

**BID PROPOSAL AND
SPECIFICATIONS**

FOR

CONCRETE LANE REPAIR

BOARD OF COUNTY ROAD COMMISSIONERS
OF THE COUNTY OF MASON

BID OPENING 10:00 A.M. – TUESDAY, July 28, 2015

PROPOSAL
CONCRETE LANE REPAIR

**To: Board of Mason County Road Commission
510 East State Street
P.O. Box 247
Scottville, Michigan 49454-0247**

The undersigned Michigan Department of Transportation (MDOT) approved contractor submits the following unit prices for Concrete Lane Repair on US-10. MDOT 2012 Standard Specifications shall apply, as modified herein and by the attached special provisions.

A. BID ITEMS

REFER TO ATTACHED SCHEDULE OF ITEMS BID SHEET, WHICH SHALL BE INCLUDED AS PART OF THIS BID PROPOSAL

B. PAYMENT TERMS:

Payment within 30 days of receipt of invoice if no issues.

C. Completion Date: All work shall be completed on or before September 25, 2015. The Mason County Road Commission reserves the right to add or delete bid quantities. Adjustment in unit prices shall be in accordance with MDOT Specifications Section 103.

Bids shall be in a sealed envelope, plainly marked "CONCRETE LANE REPAIR". The right is reserved by the Mason County Road Commission, to reject any and all bids, and to accept the bid that is in the best interest of the County and the MDOT.

Closing Date 10:00 am, TUESDAY, July 28, 2015

Mason County Road Commission

Schedule of Items (Itemized Bid Sheet)

Letting Date: Tuesday, July 28, 2015 10:00 AM

Contract ID: ConclnRepr2015
Location: US-10
Description: 85 square yards of Concrete Lane Repair at 2 locations including pavement removal, 9 inch concrete, contraction joints, lane ties and traffic control.

Project Number: ConclnRepr2015	Project Engineer: Wayne A. Schoonover, PE
Estimate Number: 1	Date Created: 7/1/2015
Project Type: Miscellaneous	Fed/State #:
Location: US-10	Fed Item:
	Control Section:

Description: 85 square yards of Concrete Lane Repair at 2 locations including pavement removal, 9 inch concrete, contraction joints, lane ties and traffic control.

Instructions to Bidders: IMPORTANT NOTICE:
If the proposal establishes a maximum price for any of the following work items, and if you bid a price higher than that maximum price, your bid will be considered to have quoted the maximum price and your bid total will be adjusted to reflect that maximum price.

If the proposal provides a specified price for any of the following work items, and if you bid a price higher or lower than that specified price, your bid will be adjusted to reflect that specified price.

If your bid is the lowest accepted bid, and if you refuse to accept the award of the contract due to the change in what you quoted as a maximum or specified price, you will forfeit your proposal guaranty.

Contractor: _____

Submitted by: _____

Address: _____

Email: _____

Business Phone: _____ Cell Phone: _____

Pay Item	Description	Quantity	Units	Unit Price		Bid Amount		
				Dollars	Cts	Dollars	Cts	
1500001	Mobilization, Max. ____ \$4030.00	1	LSUM					
6020200	Joint, Contraction, Cp	48	Ft					
6030005	Cement	1	Ton					
6030020	Joint, Contraction, Crg	48	Ft					
6030030	Lane Tie, Epoxy Anchored	40	Ea					
6030035	Non-Chloride Accelerator	42	Gal					
6030066	Pavt Repr, Reinf Conc, 9 inch	85	Syd					
6030080	Pavt Repr, Rem	85	Syd					
6030090	Saw Cut, Intermediate	120	Ft					
7127051	_ Traffic Control	1	LSUM					
Total Bid:								

Contractor: _____

(Signature)

(Date)

INSTRUCTIONS TO BIDDERS

1. CONTRACT DOCUMENTS

It is the intent of these contract documents to be as clear, complete, and consistent as possible.

2. BIDDER INVESTIGATION

The Bidder will be responsible for inspecting the multiple sites scheduled for repair and to determine all conditions under which he/she will be obligated to work. Site locations are provided to assist the Bidder in his investigation.

3. PROPOSAL PREPARATION

The name and legal status of the bidder, corporation, partnership or an individual shall be stated in the proposal. A corporation bidder shall name the state in which its Articles of Incorporation are held and must give the Title of the officer having authority, under the by-laws, to sign contracts. A partnership bidder shall give the full names and addresses of all partners. Anyone signing a proposal as an agent of another, or others, must submit with this proposal legal evidence of his authority to do so. The place of residence of each bidder, or the office address in case of a firm or company, with county and state, must be given after a signature.

The proposal shall be carefully prepared in strict accordance with these instructions, otherwise the bid may be rejected. The proposal for the work is on a unit price basis. All unit prices shall be completed in ink and the proposal legally signed in ink.

The unit prices stated in the proposal shall be plainly written. Illegibility of any work or figure in the proposal may be sufficient cause for rejection of the proposal.

Each proposal must be enclosed in a sealed envelope, addressed to the Mason County Road Commission, and labeled "CONCRETE LANE REPAIR."

The bids will be compared on the basis of comparison of the totals for the extensions of the stated unit prices. In case of an error in the preparation of the bid form, the unit prices shall be used.

4. BID SURETY

A Bid Bond or Certified Check must accompany this bid in an amount not less than five percent (5%) of the amount of the total bid, as based on quantities appearing on the form of the Proposal or other bid security as shall be outlined in the Proposal and/or the Special Provisions section of the Specifications. The bid bond or other security of the successful bidder will be held until the Contract has been duly executed.

5. PERFORMANCE BONDS AND INSURANCE

The successful bidder shall furnish performance and payment bonds in amounts equal to the contract bid price in such form and with such sureties licensed to conduct business in the State of Michigan. The successful bidder shall purchase and maintain such Public insurance that will protect him from claims under Workmen Compensation laws and Public Liability Insurance. The Contractor shall provide for and in behalf of the County, the Mason Board of County Road Commissioners, The Mason County Road Commission, and its employees Owners Protective Public Liability Insurance. A copy of all insurance coverage shall be submitted for approval prior to the award of a contract.

6. CHAPTER 11 PROCEEDINGS

The Commission reserves the right to waive consideration of any bid submitted by a bidder who either has or has pending the filing of a Chapter 11 proceedings.

7. TESTING

All materials shall be obtained from MDOT approved sources. Testing for compliance with 2012 MDOT Standards and Specifications shall be the responsibility of the Contractor, who shall provide copies of all tests done.

MCRC shall have performed Independent Assurance Tests (IAT) and split samples, at their cost.

In the event the IAT shows the material to be out of specification the split sample shall be sent to an independent lab for testing. The split sample result shall govern, if it agrees with the IAT the penalty shall be in accordance with MDOT Standard Specifications; if the split sample agrees with Contractors, no penalty.

The MCRC reserves the right to add or delete quantities as it deems necessary. Adjustments in unit prices shall be in accordance with MDOT Specification 103.

8. STANDARD SPECIFICATIONS

The 2012 Standard Specifications for Construction adopted by the Michigan Department of Transportation are hereby incorporated into these contract documents and shall apply unless otherwise noted. A copy of the "Standard Specifications" are available at the office of the Mason County Road Commission.

Specific References made in the contract documents will be shown as MDOT 0.0.00.

9. INSURANCE COVERAGE

The Contractor shall have a minimum insurance policy as described below:

General Liability	
Each Occurrence	\$1,000,000
Aggregate	\$2,000,000
Automotive Liability (minimum)	
Body Injury	\$ 500,000 per Person
	\$1,000,000 per
	Occurrence
Property Damage	\$1,000,000 per
	Occurrence
Workers Compensation	

The Contractor shall procure and maintain during the life of this contract, Worker's Compensation Insurance, including Employer Liability Coverage, in accordance with all applicable statutes of the State of Michigan. Additional Insured -- Commercial General Liability and Motor Vehicle Liability Insurance, as described above, shall include an endorsement stating the following shall be **Additional Insureds**. The Mason County Road Commission, its Board and all employees.

The Contractor agrees to hold the MCRC harmless and indemnify the MCRC from all claims or liability arising out of or pursuant to the contract provisions, including, but not limited to, the cost of defense, court costs, and any Judgment or settlement arising out of such claims.

The Contractor shall not commence work under this contract until they have obtained the insurance and bond required. All coverages shall be with insurance companies licensed and admitted to do business in the State of Michigan. All coverages shall be with insurance companies acceptable to the Mason County Road Commission.

PROJECT NOTES:

1. US-10 Project Locations: This contract includes two (2) site locations.
Center Lane – Two (2) site locations each approximately 42.5 syd, first being approximately 1450 ft. east of Pere Marquette Hwy intersection(near the Burger King), and the second being approximately 3075 ft. east of Pere Marquette Hwy intersection (near the East Fairgrounds Entrance).
 - i. Mobilization, Max. _____ 1 LS
 - ii. Joint, Contraction, Cp 48 Ft
 - iii. Cement 1 Ton
 - iv. Joint, Contraction, Crg 48 Ft
 - v. Lane Tie, Epoxy Anchored 40 Ea
 - vi. Non-Chloride Accelerator 42 Gal
 - vii. Pavt Repr, Reinf Conc, 9 inch 85 Syd
 - viii. Pavt Repr, Rem 85 Syd
 - ix. Saw Cut, Intermediate 120 Ft
 - x. Traffic Control 1 LS
2. The contractor shall furnish a detailed Progress Schedule to the Mason County Road Commission for approval. Any variation from the Progress Schedule must have prior approval of the Engineer.
3. Any request for a change in the contract must be made in writing to the Engineer at least 5 working days prior to the change being made.
4. All equipment is to be off the road at least one half hour before dark.
5. Temperature restrictions and weather limitations shall be in accordance with the MDOT 2012 Standard Specifications for Construction and will be strictly enforced
6. There will be no Saturday or Sunday work.
7. All work and materials shall be in accordance with Division 6, Portland Cement Concrete Pavements, of the MDOT 2012 Standard Specifications for Construction.

MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
MAINTAINING TRAFFIC

CADTSC:DJL

1 of 2

CADTSC:APPR

a. Description. This work will consist of maintaining traffic for concrete pavement repairs on US-10. Traffic shall be maintained according to the 2012 Standard Specifications for Construction and as specified herein.

b. Materials. n/a

c. Construction. All temporary traffic control devices shall be removed from the right-of-way within 72 hours of completion of the work.

1. Construction Influence Area (CIA).

The CIA limits shall include the roadway approaching and departing each structure a distance great enough to encompass the lead-in and departing signs in each direction of travel, also any intersecting street within these limits a distance adequate to place W20-1 signs (approx. 500') and all advance signing on.

2. Traffic Restrictions.

No work shall be permitted on Sundays, holidays, holiday weekends or during special events as defined by the Engineer. Traffic shall be maintained utilizing traffic signing sequences: M0050a, (Advance Signing Treatment); and M0380a, (CLFLTO+ two ATL) for the work near the Fair Grounds.

Only one work zone shall be utilized at a time.

3. Mobility Restrictions.

The access point and its location will require the prior approval of the Engineer. Commercial and residential driveways shall remain accessible at all times.

d. Measurement and Payment. The completed work for Traffic Control, including all labor, materials and equipment as required shall include, but not be limited to, the following items as described in the 2012 Standard Specifications for Construction:

- Minor Traffic Devices
- Sign, Type B, Temporary, Prismatic
- Lighted Arrows
- Sign Covers
- Plastic Drums
- Barricade, Type III

These items shall not be paid for separately, but will be included in and paid for at the unit price for the following contract item:

<u>Pay Item</u>	<u>Pay Unit</u>
Traffic Control	Lump Sum

Estimated quantities for the items above are provided for information only. They shall be included in the lump sum pay item for Traffic Control.

Estimates of Maintaining Traffic Quantities

Lighted Arrow, Type C, Furn,	2 Each
Lighted Arrow, Type C, Oper,	2 Each
Sign, Type B, Temp, Prismatic Furn	514 Square Foot
Sign, Type B, Temp, Prismatic Oper	514 Square Foot
Minor Traf Devices	1 Lump Sum
Sign Cover	3 Each
Plastic Drum, High Intensity, Furn.....	100Each
Plastic Drum, High Intensity, Oper.....	100Each
Barricade, Type III, High Intensity, Lighted, Furn.....	6
Each Barricade, Type III, High Intensity, Lighted, Oper.....	6
Each	

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
1	10	15	20	27	45	50	55	60	65	70
2	21	30	41	53	90	100	110	120	130	140
3	31	45	61	80	135	150	165	180	195	210
4	42	60	82	107	180	200	220	240	260	280
5	52	75	102	133	225	250	275	300	325	350
6	63	90	123	160	270	300	330	360	390	420
7	73	105	143	187	315	350	385	420	455	490
8	83	120	163	213	360	400	440	480	520	560
9	94	135	184	240	405	450	495	540	585	630
10	104	150	204	267	450	500	550	600	650	700
11	115	165	225	293	495	550	605	660	715	770
12	125	180	245	320	540	600	660	720	780	840
13	135	195	266	347	585	650	715	780	845	910
14	146	210	286	374	630	700	770	840	910	980
15	157	225	307	400	675	750	825	900	975	1050

TAPER LENGTH "L" IN FEET

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" = S x W 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
- TWO-WAY TRAFFIC TAPER

DOWNSTREAM TAPERS

(USE IS OPTIONAL)

TAPER LENGTH

- L - MINIMUM
- 1/2 L - MINIMUM
- 1/3 L - MINIMUM
- 100' - MAXIMUM
- 100' - MINIMUM (PER LANE)

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TABLES FOR "L", "D" AND "B" VALUES		
	DRAWN BY: CON:AE:djf	JUNE 2006	M0020a
CHECKED BY: BMM	PLAN DATE:	1 OF 2	
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn		REV.	08/21/2006

DISTANCE BETWEEN TRAFFIC CONTROL DEVICES "D"
AND LENGTH OF LONGITUDINAL BUFFER SPACE ON
"WHERE WORKERS PRESENT" SEQUENCES


