

| DESIGN DATA | | | | |
|---------------------------------------|---------------|------------------|------------|--|
| Traffic | Average Daily | | | |
| Current 2018 | Pass: 275 | Trucks: 85 | Total: 360 | |
| Forecast 2038 | Pass: 308 | Trucks: 95 | Total: 403 | |
| Clear Zone Distance: | | Design Speed: 55 | | |
| Minimum Sight Dist. for Stopping: 495 | | Bridges: None | | |
| Sight Dist. for No Passing Zone: N/A | | | | |
| Pavement Design Life 20 (years) | | | | |
| | | | | |

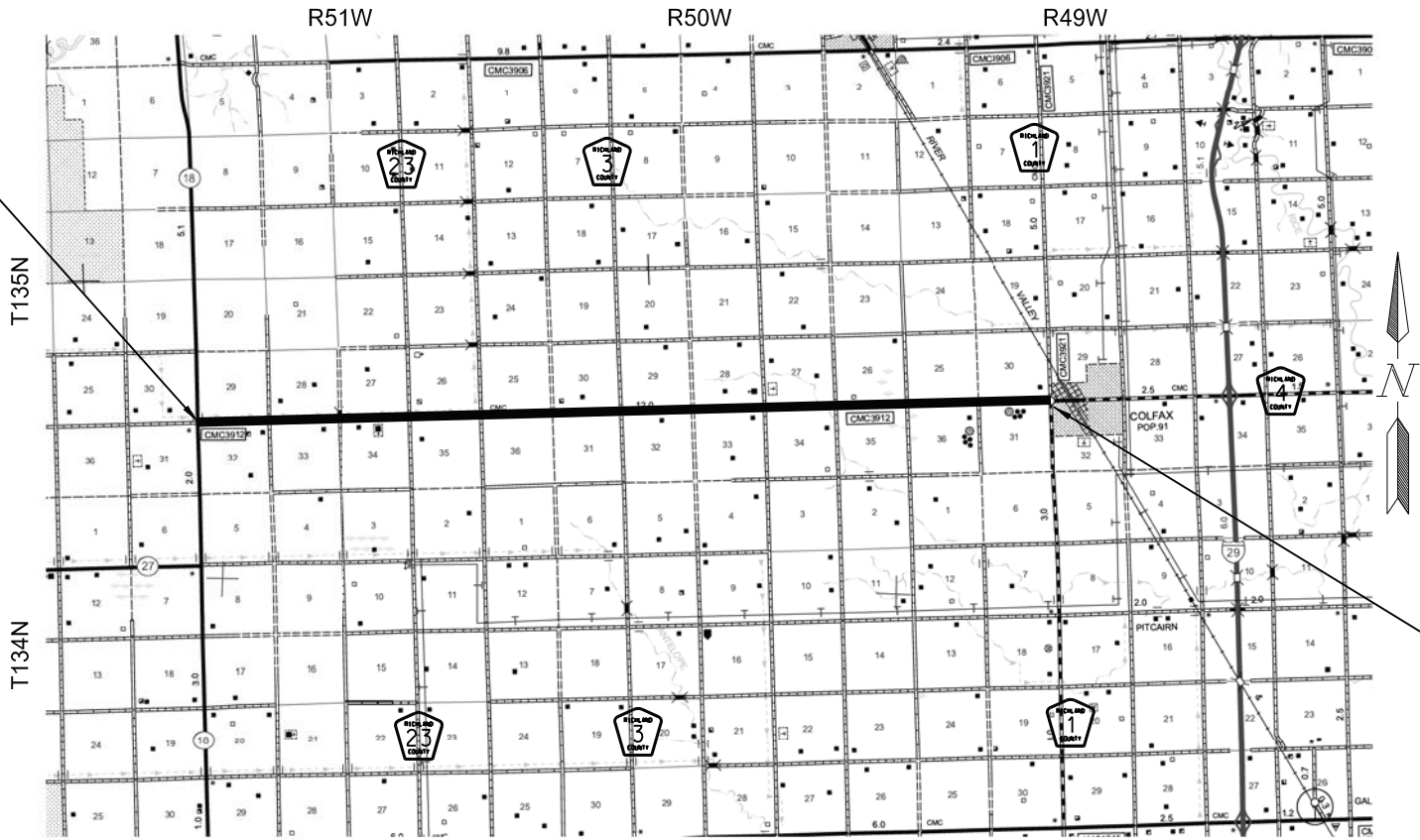
JOB # 5
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

Federal Aid Project
SC-3912(056)
Richland County
County Highway #4 (CMC 3912)
From ND 18 East 12 miles to County Highway #1 (CMC 3921)
This project consists of
12 miles of Hot Bituminous Pavement in two lifts.

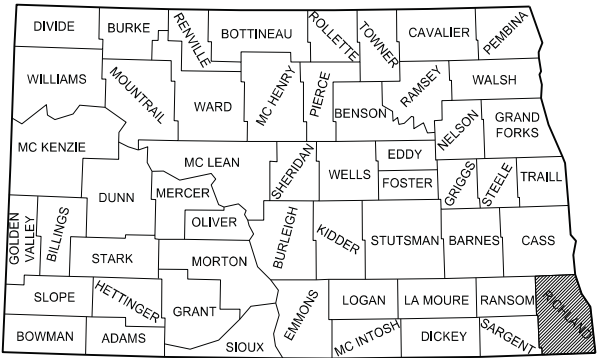
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|--|-------|--------------|-------|-------------|-----------|
| | STATE | PROJECT NO. | PCN | SECTION NO. | SHEET NO. |
| | ND | SC-3912(056) | 22035 | 1 | 1 |

| | | |
|---|-----------|-------------|
| 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 |
| SC-3912(056) | 12.000 | 12.000 |

BEGIN PROJECT SC-3912(056)
STATION 0+00
NE Corner of Section 31
T135N, R51W



END PROJECT SC-3912(056)
STATION 633+60
NE Corner of Section 31
T135N, R49W



STATE COUNTY MAP

PSE CORRECTIONS MADE
DESIGNED
DATE 8-18
DATE 7-18

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

APPROVED DATE 8/22/18
Damon K. DeVillers /s/
NDDOT DIV-DIST OR CONSULTANT FIRM

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Damon K. DeVillers
Registration Number PE-3523,
On 8/22/18 and the original document is stored at the Richland County Court House, Wahpeton, ND

| TABLE OF CONTENTS | | | | | | STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
|-------------------|---------|---------------------------|--------------|---|---------------------------|-------|--------------|-------------|-----------|
| | | | | | | ND | SC-3912(056) | 2 | 1 |
| PLAN SECTIONS | | | | | LIST OF STANDARD DRAWINGS | | | | |
| Section | Page(s) | Description | Number | Description | | | | | |
| 1 | 1 | Title Sheet | D-101-1, 2,3 | NDDOT Abbreviations | | | | | |
| 2 | 1 | Table of Contents | D-101-10 | NDDOT Utility Company and Organization Abbreviations | | | | | |
| 6 | 1 | Notes | D-101-20, 21 | Line Styles | | | | | |
| 8 | 1 | Quantities | D-101-30 | Symbols | | | | | |
| 10 | 1 | Basis of Estimate | D-704-7 | Breakaway Systems For Construction Zone Signs - Perforated Tube | | | | | |
| 20 | 1 - 2 | General Details | D-704-8 | Breakaway Systems For Construction Zone Signs - U-Channel Post | | | | | |
| 30 | 1 | Typical Sections | D-704-9 | Construction Sign Details - Terminal And Guide Signs | | | | | |
| 100 | 1 - 2 | Work Zone Traffic Control | D-704-10 | Construction Sign Details - Regulatory Signs | | | | | |
| 190 | 1 - 1 | Haul Road Restrictions | D-704-11 | Construction Sign Details - Warning Signs | | | | | |
| | | | D-704-12 | Shoulder Closure Tapers | | | | | |
| | | | D-704-13 | Barricade And Channelizing Device Details | | | | | |
| | | | D-704-14 | Construction Sign Punching And Mounting Details | | | | | |
| | | | D-704-15 | Road Closure Layouts | | | | | |
| | | | D-704-17 | Sign Layout For One Lane Closure Two Lane Roadway | | | | | |
| | | | D-704-19 | Road Closure And Lane Closure On A Two Way Road Layouts | | | | | |
| | | | D-704-20 | Terminal And Seal Coat Sign Layouts | | | | | |
| | | | D-704-22 | Construction Truck And Temporary Detour Layouts | | | | | |
| | | | D-704-24 | Shoulder Closures And Bridge Painting Layouts | | | | | |
| | | | D-704-26 | Miscellaneous Sign Layouts | | | | | |
| | | | D-704-27 | Traffic Control Plan For Moving Operations | | | | | |
| | | | D-704-31 | Construction Sign Layout - Non-Signalized Low Volume One Lane Closure | | | | | |
| | | | D-704-32 | Sign Layout For One Lane Closure Divided Highway Moving Operation | | | | | |
| | | | D-704-34 | Sign Layout For One Lane Closure | | | | | |
| | | | D-704-50 | Portable Sign Support Assembly | | | | | |
| | | | D-706-1 | Bituminous Laboratory | | | | | |
| | | | D-762-4 | Pavement Marking | | | | | |

| | | | |
|-------|--------------|-------------|-----------|
| STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
| ND | SC-3912(056) | 6 | 1 |

NOTES

DIMENSIONS: Thickness shown on the typical sections for surfacing are approximate. It is intended that the plan tonnages provided for by the basis of estimate will be used uniformly throughout the project unless otherwise authorized by the Engineer.

105-P01 UTILITIES: No utility relocations or adjustments are planned. All utilities on the project need to be protected and remain in existing location.

411-P01 MILLING PAVEMENT SURFACES: Milled tapers will be required to produce transitions to and from existing roadways. Payment for the milled tapers shall be by the square yard. All costs associated with labor and equipment for milling of the tapers shall be included in the price bid for "Milling Pavement Surface."

430-P01 Asphalt millings required to produce Recycled Asphalt Pavement for this project may be obtained from Richland County. Richland County has crushed millings located in their pit in Section 27, T130N, R50W for use on this project. Contractors are advised to check with Richland County Engineer, Jesse Sedler (701-642-7810), for details.

430-P02 HOT BITUMINOUS PAVEMENT: The hot bituminous pavement shall be placed in two lifts. The bottom lift shall consist of a 1" level course placed with a paver. The top lift shall consist of a 1.75" wearing course placed with a paver. All lifts shall be compacted in accordance with section 430.04I.1.

The Contractor will not be able to use Richland County's Pit to obtain aggregate material for the hot bituminous pavement mix. The Contractor will not be allowed to use Richland County's Pit to setup their plant.

430-P03 BITUMINOUS LABORATORY: The Contractor shall be required to provide a BITUMINOUS LABORATORY for Richland County and for themselves during mix production. All costs Associated with the laboratory and testing shall be included in the unit price bid for "BITUMINOUS LABORATORY."

704-P01 TEMPORARY TRAFFIC CONTROL: Traffic control for the milling and bituminous paving shall consist of flagging and a pilot car. Traffic Control Devices shall comply with the following Standard Drawings:

- Standard D-704-15, layout A: For temporary roadway closure during paving operations.
- Standard D-704-20, layout G: For construction signing during paving operations. Sign G20-1b-60 will not be required. Signs R2-1-48 and R2-1a-24 are to be moved as the work area moves through the construction zone and should be placed a minimum of 500 ft in advance of flagging signs.
- Standard D-704-22, layouts K and L: For trucks hauling material.
- Standard D-704-26, layouts CC, EE, and GG: For paving operations.
- Standard D704-7, 8, 9, 10, 11, 12, 13, 14 and 24 are applicable. The required traffic control signs and devices are included in the "Traffic Control Devices List" and will be measured and paid at the Contract Unit Price for each device. Additional devices required to accommodate the Contractor's operation shall be the Contractor's responsibly.
- NO CENTER STRIPE signs shall be installed according to Standard Drawings D-704-20.

704-P02 TRAFFIC CONTROL: The traffic control devices shall comply to Standard Drawings:

D-704-7, 8, 9, 10, 12, 13, 14 and 50
D-704-15: Layout Type A for a temporary one lane closure with pilot car during paving operation
D-704-20: Layout Type G as the basis of the Construction Signing Sheet
D-704-22: Layout K and L for construction trucks hauling material
D-704-26: Layout Type BB, CC, EE, FF and GG for paving operations
D-704-27: Pavement markings

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Estimated Quantities

| | | | | |
|--|-------|--------------|-------------|-----------|
| | STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
| | ND | SC-3912(056) | 8 | 1 |

| SPEC | CODE | ITEM DESCRIPTION | | UNIT | | TOTAL |
|------|------|----------------------------|----------------|-------|--------|--------|
| 103 | 100 | CONTRACT BOND | | L SUM | 1 | 1 |
| 302 | 120 | AGGREGATE BASE COURSE CL 5 | | TON | 1190 | 1190 |
| 401 | 50 | TACK COAT | | GAL | 17600 | 17600 |
| 401 | 70 | FOG SEAL | | GAL | 21120 | 21120 |
| 411 | 105 | MILLING PAVEMENT SURFACE | | SY | 310 | 310 |
| 702 | 100 | MOBILIZATION | | L SUM | 1 | 1 |
| 704 | 100 | FLAGGING | | MHR | 384 | 384 |
| 704 | 1000 | TRAFFIC CONTROL SIGNS | | UNIT | 2496 | 2496 |
| 704 | 1052 | TYPE III BARRICADE | | EA | 4 | 4 |
| 704 | 1060 | DELINEATOR DRUMS | | EA | 15 | 15 |
| 704 | 1067 | TUBULAR MARKERS | | EA | 15 | 15 |
| 704 | 1185 | PILOT CAR | | HR | 192 | 192 |
| 706 | 550 | BITUMINOUS LABORATORY | | EA | 1 | 1 |
| 706 | 600 | CONTRACTOR'S LABORATORY | | EA | 1 | 1 |
| 762 | 113 | EPOXY PVMT MK 4IN LINE | | LF | 143110 | 143110 |
| 430 | 43 | SUPERPAVE FAA 43 | Bid Option - 1 | TON | 34558 | 34558 |
| 430 | 5828 | PG 58-28 ASPHALT CEMENT | Bid Option - 1 | TON | 2178 | 2178 |
| 430 | 143 | RAP - SUPERPAVE FAA 43 | Bid Option - 2 | TON | 34558 | 34558 |
| 430 | 5828 | PG 58-28 ASPHALT CEMENT | Bid Option - 2 | TON | 1831 | 1831 |

BASIS OF ESTIMATE

BASE BID

| Approaches | Class 5 (tons) |
|--|---------------------|
| Section Line Drives (2) | 20 |
| Private Drives (5) | 15 |
| Field Drives (3) | 15 |
| Church Widening (1) | |
| Cenex Approach (1) | |
| | |
| Tack Coat - SS1H, CSS1h or MS-1 (2 Applications) (17,600 gals) | 0.05 gal/SY |
| | |
| Fog Seal - SS1H, CCS1h or MS-1 (1 Application) (21,120 gals) | 0.10 gal/SY |
| | |
| Epoxy Pavement Marking Line | |
| 4" Yellow Centerline—10' Stripe, 30' Skip = | 1,320 LF/Mile + NPZ |
| 4" White Edgeline = | 10,560 LF/Mile |
| | |
| Flagging | 32 M Hr/Mile |
| Pilot Car | 16 M Hr/Mile |

BID OPTION 1

| | |
|--|--------------------------|
| Superpave FAA 43 Wear Course 110lbs/sy/inch= | 1898 Tons/Mile |
| | |
| Superpave FAA 43 Leveling Course 110lbs/sy/inch @ 1" depth, 24' width + 15% (Slope Correction)= | 891 Tons/Mile |
| | |
| PG-58-28 | 6.3% of Superpave FAA 43 |

| Approaches | HBP (tons) | PG 58-28 (tons) |
|--------------------------|------------|-----------------|
| Section Line Drives (22) | 30 | 1.90 |
| Private Drives (12) | 15 | 0.95 |
| Field Drives (33) | 5 | 0.30 |
| Church Widening (1) | 50 | 3.15 |
| Cenex Approach (1) | 35 | 2.20 |

BID OPTION 2

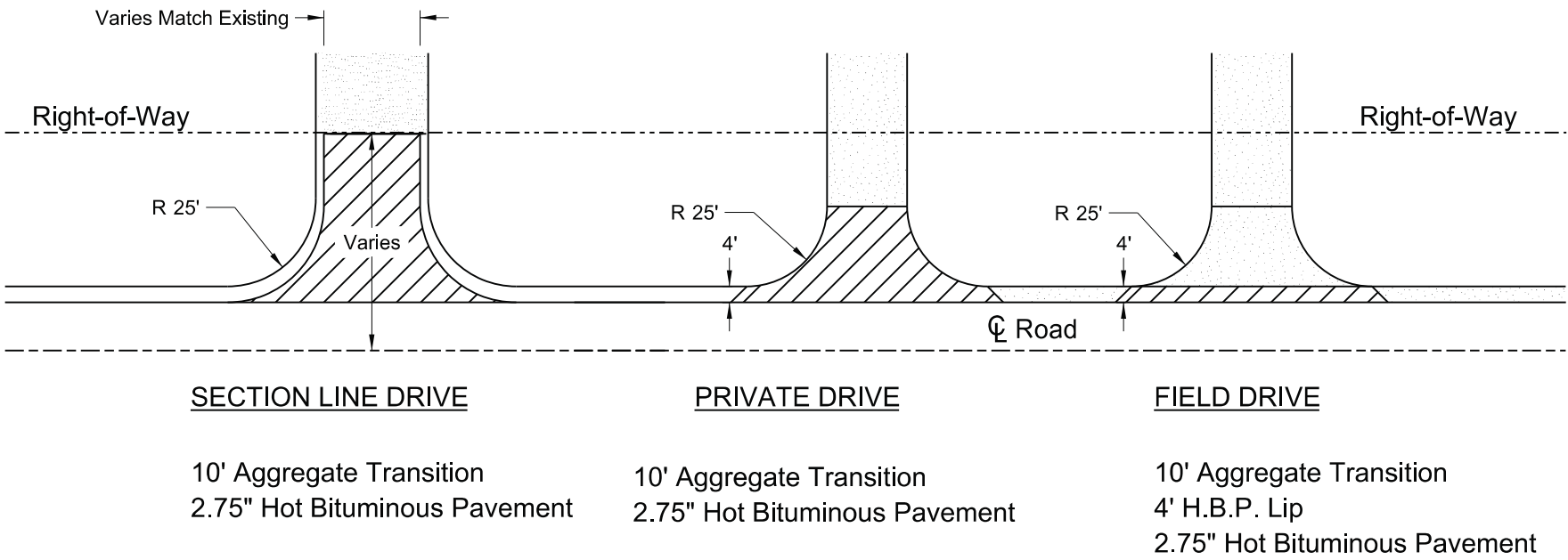
| | |
|--|---------------------------|
| RAP Superpave FAA 43 Wear Course 110lbs/sy/inch= | 1898 Tons/Mile |
| | |
| RAP Superpave FAA 43 Leveling Course 110lbs/sy/inch @ 1" depth, 24' width + 15% (Slope Correction)= | 891 Tons/Mile |
| | |
| PG-58-28 –1% assumed from RAP 43 | 5.3% of RAP Superpave FAA |

| Approaches | HBP (tons) | PG 58-28 (tons) |
|--------------------------|------------|-----------------|
| Section Line Drives (22) | 30 | 1.60 |
| Private Drives (12) | 15 | 0.80 |
| Field Drives (33) | 5 | 0.30 |
| Church Widening (1) | 50 | 2.70 |
| Cenex Approach (1) | 35 | 1.90 |



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| | | | | |
|--|-------|--------------|-------------|-----------|
| | STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
| | ND | SC-3912(056) | 20 | 1 |



TYPICAL APPROACH SURFACING
N.T.S.

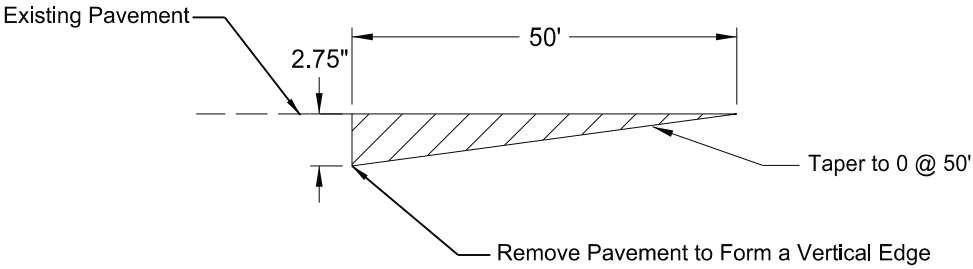
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DETAILS

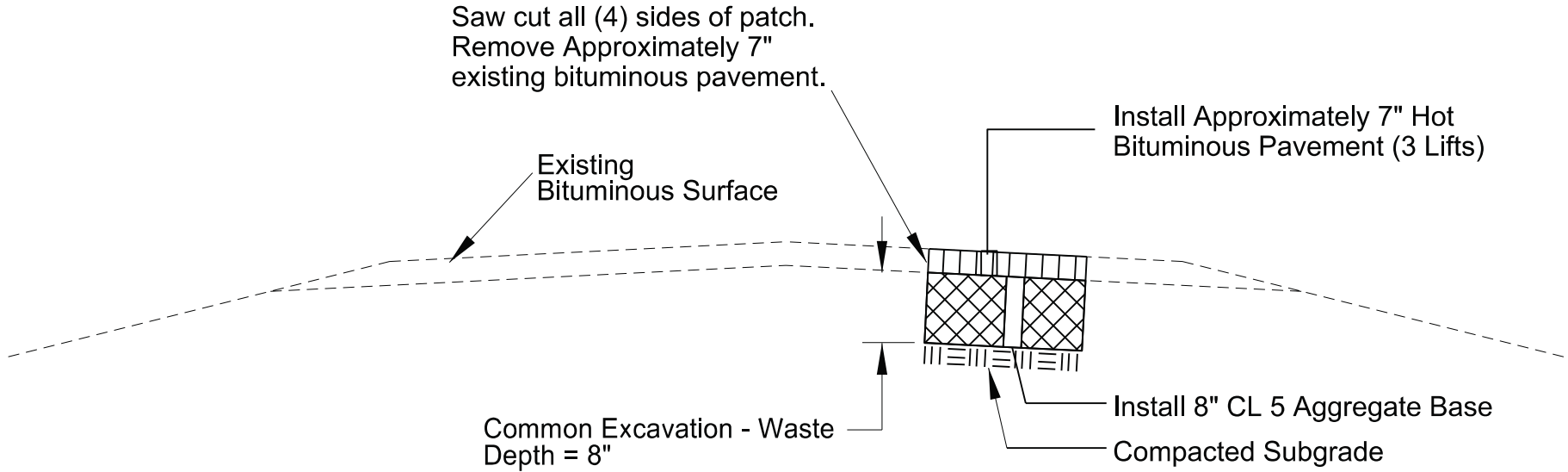
County Road 4

Richland County, North Dakota

| | | | | |
|--|-------|--------------|-------------|-----------|
| | STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
| | ND | SC-3912(056) | 20 | 2 |



MILLING AT BEGINNING AND END OF PROJECT
N.T.S



Patching areas to be determined by the Engineer in the field.

PATCHING DETAIL
N.T.S.

