CHAPTER 16: TRAFFIC

ADVANCE WARNING SIGN SPACING

The Advance Warning Sign Spacing for 0-30 mph has been reduced from 300 feet to 100 feet. This is more in line with the Federal MUTCD and accounts for more limited space in urban type jobs where the speed limit is 30 or less.

CENTERLINE MARKINGS

When paying for the double centerline yellow markings do not pay for them as two 4" solid line white but rather use the pay item…

2016 Spec…2582.502 4" DOUBLE SOLID LINE –*material* by LIN FT
2018 Spec…2582.503 4" DOUBLE SOLID LINE – *material* by LIN FT

INTERIM PAVEMENT MARKINGS – ITEM 2580

There has been confusion regarding the use of this pay item and the quantities to be included. A group has been reviewing the use of interim markings and several problems have been identified. This pay item should only be used for same day pavement markings to be placed on bituminous lifts and milled surfaces. Striping for detours or full striping of the project for suspensions should be paid for under pavement marking (2582) pay items. (Normally paint).

Interim markings do not include edge lines and the length of the skip will be 5 ft. with a 45 ft. gap. Quantities must include centerline marking for each lift including any milled surfaces. For two lane, two way roads, quantities for the no passing zones need to be included. These quantities are kept on record in the District Traffic Offices. When being paid for by the linear foot, the plan needs to indicate how many lifts were estimated, the amount of solid yellow line, yellow broken line (skip) and white broken line (skip).

If the interim markings are being paid for by the lump sum this information is not included in the plan but will be in the ProjectWise restricted file folder.

In either situation, the plan must contain the detail for the interim pavement markings.

INTERIM STRIPING TYPICAL

The interim striping typical can go in either the Traffic control section or the permanent pavement marking section. It should only be in one section and must be the typical as shown on the striping typical website. Make sure that the pay item is included in the Statement of Estimated Quantity.

MULTI COMP VS EPOXY

The pay item for Epoxy has changed. MnDOT has maintained a Qualified Products List for Epoxy pavement markings; however, many of the products on this list are not 'true epoxies', one is a modified urethane and others are modified epoxies. In addition, there are other pavement marking materials for which a separate QPL was maintained (such as Polyurea). OTST decided to combine these into a Multi-Component list.

The new 2018 spec book has changed the 3590 specification to Multi-Component Liquid Pavement Markings and the pay item had to change as well.

Thus, when using the 2018 spec book, do not use EPOXY as the pay item – use MULTI COMP instead.

ONE DIRECTION LARGE ARROW

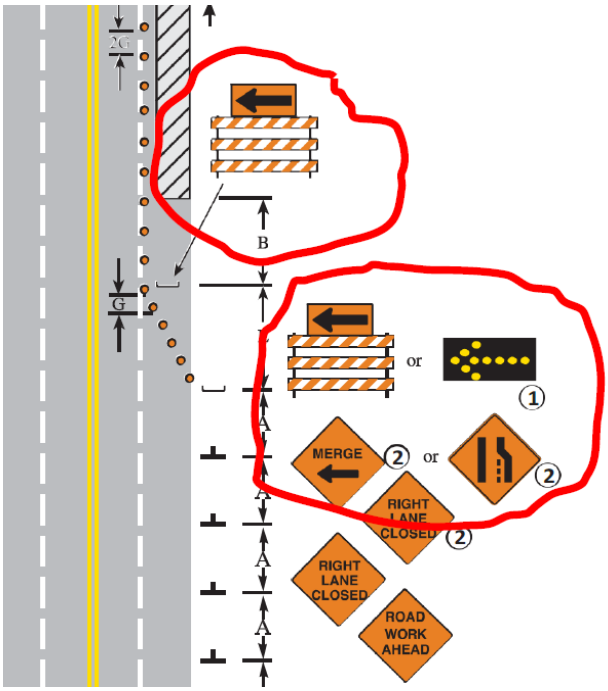
The Type III barricade with a One-Direction Large Arrow at the end of the merging taper and another identical assembly at the beginning of the taper (if a Flashing Arrow Board was not used) has essentially been what Minnesota has been using for lane closures since Appendix B was published.

However, there was no language in TTC (Temporary Traffic Control) chapter of the MN MUTCD that allowed this use. The One-Direction Large Arrow is governed by language in Warning Signs Chapter 2C (2C.12) that limits its use to delineating a change in horizontal alignment for curves. Language was drafted for consideration by the Minnesota Committee on Uniform Traffic Control Devices, but it was found to not be in compliance with the Federal MUTCD.