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

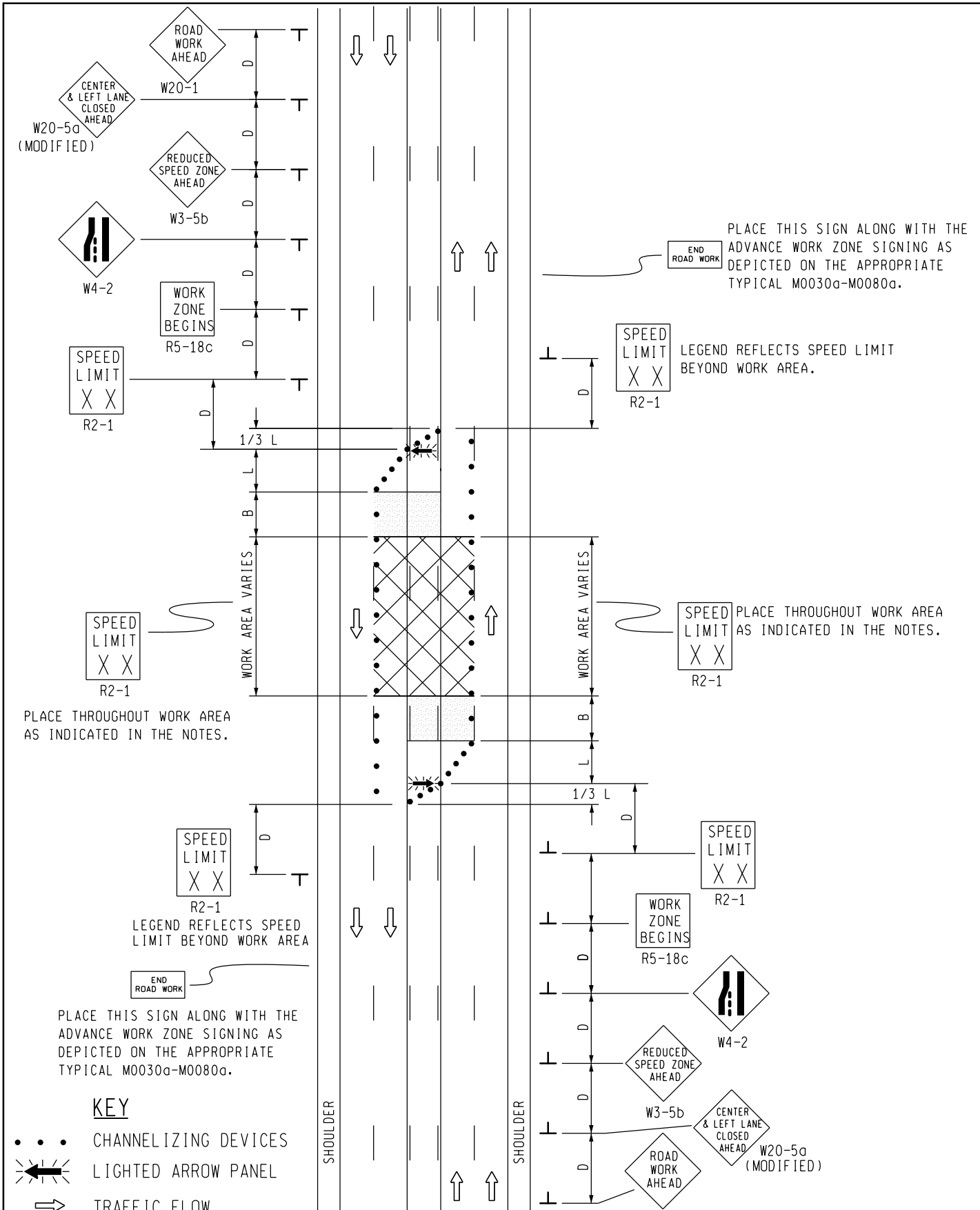
GUIDELINES FOR LENGTH OF
LONGITUDINAL BUFFER SPACE "B"

SPEED* MPH	LENGTH FEET
20	33
25	50
30	83
35	132
40	181
45	230
50	279
55	329
60	411
65	476
70	542

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

1 BASED UPON AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) BRAKING DISTANCE PORTION OF STOPPING SIGHT DISTANCE FOR WET AND LEVEL PAVEMENTS (A POLICY ON GEOMETRIC DESIGN OF HIGHWAY AND STREETS), AASHTO. THIS AASHTO DOCUMENT ALSO RECOMMENDS ADJUSTMENTS FOR THE EFFECT OF GRADE ON STOPPING AND VARIATION FOR TRUCKS.

 Michigan Department of Transportation TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TABLES FOR "L", "D" AND "B" VALUES		
	DRAWN BY: CON:AE:djf CHECKED BY: BMM	JUNE 2006 PLAN DATE:	M0020a
FILE: K:/DGN/TSR/STDS/ENGLISH/MNTTRF/M0020a.dgn REV. 08/21/2006			



PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA.

PLACE THROUGHOUT WORK AREA AS INDICATED IN THE NOTES.

PLACE THROUGHOUT WORK AREA AS INDICATED IN THE NOTES.

LEGEND REFLECTS SPEED LIMIT BEYOND WORK AREA

PLACE THIS SIGN ALONG WITH THE ADVANCE WORK ZONE SIGNING AS DEPICTED ON THE APPROPRIATE TYPICAL M0030a-M0080a.

KEY

- • • CHANNELIZING DEVICES
- ← LIGHTED ARROW PANEL
- TRAFFIC FLOW

SIGN = 240 ft x 2 - TYPE B PLUS ADDITIONAL R2-1's THROUGHOUT WORK AREA

<p>Michigan Department of Transportation</p> <p>TRAFFIC AND SAFETY</p> <p>MAINTAINING TRAFFIC</p> <p>TYPICAL</p>		<p>TYPICAL TEMPORARY TRAFFIC CONTROL FOR CLOSING A CENTER-LANE FOR LEFT TURN ONLY AND AN ADJACENT THROUGH LANE IN EACH DIRECTION ON A MULTI-LANE UNDIVIDED ROADWAY USING A SINGLE STEP DOWN IN SPEED LIMIT</p>	
<p>DRAWN BY: CON:AE:djf</p> <p>CHECKED BY: BMM:CRB</p>	<p>OCTOBER 2011</p> <p>PLAN DATE:</p>	<p>M0380a</p>	<p>SHEET</p> <p>1 OF 2</p>
<p>FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0380a.dgn REV. 10/18/2011</p>			

NOT TO SCALE


NOTES

- 1D. D = DISTANCE BETWEEN TRAFFIC CONTROL DEVICES
L & 1/3 L = MINIMUM LENGTH OF TAPER
B = LENGTH OF LONGITUDINAL BUFFER
SEE **M0020a** FOR "D," "L," AND "B" VALUES
2. ALL NON-APPLICABLE SIGNING WITHIN THE CIA SHALL BE MODIFIED TO FIT CONDITIONS, COVERED OR REMOVED.
3. DISTANCES BETWEEN SIGNS, THE VALUES FOR WHICH ARE SHOWN IN TABLE D, ARE APPROXIMATE AND MAY NEED ADJUSTING AS DIRECTED BY THE ENGINEER.
- 3A. THE "WORK ZONE BEGINS" (R5-18c) SIGN SHALL BE USED ONLY IN THE INITIAL SIGNING SEQUENCE IN THE WORK ZONE. SUBSEQUENT SEQUENCES IN THE SAME WORK ZONE SHALL OMIT THIS SIGN AND THE QUANTITIES SHALL BE ADJUSTED APPROPRIATELY.
- 4E. THE MAXIMUM RECOMMENDED DISTANCE(S) BETWEEN CHANNELIZING DEVICES SHOULD BE EQUAL IN FEET TO THE POSTED SPEED IN MILES PER HOUR ON TAPER(S) AND TWICE THE POSTED SPEED IN THE PARALLEL AREA(S).
5. FOR OVERNIGHT CLOSURES, TYPE III BARRICADES SHALL BE LIGHTED.
6. WHEN CALLED FOR IN THE FHWA ACCEPTANCE LETTER FOR THE SIGN SYSTEM SELECTED, THE TYPE A WARNING FLASHER, SHOWN ON THE WARNING SIGNS, SHALL BE POSITIONED ON THE SIDE OF THE SIGN NEAREST THE ROADWAY.
7. ALL TEMPORARY SIGNS, TYPE III BARRICADES, THEIR SUPPORT SYSTEMS AND LIGHTING REQUIREMENTS SHALL MEET NCHRP 350 CRASHWORTHLY REQUIREMENTS STIPULATED IN 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 MDOT WILL BE ALLOWED.
8. WHEN BUFFER AREAS ARE ESTABLISHED, THERE SHALL BE NO EQUIPMENT OR MATERIALS STORED OR WORK CONDUCTED IN THE BUFFER AREA.
- 16A. ADDITIONAL SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED SHALL BE PLACED AFTER EACH MAJOR CROSSROAD THAT INTERSECTS THE WORK AREA WHERE THE REDUCED SPEED IS IN EFFECT, AND AT INTERVALS ALONG THE ROADWAY SUCH THAT NO SPEED LIMIT SIGNS REFLECTING THE REDUCED SPEED ARE MORE THAN TWO MILES APART.
- 16B. WHEN REDUCED SPEED LIMITS ARE UTILIZED IN THE WORK AREA, ADDITIONAL SPEED LIMIT SIGNS RETURNING TRAFFIC TO ITS NORMAL SPEED SHALL BE PLACED BEYOND THE LIMITS OF THE REDUCED SPEED AS INDICATED.
- 16E. WHEN EXISTING SPEED LIMITS ARE REDUCED MORE THAN 10 MPH, THE SPEED LIMIT SHALL BE STEPPED DOWN IN NO MORE THAN 10 MPH INCREMENTS.
21. 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 DAYTIME-ONLY TRAFFIC PATTERNS THAT ARE ADEQUATELY DELINEATED BY OTHER TRAFFIC CONTROL DEVICES.
- 26C. THE LIGHTED ARROW PANEL SHALL BE LOCATED AT THE BEGINNING OF THE MERGING TAPER AS SHOWN. WHEN PHYSICAL LIMITATIONS RESTRICT ITS PLACEMENT AS INDICATED, THEN IT SHALL BE PLACED AS CLOSE TO THE BEGINNING OF THE MERGING TAPER AS POSSIBLE.

SIGN SIZES

DIAMOND WARNING - 48" x 48"
 RECTANGULAR REGULATORY - 48" x 60"
 R5-18c REGULATORY - 48" x 48"

NOT TO SCALE

 TRAFFIC AND SAFETY MAINTAINING TRAFFIC TYPICAL	TYPICAL TEMPORARY TRAFFIC CONTROL FOR CLOSING A CENTER-LANE FOR LEFT TURN ONLY AND AN ADJACENT THROUGH LANE IN EACH DIRECTION ON A MULTI-LANE UNDIVIDED ROADWAY USING A SINGLE STEP DOWN IN SPEED LIMIT		
	DRAWN BY: CON:AE:djf	OCTOBER 2011	M0380a
CHECKED BY: BMM:CRB	PLAN DATE:	2 OF 2	
FILE: PW RD/TS/Typicals/Signs/MT NON FWY/M0380a.dgn REV. 10/18/2011			

SIGN MATERIAL SELECTION TABLE

SIGN SIZE	SIGN MATERIAL TYPE		
	TYPE I	TYPE II	TYPE III
≤ 36" X 36"		X	X
>36" X 36" ≤ 96" TO WIDE		X	
> 96" WIDE TO 144" WIDE	X	X	
> 144" WIDE	X		

TYPE I ALUMINUM EXTRUSION
 TYPE II PLYWOOD
 TYPE III ALUMINUM SHEET

ROUNDING OF CORNERS IS NOT REQUIRED FOR TYPE I OR II SIGNS.
 VERTICAL JOINTS ARE NOT PERMITTED.
 HORIZONTAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE NOT PERMITTED.


POST SIZE REQUIREMENTS TABLE

SIGN AREA (ft ²)	POST TYPE		
	U-CHANNEL STEEL	SQUARE TUBULAR STEEL	WOOD
≤9	1 - 3 lb/ft*	1 - 2" 12 or 14 GA*	N/A
9 ≤ 20	2 - 3 lb/ft	2 - 2" 12 or 14 GA	1 - 4" X 6"*
> 20 ≤ 30	N/A	N/A	2 - 4" X 6"
> 30 ≤ 60	N/A	N/A	2 - 6" X 8"
> 60 ≤ 84	N/A	N/A	3 - 6" X 8"

*SIGNS 4 FEET AND GREATER IN WIDTH REQUIRE 2 POSTS.
 SIGNS GREATER THAN 8 FEET IN WIDTH REQUIRE 2 OR 3 WOOD
 POSTS DEPENDING ON AREA OF SIGN.
 A MAXIMUM OF 2 POSTS WITHIN A 7' PATH IS PERMITTED.

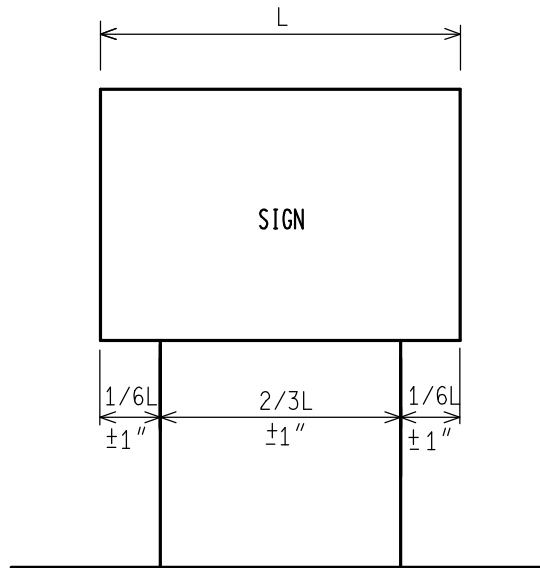
NOT TO SCALE

File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

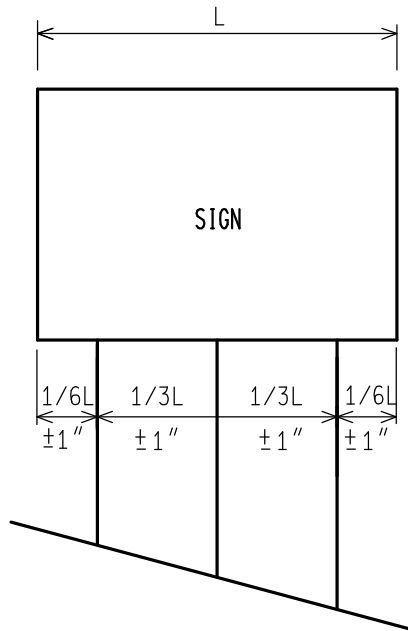
 Michigan Department of Transportation PREPARED BY TRAFFIC AND SAFETY SUPPORT AREA DRAWN BY: CON/ECH CHECKED BY: AUG	_____ ENGINEER OF DELIVERY _____ ENGINEER OF DEVELOPMENT PENDING _____ FHWA APPROVAL DATE	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR GROUND DRIVEN SIGN SUPPORTS FOR TEMP SIGNS		
	8/2006	WZD-100-A	SHEET 1 of 11	
	PLAN DATE			

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

2 POST SIGN SUPPORT SPACING



3 POST SIGN SUPPORT SPACING



* FOR ALL 11' AND 12' LONG SIGNS ON 3 WOOD SUPPORTS, SPREAD POSTS SO AS TO HAVE A 8' MIN. TO 9' MAX. DISTANCE BETWEEN OUTSIDE POSTS.