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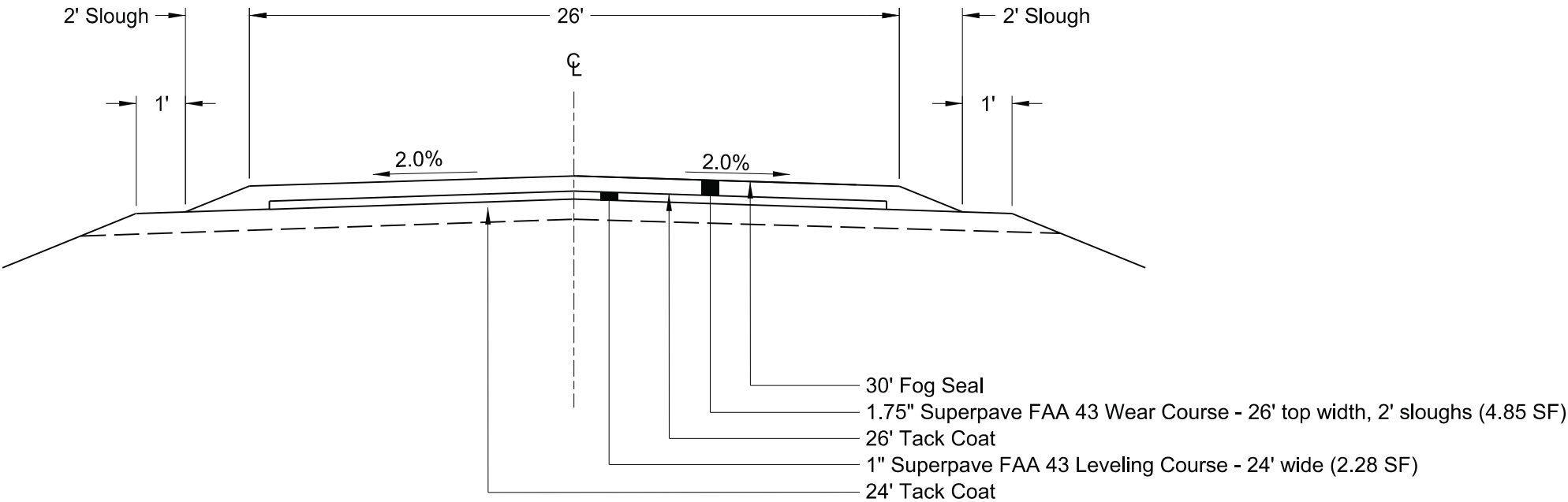
Milling and Patching Detail

County Road 4

Richland County, North Dakota

| | | | | |
|--|-------|--------------|-------------|-----------|
| | STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
| | ND | SC-3912(056) | 30 | 1 |

- Note:
1. 2' slough width used for estimating purposes only. (4:1 MIN. SLOPE) Actual slough width may vary in the field.
 2. The pavement sloughs shall have a slope of 4:1 or flatter and shall be constructed in conjunction with the surface course.



ROADWAY SYMMETRICAL ABOUT CENTERLINE

Proposed Typical Section

N.T.S.

Sta. 0+00 to Sta. 633+60

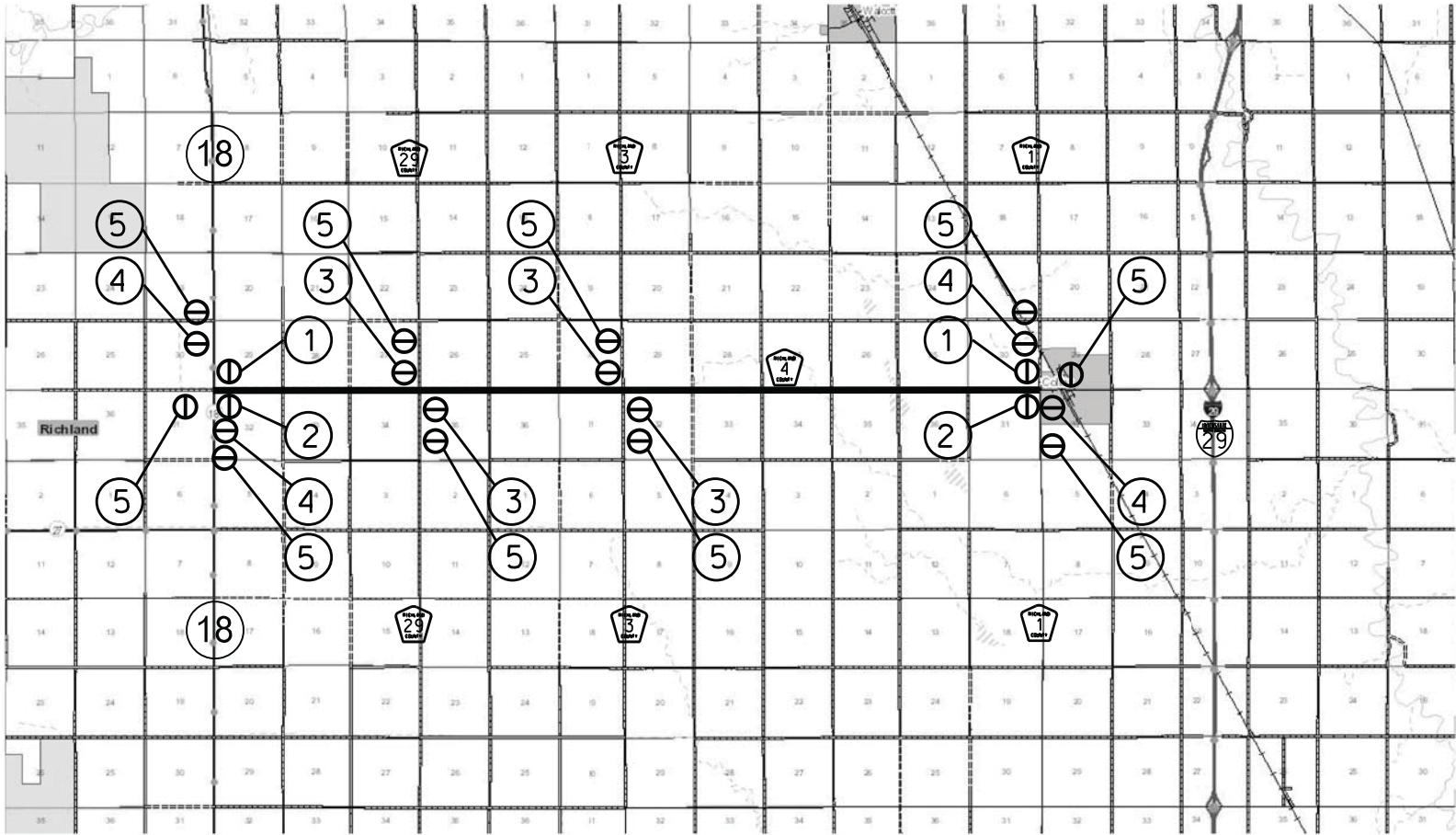
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Proposed Typical Section

County Road 4

Richland County, North Dakota

| | | | | |
|--|-------|--------------|-------------|-----------|
| | STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
| | ND | SC-3912(056) | 100 | 1 |



- ① G20-1-60 " ROAD WORK NEXT __ MILES"
BARRICADE MOUNTED
- ② G20-2-48 "END ROAD WORK"
BARRICADE MOUNTED
- ③ G20-52a-72 "ROAD WORK NEXT __ MILES"
RT OR LT ARROWS POST MOUNTED
- ④ W20-1-48 "ROAD WORK AHEAD"
POST MOUNTING
- ⑤ G20-50a-72 "ROAD WORK NEXT __ MILES"
RT & LT ARROWS POST MOUNTED



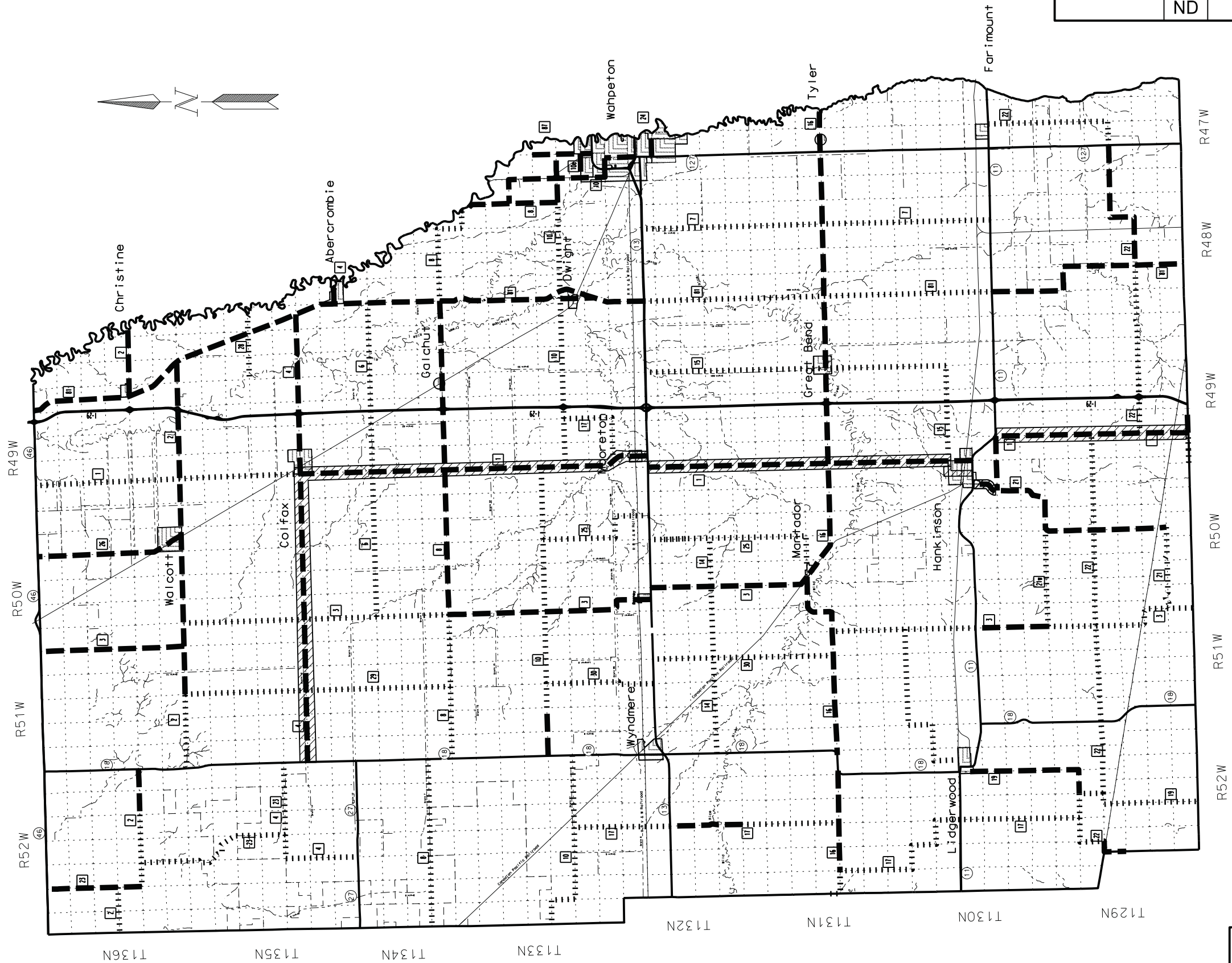
THE CONSTRUCTION SIGNING LAYOUT IS FOR INFORMATIONAL PURPOSES ONLY. TRAFFIC CONTROL SIGNING SHALL BE INSTALLED AS PER MUTCD MANUAL AND/OR STANDARD DRAWINGS

⊖ SIGN LOCATION

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Construction Signing Layout
County Road 4
Richland County, North Dakota

| | | | | |
|--|-------|--------------|-------------|-----------|
| | STATE | PROJECT NO. | SECTION NO. | SHEET NO. |
| | ND | SC-3912(056) | 190 | 1 |



- STATE HIGHWAYS
- PAVED COUNTY ROADS
- GRAVEL COUNTY ROADS
- NO HAUL ROADS

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Haul Road Restrictions
County Road 4
Richland County, North Dakota

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

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|-------------------|
| 07-01-14 | |
| REVISIONS | |
| DATE | CHANGE |
| 04-23-18 | General Revisions |

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NDDOT ABBREVIATIONS

D-101-2

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

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
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| 07-01-14 | |
| REVISIONS | |
| DATE | CHANGE |
| 08-03-15 04-23-18 | General Revisions General Revisions |

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NDDOT ABBREVIATIONS

D-101-3

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

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
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| 07-01-14 | |
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| DATE | CHANGE |
| 08-03-15 04-23-18 | General Revisions General Revisions |

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|-------------------|
| 07-01-14 | |
| REVISIONS | |
| DATE | CHANGE |
| 04-23-18 | General Revisions |

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Existing Topography

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

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

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

Traffic Utilities

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

Sign Structures

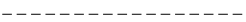
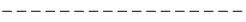




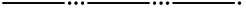






| | |
|--|---|
| | Existing Overhead Sign Structure |
| | Existing Overhead Sign Structure Cantilever |
| | Overhead Sign Structure Cantilever |

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



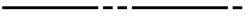
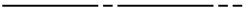
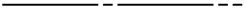




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Line Styles

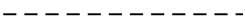
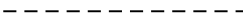
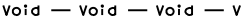
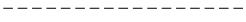




Right Of Way

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







Boundary Control

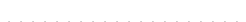
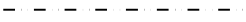
| | |
|---|--|
|  | Existing City Corporate Limits or Reservation Boundary |
|  | Existing State or International Line |
|  | Existing Township |
|  | Existing County |
|  | Existing Section Line |
|  | Existing Quarter Section Line |
|  | Existing Sixteenth Section Line |
|  | Existing Centerline |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

Cross Sections and Typicals


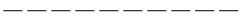
| | |
|--|---|
|  | Existing Ground |
|  | Existing Topsoil (Cross Section View) |
|  | Existing Ground Void (Not Surveyed) |
|  | Existing Concrete |
|  | Existing Aggregate (Cross Section View) |
|  | Existing Curb and Gutter (Cross Section View) |
|  | Existing Asphalt (Cross Section View) |
|  |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

Geotechnical


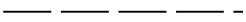
| | | |
|--|-----|---------------------------|
|  | D | Geotextile Fabric Type D |
|  | Geo | Geogrid |
|  | R | Geotextile Fabric Type R |
|  | R | Geotextile Fabric Type R1 |
|  | RR | Geotextile Fabric Type RR |
|  | S | Geotextile Fabric Type S |

| | |
|--|------------------------|
|  | Subgrade Reinforcement |
|  | Failure Line |


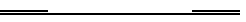

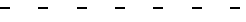


Countours

| | |
|--|----------------------|
|  | Depression Contours |
|  | Supplemental Contour |




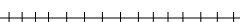
Profile

| | |
|--|---------------------------------|
|  | Subgrade, Subcut or Ditch Grade |
|  | Topsoil Profile |






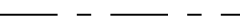
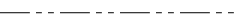
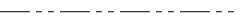

Striping

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

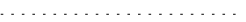



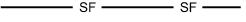

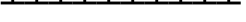
Pavement Joints

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



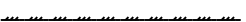
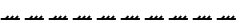
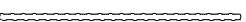
Bridge Details

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

Erosion Control

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

Environmental

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

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

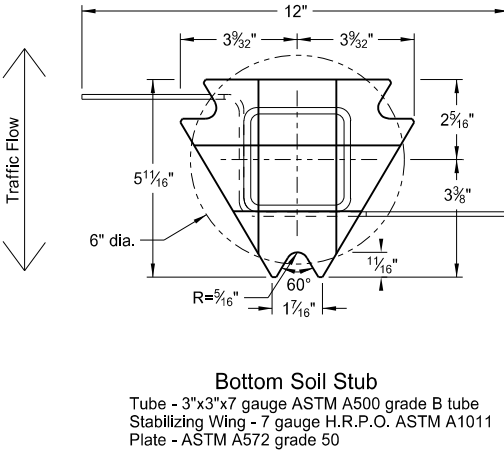
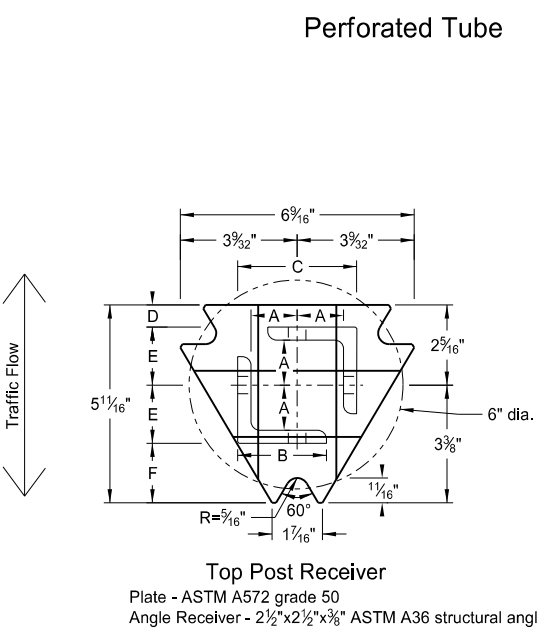
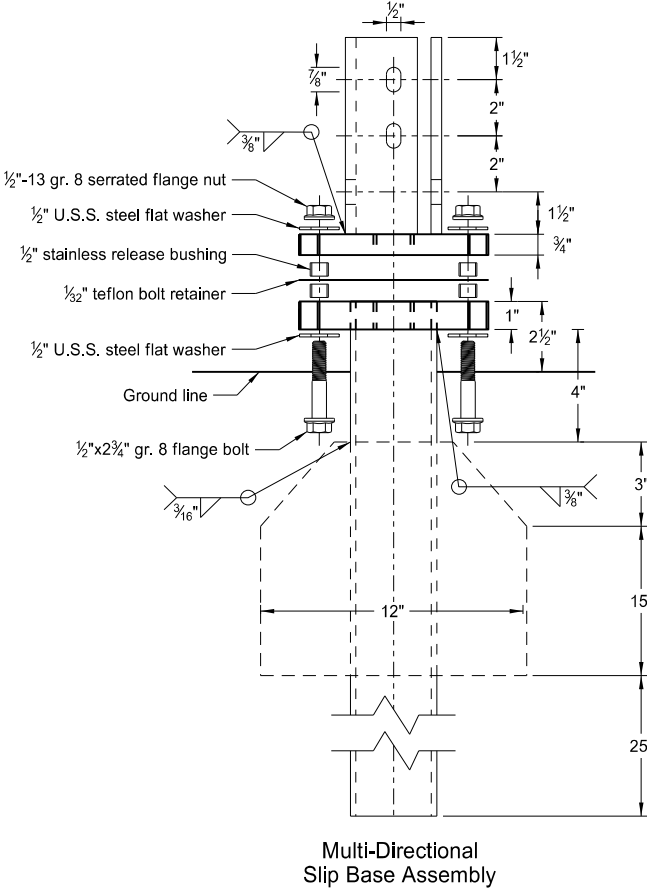
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Symbols

| | 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 | | | | | | | | | | | | |

Perforated Tube

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

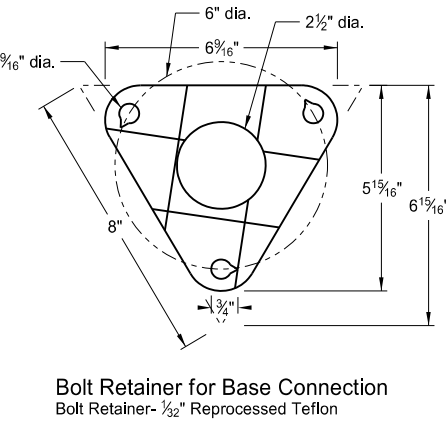
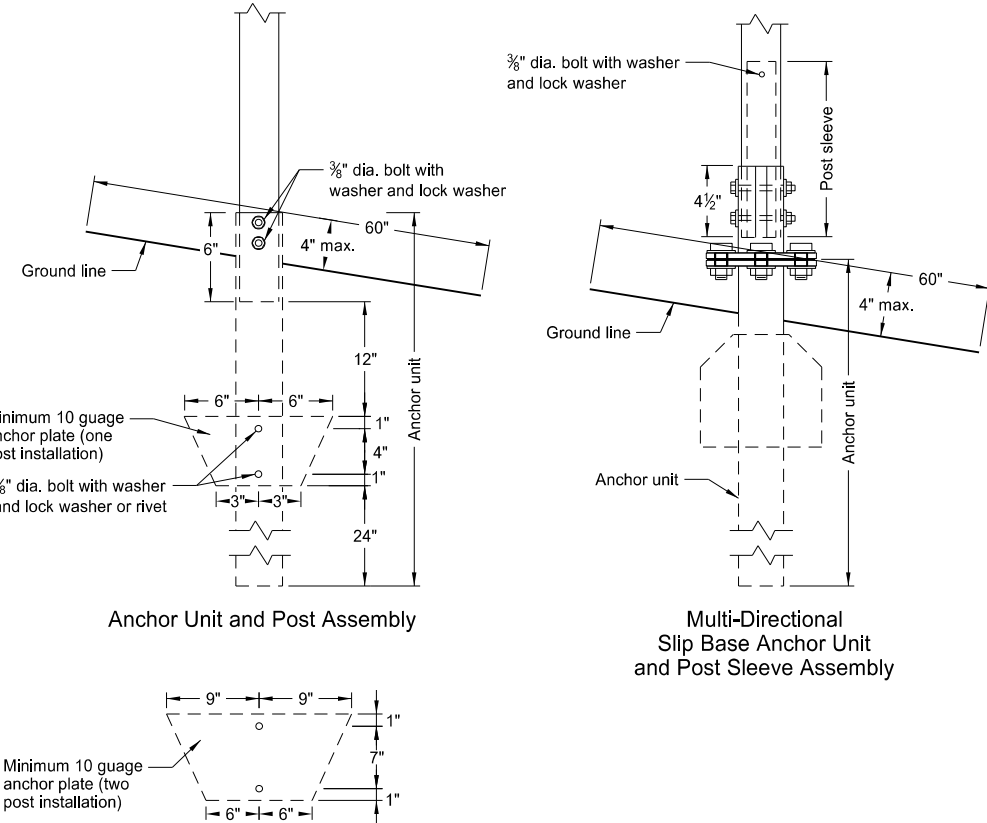


| Telescoping Perforated Tube | | | | | | |
|-----------------------------|---------------|-----------------------|-----------------|-----------------------|-----------|-----------------------------------|
| Number of Posts | Post Size in. | Wall Thick-ness Gauge | Sleeve Size in. | Wall Thick-ness Gauge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

