WOLD ENGINEERING, P.C.

SINCE 1955

CP-5208(024)

WELLS COUNTY

RESHAPING, CEMENT STABILIZED BASE AND HOT BITUMINOUS PAVING

CMC 5208 from the Intersection of ND 30, West 1.5 Miles

May 2025

BOTTINEAU: 915 11th St. E - PO Box 237 - Bottineau, ND 58318 – 701-228-2292 - wold@woldengr.com
MINOT: 110 8th Ave SW - Minot, ND 58701 - 701-852-0338 - woldeng@srt.com
BISMARCK: 316 Eastdale Dr. - PO Box 1227 - Bismarck, ND 58502 - 701-258-9227 - bismarck@woldengr.com

WELLS COUNTY

PROPOSAL

PROJECT CP-5208(024)

RESHAPING, CEMENT STABILIZATION, AND HOT BITUMINOUS PAVING

2025

This document was originally
issued and sealed by
Jason I. Mayfield,
Registration Number
PE-7877
on 05/07/25 and the original
document is stored at
Wold Engineering, P.C.
Minot, North Dakota

WOLD ENGINEERING, P.C.
915 East 11th St
Bottineau, ND 58318

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ADVERTISEMENT FOR BIDS

Projects CP-5208(024)
Wells County, North Dakota

NOTICE IS HEREBY GIVEN THAT the Commissioners of the County of Wells, North Dakota, will receive sealed bids for *Wells County Project CP-5208(024) – Re-Shaping, Cement Stabilized Base and Hot Bituminous Paving – CMC 5208 from the intersection of ND Hwy 30 – Thence West 1.5 miles,* at the office of the County Auditor of said County until *4:00 P.M.* CDST on *June 4th, 2025*, at which time said bids will be opened and read aloud.

Complete digital project bidding documents are available at www.woldengr.com or www.questcdn.com. You may download the digital plan documents for $30.00 by inputting Quest project #9683125 on the website's Project Search Page. Please contact QuestCDN.com at 952-233-1632 or info@questcdn.com for assistance in free membership registration, downloading, and working with this digital project information. An optional paper set of project documents is also available for Non-Refundable price of $100.00 per set. Please make your check payable to Wold Engineering, P.C., 915 East 11th St., PO Box 237, Bottineau, North Dakota, 58318. Please contact Wold Engineering, P.C. at 701-228-2292 if you have any questions.

The approximate quantities of work and material for construction of the project are as follows:

Remove and Relay Blended Base Course	4,134 SY
Cement Stabilized Subgrade – 8 IN	4,000 SY
Portland Cement	67 TON
Superpave FAA 42	5,765 TON
PG 58S-34 Asphalt Cement	357 TON
Incidental Items	

Each bid is to be submitted on the basis of cash payment for the work and is to be enclosed in a sealed envelope addressed to the undersigned County Auditor. Each bid is to be accompanied by a Bidder's Bond in the amount of five (5) percent of the bid, as specified by the North Dakota Century Code Par. 11-11-28, to be forfeited to Wells County should the Bidder fail to effect a contract within ten (10) days after notice of an award. Bidder will execute and effect a contract in the amount of the bid and a Bidder's Bond as required by law and regulation and determination of Wells County.

The work on said project shall be completed by *October 25, 2025*; from such date liquidated damages shall be paid.

The right is reserved to reject all bids, and to waive any informality in any bid, and to hold the bids for a period not to exceed thirty (30) days from the date of opening bids.

DATE: May 6, 2025

SIGNED: Daniel Stutlien
Wells County Auditor
700 Railway St N #37
Fessenden, North Dakota 58438-7419

GENERAL INSTRUCTIONS TO BIDDERS

Attached hereto and bound herein and all made a part and parcel hereof are the

Advertisement for Bids
General Instruction to Bidders
Proposal Submittal
Contract for Construction
Special Provisions
Specifications
Plans

All of the above relate directly to the work contemplated in pursuance of the construction of *Wells County Project CP-5208(024)*.

The instructions herein contained are given for the purpose of guiding Bidders in properly preparing their bids or proposals. These directions have equal weight and force with the specifications, and strict compliance is required for all of the provisions.

Here and After:

The Wells County Commissioners, Wells County, North Dakota, will be referred to as the Commission.

The Auditor of the said Commission shall be referred to as the Auditor.

Wold Engineering, P.C., Professional Engineers, shall be referred to as the Engineer.

The successful Bidder, to whom it is awarded and who properly executed the contract, shall be referred to as the Bidder.

Qualification of Bidders

No proposal will be accepted from, nor will any contract be awarded to any person, firm or corporation who is in arrears to the County, or who is a defaulter, as surety or otherwise, upon any obligation to the County, or who is deemed irresponsible or unreliable by the Commission.

Bid to Show License Issued

All bids and proposals for construction of this project shall contain a copy of the Contractor's License issued by the Secretary of State enclosed in the Bid Bond envelope. No contract shall be awarded to any Bidder unless they are the holder of a license in the class within which the value of the project shall fall.

A Bidder must be the holder of a license at least ten days prior to the date set for receiving bids, to be a qualified Bidder.

A bid submitted without this information properly enclosed in the Bid Bond envelope shall not be read nor considered and shall be returned to the Bidder.

Investigation by Bidders

Bidders must satisfy themselves by personal investigations and by such other means as they may think necessary or desirable as to the location of and the conditions affecting the proposed work, and as to the cost thereof. No information derived from the Engineer, or his assistants will relieve the Bidder from any risk or from fulfilling all the terms of this contract. The accuracy of the Bidder's interpretation of the facts disclosed by any preliminary investigation that may have been made by an Engineer is not guaranteed. The Engineer's estimate of the quantities given in the proposal is to be considered as preliminary and approximate only and is to be used only for the purpose of canvassing and comparing bids. The Bidder shall not, at any time, make claims for additional payment or considerations on account of any misunderstanding regarding the nature or the amount of work to be done.

Inconsistencies

Any seeming inconsistency between different provisions of the plans, specifications or contract, or any point which requires explanation must be inquired into by the Bidder, in writing, at least seventy-two (72) hours (excluding Sundays and legal holidays) prior to the time set for the opening of proposals. After proposals are opened, all Bidders must abide by the decision of the Engineer as to such interpretation. After work has begun, if any variation is found between the plans and the specifications, the discrepancy shall immediately be reported to the Engineer. Any work done by the Bidder after his discovery of such discrepancy, error, or omission shall be done at the Bidder's risk.

Legal Conditions

Bidders are notified to familiarize themselves with the provisions of the laws of the State of North Dakota relating to such work. All proposals must be submitted upon forms furnished by the Engineer. Proposals should be completed in ink or typewritten. Each proposal with its accompanying documents must be submitted unbroken, in good order, and with all blanks correctly filled in. The proposal must be submitted in a sealed envelope and deposited with the Auditor. The envelope must be addressed to the Auditor and must show the name of the Bidder and a statement as to its contents. The proposal must be signed by one duly authorized to sign, and if it is signed by a deputy or subordinate, the principals proper written authority to such deputy or subordinate must accompany the proposal.

Filling in Bids

All unit prices must be typed or neatly printed in numerals in the proposal and must fully cover all items for which proposals are herein asked, and no others. They must be signed and verified by the parties interested or their authorized agent or agents.

Causes of Rejection

In addition to the requirements set forth herein, any proposal which is incomplete, obscure, or irregular, or any alteration, interlining, or erasure in the proposal as originally prepared by the Engineer and as delivered to the Bidder may render such proposal informal. No proposal will be canvassed, considered, or accepted which, in the opinion of the Commission, is informal or unbalanced or contains inadequate or unreasonable prices for any item named in the bid items. Each item must carry its own proportion of the cost as nearly as practicable.

Bidder's Bond

Each proposal must be accompanied by a Bidder's Bond which must be in a separate envelope attached to the outside of the envelope containing the bid. The Bidder's Bond shall be payable to the Commission and shall be five percent (5%) of the bid. Such bond shall be executed by the Bidder as principal and by a surety company authorized to do business in the State of North Dakota, or by two or more free holders, residents of this State. If executed by individuals as sureties, such sureties must attach to each bond a certificate of property within the State, a sum equal to twice the penalty of the bond, over and above their exemption. Such bond shall be made payable to the Commission, and shall be conditioned that if the principal's bid be accepted and the contract for the work of improvement awarded to him, he will, within five days or within such further time as the Commission shall grant after acceptance, enter into and execute a bond in a sum equal to the amount of the bid, and perform and complete the work for which his bid was accepted, in accordance with the plans and specifications therefore, for the price named in his bid, and within the time required by the terms of said contract.

Contract

The Bidder to whom award is made will be required to execute the contract within ten (10) days after the notice that the contract has been awarded to him and receipt of such contract for execution. Failure or neglect to do so shall constitute a breach of the agreement affected by the acceptance of the proposal, and a forfeiture of the Bidder's Bond may be declared and action instituted to collect by the Commission as part of the liquidated damages.

The contract shall be, in its general provisions, in the form attached hereto and made a part of these requirements. A corporation to which a contract is awarded will, before the contract is finally executed, if deemed desirable by the Commission, be required to furnish certifications as to its corporate existence and evidence that the officer signing the contract is duly authorized to do so on behalf of the corporation.

Contract Bond

The Bidder to whom award is made will, within ten (10) days after award is made, or within such further time as the Commission shall grant, execute and file with the Auditor a contract bond assured in the same manner as the "Bidder's Bond" above. The contract bond shall guarantee to the Commission that the Bidder will well and fully perform the contract work in accordance with the terms and within the time provided pursuant to the plans and specifications filed in the office of the Auditor, and that he will pay for all labor and materials used in such work. The contract bond shall further provide that in case of default or failure of the Bidder to perform said work in said manner, the full amount of the bond shall be made available to the Commission to insure that the Commission obtains everything required by the contract for no more than the contract price. The sufficiency of the contract bond shall be determined by the Commission. If the Commission shall at any time deem the bond of the Bidder insufficient, either in form or sufficiency of the sureties, it may require the successful Bidder to furnish a new bond, to be approved by the Commission, within such reasonable time as the Commission may fix. Should the Bidder fail to furnish such new bond within the time required after notice to him to do so, his contract shall be liable in the same manner as if the Bidder had failed to perform the contract.

Limitation of Liability

The Bidder is skilled and experienced in the use and interpretation of Plans and Specifications. He has carefully reviewed the Plans and Specifications for this project and has found them free of ambiguities and sufficient for bid purposes. Further, he has carefully examined the site of the work and, from his own observations, has satisfied himself as to the nature and location of the work, the character, quality and quantity of materials, and the difficulties likely to be encountered, and other items which may affect the performance of the work. He has based his bid solely on these documents and observations and has not relied in any way on any explanation or interpretation, oral or written, from any other source. Therefore, the Bidder agrees to limit the liability of the Design Professional for his negligence, errors or omissions, to a total aggregate liability to him of $50,000 or the Design Professionals total fee for services rendered on this project, whichever is greater. The Bidder in no way assumes liability for the negligence, errors or omissions of the Design Professional.

Subletting

The Bidder shall not assign or sublet the whole or any portion of the work contemplated in this contract, except the supply of material and tools, without having first obtained the written consent of the Engineer. If consent is given, it shall in no way release the Bidder from responsibility; he shall be held in all respects accountable the same as if no consent had been given. The Bidder will be required to give his personal attention to the work.

Invitation

Bidders are invited to be present at the opening of proposals.

PROPOSAL SUBMITTAL

To: Chairman of the Board

Wells County Commissioners

Wells, North Dakota 58438

Dear Sir,

The undersigned Bidder has examined carefully the Advertisement for Bids, General Instructions to Bidders, Plans, Specifications, Special Provisions, and Contract for Construction of the County Project *CP-5208(024)* described and referred to in the "Advertisement for Bids", inviting proposals for such work dated May 6, 2025, and has examined closely the site of the work.

Said Bidder holds a Class _____ North Dakota Contractor's License No. _____ _____, which is in effect and has been for ten (10) days prior to the date set for receiving bids.

Said Bidder proposes to and will provide all necessary machinery, tools, apparatus, and other means of construction, and will do all the work and furnish all the material called for by said General Instructions to Bidders, Plans, Specifications, Special Provisions, and the Contract form, in accordance with the requirements of the Engineer under them for the sum of

_____

_____

_____

($_____), in accordance with the unit prices listed below.

BID ITEMS

BIDDER MUST TYPE OR NEATLY PRINT UNIT PRICES IN NUMERAL, MAKE EXTENSIONS FOR EACH ITEM, AND TOTAL. DO NOT CARRY UNIT PRICES FURTHER THAN THREE (3) DECIMAL PLACES.

ITEM NO.	SPEC	CODE	ITEM DESCRIPTION	UNIT	APPROX. QUANTITY	UNIT PRICE	AMOUNT
1	103	0100	CONTRACT BOND	L SUM	1		
2	230	0106	RESHAPING ROADWAY	MILE	1.52		
3	234	0205	CEMENT STABILIZED SUBGRADE-8IN	SY	4,000		
4	302	0356	AGGREGATE SURFACE COURSE CL 13	TON	130		
5	306	0350	REMOVE AND RELAY BLENDED BASE COURSE	SY	4,134		
6	401	0050	TACK COAT	GAL	1,302		
7	430	0042	SUPERPAVE FAA 42	TON	5,765		
8	430	1000	CORED SAMPLE	EA	32		
9	430	5815	PG 58S-34 ASPHALT CEMENT	TON	357		
10	550	2040	PORTLAND CEMENT	TON	67		
11	702	0100	MOBILIZATION	L SUM	1		
12	704	0100	FLAGGING	MHR	180		
13	704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,024		
14	704	1048	PORTABLE RUMBLE STRIPS	EA	2		
15	704	1052	TYPE III BARRICADE	EA	4		
16	704	1067	TUBULAR MARKERS	EA	100		
17	704	1185	PILOT CAR	HR	90		
18	706	0550	BITUMINOUS LABORATORY	EA	1		
19	706	0600	CONTRACTOR'S LABORATORY	EA	1		
20	760	0010	RUMBLE STRIPS - INTERSECTION	SET	1		
21	762	0103	PVMT MK PAINTED-MESSAGE	SF	52		
22	762	0114	EPOXY PVMT MK 6IN LINE	LF	2,756		
23	762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	5,512		
24	762	1106	PVMT MK PAINTED 6IN LINE	LF	16,051		
25	762	1124	PVMT MK PAINTED 24IN LINE	LF	18		
					Total Sum Bid		

The undersigned also agrees as follows:

To do any extra work not covered by the above schedule of prices, which may be ordered by the Engineer, and to accept as full compensation therefore such prices as may be agreed on in writing by the Engineer, the Commission, and the Bidder.

Within ten (10) days from the "Notice of Acceptance" of this proposal, to execute the contract and to furnish to the Commission a satisfactory contract bond in the full amount of the contract price as surety guaranteeing the faithful performance of the work and payment of bills, and within the same period to furnish to the Commission the special bond referred to above.

Receipt of the following Addenda is hereby acknowledged:

Addendum #_____ Dated_____

Addendum #_____ Dated_____

Addendum #_____ Dated_____

Addendum #_____ Dated_____

DATE:_____ BIDDER:_____

BY:_____

TITLE:_____

ADDRESS:_____

_____

CONTRACT FOR CONSTRUCTION

THIS AGREEMENT made and entered into this _____ day of _____, 2025, by and between the County Commissioners of Wells County, North Dakota, hereinafter called the Commission and _____ hereinafter called the Bidder.

WHEREAS, the Auditor of Wells County, North Dakota, advertised for bids for the construction of *Wells County Project CP-5208(024) – Re-Shaping, Cement Stabilized Base and Hot Bituminous Paving* according to the plans and specifications therefore approved by the County Commissioners.

WHEREAS, pursuant to proceedings theretofore had, bids were received for the materials and equipment to be furnished, and the labor to be performed in the making of such project, and the contract was awarded the Bidder to furnish such materials and equipment and to perform such labor.

NOW, THEREFORE, IT IS MUTUALLY COVENANTED AND AGREED, and by these presents the parties hereby do covenant and agree as follows:

1. That the Bidder shall fully and faithfully construct and make certain improvements in, pursuant to and in conformity with the plans and specifications therefore on file in the office of the Auditor and in accordance with the terms of the Advertisement for Bids, General Instructions to Bidders, Plans, Specifications, Special Provisions and Proposal Submittal as hereby referred to and expressly made a part hereof.

2. That the materials required for the construction of said improvement shall be furnished and the work incidental to such construction shall be performed by the Bidder subject to the approval of the Commission as defined in the General Instructions to Bidders; and that in the event that any part of the work be improperly done, the Commissioners may halt the work at any time or re-let the contract therefore or to order reconstruction of such improperly done work.

3. That the Bidder shall complete the work under this contract not later than October 25, 2025.

4. That the Bidder shall pay for all labor and materials used in such work, and shall save, keep, bear harmless and fully indemnify the Commission and any and all of its officers and agents, from all damages, costs or expense, in law or in equity, which at any time may arise or be set up for damage caused to persons or to property by reason of any acts of the Bidder, or any of his agents or employees while completing the work required to be done hereunder.

5. That the Commissioners agree to pay in cash to the Bidder for and in consideration of the faithful performance by him of the Stipulations hereof, for all material and equipment furnished, and all labor performed by him hereunder, at the unit prices specified in detail in the Bidder's proposal aggregating for the performance of said contract the sum of

   _____

   _____

   _____

   ($_____).

6. That upon receipt of written notice that the work is ready for final inspection and acceptance, that the agent shall promptly make such inspection and when he finds the work acceptable under the contract and the contract fully performed, he shall promptly issue a final certificate over his signature, stating that the work provided for in the contract has been completed and is acceptable by him under the terms and conditions thereof, and the entire balance found to be due the Bidder shall be paid the Bidder at the office of the Auditor within ten (10) days after the date of said final acceptance, subject to the terms of the specifications.

7. That the Commissioners assume and incur no general liability under this contract.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be executed the day and year first written above.

WELLS COUNTY COMMISSIONERS

BY:_____
CHAIRPERSON

ATTEST:_____

BIDDER

BY:_____

TITLE:_____

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
PRICE SCHEDULE FOR MISCELLANEOUS ITEMS (PS-1)

The Contractor agrees to accept the following unit prices for each listed item of work and or material when no project contract unit price exists for that item. Materials and construction methods used in performing maintenance and restoration work for 107. 08 Haul Roads shall meet the requirements of the relevant specifications.

Each price listed will be full compensation for the cost of labor, material, and equipment necessary to provide the item of work and/or material, complete in place, including (but not limited to) royalty, disposal of unsuitable material, equipment rental, sales tax, use tax, overhead, profit, and incidentals.

Each listed item is referenced to the Standard Specifications by Section number and Section name.

Spec	Code	Specification Section No.	Section Name	Item	Price
100	9950	704.04 C.5	Temporary Traffic Control	Flagging	$48.50 per MHR
100	9951	216.04	Water	Water	$33.00 per M Gal
100	9952	430.04 G & I.3	HMA – Bituminous Materials	Patching – Machine	$155.00per Ton
100	9952	430.04 G & I.3	HMA – Bituminous Materials	Patching – Hand Placed	$175.00 Per Ton
100	9954	302.04 B	Aggregate Base and Surface Course	Aggregate Base CL 13	$27.00 per Ton [1]
100	9955	203.01 C	Rock Excavation	Rock Excavation	$14.75 per CY
100	9956	203.01 D	Shale Excavation	Shale Excavation	$6.50 per CY
100	9957	203.01 E	Muck Excavation	Muck Excavation	$9.85 per CY
100	9958	203.01 G & 203.05 G.3	Excavation and Embankment	Overhaul	$0.08 per CY-Sta
100	9960	420.04 E	Bituminous Seal Coat	Blotter Sand	$25.00 per Ton [1]
100	9962	260.06	Silt Fence	Cleaning Silt Fence	$5.00 per LF
100	9963	261.06	Fiber Rolls	Cleaning of Fiber Rolls	$5.00 per LF
100	9964	260.06	Silt Fence	Removal of Silt Fence [2]	$5.00 per LF
100	9965	261.06	Fiber Rolls	Removal of Fiber Rolls [2]	$5.00 per LF

[1] Price Includes haul up to 10 miles. Payment for haul exceeding 10 miles will be according to Section 109.03 E, "Force Account." The haul distance for aggregate base will be based on the average haul. The haul distance for blotter sand will be from the point where the haul begins to the point where it enters the project.

[2] This is only for pre-existing items that were not installed under the Contract.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

HMA CORING, ACCEPTANCE, AND PAY FACTORS

DESCRIPTION
This special provision modifies portions of Section 430 of the 2020 Standard Specifications for Road and Bridge Construction. It changes the requirements of shoulder construction, depending on the method of construction; updates coring requirements for the changes in sublot size; and to clarify how contract price adjustments are calculated.

CONSTRUCTION REQUIREMENTS
Replace Section 430.04 I, "Compaction" and Section 430.04 M, "Acceptance" with the following text.

I. Compaction.

1. General.
Remove all surface irregularities before beginning compaction.

Sequence rolling operations and select the type and the number of rollers to match production and to attain the required density before the mat temperatures fall below 185°F.

In areas not accessible to rollers, compact the pavement mat with hand or mechanical tampers.

2. Calculated Density.

a. General.
Use calculated density on mainline pavement, interstate crossroads, ramps, turn lanes, rest area approaches, and parking lots.

b. Coring.

(1) General.
Obtain pavement cores at locations designated by the Engineer under the observation of the Engineer.

Use a machine that cuts a cylindrical core sample without disturbing the density of the sample. Complete coring on or before the working day following the placement of the lift. Obtain a core with a smooth outer surface, no distortion of the cylindrical shape, and no displacement of the aggregate particles. Obtain a core that is 4 to 6 inches in diameter and the full depth of the in place asphalt.

Fill core holes before placing the subsequent lift of pavement. If there is no subsequent lift of pavement, fill the core hole within 24 hours of obtaining the core. Remove free standing water before filling core holes. Fill core holes in 2

inch lifts using material from the same mix design used on the roadway. Compact each lift using a hand tamper.

(2) Pavement Density Cores.
Use a masonry saw to cut the core so that only the layer to be tested is removed.

Label each core, using a system approved by the Engineer, to identify the location from which the core was obtained.

(3) Pavement Thickness Determination Cores.
Obtain pavement thickness determination cores after the final lift of pavement has been placed. Label the cores. The Engineer will take possession of these cores immediately upon extraction. Do not cut these cores.

3. Ordinary Compaction.

a. General.
Use ordinary compaction on shoulders, driveways, section line approaches, bike paths, leveling courses, and patches.

Ordinary compaction consists of breakdown rolling, intermediate rolling, and finish rolling. Compact the bituminous material until the surface is tightly bound and shows no displacement under operation of the roller.

