Road & Bridge Design Publications

Monthly Update – March 2014

Revisions for the month of **March** are listed and displayed below. New special details will be included in projects submitted for the **June** letting as is stated on the special detail index sheets. Contact Wayne Pikka (pikkaw@michigan.gov) for questions related to the Road changes. Contact Vladimir Zokvic (zokvicv@michigan.gov) for questions related to the Bridge changes. Contact Carlos Libiran (libiranc@michigan.gov) for questions related to the Scoping Manual revisions.

Special Details

R-110-A: Safety Edge: In the sketches for pavement thicknesses 5" or less (configuration 2), revised the "leveling course" layer to "leveling course (or existing shoulder for single course overlays)".

Road Design Manual

6.05.13: Safety Edge: Added a note in regards to safety edge being installed in conjunction with temporary widening that is subsequently staged for removal. In this situation, the construction of a replaced safety edge against the remaining finished shoulder is not required.

11.02.02A: Exempt Special Provisions: Added Railroad Insurance to the list of exempt special provisions which do not need approval from Lansing area staff engineers.

Bridge Design Manual

8.05 T. (LFD & LRFD): New note for use with all projects with a sleeper slab. Use the note in conjunction with Bridge Design Guides 5.46.01, 6.20.03A, 6.20.04B & 6.20.04C.

Bridge Design Guides

6.05.02: Updated note for shoulder widths with reference to Bridge Design Manual Chapter 7 and AASHTO, "A Policy on Geometric Design of Highways and Streets".

Road & Bridge Design Publications

Monthly Update – March 2014

Scoping Manual

Chapter 3: Road CPM Project Identification and Selection: Added a reference to Chapter 6 for sidewalk ramp upgrade warrants.

Updates to MDOT Cell Library, Bridge Auto Draw Program, etc., may be required in tandem with some of this month's updates. Until such updates to automated tools can be made, it is the designer's/detailer's responsibility to manually incorporate any necessary revisions to notes and plan details to reflect these revisions.

Index to Special Details

3-17-2014

⑥

SPECIAL DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
21	2	GUARDRAIL AT INTERSECTIONS	5-24-01
24	5	GUARDRAIL ANCHORED IN BACK SLOPE TYPES 4B & 4T	7-22-02
99	2	CHAIN LINK FENCE WITH WIRE ROPE	11-1-00
R-30-G	2	CONCRETE CURB AND CONCRETE CURB & GUTTER	2-6-14
*R-110-A	3	PAVEMENT SAFETY EDGE	3-17-14
R-126-I	5	PLACEMENT OF TEMPORARY BARRIER	3-26-12

*** Denotes New or Revised Special Detail to be included in projects for (beginning with) the June letting.**

Note: Former Standard Plans IV-87, IV-89, IV-90, and IV-91 Series, used for building cast-in-place concrete head walls for elliptical and circular pipe culverts, are now being replaced with plans that detail each specific size. The Municipal Utilities Unit will provide these full sized special details for inclusion in construction plans for MDOT jobs. To assure prompt delivery, requests ***must*** be made in advance.

Former Standard Plans IV-93 and IV-94 series have been replaced with precast concrete box & three-sided culverts as per the 2012 Standard Specifications for Construction.

Index to Bridge Detail Sheets

3-17-2014

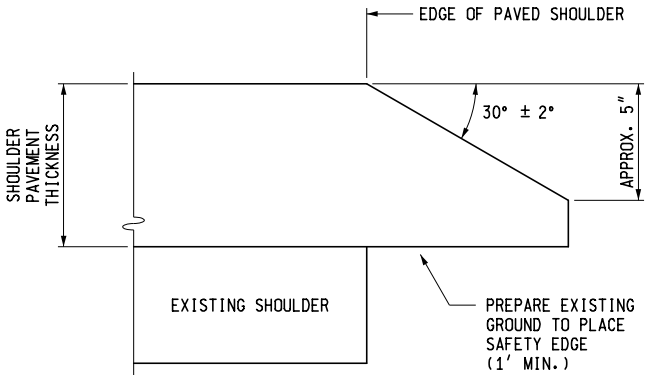
⑦

DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
EJ3Z	1 or 2	EXPANSION JOINT DETAILS	6-8-11
EJ4M	1 or 2	EXPANSION JOINT DETAILS	6-8-11
B-25-H	6	BRIDGE RAILING, AESTHETIC PARAPET TUBE	11-27-13
PC-2G	1	70" PRESTRESSED CONCRETE I-BEAM DETAILS	3-31-06
PC-4E	1	PRESTRESSED CONCRETE 1800 BEAM DETAILS	3-31-06
PC-1L	1	PRESTRESSED CONCRETE I-BEAM DETAILS	7-12-06

