

**Hot Mixed Asphalt Machine Patches
County Wide**

Letting Date – February 12, 2026, 8:15 am

Contractor: _____

Address: _____

Sign & Print: _____

Date: _____

Phone & Fax: _____

Email: _____

| <u>Contract Item (Pay Item)</u> | <u>Pay Unit</u> | <u>Unit Price (Local)</u> | <u>Unit Price (Primary)</u> |
|---------------------------------|-----------------|---------------------------|-----------------------------|
| Machine Patch 0 < HMA ≤ 5 | Ton | | |
| Machine Patches 5 < HMA ≤ 10 | Ton | | |
| Machine Patches 10 < HMA ≤ 25 | Ton | | |
| Machine Patches 25 < HMA ≤ 50 | Ton | | |
| Machine Patches 50 < HMA | Ton | | |
| Skip Patching HMA > 50 | Ton | | |
| Skip Patching HMA < 50 | Ton | | |
| Butt Joint | Each | | |
| HMA Surface Removal | Square Yard | | |
| Cold Milling (1/2) Day | Lump Sum | | |
| Cold Milling Whole Day | Lump Sum | | |

**COMPLETION DATE: Seasonal Limitations per MDOT 2020 SSFC
Signed Insurance, Agreement, ROW Permit shall be enclosed.**

Bids are to be submitted on the Road Commission forms in a plainly marked, sealed envelope. No faxed or emailed bids accepted. Plans and specifications are available online at www.tuscolaroad.org. Please contact Brent Dankert, Tuscola County Highway Engineer at 989-233-7472 or highwayengineer@tuscolaroad.org with any questions. Any addenda must be noted and initialed.

If you are interested in bidding and have downloaded plans from the website please email highwayengineer@tuscolaroad.org to be added to the plan holders list to make sure you receive addendums.

The Contractor has examined the proposal, permits, plans and the location of work described here in and is fully informed as to the nature of the work and the conditions relating to its performance. All work shall be done in accordance with Section 501 of the 2020 MDOT Standard Specifications for Construction, and as modified herein and as per attached supplemental specifications and provisions.

General:

The work shall be at various locations throughout Tuscola County or state highways under the maintenance jurisdiction of the Tuscola County Road Commission. The work shall consist of placing and compacting hot mixed asphalt in order to patch existing asphalt roads.

Schedule:

Contractor shall provide the Tuscola County Road Commission 48-hour advance notice prior to mobilization. Patching shall be completed within 14 days of notification unless approved otherwise by the Engineer or work shall be forfeited to next available contractor and/or **Liquidated damages may be assessed at a rate of \$100.00 per day per project location.**

Construction:

The Contractor shall follow the construction methods as described in Section 501.03 of the 2020 MDOT Standard Specifications for Construction except as modified herein:

1. **Paver:** Each paver must be equipped with a full-width vibratory or tamper bar screed that can spread and finish the HMA to the required cross section and grade. Use a paver that produces a uniformly finished surface free from tearing or other blemishes and free from measurable segregation.

2. **Types of Machine Patches:**

- a. **Culvert Crossings:** The contractor shall remove the existing gravel material to the existing width of the roadway and replace it with bituminous material at a depth of 2.5" or other depths specified by the Engineer. All primary roads will be a minimum of 3" in two equal lifts. The method by which the gravel is to be removed will be up to the Contractor. Immediately upon removing the gravel the aggregate base shall be compacted and the void space shall be replaced with the bituminous hot mix asphalt. The gravel removed from the patch area shall be wasted along the shoulder and graded to match the existing slope of the shoulders. A tack coat shall be applied to all vertical edges of existing HMA.
 - b. **Pavement Dips/Wedging:** A tack coat shall be applied to the existing pavement surface for proper adherence of the patch material. The crown of the existing roadway shall be matched, and bituminous material feathered at edges.
 - c. **HMA Surface Removal:** The Contractor shall remove the existing asphalt or concrete material to a depth requested by the engineer in accordance with the MDOT 2020 Standard Specifications for Construction 501.03 and 501.04. The Contractor shall be responsible for conditioning the aggregate base prior to placing the HMA. Asphalt patch is to be paved immediately after removal. Removal of existing asphalt material is paid for by HMA Surface Removal (Syd).
3. **Skip Patching:** Includes the placement of the designated amount of hot mixed asphalt material throughout the defined mile section of roadway. Skip patching includes all labor, materials, and equipment to prepping the road surface, tacking the existing asphalt surface, mobilization from one site to another, and placement and compaction of the HMA material on the following existing surfaces – HMA, milled surface, aggregate base, or as determined by the engineer. The total quantity of asphalt will be utilized over the entire one (1) mile section of the roadway.
4. **Pavement for Butt Joint Removal:** If a butt joint is required, the Contractor shall remove the existing surface to the thickness of the proposed overlay, for the full width of the joint. Uniformly taper the removal to the original surface over a minimum of 35 feet, (1" per 35'), or as agreed to with the Engineer. Installation of a butt joint is paid for by Butt Joint (Each).

5. **Cold Milling:** The Contractor shall provide a cold milling machine capable of removing the existing HMA surface to the depth, width, grade and cross section as determined by the Engineer. All equipment and workmanship shall be in accordance with the MDOT 2020 Standard Specifications for Construction. Cost associated with cold milling is paid for by Cold Milling 1/2 Day (Lump Sum) and Cold Milling Whole Day (Lump Sum). A day is defined by a 12-hour workday and based on time on project site. Cleaning, sweeping, and trucking to be performed by Tuscola County Road Commission Crews.

6. **Bond Coat:** The Contractor shall apply a bond coat to all exposed edges of the patches and between lifts of asphalt. The Bond Coat shall be applied at a uniform rate of application between 0.05 to 0.15 gallons per square yard. The bond coat will not be paid separately but included in the cost of the HMA Patch.

7. **Compaction:** The Nuclear Gauge Method for testing compaction will be used on Primary roads. The Number of Rollers Method chart below shall apply, for local road paving. The Engineer may decide to verify density on local roads with the Nuclear Gauge Method.

Number of Rollers Required Based on Placement Rate:

| Average Laydown Rate, Square Yards Per Hour | Number of Rollers Required | |
|--|----------------------------|-------------------|
| | Compaction Rollers | Finish Rollers |
| Less than 600 | 1 | *1 |
| 601 – 1200 | 1 | 1 |
| 1201 – 2400 | 2 | 1 |
| 2401 – 3600 | 3 | 1 |
| 3601 and more | 4 | 1 |

*The Compaction roller may be used as the finish roller also.

An approved self-propelled pneumatic-tired roller shall be provided and used as directed while placing Bit Mix for leveling or wedging.

Materials:

Bituminous Asphalt material shall be obtained from a state certified plant and shall be documented on tickets provided to the Road Commission. The Tuscola County Road Commission reserves the right to reject a material based on not meeting temperature as

specified in MDOT 2020 Standard Specifications for Construction. The asphalt material shall be one of the following:

- 13A or LVSP in accordance MDOT Special Provision for Marshall Hot Mix Asphalt Mixture 20SP- 501G-01
- 4EL in accordance with Section 501 and 902 of 2020 MDOT Standard Specifications for Construction
- As approved by the Engineer.

Acceptance Criteria:

The Engineer will inspect the patch for acceptance within two working days of placement. If the patch is determined to need corrective action, the Contractor will be notified immediately. Corrective action will involve remedial treatment up to and including replacement. Table 501-5 from the MDOT 2020 Standard Specifications for Construction will be used as guidance; however, the Engineer shall retain full rights for complete replacement of material. Smoothness of ride will be a factor. All costs associated with correcting variations in the patch will be borne by the Contractor.

Traffic Control:

The Road Commission will install “Road Work Ahead” signs on each project. Sufficient notice shall be given to the Road Commission to allow sign placement prior to start of projects. Traffic must be maintained to locals during construction. Primary Road work will be performed via a single lane closure. Local Road work will be performed via temporary road closure. Cost for Maintaining Traffic will be included in the tonnage price for Local or Primary patching pay items.

1. **Lane Closures:** The contractor shall be prepared to maintain traffic as per the Tuscola County Road Commission Maintaining Traffic Special Provision attached except as specified herein. Maintaining Traffic Typical M0150a shall be used on all primary roads and state highways.
2. **Temporary Road Closures** will be allowed, on local roads, if approved by the Engineer on a site-specific basis. Type III barricades or arrow boards will be required at each end of the project along with a traffic regulator for re-routing traffic. Prior to commencing work, Contractor shall contact Central Dispatch, (989) 673-8338, and School District if in session to inform of Road Closure & Road Opening.

3. **Warning Signs:** The contractor will be responsible for supplying, installing, and maintaining any signs necessary to protect the motoring public from situations that have occurred due to unfinished work.
4. **Traffic Regulators:** Traffic regulators shall be equipped with High-visibility Class 2 or Class 3 safety apparel, Stop/Slow or Stop/Stop Sign Paddles, and a two-way radio system and a standby backup system if traffic regulators are not visible to each other. Ensure persons designated to regulate traffic receive training, no more than 12 months before traffic regulating operations, on property traffic regulating procedures. Ensure this training consists of at least viewing “Safely Regulating Traffic in Michigan” and reading the current MDOT handbook, Traffic Regulators Instruction Manual. Maintain documentation on persons trained and dates trained and provide to the Engineer upon request.

Payment:

Payment will be made on a project-by-project basis with tickets accompanying the invoice.

All invoices **MUST** include the TCRC job number and project location.

Warranty:

The Contractor hereby warrants the workmanship and material placement for one year from the date of placement.

Liability:

The Contractor shall at all times exercise extreme care and shall assume all liability for any damages resulting from his operations and shall hold the Tuscola County Road Commission harmless from any such claims or damages.

The contractor must obtain a Tuscola County Right of Way Permit before any work can begin.

The successful bidder must also furnish certificates or policies giving satisfactory evidence of insurance coverage in accordance with *Tuscola County Road Commission Policies and Procedures Manual Section 9.7 Insurance Requirements*, to ensure adequate payment for any damage caused by his operations.

The contractor shall, prior to the start of work, file with the Tuscola County Road Commission a certificate of Workmen’s Compensation Insurance. The attached certificate of insurance is required for the successful bidder or bidders.

Non-Compliance with Project Specifications Provisions:

Any variation from the specifications of the project herein without written approval from the Tuscola County Road Commission and/or its authorized representative may result in, at the discretion of the Road Commission, the voiding and/or canceling of the acceptance of any bid and/or contract, resulting from this project.

The Board reserves the right to accept or reject any or all proposals and to re- advertise or to accept the proposal, which in their opinion, is in the best interest of Tuscola County.