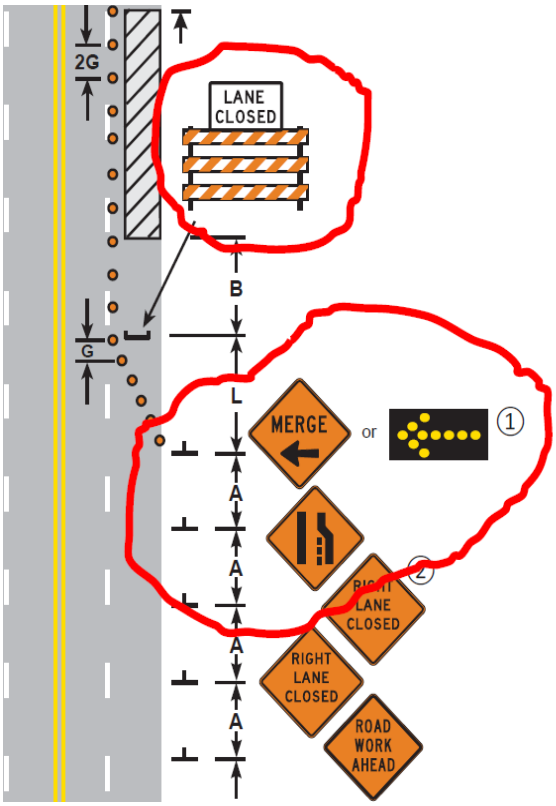
Per a recent clarification from the FHWA, it cannot be used for merging tapers, though it will still be used for shifting tapers. **Therefore, for all projects submitted for the January 26, 2018 letting or later must following the new layout as described below.**

Due to this clarification, the Field Manual Committee has developed new layout, instead of the One Direction Large Arrow on the Type III barricade at the end of the taper, a LANE CLOSED (black on White) sign will be used (required when speed limit is 45 mph or greater). If the Flashing Arrow Board is not used (it is required when speed limit is 45 mph or greater), a MERGE with Arrow sign will be placed at the beginning of the taper.

PREVIOUS METHOD-
NO LONGER ALLOWED



NEW METHOD



PAVEMENT MARKING TYPICALS

The Pavement Marking Typicals for projects follow a general style and format. The reference files are available in PDF and DGN formats to be imported in the pavement marking plans project border. They can be found at….

MnDOT Pavement Marking typical detail sheets

The designer should be aware that when adding some of these typicals in the .DGN file it may look as though there is some overwriting occurring. It will self-correct when loaded into ProjectWise with MnDOT fonts. This will also self-correct when printed with MnDOT print cues so do not be concerned about it.

When the pavement marking typicals are placed on a sheet with a signature block, the signature is affirming the use of a specific pavement marking typical which follows MnDOT's Traffic Engineering Manual. The signature is not intended to imply that the Designer designed that specific pavement marking typical.

Design Notes

The Designer notes should be removed from the typicals prior to being placed in the plan. The designer notes and asterisk are on the "CAPT BLK" level. If they turn off that level all of that should disappear.

If revising the typical based on an option in the designer notes such as using a 6" marking instead of a 4" marking, a modification date and initial is not required. As this is allowed by MnDOT's Traffic Engineering Manual, this is not considered a modification and the revision can be made without following the modification guidelines below.

Modifying Typicals

Most of the typicals are used in the plans as is, but on occasion there is a need to change or modify a typical. The designer is allowed to make changes if allowed by the Minnesota Manual on Uniform Traffic Control Devises. If a typical is modified in a way that is not proved in the designer notes, follow the process below. If a typical contains information not associated with your project, it is optional for designers to cross out the undesired details/information, do NOT delete the undesired details/information from the typical.

