DESIGN DATA - ND 810 (RP 2.157 - RP 2.773)				
Traffic	Average Daily			Max.Hr.
Current 2013	Pass: 10,470	Trucks: 355	Total: 10,805	1,085
Forecast 2033	Pass: 14,135	Trucks: 500	Total: 14,635	1,465
Clear Zone Distance: 14 FT		Design Speed: 40		
Minimum Sight Dist. for Stopping: 305 LF		Bridges:		
Limited Access Control				
Pavement Design Life				

DESIGN DATA - ND 810 (RP 2.773 - RP 2.918)				
Traffic	Average Daily			Max.Hr.
Current 2013	Pass: 15,805	Trucks: 475	Total: 16,280	1,630
Forecast 2033	Pass: 21,340	Trucks: 710	Total: 22,050	2,205
Clear Zone Distance: 14 FT		Design Speed: 40		
Minimum Sight Dist. for Stopping: 305 LF		Bridges:		
Limited Access Control				
Pavement Design Life				

DESIGN DATA for ND 810 (RP 2.918 - RP 4.176)				
Traffic	Average Daily			Max.Hr.
Current 2013	Pass: 9,935	Trucks: 340	Total: 10,275	1,030
Forecast 2033	Pass: 13,415	Trucks: 510	Total: 13,925	1,395
Clear Zone Distance: 14 FT		Design Speed: 40		
Minimum Sight Dist. for Stopping: 305 LF		Bridges:		
Limited Access Control				
Pavement Design Life				

DESIGN DATA - ND 810 (RP 4.176 - RP 4.563)				
Traffic	Average Daily			Max.Hr.
Current 2013	Pass: 5,495	Trucks: 330	Total: 5,825	585
Forecast 2033	Pass: 7,420	Trucks: 495	Total: 7,915	795
Clear Zone Distance: 12 FT		Design Speed: 40		
Minimum Sight Dist. for Stopping: 305 LF		Bridges:		
Limited Access Control				
Pavement Design Life				

DESIGN DATA - ND 810 (RP 4.563 - RP 5.741)				
Traffic	Average Daily			Max.Hr.
Current 2013	Pass: 5,460	Trucks: 765	Total: 6,225	625
Forecast 2033	Pass: 7,375	Trucks: 1,140	Total: 8,515	855
Clear Zone Distance: 18 FT		Design Speed: 50		
Minimum Sight Dist. for Stopping: 425 LF		Bridges:		
Limited Access Control				
Pavement Design Life				

DESIGN DATA for I-94				
Traffic	Average Daily			Max.Hr.
Current 2013	Pass: 7,020	Trucks: 745	Total: 7,065	480
Forecast 2033	Pass: 10,460	Trucks: 1,485	Total: 11,945	1,445
Clear Zone Distance: 22 FT		Design Speed: 50		
Minimum Sight Dist. for Stopping: 425 LF		Bridges: N/A		
Limited Access Control				
Pavement Design Life 10 (years)				

JOB # 24
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NHU-1-810(024)002
NHU-1-094(166)925
FHWA Limited Involvement
Burleigh County
Bismarck Expressway
Washington Street to Rosser Avenue
Micro-Surfacing

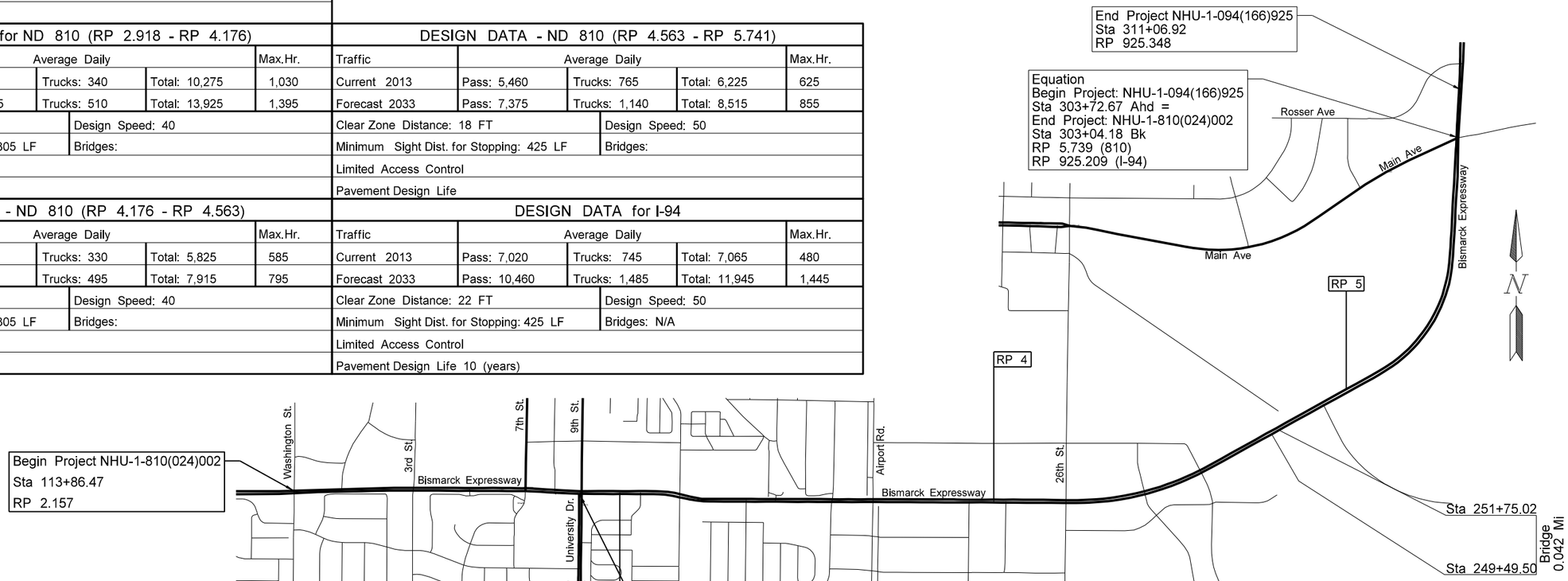
	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	20328	1	1
		NHU-1-094(166)925	20329		

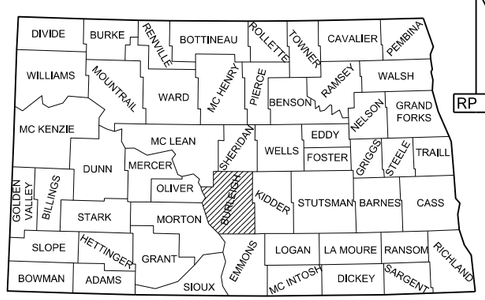
GOVERNING SPECIFICATIONS:

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NHU-1-810(024)002\Washington St to Main Ave	3.4856	3.5830
NHU-1-094(166)925\Main Ave to Rosser Ave	0.1391	0.1391

0.0435 Mi deducted for RR Structure and approach slabs.
0.0539 Mi deducted for 9th St. concrete section.





STATE COUNTY MAP

DESIGNERS

Dean Schloss /s/

APPROVED DATE 08/15/13

Kirk J. Hoff /S/
Bismarck District Engineer
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 08/15/13

Kirk J. Hoff /S/
NDDOT DIV-DIST OR CONSULTANT FIRM

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8/16/2013 7:44:16 AM dschloss G:\PROJECT\Dean\Design\NHU-1-810(024)002\001TS_001_Title.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-810(024)002 NHU-1-094(166)925	2	1

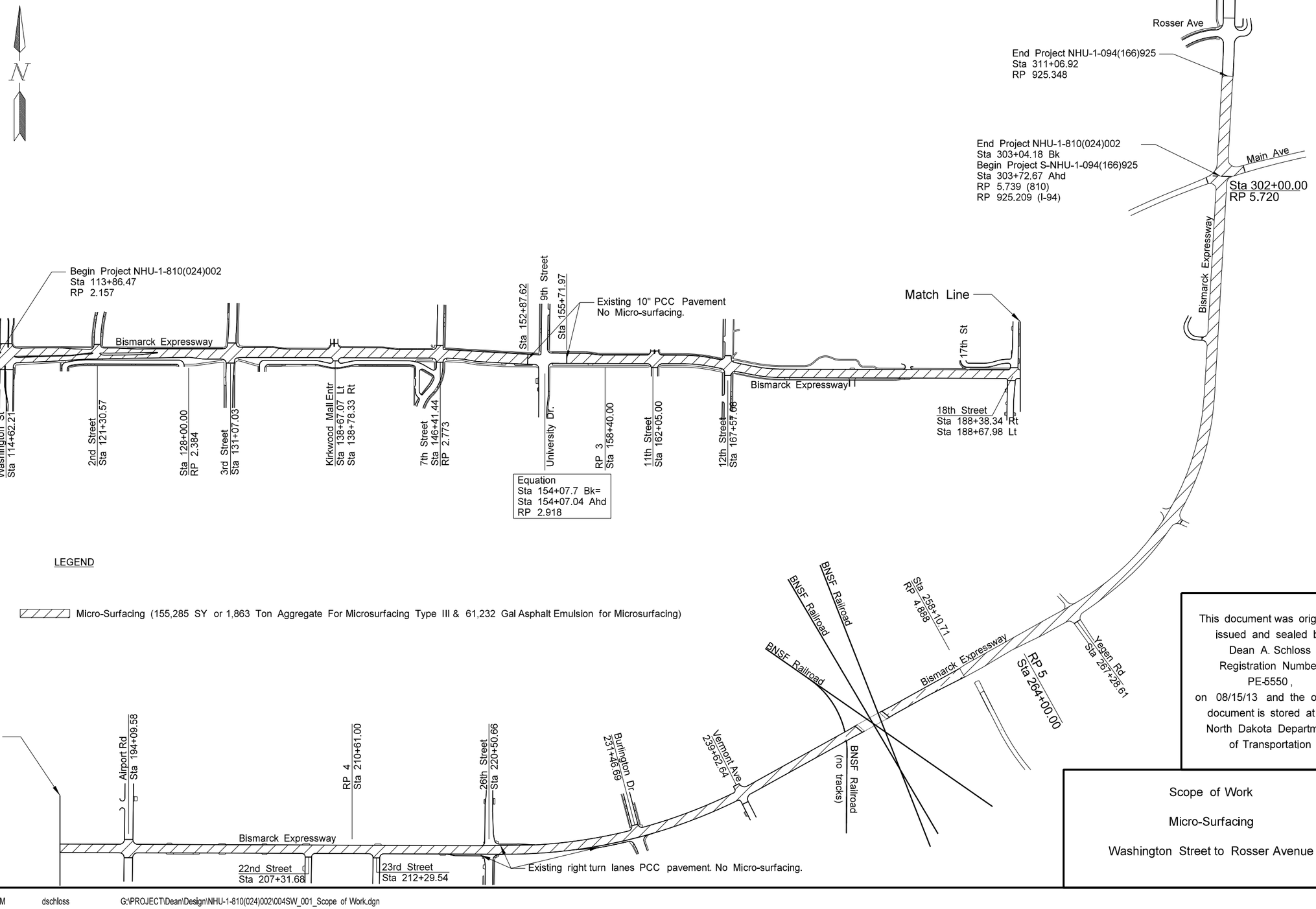
TABLE OF CONTENTS

LIST OF STANDARD DRAWINGS

Standard No.	Description
D-20-1 through 32	NDDOT Abbreviations, Line styles, and Symbols
D-704-3	Lane Markers (Spotting Tab, Seal Jobs Only)
D-704-7,8	Breakaway Systems For Construction Zone Signs
D-704-9,10,11	Construction Sign Details
D-704-13	Barricade Details and Channelizing Devices
D-704-14	Construction Sign and Barricade Assembly Details
D-704-15,20,22,26	Construction Sign and Barricade Location Details
D-704-23	Construction Sign and Barricade Location Details – Lane Closure
D-704-27	Traffic Control for Moving Operations on Conventional Highways (Pvmt Marking)
D-704-28	Traffic Control for Mobile Operation
D-704-34	Sign Layout for One Lane Closure
D-704-50	Portable Sign Support Assembly
D-762-1	Pavement Marking Message Detail
D-762-4	Pavement Marking
D-762-6	Short Term Pavement Marking

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	4	1
		NHU-1-094(166)925		

SCOPE OF WORK



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Scope of Work

Micro-Surfacing

Washington Street to Rosser Avenue

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-810(024)002 NHU-1-094(166)925	6	1

NOTES

GENERAL NOTES

105-110 **PAVEMENT SWEEPING:** The Contractor shall sweep pavements before the micro surface operation. For this sweeping, the Contractor shall furnish and utilize a vacuum type sweeper to control the dust. All costs connected with this work shall be included in the price bid of other items.

105-P01 **NOISE ORDINANCE:** A variance to the city of Bismarck's noise ordinance has been obtained by the NDDOT to allow Contractor to perform work during non-peak hours. Non-peak hours are defined in plan note 704-P03.

105-P02 **FIRE STATION ACCESS:** During all phases of construction, access shall be maintained to and from the Fire Station located at 855 East Bismarck Expressway. The fire station contact numbers will be provided at the pre-job conference.

105-P03 **WORK RESTRICTIONS:** During the McQuade softball tournament weekend, no work will be allowed on Bismarck Expressway from Airport Road west. All traffic control devices must be moved off the driving lanes. All construction signs shall be covered or removed from the roadway during this time. All costs to move the traffic devices from the lanes and cover the construction signs shall be included in the unit price bid for traffic control signs.

Work adjacent to schools shall be completed while school is not in session.

105-P04 **CONTRACTOR COORDINATION:** The city of Bismarck will have projects underway within the project limits at the same time this project is being constructed. Contractor work zones may overlap. Contractors should coordinate work efforts accordingly.

107-P01 **HAUL ROAD RESTRICTIONS:** No paved roads off the state system will be used as haul roads unless the Contractor obtains written approval from the local government agency or agencies and the Engineer. The Engineer will determine what government agency or agencies approvals are appropriate.

704-P01 **MAINTAINING ACCESS:** The Contractor will be responsible for providing reasonable access to all residential dwelling and business establishments adjacent to this project.

704-P02 **TRAFFIC CONTROL SUPERVISOR:** Traffic control supervisor shall be provided on this project. Traffic control supervisor will be required to be on site while work is in progress.

704-P03 **TRAFFIC CONTROL PHASING:** All work shall be completed during the non-peak hours. All traffic lanes shall be open to traffic at the end of each non-peak hour cycle.

Non-peak hours:
Monday 6:30 PM to Tuesday 6:30 AM (12 hrs)
Tuesday 6:30 PM to Wednesday 6:30 AM (12 hrs)
Wednesday 6:30 PM to Thursday 6:30 AM (12 hrs)
Thursday 6:30 PM to Friday 6:30 AM (12 hrs)
Friday 6:30 PM to Saturday 10:00 AM (15.5 hrs)
Saturday 6:30 PM to Monday 6:30 AM (36 hrs)

Liquidated damages for failure to open traffic lanes in the construction areas restricted to work only in non-peak hours shall be assessed at a charge of $500 per lane per hour for each 1000 FT of lane closure. Any fraction of 1000 FT or hour, shall be considered a full 1000 FT or hour. Charges will be assessed when lane closures are in place, whether or not work is in progress and regardless of weather conditions. The Engineer, in his/her sole discretion, reserves the right to waive liquidated damages charges in extenuating circumstances. Liquidated damages for lane closures in restricted areas may run concurrently with liquidated damages associated with failure to complete all work by the required completion date.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-810(024)002 NHU-1-094(166)925	6	2

NOTES

704-P04 **WORK ZONE TRAFFIC CONTROL/INTERSECTION PARAMETERS:** The contractor shall develop a work zone traffic control plan using the parameters listed below. This plan must be submitted for approval 7 days before the micro surfacing begins.

- Traffic will be maintained on Bismarck Expressway at all times for the length of the project.
- Micro surfacing shall be applied on one lane of roadway per non-peak cycle, except as described below.
  - Turn lanes may be micro surfaced in the same non-peak cycle as the adjacent through lanes.
  - Turn lanes will be micro surfaced prior to micro surfacing the adjacent through lane.
  - Additional lanes may be done during the 36 hour non-peak cycle from Saturday at 6:30 PM to Monday at 6:30 AM.
- Cross traffic at signalized intersections may be closed for short durations.
  - No adjacent signalized crossroads shall be closed at the same time.
  - Flaggers shall be used to direct traffic around or through the intersections as work progresses across each intersection.
- The contractor shall coordinate with business/property owners at all non-signalized intersections to minimize impacts.

704-P05 **TRAFFIC CONTROL DEVICES:** Traffic control for the micro surfacing shall consist of a single lane closure and flagging as needed. Traffic Control Devices shall comply with the following Standard Drawings.

D-704-7 and D-704-8, Breakaway Systems for Construction Zone Signs
D-704-9, D-704-10, D-704-11 Construction Sign Details
D-704-13, Barricade Details and Channelizing Devices
D-704-14, Construction Sign and Barricade Assembly Details
D-704-15, Construction Sign and Barricade Location Details
D-704-20, Layout Type G
D-704-22, Layouts Type K, and L for Construction Trucks Hauling Material
D-704-23, Type Q for detouring traffic on city streets
D-704-28, for pavement marking operations
D-704-34, For microsurfacing operation
D-704-50, Portable Sign Support Assembly

The traffic control quantities have been developed on the basis that the project will be constructed using a single lane closure. No extra compensation will be allowed for relocation due to work progression.

Any additional traffic control devices required by Contractor's operation shall be at his own expense.

704-P06 **SIGN COVERS:** Existing signs requiring covering shall be covered with durable covering such as plywood or pressed board so that no damage is done to the sign face. If any damage is done, the signs shall be replaced at the contractor's expense. Alternate methods of covering may be used if approved by the engineer. The cost of providing material and covering existing signing shall not be did separately but shall be included in the traffic control items.

420-P01 **FOG COAT APPLICATION**: A Fog Coat application of SS1H, CSS1H, or MS1 will be applied to the sloughs at the residual rate as shown in the Basis of Estimate, or as otherwise directed by the Engineer. The dilution rate of the Fog Coat will be 50% (water) and 50% emulsified asphalt or as directed by the Engineer. Dilution at the supplier will be required.

420-P02 **FOG COAT FOR ATR LOCATION:** An Automated Traffic Recorder (ATR) located at RP 168.7 will not be micro surfaced. A Fog Coat application of SS1H, CSS1H or MS1 will be applied over the loop sensor area at the residual rate as shown in the Basis of Estimate, or as otherwise directed by the Engineer. This area includes 100 feet before and 100 feet after the ATR site and the entire width of the roadway. The dilution rate of the Fog Coat will be 50% (water) and 50% emulsified asphalt or as directed by the Engineer. Dilution at the supplier will be required.

762-P01 **PAVEMENT MARKING: "**Short Term" and "Pavement Marking Paint" bid items will be installed at the same locations shown in the permanent striping layout in section 120.

762-P02 **PAVEMENT MARKING:** The micro surfacing shall be allowed to cure a minimum of 14 days before placing the "Pavement Marking Paint" bid items.

762-P03 **EPOXY PAVEMENT MARKING:** The Epoxy Pavement Marking will not be applied this construction season. It shall be applied by June 1 of the following construction season.

950-P01 **MATERIALS:** All aggregates and emulsified asphalt delivered to the self propelled micro surfacing machine shall be weighed on a certified scale approved by the engineer. Any partial loads remaining at the end of the day or at the end of the project shall be weighed again.

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-810(024)002	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	NHU-1-810(024)002	NHU-1-094(166)925	TOTAL
103	0100	CONTRACT BOND	L SUM	0.95	0.05	1
420	0109	SS1H OR CSS1H EMULSIFIED ASPHALT	GAL	184	17	201
421	0011	AGGREGATE FOR MICROSURFACING TYPE III	TON	1,774	90	1,864
421	0020	ASPHALT EMULSION FOR MICROSURFACING	GAL	58,280	2,952	61,232
702	0100	MOBILIZATION	L SUM	0.95	0.05	1
704	0100	FLAGGING	MHR	700	50	750
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,555	323	1,878
704	1052	TYPE III BARRICADE	EA	66	4	70
704	1060	DELINEATOR DRUMS	EA	21		21
704	1067	TUBULAR MARKERS	EA	315	25	340
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1		1
762	0103	PVMT MK PAINTED-MESSAGE	SF	1,984	64	2,048
762	0112	EPOXY PVMT MK MESSAGE	SF	1,984	64	2,048
762	0113	EPOXY PVMT MK 4IN LINE	LF	63,810	4,102	67,912
762	0114	EPOXY PVMT MK 6IN LINE	LF	3,990		3,990
762	0115	EPOXY PVMT MK 8IN LINE	LF	10,909	478	11,387
762	0117	EPOXY PVMT MK 24IN LINE	LF	1,615	89	1,704
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	63,810	4,102	67,912
762	0432	SHORT TERM 6IN LINE-TYPE NR	LF	3,990		3,990
762	0434	SHORT TERM 8IN LINE-TYPE NR	LF	10,909	478	11,387
762	0436	SHORT TERM 24IN LINE-TYPE NR	LF	1,615	89	1,704
762	0442	SHORT TERM MESSAGE-TYPE NR	SF	1,984	64	2,048
762	1104	PVMT MK PAINTED 4IN LINE	LF	63,810	4,102	67,912
762	1106	PVMT MK PAINTED 6IN LINE	LF	3,990		3,990
762	1108	PVMT MK PAINTED 8IN LINE	LF	10,909	478	11,387
762	1124	PVMT MK PAINTED 24IN LINE	LF	1,615	89	1,704

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	10	1
		NHU-1-094(166)925		

Basis of Estimate

NHU-1-810(024)002

Description	Unit	Width (FT)	Area (SY)	Total
Aggregate for Micro Type III (24 lb/SY) Mainline	Ton	60-75	147,799	1,774
Asphalt Emulsion for Micro (14% of Aggregate / 8.521 lb/Gal) Mainline	Gal	60-75		58,280

Square yard area includes intersection and turn lanes

NHU-1-094(166)925

Description	Unit	Width (FT)	Area (SY)	Total
Aggregate for Micro Type III (24 lb/SY) Mainline	Ton	75	7,486	90
Asphalt Emulsion for Micro (14% of Aggregate */8.521 lb/Gal) Mainline	Gal	75		2,952

Square yard area includes intersection and turn lanes

Description	Unit	Width (ft)	Area (SY)	Total
Fog Coat - SS1H or CSS1H (0.05 Gal/SY) Slough	Gal	2	1,998	100
Fog Coat - SS1H or CSS1H (0.05 Gal/SY) ATR Location	Gal	75	1,667	84

Description	Unit	Width (ft)	Area (SY)	Total
Fog Coat - SS1H or CSS1H (0.05 Gal/SY) Slough	Gal	2	327	17

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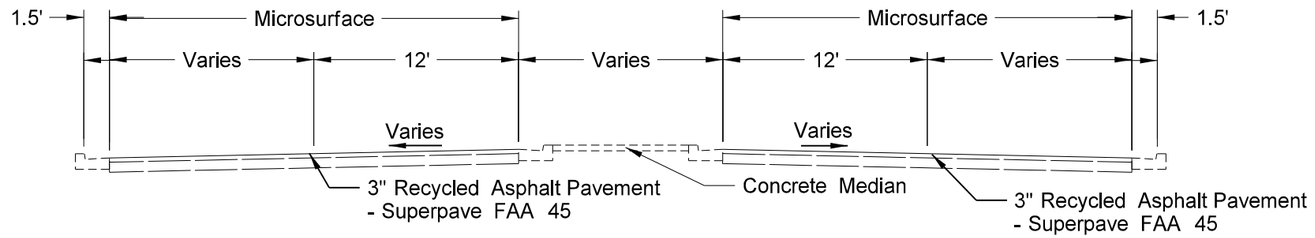
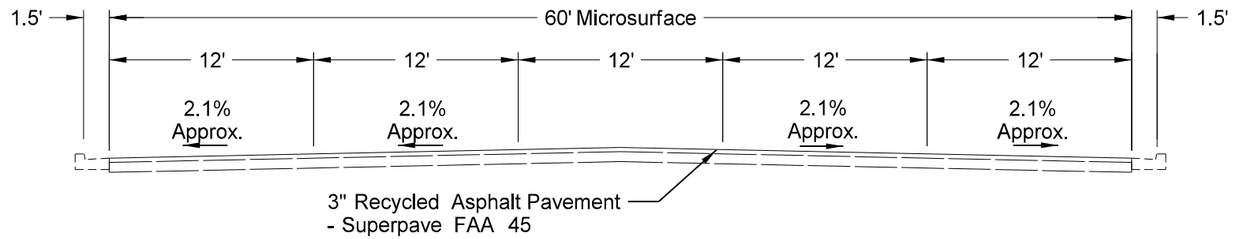
Basis of Estimate

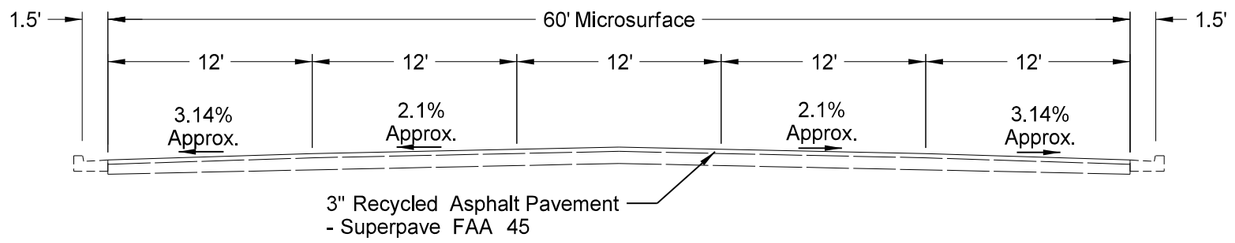
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	30	1