Attachments:

1. Title IV and VI Compliance
2. Agreement
3. Tuscola County Right of Way Permit
4. Traffic Control Policy
5. Insurance Policy
6. Special Provision – 501G-01Marshall Hot Mix Asphalt Mixture

TUSCOLA COUNTY ROAD COMMISSION

TITLE IV COMPLIANCE

APPENDIX A

During the performance of this contract, the contractor, for itself, its assignees, and successors in interest (hereinafter referred to as the "contractor") agrees as follows:

1. Compliance with Regulations: The contractor shall comply with the Regulations relative to non-discrimination in Federally-assisted programs of the Department of Transportation, Title 49, code of Federal Regulations, Part 21 as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
2. Non-discrimination: The contractor, with regard to the work performed by it during the contract, shall not discriminate on the grounds of race, color, or national origin in the selection and retention of subcontractors, including procurements of materials and leases of equipment.
3. The contractor shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulation, including employment practices when the contractor covers a program set forth in Appendix B of the Regulations.
4. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by the contractor for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by the contractor of the contractor's obligations under this contract and the Regulations relative to non-discrimination on the grounds of race, color, or national origin.
5. Information and Reports: The contractor shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Tuscola County Road Commission to be pertinent to ascertain compliance with such Regulations or directives. Where any information required of a contractor is in the exclusive possession of another who fails or refuses this information, the contractor shall so certify to the State highway department, or the Federal Highway Administration as appropriate, and shall set forth what efforts it has made to obtain the information.
6. Sanctions for Non-compliance: In the event of the contractor's non-compliance with the non-discrimination provisions of this contract, the Tuscola County Road Commission Shall Impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to:
 - a) Withholding of payments to the contractor under the contract until the contractor complies, and/or
 - b) Cancellation, termination, or suspension of the contract, in whole or in part.
7. Incorporation of Provisions: The contractor shall Include the provisions of paragraphs (1) through (6) in every subcontract, including procurement of materials and leases of equipment, unless exempt by the Regulations, or directives Issues pursuant thereto. The contractor shall take such action with respect to any subcontract or procurement as the Tuscola County Road Commission may direct as a means of enforcing such provisions including sanctions for noncompliance: Provided, however, that, in the event u contractor becomes involved in, or is threatened with, litigation with a subcontractor or supplier as a result of such direction, the contractor may request the Tuscola County Road Commission to enter into such litigation to protect the interests of the County, and, in addition, the contractor may request the State highway department to enter into such litigation to protect the interests of the State and/or the United States to enter into such litigation to protect the interests of the United States.

"The TUSCOLA COUNTY ROAD COMMISSION, in accordance with Title VI of the Civil Rights Act of 1964, 78-252, 42 U.S.C. 2000d-222d-4, the Civil Rights Act of 1987, P.L. 100-259, and Title 49, Code of Federal Regulations, Department of Transportation, subtitle A, Office of the Secretary, Part 21, Non- discrimination in federally assisted programs of the Department of Transportation issued pursuant to such Act, hereby notifies all bidders that it will affirmatively insure that in any contract entered into pursuant to this advertisement, Disadvantaged Business Enterprise firms will be afforded full opportunity to submit bids in response to this invitation and will not be discriminated against on the grounds of Race, Color, Sex, Age, National Origin, or Handicap in consideration for an award. For additional compliance information, please see Appendix A."

AGREEMENT

TUSCOLA COUNTY ROAD COMMISSION – 1733 S. MERTZ ROAD, CARO, MI 48723
PAGE 1 OF 1

This agreement made this _____ day of _____, 20_____
by and between the Board of Tuscola County Road Commissioners and _____
_____.

1. _____ hereby agrees to undertake the following work
in the status of an independent contractor performing the following job:

_____.

2. Said contractor, _____, shall at all
times exercise extreme care and shall assume any and all liability for property damage or bodily
injury resulting from the above operation by this employees, agents, assigns, sub-contractors
and anyone else acting under his control or direction; and will indemnify, hold harmless and
defend the Tuscola County Road Commission, its Commissioners or employees from any and all
claims for property damage or bodily injury arising out of this Agreement.

3. Said contractor, _____, while
engaged in said job shall maintain and furnish certificates of insurance, naming the Tuscola
County Road Commission and Commissioners as an additional insured under the policy, with
policy limits of \$500,000/\$1,000,000 for property damage and bodily injury, and shall furnish
the Tuscola County Road Commission copies of said certificates of insurance prior to
commencing any work on said project.

Additionally, said contractor, _____, shall furnish
prior to start of said job with the Board of Tuscola County Road Commissioners, a policy of
insurance certifying he carries and has in effect worker's compensation insurance on all those
required to be covered under Michigan law.

4. The address of the Board of Tuscola County Road Commissioners is 1733 S, Mertz Rd., Caro, MI
48723.

Witnessed:

Board of Tuscola County Road Commissioners

Contractor

Contractor bid will not be accepted unless the enclosed Agreement is Signed and Returned with you bid.

TUSCOLA COUNTY ROAD COMMISSION

Right - of - Way Permit Worksheet

Permit Fees & Proof of Insurance are required prior to review of the permit application

Date: _____

Applicant/Property Owner:

Name: _____

Address: _____

Phone: _____

Email: _____

Signature: _____

Contractor:

Name: _____

Address: _____

Phone: _____

Email: _____

Signature: _____

Project Locations:

Address: _____

Road: _____

Between: _____

And: _____

Township: _____ Section: _____

Project Description:

Type of Work:

Driveway: *Commercial Residential/Farm

Special Use: Utility Yard Enclosure

Road Crossing: Bore Open Cut

Misc.: _____

Material: *(If Known)*

**Pipe/Culvert Material: _____

Pipe/Culvert Diameter: _____

Pipe/Culvert Length: _____

***Backfill Material: _____

Reviewer's Recommendations:

**Additional Permit Standards & Policies apply, available upon Request*

Reviewer's Signature: _____

***Plastic, Concrete, or CMP (CMP may be purchased thru TCRC if placed in R-O-W)*

Flagged: _____

****A Copy of the Certified Mechanical Analysis & the Density Report are required for material placed under roadway*



8. TRAFFIC CONTROL POLICY

PURPOSE

The Tuscola County Road Commission manages traffic operations throughout the county and local road network to minimize vehicle crashes and maximize mobility.

POLICY

Traffic shall be maintained in accordance with Sections 812 and 922 of the 2020 Michigan Department of Transportation (MDOT) Standard Specifications for Construction, including any Supplemental Specifications, and as herein specified.

LOCATION OF WORK

- A. **Work outside of the shoulder** – occurs when equipment, personnel, and/or material “is confined to an area 5 feet or more from the edge of the traveled way”
- B. **Work on the shoulder**– when equipment, personnel, and/or material is confined to the shoulder without reducing any width of the traveled way. Edge of pavement to 5 feet.
- C. **Work within the traveled way** – work that exceeds the definition of any work previously described in parts A through B.

Location A. signing for work outside of the shoulder shall be according to the MDOT Maintaining Traffic typical [4000-M-SHL-OUT](#). Additional signage maybe required at Engineers discretion depending on number of personal & equipment in the ROW.

Location B. signing for a shoulder closure shall be according to attached MDOT Maintaining Traffic Typical [122-NFW-SHL-\(R\)](#).

Location C. work that exceeds the boundaries set by Parts A and B shall be completed in a single lane closure detailed according to a MDOT typical [110-TR-NFW-2L](#). Any alterations to this typical must be approved by the engineer prior to implementation of the TTC plan.

CONSTRUCTION INFLUENCE AREA

The construction influence area (CIA) shall consist of the width of the project right-of-way from 3,500 feet before the project P.O.B. to 3,500 feet beyond the project P.O.E. and 1,500 feet in all directions along all crossroads.



TRAFFIC CONTROL DEVICES

All traffic control devices and their usage shall conform to the Michigan Manual on Uniform Traffic Control Devices (MMUTCD), 2011 edition as amended, and as herein specified.

Sign covers shall be placed over existing regulatory, warning and construction signs that are not applicable during construction.

Arrow boards are to be placed and used in a manner that allows for the signal board to be “clearly legible at distances from 2500 feet to 200 feet, from all traffic lanes and roadway entrances. Do not place the lighted arrow on a horizontal or vertical curve that might interfere with this legibility requirement” – MDOT typical Sheet [104-GEN-AB](#).

Reflective sheeting must meet or exceed the requirements of ASTM D4956 for Type VIII reflective sheeting on rigid signs. Reflective sheeting must meet or exceed the requirements of ASTM D4956 for Type VI reflective sheeting on flexible, roll-up signs. Orange sheeting must be fluorescent orange reflective sheeting.

FLAGGER/TRAFFIC REGULATORS

Traffic regulators are required to have completed the Michigan Traffic Regulator training within 12 months prior to performing any traffic regulating duties.

Traffic regulators and workers must conform with paragraph 4 of Section 6D.03 (MMUTCD) as quoted below.

Traffic Control for a one-lane, two-way traffic control shall be conducted in accordance with Section 6C.11 of the MMUTCD and as herein modified.

“Traffic should be controlled by a traffic regulator at each end of a constricted section of roadway. One of the traffic regulators should be designated as the coordinator. To provide coordination of the control of the traffic, traffic regulators should be able to communicate with each other orally, electronically, or with manual signs. These manual signals should not be mistaken for traffic regulating signals. Any alternative options must be approved by the engineer.”

Alternatively, traffic control may be conducted via an automated flagger assistance device or pilot car as stated by the MMUTCD, except as modified herein w/ prior approval from the Engineer.



ALL WORKERS IN ROW

“All workers, including emergency responders, within the right-of-way who are exposed either to traffic (vehicles using the highway for purposes of travel) or to work vehicles and construction equipment with the Temporary Traffic Control (TTC) zone shall wear high-visibility safety apparel that meets the Performance Class 2 or 3 requirements of the ANSI/ISEA 107-2004 publication entitled "American National Standard for High-Visibility Safety Apparel and Headwear" (see Section 1A.11), or equivalent revisions, and labeled as meeting the ANSI 107-2004 standard performance for Class 2 or 3 risk exposure, except as provided in Paragraph 5 (MMUTCD). A person designated by the employer to be responsible for worker safety shall make the selection of the appropriate class of garment.”

WORK DURATION

Work duration is a major factor in determining the number and types of devices used in TTC zones. The duration of a TTC zone is defined relative to the length of time a work operation occupies a spot location.

Standard

The four categories of work duration and their time at a location shall be:

- A. Intermediate-term stationary is work that occupies a location more than one daylight period up to 3 days or more.
- B. Short-term stationary is daytime work that occupies a location for more than 1 hour within a single daylight period.
- C. Short duration is work that occupies a location up to 1 hour.
- D. Mobile is work that moves intermittently or continuously.”

In addition, work shall be conducted during daylight hours only. No work shall be conducted on Sundays unless approved by the Engineer. The maximum distance between the traffic regulators shall be no more than 2 miles in length. All sequences of more than 2 miles in length will require written permission from the Engineer before proceeding.

Traffic Control for work conducted on the shoulder shall be in accordance with section 6H.01 of the MMUTCD as modified herein.

- a. **Short duration or mobile operations on the shoulder** – “Stationary warning signs may be omitted if the work vehicle displays high-intensity rotating, flashing, oscillating, or strobe lights. If an arrow board is used, the caution mode shall be used. Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.”
- b. **Short-term or intermediate-term work on the shoulder without encroachment** – “When paved shoulders having a width of 8 feet or more are closed, at least one advance warning sign shall be used. In addition, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct vehicular traffic to remain



- within the traveled way. Alternatively, traffic regulation shall be in accordance with MDOT typical 122-NFW-SHL-(R).”
- c. **Work on the shoulder with encroachment** – “Where the opposite shoulder is suitable for carrying vehicular traffic and of an adequate width, lanes may be shifted by use of closely-spaced channelizing devices, provided that the minimum lane width of 10 feet is maintained. Otherwise, a lane closure shall be employed in accordance with MDOT typical 110-TR-NFW-2L.”
 - d. Work extending beyond the criteria above shall have traffic control in accordance with MDOT typical 110-TR-NFW-2L or result in a full road closure.