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
FHWA APPROVAL DATE

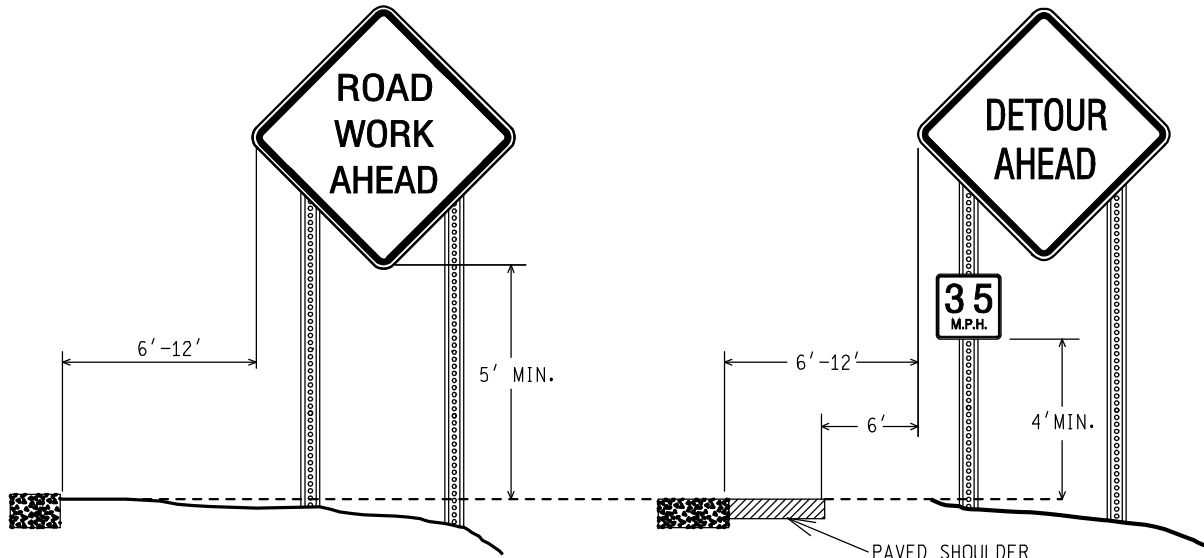
8/2006
PLAN DATE

WZD-100-A

SHEET
2 of 11

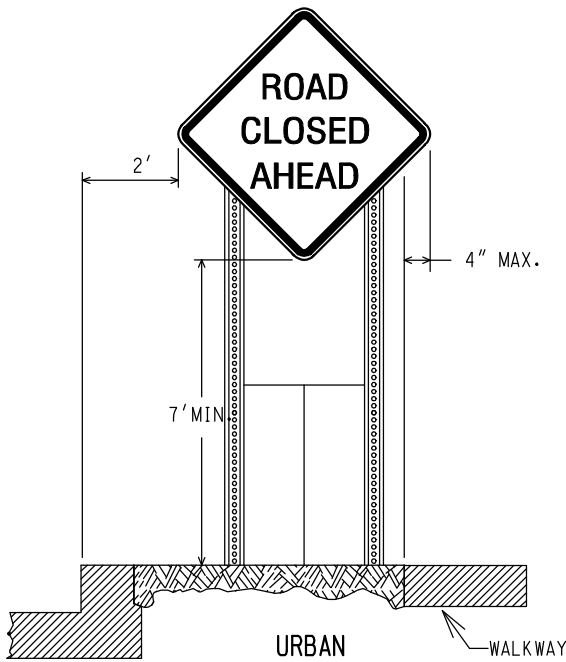
File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



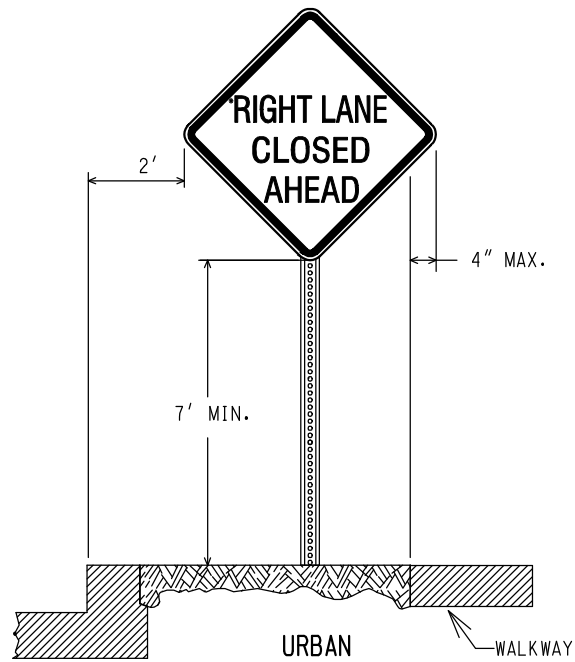
RURAL

RURAL WITH ADVISORY SPEED PLATE



URBAN

WALKWAY



URBAN

WALKWAY

(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)

(CURBED AREAS OR WHERE WALKWAYS ARE PRESENT)

BOTTOM HEIGHT AND OFFSET

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
FHWA APPROVAL DATE

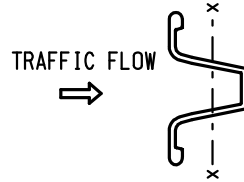
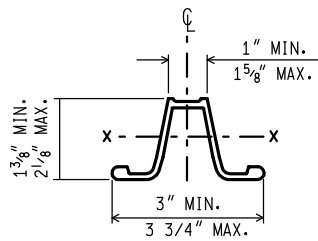
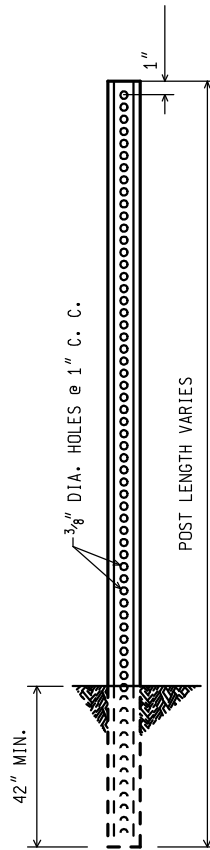
8/2006

PLAN DATE

WZD-100-A

SHEET
3 of 11

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



WEIGHT = 3 lbs/ft
 SECT. MOD. X.-X. = 0.31 CUBIC INCHES MIN.

3 lb. U - CHANNEL STEEL POST (NO SPLICE)

MOUNT SIGN ON OPEN FACE OF
 U - CHANNEL STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
 FHWA APPROVAL DATE

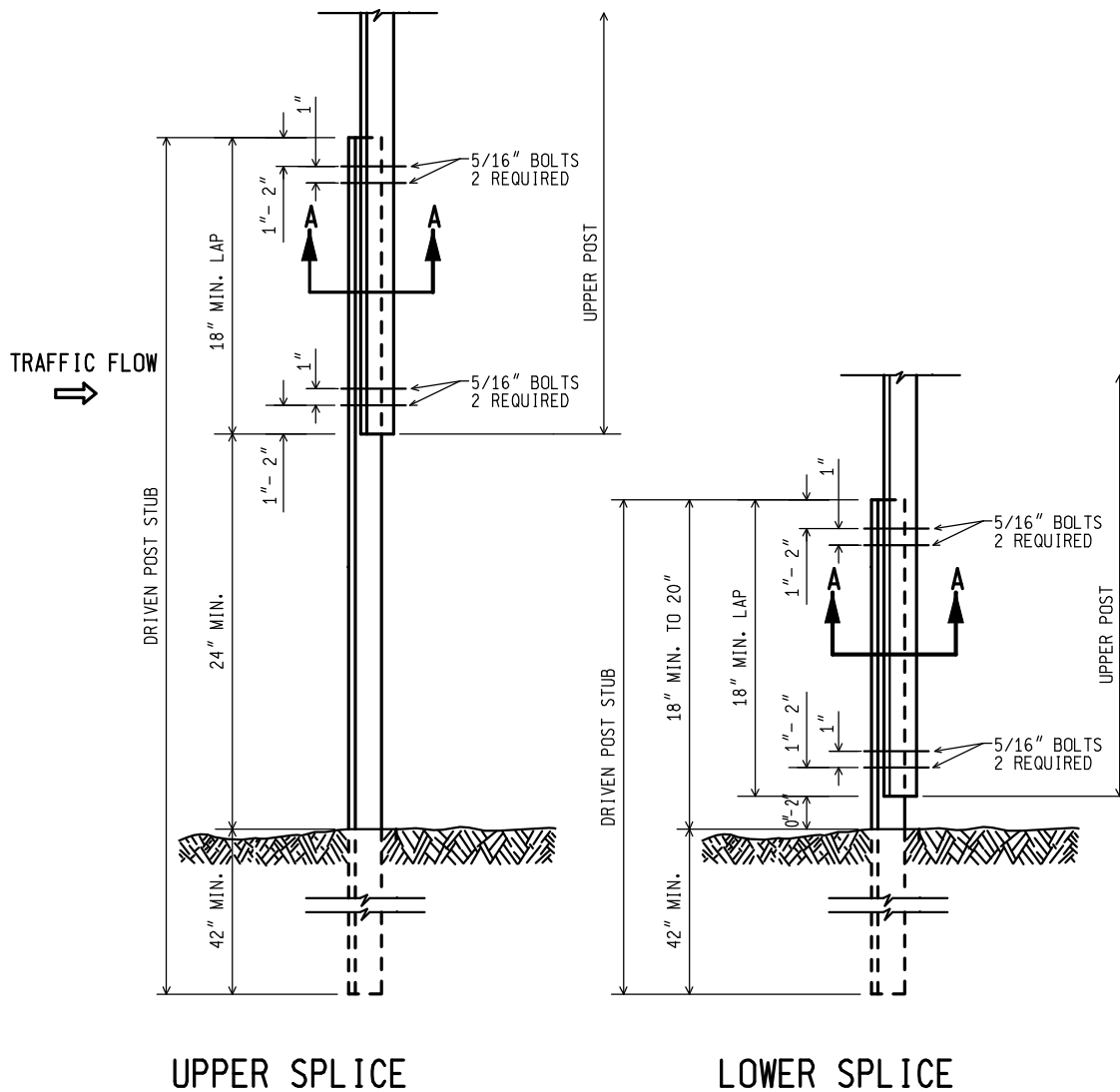
8/2006
 PLAN DATE

WZD-100-A

SHEET
 4 of 11

File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



**3 lb. U - CHANNEL STEEL POST
(WITH SPLICE)**

MOUNT SIGN ON OPEN FACE OF
UPPER U - CHANNEL STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
FHWA APPROVAL DATE

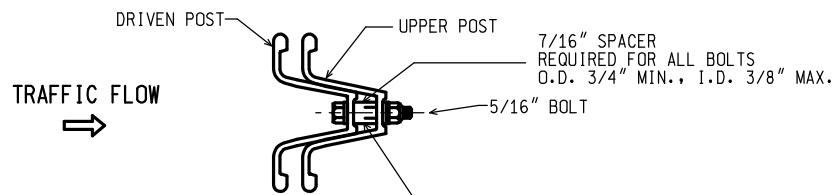
8/2006
PLAN DATE

WZD-100-A

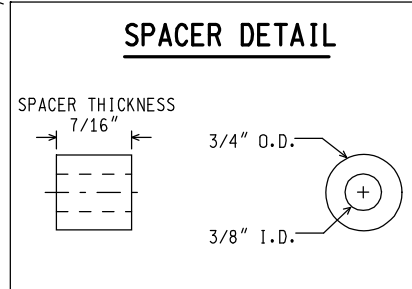
SHEET
5 of 11

File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



SECTION A-A



NOTES:

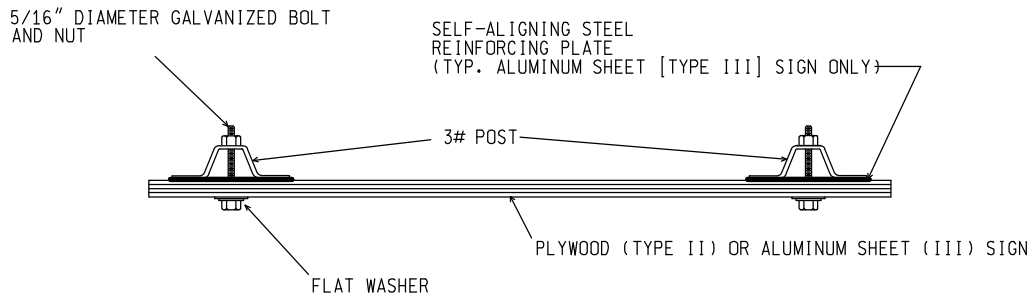
1. THE SPACER THICKNESS SHALL BE 1/16" LESS THAN THE GAP BETWEEN THE POST WHEN POSITIONED IN THE UNBOLTED CONFIGURATION.
2. THE EXTERIOR BOLT (CLOSEST TO LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN A PREPUNCHED HOLE 1" to 2" FROM THE END OF THE LAP.
3. THE INTERIOR BOLT (FARTHEST FROM LAP), SPACER, WASHER, AND NUT SHALL BE INSTALLED IN THE NEXT PREPUNCHED HOLE.
4. THE DRIVEN POST SHALL ALWAYS BE MOUNTED IN FRONT OF THE UPPER POST WITH RESPECT TO THE ADJACENT ONCOMING TRAFFIC, REGARDLESS OF THE DIRECTION THE SIGN IS FACING.
5. THE SPLICE LAP SHALL BE FASTENED BY FOUR-5/16" DIA. GALVANIZED A449 BOLTS (SAE J429 GRADE 5) OR GALVANIZED A325 BOLTS.

3 lb. U - CHANNEL STEEL POST
(WITH SPLICE)

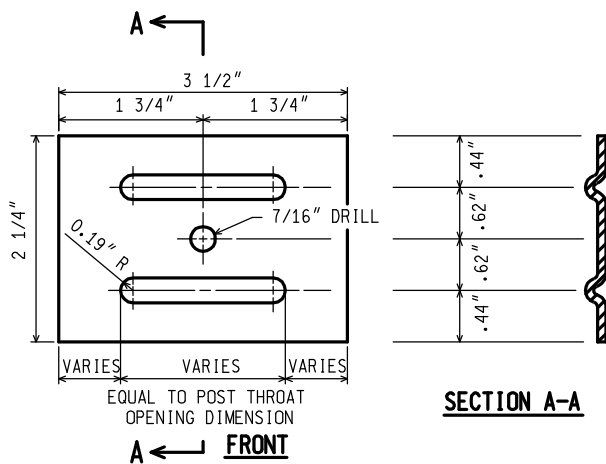
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A	SHEET 6 of 11
File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH				

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



SIGN TO 3 lb. POST CONNECTION



NOTES: (FOR STEEL SIGN REINF' PLATE)

1. MATERIAL: 12 GAUGE CARBON STEEL.
2. TOLERANCE ON ALL DIMENSIONS $\pm 0.0625"$
3. FINISH-AFTER STAMPING AND PUNCHING, GALVANIZE ACCORDING TO CURRENT SPECIFICATIONS FOR ZINC (HOT GALVANIZE) COATINGS ON PRODUCTS FABRICATED FROM PLATES OR STRIPS

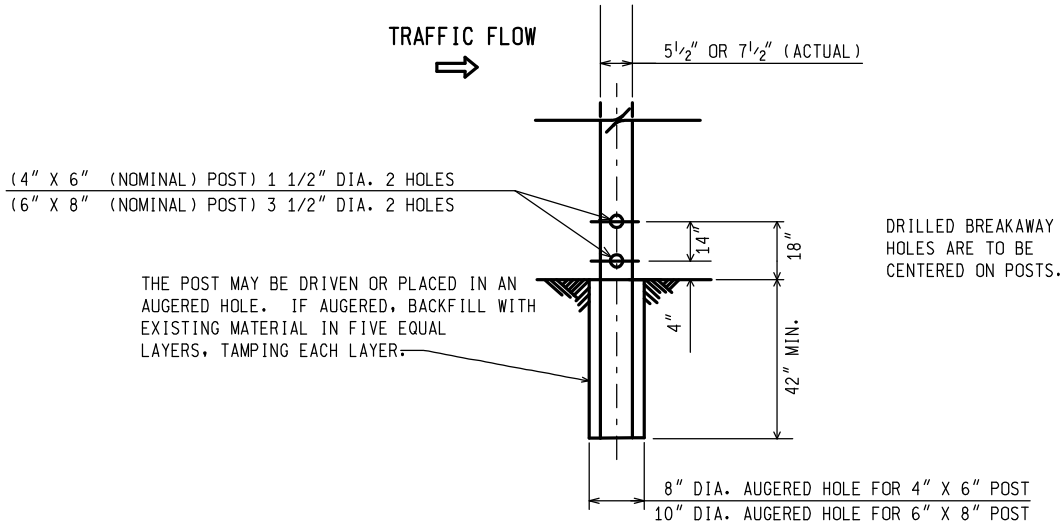
STEEL SIGN REINFORCING PLATE
REQUIRED FOR TYPE III SIGNS ONLY

