



Road & Bridge Design Publications

Monthly Update – March 2015

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. E-mail questions related to the road changes to MDOT-Road-Design-Standards@michigan.gov. E-mail Bridge related questions to MDOT-Bridge-Design-Standards@michigan.gov.

Special Details

R-1-G: Drainage Structures: Added details for larger diameter drainage structures (84”, 96”, 108”, & 120” diameters) on sheets 5-8. Standard pay items have been added for these structures.

Road Design Manual

1.02.01A: Project Location: Removed a sentence regarding the inclusion of detour routes on the title sheet.

1.03.02B: File Naming Conventions: A listing of file naming conventions was replaced with links to their current locations.

Chapter 14: In multiple locations, the term “THE Plan Review” was revised to “The Plan Review”.

14.12.01: Request for Survey/Mapping: Design alignment deliverables designated on CADD levels were revised for 3D Model implementation.

14.36: The Plan Review & 14.36.01: Requirements: The submission of Plan Review material was revised for 3D Model implementation.

14.36.02: Procedure: MDOT RID Support was added to the list of reviewers for plans & other materials.

14.53: Transmittal of Alignment Data to Construction: This section was deleted as it is no longer current practice.

14.54 OEC Meeting: Form 0303 (Design Plan Submittal) was listed in addition to Form 0330 (OEC Material Submittal Order) in regards to the OEC process. Links were added for these forms where available.



Road & Bridge Design Publications

Monthly Update – March 2015

14.54.02: OEC Package Material: This section was updated for 3D Model implementation.

14.65: Reference Information Documents: This section was updated for 3D Model implementation.

14.69: Archiving Project Files (Workstation): This section was deleted as it is no longer current practice.

14.71: Plan Revisions: An additional “guideline for preparing a plan revision”, regarding RID files, was added for 3D Model implementation.

14.73.02: As Built File Naming Standards: Examples of file naming conventions for as built projects and consecutive as built sheets were revised for 3D Model implementation.

Bridge Design Manual

8.05 K (LFD & LRFD): Updated use statement.

Bridge Design Guides

8.21.01, 8.21.02 & 8.21.02 A: Added handling holes and use criteria.

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

3-16-2015

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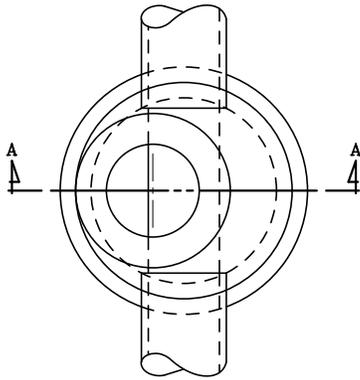
SPECIAL DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
21	2	GUARDRAIL AT INTERSECTIONS	5-24-01
24	5	GUARDRAIL ANCHORED IN BACK SLOPE TYPES 4B & 4T	7-22-02
99	2	CHAIN LINK FENCE WITH WIRE ROPE	9-22-14
* R-1-G	9	DRAINAGE STRUCTURES	2-26-15
R-62-H	5	GUARDRAIL APPROACH TERMINAL TYPES 2B & 2T (SKT)	10-28-14
R-126-I	5	PLACEMENT OF TEMPORARY BARRIER	3-26-12
<p>* Denotes New or Revised Special Detail to be included in projects for (beginning with) the June letting.</p> <p>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.</p> <p>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.</p>			