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

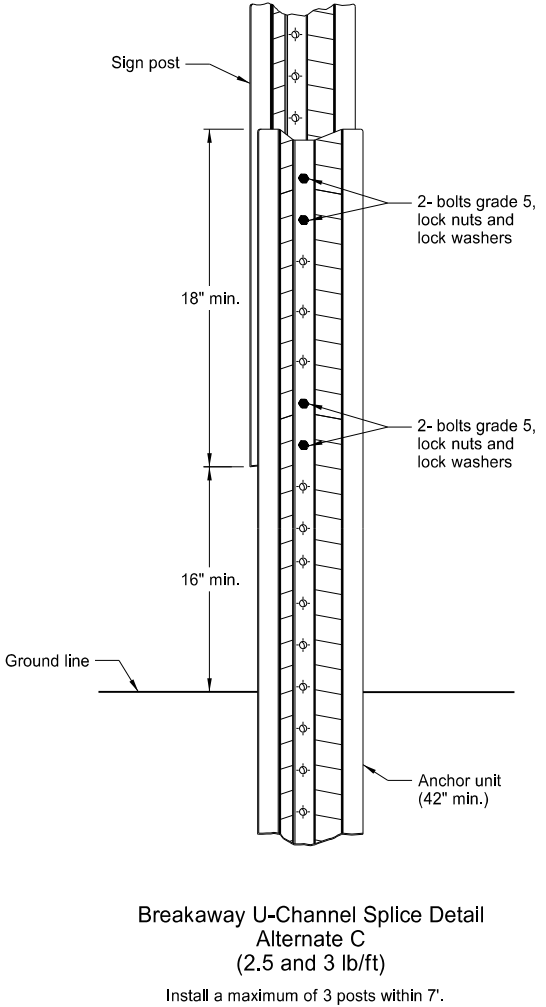
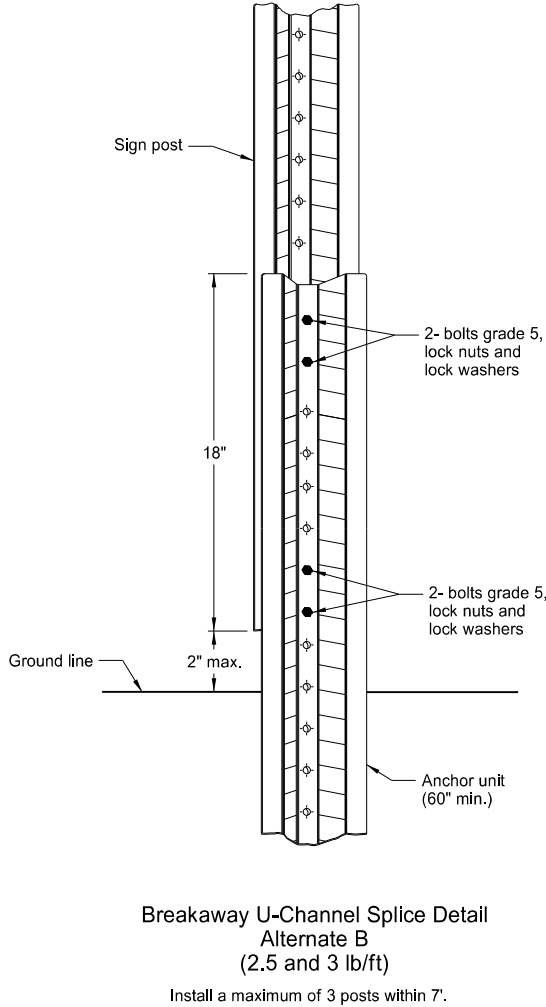
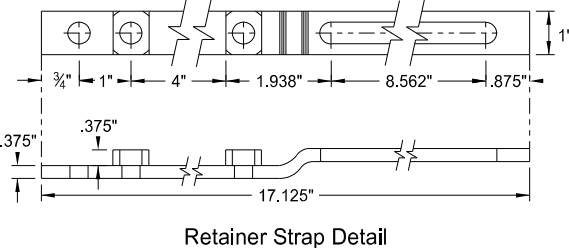
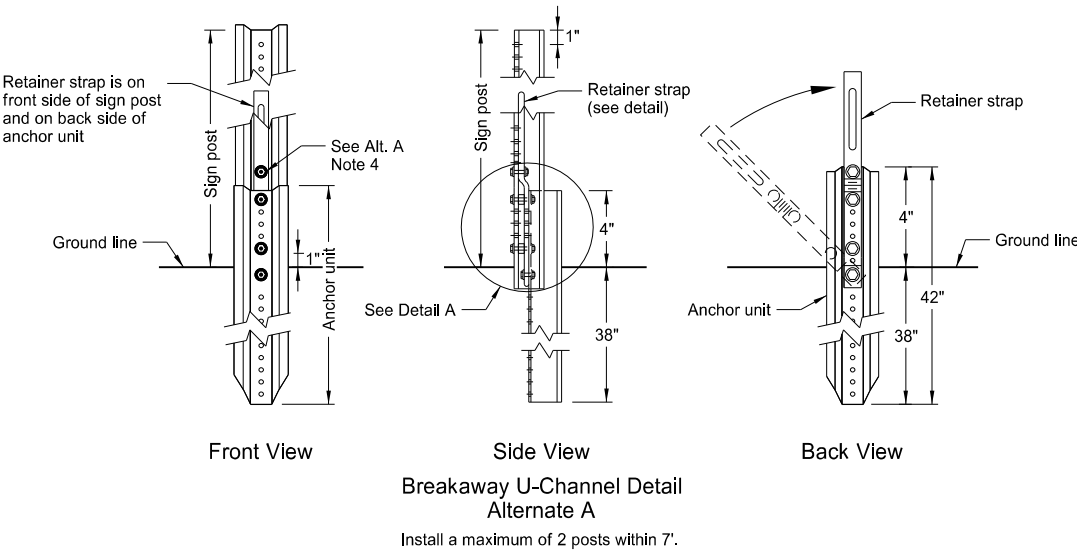
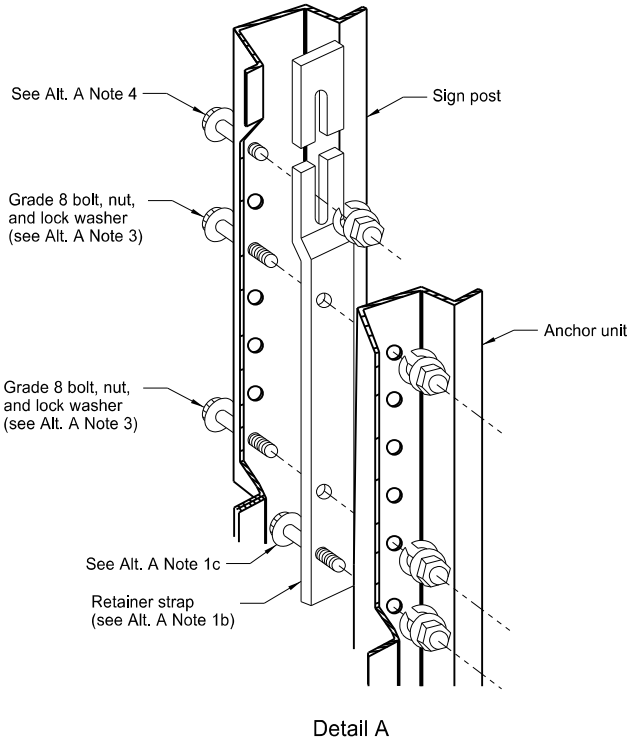
| Top Post Receiver Data Table | | | | | | |
|------------------------------|---------|--------|---------|---------|----------|--------|
| Square Post Sizes (B) | A | B | C | D | E | F |
| 2 3/16"x10 ga. | 1 5/16" | 2 1/2" | 3 1/2" | 2 5/32" | 1 33/64" | 1 7/8" |
| 2 1/2"x10 ga. | 1 3/32" | 2 1/2" |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

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



| | | |
|--|-------------------------|---|
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| 2-28-14 | | |
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| DATE | CHANGE | |
| 9-27-17 | Updated to active voice | |

U-Channel Post



Alternate A Steps of Installation:

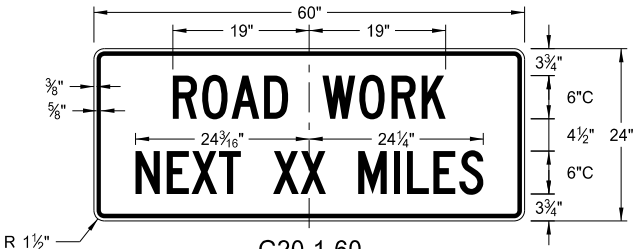
- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
- a) Drive anchor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

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| 2-28-14 | |
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| DATE | CHANGE |
| 9-27-17 | Updated to active voice |

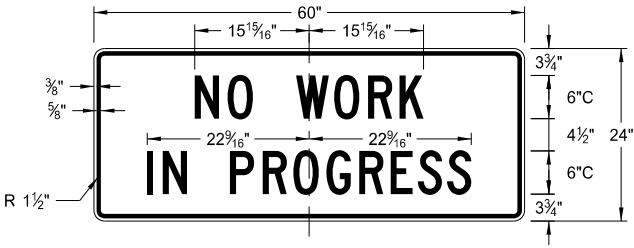
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

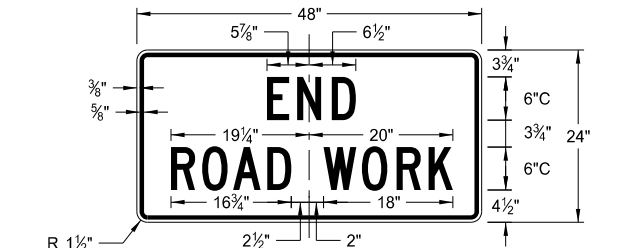
D-704-9



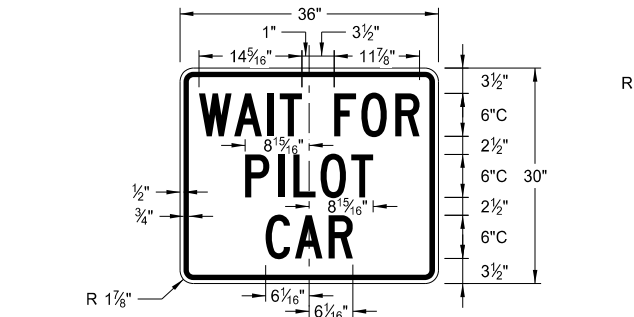
G20-1-60
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Background: orange



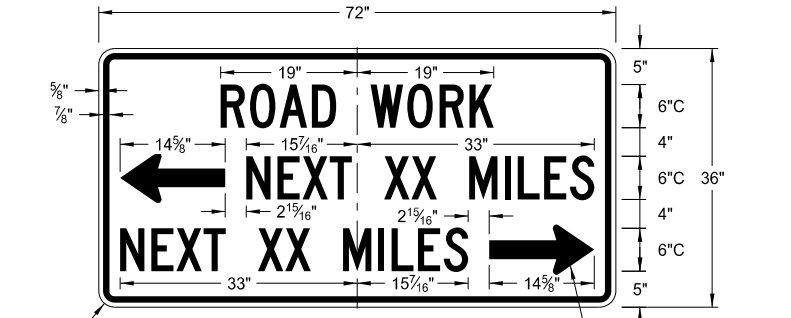
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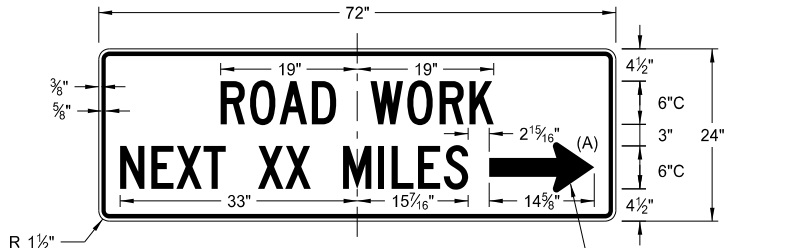
G20-2-48
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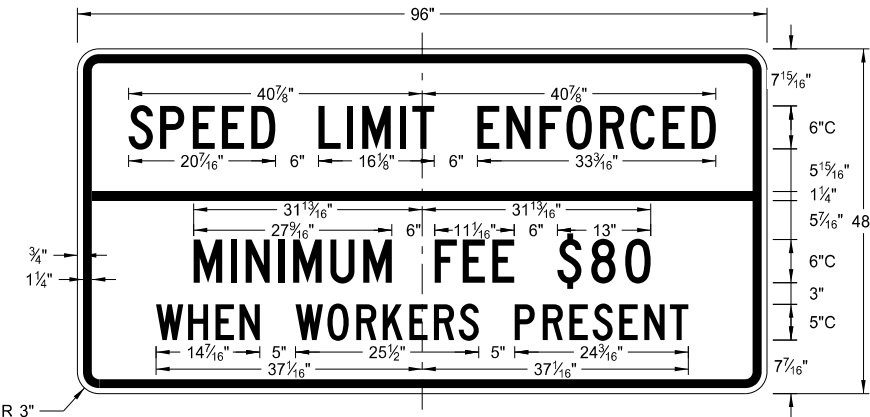
G20-4b-36
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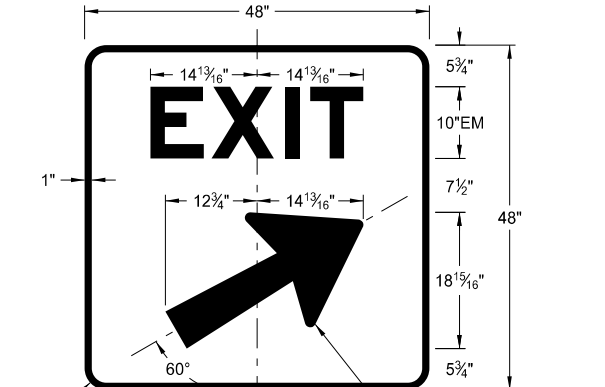
G20-50a-72
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Background: orange



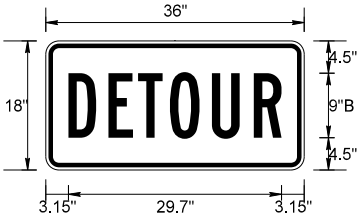
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Background: orange



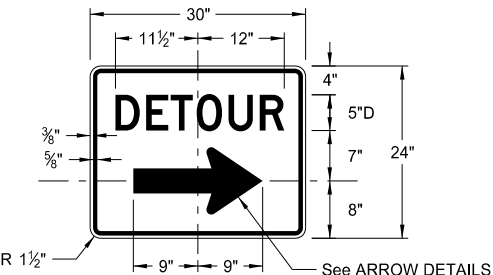
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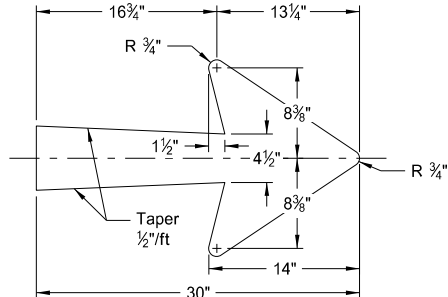
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



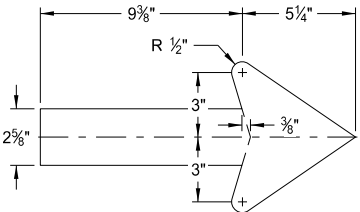
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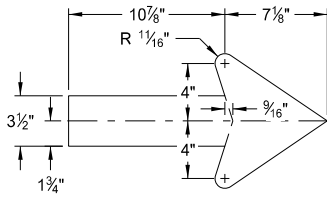
M4-9(L or R)-30 &
M4-9-30
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Background: orange



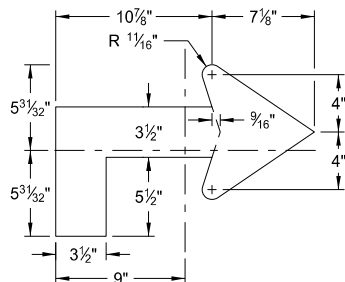
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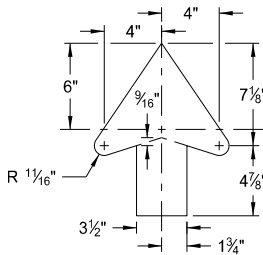
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G20-52a-72



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



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



M4-9-30
Straight

ARROW DETAILS

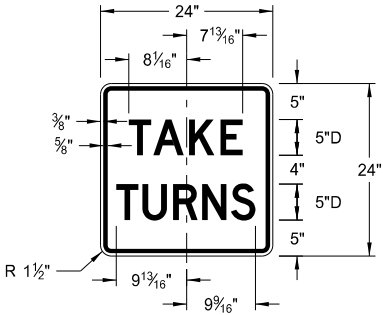
NOTES:
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

| | |
|--|-------------------------------|
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| 8-13-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 8-17-17 | Added sign & background color |

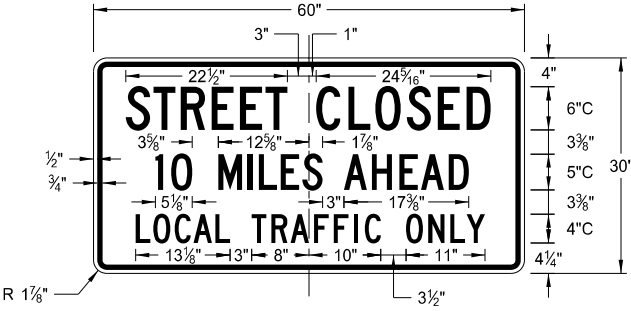
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

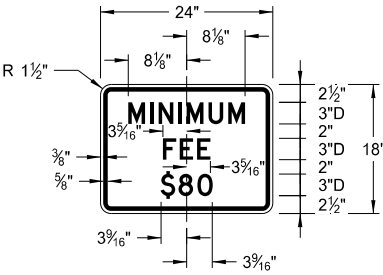
D-704-10



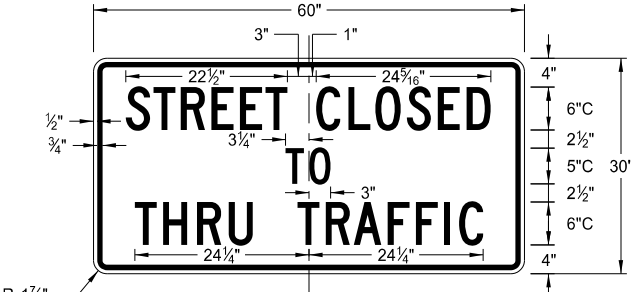
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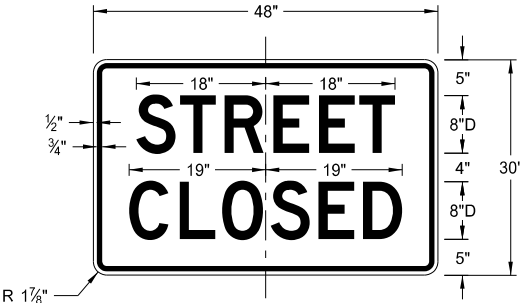
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R2-1aP-24
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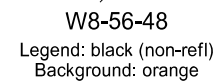
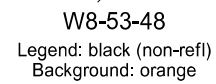
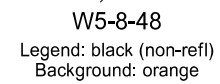
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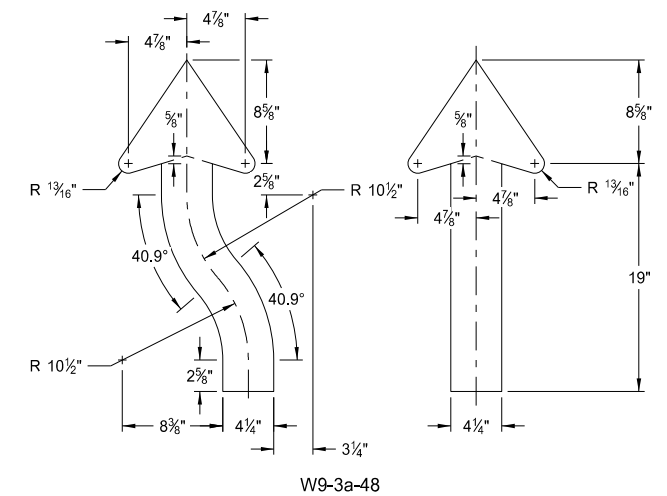
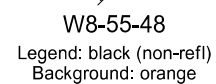
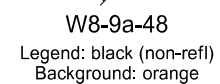
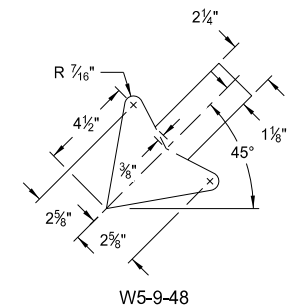
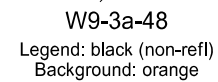
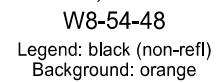
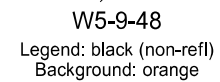
R11-2a-48
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Background: white

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|---------------------|
| 8-13-13 | |
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| 8-17-17 | Revised sign number |

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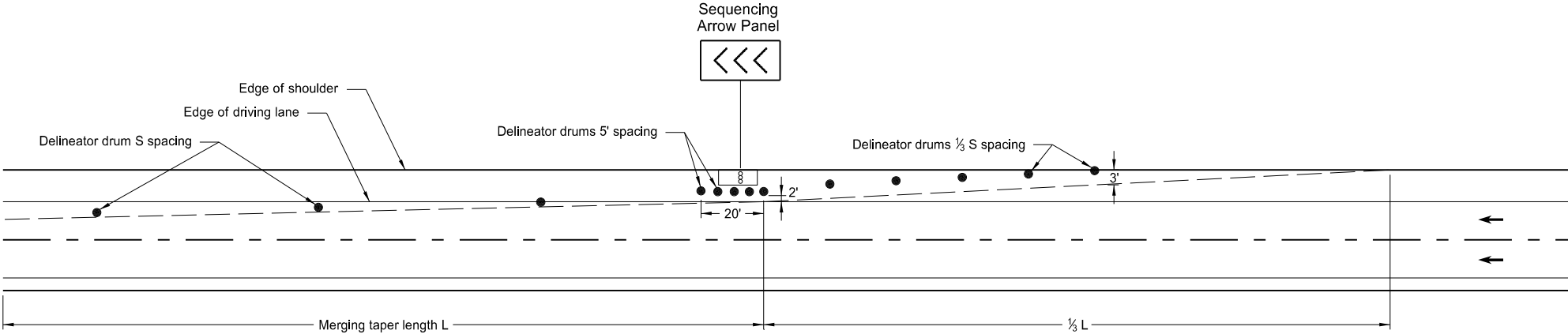


* DISTANCE MESSAGES

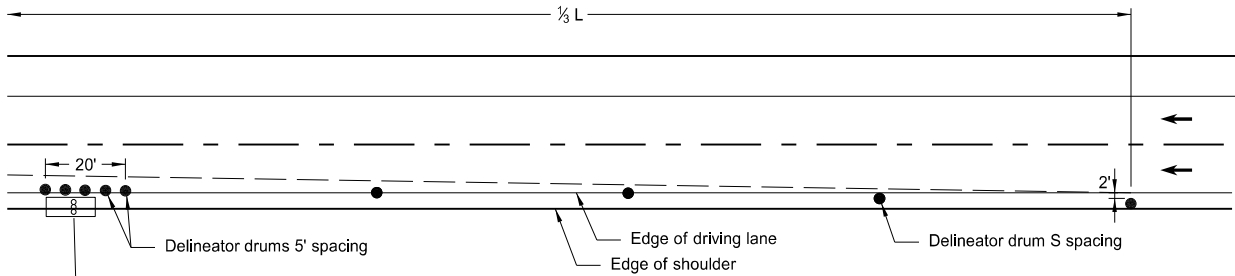


ARROW DETAILS

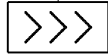
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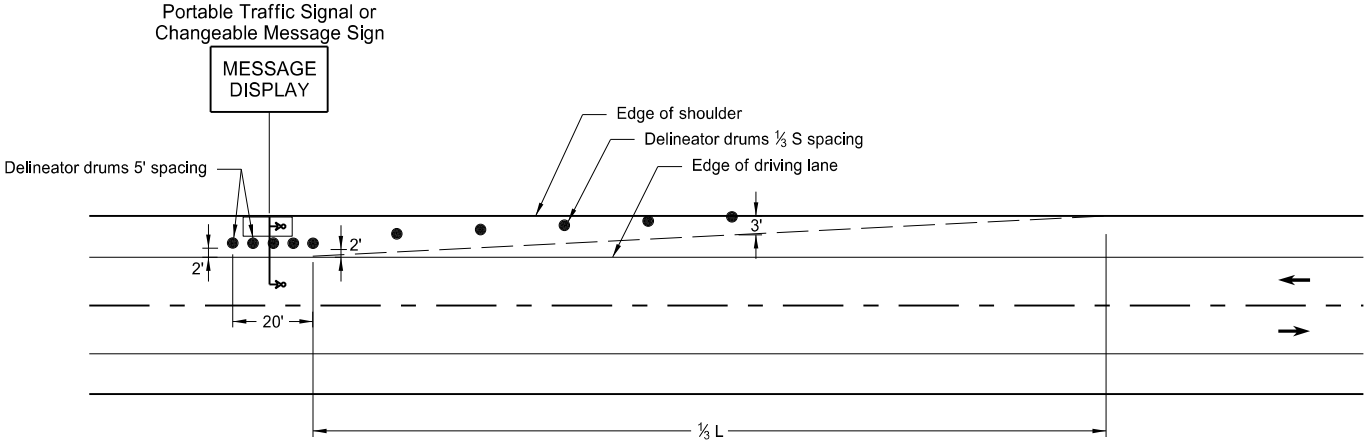
SHOULDER CLOSURE WITH LANE CLOSURE
(when shoulder is 8' or wider)