For patching, immediately after spreading perform initial rolling with pneumatic-tired rollers or combination rollers.

b. Breakdown Rolling.
Breakdown rolling consists of one or more complete coverage with a roller meeting the requirements of one of the following Sections:
- 151.01 A.3, "Self-Propelled Pneumatic-Tired Rollers";
- 151.01 B.2, "Smooth-Faced Steel-Wheel Roller: Tandem – Type A";
- 151.01 C, "Vibratory Rollers"; or
- 151.01 D, "Combination Rollers".

c. Intermediate Rolling.
Follow breakdown rolling with intermediate rolling with a roller conforming to Section 151.01 A.3, "Self-Propelled Pneumatic-Tired Rollers", or 151.01 D, "Combination Rollers" until the surface is tightly bound and shows no displacement under the roller.

If roller tires pick up the bituminous material or there are excessive roller marks in the mat, the Engineer may allow the removal of the intermediate rolling operation if it appears to the Engineer that compaction is being achieved.

d. Finish Rolling.
Perform the finish rolling with a roller conforming to Section 151.01 B.3, "Smooth-Faced Steel-Wheel Roller: Tandem – Type B", or 151.01 C, "Vibratory Rollers" in the static mode, and continue until roller marks are eliminated.

M. Acceptance.

1. General.
The Engineer will accept bituminous mix based on the criteria in this section.

The Engineer will exclude material used in shoulder placement when calculating the total quantity of material affected by pay factors and will not designated core locations within shoulder areas.

2. Aggregate.
The Engineer will accept aggregate used in the mix based on QC tests that are verified by QA testing, and the control limits specified in Section 430.04 E.5, "Control Limits".

If the results for two consecutive aggregate gradation tests in a single day fall outside the single test target value control limits, the Engineer will apply a contract price adjustment as specified in Section 430.06 C, "Contract Price Adjustments".

3. Asphalt Content.
The Engineer will base the acceptance of the asphalt content of bituminous mix on the totalizer readings obtained as specified in Section 430.04 E, "QC Testing" and SFN 9988, "Mix Bitumen Cut-Off Report" and will apply a contract price adjustment as specified in Section 430.06 C, "Contract Price Adjustments".

If the average asphalt content, as determined by the Engineer according to SFN 9988, "Mix Bitumen Cut-off Report" deviates from the target value by 0.40 percentage points or more, the Engineer may reject the material. If the material is accepted, the Engineer will apply a contract price adjustment as specified in Section 430.06 C, "Contract Price Adjustments".

4. Field Density.
This section will apply when the pavement is constructed as specified in Section 430.04 I.2, "Calculated Density".

The Engineer will base acceptance of the density of hot mix asphalt on the average density of the pavement compared to the daily average maximum theoretical density. The comparison will be made using SFN 59132, "Density Pay Factor".

The Engineer will determine the density of pavement based on lots. A lot is equal to the amount of material, in tons, placed each production day.

A sublot is defined as a single lift, one paver width wide, and 1,000 feet long. If a partial sublot is less than 500 feet, it will be included in the previous sublot. A partial sublot 500 feet or greater will be considered a separate sublot.

The individual sublot densities will be averaged to determine the density of the pavement lot.

If the average density of the pavement compared to the daily average maximum theoretical density is above the values in Table 430-10, the Engineer will apply the adjustment factors specified in Section 430.06 C, "Contract Price Adjustments".

If the average density of the pavement compared to the daily average maximum theoretical density is at or below the values specified in Table 430-10, remove and replace the pavement.

Table 430-10

Superpave FAA 40, 41, 42, and 43	Superpave FAA 44 and 45
88.0%	89.0% [1]

[1] When the lift of pavement is placed on aggregate base, reclaimed material, or cold in place recycle material this number is reduced to 88.0%

BASIS OF PAYMENT

Replace Section 430.04 C.1, "General" with the following text.

C. Contract Price Adjustments.

1. General

The Engineer will calculate the Combined Adjustment Factor by multiplying the individual adjustment factors for:

- Aggregate gradation;
- Asphalt content; and
- Compaction.

1.0 will be subtracted from the Combined Adjustment Factor to determine the Contract Price Adjustment.

The contract price adjustment will be determined by multiplying the Contract Price Adjustment Factor by the total tons of hot mix asphalt placed during a single day and the contract unit price for "Superpave, FAA __" or "RAP Superpave FAA ___".

DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 2019	Pass: -	Trucks: -	Total: <750	-
Forecast 2039	Pass: -	Trucks: -	Total: <750	-
Clear Zone Distance: 32		Design Speed: 55		
Minimum Sight Dist. for Stopping: 495				
Minimum Sight Dist. for Safe Passing: 1985				
Sight Dist. for No Passing Zone: 900				

WELLS COUNTY
NORTH DAKOTA

COUNTY PROJECT:
CP-5208(024)

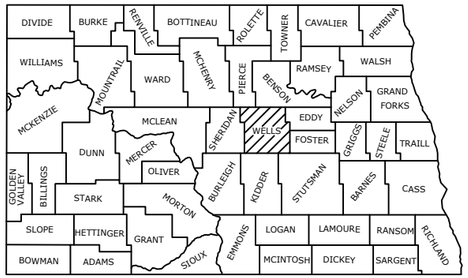
Re-Shaping, Cement Stabilized Base, and Bituminous Paving

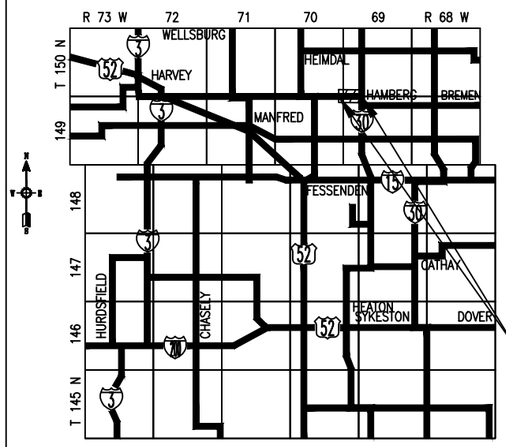
CMC 5208 - County Road 5, From 1.5 miles West of ND Hwy 30, Thence East 1.5 Miles

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	CP-5208(024)	-	1	1

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	07/01/2024
Supplemental Specifications	NONE

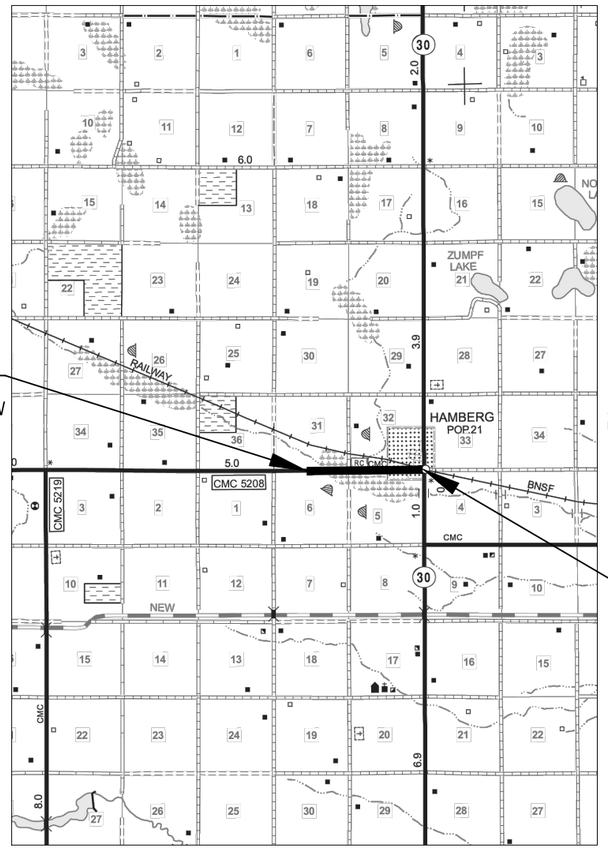
LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
CP-5208(024) ~ STA. 0+00 TO 80+29.67	1.520	1.520
TOTAL	1.520	1.520





Begin Project CP-5208(024)
STA. 0+00 = A Point 2,748.74 West of
The NW Corner of Sec 5, Twp 149 N, Rge 69 W

Project Location
CP-5208(024)



End Project CP-5208(024)
STA. 80+29.67
The NE Corner of Sec 5, Twp 149 N, Rge 69 W

WOLD ENGINEERING, P.C.
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DESIGNER
Jason I. Mayfield, P.E.
DESIGNER
Kent D. Indvik, P.E.
DESIGNER
Jesse R. Brandvold, P.E.
DESIGNER
Kole Jenson

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 04-21-2025

Jason I. Mayfield, P.E.

Wold Engineering, P.C.

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100-P01 **GENERAL:** The cost of incidental items shown on plans, but not listed in the estimate of quantities, will be included in the unit price bid for various pay items.

105-P01 **PAVEMENT PROTECTION:** The Contractor will protect the existing pavement outside the construction limits. The Contractor, at the Contractor's expense, will repair any pavement damaged due to their operations before the project will be accepted. Repairs may include, but are not limited to: sawing, removals and placing additional hot bituminous pavement to damaged areas.

105-P02 **TYPICAL SECTION:** The dimensions shown for the bituminous pavement course are approximate. Plan quantities will be placed throughout except where the Engineer authorizes a change.

105-P03 **PIT RELEASE STATEMENTS**: The County will require a pit release and receipt from the landowner(s) before final payment being issued for the aggregate used on this project.

107-P01 **HAUL ROADS:** All roads off the state system will not be designated as haul roads. The Contractor will obtain approval from the local government agency in charge of local roads before using them as haul roads. The Engineer, Contractor, and local agency official prior to and after hauling operations will conduct a haul road inspection.

107-P02 **ENVIRONMENTAL PROTECTION:** Any land use by the Contractor outside the Right of Way limits, for any purpose, must be approved by the land owner and the Project Engineer.

151-P01 **CONTRACTOR FURNISHED SCALE, SCALE PERSON AND DUMP PERSON**: A Contractor furnished scale, scale person and dump person will be required on this project.

230-P01 **SHOULDER PREPARATION:** Before placing Hot Bituminous Pavement, the Contractor will mow the grass shoulders a minimum of ten (10) feet beyond the pavement edge and to a height not greater than three (3) inches just prior to application of the herbicide. All weeds, grass, dirt, and other objectionable material will be removed from the existing shoulders by blading, power brooms, or other means approved by the Engineer without disturbing the underlying asphalt pavement. All sod and debris large enough to cause problems in maintaining the inslopes area will be loaded and hauled to a disposal area. The cost of this work will be incidental to the price bid for "SUPERPAVE FAA 42".

230-P02 **VEGETATION:** All vegetation that is within the 4-foot shoulder will be chemically killed with a non-selective herbicide (Roundup or equivalent) a minimum of three weeks before the shoulder preparation and the paving operation. The cost of this work will be incidental to the price bid for "SUPERPAVE FAA 42".

230-P03 **RESHAPING ROADWAY**: The Contractor will reshape the existing blended base course material to have a uniform finished cross-slope of 2.5% prior to paving roadway. All costs for water placement, equipment, material, and labor for reshaping the existing blended base will be included in the price bid for "RESPHAPING ROADWAY".

234-P01 **CEMENT STABILIZED SUBGRADE:**

GENERAL

This work consists of constructing a cement stabilized subgrade by uniformly mixing the existing subgrade, existing gravel, Portland cement, and water.

EQUIPMENT

A. General

Item	Section
Pneumatic-Tired Rollers	151.01 A
Vibratory Sheep's Foot/Pad Foot/Extended Pad Foot Rollers	151.01 A
12 Ton Steel Wheel Vibratory Roller	151.01 B
Water Trucks	151.01 B
Motor Grader	

B. Cement Truck.
Use a truck equipped with a vane feeder and measuring device to distribute the cement.

C. Mining and Blending Machine.
Provide machinery that will pulverize the existing subgrade section, blend the cement, and meets the requirements of Section 153.01 "Reclaimer" and the following:
• Equip the machine with computerized integral liquid proportioning system capable of regulating and monitoring the liquid applications rate relative to the depth of cut, width of injection, advance speed, and material density.
• Mount the spray bar to allow liquid additive to be injected directly into the cutting drum/mixing chamber area of pulverized material in suspension.

Use a machine that is equipped with both automated and manual operations for injecting liquids to be mixed. Machine functions include:
• Automatic nozzle cleaning
• Partial spray bar use
• On-the-fly changes to the quantities of material being added
Use non-contact flow meters to measure liquid volumes. During automatic operation, the system will allow liquids to be added only when the machine is in motion.

MATERIALS

Item	Section
Cement	804.01
Water	812

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CONSTRUCTION REQUIREMENTS

A. Cement Application and Blending

Do not apply cement or blend the surface in the following conditions:

- The roadway is frozen
- Air temperature is below 40° F
- The air temperature will fall below 40° F for 4 hours with 24 hours of completion.

Construct a test section of 20 feet to demonstrate the application and blending of the materials. The Engineer and Contractor will evaluate the results of the test section. If the test section is unsatisfactory, revise the method and construct another test section. Uniformly and Portland Cement to the road at a rate of 6 percent, within tolerance of 0.3 percent. Do not spread Portland Cement in the following conditions:

- Over ponded water
- During rain
- When rain is imminent
- When wind speed is 15 mph or greater

Begin blending immediately after the cement has been spread and continue blending until a uniform cement stabilized subgrade is produced. Add water to the blended material so the moisture content is within optimum moisture content. Do the following work in a continuous manner; applying cement; mixing; compaction; and finishing. Complete finishing within 2 hours of applying the cement to the surface. Do not leave the cement undisturbed for more than 30 minutes until the finishing is complete.

B. Compaction

Compact the cement stabilized subgrade to a uniform density. Moisten the subgrade to obtain compaction. Use the vibratory sheep's foot/pad foot/extended pad foot roller to obtain compaction until the feet or pads ride up within ½ inch of the surface of the cement stabilized subgrade. Compact the top with a pneumatic roller until the surface is bound tightly and shows no sign of rutting or displacement under compaction operation.

C. Finishing

Keep the surface moist by using a spray device that will not erode the surface. Complete all finishing operations within 2 hours of the application of cement. Continue compaction until uniform and adequate density is obtained. Keep the surface free of: Compaction planes; Cracks; Ridges; and Loose material.

D. Construction Joints

1. Traverse Joints
- Construct transverse joints by blending 5 feet into the previously stabilized subgrade.

2. Longitudinal Joints
- Construct longitudinal joints when the cement stabilized subgrade is more than 2 hours old. Overlap blending a minimum of 6 inches into the previously constructed area.

E. Soft Areas

Repair unstable areas that appear after the cement stabilized subgrade has been compacted and areas identified by the Engineer. Rework unstable areas due to poor compaction of the cement stabilized subgrade, until compaction is obtained.

F. Traffic

The cement stabilized subgrade will be sufficiently stable to withstand marring or permanent deformation. Any marring or permanent deformation in the cement stabilized subgrade resulting from traffic operations will be repaired at the Contractors expense.

G. Maintenance

Repair any defects that occur. If needed, replace any processed material. Make full depth vertical cuts into the cement stabilized subgrade before replacing the material. Do not use skin patches for repairs.

METHOD OF MEASURMENT

A. Cement Stabilized Subgrade

The Engineer will field measure the Cement Stabilized Subgrade – 8IN.

B. Water

The water used for Cement Stabilized Subgrade – 8 IN will be included in the bid price for "Cement Stabilized Subgrade – 8IN".

BASIS OF PAYMENT

Payment will be made at the contract unit price for the following;

Pay Item	Pay Unit
Cement Stabilized Subgrade – 8IN	Square Yard
Portland Cement	TON

Such payment is full compensation for furnishing all materials, equipment, labor, and incidentals to complete the work specified.

234-P02 **CEMENT STABALIZED SUBGRADE**: The quantities shown on the plans are approximate and will be marked in the field by the Engineer. The "Cement Stabilized Subgrade-8IN" and "Portland Cement" quantities may be increased or decreased at the Engineer's discretion without an adjustment to bid prices.

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302-P01 **AGGREGATE BASE COURSE CLASS 13:** The Class 13 aggregate is provided if needed for fill material in approach radius and pavement ends at the discretion of the Engineer.

306-P02 **REMOVE & RELAY BLENDED BASE COURSE:** Contractor will remove and salvage 2" blended base course from Sta. 12+00 to 24+00 prior to completion of cement stabilized subgrade operations. Following completion of cement stabilization and prior to paving, the Contractor will relay the salvaged 2" blended base course material. All costs associated with the removing, salvaging, and relaying 2" blended base course material will be included in the price bid for "REMOVE AND RELAY BLENDED BASE COURSE".

430-P01 **MIX DESIGN:** The mix design will be Contractor developed with the aggregate and asphalt to be used on the project. The Mix Design will be done in the manner specified in NDDOT Standard Specification Section 430, prior to the start of the paving operation. The Contractor will submit a HBP mix design to the Engineer 10 days prior to the start of the construction. This cost will be included in the price bid for "SUPERPAVE FAA 42".

430-P02 **HOT BITUMINOUS PAVEMENT:** SUPERPAVE FAA 42 will have the aggregate and mix design properties as shown in Table 430-03, with these exceptions – the number of gyrations used in the mix design will be 50, as well as Ninital=6 and Nmax=75.

430-P03 **PG ASPHALT ACCEPTANCE**: PG Asphalt Cement will be accepted by certification. The asphalt binder supplier will certify that the product furnished to the project complies with SHRP binder specification for a PG binder. In order to supply asphalt material to this project by certification, the supplier will submit a letter to the Project Engineer stating that the supplier has an established quality control plan. This control plan must be in accordance with the January 2009 publication "Combined States Binder Group." Result of the required asphalt tests will be sent to Wold Engineering, P.C., PO Box 237, Bottineau ND 58318.

430-P04 **APPROACH PAVING:** The lifts on the approaches will be paved prior to or concurrent with the placement of each lift of Superpave FAA 42 mainline paving. An adequate transition to match existing conditions will be required. All approaches will have a 4-inch minimum thickness. Approaches will be paver laid with two equal lifts of Superpave FAA 42.

430-P05 **TOP LIFT:** The top lift of Hot Bituminous Pavement will be placed a minimum of 24 hours after the bottom lift is placed.

430-P06 **SUPERPAVE FAA 42:** The Contractor may substitute Superpave FAA 43 or greater if approved by the Engineer. No additional compensation will be allowed.

430-P07 **PAVING TRANSITIONS:** Where new pavement ties into the existing pavement at intersections, the Contractor will excavate along the edge of the existing pavement and taper the existing base at a rate of 50 ft/inch to allow placement of the full thickness of the bottom lift of pavement. The top lift will be tapered out as directed by the Engineer to tie in the existing intersecting roadway shoulder. All work associated with the paving transitions at approaches or intersections, including excavating and removal of aggregate will be included in the price bid for "SUPERPAVE FAA 42".

550-P01 **PORTLAND CEMENT:** Portland Cement quantity for Cement Stabilized Subgrade calculated at 33.42 Lbs./SY.

704-P01 **PORTABLE RUMBLE STRIPS:** Use PRS made of rubber or engineered polymers.

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up:

- "Be Prepared to Stop" (W3-4); and
- "Flagger" symbol (W20-7)

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement;
- Have a manufacturer's speed rating that meets or exceeds the posted speed limit; and
- Each strip in the array must weigh a minimum of 100 pounds.

Use individual PRS constructed in one of the following manners:

- A single piece;
- Interlocking segments; or
- Two pieces hinged at the midpoint.

An installed array of PRS consists of a minimum of 3 individual strips.

Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "Portable Rumble Strips".

704-P02 **TRAFFIC CONTROL FOR UNEVEN PAVEMENT:** The contractor has the option of making the paving lanes even at the end of each day's paving operation or signing for the uneven pavement and providing the following devices: Install "Uneven Lanes" signs (Sign No. W8-11-48) and a supplemental plate (Sign No. W20-52-54), identifying the distance, on the right shoulder (both directions) in advance of the beginning of the uneven pavement and at major intersections. A major intersection will be defined as a CMC, State, U.S. highway, or Interstate ramp. Install "Do Not Pass" signs (Sign No. R4-1-48) on the right shoulder (both directions) between the uneven lanes sign and the beginning of the uneven pavement and at major intersections. Install tubular markers spaced at two times the posted speed limit on the centerline where uneven pavement exists.

These traffic control devices will be left in place until the lanes are even. These signs and tubular markers are included in the "Traffic Control Devices List" and will be measured and paid for at the contract unit price for each device. No extra compensation will be allowed for relocation due to work progression.

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704-P03 **TRAFFIC CONTROL FOR BITUMINOUS SURFACING:** Traffic control for the reshaping roadway and paving will consist of a temporary road closure, flagging, and a pilot car. Traffic Control Devices will comply with the following Standard Drawings:

1. D-704-15, Layout Type A for a temporary one lane closure with pilot car for paving and patching.
2. D-704-20, Layout Type G: For project terminal 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. Signs will be required at the junctions shown on the Traffic Control Layout.
3. D-704-22, Layouts Type K and Type L for construction trucks hauling material.
4. D-704-26, Layouts Type CC, EE and GG as needed.
5. D-704-7, 8, 9, 10, 11, 12, 13, and 14 are applicable.

Quantities have been developed based on 6-mile limitation for the paving operations. 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 will be the Contractor's responsibility.

706-P01 **BITUMINOUS LABORATORY:** Supply a copy machine, with reduction capabilities, and toner. The payment for these items will be included in the price bid for “Bituminous Laboratory”.

762-P01 **SHORT TERM PAVEMENT MARKINGS:** The short-term application will be applied immediately following completion of the paving operations on the entire mainline. No intermediate applications will be necessary while Sign No. W8-12-48, No Center Stripe, is in place. Final short-term pavement marking will not be field measured unless changes are made in the field. Payment will be made to plan quantity.

762-P02 **PERMANENT PAVEMENT MARKINGS:** Permanent pavement markings will be placed no sooner than 7 days and no later than 21 days after completion of the short-term pavement markings.

