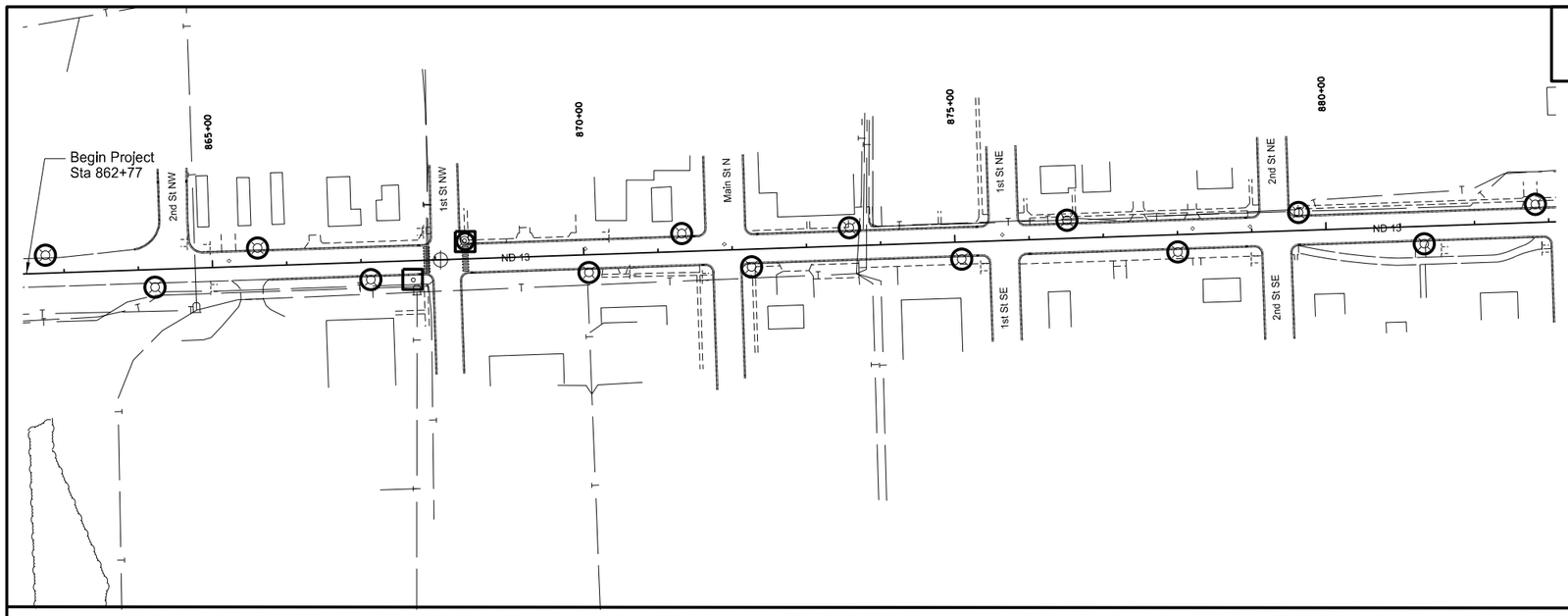
TABLE OF CONTENTS

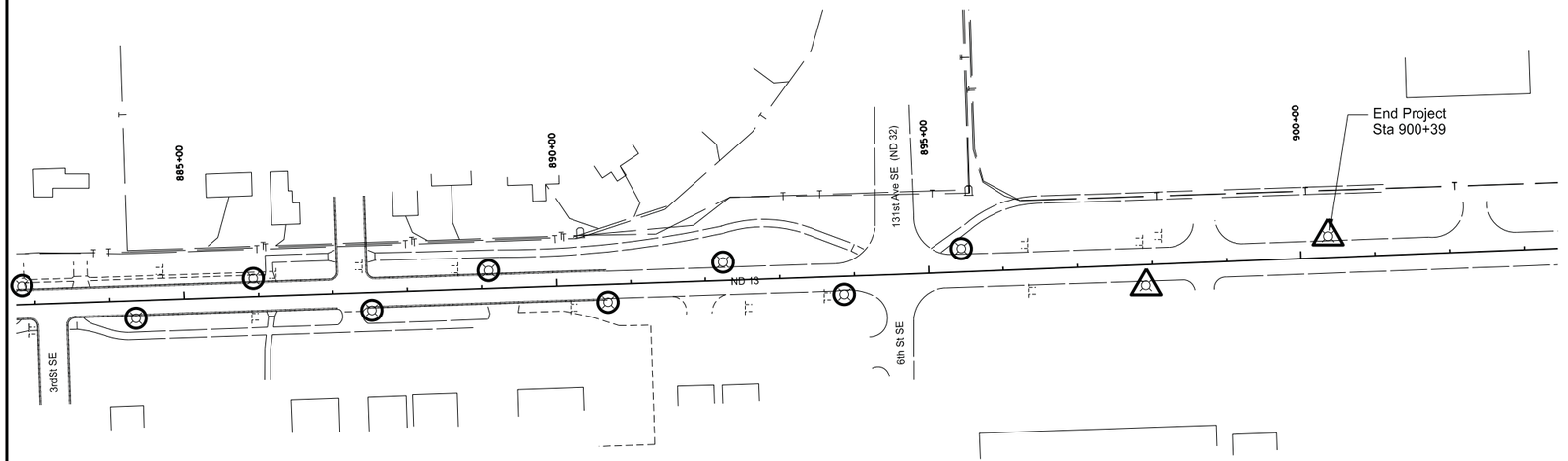
PLAN SECTIONS

LIST OF STANDARD DRAWINGS

Number	Description
D-101-1, 2,3	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31,32	Symbols
D-704-1	Attenuation Device
D-704-5	Contractor Sign Detail
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11	Construction Sign Details - Warning Signs
D-704-12	Shoulder Closure Tapers
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-17	Sign Layout For One Lane Closure Two Lane Roadway
D-704-19	Road Closure And Lane Closure On A Two Way Road Layouts
D-704-24	Shoulder Closures And Bridge Painting Layouts
D-704-25	Lane Closures On Urban Streets Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-50	Portable Sign Support Assembly
D-750-2	Sidewalk
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-770-5	Light Standard Details
D-772-7	Flashing Beacon

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	4	1





Replace Luminaire

Replace Light Pole

Replace Flashing Beacons

N

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Scope of Work

Gwinner, North Dakota

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-8-013(053)338	6	1

NOTES

107-P01 MAINTAINING ACCESS:
The Contractor will be responsible for coordinating and communicating with adjacent Businesses and residents regarding access control.

251-P01 SEEDING CLASS III: Provide the seed mix as follows:

Species	Pound Pure Live Seed/Acre
Kentucky Bluegrass	50
Perennial Rye Grass	20
Six-Week Fescue or Dural-hard Fescue	30
Annual Rye Grass	50
	150

100% of the seed shall be sown prior to hydraulic mulching. Apply the fertilizer mix provided in section 251 of the standard specifications. Topsoil thickness limitation specification for fertilizer shall not apply to this project.
Include all costs associated with Seeding Class III in the price bid for “Concrete Foundation-Highway Lighting”.

704-P01 FLAGGING: Flagging hours in the contract are for use as needed for light and signal construction. Flagging shall also be required when materials / equipment are moved into and out of the project work zone on adjacent public streets.

754-P01 RESET SIGN PANEL: Speed queue warning signs at Sta 864+20 – RT and Sta 871+34 – LT shall be reset on new poles. The solar panels shall be removed and delivered to Darrell Swanson (701)680-0081 with the City of Gwinner. The City of Gwinner will provide kits to connect the Speed queue warning signs to connect to continuous power provided at the light poles. Contractor shall remove, reset and connect power to the signs with the kits provided by the City if Gwinner. All labor, materials and equipment required to connect the flashing speed limit signs shall be included in the price bid for “Reset Sign Panel”.

770-P01 REMOVE LIGHT STANDARD AND LUMINAIRE: The existing lighting shown on the plans shall be removed by the Contractor. The Contractor shall coordinate removal with the City of Gwinner and Otter Tail Power Company. The lighting shall remain in place until construction activities require its removal. Poles and fixtures shall be disposed of by the Contractor.

770-P02 REMOVE FEEDPOINTS: The existing street light feedpoints shall be removed and disposed of by the Contractor.

770-P03 LIGHT STANDARDS: The lighting standards shall be 30 feet tall, tapered, painted galvanized steel or painted stainless steel, with 6 foot davit arm and breakaway type transformer base. The color shall be black. The pole shall have a Festoon receptacle located at the street side of the pole and mounted at 15 feet above grade. The Festoon receptacle shall be a 15 amp GFCI type device with weatherproof in use type cover. Provide a flag holder bracket at 7 feet above grade, on the street side of the pole. Banner Arms/Brackets and two plant holders shall also be provided. The pole finish and accessories shall be painted black (Federal # 27038). Leveling nuts shall be used for all anchor bolts. 10A inline fuses for each luminaire and Festoon receptacle fused at 10A. Furnish enough slack to withdraw fuse and all wire connections including the Festoon circuit thru handhole 2’. Gelcap type Splice Cover Kit is to be used on all connections.

770-P04 LIGHT STANDARD FOUNDATION: The light standard foundations shall be 24 inches diameter round top and 24 inches minimum diameter below the top to a depth of 6 feet. The elevation of the top of base shall be verified with Engineer. Provide a minimum of two 2 inch PVC or interduct stub-out from each base. Provide steel reinforcement cage consisting of four #3x64” vertical rebar and four #3 horizontal rings at 17 inches on center. Provide ½”x8’ copper clad round rod.

770-P05 LED LUMINAIRE: Luminaries as finished and installed by contractor shall be approved equal to: McGraw Edison. Hubbell, or Holophane Autobahn, 1000mA drive current, 60 LED, Type II (R2) distribution, multi-volt, wired for 240 V., 3,000K, black finish. All wiring within the lighting standards between distribution conductors and luminaries shall be #10 A.W.G. stranded copper, 600-volt, type USE.

770-P06 FEEDPOINT TYPE IV PAD MOUNT: The pad mount feedpoint shall be manufactured by Northwoods, States Electric, or Povolny. The free standing enclosure shall be stainless steel with integral 200 amp single phase meter socket and photocell, with a viewing window for each. The enclosure shall be service entrance rated at 150 amp, with a distribution panel with 150 amp main circuit breaker, (4) 40/2 breakers for the lighting circuits, (4) 40-1 circuit breakers for Festoon circuits, (2) 20/1 circuit breaker for the control circuit and the convenience receptacle required by NEC. (2) 30/1 circuit breakers for Flashing Speed Queue Warning Signs and (2) 30/1 circuit breakers for the Flashing Beacon System #1 and #2. Provide (4) 40A, 2 pole contactors for light circuit control and (4) 40A, 1 pole contactors for festoon circuit control.

770-P07 2 INCH DIAMETER RIGID CONDUIT AND UNDERGROUND CONDUCTOR: Furnish and install rigid conduit and single RHW conductors sized as shown on plans. The cost to furnish conduit and conductors shall be paid for at the contract price bid for rigid and underground conductors. The cost of installing conduit with single conductors shall be paid for at the contract bid price for “2IN Diameter Rigid Conduit”.

772-P01 SPEED QUEUE WARNING SYSTEM: Provide 120 volt connection to speed queue warning system signs (total of two).

772-P02 SIGNAL FOUNDATION: The signal foundation shall be 24 inch diameter below the top to a depth of 11 feet.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-8-013(053)338	6	2

ENVIRONMENTAL NOTES

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

Based on the NEPA documentation, no additional permits or environmental commitments have been identified beyond what is covered by the NDDOT's Standard Specification of Road and Bridge Construction.

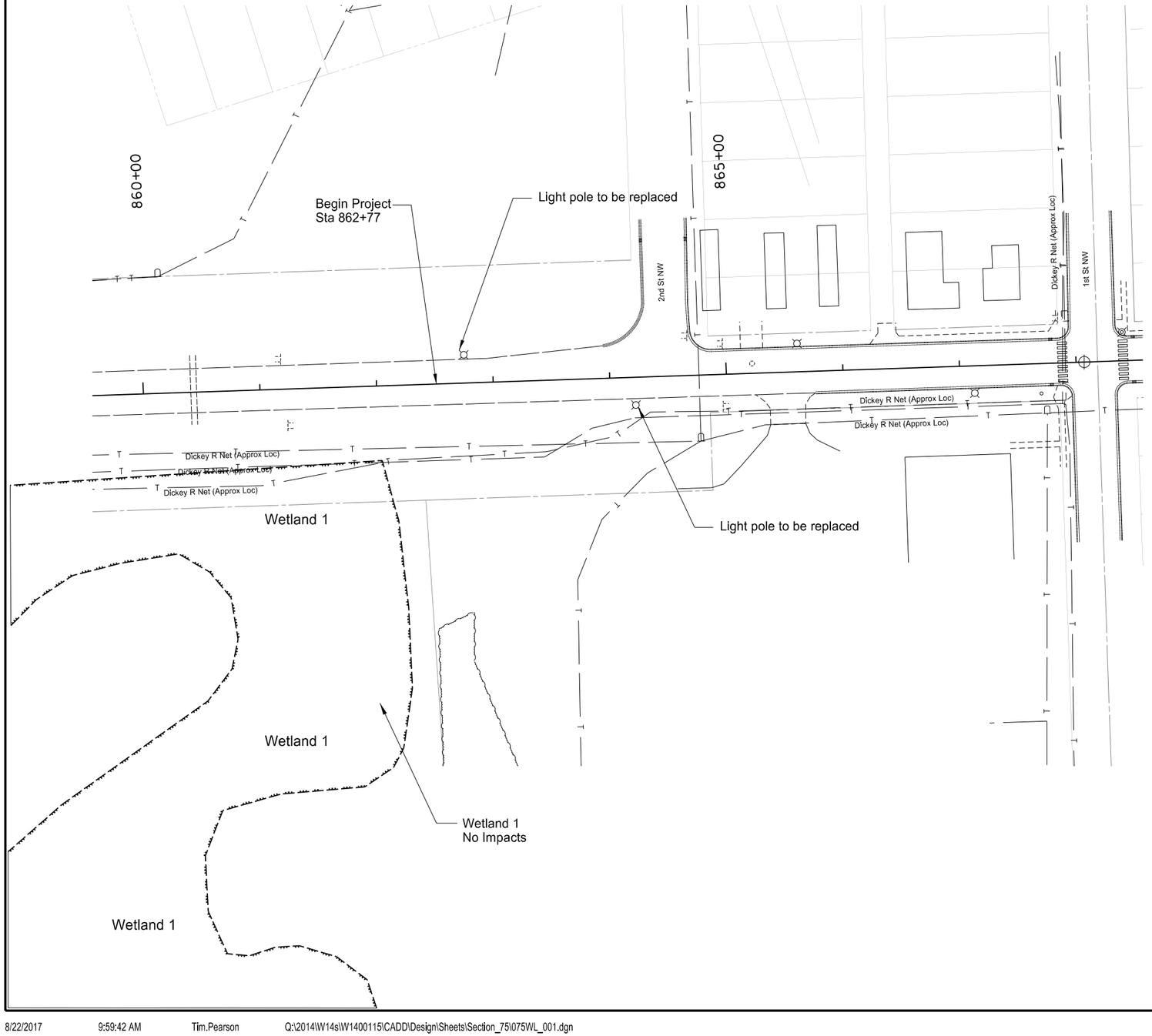
This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-8-013(053)338	8	1

ESTIMATED QUANTITIES

SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL QUANTITIES
103	0100	CONTRACT BOND	L SUM	1
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	24
702	0100	MOBILIZATION	L SUM	1
704	0100	FLAGGING	MHR	40
704	1000	TRAFFIC CONTROL SIGNS	UNIT	754
704	1052	TYPE III BARRICADE	EA	8
704	1060	DELINEATOR DRUMS	EA	20
704	1067	TUBULAR MARKERS	EA	40
750	0115	SIDEWALK CONCRETE 4IN	SY	24
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	9.7
754	0592	RESET SIGN PANEL	EA	18
770	0020	CONCRETE FOUNDATION-HIGHWAY LIGHTING	EA	22
770	0330	2IN DIAMETER RIGID CONDUIT	LF	7747
770	0504	UNDERGROUND CONDUCTOR NO4-TYPE RHW	LF	16034
770	0505	UNDERGROUND CONDUCTOR NO6-TYPE RHW	LF	24051
770	0506	UNDERGROUND CONDUCTOR NO8-TYPE RHW	LF	2552
770	0745	FEED POINT-TYPE IV-PAD MOUNTED	EA	1
770	1066	LT STD 6FT MA 30FT MT HT	EA	22
770	4210	LED LUMINAIRE	EA	25
770	4560	REMOVE LIGHT STANDARD	EA	22
770	4570	REMOVE STREET LIGHT LUMINAIRE	EA	2
770	4582	REMOVE CONCRETE FOUNDATION	EA	22
770	4590	REMOVE FEED POINT	EA	1
772	0020	CONCRETE FOUNDATION-TRAFFIC SIGNALS	EA	2
772	2145	FLASHING BEACON-MA MOUNTED	EA	1
772	3131	REMOVE FEED POINT	EA	1
772	3150	REMOVE FLASHING BEACON SYSTEM	EA	1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	75	1



Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)	
					Temp.	Perm.	Temp.	Perm.
#1	Sec. 26, T132N, R56W	Fresh Water Emergent	Natural	N/A	0	0	0	0
				Totals	**0**	**0**	**0**	**0**

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

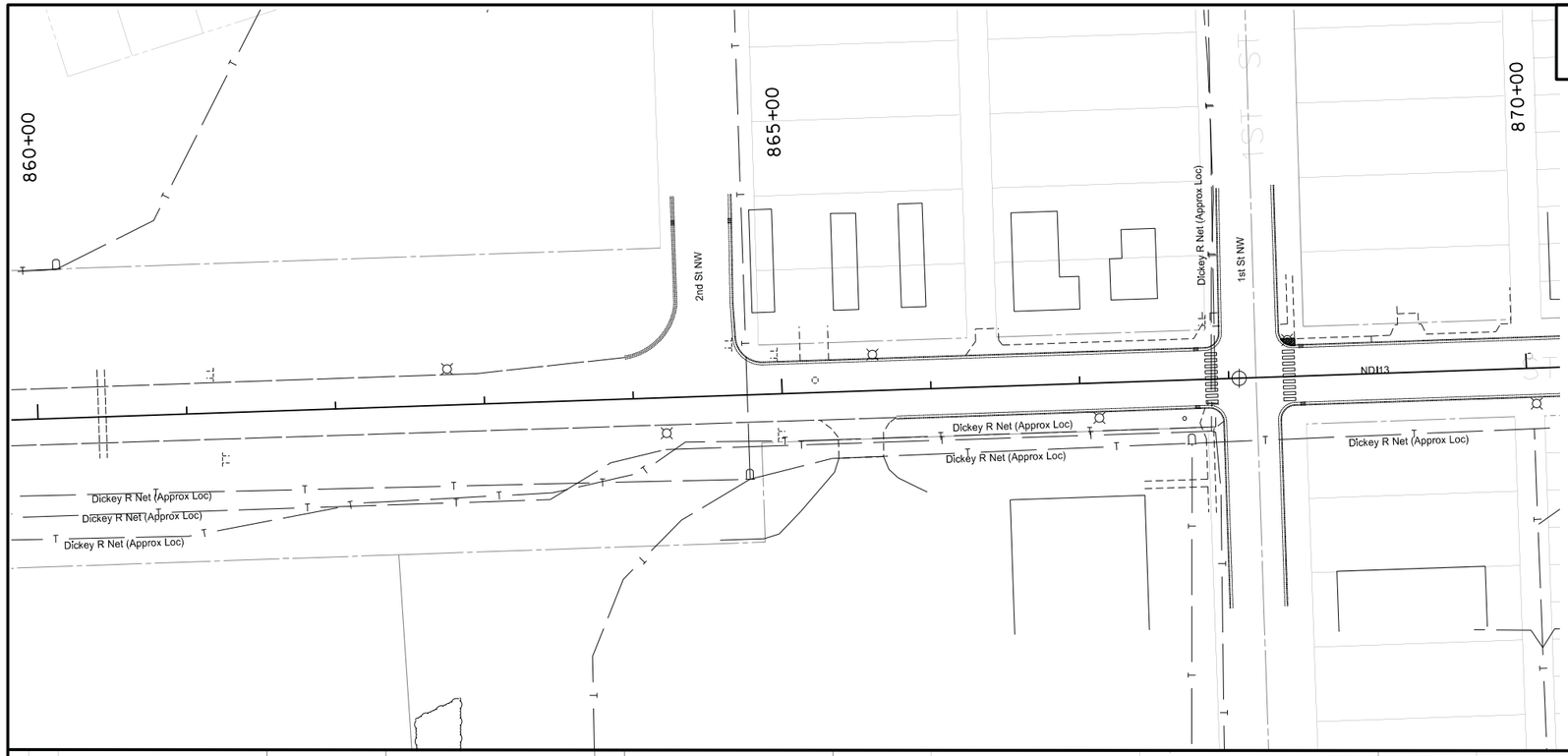
Environmental Wetlands

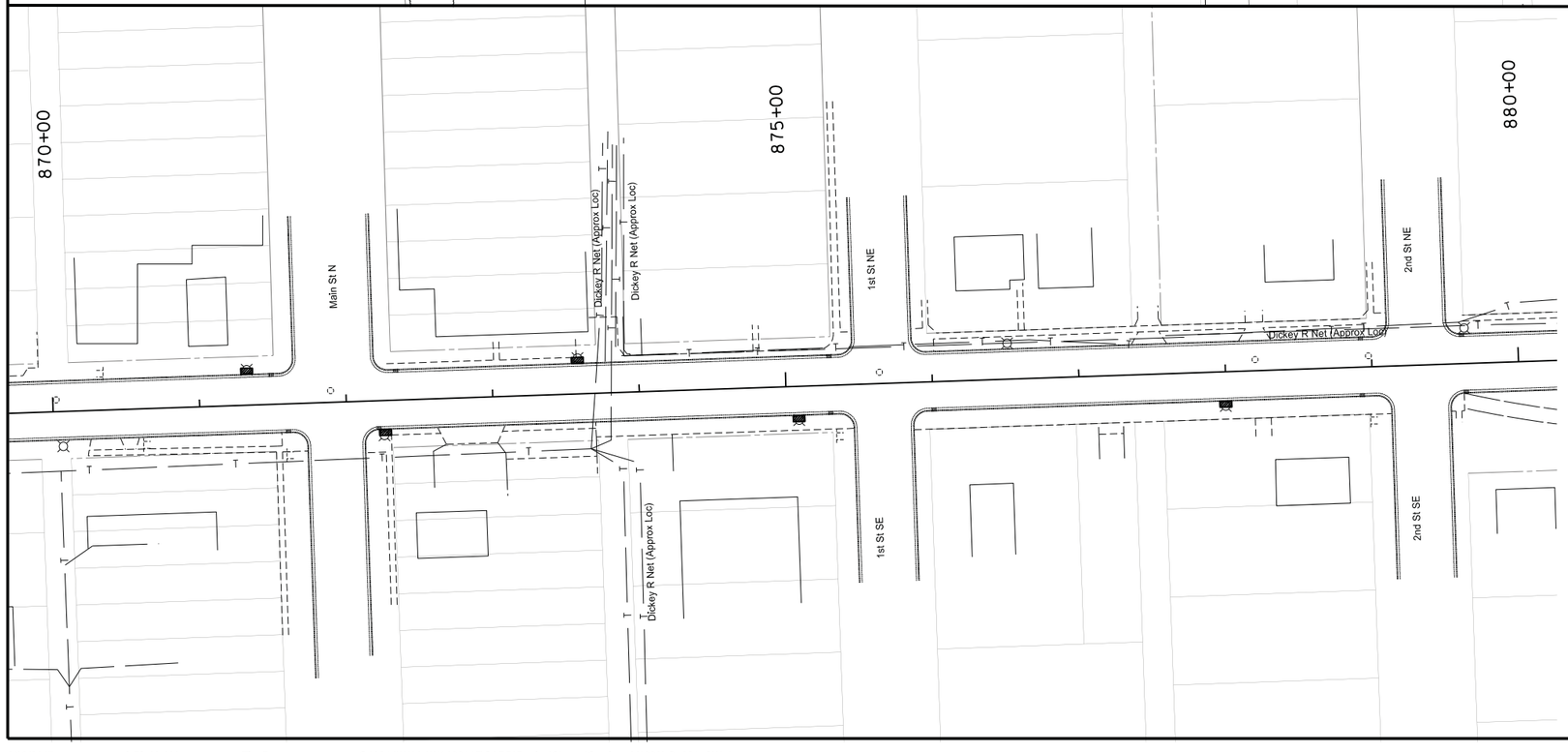
Sta 862+50 to Sta 868+00

Gwinner, North Dakota

8/22/2017 9:59:42 AM Tim.Pearson Q:\2014\W14s\W1400115\CADD\Design\Sheets\Section_75\075WL_001.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	80	1





Removal of Concrete Pavement

868+30 - LT	4 SY
871+25 - LT	4 SY
872+15 - RT	4 SY
873+70 - LT	4 SY
875+65 - RT	4 SY
877+98 - RT	4 SY
	24 SY

Sidewalk Concrete 4IN

868+30 - LT	4 SY
871+25 - LT	4 SY
872+15 - RT	4 SY
873+70 - LT	4 SY
875+65 - RT	4 SY
877+98 - RT	4 SY
	24 SY

0 100 200

SCALE IN FEET

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Sidewalk Replacement Layout

Sta 860+00 to Sta 880+00

Gwinner, North Dakota

8/22/2017 9:59:43 AM Tim.Pearson Q:\2014\W14s\W1400115\CADD\Design\Sheets\Section_80\080LO_001_SW.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-8-013(053)338	100	1

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

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	**48"x48"**	**SHOULDER WORK**	**2**	**35**	**70**
W21-5a-48	**48"x48"**	**RIGHT or LEFT SHOULDER CLOSED**	**2**	**35**	**70**
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	
R9-9-30	**30"x18"**	**SIDEWALK CLOSED**	**8**	**5**	**40**

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**754**

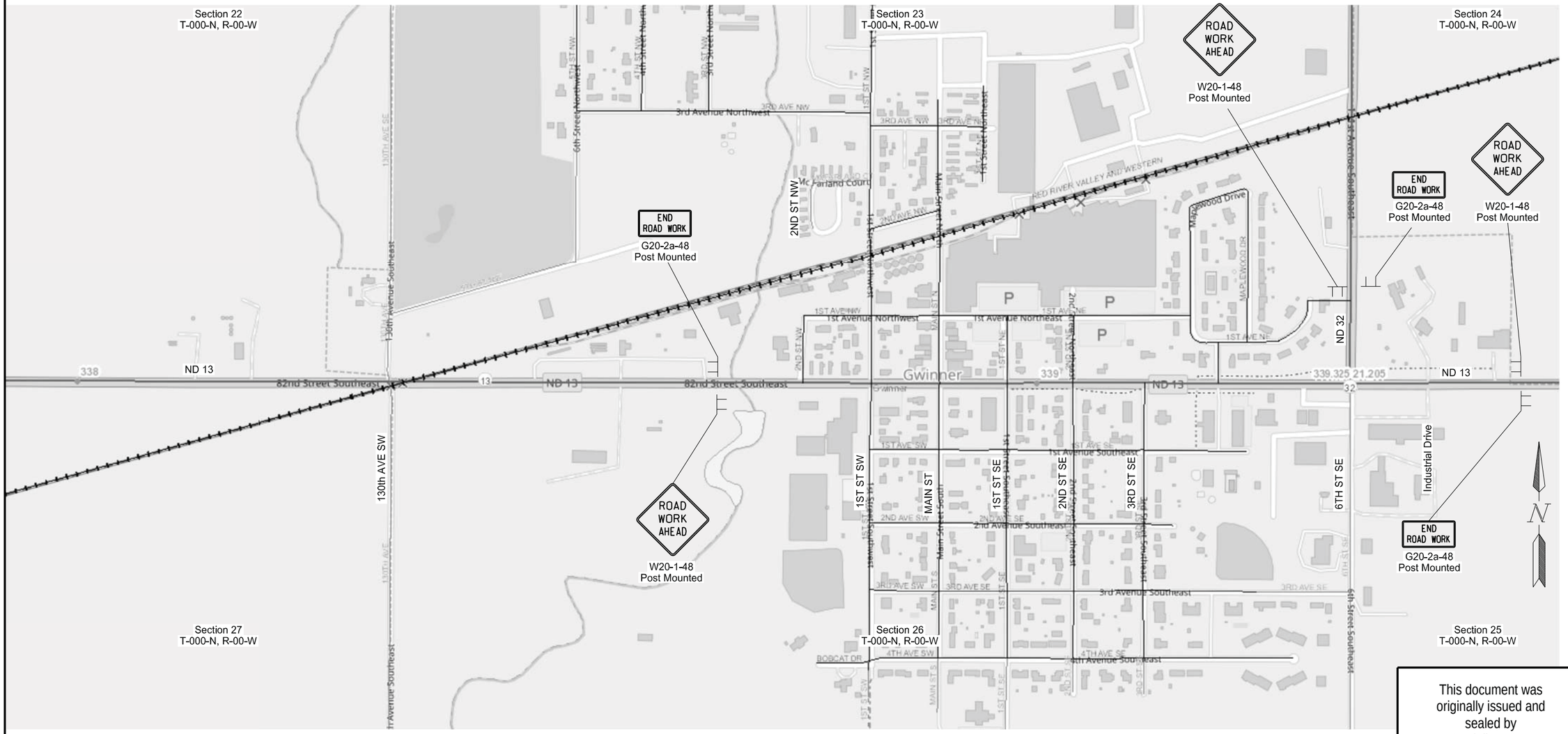
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**40**
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**8**
704-1060	**DELINEATOR DRUMS**	**EACH**	**20**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**40**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	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	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
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	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

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

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	100	2



The construction signing layout is for informational purposes only. Traffic control signing shall be installed as per MUTCD Manual and/or Standard Drawings.