*** Denotes New or Revised Special Detail to be included in projects for (beginning with) the June letting.**

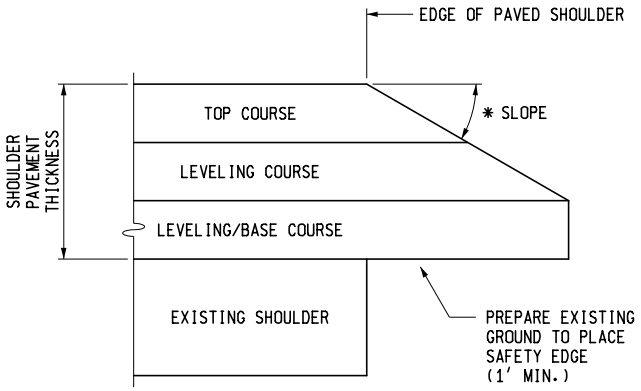
Note: Details EJ3Z & EJ4M are interactive, i.e. designers and detailers choose details based upon railing type and angle of crossing. Place all details appropriate for the project, structure specific information, and the Expansion Joint Device quantity on the sheet. The sheet shall then be added to the plans as a normal plan sheet.

Detail PC-1L, PC-2G and PC-4E shall have structure specific information and quantities added to the sheet. The sheet shall then be added to the plans as a normal plan sheet.

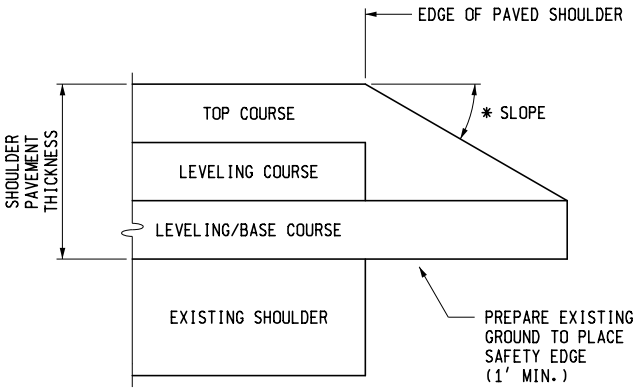


SAFETY EDGE FOR CONCRETE PAVEMENT

OVERLAY



CONFIGURATION 1 FOR
PAVEMENT THICKNESS GREATER THAN 5"



CONFIGURATION 2 FOR
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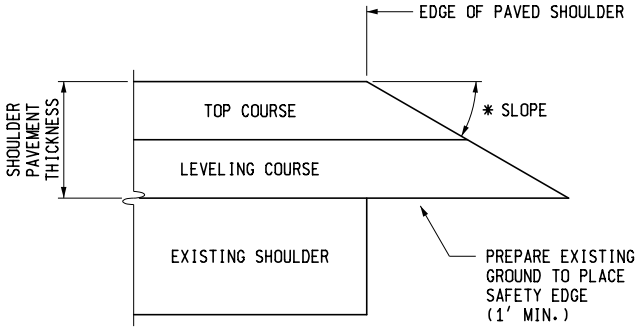

CONFIGURATION 1 FOR
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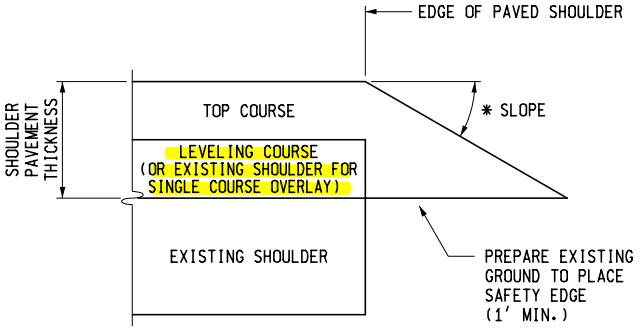