Index to Bridge Detail Sheets

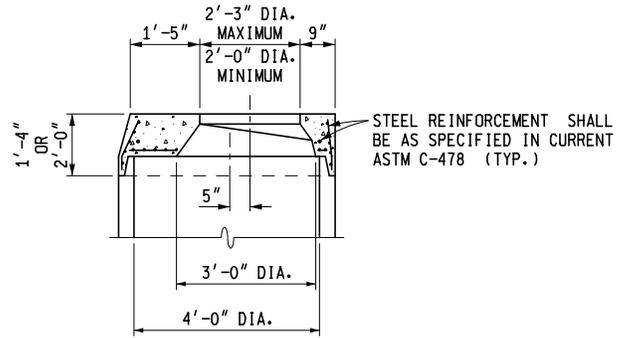
3-16-2015

7

DETAIL NUMBER	NUMBER OF SHEETS	TITLE	CURRENT DATE
EJ3AA	1 or 2	EXPANSION JOINT DETAILS	6-16-14
EJ4N	1 or 2	EXPANSION JOINT DETAILS	6-16-14
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
<p>* Denotes New or Revised Special Detail to be included in projects for (beginning with) the June letting.</p> <p>Note: Details EJ3AA & EJ4N 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.</p> <p>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.</p>			



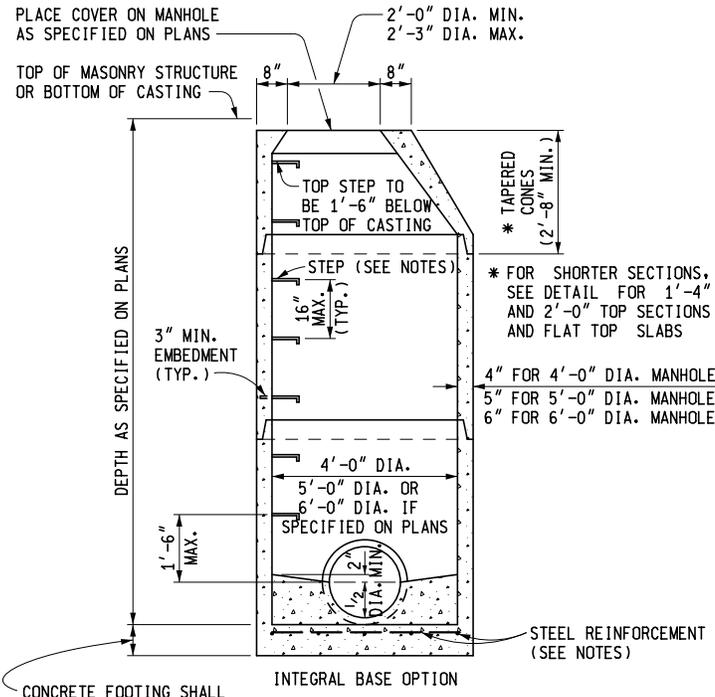
PLAN VIEW



DETAIL FOR
1'-4" & 2'-0" TOP SECTIONS

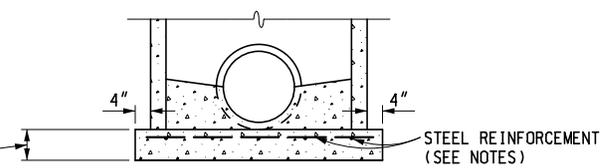
SHAPE MAY VARY FROM DETAIL SHOWN BUT MUST COMPLY WITH ASTM C-478 AND JOINTS SHALL BE COMPATIBLE WITH THE RISER

STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN CURRENT ASTM C-478 (TYP.)



INTEGRAL BASE OPTION

CONCRETE FOOTING SHALL BE 8" THICK FOR DEPTHS TO 25'-0" AND 1'-0" THICK FOR DEPTHS OVER 25'-0"