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



Sequencing
Arrow Panel



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY

- Delineator Drum
- Message Display
- ∞ Sequencing Arrow Panel
- ↳ Portable Traffic Signal

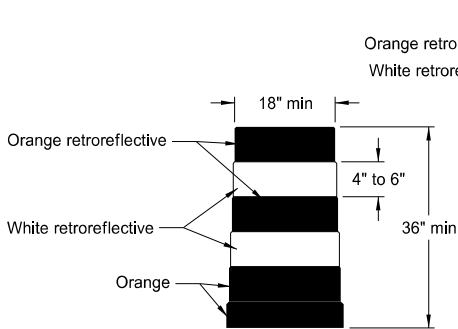
Notes:

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

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

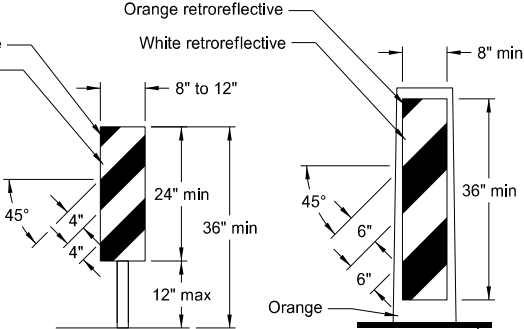
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Registration Number
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on 9/27/2017 and the original document is stored at the
North Dakota Department
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BARRICADE AND CHANNELIZING DEVICE DETAILS



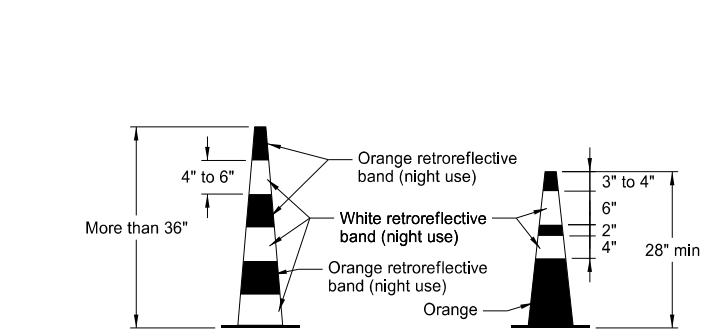
DELINEATOR DRUM

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



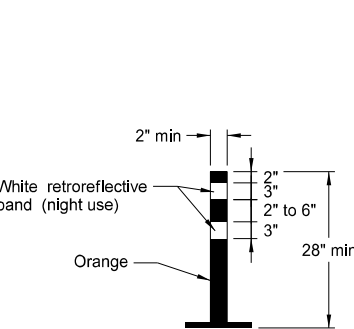
VERTICAL PANEL

Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, use a stripe width of 6 inches.



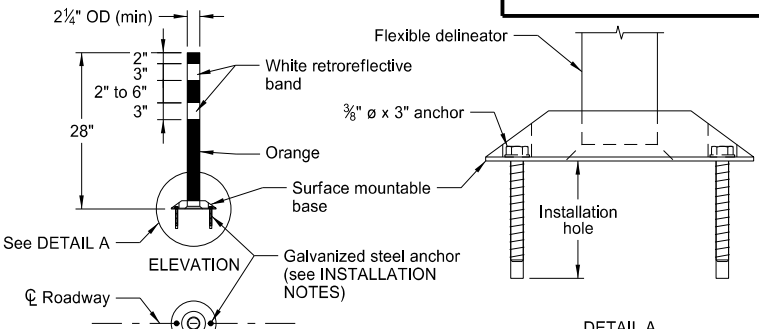
TRAFFIC CONE

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



TUBULAR MARKER

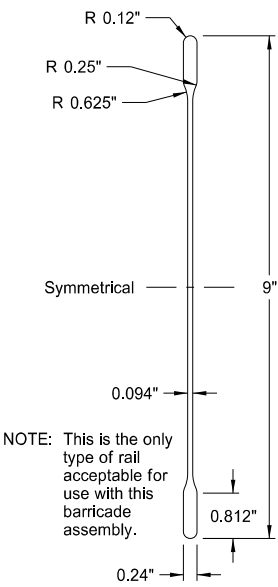
Provide retroreflectORIZATION of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

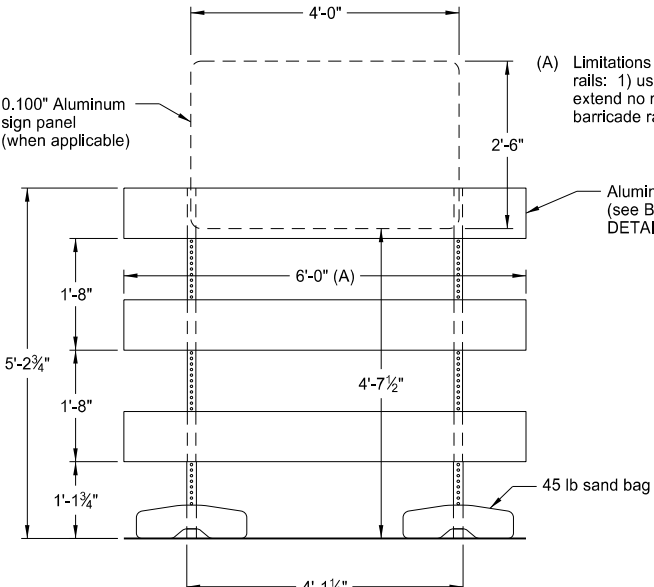
INSTALLATION NOTES:

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



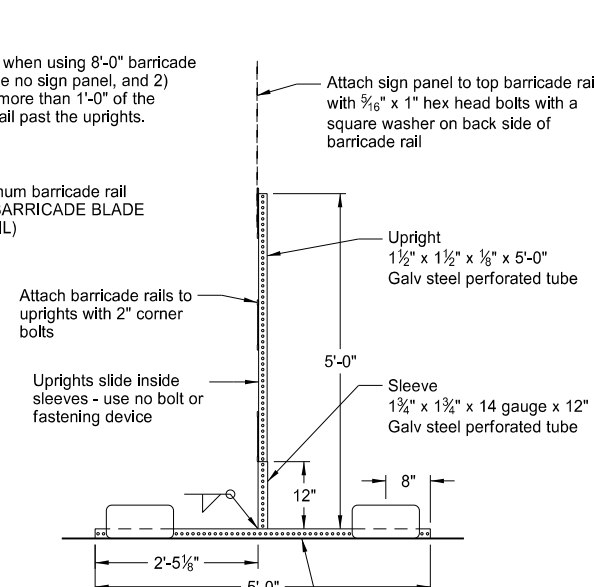
BARRICADE BLADE DETAIL

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

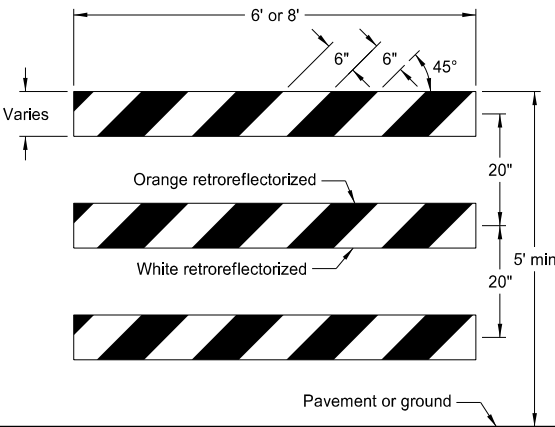


ELEVATION VIEW

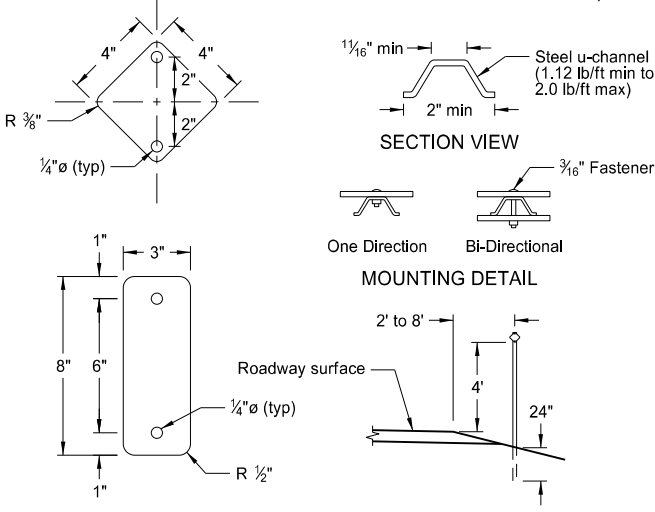
BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)



SIDE VIEW



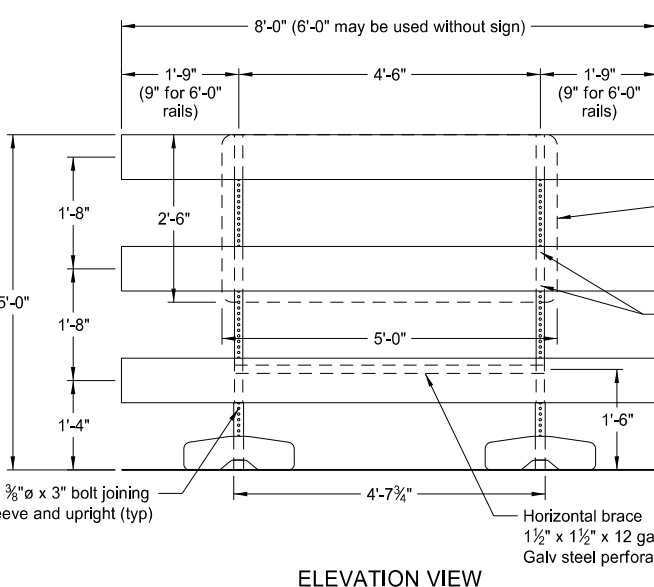
TYPE III BARRICADE



REFLECTOR DETAIL

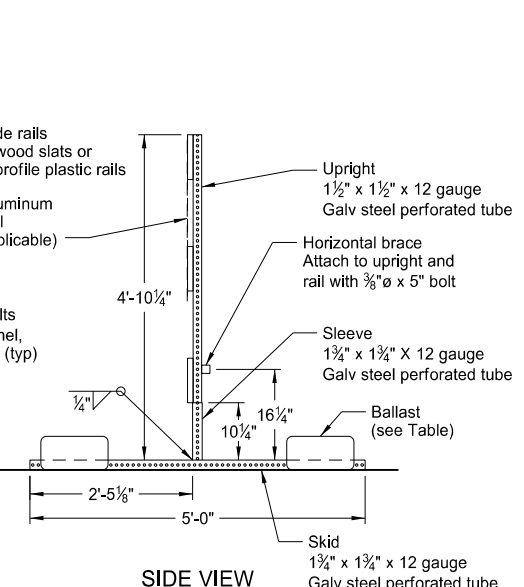
ELEVATION

DELINEATORS



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 |

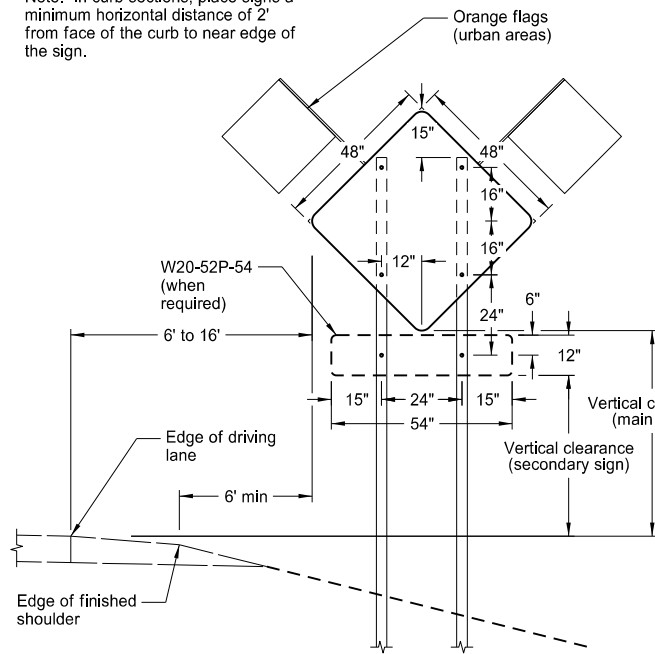
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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

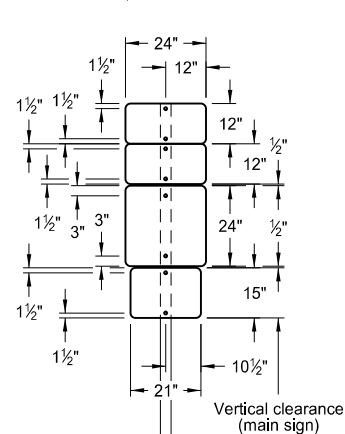
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

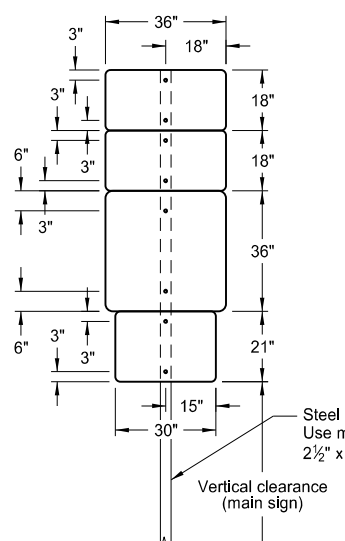
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



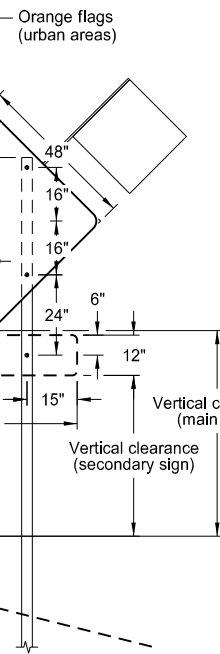
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



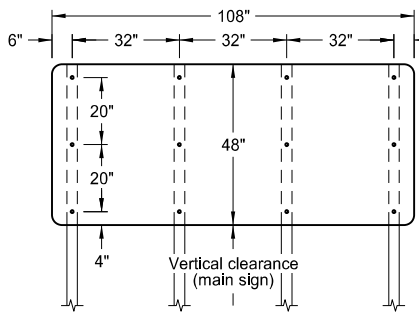
24" x 24"
ROUTE MARKER
ASSEMBLY



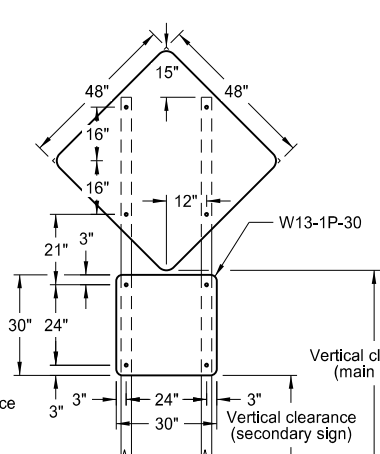
36" x 36"
ROUTE MARKER
ASSEMBLY



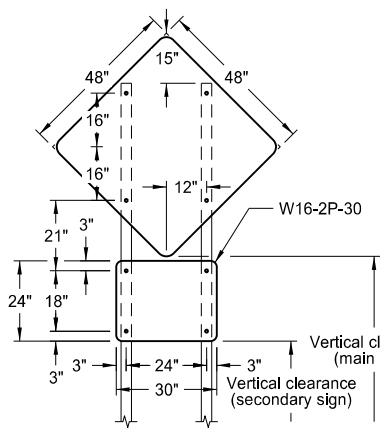
18" x 18"
DIAMOND SIGN



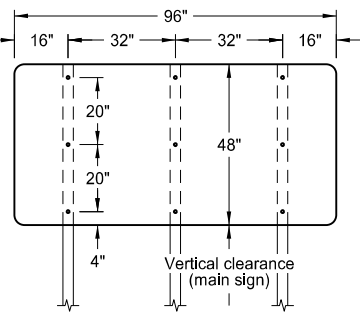
108" x 48" SIGN



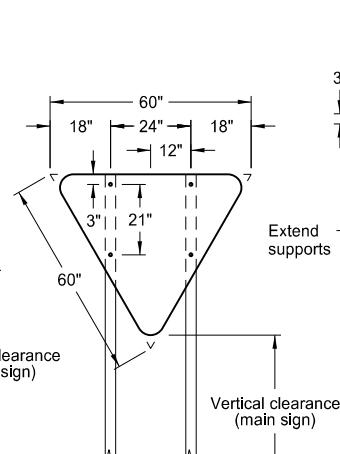
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



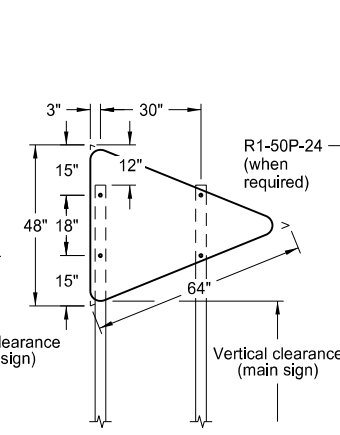
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



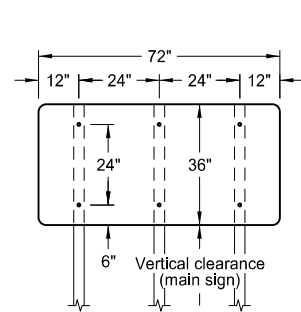
96" x 48" SIGN



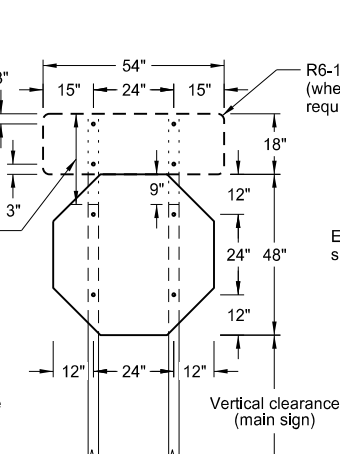
R1-2-60 - YIELD SIGN



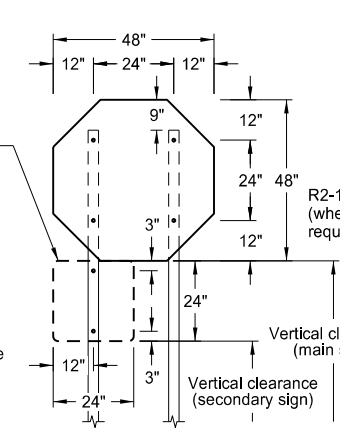
W14-3-64 - PENNANT SIGN



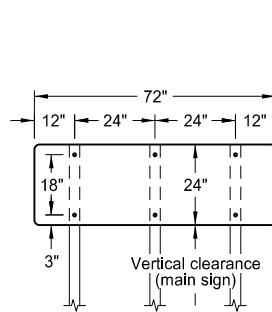
72" x 36" SIGN



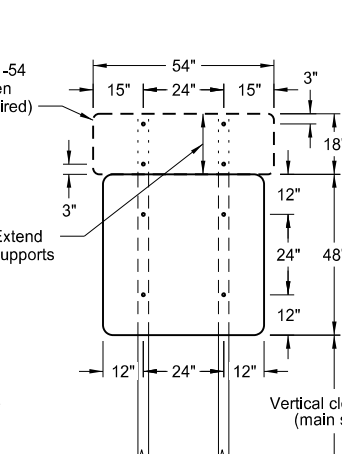
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



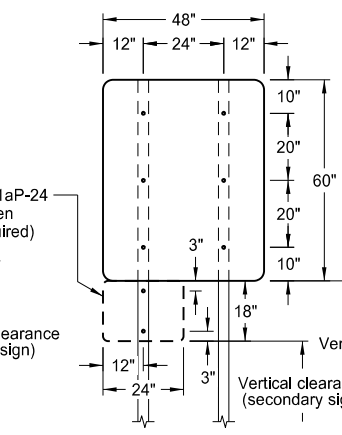
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



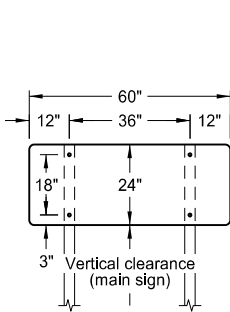
72" x 24" SIGN



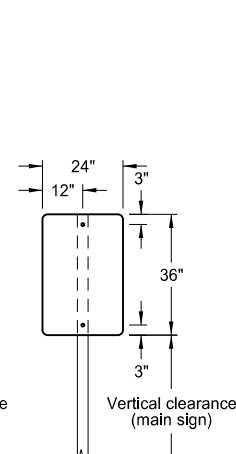
48" x 48" SIGN
(with R6-1-54 sign as required)



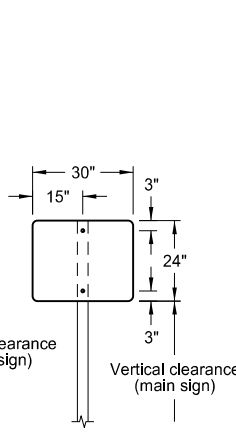
48" x 48" SIGN
(with R2-1aP-24 sign as required)



60" x 24" SIGN



24" x 36" SIGN



30" x 24" SIGN

NOTES:

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

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

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.
3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

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

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

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

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

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

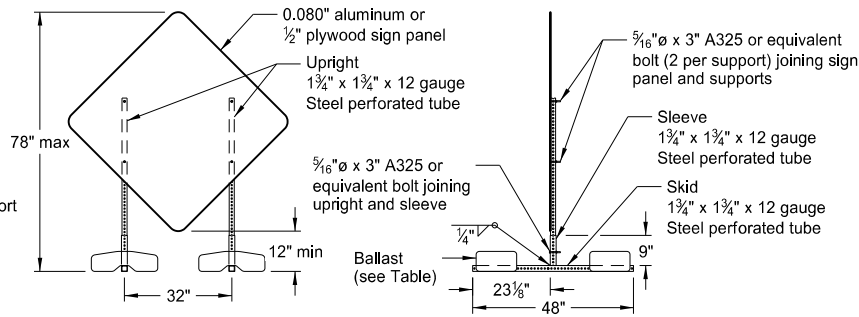
Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period.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