CONFIGURATION 2 FOR
PAVEMENT THICKNESS 5" OR LESS

* THE RANGE FOR SLOPE IS:
29° MINIMUM
30° DESIREABLE
40° MAXIMUM

SAFETY EDGE FOR HMA PAVEMENT

OVERLAY

MDOT Michigan Department of Transportation

PREPARED BY DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Steudle

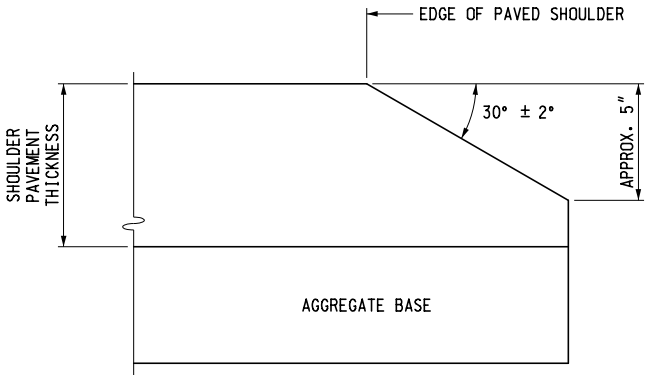
APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

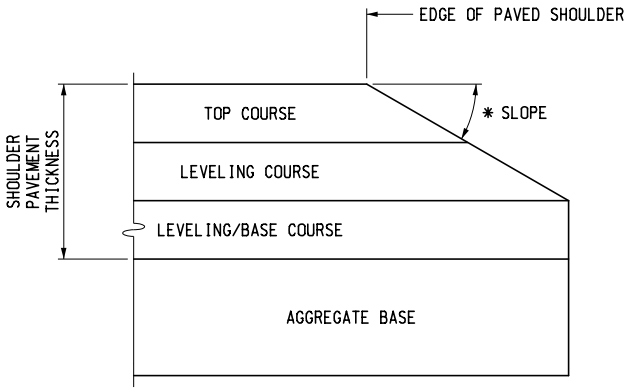
PAVEMENT SAFETY EDGE

F.H.W.A. APPROVAL	3-17-2014 PLAN DATE	R-110-A	SHEET 1 OF 3

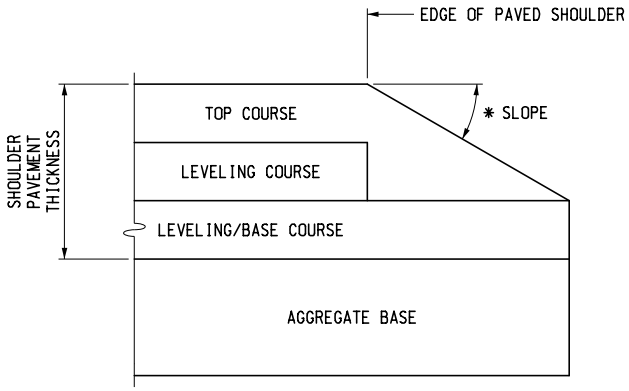


SAFETY EDGE FOR CONCRETE PAVEMENT

NEW CONSTRUCTION / RECONSTRUCTION



CONFIGURATION 1 FOR
PAVEMENT THICKNESS GREATER THAN 5"



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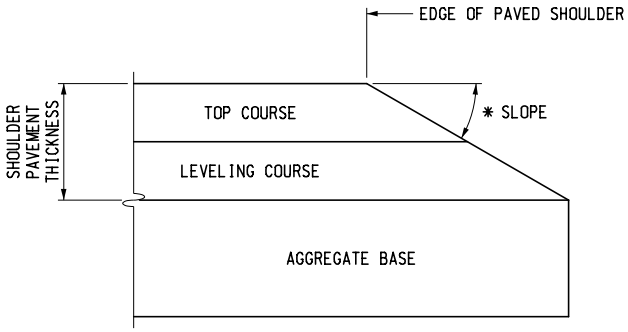