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE		APPROACHES		TOTAL
103	0100	CONTRACT BOND	L SUM	1				1
230	0106	RESHAPING ROADWAY	MILE	1.52				1.52
234	0205	CEMENT STABILIZED SUBGRADE-8IN	SY	4000				4000
302	0356	AGGREGATE SURFACE COURSE CL 13	TON			130		130
306	0350	REMOVE AND RELAY BLENDED BASE COURSE	SY	4134				4134
401	0050	TACK COAT	GAL	1249		53		1302
430	0042	SUPERPAVE FAA 42	TON	5550		215		5765
430	1000	CORED SAMPLE	EA	32				32
430	5815	PG 58S-34 ASPHALT CEMENT	TON	344		13		357
550	2040	PORTLAND CEMENT	TON	67				67
702	0100	MOBILIZATION	L SUM	1				1
704	0100	FLAGGING	MHR	180				180
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1024				1024
704	1048	PORTABLE RUMBLE STRIPS	EA	2				2
704	1052	TYPE III BARRICADE	EA	4				4
704	1067	TUBULAR MARKERS	EA	100				100
704	1185	PILOT CAR	HR	90				90
706	0550	BITUMINOUS LABORATORY	EA	1				1
706	0600	CONTRACTOR'S LABORATORY	EA	1				1
760	0010	RUMBLE STRIPS - INTERSECTION	SET	1				1
762	0103	PVMT MK PAINTED-MESSAGE	SF	52				52
762	0114	EPOXY PVMT MK 6IN LINE	LF	2756				2756
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	5512				5512
762	1106	PVMT MK PAINTED 6IN LINE	LF	16051				16051
762	1124	PVMT MK PAINTED 24IN LINE	LF	18				18

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BASIS OF ESTIMATE - MARKING

PAVEMENT MARKING PAINTED LINE (PERMANENT)

CENTERLINE - 6" YELLOW, 10 FT LINES, 30 FT SKIP (1,320 LF/MILE)

BARRIER LINES - 6" YELLOW, 4" BETWEEN LINES

EDGE LINES - 6" WHITE, 10,560 LF/MILE

BARRIER LINES:

STA. 72+30 TO 79+80 RT = 750 LF

EPOXY PVMT MK 6IN LINE: (BARRIER TOTAL)	=	750 LF
EPOXY PVMT MK 6IN LINE: (CENTERLINE TOTAL)	=	2,006 LF
PAVEMENT MK PAINTED 6IN LINE: (EDGE LINE)	=	16,051 LF
PERMANENT PAVEMENT MARKING TOTAL:	=	18,807 LF
SHORT TERM PAVEMENT MARKING: (2 APPLICATIONS)	=	5,512 LF
PVMT MK PAINTED-MESSAGE:		
STA. 69+30 RT - STOP AHEAD	=	52 SF
PVMT MK PAINTED 24IN LINE: (1 STOP BAR)	=	18 LF

BASIS OF ESTIMATE - ROADWAY

STA. 0+00 TO STA. 80+30 (1.52 MILES)				DESCRIPTION
QUANTITY PER MILE	WIDTH	UNIT	TOTAL	
822	28'	GAL	1,249	EMULSIFIED ASPHALT FOR TACK COAT AT 0.05 GAL/SY
1,793	26'	TON	2,725	SUPERPAVE FAA 42 HOT BITUMINOUS PAVEMENT AT 2.0 TON/CY - 2" BASE COURSE
1,858	26'	TON	2,825	SUPERPAVE FAA 42 HOT BITUMINOUS PAVEMENT AT 2.0 TON/CY - 2" SURFACE COURSE
111	26	TON	169	PG 58S-34 ASPHALT CEMENT FOR SUPERPAVE FAA 42 AT 6.2% - 2" BASE COURSE
115	26	TON	175	PG 58S-34 ASPHALT CEMENT FOR SUPERPAVE FAA 42 AT 6.2% - 2" SURFACE COURSE
STA. 12+00 TO STA. 24+00 (0.227 MILES)				DESCRIPTION
18,187	31'	SY	4,134	REMOVE & RELAY BLENDED BASE COURSE (2")
17,600	30'	SY	4,000	CEMENT STABILIZED SUBGRADE - 8IN
294.1	30'	TON	67	PORTLAND CEMENT (33.42 LBS/SY APPLICATION RATE)

BASIS OF ESTIMATE - APPROACHES

DESCRIPTION	UNIT	SEC. LN. & ST. APPR.	PR. DRV.	FIELD APPR	TOTAL
NUMBER	EA	1	4	7	12
TACK COAT	GAL	15	6	2	53
SUPERPAVE FAA 42	TON	30	20	15	215
PG 58S-34 ASPHALT CEMENT	TON	2	1	1	13
CL 13 AGGREGATE SURFACE COURSE	TON	20	10	10	130

FLAGGING & PILOT CAR - PAVING

DESCRIPTION	BASIS	QUANTITY
FLAGGING	30 MHR/MILE/LIFT	120
PILOT CAR	15 MHR/MILE/LIFT	60

FLAGGING & PILOT CAR - CEMENT STABILIZING SUBGRADE

DESCRIPTION	BASIS	QUANTITY
FLAGGING	30 MHR/MILE	60
PILOT CAR	15 MHR/MILE	30

HMA CORED SAMPLES

	A	B		C			
SPECIFICATION SECTION	DISTANCE (ft)÷1000	LANES	JOINTS	LIFTS	QUANTITY (A X B X C)	QUANTITY (1 PER MILE)	UNITS
430.04 I.2.b(1). "GENERAL"	8	2	N/A	2	32	N/A	EA
SSP 4 LONGITUDINAL JOINT DENSITY IN HMA PAVEMENTS (CENTERLINE)	N/A	N/A	N/A	N/A	N/A	N/A	EA
430.04 I.22B(2) "PAVEMENT THICKNESS DETERMINATION CORES"					N/A	0	EA
				SUBTOTAL	32	0	EA

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BASIS OF ESTIMATE

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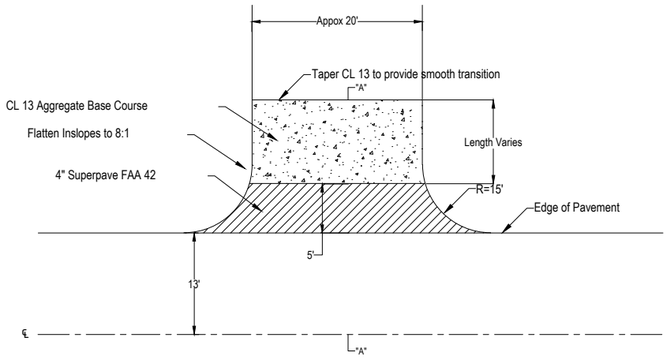
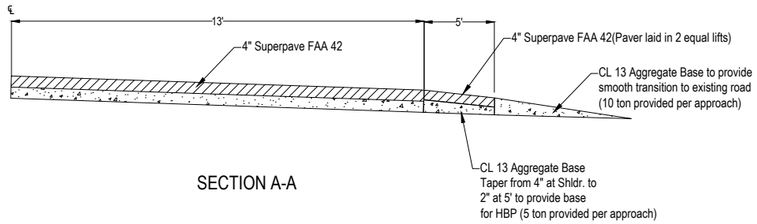
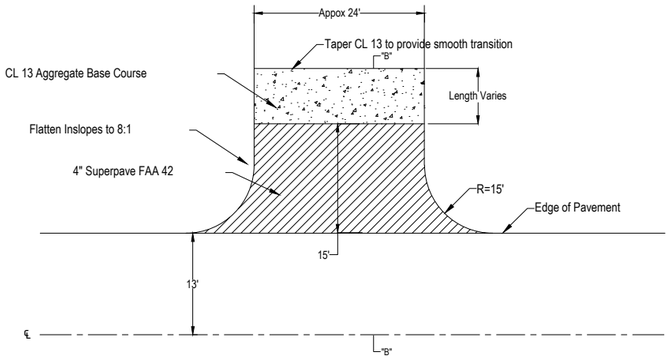


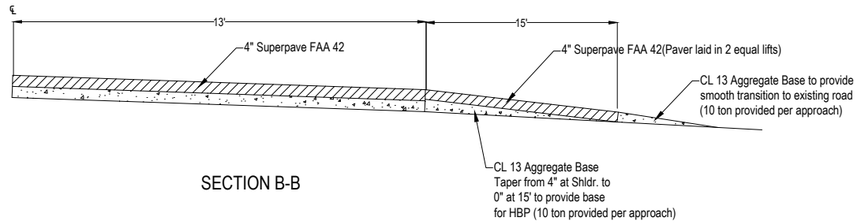
FIELD APPROACH



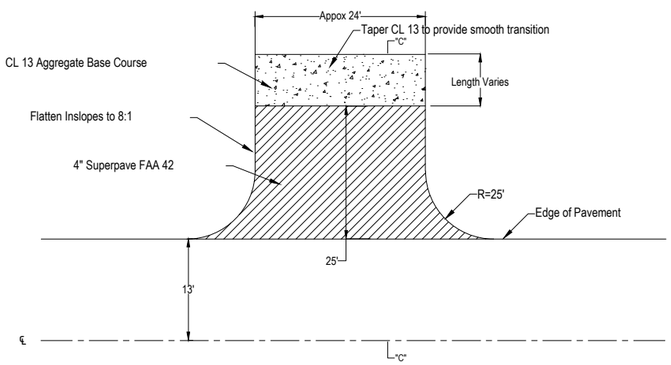
SECTION A-A



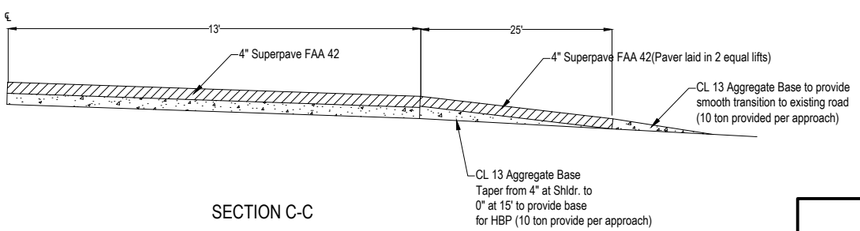
PRIVATE DRIVE



SECTION B-B



SECTION LINE APPROACH



SECTION C-C

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APPROACH TYPICAL SECTIONS

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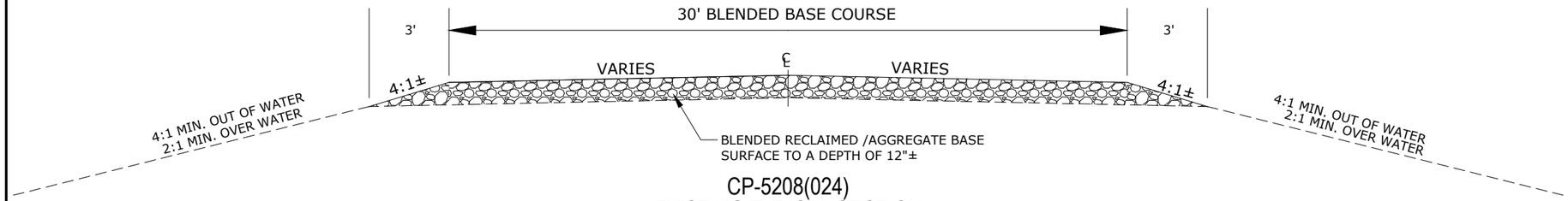
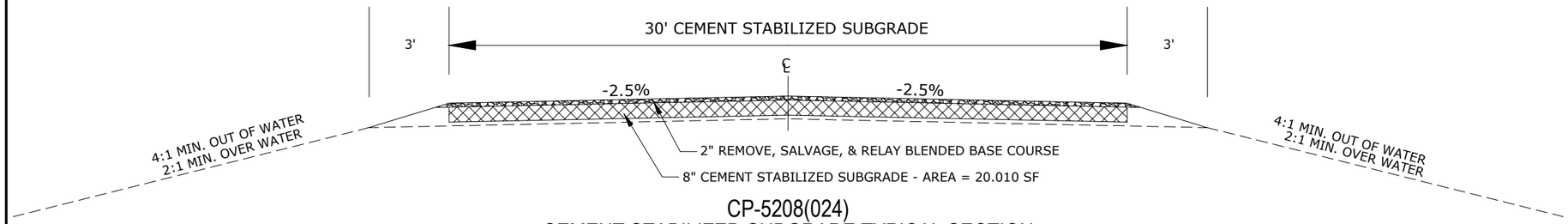
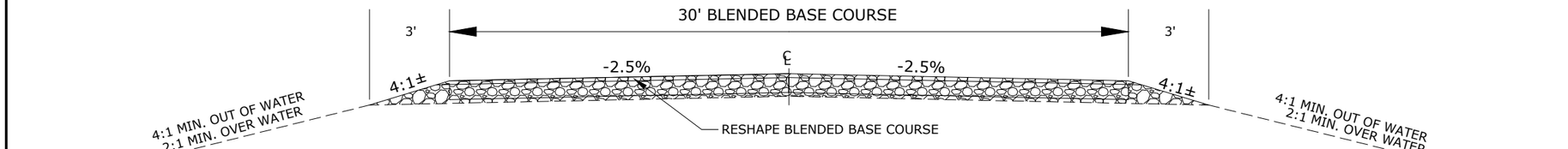


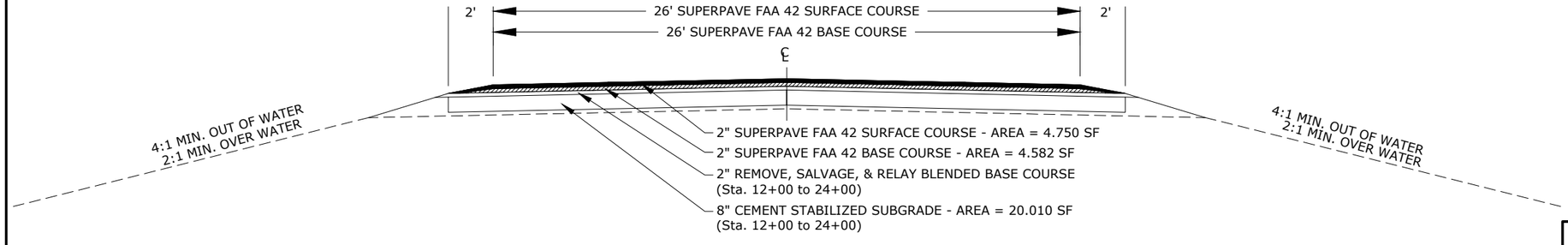
CP-5208(024)
EXISTING TYPICAL SECTION
STA. 0+00 TO 80+30



CP-5208(024)
CEMENT STABILIZED SUBGRADE TYPICAL SECTION
STA. 12+00 TO 24+00



CP-5208(024)
RESHAPING TYPICAL SECTION
STA. 0+00 TO 80+30



CP-5208(024)
PROPOSED TYPICAL SECTION
STA. 0+00 TO 80+30

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SINCE 1955

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CP-5208(024)
TYPICAL SECTIONS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CP-5208(024)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**28**	**56**
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**26**	**52**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**1**	**18**	**18**
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**2**	**36**	**72**
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)		30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**2**	**39**	**78**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**2**	**10**	**20**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	**48"x60"**	**DO NOT PASS**	**2**	**39**	**78**
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	**48"x48"**	**BUMP**	**2**	**35**	**70**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
W8-12-48	**48"x48"**	**NO CENTER LINE**	**2**	**35**	**70**
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**35**	**70**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**4**	**5**	**20**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1024**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**180**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**4**
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**100**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	**SHORT TERM 4IN LINE - TYPE NR**	**LF**	**5512**

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
http://www.dot.nd.gov/

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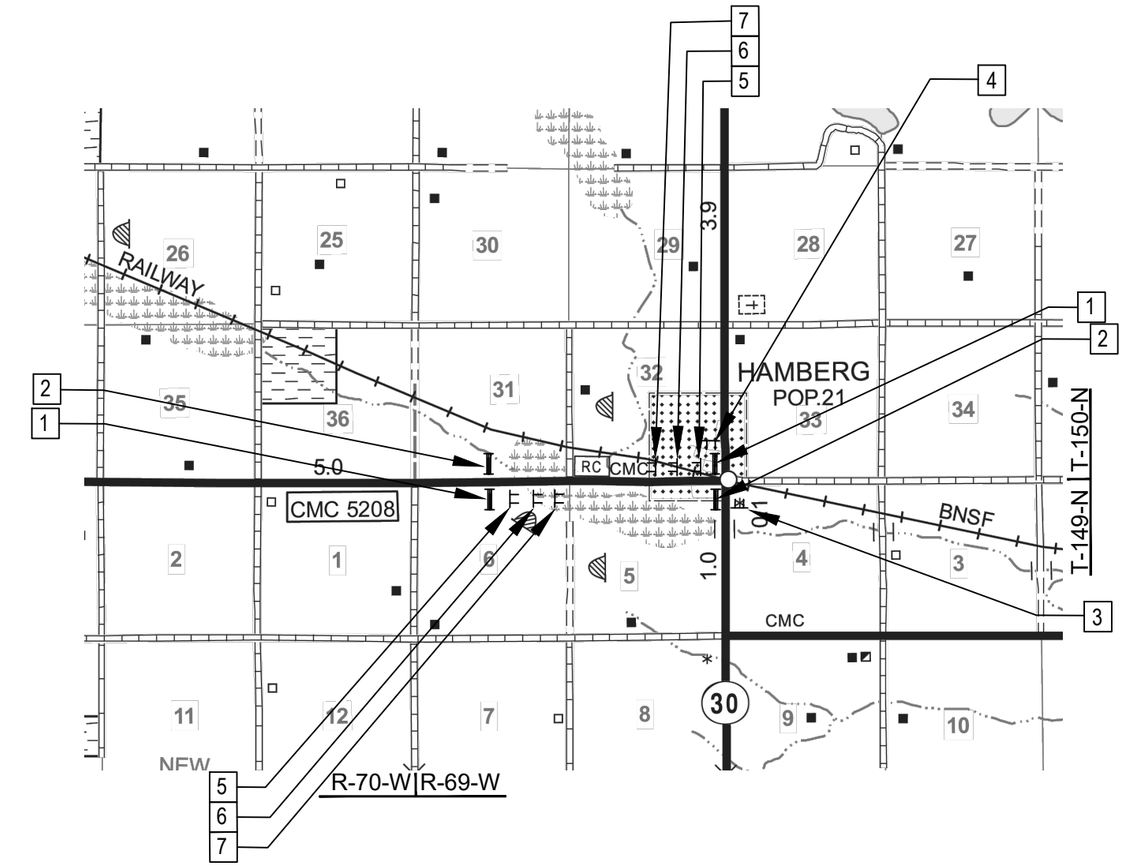
Traffic Control Devices List

STATE.	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CP-5208(024)	100	2



1

G20-1a-60
Barricade Mounted

Type III Barricade
Post Mounted

2

G20-2a-48
Barricade Mounted

Type III Barricade
Post Mounted

3

G20-52a-72
Post Mounted

4

G20-52a-72
Post Mounted

5

W8-12-48
Post Mounted

6

R4-1-48
Post Mounted

7

R2-1-48
(40 MPH)
&
R2-1a-24
Post Mounted

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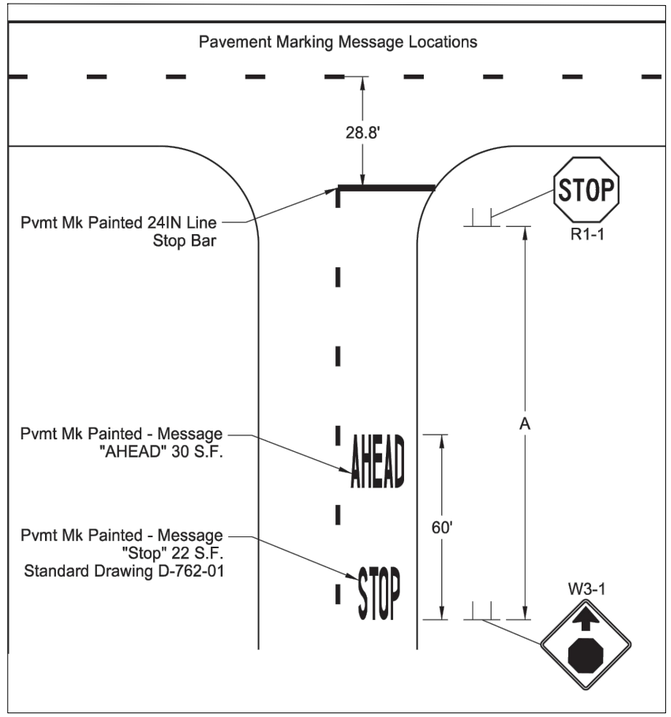
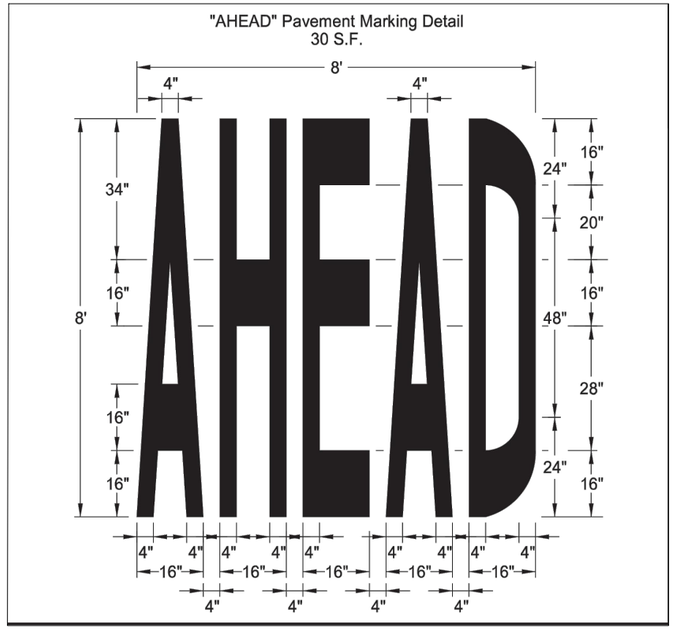
WORK ZONE TRAFFIC CONTROL

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	CP-5208(024)	120	1





SPEC	CODE	BID ITEM	QTY	UNIT
762	0103	PVMT MK PAINTED - MESSAGE		
		STOP - STA. 68+30 RT	22	SF
		AHEAD - STA. 68+90 RT	30	SF
762	0124	PVMT MK PAINTED 24IN LINE		
		NDSH 30 INTERSECTION	18	LF

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PAVEMENT MARKING
PAINTED MESSAGE

NDDOT ABBREVIATIONS

D-101-1

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

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

KIRK J. HOFF
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NORTH DAKOTA
08/16/22

NDDOT ABBREVIATIONS

D-101-2

Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Gov	government
Grd	graded/grade
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ht	height
Hel	helical
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
HTCG	high tension cable guardrail
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
HMA	hot mix asphalt
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IP	iron pipe
Jt	joint
Jct	junction

Ln	lane
Lg	large
Lat	latitude
Lt	left
Lens	lenses
Lvl	level
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Liq	liquid
LL	liquid limit
Loc	location
Long.	longitude
Lp	loop
LD	loop detector
Lum	luminaire
Mb	mailbox
ML	main line
MH	manhole
Mkd	marked
Mkr	marker
Mkg	marking
MA	mast arm
Matl	material
Max	maximum
MC	meander corner
Meas	measure
Mdn	median
MD	median drain
MC	medium curing
MGS	Midwest Guardrail System
MM	mile marker
MP	mile post
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Neop	neoprene
Ntwk	network
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number

Obsc	obscure(d)
Ocpd	occupied
Ocpy	occupy
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
Perm	permanent
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl or ℄	plate
Pt	point
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd or Pref	preformed
Prep	preperation
Press.	pressure
PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box

Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
RC	rapid curing
Rec	record
Rcy	recycle
RAP	recycled asphalt pavement
RPCC	recycled portland cement concrete
Ref	reference
R Mkr	reference marker
RM	reference monument
RP	reference point
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCFES	reinforced concrete flared end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
RCTES	reinforced concrete traversable end section
Reinf	reinforcement
Res	reservation
Res	residence
Ret	retaining
Rev	reverse
Rt	right
R/W	right of way
Riv	river
Rd	road
Rdbd	road bed
Rdwy	roadway
RWIS	roadway weather information system
Rk	rock
Rt	route

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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08-03-15	General Revisions
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08/16/22

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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08-03-15	General Revisions
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12-18-20	General Revisions
08-16-22	General Revisions