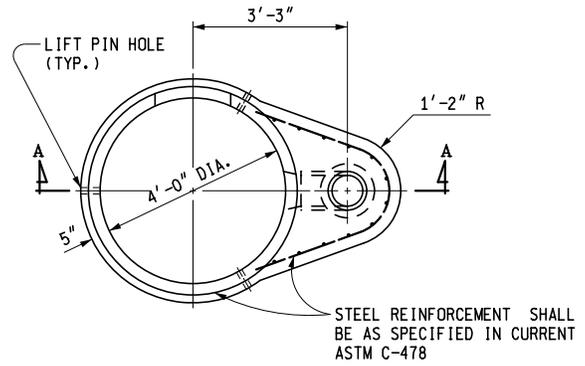


SEPARATE BASE OPTION

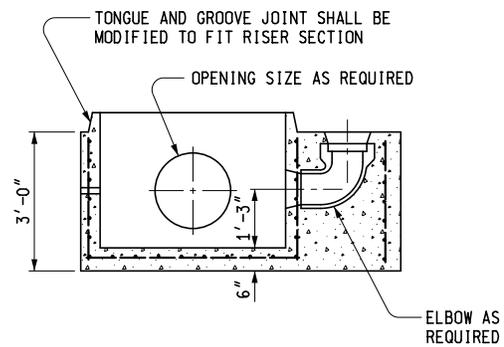
CONCRETE FOOTING SHALL BE 8" THICK FOR DEPTHS TO 25'-0" AND 1'-0" THICK FOR DEPTHS OVER 25'-0"

SECTION A - A
TYPICAL MANHOLE

PRECAST REINFORCED CONCRETE SHOWN
OTHER OPTIONS INCLUDE CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE WALL SECTIONS
SEE TYPICAL WALL SECTIONS FOR WALL THICKNESS



STEEL REINFORCEMENT SHALL BE AS SPECIFIED IN CURRENT ASTM C-478



SECTION A - A

TYPICAL PRECAST REINFORCED
BOTTOM SECTION FOR DROP MANHOLE

MDOT
Michigan Department of Transportation

PREPARED BY
DESIGN DIVISION

DRAWN BY: B.L.T.

CHECKED BY: W.K.P.

DEPARTMENT DIRECTOR
Kirk T. Stedile

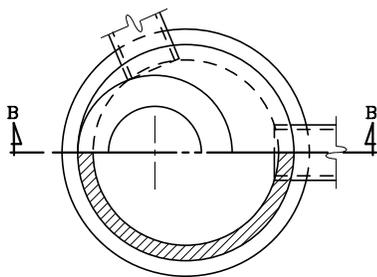
APPROVED BY: _____
DIRECTOR, BUREAU OF FIELD SERVICES

APPROVED BY: _____
DIRECTOR, BUREAU OF HIGHWAY DEVELOPMENT

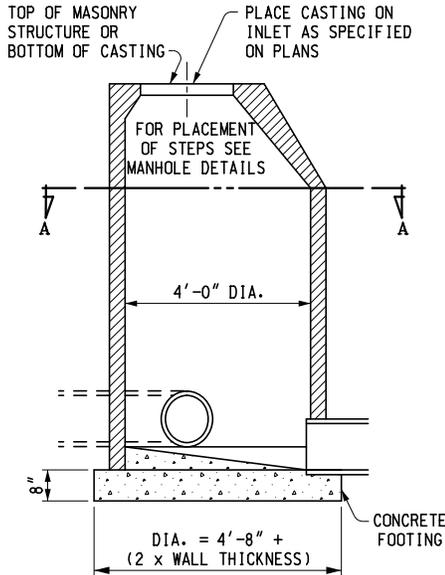
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