3 lb. U - CHANNEL STEEL POST SIGN CONNECTION

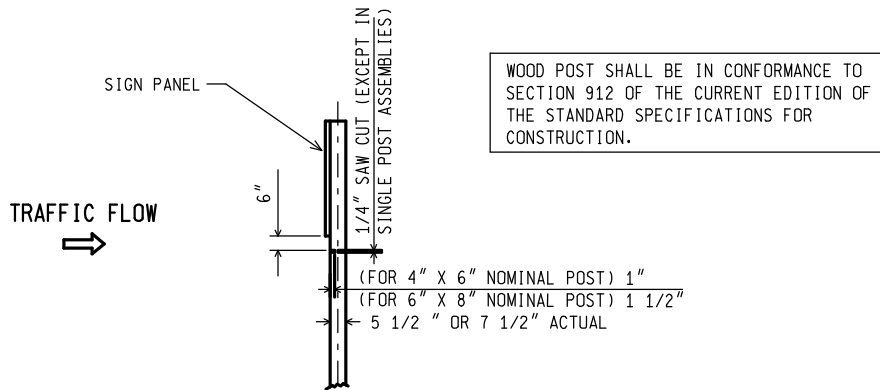
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A	SHEET 7 of 11
File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH				

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



**WOOD POST BREAKAWAY HOLES/
 DIRECT EMBEDMENT DETAILS**



**SAW CUT DETAIL
 (MULTIPLE POST INSTALLATIONS)**

WOOD POST DETAILS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
 FHWA APPROVAL DATE

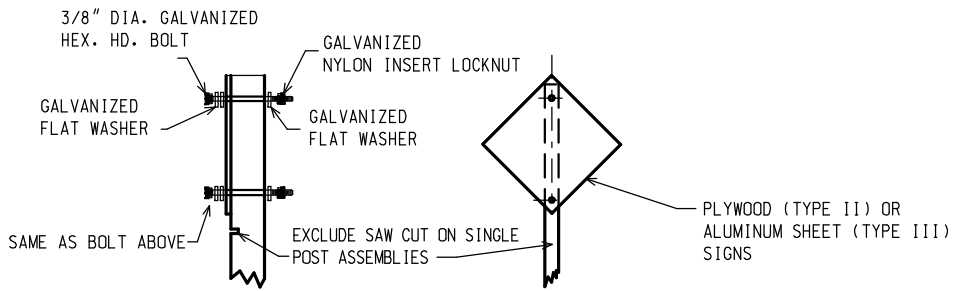
8/2006
 PLAN DATE

WZD-100-A

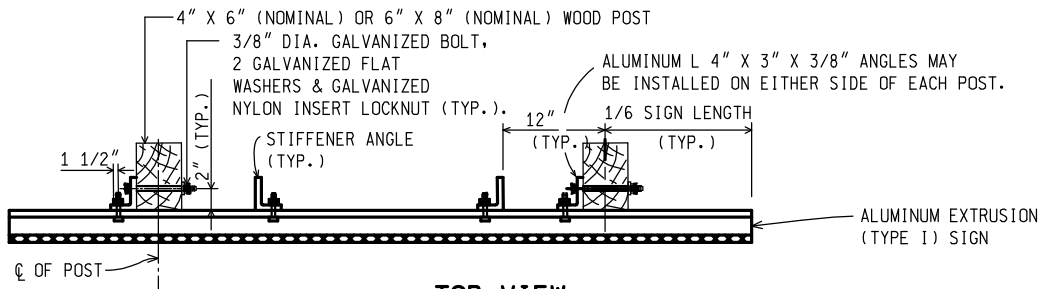
SHEET
 8 of 11

File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

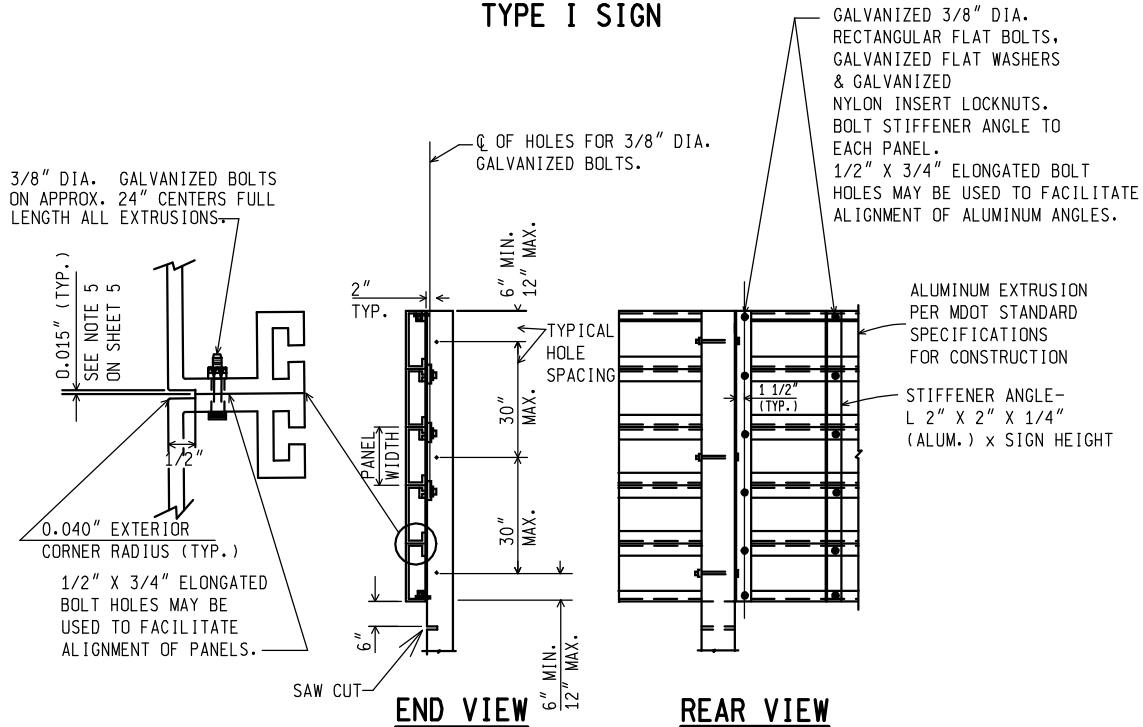
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



TYPE II AND TYPE III SIGNS



**TOP VIEW
 TYPE I SIGN**



TYPE I SIGN - ERECTION DETAILS

WOOD POST CONNECTIONS

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
 FHWA APPROVAL DATE

8/2006

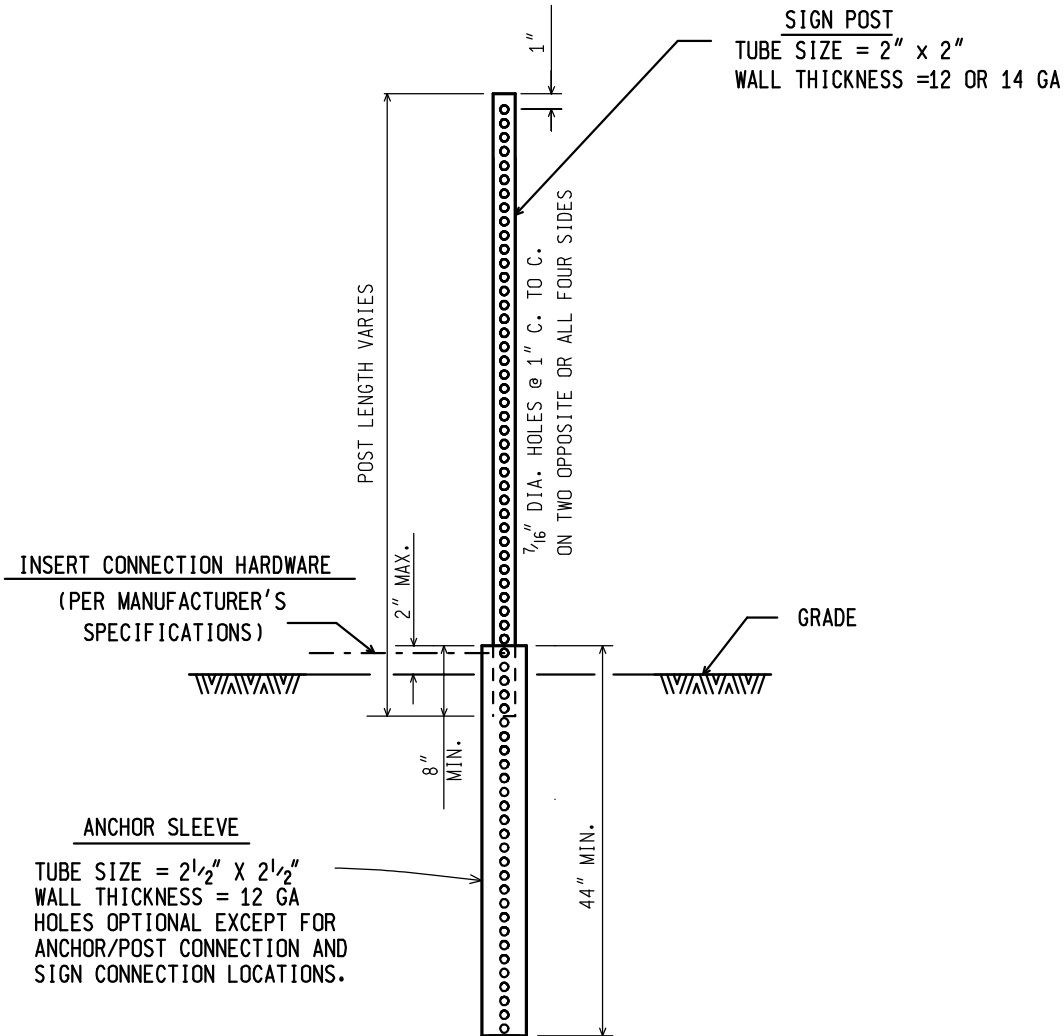
WZD-100-A

SHEET
 9 of 11

File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

PLAN DATE

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



SQUARE TUBULAR STEEL POST

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

PENDING
 FHWA APPROVAL DATE

8/2006

WZD-100-A

SHEET
 10 of 11

File:PW/Doc/RD/T&S/Typ/Dev/Sign MainTraf D/WZD-100-A Rev. 8/21/06 ECH

PLAN DATE

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

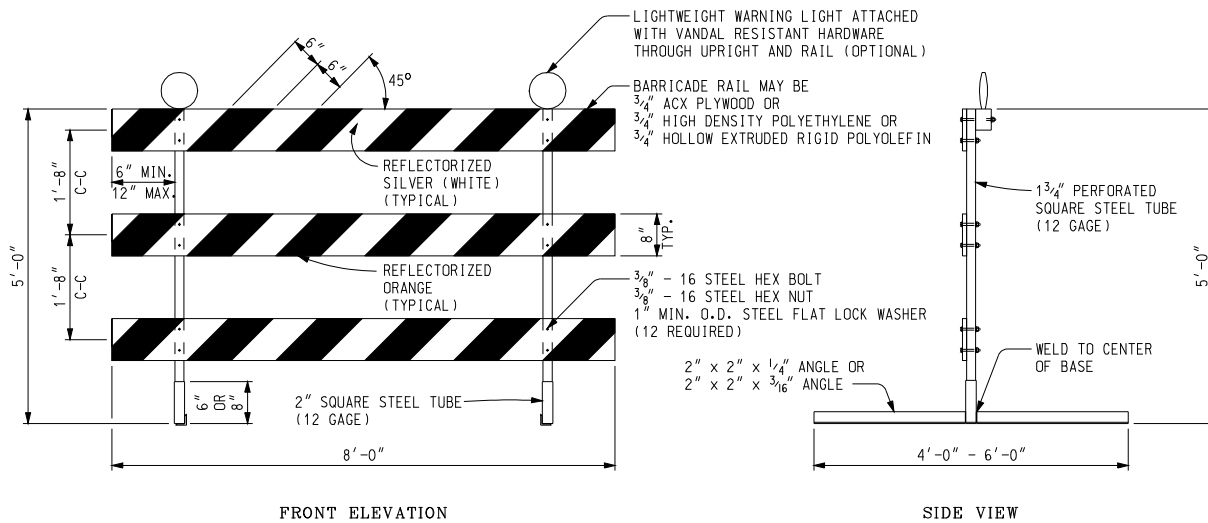
GENERAL NOTES:

1. A MAXIMUM OF TWO POSTS WITHIN A 7 FOOT PATH IS PERMITTED.
2. ALL SIGN POSTS SHALL COMPLY WITH NCHRP 350.
3. ALL POSTS SHALL BE EMBEDDED A MINIMUM OF 42".
4. BRACING OF POST IS NOT PERMITTED.
5. SIGN SHALL BE LEVEL, AND UPRIGHT FOR THE DURATION OF INSTALLATION.
6. ERECT POSTS SO THE SIGN FACE AND SUPPORTS DO NOT VARY FROM PLUMB BY MORE THAN 3/16" IN 3'. PROVIDE A CENTER-TO-CENTER DISTANCE BETWEEN POSTS WITHIN 2 PERCENT OF PLAN DISTANCE.
7. NO MORE THAN ONE SPLICE PER POST, AS SHOWN, WILL BE PERMITTED.
8. POST TYPES SHALL NOT BE MIXED WITHIN A SIGN SUPPORT INSTALLATION.
9. NO VERTICAL JOINTS ARE PERMITTED IN SIGN. NO HORIZONTAL JOINTS THROUGH SIGN LEGEND OR SYMBOLS ARE PERMITTED IN SIGN
10. REMOVE SIGN POSTS AND/OR POST STUBS IN THEIR ENTIRETY WHEN NO LONGER REQUIRED.
11. ALL LABOR, MATERIALS, AND EQUIPMENT, INCLUDING TEMPORARY SUPPORTS REQUIRED TO INSTALL, MAINTAIN, RELOCATE, COVER, AND/OR REMOVE THE TEMPORARY SIGN, INCLUDING SUPPORTS, ARE CONSIDERED TO BE INCLUDED IN THE COST OF THE TEMPORARY SIGN.
12. SAW CUTS IN WOOD POSTS ARE TO BE PARALLEL TO THE BOTTOM OF THE SIGN.
13. POSTS SHALL NOT EXTEND MORE THAN 4" ABOVE TOP OF SIGN.