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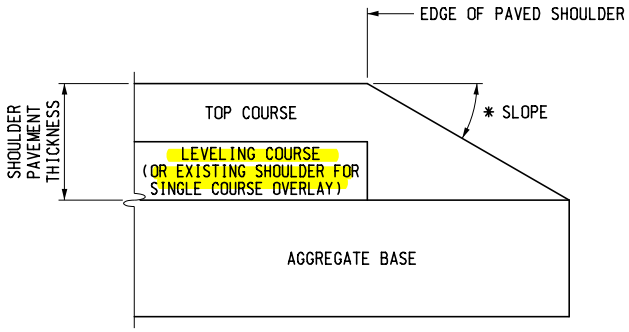


CONFIGURATION 2 FOR
PAVEMENT THICKNESS 5" OR LESS

* THE RANGE FOR SLOPE IS:
29° MINIMUM
30° DESIREABLE
40° MAXIMUM

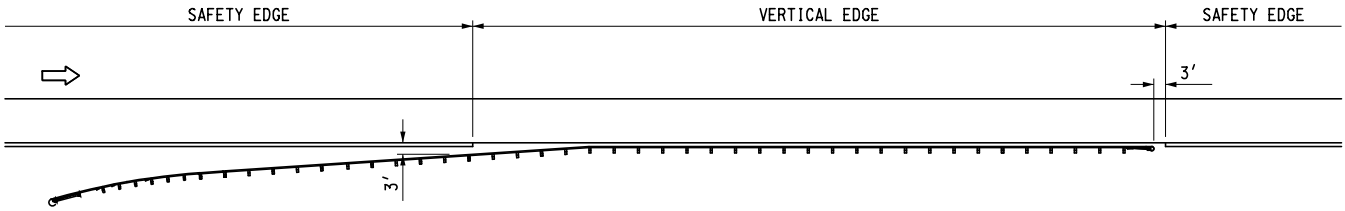
SAFETY EDGE FOR HMA PAVEMENT

NEW CONSTRUCTION / RECONSTRUCTION

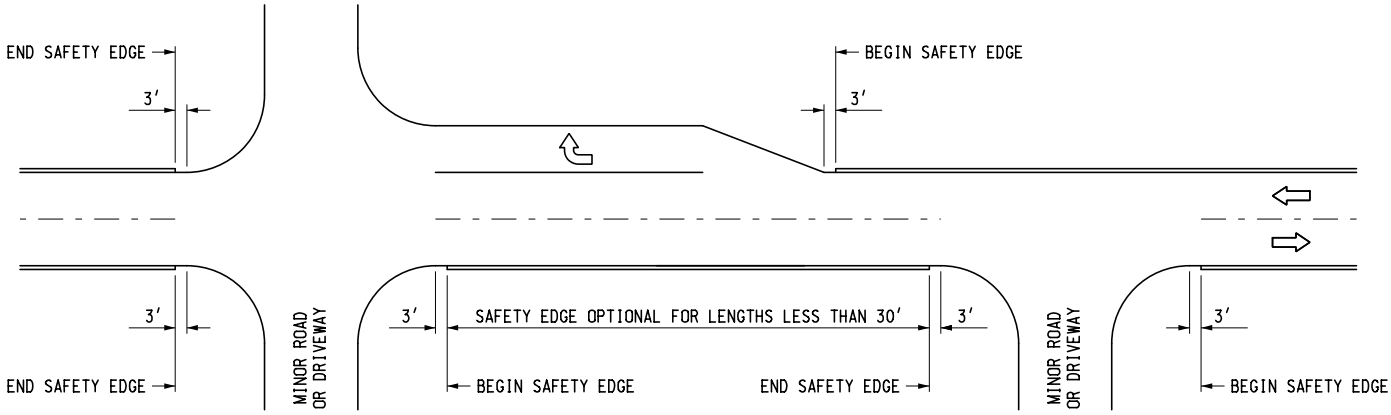
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