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

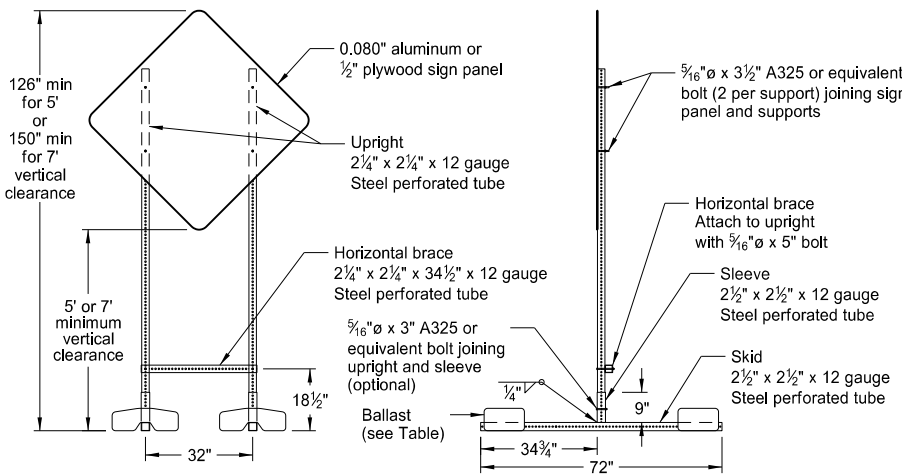
MINIMUM BALLAST
(For each side of sign support base)

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

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



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|--|
| 10-4-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 11-14-13 9-27-17 | Revised Note 6, Updated to active voice |

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Roger Weigel,
Registration Number
PE-2930,
on 9/27/2017 and the original document is stored at the
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of Transportation

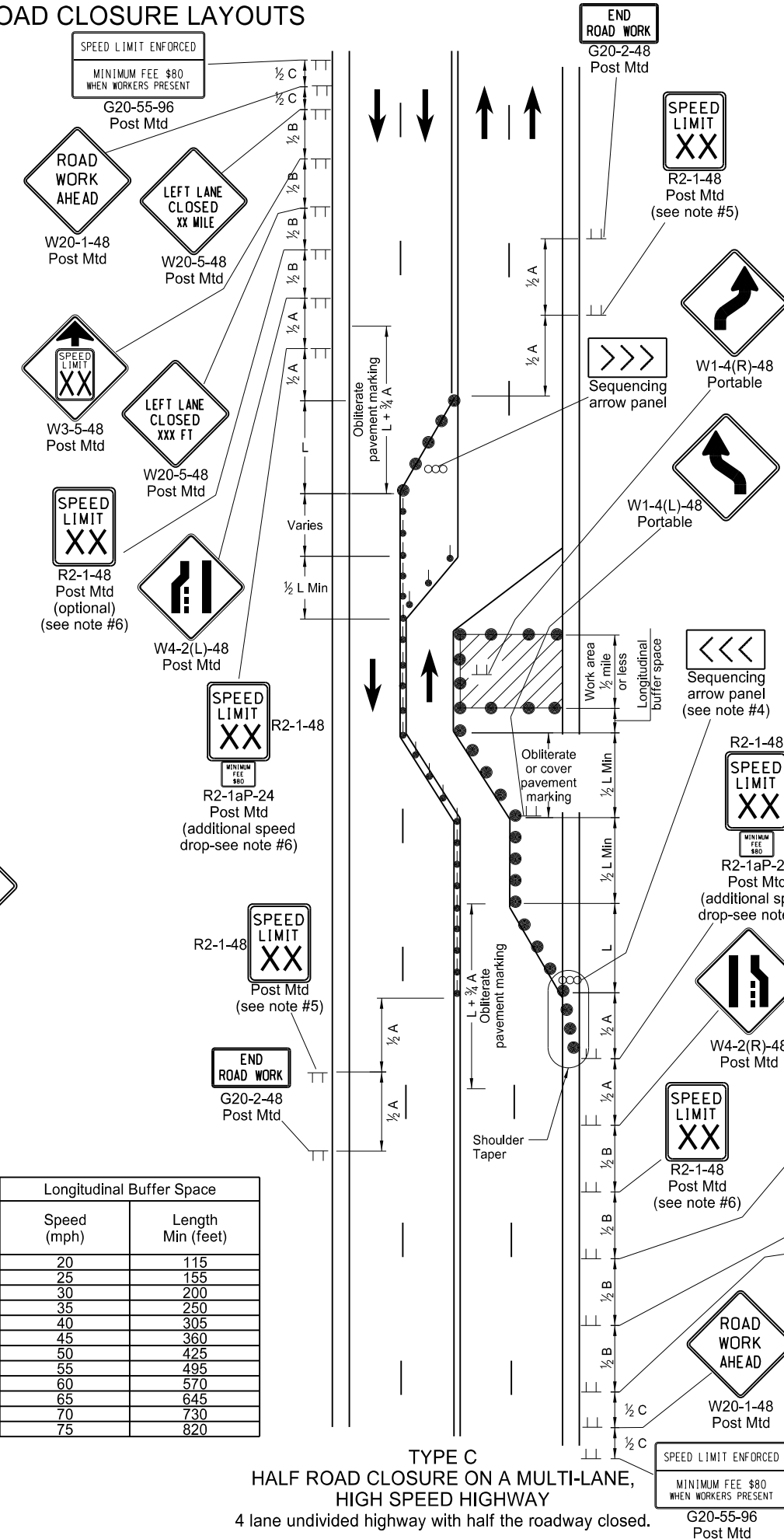
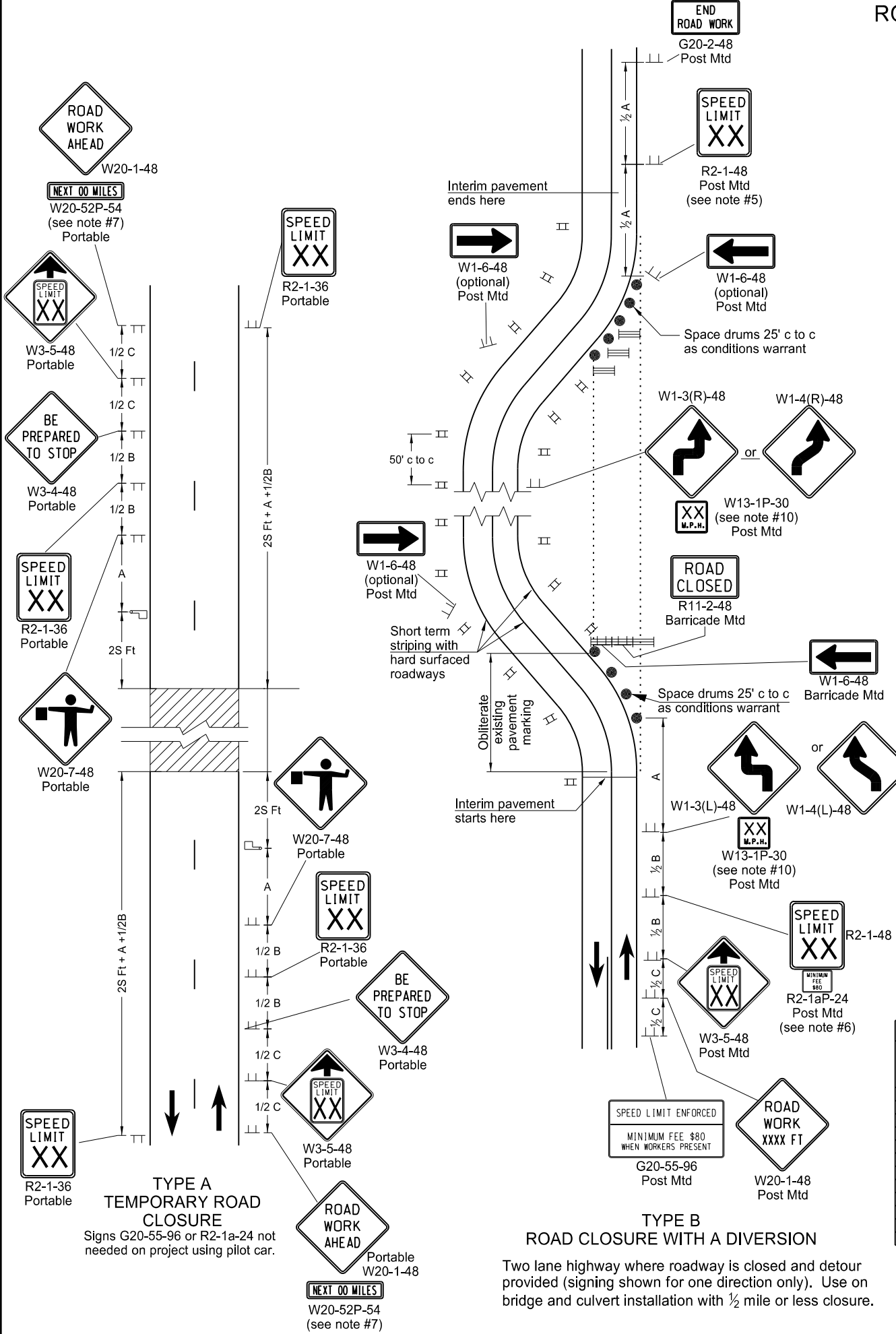
ROAD CLOSURE LAYOUTS

- Notes
1. Variables
- S = Numerical value of speed limit or 85th percentile.
W = The width of taper in feet.
L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x S²/60 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 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 |
| | Sign |
| | Delineator drum |
| | Tubular markers |
| | Work area |
| | Flagger |
| | Sequencing arrow panel |
| | Vertical panels back to back |

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



| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|---|-----------------------------------|
| 9-27-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 8-17-17 | Updated notes & Speed Limit signs |

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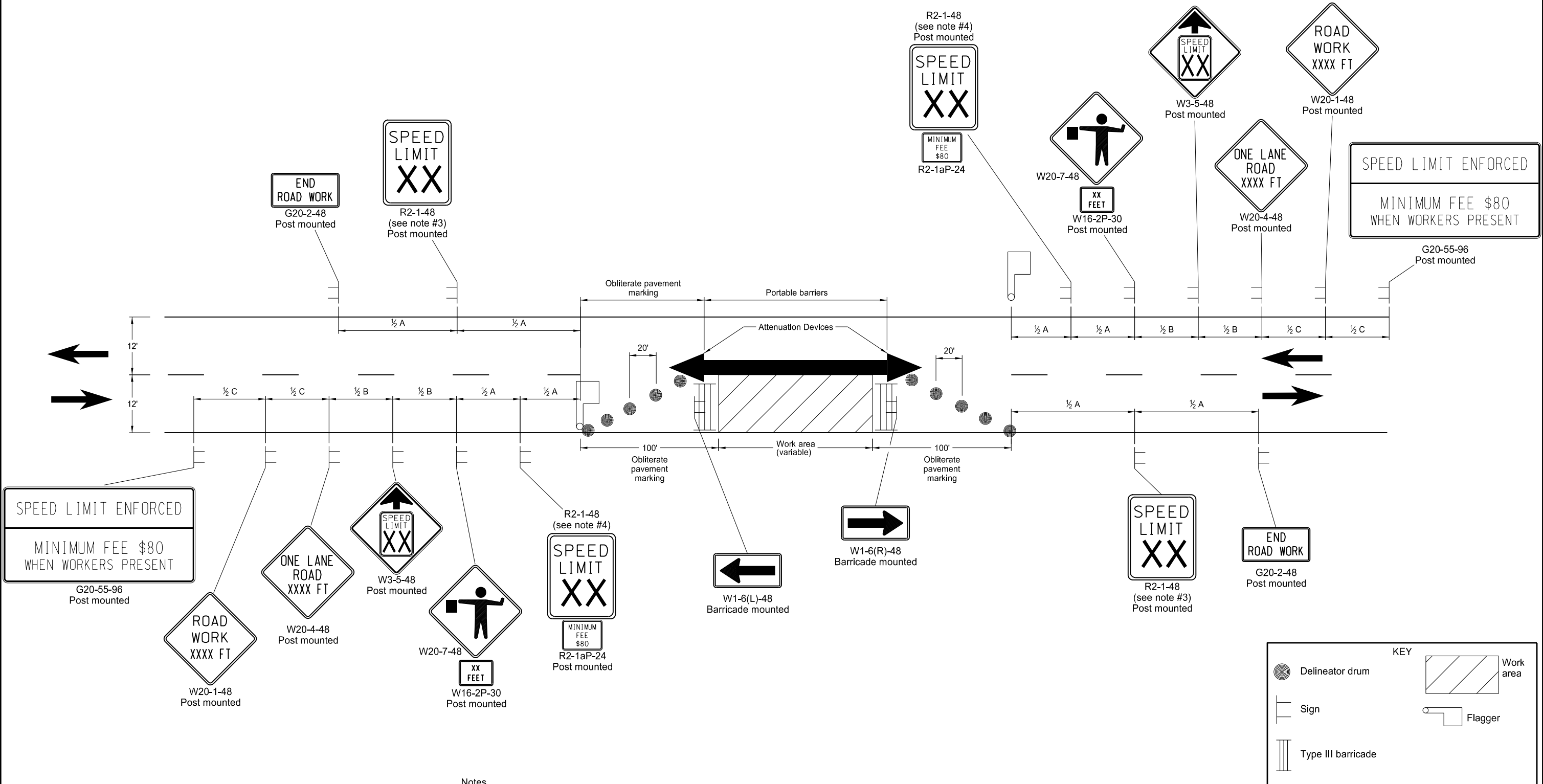
Roger Weigel

Registration Number PE-2930,

on 08/17/17 and the original document is stored at the North Dakota Department of Transportation

SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



Notes

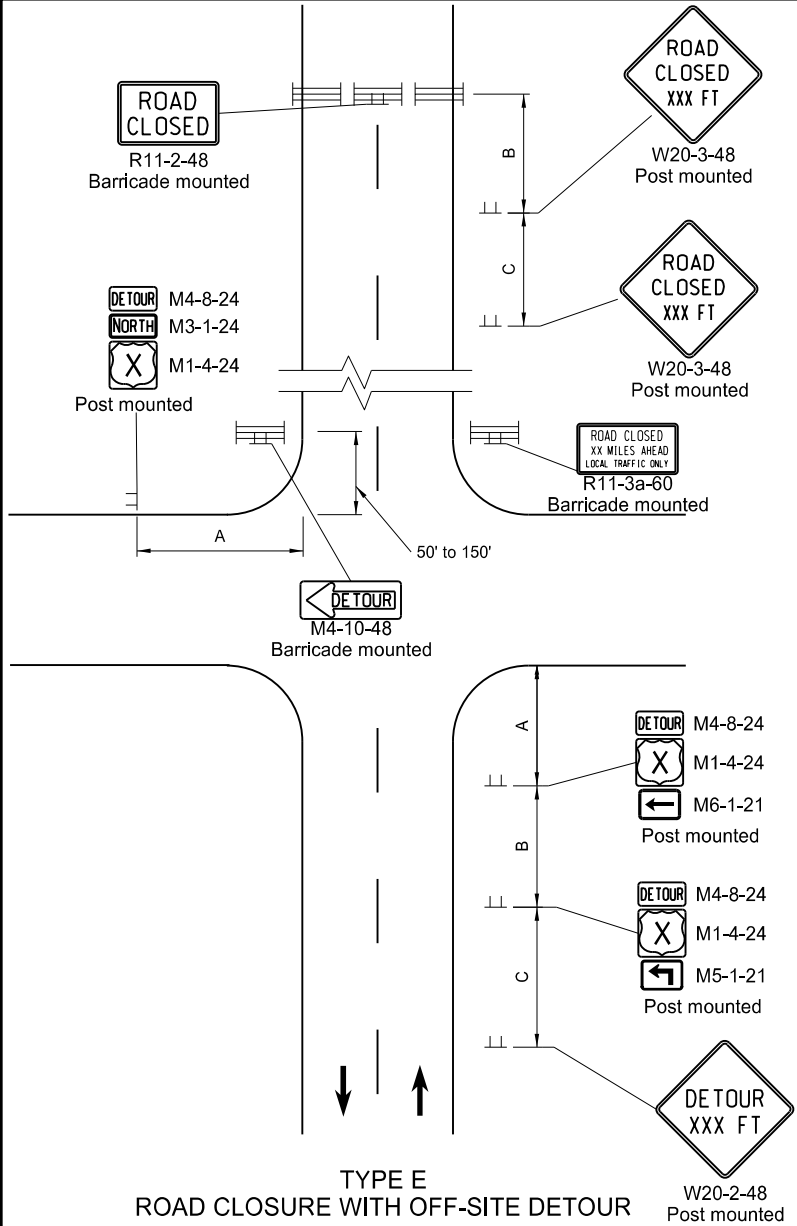
1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at 1/2 B.
5. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
6. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
7. Cover existing speed limit signs within a reduced speed zone.
8. Sign G20-55-96 is not required if layout is part of other traffic control or if work is less than 15 days.
9. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

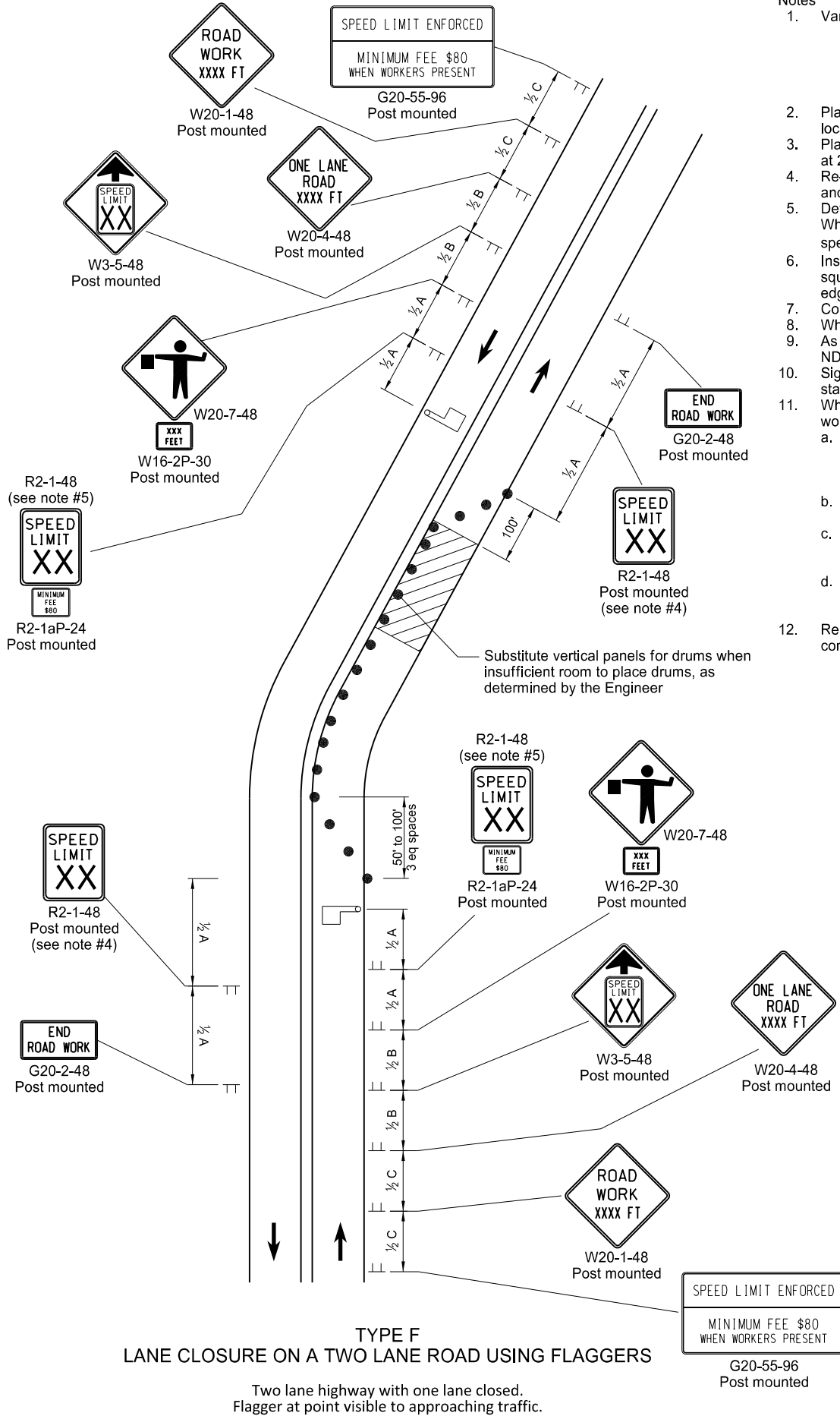
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|--|----------------------------|
| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
| 9-27-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 8-17-17 | Note update & sign numbers |

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Roger Weigel
Registration Number
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ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS



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



- Notes
- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of taper in feet
 - L = Minimum length of taper in feet. S x W for freeways, expressways, and roads with speeds of 45 mph or greater, or W x S²/60 for urban, residential, and streets with speeds of 40 mph or less.
 - Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
 - Place delineator drums for tapering traffic at 3 equal spaces and for tangents space them at 2 times dimension "S".
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place second speed limit sign at 1/2B.
 - 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.
 - Where necessary, safe speed to be determined by the Engineer.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
 - Signs G20-55-96 or R2-1aP-24 are not required when pilot car operation is used, if this standard is part of other traffic control layouts, or if work is less than 15 days.
 - When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
 - Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
 - Place "Do Not Stop on Tracks" sign (R8-8-24) near cross buck in each direction while lane closure is near tracks.
 - Extend buffer space between work zone and lane closure transition upstream of the highway-rail grade crossing to prevent flagging queue from extending across highway-rail grade crossing.
 - If queuing extends across highway-rail crossing, provide flagger at crossing to prevent vehicles from stopping within the crossing (even when automatic warning devices are in place.)
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