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NDDOT ABBREVIATIONS

MEASUREMENTS

ac	acres
A	ampere
Bd Ft	board feet
Cd	candela
cm	centimeter
C	coulomb
CF	cubic feet
m3	cubic meter
m3/s	cubic meters per second
CY	cubic yard
CY/mi	cubic yards per mile
D or Deg	degree
F	Fahrenheit
F	farad
ft	feet/foot
Gal	gallon
G	giga
Ha	hectare
H	henry
Hz	hertz
hr	hour(s)
in	inch
J	joule
K	kelvin
kN	kilo newton
kPa	kilo pascal
kg	kilogram
kg/m3	kilogram per cubic meter
km	kilometer
K	Kip(s)
LF	linear foot
L	litre
Lm	lumen
L sum	lump sum
Lx	lux
M Hr	man hour
M	mega
m	meter
m/s	meters per second
mi	mile
mL	milliliter
mm	millimeter
mm/hr	millimeters per hour
n	nano
N	newton
Pa	pascal
lb	pounds
sec	seconds
S	siemens
SF	square feet
km2	square kilometer
m2	square meter
SY	square yard
Sta Yd	station yards
SI	Systems International
T	tesla
T/mi	tons per mile
V	volt
W	watt
Wb	weber

SURVEY DESCRIPTIONS

Az	azimuth
Bs	backsight
Brg	bearing
BP Cap	blue plastic cap
BS	both sides
BC	brass cap
CS	curve to spiral
Eq	equation
E	external of curve
FS	far side
FB	field book
Fs	foresight
Geod	geodetic
GIS	Geographical Information System
GPS	Global Positioning System
HI	height of instrument
IM	iron monument
I Pn	iron pin
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
L	length of curve
LC	long chord
LB	level book
Mer	meridian
M	mid ordinate of curve
NGS	National Geodetic Survey
NS	near side
Obsn	observation
Off Loc	office location
OP Cap	orange plastic cap
PK	Parker-Kalon nail
P Cap	plastic cap
PP Cap	pink plastic cap
PCC	point of compound curve
PC	point of curve
PI	point of intersection
PRC	point of reverse curvature
PT	point of tangent
POC	point on curve
POT	point on tangent
RTP	random traverse point
Rge	range
RP Cap	red plastic cap
SC	spiral to curve
ST	spiral to tangent
Sta	station
SE	superelevation
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Twp	township
TB	transit book
TP	traverse point
TP	turning point
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
VC	vertical curve
WGS	World Geodetic System
YP Cap	yellow plastic cap
Z	zenith

SOIL TYPES

Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Co S	coal slack
C Gr	coarse gravel
CS	coarse sand
FS	fine sand
Gr	gravel
Lig Co	lignite coal
Lig Sl	lignite slack
Lm	loam
Rk	rock
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
Sc	scoria
Sh	shale
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam

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07-01-14

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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LINE STYLES

D-101-20

Existing Topography

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

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

Traffic Utilities

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

Sign Structures

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Existing Conditions Object
- Centerline Main
- Centerline Secondary
- Excavation Limits
- Proposed Ground
- Sheet Piling

Erosion Control

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

Environmental

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

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SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

Existing Section Corner (Full, Quarter, Sixteenth, Meander)

Existing Witness Corner

Existing Control Point (CP, GPS-RTK, TRI)

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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SYMBOLS

D-101-31

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

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

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SYMBOLS

D-101-32

- Existing Luminaire
- Luminaire LED
- Existing Light Standard Luminaire
- Relocate Light Standard
- Light Standard Light LED Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Emergency Vehicle Detector
- Video Detection Camera

- High Mast Light Standard 3 Luminaire (Exst, Ppsd)
- High Mast Light Standard 4 Luminaire (Exst, Ppsd)
- High Mast Light Standard 5 Luminaire (Exst, Ppsd)
- High Mast Light Standard 6 Luminaire (Exst, Ppsd)
- High Mast Light Standard 7 Luminaire (Exst, Ppsd)
- High Mast Light Standard 8 Luminaire (Exst, Ppsd)
- High Mast Light Standard 9 Luminaire (Exst, Ppsd)
- High Mast Light Standard 10 Luminaire (Exst, Ppsd)
- Overhead Sign Structure Load Center (Exst, Ppsd)
- Traffic Signal Controller (Exst, Ppsd)
- Pad Mounted Traffic Signal Controller (Exst, Ppsd)
- Flashing Beacon (Exst, Ppsd)
- Concrete Foundation (Exst, Ppsd)
- Pipe Mounted Flasher (Exst, Ppsd)
- Pad Mounted Feed Point (Exst, Ppsd)
- Pipe Mounted Feed Point with Pad (Exst, Ppsd)
- Pole Mounted Feed Point (Exst, Ppsd)
- Junction Box (Exst, Ppsd)
- Existing Pedestrian Head with Number
- Existing Signal Head
- Pole Mounted Head
- Existing Lighting Standard Pole

- Existing Traffic Signal Standard
- Pull Box (Exst-Ppsd-Undefined)
- Intelligent Transportation Pull Box (Exst, Ppsd)
- Transformer (Exst, Ppsd)
- Power Pole (Exst-Ppsd-with Transformer)
- Wood Pole (Exst, Ppsd)
- Pedestrian Push Button Post (Exst, Ppsd)
- Existing Pole
- Existing Telephone Pole
- Existing Post
- Connection Conductor (Ground, Neutral, Phase 1, Phase 2)

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

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

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

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

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

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

Catch Basin (Riser 30 Inch, Beehive, Type A)

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

Inlet Special (Catch Basin, Type 1, Type A)

Inlet (Tee, Type 1, Type 2, Type 2 Double)

Median Drain

Headwall (Exst, Ppsd, Ppsd Single with Vegitation Barrier, Ppsd Double with Vegitation Barrier)

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

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

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

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

Pump
Sanitary, Storm Drain, Exst Water

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

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

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

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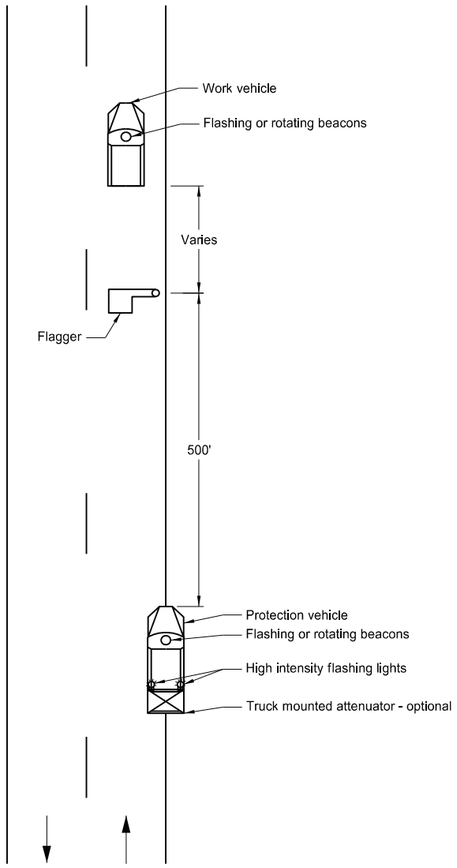
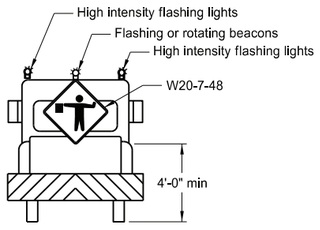
TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

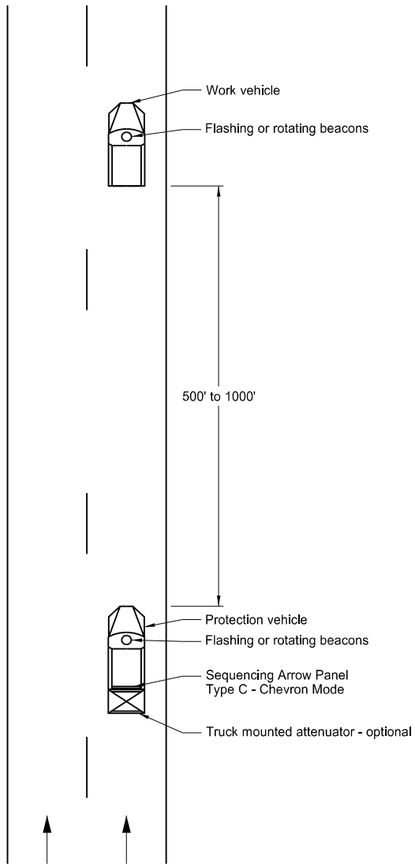
Two Lane, Two Way Roadways

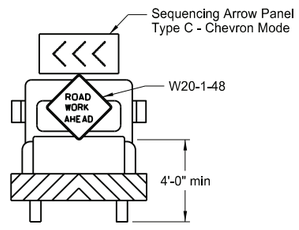




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.

2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.

3. Use these layouts during daylight hours and in areas of good visibility only.

4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

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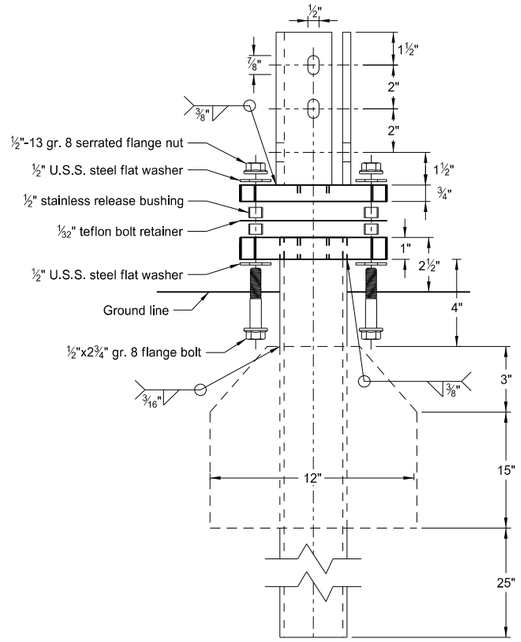
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

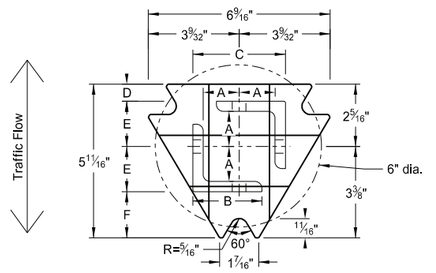
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

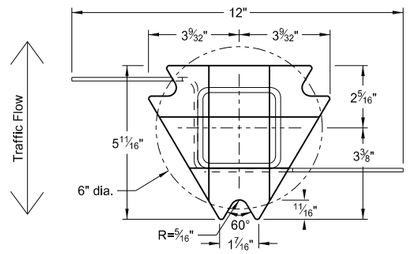


Multi-Directional
Slip Base Assembly

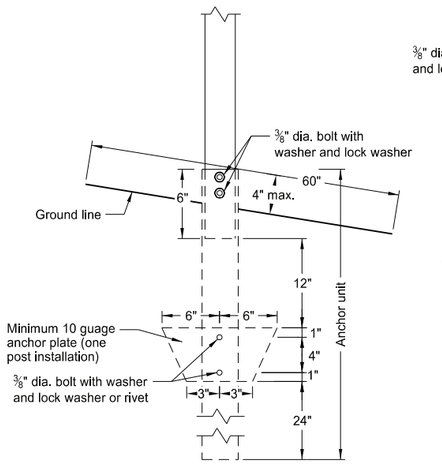
Perforated Tube



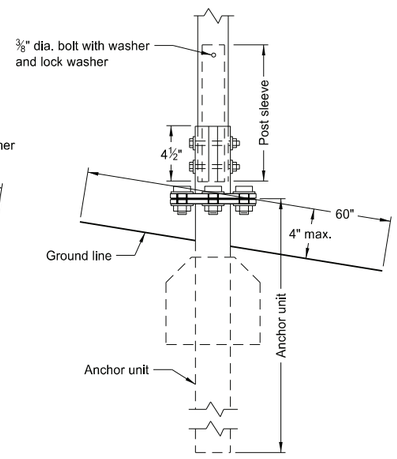
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



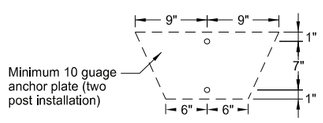
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

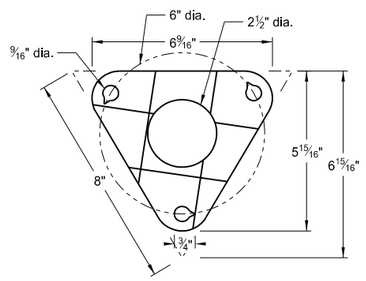


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

Notes:

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

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

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

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

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

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

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

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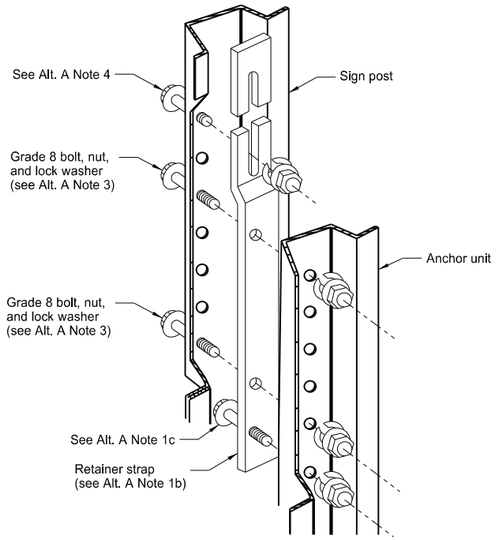
08/01/24

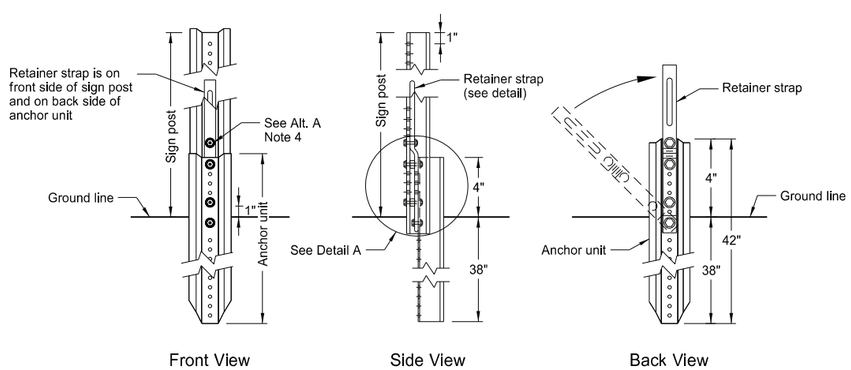
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



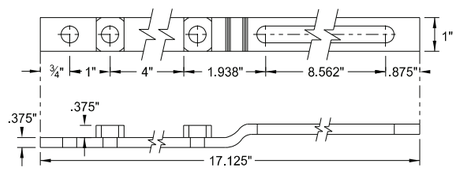
Detail A



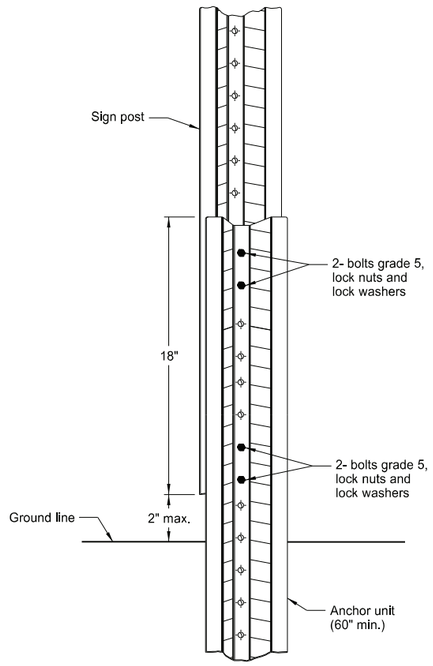
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

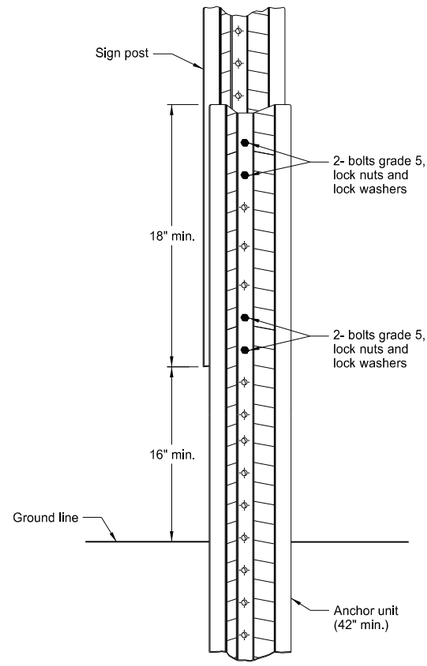


Retainer Strap Detail



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

Install a maximum of 3 posts within 7'.



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

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

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

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

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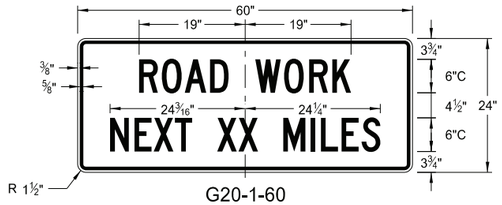
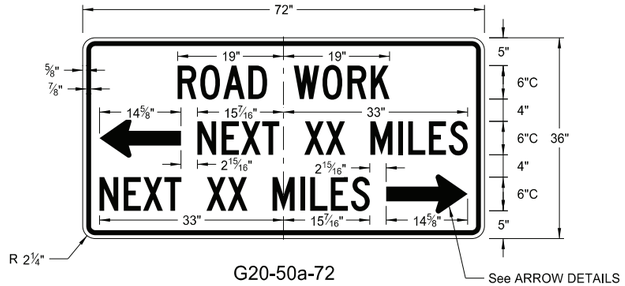
08/01/24

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

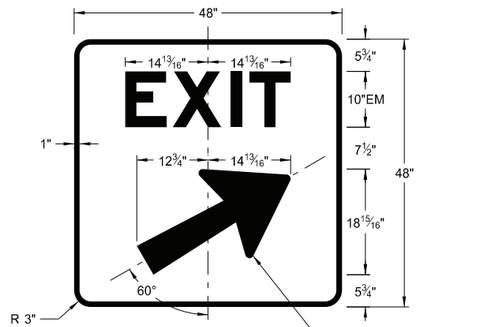
D-704-9



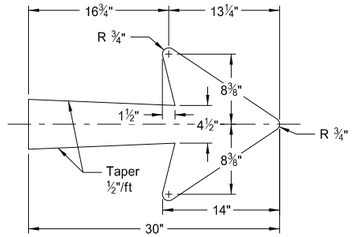
G20-1-60
Legend: black (non-refl)
Background: orange



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

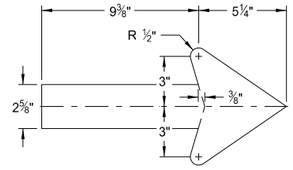


E5-1(L or R)-48
Legend: white
Background: green (orange optional)

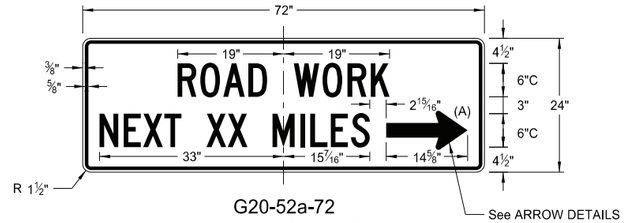


E5-1-48

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



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



G20-52a-72
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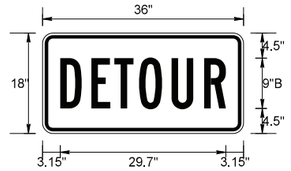
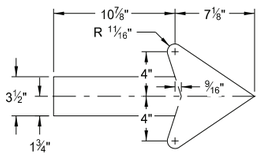
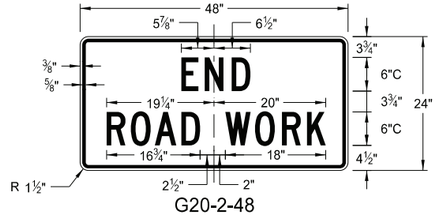
Background: orange



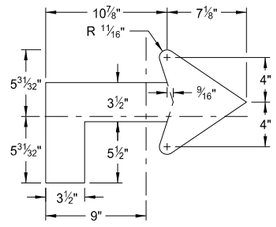
M4-8-36
Legend: black (non-refl)
Background: orange



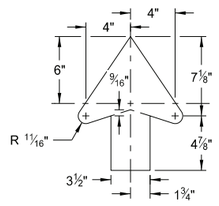
M4-9(L or R)-30
Right or Left



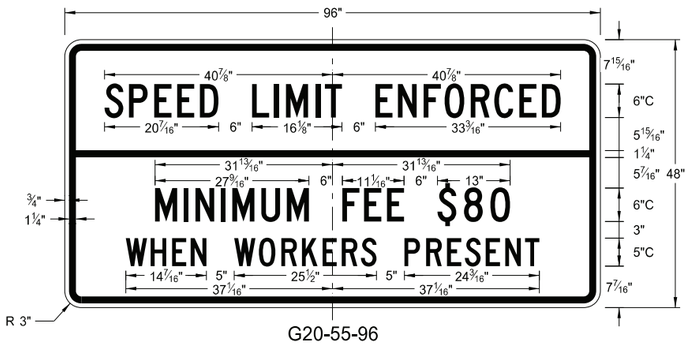
G20-2-48
Legend: black (non-refl)
Background: orange



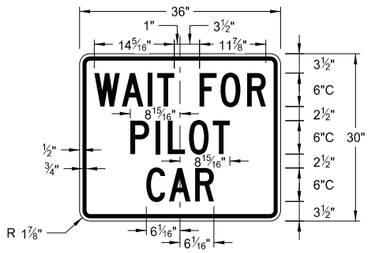
M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight



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



G20-4b-36
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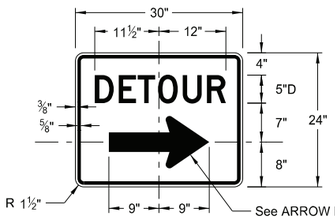
Background: orange



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

ARROW DETAILS

NOTES:

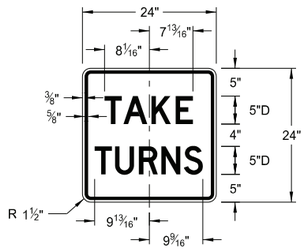
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

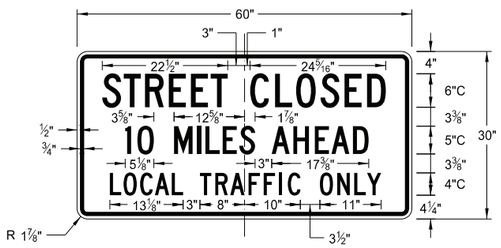
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

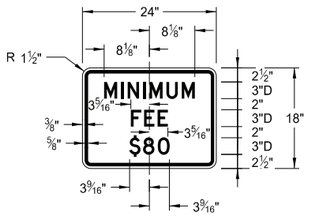
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