PAVEMENT SAFETY EDGE

F.H.W.A. APPROVAL	3-17-2014 PLAN DATE	R-110-A	SHEET 2 OF 3



SAFETY EDGE TREATMENT AT GUARDRAIL



SAFETY EDGE TREATMENT AT INTERSECTIONS AND DRIVEWAYS

NOTES:

WHEN CALLED FOR, SAFETY EDGE ON FREEWAY OUTSIDE SHOULDERS WILL END PRIOR TO RAMP SHOULDER TRANSITIONS AND CONTINUE WHERE FULL MAINLINE SHOULDER RESUMES.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

PAVEMENT SAFETY EDGE

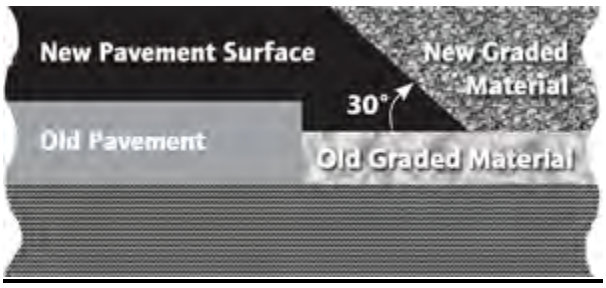
F.H.W.A. APPROVAL	3-17-2014 PLAN DATE	R-110-A	SHEET 3 OF 3

6.05.13 (revised 3-17-2014)

Safety Edge

The safety edge is a beveled pavement edge designed to reduce the severity of vehicle roadway departures and provides increased driver control on re-entry.

On February 6, 2013 the Engineering Operations Committee adopted a policy to incorporate the safety edge.



The safety edge will be applied as follows for all pavement types:

Temporary Pavements - All newly constructed temporary pavements will be constructed with a safety edge. This includes permanent shoulders that are newly constructed, resurfaced (1½" minimum) or widened, and fully or partially used in the course of the same project as temporary lanes with construction speeds of 45 mph or greater. When a safety edge is installed in conjunction with temporary widening that is subsequently staged for removal, construction of a replaced safety edge against the remaining finished shoulder is not required.

Confined Edges - The safety edge should be omitted in those locations where the shoulder is terminated or separated by curb and gutter or valley gutter.

Freeway Ramps - Freeway to freeway ramp shoulders constructed, resurfaced (1½" minimum), or widened without shoulder corrugations will be constructed, resurfaced or widened with a safety edge. Regular freeway off and on ramps should not incorporate the safety edge.

6.05.13 (continued)

Narrow freeway shoulders (4' paved or less) that are constructed, resurfaced (1½" minimum), or widened will be constructed, resurfaced or widened with a safety edge.

Rural Trunkline – Trunkline shoulders that are newly constructed, resurfaced (1½" minimum) or widened without shoulder corrugations will be constructed, resurfaced or widened with a safety edge where the posted speed is 45 mph or greater .

The safety edge may be omitted in developed rural areas where driveway density exceeds 30 access points within ½ mile.

Safety Application - If safety concerns are known, the Safety Edge can be considered for use on any roadway or ramp.

Details of the safety edge are shown on Standard Plan R-110-Series. Specifications require that the safety edge be constructed monolithically with the shoulder pavement and that there will be no separate payment for constructing it. Designers should provide additional concrete pay item quantities used for concrete shoulder to construct the safety edge adjacent to concrete shoulder. The locations where the safety edge applies should be identified where appropriate on the typical cross sections or maintaining traffic details.

The designer should review existing field conditions to identify areas where berming may have developed that would impede postive drainage. Additional details and sperate payment such as station grading modified may be needed to remove the berm.

11.02.02 (revised 3-17-2014)

Special Provision Development

Designers are asked to always check for a template, recommended and/or previously approved special provision to use first. If you are not able to find one suitable on the web site, send an email to;
MDOT-SpecialProvision@michigan.gov
to request a search for a suitable special provision.

Many approved provisions are posted to the web in Microsoft Word (rtf) format and may be reused or revised (and in some instances **must** be revised) to include project specific details. Already approved special provisions must be reviewed carefully to make sure all requirements are applicable to the project.

If no changes are required, simply insert the approved special provision in the proposal package. Do not change the source code, approval code, or identification code.