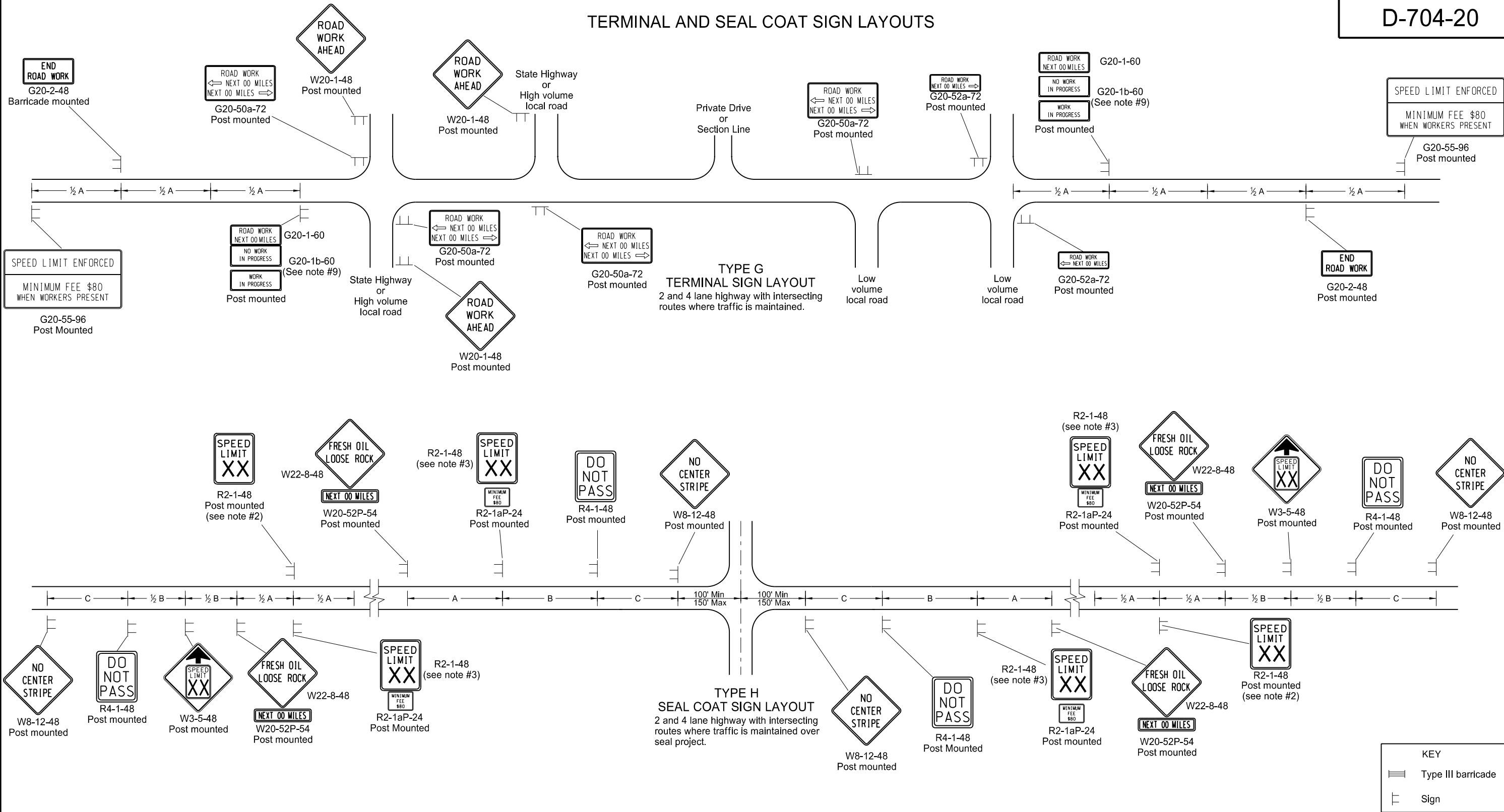
| KEY | | |
|-----------------|--------------------|---------|
| Delineator Drum | Type III Barricade | Flagger |
| Sign | Work/Hazard Area | |

| | |
|--|--------------------------------------|
| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
| 9-27-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 3-13-14 | Revised Sign Call "ROAD WORK XXX FT" |
| 8-17-17 | Update notes & sign numbers |

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North Dakota Department
of Transportation

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Determine the exact speed limit in the field, based on location and conditions.
- Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
- 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.
- On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
- Install sign G20-1b-60 when work is suspended for winter.
- Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
- Sign G20-55-96 is not required if work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

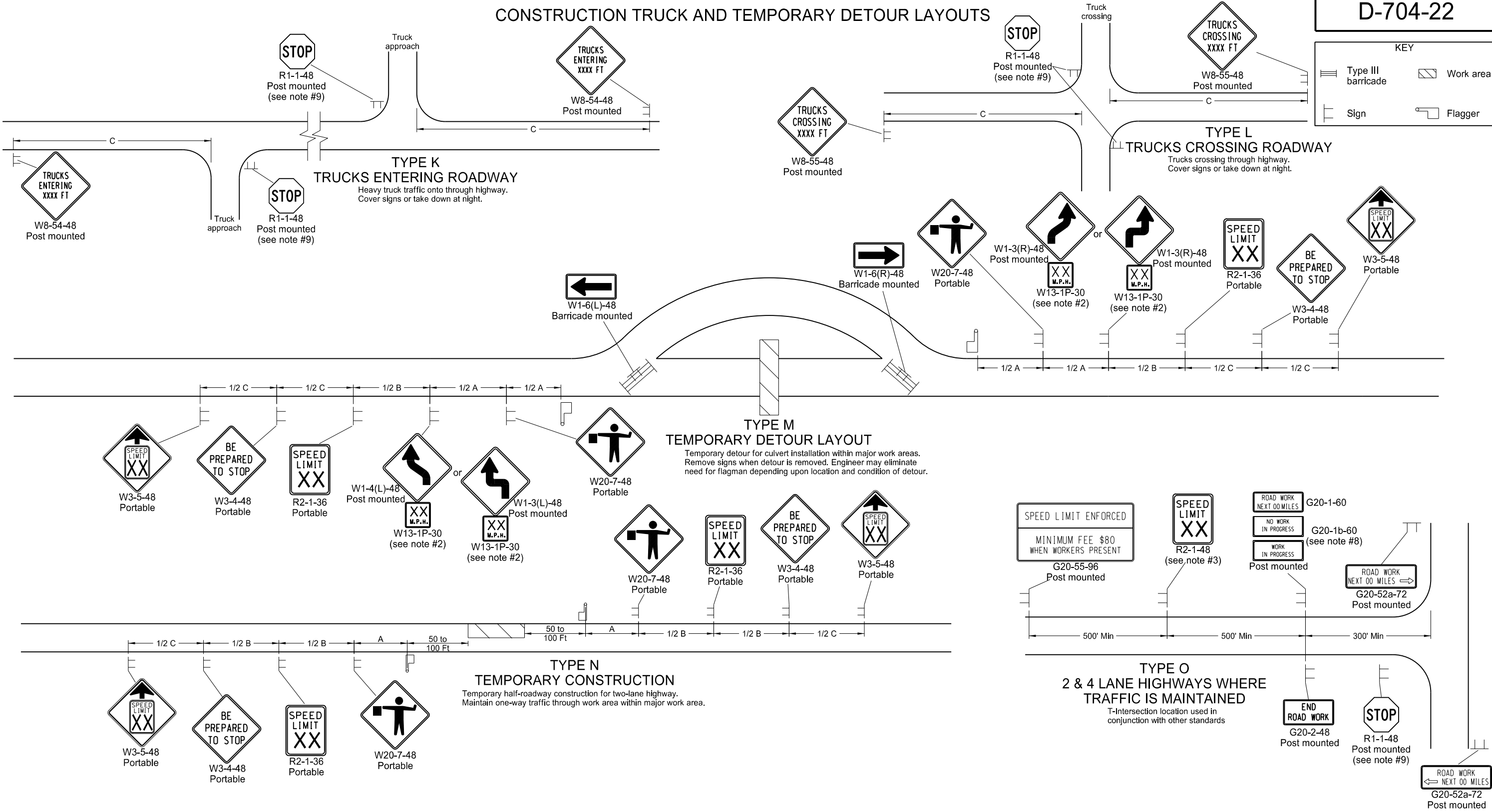
| ADVANCE WARNING SIGN SPACING | | | |
|---|----------------------------------|------|------|
| Road Type | Distance Between Signs Min. (ft) | | |
| | A | B | C |
| Urban - Low Speed (30 mph or less) | 150 | 150 | 150 |
| Urban - Low Speed (over 30 to 40 mph) | 280 | 280 | 280 |
| Urban - High Speed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

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

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 Registration Number PE- 2930,
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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

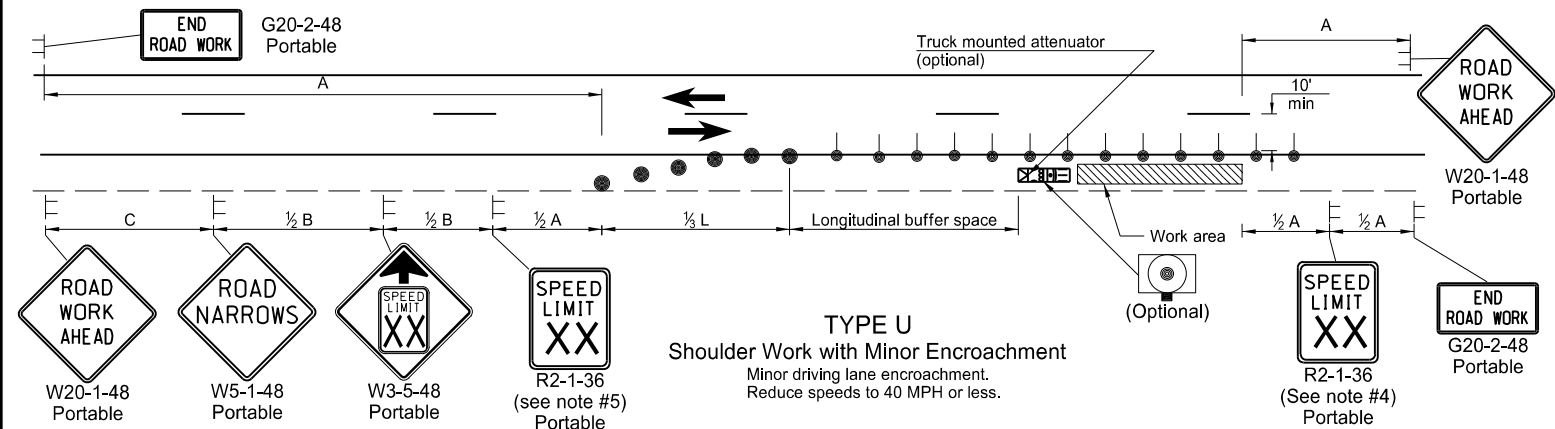
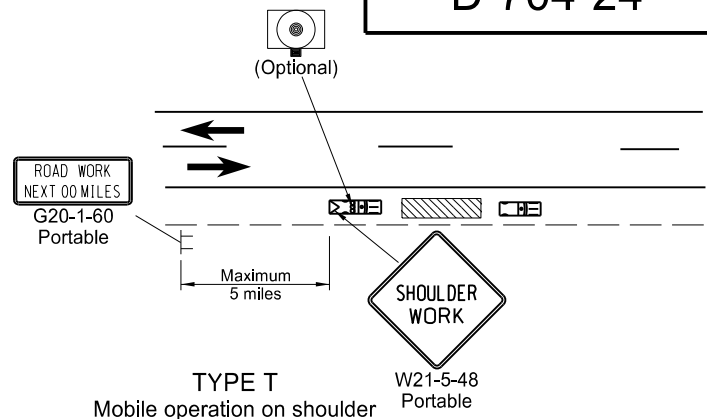
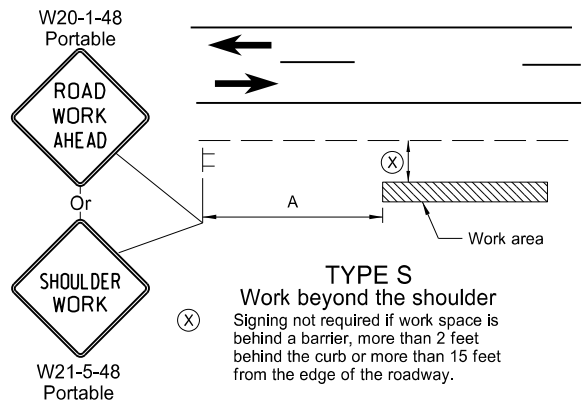
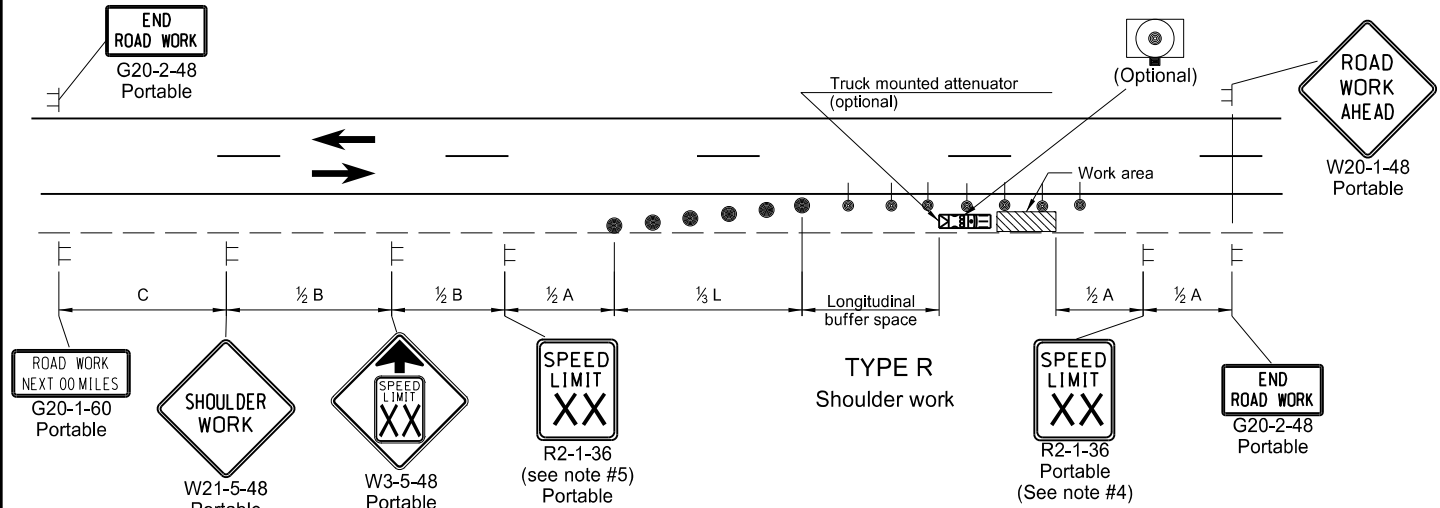
- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
- Where necessary, safe speed to be determined by the Engineer.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install 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 |

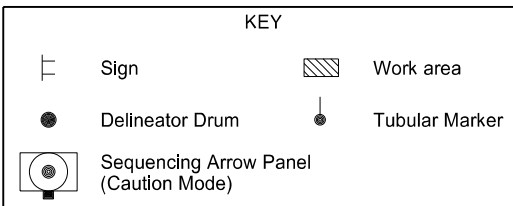
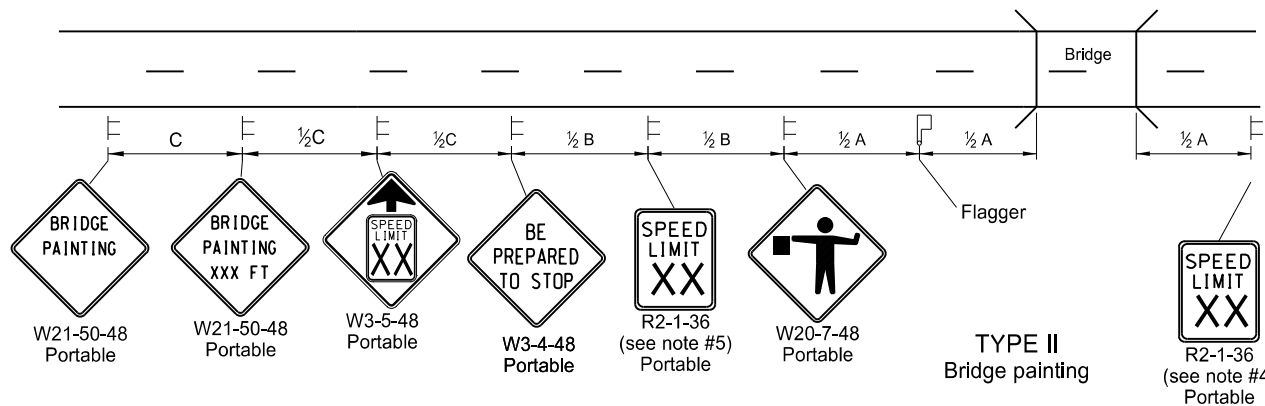
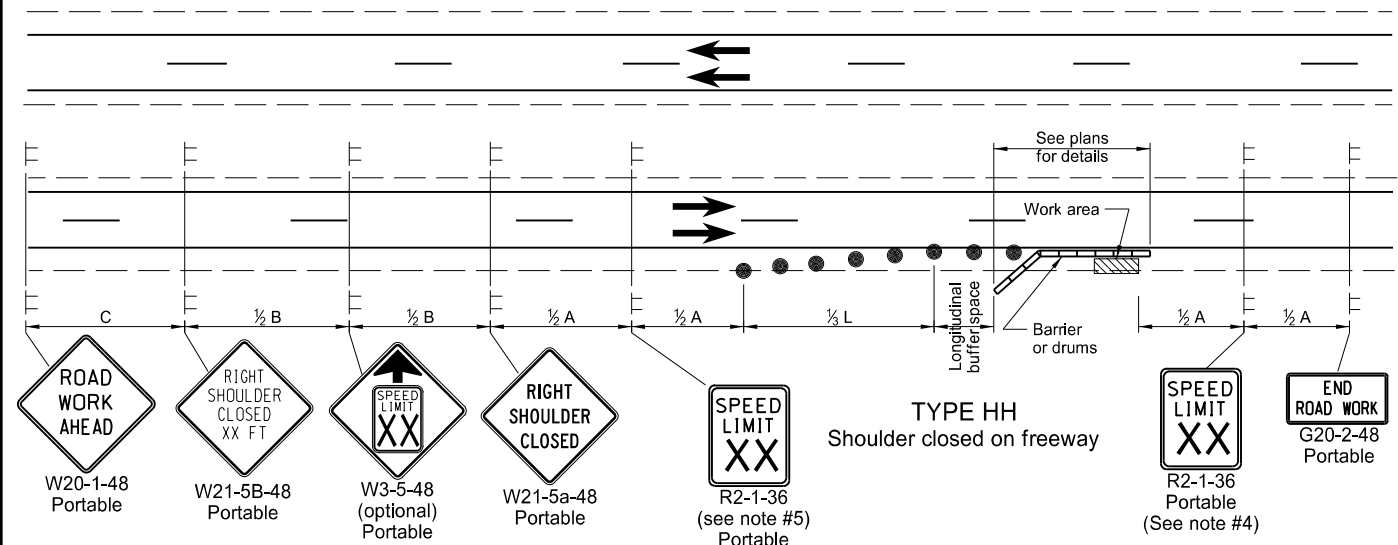
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SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS



Notes

- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of the taper in feet.
 - L = Minimum length of taper, $S \times W$ for freeways, expressways, and all 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.
- Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
- Sequencing Arrow Panels
 - Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 - 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).
- Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
- 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.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
- 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 | |

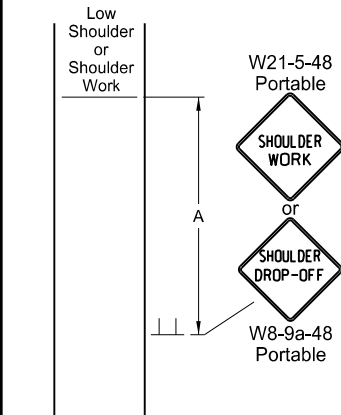
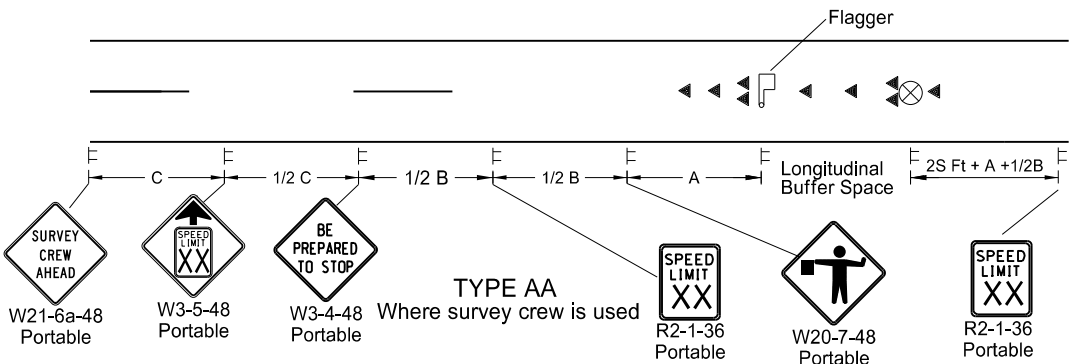
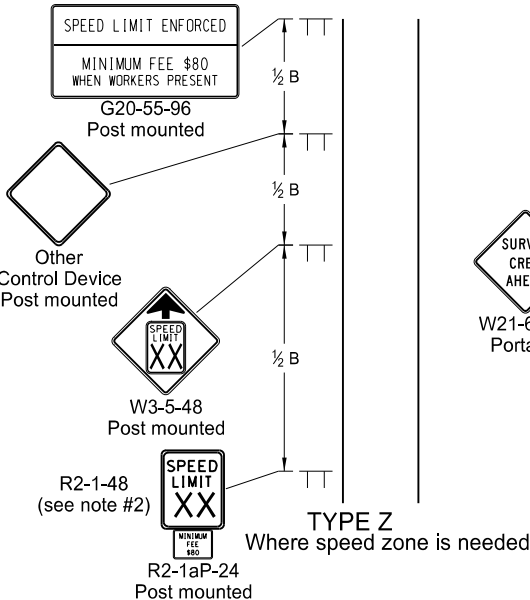
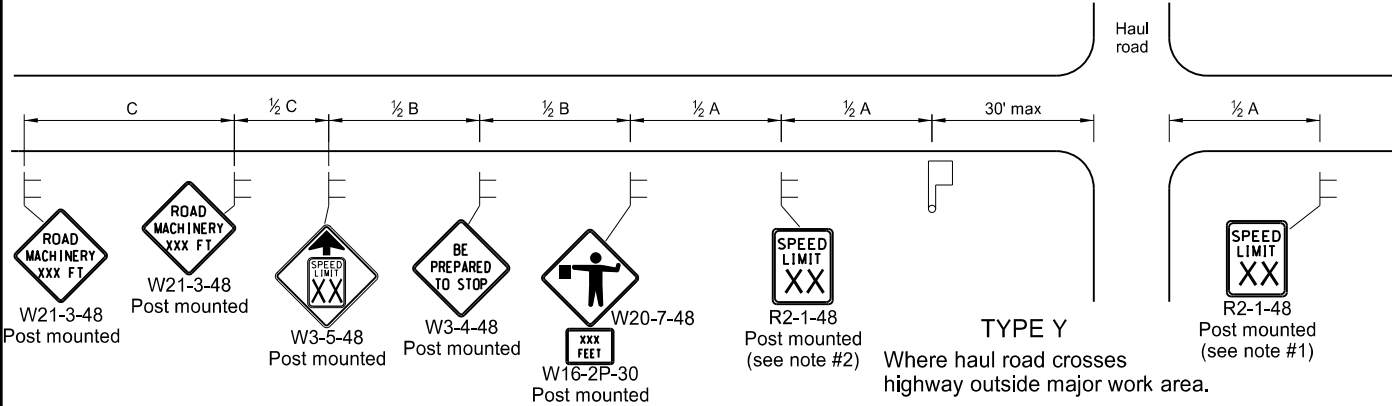
| Longitudinal Buffer Space | |
|---------------------------|-------------------|
| Speed (mph) | Length Min (feet) |
| 20 | 115 |
| 25 | 155 |
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |
| 75 | 820 |

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|---|-------------------------------|
| 9-27-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 8-17-17 | Updated notes & revised signs |

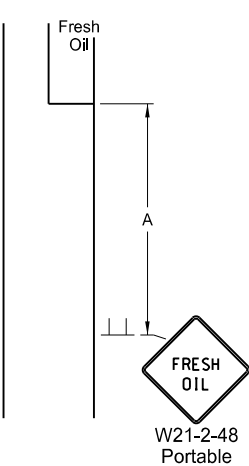
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MISCELLANEOUS SIGN LAYOUTS