- Fill in the modified date and designer initial in the bottom corner of the typical.
- Identify the changes made to the typicals
  - Label the changes using Italicized text and
  - Add a note to the typical above the PUBLISHED DATE: **DENOTES MODIFICATION FROM STANDARD TYPICAL*
  - Use the MicroStation custom line style StdsPlnMod to place a double line (thick/thin) box around the text to highlight/identify the modification(s).
  - See example below…

LEFT TURN LANE ISLAND
NOTE:
END PAVEMENT MARKINGS AT BEGINNING OF RADIUS
TYPICAL MARKINGS FOR LEFT TURN ISLANDS
4" DOUBLE LINE YELLOW
24" SOLID LINE YELLOW
30'
45°
"A"
STOP TURN LANE LINE BEGINNING OF RADIUS
4" DOTTED LINE WHITE
500' SOLID YELLOW
NOTE:
USE 4" DOTTED LINE WHITE IN ALL TURN LANES.
INCLUDE ARROWS IN TURN LANES WHERE SPECIFIED.
* DENOTES MODIFICATION FROM STANDARD TYPICAL
PUBLISHED BY DIST: 14 OCT 2016
MODIFIED: 4/3/17 D3 Traffic
FILE NAME: Projects/03 BAU/Non Project/Traffic/Pavement Markings/-Main Striping-Dec2017
CERTIFIED BY
LICENSED PROFESSIONAL ENGINEER
LIC. NO. 50733
STATE PROJ. NO. XXXX-XX (T.H. XX)
SHEET NO. XX OF XX SHEETS
PAVEMENT MARKING DETAILS
TURN LANE WITH ARROW MESSAGE
LEFT TURN LANE
RIGHT TURN LANE
TURN LANE
THRU LANE
4" SOLID LINE WHITE
4" SOLID LINE YELLOW
4" BROKEN OR SOLID LINE WHITE
4" SOLID LINE WHITE
2" +/- 1"
STOP TURN LANE LINE BEGINNING OF RADIUS
4" DOTTED LINE WHITE
1/2 "L"
"L" 200' OR LESS
50'
30' - 80'
OVER 200'
20'
12'
NOTE:
END PAVEMENT MARKINGS AT BEGINNING OF RADIUS
NOTE:
SEE STRIPING LAYOUT FOR ARROW LOCATIONS
NOTE:
USE 4" DOTTED LINE WHITE IN ALL TURN LANES.
INCLUDE ARROWS IN TURN LANES WHERE SPECIFIED.
* DENOTES MODIFICATION FROM STANDARD TYPICAL
PUBLISHED BY DIST: 14 OCT 2016
MODIFIED: 4/3/17 D3 Traffic

PAVEMENT MESSAGES

Pavement messages are now paid for by the square foot. Individual messages (placing and removing) should be listed in a tab. The following chart shows square areas for both removal of messages, which includes a larger area around the marking, and installation, which only includes the area of material installed. The chart can be found at…

[MnDOT Pavement Marking typical detail sheets]

The reason that the removal areas are larger than the placement areas is because the removal is a rectangular area.

- It is easier for the contractor to grind out a rectangle than the shape.
- If only the shape is removed, that removed shape may still be seen at night or in wet conditions.

Pavement Marking Character Areas
Areas are in square feet.
Pavement letters are 96" tall.

Character		Installed Area	Removal Area
A	=	5.27	10.67
B	=	7.19	10.67
C	=	4.79	10.67
D	=	6.26	10.67
E	=	5.84	10.67
F	=	4.61	10.67
G	=	5.89	10.67
H	=	5.94	10.67
I	=	2.56	2.67
J	=	3.76	10.67
K	=	5.71	10.67
L	=	3.79	10.67
M	=	8.13	10.67
N	=	7.07	10.67
O	=	6.04	10.67
P	=	5.35	10.67
Q	=	6.30	10.67
R	=	6.33	10.67
S	=	5.89	10.67
T	=	3.79	10.67
U	=	5.75	10.67
V	=	4.70	10.67
W	=	6.18	10.67
X	=	4.66	10.67
Y	=	3.86	10.67
Z	=	5.00	10.67
1	=	2.56	10.67
2	=	5.68	10.67
3	=	5.59	10.67
4	=	5.13	10.67
5	=	6.18	10.67
6	=	6.35	10.67
7	=	3.80	10.67
8	=	6.76	10.67
9	=	6.35	10.67
0	=	6.04	10.67

Message		Installed Area	Removal Area
AHEAD	=	28.58	64.99
BIKE	=	21.30	42.00
LANE	=	21.97	42.00

Message		Installed Area	Removal Area
ONLY	=	20.76	47.00
PED	=	17.45	37.00
SCHOOL	=	31.86	74.00
SIGNAL	=	29.84	67.20
STOP	=	20.44	50.00
XING	=	20.18	42.00
YIELD	=	22.31	54.27
	=	15.00	48.00
	=	12.01	35.00
	=	26.16	95.00
	=	25.87	88.00
	=	37.04	70.00
	=	42.55	44.00
	=	18.87	67.20
	=	25.10	93.39
	=	9.75	30.00
	=	0.75	1.50
	=	3.00	6.00
	=	5.79	8.00
	=	8.69	18.00
	=	11.58	32.00
	=	7.63	32.07
	=	3.53	14.12
RR	=	61.72	204.00

