

DESIGN DATA				
Traffic		Average Daily		
Current	2017	Pass: 670	Trucks: 204	Total: 874
Preventive Maintenance				

JOB # 22

NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

NH-4-005(038)117

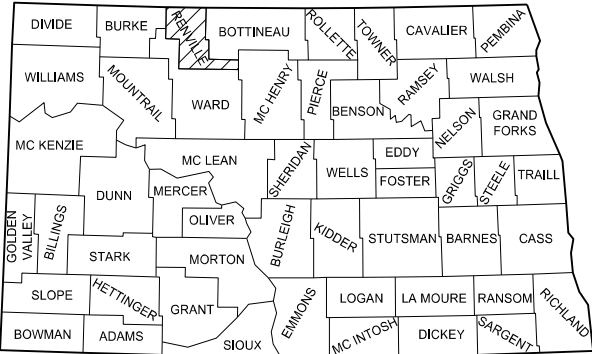
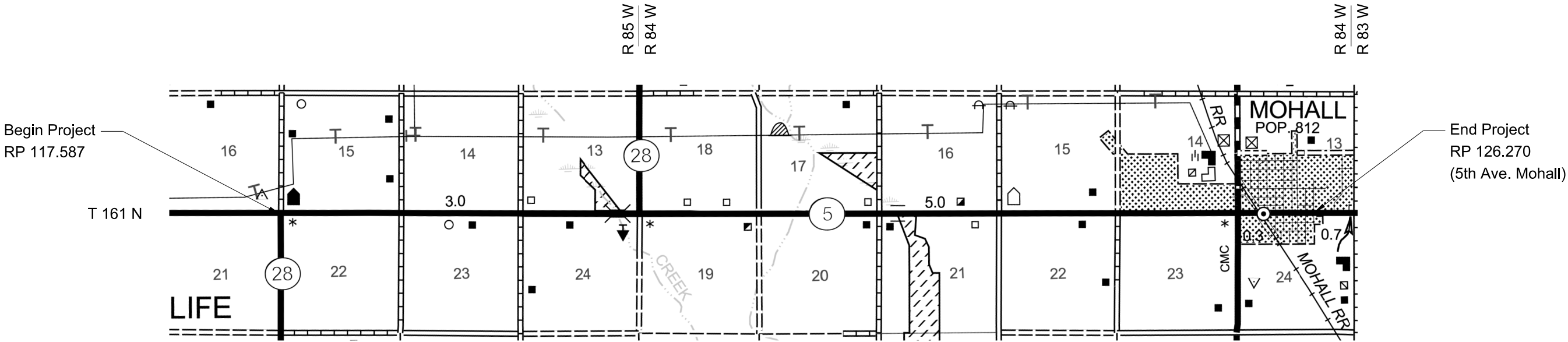
Renville County
W. Jct. ND 28 E. Thru Mohall

Chip Seal

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NH-4-005(038)117	22389	1	1

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-4-005(038)117	8.683	8.683



STATE COUNTY MAP



DESIGNER Lonnie Heth
DESIGNER
DESIGNER

ND DEPARTMENT OF TRANSPORTATION MINOT DISTRICT ENGINEER	
James L. Redding /s/	01/28/19

MINOT DISTRICT

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Registration Number
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-005(038)117	6	1

NOTES

- 100-P02 COORDINATION WITH CITY OF MOHALL: Coordinate work activities with Mohall City officials to address traffic control needed for the proposed project. Contact Tom Witteman @ 701-240-5226 at least 48 hours before conducting any work through Mohall.
- 107-P01 HEIGHT RESTRICTION FOR CONSTRUCTION EQUIPMENT: Between RP 125.00 and RP 125.20 equipment is restricted to a height of 16 feet or less due to Airport restrictions. Equipment height will be measured from the centerline of the roadway and will include the extended box height of end dumps.
- 107-P02 PAVEMENT SWEEPING: Sweep the roadway within the City of Mohall at the end of each workday to pick up excess Cover Coat material. Utilize a vacuum or pickup type sweeper.
- 107-113 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses the Northern Plains Railroad at RP 125.700. The type of work that will be performed within the railroad right of way is Chip Seal. Direct inquiries regarding protective liability insurance to:
- Jesse Chalich
Vice President Operations
Northern Plains Railroad
P.O. Box 38
Fordville, ND 58231
701-229-3330
jesse_chalich@nprail.com
- Obtain information regarding crossing number **092939W** from the Federal Railroad Administration website: <http://safetydata.fra.dot.gov/Officeofsafety/>
- 420-P01 FOG COAT: Do not fog seal Mohall city-section.
- 420-P02 TEST STRIPS: Construct (one) 1000' test strip on each of the tied projects at locations to be determined by the Engineer.
- 420-P03 BITMUNINOUS SEAL COAT MATERIAL: Use CRS2P Emulsified Asphalt. Apply at a rate of 0.40 – 0.43 Gal per SY.

- 704-P01 TRAFFIC CONTROL FOR SEAL COATS: Provide traffic control consisting of a temporary lane closure, flagging, and a pilot car.
- Traffic control device quantities are based on a 5 mile limitation and following list:
1. Standard D-704-15, layout A, flagging stations near the active work area require sign W20-7a-48 only;
 2. Standard D-704-20, layout H, signing will be required at all major intersections.
 3. Standard D-704-22, layouts K and L.
- 704-500 PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers.
- Install PRS that meet the following criteria:
- Have no adhesives or fasteners required for placement;
 - Have a manufacture's speed rating that meets or exceeds the posted speed limit; and
 - Each strip in the array must weigh a minimum of 100 pounds.
- Use individual PRS constructed in one of the following manners:
- A single piece;
 - Inter locking segments; or
 - Two pieces hinged at the midpoint.
- An installed array of PRS consists of a minimum of 3 individual strips.
- Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.
- The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "Portable Rumble Strips".
- 762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for pavement marking items.

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-005(038)117	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.131	0.131
107	0100 RAILWAY PROTECTION INSURANCE	L SUM	0.5	0.5
420	0405 SEAL COAT	SY	155,659	155,659
702	0100 MOBILIZATION	L SUM	0.131	0.131
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,818	1,818
704	1048 PORTABLE RUMBLE STRIPS	EA	2	2
762	0103 PVMT MK PAINTED-MESSAGE	SF	265	265
762	0460 SHORT TERM PAINTED LINE-SEAL JOBS	LF	39,882	39,882
762	1104 PVMT MK PAINTED 4IN LINE	LF	110,919	110,919
762	1108 PVMT MK PAINTED 8IN LINE	LF	120	120
762	1124 PVMT MK PAINTED 24IN LINE	LF	24	24

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-005(038)117	10	1

		City Section - Mohall														
		Typical Section 1			Typical Section 2			Typical Section 3			Typical Section 4			Typical Section 5		
		West Jct. ND 28 to Mohall			1 st Ave. NW to 2 nd Ave. E.			2 nd Ave. E. to 3 rd Ave. E.			3 rd Ave E. to 4 th Ave. E			4 th Ave. E. to 5 th Ave. E.		
		8.297 Miles			0.201 Miles			0.047 Miles			0.069 Miles			0.069 Miles		
Material	Unit	Width	Quantity/ Mile	SY/Mile	Width	Quantity/ Mile	SY/Mile	Width	Quantity/ Mile	SY/Mile	Width	Quantity/ Mile	SY/Mile	Width	Quantity/ Mile	SY/Mile
CRS2P Emulsified Asphalt @ 0.40 Gal./ SY - Mainline	Ton	25	5,867	14,667	76	17,835	44,587	69	16,192	40,480	57	13,376	33,440	52.5	12,320	30,800
CRS2P Emulsified Asphalt @ 0.10 Gal./ SY – Shoulders & Sloughs	Ton	3	176	1,760	---	---	---	---	---	---	---	---	---	---	---	---
CSS1H Emulsified Asphalt @ 0.05 Gal./ SY – Mainline	Gal	25	733	---	---	---	---	---	---	---	---	---	---	---	---	---
Cover Coat Material Class 41-M @ 25lbs./ SY – Mainline	Ton	25	183.3	---	76	557.3	---	69	506	---	57	418	---	52.5	385	---

Approaches	SY	See Sec. 20-1 for details	4,067
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Short-term Pavement Marking

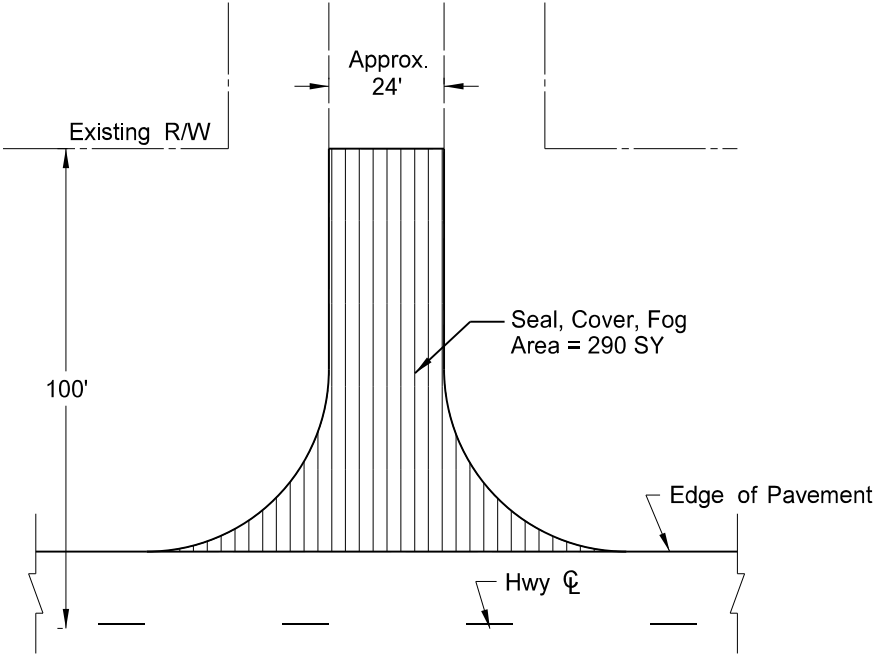
Location	Basis	Qty.
Centerline	Centerline Skips In-place	21,904 LF
Centerline	Barrier Stripe In-place	17,978 LF
Total is based on 2 applications		

Permanent Pavement Marking

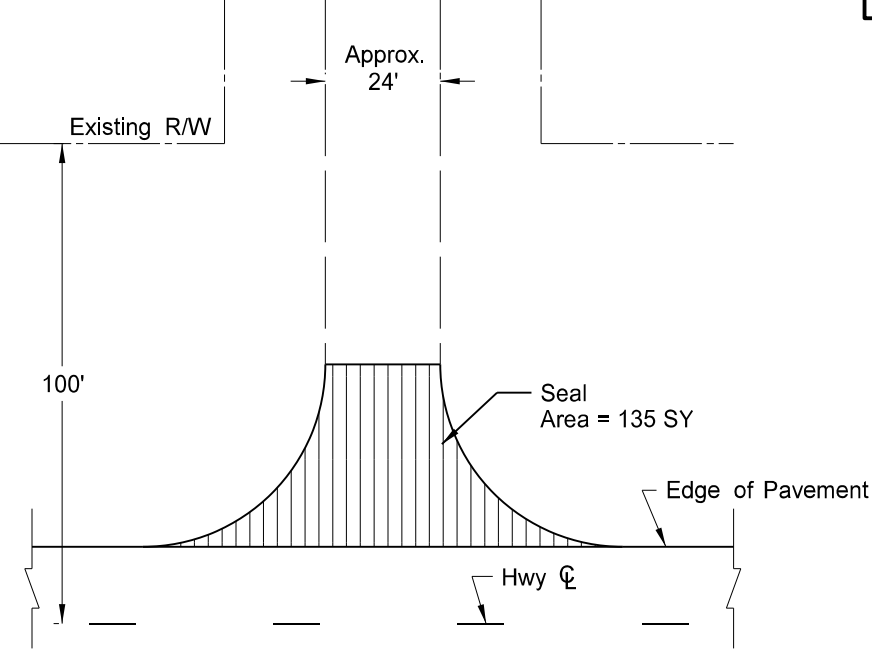
Pvmt. Mk. 4 In. Line	107,557	LF
Pvmt. Mk. 4 In. Line (Parking Lines – Mohall)	3,362	LF
Pvmt. Mk. 8 In. Line	120	LF
Pvmt. Mk 24 In. Line	24	LF
Pvmt. Mk. Message		
RR cross & 2 R's x 2	121 SF	
3 Bands (12' lane) x 2	144 SF	
	265	SF

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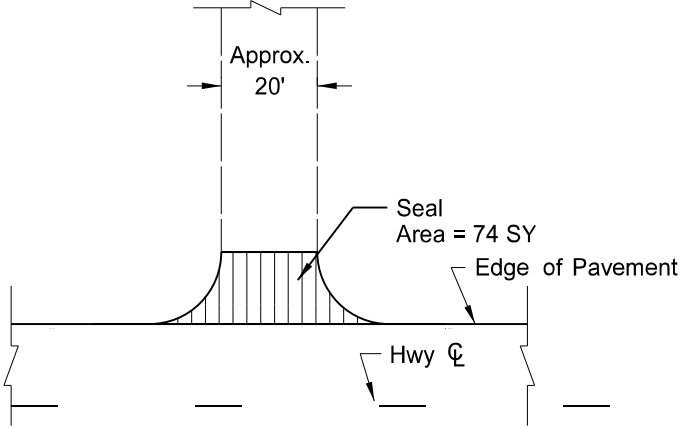
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-005(038)117	20	1



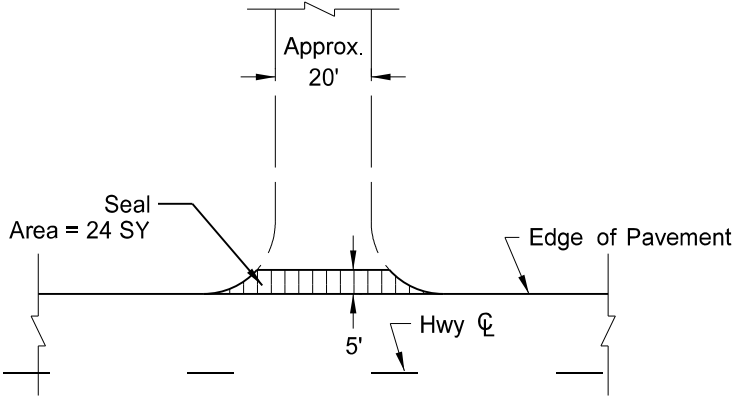
(1) Paved Section Line, County Road, or Street Approach



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



(3) Paved Private Drive Approach



(4) Field Drive Approach

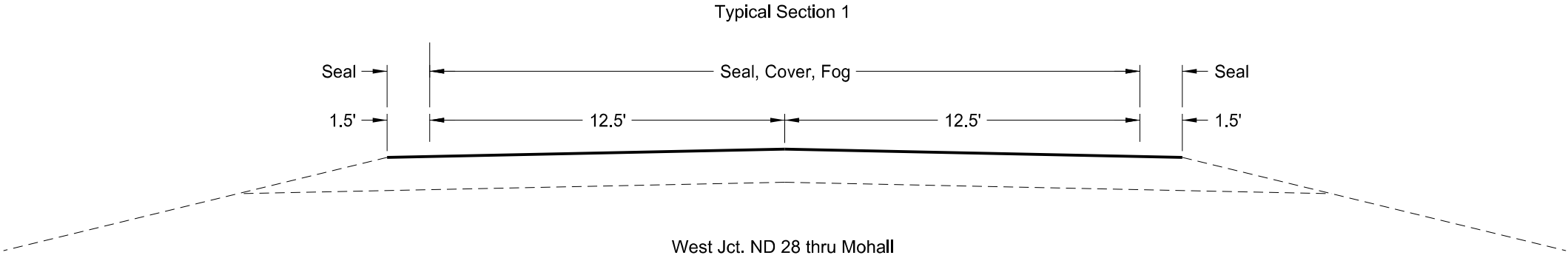
Basis of Estimate		(1)		(2)		(3)		(4)		Total	Total SY
		Paved Section Line		Gravel Section Line		Paved Private Drive		Field Drive			
Number of Locations		3		13		25		36			
		Total	SY	Total	SY	Total	SY	Total	SY		
Description	Unit	Total	SY	Total	SY	Total	SY	Total	SY		
CRS2P Emulsified Asphalt @ 0.40 Gal./SY	Gal	348	870	~	~	~	~	~	~	348	870
CRS2P Emulsified Asphalt @ 0.10 Gal./SY	Gal	~	~	176	1,755	185	1,850	158	1,584	519	5,189
CSS1H Emulsified Asphalt @ 0.05 Gal./SY	Gal	44	~	~	~	~	~	~	~	44	~
Cover Coat Material Class 41-M @ 25lbs./SY	Ton	11	~	~	~	~	~	~	~	11	~

Quantities for the approaches will be paid per SY under the bid item "Seal Coat."

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Approach Details

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-005(038)117	30	1

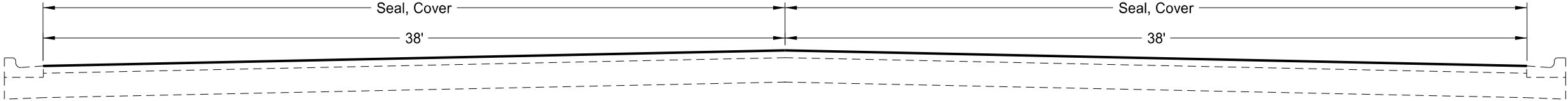


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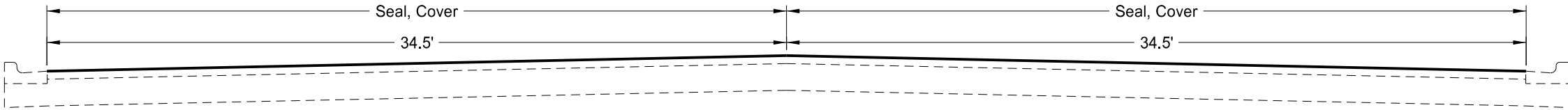
Typical
Section

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-005(038)117	30	2

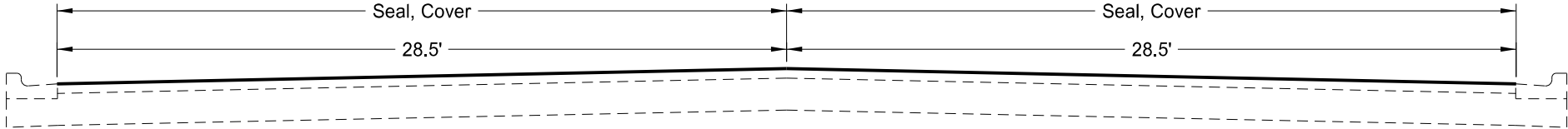
Typical Section 2
Mohall - RR Ave. to 2nd Ave. E.



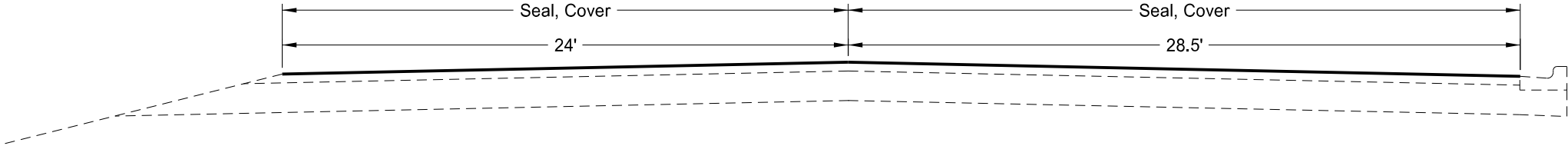
Typical Section 3
Mohall - 2nd Ave. E. to 3rd Ave. E.