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Work Zone Traffic Control

Gwinner, North Dakota

8/22/2017 9:59:45 AM Tim.Pearson Q:\2014\W14s\W1400115\CADD\Design\Sheets\Section_100\100WZ_001.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NH-8-013(053)338	110	1

Sta/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	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
Gwinner																						
864+28 Rt									0										3			Reset on new Light Standard
867+69 Rt																			2			Mount on New Flashing Beacon Pole
867+70 Rt		71		4.7																		Mount on Mast Arm
868+41 Lt									0										2			Reset on New Flashign Beacon Pole
868+42 Lt									0										1			Reset on New Mast Arm
871+39 Lt									0										3			Reset on new Light Standard
881+32 Rt									0										1			Reset on new Light Standard
884+36 Rt									0										1			Reset on new Light Standard
887+58 Rt									0										2			Reset on new Light Standard
889+11 Lt									0										1			Reset on new Light Standard
892+26 Lt									0										2			Reset on new Light Standard
895+46 Lt		9		5.0																		Mount on Light Standard
Sub Total			0.0	9.7		**Total**	0.0									**Total**	0		18	0	0	
Grand Total			0.0	9.7		**Total**	0.0									**Total**	0		18	0	0	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated
using the following vertical clearances:

Areas where parking and/or pedestrian movement will occur - 84"

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Sign Summary
Perforated Tube

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	110	2

250'

855+00

860+00

865+00

ADOPT-A-HIGHWAY
DIVISION OF INDEPENDENT STUDIES

Sta 856+35 LT
Post Mounted
To Remain

WEST
N 13

Sta 861+19 LT
Post Mounted
To Remain

2nd St NW
HIGHWAY13W

Sta 864+67 LT
Post Mounted
To Remain

Sta 868+42 LT
Mast Arm Mounted
Remove and Reset

Sta 868+41 LT
Pole Mounted
Remove and Reset
on New Pole

Dickey R Net (Approx Loc)

2nd St NW

1st St NW

PT 868+07.06

ND 13

Gwinner
Sta 861+23 RT
Post Mounted
To Remain

AHEAD
Sta 863+19 RT
Post Mounted
To Remain

SCHOOL
SPEED LIMIT 15
YOUR SPEED XX
Sta 864+28 RT
Pole Mounted
Remove and Reset
on New Light Pole

SCHOOL
Sta 864+97 RT
Post Mounted
To Remain

Sta 867+69 RT
Pole Mounted
Remove and Reset
on New Pole

Sta 867+70 RT
Mast Arm Mounted
Assembly 71

N

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Signing

Sta 854+00 toSta 868+00

Gwinner, North Dakota

8/23/2017 2:29:18 PM Tim.Pearson Q:\2014\W14s\W1400115\CADD\Design\Sheets\Section_110\110SN_001.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	110	3

Sta 868+41 LT
Pole Mounted
Remove and Reset
on New Pole

Sta 870+35 LT
Post Mounted
To Remain

Sta 871+39 LT
Pole Mounted
Remove and Reset
on New Light Pole

Sta 870+61 RT
Post Mounted
To Remain

Sta 871+58 RT
Post Mounted
To Remain

Sta 875+34 RT
Post Mounted
To Remain

Sta 878+98 RT
Post Mounted
To Remain

Sta 881+32 RT
Pole Mounted
Remove and Reset
on New Light Pole

870+00

875+00

880+00

PT 868+07.06

1st St NW

Main St N

1st St NE

2nd St NE

1st St SE

2nd St SE

Dickey R Net (Approx Loc)

ND 13

bly 71

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Signing

Sta 868+00 to Sta 882+00

Gwinner, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	110	4

Sta 886+24 LT
Post Mounted
To Remain

MAPLEWOODDR
HIGHWAY13
Sta 887+40 LT
Post Mounted
To Remain

Sta 888+69 LT
Post Mounted
To Remain

SPEED LIMIT 25
Sta 889+11 LT
Pole Mounted
Remove and Reset
on New Light Pole

WEST
N 13
Sta 892+26 LT
Pole Mounted
Remove and Reset
on New Light Pole

SPEED LIMIT 25
Sta 895+46 LT
Pole Mounted
Remove

SPEED LIMIT 25 R2-1
Sta 895+46 LT
Pole Mounted
Assembly 9

885+00

890+00

895+00

Dickey R Net (Approx Loc)

Dickey R Net (Approx Loc)

Dickey R Net (Approx Loc)

Dickey R Net (Approx Loc)

Dickey R Net (Approx Loc)

Dickey R Net (Approx Loc)

Dickey R Net (Approx Loc)

Dickey R Net (Approx Loc)

131st Ave SE

PI ND 13 894+57.25

ND 13

3rd St SE

6th St SE

3RD ST NE
HIGHWAY 13
NO TRUCKS
Sta 882+90 RT
Post Mounted
To Remain

SPEED LIMIT 25
Sta 884+36 RT
Pole Mounted
Remove and Reset
on New Light Pole

Sta 885+90 RT
Post Mounted
To Remain

JCT
N 32
Sta 887+58 RT
Pole Mounted
Remove and Reset
on New Light Pole

MILNOR 11
WYNDMERE 26
LISBON 15
Sta 890+18 RT
Post Mounted
To Remain

SHIPPING AND RECYCLING
PRODUCT ENGINEERING
MARKETING SERVICES
Sta 892+52 RT
Post Mounted
To Remain

N 32 N 13
Sta 893+59 RT
Post Mounted
To Remain

N

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

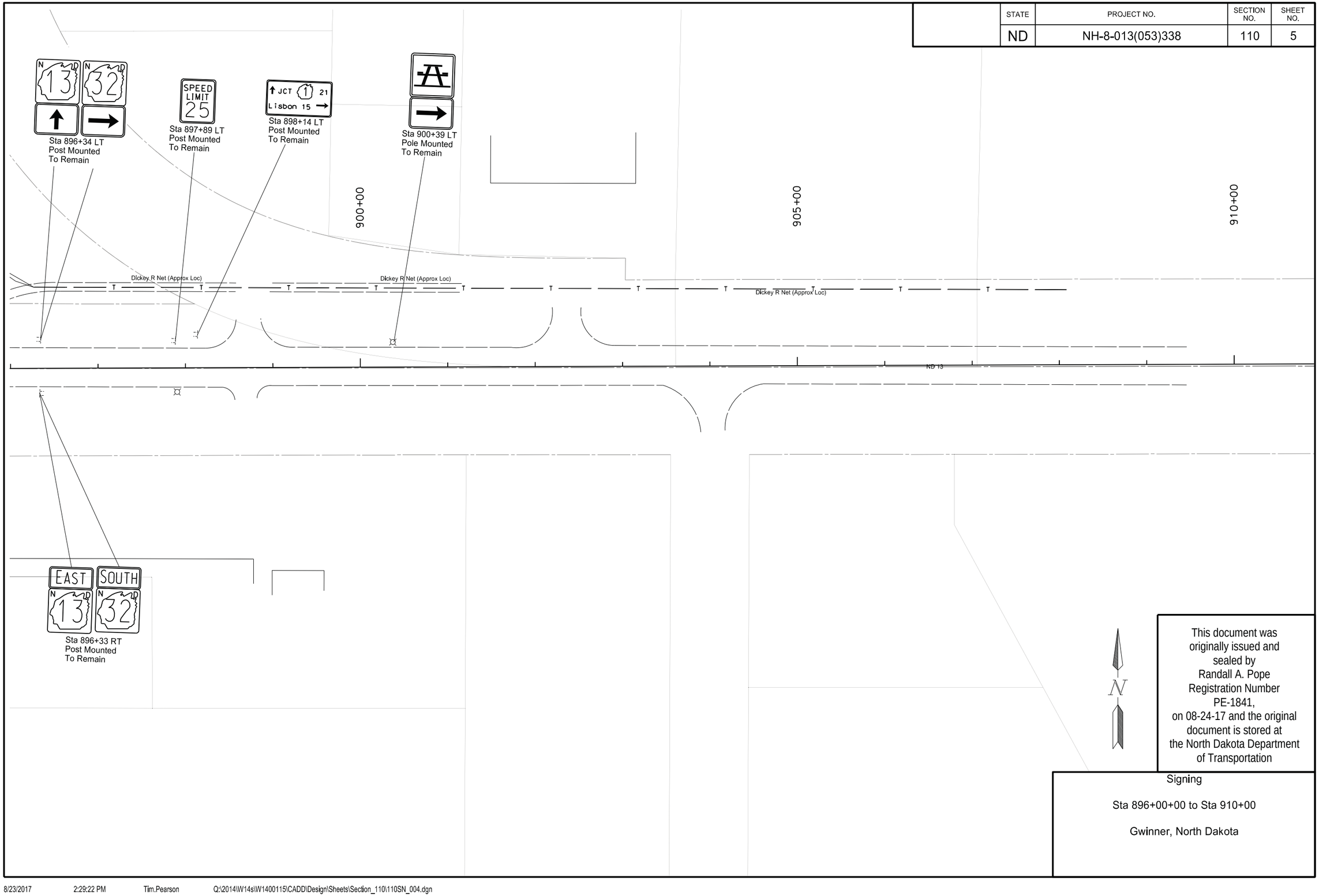
Signing

Sta 882+00+00 to Sta 896+00

Gwinner, North Dakota

8/23/2017 2:29:21 PM Tim.Pearson Q:\2014\W14s\W1400115\CADD\Design\Sheets\Section_110\110SN_003.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	110	5



This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

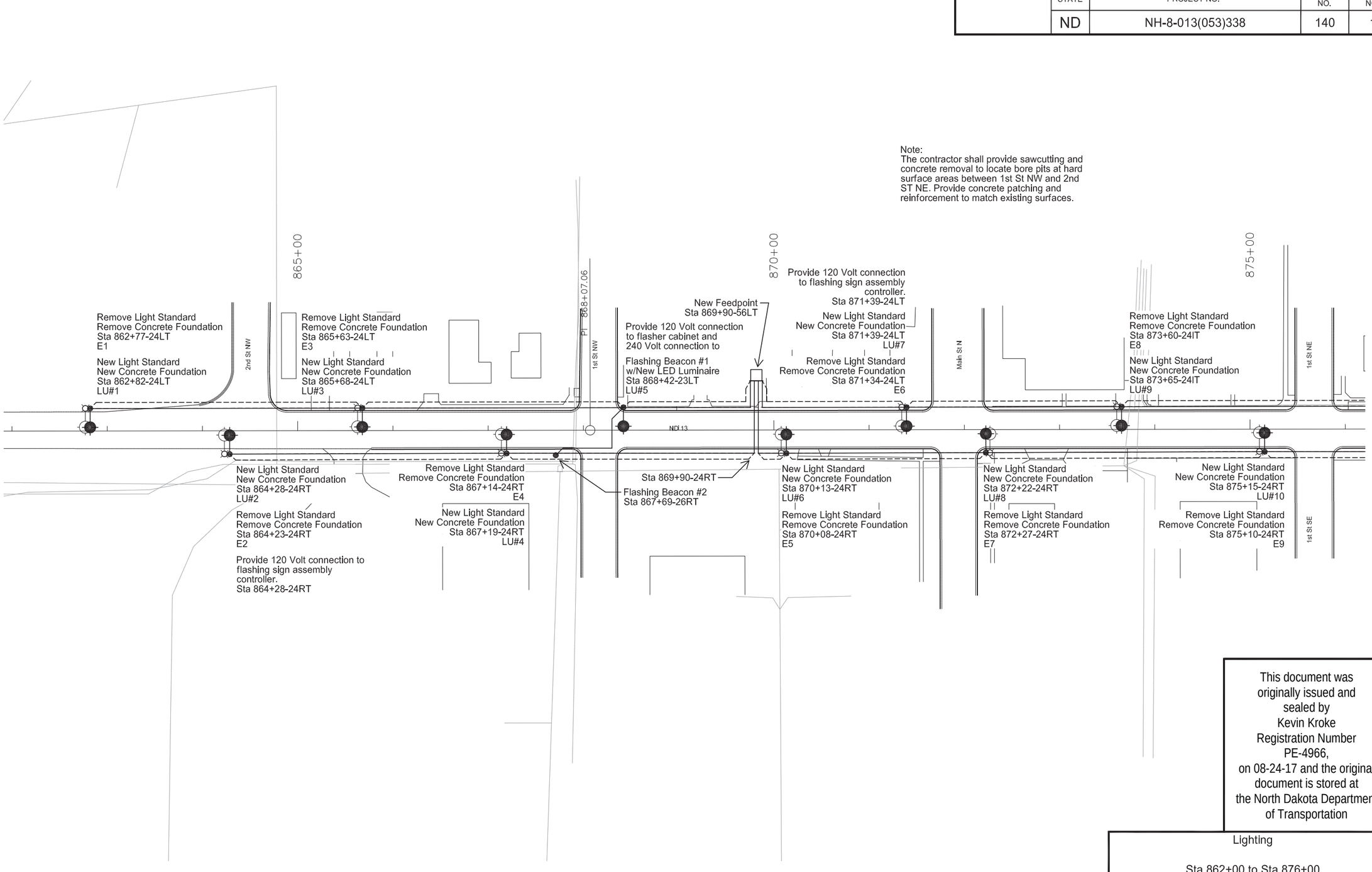
Signing

Sta 896+00+00 to Sta 910+00

Gwinner, North Dakota

8/23/2017 2:29:22 PM Tim.Pearson Q:\2014\W14s\W1400115\CADD\Design\Sheets\Section_110\110SN_004.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	140	1



Note:
The contractor shall provide sawcutting and concrete removal to locate bore pits at hard surface areas between 1st St NW and 2nd ST NE. Provide concrete patching and reinforcement to match existing surfaces.

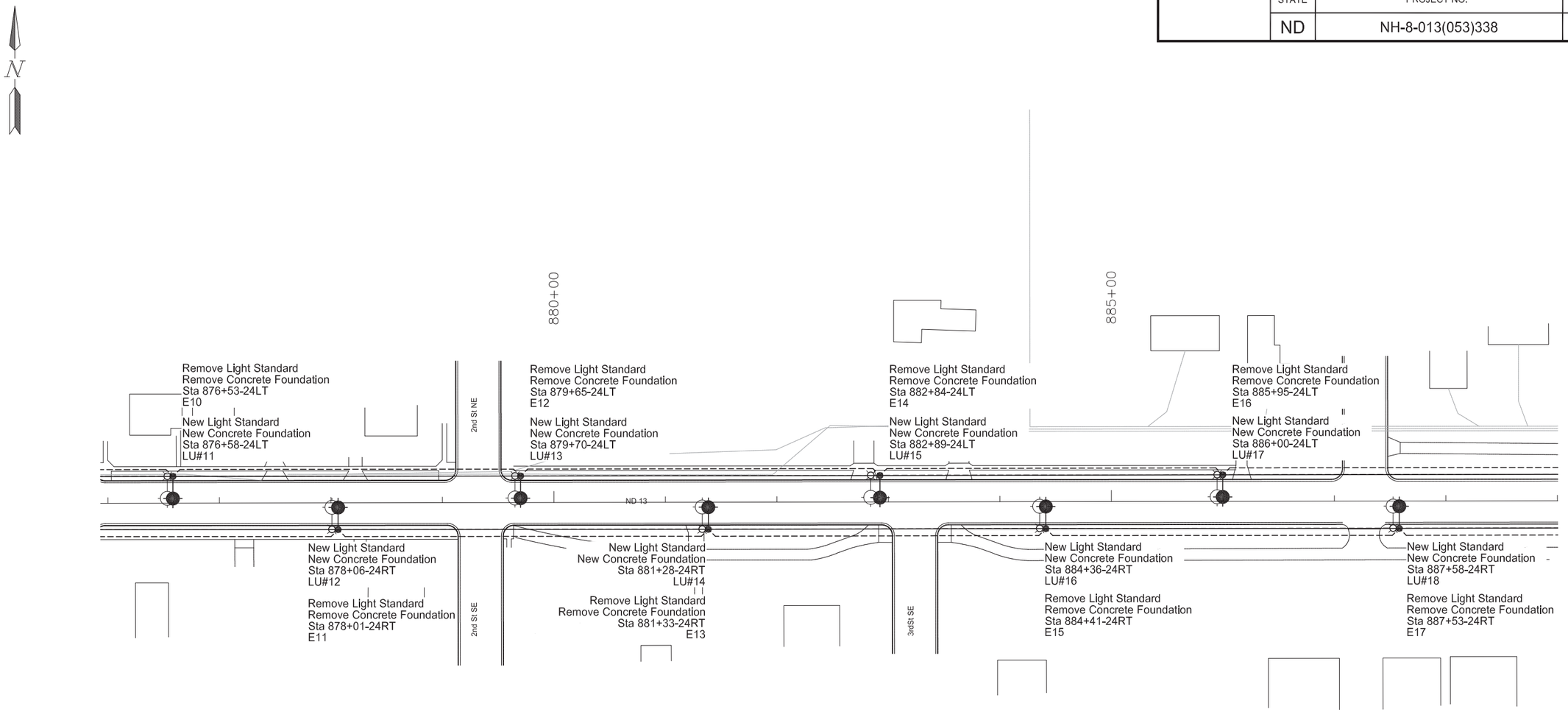
This document was originally issued and sealed by Kevin Kroke Registration Number PE-4966, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Lighting

Sta 862+00 to Sta 876+00

Gwinner, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	140	2



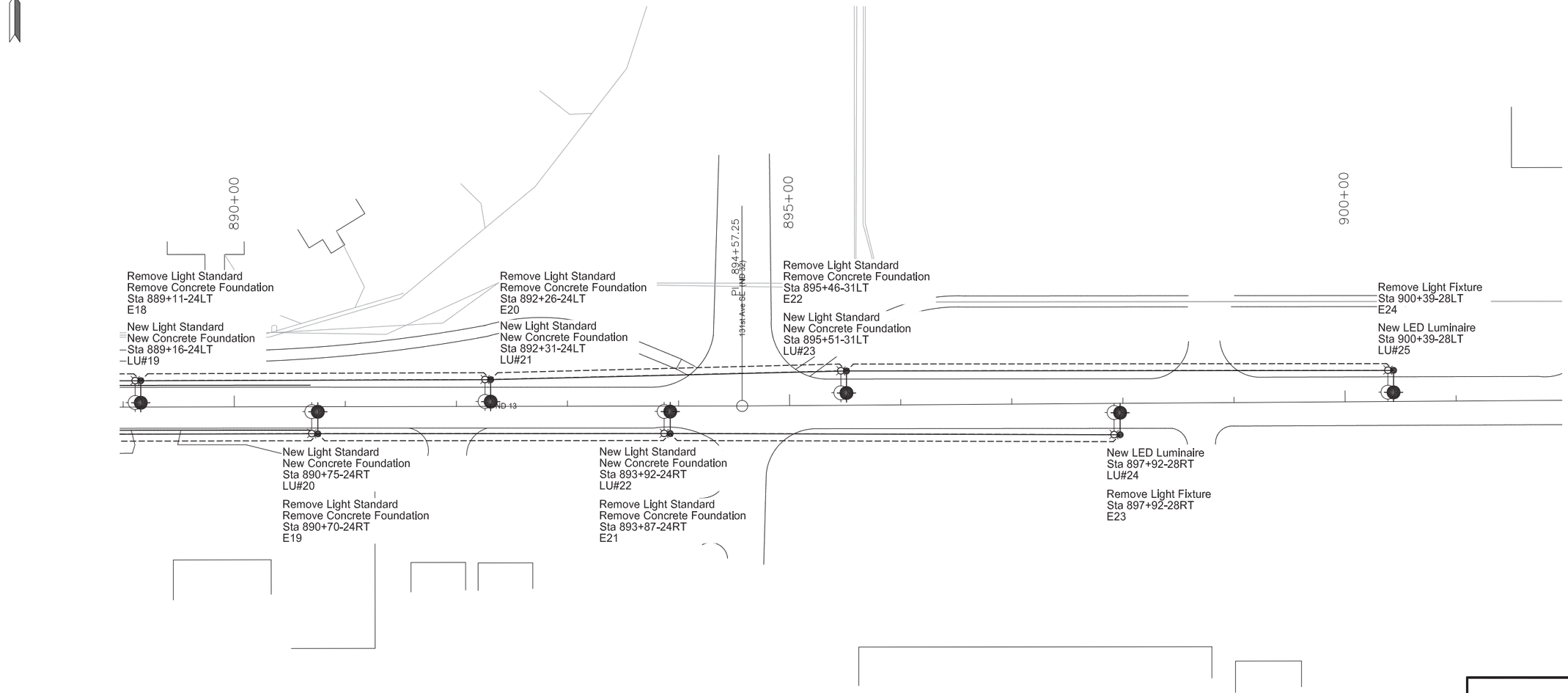
This document was originally issued and sealed by Kevin Kroke Registration Number PE-4966, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Lighting

Sta 876+00 to Sta 889+00

Gwinner, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	140	3



This document was originally issued and sealed by Kevin Kroke Registration Number PE-4966, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Lighting

Sta 889+00 to Sta 902+00

Gwinner, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	140	4

North Circuit						
Light Std Number	Station	Conduit Runs		Cable Runs		
		LF	Dia.	LF	Type	
LU#1 LU#3	Sta 862+82-24LT to Sta 865+68-24LT	286	2"	592 592 296	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	Lighting Circuit Festoon Circuit Ground
LU#3 Beacon #1	Sta 865+68-24LT to Sta 868+42-23LT	274	2"	568 568 284	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
Beacon #1 (LU#5)	Sta 868+42-23LT to Sta 869+90-24LT	148	2"	296 296 296 158	(2) No.4 RHW (2) No.6 RHW (2) No.8 RHW (1) No.6 RHW	Lighting Circuit Festoon Circuit Beacon Circuit Ground
Feedpoint	Sta 868+42-23LT to Sta 869+90-24LT	32	2"	84 84 84 42	(2) No.4 RHW (2) No.6 RHW (2) No.8 RHW (1) No.6 RHW	
Beacon #1	Sta 868+42-23LT to Sta 868+42-26RT	49	2"	118 59	(2) No.8 RHW (1) No.8 RHW	Beacon Circuit Ground
Beacon #2	Sta 868+42-26RT to Sta 867+69-26RT	73	2"	166 83	(2) No.8 RHW (1) No.8 RHW	
Feedpoint	Sta 869+90-56LT to Sta 869+90-24LT	32	2"	84 84 84 42	(2) No.4 RHW (2) No.6 RHW (2) No.8 RHW (1) No.6 RHW	Lighting Circuit Festoon Circuit Sign Circuit Ground
LU#7	Sta 869+90-24LT to Sta 871+39-24LT	149	2"	318 318 318 159	(2) No.4 RHW (2) No.6 RHW (2) No.8 RHW (1) No.6 RHW	
LU#7 LU#9	Sta 871+39-24LT to Sta 873+65-24LT	226	2"	472 472 236	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	Lighting Circuit Festoon Circuit Ground
LU#9 LU#11	Sta 873+65-24LT to Sta 876+58-24LT	293	2"	606 606 303	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#11 LU#13	Sta 876+58-24LT to Sta 879+70-24LT	312	2"	644 644 322	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#13 LU#15	Sta 879+70-24LT to Sta 882+89-24LT	319	2"	658 658 329	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#15 LU#17	Sta 882+89-24LT to Sta 886+00-24LT	311	2"	642 642 321	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#17 LU#19	Sta 886+00-24LT to Sta 889+16-24LT	316	2"	652 652 326	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#19 LU#21	Sta 889+16-24LT to Sta 892+31-24LT	315	2"	650 650 325	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#21 LU#23	Sta 892+31-24LT to Sta 895+51-31LT	320	2"	660 660 330	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#23 LU#25	Sta 895+51-31LT to Sta 900+39-28LT	493	2"	1006 1006 503	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	