ATTACHMENTS

| <u>MDOT TYPICAL</u> | <u>Pg.</u> |
|---|-------------------|
| <u>101-GEN-SPACING-CHARTS</u> | 33 |
| <u>102-GEN-NOTES</u> | 36 |
| <u>103-GEN-SIGN</u> | 38 |
| <u>104-GEN-AB</u> | 43 |
| <u>110-TR-NFW-2L</u> | 44 |
| <u>122-NFW-SHL-(R)</u> | 45 |
| <u>4000-M-SHL-OUT</u> | 46 |

Maintaining Traffic Typical can also be found on MDOT’s website:
<https://mdotboss.state.mi.us/TSSD/tssdHome.htm>.

DISTANCE BETWEEN TRAFFIC SIGNS, "D"

| "D" DISTANCES | POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA) | | | | | | | | | | |
|------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
| D (FEET) | 250 | 300 | 350 | 400 | 450 | 500 | 550 | 600 | 650 | 700 | 750 |

GUIDELINES FOR LENGTH OF LONGITUDINAL BUFFER SPACE, "B"

| "B" LENGTHS | SPEED* MPH (PRIOR TO WORK AREA) | | | | | | | | | | | |
|----------------|---------------------------------|----|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
| B (FEET) | 33 | 50 | 83 | 132 | 181 | 230 | 279 | 329 | 411 | 476 | 542 | 625 |

* POSTED SPEED, OFF-PEAK 85TH PERCENTILE SPEED PRIOR TO WORK STARTING, OR THE ANTICIPATED OPERATING SPEED.

MINIMUM MERGING TAPER LENGTH, "L" (FEET)

| OFFSET (FEET) | POSTED SPEED LIMIT, MPH (PRIOR TO WORK AREA) | | | | | | | | | | |
|------------------|--|-----|-----|-----|-----|-----|-----|-----|-----|------|------|
| | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
| 1 | 11 | 15 | 21 | 27 | 45 | 50 | 55 | 60 | 65 | 70 | 75 |
| 2 | 21 | 30 | 41 | 54 | 90 | 100 | 110 | 120 | 130 | 140 | 150 |
| 3 | 32 | 45 | 62 | 80 | 135 | 150 | 165 | 180 | 195 | 210 | 225 |
| 4 | 42 | 60 | 82 | 107 | 180 | 200 | 220 | 240 | 260 | 280 | 300 |
| 5 | 53 | 75 | 103 | 134 | 225 | 250 | 275 | 300 | 325 | 350 | 375 |
| 6 | 63 | 90 | 123 | 160 | 270 | 300 | 330 | 360 | 390 | 420 | 450 |
| 7 | 73 | 105 | 143 | 187 | 315 | 350 | 385 | 420 | 455 | 490 | 525 |
| 8 | 84 | 120 | 164 | 214 | 360 | 400 | 440 | 480 | 520 | 560 | 600 |
| 9 | 94 | 135 | 184 | 240 | 405 | 450 | 495 | 540 | 585 | 630 | 675 |
| 10 | 105 | 150 | 205 | 267 | 450 | 500 | 550 | 600 | 650 | 700 | 750 |
| 11 | 115 | 165 | 225 | 294 | 495 | 550 | 605 | 660 | 715 | 770 | 825 |
| 12 | 125 | 180 | 245 | 320 | 540 | 600 | 660 | 720 | 780 | 840 | 900 |
| 13 | 136 | 195 | 266 | 347 | 585 | 650 | 715 | 780 | 845 | 910 | 975 |
| 14 | 146 | 210 | 286 | 374 | 630 | 700 | 770 | 840 | 910 | 980 | 1050 |
| 15 | 157 | 225 | 307 | 400 | 675 | 750 | 825 | 900 | 975 | 1050 | 1125 |

NOT TO SCALE

| | | | | |
|--|--------------|-----------------------------|---|----------------|
| | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | "B", "D" AND "L" TABLES CHANNELIZING DEVICE SPACING, SIGN BORDER KEY, AND ROLL-AHEAD SPACING | DATE: MAY 2021 |
| | | NO. 101-GEN-SPACING-CHARTS | | SHEET: 1 OF 3 |

FILE: 101-GEN-SPACING-CHARTS.dgn

THE FORMULAS FOR THE MINIMUM LENGTH OF A MERGING TAPER IN DERIVING THE "L" VALUES SHOWN IN THE ABOVE TABLES ARE AS FOLLOWS:

$L = \frac{W \times S^2}{60}$ WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 40 MPH OR LESS

$L = W \times S$ WHERE POSTED SPEED PRIOR TO THE WORK AREA IS 45 MPH OR GREATER

L = MINIMUM LENGTH OF MERGING TAPER
S = POSTED SPEED LIMIT IN MPH PRIOR TO WORK AREA
W = WIDTH OF OFFSET

TYPES OF TAPERS

UPSTREAM TAPERS
MERGING TAPER
SHIFTING TAPER
SHOULDER TAPER
2 TO 1 LANE ROAD TAPER

DOWNSTREAM TAPERS
(USE IS RECOMMENDED)

TAPER LENGTH

L - MINIMUM
1/2 L - MINIMUM
1/3 L - MINIMUM
100' - MAXIMUM

100' (PER LANE)

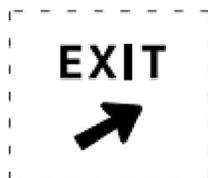
MAXIMUM SPACING FOR CHANNELIZING DEVICES

| WORK ZONE SPEED LIMIT | DRUM AND 42" DEVICE SPACING (FT) | | NIGHTTIME 42" DEVICE SPACING (FT) | |
|-----------------------|----------------------------------|-----------------|-----------------------------------|---------|
| | TAPER | TANGENT | TAPER | TANGENT |
| < 45 MPH | 1 x SPEED LIMIT | 2 x SPEED LIMIT | 25 FEET | 50 FEET |
| ≥ 45 MPH | 50 FEET | 100 FEET | 25 FEET | 50 FEET |

SIGN OUTLINE KEY

DASHED OUTLINES INDICATE A SIGN THAT EXISTS ON SITE, AND NEEDS TO BE COVERED.

SOLID OUTLINES INDICATE A SIGN THAT IS TO BE PLACED ON THE PROJECT



NOT TO SCALE

| | | | | |
|--|--------------|-----------------------------|--|----------------|
| | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | "B", "D" AND "L" TABLES CHANNELIZING DEVICE SPACING SIGN BORDER KEY AND ROLL-AHEAD SPACING | DATE: MAY 2021 |
| | | NO. 101-GEN-SPACING-CHARTS | | SHEET: 2 OF 3 |

FILE: 101-GEN-SPACING-CHARTS.dgn

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES - TEST LEVEL 2

| WEIGHT OF TMA VEHICLE | PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE) | ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA) |
|-----------------------|--|--|
| 5.5 TONS (STATIONARY) | 40 MPH OR LESS | 25 FT |

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 4,410 POUND IMPACT VEHICLE WEIGHT.

GUIDELINES FOR ROLL-AHEAD DISTANCES FOR TMA VEHICLES - TEST LEVEL 3

| WEIGHT OF TMA VEHICLE | PREVAILING SPEED (POSTED SPEED PRIOR TO WORK ZONE) | ROLL-AHEAD DISTANCE* (DISTANCE FROM FRONT OF TMA VEHICLE TO WORK AREA) |
|-----------------------|--|--|
| 5 TONS (MOBILE) | 45 MPH | 100 FT |
| | 50-55 MPH | 150 FT |
| | 60-75 MPH | 175 FT |
| 12 TONS (STATIONARY) | 45 MPH | 25 FT |
| | 50-55 MPH | 25 FT |
| | 60-75 MPH | 50 FT |

* ROLL-AHEAD DISTANCES ARE CALCULATED USING A 10,000 POUND IMPACT VEHICLE WEIGHT.

| | | | |
|---|-----------------------------|--|----------------|
|  NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | "B", "D" AND "L" TABLES CHANNELIZING DEVICE SPACING SIGN BORDER KEY AND ROLL AHEAD SPACING | DATE: MAY 2021 |
| | NO: 101-GEN-SPACING-CHARTS | | SHEET: 3 OF 3 |

FILE: 101-GEN-SPACING-CHARTS.dgn

THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

GENERAL NOTES

- G1: SEE GEN-SPACING-CHARTS FOR COMMON VALUES INCLUDING:
D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
ROLL AHEAD DISTANCE
- G2: DISTANCE BETWEEN SIGNS, "D", THE VALUES FOR WHICH ARE SHOWN IN TYPICAL GEN-KEY ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- G3: ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING MUST MEET NATIONAL COOPERATIVE HIGHWAY RESEARCH PROGRAM REPORT 350 (NCHRP 350) TEST LEVEL 3, OR MANUAL FOR ASSESSING SAFETY HARDWARE (MASH TL-5 AS WELL AS THE CURRENT EDITION OF THE MICHIGAN MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, THE CURRENT EDITION OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS. ONLY DESIGNS AND MATERIALS APPROVED BY MDTOT WILL BE ALLOWED.
- G4: DO NOT STORE EQUIPMENT, MATERIALS OR PERFORM WORK IN ESTABLISHED BUFFER AREAS.
- G5: ALL EXISTING PAVEMENT MARKINGS WHICH ARE IN CONFLICT WITH EITHER PROPOSED CHANGES IN TRAFFIC PATTERNS OR PROPOSED TEMPORARY TRAFFIC MARKINGS SHALL BE REMOVED BEFORE ANY CHANGE IS MADE IN THE TRAFFIC PATTERN. EXCEPTION WILL BE MADE FOR TRAFFIC PATTERNS FOR WORK LESS THAN THREE DAYS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.