Washington Street to 500' West of 3rd Street
Station 113+86.47 to Station 125+73.55



Station 125+73.55 to Station 128+00.00



Station 128+00.00 to 7th Street (Station 146+41.33)

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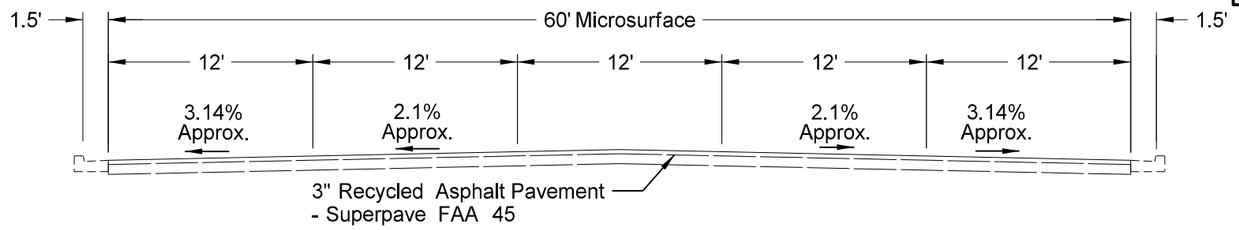
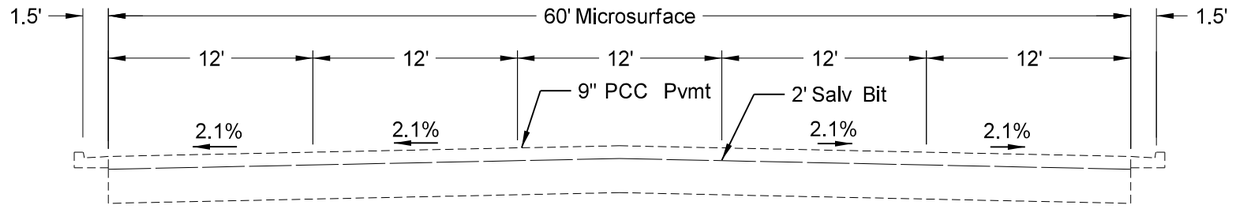
Typical Sections

Washington Street to 7th Street

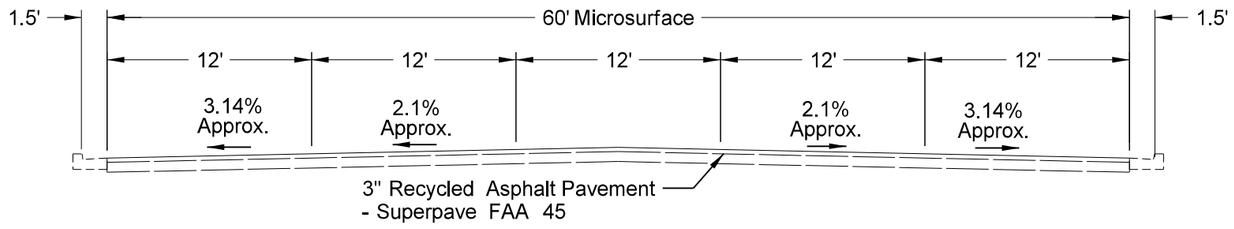
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	30	2



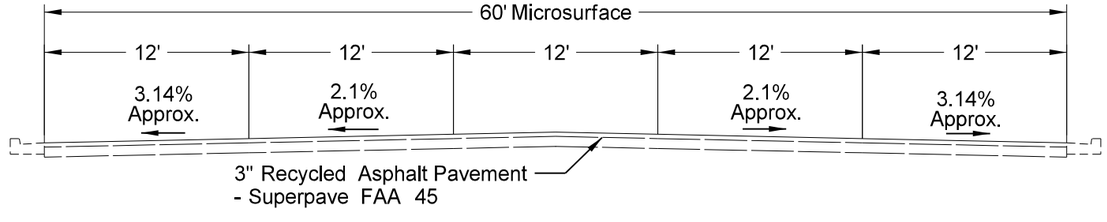
7th Street to 120' West of 9th Street
Sta. 146+41.44 to Sta 152+87.7
165' East of 9th Street to 12th Street
Sta 155+72.7 to Sta 167+57.08



120' West of 9th Street to 165' East of 9th Street



12th Street to 26th Street
Sta. 167+57.08 to Sta. 220+50.66



26th Street to 600' East of RR Structure
Sta. 220+50.66 to Sta. 258+10.71

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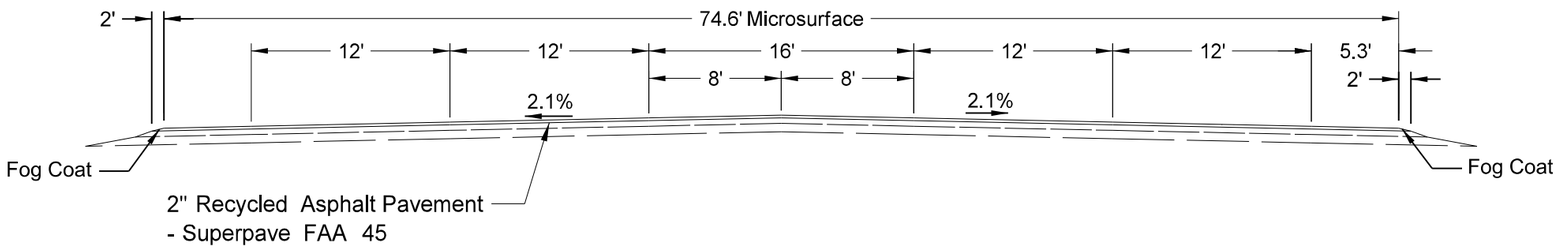
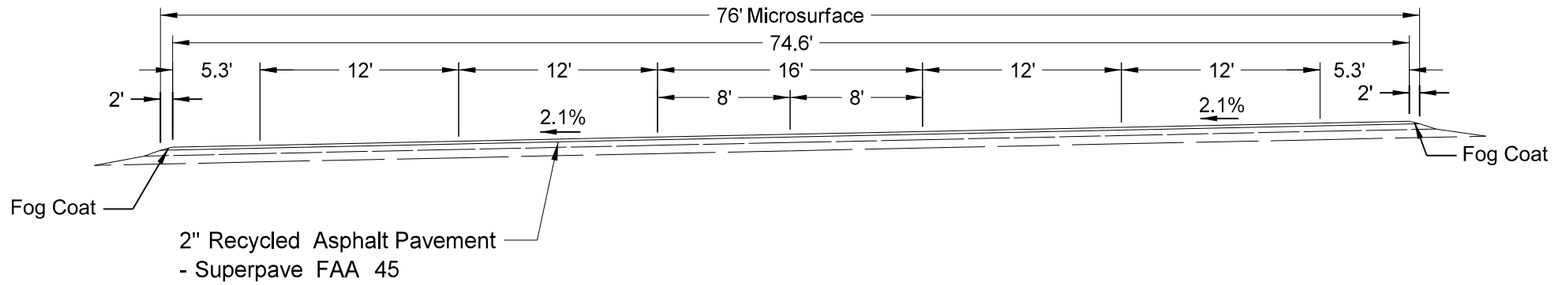
Typical Section

7th Street to 600' East of RR Structure

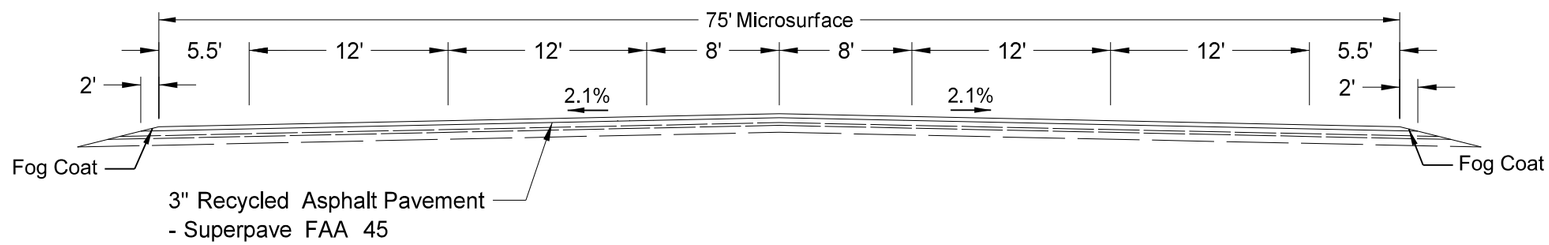
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	30	3
		NHU-1-094(166)925		



600' East of RR Structure to Main Avenue
Sta. 258+10.71 to Sta. 269+16.09
Sta. 285+41.51 to Sta. 302+00.00



Curve Section
Sta. 269+16.09 to Sta. 285+41.51



Main Avenue to 315' South of Rosser Avenue
Sta. 302+00.00 to 303+72.67 Ahd
Sta 303+04.18 Bk Sta 311+06.92

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Typical Sections

600' East of RR Structure to Main Ave
Main Avenue to 315' South of Rosser Avenue

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NHU-1-810(024)002	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	
G20-1a-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**34**	**68**
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2a-48	**48"x24"**	**END ROAD WORK**	**2**	**19**	**38**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME		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**	**6**	**5**	**30**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**6**	**39**	**234**
R2-1a-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**2**	**10**	**20**
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	**48"x60"**	**DO NOT PASS**	**2**	**39**	**78**
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**	**22**	**28**	**616**
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**	**4**	**35**	**140**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	**48"x48"**	**RIGHT or LEFT LANE TRANSITION SYMBOL**	**2**	**35**	**70**
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC 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		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT.**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT.**	**2**	**35**	**70**
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**	**2**	**35**	**70**
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.**	**2**	**35**	**70**
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**4**	**35**	**140**
W20-7k-24	24"x18"	__ FEET (Mounted of warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	**54"x12"**	**NEXT __ MILES (Mounted on warning sign post)**	**2**	**12**	**24**
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**2**	**35**	**70**
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		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1878**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**750**
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**	**70**
704-1060	**DELINEATOR DRUMS**	**EACH**	**21**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**340**
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**	**1**
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
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**	**67912**
762-1500	OBLITERATION OF PVMT MK	SF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

PROJECT NO.

S-NHU-1-094(166)925

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

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Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	1

Epoxy pvmt mk message

Right arrow (4)	64 SF
Left arrow (10)	160 SF
Total	224 SF

Epoxy pvmt mk 4in line

4" lane line	390 LF

Epoxy pvmt mk 6in line

6" crosswalk line	886 LF

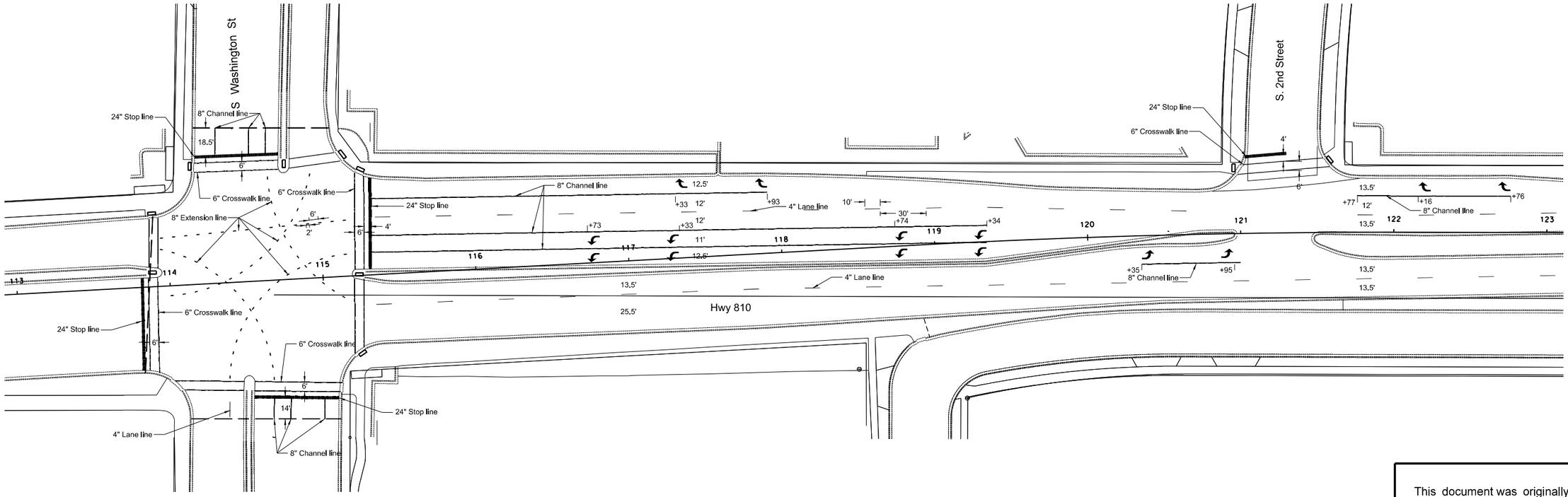
Epoxy pvmt mk 8in line

8" white channel line	1325 LF
8" white dotted line 2' line, 6' skip	156 LF
Total	1481 LF

Epoxy pvmt mk 24in line

24" white stop line	256 LF

N



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

8/14/2013 10:37:35 AM dschloss G:\PROJECT\Dean\Design\NHU-1-810(024)002\120SN_001_lpvmt.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	2

Epoxy pvmt mk message

Right arrow (2)	32 SF
Left arrow (4)	64 SF
Total	96 SF

Epoxy pvmt mk 4in line

4" lane line	420 LF
Double 4" yellow barrier line (4" between)	1243 LF
Total	1663 LF

Epoxy pvmt mk 6in line

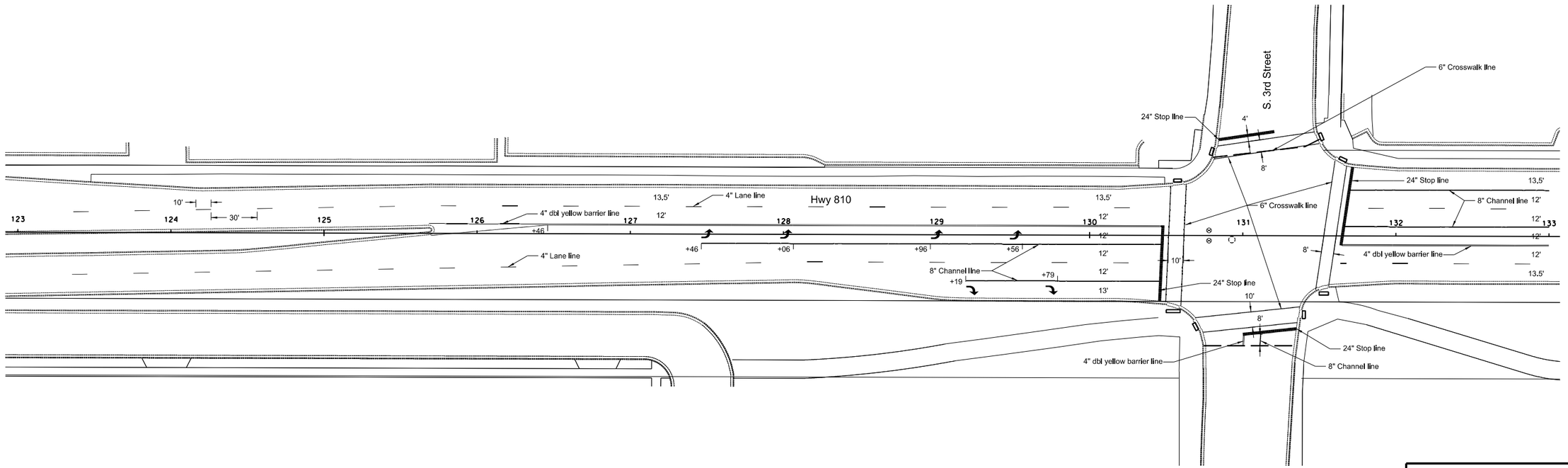
6" crosswalk line	583 LF

Epoxy pvmt mk 8in line

8" white channel line	702 LF

Epoxy pvmt mk 24in line

24" white stop line	173 LF



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

8/14/2013 10:38:43 AM dschloss G:\PROJECT\Dean\Design\NHU-1-810(024)002\120SN_002_lpvmt.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	3

Epoxy pvmt mk message

Right arrow (6)	96 SF
Left arrow (8)	128 SF
Total	224 SF

Epoxy pvmt mk 4in line

4" lane line	470 LF
Double 4" yellow barrier line (4" between)	2262 LF
Total	2732 LF

Epoxy pvmt mk 6in line

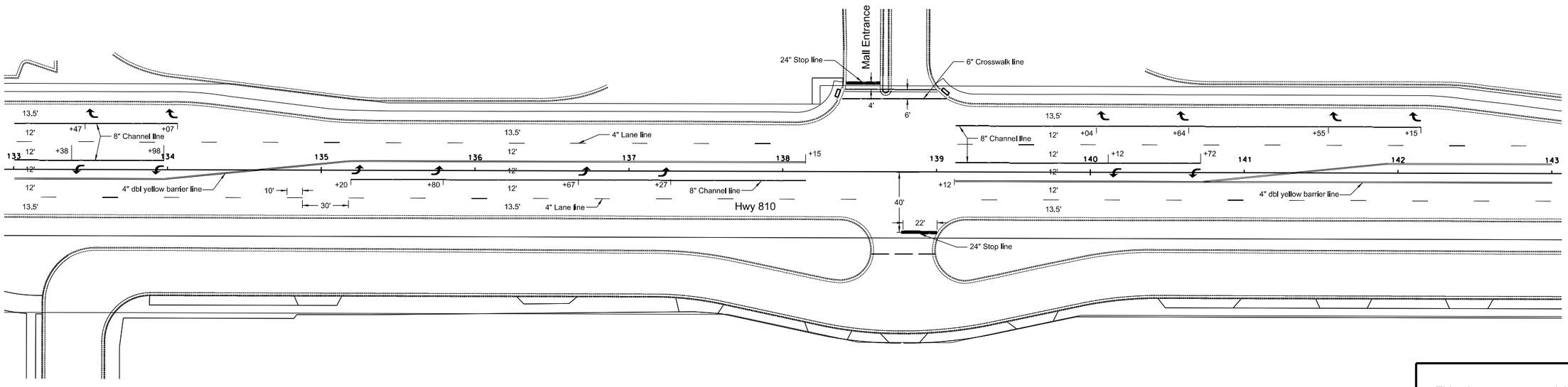
6" crosswalk line	128 LF

Epoxy pvmt mk 8in line

8" white channel line	962 LF

Epoxy pvmt mk 24in line

24" white stop line	44 LF



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	4

Epoxy pvmt mk message

Right arrow (4)	64 SF
Left arrow (6)	96 SF
Total	160 SF

Epoxy pvmt mk 4in line

4" lane line	440 LF
Double 4" yellow barrier line (4" between)	2330 LF
Total	2770 LF

Epoxy pvmt mk 6in line

6" crosswalk line	472 LF

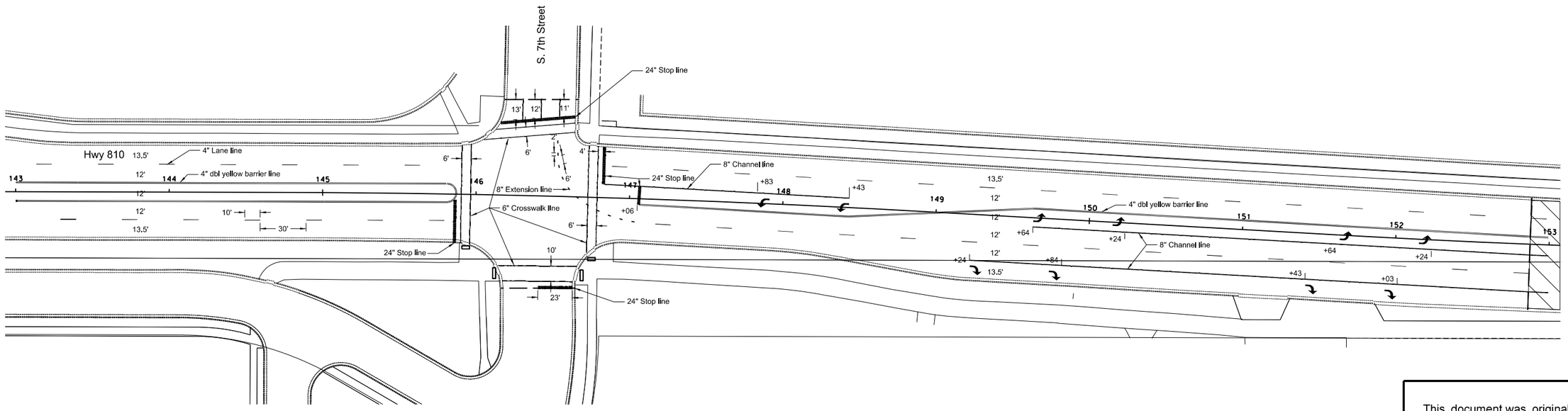
Epoxy pvmt mk 8in line

8" white channel line	913 LF
8" white dotted line 2' line, 6' skip	22 LF
Total	935 LF

Epoxy pvmt mk 24in line

24" white stop line	158 LF

N



Existing Preformed Patterned PVMT Marking to Remain in place

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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

8/14/2013 10:40:29 AM dschloss G:\PROJECT\Dean\Design\NHU-1-810(024)002\120SN_004_lpvmt.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	5

N

Epoxy pvmt mk message

Right arrow (2)	32 SF
Left arrow (7)	112 SF
Total	144 SF

Epoxy pvmt mk 4in line

4" lane line	320 LF
Double 4" yellow barrier line (4" between)	1286 LF
Total	1606 LF

Epoxy pvmt mk 6in line

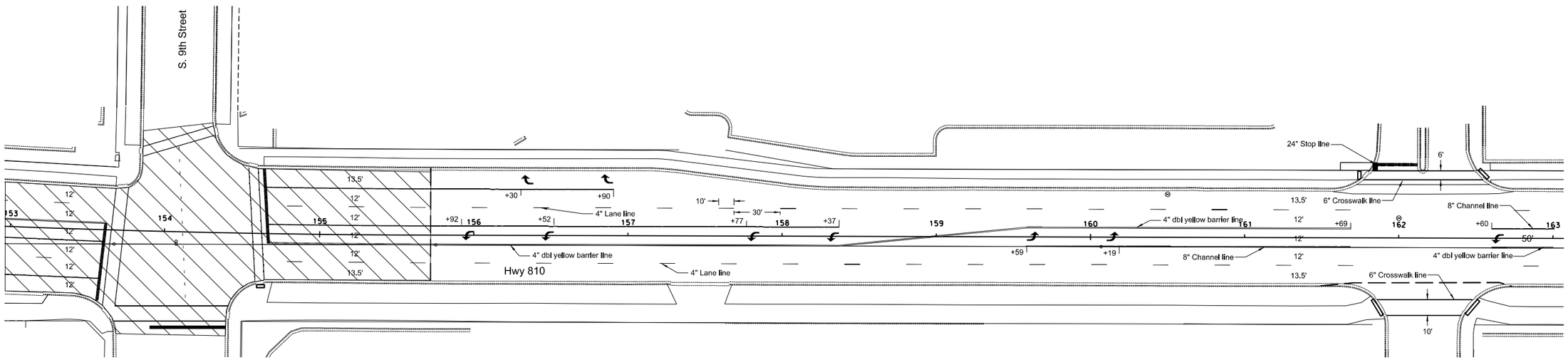
6" crosswalk line	253 LF

Epoxy pvmt mk 8in line

8" white channel line	646 LF

Epoxy pvmt mk 24in line

24" white stop line	27 LF



Existing Preformed Patterned PVMT Marking to Remain in place

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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	6

Epoxy pvmt mk message

Left arrow (5)	80 SF

Epoxy pvmt mk 4in line

4" lane line	460 LF
Double 4" yellow barrier line (4" between)	2352 LF
Total	2812 LF

Epoxy pvmt mk 6in line

6" crosswalk line	486 LF

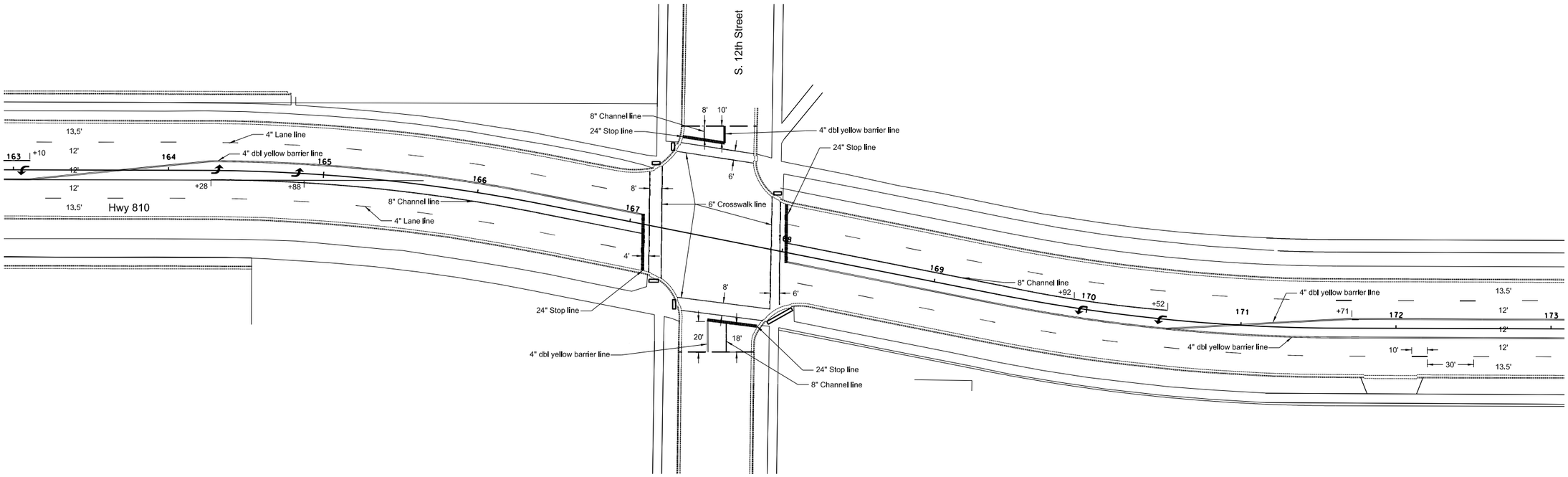
Epoxy pvmt mk 8in line

8" white channel line	557 LF

Epoxy pvmt mk 24in line

24" white stop line	134 LF

N



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	7

Epoxy pvmt mk message

Left arrow (6)	96 SF

Epoxy pvmt mk 4in line

4" lane line	500 LF
Double 4" yellow barrier line (4" between)	2167 LF
Total	2667 LF