Typical Section 4
Mohall - 3rd Ave. E. to 4th Ave. E.



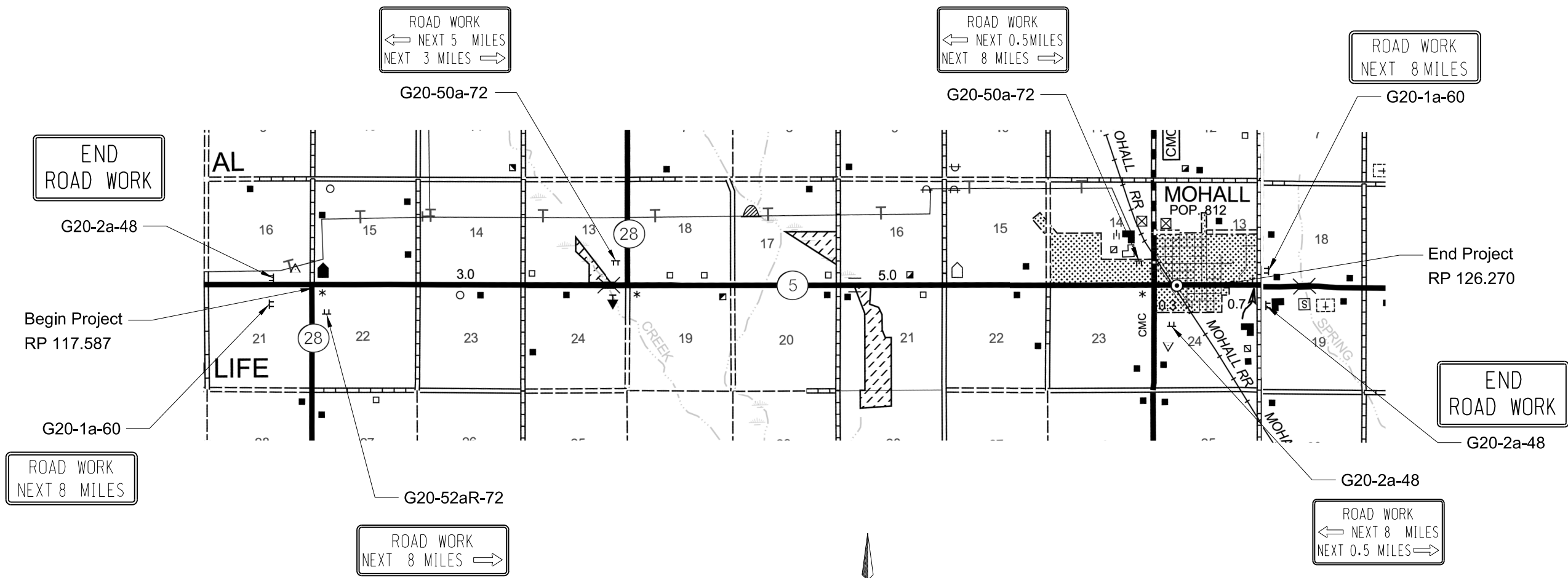
Typical Section 5
Mohall - 4th Ave. E. to 5th Ave. E.



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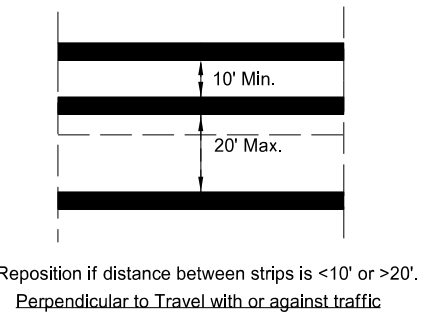
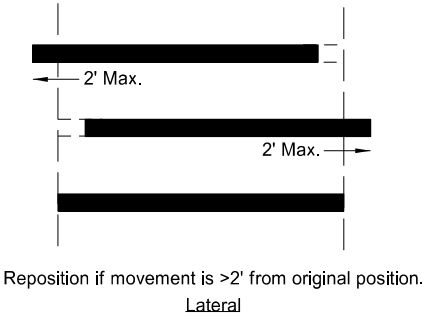
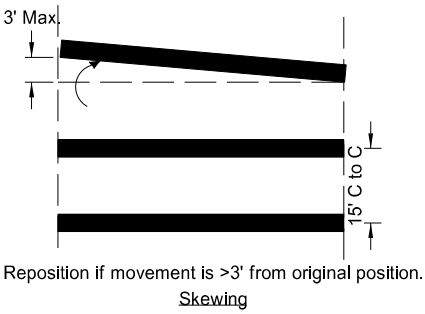
Typical
Sections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-005(038)117	100	2



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Construction Signing



PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

- Notes:
1. Number of devices were calculated using 40 mph. Speed determined in the field based on location and conditions.
 2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
 3. Use sign W20-52-54 when work area is 1 mile or longer.
 4. Rumble strips are not used on a non paved surface or in a pre-construction speed zone of 25 mph or less.

Road Type	ADVANCE WARNING SIGN SPACING		
	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

KEY

Work area

Flagger

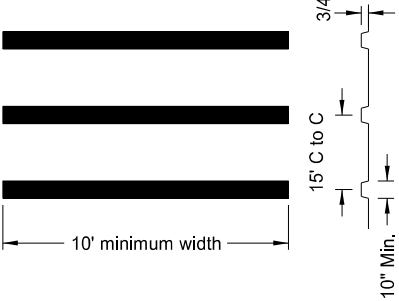
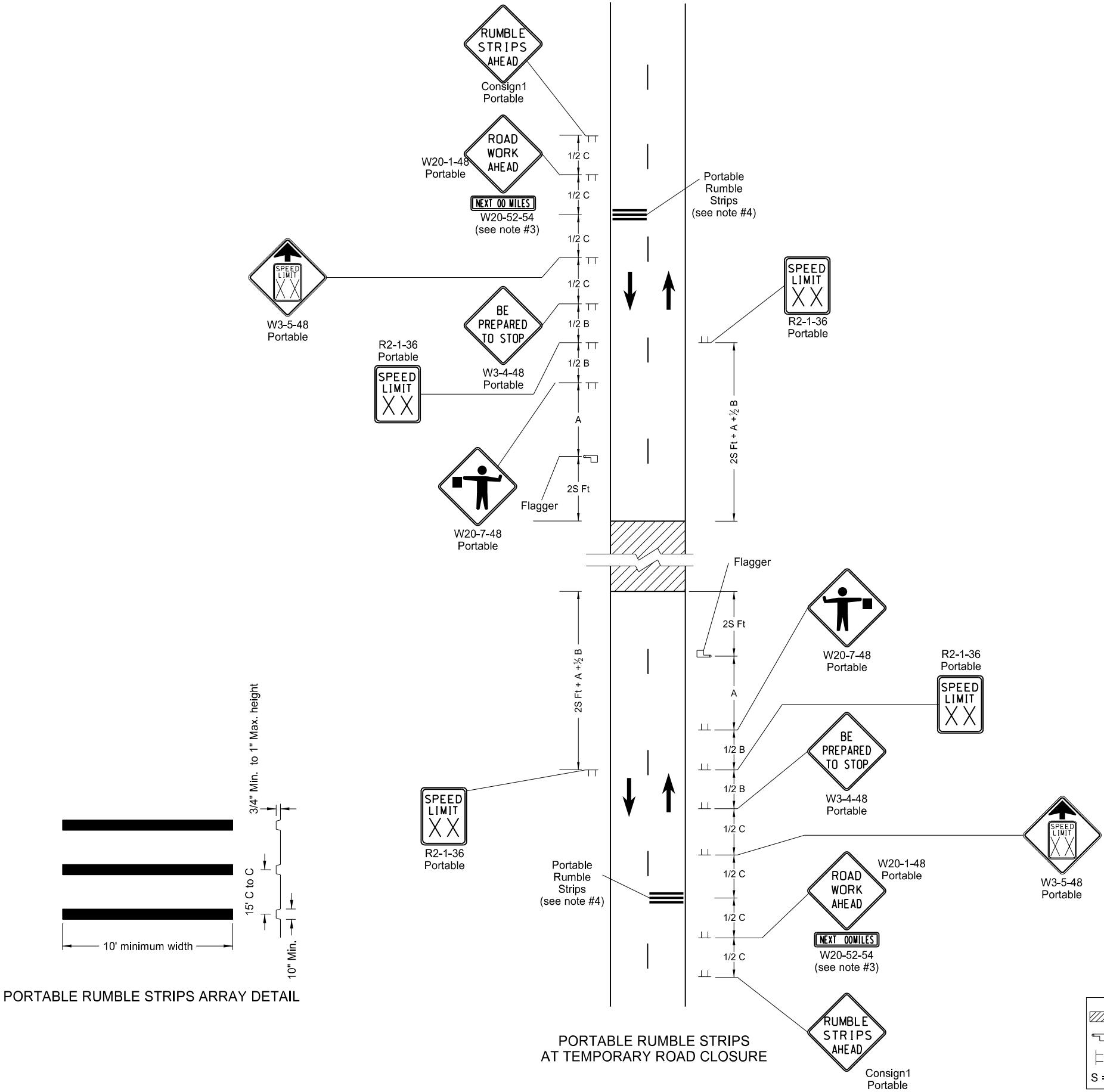
Sign

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

Drawing not to scale.

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Portable Rumble Strips



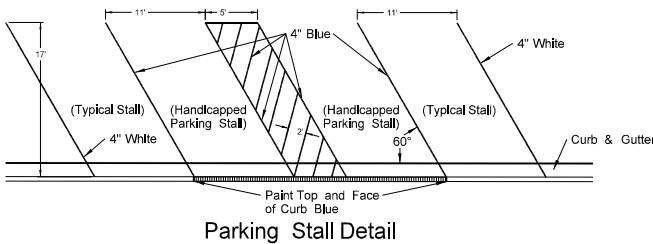
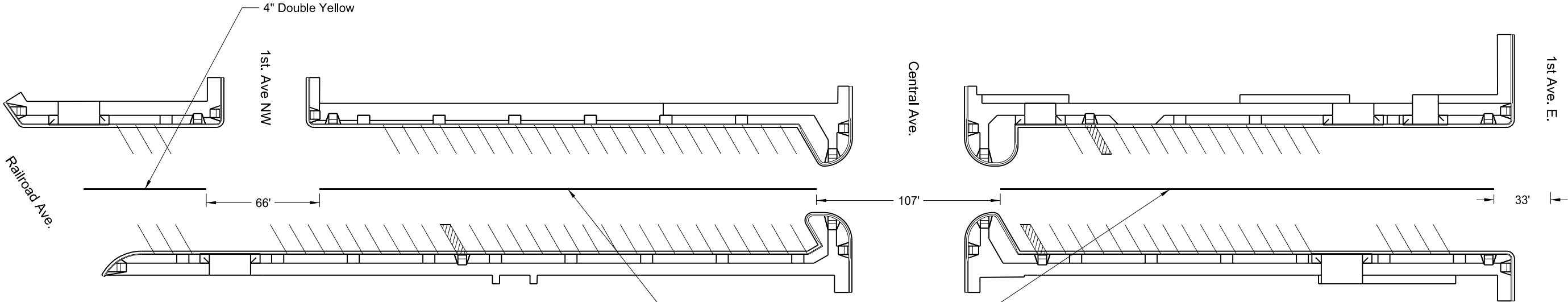
PORTABLE RUMBLE STRIPS ARRAY DETAIL

PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-005(038)117	120	1

Pvmt Mk Painted 4in Line

4" Double Yellow Barrier Lines	1296 LF
4" White Parking Lines	1620 LF
4" Blue Handicapped Parking Lines	384 LF



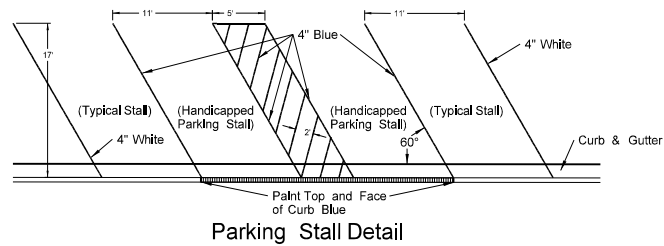
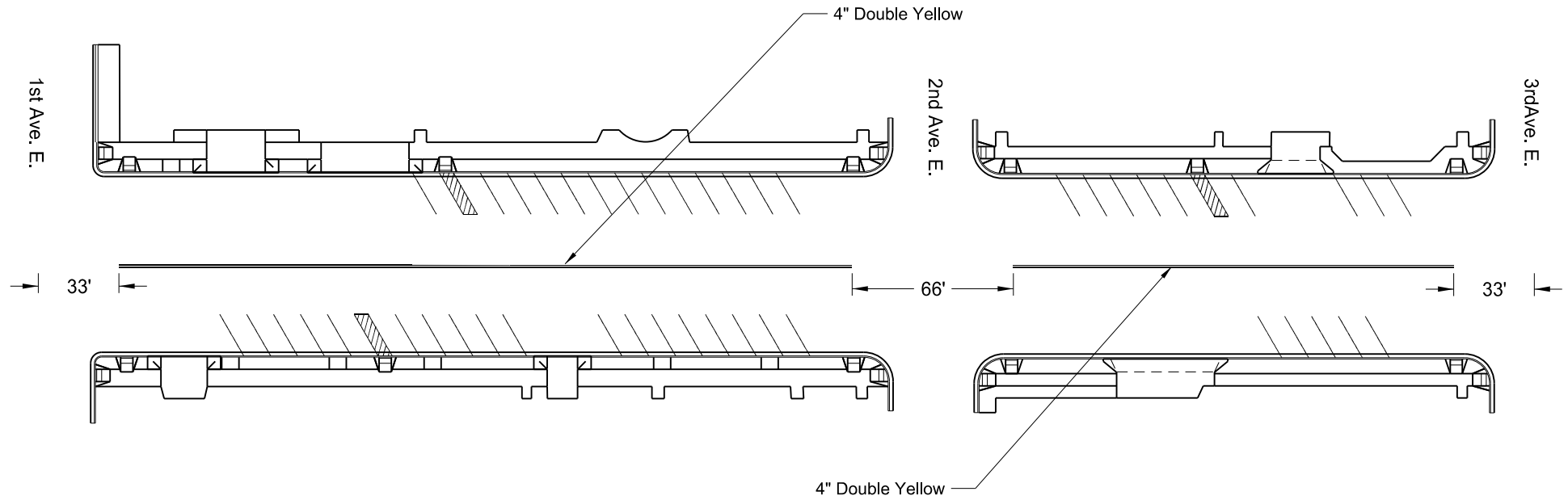
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Pavement Marking
City of Mohall

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-005(038)117	120	2

Pvmt Mk Painted 4in Line

4" Double Yellow Barrier Lines	960 LF
4" White Parking Lines	800 LF
4" Blue Handicapped Parking Lines	384 LF



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Pavement Marking
City of Mohall

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.		
Abn	abandoned	BV	butterfly valve
Abut	abutment	Byp	bypass
Ac	acres	C Gdrl	cable guardrail
Adj	adjusted	Calc	calculate
Aggr	aggregate	Cd	candela
Ahd	ahead	CIP	cast iron pipe
ARV	air release valve	CB	catch basin
Align	alignment	CRS	cationic rapid setting
Al	alley	C Gd	cattle guard
Alt	alternate	C To C	center to center
Alum	aluminum	Cl or C	centerline
ADA	Americans with Disabilities Act	Cm	centimeter
A	ampere	Ch	chain
&	and	Chnlk	chain-link
Appr	approach	Ch Blk	channel block
Approx	approximate	Ch Ch	channel change
ACP	asbestos cement pipe	Chk	check
Asph	asphalt	Chsld	chiseled
AC	asphalt cement	Cir	circle
Assmd	assumed	Cl	class
@	at	Cl	clay
Atten	attenuation	Cl F	clay fill
ATR	automatic traffic recorder	Cl Hvy	clay heavy
Ave	Avenue	Cl Lm	clay loam
Avg	average	Clnt	clean-out
ADT	average daily traffic	Clr	clear
Az	azimuth	Cl&gr	clearing & grubbing
Bk	back	Co S	coal slack
BF	back face	Comb.	combination
Bs	backsight	Coml	commercial
Balc	balcony	Compr	compression
B Wire	barbed wire	CADD	computer aided drafting & design
Barr	barricade	Conc	concrete
Btry	battery	Cond	conductor
Brg	bearing	Const	construction
BI	beehive inlet	Cont	continuous
Beg	begin	CSB	continuous split barrel sample
BM	bench mark	Contr	contraction
Bkwy	bikeway	Contr	contractor
Bit	bituminous	CP	control point
Blk	block	Coord	coordinate
Bd Ft	board feet	Cor	corner
BH	bore hole	Corr	corrected
BS	both sides	CAES	corrugated aluminum end section
Bot	bottom	CAP	corrugated aluminum pipe
Blvd	Boulevard	CMES	corrugated metal end section
Bndry	boundary	CMP	corrugated metal pipe
BC	brass cap	CPVCP	corrugated poly-vinyl chloride pipe
Brkwy	breakaway	CSES	corrugated steel end section
Br	bridge	CSP	corrugated steel pipe
Bldg	building	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
		DInt	delineate
		DIntr	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 EI	elevation
		Ellipt	elliptical
		Emb	embankment
		Emuls	emulsion/emulsified
		ES	end section
		Engr	engineer
		ESS	environmental sensor station
		Eq	equal
		Eq	equation
		Evgr	evergreen
		Exc	excavation
		Exst	existing
		Exp	expansion
		Expy	Expressway
		E	external of curve
		Extru	extruded
		FOS	factor of safety
		F	Fahrenheit
		FS	far side
		F	farad
		Fed	Federal
		FP	feed point
		Ft	feet/foot
		Fn	fence
		Fn P	fence post
		FO	fiber optic
		FB	field book
		FD	field drive
		F	fill
		FAA	fine aggregate angularity
		FS	fine sand
		FH	fire hydrant
		FI	flange
		Flrd	flared
		FES	flared end section
		F Bcn	flashing beacon
		FA	flight auger sample
		FL	flow line
		Ftg	footing
		FM	force main
		Fs	foresight
		Fnd	found
		Fdn	foundation
		Frac	fractional
		Frwy	freeway
		Frt	front
		FF	front face
		F Disp	fuel dispenser

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

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NDDOT ABBREVIATIONS

D-101-2

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

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NDDOT ABBREVIATIONS

D-101-3

Qty quantity
Qtr quarter
Rad or R radius
RR railroad
Rlwy railway
Rsd raised
RTP random traverse point
Rge or R range
RC rapid curing
Rec record
Rcy recycle
RPCC recycled Portland cement concrete
Ref reference
R Mkr reference marker
RM reference monument
Refl reflectorized
RCB reinforced concrete box
RCES reinforced concrete end section
RCP reinforced concrete pipe
RCPS reinforced concrete pipe sewer
Reinf reinforcement
Res reservation
Ret retaining
Rev reverse
Rt right
R/W right of way
Riv river
Rd road
Rdbd road bed
Rdwy roadway
RWIS Roadway Weather Information System
Rk rock
Rt route
Salv salvage(d)
Sd sand
Sdy Cl sandy clay
Sdy Cl Lm sandy clay loam
Sdy Fl sandy fill
Sdy Lm sandy loam
San sanitary sewer line
Sc scoria
Sec seconds
Sec section
SL section line
Sep separation
Seq sequence
Serv service
Sh shale
Sht sheet
Shtng sheeting
Shldr shoulder
Sw sidewalk
S siemens
SD sight distance
SN sign number