If any change is required then the special provision must be resubmitted for review and approval. Use the track changes feature of Microsoft Word to make any revisions being sure to leave the source code, approval code and the identification code for the previously approved version, to allow the reviewer to check the original version.

It is **unacceptable** to make any changes to a document without resubmitting for review and approval.

11.02.02 (continued)

A. Exempt Special Provisions

(Ref: BOH IM 1998-11 and BOH IM 2003-10) Due to the nature of certain special provisions, approval by Lansing area staff engineers is not always a value added process. These documents are instead reviewed and approved at the Region/TSC level. The approved format and organization of content, as described herein, **must** still be followed and the appropriate source code and approval code and approval date is required. At this time only the following types of special provisions are exempt from the review and approval process:

- Maintaining Traffic
- Maintaining Waterways
- Intelligent Transportation System
- Municipal Water or Sewer System (when developed with input from the Municipal Utilities Unit of the Design Division)
- Railroad Insurance

8.05 (continued)

GENERAL PLAN OF STRUCTURE SHEET

L. A cofferdam has not been provided for this structure. Other means of water control may be used, as approved by the Engineer, provided they do not disturb the stream bed. Water control, whether it be by cofferdam or other approved means, will be included in the bid item "Excavation, Fdn". [Use on stream crossings when water control measures other than a cofferdam are appropriate. See Subsection 7.03.04.] (12-5-2005)

M. The tremie seal design was based on a water surface at El. _____.

N. Placement of temporary barrier shall be according to Standard Plan R-126-Series or as approved by the Engineer. (Included in the pay item "Conc Barrier, Temp, Furn") [Use when the toe of temporary barrier on the traffic side is less than 4'-0" from a precipitous drop-off. Place note on staging sheet where applicable.] (12-5-2005)

O. The riprap quantity is based on the lateral dimensions of the area to be protected, regardless of the number of layers required. The estimated weight of riprap is _____ tons. (9-18-98)

P. Alternate methods of stream diversion shall be submitted to the Engineer for approval. [Use when stream diversion method is detailed on Plan Sheet.] (9-18-98)

Q. Place riprap from El _____ to El _____. [Place this note in the vicinity to which it applies, when lateral limits are not fixed.]

8.05 (continued)

R. False decking shall include the area bounded by (Reference Lines ___& __) (edges of shoulders) and outside flange fascias of Beams __& __. The estimated area is ____square feet during removal (and ____square feet during proposed construction). [Detail limits on the plans and include areas in note.] (12-5-2005)

S. Items cast into structural precast concrete to facilitate bridge construction (forming, finishing, etc.) shall be galvanized or epoxy coated. [Use for box and three-sided culverts, MSE walls, sound walls, precast bridge element systems, etc.] (6-17-2013)

T. Do not use wheeled, roller based or machine mounted compaction equipment to compact the subgrade, subbase, and base within 10' of the sleeper slab after it is built. Use only hand/plate compactors. Contact pressure of compaction equipment shall not exceed 10 psi. [Use on all projects with a sleeper slab.] (3-17-2014)

8.05 (continued)

GENERAL PLAN OF STRUCTURE SHEET

I. The maximum foundation pressures are calculated to be:

Avg. D.L. only Case

Abutments _____ psf
Piers _____ psf

Avg. D.L. + L.L. Case

Abutments _____ psf
Piers _____ psf

[Note only on Preliminary Plans][Use Avg. D.L. Case for cohesive soils only.]

J. For details of slope protection, see Standard Plan B-102-Series.

K. The allowable fatigue stress range is based on a design life of 75 years (and an average daily truck traffic of _____). [For steel bridges only.] (8-6-92)

L. A cofferdam has not been provided for this structure. Other means of water control may be used, as approved by the Engineer, provided they do not disturb the stream bed. Water control, whether it be by cofferdam or other approved means, will be included in the bid item "Excavation, Fdn". [Use on stream crossings when water control measures other than a cofferdam are appropriate. See Subsection 7.03.04.] (12-5-2005)

M. The tremie seal design was based on a water surface at El. ____.

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R. False decking shall include the area bounded by (Reference Lines ___& __) (edges of shoulders) and outside flange fascias of Beams __& __. The estimated area is ____square feet during removal (and ____square feet during proposed construction). [Detail limits on the plans and include areas in note.] (12-5-2005)