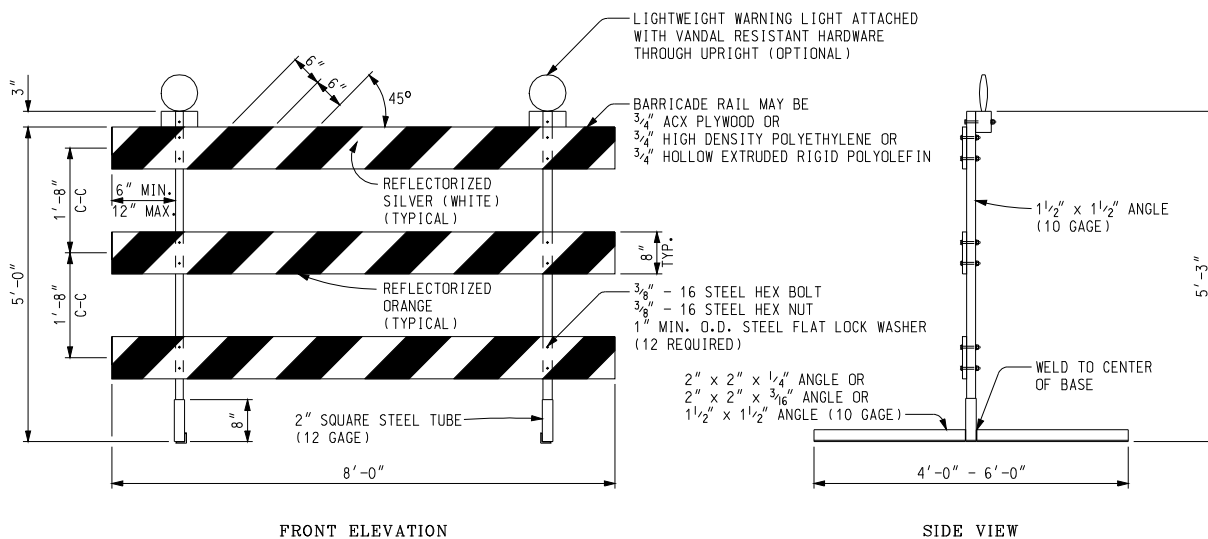
NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	PENDING FHWA APPROVAL DATE	8/2006 PLAN DATE	WZD-100-A	SHEET 11 of 11
--	-------------------------------	---------------------	-----------	-------------------

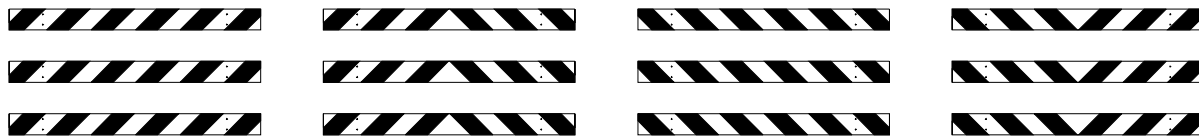
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



PERFORATED SQUARE STEEL TUBE OPTION



ANGLE IRON OPTION



LEFT DIRECTIONAL

BI-DIRECTIONAL

RIGHT DIRECTIONAL

CLOSURES

BARRICADE RAIL SHEETING OPTIONS
TYPE III BARRICADES

Other Type III Barricades meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE

File: T&S/Typ/Signs/WorkZones/wzd 125 d

Rev. 09/22/09 PJ



PREPARED BY
TRAFFIC AND SAFETY

ENGINEER OF DELIVERY

ENGINEER OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN FOR

Temporary
Traffic Control Devices

DRAWN BY: ECH

(SPECIAL DETAIL)

9/22/09
PLAN DATE

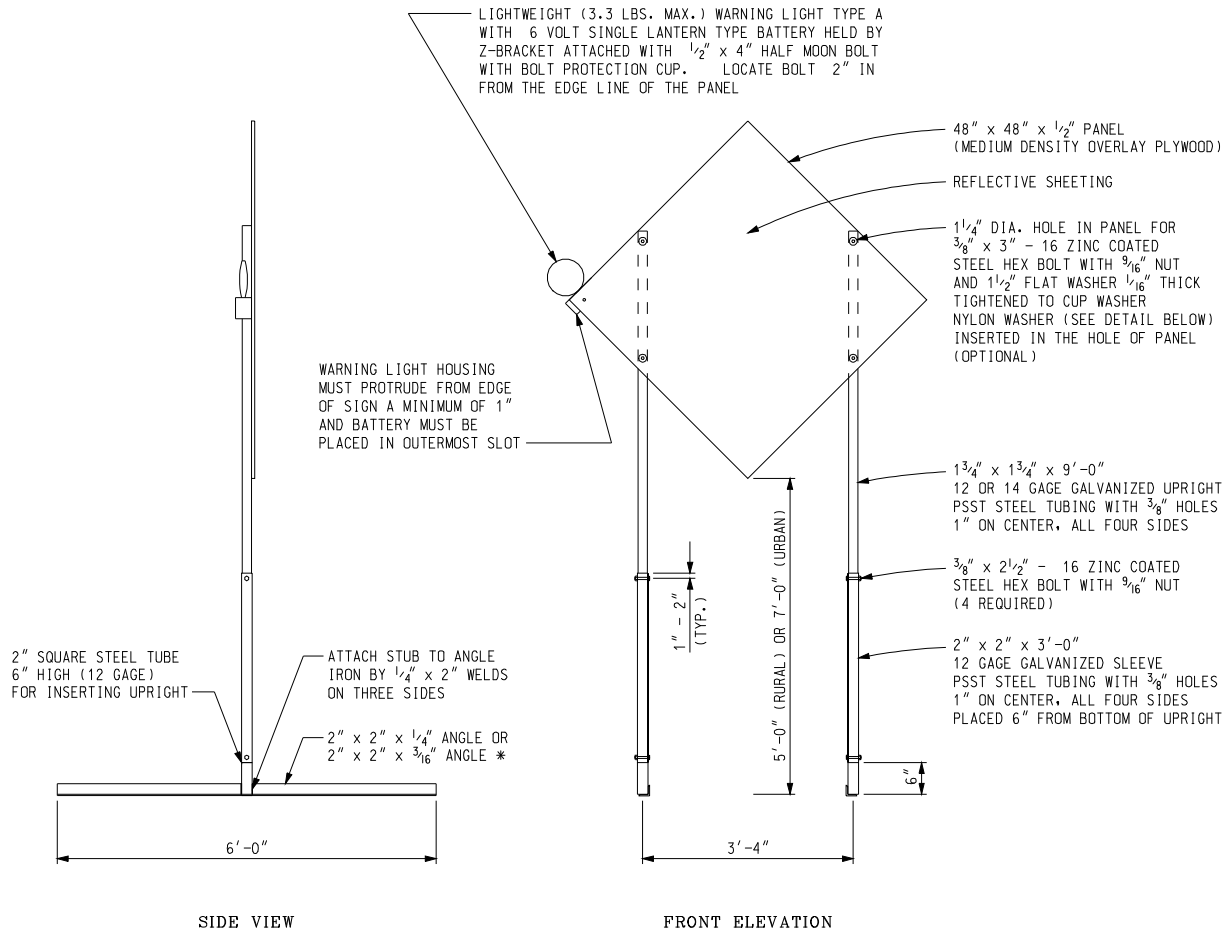
WZD-125-E

SHEET
1 of 3

CHECKED BY: MWB

FHWA APPROVAL DATE

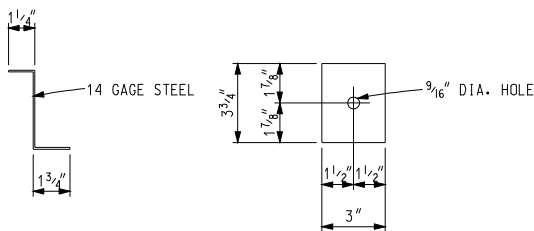
NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.



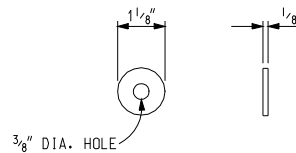
TEMPORARY SIGN SUPPORT

(WARNING LIGHT PLACED ON SIDE CLOSEST TO TRAFFIC)

- * SIGN STAND IS BALLASTED WITH FOUR OR MORE 35 LB SANDBAGS. A MINIMUM OF ONE ON EACH END.
- UPRIGHTS SHALL NOT EXTEND ABOVE THE SIGN PANEL.



Z-BRACKET DETAIL



OPTIONAL NYLON WASHER

Other temporary sign supports meeting current NCHRP crash worthy criteria can be found on the FHWA Safety website at http://safety.fhwa.dot.gov/roadway_dept/road_hardware/wzd.htm

NOT TO SCALE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN

(SPECIAL DETAIL)
FHWA APPROVAL DATE

9/22/09
PLAN DATE

WZD-125-E

SHEET
2 of 3

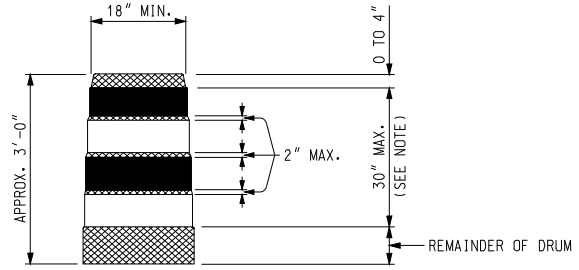
File: T&S/Typ/Signs/WorkZones/wzd 125 d

Rev. 09/22/09 PJ

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

- PLASTIC DRUM
- ▲▲▲ PROPOSED TYPE III BARRICADE
- △△△ EXISTING TYPE III BARRICADE

SYMBOLS TO BE USED ON PLANS



- REFLECTORIZED ORANGE
- REFLECTORIZED WHITE
- ▨ NON REFLECTORIZED ORANGE

NOTE:
 DRUMS SHALL HAVE AT LEAST 4 HORIZONTAL REFLECTORIZED STRIPES (2 ORANGE AND 2 WHITE) OF 6" UNIFORM WIDTH, ALTERNATING IN COLOR WITH THE TOPMOST REFLECTORIZED STRIPE BEING ORANGE. NON REFLECTORIZED SPACES BETWEEN THE HORIZONTAL REFLECTORIZED ORANGE AND WHITE STRIPES SHALL BE ORANGE IN COLOR AND EQUAL IN WIDTH.

PLASTIC DRUM

NOTES:

2" PERFORATED SQUARE STEEL TUBES MAY BE USED TO FABRICATE THE HORIZONTAL BASE OF THE TYPE III BARRICADE.

WARNING LIGHTS SHALL BE PLACED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION AND ALL OTHER PROVISIONS IN THE CONTRACT WHEN THEY ARE USED ON TYPE III BARRICADES.

SEE ROAD STANDARD PLANS R-113-SERIES FOR TEMPORARY CROSSOVERS FOR DIVIDED ROADWAY, AND R-126-SERIES FOR TYPICAL LOCATION AND SPACING OF PLASTIC DRUMS FOR PLACEMENT OF TEMPORARY CONCRETE BARRIER.

SIGNS, BARRICADES, AND PLASTIC DRUMS SHALL BE FACED WITH PRESSURE-SENSITIVE REFLECTIVE SHEETING ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

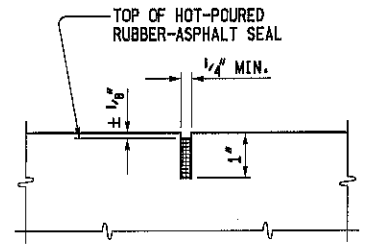
SANDBAGS SHALL BE USED WHEN SUPPLEMENTAL WEIGHTS ARE REQUIRED TO ACHIEVE STABILITY OF THE BARRICADE. THE SANDBAGS SHALL BE PLACED SO THEY WILL NOT COVER OR OBSTRUCT ANY REFLECTIVE PORTION OF THE TRAFFIC CONTROL DEVICE.

NOT TO SCALE

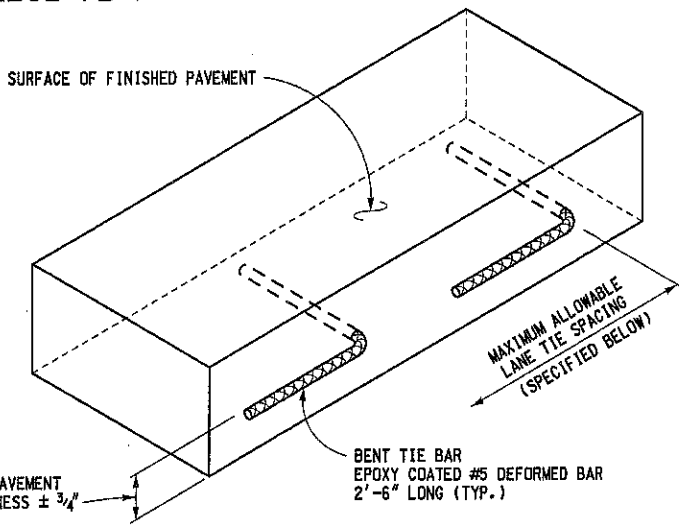
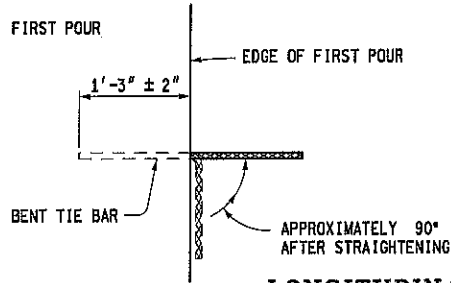
MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAYS DELIVERY STANDARD PLAN	(SPECIAL DETAIL) FHWA APPROVAL DATE	9/22/09	WZD-125-E	SHEET 3 of 3
File: T&S/Typ/Signs/WorkZones/wzd 125 d	Rev. 09/22/09 PJ	PLAN DATE		

NOTE: THE ORIGINAL SIGNED COPY IS KEPT ON FILE AT THE MICHIGAN DEPARTMENT OF TRANSPORTATION.

SYMBOL (B)



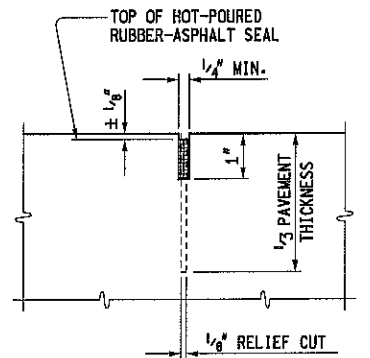
SAWED JOINT SEALED WITH HOT - POURED RUBBER - ASPHALT



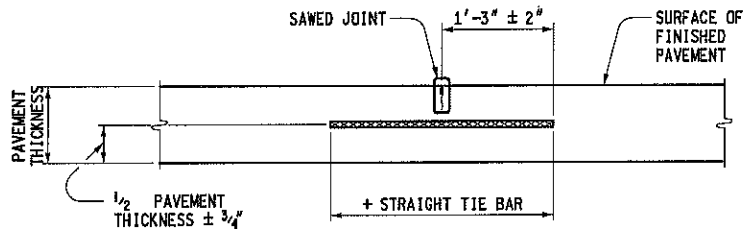
LONGITUDINAL BULKHEAD JOINT - SYMBOL (B)

ALL SYMBOL (B) JOINTS SHALL BE SAWED AND SEALED EXCEPT JOINTS WITHOUT LANE TIES AND JOINTS ADJACENT TO VERTICAL FACES WHICH WOULD PROHIBIT SAWING.

SYMBOL (D) AND (S)



SAWED JOINT SEALED WITH HOT - POURED RUBBER - ASPHALT



+ EPOXY COATED #5 DEFORMED BAR 2'-6" LONG FOR SYMBOL (D)
EPOXY COATED #5 SMOOTH BAR 2'-6" LONG FOR SYMBOL (S)
(MAXIMUM ALLOWABLE LANE TIE SPACING SPECIFIED BELOW)

LONGITUDINAL LANE TIE JOINT - SYMBOL (D)
LONGITUDINAL SMOOTH LANE TIE JOINT - SYMBOL (S)

SYMBOL (D) AND SYMBOL (S) TIE BARS SHALL BE PLACED AT THE PROPER SPACING LONGITUDINALLY, AND TRANSVERSELY AT 90° WITH THE JOINT.