South Circuit						
Light Std Number	Station	Conduit Runs		Cable Runs		
		LF	Dia.	LF	Type	
LU#2 LU#4	Sta 864+28-24RT to Sta 867+19-24RT	291	2"	602 602 602 301	(2) No.4 RHW (2) No.6 RHW (2) No.8 RHW (1) No.6 RHW	Lighting Circuit Festoon Circuit Sign Circuit Ground
LU#4 LU#6	Sta 867+19-24RT to Sta 869+90-24RT	271	2"	562 562 562 281	(2) No.4 RHW (2) No.6 RHW (2) No.8 RHW (1) No.6 RHW	
Feedpoint	Sta 869+90-24RT to Sta 869+90-56LT	80	2"	180 180 180 90	(2) No.4 RHW (2) No.6 RHW (2) No.8 RHW (1) No.6 RHW	
Feedpoint	Sta 869+90-56LT to Sta 869+90-24RT	80	2"	180 180 90	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	Lighting Circuit Festoon Circuit Ground
LU#6	Sta 869+90-24RT to Sta 870+13-24RT	23	2"	66 66 33	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#6 LU#8	Sta 870+13-24RT to Sta 872+22-24RT	209	2"	438 438 219	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#8 LU#10	Sta 872+22-24RT to Sta 875+15-24RT	293	2"	606 606 303	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#10 LU#12	Sta 875+15-24RT to Sta 878+06-24RT	291	2"	602 602 301	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#12 LU#14	Sta 878+06-24RT to Sta 881+28-24RT	322	2"	664 664 332	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#14 LU#16	Sta 881+28-24RT to Sta 884+36-24RT	308	2"	636 636 318	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#16 LU#18	Sta 884+36-24RT to Sta 887+58-24RT	322	2"	664 664 332	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#18 LU#20	Sta 887+58-24RT to Sta 890+75-24RT	317	2"	654 654 327	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#20 LU#22	Sta 890+75-24RT to Sta 893+92-24RT	317	2"	654 654 327	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	
LU#22 LU#24	Sta 893+92-24RT to Sta 897+92-28RT	405	2"	930 930 415	(2) No.4 RHW (2) No.6 RHW (1) No.6 RHW	

Light Standards						
No.	Station	Wattage	Circuit	IES-Type	Mtg. Ht.	Mast Arm
1	Sta 862+82-24LT	150	--	IV	30' Brkwy	6'
2	Sta 864+28-24RT	150	--	IV	30' Brkwy	6'
3	Sta 865+68-24LT	150	--	IV	30' Brkwy	6'
4	Sta 866+19-24RT	150	--	IV	30' Brkwy	6'
5	Sta 868+42-23RT	150	--	IV	30' Brkwy	6'
7	Sta 870+13-24RT	150	--	IV	30' Brkwy	6'
8	Sta 871+39-24LT	150	--	IV	30' Brkwy	6'
9	Sta 872+22-24RT	150	--	IV	30' Brkwy	6'
10	Sta 873+65-24LT	150	--	IV	30' Brkwy	6'
11	Sta 875+15-24RT	150	--	IV	30' Brkwy	6'
12	Sta 876+58-24LT	150	--	IV	30' Brkwy	6'
13	Sta 878+06-24RT	150	--	IV	30' Brkwy	6'
14	Sta 879+70-24LT	150	--	IV	30' Brkwy	6'
15	Sta 881+28-24RT	150	--	IV	30' Brkwy	6'
16	Sta 882+89-24LT	150	--	IV	30' Brkwy	6'
17	Sta 884+36-24RT	150	--	IV	30' Brkwy	6'
18	Sta 886+00-24LT	150	--	IV	30' Brkwy	6'
19	Sta 887+58-24RT	150	--	IV	30' Brkwy	6'
20	Sta 889+16-24LT	150	--	IV	30' Brkwy	6'
21	Sta 890+75-24RT	150	--	IV	30' Brkwy	6'
22	Sta 892+31-24LT	150	--	IV	30' Brkwy	6'
23	Sta 893+92-24RT	150	--	IV	30' Brkwy	6'
24	Sta 895+51-31LT	150	--	IV	30' Brkwy	6'
25	Sta 897+92-28RT	150	--	IV	30' Brkwy	6'
26	Sta 900+39-28LT	150	--	IV	30' Brkwy	6'

Type IV feed point Sta 869+90-56RT.

Lighting Quantities (A)											
Concrete Foundation - Highway Lighting	2" Diameter Rigid Conduit	Underground Conductor No 4 - Type RHW	Underground Conductor No 6 - Type RHW	Underground Conductor No 8 - Type RHW	LED Luminaire	Lt Std 6 ft MA 30 ft Mt Ht	Feed Point - Type "IV" Pad Mounted	Remove Light Standard	Remove Concrete Foundation	Remove Feed Point	Remove Street Light Luminaire
EA	EA	LF	LF	LF	EA	EA	EA	EA	EA	EA	EA
22	7747	16034	24051	2552	25	22	1	22	22	1	2
770	770	770	770	770	770	770	770	770	770	770	770
0020	0330	0504	0505	0506	4210	1066	0745	4560	4582	4590	4570

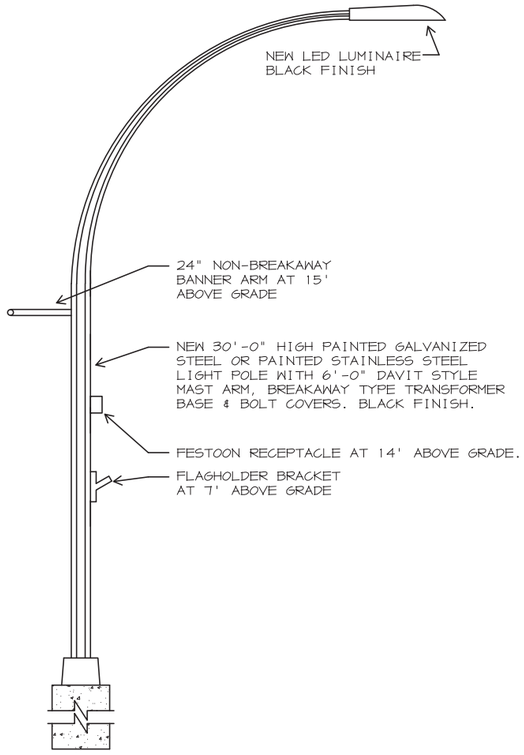
This document was originally issued and sealed by Kevin Kroke Registration Number PE-4966, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Lighting

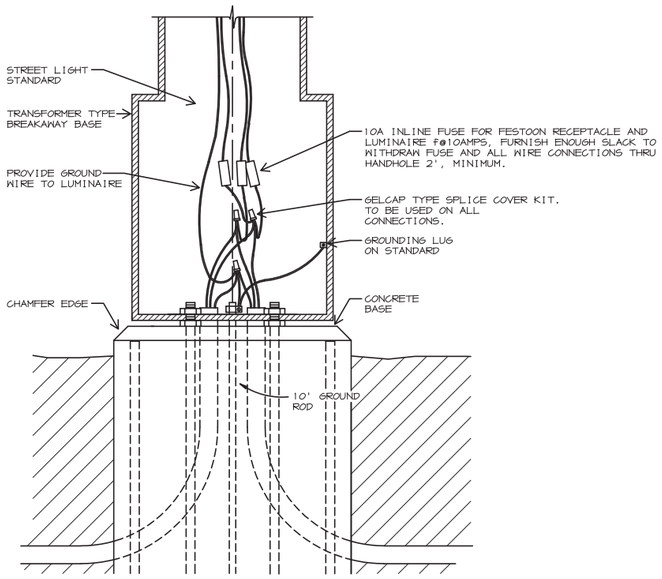
Sta 862+00 to Sta 902+00

Gwinner, North Dakota

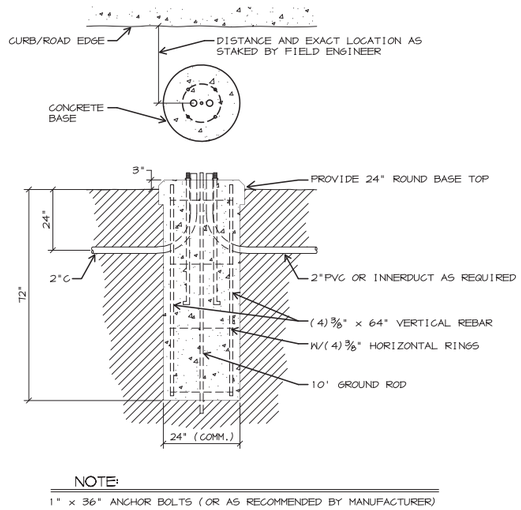
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	140	5



LIGHT FIXTURE DIAGRAM
SCALE: NONE



POLE BASE DETAIL
SCALE: NONE

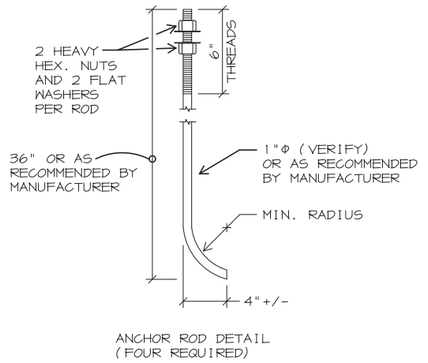


NOTE:
1" x 36" ANCHOR BOLTS (OR AS RECOMMENDED BY MANUFACTURER)

CONCRETE BASE DETAIL
SCALE: NONE

LIGHT BASE NOTES:

1. CONCRETE SHALL BE CLASS AE PORTLAND CEMENT. (4000 LB)
2. CENTER OF CONCRETE BASE SHALL AS STAKED BY FIELD ENGINEER. CONCRETE BASE SHALL BE 3" ABOVE TOP GRADE (VERIFY WITH ENGINEER).
3. FOUNDATIONS MAY BE CONSTRUCTED IN AUGURED HOLES UNLESS THE NATURAL SOILS WILL NOT STAND OPEN. IN WHICH CASE FORMING WILL BE REQUIRED.
4. LOCATE HANDHOLE 180 DEG. FROM STREET SIDE.
5. THE GROUND ROD SHALL BE PLACED INSIDE THE BASE WITH THE TOP EXTENDING 3" ABOVE THE TOP OF CONCRETE.
6. ANCHOR BOLTS AS RECOMMENDED BY MFG & PER SPECIFICATIONS. GALVANIZE TOP 1'-0" OF ANCHOR ROD & NUTS.
7. PVC CONDUIT AS PER SPEC. SHALL BE PROTECTED 3"+/- ABOVE THE FOUNDATION BEFORE THE CONCRETE IS PLACED & SHALL BE THE SIZE & NUMBER SHOWN IN THE PLAN OR AS SPECIFIED.
8. A TEMPLATE SHALL BE PROVIDED FOR ANCHOR ROD PLACEMENT & SHALL BE LEFT IN PLACE UNTIL CONCRETE HAS SET.
9. VERIFY EXACT BASE REQUIREMENTS WITH POLE MANUFACTURER.



ANCHOR ROD DETAIL
(FOUR REQUIRED)

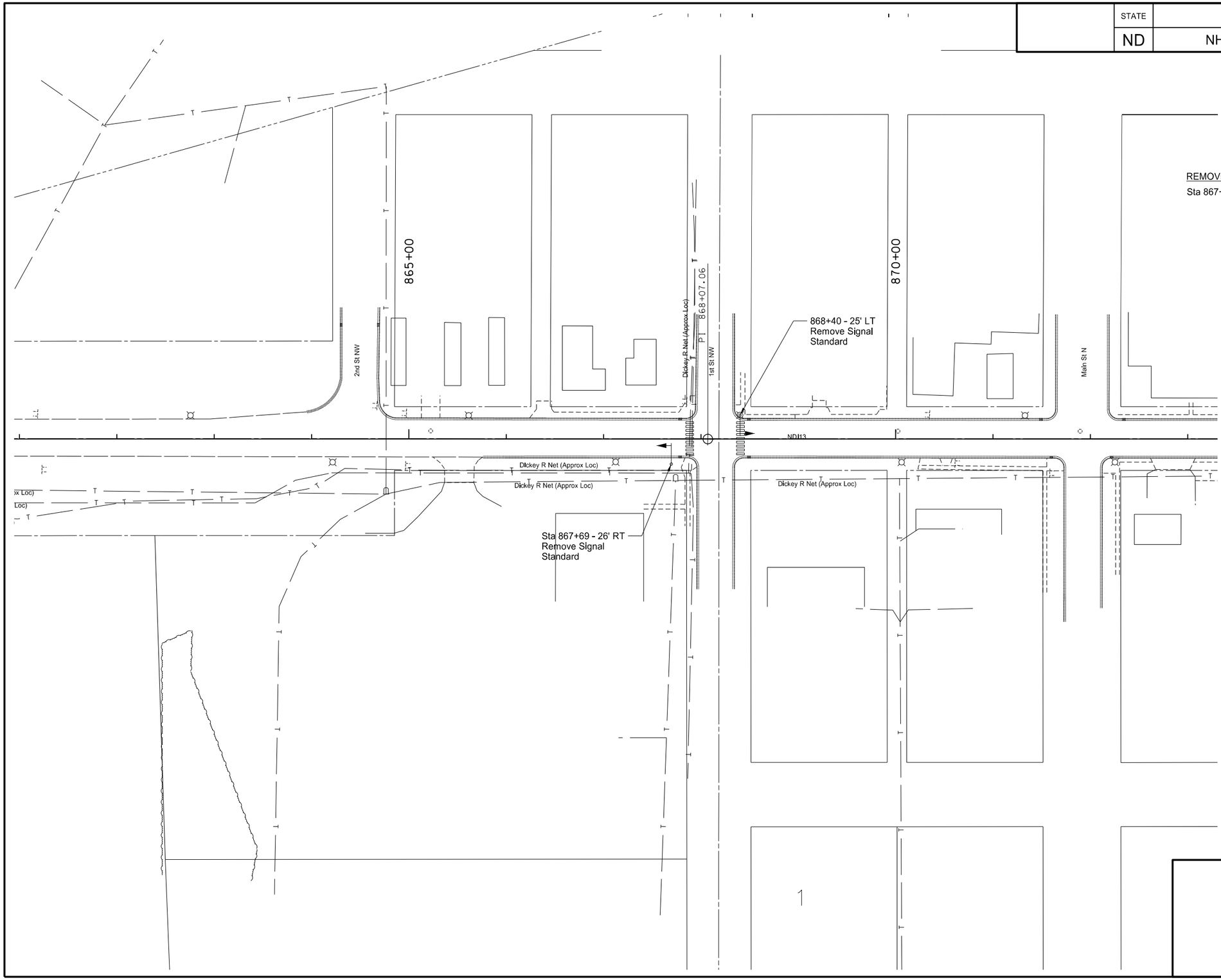
This document was originally issued and sealed by Kevin Kroke Registration Number PE-4966, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Lighting

Sta 862+00 to Sta 902+00

Gwinner, North Dakota

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	150	1



REMOVE FLASHING BEACON SYSTEM

Sta 867+69 to 868+40 1 EA

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

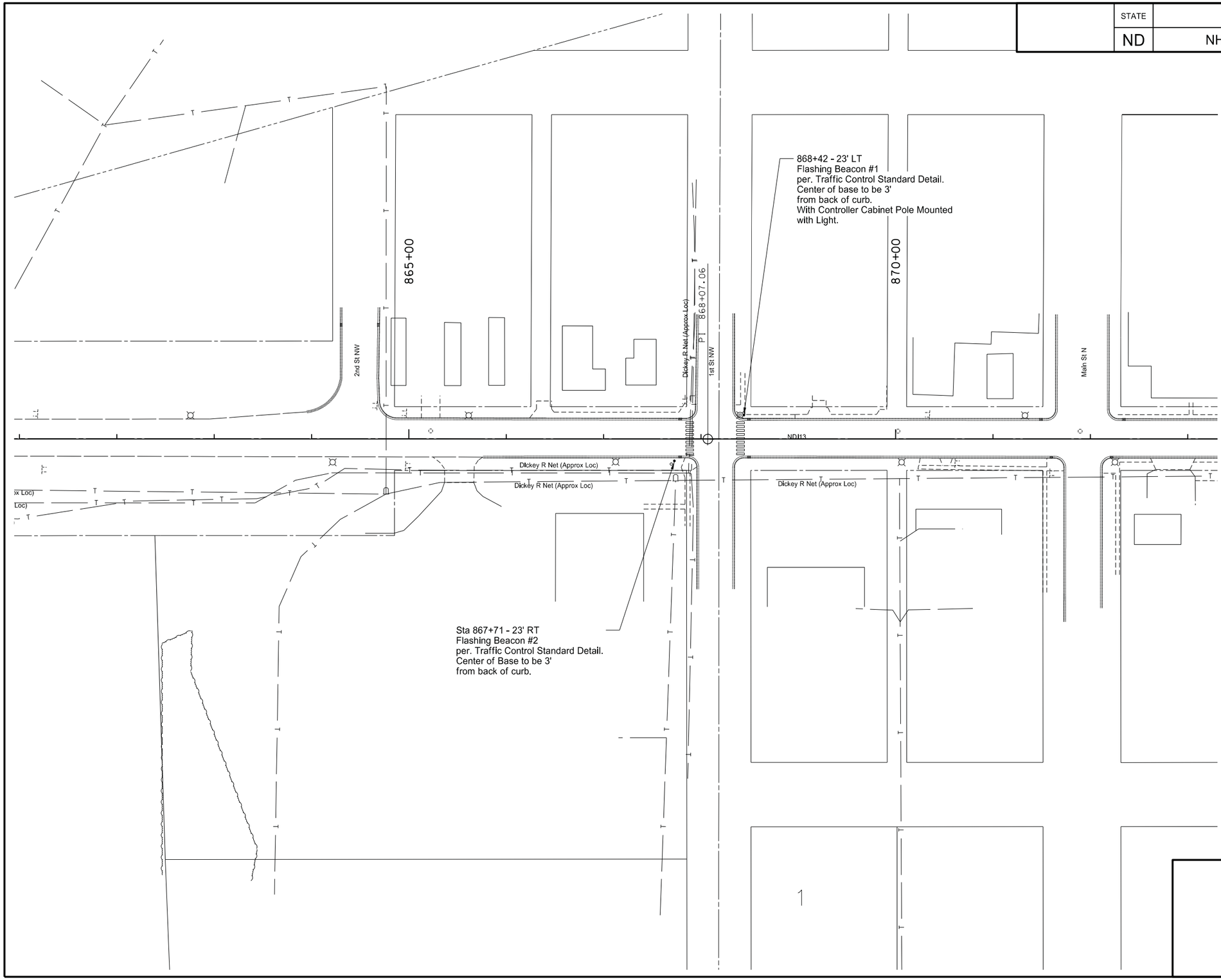
Flashing Beacon Removal

ND 13

Gwinner, North Dakota

8/22/2017 9:59:55 AM Tim.Pearson Q:\2014\W14s\W1400115\CADD\Design\Sheets\Section_150\150SL_001_LREMSGNL.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	150	2



CONCRETE FOUNDATION - TRAFFIC SIGNALS

Sta 867+71 - 23' RT	1 EA
Sta 868+42 - 23' LT	1 EA

FLASHING BEACON - MA MOUNTED

Sta 867+71 - 23' RT to Sta 868+42 - 23' LT	1 EA

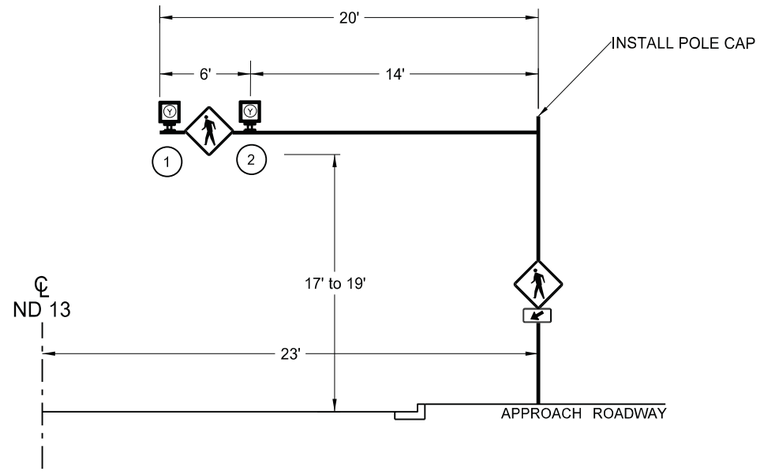
This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Flashing Beacon

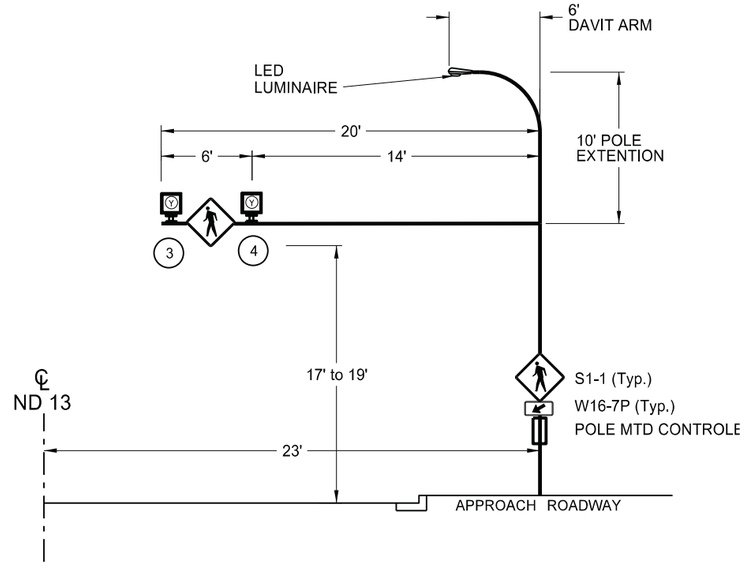
ND 13

Gwinner, North Dakota

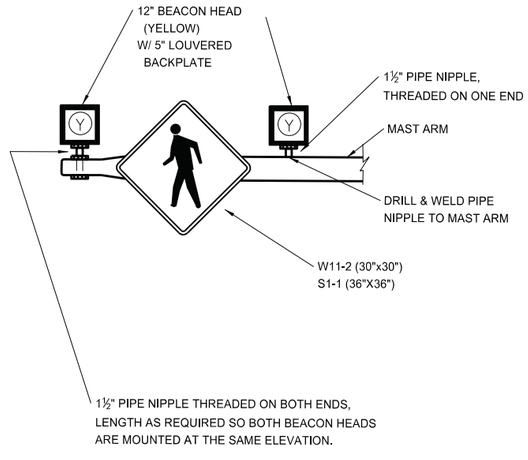
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-8-013(053)338	150	3



EASTBOUND ND13
Sta 867+71



WESTBOUND ND13
Sta 868+42



NOTE:
1. THE FLASHING BEACON HEADS SHALL FLASH ALTERNATELY.

2. BEACON CONTROLLER MOUNTED TO POLE ON NORTH SIDE OF ND13.

3. THE POLES AND ARMS SHALL BE PAINTED BLACK AS DESCRIBED UNDER LIGHT STANDARDS.

4. BOTTOM OF CONTROLLER BOX TO BE 7'-0" MINIMUM ABOVE SIDEWALK MOUNT ON WEST SIDE OF POLE.

This document was originally issued and sealed by Randall A. Pope Registration Number PE-1841, on 08-24-17 and the original document is stored at the North Dakota Department of Transportation

Signal Details
Signals Standard And Head Locations

ND 13

Gwinner, ND

NDDOT ABBREVIATIONS

D-101-1

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

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 07/01/14 and the original document is stored at the North Dakota Department of Transportation

NDDOT ABBREVIATIONS

D-101-2

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

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 08/03/15 and the original document is stored at the North Dakota Department of Transportation

NDDOT ABBREVIATIONS

D-101-3

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

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 08/03/15 and the original document is stored at the North Dakota Department of Transportation

NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 07/01/14 and the original document is stored at the North Dakota Department of Transportation

Line Styles

D-101-20

Existing Topography

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

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

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

Traffic Utilities

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

Sign Structures

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

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 09/23/16 and the original document is stored at the North Dakota Department of Transportation

Line Styles

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 09/23/16 and the original document is stored at the North Dakota Department of Transportation

Symbols

D-101-30

North Arrow (Half Scale)

Truck Mounted Attenuator

Type I Barricade

Type II Barricade

Type III Barricade

Catch Basin

Cairn or Stone Circle

Video Detection Camera

Storm Drain Cap or Stub

Corrugated Metal End Section 18 Inch

Corrugated Metal End Section 24 Inch

Corrugated Metal End Section 30 Inch

Corrugated Metal End Section 36 Inch

Corrugated Metal End Section 42 Inch

Corrugated Metal End Section 48 Inch

Concrete Foundation

Ground Connection Conductor

Neutral Connection Conductor

Phase 1 Connection Conductor

Phase 2 Connection Conductor

Traffic Cone

Signal Controller

Pad Mounted Signal Controller

Alignment Data Point

Emergency Vehicle Detector

Attenuation Device

Diamond Grade Delineator Type A

Diamond Grade Delineator Type B

Diamond Grade Delineator Type C

Diamond Grade Delineator Type D

Diamond Grade Delineator Type E

Flexible Delineator

Flexible Delineator Type A

Flexible Delineator Type B

Flexible Delineator Type C

Flexible Delineator Type D

Flexible Delineator Type E

Delineator Type A

Delineator Type A Reset

Delineator Type B

Delineator Type B Reset

Delineator Type C

Delineator Type D

Delineator Type E

Delineator Drums

Spot Elevation

Existing Access Control Arrow

Existing Artifact

Existing Flashing Beacon

Existing Benchmark

Existing Railroad Battery Box

Existing Bush or Shrub

Existing Gas Cap or Stub

Existing Sanitary Cap or Stub

Existing Storm Drain Cap or Stub

Existing Water Cap or Stub

Existing Sanitary Cleanout

Existing Concrete Foundation

Existing Traffic Signal Controller

Existing Pad Mounted Signal Controller

Existing Sixteenth Section Corner

Existing Quarter Section Corner

Existing Section Corner

Existing Railroad Crossbuck

Existing Satellite Dish

Existing Fuel Dispensers

Existing Flexible Delineator Type A

Existing Flexible Delineator Type B

Existing Flexible Delineator Type C

Existing Flexible Delineator Type D

Existing Flexible Delineator Type E

Existing Delineator Type A

Existing Delineator Type B

Existing Delineator Type C

Existing Delineator Type D

Existing Delineator Type E

Existing EFB Misc

Existing Flashing Beacon

Existing Pipe Mounted Flasher

Existing Pad Mounted Feed Point

Existing Pipe Mounted Feed Point with Pad

Existing Pole Mounted Feed Point

Existing Railroad Frog

Existing Snow Gate 18

Existing Snow Gate 28

Existing Snow Gate 40

Existing Headwall

Existing Pedestrian Head with Number

Existing Signal Head

Existing Sprinkler Head

Existing Fire Hydrant

Existing Catch Basin Drop Inlet

Existing Curb Inlet

Existing Manhole Inlet

Existing Junction Box

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 07/01/14 and the original document is stored at the North Dakota Department of Transportation

Symbols

D-101-31

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

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 07/01/14 and the original document is stored at the North Dakota Department of Transportation

Symbols

D-101-32

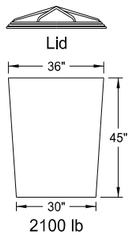
- Pad Mounted Feed Point
- Pipe Mounted Feed Point with Pad
- Pole Mounted Feed Point
- Headwall
- Double Headwall with Vegitation Barrier
- Single Headwall with Vegitation Barrier
- Pole Mounted Head
- Sprinkler Head
- Fire Hydrant
- Inlet Type 1
- Inlet Type 2
- Double Inlet Type 2
- Inlet Grate Type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

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

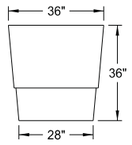
This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 07/01/14 and the original document is stored at the North Dakota Department of Transportation

ATTENUATION DEVICE

D-704-1

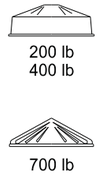


2100 lb



200, 400, 700 and 1400 lb

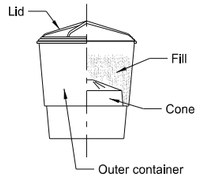
Outer Containers



200 lb
400 lb

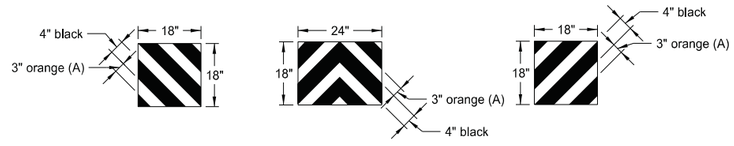
700 lb

Cones



Typical Assembly

Typical Module Construction Detail



Left Side Traffic

Both Sides Traffic

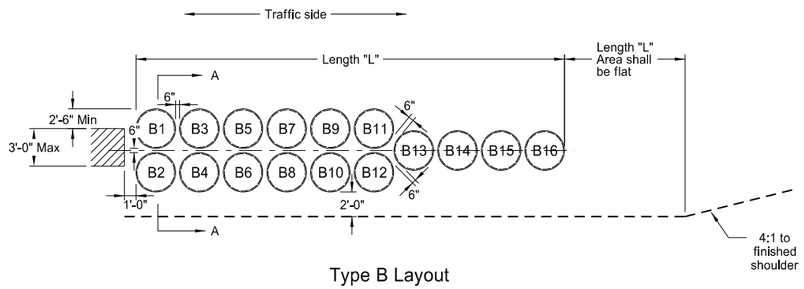
Right Side Traffic

Reflective Sheet Detail

Note:
The last attenuation device facing traffic shall have a reflective sheet, following the details above, directly applied to the outer container. The sheet may also be applied to a metallic sheet and attached to the container with approved fasteners. The reflective sheeting shall be Type IV as specified in NDDOT Standard Specifications.