Sig signal
Si Cl silt clay
Si Cl Lm silty clay loam
Si Lm silty loam
Sgl single
SC slow curing
SS slow setting
Sm small
S South
SE South East
SW South West
SB Southbound
Sp spaces
Spcl special
SA special assembly
SP special provisions
G specific gravity
Spk spike
SC spiral to curve
ST spiral to tangent
SB split barrel sample
SH sprinkler head
SV sprinkler valve
Sq square
SF square feet
Km2 square kilometer
M2 square meter
SY square yard
Stk stake
Std standard
N standard penetration test
Std Specs Standard Specifications
Sta station
Sta Yd station yards
Stm L steam line
SEC steel encased concrete
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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

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

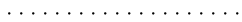




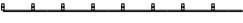
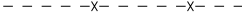
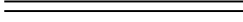
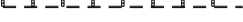


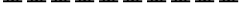
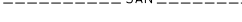



























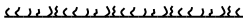

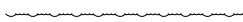

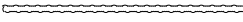

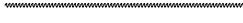

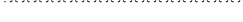






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Line Styles

	Limits of Const Transition Line		Floating Silt Curtain		Existing Aggregate (Cross Section View)		Existing Centerline
	Bale Check		Existing Telephone Line		Existing Curb and Gutter (Cross Section View)		Supplemental Contour
	Rock Check		Existing TV Line		Existing Riprap		Right of Way
	Sight Distance Triangle Line		Existing Assumed Ground (Not Surveyed)		Existing Underground Vault or Lift Station		Existing Right of Way
	Small Hidden Object		Tentative Ground Line		Tangent Line		Existing Right of Way Railroad
	Dimension Leader		Existing Water or Steam Line		Hidden Object		Failure Line
	Existing Ground		Existing Under Drain		Existing Dirt Surface		Existing Conditions
	Existing Topsoil (Cross Section View)		Under Drain		Existing Conduit		Existing Ground (Details)
	Large Hidden Object		Wall		Topsoil Profile		Existing Sixteenth Section Line
	Edge Drain		Existing Slotted Drain		Existing Conductor		Existing Right of Way Not State Owned
	Geotextile Fabric Type D		Existing Cemetary Boundary		Conductor		Phantom Object
	Existing Electrical		Centerline Pavement Marking		Fiber Optic		Centerline Main
	Existing Fiber Optic Line		Barrier with Centerline Pavement Marking		Existing Loop Detector		Existing Guardrail Cable
	Existing TV Fiber Optic		Barrier Pavement Marking		Subgrade, Subcut or Ditch Grade		Existing Guardrail Metal
	Existing Gas Pipe		Stripe 4 IN Dotted Extension White		Existing Asphalt Surface		Existing Edge of Water
	Geogrid		Stripe 8 IN Dotted Extension White		Existing Asphalt (Cross Section View)		Excavation Limits
	Existing Overhead Utility Line		Stripe 8 IN Lane Drop		Existing Reinforcement Rebar		Existing Government Lot Line
	Existing Power		Wetland Mitigation		Existing Tie Point Line		Existing Adjacent Block Lines
	Existing Fuel Pipeline		Existing Box Culvert Bridge		Existing State or International Line		Existing Adjacent Lot Lines
	Existing Undefined Above Ground Pipe Line		Existing Concrete Surface		Existing Quarter Section Line		Existing Adjacent Property Line
	Geotextile Fabric Type R		Existing Drainage Structure		Existing County		Existing Adjacent Subdivision Lines
	Geotextile Fabric Type R1		Easement		Existing Section Line		
	Remove Line		Existing Concrete		Existing Township		
	Geotextile Fabric Type RR		Existing Easement		Existing Railroad Centerline		
	Geotextile Fabric Type S		Existing Gravel Surface		Centerline		

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Line Styles

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

















































































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Symbols

	North Arrow (Half Scale)		Attenuation Device		Existing Railroad Battery Box		Existing Delineator Type E										
	Truck Mounted Attenuator		Diamond Grade Delineator Type A		Existing Bush or Shrub		Existing EFB Misc										
	Type I Barricade		Diamond Grade Delineator Type B		Existing Gas Cap or Stub		Existing Flashing Beacon										
	Type II Barricade		Diamond Grade Delineator Type C		Existing Sanitary Cap or Stub		Existing Pipe Mounted Flasher										
	Type III Barricade		Diamond Grade Delineator Type D		Existing Storm Drain Cap or Stub		Existing Pad Mounted Feed Point										
	Catch Basin		Diamond Grade Delineator Type E		Existing Water Cap or Stub		Existing Pipe Mounted Feed Point with Pad										
	Cairn or Stone Circle		Flexible Delineator		Existing Sanitary Cleanout		Existing Pole Mounted Feed Point										
	Video Detection Camera		Flexible Delineator Type A		Existing Concrete Foundation		Existing Railroad Frog										
	Storm Drain Cap or Stub		Flexible Delineator Type B		Existing Traffic Signal Controller		Existing Snow Gate 18										
	Corrugated Metal End Section 18 Inch		Flexible Delineator Type C		Existing Pad Mounted Signal Controller		Existing Snow Gate 28										
	Corrugated Metal End Section 24 Inch		Flexible Delineator Type D		Existing Sixteenth Section Corner		Existing Snow Gate 40										
	Corrugated Metal End Section 30 Inch		Flexible Delineator Type E		Existing Quarter Section Corner		Existing Headwall										
	Corrugated Metal End Section 36 Inch		Delineator Type A		Existing Section Corner		Existing Pedestrian Head with Number										
	Corrugated Metal End Section 42 Inch		Delineator Type A Reset		Existing Railroad Crossbuck		Existing Signal Head										
	Corrugated Metal End Section 48 Inch		Delineator Type B		Existing Satellite Dish		Existing Sprinkler Head										
	Concrete Foundation		Delineator Type B Reset		Existing Fuel Dispensers		Existing Fire Hydrant										
	Ground Connection Conductor		Delineator Type C		Existing Flexible Delineator Type A		Existing Catch Basin Drop Inlet										
	Neutral Connection Conductor		Delineator Type D		Existing Flexible Delineator Type B		Existing Curb Inlet										
	Phase 1 Connection Conductor		Delineator Type E		Existing Flexible Delineator Type C		Existing Manhole Inlet										
	Phase 2 Connection Conductor		Delineator Drums		Existing Flexible Delineator Type D		Existing Junction Box										
	Traffic Cone		Spot Elevation		Existing Flexible Delineator Type E	<table><tr><th colspan="2">NORTH DAKOTA DEPARTMENT OF TRANSPORTATION</th></tr><tr><th colspan="2">07-01-14</th></tr><tr><th colspan="2">REVISIONS</th></tr><tr><th>DATE</th><th>CHANGE</th></tr><tr><td></td><td></td></tr></table>		NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		07-01-14		REVISIONS		DATE	CHANGE		
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION																	
07-01-14																	
REVISIONS																	
DATE	CHANGE																
	Signal Controller		Existing Access Control Arrow		Existing Delineator Type A												
	Pad Mounted Signal Controller		Existing Artifact		Existing Delineator Type B												
	Alignment Data Point		Existing Flashing Beacon		Existing Delineator Type C												
	Emergency Vehicle Detector		Existing Benchmark		Existing Delineator Type D												

Symbols






























































D-101-31

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

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

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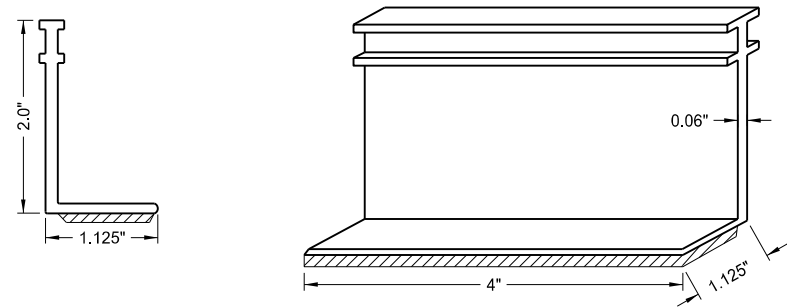
Symbols

	Pad Mounted Feed Point		Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire		Object Marker Type I		Reinforced Concrete End Section 48 Inch									
	Pipe Mounted Feed Point with Pad		Light Standard 150 Watt High Pressure Sodium Vapor Luminaire		Object Marker Type II		Reinforced Concrete End Section 54 Inch									
	Pole Mounted Feed Point		Light Standard 175 Watt High Pressure Sodium Vapor Luminaire		Object Marker Type III		Reset Right of Way Marker									
	Headwall		Light Standard 200 Watt High Pressure Sodium Vapor Luminaire		Caution Mode Arrow Panel		Reset USGS Marker									
	Double Headwall with Vegetation Barrier		Light Standard 250 Watt High Pressure Sodium Vapor Luminaire		Back to Back Vertical Panel Sign		Right of Way Markers									
	Single Headwall with Vegetation Barrier		Light Standard 310 Watt High Pressure Sodium Vapor Luminaire		Double Direction Arrow Panel		Riser 30 Inch									
	Pole Mounted Head		Light Standard 35 Watt High Pressure Sodium Vapor Luminaire		Left Directional Arrow Panel		Continuous Split Barrel Sample									
	Sprinkler Head		Light Standard 400 Watt High Pressure Sodium Vapor Luminaire		Right Directional Arrow Panel		Flight Auger Sample									
	Fire Hydrant		Light Standard 50 Watt High Pressure Sodium Vapor Luminaire		Sequencing Arrow Panel		Split Barrel Sample									
	Inlet Type 1		Light Standard 70 Watt High Pressure Sodium Vapor Luminaire		Truck Mounted Arrow Panel		Thinwall Tube Sample									
	Inlet Type 2		Light Standard 700 Watt High Pressure Sodium Vapor Luminaire		Power Pole		Highway Sign									
	Double Inlet Type 2		Manhole		Wood Pole		SNOW GATE 18 FT									
	Inlet Grate Type 2		Manhole 48 Inch		Pedestrian Push Button Post		SNOW GATE 28 FT									
	Junction Box		Sanitary Force Main Manhole		Property Corner		SNOW GATE 40 FT									
	High Mast Light Standard 10 Luminaire		Sanitary Sewer Manhole		Pull Box		Standard Penetration Test									
	High Mast Light Standard 3 Luminaire		Storm Drain Manhole		Intelligent Transportation Pull Box		Transformer									
	High Mast Light Standard 4 Luminaire		Storm Drain Manhole with Inlet		Sanitary Pump		Inclinometer Tube									
	High Mast Light Standard 5 Luminaire		Reset Mile Post		Storm Drain Pump		Underdrain Cleanout									
	High Mast Light Standard 6 Luminaire		Mile Post Type A		Reinforced Pavement		Excavation Unit									
	High Mast Light Standard 7 Luminaire		Mile Post Type B		Reinforced Concrete End Section 15 Inch		Water Valve									
	High Mast Light Standard 8 Luminaire		Mile Post Type C		Reinforced Concrete End Section 18 Inch	<table><tr><th colspan="2">NORTH DAKOTA DEPARTMENT OF TRANSPORTATION</th></tr><tr><td colspan="2">07-01-14</td></tr><tr><th colspan="2">REVISIONS</th></tr><tr><th>DATE</th><th>CHANGE</th></tr><tr><td></td><td></td></tr></table>	NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		07-01-14		REVISIONS		DATE	CHANGE		
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION																
07-01-14																
REVISIONS																
DATE	CHANGE															
	High Mast Light Standard 9 Luminaire		Right of Way Marker		Reinforced Concrete End Section 24 Inch											
	Relocate Light Standard		Tubular Marker		Reinforced Concrete End Section 30 Inch											
	Overhead Sign Structure Load Center		Alignment Monument		Reinforced Concrete End Section 36 Inch											
	Light Standard 100 Watt High Pressure Sodium Vapor Luminaire		Iron Pin Reference Monument		Reinforced Concrete End Section 42 Inch											

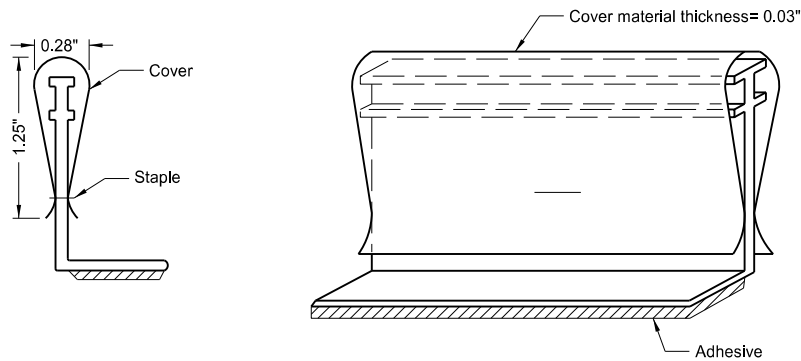
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930 , on 07/01/14 and the original document is stored at the North Dakota Department of Transportation
07-01-14		
REVISIONS		
DATE	CHANGE	

LANE MARKERS
(Spotting Tab for Seal Projects only)

D-704-3



Marker Body



Marker Body with Protective Cover

Notes:

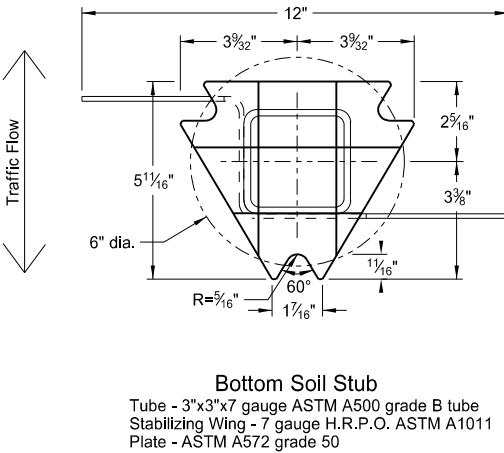
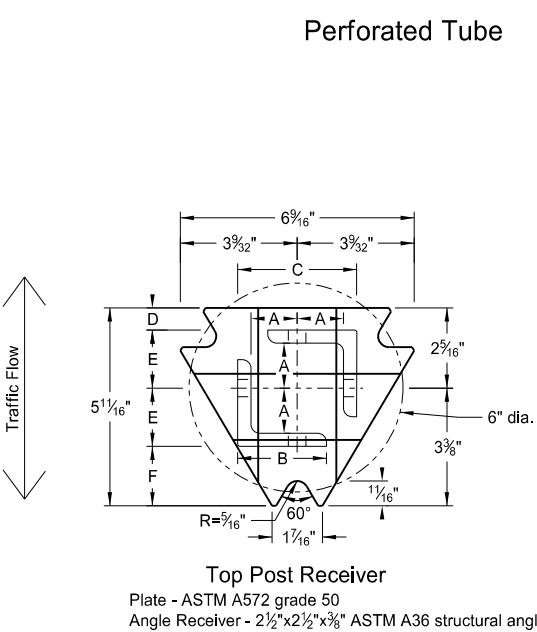
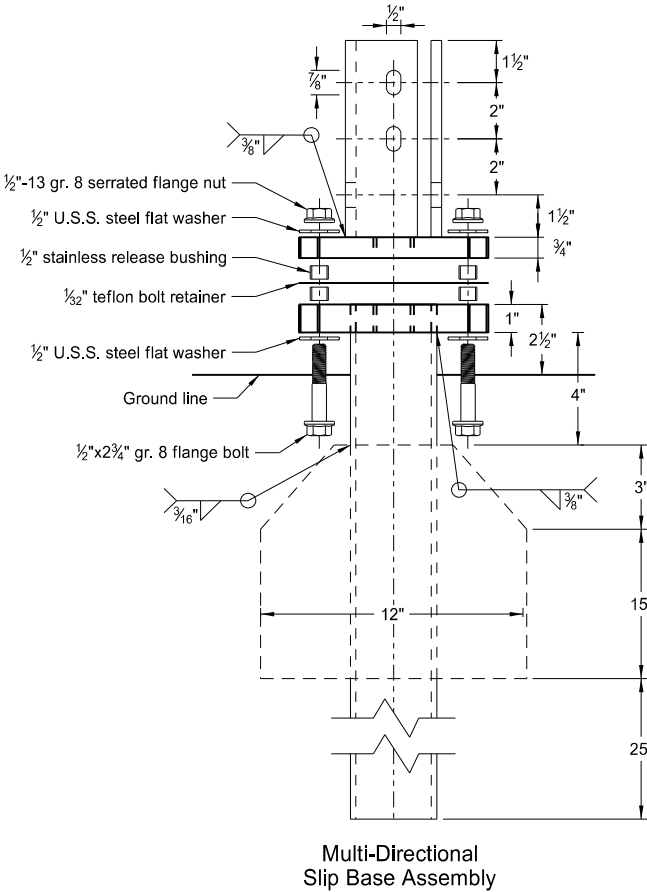
1. Install lane line markers as shown, prior to beginning the seal coat.
2. Attach cover to vertical part of marker so traffic does not cause it to detach, but it can be easily removed manually.
3. Remove protective covers immediately after seal coat is applied.
4. Remove markers after permanent pavement marking is installed.
5. Use marker body and cover manufactured from polyurethane material.
6. 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.
7. Use retrorreflective tape with a minimum reflectance of 1200 candle power per foot-candle per square foot, using a .1 degree observation angle and 0 degree entrance angle.
8. Use adhesive conforming to AASHTO M 237.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice

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Roger Weigel
Registration Number
PE- 2930,
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of Transportation

Perforated Tube

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

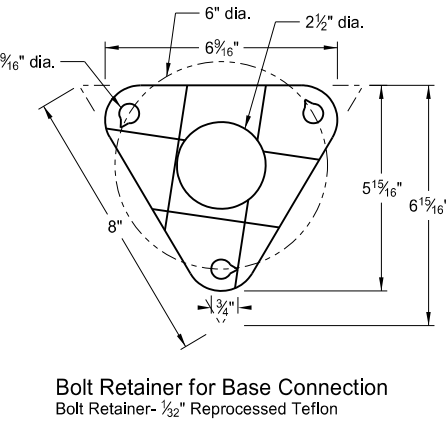
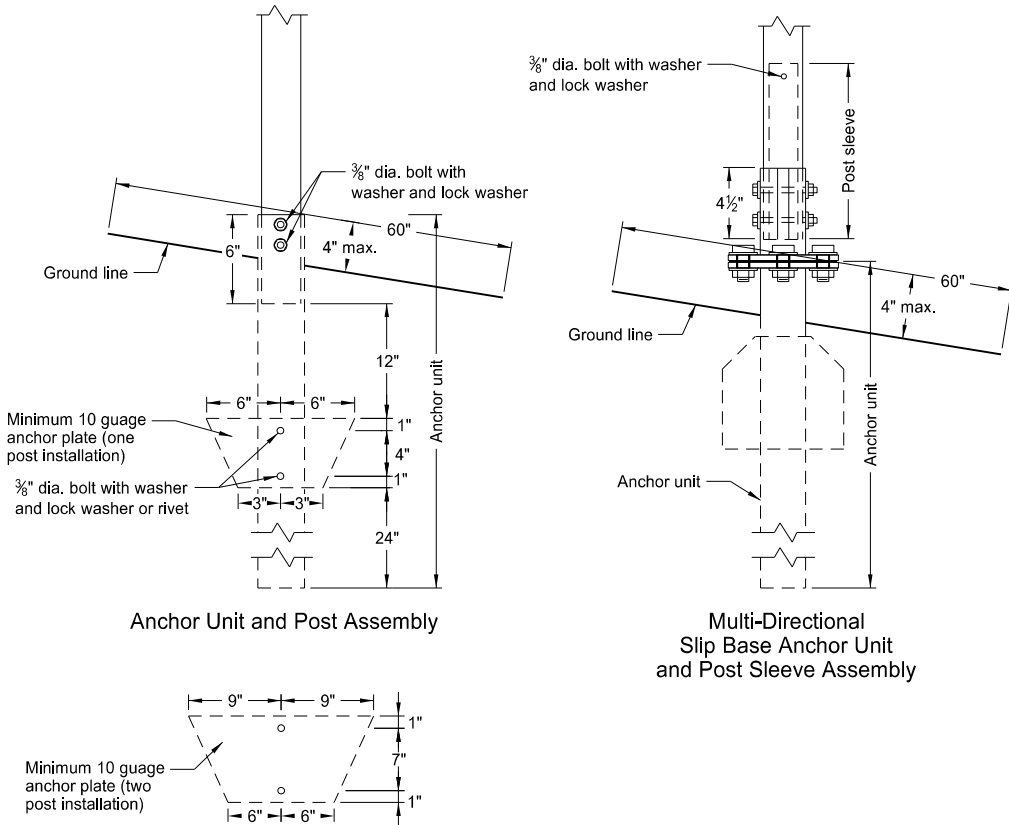


Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No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

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

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

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



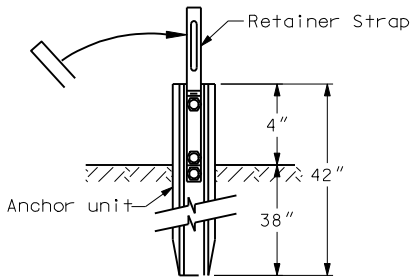
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Roger Weigel, Registration Number PE- 2930, on 9/27/2017 and the original document is stored at the North Dakota Department of Transportation
2-28-14		
REVISIONS		
DATE	CHANGE	
9-27-17	Updated to active voice	

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

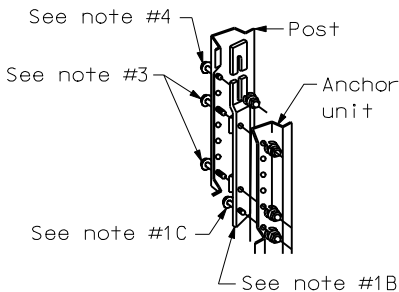
FLANGED CHANNEL

3 LB/FT U POSTS

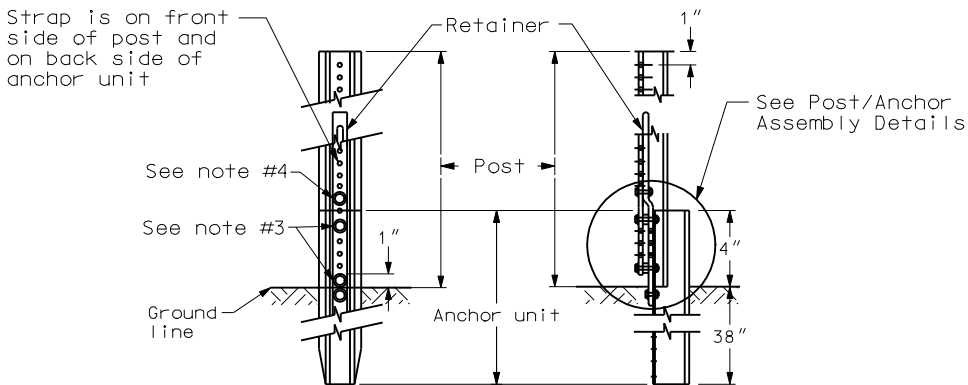


Anchor Unit & Strap Assembly Detail

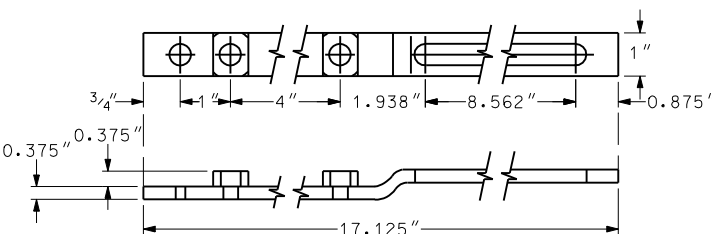
- STEPS OF INSTALLATION
1. A) Drive anchor unit to within 12" of ground level.
B) Proper assembly established by lining up the top 3/4" slot of retainer spacer strap with top hole of anchor unit.
C) Assemble strap to back of anchor unit using 3/8"-16 UNC x 2.0" long bolt, lock washer and nut.
D) Rotate 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

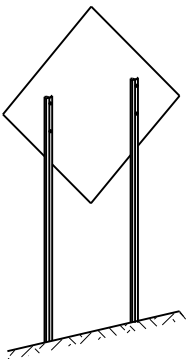


Front View Side View Sign Post Assembly Detail

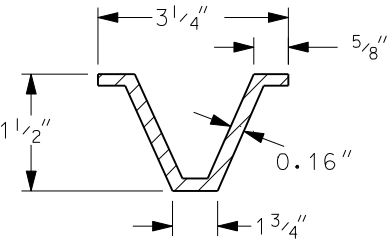


Retainer/Spacer Strap Detail

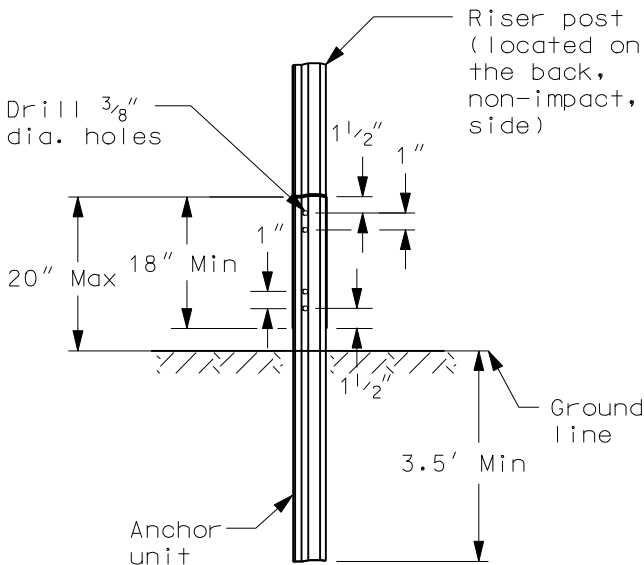
CHANNEL SIZE IN.	WALL THICKNESS IN.	WEIGHT PER FOOT LBS.	MOMENT OF INERTIA IN. 4	CROSS SECT. AREA IN. SQ.	SECTION MODULUS IN. 3
1.516 x 3.125"	.116	2.00	.179	.590	.225
1.532 x 3.125"	.124	2.25	.201	.648	.254
1.562 x 3.125"	.132	2.50	.233	.748	.289
1.578 x 3.125"	.140	2.75	.271	.819	.329
1.750 x 3.500"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



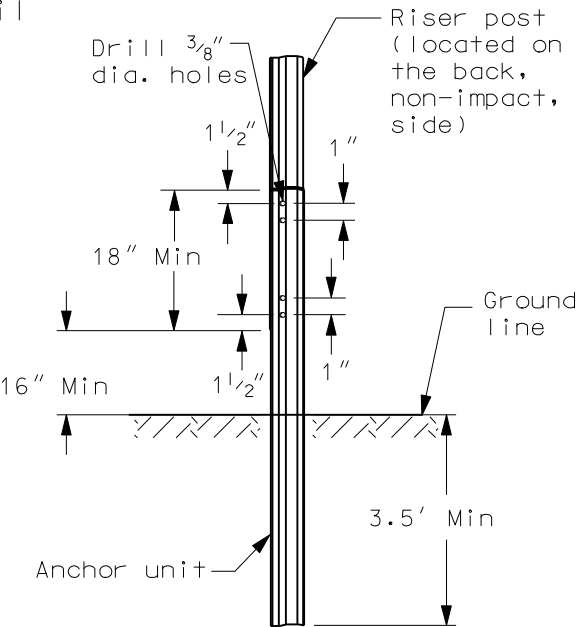
Typical Installation



U-Post Detail (3 lb/ft)



U-Channel Splice Option 1



U-Channel Splice Option 2

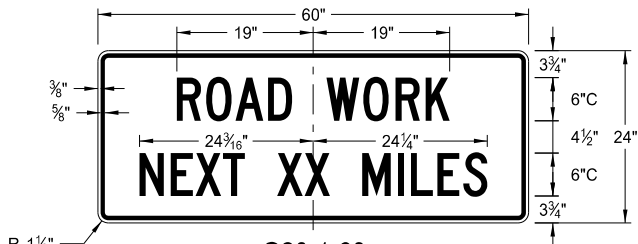
- Notes
1. Use 3 lb/ft riser anchor units and risers
 2. Driven riser posts shall be at least 7' long and embedded at least 3.5'.
 3. A splice shall overlap a minimum of 18".
 4. Use 4 bolts 5/16" diameter with washers and nuts. Two at top and two at bottom of splice.
 5. Anchor unit for guy wires shall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

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

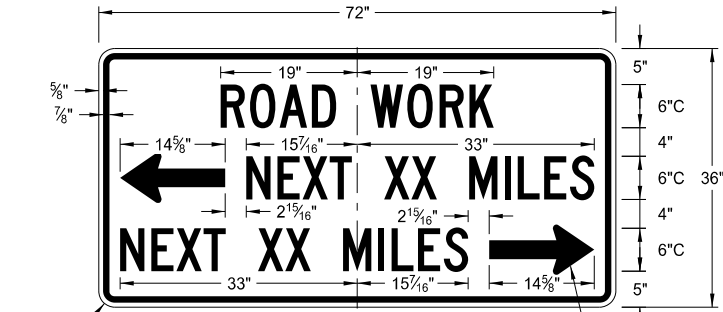
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

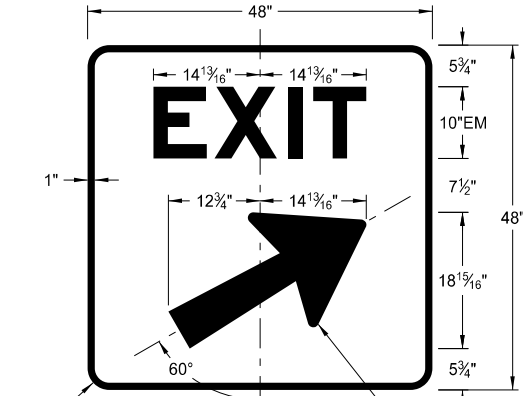
D-704-9



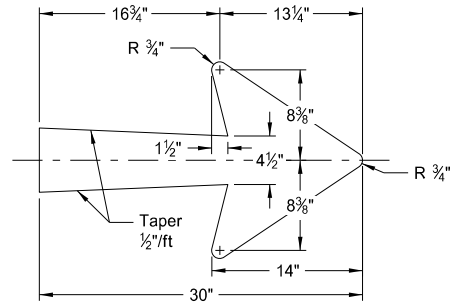
G20-1-60
Legend: black (non-refl)
Background: orange



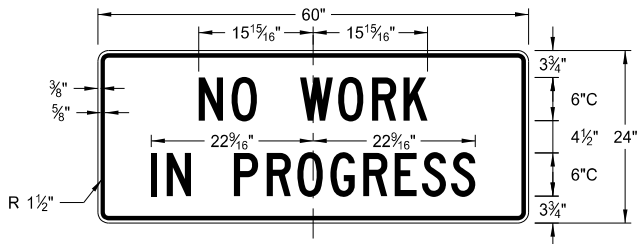
G20-50a-72
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Background: orange



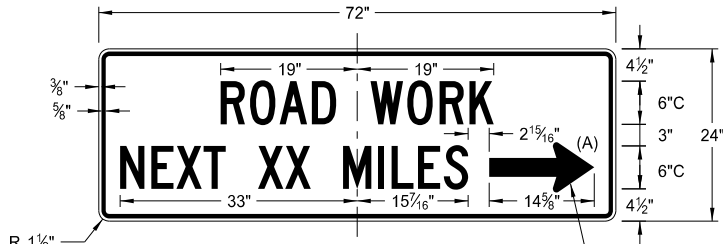
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



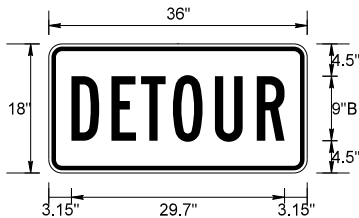
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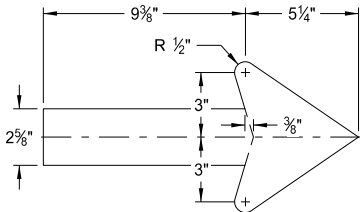
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Background: orange



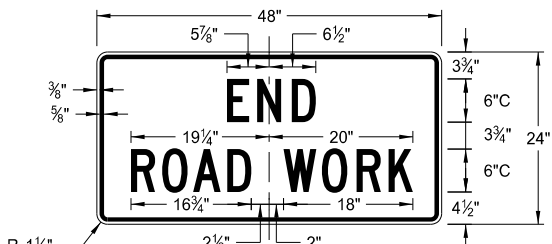
G20-52a-72
Legend: black (non-refl)
Background: orange



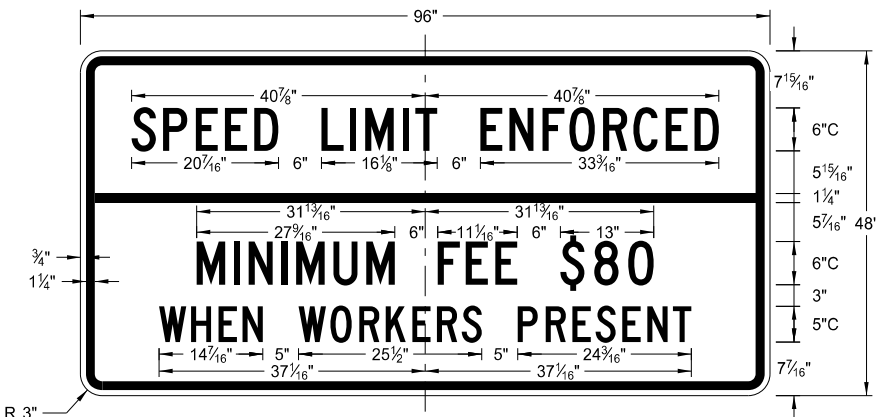
M4-8-36
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Background: orange



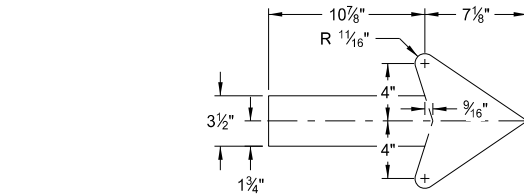
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G20-52a-72



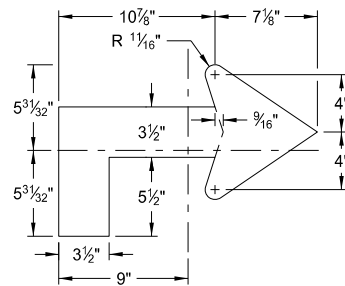
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Background: orange



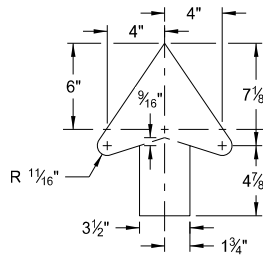
G20-55-96
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Background: orange



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



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



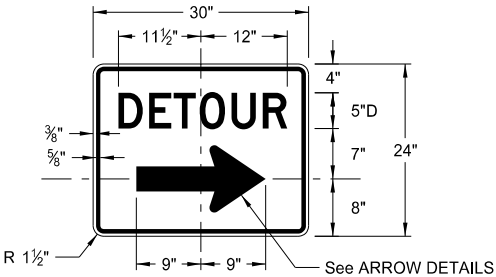
M4-9-30
Straight

ARROW DETAILS

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

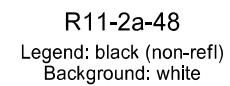
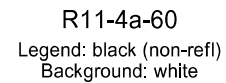
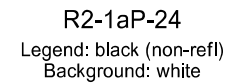
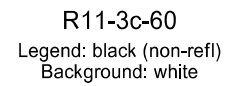
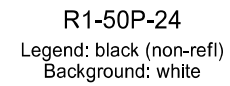
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color

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

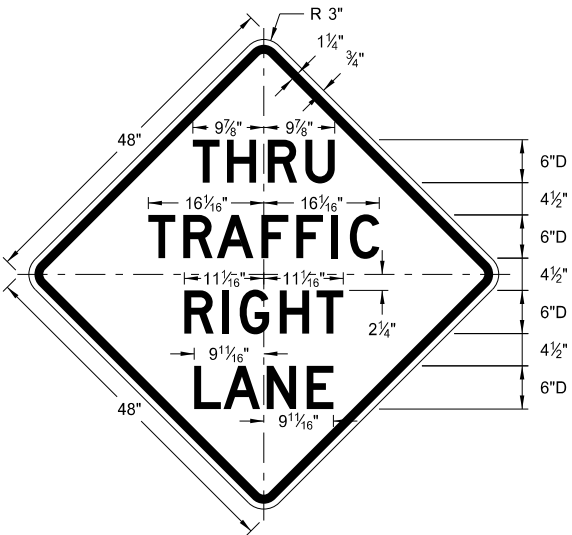
D-704-10



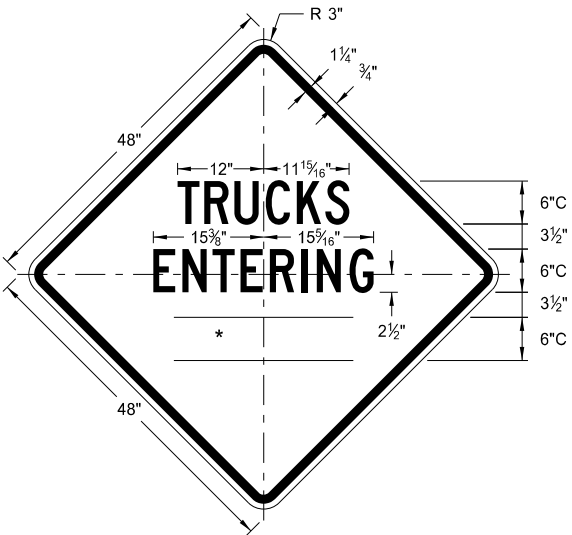
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		<p>This document was originally issued and sealed by</p> <p>Roger Weigel,</p> <p>Registration Number</p> <p>PE- 2930 ,</p> <p>on 8/17/17 and the original document is stored at the North Dakota Department of Transportation</p>
8-13-13		
REVISIONS		
DATE	CHANGE	
8-17-17	Revised sign number	