Epoxy pvmt mk 6in line

6" crosswalk line	160 LF

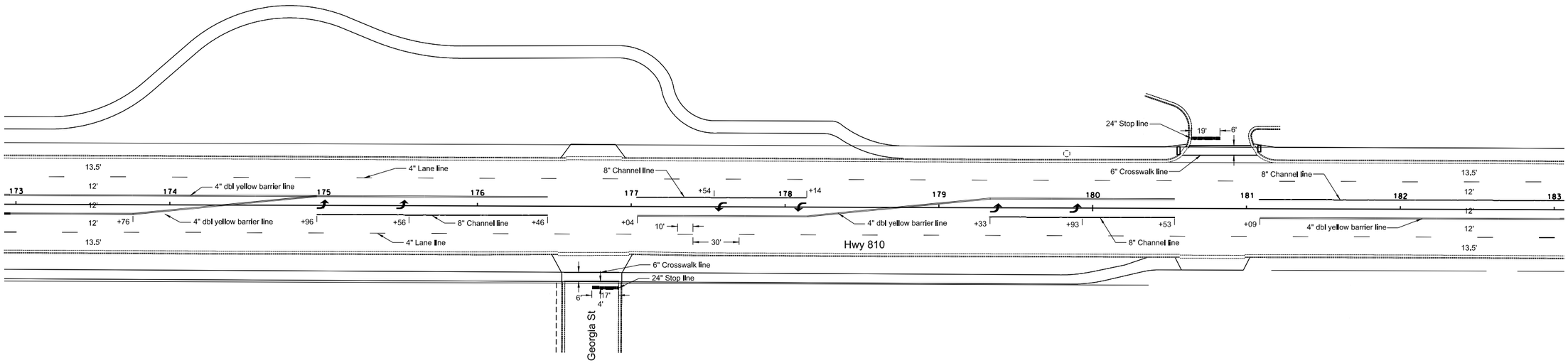
Epoxy pvmt mk 8in line

8" white channel line	571 LF

Epoxy pvmt mk 24in line

24" white stop line	36 LF

N



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	8

Epoxy pvmt mk message

Left arrow (10)	160 SF

Epoxy pvmt mk 4in line

4" lane line	480 LF
Double 4" yellow barrier line (4" between)	1830 LF
Total	2310 LF

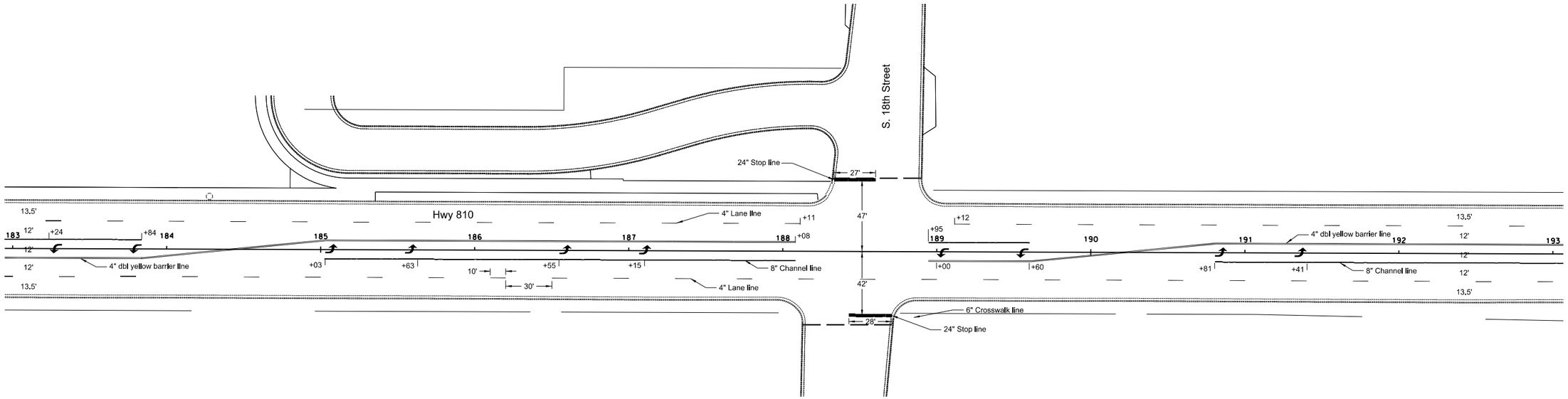
Epoxy pvmt mk 8in line

8" white channel line	673 LF

Epoxy pvmt mk 24in line

24" white stop line	55 LF

N



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	9

Epoxy pvmt mk message

Left arrow (6)	96 SF

Epoxy pvmt mk 4in line

4" lane line	450 LF
Double 4" yellow barrier line (4" between)	1082 LF
Two-way left turn channelization (4" yellow line and 4" yellow 10' line, 30' skip, 4" between)	898 LF
Total	2430 LF

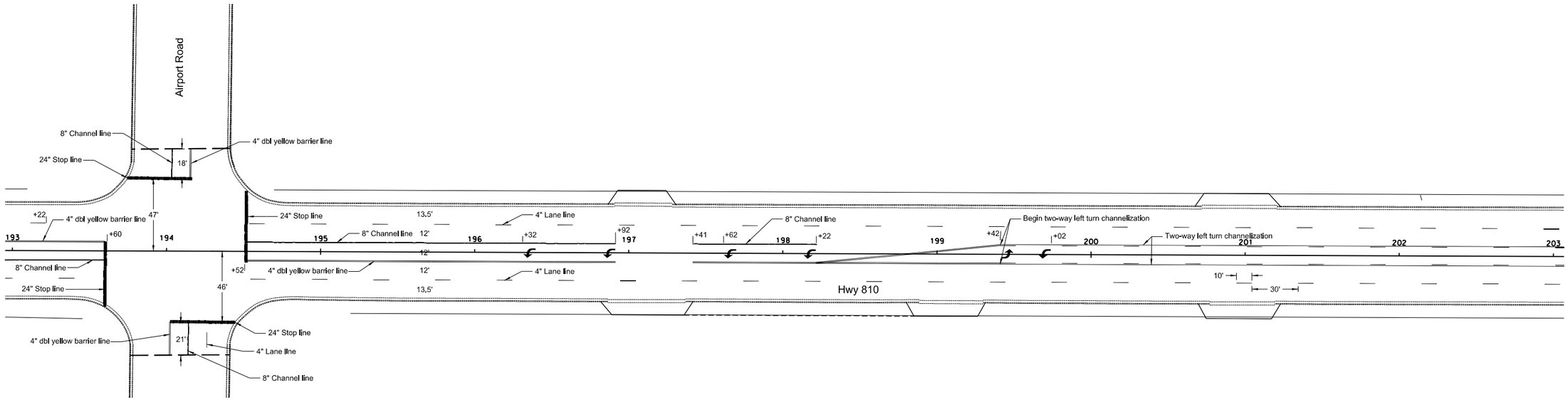
Epoxy pvmt mk 8in line

8" white channel line	419 LF

Epoxy pvmt mk 24in line

24" white stop line	170 LF

N



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Washington Street to Main Avenue

ND Hwy 810

8/14/2013 10:44:08 AM dschloss G:\PROJECT\Dean\Design\NHU-1-810(024)002\120SN_009_lpvmt.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	10

Epoxy pvmt mk message

Left arrow (8)	128 SF

Epoxy pvmt mk 4in line

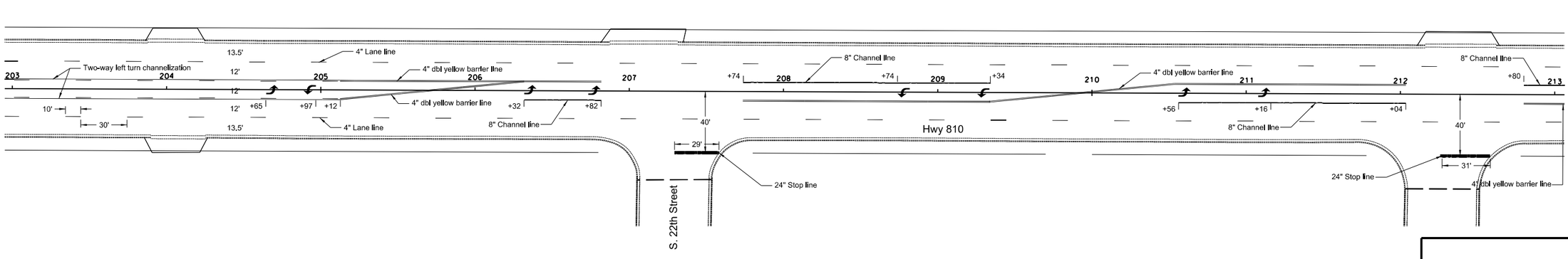
4" lane line	520 LF
Double 4" yellow barrier line (4" between)	1478 LF
Two-way left turn channelization (4" yellow line and 4" yellow 10' line, 30' skip, 4" between)	544 LF
Total	2542 LF

Epoxy pvmt mk 8in line

8" white channel line	378 LF

Epoxy pvmt mk 24in line

24" white stop line	60 LF



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	11

Epoxy pvmt mk message

Right arrow (4)	64 SF
Left arrow (6)	96 SF
Total	160 SF

Epoxy pvmt mk 4in line

4" lane line	420 LF
Double 4" yellow barrier line (4" between)	1782 LF
Total	2202 LF

Epoxy pvmt mk 6in line

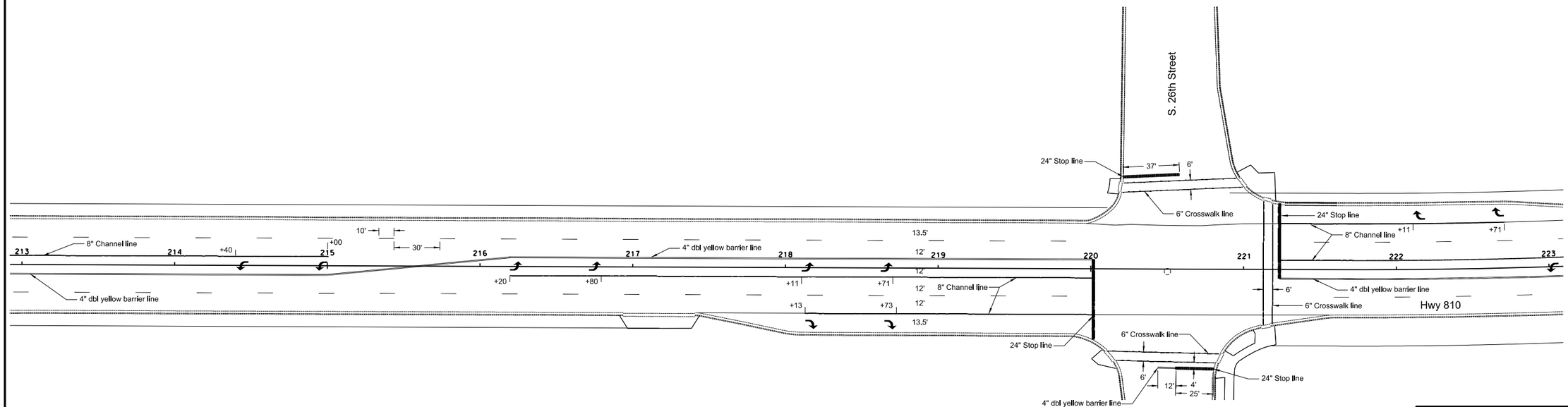
6" crosswalk line	450 LF

Epoxy pvmt mk 8in line

8" white channel line	1095 LF

Epoxy pvmt mk 24in line

24" white stop line	162 LF



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	12

Epoxy pvmt mk message

Right arrow (2)	32 SF
Left arrow (4)	64 SF
Total	96 SF

Epoxy pvmt mk 4in line

4" lane line	450 LF
Double 4" yellow barrier line (4" between)	2928 LF
Total	3378 LF

Epoxy pvmt mk 6in line

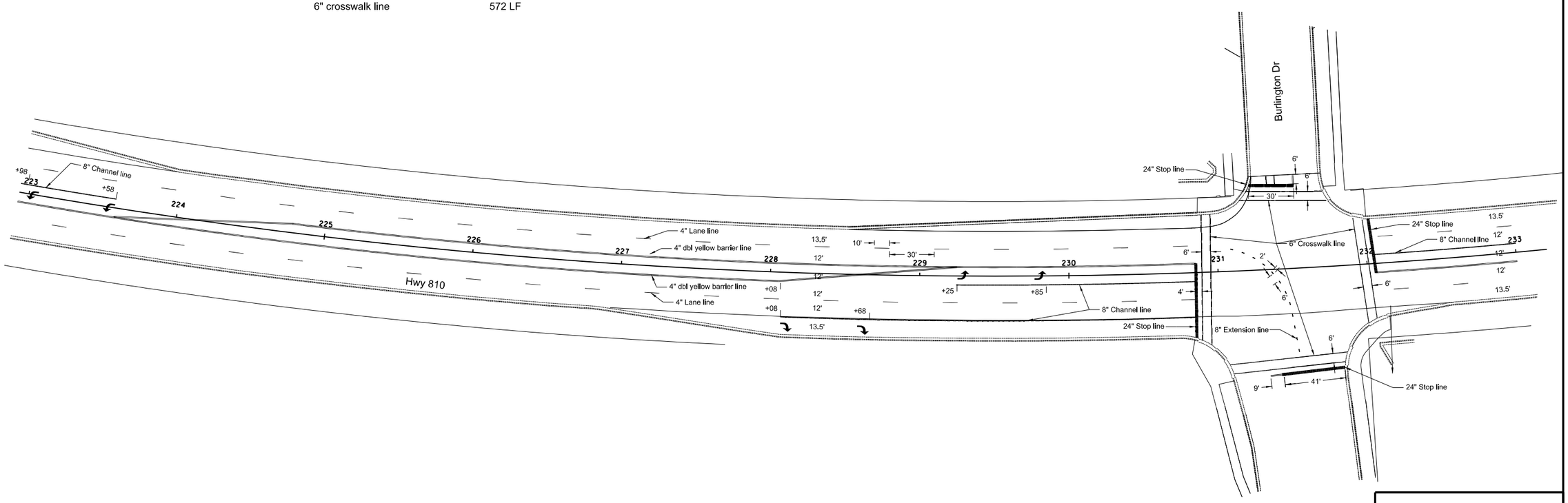
6" crosswalk line	572 LF

Epoxy pvmt mk 8in line

8" white channel line	605 LF
8" white dotted line 2' line, 6' skip	24 LF
Total	629 SF

Epoxy pvmt mk 24in line

24" white stop line	158 LF



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

8/14/2013 10:45:57 AM dschloss G:\PROJECT\Dean\Design\NHU-1-810(024)002\120SN_012_lpvmt.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	13

Epoxy pvmt mk message

Left arrow (5)	80 SF

Epoxy pvmt mk 4in line

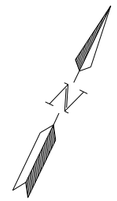
4" lane line	510 LF
Double 4" yellow barrier line (4" between)	2746 LF
Total	3256 LF

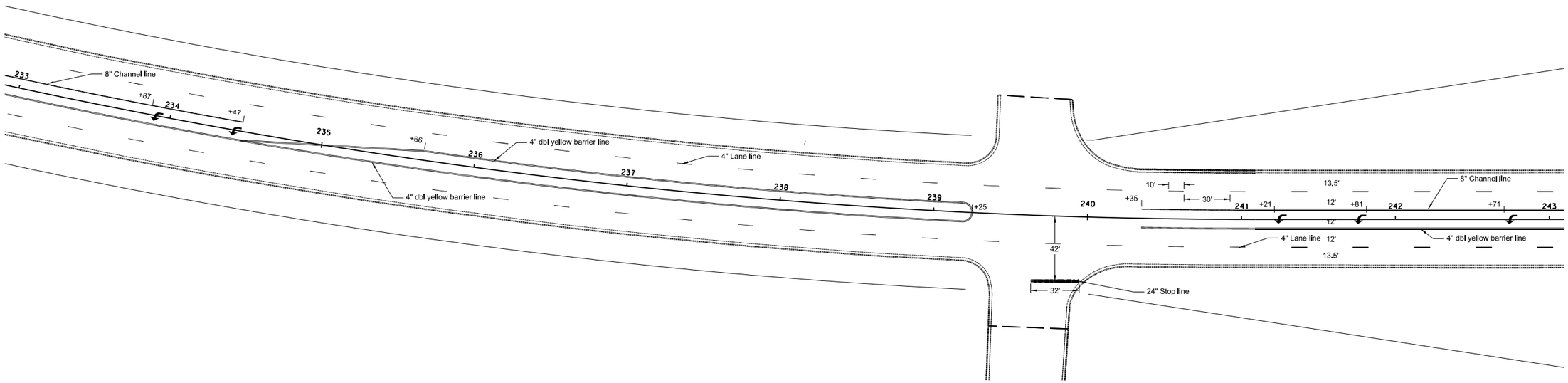
Epoxy pvmt mk 8in line

8" white channel line	412 LF

Epoxy pvmt mk 24in line

24" white stop line	32 LF





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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	14

Epoxy pvmt mk message

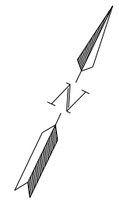
Left arrow (1)	16 SF

Epoxy pvmt mk 8in line

8" white channel line	31 LF

Epoxy pvmt mk 4in line

4" lane line	500 LF
Double 4" yellow barrier line (4" between)	3938 LF
Total	4438 LF



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Pavement Marking Layout

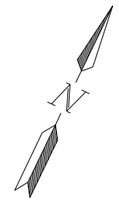
Washington Street to Main Avenue

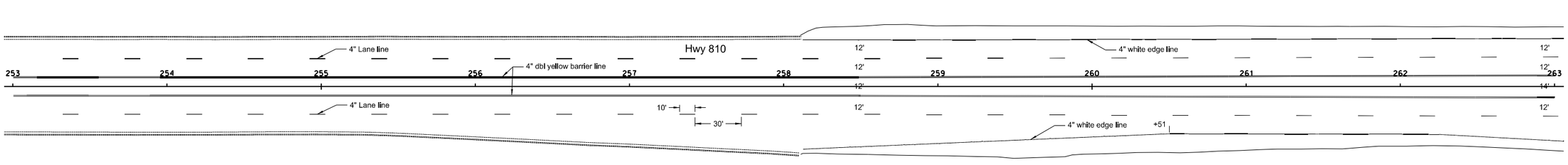
ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	15

Epoxy pvmt mk 4in line

4" lane line	500 LF
Double 4" yellow barrier line (4" between)	4000 LF
4" white edge line	976 LF
Total	5476 LF





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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	16

Epoxy pvmt mk message

Right arrow (2)	32 SF
Left arrow (4)	64 SF
Total	96 SF

Epoxy pvmt mk 4in line

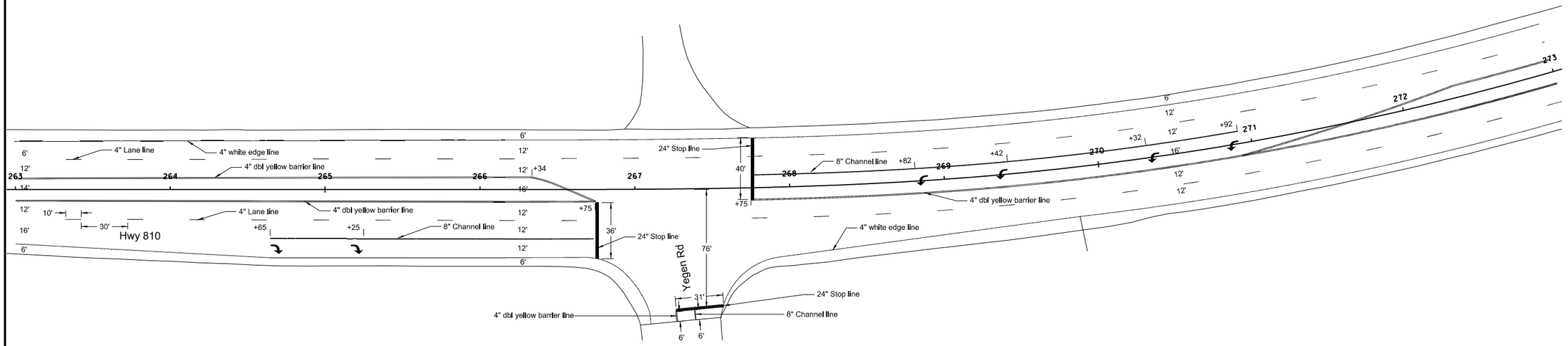
4" lane line	470 LF
Double 4" yellow barrier line (4" between)	3144 LF
4" white edge line	2003 LF
Total	5617 LF

Epoxy pvmt mk 8in line

8" white channel line	524 LF

Epoxy pvmt mk 24in line

24" white stop line	107 LF



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

8/14/2013 10:49:47 AM dschloss G:\PROJECT\Dean\Design\NHU-1-810(024)002\120SN_016_lpvmt.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	17

Epoxy pvmt mk message

Left arrow (2)	32 SF

Epoxy pvmt mk 4in line

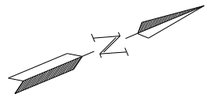
4" lane line	490 LF
Double 4" yellow barrier line (4" between)	3682 LF
4" white edge line	1998 LF
Total	6170 LF

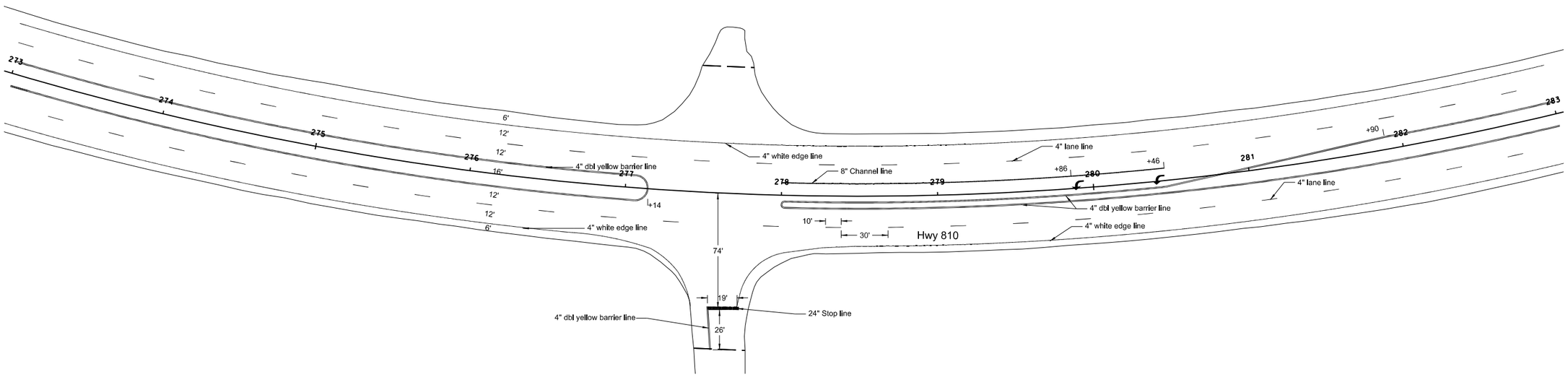
Epoxy pvmt mk 8in line

8" white channel line	245 LF

Epoxy pvmt mk 24in line

24" white stop line	19 LF





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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	18

Epoxy pvmt mk message

Left arrow (2)	32 SF

Epoxy pvmt mk 4in line

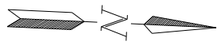
4" lane line	500 LF
Double 4" yellow barrier line (4" between)	3094 LF
4" white edge line	1805 LF
Total	5399 LF

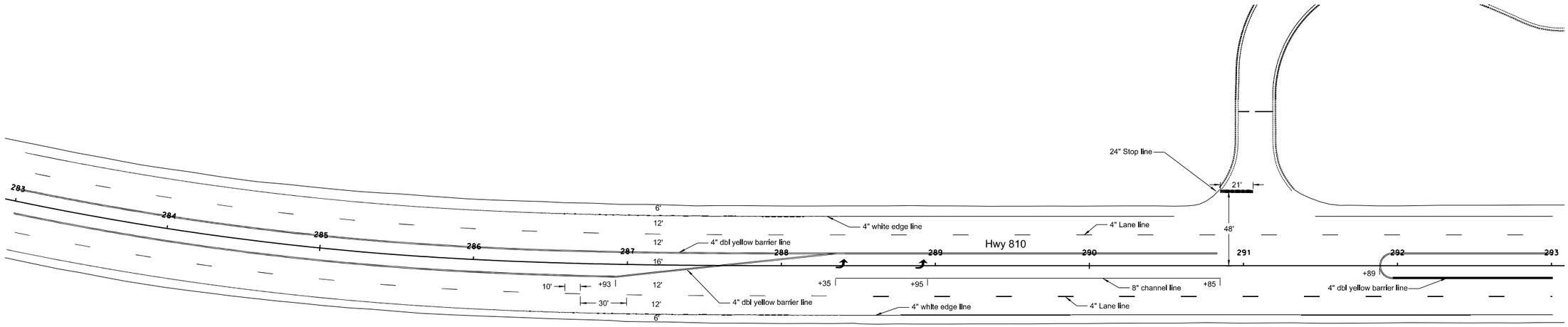
Epoxy pvmt mk 8in line

8" white channel line	250 LF

Epoxy pvmt mk 24in line

24" white stop line	21 LF





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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