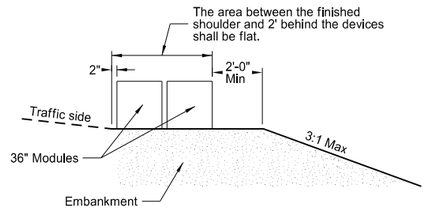
(A) 3" orange sheeting shall be used for temporary installations, and 3" yellow sheeting shall be used for permanent installations.

Fill Chart					
	Module Weights (LBS)				
	200	400	700	1400	2100
Distance from top edge	8½"	5"	4"	3"	0"



Type B Layout

Note:
When attenuation devices are placed at piers offset from roadway, they shall be angled 10 degrees towards traffic.



Section A-A
(Type B Layout)

Type B Attenuation Device											
Module Number	Dash Number										
	75	70	65	60	55	50	45	40	35	30	25
	Module Weights (LBS)										
B1	2100										
B2	2100										
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B5	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B6	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B7	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B8	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B9	700	700	700	700	700	700	700	700	700	700	700
B10	700	700	700	700	700	700	700	700	700	700	700
B11	700	700	700	700	700	700	700	700	700	700	700
B12	700	700	700	700	700	700	700	700	700	700	700
B13	700	700	700	700	700	700	700	700	700	700	700
B14	400	400	400	400	400	400	400	400	400	400	400
B15	400	400	400	400	400	400	400	400	400	400	400
B16	200	200	200	200	200	200	200	200	200	200	200
Length (L)	34.2'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	27.2'	27.2'
Module Weights (LBS)	Replacement Module										
2100	1	1	1	1	1	1	1	1	1		
1400	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	1	1	1	1	1	1	1	1

Notes:

1. Materials
   A) Modules shall be manufactured from a frangible polyethylene material which will shatter upon impact.
   B) Modules shall be filled with class 43 aggregate meeting the requirements for aggregate according to NDDOT Standard Specifications. The fill unit weight shall be at least 100 pounds per cubic foot. Fill left over winter shall have a moisture content of 2% or less.

2. Modules
   The modules shall be provided in two sizes to contain volumes of either 2, 4, 7, 14, or 21 cubic feet as a minimum.
   A) The module for the 2, 4 or 7 cubic foot container shall consist of three components:
      1) A 14 C.F., yellow outer container.
      2) A black lid which locks securely over the top lip of the container.
      3) A cone-shaped supporting insert. The insert shall be varied to allow for the three sizes of modules and capable of supporting 200, 400, or 700 pounds of sand mass. The cone inserts shall be placed inside the 14 cubic foot container.
   B) The module for the 21 cubic foot container shall consist of two components:
      1) A 36" height X 36" width yellow outer container.
      2) A black lid which locks securely over the top of the container.

3. For temporary use: The modules shall be Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or an approved equal. The attenuation devices may be placed on pallets to facilitate maintenance. Pallets shall have a maximum thickness of 3½".

4. For permanent use: Barrel Attenuation Device installations, the outer sand container portion of the modules shall consist of a one-piece container with separate detachable lid. The modules which meet these requirements are Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or an approved equal. Modules having outer sand containers assembled from multiple pieces shall not be accepted for permanent installations.

5. The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. The manufacturer of other sand filled attenuation modules shall provide any necessary layouts and details required which differ from those shown here.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revised sheeting in reflective sheet detail

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 7/18/14 and the original document is stored at the North Dakota Department of Transportation

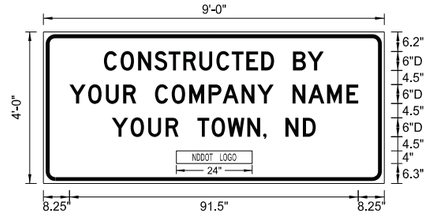
CONSTRUCTION SIGN DETAIL

D-704-5

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

SYMBOL	X	Y	WID	HT	ANGLE
	42.1	6.2	24	4	0

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



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

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

Notes:

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

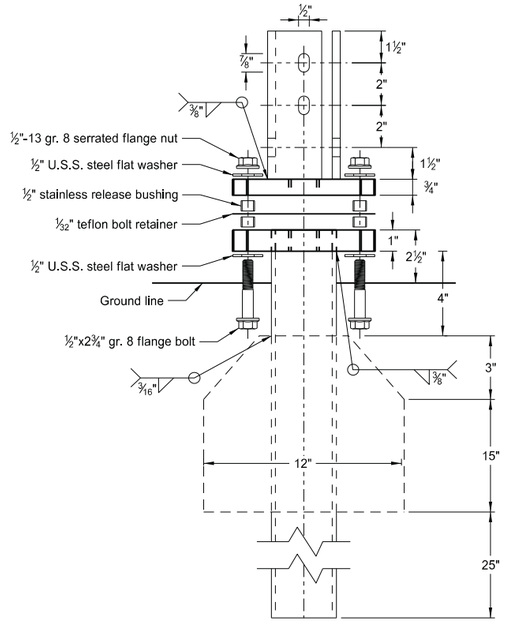
Advance Warning Sign Spacing (A)			
Road Type	Distance between signs min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

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

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 7/18/14 and the original document is stored at the North Dakota Department of Transportation

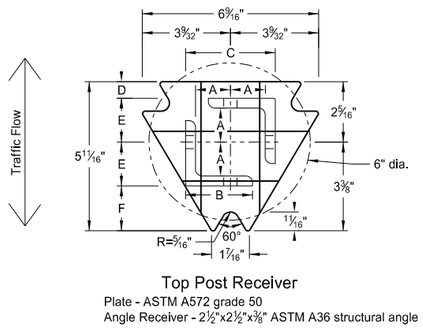
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

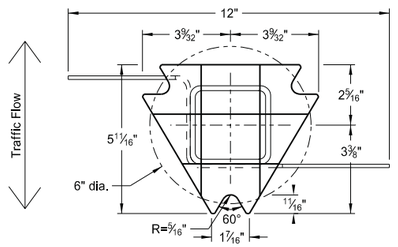


Multi-Directional
Slip Base Assembly

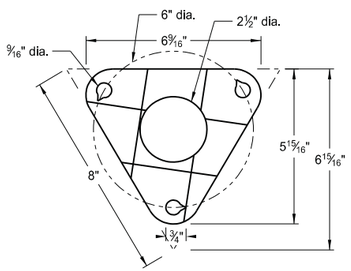
Perforated Tube



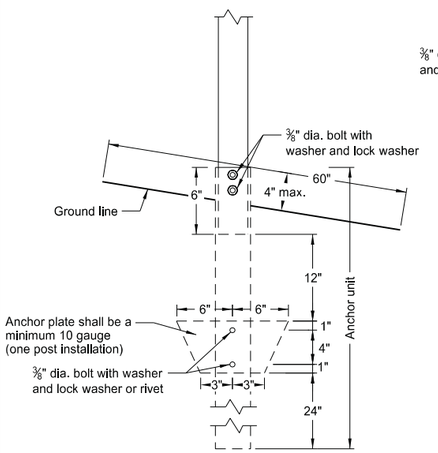
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



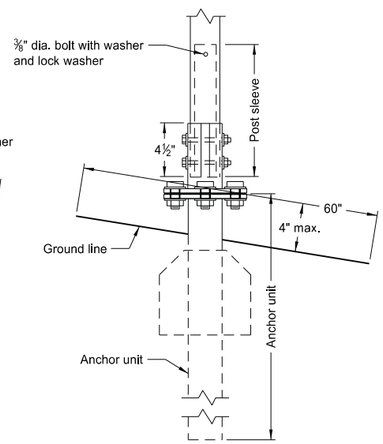
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50



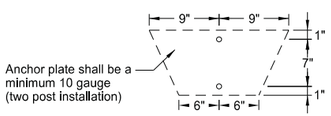
Bolt Retainer for Base Connection
Bolt Retainer- 1/32" Reprocessed Teflon



Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly



Notes:

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

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

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

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

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

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

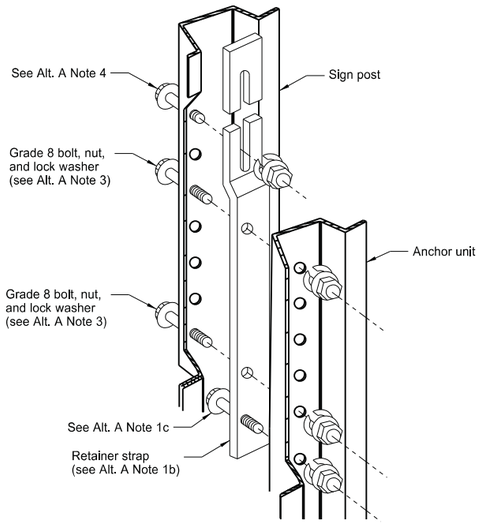
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 2/28/14 and the original document is stored at the North Dakota Department of Transportation

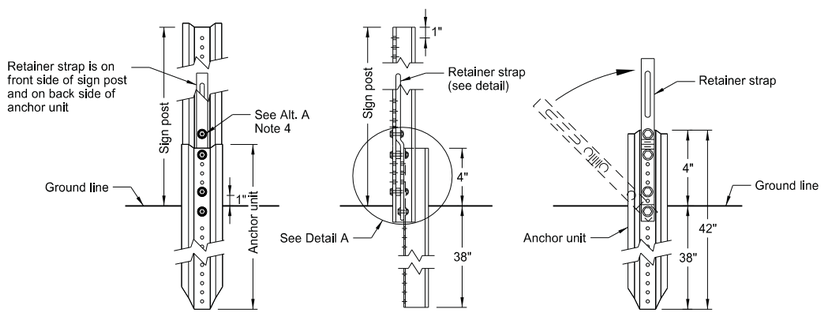
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



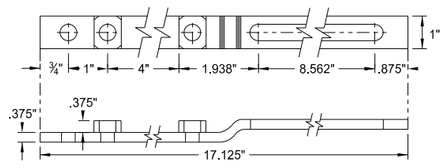
Detail A



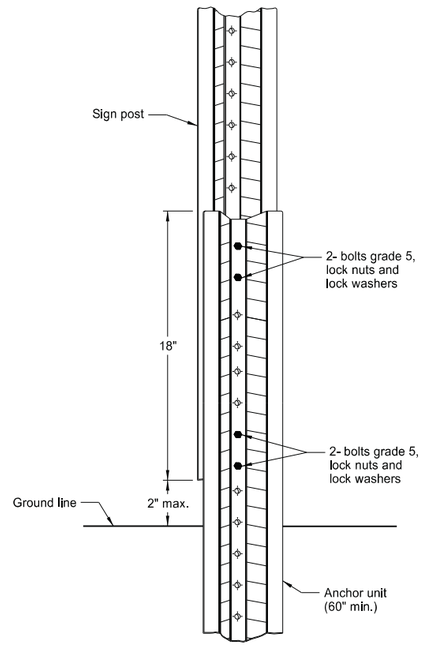
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

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

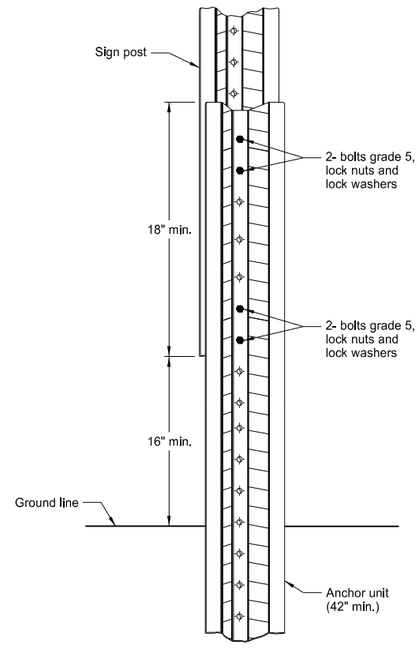


Retainer Strap Detail



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

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



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

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

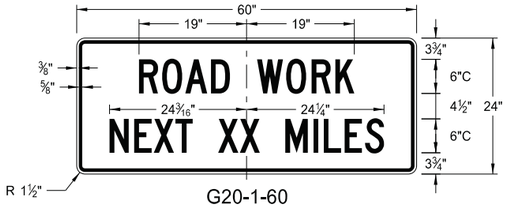
Alternate A Steps of Installation:

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

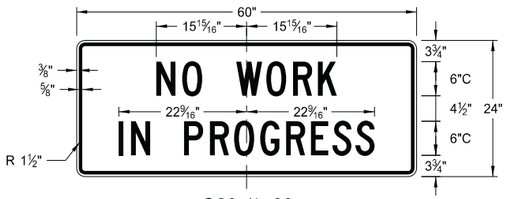
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 2/28/14 and the original document is stored at the North Dakota Department of Transportation

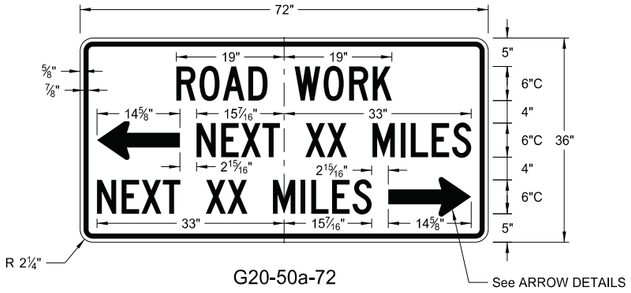
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



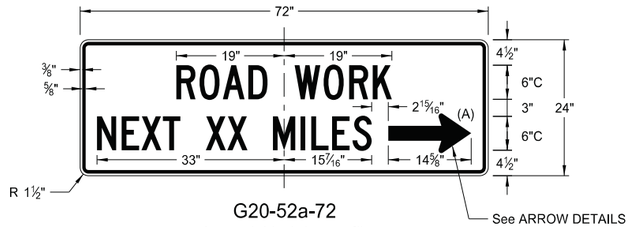
G20-1-60
Legend: black (non-refl)
Background: orange



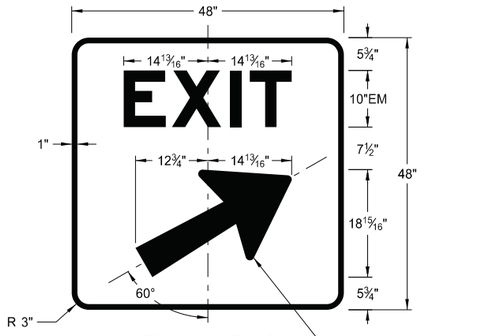
G20-1b-60
Legend: black (non-refl)
Background: orange



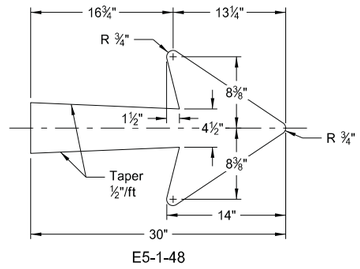
G20-50a-72
Legend: black (non-refl)
Background: orange



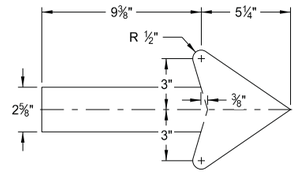
G20-52a-72
Legend: black (non-refl)
Background: orange



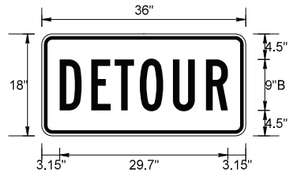
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



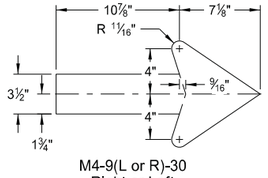
E5-1-48



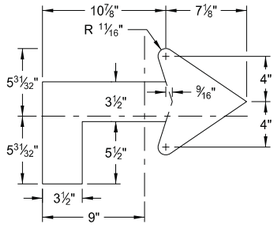
G20-50a-72
G20-52a-72



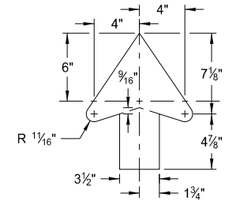
M4-8-36
Legend: black (non-refl)
Background: orange



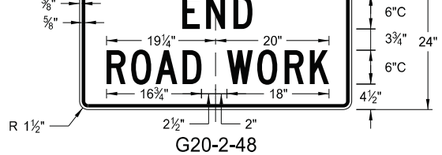
M4-9(L or R)-30
Right or Left



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

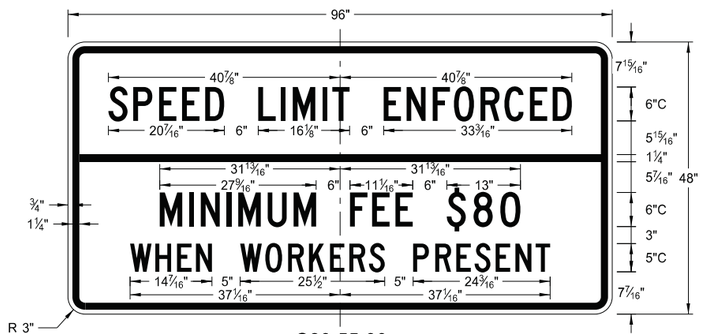


M4-9-30
Straight

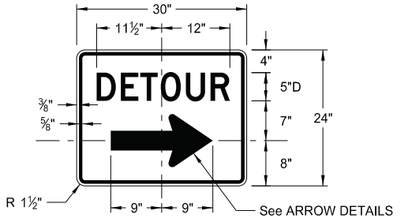


G20-2-48
Legend: black (non-refl)
Background: orange

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



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



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

ARROW DETAILS

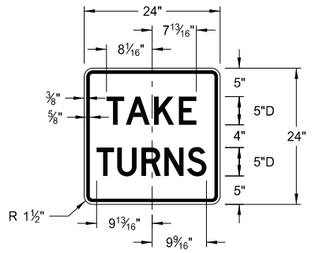
NOTES:

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

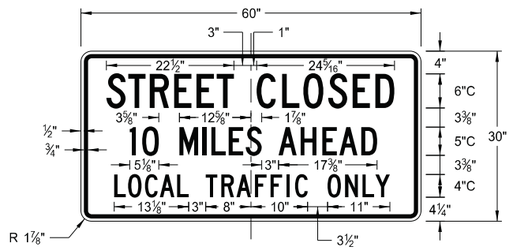
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 8/17/17 and the original document is stored at the North Dakota Department of Transportation

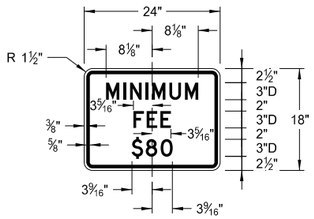
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



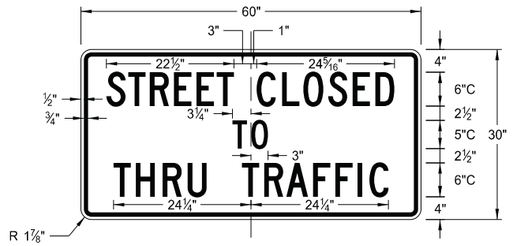
R1-50P-24
Legend: black (non-refl)
Background: white



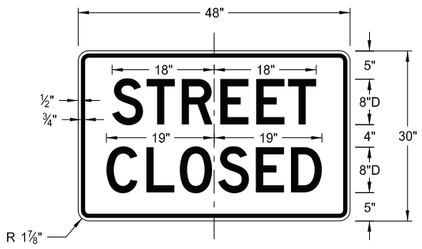
R11-3c-60
Legend: black (non-refl)
Background: white



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



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

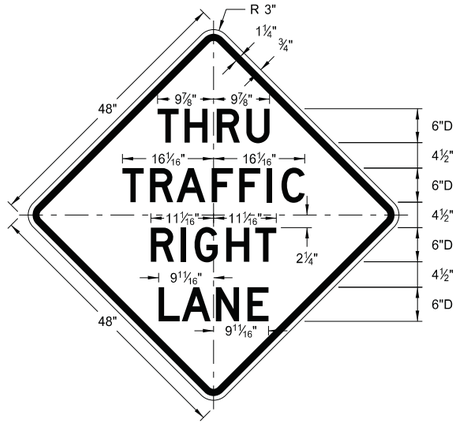


R11-2a-48
Legend: black (non-refl)
Background: white

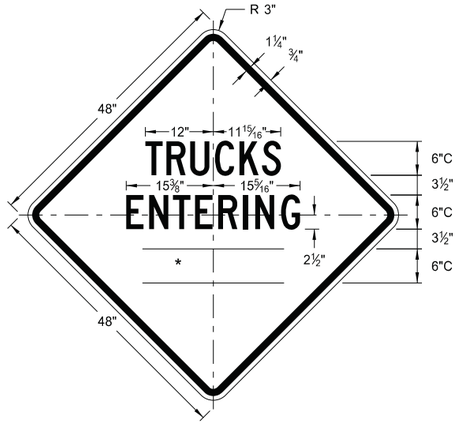
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 8/17/17 and the original document is stored at the North Dakota Department of Transportation

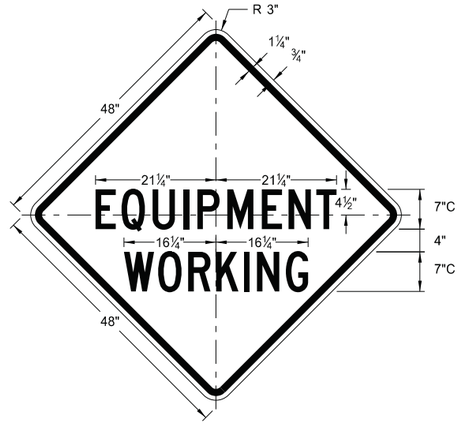
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



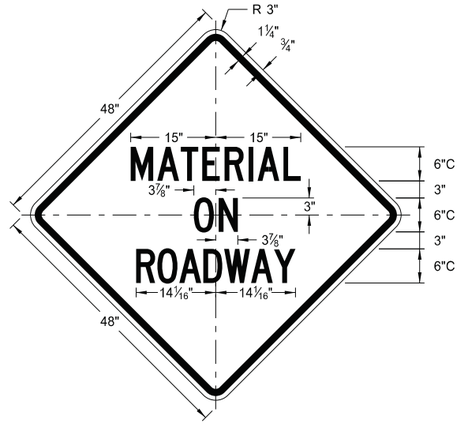
W5-8-48
Legend: black (non-refl)
Background: orange



W8-54-48
Legend: black (non-refl)
Background: orange



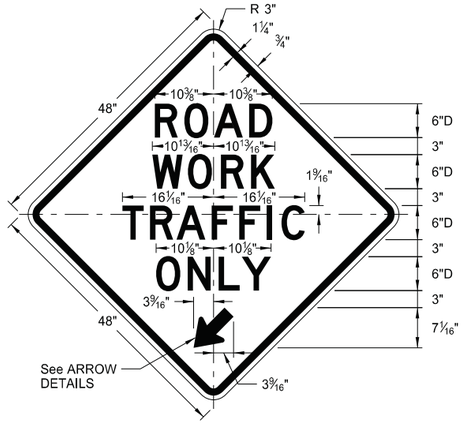
W20-51-48
Legend: black (non-refl)
Background: orange



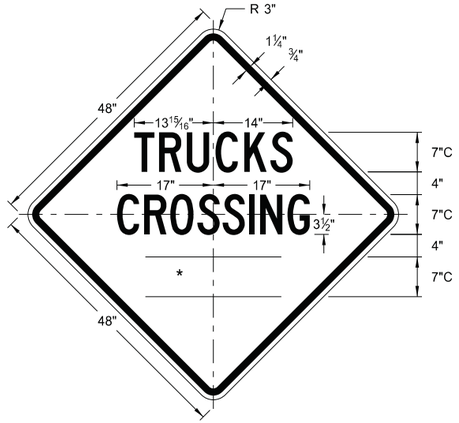
W21-51-48
Legend: black (non-refl)
Background: orange