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

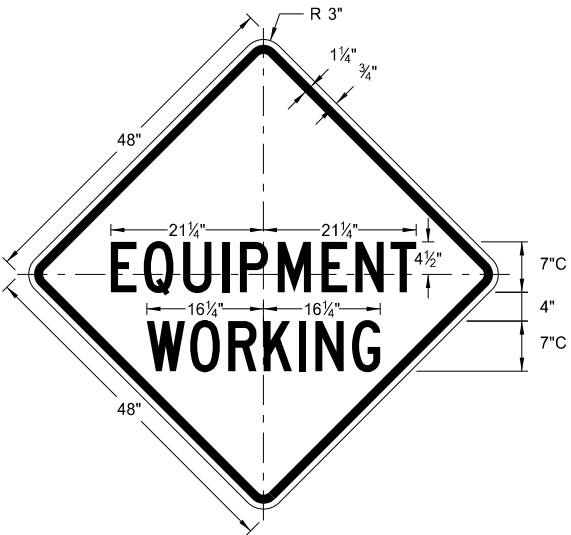
D-704-11



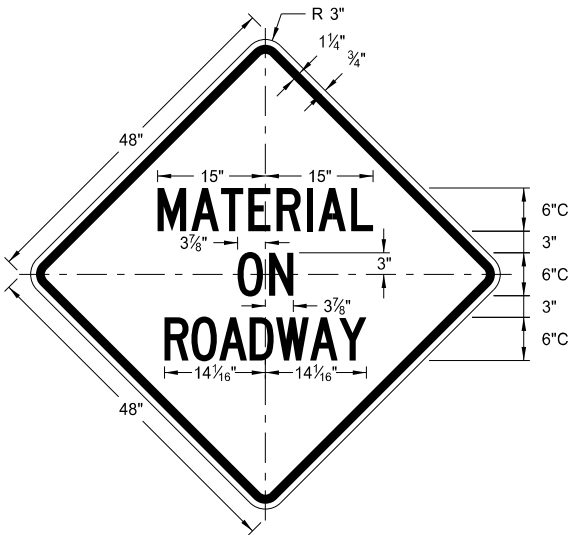
W5-8-48
Legend: black (non-refl)
Background: orange



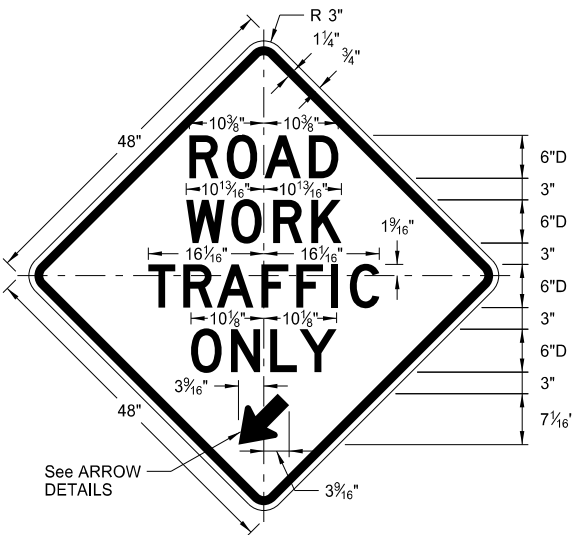
W8-54-48
Legend: black (non-refl)
Background: orange



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

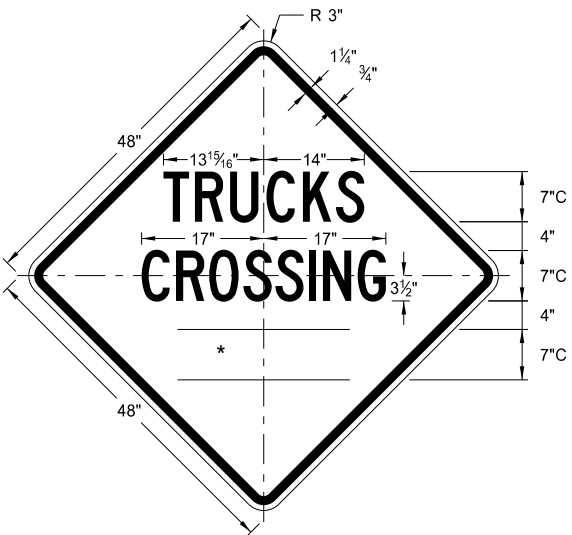


W21-51-48
Legend: black (non-refl)
Background: orange

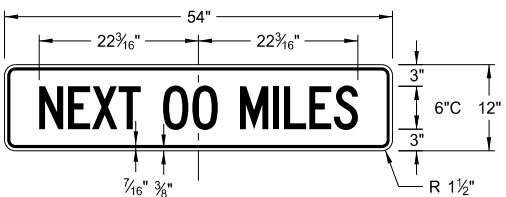


See ARROW
DETAILS

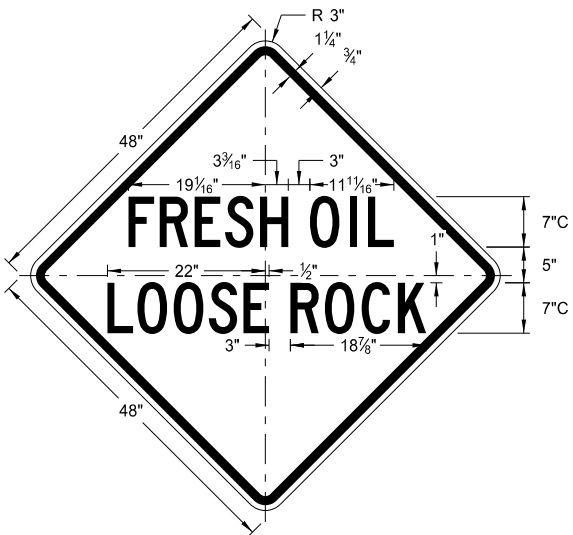
W5-9-48
Legend: black (non-refl)
Background: orange



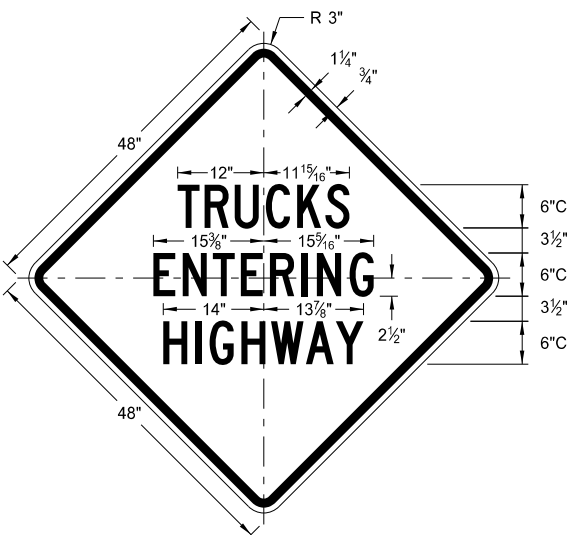
W8-55-48
Legend: black (non-refl)
Background: orange



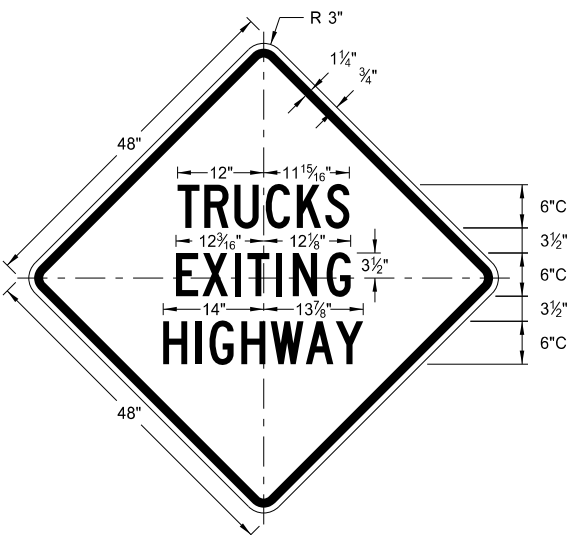
W20-52P-54
Legend: black (non-refl)
Background: orange



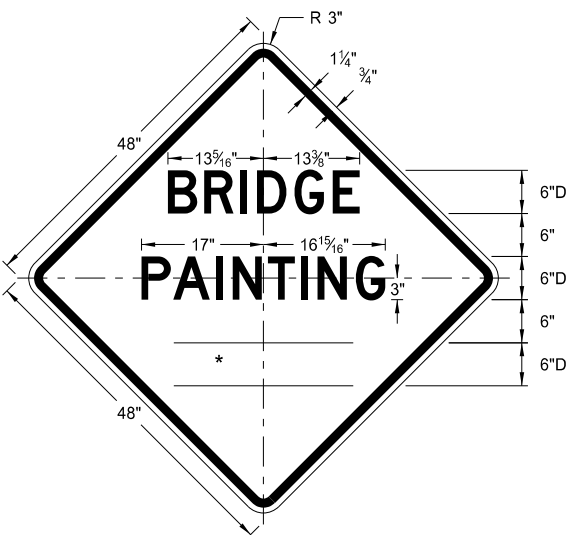
W22-8-48
Legend: black (non-refl)
Background: orange



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



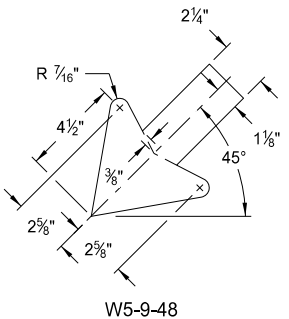
W8-56-48
Legend: black (non-refl)
Background: orange



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

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
1/2 MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



ARROW DETAILS

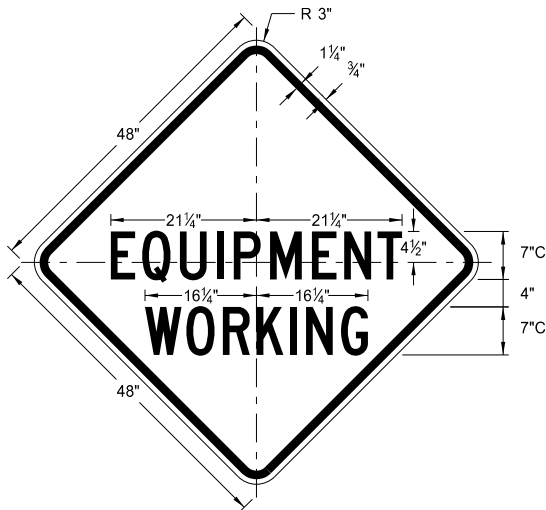
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number

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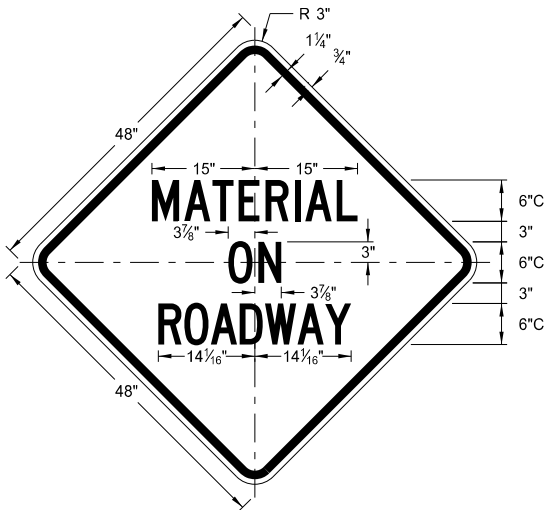
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

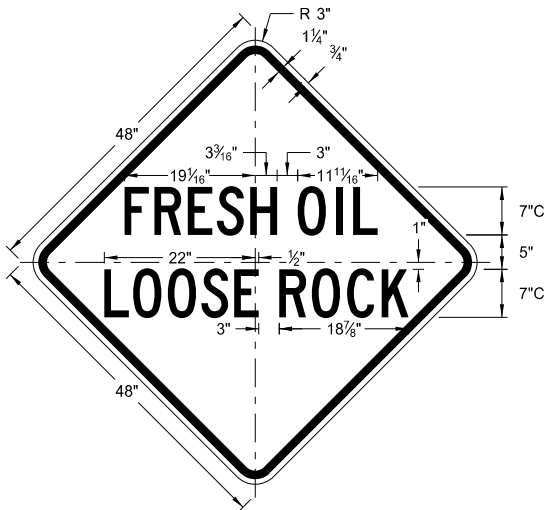
* DISTANCE MESSAGES



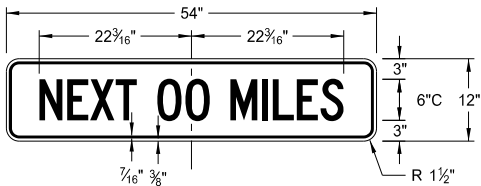
W20-51-48
Legend: black (non-refl)
Background: orange



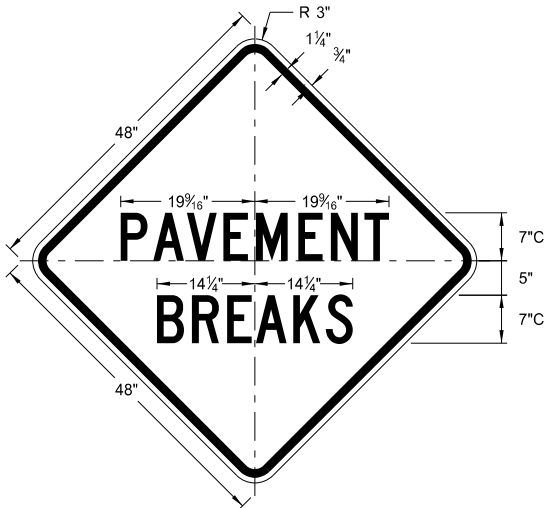
W21-51-48
Legend: black (non-refl)
Background: orange



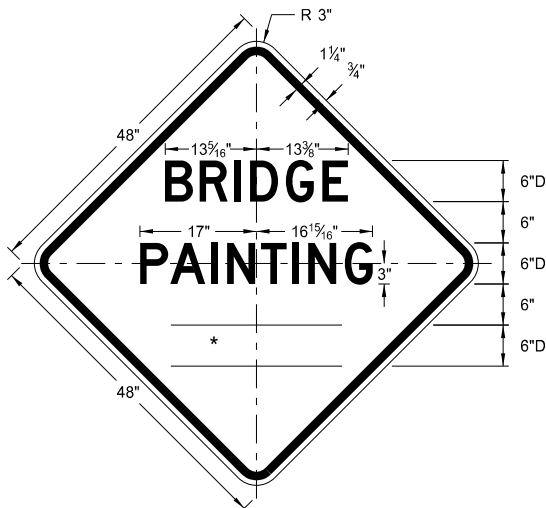
W22-8-48
Legend: black (non-refl)
Background: orange



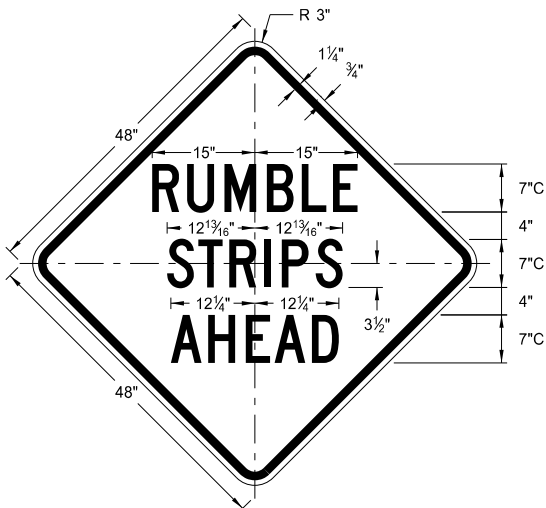
W20-52P-54
Legend: black (non-refl)
Background: orange



W21-52-48
Legend: black (non-refl)
Background: orange



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



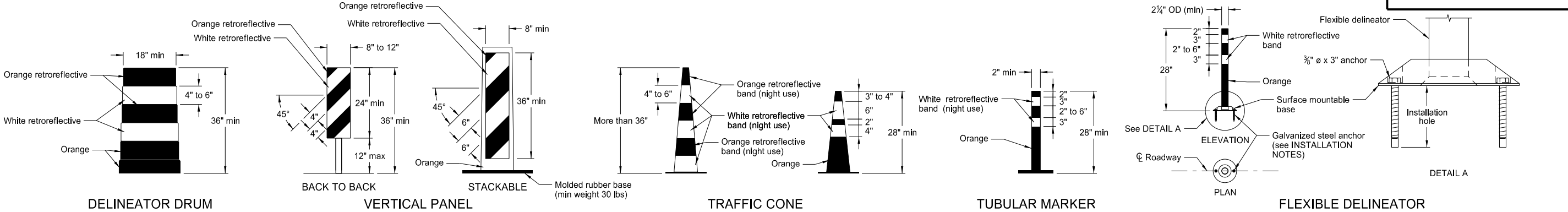
W21-53-48
Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE

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BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



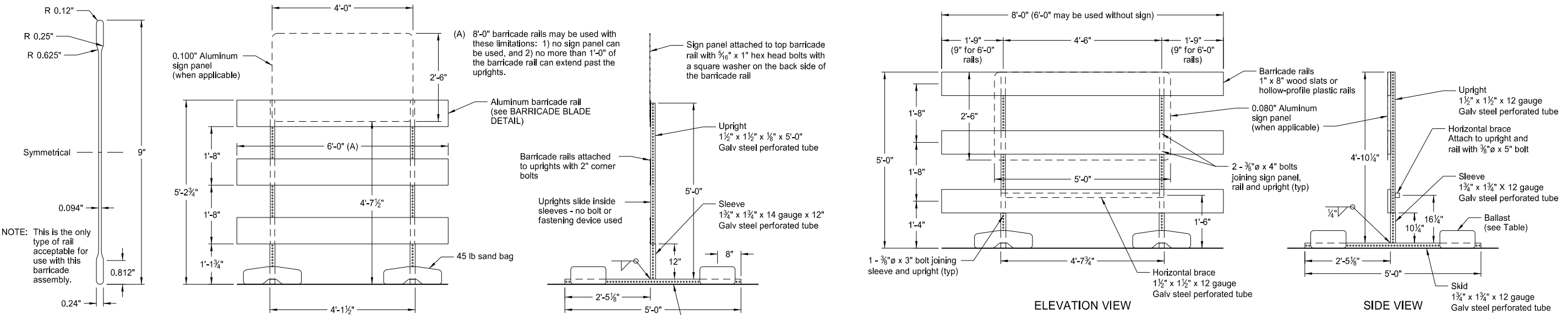
The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized spaces between the horizontal orange and white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

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

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

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

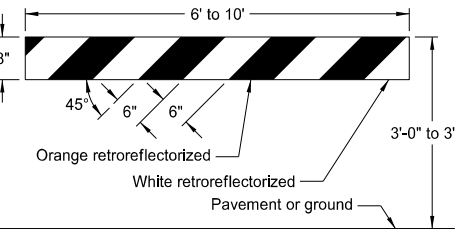
- INSTALLATION NOTES:
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl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



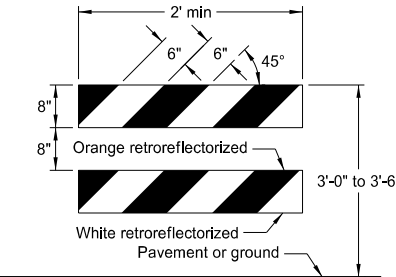
BARRICADE BLADE DETAIL

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

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

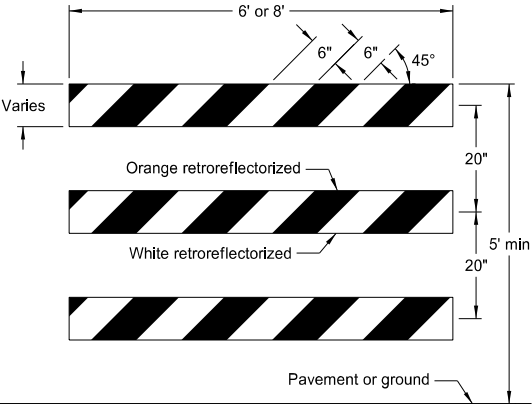


TYPE I BARRICADE

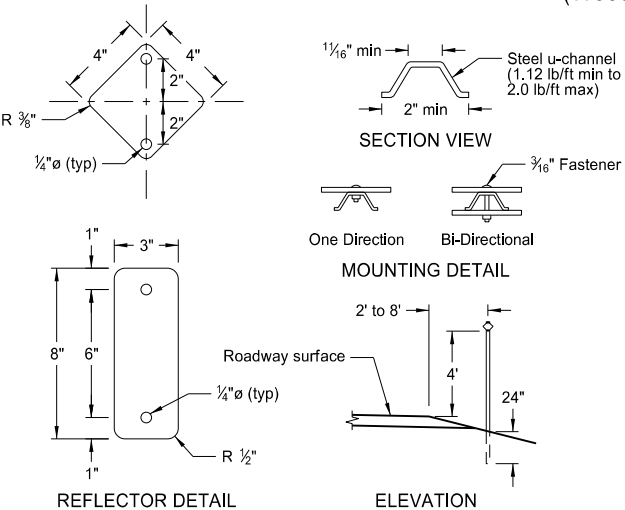


TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

SIDE VIEW

MINIMUM BALLAST (For each side of barricade support)