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



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



R2-1aP-24
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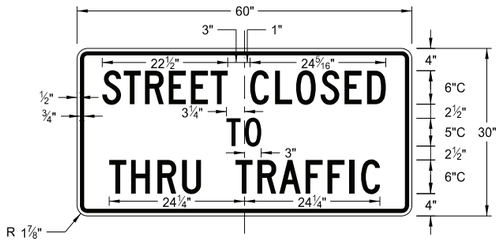
Background: white



R11-4a-60
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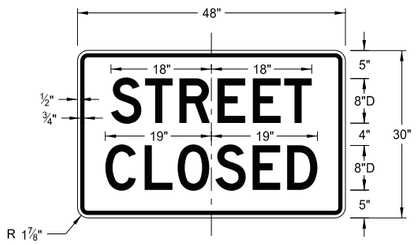

R11-2a-48
Legend: black (non-refl)
Background: white

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

KIRK J. HOFF
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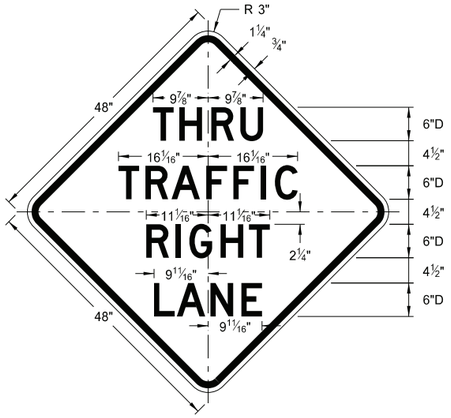
NORTH DAKOTA

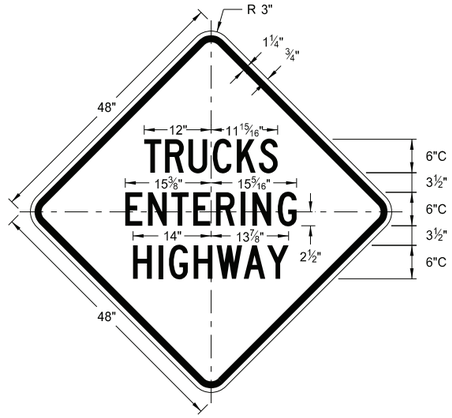
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

D-704-11



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



W8-53-48
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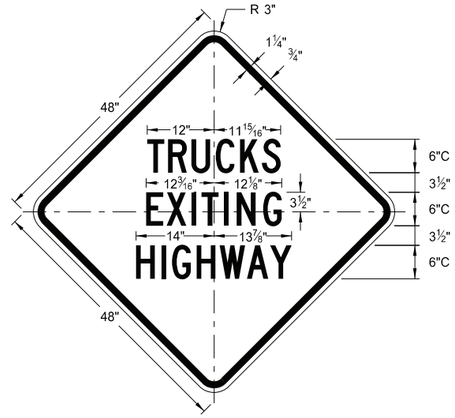
Background: orange



W8-56-48
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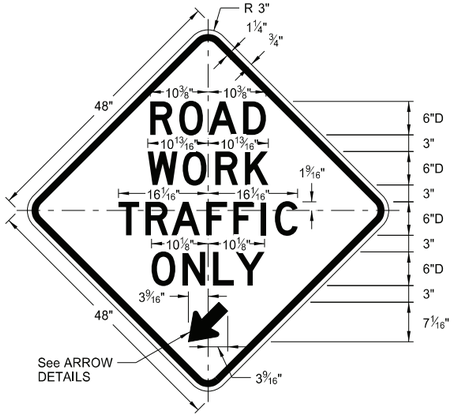
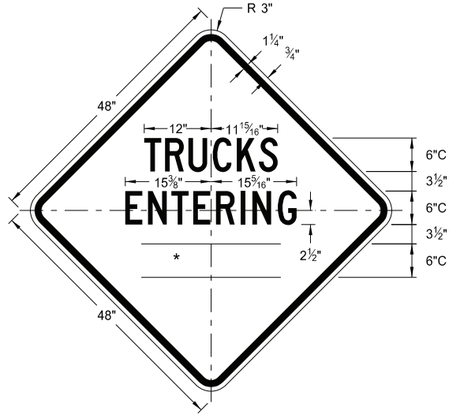
Background: orange



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



W8-54-48
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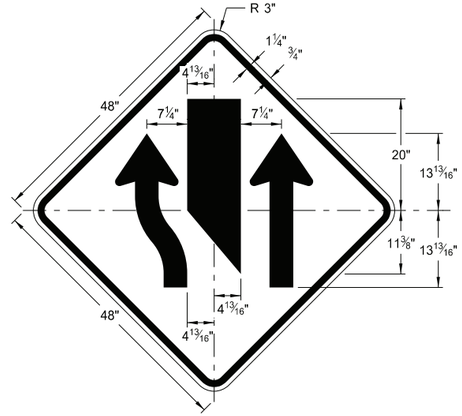
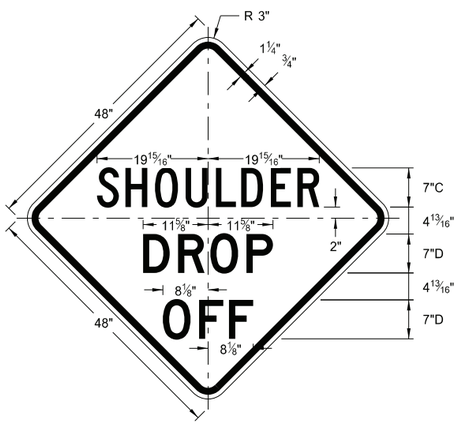
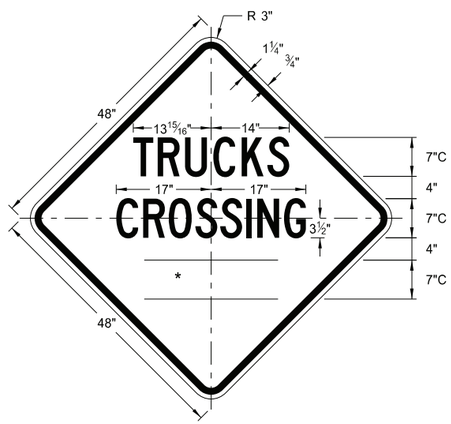
Background: orange



W9-3a-48
Legend; black (non-refl)
Background: orange



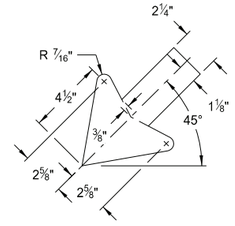
W8-9a-48
Legend: black (non-refl)
Background: orange



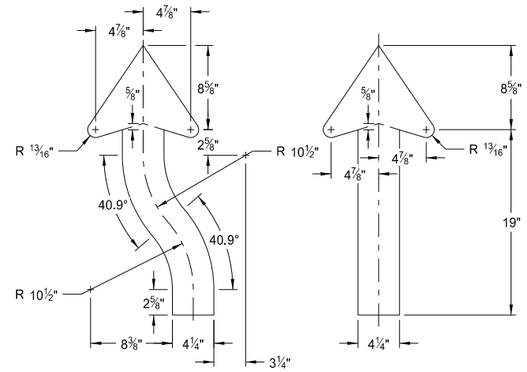
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature

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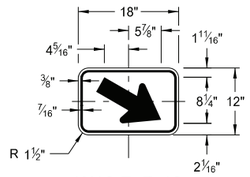
PE-4683
ENGINEER
NORTH DAKOTA

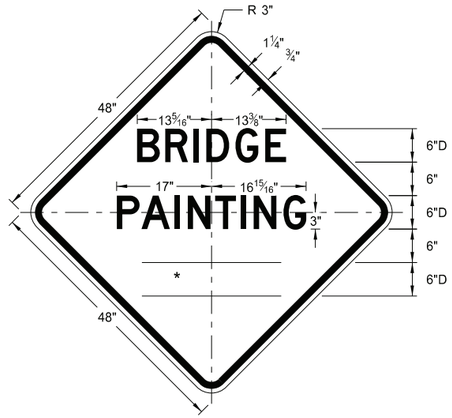
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

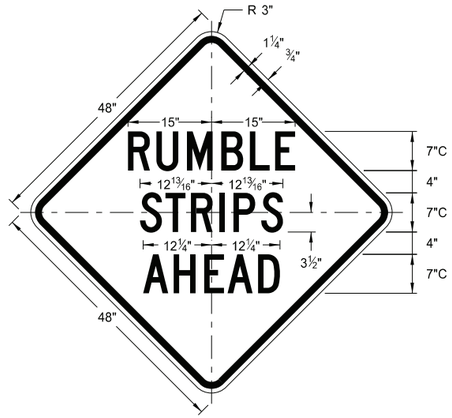
D-704-11A



W16-7aP-18
Legend: black (non-refl)
Background: orange



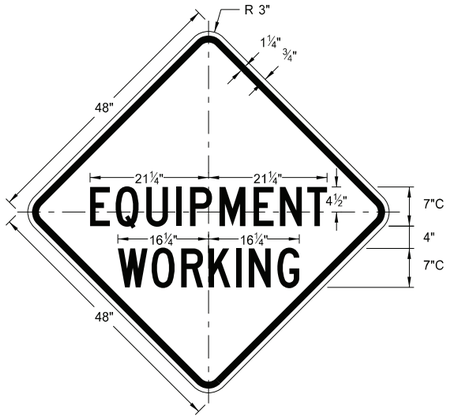
W21-50-48
Legend: black (non-refl)
Background: orange



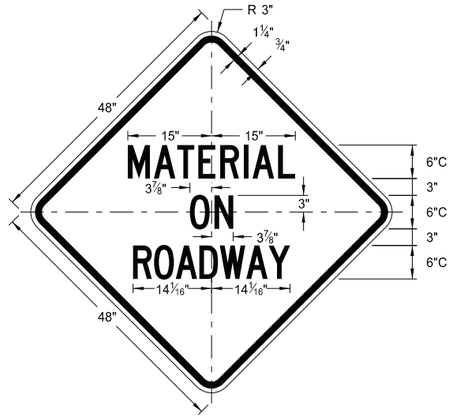
W21-53-48
Legend: black (non-refl)
Background: orange

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

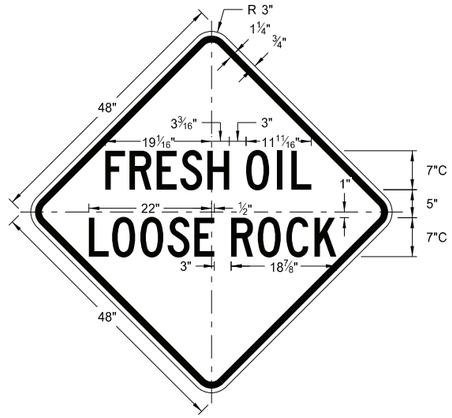
* DISTANCE MESSAGES



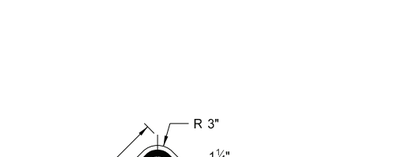
W20-51-48
Legend: black (non-refl)
Background: orange



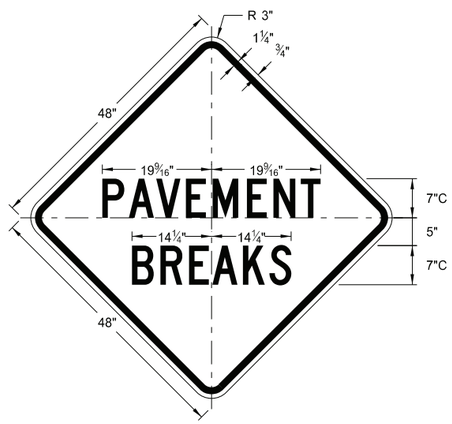
W21-51-48
Legend: black (non-refl)
Background: orange



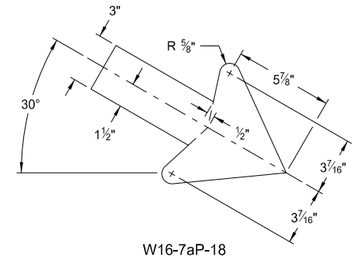
W22-8-48
Legend: black (non-refl)
Background: orange



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



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



W16-7aP-18

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.
8-01-24	Electronic Stamp/Signature.

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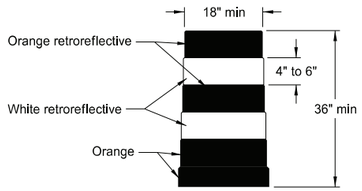
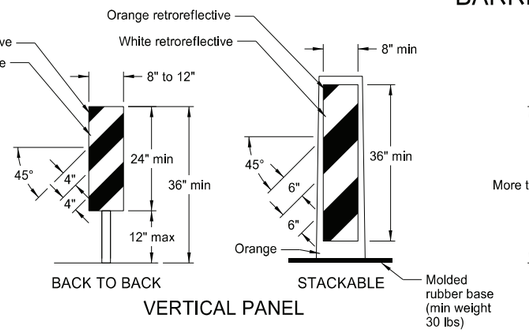
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



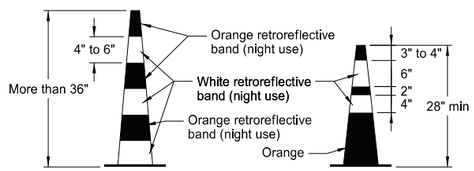
DELINEATOR DRUM

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



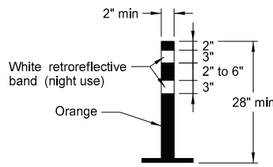
VERTICAL PANEL

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



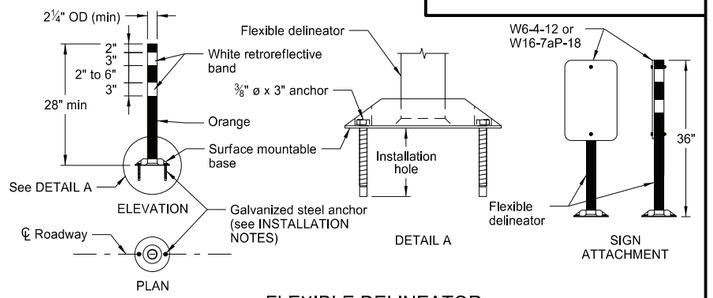
TRAFFIC CONE

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



TUBULAR MARKER

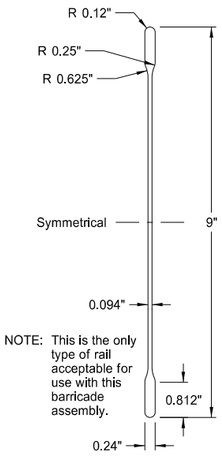
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



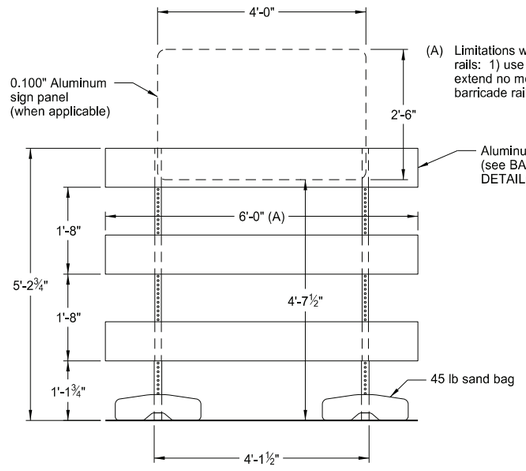
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

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

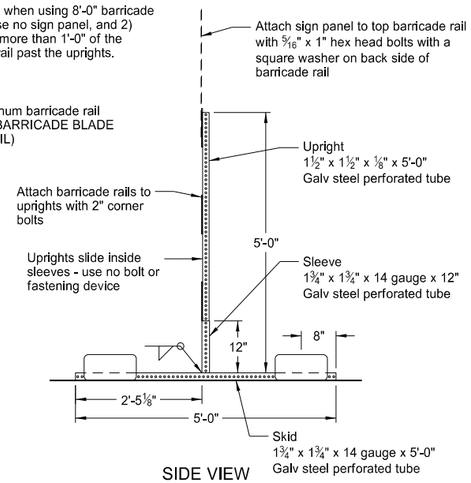


BARRICADE BLADE DETAIL



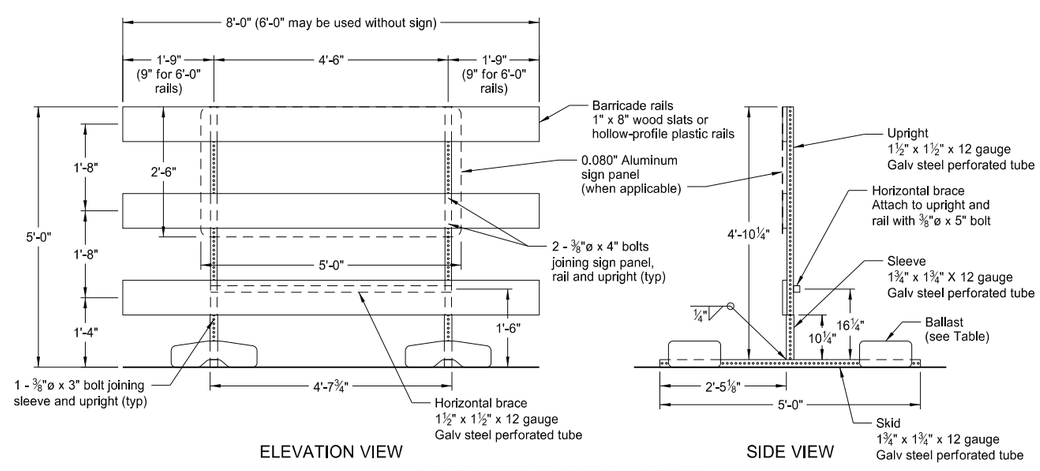
ELEVATION VIEW

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



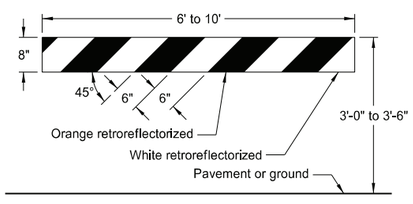
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

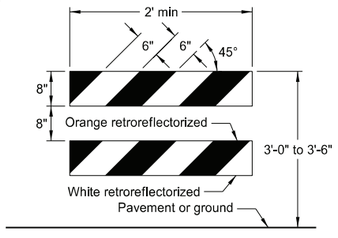


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

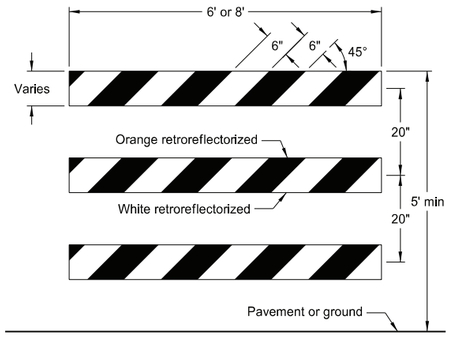
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

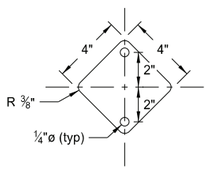


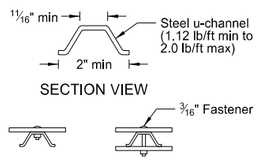
TYPE II BARRICADE

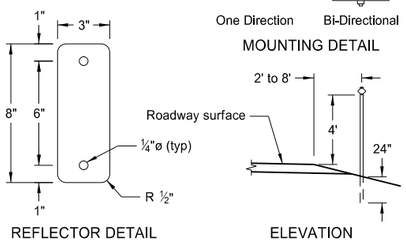


TYPE III BARRICADE

BARRICADE RAIL DETAILS







DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature

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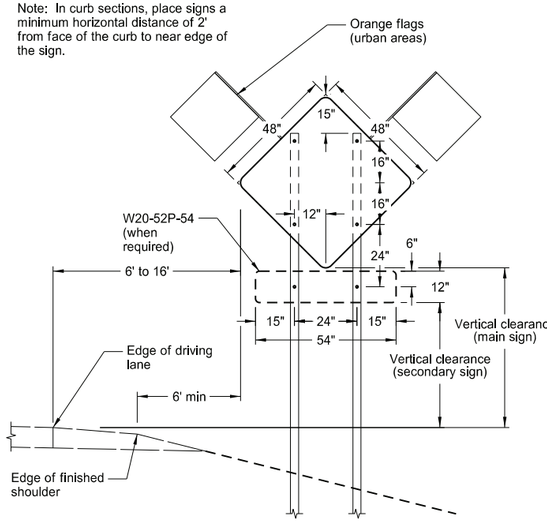
08/01/24

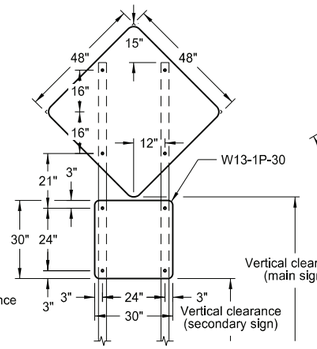
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

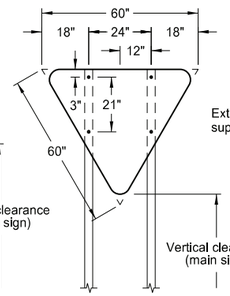
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



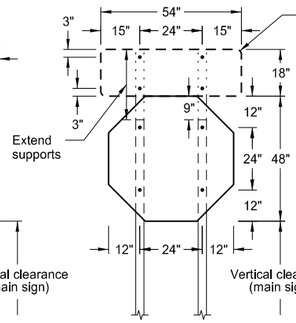
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



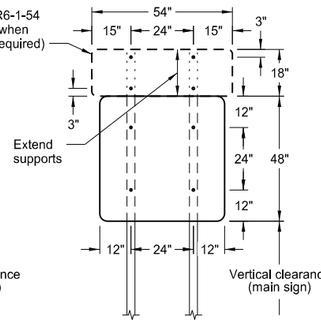
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



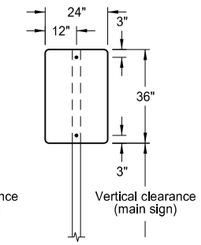
R1-2-60 - YIELD SIGN



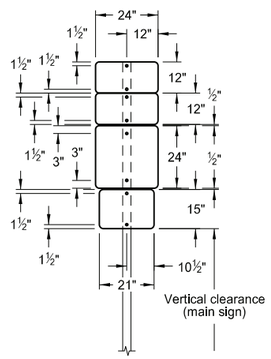
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



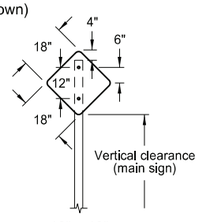
48" x 48" SIGN
(with R6-1-54 sign as required)