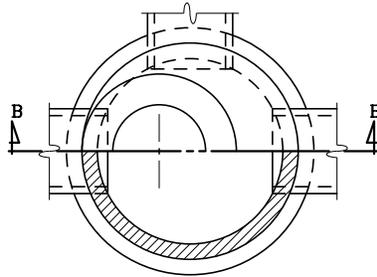
F.H.W.A. APPROVAL	2-26-2015 PLAN DATE	R-1-G	SHEET 1 OF 9
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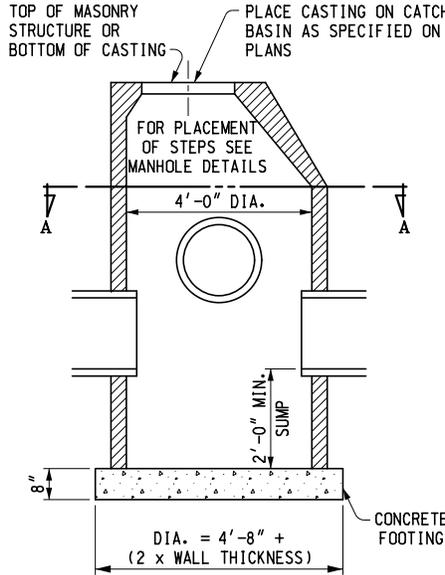
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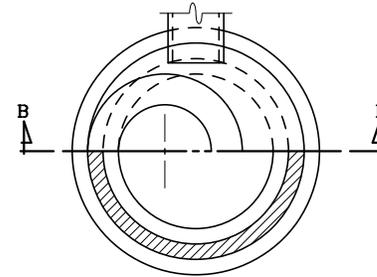
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
INLET



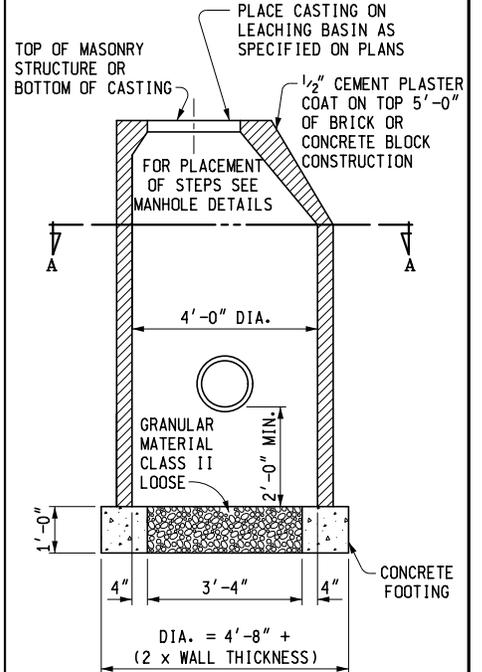
HALF SECTION A - A



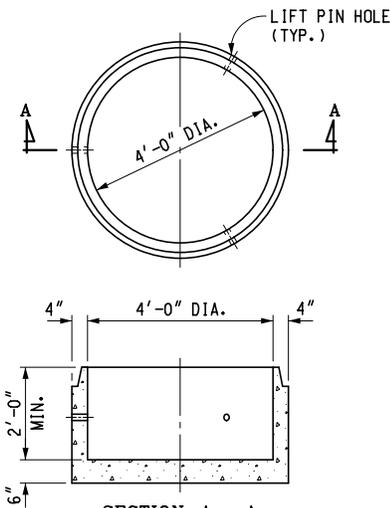
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
CATCH BASIN



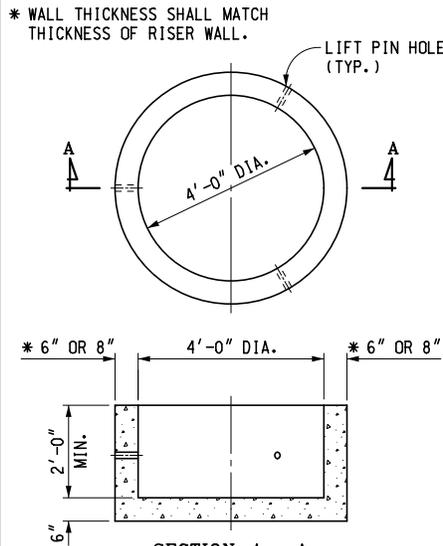
HALF SECTION A - A



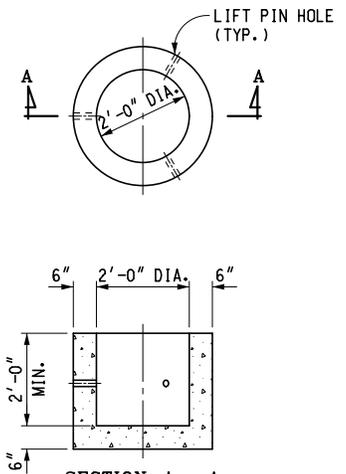
SEE MANHOLE DETAILS FOR BASE OPTIONS
SECTION B - B
LEACHING BASIN