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

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

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

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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

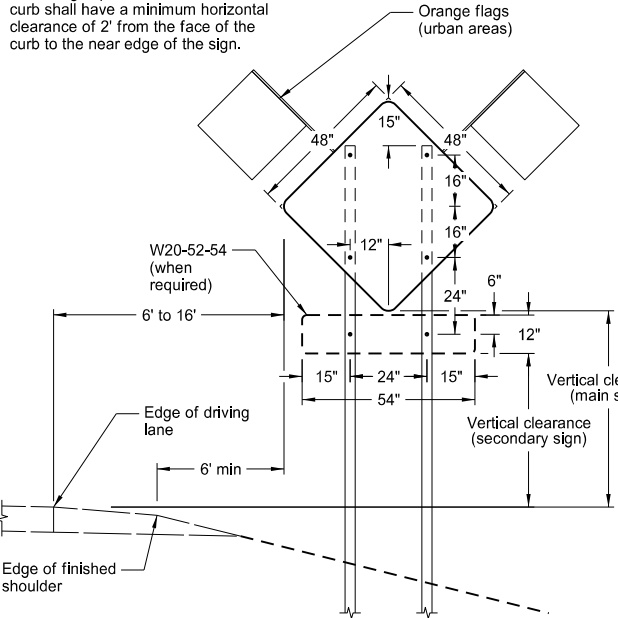
Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

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

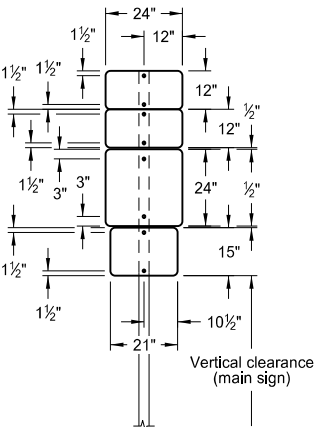
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

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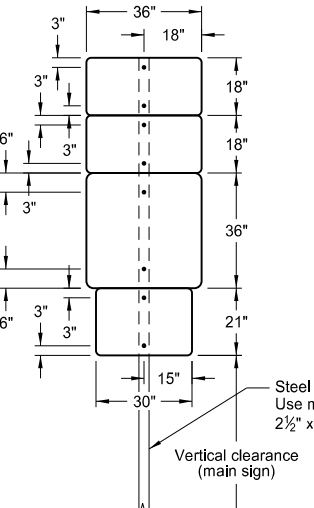
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



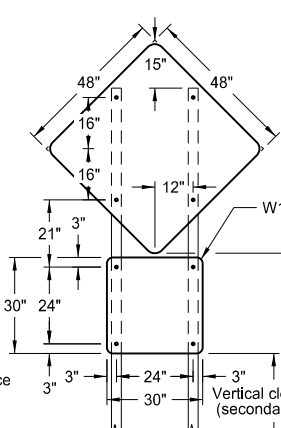
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



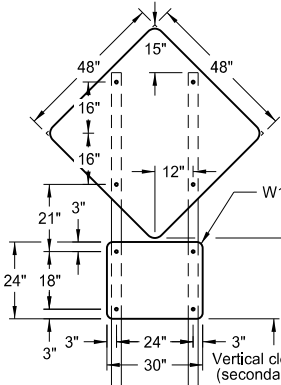
24" x 24" ROUTE MARKER ASSEMBLY



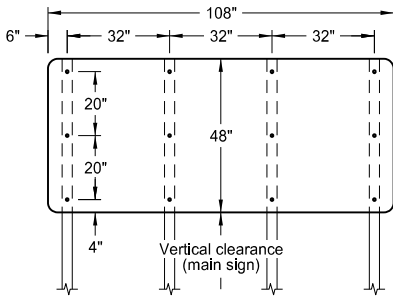
36" x 36" ROUTE MARKER ASSEMBLY



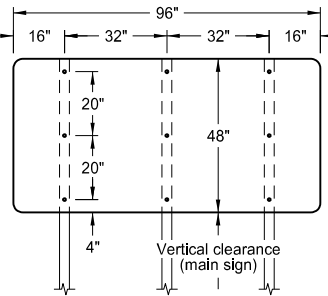
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



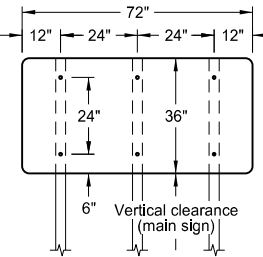
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



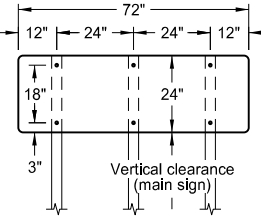
108" x 48" SIGN



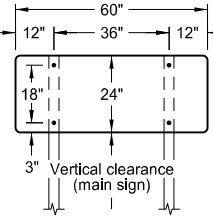
96" x 48" SIGN



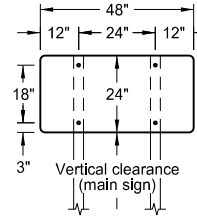
72" x 36" SIGN



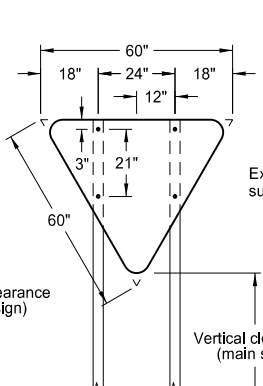
72" x 24" SIGN



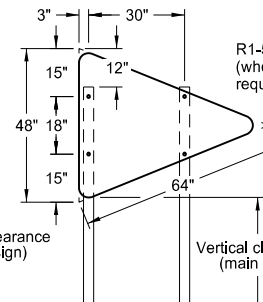
60" x 24" SIGN



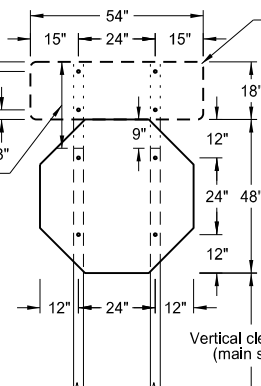
48" x 24" SIGN



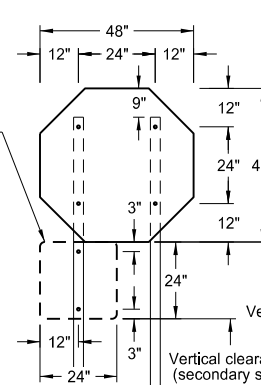
R1-2-60 - YIELD SIGN



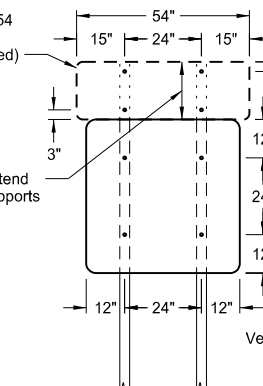
W14-3-64 - PENNANT SIGN



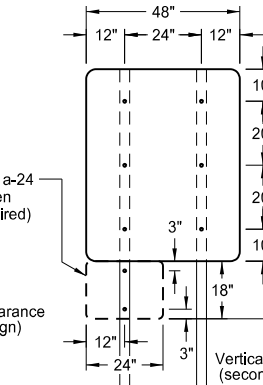
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



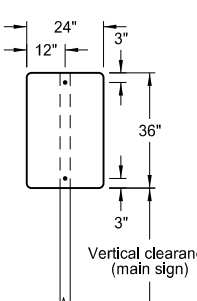
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



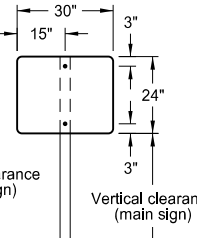
48" x 48" SIGN
(with R6-1-54 sign as required)



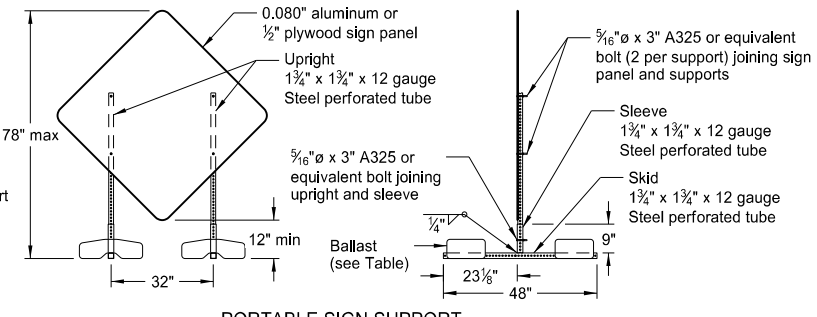
48" x 48" SIGN
(with R2-1a-24 sign as required)



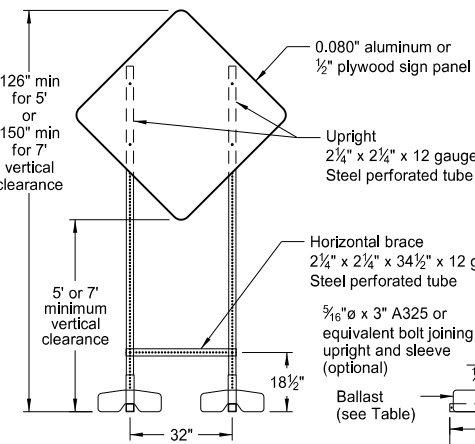
24" x 36" SIGN



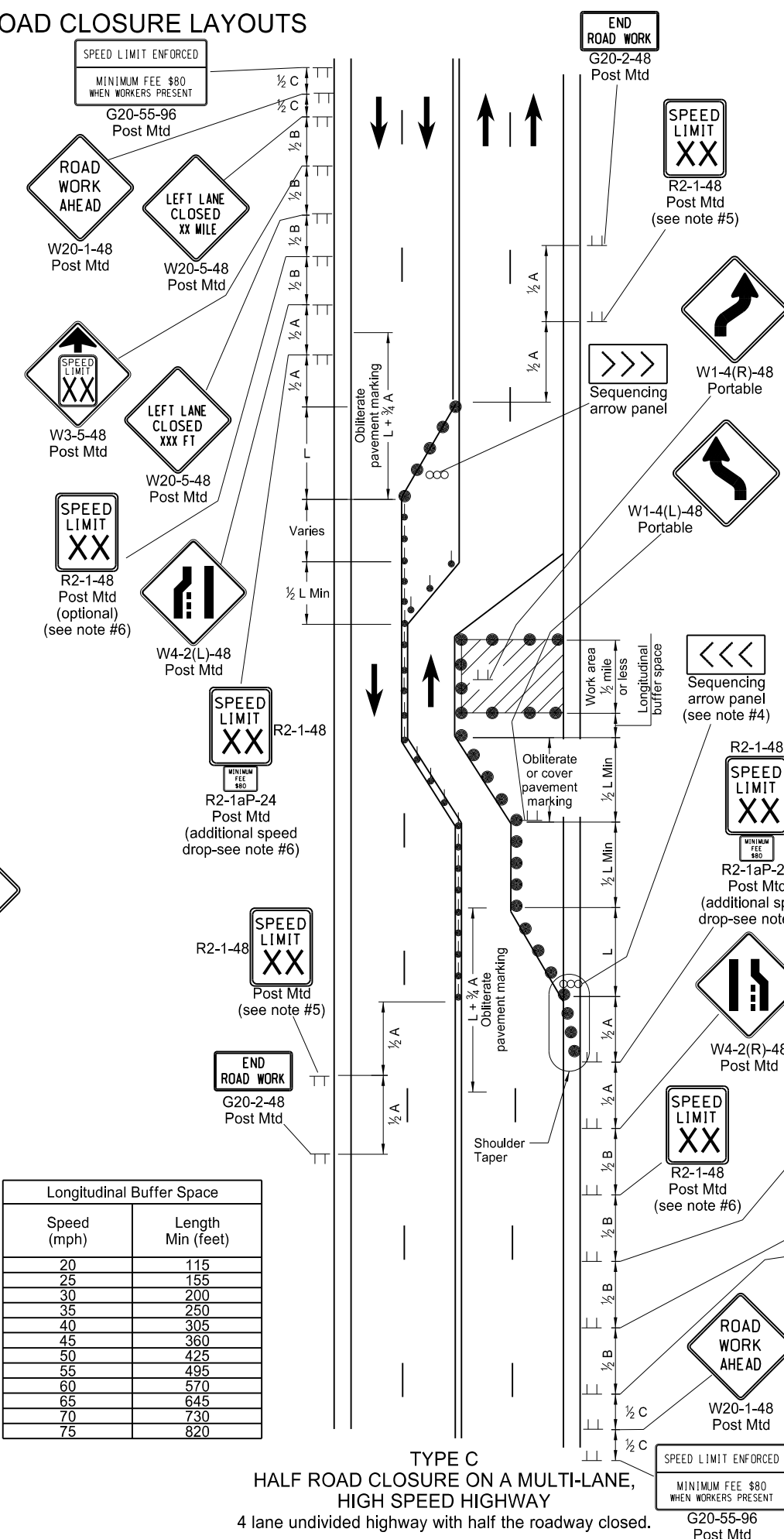
30" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT



D-704-15

Notes

1.Variables

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

W = The width of taper in feet.

L = Minimum length of taper, $S \times W$ for freeways, expressways, and other roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.

2.Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.

3.Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".

4.Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.

Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).

Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).

Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).

5.Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.

6.Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at $\frac{1}{2}$ B.

7.Use when work area is 1 mile or longer.

8.Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.

9.Cover existing speed limit signs within reduced speed zones.

10.Where necessary, engineer will determine safe speed.

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









12.Sign G20-55-96 is not required if this standard is part of other traffic control, or the work is less than 15 days.

13.Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING

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

KEY

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

W20-5-48
Post Mtd

W3-5-48
Post Mtd

W20-5-48
Post Mtd

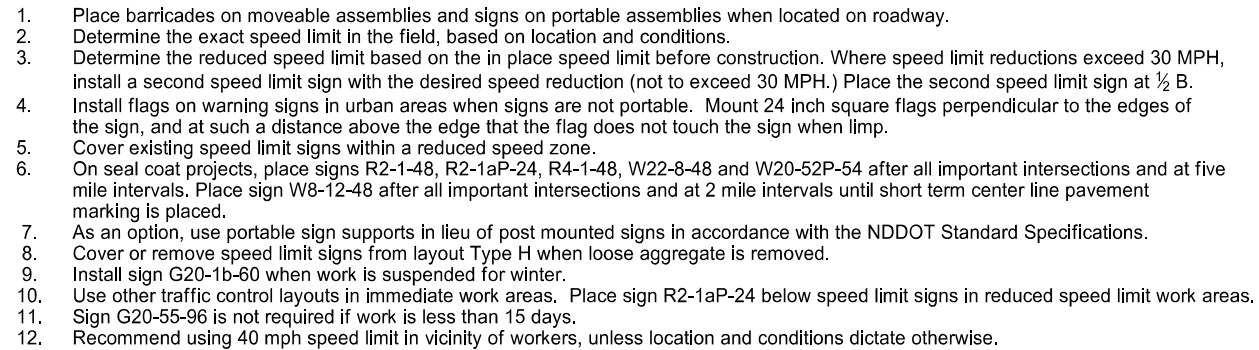
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

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

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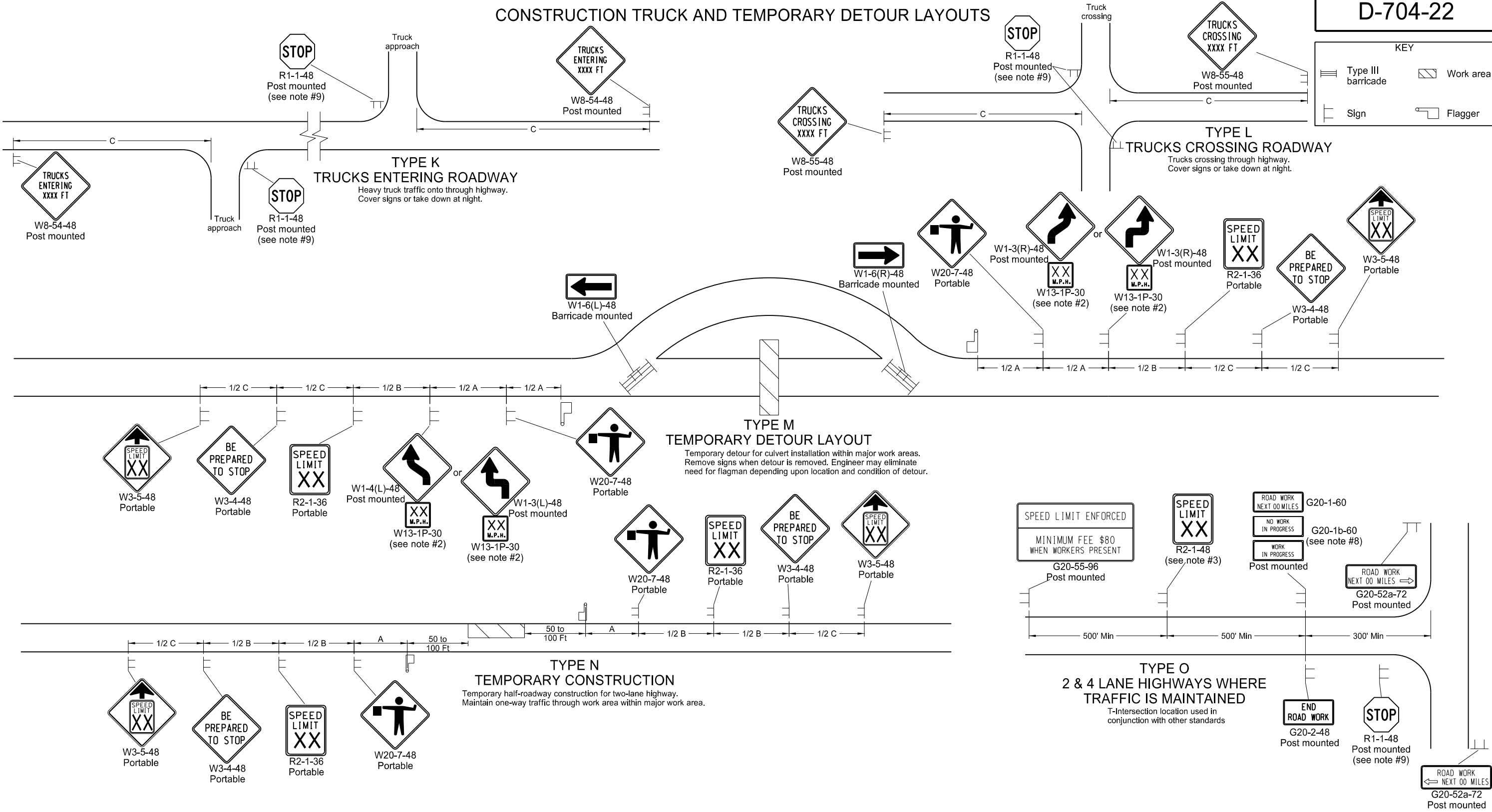
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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