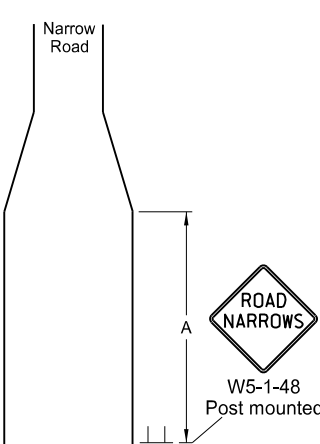
D-704-26



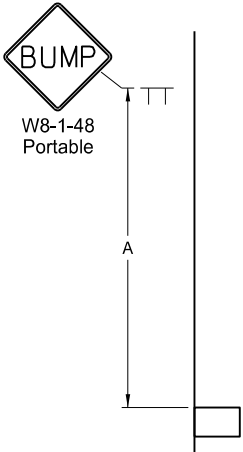
TYPE BB
Within major work area
where sign conditions exist



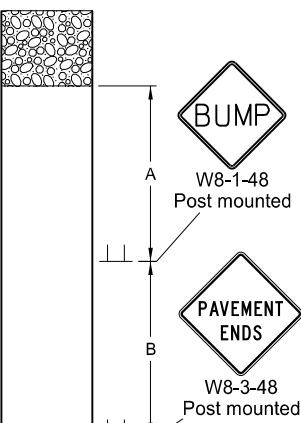
TYPE CC
Where sign conditions exist



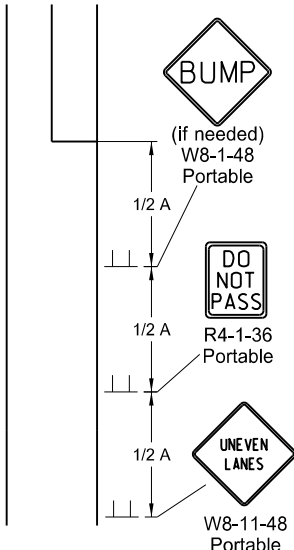
TYPE DD
Where sign conditions exist



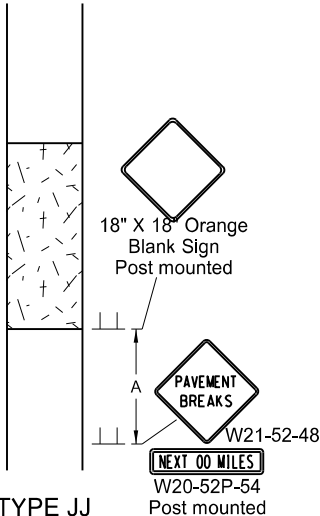
TYPE EE
Where sign conditions exist



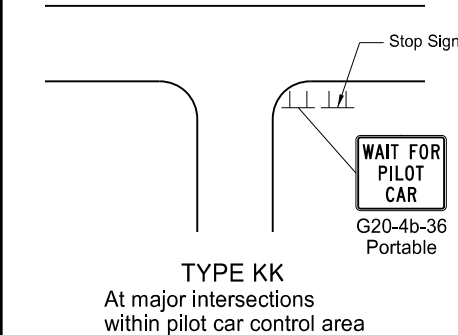
TYPE FF
Where sign conditions exist



TYPE GG
Where elevation difference
exists between lanes



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



TYPE KK
At major intersections
within pilot car control area

- Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 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) | | | C |
| | A | B | B | |
| 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

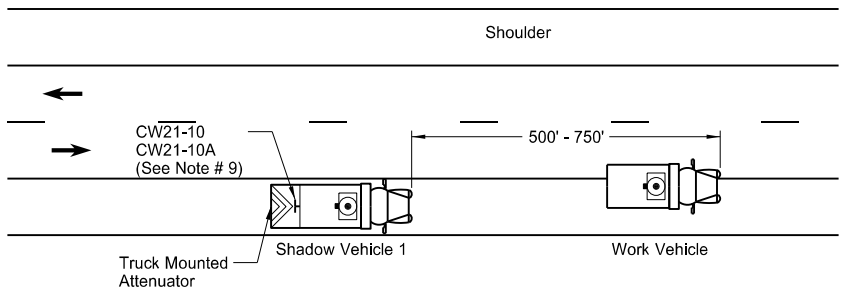
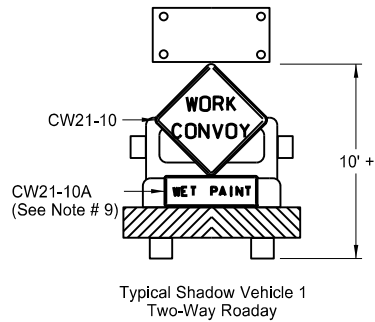
S = Numerical value of speed limit or 85th percentile.

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

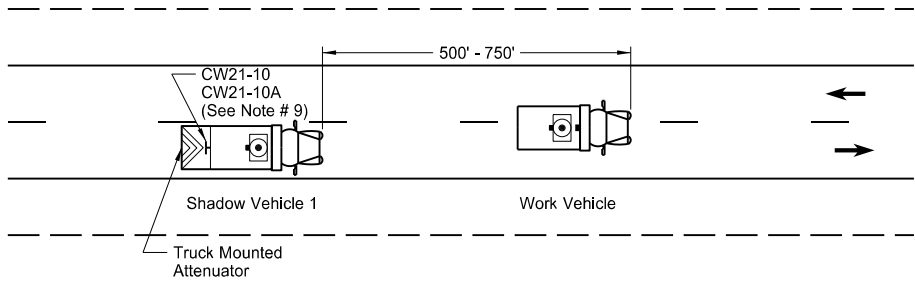
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TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

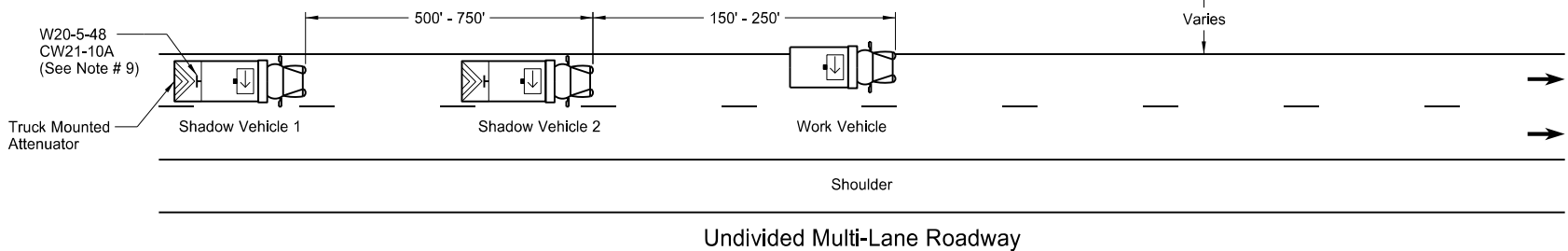
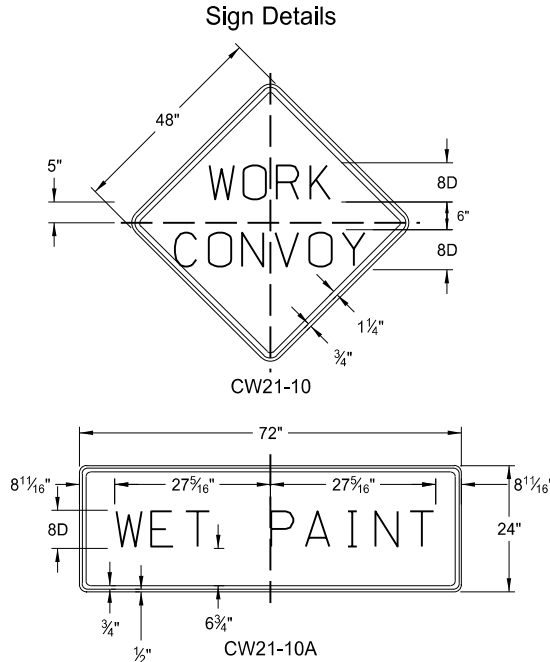
D-704-27



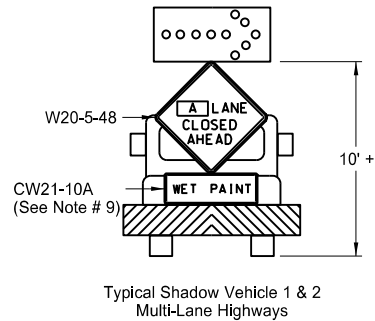
Two-Way Roadway with Paved Shoulders



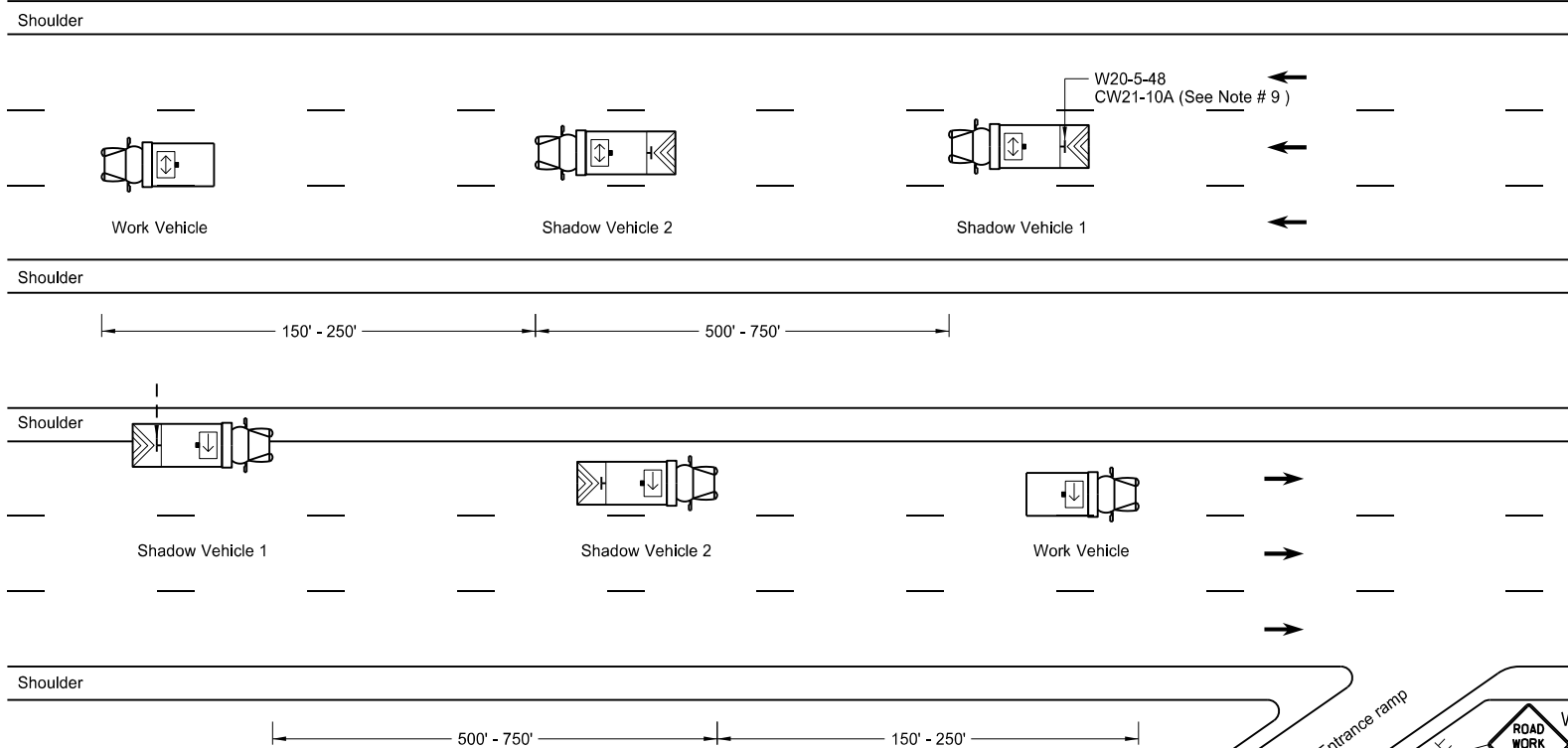
Two-Way Roadway without Paved Shoulders



Undivided Multi-Lane Roadway

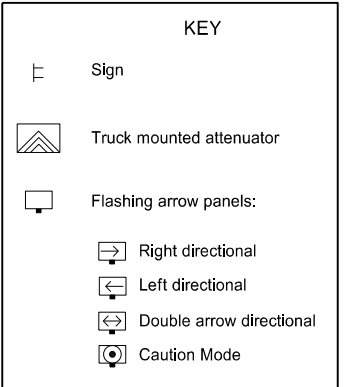


A = Left Right Center



Divided Multi-Lane Highway

- Notes
1. Use additional vehicles you choose to be in the convoy with truck mounted attenuators, at your own expense.
 2. Display yellow rotating beacons or strobe lights on shadow and work vehicles, unless otherwise stated in the plans.
 3. Use Type B or Type C flashing arrow panels controlled from inside the vehicle.
 4. Provide each vehicle with two-way electronic communication capability.
 5. Move shadow vehicle 1 first to shadow other convoy vehicles when convoy changes lane.
 6. Vary vehicle spacing between shadow vehicle 1 and shadow vehicle 2 based on sight distance restrictions. Motorists approaching the work convoy need to see trail vehicle in time to slow down and/or change lanes as they approach shadow vehicle.
 7. Sign Colors
Letters = Black
Border = Black
Background = Orange
 8. As an option, use shadow vehicle 2 the paint tender vehicle.
 9. Use sign CW21-10A only during painting operation.
 10. Pull over work and shadow vehicles periodically to allow motor vehicle traffic to pass on two lane - two way roadways.

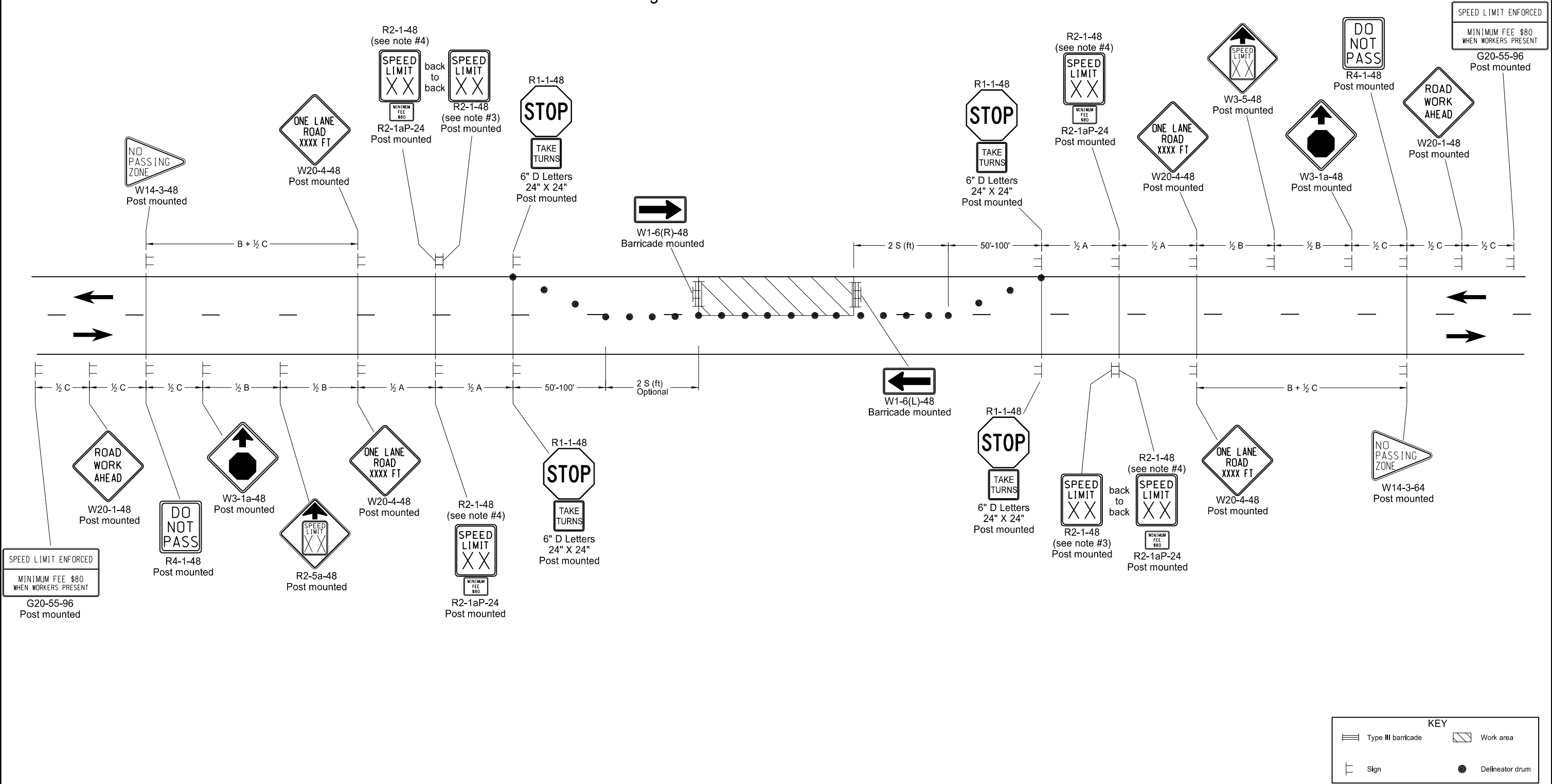


| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|---|
| 9-27-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 6-18-14 | Removed shadow vehicle 2 on two lane roadways |
| 9-27-17 | Updated to active voice |

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CONSTRUCTION SIGN LAYOUT
Non-signalized Low Volume One Lane Closure

D-704-31



Notes

- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Place delineator drums or cones used for tapering traffic at 3 equal spaces and delineator drums for tangents at dimension "S". "S" = the numerical value of speed limit.
- Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
- 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.
- 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.
- Sign G20-55-96 is not required if layout is part of other traffic control layouts, or work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

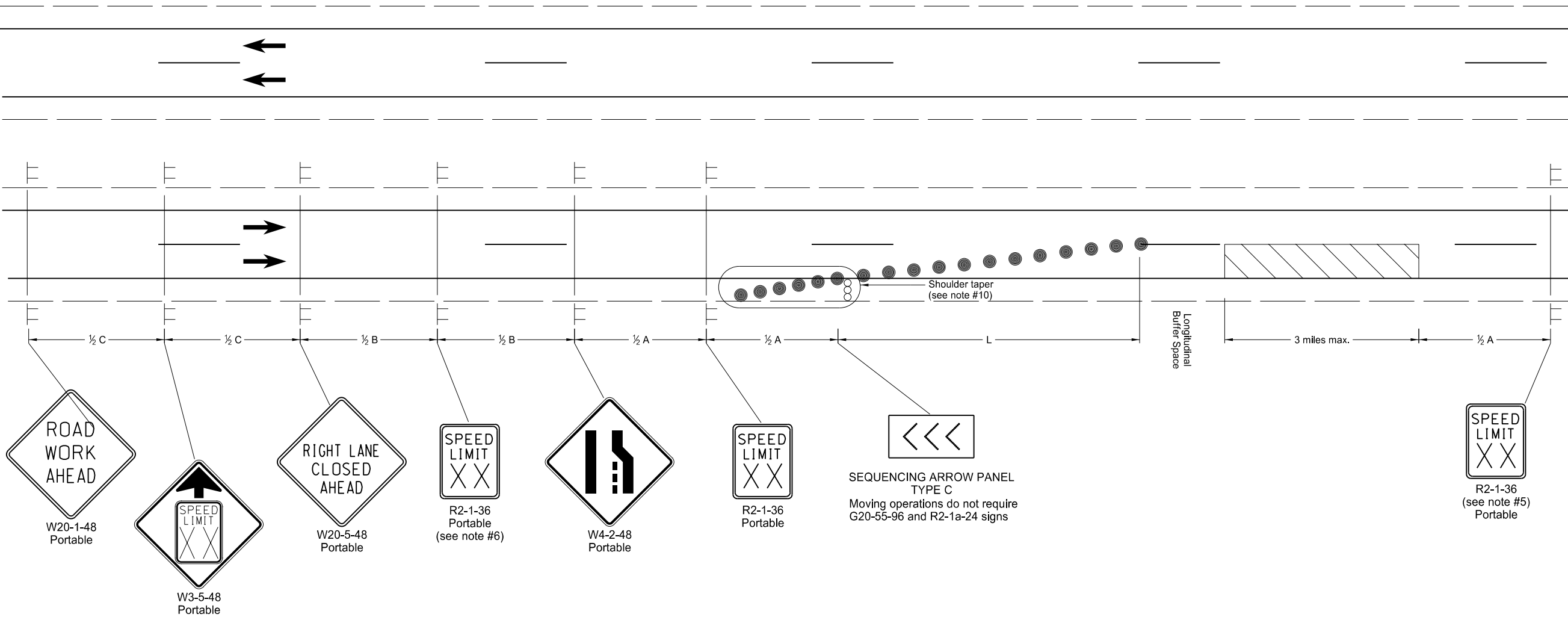
| ADVANCE WARNING SIGN SPACING | | | |
|---|----------------------------------|------|------|
| Road Type | Distance Between Signs Min. (ft) | | |
| | A | B | C |
| Urban - Low Speed (30 mph or less) | 150 | 150 | 150 |
| Urban - Low Speed (over 30 to 40 mph) | 280 | 280 | 280 |
| Urban - High Speed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

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

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SIGN LAYOUT FOR ONE LANE CLOSURE DIVIDED HIGHWAY MOVING OPERATION

D-704-32



- Notes
- Provide an additional sequencing arrow panel in the closed lane, near the work area, if the moving operation is not visible to the motorist from the end of the taper.
 - Variables
S = Numerical value of speed limit or 85th percentile.
W = The width of the taper.
L = Minimum length of taper, S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S² /60 for urban, residential, and other streets with speeds of 40 mph or less.
 - Space delineator drums for tapering traffic at dimension "S".
 - Sequencing Arrow Panels
Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface.
Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph & 750 ADT or less).
Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph and 5000 ADT or less).
Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph and 5000 ADT).
 - Re-establish speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit 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.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
 - Provide shoulder taper when shoulder is 8' or wider.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

| KEY | | | |
|-----|------------------|--|------------------------|
| | Sign | | Work area |
| | Delineator Drums | | Sequencing arrow panel |

| 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 anticipated operating speed in mph.