NOTE:
ALL REMOVAL AREAS ARE COMPUTED AS RECTANGLES AS REQUIRED BY SPEC. 2102

INSTALLATION AND REMOVAL OF HORIZONTAL BARS FOR RAILROAD CROSSING PAVEMENT MESSAGE PAID FOR AS 24" SOLID LINE WHITE.

PUBLISHED BY OTST: 19 JAN 2017 | MODIFIED:

RADIUS CORNERS ON TYPE D SIGNS

Currently, there is a standard note that is placed on the Type D Sign Panel Layouts in the Signing Plan. It states: "Corners of the sign panels extending beyond the border shall not be trimmed."

The MNMUTCD allows for corners of sign panels to be trimmed. Please remove the above note from all future plans for Type D signs.

It is important to note that by removing the note in the construction signing plan, it does not mean that all MnDOT Type D signs are required to have the corners trimmed. It simply means that if Type D signs are manufactured with the corners trimmed MnDOT will accept them.

RAISED PAVEMENT MARKERS TEMPORARY

When including temporary raised pavement markers in the plan, show only one pay item. "Raised Pavement Markers Temporary" - and add footnote to the item indicating how many are one-way, two-way, and what color. We have a specification to attach to the proposal that only includes this pay item. (There is very little difference in cost for the different types.)

REMOVABLE PAVEMENT MESSAGES

The various message items 2581.602 PAVEMENT MESSAGE (_____) REMOVABLE POLY PREFORM by the EACH have been changed to one item 2581.618 REMOVABLE PREFORMED PAVEMENT MESSAGE TAPE by the SQ FT to match the permanent message items.

RUMBLE STRIPES

Any Wet Reflective pavement marking needs to be recessed somehow. This is due to the fact that the Wet Reflective markings utilize larger sized reflective media that will typically be scraped off in the winter months by plows – leading to little-to-no retroreflectivity after some snow plow operations. As a reminder, only liquid Wet Reflective pavement markings can be placed in a rumble.

This can become even more confusing when placed in a rumble. When a Wet Reflective marking is placed in a sinusoidal rumble (which is installed fully below the pavement surface) or placed in a centerline area that is recessed by installing a chip seal only in the travel lanes, it is already recesses and does NOT need to be ground in further. Therefore, the pay item for these pavement markings should just be (WR) not Ground In (WR).

The rectangular corrugated rumble is made by grinding out corrugations every 7 inches out of the pavement, which leaves the space in between the corrugations alone. If a Wet Reflective pavement marking is placed on a rectangular corrugated rumble, then the reflective media between the rumbles will be scraped off. Therefore, it is recommended that these Wet Reflective pavement markings also be ground in…Ground In (WR).

ALTERNATE PEDESTRIAN ROUTE (APR)

A wide range of pedestrians can be expected at work sites, including the young, elderly, and people with disabilities such as hearing, visual, or mobility. These pedestrians need a clearly delineated and usable travel path.

If the TTC zone affects the movement of pedestrians, adequate pedestrian access and walkways shall be provided. If the TTC zone affects an accessible and detectable pedestrian facility, the accessibility and detectability shall be maintained along the alternate pedestrian route. Layouts are available in the Minnesota Temporary Traffic Control Field Manual and Traffic Control Templates are available at:

MnDOT's Temporary Traffic Control Plan Template Sheets website

Consideration should be made to separate pedestrian movements from both work site activity and motor vehicle traffic.

It is strongly encouraged to pay for this as…
2563.601 ALTERNATE PEDESTRIAN ROUTE by the LUMP SUM.

However, the ADA Office recommends making APR on mill and overlay projects incidental unless there are multiple curb line changes which require removal of large areas of pavement.

When APR is not practical pinch the staging timelines so that pedestrian facilities are interrupted for as little time as possible.

TRAFFIC CONTROL TABULATION

Traffic control items that are included with the lump sum should not show quantities on the tabulation. This information will be supplied in the current tabulated or listed format via a stand alone document to the Cost Estimating Engineer and the Project Design Services the Projectwise restricted file foder only, at the time of project submittal. The Preliminary Estimate and Data Base file (*.mdb) will be located in the specific projects ProjectWise location (a right protected folder), with AD group name of "DxEstimates" and a Folder name of "Estimates_Restricted" which restricts access for anyone except newly established AD group (Ex. Design Engineer, Lead Designer & District Cost Estimating Engineer).