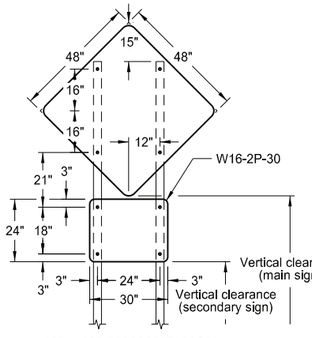
24" x 36" SIGN



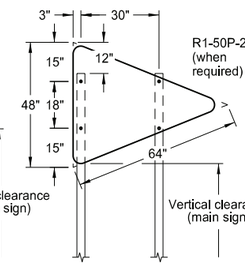
24" x 24"
ROUTE MARKER
ASSEMBLY



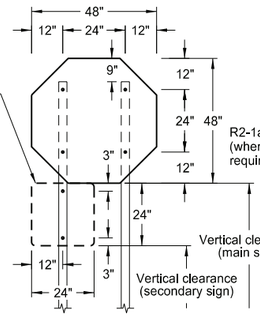
18" x 18"
DIAMOND SIGN



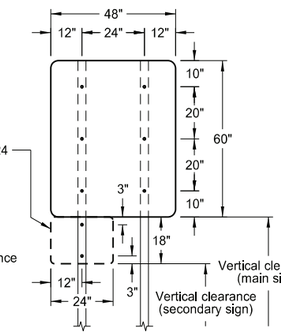
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



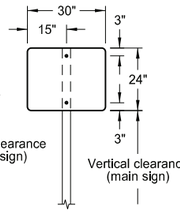
W14-3-64 - PENNANT SIGN



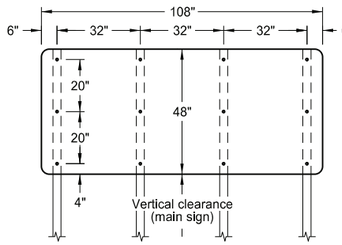
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



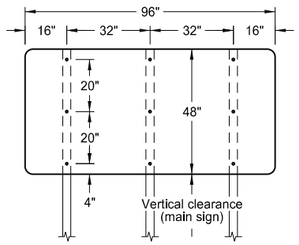
48" x 48" SIGN
(with R2-1aP-24 sign as required)



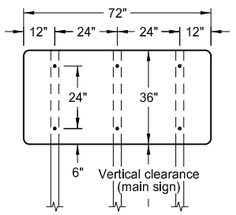
30" x 24" SIGN



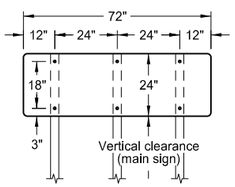
108" x 48" SIGN



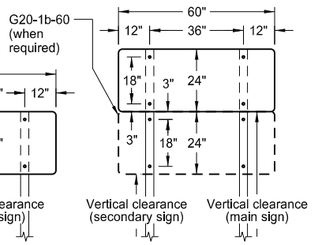
96" x 48" SIGN



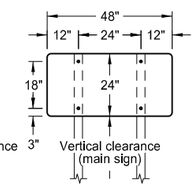
72" x 36" SIGN



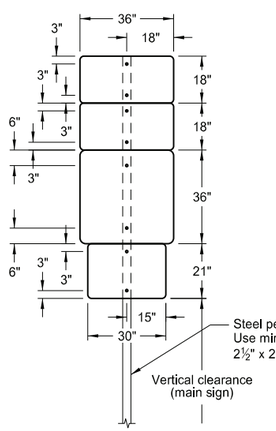
72" x 24" SIGN



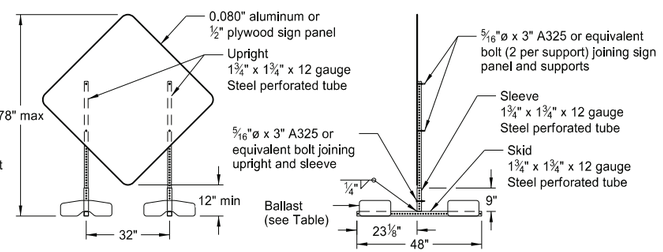
60" x 24" SIGN



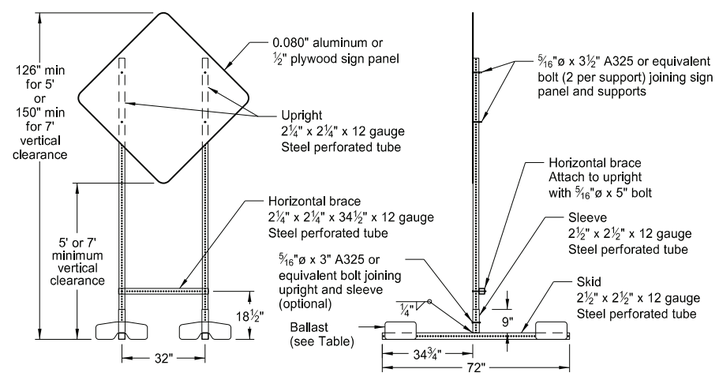
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

   Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.

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

3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-4-13

REVISIONS

DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail
8-01-24	Electronic Stamp/Signature

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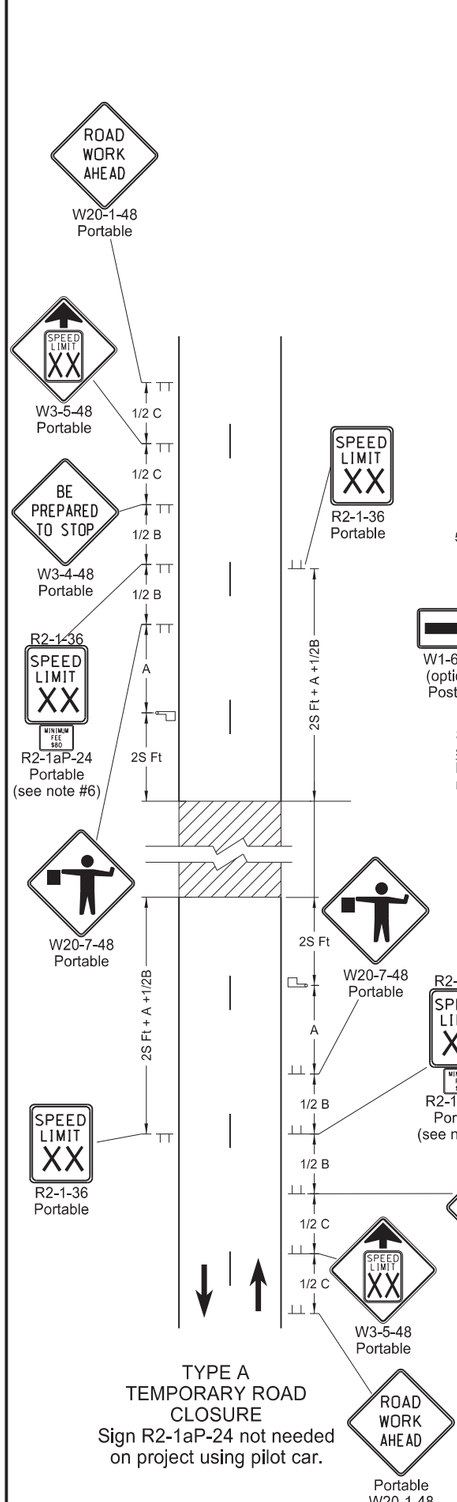
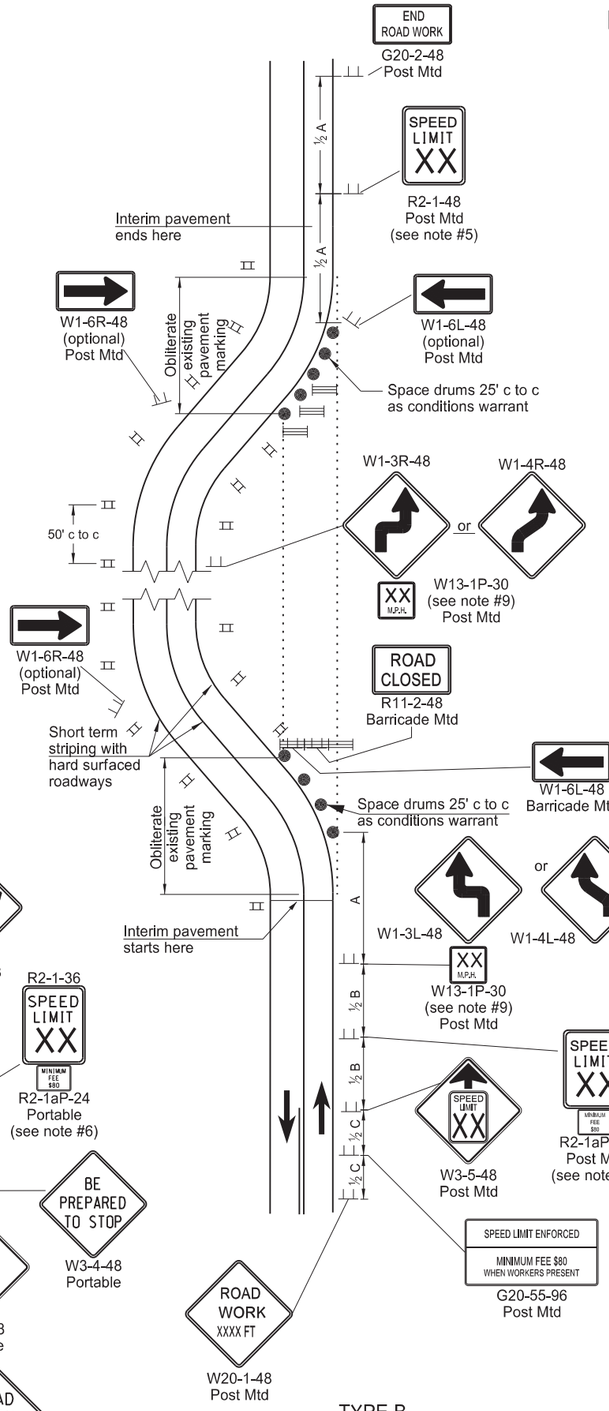
08/01/24

ROAD CLOSURE LAYOUTS

D-704-15

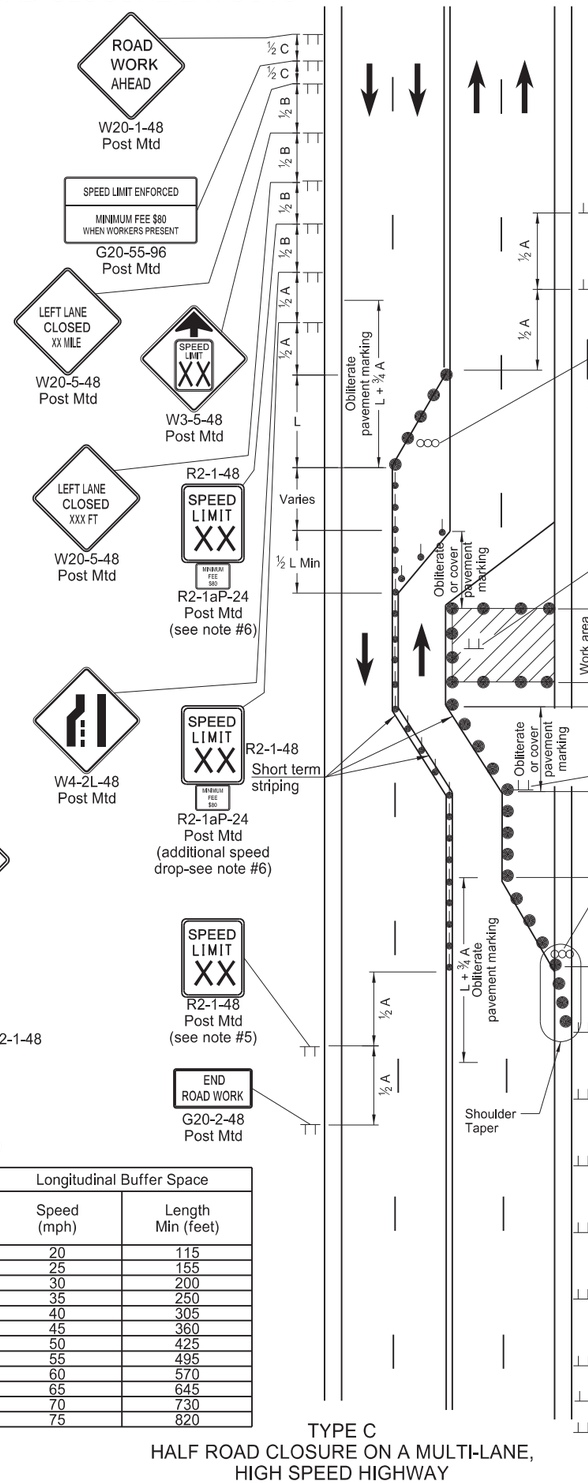


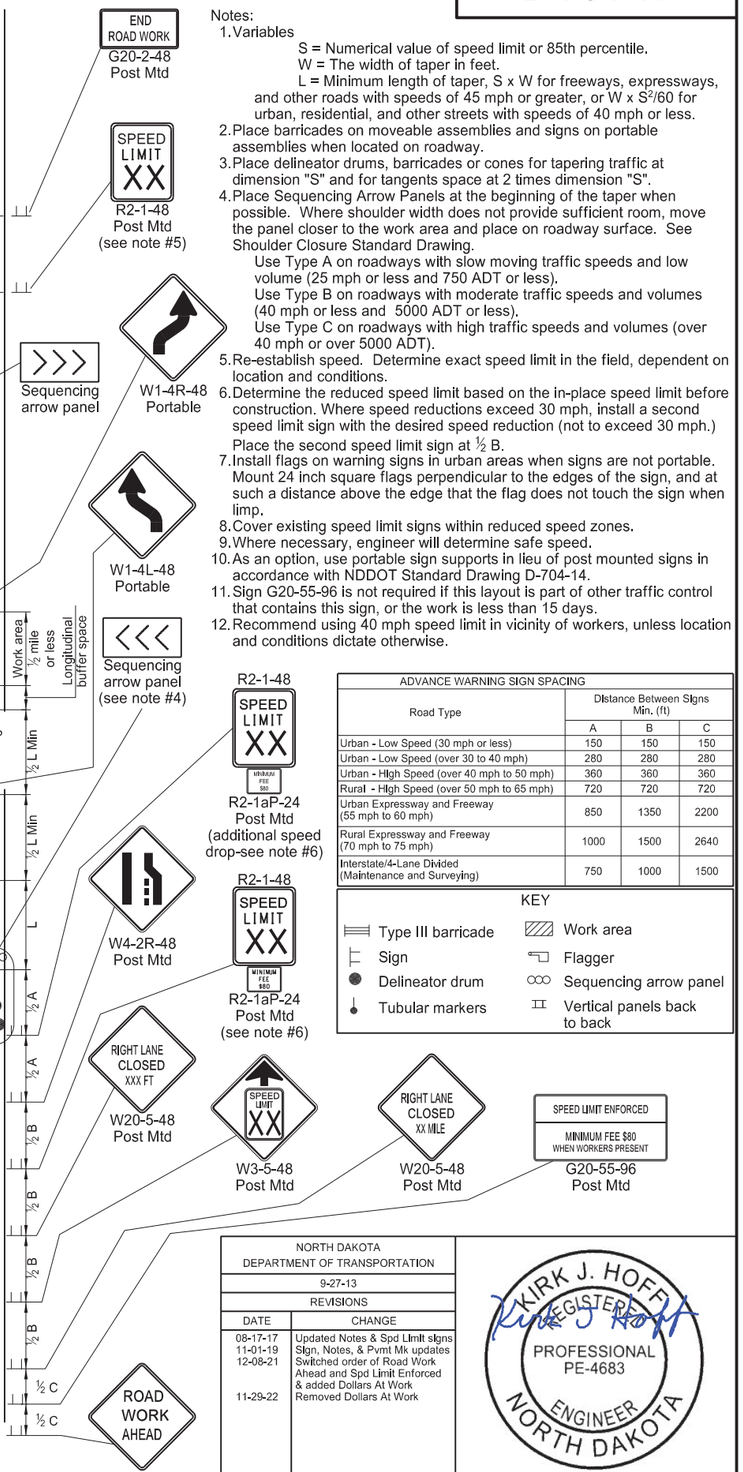
TYPE A
TEMPORARY ROAD CLOSURE
Sign R2-1aP-24 not needed on project using pilot car.



TYPE B
ROAD CLOSURE WITH A DIVERSION
Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with ½ mile or less closure.

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





TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY
4 lane undivided highway with half the roadway closed.

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 S^2/60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
11. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pvmt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work

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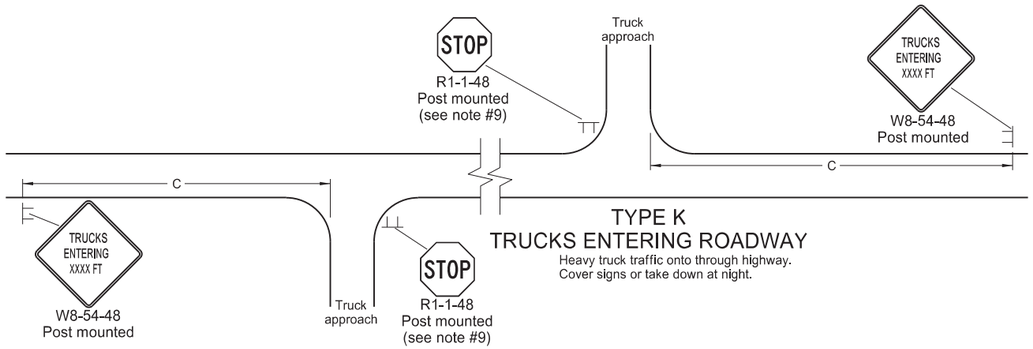
11/29/22

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

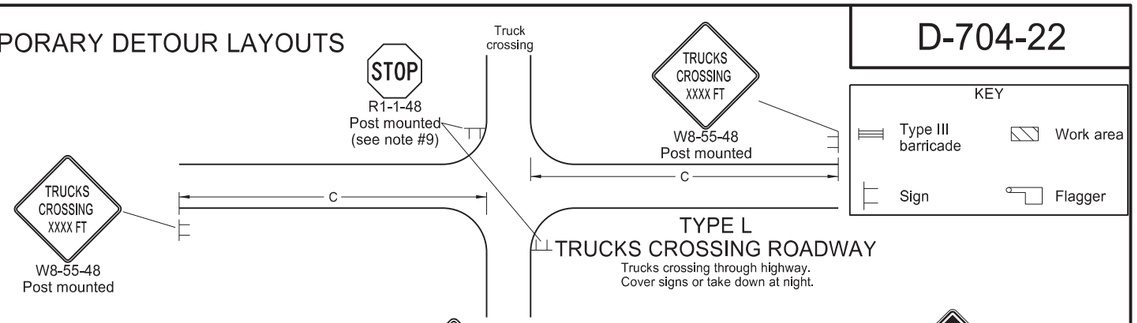
D-704-22

KEY
- Type III barricade
- Work area
- Sign
- Flagger



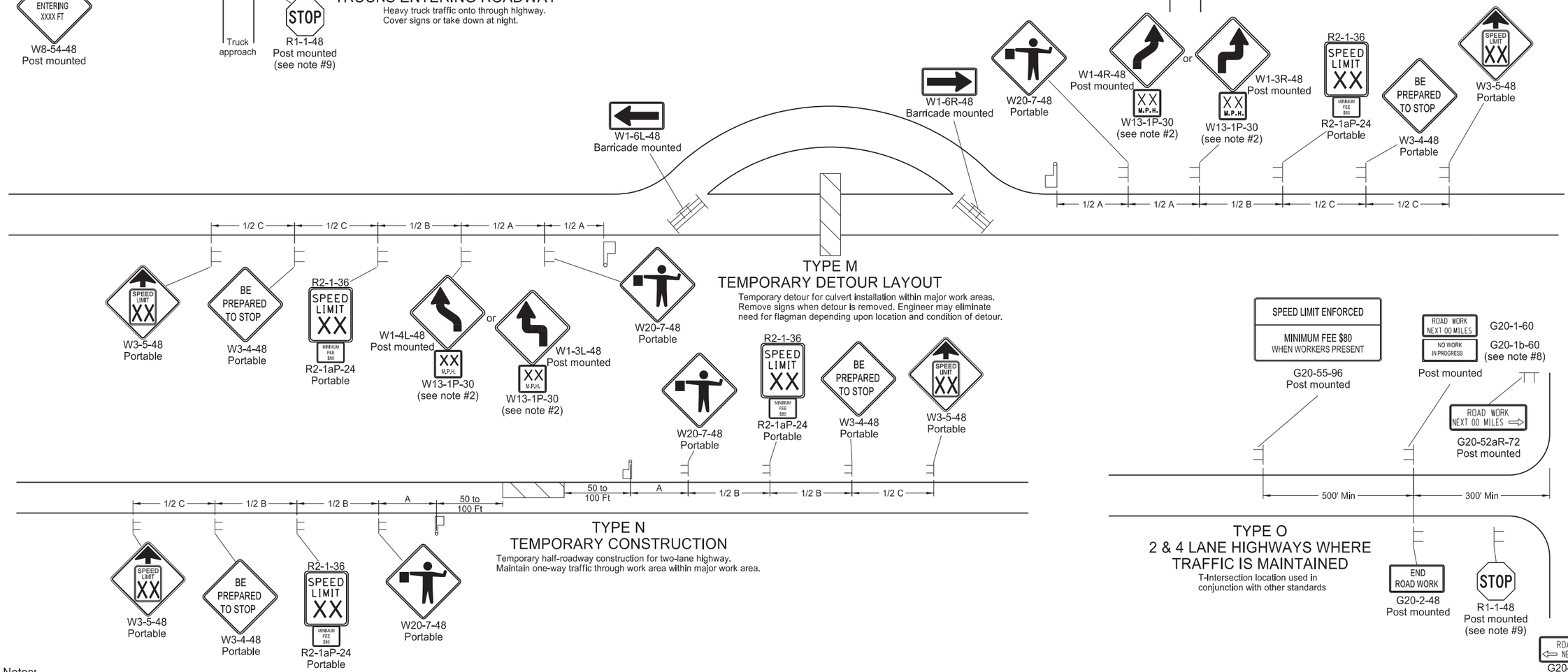
TYPE K
TRUCKS ENTERING ROADWAY

Heavy truck traffic onto through highway.
Cover signs or take down at night.



TYPE L
TRUCKS CROSSING ROADWAY

Trucks crossing through highway.
Cover signs or take down at night.



TYPE M
TEMPORARY DETOUR LAYOUT

Temporary detour for culvert installation within major work areas.
Remove signs when detour is removed. Engineer may eliminate need for flagman depending upon location and condition of detour.

TYPE N
TEMPORARY CONSTRUCTION

Temporary half-roadway construction for two-lane highway.
Maintain one-way traffic through work area within major work area.

TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes:
1. Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
2. Where necessary, safe speed to be determined by the Engineer.
3. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
4. 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.
5. Cover existing speed limit signs within a reduced speed zone.
6. Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
8. Install sign G20-1b-60 when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. Sign G20-55-96 is not required if layout is part of other traffic control that contains this sign, or if work is less than 15 days.
11. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work

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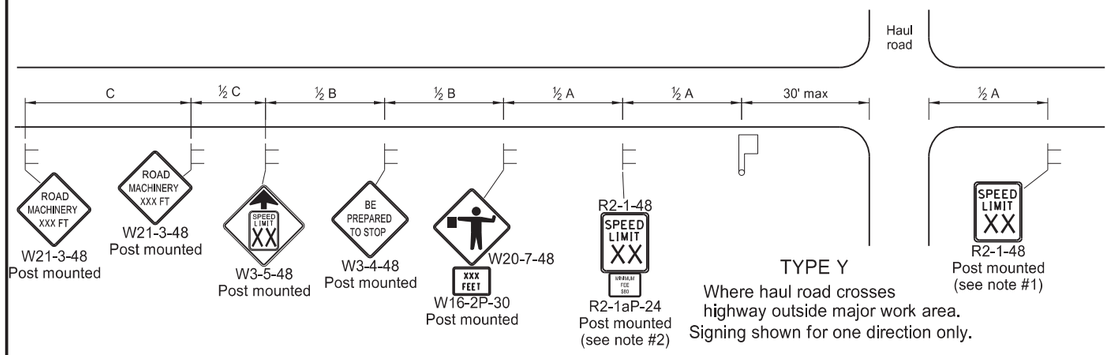
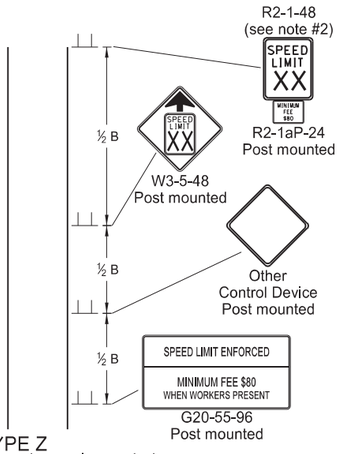
11/29/22

MISCELLANEOUS SIGN LAYOUTS

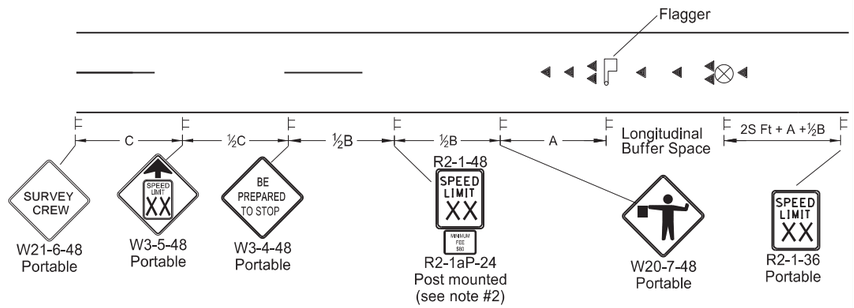
D-704-26



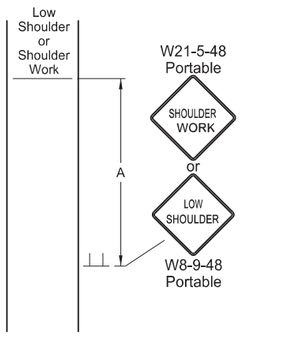
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



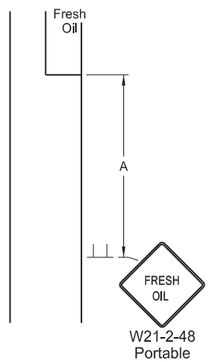
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



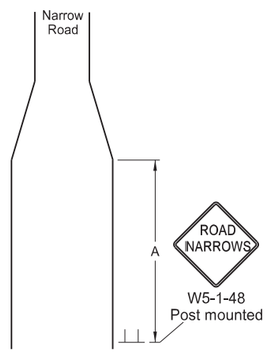
TYPE AA
Where survey crew is used
Signing shown for one direction only.



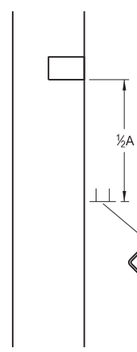
TYPE BB
Within major work area where sign conditions exist



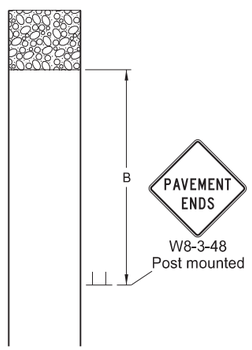
TYPE CC
Where sign conditions exist



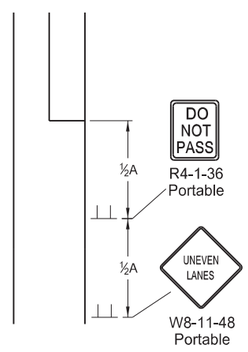
TYPE DD
Where sign conditions exist



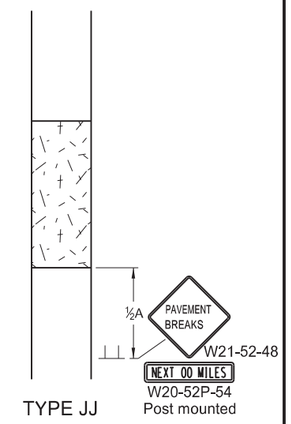
TYPE EE
Where sign conditions exist



TYPE FF
Where sign conditions exist
Signing shown for one direction only.



TYPE GG
Where elevation difference exists between lanes

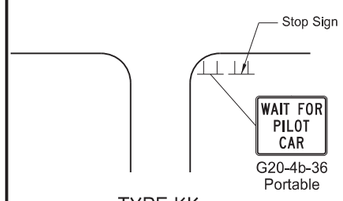


TYPE JJ
For break in pavement.
Install signs when conditions exist and remove when not applicable.
Signing shown for one direction only.

KEY

Flagger	Sign
Cones	Survey Equipment

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



TYPE KK
At major intersections within pilot car control area

Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
3. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
4. Cover existing speed limit signs within reduced speed zones.
5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
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.
9. Layouts shown for one direction only.

ADVANCE WARNING SIGN SPACING

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

Longitudinal Buffer Space

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers.
11-01-19	Revised note 5 & sign numbers.
2-23-23	Revised distance & removed signs.

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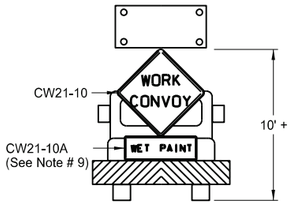
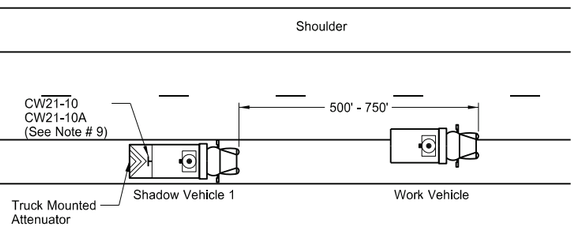
02/23/23

MOBILE OPERATION
(PAVEMENT MARKING)

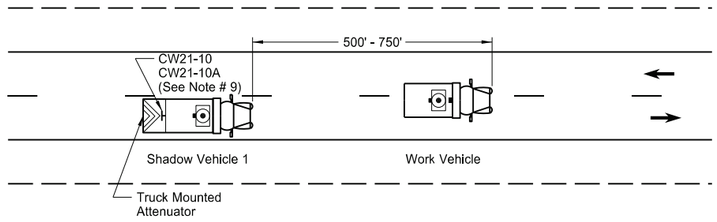
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday

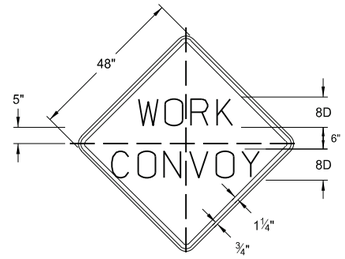


Two-Way Roadway with Paved Shoulders

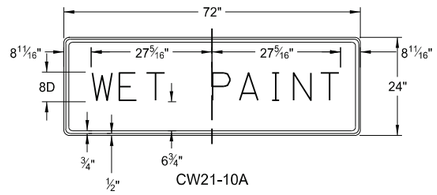


Two-Way Roadway without Paved Shoulders

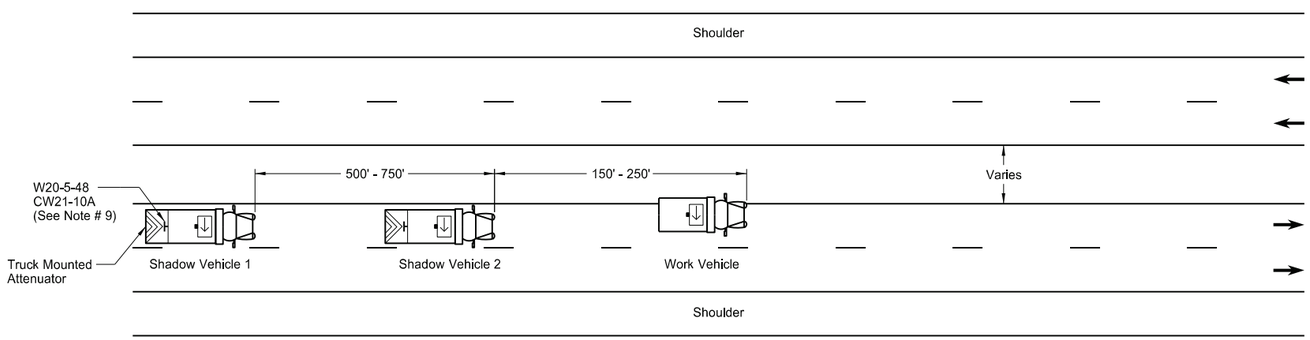
Sign Details



CW21-10

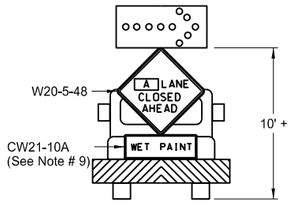


CW21-10A



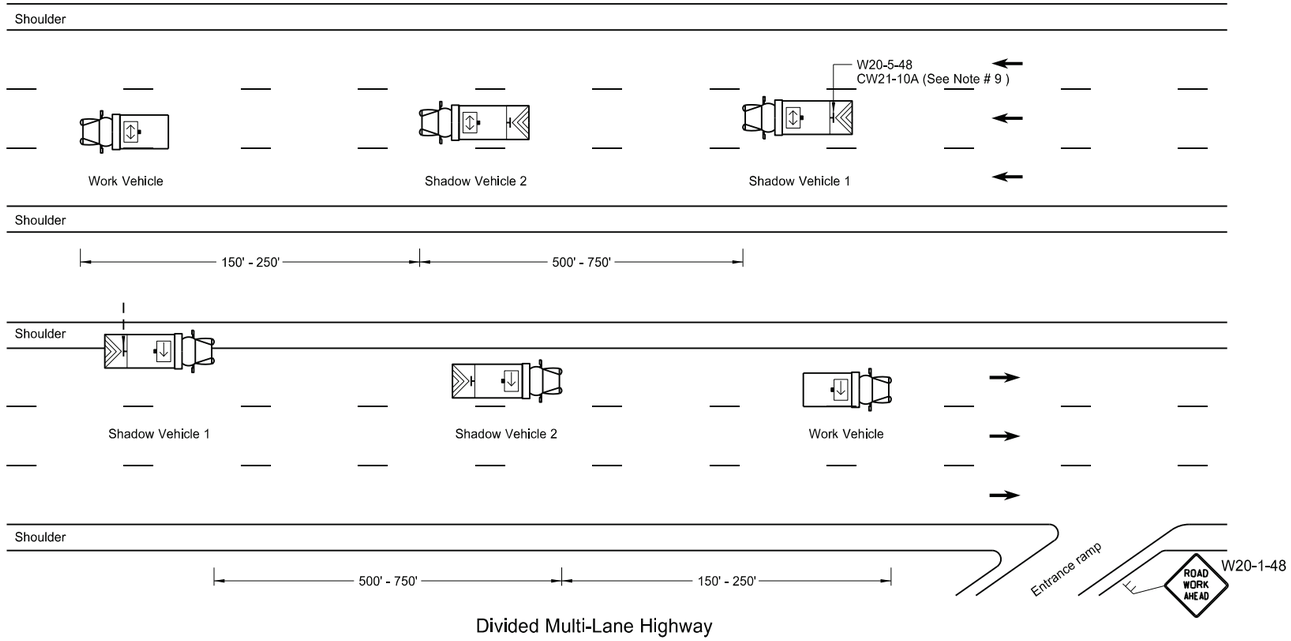
Undivided Multi-Lane Roadway

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 stobe 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.



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center



Divided Multi-Lane Highway

KEY

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading
8-02-24	Electronic Stamp/Signature.

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08/02/24

Two-Lane Roadway Portable Rumble Strips

D-704-33

KEY

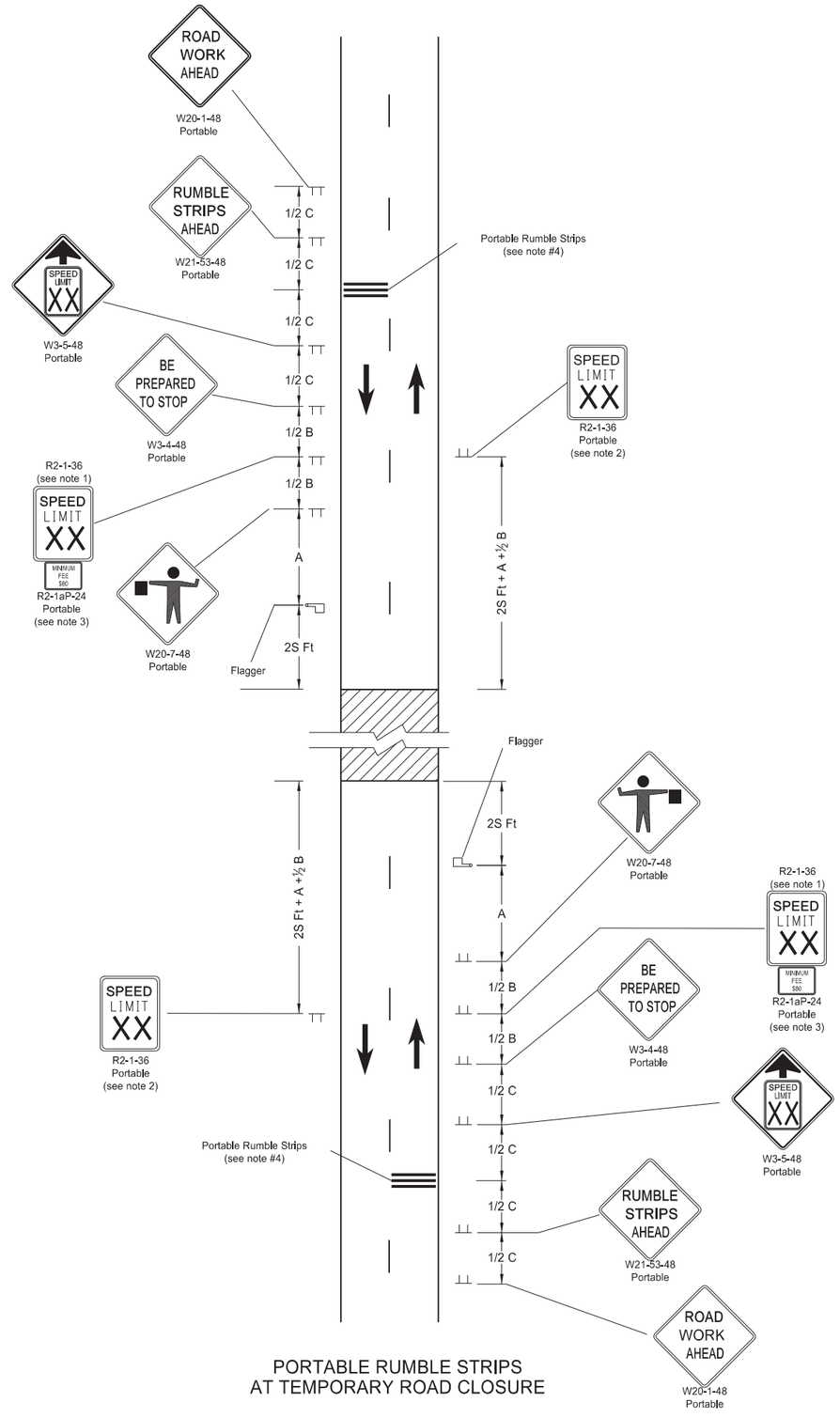
Work area

Flagger

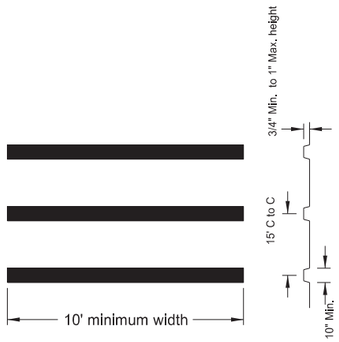
Sign

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

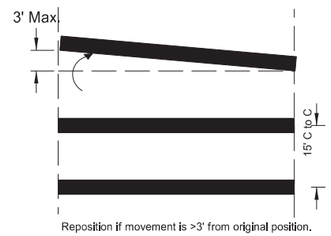
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE



PORTABLE RUMBLE STRIPS ARRAY DETAIL

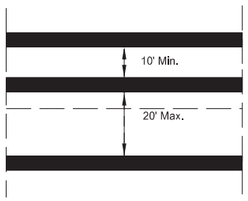


Reposition if movement is >3' from original position.

Skewing

Reposition if movement is >2' from original position.

Lateral



Reposition if distance between strips is <10' or >20'.

Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:

1. Determine speed in the field based on location and conditions.
2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
3. Sign R2-1aP-24 is not required when pilot car operation is used.
4. Do not use rumble strips on a non paved surface or in a pre-construction speed zone of 45 mph or less.

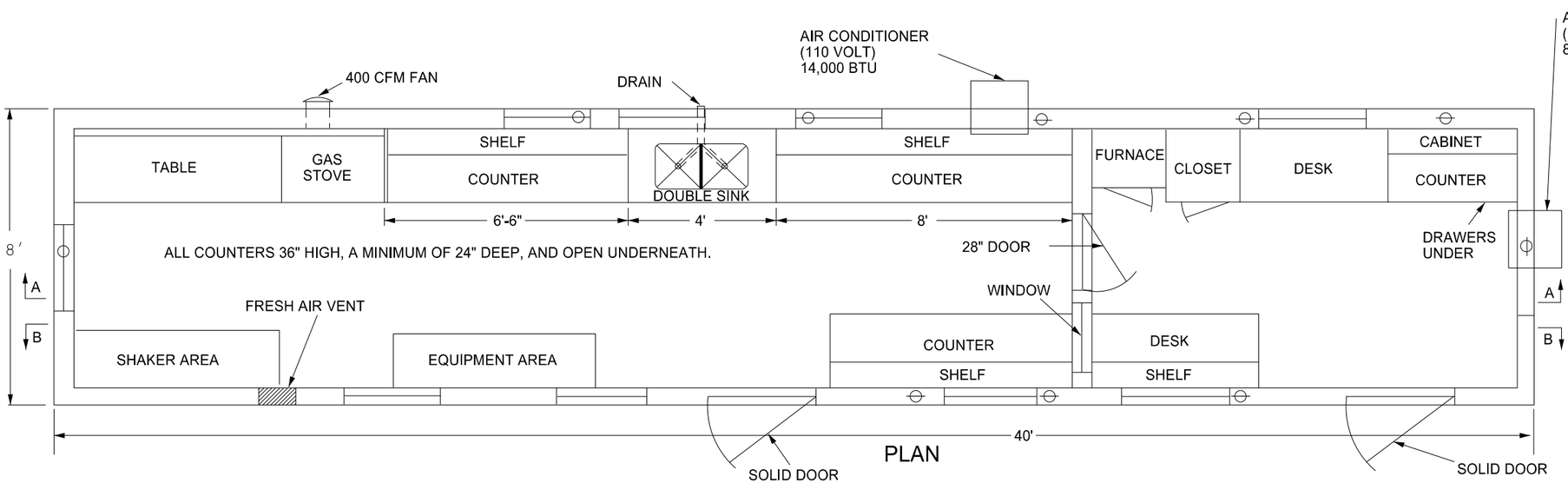
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03/07/23	Use changed to min 45 mph.