MAXIMUM ALLOWABLE LANE TIE SPACING SYMBOLS (B), (D), (L2), AND (S)		* TOTAL DISTANCE OF TIED JOINT FROM NEAREST FREE EDGE
(B) GRADE 40	(D), (L2), AND (S) GRADE 60	
2'-10"	3'-7"	12' OR LESS
1'-11"	2'-7"	OVER 12' THROUGH 17'
1'-5"	1'-11"	OVER 17' THROUGH 24'
1'-2"	1'-9"	OVER 24' THROUGH 28'
1'-2"	1'-4"	OVER 28' THROUGH 36'
1'-1"	1'-1"	36' OR GREATER **

* INCLUDES ANY TIED COMBINATION OF LANE WIDTH, VALLEY GUTTER, CURB & GUTTER, OR SHOULDER

** FOR WIDTHS GREATER THAN 48' USE #6 DEFORMED BARS AT 1'-2" SPACING.

MAXIMUM ALLOWABLE LANE TIE SPACING



PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: *Randy V. Penttila*
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: *Mark A. Van Pelt*
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

LONGITUDINAL PAVEMENT JOINTS

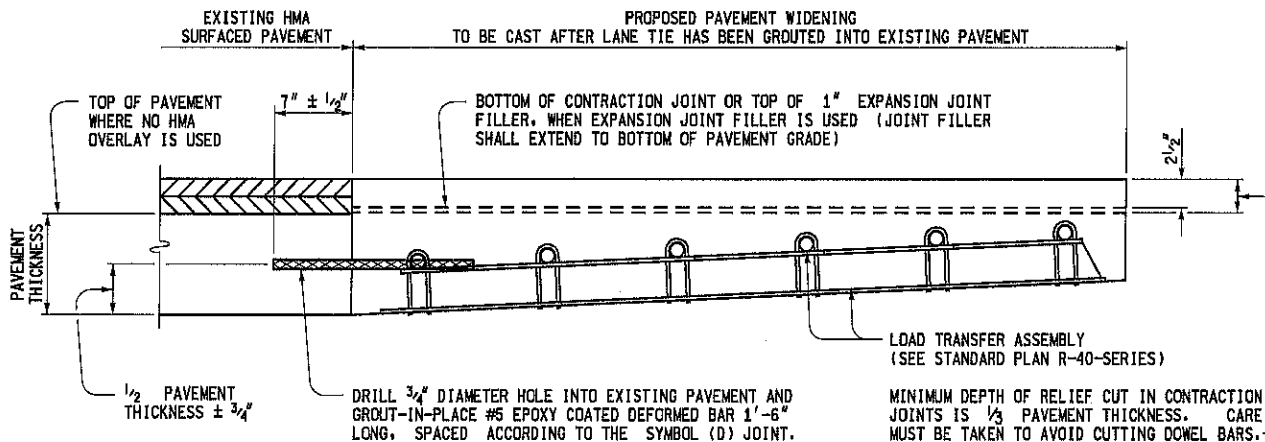
9-30-2014
F.H.W.A. APPROVAL

4-22-2013
PLAN DATE

R-41-H

SHEET 1 OF 2

SYMBOL (L2)



NOTE:
 SYMBOL (L2) JOINT USED FOR WIDENING CONCRETE PAVEMENTS WITHOUT HMA OVERLAYS SHALL BE SAWED AND SEALED ACCORDING TO THE SYMBOL (B) JOINT.

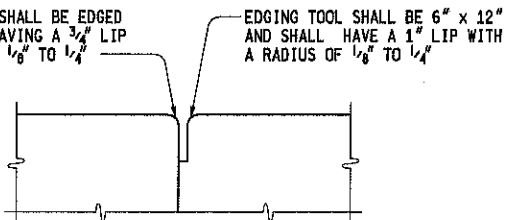
THE LONGITUDINAL JOINT USED FOR WIDENING EXISTING CONCRETE BASE COURSE OR CONCRETE PAVEMENT HAVING A HMA SURFACE SHALL HAVE EPOXY ANCHORED LANE TIES PLACED AS SPECIFIED.

TAPERED PAVEMENT THICKNESS OVER THE DISTANCE OF PAVEMENT WIDENING OR IN ONE LANE WIDTH WHEN WIDENING IS FOR TWO OR MORE LANES.

LONGITUDINAL BULKHEAD JOINT

FOR WIDENING EXISTING CONCRETE PAVEMENT OR CONCRETE BASE COURSE (USING EPOXY ANCHORED LANE TIES)

THE FIRST SLAB SHALL BE EDGED WITH AN EDGER HAVING A 3/4" LIP AND A RADIUS OF 1/8" TO 1/4"



METHOD OF EDGING

NOTES:

ALL LANE TIE BARS SHALL BE DEFORMED EXCEPT SYMBOL (S) WHICH WILL BE SMOOTH.

THE EPOXY COATED S BARS ARE TO BE FACTORY COATED WITH AN APPROVED BOND RELEASE AGENT, UNIFORMLY APPLIED BY DIPPING AND WITHOUT EXCESSIVE DRIPS OR THICKNESS.

THE INSTALLATION OF LANE TIE BARS AND THE SAWING OF LONGITUDINAL JOINTS WILL NOT BE REQUIRED FOR TEMPORARY CONCRETE PAVEMENT UNLESS SPECIFIED ON PLANS OR IN THE PROPOSAL. THE EDGING OF TEMPORARY CONCRETE PAVEMENT WILL NOT BE REQUIRED.

FOR JOINT LAYOUT DETAILS, SEE STANDARD PLAN R-42-SERIES.

SAWING PROCEDURES AND RELATED OPERATIONS ARE DESCRIBED IN THE CURRENT STANDARD SPECIFICATIONS.

NO SAWED OR SEALED JOINT SHALL BE CONSTRUCTED BETWEEN THE PAVEMENT AND CURB OR PAVEMENT AND CURB AND GUTTER, WHERE THESE ITEMS ARE CAST INTEGRALLY.

WHEN JOINTED PLAIN CONCRETE IS SPECIFIED AT INTERSECTIONS SYMBOL (S) JOINTS ARE TO BE USED FOR THE LONGITUDINAL JOINT BETWEEN THE THE E2 JOINT AT THE SPRINGPOINT OF THE SIDE STREET AND THE THROUGH LANE GUTTER PAN LINE. WHEN THE E2 JOINT IS MOVED TO THE THROUGH LANE GUTTER PAN LINE USE SYMBOL (D) JOINT AS NORMALLY REQUIRED.

ALL STRAIGHT TIE BARS SHALL BE EPOXY COATED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS FOR EPOXY COATED STEEL REINFORCEMENT FOR STRUCTURES.

WHEN LANE TIES ARE GROUTED INTO AN EXISTING PAVEMENT, THE GROUT SHALL BE SELECTED FROM THE PREQUALIFIED MATERIALS LISTED IN THE DEPARTMENT'S "MATERIALS SAMPLING GUIDE" FOR LANE TIES.

IN ORDER TO AVOID CONFLICT WITH THE LOAD TRANSFER ASSEMBLY, THE PLACEMENT OF THE END LANE TIE ADJACENT TO ANY TRANSVERSE JOINT SHALL BE AS FOLLOWS:

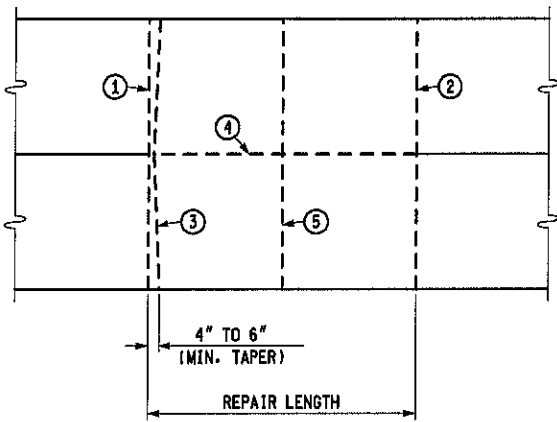
1. WHEN MAXIMUM ALLOWABLE LANE TIE SPACING EXCEEDS 3'-4", PLACE FIRST AND LAST LANE TIE HALF THE MAXIMUM ALLOWABLE LANE TIE SPACING FROM JOINT.
2. WHEN MAXIMUM ALLOWABLE LANE TIE SPACING IS LESS THAN 3'-4", PLACE FIRST AND LAST LANE TIE A MINIMUM OF 1'-8" FROM JOINT.

IT MAY BE NECESSARY TO ADJUST THE LAST THREE LANE TIE SPACINGS TO ENSURE UNIFORM LOADING RESISTANCE ALONG THE LONGITUDINAL JOINT.

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

**LONGITUDINAL
 PAVEMENT JOINTS**

9-30-2014 F.H.W.A. APPROVAL	4-22-2013 PLAN DATE	R-41-H	SHEET 2 OF 2
--------------------------------	------------------------	--------	-----------------

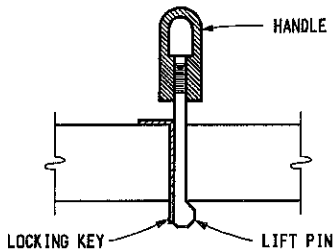


PLAN OF SAWING DIAGRAM

THIS METHOD OF REMOVING DISTRESSED CONCRETE SHALL BE USED IN CONJUNCTION WITH FULL DEPTH CAST-IN-PLACE REPAIRS LESS THAN 50'-0" LONG AND IS OPTIONAL FOR REPAIRS OVER 50'-0" IN LENGTH.

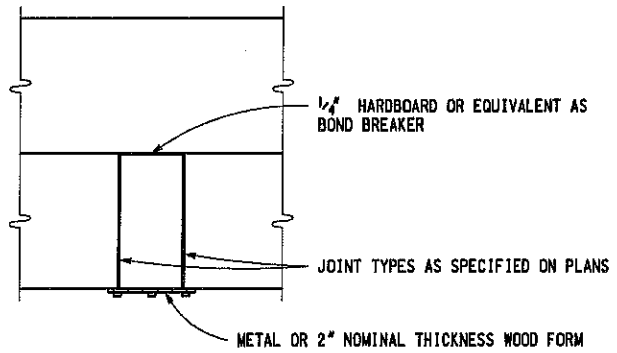
- ① & ② THESE SAW CUTS SHALL BE FULL DEPTH AND PERPENDICULAR TO THE EDGE OF THE ROADWAY, WITHIN A TOLERANCE OF 1". NO OVERCUTTING INTO ADJACENT LANES SHALL BE MADE UNLESS THE OVERCUT IS WITHIN THE LIMITS OF A SUBSEQUENT REPAIR TO THE ADJACENT LANE. SHOULDER OVERCUTS WILL BE ALLOWED.
- ③ THIS FULL DEPTH SAW CUT IS MADE TO FACILITATE OPENING A TRENCH ACROSS THE SLAB TO RELIEVE COMPRESSION IN THE PAVEMENT PRIOR TO LIFTING OUT THE FAILED AREA. THIS SAW CUT MAY BE OMITTED PROVIDED NO SPALLING OF THE REMAINING CONCRETE OCCURS. IF SPALLING DOES OCCUR, THE CONTRACTOR WILL BE REQUIRED TO MAKE THIS SAW CUT ON SUBSEQUENT REPAIRS. WHEN THIS SAW CUT IS USED AND THE ADJACENT LANE IS NOT REPAIRED, NO OVERCUTTING INTO THAT LANE SHALL BE MADE.
- ④ THIS LONGITUDINAL FULL DEPTH SAW CUT IS MADE BETWEEN LANES OR BETWEEN ANY COMBINATION OF THE FOLLOWING: LANE, RAMP, CURB, CONCRETE SHOULDER, OR PARTIAL LANE WIDTH REPAIR.
- ⑤ IF REQUIRED, INTERMEDIATE SAW CUTS MAY BE MADE TO REMOVE A SECTION OF PAVEMENT LANE WHICH IS OVER 6'-0" IN LENGTH, TO PERMIT LOADING INTO THE HAULING UNITS.

ADDITIONAL SAW CUTS, AT CONTRACTOR'S EXPENSE, MAY BE MADE INSIDE THE REPAIR LIMITS TO REDUCE 6'-0" BY 12'-0" OR LESS SLABS INTO SMALLER PIECES TO FACILITATE REMOVAL.

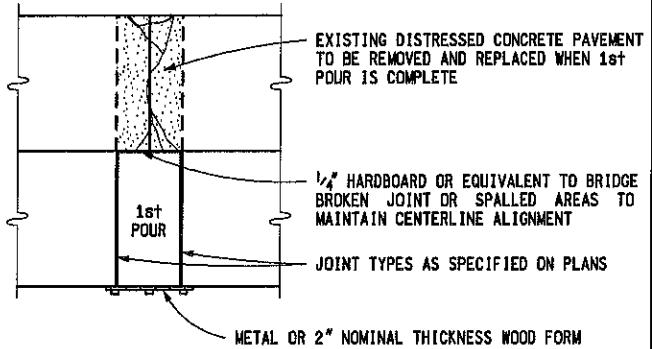


SCHEMATIC OF TYPICAL LIFT PIN ASSEMBLY

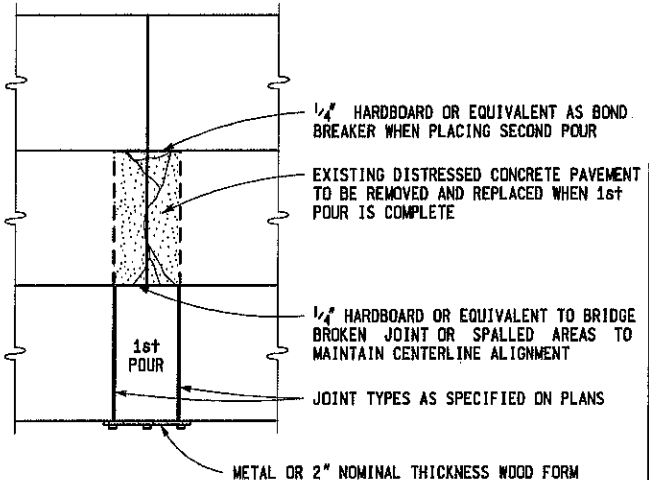
SAWING DIAGRAM & LIFT PIN FOR REMOVING OLD SLAB



**ONE LANE REPAIRS
(2 - LANE ROADWAY SHOWN)**



**ALL LANES REPAIRED
(2 - LANE ROADWAY SHOWN)**



**MORE THAN ONE LANE REPAIRED
BUT REPAIR LESS THAN FULL WIDTH
(3 - LANE ROADWAY SHOWN)**

FORMING NOTES:

STAKES USED TO HOLD HMA FILLER OR HARDBOARD IN PLACE DURING CONCRETE PLACEMENT SHALL BE REMOVED BEFORE SCREEDING THE CONCRETE.

ADJACENT LANE REPAIRS MAY BE CAST INTEGRALLY, WHEN APPROVED BY THE ENGINEER.