Quantities can only be given in the plan for the items which are being paid for separately. However, the items which are paid for separately (not part of the lump sum) should be shown as a tabulation for traffic control and noted as being paid for separately. Items such as, but not limited to …

- 2533 PORTABLE PRECAST CONRETE BARRIER DES 8337
- 2554 IMPACT ATTENUATOR BARRELS
- 2554 IMPACT ATTENUATOR
- 2563 PORTABLE CHANGEABLE MESSAGE SIGN

- 2563 RAISED PAVEMENT MARKER TEMPORARY
- 2563 TUBE DELINEATOR
- 2582 TEMPORARY STRIPING

TRAFFIC DETAILS

There has been some confusion on when certain traffic details need to be signed or not signed. Hopefully this will clear that up.

There are several different areas of details managed by the Office of Traffic Engineering. The most current version should always be used for each of the following situations.

The following is how each areas details should be handled in the plans.

- **Pavement Markings Typicals Details**

  The Pavement Marking Typical Details have been created with the intent of reducing the number of plan sheets needed for the Pavement Marking Plan. They are also referenced by the MnDOT Traffic Engineering Manual to convey the MnDOT Traffic Engineering Organization's (TEO) convention for pavement markings. Designers may make modifications to the Typical Details as long as the design is allowed by the Minnesota Manual on Uniform Traffic Control Devices; however, modifications to the TEO convention needs to be indicated on the typical and the Designer needs to sign off on the modification.

  The PM Typical Details are to be placed onto the Pavement Marking Typical blank plan sheets and, if modified, the modified box in the typical detail needs to be filled out with both a date and initials. If a PM Typical Detail includes elements that are not used, cross out the elements not used. *Changes made to the typical detail allowed by the Designer Notes do not require the modified box to be filled out.* The signature for the Pavement Marking Typical *plan sheet* indicates the selection of the PM Typical Details to be used and for any modifications made to the typicals. The plan sheet must be signed whether or not any modifications were made to the PM Typical Details.

- **Temporary Traffic Control Templates**

  The Traffic Control Templates are meant to be a guidance about the MnDOT best practice for Traffic Control Plan designers. They are essentially upgraded from Field Manual Layouts (which are a standard to be used on all roads open to the public in the state of MN) to be used for long term use (greater than 3 days). **They are not specifically intended to be placed into a plan.** If a designer does put them in the plan then they may copy the design elements from the Templates and modify appropriately for their project. It is possible that not all information from the template will be on the detail sheet. When these templates are used the Engineer is taking responsibility for that sheet, thus the Engineer will need to include a plan sheet border and sign the signature block on this page.

- **Signing Details**

  The Signing Details have been created with the intent of specifically adding these sheets into plans. These sheets can be inserted into the plan and do not require a signature. However, if modified then the Engineer is taking responsibility for that sheet, thus the Engineer will

need to sign the signature block on this page.

- **Lighting Details**
  The Lighting Details have been created with the intent of specifically adding these sheets into plans. These sheets can be inserted into the plan and do not require a signature. However, if modified then the Engineer is taking responsibility for that sheet, thus the Engineer will need to sign the signature block on this page.

- **Signal Details**
  The Signal Details have been created with the intent of specifically adding these sheets into plans. These sheets can be inserted into the plan and do not require a signature. However, if modified then the Engineer is taking responsibility for that sheet, thus the Engineer will need to sign the signature block on this page.

- **TMS Details**
  The Traffic Management System Details have been created with the intent of specifically adding these sheets into plans. These sheets can be inserted into the plan. These plan sheets must be signed. The signature for the overall plan sheet indicates the selection of the details to be used and for any modifications made to the details.

The easiest way to tell if it needs to be signed is that when you open the detail from the various websites if it contains a signature block it needs to be signed.

WET REFLECTIVE MARKINGS

There has been a request to have specific pay items for the wet reflective pay items so that they can track where these items are used and to obtain historical price data on them.

Therefore, when the plan contains wet reflective pay items the following should be used on the Statement of Estimated Quantities….

Wet reflective items are required to be recessed per MnDOT Standard Specifications and MnDOT's Traffic Engineering Manual.