SIGN NOTES

- S1: ALL NON-APPLICABLE SIGNING WITHIN THE CIA MUST BE MODIFIED TO FIT CONDITIONS, COVERED, OR REMOVED, FOR GUIDANCE SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, SECTIONS 6.01.09 AND 6.01.10.
- S2: R5-18b SIGNS ARE ONLY REQUIRED ON FREEWAY PROJECTS WITH A DURATION OF 15 DAYS OR LONGER OR NON-FREEWAY PROJECTS WITH A DURATION OF 90 DAYS OR LONGER. TO APPLY THIS TYPICAL WITHOUT R5-18b SIGNS, REMOVE THE SIGNS AND CONSOLIDATE THE SEQUENCE AS APPROPRIATE.
- S3: R5-18c IS ONLY REQUIRED IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. OMIT THIS SIGN IN SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE.
- S4: ADDITIONAL SIGNING AND/OR ELONGATED SIGNING SEQUENCES SHOULD BE USED WHEN TRAFFIC VOLUMES ARE SIGNIFICANT ENOUGH TO CREATE BACKUPS BEYOND THE W20-5 SIGNS.
- S5: PLACE ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE WORK ZONE SPEED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK ZONE, OR AFTER EACH ENTRANCE RAMP THAT COMES ONTO THE FREEWAY WHERE THE REDUCED SPEED IS IN EFFECT. PLACE ADDITIONAL SPEED LIMIT SIGNS AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS ARE MORE THAN 2 MILES APART. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, PLACE ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED BEYOND THE LIMITS OF THE WORK AREA AS INDICATED. IF PERMANENT SIGNS DISPLAYING THE CORRECT SPEED LIMIT ARE POSTED, OMIT ALL W3-5b AND R2-1 SIGNS AND REDUCE SPACING ACCORDINGLY.
- S6: FABRICATE SPECIAL SIGNS IN ACCORDANCE WITH CURRENT SIGNING DESIGN STANDARDS.
- S7: PLACE ADDITIONAL R8-3 SIGNS AT A MAXIMUM 500' SPACING THROUGHOUT THE WORK ZONE.
- S8: WHEN SPEED LIMIT SIGNS CANNOT BE PLACED SIDE BY SIDE AS SHOWN, PLACE THEM "D" DISTANCE APART.
- S9: STOP SIGNS NOT REQUIRED IF SIGNALS ARE ON 4-WAY FLASHING RED. STOP AHEAD SIGNS ARE NOT REQUIRED IF THERE IS ADEQUATE VISIBILITY OF THE STOP SIGN OR IF SIGNALS ARE BEING USED TO CONTROL TRAFFIC.
- S10: PLACE REDUCED SPEED ZONE AHEAD SIGN (W3-5d) HERE WHEN USING A SPEED REDUCTION IN THIS DIRECTION.
- S11: THE NUMBER OF W1-6 SHIFT SIGNS TO PLACE FOR A SHIFT IS AS FOLLOWS:
SHIFTS 4FT OR LESS, PLACE ONE W1-6(R/L)
SHIFTS 5FT TO 12FT, PLACE TWO W1-6(R/L)
SHIFTS MORE THAN 12FT, PLACE THREE OR MORE W1-6(R/L) SIGNS DEPENDING UPON LENGTH OF SHIFT AND AS PER THE ENGINEER.
- S12: PLACE R2-1 SIGNS AS DETAILED IN NOTE S5 WHEN THERE IS A SPEED REDUCTION IN THIS DIRECTION

TRAFFIC REGULATOR NOTES

- TR1: TRAFFIC REGULATORS MUST FOLLOW ALL THE REQUIREMENTS IN THE STANDARD SPECIFICATIONS, THE STANDARD PLANS AND APPLICABLE SPECIAL PROVISIONS, THE CURRENT VERSIONS OF THE TRAFFIC REGULATOR'S INSTRUCTION MANUAL AND THE VIDEO "HOW TO SAFELY REGULATE TRAFFIC IN MICHIGAN". THE MAXIMUM DISTANCE BETWEEN THE TRAFFIC REGULATORS IS DETERMINED BY THE ROADWAY ADT, GEOMETRICS, AND AS DIRECTED BY THE ENGINEER.
- TR2: PROVIDE APPROPRIATE BALLOON LIGHTING TO SUFFICIENTLY ILLUMINATE TRAFFIC REGULATOR'S STATIONS WHEN TRAFFIC REGULATING IS ALLOWED DURING THE HOURS OF DARKNESS.
- TR3: PROVIDE EITHER A STOP/SLOW AFAD OR A RED/YELLOW LENS AFAD, MEETING THE REQUIREMENTS OF THE MMUTCD

TEMPORARY TRAFFIC CONTROL DEVICE NOTES

- TC01: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TAPER SHOULD NOT EXCEED 1.0 TIMES THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 50 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TAPERS ARE NOT TO EXCEED 25 FEET AT NIGHT.
- TC02: THE MAXIMUM DISTANCE IN FEET BETWEEN CHANNELIZING DEVICES IN A TANGENT SHOULD NOT EXCEED TWICE THE WORK ZONE SPEED LIMIT IN MPH FOR ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT LESS THAN 45 MPH AND SHOULD NOT EXCEED 100 FEET ON ROADWAYS WITH A POSTED WORK ZONE SPEED LIMIT OF 45 MPH OR GREATER. THE SPACING FOR 42 INCH CHANNELIZING DEVICE TANGENTS ARE NOT TO EXCEED 50 FEET AT NIGHT.
- TC03: TYPE III BARRICADES MUST BE LIGHTED FOR OVERNIGHT CLOSURES.
- TC04: WHEN THE HAUL ROAD IS NOT IN USE, PLACE LIGHTED TYPE III BARRICADES WITH "ROAD CLOSED" EXTENDING COMPLETELY ACROSS THE HAUL ROAD.
- TC05: USE OBJECT MARKER SIGNS IN LIEU OF THE TYPE B HIGH INTENSITY LIGHT SHOWN IN THE STANDARD PLAN FOR TEMPORARY CONCRETE BARRIER (R-53 AND R-126) WHEN USED WITH A TEMPORARY SIGNAL SYSTEM. THE OBJECT MARKERS MUST BE A MINIMUM OF 12 INCHES IN WIDTH AND 36 INCHES IN HEIGHT AND HAVE ORANGE AND WHITE RETROREFLECTIVE SHEETING. THE RETROREFLECTIVE SHEETING MUST HAVE ALTERNATING DIAGONAL ORANGE AND WHITE STRIPES SLOPING DOWNWARD AT AN ANGLE OF 45 DEGREES IN THE DIRECTION VEHICULAR TRAFFIC IS TO PASS.
- TC06: PLACE LIGHTED ARROW PANELS AS CLOSE TO THE BEGINNING OF TAPERS AS PRACTICAL, BUT NOT IN A MANNER THAT WILL OBSCURE OR CONFUSE APPROACHING MOTORISTS WHEN PHYSICAL LIMITATIONS RESTRICT PLACEMENT. IN CURBED SECTIONS, IF ARROW BOARD CANNOT BE PLACED BEHIND CURB, PLACE ARROW BOARD IN THE CLOSED LANE AS CLOSE TO THE BEGINNING OF TAPER AS POSSIBLE.
- TC07: ADDITIONAL TYPE III BARRICADES MAY BE REQUIRED TO COMPLETELY CLOSE OFF ROAD FROM EDGE OF PAVEMENT TO EDGE OF PAVEMENT.
- TC08: WHERE THE SHIFTED SECTION IS SHORTER THAN 600 FEET, A DOUBLE REVERSE CURVE SIGN (W4-1) CAN BE USED INSTEAD OF THE FIRST REVERSE CURVE SIGN AND THE SECOND REVERSE CURVE SIGN CAN BE OMITTED.
- TC09: RUMBLE STRIPS ARE TO BE PLACED AS SPECIFIED IN THE CONTRACT. IF NOT SPECIFIED IN THE CONTRACT, PLACE RUMBLE STRIPS AS SHOWN, AND IN ACCORDANCE WITH THE RUMBLE STRIP MANUFACTURER'S RECOMMENDATIONS. AN ARRAY OF RUMBLE STRIPS CONTAINS THREE RUMBLE STRIPS, PLACE THE RUMBLE STRIPS IN THE ARRAY AT A CONSISTENT DISTANCE BETWEEN 10' AND 20' APART.
- TC010: SEE THE WORK ZONE SAFETY AND MOBILITY MANUAL, PORTABLE CHANGEABLE MESSAGE SIGN GUIDELINES FOR RECOMMENDED AND CORRECT PCMS MESSAGING, STAGGER PCMS THAT ARE ON OPPOSING SIDES OF THE ROAD 1000 FEET FROM EACH OTHER.

RAMP NOTES

- RMP1: WHEN CONDITIONS ALLOW, E5-1 SIGNS MUST BE REMOVED OR COVERED AND CHANNELIZING DEVICES MUST BE POSITIONED TO ENABLE RAMP TRAFFIC TO DIVERGE IN A FREE MANNER
- RMP2: STOP AND YIELD CONDITIONS SHOULD BE AVOIDED WHENEVER PRACTICAL. WHEN CONDITIONS WARRANT, R1-1 SIGNS MAY BE USED IN PLACE OF R1-2 SIGNS. WHEN R-1 SIGNS ARE USED, W3-1 SIGNS MUST BE USED IN PLACE OF W3-2 SIGNS. CONSIDERATION SHOULD BE GIVEN TO CLOSING THE RAMP TO COMPLETE WORK TO ALLOW AN ADEQUATE MERGE DISTANCE. WORK SHOULD BE EXPEDITED TO AVOID THE STOP AND/OR YIELD CONDITIONS.

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|  Michigan Department of Transportation FILE: 102-GEN-NOTES.dgn | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | TRAFFIC TYPICALS NOTE SHEET | DATE: MAY 2022 |
| | | NO. 102-GEN-NOTES | | SHEET: 1 OF 2 |



THE FOLLOWING NOTES APPLY IF CALLED FOR ON THE TRAFFIC TYPICAL

SIGNAL NOTES

- SI01: EXISTING SIGNAL MUST BE EITHER 4-WAY FLASHING RED, BAGGED, OR TURNED OFF.
- SI02: SIGNAL IS IN OPERATION.
- SI03: DELINEATE THE WORK ZONE AREA WITH 28 INCH CONES FOR DAYTIME WORK, OR 42 INCH CHANNELIZING DEVICES FOR NIGHTTIME WORK.
- SI04: THE CONTRACTOR MUST HAVE A DESIGNATED SPOTTER IF THE AERIAL BUCKET TRUCK IS LOCATED OVER ACTIVE TRAVEL LANES.
- SI05: THE LOWEST POINT OF THE BUCKET MAY NOT TRAVEL BELOW 14 FOOT VERTICAL CLEARANCE. THE CONTRACTOR MUST UTILIZE AN ALTERNATE SET UP, OR PLACE THE INTERSECTION IN A 4 WAY STOP IF THE 14 FOOT VERTICAL CLEARANCE IS COMPROMIZED, USE TRAFFIC REGULATORS TO CONTROL TRAFFIC THROUGH THE INTERSECTION WHEN TRAFFIC IS PLACED IN A 4 WAY STOP.
- SI06: DELINEATE THE TRUCK WITH CHANNELIZING DEVICES. THE POSITION OF THE TRUCK MAY BE MOVED TO FACILITATE WORK.