**FORMING REQUIREMENTS FOR
CAST-IN-PLACE REPAIRS 12'-0" OR LESS**



PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: M.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stuedle

APPROVED BY: John C. Fissel
ENGINEER OF DELIVERY

APPROVED BY: Mark A. Van Pelt
ENGINEER OF DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

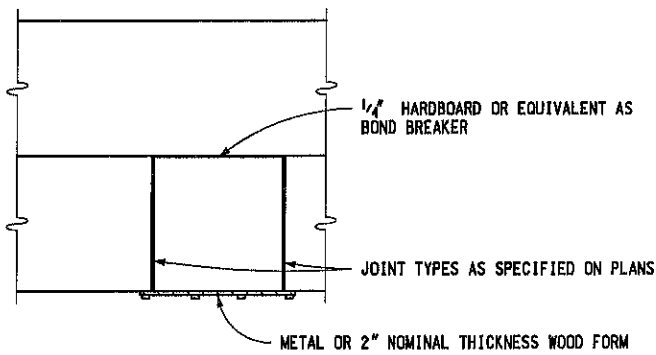
CONCRETE PAVEMENT REPAIR

9-10-2010
F.H.W.A. APPROVAL

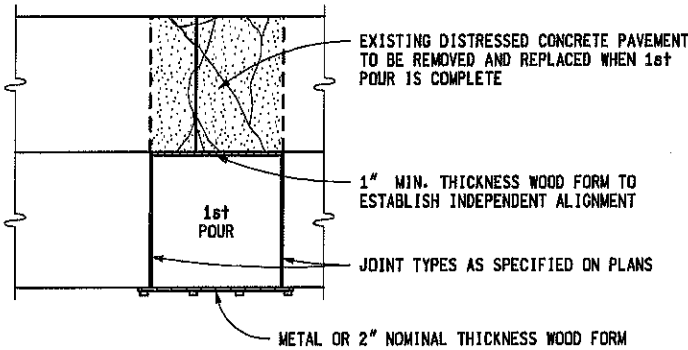
8-9-2010
PLAN DATE

R-44-F

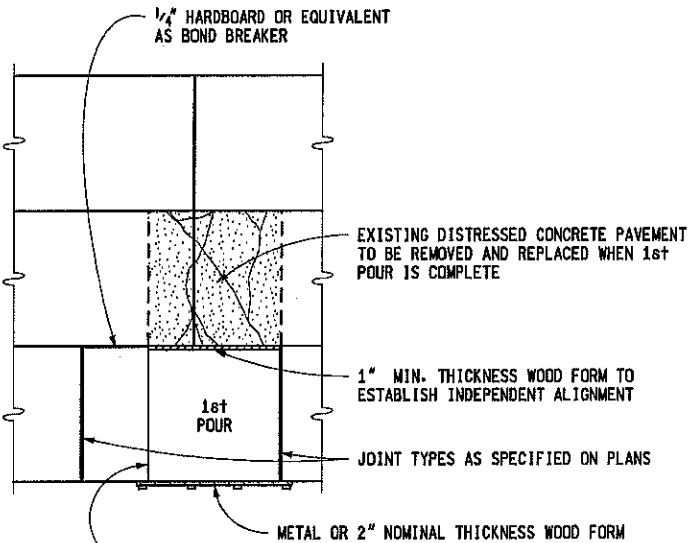
SHEET
1 OF 6



**ONE LANE REPAIRS
(2 - LANE ROADWAY SHOWN)**



**ALL LANES REPAIRED
(2 - LANE ROADWAY SHOWN)**



**MORE THAN ONE LANE REPAIRED
BUT REPAIRS ARE OFFSET
(3 - LANE ROADWAY SHOWN)**

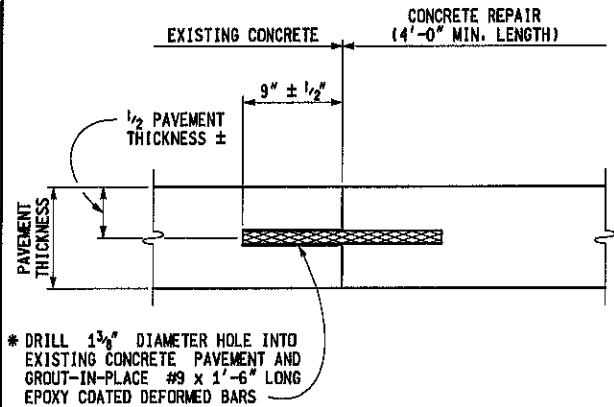
FORMING NOTES:

WHERE REPAIRS LONGER THAN 12'-0" ARE REQUIRED, A NEW GRADE MUST BE ESTABLISHED ALONG THE OLD PAVEMENT INNER JOINT LINE INDEPENDENT OF THE OLD PAVEMENT SURFACE, SO THAT SCREEDING MAY BE DONE PERPENDICULAR TO THE CENTERLINE AND INDEPENDENT OF THE OLD PAVEMENT GRADE.

STAKES USED TO HOLD HMA FILLER OR HARDBOARD IN PLACE DURING CONCRETE PLACEMENT SHALL BE REMOVED BEFORE SCREEDING THE CONCRETE.

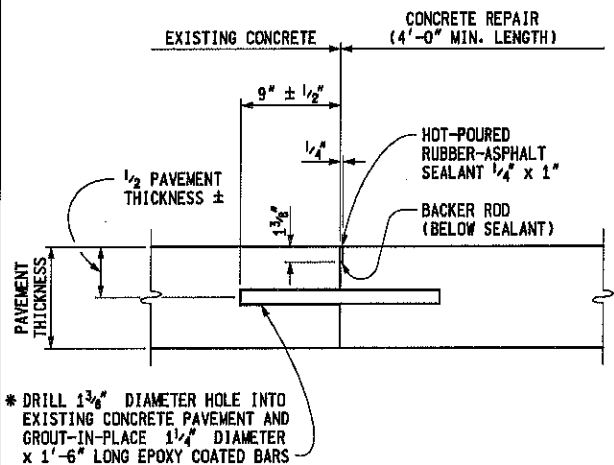
ADJACENT LANE REPAIRS MAY BE CAST INTEGRALLY, WHEN APPROVED BY THE ENGINEER.

**FORMING REQUIREMENTS FOR
CAST-IN-PLACE REPAIRS GREATER THAN 12'-0"**



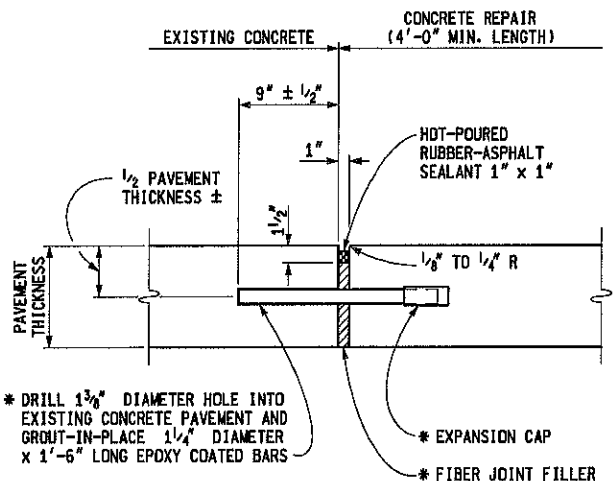
* DRILL 1 3/8" DIAMETER HOLE INTO EXISTING CONCRETE PAVEMENT AND GROUT-IN-PLACE #9 x 1'-6" LONG EPOXY COATED DEFORMED BARS

TIED JOINT, Trg



* DRILL 1 3/8" DIAMETER HOLE INTO EXISTING CONCRETE PAVEMENT AND GROUT-IN-PLACE 1 1/4" DIAMETER x 1'-6" LONG EPOXY COATED BARS

CONTRACTION JOINT, Crg



* DRILL 1 3/8" DIAMETER HOLE INTO EXISTING CONCRETE PAVEMENT AND GROUT-IN-PLACE 1 1/4" DIAMETER x 1'-6" LONG EPOXY COATED BARS

* EXPANSION CAP
* FIBER JOINT FILLER

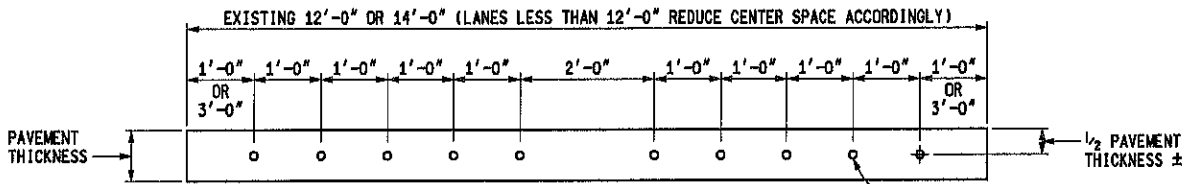
EXPANSION JOINT, Erg

* SEE SHEET 3 OF 6 FOR BAR SPACING AND SHEET 6 OF 6 FOR NOTES.

**CAST-IN-PLACE REPAIR JOINTS USING
GROUTED DOWEL OR DEFORMED BARS**

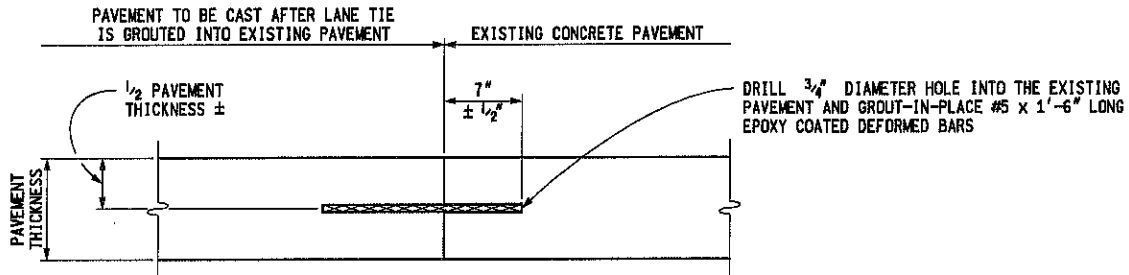
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONCRETE PAVEMENT REPAIR

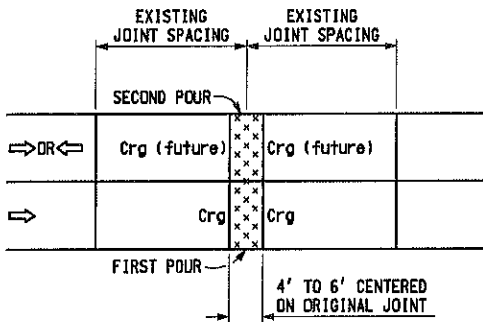


NOTE:
 THE HOLE SPACING MAY BE ADJUSTED 1" HORIZONTALLY, RAISED 1/2", OR LOWERED 1/2" FROM THE ABOVE LOCATIONS TO AVOID DRILLING INTO THE REINFORCEMENT.

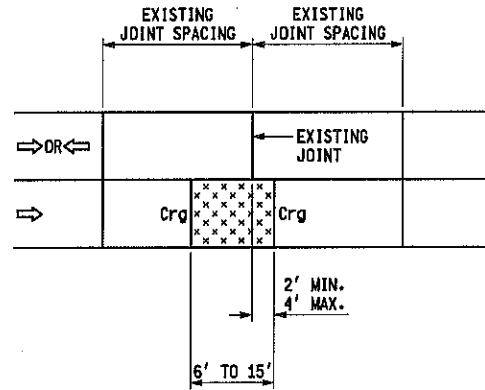
DOWEL OR DEFORMED BAR SPACING FOR CONCRETE REPAIRS



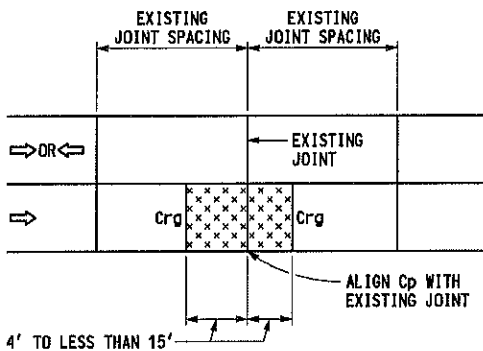
EPOXY ANCHORED LANE TIE



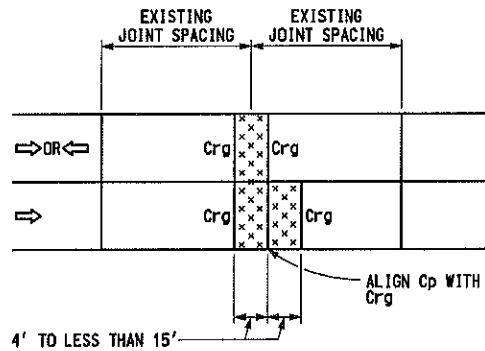
SINGLE LANE OR FULL WIDTH REPAIR



REPAIR LENGTH 6' - 15' WITH ONE JOINT NEAR AN EXISTING JOINT (SINGLE LANE REPAIR)



REPAIR LENGTHS OVER 15' WITH Cp JOINT (SINGLE LANE REPAIR)



OFFSETTING LANE REPAIRS WITH Cp JOINT

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

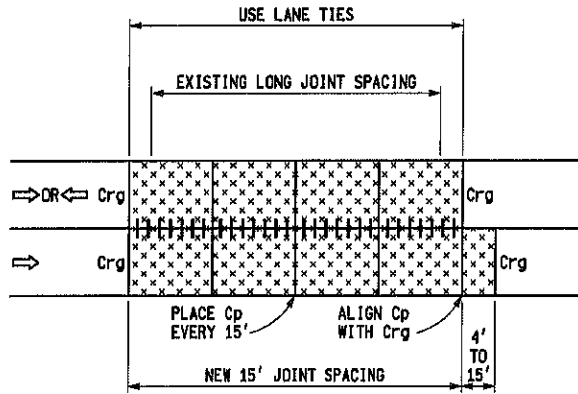
CONCRETE PAVEMENT REPAIR

9-10-2010
 F.H.W.A. APPROVAL

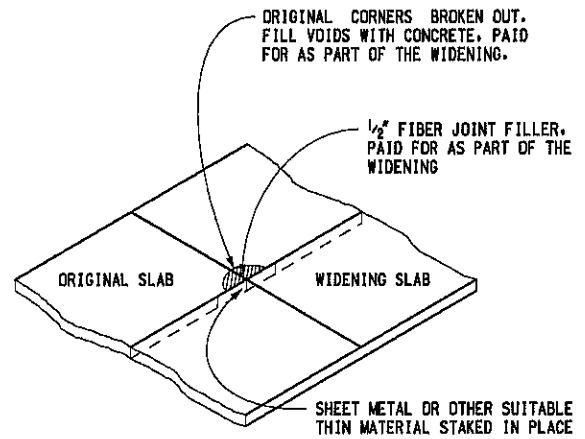
8-9-2010
 PLAN DATE

R-44-F

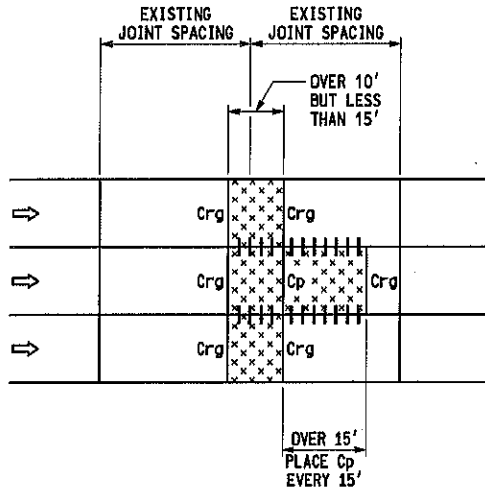
SHEET
 3 OF 6



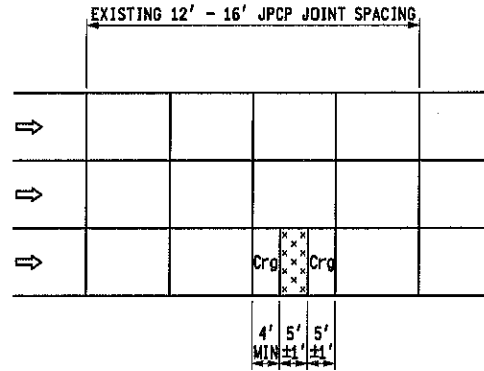
**LONG REPAIR SHOWING
Cp JOINT ALIGNMENTS AND LANE TIES**



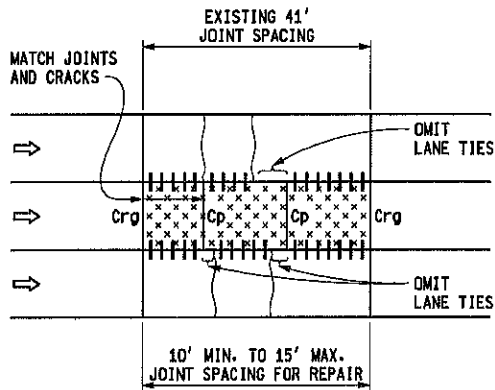
JOINT PATCH ADJACENT TO WIDENING SLAB



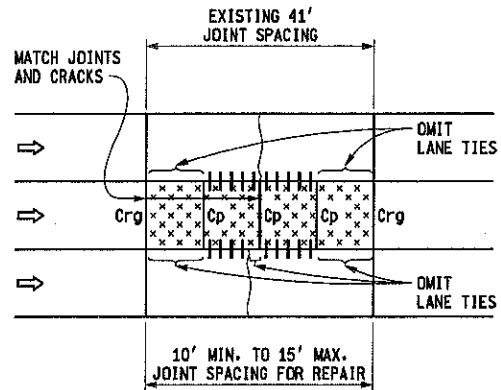
**FULL WIDTH MULTI-LANE REPAIRS
WITH OFFSET IN ONE LANE**