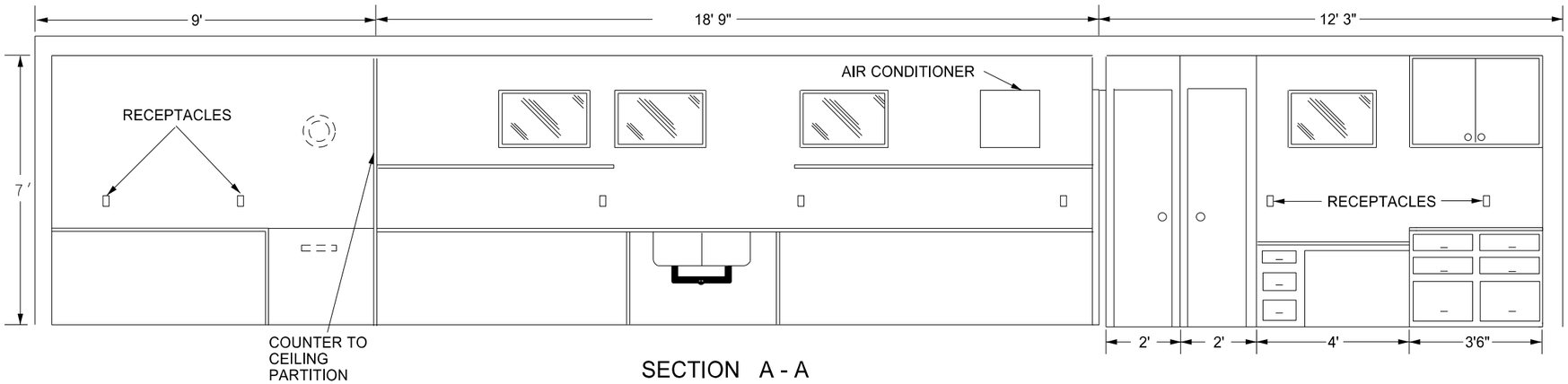
KIRK J. HOFFMANN
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

03/07/23

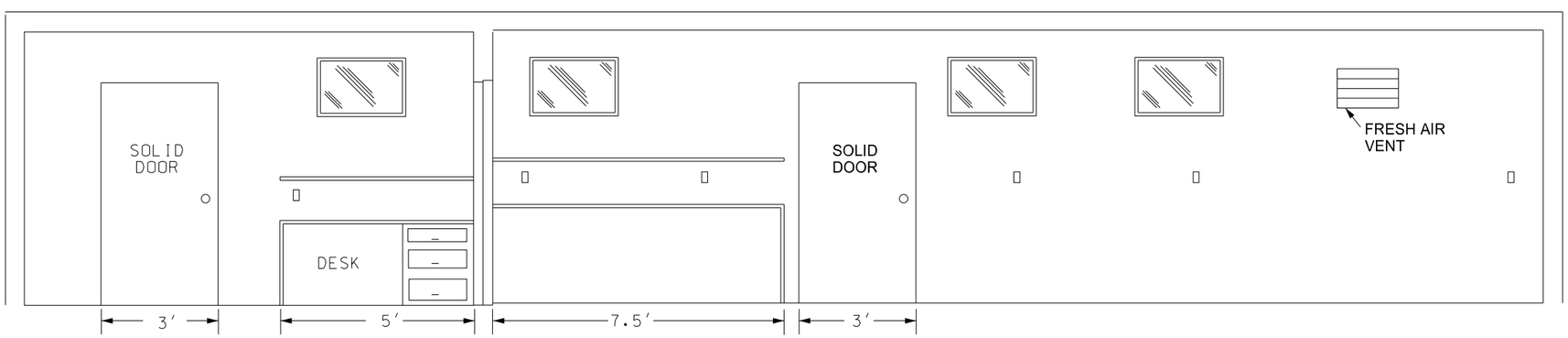
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

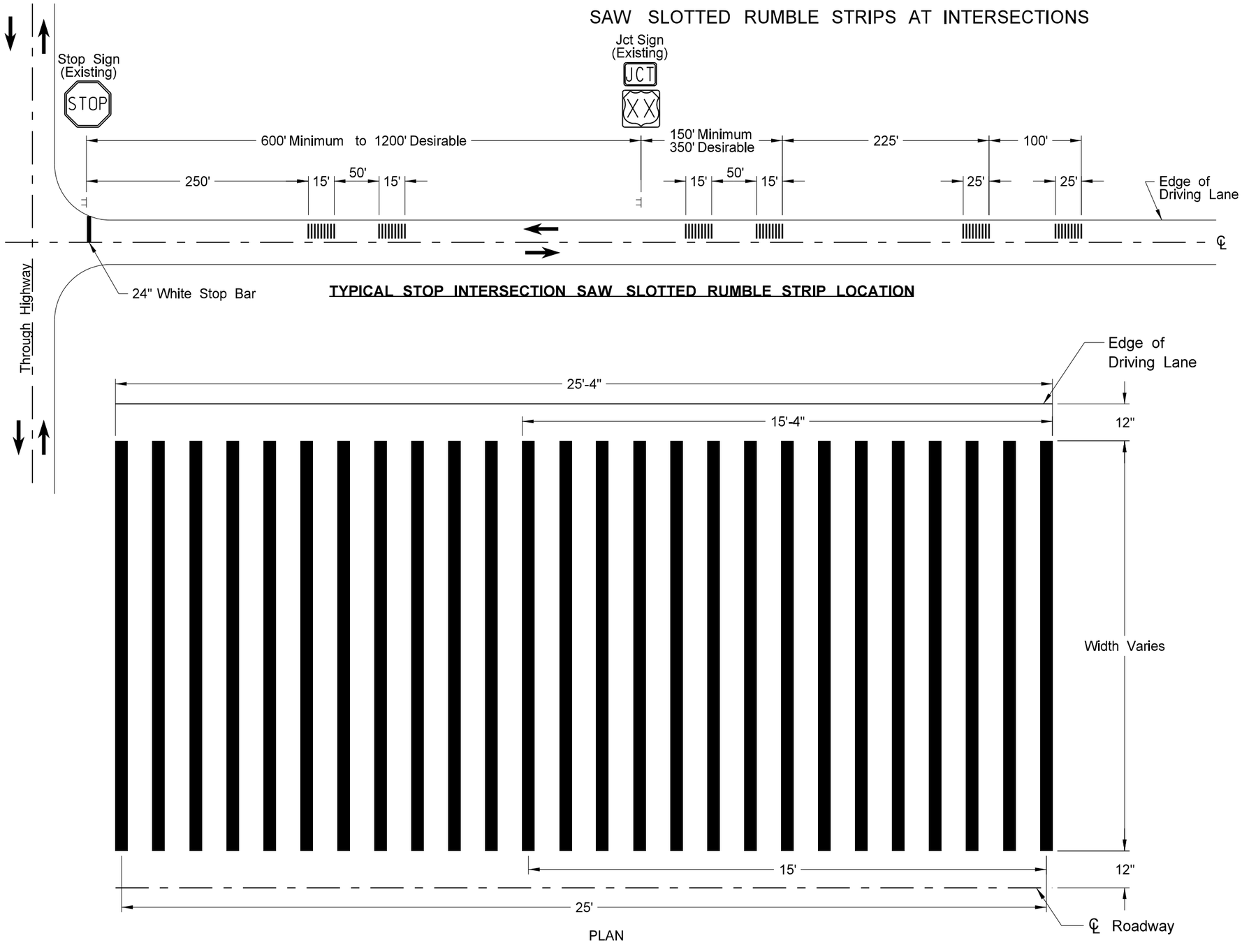
Provide a laboratory with the following:

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.
08-27-19	New Design Engineer PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

SAW SLOTTED RUMBLE STRIPS AT INTERSECTIONS



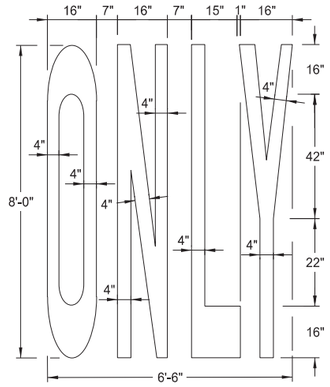
SAW SLOTTED RUMBLE STRIP DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-22-10	Saw Slotted width revised.
2-25-10	Note 7 was added.
9-8-11	Revised Notes and D-760-5.
7-7-14	Deleted Notes.
8-27-19	New Design Engr PE Stamp.

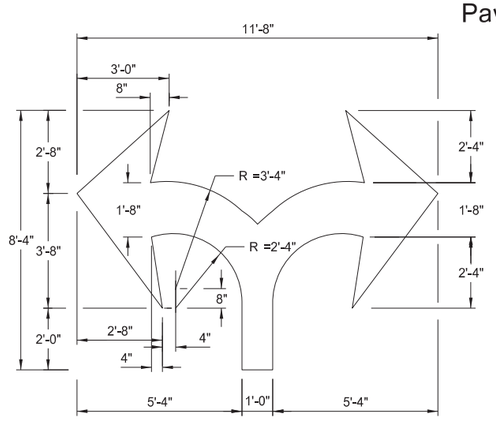
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683 , on 8/27/19 and the original document is stored at the North Dakota Department of Transportation

Pavement Marking Message Details

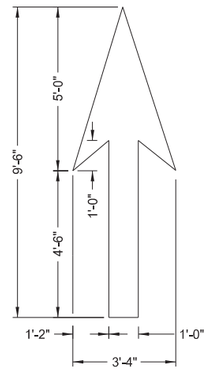
D-762-1



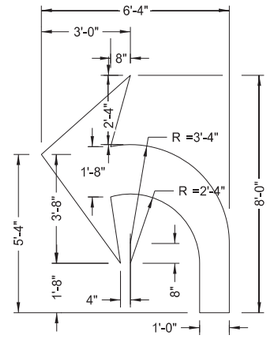
22 S. F.



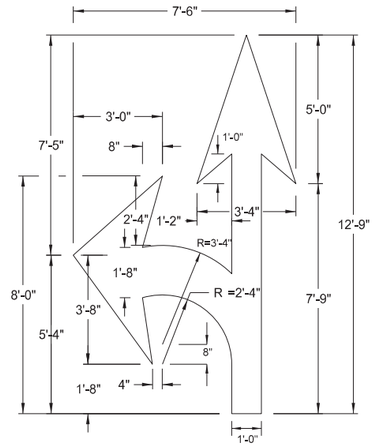
29 S. F.



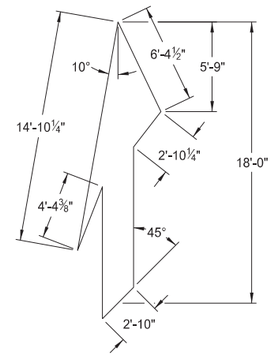
12 S. F.



16 S. F.

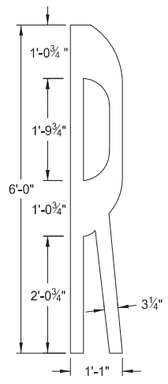


27 S. F.

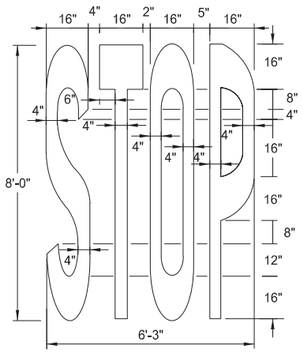


41 S. F.

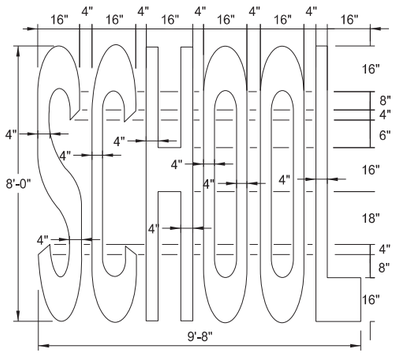
Note: Rotate merge arrow 20° from edge of roadway.



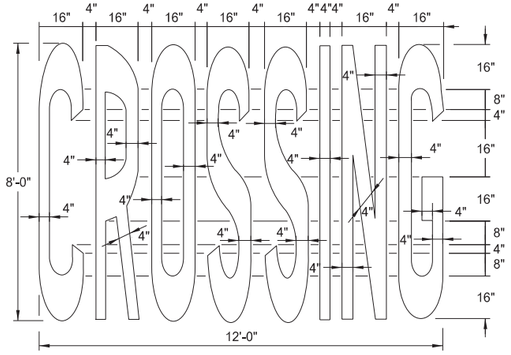
4 S. F.



22 S. F.



34.5 S. F.

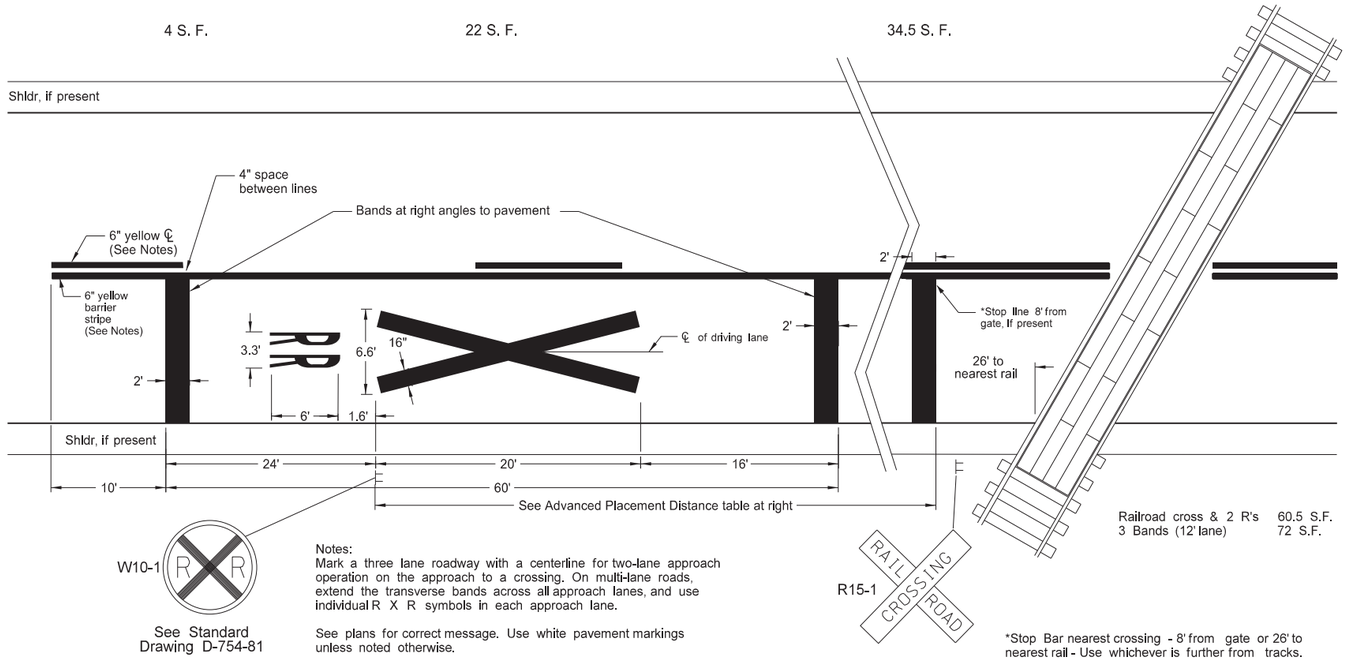


46 S. F.

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

Chevron Crosshatching Table

Centerline Pavement Marking Skip Spacing Detail



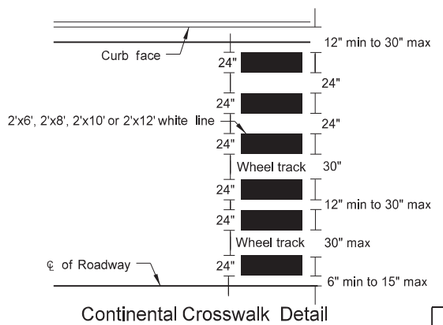
Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

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

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

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

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



Continental Crosswalk Detail

NOTES:

1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

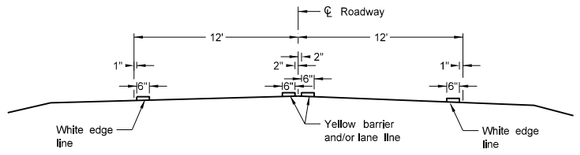
REVISIONS

DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
01-28-2020	Revised min Stop Bar distance to rail.
11-22-2023	Revised pavement marking widths.

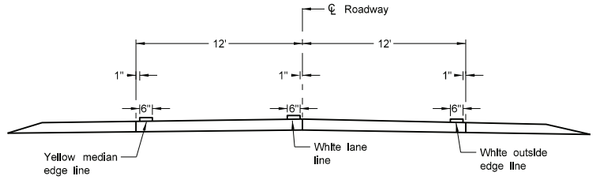
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 11/22/23 ENGINEER NORTH DAKOTA

PAVEMENT MARKING

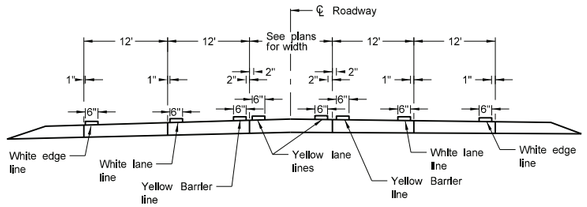
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

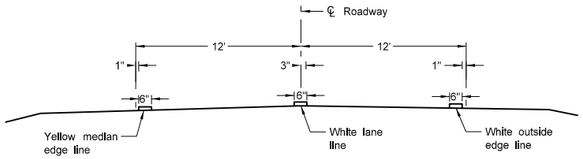
NOTES:

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

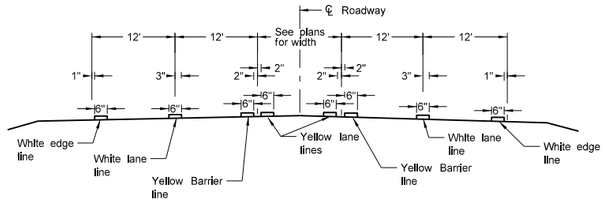
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

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

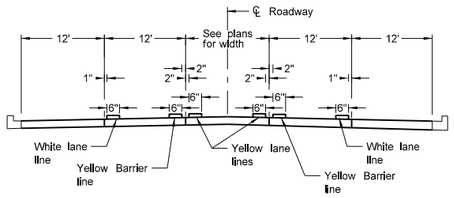
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



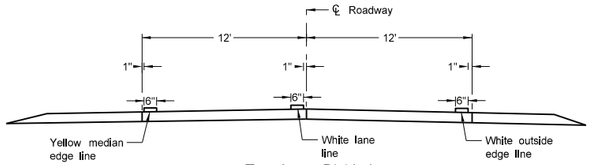
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



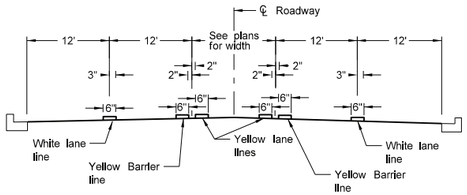
RURAL FIVE LANE ROADWAY
Asphalt Section



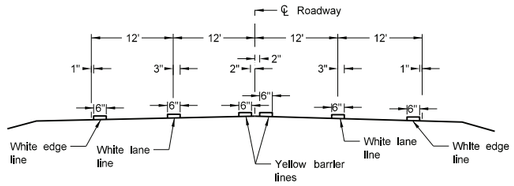
URBAN FIVE LANE SECTION
Concrete Section



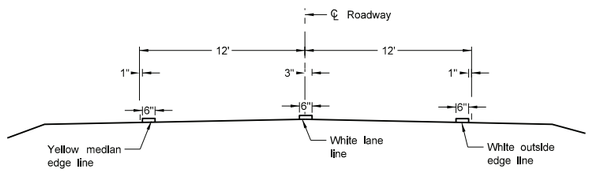
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



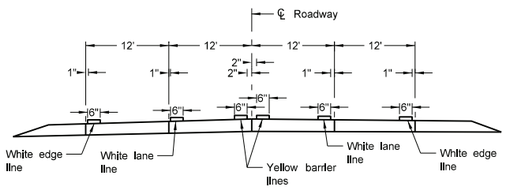
URBAN FIVE LANE SECTION
Asphalt Section



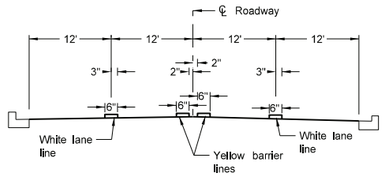
RURAL FOUR LANE ROADWAY
Asphalt Section



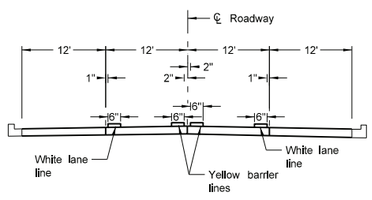
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



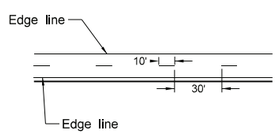
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



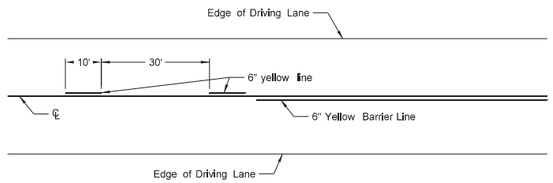
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

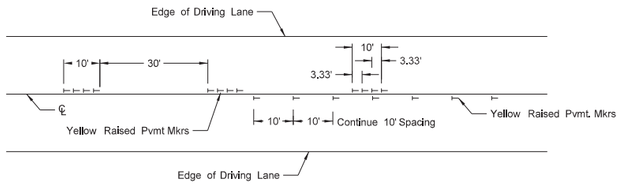
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
07/09/24
ENGINEER
NORTH DAKOTA

SHORT-TERM PAVEMENT MARKING

D-762-11

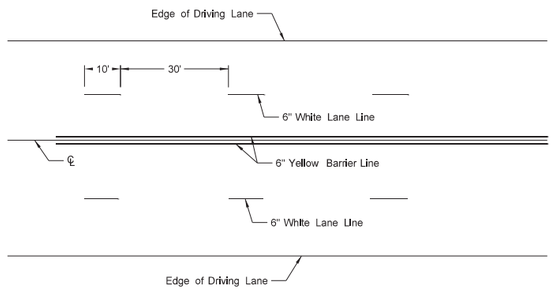


Painted or Tape Lines

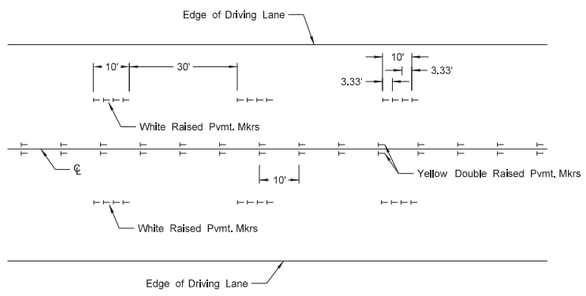


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

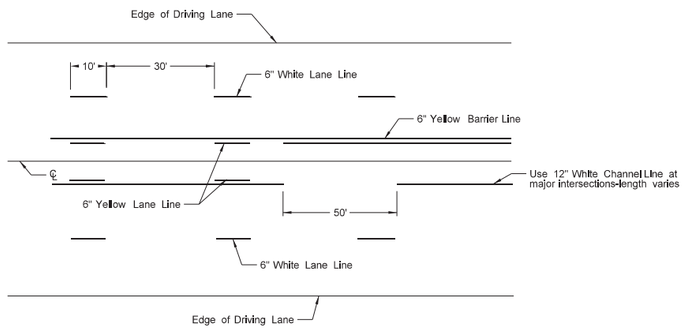


Painted or Tape Lines

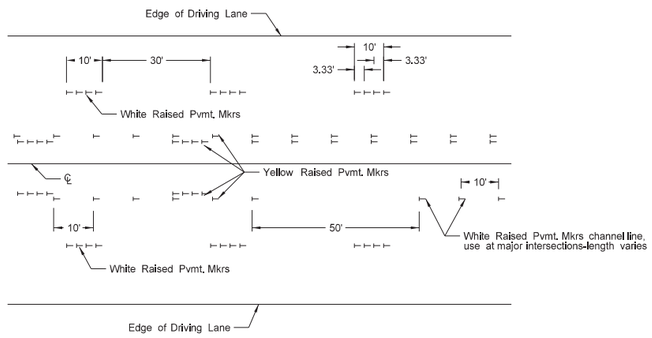


Raised Pavement Markers

FOUR LANE ROADWAY

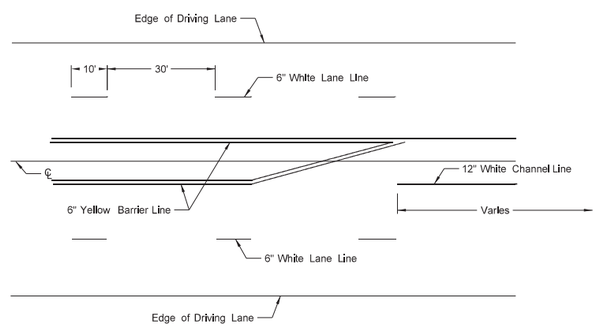


Painted or Tape Lines

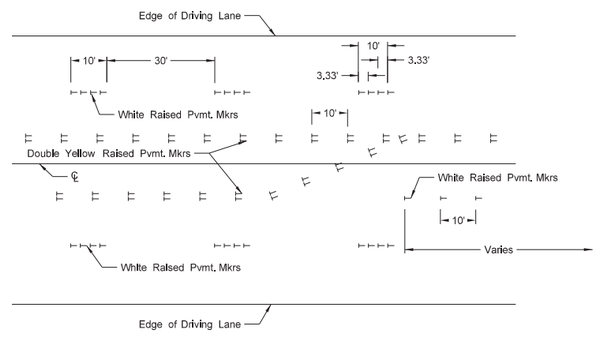


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvmt marking width.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
01/17/24
ENGINEER
NORTH DAKOTA