MAINTENANCE AND SURVEYING NOTES

- MS1: WHENEVER STOPPING SIGHT DISTANCE EXISTS TO THE REAR, THE SHADOW VEHICLES SHOULD MAINTAIN THE RECOMMENDED DISTANCE FROM THE WORK AREA AND PROCEED AT THE SAME SPEED. THE SHADOW VEHICLE SHOULD SLOW DOWN AND TRAVEL AT A FARTHER DISTANCE TO PROVIDE ADEQUATE SIGHT DISTANCE IN ADVANCE OF VERTICAL OR HORIZONTAL CURVES.
- MS2: WORKERS OUTSIDE OF VEHICLES SHOULD WORK WITHIN 150' OF WORK VEHICLES WITH AN ACTIVATED BEACON, BETWEEN THE "BEGIN WORK CONVOY" SIGN AND THE "END WORK CONVOY" SIGN, OR BETWEEN THE "WORK ZONE BEGINS" AND "END ROAD WORK" SIGN.
- MS3: WORK OR SHADOW VEHICLES WITH OR WITHOUT A TMA MAY BE USED TO SEPARATE THE WORK SPACE FROM TRAFFIC, IF USED, THE VEHICLES SHOULD BE PARKED ACCORDING TO THE ROLL AHEAD DISTANCE TABLES.
- MS4: WORK AND SHADOW VEHICLES SHALL BE APPROPRIATELY EQUIPPED WITH AN ACTIVATED AMBER BEACON.
- MS5: WHEN WORKERS ARE OUTSIDE THEIR VEHICLES IN AN EXISTING LANE WHILE A MOBILE OPERATION IS OCCURRING DURING THE NIGHTTIME HOURS, CHANNELIZING DEVICES TO DELINEATE OPEN OR CLOSED LANES AT 50 FT SPACING MUST BE USED, AN EXAMPLE OF AN OPERATION (BUT NOT LIMITED TO) IS THE LAYOUT OF CONCRETE PATCHES.
- MS6: W21-6 AND W20-1 SIGNS MAY BE SUBSTITUTED AS DETERMINED BY THE TYPE OF WORK TAKING PLACE AS PER THE ENGINEER.

| | | | | |
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| | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | TRAFFIC TYPICALS NOTE SHEET | DATE: MAY 2022 |
| | | NO1 102-GEN-NOTES | | SHEET: 2 OF 2 |
| FILE: 102-GEN-NOTES.dgn | | | | |

SIGN NUMBER KEY

| | | | | | | | |
|---|---|--|--|---|---|---|---|
| E5-1F 48" x 48" 60" x 48" | E5-2 48" x 36" | E5-2a 48" x 36" | E5-3 48" x 36" | E13-1P VAR x 24" | E13-1aP 36" x 24" | G20-1 60" x 24" | G20-2 48" x 24" |
| G20-4 36" x 18" | 18" x 18" 24" x 24" 30" x 30" | M1-1 18" x 18" 24" x 24" 36" x 36" 48" x 48" | M1-1 22.5" x 18" 30" x 24" 45" x 36" 60" x 48" | M1-2 18" x 18" 24" x 24" 36" x 36" 48" x 48" | M1-2 22.5" x 18" 30" x 24" 45" x 36" 60" x 48" | M1-3 18" x 18" 24" x 24" 36" x 36" 48" x 48" | M1-3 22.5" x 18" 30" x 24" 45" x 36" 60" x 48" |
| M1-4 18" x 18" 24" x 24" 36" x 36" 48" x 48" | M1-4 22.5" x 18" 30" x 24" 45" x 36" 60" x 48" | M1-5 18" x 18" 24" x 24" 30" x 30" 36" x 36" | M1-5a 18" x 18" 24" x 24" | M1-6 18" x 18" 24" x 24" 36" x 36" | M1-6 22.5" x 18" 30" x 24" 45" x 36" | M3-1 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M3-2 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" |
| M3-3 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M3-4 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-1 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-1a 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-2 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-3 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-4 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-5 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" |
| M4-6 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-7 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-7a 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" | M4-8 12" x 6" 18" x 9" 24" x 12" 30" x 15" | M4-8a 24" x 18" | M4-8b 24" x 12" | M4-9 30" x 24" 48" x 36" 60" x 48" | M4-9a 30" x 24" 48" x 36" 60" x 48" |
| M4-9j 30" x 24" 48" x 36" 60" x 48" | M4-9kL 30" x 30" 48" x 42" 60" x 54" | M4-9kR 30" x 30" 48" x 42" 60" x 54" | M4-9mL 30" x 30" 48" x 42" 60" x 54" | M4-9mR 30" x 30" 48" x 42" 60" x 54" | M4-9dL 12" x 18" | M4-9dR 12" x 18" | M4-9e 12" x 18" |
| M4-9f 12" x 18" | M4-9gL 12" x 18" | M4-9gR 12" x 18" | M4-9h 12" x 24" | M4-9i 12" x 18" | M4-10L 48" x 18" | M4-10R 48" x 18" | M4-11a 12" x 6" 18" x 9" 24" x 12" 30" x 15" 36" x 18" |
| M5-1L 12" x 9" 21" x 15" 30" x 21" | M5-1R 12" x 9" 21" x 15" 30" x 21" | M5-2L 12" x 9" 21" x 15" 30" x 21" | M5-2R 12" x 9" 21" x 15" 30" x 21" | M5-3 12" x 9" 21" x 15" 30" x 21" | M6-1L 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-1R 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-2L 12" x 9" 18" x 12" 21" x 15" 30" x 21" |
| M6-2R 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-3 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-4 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-5 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-6L 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-6R 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-7L 12" x 9" 18" x 12" 21" x 15" 30" x 21" | M6-7R 12" x 9" 18" x 12" 21" x 15" 30" x 21" |

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS

| | | | | |
|---|--------------|-----------------------------|--------------------------------|-----------------|
| MDOT Michigan Department of Transportation | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | TRAFFIC TYPICALS SIGN SHEET | DATE: JUNE 2021 |
| | | NO: 103-GEN-SIGN | | SHEET: 1 OF 5 |

FILE: 103-GEN-SIGN.dgn

SIGN NUMBER KEY

| | | | | | | | | | | | | | |
|---|---|---|--|--|---|--|--|--|---|-----------------------|------------------------------------|-------------------------------------|--------------------------------------|
| N8-1GL 36" x 66" | N8-1GR 36" x 66" | N8-2D 60" x 48" | O1-3L 12" x 36" 24" x 48" 36" x 72" | O1-3R 12" x 36" 24" x 48" 36" x 72" | R1-1 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" | R1-1a 18" x 18" 24" x 24" | R1-2 18" 24" 30" 36" 48" 60" | | | | | | |
| R1-2aP 24" x 18" 36" x 30" 48" x 36" | R2-1 18" x 24" 24" x 30" 30" x 36" 36" x 48" 48" x 60" | R2-1a 48" x 60" | R3-1 24" x 24" 30" x 30" 36" x 36" 48" x 48" | R3-2 24" x 24" 30" x 30" 36" x 36" 48" x 48" | R3-3 24" x 24" 36" x 36" 48" x 48" | R3-4 24" x 24" 30" x 30" 36" x 36" 48" x 48" | R3-5L 30" x 36" 36" x 48" | | | | | | |
| R3-5R 30" x 36" 36" x 48" | R3-5a 30" x 36" 36" x 48" | R3-6L 30" x 36" 42" x 48" | R3-6R 30" x 36" 42" x 48" | R3-7L 30" x 30" 36" x 36" | R3-7R 30" x 30" 36" x 36" | R3-8c 36" x 30" | R3-8d 36" x 30" | | | | | | |
| R4-1 12" x 18" 18" x 24" 24" x 30" 36" x 48" 48" x 60" | R4-2 12" x 18" 18" x 24" 24" x 30" 36" x 48" 48" x 60" | R4-3 12" x 18" 18" x 24" 24" x 30" 36" x 48" 48" x 60" | R4-8 18" x 24" 24" x 30" 36" x 48" 48" x 60" | R4-9 18" x 24" 24" x 30" 36" x 48" 48" x 60" | R5-1 30" x 30" 36" x 36" 48" x 48" | R5-1a 30" x 18" 36" x 24" 42" x 30" | R5-18b 48" x 60" | | | | | | |
| R5-18c 48" x 48" | R5-18d 78" x 12" | R5-18e 72" x 12" | R5-18f 48" x 60" | R5-18g 30" x 42" | R5-18h 48" x 60" | R6-1L 36" x 12" 54" x 18" | R6-2L 12" x 16" 18" x 24" 24" x 30" 36" x 48" 48" x 60" | R6-2R 12" x 16" 18" x 24" 24" x 30" 36" x 48" 48" x 60" | R6-3 12" x 12" 18" x 18" 24" x 24" 36" x 36" 48" x 48" | R9-8 36" x 18" | R9-9 24" x 12" 30" x 18" | R9-10 24" x 12" 48" x 24" | R9-11L 24" x 12" 48" x 36" |
| R9-11R 24" x 12" 48" x 36" | R9-11GL 24" x 12" 48" x 24" | R9-11GR 24" x 12" 48" x 24" | R10-4b 36" x 54" | R11-2 48" x 30" | R11-2a 48" x 30" | R11-2b 48" x 30" | R11-2c 60" x 30" | | | | | | |
| R11-3a 60" x 30" | R11-3b 60" x 30" | R11-4 60" x 30" | SEE MDOT SMS 13-WORK ZONE FOR SIGN DETAILS | | | | | | | | | | |

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| NOT TO SCALE FILE: 103-GEN-SIGN.dgn | MAINTAINING TRAFFIC TYPICAL NO: 103-GEN-SIGN | TRAFFIC TYPICALS SIGN SHEET | DATE: JUNE 2021 SHEET: |
| | | | |

SIGN NUMBER KEY

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|---|---|---|---|--|--|---|---|
|  W1-1L 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-1R 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-2L 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-2R 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-2BL 36" x 36" 48" x 48" |  W1-2BR 36" x 36" 48" x 48" |  W1-3L 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-3R 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |
|  W1-4L 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-4R 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-4BL 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-4BR 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-4CL 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W1-4CR 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W24-1L 30" x 30" 36" x 36" 48" x 48" |  W24-1R 30" x 30" 36" x 36" 48" x 48" |
|  W24-1CL 30" x 30" 36" x 36" 48" x 48" |  W24-1CR 30" x 30" 36" x 36" 48" x 48" |  W24-1BL 36" x 36" 48" x 48" |  W24-1BR 36" x 36" 48" x 48" |  W1-6L 24" x 12" 36" x 18" 48" x 24" 60" x 30" 96" x 48" |  W1-6R 24" x 12" 36" x 18" 48" x 24" 60" x 30" 96" x 48" |  W1-8L 12" x 18" 18" x 24" 24" x 30" 30" x 36" 36" x 48" |  W1-8R 12" x 18" 18" x 24" 24" x 30" 30" x 36" 36" x 48" |
|  W3-1 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W3-2 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W3-3 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  BE PREPARED TO STOP 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  PREPARE TO STOP WITH FLASHING 30" x 30" 36" x 36" 48" x 48" |  W3-5 36" x 36" 48" x 48" |  30 MPH SPEED ZONE AHEAD 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  SPEEDER SPEED ZONE AHEAD 30" x 30" 36" x 36" 48" x 48" |
|  W4-1L 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W4-1R 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W4-2L 30" x 30" 36" x 36" 48" x 48" |  W4-2R 30" x 30" 36" x 36" 48" x 48" |  W4-3L 30" x 30" 36" x 36" 48" x 48" |  W4-3R 30" x 30" 36" x 36" 48" x 48" |  W4-5L 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W4-5R 24" x 24" 30" x 30" 36" x 36" 48" x 48" |
|  NO MERGE AREA 18" x 24" 24" x 30" |  W4-6L 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W4-6R 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  THRU TRAFFIC MERGE LEFT 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  THRU TRAFFIC MERGE RIGHT 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  ROAD NARROWS 30" x 30" 36" x 36" 48" x 48" |  NARROW BRIDGE 18" x 18" 30" x 30" 36" x 36" 48" x 48" |  ONE LANE BRIDGE 24" x 24" 30" x 30" 36" x 36" 48" x 48" |
|  RAMP NARROWS 30" x 30" 36" x 36" 48" x 48" |  W6-1 30" x 30" 36" x 36" 48" x 48" |  W6-2 30" x 30" 36" x 36" 48" x 48" |  W6-3 30" x 30" 36" x 36" 48" x 48" |  W6-4 12" x 18" |  W7-1 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W7-1a 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  BUMP 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |

SEE MOOT SHS 13-WORK ZONE FOR SIGN DETAILS

| | | | | |
|---|--------------|-----------------------------|--------------------------------|------------------|
|  File: 103-GEN-SIGN.dgn | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | TRAFFIC TYPICALS SIGN SHEET | DATE: JUNE 2021 |
| | | NO: 103-GEN-SIGN | | SHEET: 3 OF 5 |

SIGN NUMBER KEY

| | | | | | | | |
|---|--|--|--|--|---|---|--|
|  WB-2 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-3 18" x 18" 30" x 30" 36" x 36" 48" x 48" |  WB-4 18" x 18" 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-5 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-5P 24" x 18" 30" x 24" 36" x 30" |  WB-7 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-8 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-9 24" x 24" 30" x 30" 36" x 36" 48" x 48" |
|  WB-11 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-12 30" x 30" 36" x 36" 48" x 48" |  WB-14 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-15 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-15P 24" x 18" 30" x 24" 36" x 30" |  WB-17L 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-17R 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-17P 24" x 18" 30" x 24" 36" x 30" |
|  WB-18 24" x 24" 36" x 36" 48" x 48" |  WB-23 24" x 24" 36" x 36" 48" x 48" |  WB-24 30" x 30" 36" x 36" 48" x 48" |  WB-25 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-26 36" x 36" 48" x 48" |  WB-2L 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-2R 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-2L 30" x 30" 36" x 36" 48" x 48" |
|  WB-2R 30" x 30" 36" x 36" 48" x 48" |  WB-3C 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-3L 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-3R 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-3a 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-3b 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-10 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-10a 24" x 24" 30" x 30" 36" x 36" 48" x 48" |
|  WB-24 36" x 36" 48" x 48" |  WB-21 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  WB-22 18" x 18" 18" x 18" 30" x 30" 36" x 36" 48" x 48" |  WB-1P 18" x 18" 24" x 24" 30" x 30" |  WB-2 24" x 30" 36" x 48" 48" x 60" |  WB-3 24" x 30" 36" x 48" 48" x 60" |  WB-4P 24" x 24" 36" x 36" |  WB-6 24" x 42" 36" x 60" 48" x 84" |
|  WB-6a 24" x 42" 36" x 60" 48" x 84" |  WB-7 24" x 42" 36" x 60" 48" x 84" |  WB-7a 24" x 42" 36" x 60" 48" x 84" |  WB-3 36" x 24" 40" x 30" 48" x 36" 64" x 48" |  WB-2P 18" x 12" 24" x 18" 30" x 24" |  WB-4aP 18" x 12" 24" x 18" 30" x 24" 36" x 30" |  WB-12P 24" x 18" |  WB-13P 24" x 18" 30" x 24" |
|  WB-20-1 24" x 24" 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-20-1a 24" x 24" 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-20-1b 24" x 24" 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-20-1c 24" x 24" 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-20-1d 24" x 24" 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  WB-20-2 30" x 30" 36" x 36" 48" x 48" |  WB-20-3 30" x 30" 36" x 36" 48" x 48" |  WB-20-3a 30" x 30" 36" x 36" 48" x 48" |

SEE MOOT SHS 13-WORK ZONE FOR SIGN DETAILS

| | | | | |
|---|--------------|-----------------------------|----------------------------|-----------------|
|  | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | TRAFFIC TYPICAL SIGN SHEET | DATE: JUNE 2021 |
| | | NO: 103-GEN-SIGN | | SHEET: 4 OF 5 |

FILE: 103-GEN-SIGN.dgn

SIGN NUMBER KEY

| | | | | | | | |
|--|--|--|--|--|---|--|--|
|  W20-3b 30" x 30" 36" x 36" 48" x 48" |  W20-4 30" x 30" 36" x 36" 48" x 48" |  W20-4c 36" x 36" 48" x 48" |  W20-5C 30" x 30" 36" x 36" 48" x 48" |  W20-5L 30" x 30" 36" x 36" 48" x 48" |  W20-5L1 30" x 30" 36" x 36" 48" x 48" |  W20-5L2 30" x 30" 36" x 36" 48" x 48" |  W20-5R 30" x 30" 36" x 36" 48" x 48" |
|  W20-5R1 30" x 30" 36" x 36" 48" x 48" |  W20-5R2 30" x 30" 36" x 36" 48" x 48" |  W20-5dL2 30" x 30" 36" x 36" 48" x 48" |  W20-5dL3 30" x 30" 36" x 36" 48" x 48" |  W20-5dR2 30" x 30" 36" x 36" 48" x 48" |  W20-5dR3 30" x 30" 36" x 36" 48" x 48" |  W20-7a 30" x 30" 36" x 36" 48" x 48" |  W20-8 24" x 18" |
|  W20-9 54" x 48" |  W20-10 48" x 24" 66" x 30" |  W20-11 12" x 18" |  W20-12P VARIABLE x 12" |  W20-13P VARIABLE x 12" |  W20-14L 36" x 36" 48" x 48" |  W20-14R 36" x 36" 48" x 48" |  W20-14aP 36" x 12" 48" x 12" |
|  W20-14bP 36" x 12" 48" x 12" |  W20-15 36" x 36" 48" x 48" |  W20-15a 36" x 36" 48" x 48" |  W20-15c 48" x 54" |  W20-15d 48" x 54" |  W20-16 36" x 36" 48" x 48" |  W20-17 36" x 36" 48" x 48" |  W21-1 24" x 24" 30" x 30" 36" x 36" 48" x 48" |
|  W21-2 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W21-2 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W21-3 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W21-4 36" x 18" |  W21-5 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W21-5dL 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  W21-5dR 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  W21-5dL 30" x 30" 36" x 36" 48" x 48" 60" x 60" |
|  W21-5bR 30" x 30" 36" x 36" 48" x 48" 60" x 60" |  W21-6 24" x 24" 30" x 30" 36" x 36" 48" x 48" |  W21-7 30" x 30" 36" x 36" 48" x 48" |  W21-8 30" x 30" 36" x 36" 48" x 48" |  W22-1 30" x 30" 36" x 36" 48" x 48" |  W22-2 42" x 36" |  W22-3 36" x 30" 42" x 36" |  W23-1 48" x 24" |
|  W23-2 36" x 36" 48" x 48" | | | | | | | |

SEE MDOT SHS 13-WORK ZONE FOR SIGN DETAILS



NOT TO SCALE

MAINTAINING TRAFFIC TYPICAL

NO:

103-GEN-SIGN

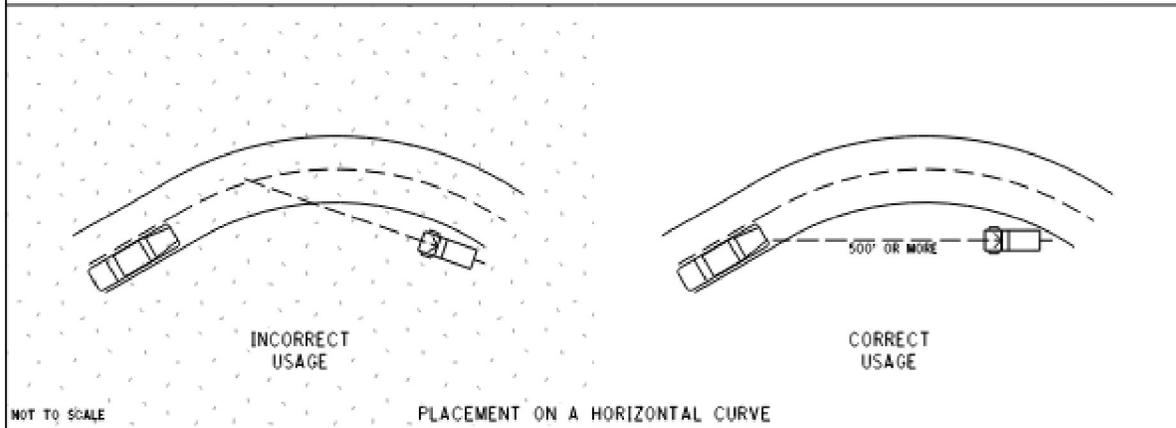
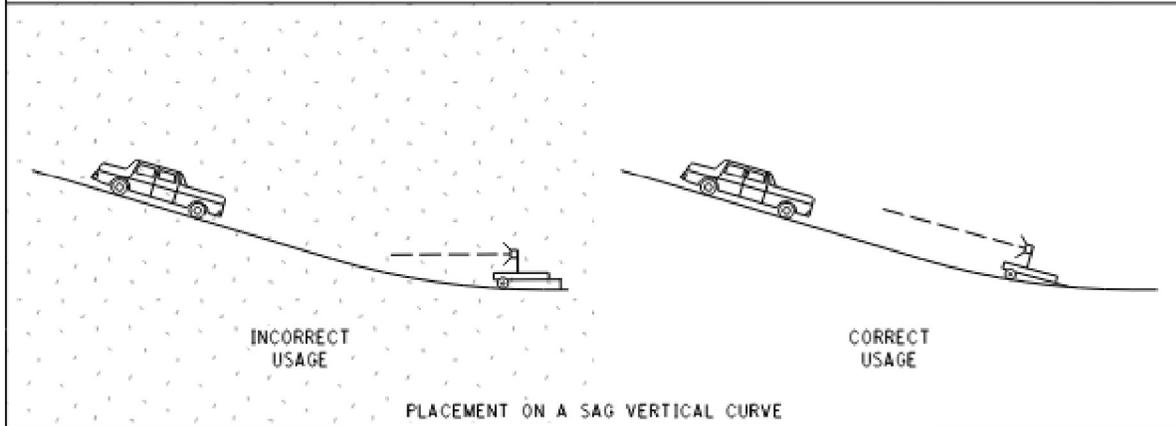
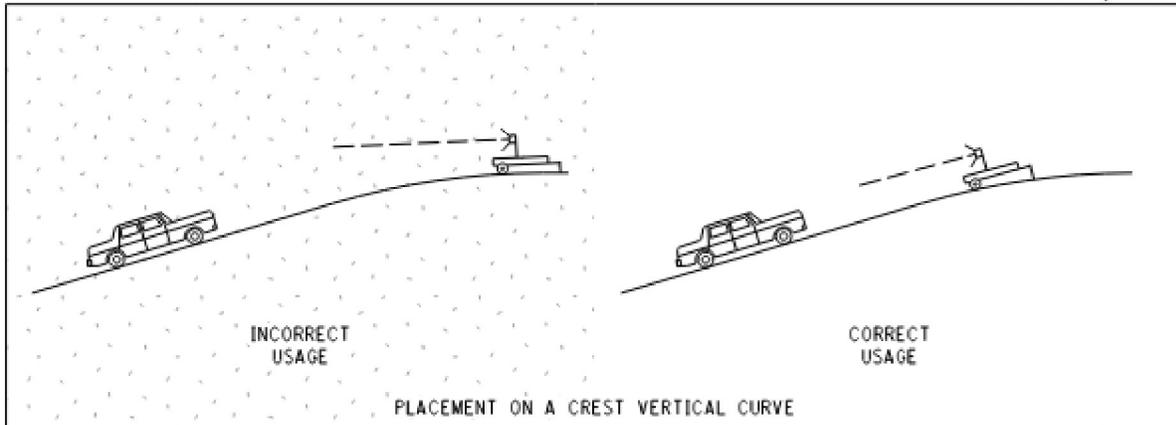
TRAFFIC TYPICALS
SIGN SHEET