SECTION A - A
PRECAST SUMP FOR PRECAST RISERS



* WALL THICKNESS SHALL MATCH THICKNESS OF RISER WALL.
SECTION A - A
PRECAST SUMP FOR BRICK OR BLOCK CONSTRUCTION



SECTION A - A
PRECAST SUMP FOR 2'-0" DIA. STRUCTURES

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

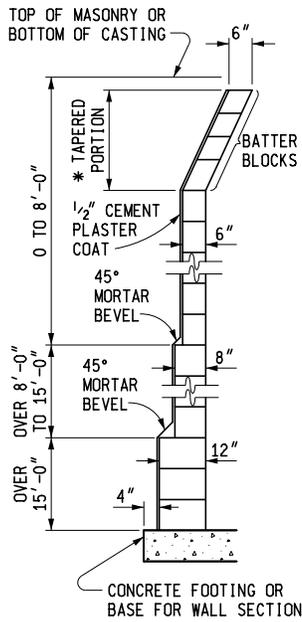
F.H.W.A. APPROVAL

2-26-2015
PLAN DATE

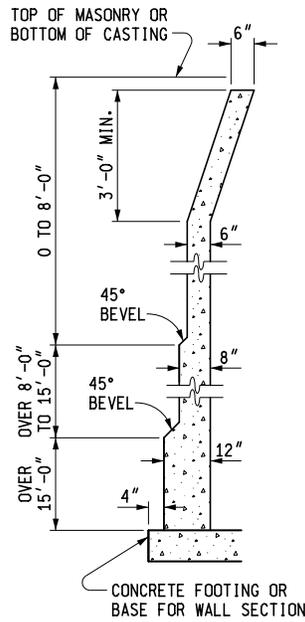
R-1-G

SHEET
2 OF 9

* 4 BLOCK MIN. FOR 4'-0" DIA. STRUCTURE
 6 BLOCK MIN. FOR 5'-0" DIA. STRUCTURE
 6 BLOCK MIN. FOR 6'-0" DIA. STRUCTURE