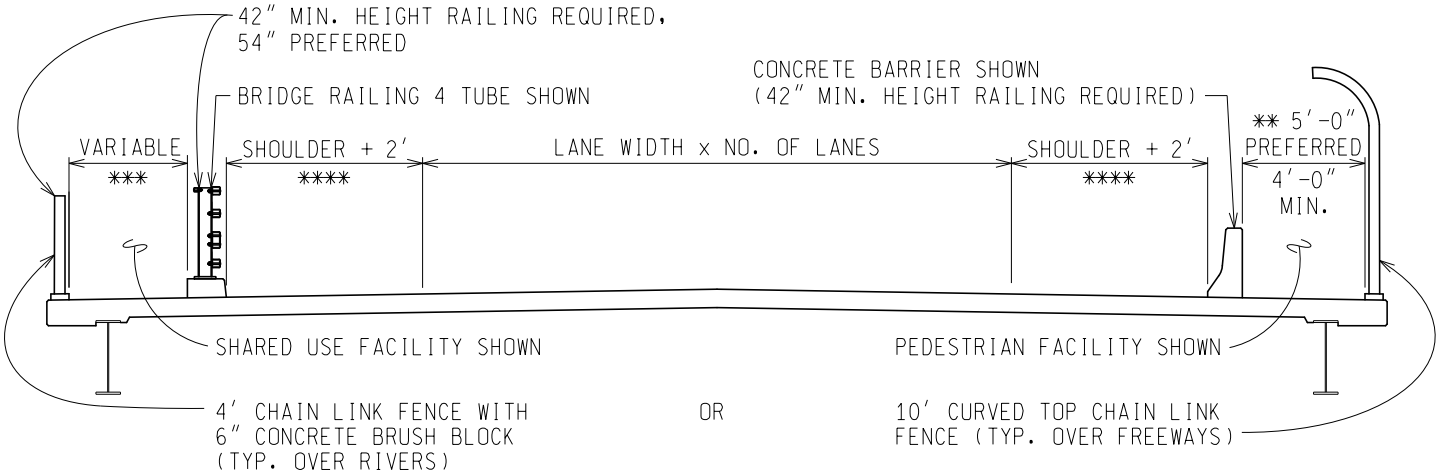
S. Items cast into structural precast concrete to facilitate bridge construction (forming, finishing, etc.) shall be galvanized or epoxy coated. [Use for box and three-sided culverts, MSE walls, sound walls, precast bridge element systems, etc.] (6-17-2013)

T. Do not use wheeled, roller based or machine mounted compaction equipment to compact the subgrade, subbase, and base within 10' of the sleeper slab after it is built. Use only hand/plate compactors. Contact pressure of compaction equipment shall not exceed 10 psi. [Use on all projects with a sleeper slab.] (3-17-2014)

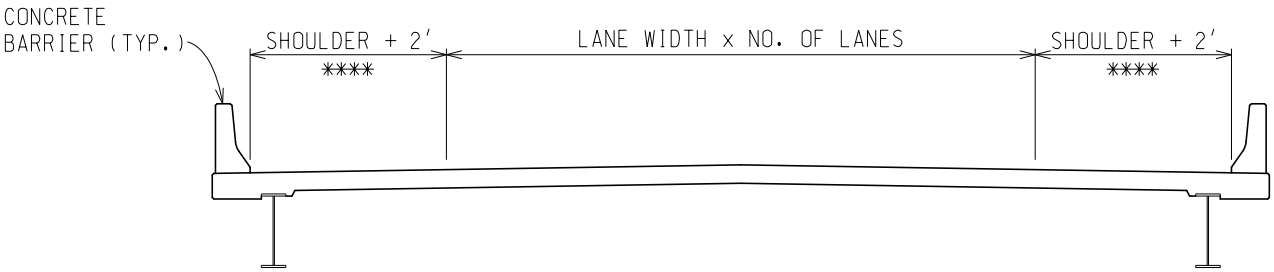
DRAWN BY: BLT CHECKED BY: VZ APPROVED BY: DAJ	MICHIGAN DEPARTMENT OF TRANSPORTATION BUREAU OF HIGHWAY DEVELOPMENT BRIDGE CROSS SECTIONS TRUNKLINE, COUNTY & CITY BRIDGES	ISSUED: 03/17/14 SUPERSEDES: 02/14/11