DATE: JUNE 2021

SHEET:

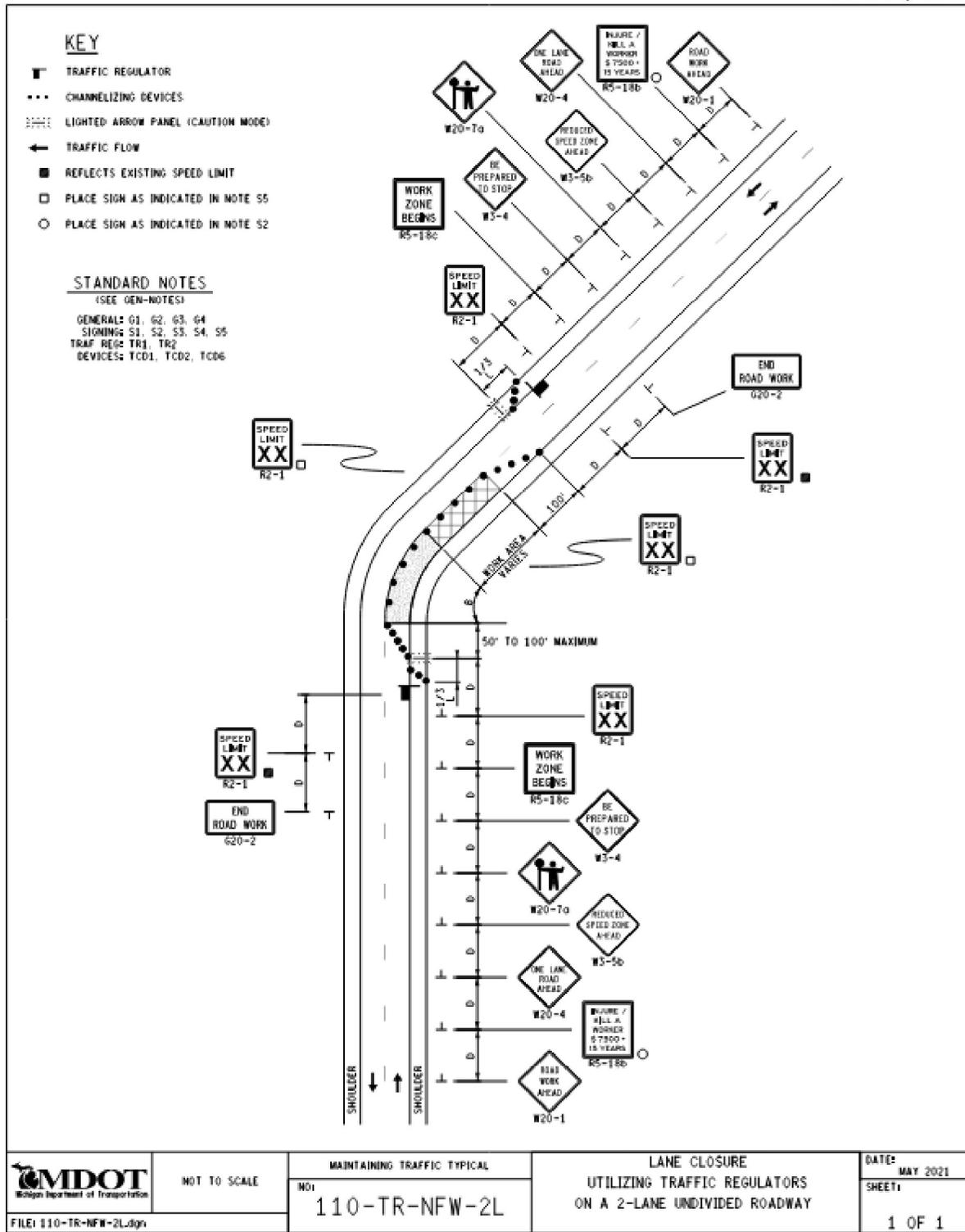
5 OF 5

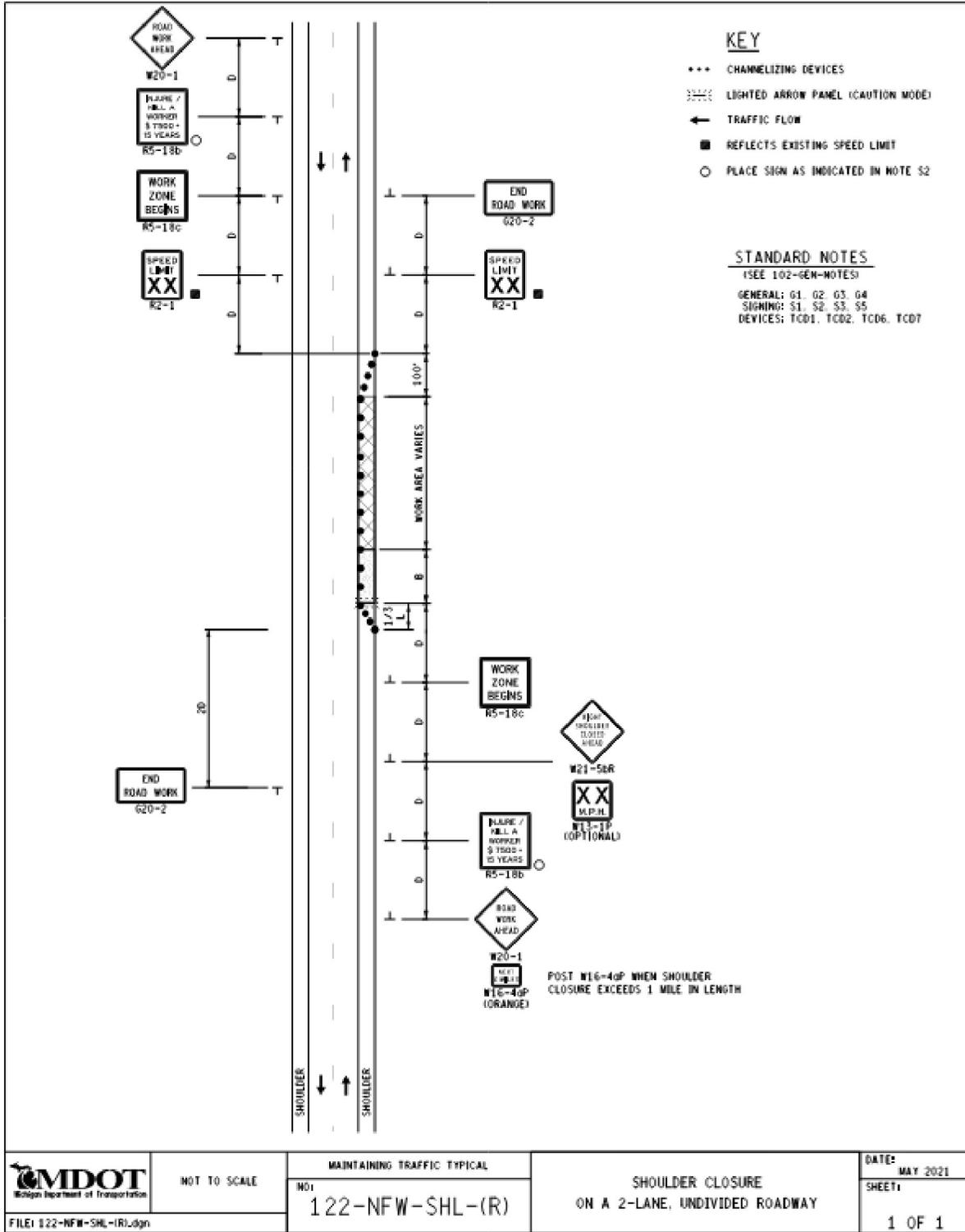
FILE: 103-GEN-SIGN.dgn



NOTE:
ENSURE THE ARROW REMAINS CLEARLY LEGIBLE AT DISTANCES FROM 2,500 FEET TO 200 FEET, FROM ALL TRAFFIC LANES AND ROADWAY ENTRANCES. DO NOT PLACE THE LIGHTED ARROW ON A HORIZONTAL OR VERTICAL CURVE THAT MIGHT INTERFERE WITH THIS LEGIBILITY REQUIREMENT.

| | | | | |
|---|--------------|-----------------------------|--|----------------|
|  FILE: 104-GEN-AB.dgn | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | USE OF ARROW BOARD ON HILL OR CURVE AND WORK ZONE LAYOUT | DATE: MAY 2021 |
| | | NO: 104-GEN-AB | | SHEET: 1 OF 1 |





| | | | |
|---|--------------|---|----------------|
|  | NOT TO SCALE | MAINTAINING TRAFFIC TYPICAL | DATE: MAY 2021 |
| | | NO1 122-NFW-SHL-(R) | SHEET: 1 OF 1 |
| FILE: 122-NFW-SHL-IRL.dgn | | SHOULDER CLOSURE ON A 2-LANE, UNDIVIDED ROADWAY | |

NOTES

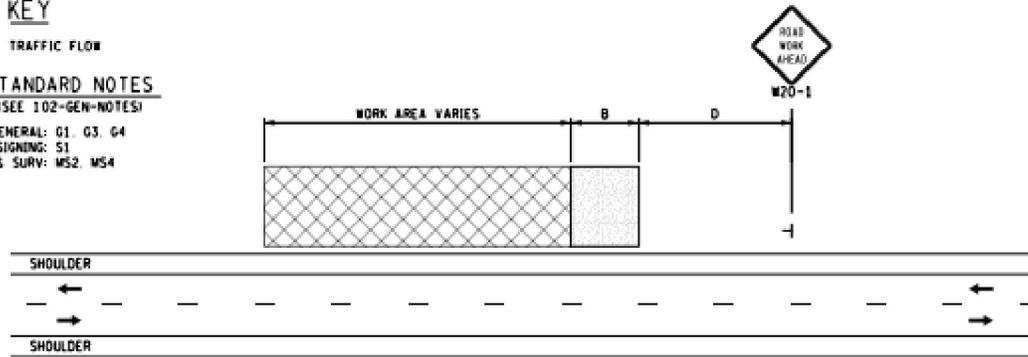
1. FOR SHORT-DURATION OR MOBILE OPERATIONS, NO SIGNS ARE REQUIRED IF APPROPRIATELY EQUIPPED VEHICLES ARE USED.
2. IF THE OPERATION HAS VEHICLE(S) PARKED ON THE SHOULDER OR VEHICLES ACCESSING THE WORK SITE VIA THE HIGHWAY OR CROSSING THE HIGHWAY TO PERFORM OPERATIONS, A "ROAD WORK AHEAD" SIGN OR AN ARROW BOARD IN CAUTION MODE SHALL BE USED.
3. WORK VEHICLES SHOULD BE PARKED AS FAR OFF THE TRAVELED WAY AS PRACTICAL.
4. IF THE WORK SPACE IS IN THE MEDIAN OF A DIVIDED ROADWAY, ADVANCE WARNING SIGNS SHALL BE PLACED IN BOTH DIRECTIONS OF TRAVEL.
5. VEHICLES AND PERSONNEL SHOULD ALL BE LOCATED AND PARKED ON THE SAME SIDE OF THE ROADWAY TO THE EXTENT PRACTICAL.