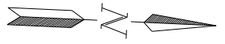
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	19

Epoxy pvmt mk message

Left arrow (3)	48 SF

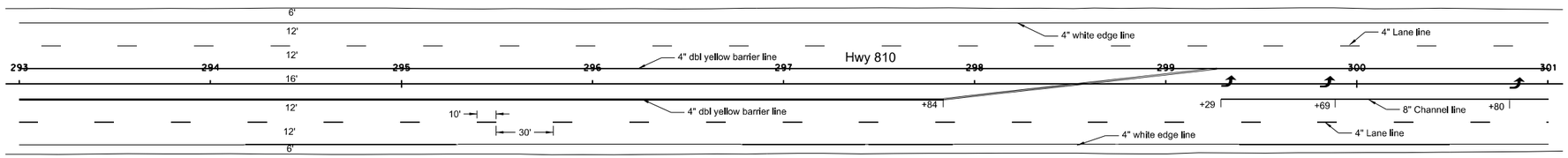
Epoxy pvmt mk 8in line

8" white channel line	171 LF



Epoxy pvmt mk 4in line

4" lane line	400 LF
Double 4" yellow barrier line (4" between)	2856 LF
4" white edge line	1600 LF
Total	4856 LF



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Pavement Marking Layout

Washington Street to Main Avenue

ND Hwy 810

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NHU-1-810(024)002	120	20
		NHU-1-094(166)925		

NHU-1-810(021)002 Quantities

Epoxy pvmt mk message

Left arrow (1)	16 SF

Epoxy pvmt mk 8in line

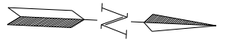
8" white channel line	228 LF

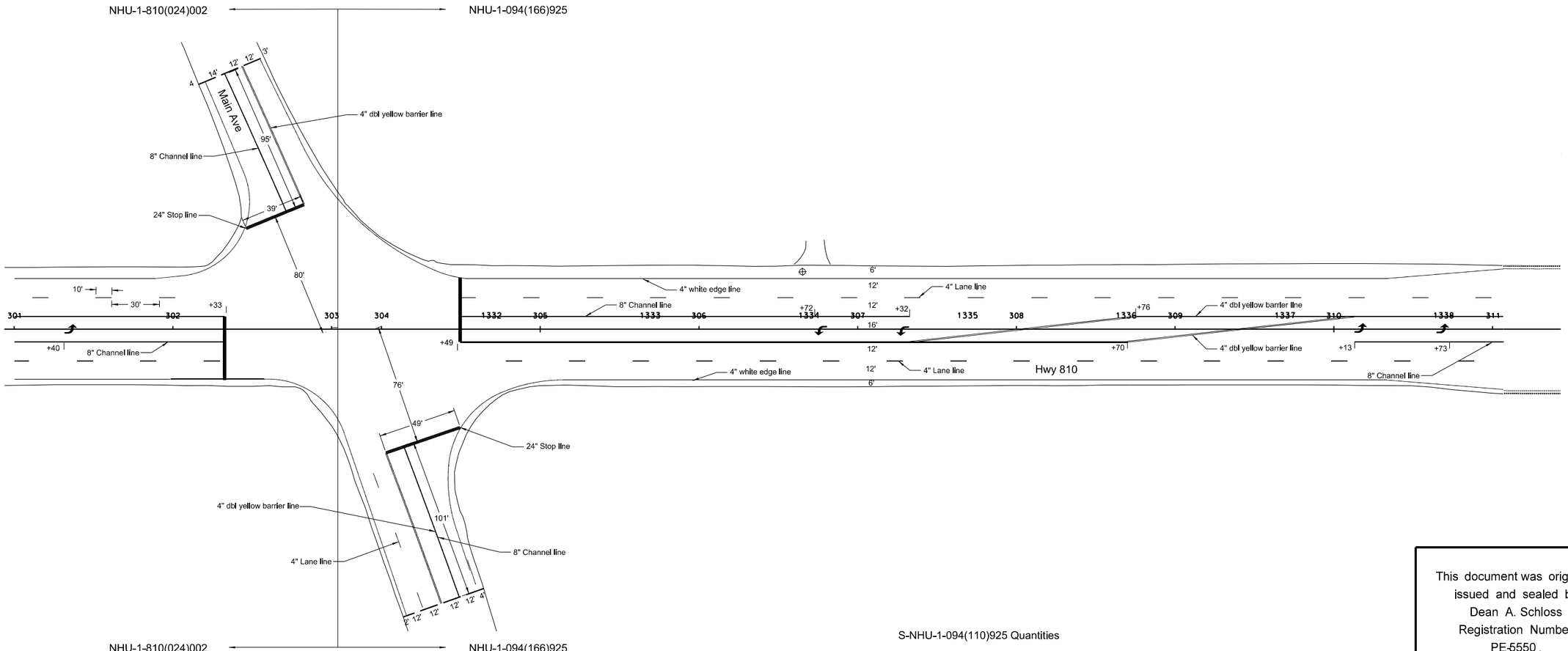
Epoxy pvmt mk 4in line

4" lane line	70 LF
Double 4" yellow barrier line (4" between)	456 LF
4" white edge line	570 LF
Total	1096 LF

Epoxy pvmt mk 24in line

24" white stop line	79 LF





S-NHU-1-094(110)925 Quantities

Epoxy pvmt mk message

Left arrow (4)	64 SF

Epoxy pvmt mk 8in line

8" white channel line	478 LF

Epoxy pvmt mk 4in line

4" lane line	360 LF
Double 4" yellow barrier line (4" between)	2082 LF
4" white edge line	1660 LF
Total	4102 LF

Epoxy pvmt mk 24in line

24" white stop line	89 LF

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Pavement Marking Layout

Washington Street to Main Avenue

Main Avenue to Rosser Avenue

NDDOT ABBREVIATIONS

D-20-1

Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
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
BLM	Bureau of Land Management
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
FHWA	Federal Highway Administration
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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
06-15-10	
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DATE	CHANGE
04-20-11 03-15-13	Added Items Added Items

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NDDOT ABBREVIATIONS

D-20-2

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
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
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
NDDOT	North Dakota Department of Transportation
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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
06-15-10	
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DATE	CHANGE
04-20-11	Added Items
03-15-13	Added Items

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NDDOT ABBREVIATIONS

D-20-3

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
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
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
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
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
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	
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DATE	CHANGE
04-20-11 03-15-13	Added Items Added Items

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NDDOT UTILITY COMPANY ABBREVIATIONS

D-20-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users Incorporated
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
BASIN ELEC	Basin Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative
BELLE PL	Belle Fourche Pipeline Company
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 PWR ELEC	Central Power Electric Cooperative
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
FALK MNG	Falkirk Mining Company
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
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 WRD	McKenzie County Water Resource District
MCKNZ ELEC	McKenzie Electric Cooperative
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
MRE LBTY TEL	Moore & Liberty Telephone
MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative
MUNICIPAL	City Of '.....'
MUNICIPAL	City Water And Sewer
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
OTTR TL PWR	Otter Tail Power Company
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
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
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
STUT RWU	Stutsman Rural Water Users
T M C	Turtle Mountain Communications
TCI	TCI of North Dakota
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
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	
6-15-10	
REVISIONS	
DATE	CHANGE
04-20-11	Added Items
03-15-13	Added Items

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 3/15/13 and the original document is stored at the North Dakota Department of Transportation

Line Styles

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Sight Distance Triangle Line
- Small Hidden Object
- Dimension Leader
- Existing Ground
- Existing Topsoil (Cross Section View)
- Large Hidden Object
- Edge Drain
- Geotextile Fabric Type D
- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Geogrid
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Geotextile Fabric Type R
- Geotextile Fabric Type R1
- Remove Line
- Geotextile Fabric Type RR
- Geotextile Fabric Type S
- Floating Silt Curtain
- Existing Telephone Line
- Existing TV Line
- Existing Assumed Ground (Not Surveyed)
- Tentative Ground Line
- Existing Water or Steam Line
- Existing Under Drain
- Under Drain
- Wall
- Existing Slotted Drain
- Existing Cemetary Boundary
- 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
- Wetland Mitigation
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Easement
- Existing Concrete
- Existing Easement
- Existing Gravel Surface
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Riprap
- Existing Underground Vault or Lift Station
- Tangent Line
- Hidden Object
- Existing Dirt Surface
- Existing Conduit
- Topsoil Profile
- Existing Conductor
- Conductor
- Fiber Optic
- Existing Loop Detector
- Subgrade, Subcut or Ditch Grade
- Existing Asphalt Surface
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar
- Existing Tie Point Line
- Existing State or International Line
- Existing Quarter Section Line
- Existing County
- Existing Section Line
- Existing Township
- Existing Railroad Centerline
- Centerline
- Existing Centerline
- Supplemental Contour
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Failure Line
- Existing Conditions
- Existing Ground (Details)
- Existing Sixteenth Section Line
- Existing Right of Way Not State Owned
- Phantom Object
- Centerline Main
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Excavation Limits
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-20-11	
REVISIONS	
DATE	CHANGE

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Line Styles

- Subgrade Reinforcement
- Existing Down Guy Wire Down Guy
- Existing Fence
- Existing Railroad
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Fence
- Silt Fence
- Existing Field Line
- Exst Flow
- Flow
- Existing Culvert
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Overhead Sign Structure
- Existing Micro Loop Detector
- Micro Loop Detector
- Existing Overhead Sign Structure Cantilever
- Existing Railroad Switch
- Overhead Sign Structure Cantilever
- 24 Inch Pipe
- Reinforced Concrete Pipe
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm
- Tie Bar at Random Spacing
- 3-Cable w Posts
- Existing 3-Cable w Posts
- Site Boundary
- Fiber Rolls
- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Depression Contours
- Existing City Corporate Limits or Reservation Boundary
- Gravel Pit - Borrow Area
- Existing Tree Boundary
- Tree Row
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Retaining Wall (Plan View)
- Sheet Piling
- W-Beam w Posts
- Existing W-Beam Guardrail with Posts
- Exst Wet Area-Vegetation Break
- Existing Wetland Delineated

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
4-20-11	
REVISIONS	
DATE	CHANGE

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Symbols

D-20-30

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	
4-20-11	
REVISIONS	
DATE	CHANGE

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Symbols

D-20-31

- 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
- Existing Monument Found
- Existing Monument set
- Existing RW Property Monument Found
- Existing RW PropertyMonument set
- 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	
4-20-11	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 4/20/11 and the original document is stored at the North Dakota Department of Transportation

Symbols

D-20-32

- 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
- Concrete Monument to Be Set
- RW Property Monument to Be Set
- 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	
4-20-11	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 4/20/11 and the original document is stored at the North Dakota Department of Transportation

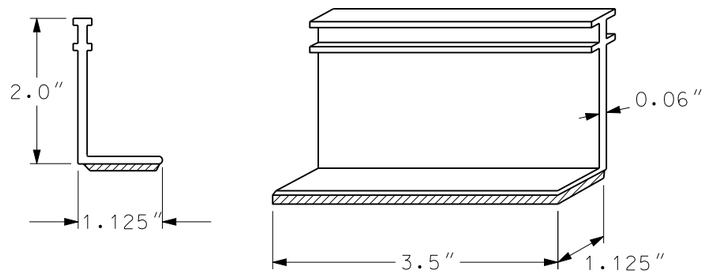
LANE MARKERS
(Spotting tab, seal jobs only)

D-704-3

Materials

1. The reflective tape shall be metalized Polycarbonate Microprism Retroflective material with acrylic backing or equal. The tape shall have a minimum reflectance of 1200 candle power per footcandle per square foot at 1/10° observation and 0° entrance angles.
2. The adhesive tape shall be neoprene foam coated on one side with rubber and on the other side with acrylic adhesive.
3. The marker body and cover shall be manufactured from a Polyurethane material meeting the following requirements:

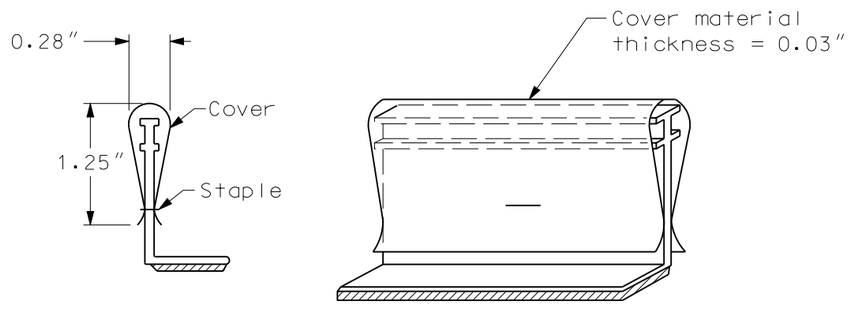
		ASTM Test Method
Specific Gravity (min)	1:19	D-792
Hardness (min)	80A	D-2240
Tensile strength (min psi)	4600	D-412
Ultimate elongation (min%)	330	D-412
Modulus @ 300% psi	1000	D-412
Stiffness		
@ -20° F (min psi)	1700	D-1053
@ 72° F (min psi)	900	D-1053
Compression set		
22 hrs. @ 70° C (%)	65	0395
Tabor abrasion		
CS 17 wheel wt. loss (mg/1000 cycles)	3	



MARKER BODY

Notes

1. The cover shall be attached to the vertical part of the marker in such a way that traffic will not cause it to detach and so that it may be easily removed manually.
2. The lane line markers shall be installed as shown and prior to the beginning of the seal coat.
3. Immediately after the seal coat is applied, the protective covers shall be removed.
4. The markers shall be removed after permanent pavement striping has been installed.
5. Marker types:
   Type Y - Yellow body and cover with yellow reflective tape on both sides.
   Type W - White body and cover with white reflective tape on one side.



MARKER BODY WITH PROTECTIVE COVER

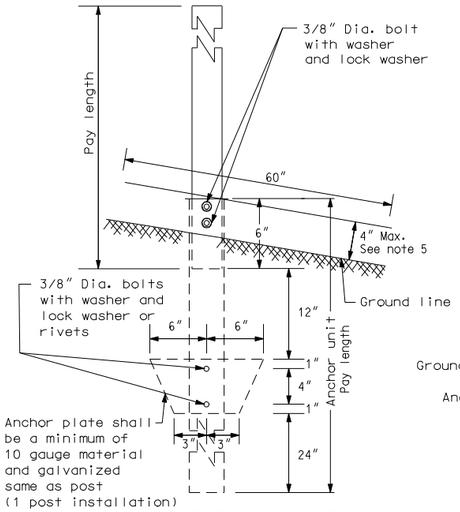
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
07-12-93	Spotting tab
07-02-03	Layout revision
12-01-04	PE stamp added

This document was originally issued and sealed by MARK S. GAYDOS Registration Number PE- 4518 , on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

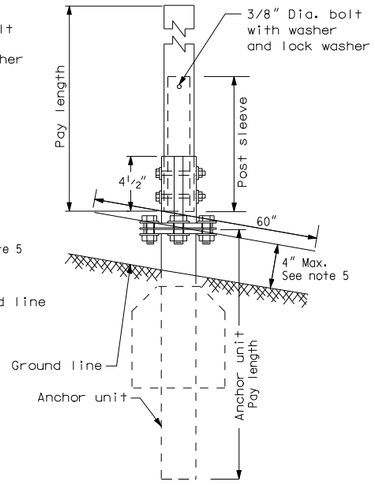
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

PERFORATED TUBE

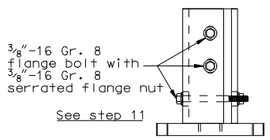
D-704-7

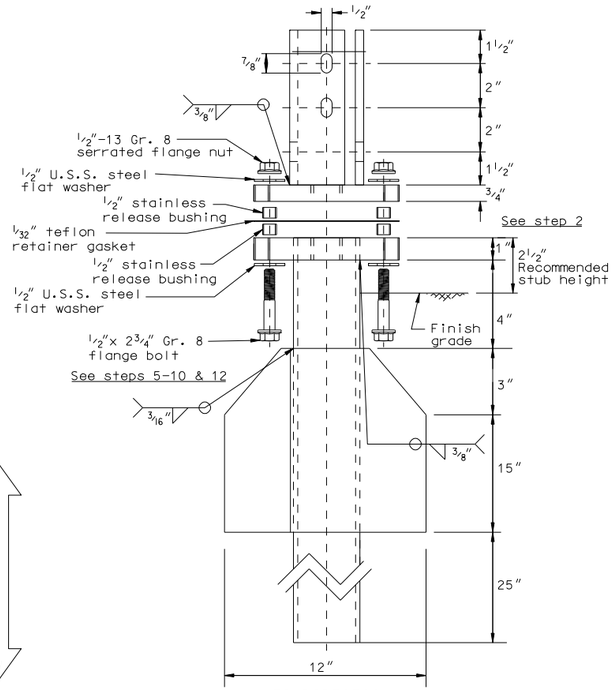


ANCHOR UNIT AND POST ASSEMBLY

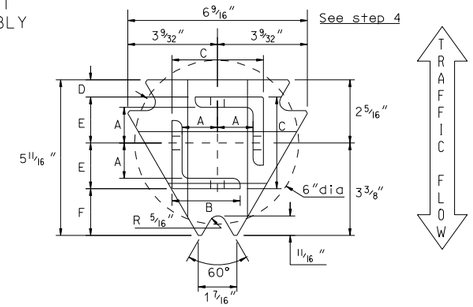


SLIP BASE ANCHOR UNIT AND POST SLEEVE ASSEMBLY





MULTI-DIRECTIONAL SLIP BASE ASSEMBLY

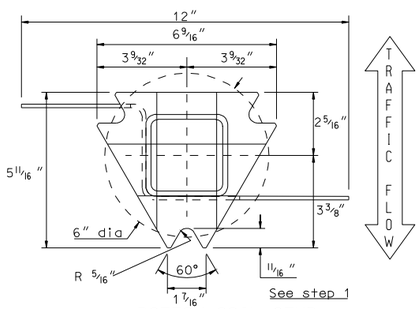


TOP POST RECEIVER

Materials: Plate - ASTM A572 grade 50
Angle receiver - $2\frac{1}{2}$"x $2\frac{1}{2}$"x $\frac{3}{8}$" ASTM A36 structural angle

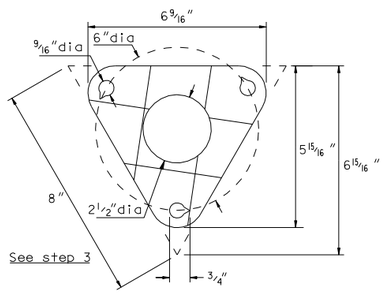
TOP POST RECEIVER DATA TABLE						
Square Post Sizes	A	B	C	D	E	F
2 3/16" x 10 Ga. Square Post	1 9/64"	2 1/2"	3 1/32"	25/32"	1 33/64"	1 7/8"
2 1/2" x 10 Ga. Square Post	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

$2\frac{3}{16}$" x 10 gauge may be inserted into $2\frac{1}{2}$" x 10 gauge for additional wind load.



BOTTOM SOIL STUB

Materials: Tube - 3"x 3"x 7 gauge ASTM A500 Gr B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A 569
Plate - ASTM A572 grade 50



BOLT RETAINER FOR BASE CONNECTION

Materials: 1/32" reprocessed Teflon

Notes
1. Slip base bolts shall be torqued as specified by the manufacturer.
2. The $2\frac{3}{16}$" size 10 gauge is shown as 2.19" size on the plans. The $2\frac{1}{2}$" size 10 gauge is shown as 2.51" size on the plans.
3. Anchor for 2", $2\frac{1}{4}$", and $2\frac{1}{2}$" posts.
4. Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3"x 3"x 7 gauge ASTM A500 Grade B. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/A153. All tolerances on anchor unit and slip base bottom assembly are ± 0.005 unless otherwise noted.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
6. When used in concrete sidewalk, anchor shall be the same except without the wings.
7. Four post signs shall have over 8' between the first and fourth posts.

MULTI-DIRECTIONAL SLIP BASE ASSEMBLY	
STEP	INSTALLATION PROCEDURE
1.	Install bottom soil anchor stub plumb and squared up with road, with point of plate facing oncoming traffic.
2.	Depth of imbedment to leave $2\frac{1}{2}$" from grade to top of anchor plate.
3.	Place teflon bolt retainer gasket on top of bottom plate (make sure that notches in holes are pointing counter clockwise).
4.	Place top post receiver on to retainer gasket, properly indexed so that angle receivers are squared up with road.
5.	Slide 1 each $\frac{1}{2}$" flat washer on to 1 each inverted $\frac{1}{2}$"-13 gr. 8 flange bolt, followed by 1 each stainless steel release bushing.
6.	Insert above bolt with washer and bushing up through notched points of top and bottom plates, passing through hole in gasket.
7.	Slide second bushing down on to above bolt until it rests on top of gasket followed by second washer.
8.	Complete by threading $\frac{1}{2}$"-13 gr. 8 serrated flange nut snugly down against top of washer.
9.	Repeat steps 5,6,7 & 8 at the two remaining notched triangle points.
10.	Insert sign post into angle receivers on top half until post(s) bottom out. *NOTE: Where higher wind load is desired, insert the next size smaller square post inside bottom of main upright post (Minimum of 48", not to exceed beyond bottom edge of sign).
11.	Secure posts into receivers using 3 each $\frac{3}{8}$"-16 gr. 8 flange bolts and 3 each $\frac{3}{8}$"-16 serrated flange nuts in receiver slots (top 2 bolts should be parallel to highway) do not tighten nuts until all bolts are in place.
12.	After all sub-assembly hardware is tightened, then torque the three $\frac{1}{2}$"-13 nuts to 42 ft-lbs, in a circular pattern until all bolt assemblies reach the required torque. *NOTE: On multi-leg installations, be sure that all anchors are squared and lined up with each other.

Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.^{4}	Cross Sect. area In.^{2}	Section Modulus In.^{3}
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785
4 x 4	0.250	1/4	6.600	3.040	1.940	1.050

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

B - The $2\frac{1}{2}$", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-21-02	
REVISIONS	
DATE	CHANGE
12-01-04	PE stamp added

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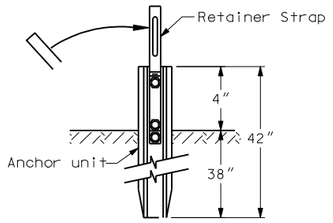
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

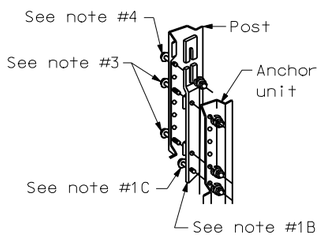
FLANGED CHANNEL



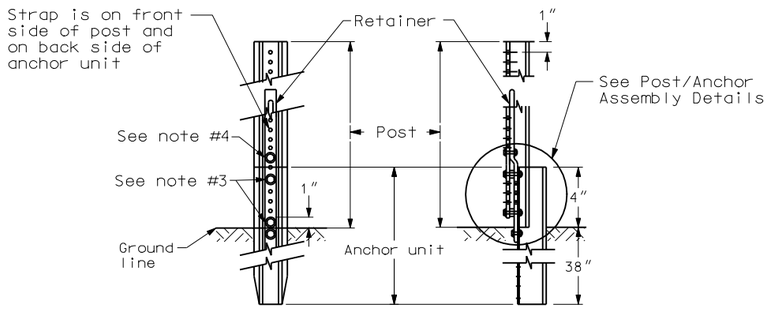
Anchor Unit &
Strap Assembly Detail

STEPS OF INSTALLATION

1. A) Drive anchor unit to within 12″ of ground level.
   B) Proper assembly established by lining up the top 3/4″ slot of retainer spacer strap with top hole of anchor unit.
   C) Assemble strap to back of anchor unit using 3/8″-16 UNC x 2.0″ long bolt, lock washer and nut.
   D) Rotate strap 90° to left.
2. A) Drive anchor unit to 4″ dimension.
   B) Rotate strap to vertical position.
3. A) Place 3/8″-16 UNC x 2″ bolt, lock washer & nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit (this coincides with the bottom 3/4″ slot in the strap).
   B) Alternately tighten two connector bolts.
4. A) Complete assembly by tightening 3/8″-16 UNC x 2″ long retainer bolt (this fastens sign post to retainer spacer strap).
5. The base post, strap & 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.