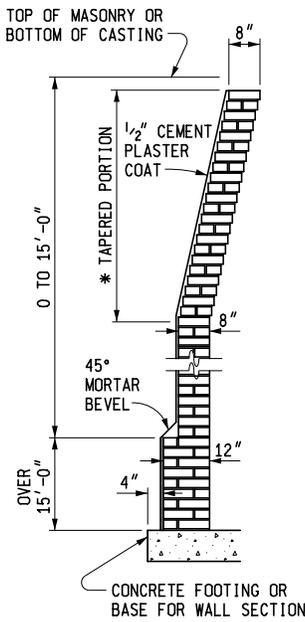


TYPICAL CONCRETE BLOCK WALL SECTION

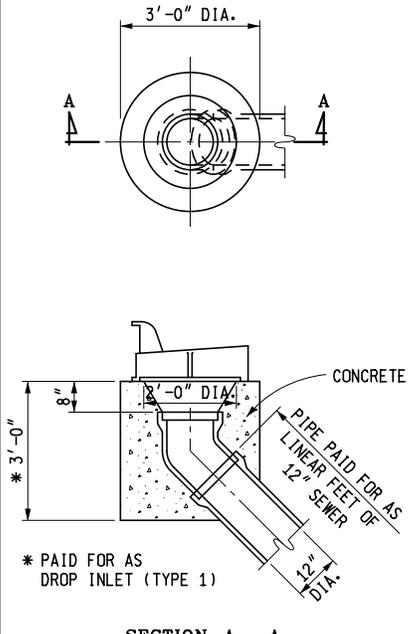


TYPICAL CAST-IN-PLACE CONCRETE WALL SECTION

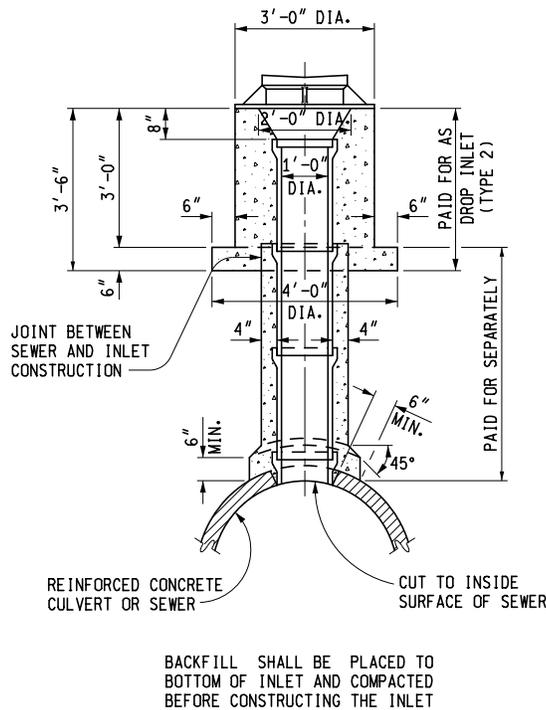
* 5'-0" MIN. FOR 4'-0" DIA. STRUCTURE
 6'-0" MIN. FOR 5'-0" DIA. STRUCTURE
 6'-0" MIN. FOR 6'-0" DIA. STRUCTURE



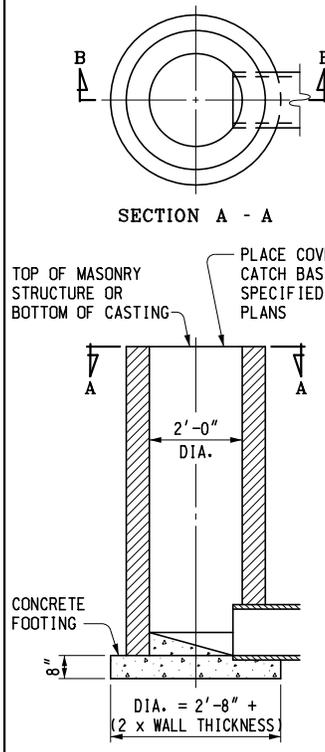
TYPICAL BRICK WALL SECTION



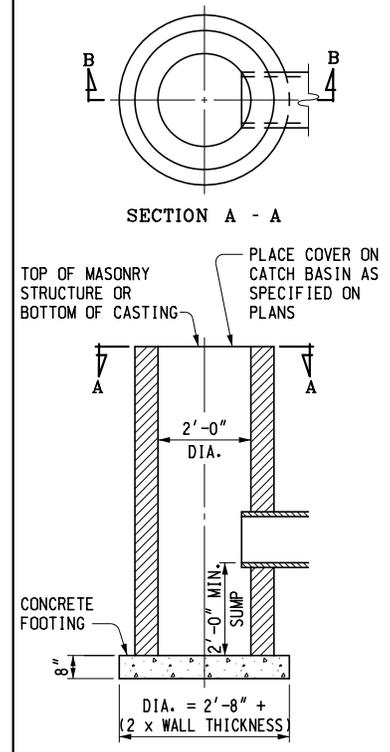
SECTION A - A
 DROP INLET (TYPE 1)



DROP INLET (TYPE 2)