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

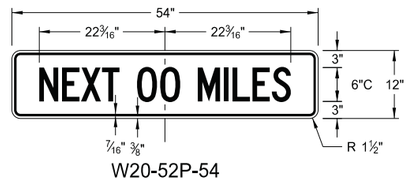
* DISTANCE MESSAGES



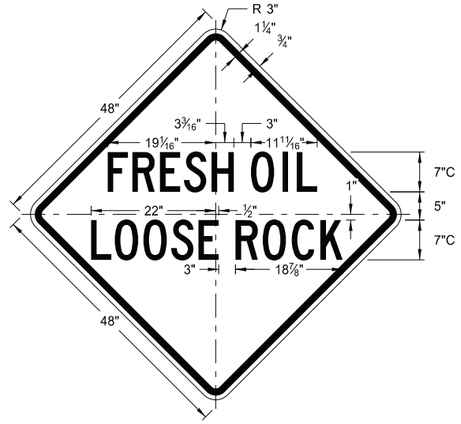
W5-9-48
Legend: black (non-refl)
Background: orange



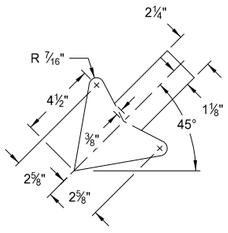
W8-55-48
Legend: black (non-refl)
Background: orange



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

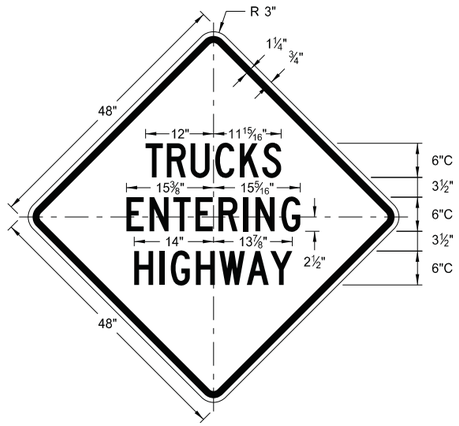


W22-8-48
Legend: black (non-refl)
Background: orange

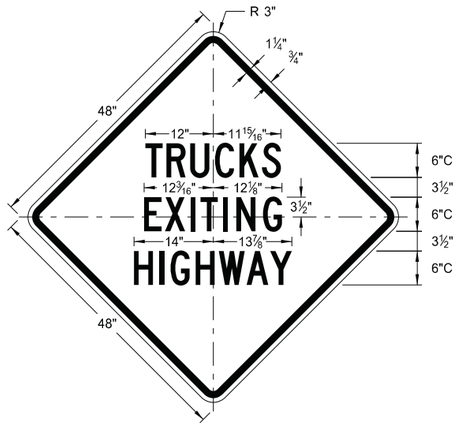


W5-9-48

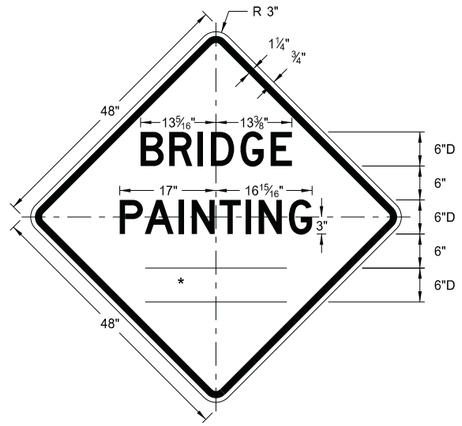
ARROW DETAILS



W8-53-48
Legend: black (non-refl)
Background: orange



W8-56-48
Legend: black (non-refl)
Background: orange



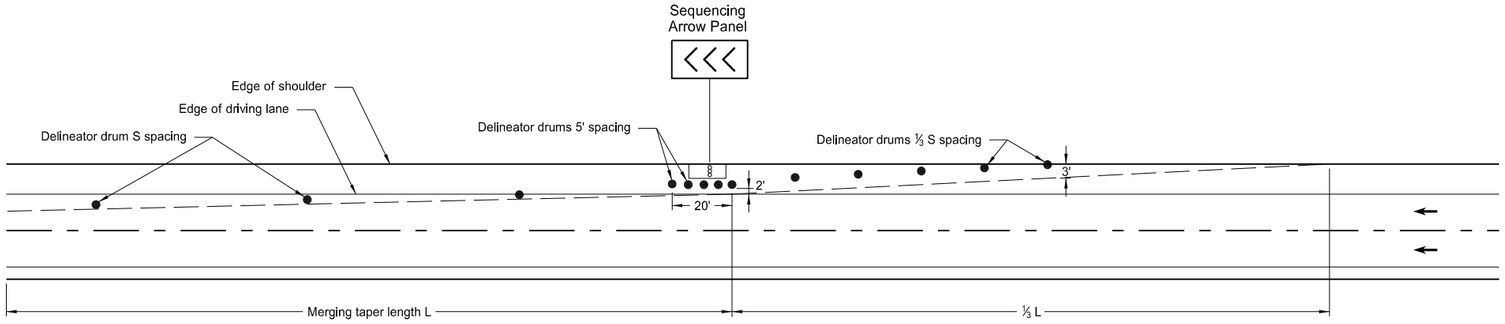
W21-50-48
Legend: black (non-refl)
Background: orange

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

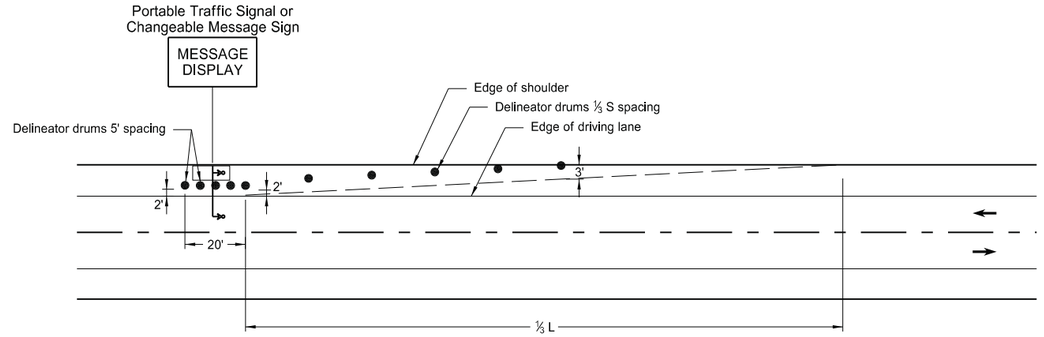
This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 8/17/17 and the original document is stored at the North Dakota Department of Transportation

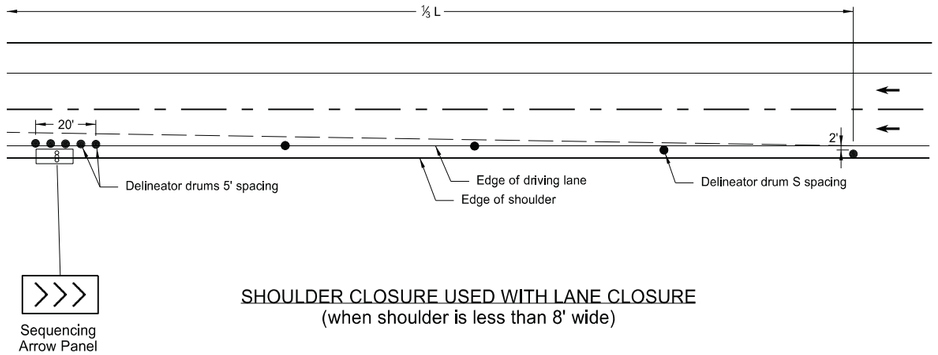
SHOULDER CLOSURE TAPERS

D-704-12



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





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

PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

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

Notes:

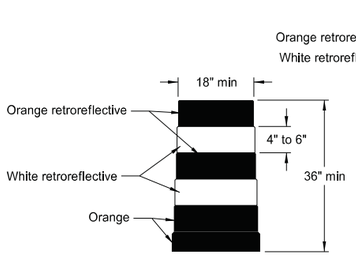
1. S = Posted Speed Limit in mph
   W = Width of offset in feet
   L = Taper length in feet
   L = $WS^2/60$ (40mph or less)
   L = WS (45mph or more)
2. If a shoulder taper is used, it should have a length of approximately ⅓L. If a shoulder is used as a travel lane, a normal merging or shifting taper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

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

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

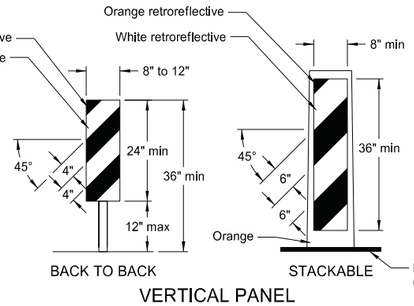
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



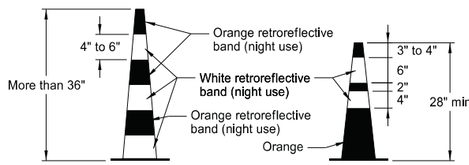
DELINEATOR DRUM

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



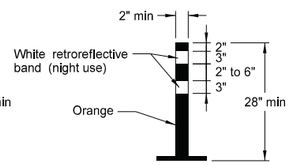
VERTICAL PANEL

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



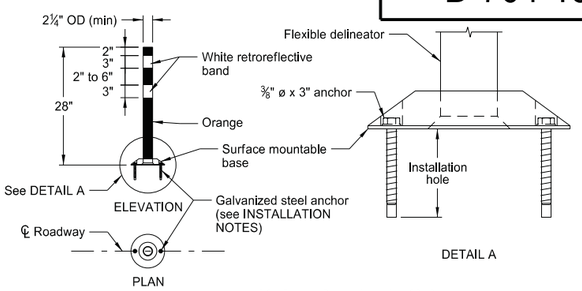
TRAFFIC CONE

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



TUBULAR MARKER

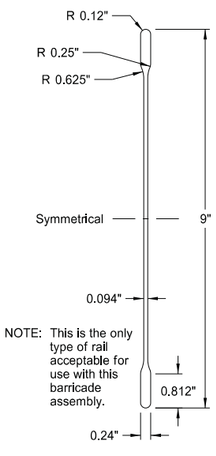
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



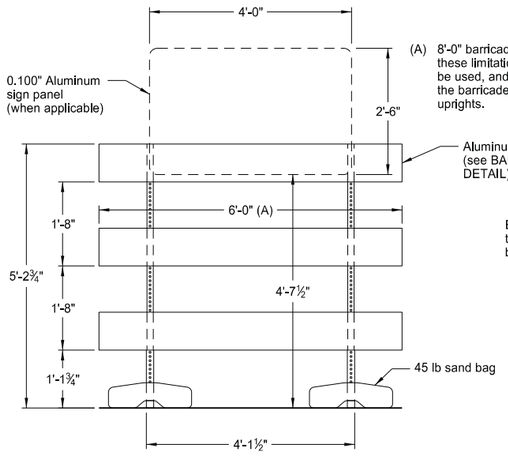
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

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

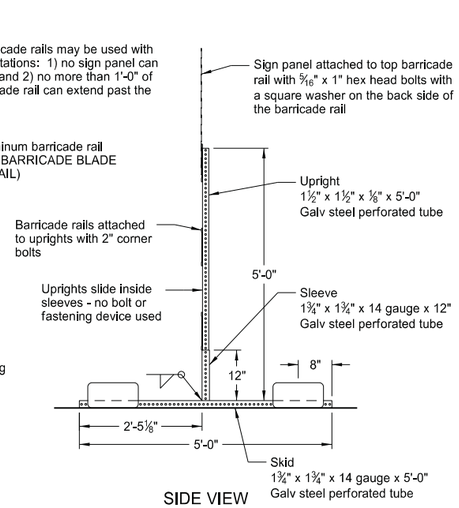


BARRICADE BLADE DETAIL



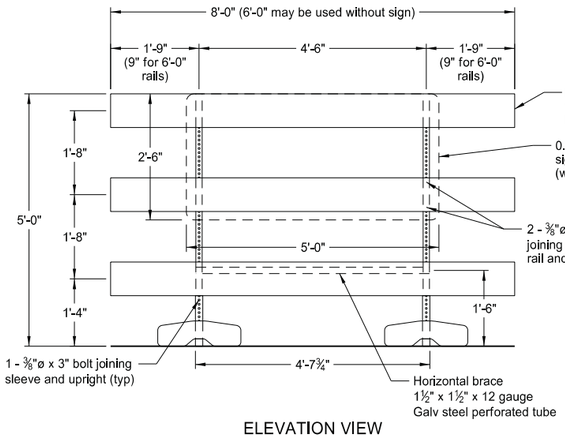
ELEVATION VIEW

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

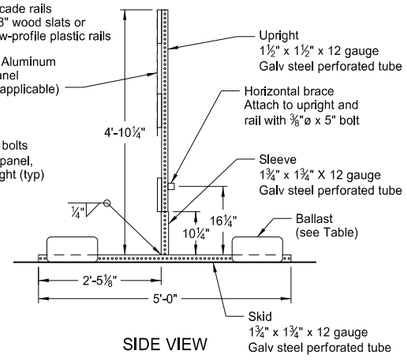


SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)



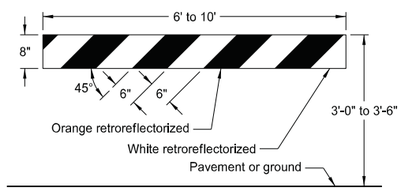
ELEVATION VIEW



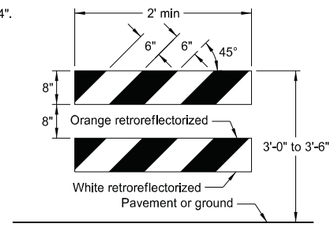
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

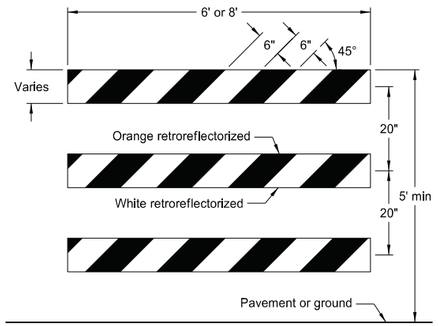
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular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



TYPE I BARRICADE

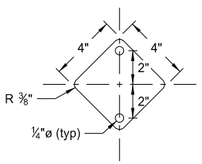


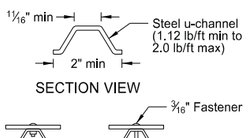
TYPE II BARRICADE

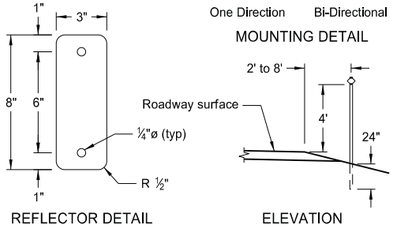


TYPE III BARRICADE

BARRICADE RAIL DETAILS







DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

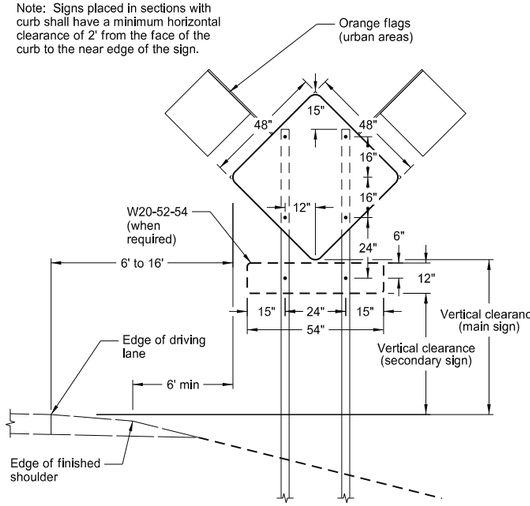
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

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

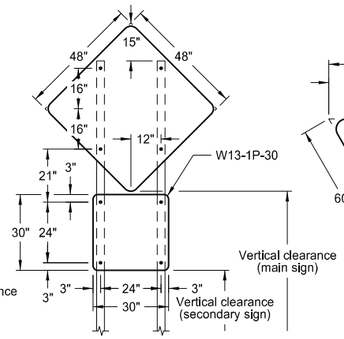
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

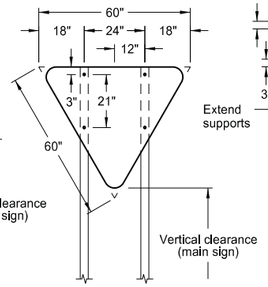
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



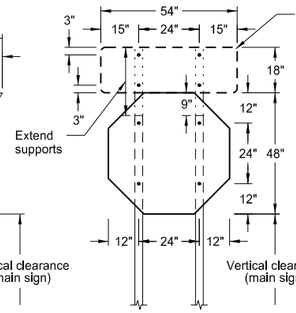
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



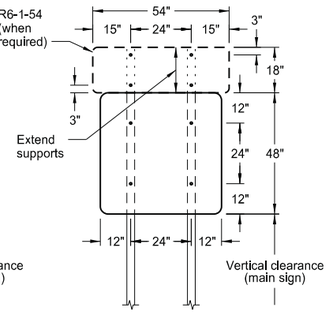
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



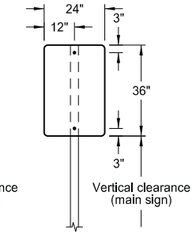
R1-2-60 - YIELD SIGN



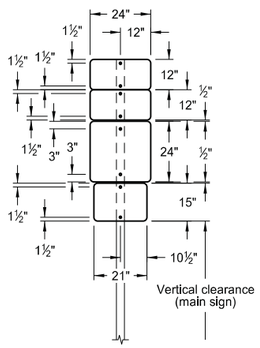
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



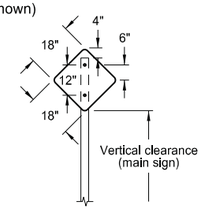
48" x 48" SIGN
(with R6-1-54 sign as required)



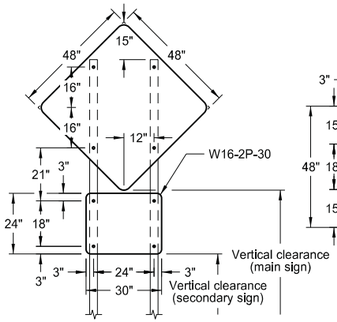
24" x 36" SIGN



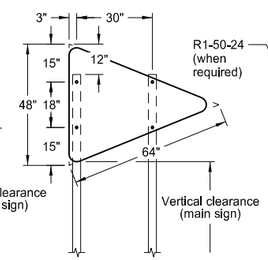
24" x 24"
ROUTE MARKER
ASSEMBLY



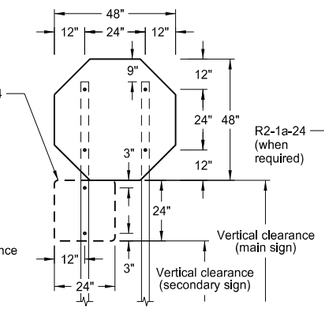
18" x 18"
DIAMOND SIGN



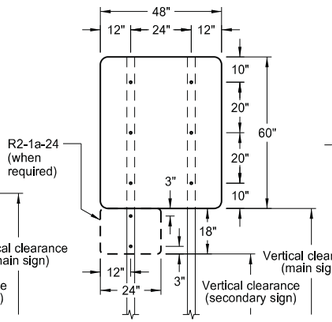
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



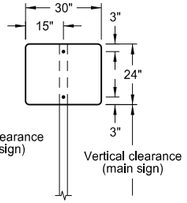
W14-3-64 - PENNANT SIGN



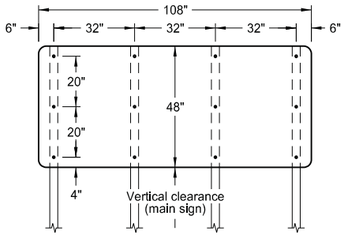
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



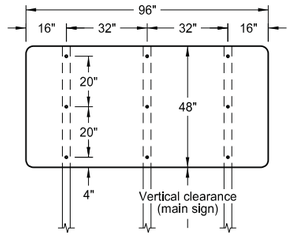
48" x 48" SIGN
(with R2-1a-24 sign as required)



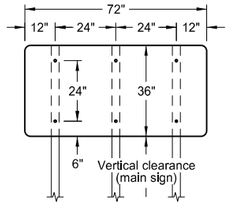
30" x 24" SIGN



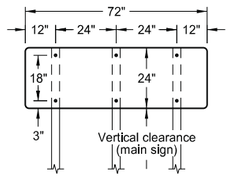
108" x 48" SIGN



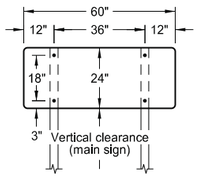
96" x 48" SIGN



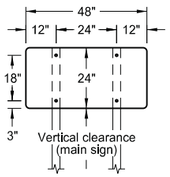
72" x 36" SIGN



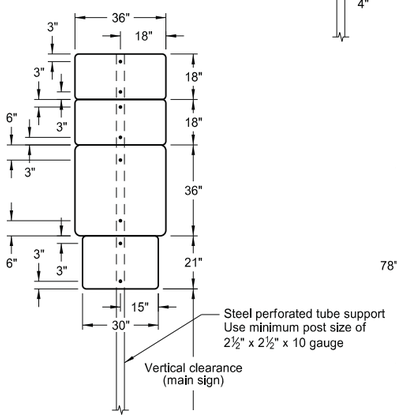
72" x 24" SIGN



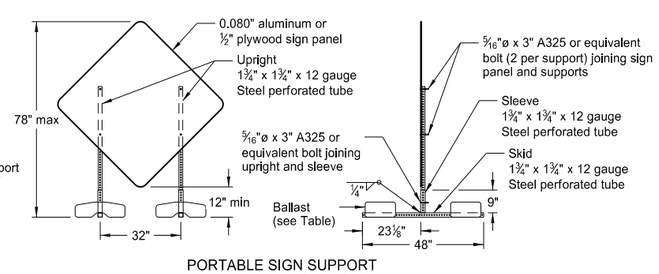
60" x 24" SIGN



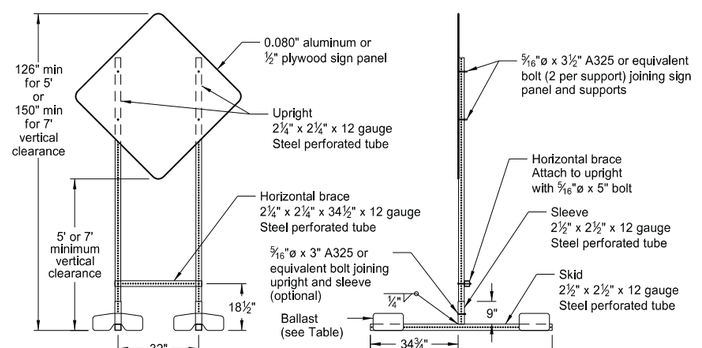
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

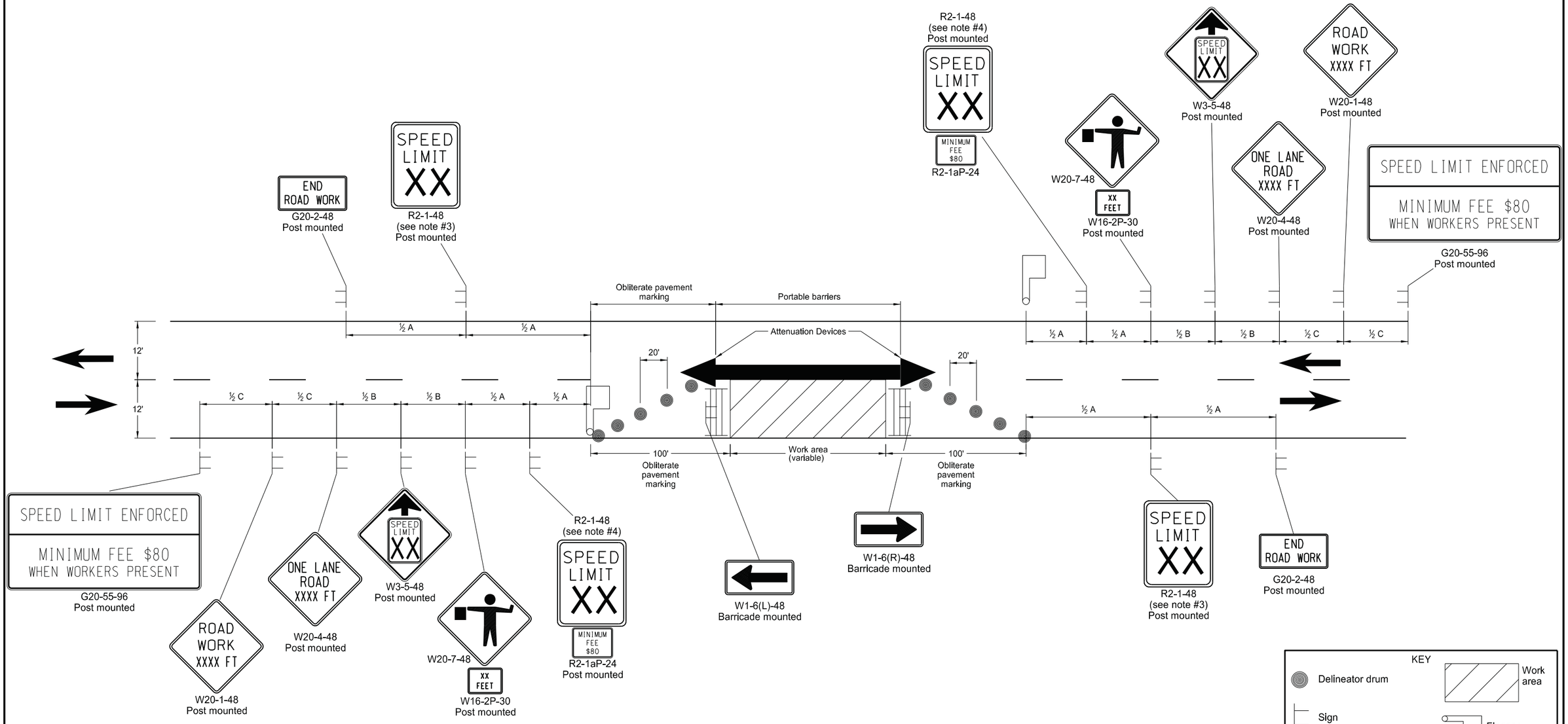
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

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

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

SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



KEY

- Delineator drum
- Work area
- Sign
- Flagger
- Type III barricade

Notes

1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. 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.
5. 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.
6. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
7. Cover existing speed limit signs within a reduced speed zone.
8. Sign G20-55-96 is not required if layout is part of other traffic control or if work is less than 15 days.
9. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