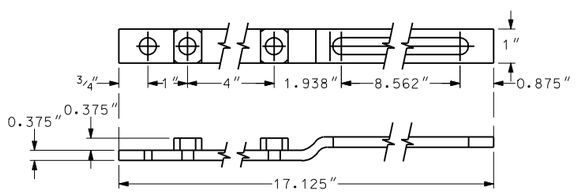


Post/Anchor
Assembly Details



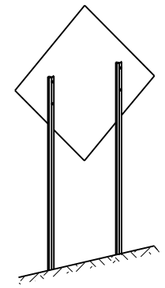
Front View Side View

Sign Post Assembly Detail

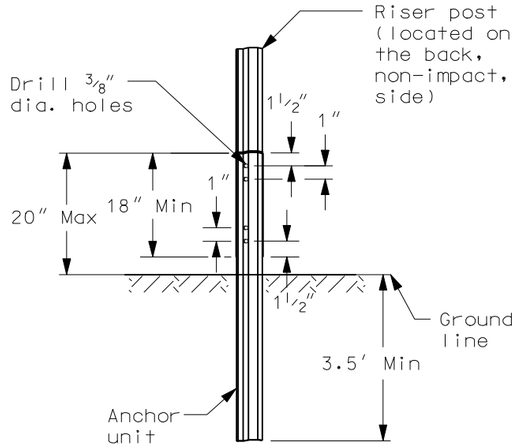


Retainer/Spacer Strap Detail

CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN.4	CROSS SECT. AREA IN. SQ.	SECTION MODULUS IN.3
1.516 x 3.125"	.116	2.00	.179	.590	.225
1.532 x 3.125"	.124	2.25	.201	.648	.254
1.562 x 3.125"	.132	2.50	.233	.748	.289
1.578 x 3.125"	.140	2.75	.271	.819	.329
1.750 x 3.500"	.150	3.00	.372	.918	.403
1.750 x 3.500"	.175	4.00	.500	1.190	.560



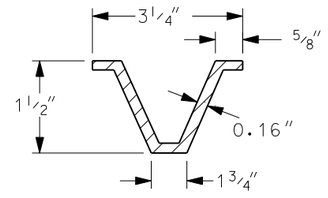
Typical
Installation



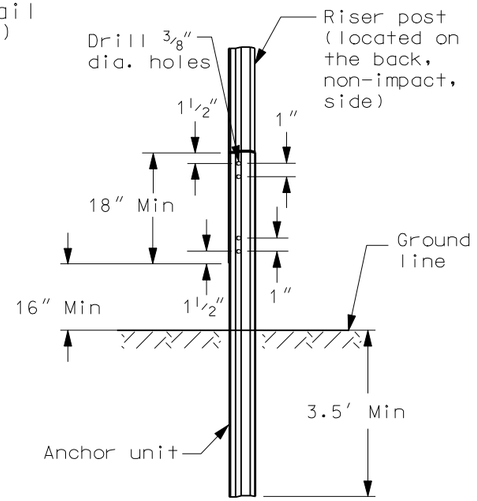
U-Channel Splice
Option 1

3 LB/FT U POSTS

Notes
1. Use 3 lb/ft riser anchor units and risers
2. Driven riser posts shall be at least 7′ long and embedded at least 3.5′.
3. A splice shall overlap a minimum of 18″.
4. Use 4 bolts 5/16″ diameter with washers and nuts. Two at top and two at bottom of splice.
5. Anchor unit for guy wires shall be no more than 4″ above ground and embedded at least 3.5′.



U-Post Detail
(3 lb/ft)



U-Channel Splice
Option 2

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-28-93	
REVISIONS	
DATE	CHANGE
03-07-01	Revised U-post details
11-21-02	Deleted perforated tube
05-08-03	Revised U-Channel splice
12-01-04	PE stamp added
06-29-05	Revised flanged channel note

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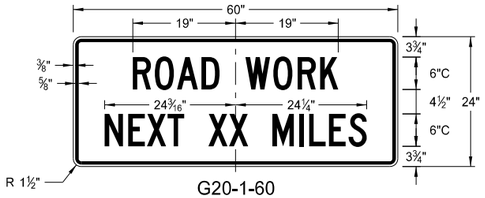
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



G20-1-60
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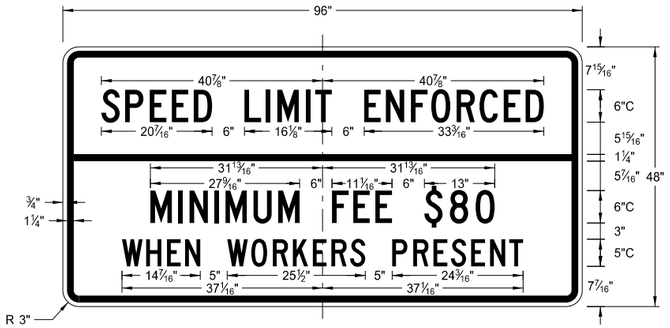
Background: orange

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



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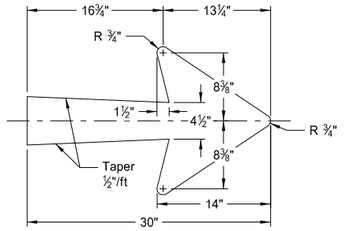
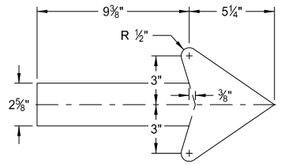
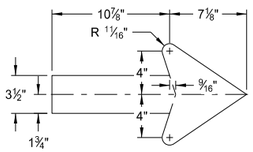


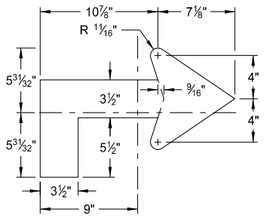
E5-1-48



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



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



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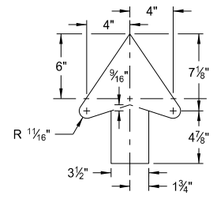
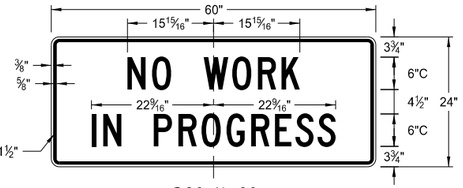
Advanced Right or Left



M4-9-30
Straight



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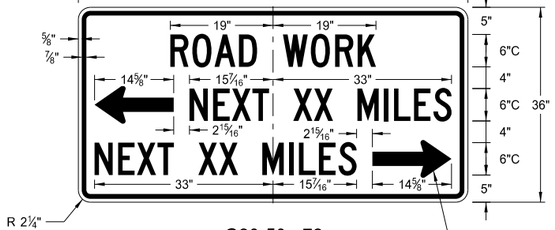

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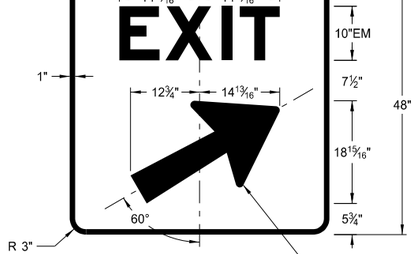

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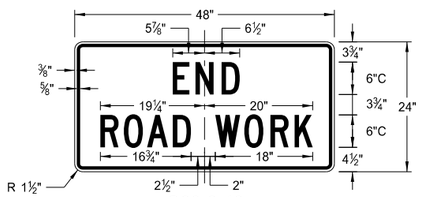
Background: green



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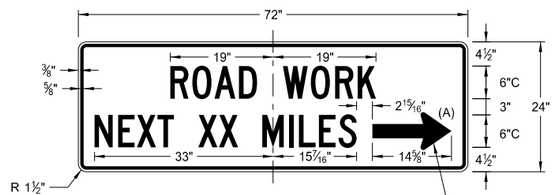

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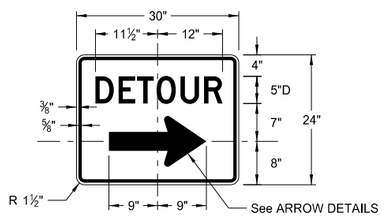

M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange

ARROW DETAILS

NOTES:

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

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

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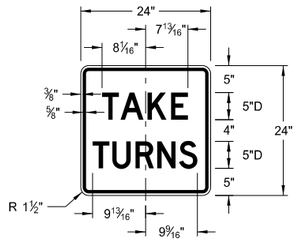
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



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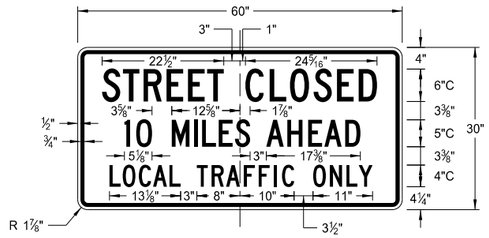

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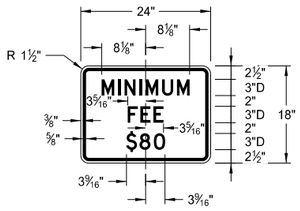

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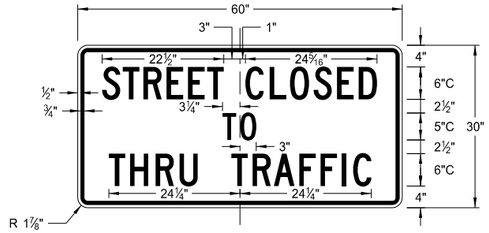

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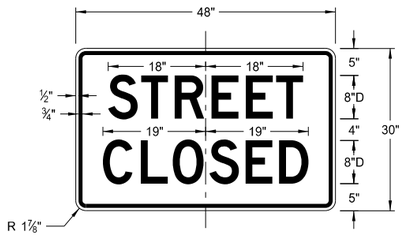

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8-13-13	
REVISIONS	
DATE	CHANGE

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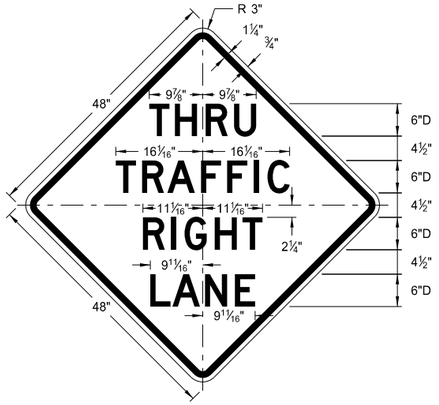
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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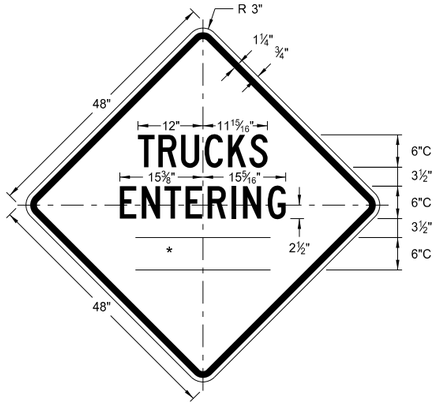

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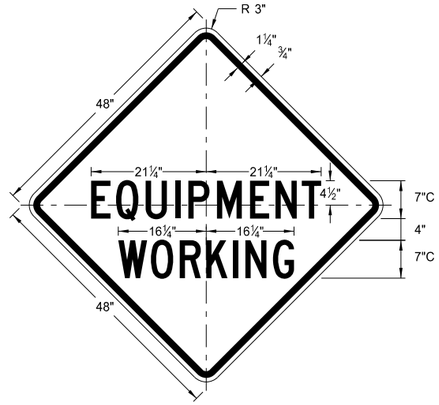

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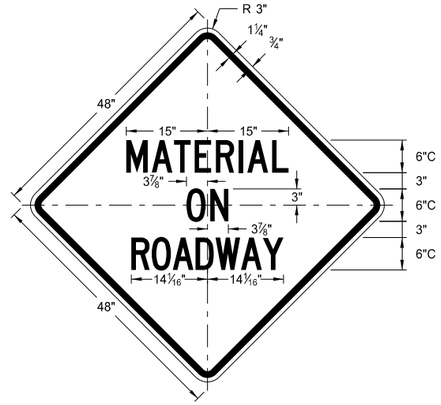

W21-51-48
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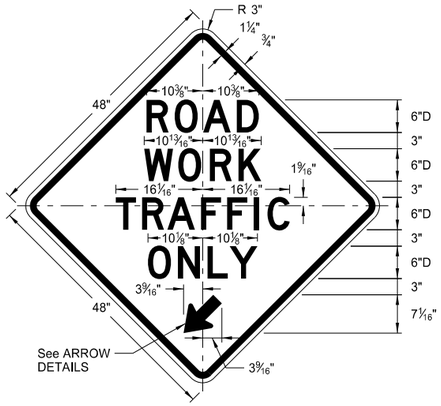
Background: orange

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



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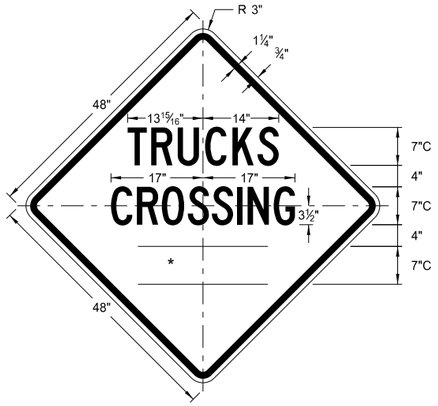

W8-55-48
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Background: orange

W20-52-54
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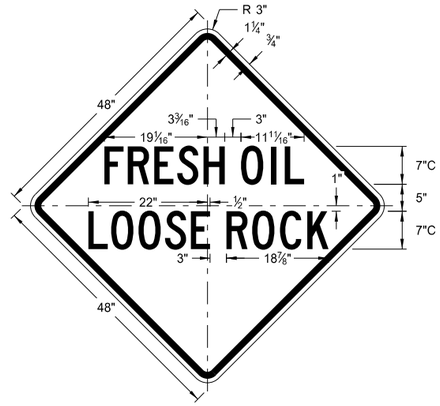
Background: orange



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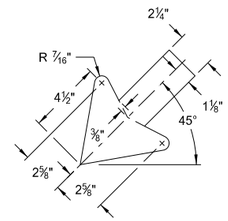
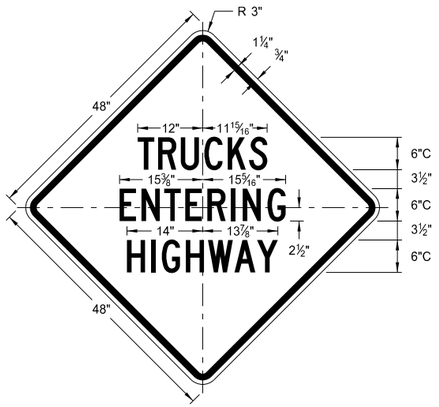


W5-9-48

ARROW DETAILS



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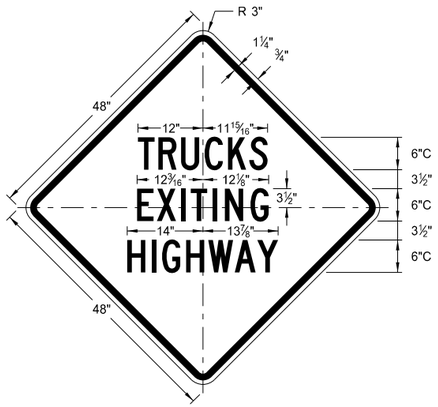

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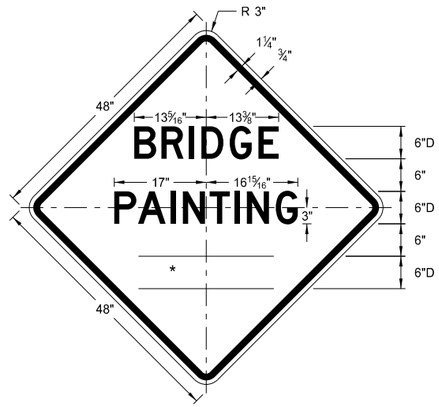

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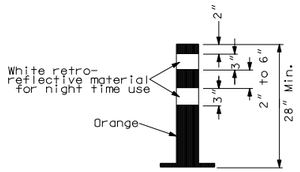
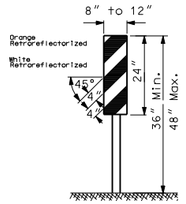
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 8/13/13 and the original document is stored at the North Dakota Department of Transportation

BARRICADE DETAILS AND CHANNELIZING DEVICES



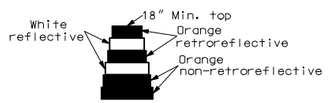
TUBULAR MARKER



VERTICAL PANEL

(Retroreflective sheeting shall be placed on both sides)

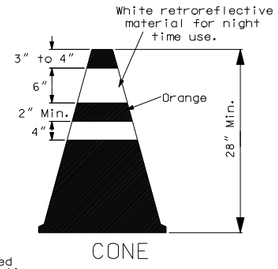
NOTE: Vertical panels used on the expressways or other high speed roadways shall be 12" by 24"



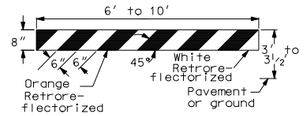
DELINEATOR DRUM

36" Min. height

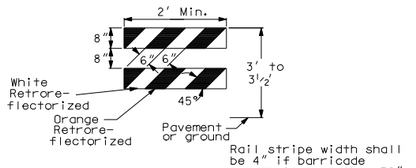
The markings on drums shall be orange and white stripes 4 to 6 inches wide. There shall be at least two orange and two white stripes. Where drums have ribs or indentations, there shall be no retroreflectorized sheeting in this area. This space shall be no more than 2 inches wide. The drum surface shall be prepared as recommended by the sheeting manufacturer before retro reflective sheeting is applied



CONE

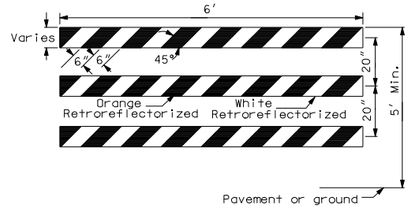


TYPE I BARRICADE



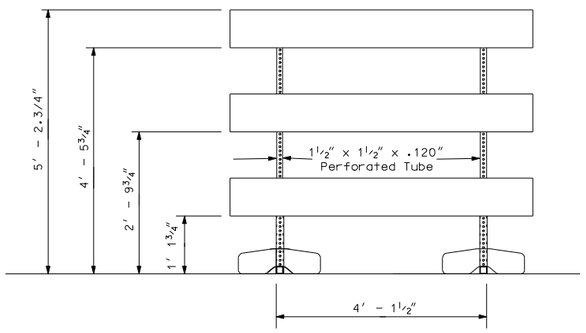
TYPE II BARRICADE

Rail stripe width shall be 4" if barricade length is less than 36".

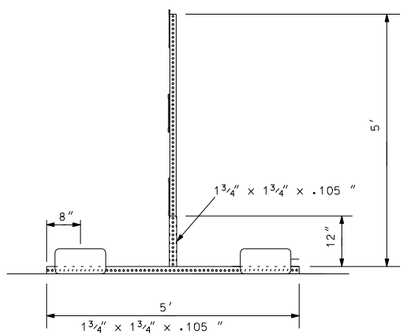


TYPE III BARRICADE

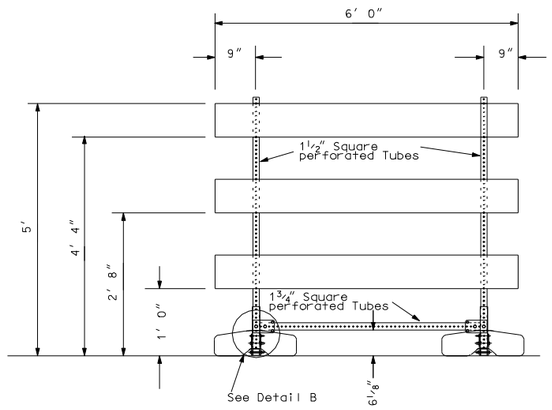
BARRICADES:
Number of retroreflectorized rail faces:
Type I - 2 (One each direction)
Type II - 4 (Two each direction)
Type III- 6 (Three in each direction)

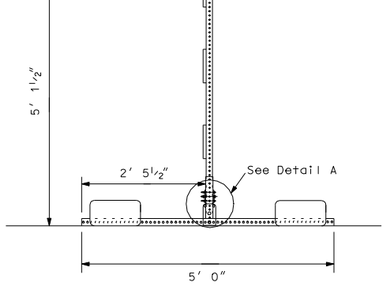


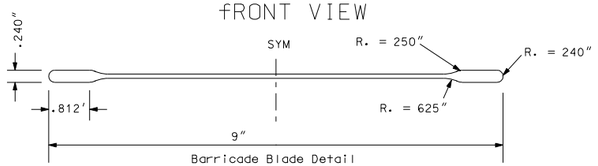
FRONT VIEW



END VIEW







Barricade Blade Detail

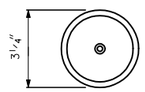
Ballast = 45lb sandbag at the end of each leg.

Barricade blade fastened to vertical supports with 2" corner bolts.

Vertical potion of leg is welded to horizontal portion on all four sides.

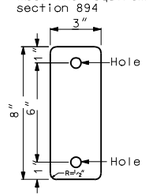
Masts slide inside vertical portion of legs. No bolts or fastenings devices used.

BARRICADE ASSEMBLY DETAIL
(Use when aluminum blade as detailed above)



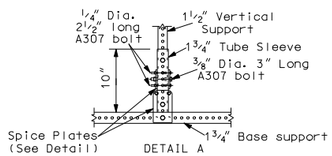
ACRYLIC PLASTIC REFLECTOR

Delineator reflector shall meet the requirements of section 894

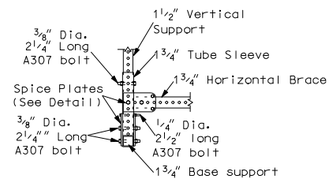


DELINEATOR REFLECTOR

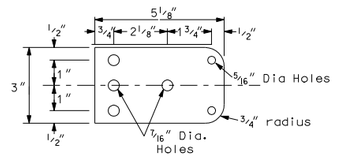
3"x8"- 18 Gauge galvanized steel sheet or 0.080" aluminum plate with white retroreflective sheeting (Type 3A or 3B) as specified in section 894 of the Standard Specifications.



DETAIL A



DETAIL B



SPLICE PLATE

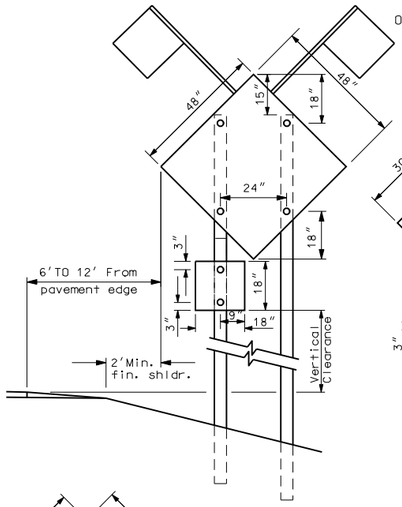
BARRICADE ASSEMBLY DETAIL
(Use when Plastic I-Beam w/ 1½" Hollow Core Flanges or 1" x 8" x72" wood boards.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-03-87	Type sheeting
10-01-87	Delineator drum note
06-08-88	Barricade type III
06-01-92	General revision
06-10-93	General revision
09-23-93	Vertical panel
06-09-95	Reflective sheeting
03-01-02	Barricade type III assembly details
04-01-02	Type III barricade
12-01-04	PE stamp added
06-29-05	Revised Type II barricade stripe

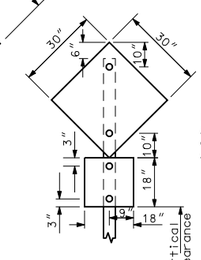
This document was originally issued and sealed by MARK S GAYDOS Registration Number PE-4518, on 06/29/05 and the original document is stored at the North Dakota Department of Transportation

D-704-14

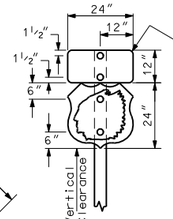
CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS



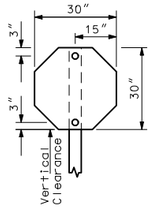
POST MOUNTING
48"x48" Signs



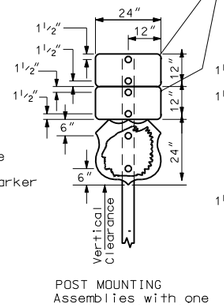
POST MOUNTING
30"x30" Signs



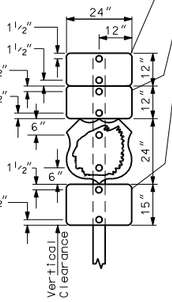
POST MOUNTING
Assemblies with one cardinal direction sign & one route marker



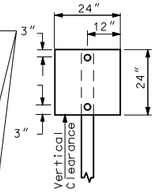
POST MOUNTING
Sign R1-1-30



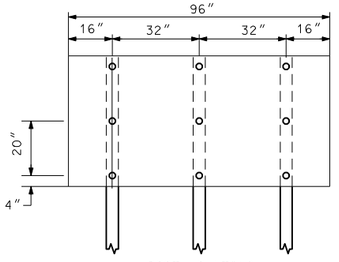
POST MOUNTING
Assemblies with one cardinal direction sign, one detour sign & one route marker



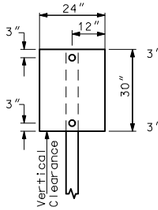
POST MOUNTING
Assemblies with one cardinal direction sign, one detour sign, one route marker & one directional arrow.