INLET



CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

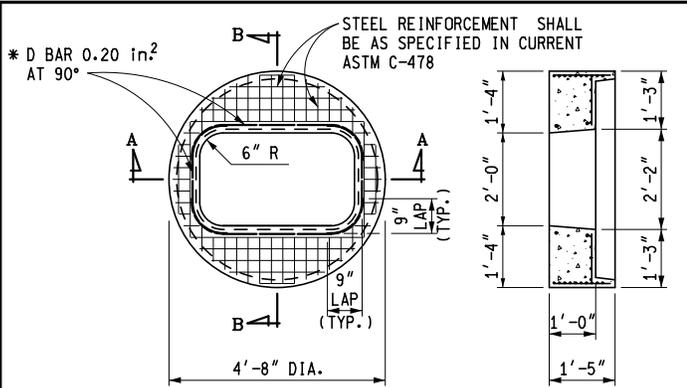
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

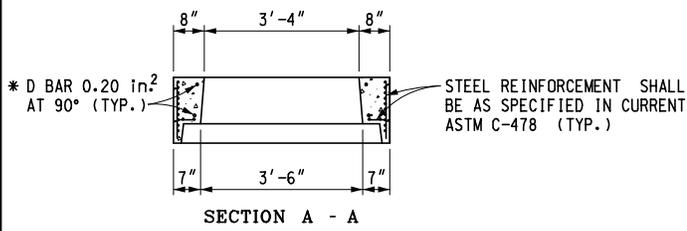
2-26-2015
 PLAN DATE

R-1-G

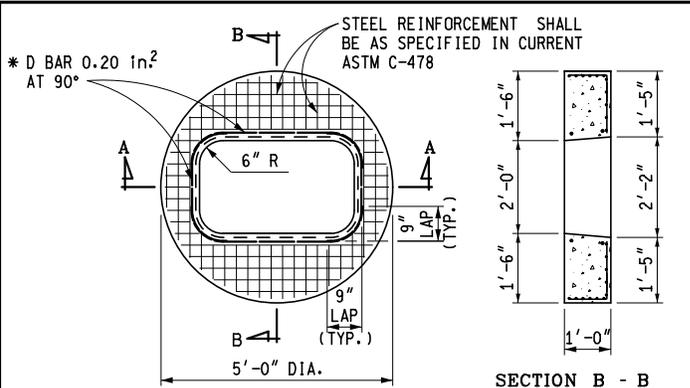
SHEET
 3 OF 9



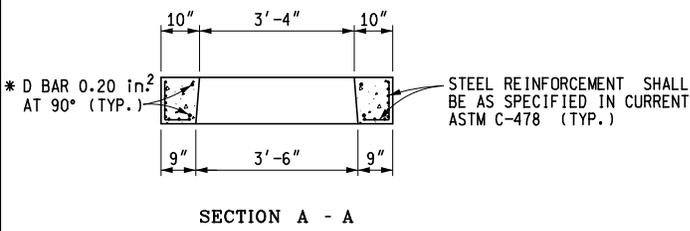
* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



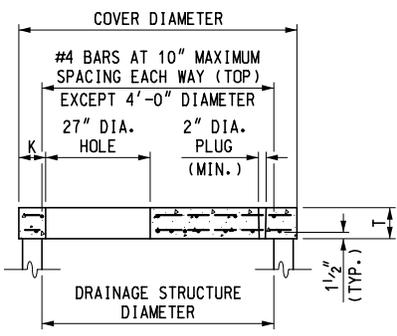
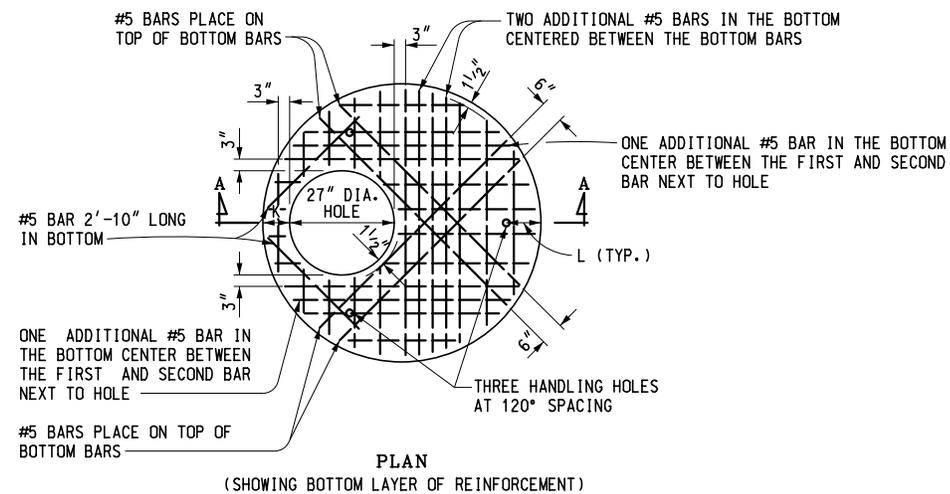
PRECAST FLAT SLAB TOP FOR PRECAST CONCRETE STRUCTURE, 2' x 4' CASTING