KEY

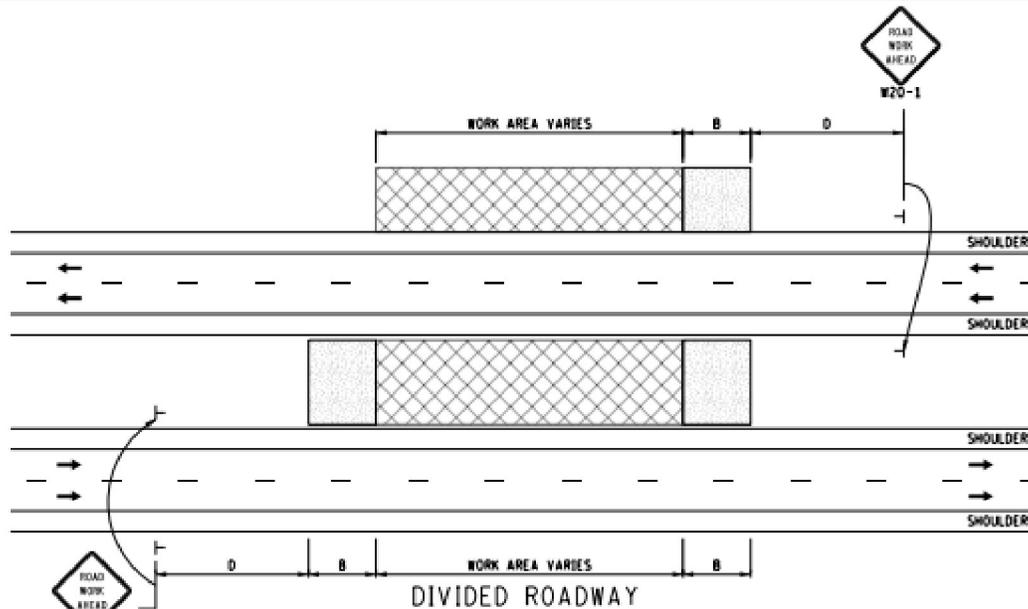
← TRAFFIC FLOW

STANDARD NOTES
(SEE 102-GEN-NOTES)

GENERAL: G1, G3, G4
SIGNING: S1
MAINT & SURV: MS2, MS4



TWO LANE, TWO WAY ROADWAY



DIVIDED ROADWAY

NOT TO SCALE



MAINTENANCE
MAINTAINING TRAFFIC
TYPICAL

DURATION:

ALL

WORK OUTSIDE SHOULDER

DATE: MAY 2021

NO: 4000-M-SHL-OUT

SHEET: 1 OF 1

FILE: 4000-M-SHL-OUT.dgn



9.7. INSURANCE REQUIREMENTS

| Agriculture Hauling Permit | |
|----------------------------|---|
| Type of Insurance | Notes |
| None | As required by Statute per the Attorney General Opinion |

| Oversize / Overweight Permits | | | | | | |
|-------------------------------|---|---------------|-----------------------|--------------------------|-------------|-----------------|
| Type of Insurance | Coverage Limits | Addl. Insured | Waiver of Subrogation | Primary/Non Contributory | Claims Made | Indemnification |
| Auto Liability | Michigan No Fault Coverage/Property Protection (PPI) \$1M Statutory Limit | No | No | No | No | Yes |

| Driveway Permit | |
|---|---|
| Individual Homeowner Permit Holder - Residential Driveway | |
| Type of Insurance | Notes |
| None | Advise homeowner they will be responsible for any damage done to the ROW |
| | Advise homeowner they will be responsible for any injuries as a result of the work in the ROW |
| | Advise homeowner they will be required to indemnify the RC as outlined in the ROW permit |

Contractor Permit Holder - Commercial or Residential Driveway

| Type of Insurance | Coverage Limits | Addl. Insured | Waiver of Subrogation | Primary/Non Contributory | Claims Made | Indemnification |
|------------------------------------|----------------------------|---------------|-----------------------|--------------------------|-------------|-----------------|
| Commercial General Liability (CGL) | Each Occurrence | No | No | No | No | Yes |
| | Products Comp/Op Aggregate | | | | | |
| | General Aggregate | | | | | |

| Special Event / Parade Permits | | | | | | |
|------------------------------------|-------------------|--|-----------------------|--------------------------|-------------|-----------------|
| Type of Insurance | Coverage Limits | Addl. Insured | Waiver of Subrogation | Primary/Non Contributory | Claims Made | Indemnification |
| Commercial General Liability (CGL) | Each Occurrence | Yes | Yes | Yes | No | Yes |
| | General Aggregate | | | | | |
| Notes | | For special events requiring participant waivers - Endeavor to have the RC added to the waiver. If alcohol is being served, host liquor liability is required. | | | | |

| General Right of Way Permit | |
|------------------------------------|---|
| Individual Homeowner Permit Holder | |
| Type of Insurance | Notes |
| None | Advise homeowner they will be responsible for any damage done to the ROW |
| | Advise homeowner they will be responsible for any injuries as a result of the work in the ROW |
| | Advise homeowner they will be required to indemnify the RC as outlined in the ROW permit |

Contractor Permit Holder

| Type of Insurance | Coverage Limits | Addl. Insured | Waiver of Subrogation | Primary/Non Contributory | Claims Made | Indemnification | |
|-------------------------------------|---|---------------|-----------------------|--------------------------|-------------|-----------------|-----|
| Commercial General Liability (CGL) | Each Occurrence | Yes | Yes | Yes | No | Yes | |
| | Products Comp/Op Aggregate | | | | | | |
| | General Aggregate | | | | | | |
| Auto Liability | Michigan No Fault Coverage/Property Protection (PPI) \$1M Statutory Limit | No | No | No | No | Yes | |
| Professional Liability, as required | Each Occurrence & Aggregate | \$2,000,000 | N/A | N/A | N/A | Yes | Yes |

Umbrella may be used to meet limit requirements: Commercial General Liability & Auto Liability
 Retro Date for Professional Liability must be prior to issuing permit date.
 It is recommended the Self Insured Retention (SIR) for CGL be no greater than \$25,000.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
MARSHALL HOT MIX ASPHALT MIXTURE

CFS:JWB

1 of 2

APPR:KPK:CJB:03-04-20
FHWA:APPR:03-13-20

a. Description. This work consists of furnishing a hot mix asphalt (HMA) mixture, designed using Marshall Mixture Design Methods, in accordance with the standard specifications except as modified by this special provision.

b. Mix Design. Submit the mix design for evaluation in accordance with the Department's *HMA Production Manual*. Use a 50 blow Marshall hammer when compacting mixtures for developing Marshall mix designs.

c. Recycled Mixtures. Substituting reclaimed asphalt pavement (RAP) for a portion of the new material required to produce the HMA mixture is allowed provided that the mixture is designed and produced to meet all criteria specified herein, unless otherwise prohibited. Ensure RAP materials are in accordance with the standard specifications.

d. Materials. Table 1 provides the mix design criteria and volumetric properties. Table 2 provides the required aggregate properties. Use aggregates of the highest quality available to meet the minimum specifications. Use the mixture designation number shown in the pay item name when determining mix design properties from Tables 1 and 2.

e. Measurement and Payment. The completed work, as described, will be measured and paid for at the contract unit price using the following pay item:

| | |
|--------------------------|-----------------|
| Pay Item | Pay Unit |
| HMA, <u>(type)</u> | Ton |

Table 1: Mix Design Criteria and Volumetric Properties

| | Mixture No. | | | | |
|---------------------------------|-------------|-------|-------|-------|-------|
| | 2C | 3C | 4C | 13A | 36A |
| Target Air Void, % (a) | 3.00 | 4.00 | 4.00 | 4.00 | 4.00 |
| VMA (min) (b) | 11.00 | 13.00 | 14.00 | 14.00 | 15.00 |
| VFA | 65-78 | 65-78 | 65-78 | 65-78 | 65-78 |
| Fines to Binder Ratio (max) (c) | 1.2 | 1.2 | 1.2 | 1.2 | 1.2 |
| Flow (0.01 inch) | 8-16 | 8-16 | 8-16 | 8-16 | 8-16 |
| Stability (min), lbs | 1200 | 1200 | 1200 | 900 | 900 |

- a. Lower target air voids by 1.00% if used in a separate shoulder paving operation. Consider reducing air void targets to 3.00% for lower traffic volume roadways when designing 13A and 36A mixtures for local agency use.
- b. VMA calculated using Gsb of the combined aggregates.
- c. Ratio of the weight of aggregate passing the No. 200 sieve to total asphalt binder content by weight; including fines and binder contributed by RAP.

Table 2: Aggregate Properties

| | Mixture No. | | | | |
|---|---|---------|---------|-------|--------|
| | 2C | 3C | 4C | 13A | 36A |
| | Percent Passing Indicated Sieve or Property Limit | | | | |
| 1½ inch | 100 | | | | |
| 1 inch | 91-100 | 100 | | | |
| ¾ inch | 90 max. | 91-100 | 100 | 100 | |
| ½ inch | 78 max. | 90 max. | 91-100 | 75-95 | 100 |
| ⅜ inch | 70 max. | 77 max. | 90 max. | 60-90 | 92-100 |
| No. 4 | 52 max. | 57 max. | 67 max. | 45-80 | 65-90 |
| No. 8 | 15-40 | 15-45 | 15-52 | 30-65 | 55-75 |
| No. 16 | 30 max. | 33 max. | 37 max. | 20-50 | |
| No. 30 | 22 max. | 25 max. | 27 max. | 15-40 | 25-45 |
| No. 50 | 17 max. | 19 max. | 20 max. | 10-25 | |
| No. 100 | 15 max. | 15 max. | 15 max. | 5-15 | |
| No. 200 | 3-6 | 3-6 | 3-6 | 3-6 | 3-10 |
| Crushed (min), % (MTM 117) | 90 | 90 | 90 | 25 | 60 |
| Soft Particle (max), % (a) | 12.0 | 12.0 | 8.0 | 8.0 | 8.0 |
| Angularity Index (min) (b) | 4.0 | 4.0 | 4.0 | 2.5 | 3.0 |
| L.A. Abrasion (max), % loss (c) | 40 | 40 | 40 | 40 | 40 |
| Sand Ratio (max) (d) | - | - | - | 50 | 50 |
| <ol style="list-style-type: none"> a. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 8.0 percent for aggregates used in top course. The sum of the shale, siltstone, structurally weak, and clay-ironstone particles must not exceed 12.0 percent for aggregates used in base and leveling courses. b. The fine aggregate angularity of blended aggregates, determined by MTM 118, must meet the minimum requirement. In mixtures containing RAP, the required minimum fine aggregate angularity must be met by the virgin material. NAA fine aggregate angularity must be reported for information only and must include the fine material contributed by RAP if present in the mixture. c. Los Angeles abrasion maximum loss must be met for the composite mixture, however, each individual aggregate must be less than 50 d. Sand ratio for 13A and 36A no more than 50% of the material passing the No. 4 sieve is allowed to pass the No. 30 Sieve. | | | | | |