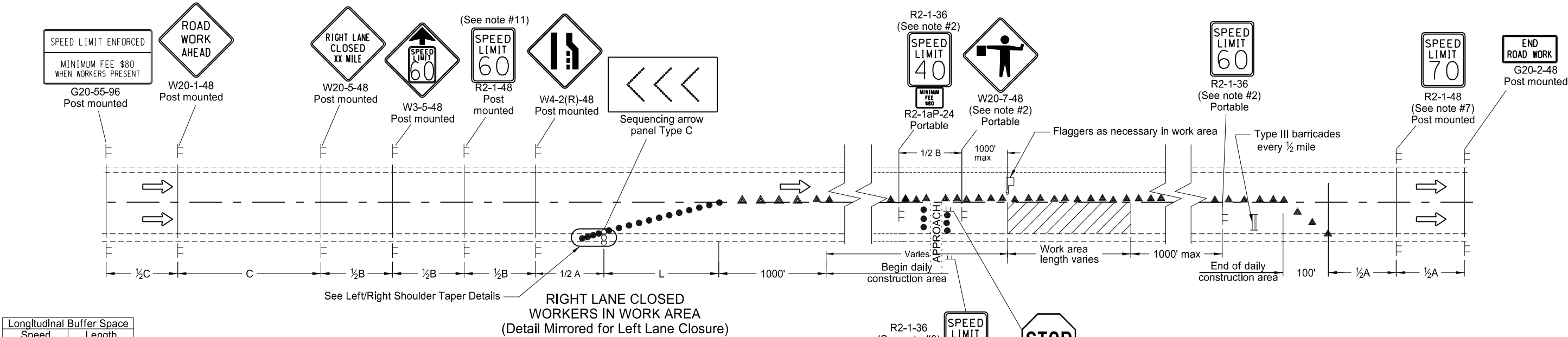
| ADVANCE WARNING SIGN SPACING | | | |
|---|----------------------------------|------|------|
| Road Type | Distance Between Signs Min. (ft) | | |
| | A | B | C |
| Urban - Low Speed (30 mph or less) | 150 | 150 | 150 |
| Urban - Low Speed (over 30 to 40 mph) | 280 | 280 | 280 |
| Urban - High Speed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

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|--|
| 9-27-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 6-24-14 8-17-17 | Revised Note 9 Updated notes & sign numbers |

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SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34

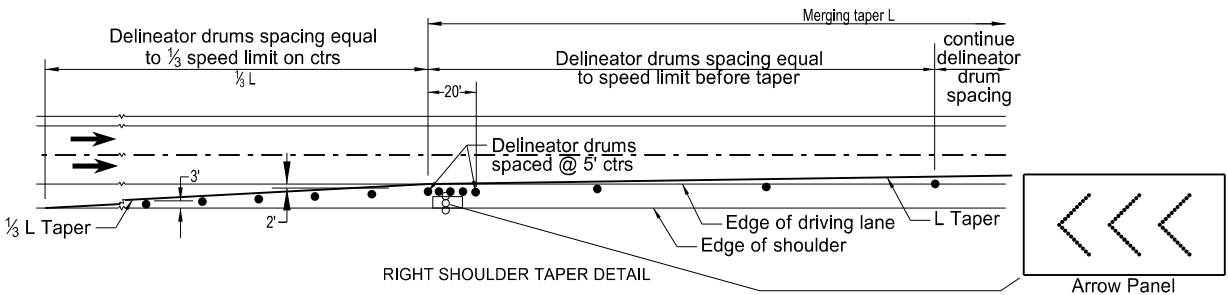
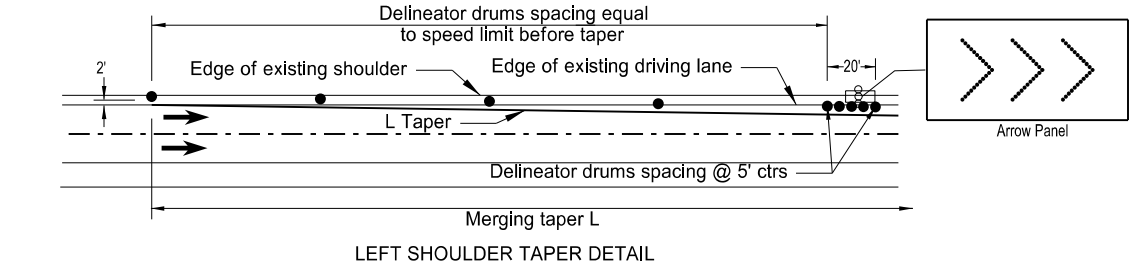


| Longitudinal Buffer Space | |
|---------------------------|-------------------|
| Speed (mph)* | Length Min (feet) |
| 20 | 115 |
| 25 | 155 |
| 30 | 200 |
| 35 | 250 |
| 40 | 305 |
| 45 | 360 |
| 50 | 425 |
| 55 | 495 |
| 60 | 570 |
| 65 | 645 |
| 70 | 730 |
| 75 | 820 |

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

| KEY | |
|-----|------------------------|
| | Type I barricade |
| | Type II barricade |
| | Type III barricade |
| | Sign |
| | Delineator drum |
| | Work area |
| | Flagger |
| | Sequencing arrow panel |
| | Tubular markers |

- Notes:
1. Install advance signs for flagging when flaggers are flagging.
 2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at $\frac{1}{2}A$ in advance of the flagger sign and move the 60 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee \$80 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
 3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
 4. Variables:
S=Numerical value of speed limit or 85th percentile
W=The width of taper.
L=Minimum length of taper, or $S \times W$ for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $(W \times S \times S)/60$ for urban, residential, and other streets with speeds of 40 mph or less.
 5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
 6. 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 the roadway surface.
Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
 7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
 8. Cover existing speed limit signs within a reduced speed zone.
 9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 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 $\frac{1}{2}B$.
 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 layouts or the work is less than 15 days.



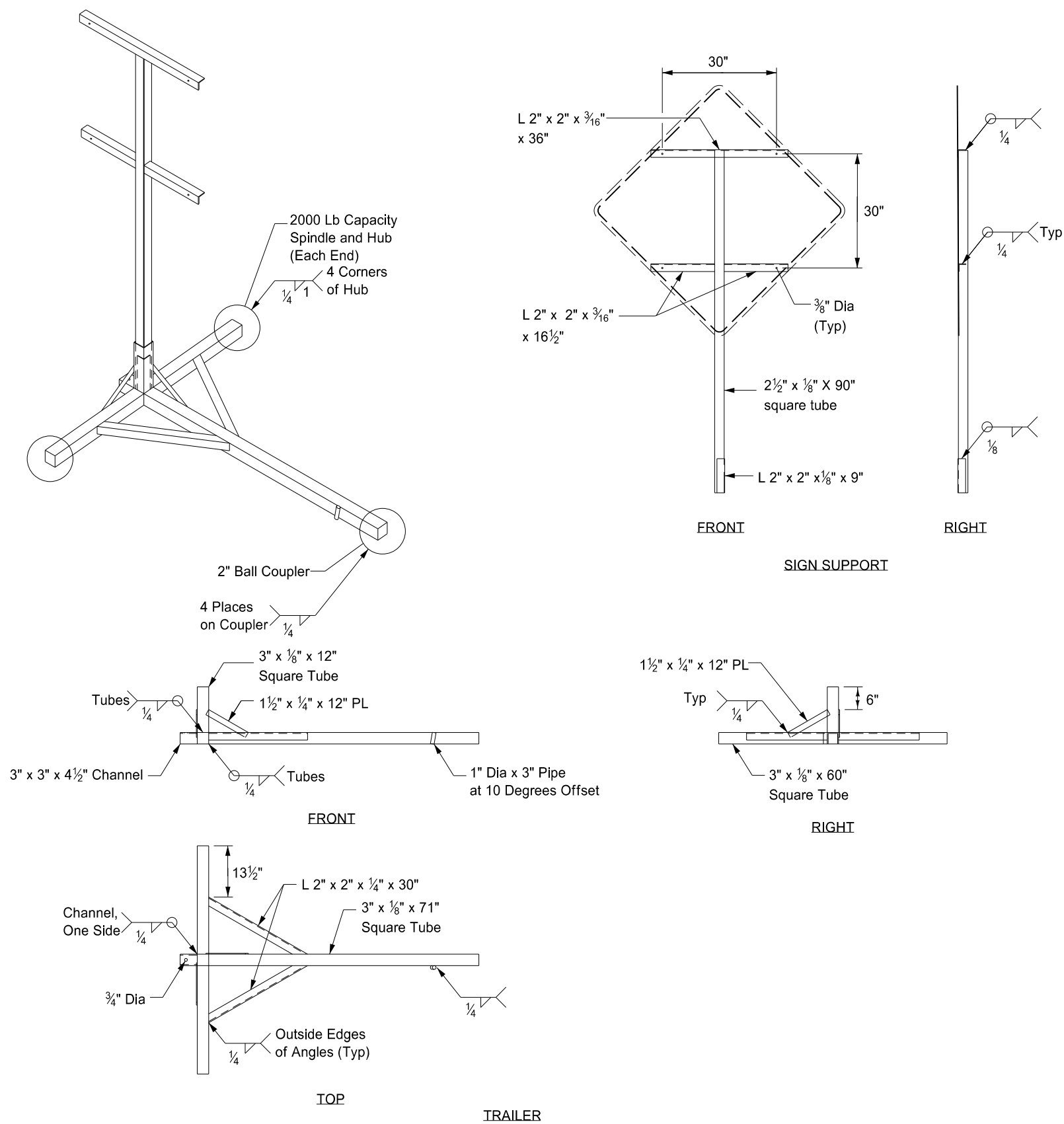
| ADVANCE WARNING SIGN SPACING | | | |
|---|---------------------------------|------|------|
| Road Type | Distance Between Signs Min (ft) | | |
| | A | B | C |
| Urban - Low Speed (30 mph or less) | 150 | 150 | 150 |
| Urban - Low Speed (over 30 to 40 mph) | 280 | 280 | 280 |
| Urban - High Speed (over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

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|---|
| 9-26-2012 | |
| REVISIONS | |
| DATE | CHANGE |
| 3-15-16 | Removed Do Not Pass signs and updated notes |
| 8-17-17 | Updated notes & sign nos. & moved Speed Limit signs |

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



Notes:

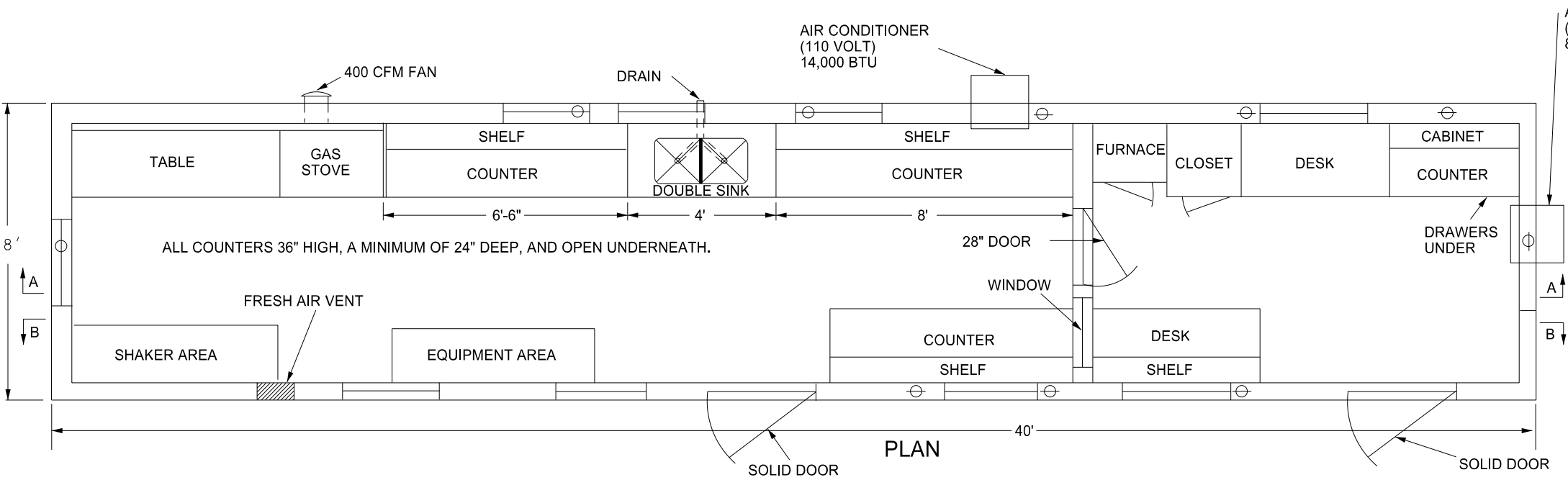
- ① The maximum weight of the assembly is 250 pounds.
- ② Use a 14" wheel and tire.
- ③ Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
- ④ Other NCHRP 350 crash tested assemblies are acceptable.

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

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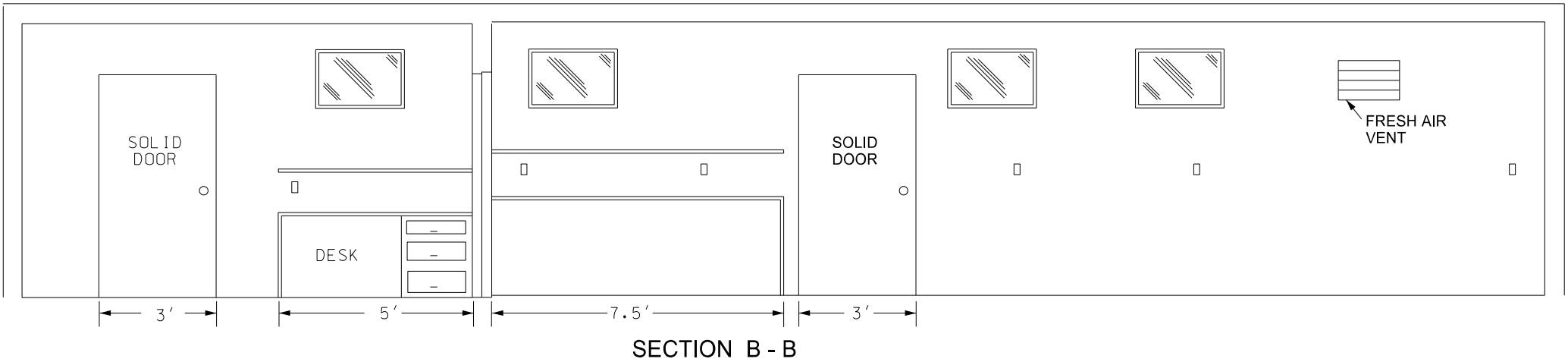
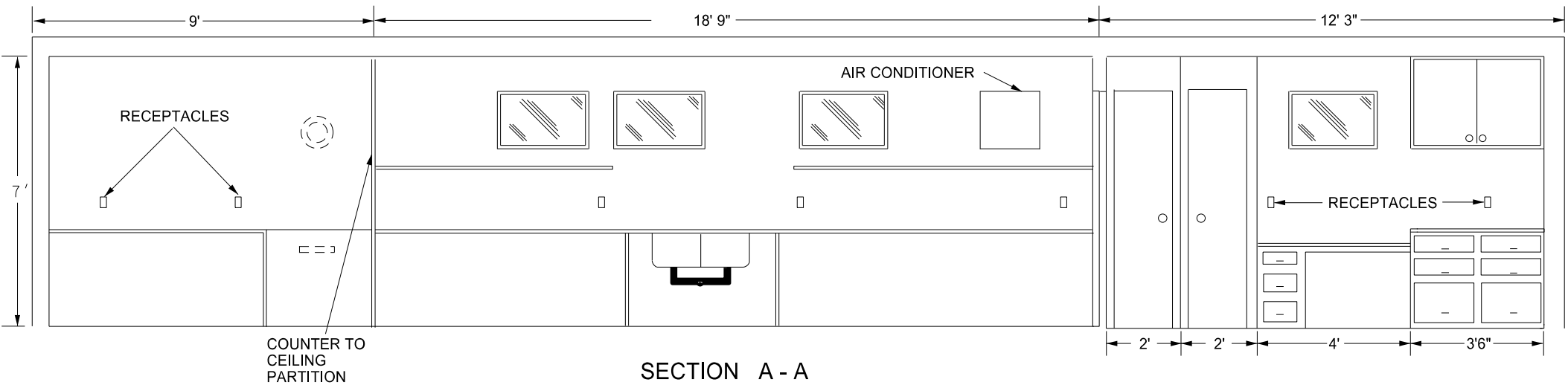
BITUMINOUS LABORATORY

D-706-1



Provide a laboratory with the following:

1. A 1'x1' shelf at 36" above the regular countertop.
2. Double compartment stainless steel sink, with each compartment a minimum of 16"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of ½ inch.
3. An exhaust fan capable of removing inside air at a rate of 400 CFM.
4. Fresh air vent hinged to open or close manually.
5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.
6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.
7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.
8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.
9. The steel cable tie downs and ground anchors at each corner of the lab.
10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.

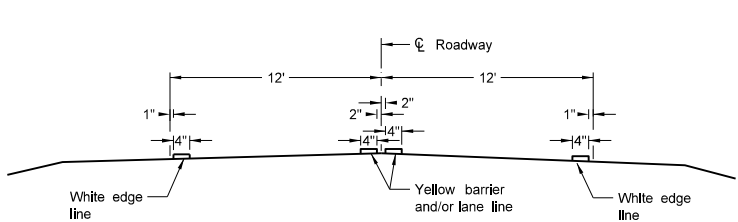


| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|---|
| 10-03-13 | |
| REVISIONS | |
| DATE | CHANGE |
| 07-30-14 | Changed standard's title and revised notes. |
| 01-11-16 | Revised notes. |

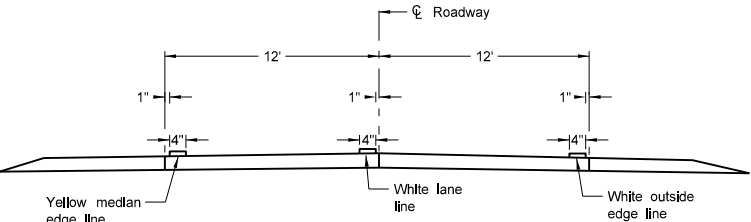
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PAVEMENT MARKING

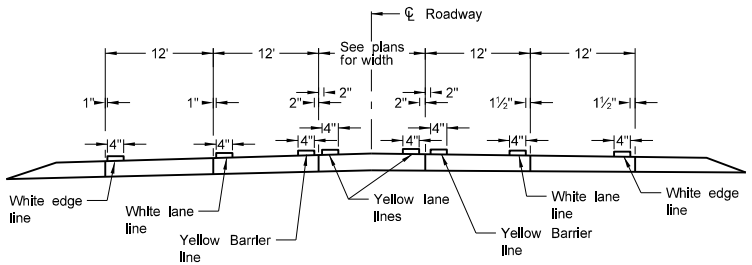
D-762-4



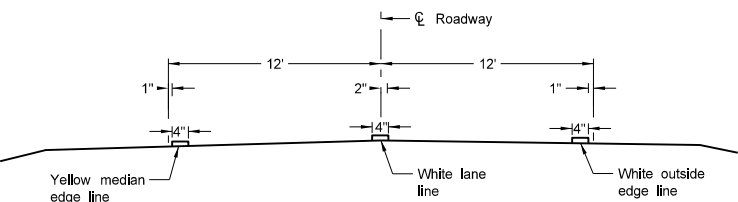
Two Lane Two Way
RURAL ROADWAY



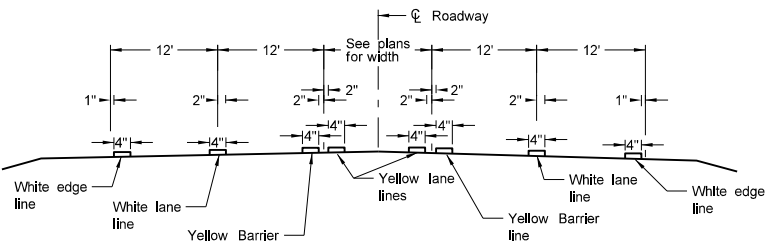
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



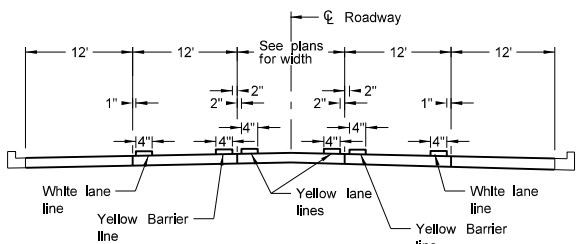
RURAL FIVE LANE ROADWAY
Concrete Section



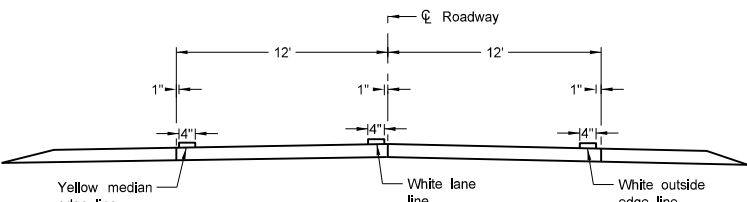
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



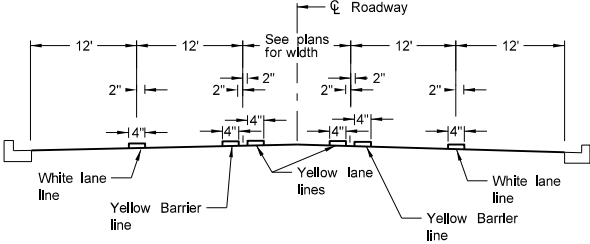
RURAL FIVE LANE ROADWAY
Asphalt Section



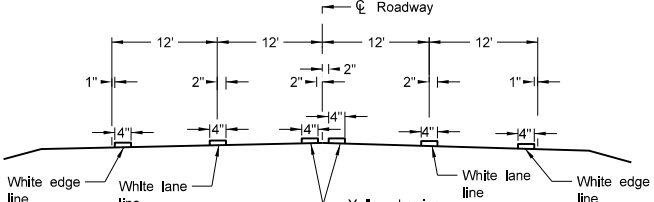
URBAN FIVE LANE SECTION
Concrete Section



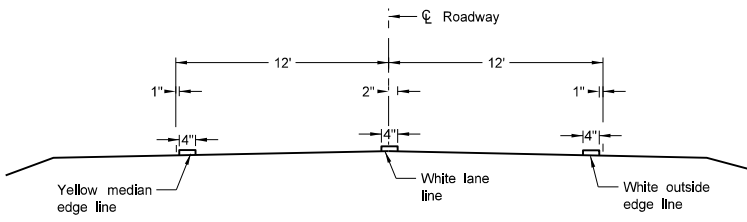
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



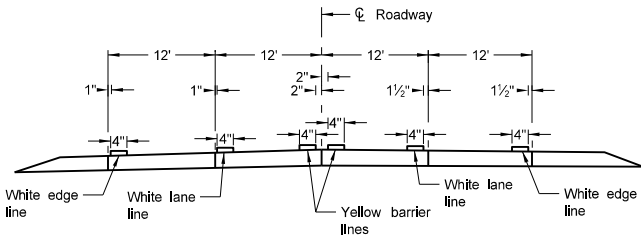
URBAN FIVE LANE SECTION
Asphalt Section



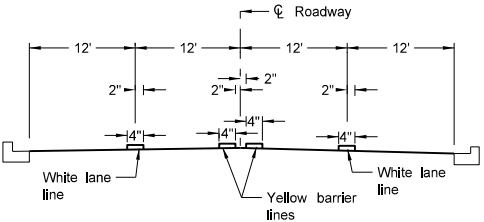
RURAL FOUR LANE ROADWAY
Asphalt Section



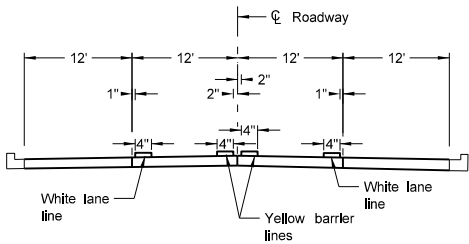
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



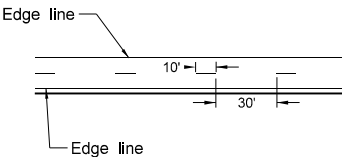
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

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

| NORTH DAKOTA DEPARTMENT OF TRANSPORTATION | |
|--|--------------------------|
| 12-1-10 | |
| REVISIONS | |
| DATE | CHANGE |
| 10-17-17 | Updated to active voice. |

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