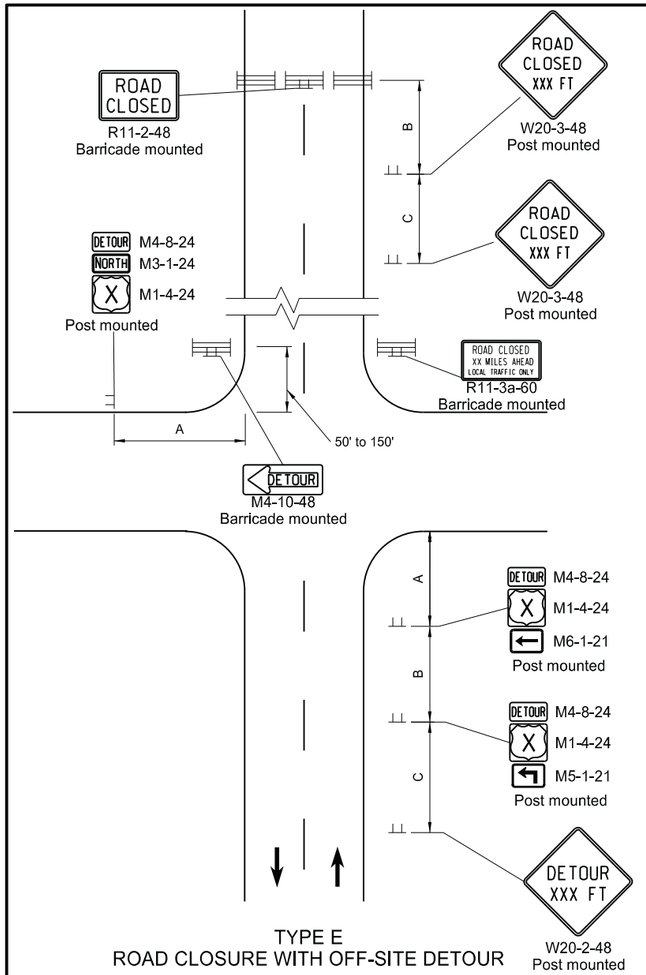
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Note update & sign numbers

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

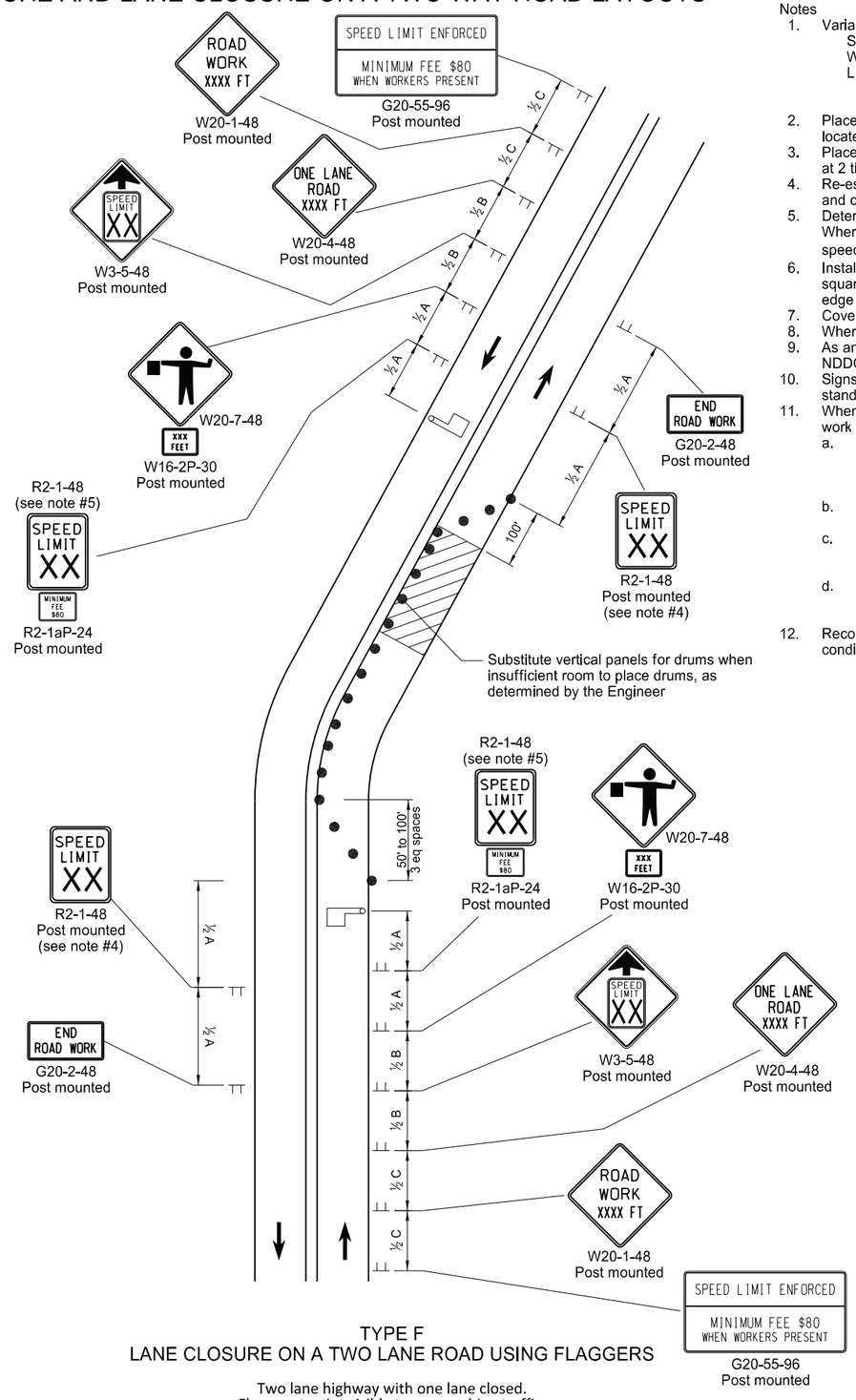
ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS

D-704-19



TYPE E
ROAD CLOSURE WITH OFF-SITE DETOUR

Road closed beyond detour point.
Signing shown for one direction only.
Install and maintain signs shown in plans.



TYPE F
LANE CLOSURE ON A TWO LANE ROAD USING FLAGGERS

Two lane highway with one lane closed.
Flagger at point visible to approaching traffic.

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet
   L = Minimum length of taper in feet. S x W for freeways, expressways, and roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
3. Place delineator drums for tapering traffic at 3 equal spaces and for tangents space them at 2 times dimension "S".
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 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. Where necessary, safe speed to be determined by the Engineer.
9. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
10. Signs G20-55-96 or R2-1aP-24 are not required when pilot car operation is used, if this standard is part of other traffic control layouts, or if work is less than 15 days.
11. When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
    a. Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
    b. Place "Do Not Stop on Tracks" sign (R8-8-24) near cross buck in each direction while lane closure is near tracks.
    c. Extend buffer space between work zone and lane closure transition upstream of the highway-rail grade crossing to prevent flagging queue from extending across highway-rail grade crossing.
    d. If queuing extends across highway-rail crossing, provide flagger at crossing to prevent vehicles from stopping within the crossing (even when automatic warning devices are in place.)
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

KEY

- Delineator Drum
- Type III Barricade
- Flagger
- Sign
- Work/Hazard Area

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

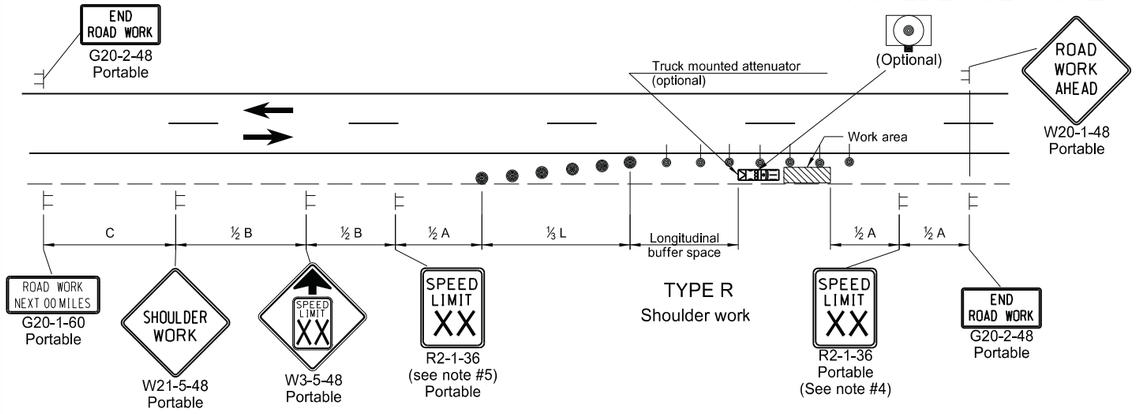
REVISIONS

DATE	CHANGE
3-13-14	Revised Sign Cell "ROAD WORK XXX FT"
8-17-17	Update notes & sign numbers

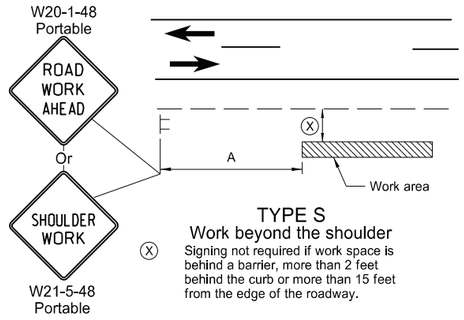
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

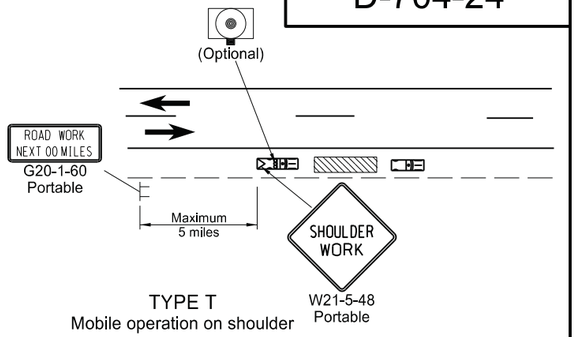
D-704-24



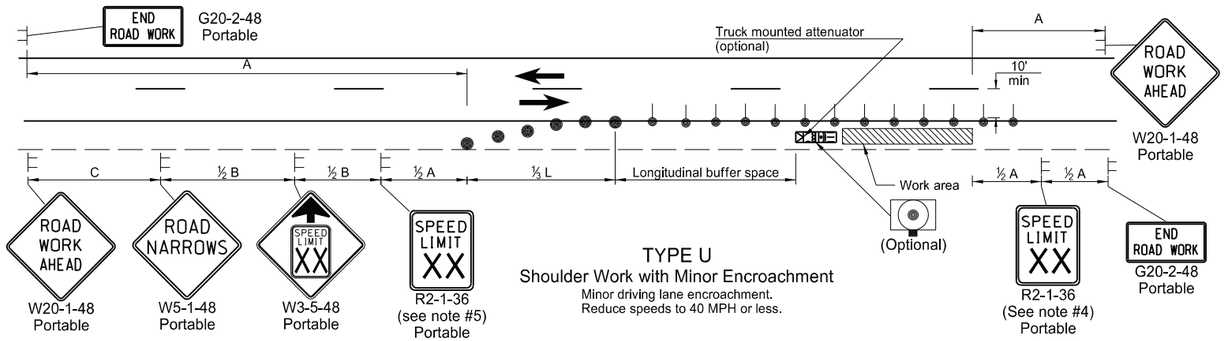
TYPE R
Shoulder work



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

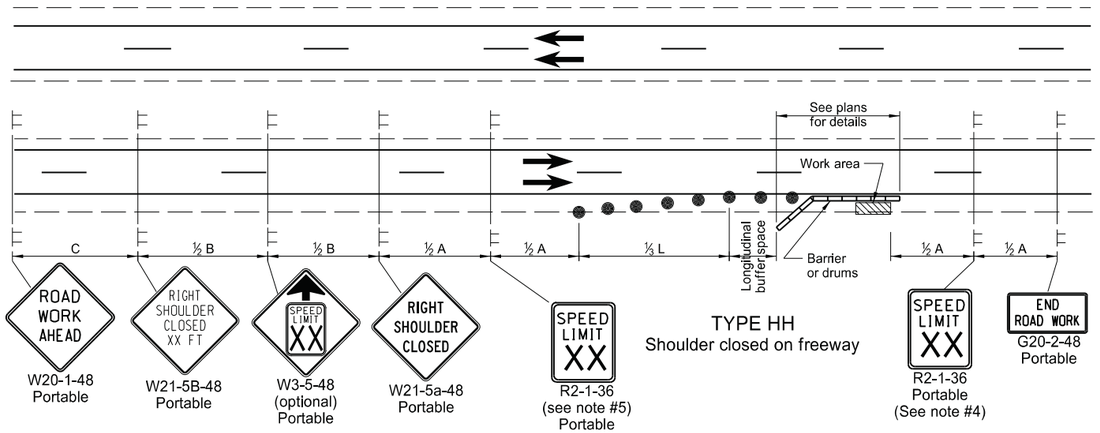


TYPE T
Mobile operation on shoulder

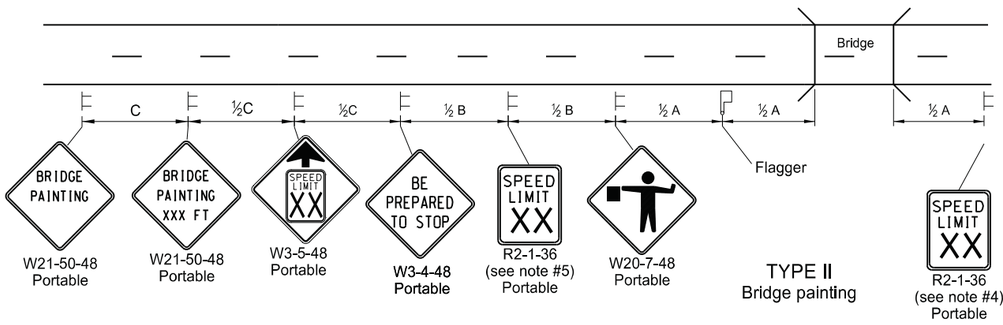


TYPE U
Shoulder Work with Minor Encroachment
Minor driving lane encroachment.
Reduce speeds to 40 MPH or less.

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



TYPE HH
Shoulder closed on freeway



TYPE II
Bridge painting

KEY

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

ADVANCE WARNING SIGN SPACING

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

Longitudinal Buffer Space

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

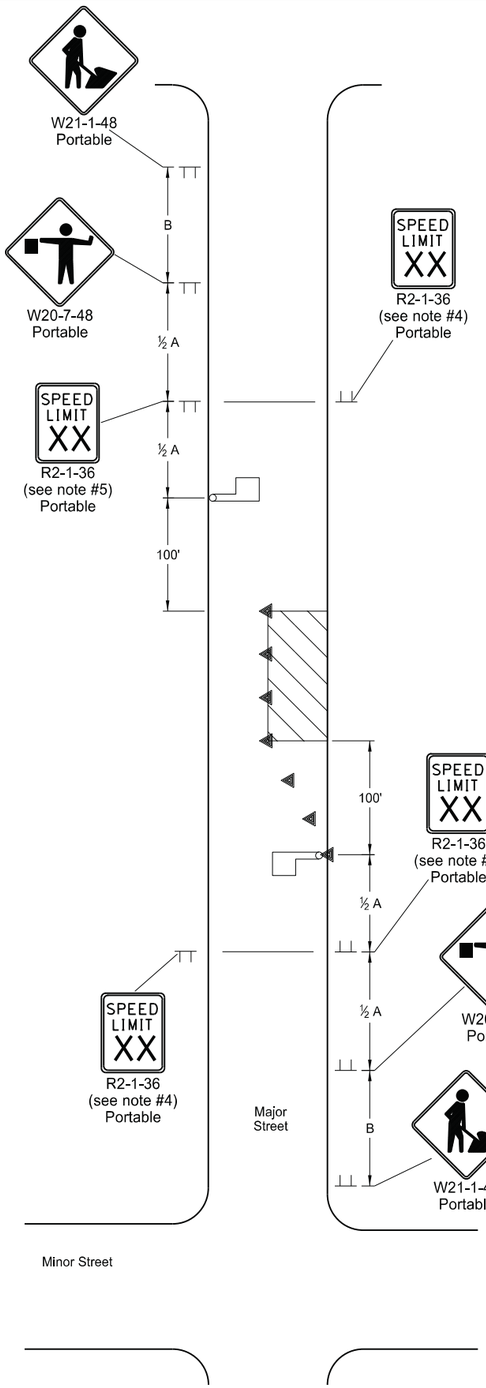
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
9-27-13
REVISIONS

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

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

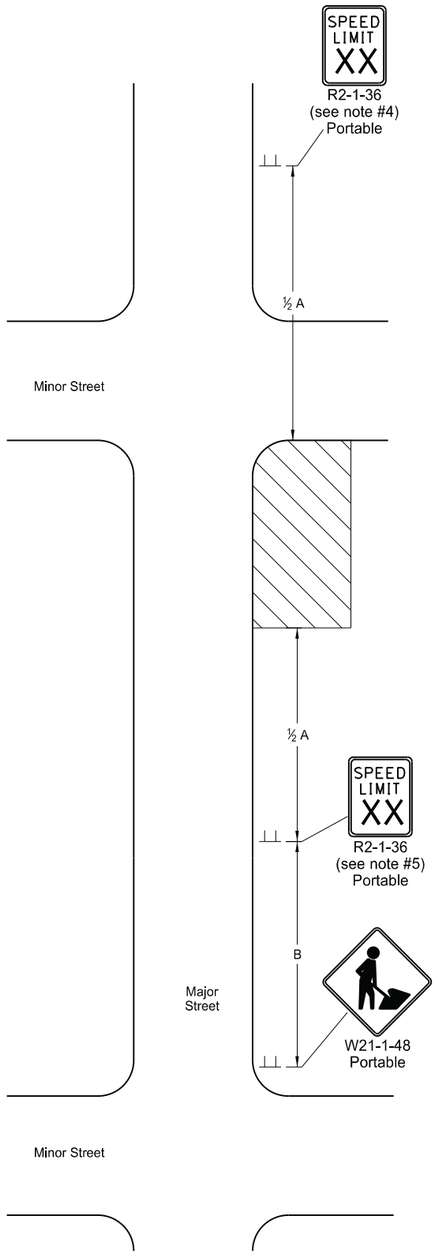
LANE CLOSURES ON URBAN STREETS LAYOUTS

D-704-25



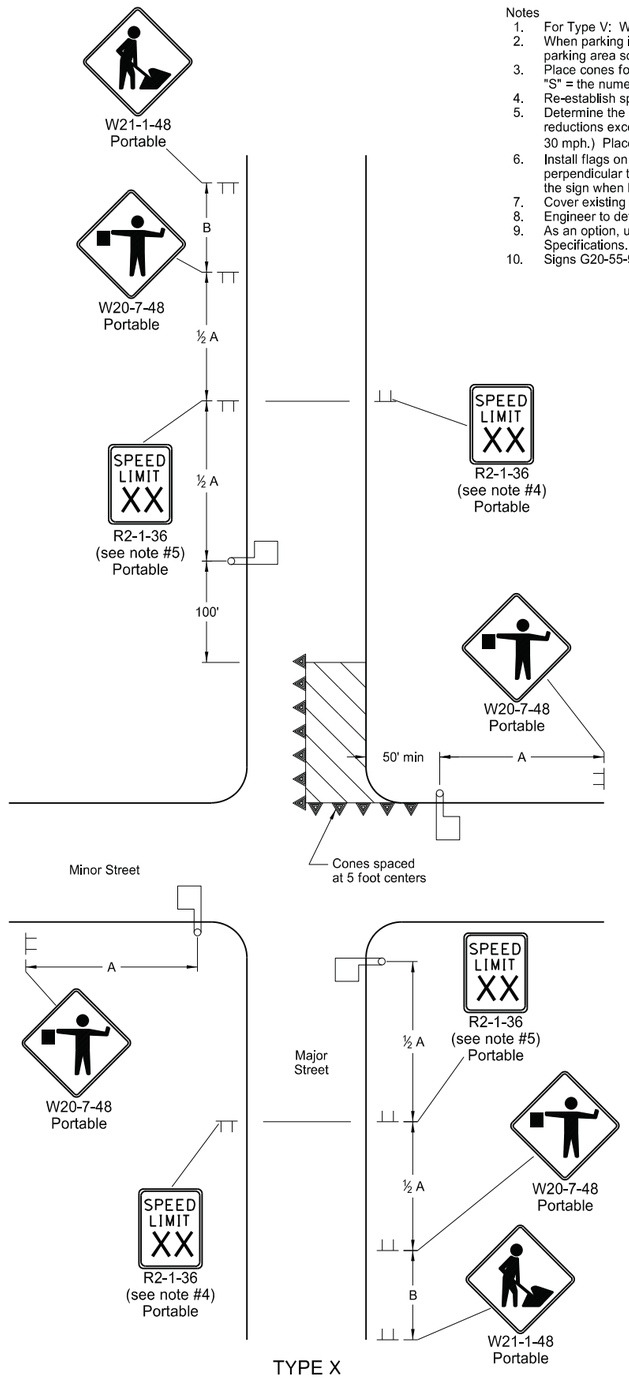
TYPE V
LANE CLOSURE ON URBAN STREET

Portion of roadway closed to traffic only
during daylight hours (mid block location).



TYPE W
WORK BEYOND CURB ON URBAN STREET

Work area outside driving lane and no closure necessary.



TYPE X
LANE CLOSURE NEAR INTERSECTION ON URBAN STREET

Portion of roadway closed to traffic only
during daylight hours (end block location).

Notes

1. For Type V: Work on one side of roadway at a time so as not to block off more than one lane of traffic.
2. 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. Place signs on portable mounts when located on roadway.
3. Place cones for tapering traffic at 3 equal spaces and cones for tangents at dimension "S".
   "S" = the numerical value of speed limit.
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 ½ B.
6. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches 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 reduced speed zones.
8. Engineer to determine safe speed, when necessary.
9. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
10. Signs G20-55-96 and R2-1aP-24 are not required for urban projects.

ADVANCE WARNING SIGN SPACING

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

KEY

Sign — Work area
Cones — Flagger

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

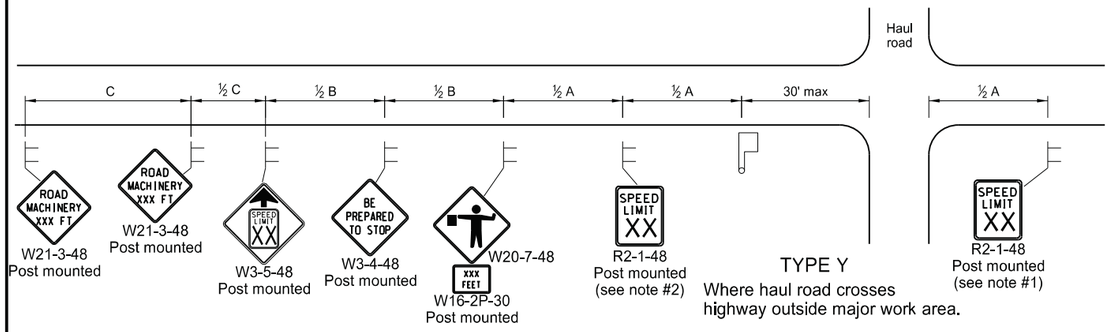
REVISIONS

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

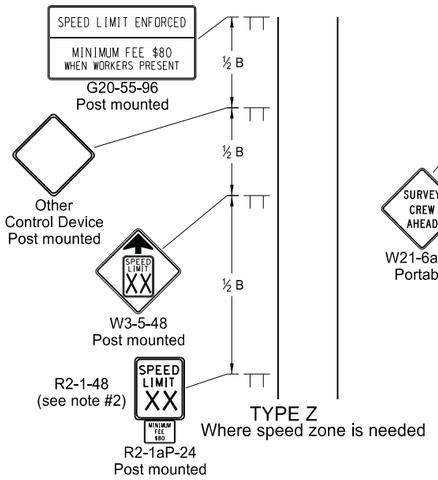
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

MISCELLANEOUS SIGN LAYOUTS

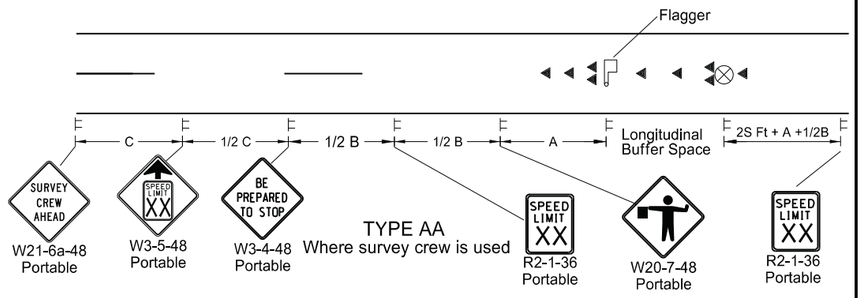
D-704-26



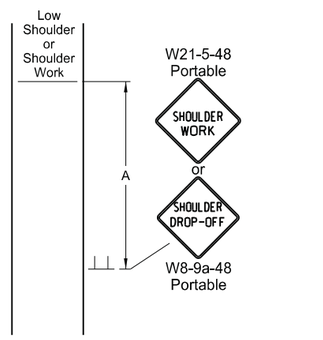
TYPE Y
Where haul road crosses highway outside major work area.