**REPAIR OF 12' - 16' JPCP WITH
ONLY ONE MID-PANEL CRACK
(IF THE PANEL HAS MORE THAN ONE MID-PANEL CRACK REPLACE ENTIRE PANEL)
(SINGLE LANE OR FULL WIDTH REPAIR)**



TWO CRACK PANEL REPAIR



MID PANEL CRACK REPAIR

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

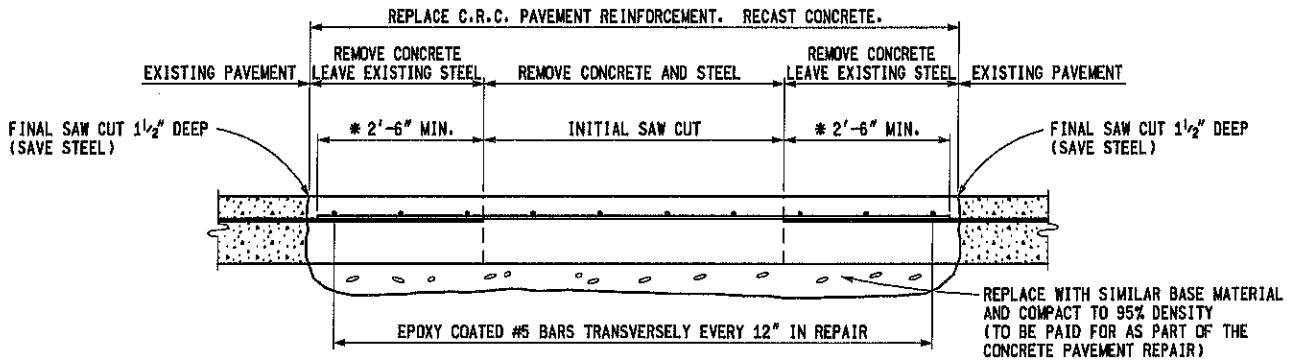
CONCRETE PAVEMENT REPAIR

9-10-2010
F.H.W.A. APPROVAL

8-9-2010
PLAN DATE

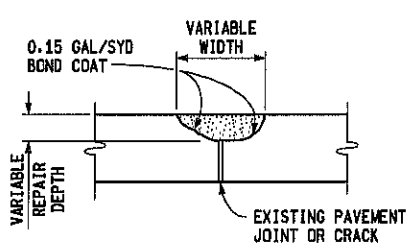
R-44-F

SHEET
4 OF 6



* NOTE: IF EXISTING REINFORCEMENT LAPS ARE ENCOUNTERED IN THIS AREA, FINAL SAW CUT MUST BE MOVED BACK TO PROVIDE MINIMUM 2'-6" LAP OF PAVEMENT REINFORCEMENT.

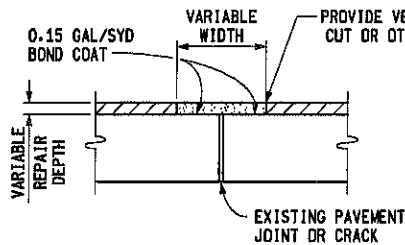
REPAIRING CONTINUOUSLY REINFORCED CONCRETE



CASE I

HMA REPAIR OF CONCRETE PAVEMENT

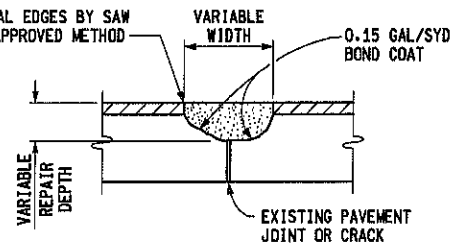
REMOVE LOOSE DETERIORATED CONCRETE. (NOT TO EXCEED PAVEMENT THICKNESS)



CASE II

HMA REPAIR OF CONCRETE PAVEMENT WITH HMA SURFACE

REMOVE HMA OVERLAY TO CONCRETE SURFACE.



CASE III

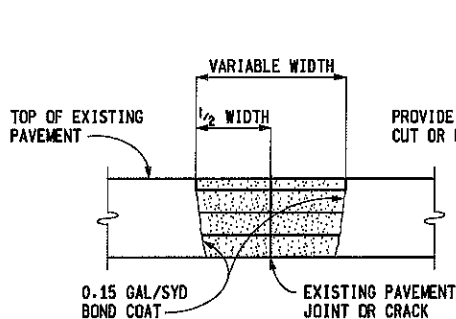
HMA REPAIR OF CONCRETE PAVEMENT WITH HMA SURFACE

REMOVE HMA OVERLAY AND LOOSE DETERIORATED CONCRETE. (NOT TO EXCEED PAVEMENT THICKNESS)

FOR CASES I, II, & III, THE REMOVED MATERIAL SHALL BE REPLACED WITH A HMA TOP COURSE MIXTURE. THE HMA SHALL BE COMPACTED WITH A MACHINE VIBRATOR OR APPROVED ROLLER WITH BASE LIFT THICKNESSES NOT TO EXCEED 3" AND WITH THE TOP LIFT THICKNESS NOT TO EXCEED 2". THE FINAL SURFACE OF THE REPAIR SHALL BE FLUSH WITH THE EXISTING PAVEMENT SURFACE.

SURFACE REPAIR FOR JOINT OR CRACK (TRANSVERSE OR LONGITUDINAL)

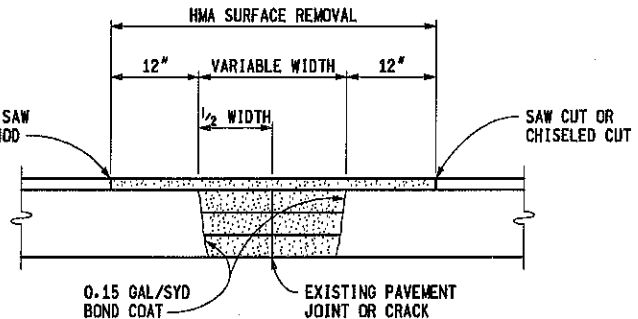
DETAIL 7



CASE IV

FULL DEPTH HMA REPAIR OF CONCRETE PAVEMENT

REMOVE THE DETERIORATED CONCRETE FULL DEPTH. COMPACT LOOSE EXISTING BASE. REPLACE AND COMPACT WITH HMA ANY LOST BASE.



CASE V

FULL DEPTH HMA REPAIR OF CONCRETE PAVEMENT WITH HMA SURFACE

REMOVE EXISTING HMA DETERIORATED CONCRETE PAVEMENT FULL DEPTH. COMPACT LOOSE EXISTING BASE. REPLACE AND COMPACT WITH HMA ANY LOST BASE.

FOR CASES IV, & V, THE REMOVED MATERIAL SHALL BE REPLACED WITH A HMA TOP COURSE MIXTURE. THE HMA SHALL BE COMPACTED WITH A MACHINE VIBRATOR OR APPROVED ROLLER WITH BASE LIFT THICKNESSES NOT TO EXCEED 3" AND WITH THE TOP LIFT THICKNESS NOT TO EXCEED 2". THE FINAL SURFACE OF THE REPAIR SHALL BE FLUSH WITH THE EXISTING PAVEMENT SURFACE.

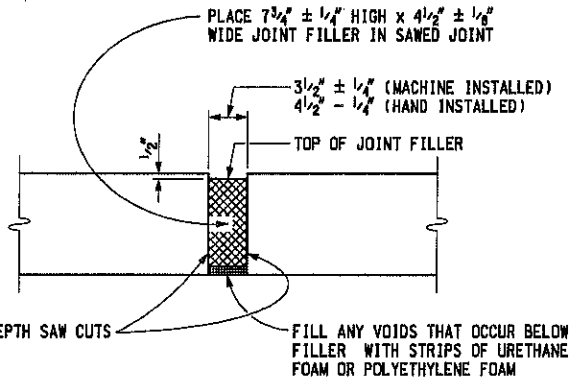
FULL DEPTH REPAIR FOR JOINT OR CRACK (TRANSVERSE OR LONGITUDINAL)

DETAIL 8

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONCRETE PAVEMENT REPAIR

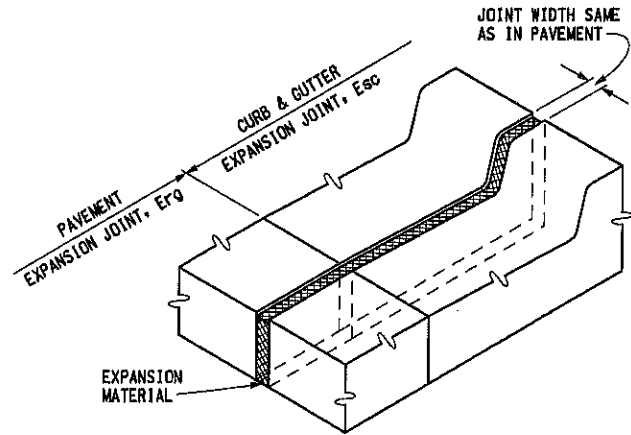
9-10-2010 F.H.W.A. APPROVAL	8-9-2010 PLAN DATE	R-44-F	SHEET 5 OF 6
--------------------------------	-----------------------	--------	-----------------



NOTES:
 WHEN PRESSURE RELIEF JOINT IS TO BE CONSTRUCTED THROUGH CONCRETE SHOULDER, TRENCHING BELOW CONCRETE MAY BE NECESSARY TO ALLOW ROOM FOR $7\frac{1}{4}''$ FILLER.

PRESSURE RELIEF JOINT

THIS DETAIL ALSO APPLIES TO HMA SURFACED CONCRETE PAVEMENT REQUIRING PRESSURE RELIEF JOINTS



CURB, GUTTER, AND CURB FACE SHALL BE SAWED AS DEEP AS THE EXISTING PAVEMENT THICKNESS. THE REMAINING CONCRETE SHALL BE CHIPPED OUT AND EXPANSION MATERIAL OF SUFFICIENT THICKNESS SHALL BE PLACED IN SAWED JOINT TO FILL THE GAP AS DIRECTED BY THE ENGINEER.

EXPANSION JOINT, Esc

NOTES:

CONCRETE PAVEMENT REPAIRS (INCLUDING JOINT TYPES) OR PRESSURE RELIEF DETAILS SHALL BE AS SPECIFIED ON THE PLANS OR IN THE LOG OF PROJECT.

IF THE EXISTING PAVEMENT HAS A HMA SURFACE, THE SAW CUTS SHALL EXTEND THROUGH THE UNDERLYING PORTLAND CEMENT CONCRETE.

SAW OVERCUTS IN ADJACENT LANE, SHOULDER, RAMP, AND GUTTERS THAT WILL REMAIN IN PLACE, SHALL BE CLEANED AND THEN SEALED WITH HOT-POURED RUBBER-ASPHALT.

WHEN THE CONCRETE PAVEMENT REPAIR IS CONSTRUCTED IN PREPARATION FOR AN OVERLAY, Crg JOINT RESERVOIRS AND SEALANTS SHALL BE OMITTED AND EXPANSION JOINTS (Erg) SHALL HAVE THE FIBER JOINT FILLER KEPT FLUSH TO THE PAVEMENT SURFACE.

EXPANSION CAPS SHALL BE ACCORDING TO STANDARD PLAN R-40-SERIES.

TRANSVERSE CONTRACTION Cp AND EXPANSION E2 JOINTS SHALL BE ACCORDING TO STANDARD PLAN R-39P-SERIES.

DOWEL AND DEFORMED BARS USED IN Trg, Crg, AND Erg JOINTS SHALL BE EPOXY COATED ACCORDING TO THE CURRENT STANDARD SPECIFICATIONS.

DOWEL BARS AND DEFORMED BARS FOR TIED JOINTS SHALL BE GROUTED INTO EXISTING PAVEMENT WITH A GROUT SELECTED FROM THE PREQUALIFIED MATERIALS LISTED IN THE DEPARTMENT'S "MATERIALS SOURCE GUIDE" UNDER ADHESIVE SYSTEMS FOR GROUTING DOWEL BARS AND TIE BARS FOR FULL-DEPTH CONCRETE PAVEMENT REPAIRS.

THE BACKER ROD SHALL MEET THE REQUIREMENTS OF THE STANDARD SPECIFICATIONS FOR CONSTRUCTION.

THE SAME TYPE JOINT SHALL EXTEND ACROSS ADJACENT LANE REPAIRS.

AFTER GROUTING IN-PLACE, RC-250 OR AN APPROVED BOND BREAKER SHALL BE APPLIED TO THAT PORTION OF Crg AND Erg DOWEL BARS THAT EXTEND INTO THE CAST CONCRETE.

REPAIRED CONCRETE PAVEMENTS REQUIRE THAT 1" OF Erg EXPANSION JOINTS BE DISTRIBUTED THROUGHOUT A GIVEN 1000' SECTION.

WHERE THERE ARE NO REPAIR LOCATIONS WITHIN A 1000' LENGTH, NO EXPANSION SPACE WILL BE PROVIDED.

EXPANSION JOINT FILLER SHALL EXTEND THE FULL DEPTH OF THE REPAIR AND BE FLUSH WITH THE EXISTING PAVEMENT SURFACE. PRIOR TO SEALING, THE JOINT FIBER FILLER AT THE PAVEMENT SURFACE SHALL BE REMOVED BY CUTTING 1" WIDE AND $1\frac{1}{2}''$ DEEP TO PERMIT THE PLACEMENT OF THE HOT-POURED RUBBER ASPHALT SEALANT. HOLES IN EXPANSION JOINT FILLER SHALL BE $\frac{1}{2}''$ MAXIMUM DIAMETER AND SHALL BE ALIGNED TO FIT DRILLED HOLES IN CONCRETE.

Erg JOINTS SHALL BE CONSTRUCTED ONLY WHEN THEY EXTEND ACROSS ALL LANES, RAMPS, OR SHOULDERS.

WHEN Erg JOINTS ARE PLACED ADJACENT TO CONCRETE CURB AND GUTTER THAT IS NOT REQUIRED TO BE REMOVED, AN Esc JOINT SHALL BE CONSTRUCTED IN THE CURB AND GUTTER.

JOINT RESERVOIRS FOR THE HOT-POURED RUBBER-ASPHALT SEALANT SHALL BE ABRASIVE BLAST CLEANED, FOLLOWED BY A FINAL CLEANING OF OIL-FREE COMPRESSED AIR PRIOR TO SEALING.

LANE TIES (TO ADJACENT PAVEMENT LANE, WHEN REQUIRED) SHALL BE SPACED ACCORDING TO STANDARD PLAN R-41-SERIES, EXCEPT THAT THE FIRST LANE TIE ADJACENT TO A TRANSVERSE JOINT SHALL BE INSTALLED AT A DISTANCE OF 1'-8" FROM THE JOINT. WHEN BOTH SIDES OF A LONGITUDINAL JOINT ARE POURED INTEGRALLY, LANE TIES SHALL BE STRAIGHT DEFORMED EPOXY COATED BARS CAST-IN-PLACE AS SPECIFIED ON STANDARD PLAN R-41-SERIES. WHEN ADJACENT LANES ARE CAST SEPARATELY, LANE TIES SHALL BE GROUTED-IN-PLACE AS SPECIFIED ON THIS PLAN. THE GROUT SHALL BE SELECTED FROM THE PREQUALIFIED MATERIALS LISTED IN THE DEPARTMENT'S "MATERIALS SOURCE GUIDE", UNDER LANE TIES.

THE MONTH AND YEAR OF CASTING AND STATION NUMBER (IF REMOVED) SHALL BE STENCILED ON EACH CONCRETE REPAIR.

ALL REPAIRS WILL BE JOINTED PLAIN CONCRETE PAVEMENT.

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

CONCRETE PAVEMENT REPAIR

9-10-2010
 F.H.W.A. APPROVAL

8-9-2010
 PLAN DATE

R-44-F

SHEET
 6 OF 6