[illegible]

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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



- Notes
- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
 - Where necessary, safe speed to be determined by the Engineer.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 - Cover existing speed limit signs within a reduced speed zone.
 - Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
 - Install sign G20-1b-60 when work is suspended for winter.
 - If existing stop sign is in place, a 48" stop sign is not required.
 - Sign G20-55-96 is not required if layout is part of other traffic control or if work is less than 15 days.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

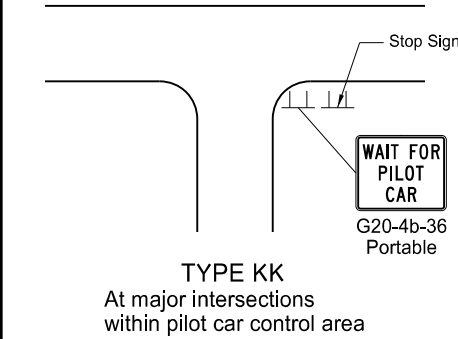
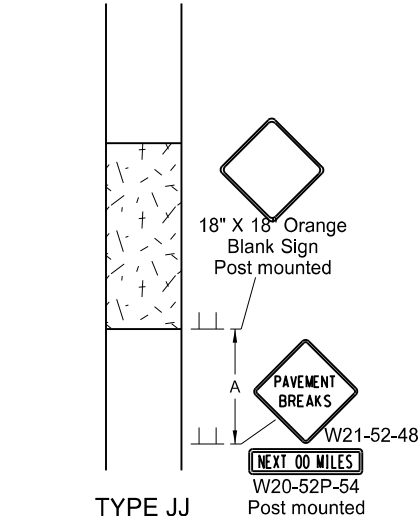
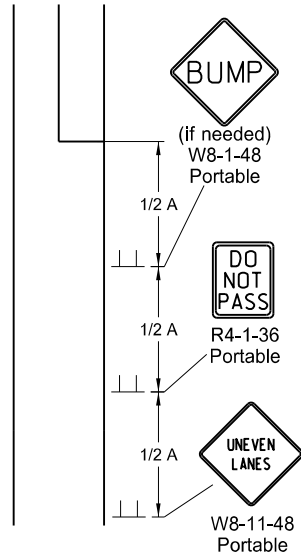
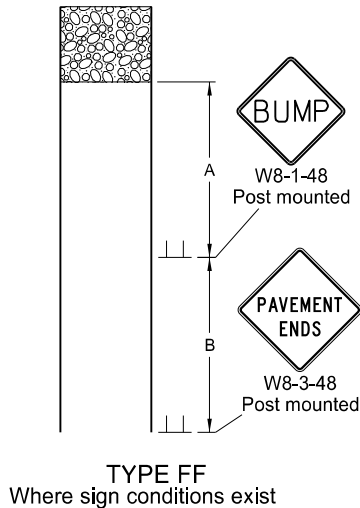
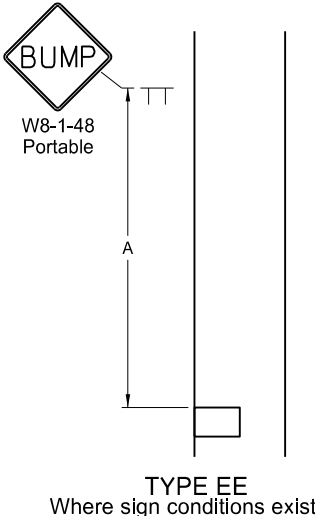
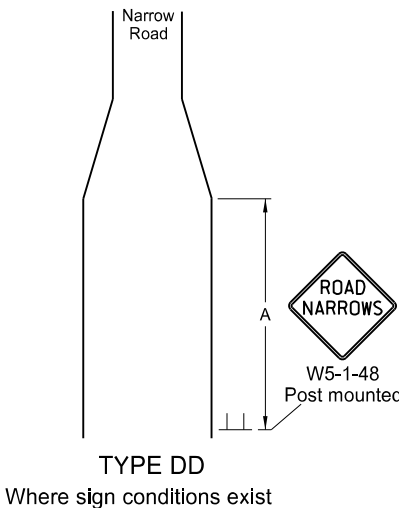
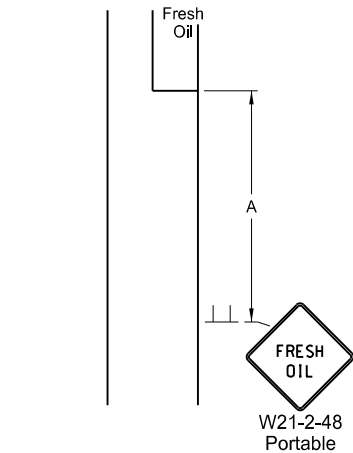
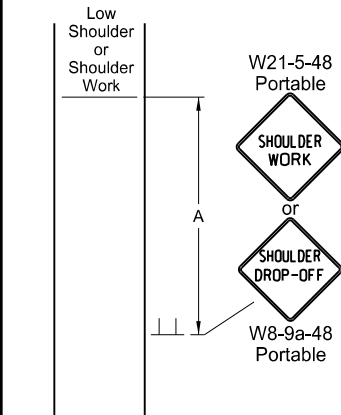
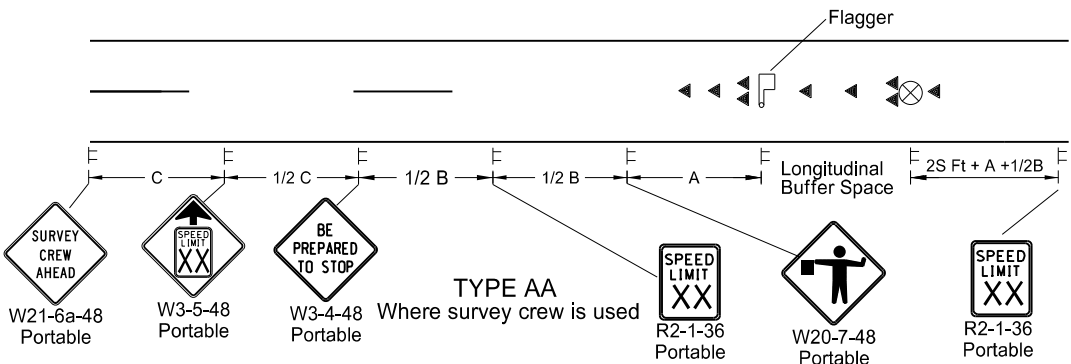
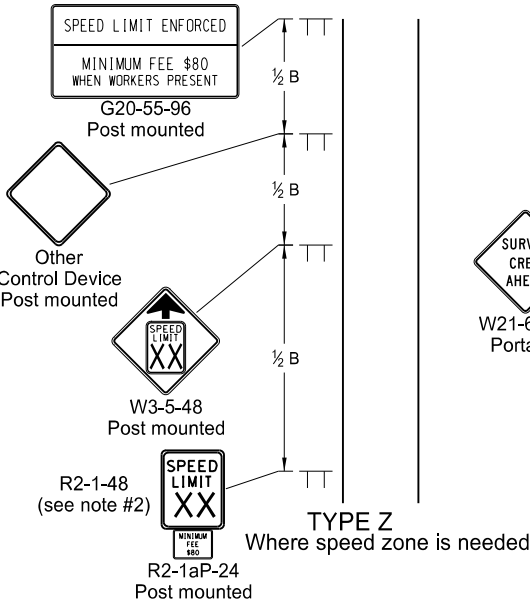
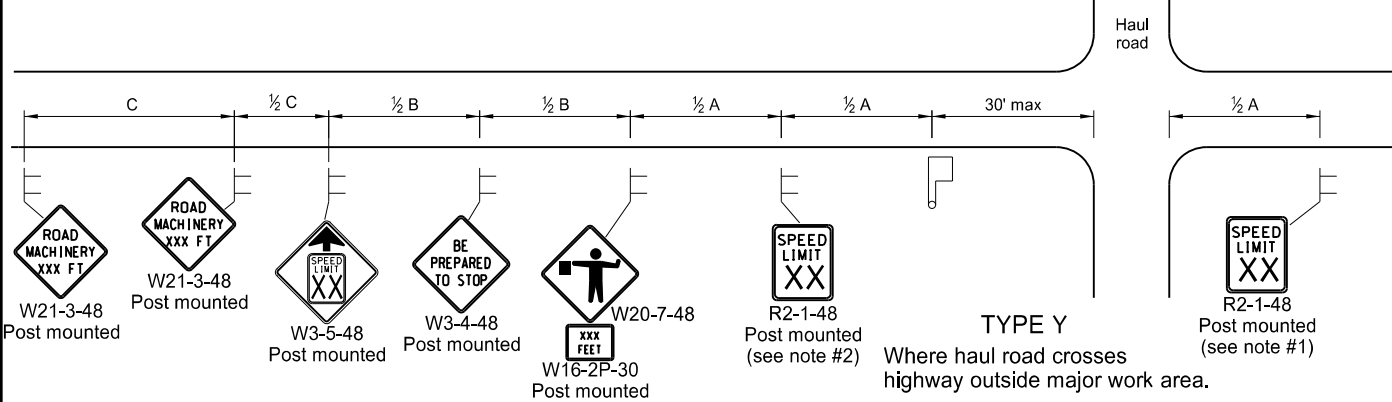
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and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

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

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

MISCELLANEOUS SIGN LAYOUTS

D-704-26



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

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

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

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

KEY

Sign Flagger Cones

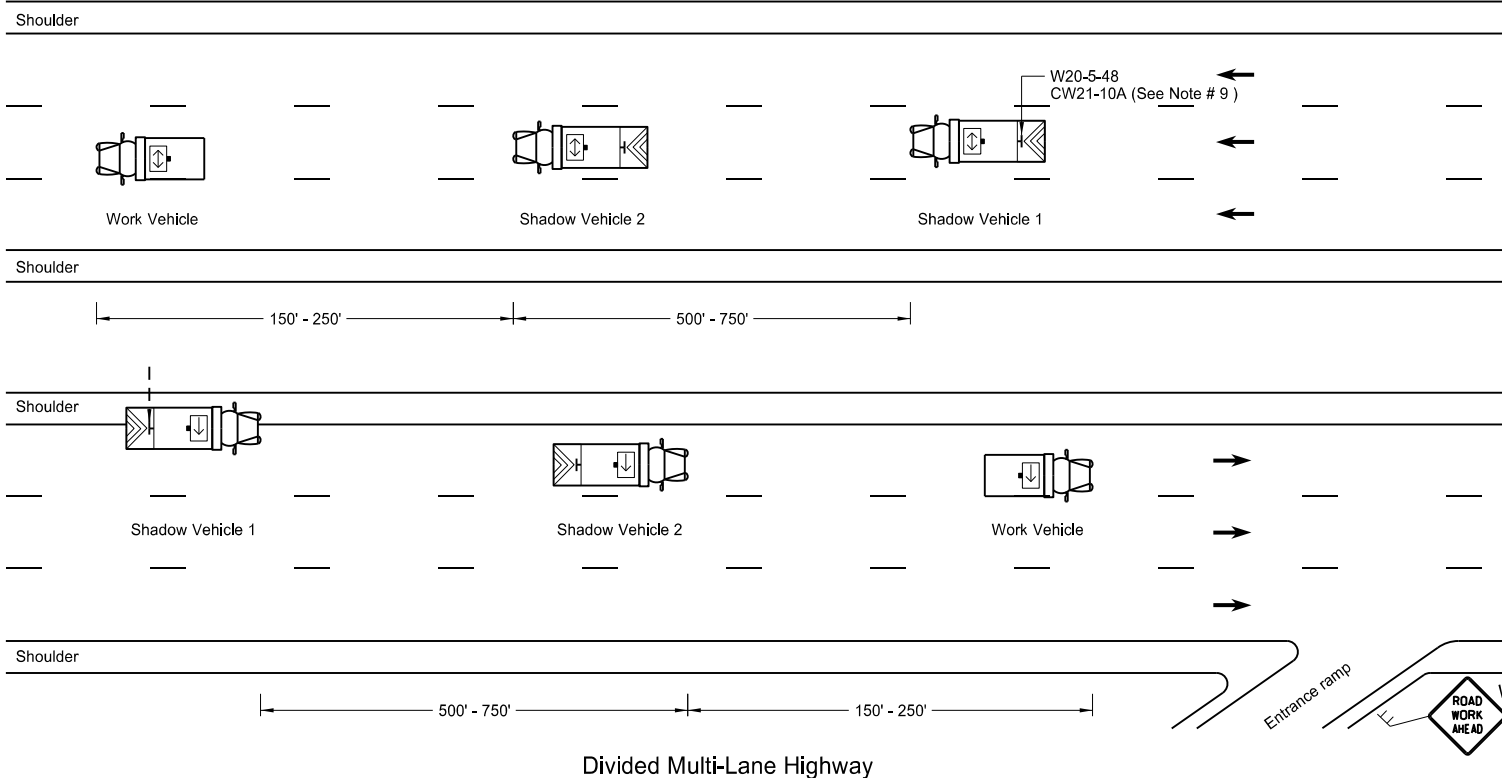
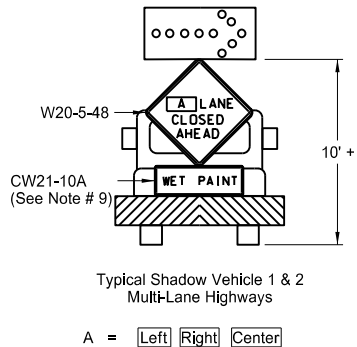
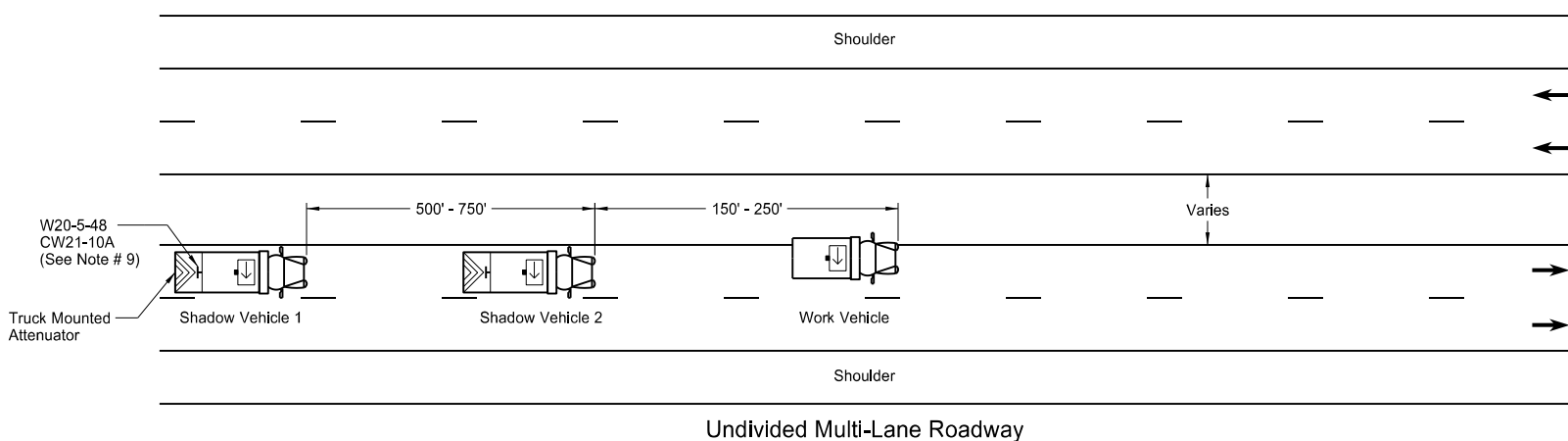
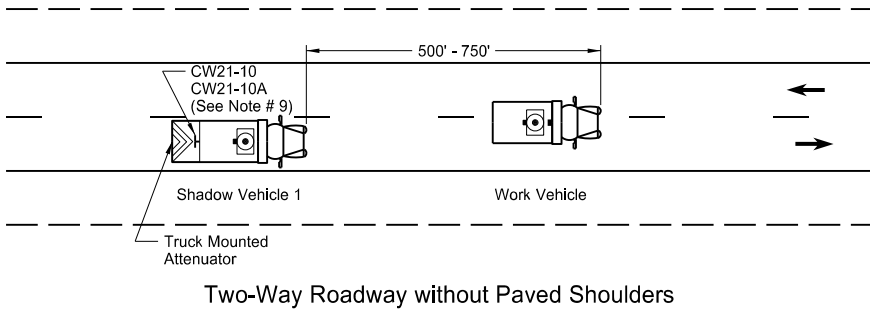
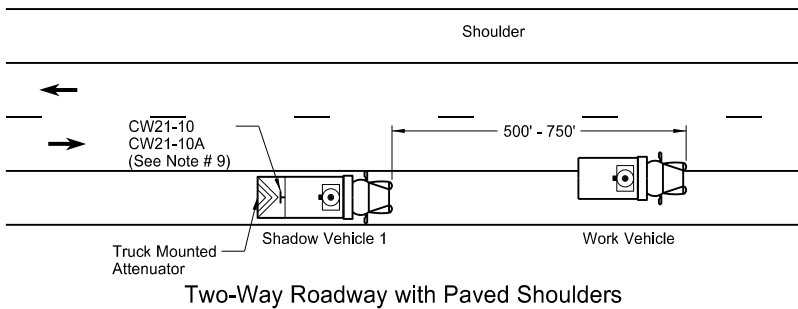
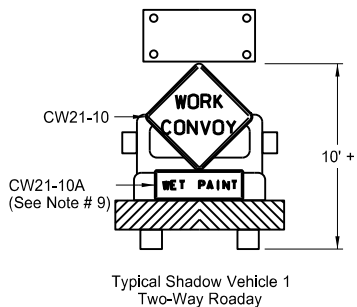
S = Numerical value of speed limit or 85th percentile.