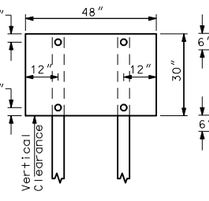
POST MOUNTING
24"x24" Signs



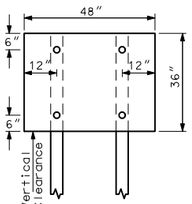
POST MOUNTING
48"x96" Signs



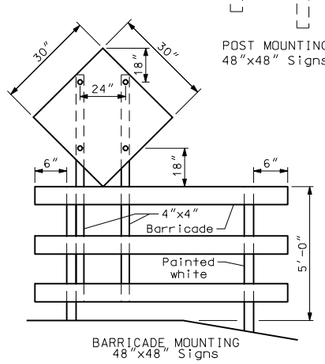
POST MOUNTING
24"x30" Signs



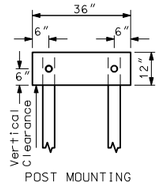
POST MOUNTING
48"x30" Signs



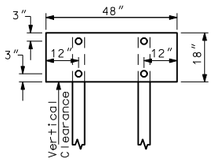
POST MOUNTING
48"x36" Signs



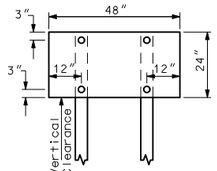
BARRICADE MOUNTING
48"x48" Signs



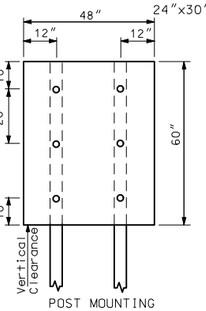
POST MOUNTING
36"x12" Signs



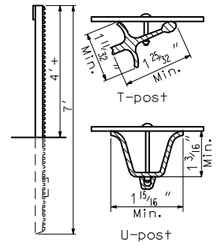
POST MOUNTING
48"x18" Signs



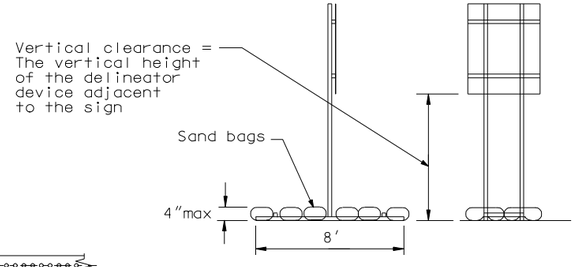
POST MOUNTING
48"x24" Signs



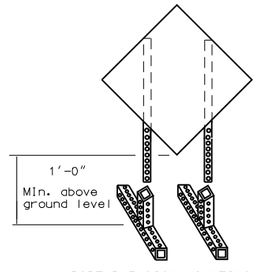
POST MOUNTING
48"x60" Signs



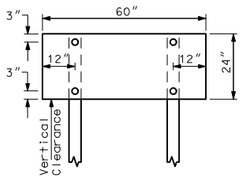
DELINEATOR ATTACHMENT AND POST MOUNTING DETAILS



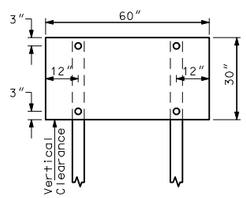
SKID MOUNTED SIGNS



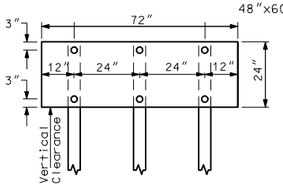
PORTABLE SIGN MOUNTING



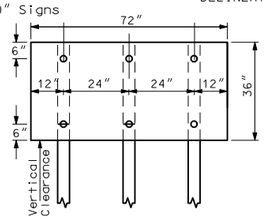
POST MOUNTING
60"x24" Signs



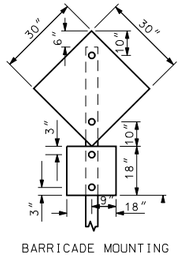
POST MOUNTING
60"x30" Signs



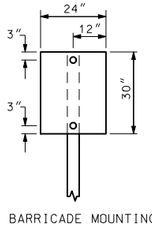
POST MOUNTING
72"x24" Signs



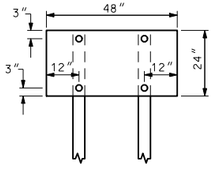
POST MOUNTING
72"x36" Signs



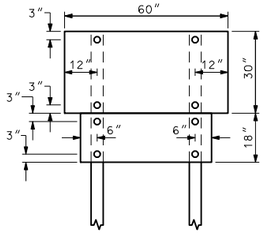
BARRICADE MOUNTING
30"x30" Signs



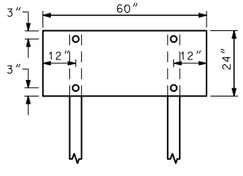
BARRICADE MOUNTING
24"x30" Signs



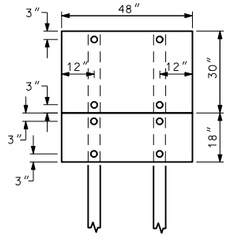
BARRICADE MOUNTING
48"x24" Signs



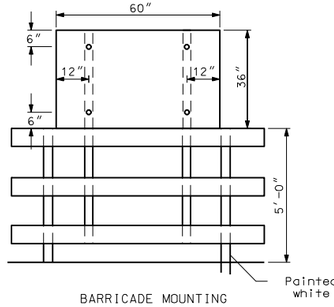
BARRICADE MOUNTING
60"x30" & 48"x18" Signs



BARRICADE MOUNTING
60"x24" Signs



BARRICADE MOUNTING
48"x30" & 48"x18" Signs



BARRICADE MOUNTING
G20-1-60 Signs

NOTES:

1. Barricade and Sign Supports: Wooden supports shall be painted white. Steel supports shall be galvanized or painted.
2. Barricade Mounting Signs: The bottom of the sign shall be flush with the top of the top rail. Wood sign posts shall be 4"x4" min. SFS or equivalent steel posts. All barricades and barricade mounted signs shall be assembled with 3/8" bolts.
3. Sign Supports: Sign supports shall be 4"x4" min. SFS or equivalent steel post. The anchor for steel supports shall have a stub height of 4" or less. Wood posts more than 4"x4" shall be breakaway. Sign supports shall be imbedded to a sufficient depth so that signs will remain plumb throughout duration of project. It is suggested that wood posts have a min. depth of embedment of 5' and steel posts be embedded a min. 3'-6".
   Material: All signs shall be 0.100" aluminum, 12 gauge steel, 1/2" plywood or other approved material.
   Holes: All holes to be punched round for 3/8" bolts.
4. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate without a border and this plate installed and removed as required.
5. Advance Warning Flashing or Sequencing Arrow Panels: The minimum mounting height shall be 7 feet above the roadway to the bottom of the panel, except on vehicle mounted panels which shall be as high as practicable.
6. Delineator Posts: Typical fence post sections are shown in Attachment Details. Other types of metal fence posts may be substituted upon approval of the engineer. These substituted posts shall have reflectors attached similar to the ones shown.
7. Route Marker Auxiliary Signs: The route marker auxiliary signs such as the cardinal direction and directional arrows shall have background colors the same as the route marker they are used with (Interstate route markers, blue background, US and State route markers, white background, Interstate Business loop and spur, green background, and County route markers, blue background).
8. Vertical Clearance: Post mounted signs placed in rural areas shall have a vertical clearance of at least 5 feet measured from the bottom of the sign to the near edge of the driving lane. In business, commercial and residential districts where parking and/or pedestrian movement is likely to occur or where other obstructions to view, the distance between the bottom of the sign to the near edge of the driving lane shall be at least 7 feet. The height to the bottom of secondary signs mounted below another sign may be 1 foot less than the appropriate height specified. Large signs having an area exceeding 50 square feet that are installed on multiple breakaway posts shall be mounted a minimum of 7 feet above the ground.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-1-86	
REVISIONS	
DATE	CHANGE
08-01-88	Sign assembly
05-01-92	Sign assembly
03-30-93	Sign supports note
03-04-96	Sign height
08-15-96	Note 8
07-10-97	Note revision
07-31-98	Note & portable sign
10-01-99	Skid mounted sign
02-07-03	Vertical clearance note
11-30-04	Third post added to some signs
12-01-04	PE stamp added

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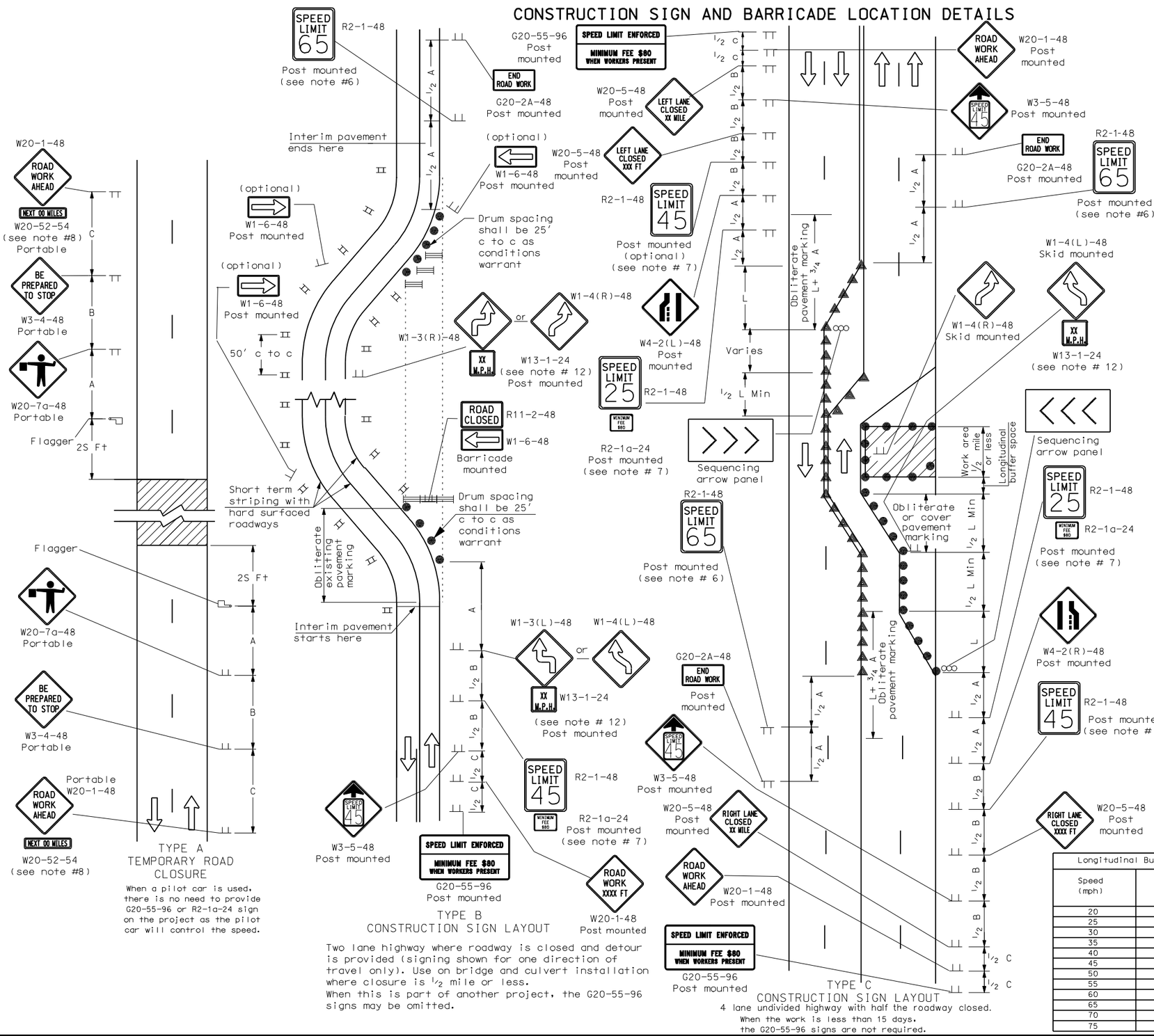
CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-15



Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper.
   L = Minimum length of taper, or 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. Barricade shown to be placed on roadway shall be on a moveable assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Sign shown to be placed on roadway shall be placed on skid mounted assemblies.
3. Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
4. Existing striping shall be removed as required. Delineators will only be used when foreslope is 1V:4H or better and roadway alignment is visible to approaching vehicles. Vertical panels shall be used where roadways has steep slopes and alignment is not visible to approaching vehicles. Delineators and vertical panels shall be installed back to back.
5. Sequencing Arrow Panels
   Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph and 5000 ADT).
6. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
7. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
8. Use when work area is 1 mile or longer.
9. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
10. Existing speed limit signs within a reduced speed zone shall be covered.
11. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
12. Where necessary, safe speed to be determined by the Engineer.
13. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.

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

KEY

- Type I barricade
- Type II barricade
- Type III barricade
- Sign
- Delineator drum
- Cones
- Work area
- Flagger
- Sequencing arrow panel
- Type A delineator or vertical panels back to back

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

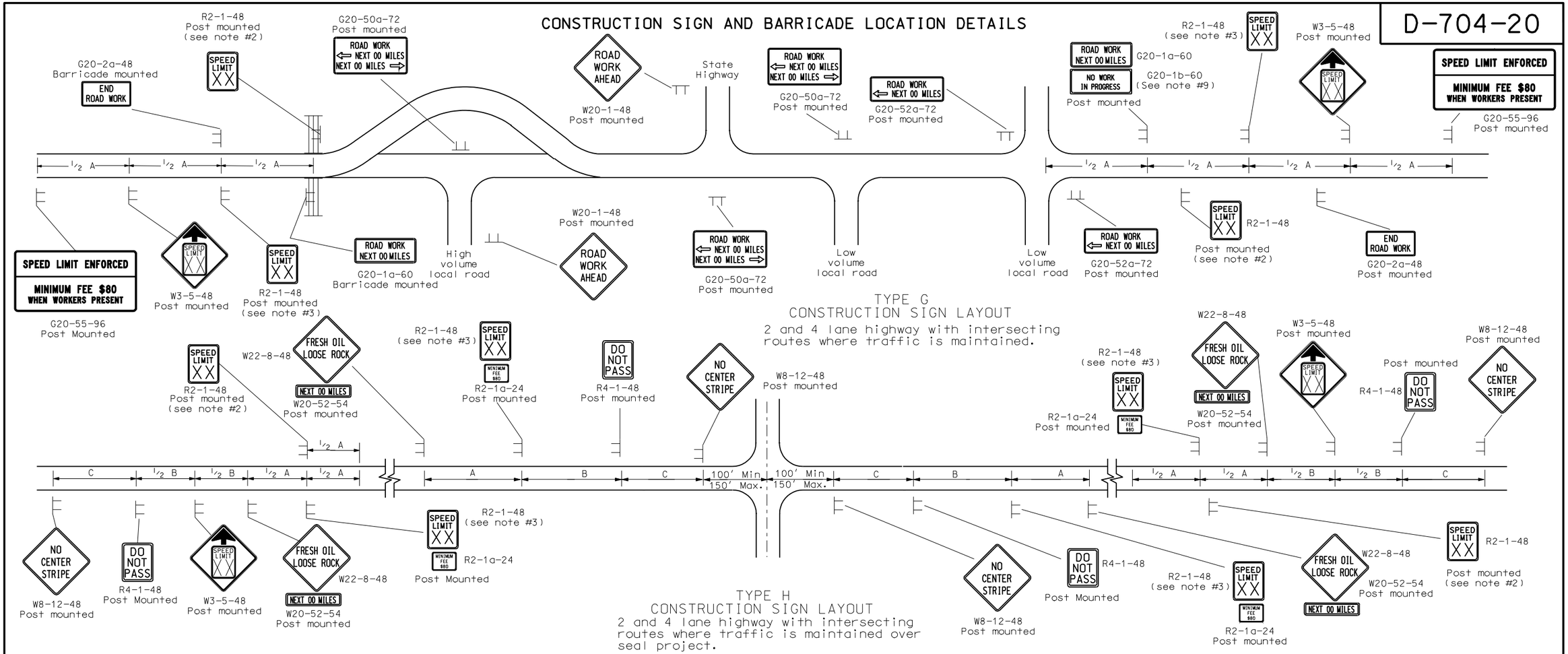
10-1-86

REVISIONS

DATE	CHANGE
01-05-01	Revised note 3
07-19-02	Reversed End Road Work & Speed Signs
07-25-03	Revised R2-1, R2-1a and W20-1
04-01-04	Change Fee Sign, Warning & Buffer Spacing
12-18-03	Relocated reverse curve
12-01-04	PE stamp added
06-29-05	Revised W4-2, Replaced R2-5a with W3-5, Rev. Adv. Warning Table, Rev. Note 7.
07-05-05	Changed W20-7b to W3-4

CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-20



1. Barricade shown to be placed on roadway shall be on a moveable assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. Sign shown to be placed on the roadway shall be placed on skid mounted assemblies.
2. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 MPH below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Sign no. R2-1-48, R2-1a-24, R4-1-48, W22-8-48, W20-52-54, and W8-12-48 shall be placed just after all important intersections and every five miles in either direction. Sign no W8-12-48 shall be placed when traffic volumes are 750 ADT or less. No short term markings are placed when this condition exists.
7. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.
8. Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
9. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
10. The layouts show the signs needed before work begins. The requirements at the actual work areas will require the use of other standards. If the speed limit is reduced in the work areas, the speed limit signs shall have the R2-1a-24 sign placed below.

KEY

Type I barricade	Work area
Type II barricade	Flagger
Type III barricade	Sequencing arrow panel
Sign	Type A delineator or vertical panels back to back
Delineator drum	
Cones	

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

10-1-86

REVISIONS

DATE	CHANGE
08-15-96	Revise flag note
10-01-99	General revisions
10-18-01	Added note 8 & 9
07-19-02	Rev. end road work & speed limit sign
07-25-03	Rev. R2-1a & W20-1
04-01-04	Rev. fee sign & warning sign spacing Rev note 3, add note 10
12-01-04	PE Stamp added
06-29-05	Added W3-5 to Type H and Type G. Rev. Adv. Warning Table. Rev. Note 3
04-05-06	Corrected sign W3-5

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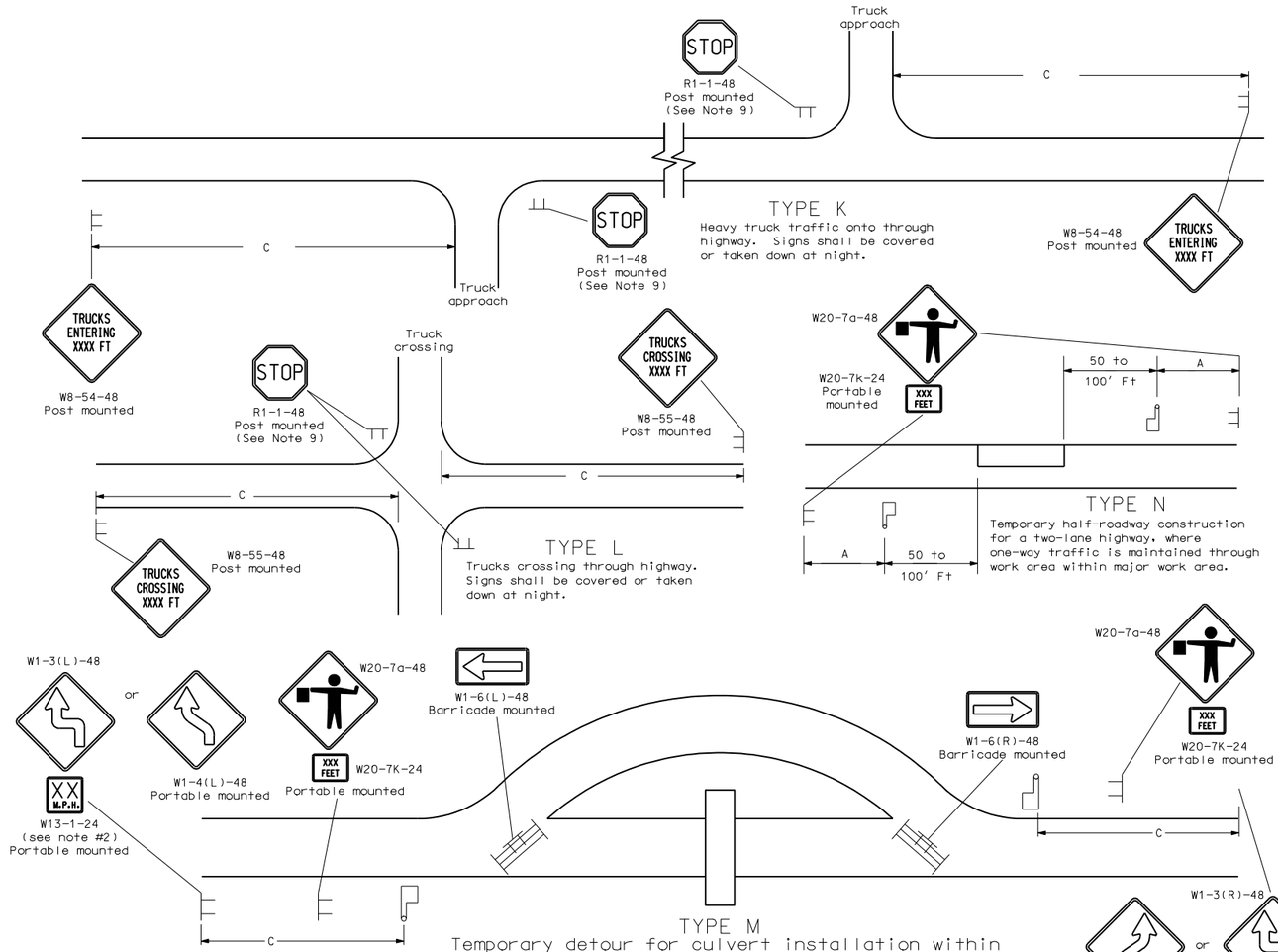
CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-22



Notes

1. Barricade shown to be placed on roadway shall be on a moveable assembly. on the top of the top barricade bar. Sign shown to be placed on the roadway Sign to be mounted on barricades shall be mounted with the sign bottom shall be placed on skid mounted assemblies.
2. Where necessary, safe speed to be determined by the Engineer.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at $\frac{1}{2}$ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.
8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.

KEY

	Type I barricade		Work area
	Type II barricade		Flagger
	Type III barricade		Sequencing arrow panel
	Sign		Type A delineator or vertical panels back to back
	Delineator drum		
	Cones		

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

10-1-86

REVISIONS

DATE	CHANGE
09-30-93	General revisions
06-21-95	General revisions
08-15-96	Revise flag note
10-01-99	General revisions
02-02-00	W8-55-48
10-17-02	Deleted Work In Progress Sign
07-25-03	Revised R2-1a
04-01-04	Revised fee sign & Warning sign spacing. Revised note 3
12-01-04	PE stamp added
02-14-05	Added note 9 and revised stop sign size
06-29-05	Rev. Adv. Warning Table. Rev. Note 3

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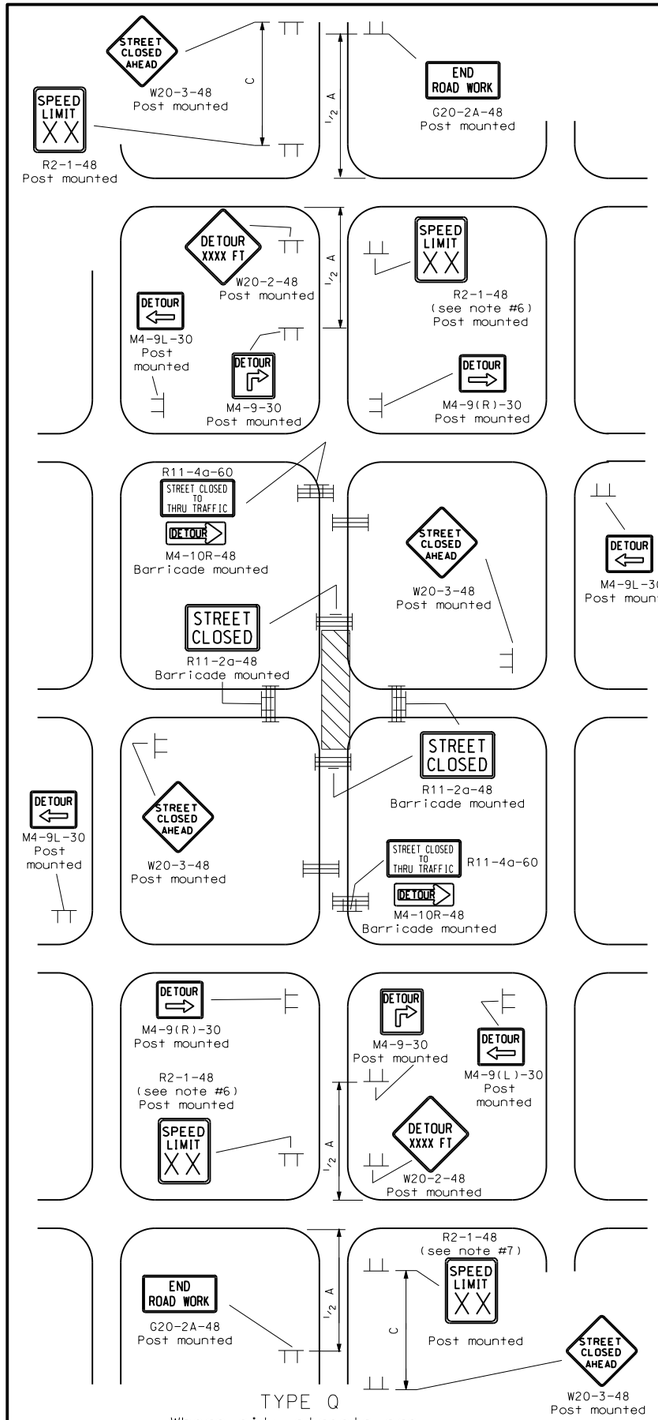
CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

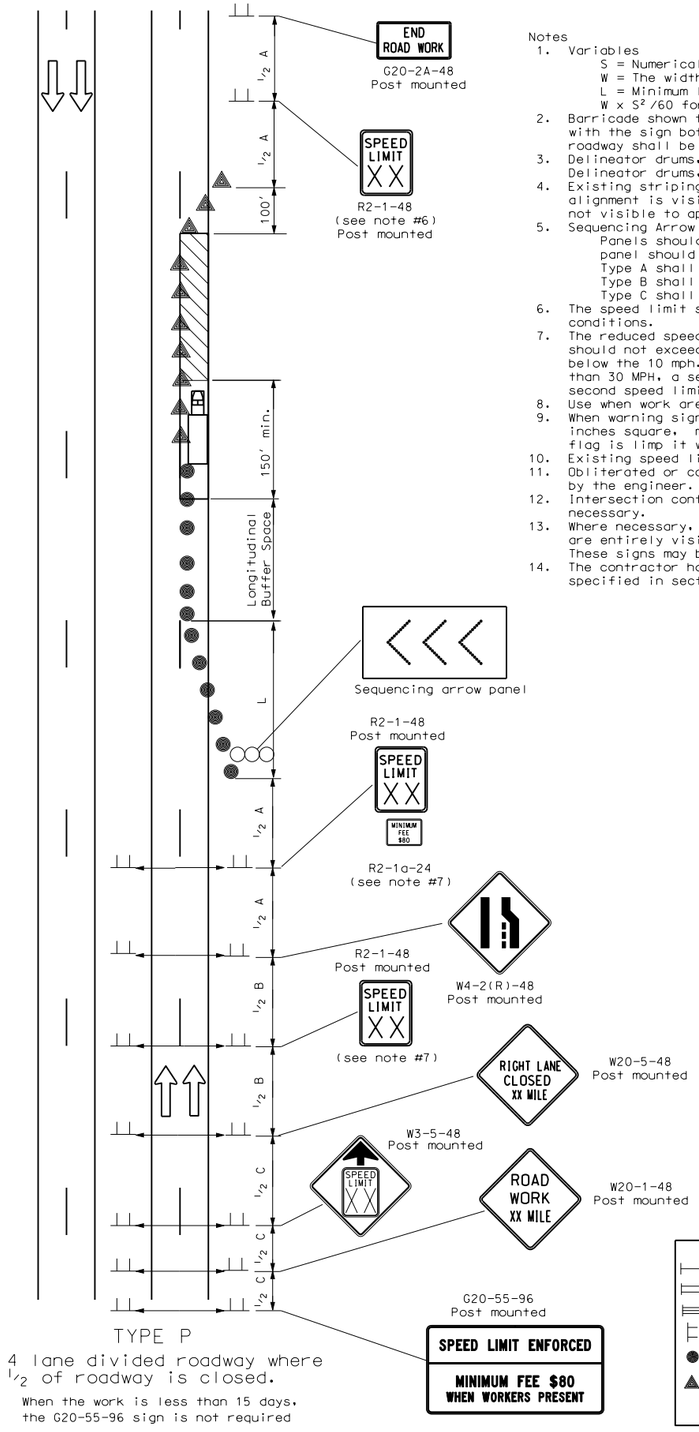
D-704-23



TYPE Q

Where city streets are used for detouring traffic

Urban projects do not need the G20-55-96 and R2-1a-24 signs.