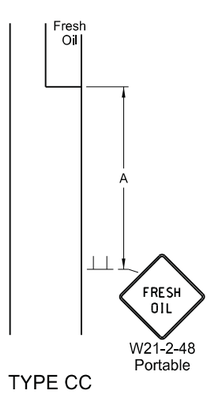
TYPE Z
Where speed zone is needed



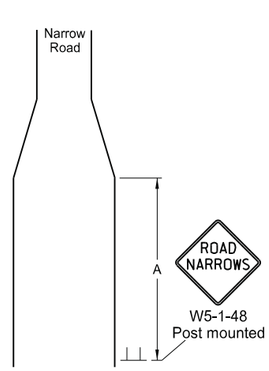
TYPE AA
Where survey crew is used



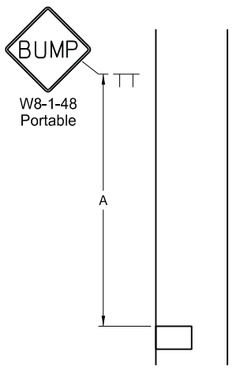
TYPE BB
Within major work area where sign conditions exist



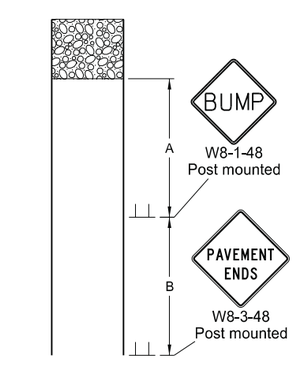
TYPE CC
Where sign conditions exist



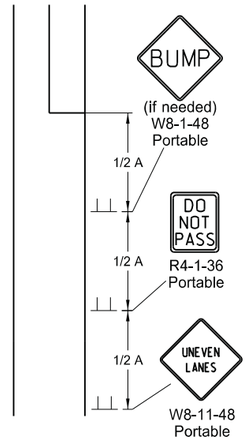
TYPE DD
Where sign conditions exist



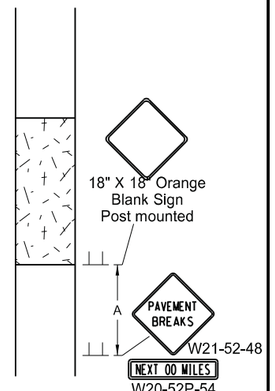
TYPE EE
Where sign conditions exist



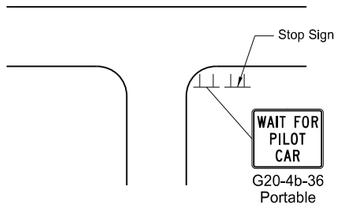
TYPE FF
Where sign conditions exist



TYPE GG
Where elevation difference exists between lanes



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



TYPE KK
At major intersections within pilot car control area

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

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

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

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

KEY

Sign Flagger Cones

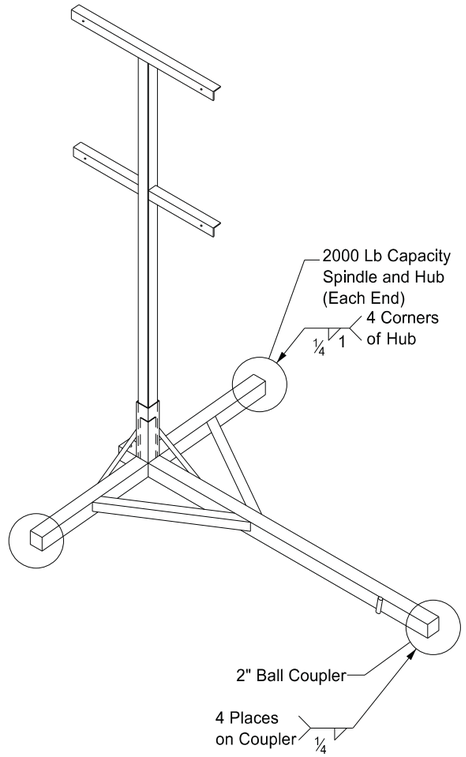
S = Numerical value of speed limit or 85th percentile.

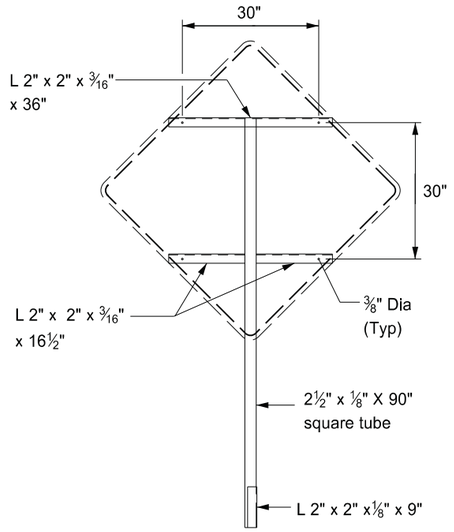
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers

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

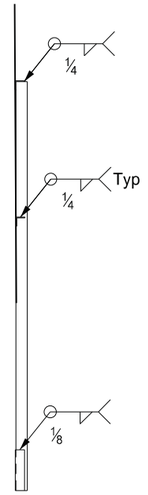
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



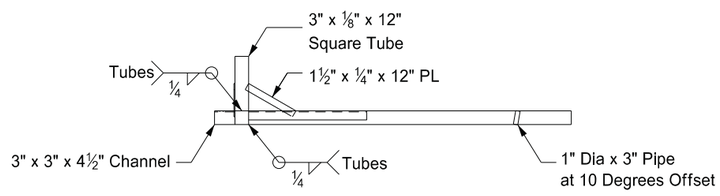


FRONT

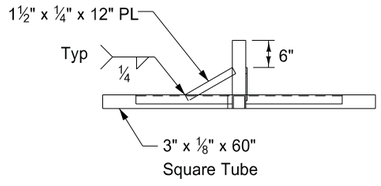


RIGHT

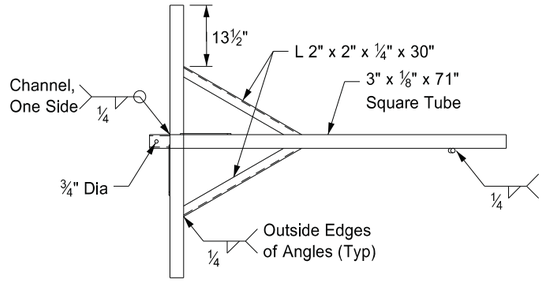
SIGN SUPPORT



FRONT



RIGHT



TOP

TRAILER

Notes:

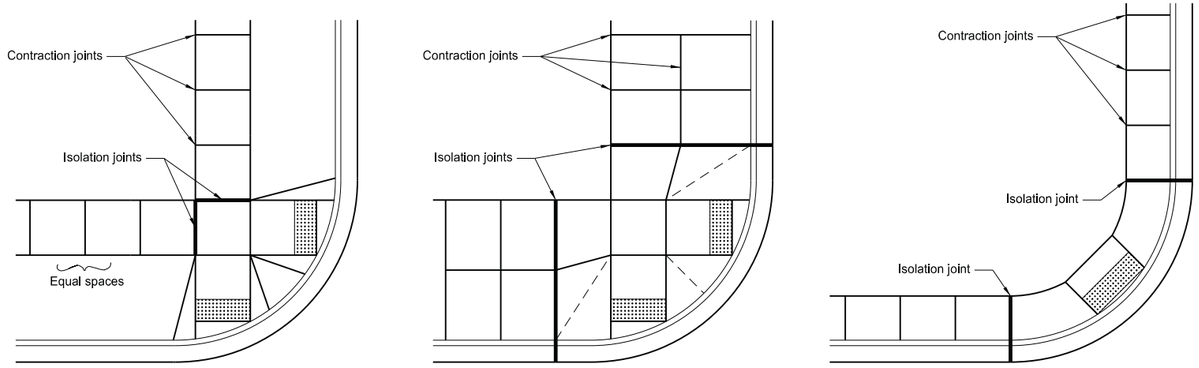
1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

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

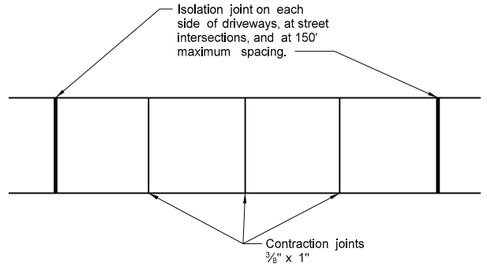
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930 , on 11/23/10 and the original document is stored at the North Dakota Department of Transportation

SIDEWALK

D-750-2



Typical Joint Layouts



NOTES:

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

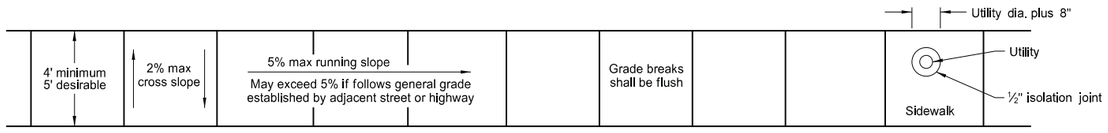
   Longitudinal contraction joints shall be used where the sidewalk width is 8' or greater, and shall be spaced at half the sidewalk width.

   The contraction joints may be sawed or a grooved joint, and shall be a minimum of 1/3 the depth of the concrete.

   When the sidewalk is adjacent to the curb & gutter, the sidewalk joint spacing shall be varied to match up with the curb & gutter joints.

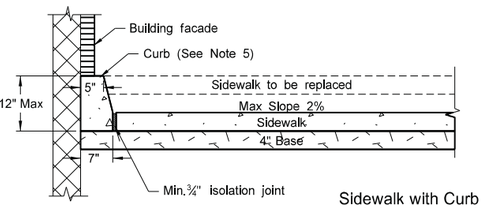
   Isolation joints should also be used between seperately poured concretes, or between old and new concrete.

   The cost for all labor, equipment, and material necessary to construct contraction and isolation joints shall be included in the price bid for sidewalk concrete.
3. 4" sidewalk concrete thickness to be used unless otherwise specified in the plans.
4. 4" base material thickness to be used unless otherwise specified in the plans. All labor and materials necessary to place the base material shall be included in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."
5. Landscaping is preferred to modify existing ground slope changes as needed. If not possible, such as adjacent buildings, a vertical curb may be used as shown in the detail below. The curb will be paid for at the unit price bid for the item "Curb - Type I" per lineal foot.

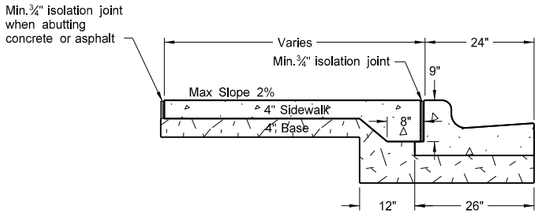


Sidewalk Width and Grade

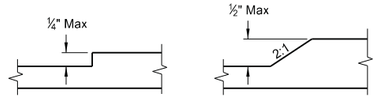
Utility Blockout



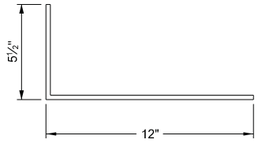
Sidewalk with Curb Detail
(Building face application)



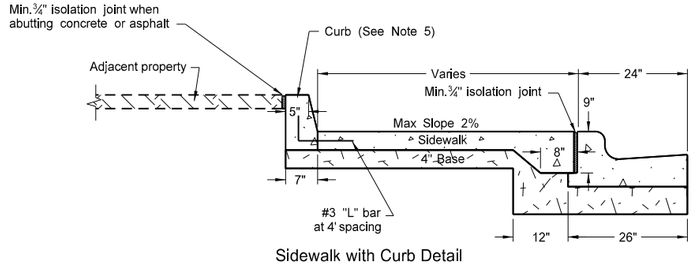
Sidewalk Detail
(Installed adjacent to curb and gutter)



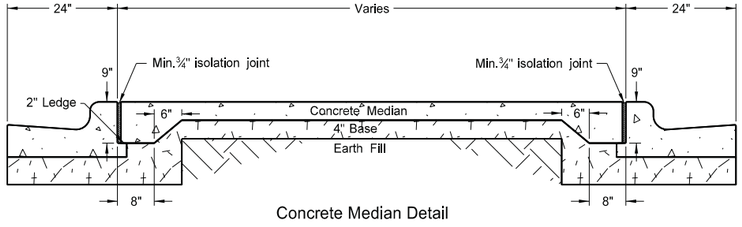
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



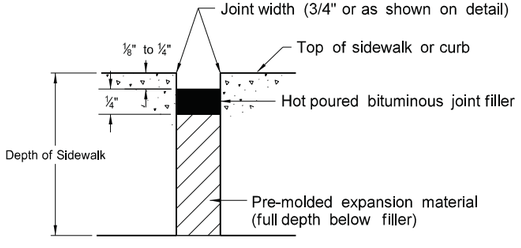
"L"Bar Detail
#3 Bar



Sidewalk with Curb Detail
(Adjacent property application)



Concrete Median Detail



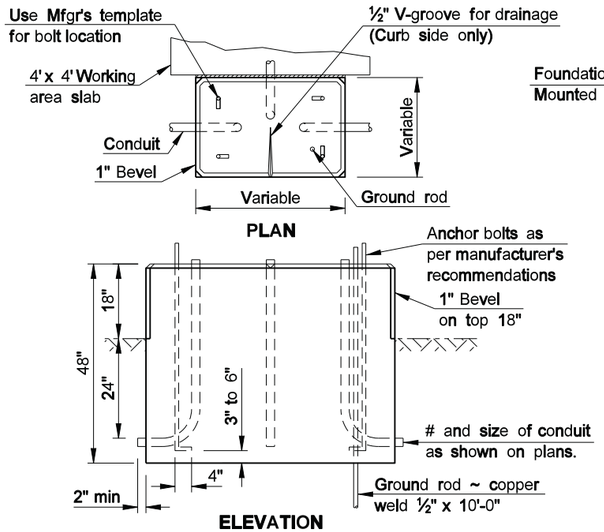
Typical Isolation Joint Seal
(longitudinal and transverse)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 11/26/13 and the original document is stored at the North Dakota Department of Transportation

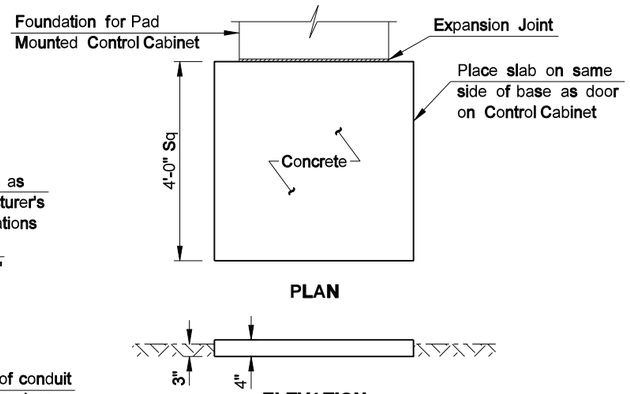
CONCRETE FOUNDATIONS
(TRAFFIC SIGNALS & HIGHWAY LIGHTING)

D-770-1



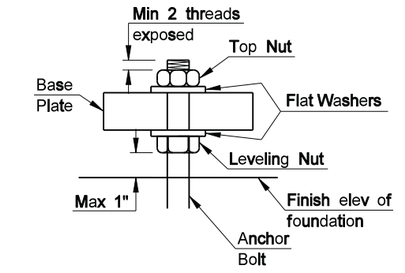
CONTROLLER CABINET FOUNDATION PAD MOUNT

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

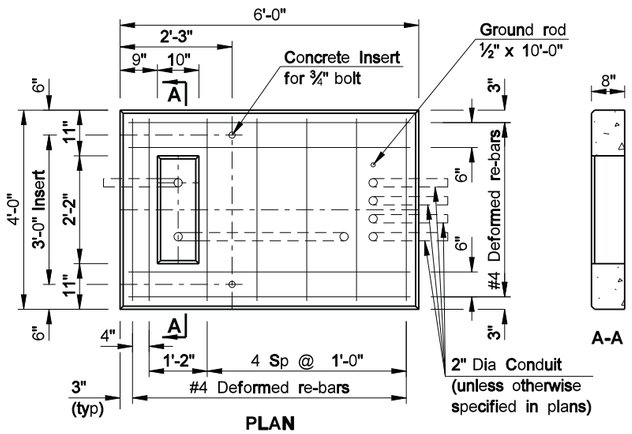


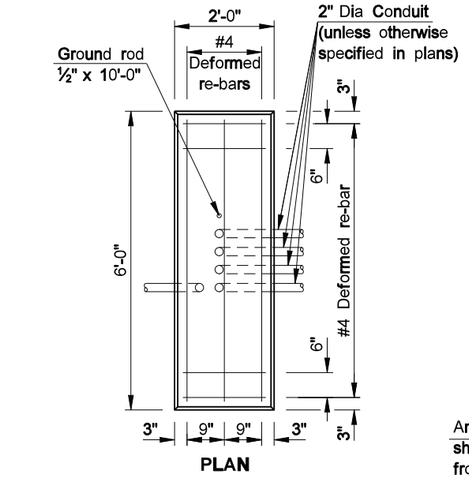
WORKING AREA SLAB

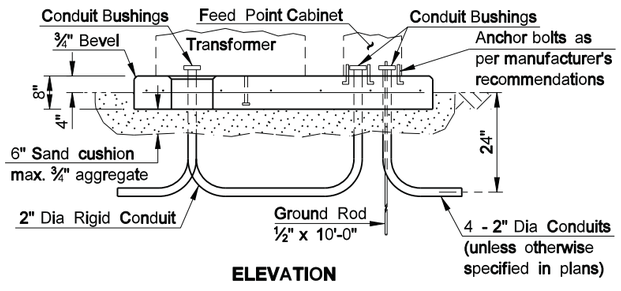
The Working Area Slab shall be installed where shown on the plans and shall not be bid separately but shall be included in the price bid for Concrete Foundation - Traffic Signals.



ANCHOR BOLT DETAIL

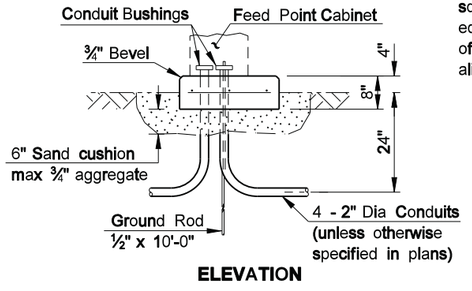






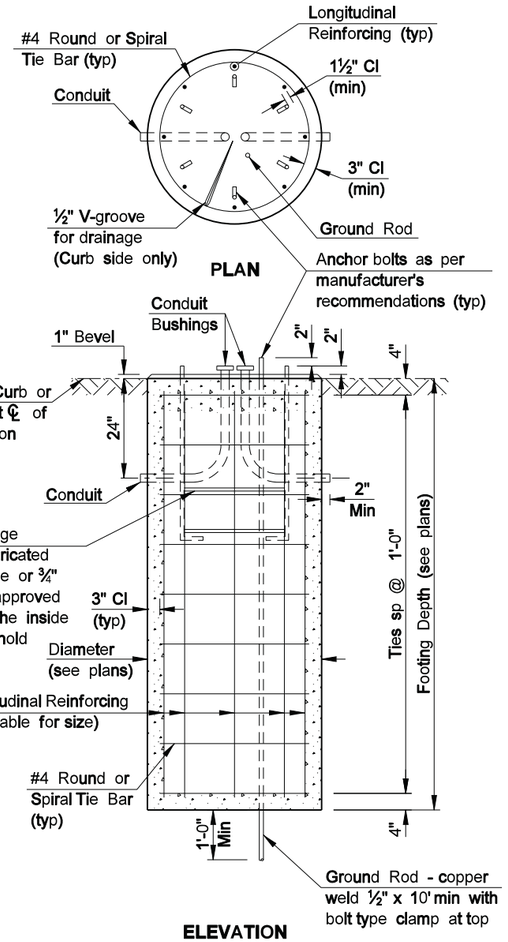
TRANSFORMER & FEED POINT CABINET FOUNDATION PAD MOUNT

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.

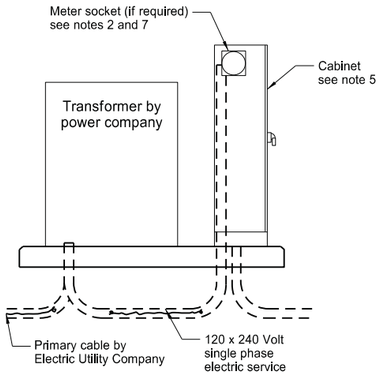
LIGHT & SIGNAL FOUNDATION TABLE	
FOOTING DEPTH (ft)	LONGITUDINAL REINFORCING
≤ 12	8 - #5
13 - 14	8 - #6
15 - 16	8 - #7
17 - 19	8 - #8

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

FEED POINTS
(ROADWAY LIGHTING)

D-770-2



Elevation

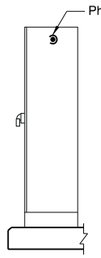
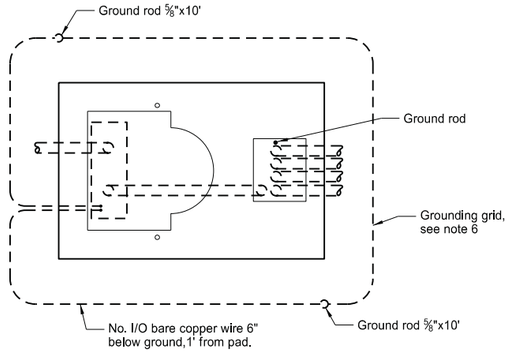
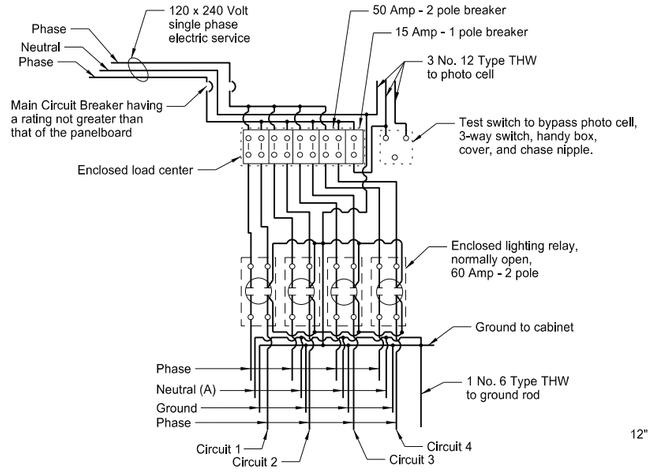


Photo Cell
Mounting Detail



Plan

Transformer and Feed Point Cabinet Pad Mounted



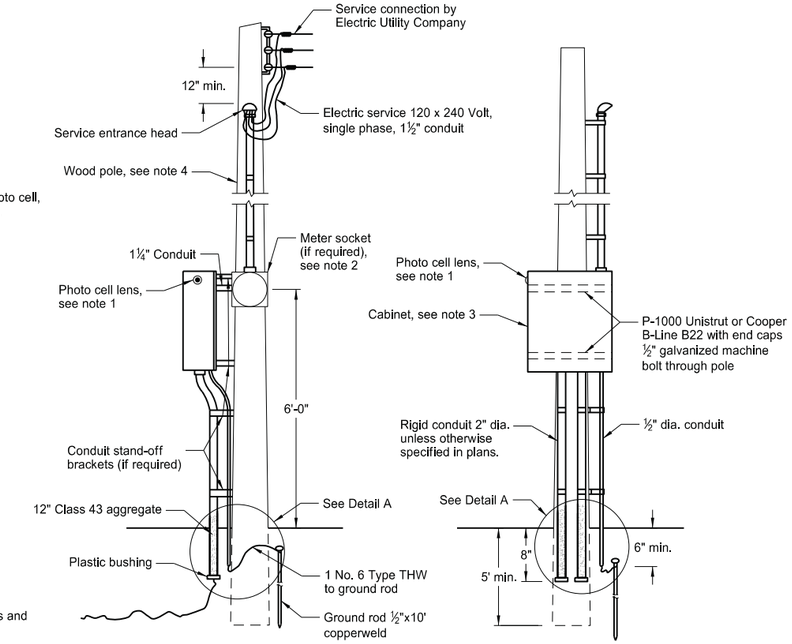
Feed Point Type IV

Type I feed point is similar to Type IV except only one electrical circuit, one 50 Amp - 2 pole breakers and one lighting relay, normally open, shall be installed.

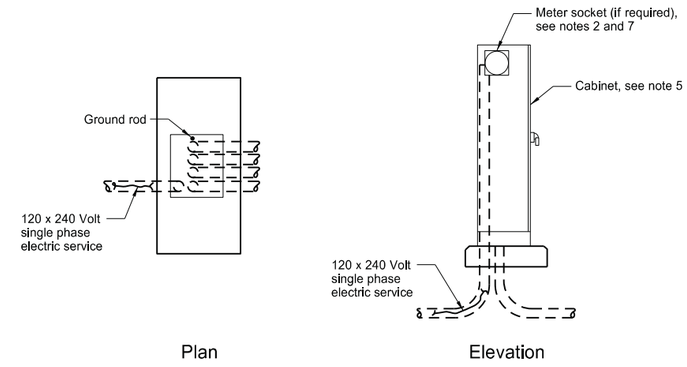
Type II feed point is similar to Type IV except only two electrical circuit, two 50 Amp - 2 pole breakers and two lighting relays, normally open, shall be installed.

Type III feed point is similar to Type IV except only three electrical circuits, three 50 Amp - 2 pole breakers and three lighting relays, normally open, shall be installed.

(A) Install when festoon circuit is required.

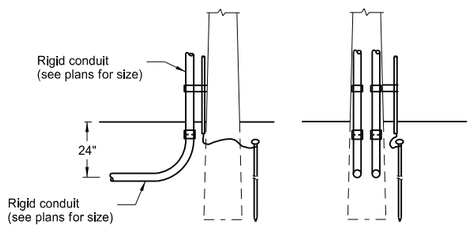


Feed Point Pole Mounted



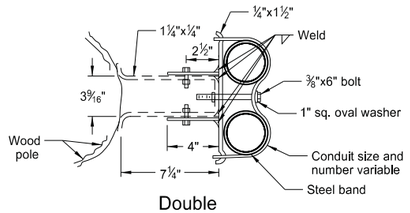
Plan Elevation

Feed Point Cabinet Pad Mounted

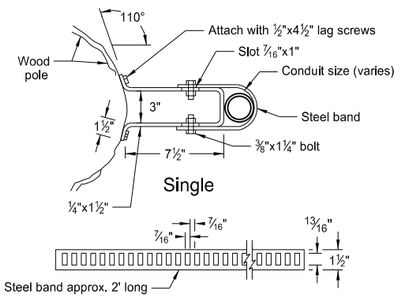


Detail A

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



Double



Conduit Standoff Bracket

The conduit standoff brackets may be omitted if not required by the local utility company.

Notes:

1. Photo Cell: The electrical contractor shall furnish and install the photoelectric cell. The photo lens shall face north.
2. Meter Socket: The contractor shall install the meter socket and trim if the meter is required by local Utility Company. Meter to be furnished and installed by Utility Company.
3. Pole Mounted Cabinet: Cabinet shall have lock drip shield, factory installed steel backing, stainless steel hardware, and side hinge door. Cabinet shall be shop coated with one coat of primer and have two coats of exterior gray enamel.