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

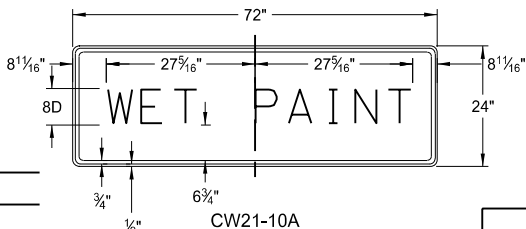
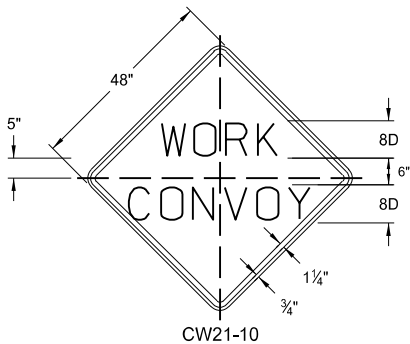
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TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

D-704-27



Sign Details



Notes

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

KEY

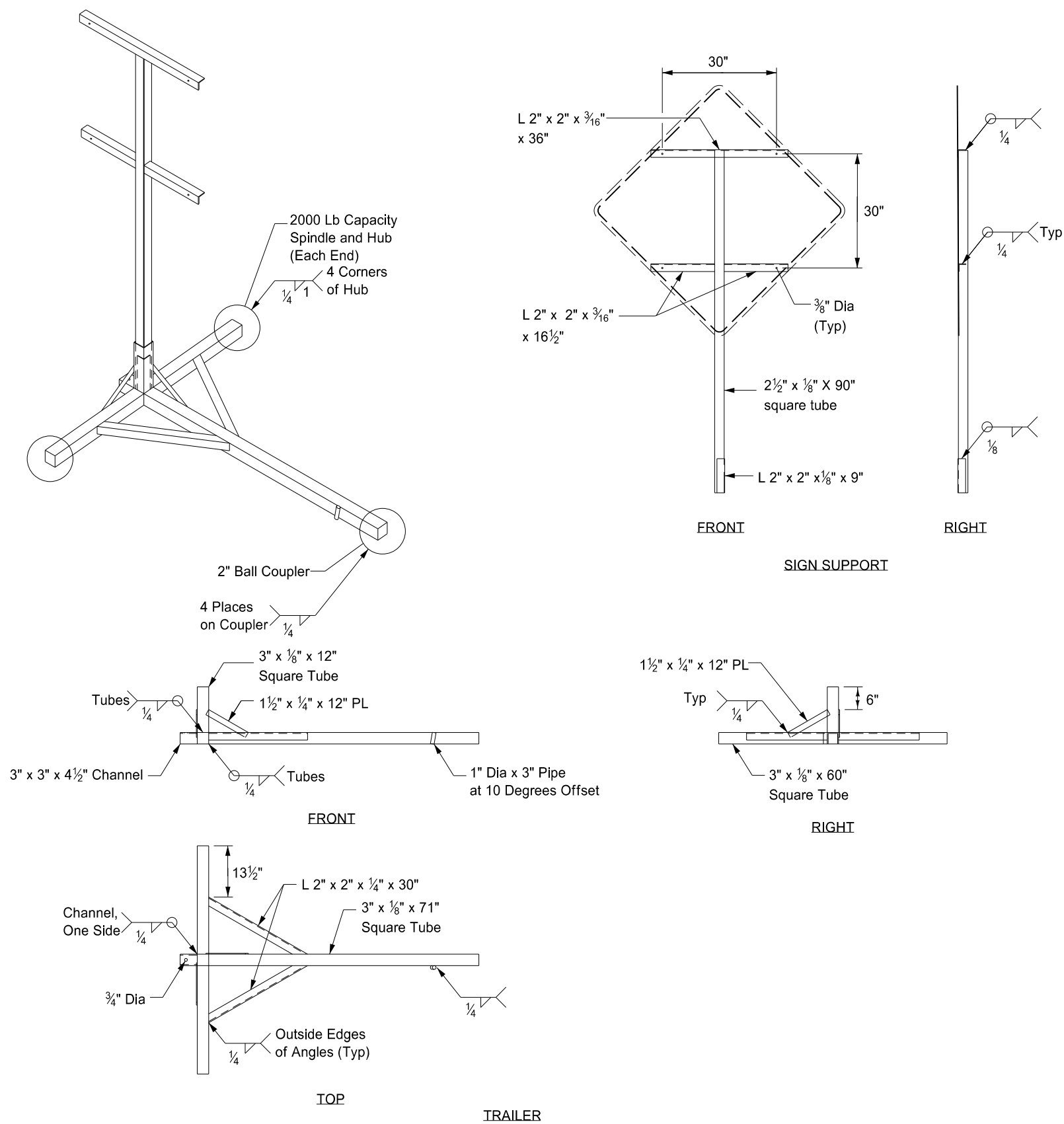
- Sign
- Truck mounted attenuator
- Flashing arrow panels:
 - Right directional
 - Left directional
 - Double arrow directional
 - Caution Mode

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

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



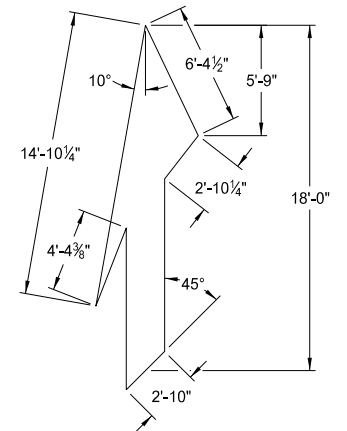
Notes:

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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D-762-1



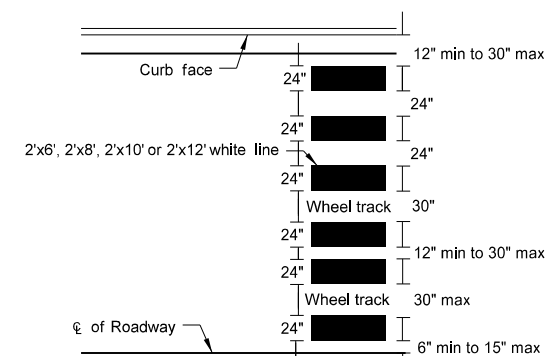
41 S. F.

Technical drawing of a stylized 'B' logo. The logo is composed of several vertical strokes and curves. Dimensions are provided in feet and inches (e.g., 16", 4", 8'-0", 12'-0"). The overall height is 8'-0" and the overall width is 12'-0". The drawing includes various dimension lines and arrows indicating the specific measurements for each part of the logo.

46 S. F.

The diagram shows a cross-section of a road. It consists of a top horizontal line labeled "Edge line" and a bottom horizontal line also labeled "Edge line". Between these lines, there is a section labeled "10'" with a dimension line indicating its width. To the right of this section is a larger section labeled "30'" with a dimension line indicating its width. The "10'" section is further divided into two sub-sections by a small vertical line.

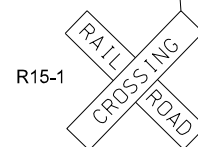
Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft



W10-1 

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.



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

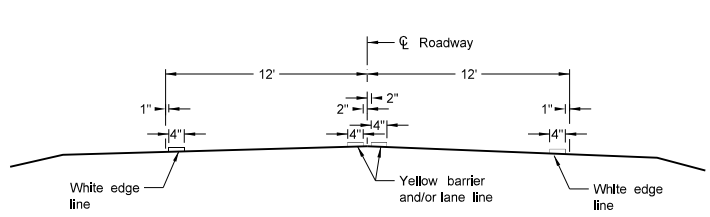
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE

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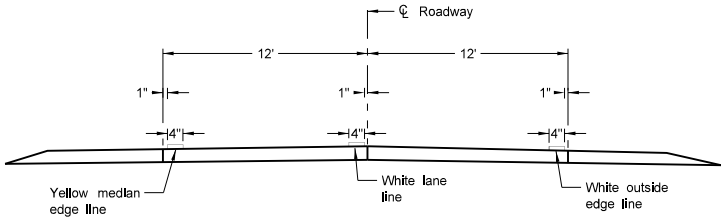
PAVEMENT MARKING

D-762-4

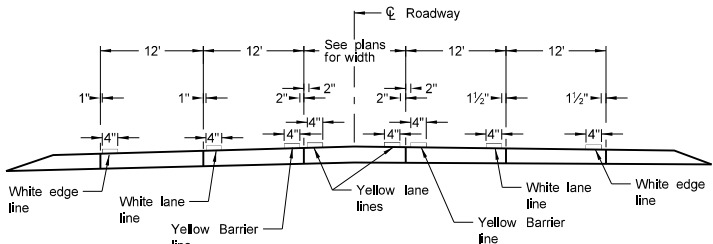
NOTES:
1. Edge lines shall be continued through private drives and field drives and broken for intersections.



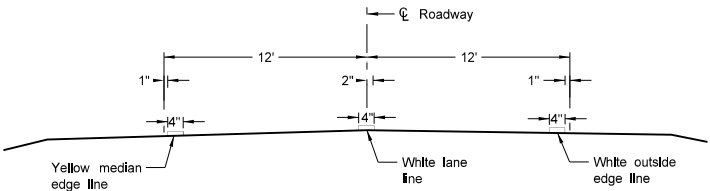
Two Lane Two Way
RURAL ROADWAY



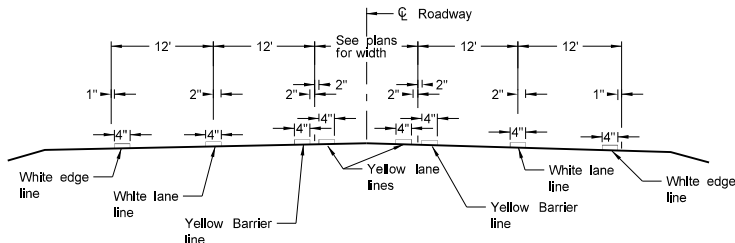
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



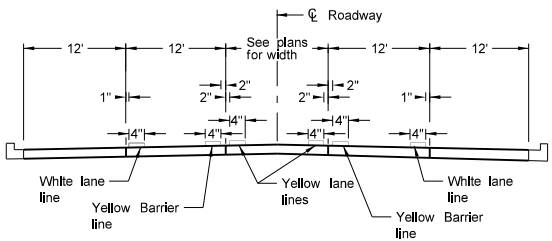
RURAL FIVE LANE ROADWAY
Concrete Section



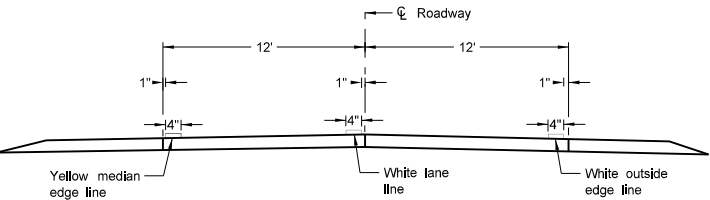
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



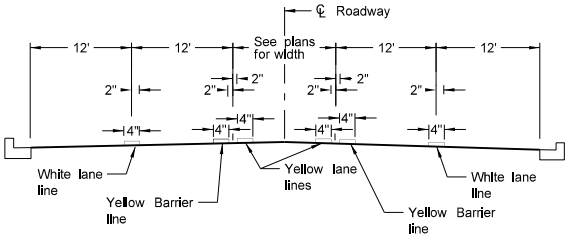
RURAL FIVE LANE ROADWAY
Asphalt Section



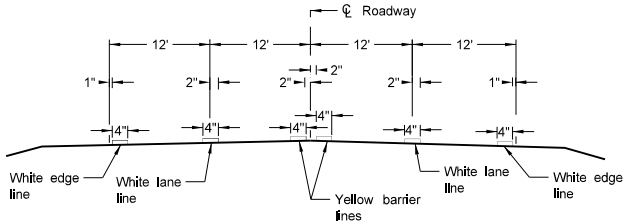
URBAN FIVE LANE SECTION
Concrete Section



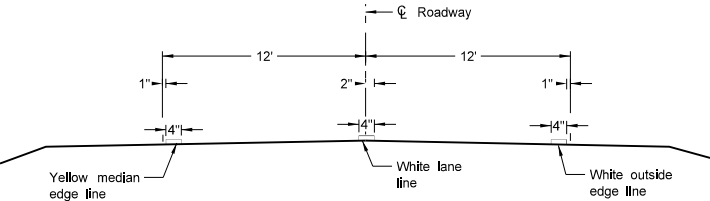
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



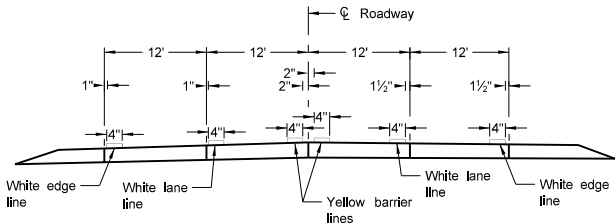
URBAN FIVE LANE SECTION
Asphalt Section



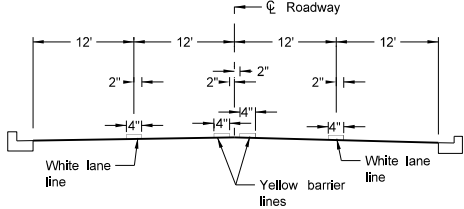
RURAL FOUR LANE ROADWAY
Asphalt Section



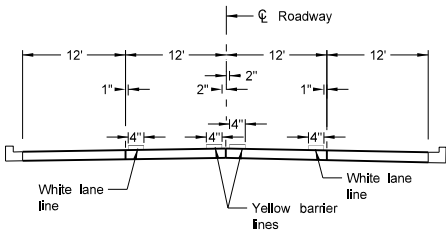
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



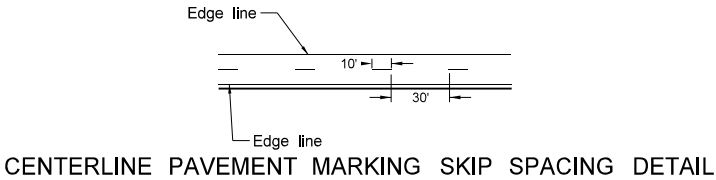
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



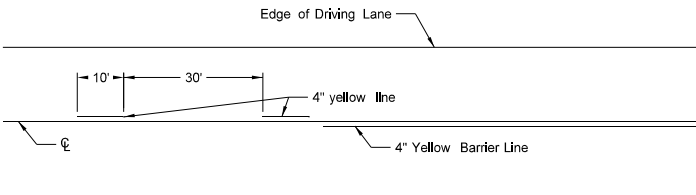
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

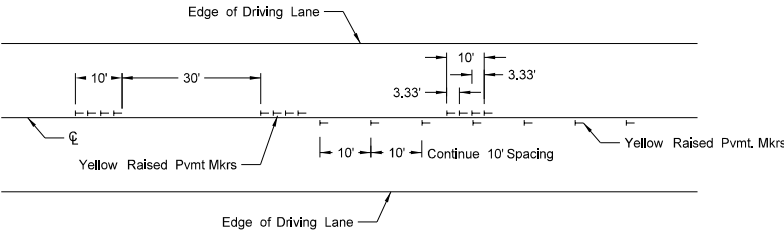
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SHORT-TERM PAVEMENT MARKING

D-762-11

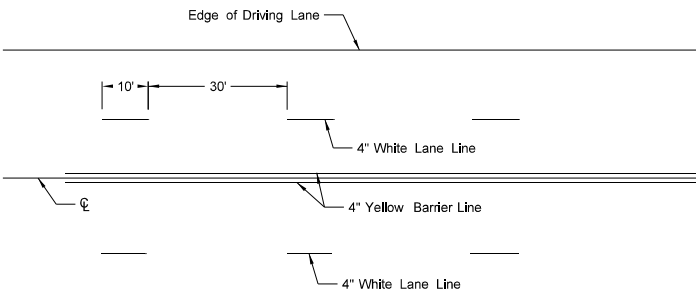


Painted or Tape Lines

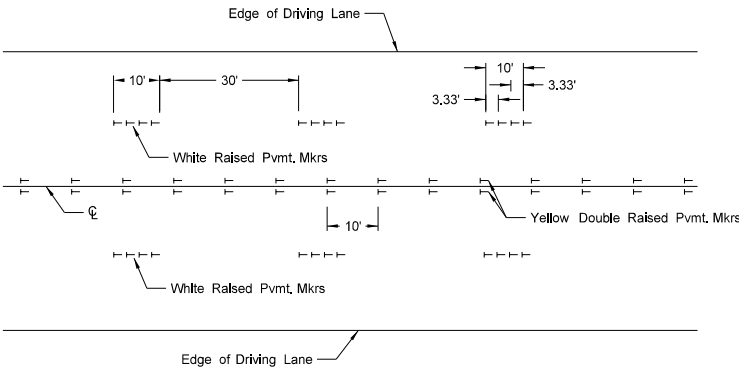


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

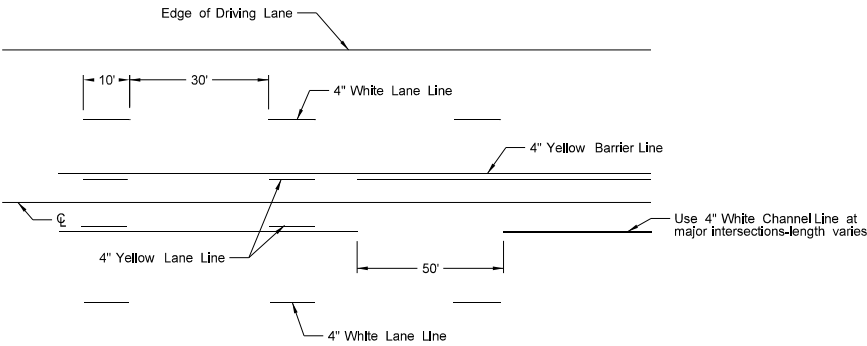


Painted or Tape Lines

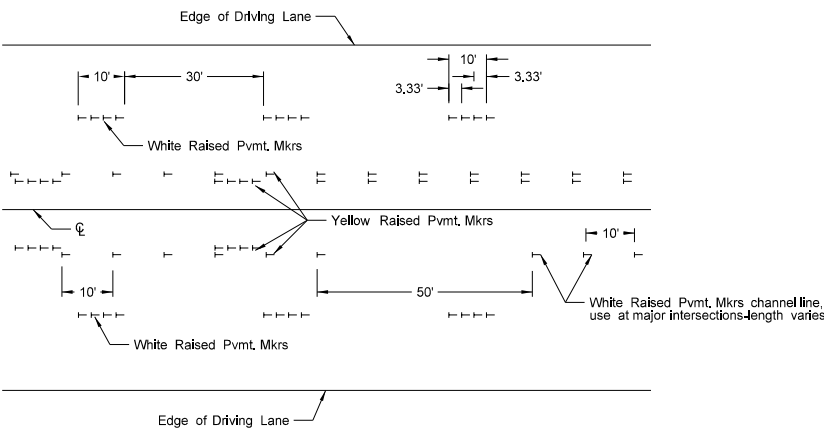


Raised Pavement Markers

FOUR LANE ROADWAY

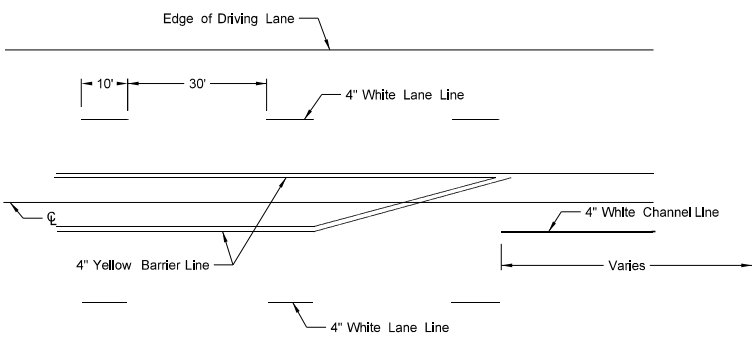


Painted or Tape Lines

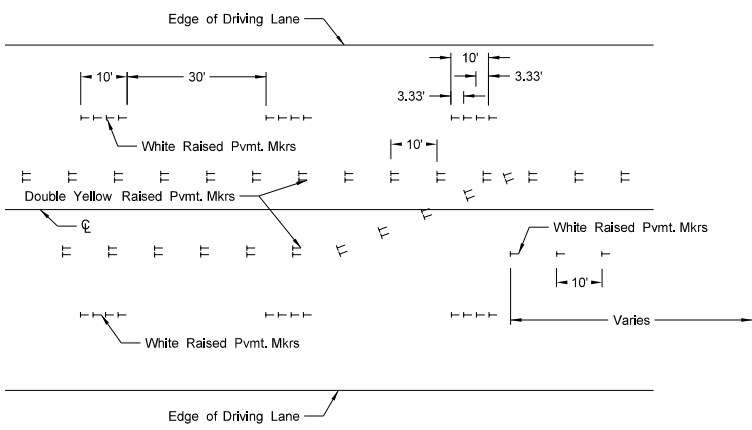


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

- NOTES:
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
 2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
 3. Remove raised markers and tape markings after permanent pavement marking is installed.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.

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Registration Number
PE- 2930,
on 10-17-2017 and the original document is stored at the
North Dakota Department
of Transportation