TYPE P

4 lane divided roadway where ½ of roadway is closed.

When the work is less than 15 days, the G20-55-96 sign is not required

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper
   L = Minimum length of taper, or 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. Barricade shown to be placed on roadway shall be on a moveable assembly. Sign to be mounted on barricades shall be mounted with the sign bottom on the top of the top barricade bar. signs shown to be placed on the roadway shall be placed on skid mounted assemblies.
3. Delineator drums, or cones used for tapering traffic shall be spaced at dimension "S". Delineator drums, or cones used for tangents shall be spaced at 2 times "S".
4. Existing striping shall be removed as required. Delineator will only be used when inslope is 4:1 or better and roadway alignment is visible to approaching vehicles. Vertical panels shall be used where roadways has steep slopes and not visible to approaching vehicles. Delineators and vertical panels shall be installed back to back.
5. Sequencing Arrow Panels
   Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room the panel should be moved closer to the work area so that it can be placed on the roadway surface.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph 5000 ADT or less)
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph and 5000 ADT).
6. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
7. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
8. Use when work area is 1 mile or longer.
9. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
10. Existing speed limit signs within a reduced speed zone shall be covered.
11. Obliterated or covered payment marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
12. Intersection control for Type Q may have to be changed on detour. The Engineer in the field shall determine what control is necessary.
13. Where necessary, safe speed to be determined by the Engineer. When parking is present, signs shall be placed so they are entirely visible above parked vehicles or placed at the edge of the parking area so they are visible to oncoming traffic. These signs may be skid mounted when placed on the roadway surface.
14. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.

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

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

KEY

Type I barricade	Work area
Type II barricade	Flagger
Type III barricade	Sequencing arrow panel
Sign	Type A delineator or vertical panels back to back
Delineator drum	
Cones	

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-1-86

REVISIONS

DATE	CHANGE
09-03-96	70 MPH
01-31-97	Sign spacing
10-01-99	General revisions
11-15-99	Add Taper Width to note
01-05-01	Revised note 3
07-19-02	Reversed End Road Work & Speed Limit Signs
07-25-03	Revised R2-1a and W20-1
04-01-04	Rev fee sign & warning & buffer spacing. Rev note 7
09-15-04	General revisions
12-01-04	PE Stamp added
06-29-05	Revised W4-2. Replaced R2-5a with W3-5. Rev. Adv. Warning Table. Rev. Note 7

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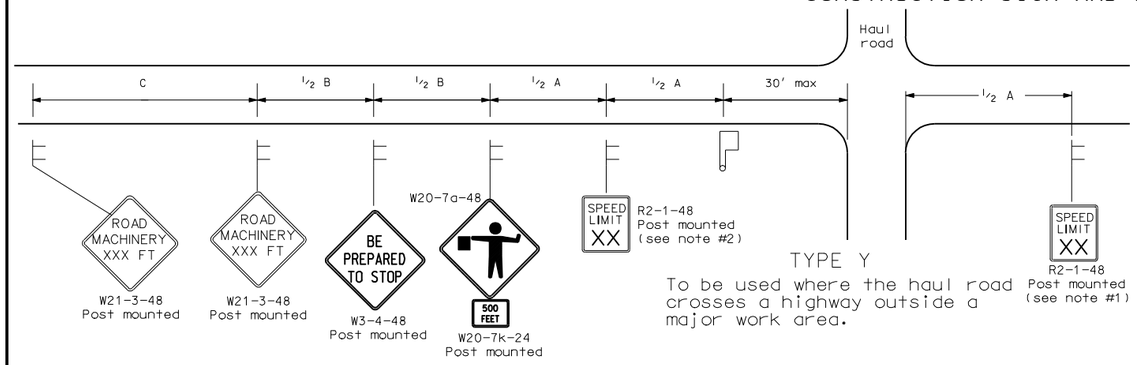
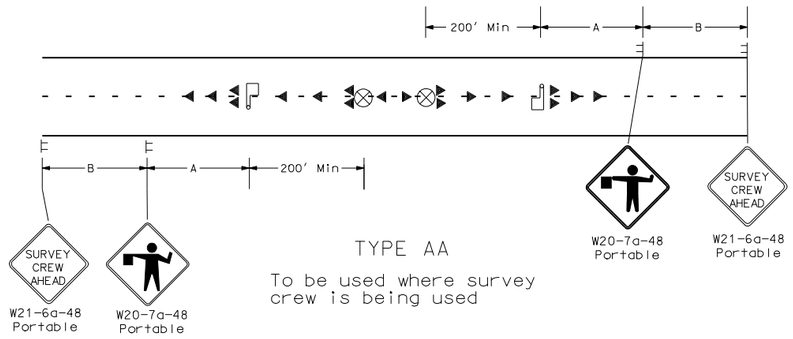
CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS

D-704-26



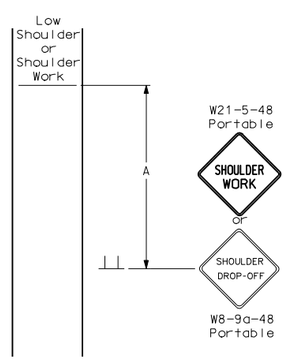
TYPE Y

To be used where the haul road crosses a highway outside a major work area.



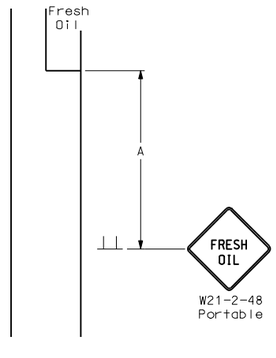
TYPE AA

To be used where survey crew is being used



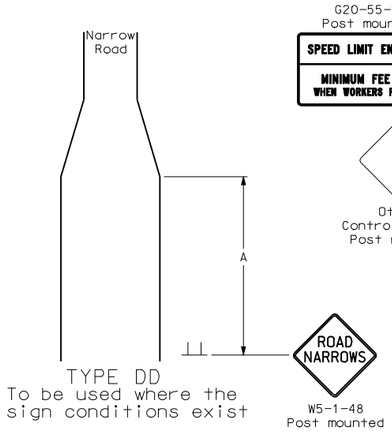
TYPE BB

To be used within a major work area where the sign conditions exist



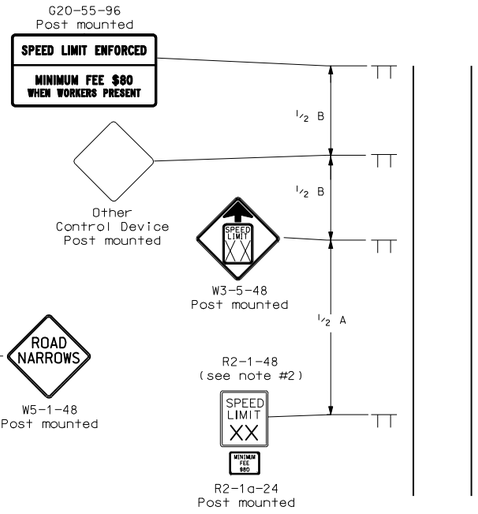
TYPE CC

To be used where the sign conditions exist



TYPE DD

To be used where the sign conditions exist

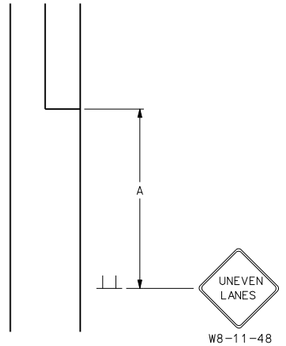


TYPE Z

To be used where speed zone is needed

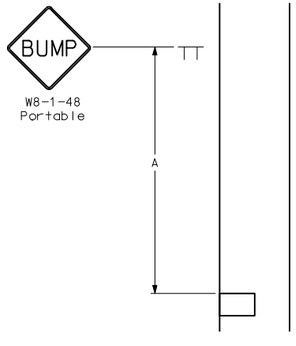
Notes

1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
4. Existing speed limit signs within a reduced speed zone shall be covered.
5. The contractor has the option of using portable sign supports in lieu of post mounted sign as shown on the standard drawings as specified in section 704.03 C.
6. G20-55-96 or R2-1a-24 signs are not required if this standard is part of other traffic control layouts, or the work is less than 5 days.



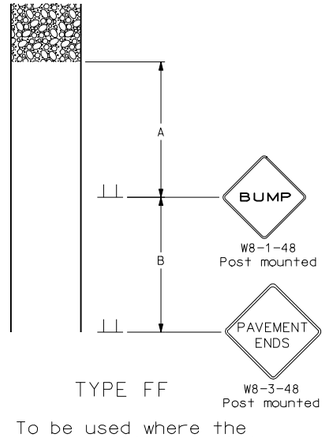
TYPE GG

To be used where a difference of elevation between lanes exist



TYPE EE

To be used where the sign conditions exist



TYPE FF

To be used where the sign conditions exist

KEY

- Type I barricade
- Type II barricade
- Type III barricade
- Sign
- Delineator drum
- Cones
- Work area
- Flagger
- Sequencing arrow panel
- Type A delineator or vertical panels back to back

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

10-1-86

REVISIONS

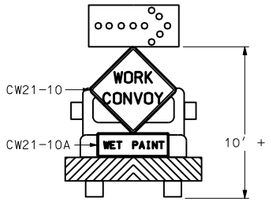
DATE	CHANGE
09-03-96	70 mph
01-31-97	Sign spacing
10-01-99	General Revision
07-19-02	Revised spacing of Speed Limit Signs
01-30-03	Pavement end sign
07-25-03	Revised R2-1a
04-01-04	Rev. fee sign & warning sign spacing. Add note 6
12-01-04	PE Stamp added
06-29-05	Replaced R2-5a with W3-5. Rev. Adv. Warning Table. Rev. Note 2
07-05-05	Changed W20-7b to W3-4

This document was originally issued and sealed by Mark S Gaydos Registration Number PE-4518, on 07/05/05 and the original document is stored at the North Dakota Department of Transportation

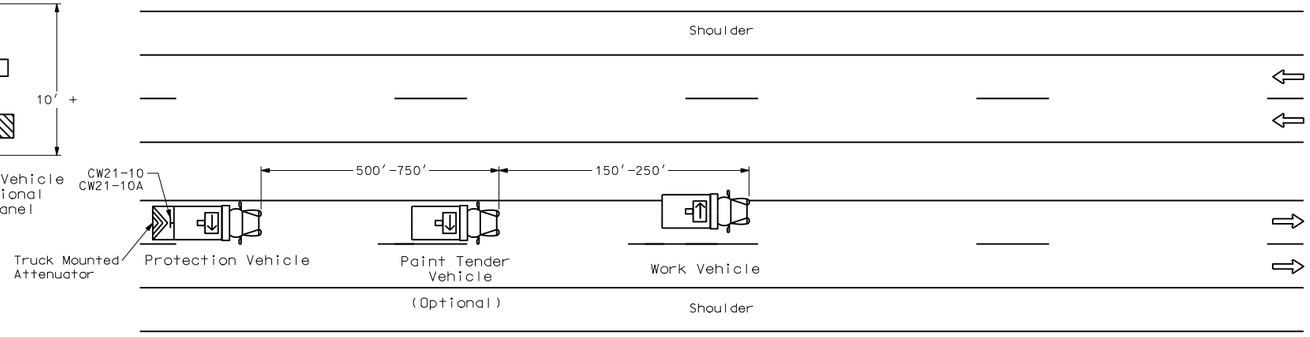
TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS ON CONVENTIONAL HIGHWAYS

(Pavement Marking)

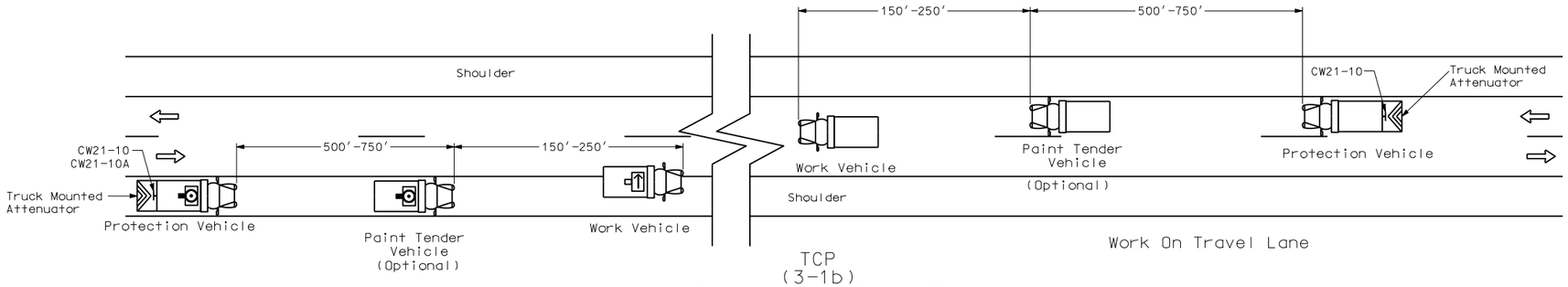
D-704-27



Typical Protection Vehicle
with Right Directional
Flashing Arrow Panel

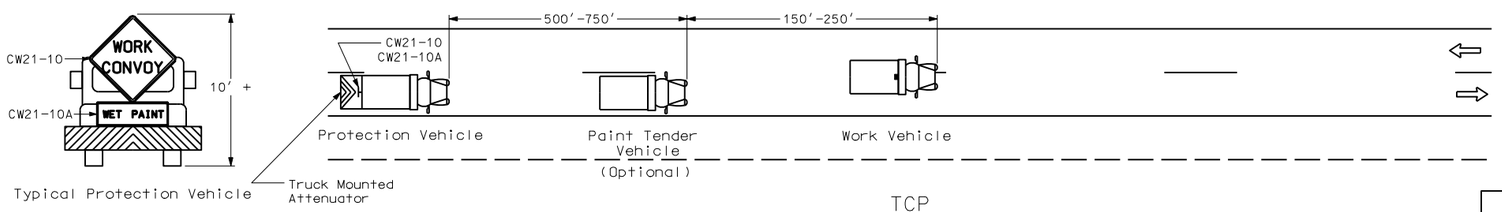


TCP
(3-1a)
Undivided Multi lane Roadway



TCP
(3-1b)

Work On Shoulder — Two-Way Roadway with Paved Shoulders — Work On Travel Lane

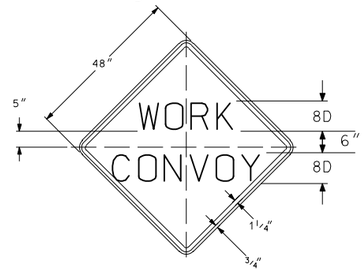


Typical Protection Vehicle

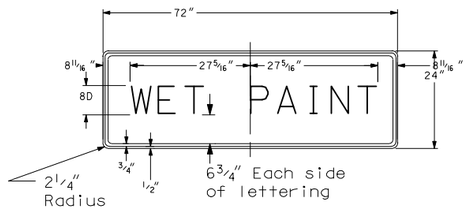
TCP
(3-1c)
Two-Way Roadway without Paved Shoulders

Notes
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractors expense.
2. All traffic control devices shall be in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD), latest edition.
3. The use of yellow rotating beacons or strobe lights on vehicles is required unless otherwise stated elsewhere in the plans.
4. Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
5. Each vehicle shall have two-way radio communication capability.
6. When work convoys must change lanes, the protection vehicle should change lanes first to shadow other convoy vehicles.
7. Vehicle spacing between the protection vehicle and paint tender vehicle will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the protection vehicle in time to slow down and/or change lanes as they approach the trail vehicle.
8. Sign Colors
   Letters = Black
   Border = Black
   Background = Orange

Sign Details



CW21-10



CW21-10A

KEY

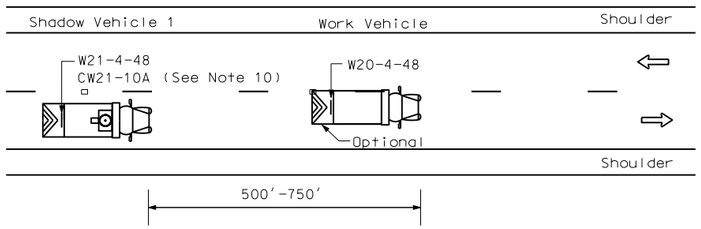
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
01-22-92	
REVISIONS	
DATE	CHANGE
02-24-93	General
03-15-95	General
06-21-95	Remove caution mode
10-01-99	General Revisions
07-25-00	General Revisions
12-01-04	PE Stamp added

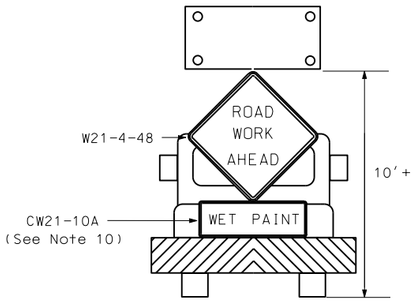
This document was originally issued and sealed by MARK S GAYDOS, Registration Number PE-4518, on 12/01/04 and the original document is stored at the North Dakota Department of Transportation

TRAFFIC CONTROL FOR MOBILE OPERATIONS

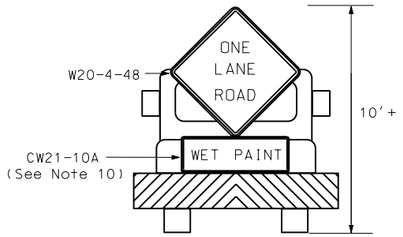
D-704-28



Two Lane Highway
(Work on Travel Lane)

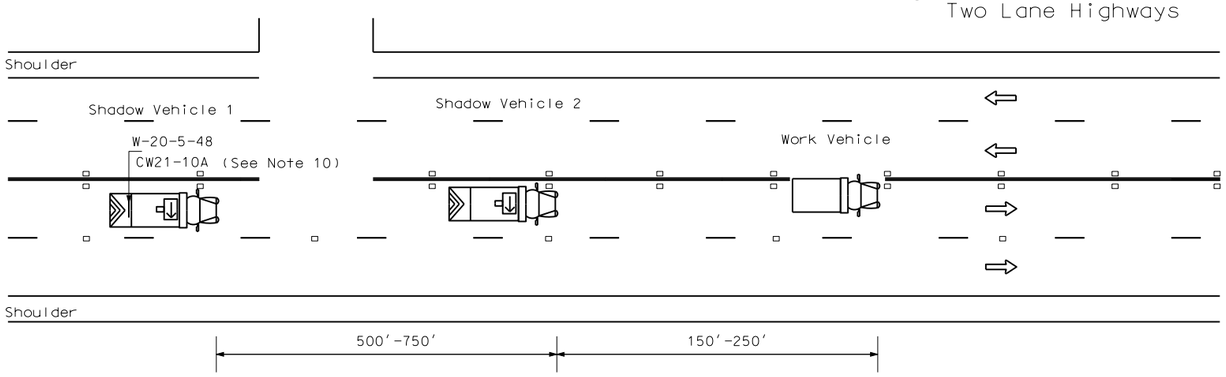


Typical Shadow Vehicle 1
Two Lane Highways



Work Vehicle
Two Lane Highways

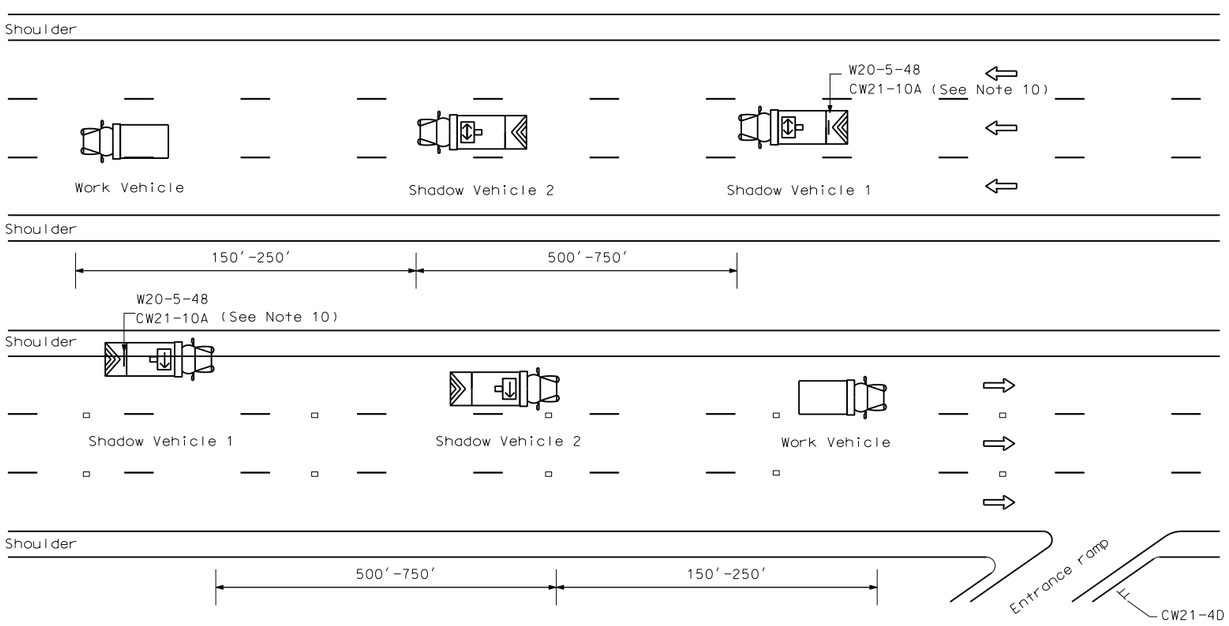
Notes
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractors expense.
2. All traffic control devices shall be in accordance with the "Manual on Uniform Traffic Control Devices" (MUTCD), latest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



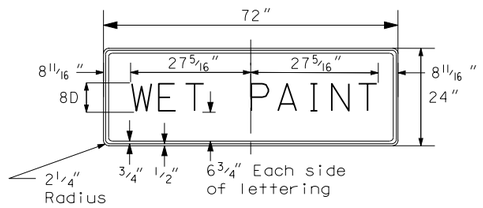
Undivided Multi lane Highway

Sign Details

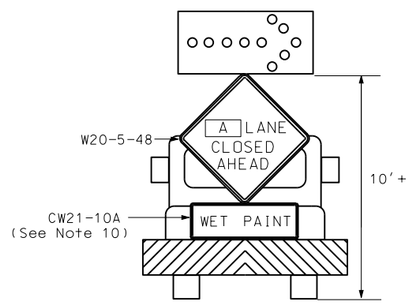
W20-5-48



Divided Multi lane Highway



CW21-10A



Typical Shadow Vehicle 1 & 2
Multi Lane Highways

KEY

A = Left Right Center

Truck mounted attenuator

Flashing arrow panels:

Right directional

Left directional

Double arrow directional

Caution Mode

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
01-22-92	
REVISIONS	
DATE	CHANGE
02-24-93	General
06-21-95	Remove arrow panels
06-04-99	W21-4-48 sign
10-01-99	General revisions
07-25-00	General revisions
05-24-02	Major revisions
12-01-04	PE Stamp added

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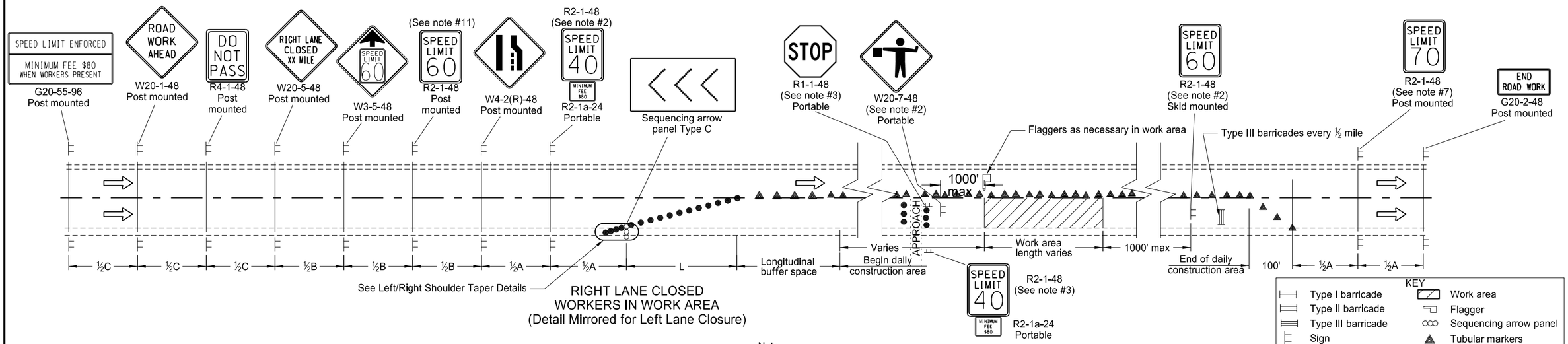
SIGN LAYOUT FOR ONE LANE CLOSURE

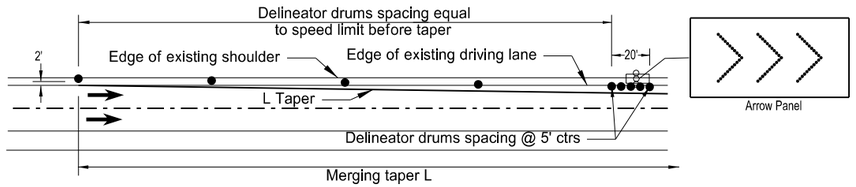
D-704-34



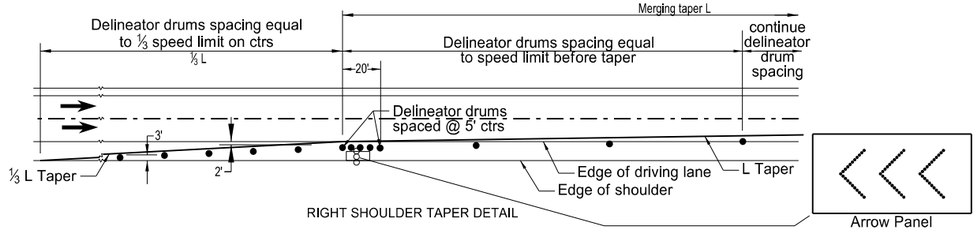
RIGHT LANE CLOSED
WORKERS IN WORK AREA
(Detail Mirrored for Left Lane Closure)

Notes:

1. Advance signs for flagging should be installed when flaggers are present.
2. The advanced flagger sign and the speed limit signs shall be moved as the work area moves through the construction zone. When the work area is not visible from the flagger, the flagger station shall be placed so the work area is visible. The 40 mph speed limit sign shall be spaced at ½A in advance of the flagger sign. The 60 mph speed limit sign shall also be moved. Upon completion of the work day or when workers are not present, the 40 mph speed limit and the Minimum Fee $80 signs shall be covered or removed. The exact speed limit shall be determined in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, the approach shall be controlled by installing a 40 mph speed limit sign. If this approach is on the side of the lane closure, the existing stop sign shall be covered and a new portable stop sign shall be installed. When the main line 40 mph speed zone is moved past the approach, the approach speed limit sign shall be removed.
4. Variables:
   S=Numerical value of speed limit or 85th percentile
   W=The width of taper.
   L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Delineator drums, used for tapering traffic shall be spaced at the dimension "S". Tubular markers used for tangents shall be spaced at 2 times dimension "S".
6. Sequencing arrow panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
7. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
8. Existing speed limit signs within a reduced speed zone shall be covered.
9. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
10. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 mph. Where speed limits are to be reduced more than 30 mph, a second speed limit sign shall be installed with the desired speed reduction, but shall not exceed 30 mph. The second speed limit sign shall be placed at ½B.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
12. Sign G20-55-96 is not required if this standard is part of other traffic control layouts or the work is less than 15 days.



LEFT SHOULDER TAPER DETAIL



RIGHT SHOULDER TAPER DETAIL

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.

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

9-26-2012

REVISIONS

DATE	CHANGE

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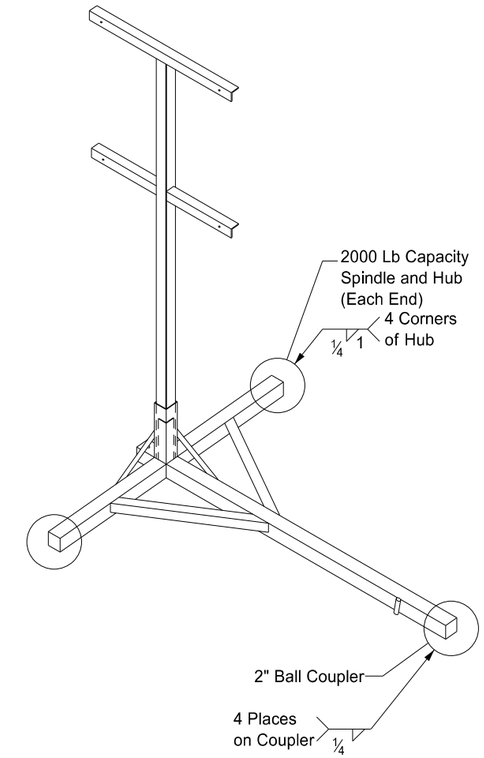
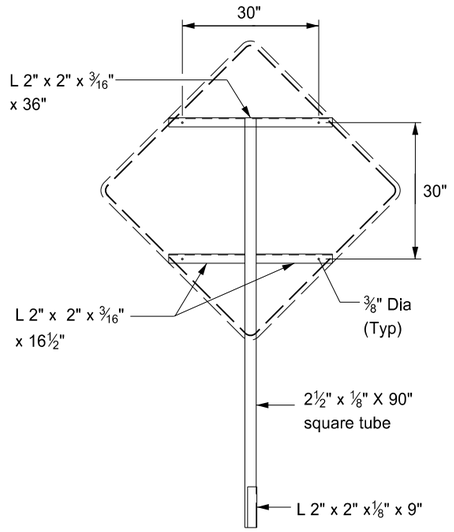
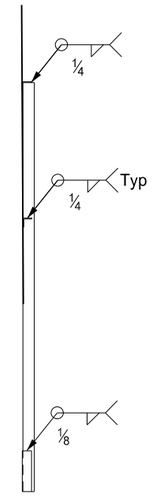
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



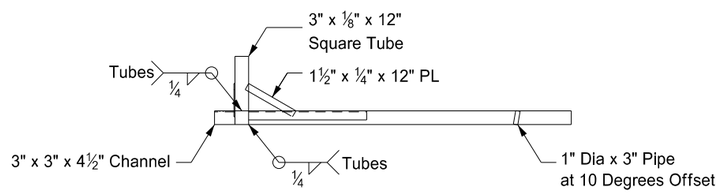


FRONT



RIGHT

SIGN SUPPORT



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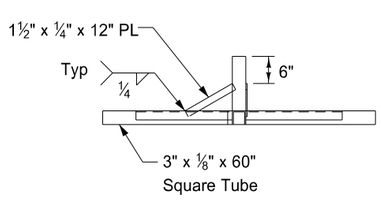
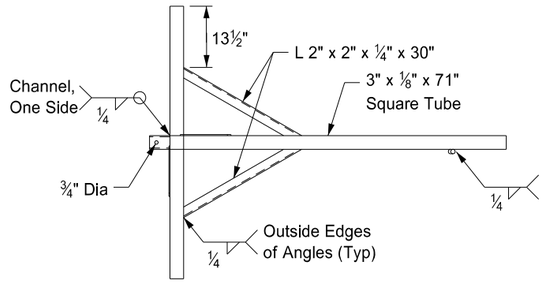


RIGHT



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

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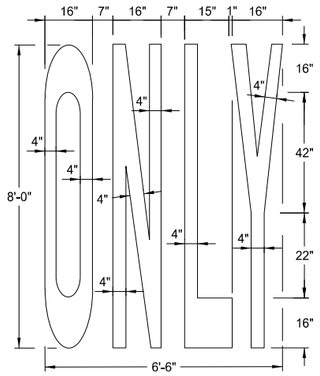
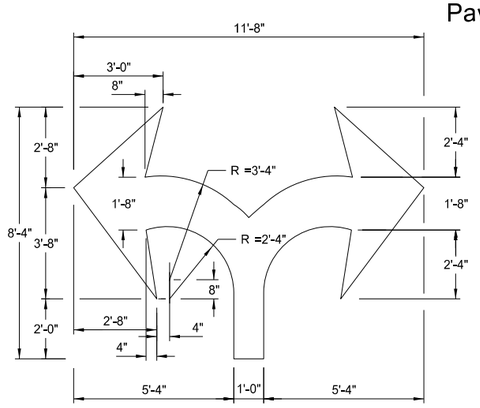
Pavement Marking Message Details

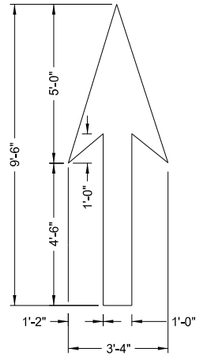
D-762-1



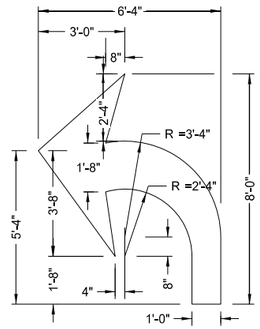
22 S. F.



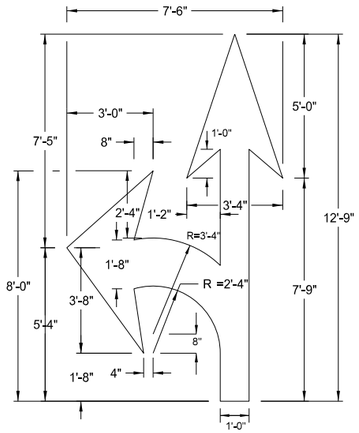
29 S. F.



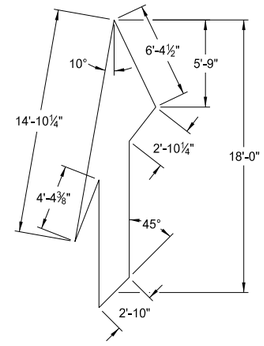
12 S. F.



16 S. F.

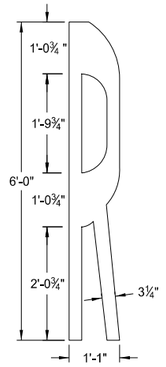


27 S. F.

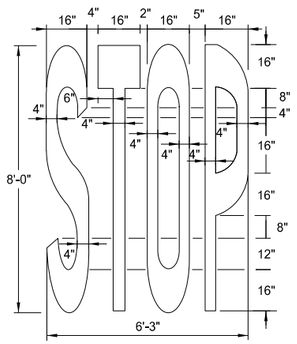


41 S. F.

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



4 S. F.



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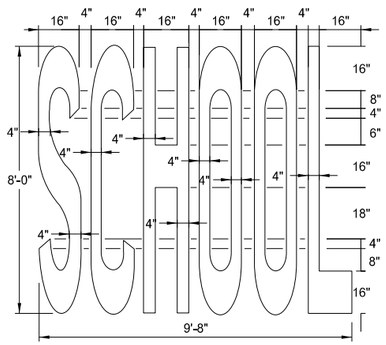
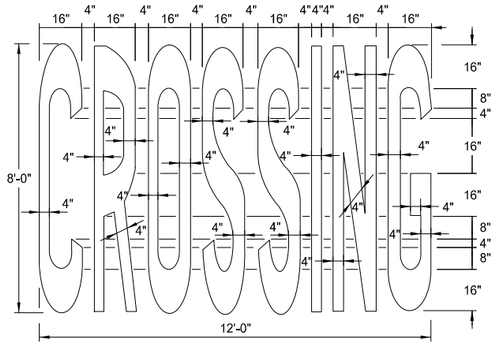


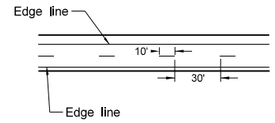
34.5 S. F.



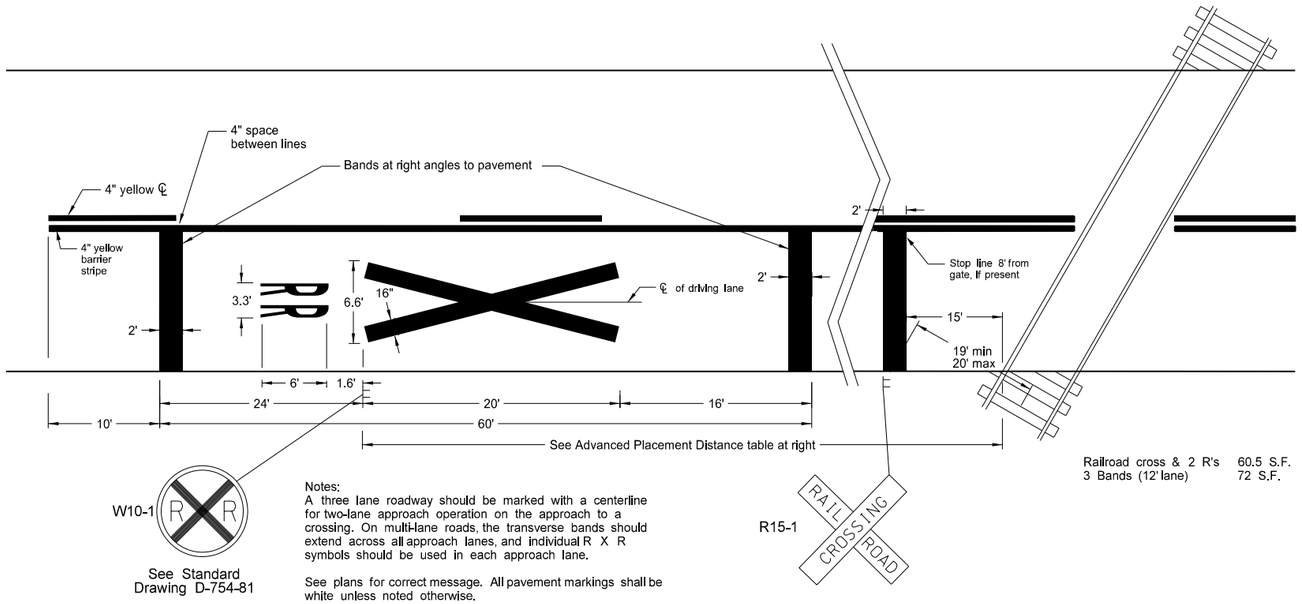
46 S. F.

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

Chevron Crosshatching Table



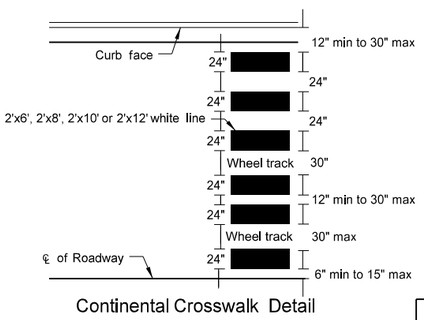
Centerline Pavement Marking Skip Spacing Detail



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

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

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



Continental Crosswalk Detail

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

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

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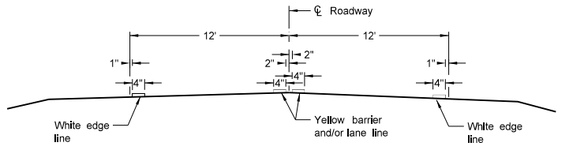
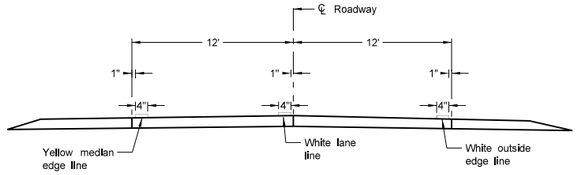
PAVEMENT MARKING

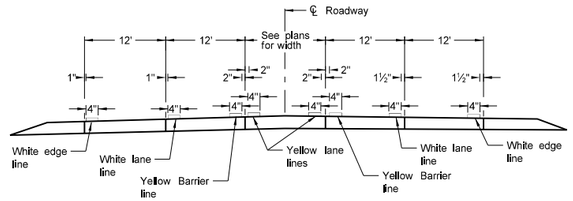
D-762-4



Two Lane Two Way
RURAL ROADWAY



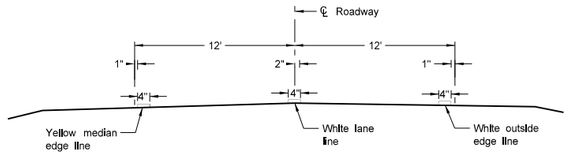
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



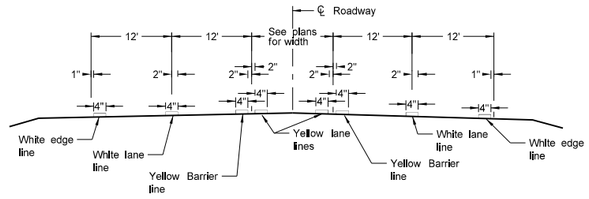
RURAL FIVE LANE ROADWAY
Concrete Section

NOTES:

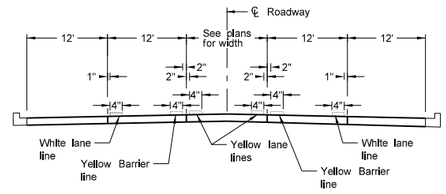
1. Edge lines shall be continued through private drives and field drives and broken for intersections.



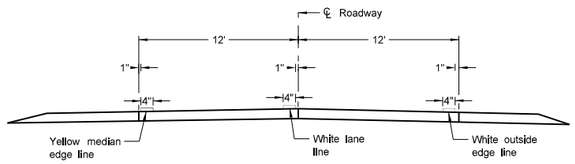
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



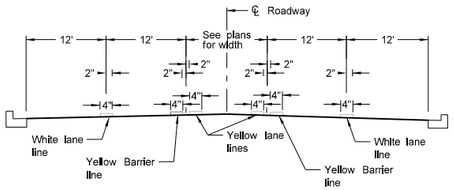
RURAL FIVE LANE ROADWAY
Asphalt Section



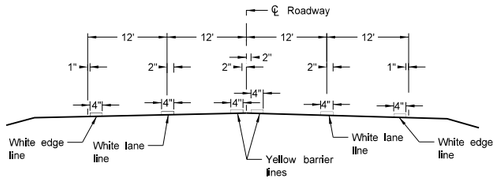
URBAN FIVE LANE SECTION
Concrete Section



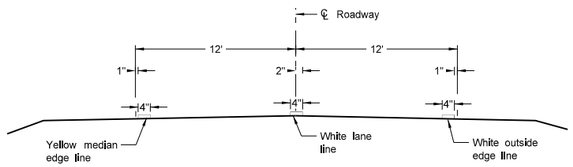
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



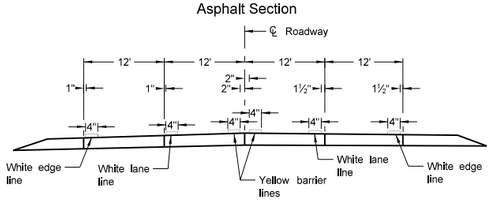
URBAN FIVE LANE SECTION
Asphalt Section



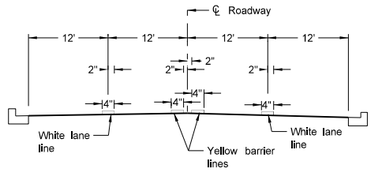
RURAL FOUR LANE ROADWAY
Asphalt Section



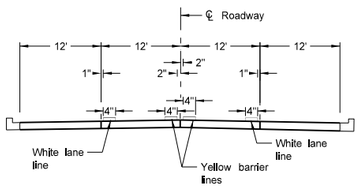
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



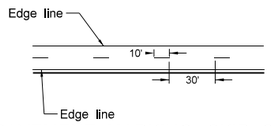
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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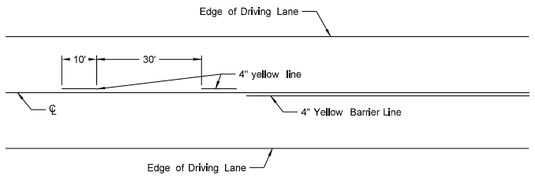
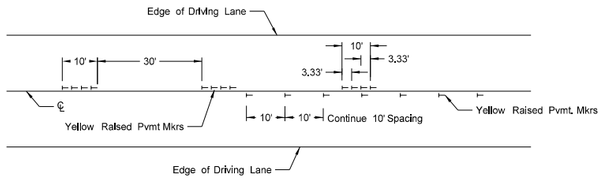
SHORT-TERM PAVEMENT MARKING

D-762-6

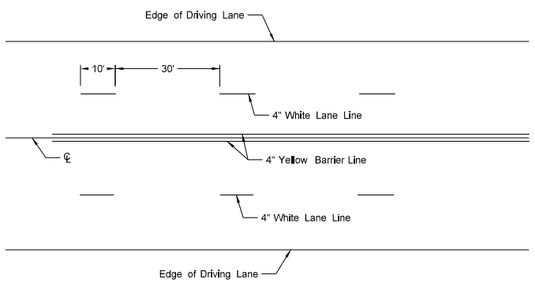


Painted or Tape Lines



Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY



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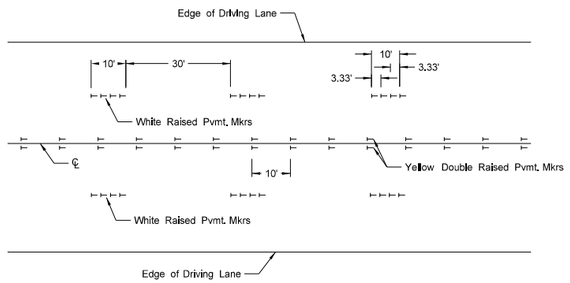
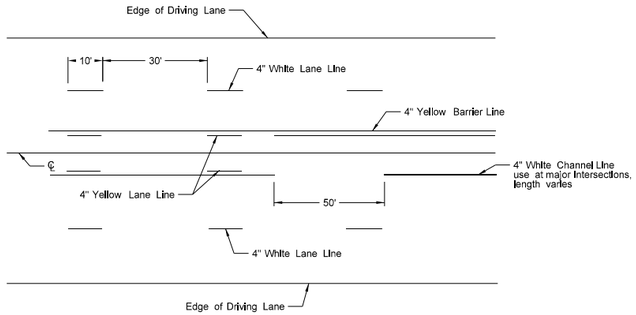


Raised Pavement Markers

FOUR LANE ROADWAY



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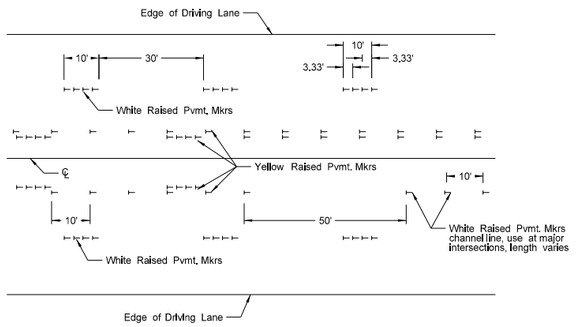
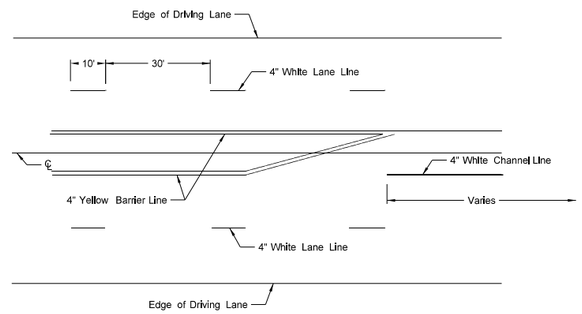


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



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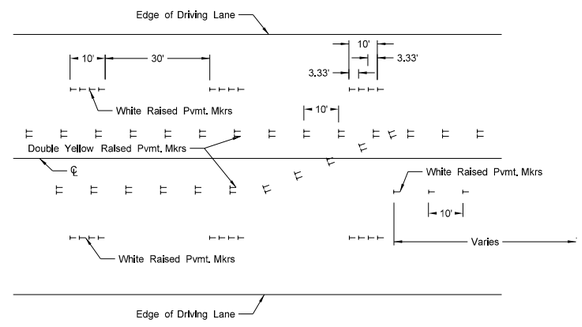

Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

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

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

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

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