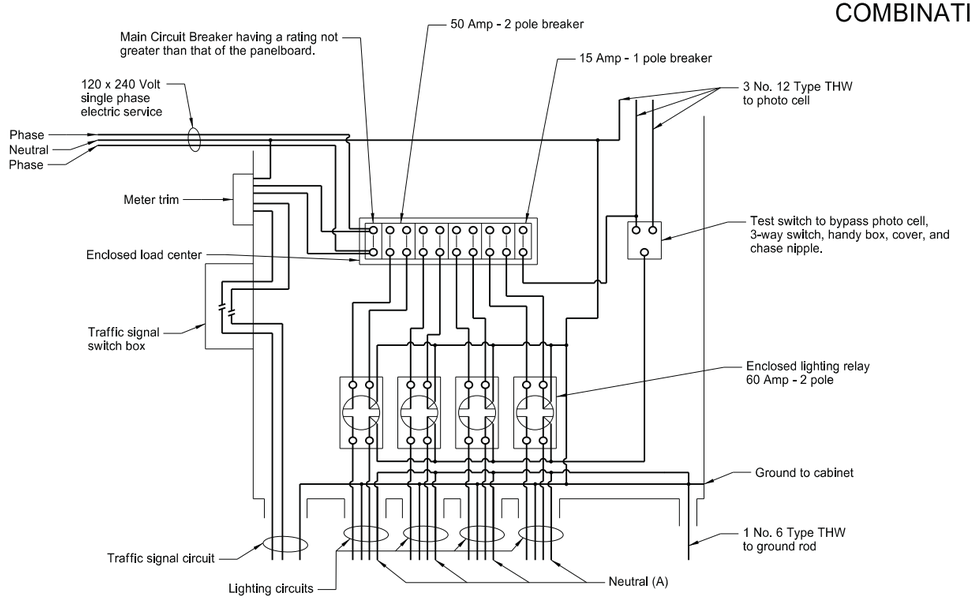
   Type I and II feed point shall be 30" high x 24" wide x 8" deep, Type III and IV feed point shall be 30" high x 42" wide x 10" deep or 36" high x 36" wide x 10" deep.
4. Wood Pole: Minimum 20' Class VII full length penta pressure treated wood pole. (if required, see layout sheets)
5. Pad Mounted Cabinet: Cabinet shall be 56" high x 26" wide x 14" deep. Minimum 12 gauge steel or aluminum with provisions for padlock. Cabinet shall be weatherproof. A steel cabinet shall have one coat of primer and two coats of exterior dark green enamel.
6. Grounding Grid: The grounding grid shall have a ground resistance not to exceed 25 ohms. This shall be obtained by one or more ⅝"x10' copperweld ground rods in parallel or series at two corners. Minimum distance between ground unit assemblies shall be 6'0".
7. Meter Location: The meter (if required) shall not be mounted on the same side of the cabinet as the photo cell.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 3

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 07/08/14 and the original document is stored at the North Dakota Department of Transportation

COMBINATION FEED POINT DETAILS

D-770-2A



Combination Lighting and Signal
Feed Point Type IV

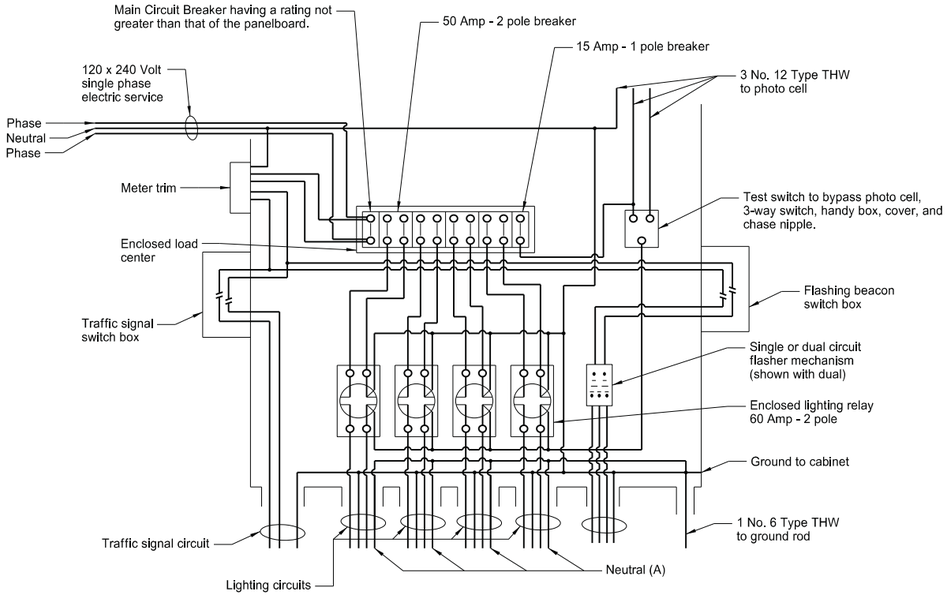
Notes:

Type I feed point is similar to Type IV except only one electrical circuit, one 50 Amp - 2 pole breaker and one lighting relay, normally open, shall be installed.

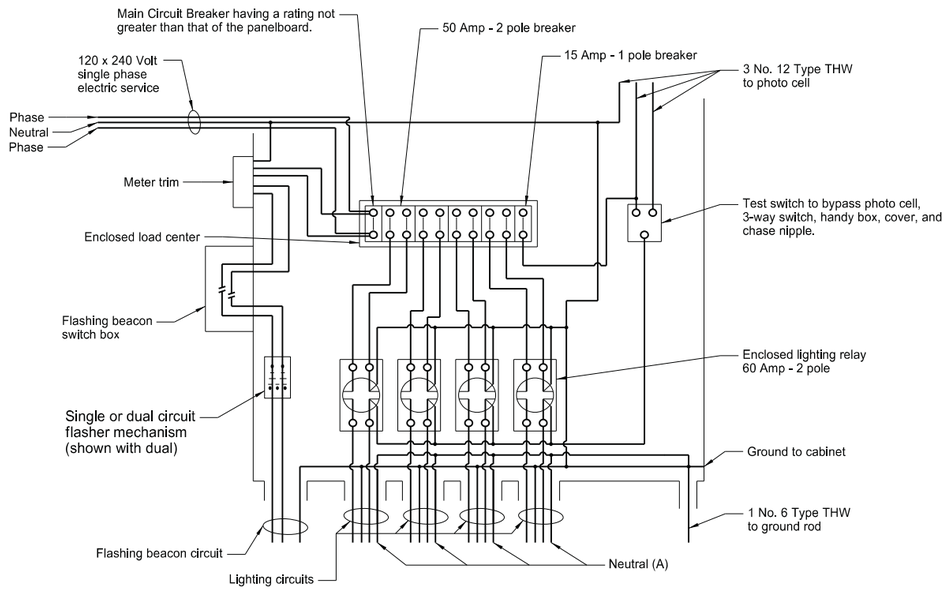
Type II feed point is similar to Type IV except only two electrical circuits, two 50 Amp - 2 pole breakers and two lighting relays, normally open, shall be installed.

Type III feed point is similar to Type IV except only three electrical circuits, three 50 Amp - 2 pole breakers and three lighting relays, normally open, shall be installed.

(A) Install when festoon circuits are required



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



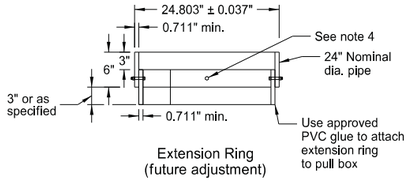
Combination Lighting and Flashing Beacon
Feed Point Type IV

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE

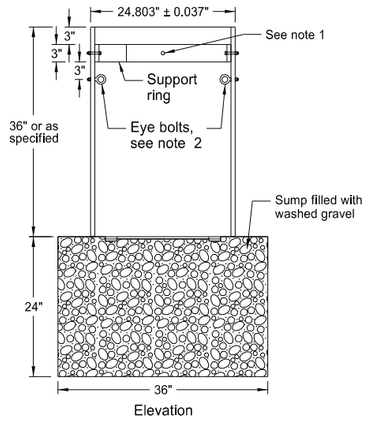
This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 10/08/13 and the original document is stored at the North Dakota Department of Transportation

PULL BOX DETAILS

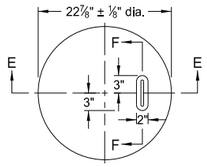
D-770-3



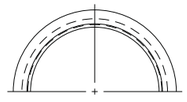
Extension Ring
(future adjustment)



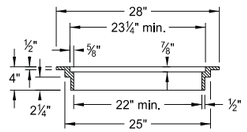
Elevation



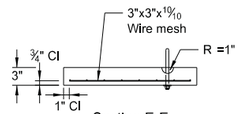
Concrete Cover



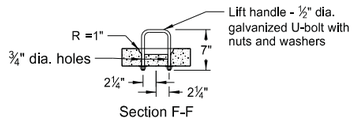
Half Top View



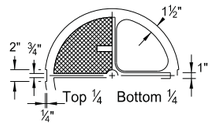
Section Frame

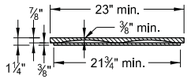


Section E-E



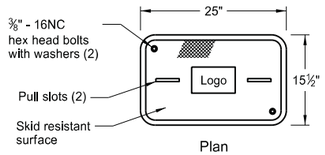
Section F-F



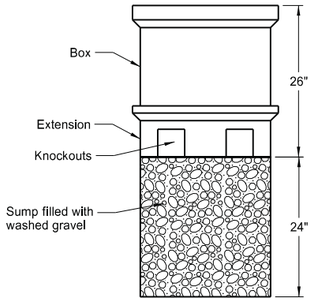


Section Cover

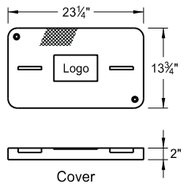
Cast Iron Frame and Cover



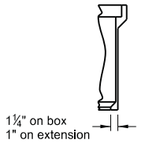
Plan



Elevation



Cover



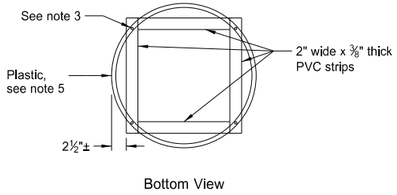
Polymer Concrete Pull Box

Note: Polymer concrete reinforced by a heavy weave fiberglass

Notes:

1. Place top of pull box flush with surfaced area and approximatley one inch above earth or sodded areas on level surfaces.
2. Pull box shall have at least one knockout per side.
3. Polymer Concrete pull box shall be Tier 22 as per ANSI / SCTE 77.

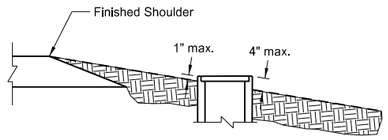
PVC Pull Box



Bottom View

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. Conduit holes located in barrel section shall be sized no more than 1" larger than size of conduit being used.
7. After pull box and conduit installation all inside walls and cover shall be made water tight to the satisfaction of the Engineer.
8. PVC pipe to meet requirements of ASTM F679T-1 or equal.
9. Hex head bolts and nuts shall be austenitic stainless steel. Other fasteners to be galvanized as per AASHTO M-232.
10. Concrete cover shall be coated on top and sides with an approved epoxy coating. The epoxy protective coating shall be light gray, clear, or neutral in color and shall be applied as recommended by the manufacturer. The surfaces of the concrete to which the epoxy protective coating is applied, shall be cleaned by wire brush and shall be dry before application.
11. Cast Iron Cover castings shall be gray iron as per AASHTO M 105, Class 35B.



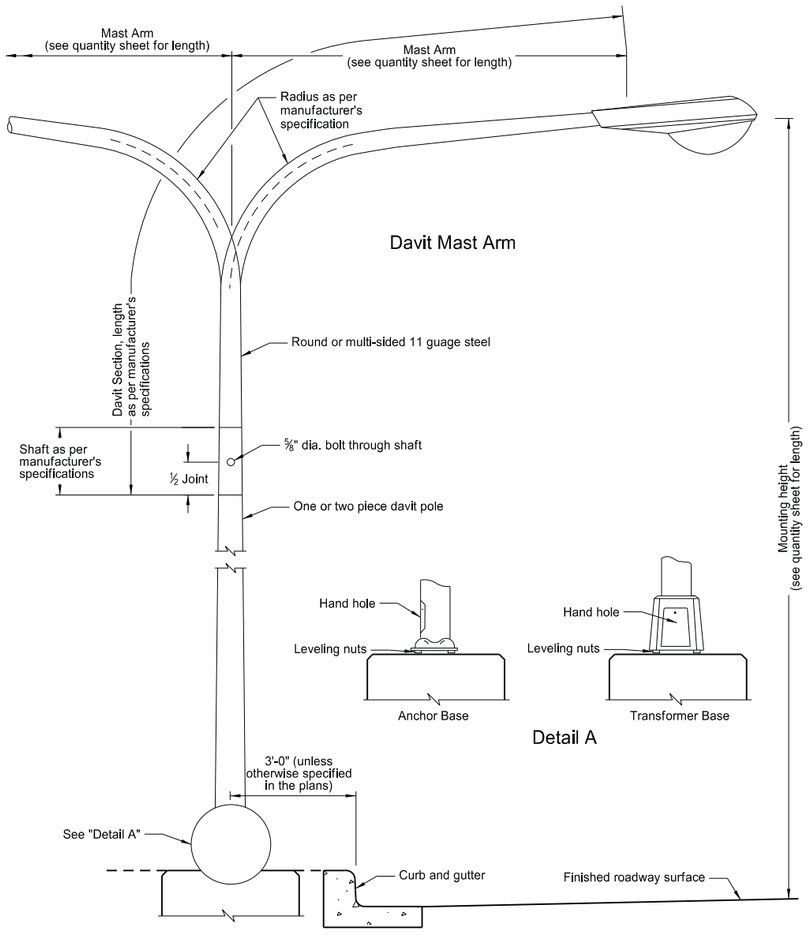
Typical Pull Box in Rural Section

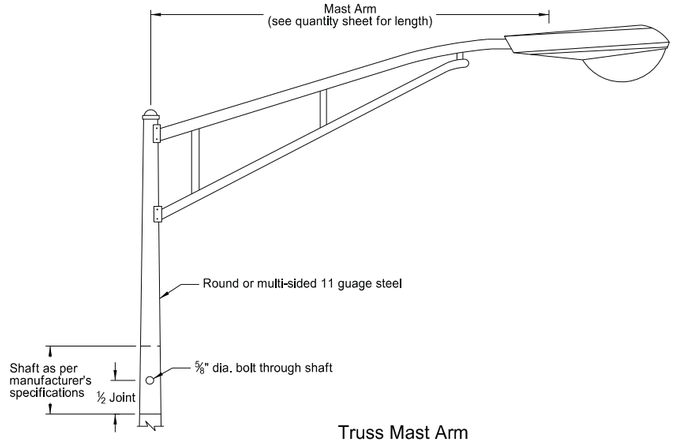
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE
7-8-14	Added Note 3

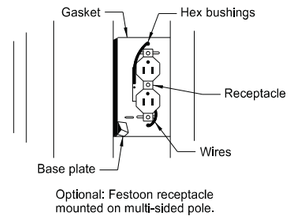
This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 07/08/14 and the original document is stored at the North Dakota Department of Transportation

LIGHT STANDARD DETAILS

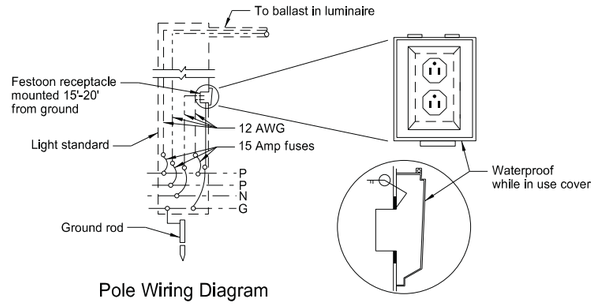
D-770-5







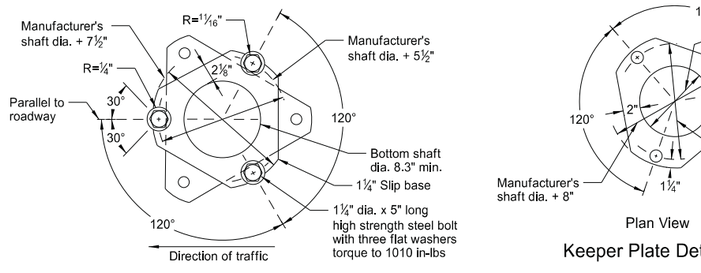
Optional: Festoon receptacle mounted on multi-sided pole.



Pole Wiring Diagram

Receptacle Mounting Detail (B)

(B) Receptacle shall be mounted on the side of the pole that faces the street side. Festoon Receptacle shall be installed only when specified in the plans.



Keeper Plate Detail (A)

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

Notes:

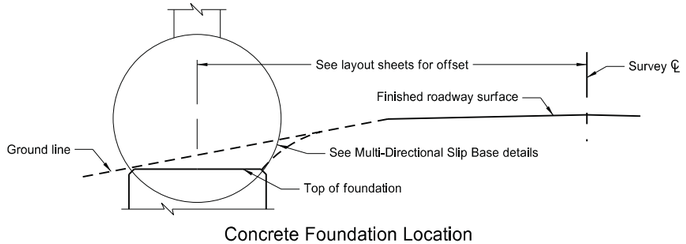
Light Standard Locations: The offset distance shall have a minimum offset from the curb face of 3 feet. Light standards that are placed in urban areas and where speeds are less than 30 mph, may be placed at 3 feet. Where speeds are 30 mph or more, light standards shall be placed at least 16 feet from the driving lane.

Steel Standards: Marred or scratched areas shall be touched up after erection.

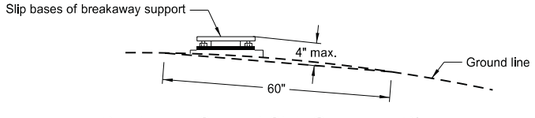
Luminaire: Shall be internal ballast-constant wattage 120x240 voltage. See layout sheets for type of luminaire, wattage, I.E.S. distribution, and operating system.

Fusing: Fusing in base, see specifications.

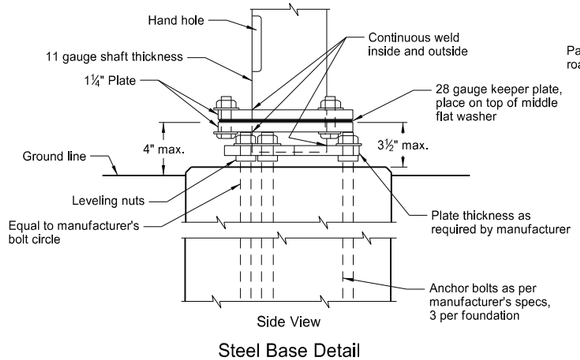
Slip Base Bolt Torque Procedure:
1. Tighten all bolts the maximum possible with 12" to 15" wrench to bed washers and to clean bolt threads, then loosen.
2. Retighten bolts with a systematic order to prescribed torque.
3. Loosen each bolt and retighten to prescribed torque in the same order as initial retightening.
4. Burr threads of junction with nut using center punch to prevent nut loosening.



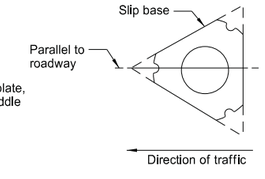
Concrete Foundation Location



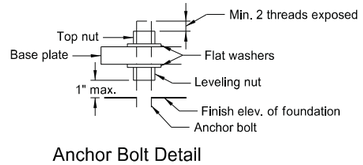
Breakaway Support Stub Clearance Diagram



Steel Base Detail



Slip Base Placement Detail



Anchor Bolt Detail

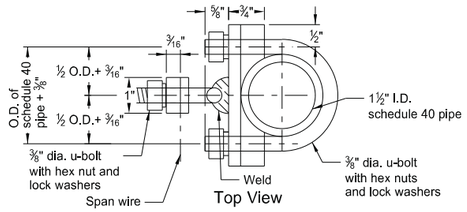
Multi-Directional Slip Base

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-8-13	
REVISIONS	
DATE	CHANGE

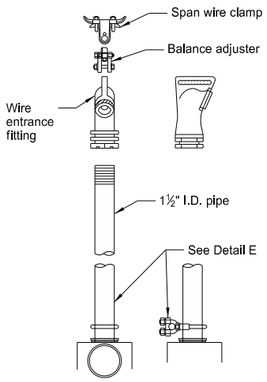
This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 10/08/13 and the original document is stored at the North Dakota Department of Transportation

FLASHING BEACON

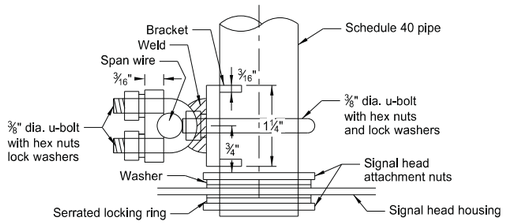
D-772-7



Top View

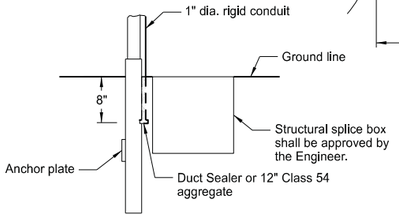


Detail D



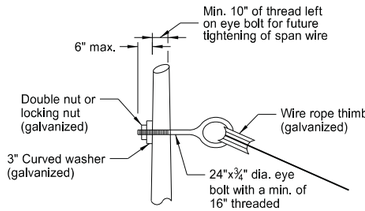
End View

Detail E

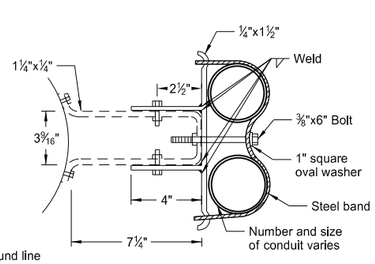


Detail C

Detail where more than one set of wires pass through Flashing Beacon location.

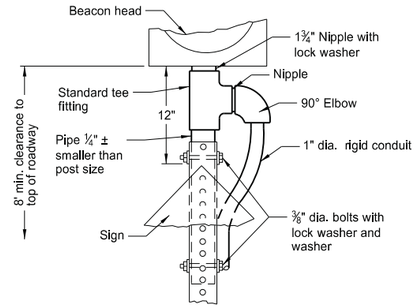


Eye Bolt Detail

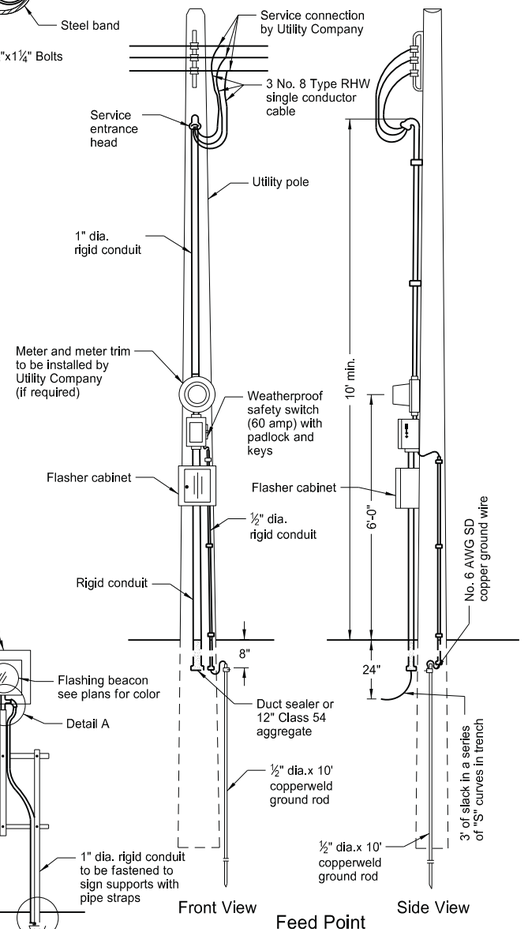


Conduit Standoff Bracket

To be used when required by local Utility Company

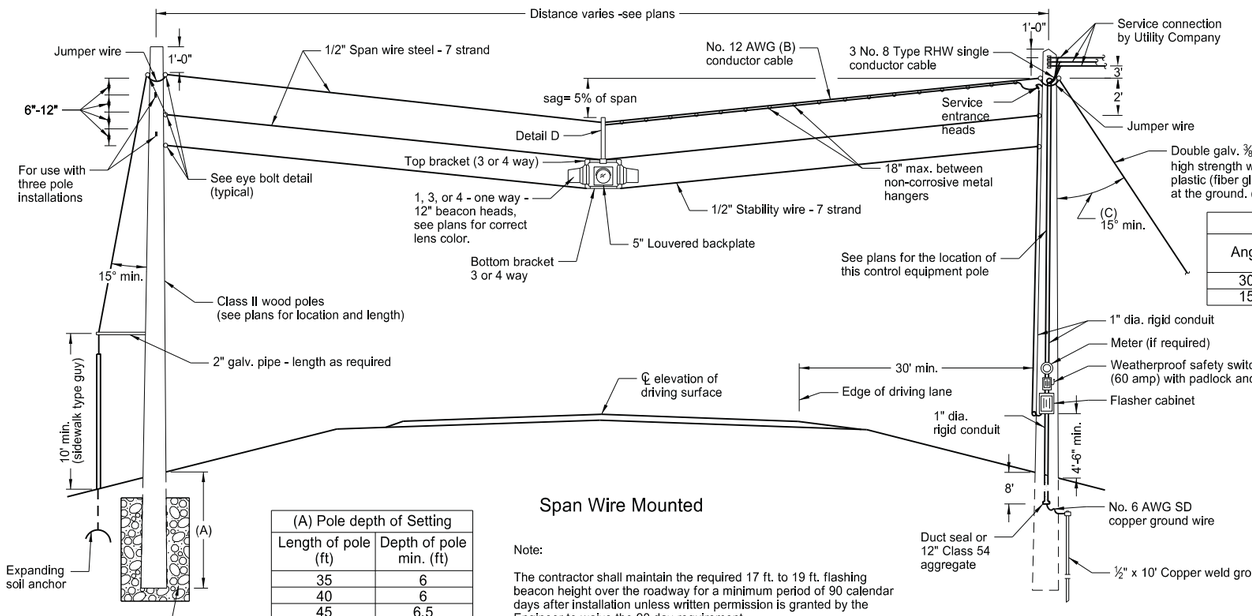


Detail A



Feed Point (Post Mounted)

Flasher shall be operated on 120 volts.



Span Wire Mounted

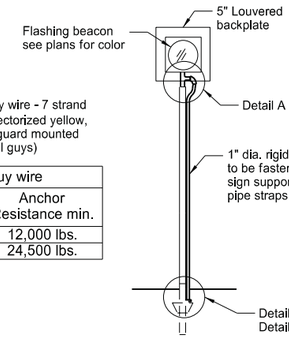
(C) Guy wire	
Angle	Anchor Resistance min.
30°	12,000 lbs.
15°	24,500 lbs.

(A) Pole depth of Setting	
Length of pole (ft)	Depth of pole min. (ft)
35	6
40	6
45	6.5
50	7
55	7.5

(B) See layout for number

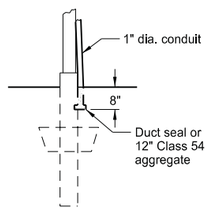
Note:

The contractor shall maintain the required 17 ft. to 19 ft. flashing beacon height over the roadway for a minimum period of 90 calendar days after installation unless written permission is granted by the Engineer to waive the 90 day requirement.



Post Mounted

For sign and sign support details, see standard drawings.



Detail B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
7-8-14	Span wire size and sag

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 07/08/14 and the original document is stored at the North Dakota Department of Transportation