MAXIMUM POSTED SPEED 40 MPH
PEDESTRIAN FACILITY REQUIRED

FOR CURBED APPROACHES



POSTED SPEEDS GREATER THAN 40 MPH
PEDESTRIAN FACILITY REQUIRED



ANY POSTED SPEED
NO PEDESTRIAN FACILITY REQUIRED

FOR COUNTY & CITY BRIDGES ONLY
FOR TRUNKLINE BRIDGES WITHOUT PEDESTRIAN FACILITY
SEE BRIDGE DESIGN GUIDE 6.05.01

* 5'-2" TO TOE OF CURB, 5'-0" TO BEVEL POINT.

** WHEN A SIDEWALK WIDTH OF LESS THAN 5'-0" EXISTS FOR A LENGTH OF 200' OR MORE (INCLUDING APPROACHES) A PASSING SPACE, 5'-0" x 5'-0" (INCLUSIVE OF THE SIDEWALK), SHALL BE PRESENT EVERY 200' OR LESS OR A 5'-0" SIDEWALK SHALL BE USED TROUGHOUT.

*** FOR WIDTH REFER TO AASHTO "GUIDE FOR THE DEVELOPMENT OF BICYCLE FACILITIES".

**** 2'-0" MIN. FOR CURB APPROACH.
FOR MINIMUM APPROACH SHOULDER WIDTHS SEE BRIDGE DESIGN MANUAL CHAPTER 7 AND AASHTO "A POLICY ON GEOMETRIC DESIGN OF HIGHWAYS AND STREETS".

WHERE AN AUXILIARY LANE ON THE STRUCTURE IS A CONTINUATION OF A RAMP, MATCH THE RAMP SHOULDER AS THE LATERAL CLEARANCE TO THE BRIDGE RAIL. USE 4' (TOTAL) MAX ON LEFT AND 8' (TOTAL) MAX. ON RIGHT.

PREPARED BY DESIGN DIVISION	6.05.02

Road CPM Project Identification and Selection (revised 3- 17- 14)

Delays in performing CPM work allow the quantity of pavement defects and their severity to increase, which in turn leads to an increase in cost to perform the fix. Consequently, this causes considerable increases in the life- cycle costs of the pavement (i.e. the cost of maintaining the pavement throughout its service life).

Emphasis should be placed on life cycle work (the effort to extend a pavement's service life), for both rigid and flexible pavement.

Appropriate CPM should be done until repair costs exceed the benefits derived from such activities or until the pavement structure needs to be reconstructed. This may require that CPM is performed on pavements at a more frequent interval. The basis of CPM should be consistent with the Region's overall preservation strategy.

CPM Guidelines

Selection for CPM projects can be assisted by using pavement condition data. Recommended pavement condition levels, for each preventive maintenance treatment, are listed in MDOT's CPM Program Guidelines and are shown in the Appendix. The condition levels listed have been identified to aid the engineer in determining the cost effectiveness for specific preventive maintenance treatments given an existing pavement condition.

On CPM mill and overlay/inlay projects the need for ADA improvements shall be considered when scoping the project (refer to Chapter 6 for sidewalk ramp upgrade warrants).

Timing for CPM Activities

CPM should be performed on pavements with:

- RSL of greater than or equal to 3 years – RSL categories II, III, IV, V and VI
- DI of less than 40

Routine maintenance should be performed on all pavements, including those which may require rehabilitation or reconstruction.

When NOT to perform CPM

Normally, CPM should not be performed:

- On RSL Category I pavement
- On severely distressed pavement structures or pavements with a severely rutted cross section
- Beyond the outside edges of the shoulders or curbs

Limitations of CPM

Minor safety work can be included in CPM projects, but such work should not be extensive. Examples of minor safety work include:

- Modification of pavement cross sections, by either milling or placing a HMA wedge course