* D BARS MAY BE BENT AT A SMALLER RADIUS RATHER THAN PARALLELING THE RADIUS IN THE DRAIN OPENING



PRECAST FLAT SLAB TOP FOR MASONRY STRUCTURE, 2' x 4' CASTING



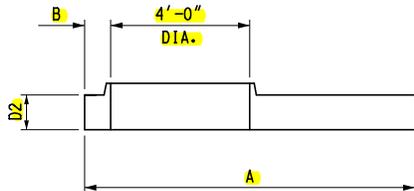
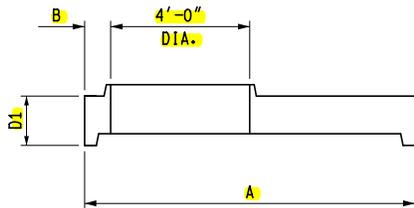
PRECAST REINFORCED CONCRETE FLAT SLAB TOP

TABLE OF DIMENSIONS					
STRUCTURE DIAMETER	COVER DIAMETER	T	K	L	#5 BAR MAXIMUM SPACING (BOTTOM EACH WAY)
* 4'-0"	58"	6"	6"	8"	6"
5'-0"	72"	8"	7"	9"	7"
6'-0"	86"	8"	8"	10"	6"

* ONLY BOTTOM LAYERS OF STEEL NECESSARY

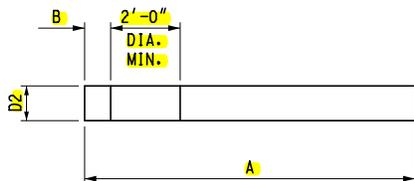
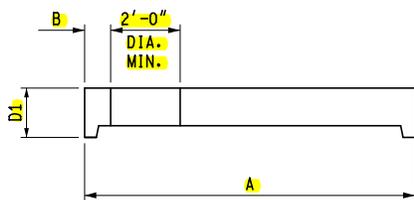
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES



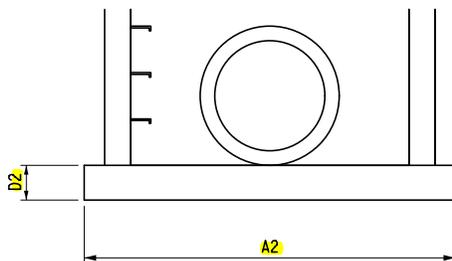
PRECAST REDUCER CAP

REDUCER CAP DIMENSIONS				
STRUCTURE DIAMETER	CAP DIAMETER "A"	B	CAP DEPTH "D1"	CAP DEPTH "D2"
7'-0"	101 1/2"	8 3/4"	1'-5"	12"
8'-0"	114"	9"	1'-5"	12"
9'-0"	128"	10"	1'-5"	12"
10'-0"	140"	10"	1'-6"	12"



PRECAST FLAT SLAB TOP

FLAT SLAB TOP DIMENSIONS				
STRUCTURE DIAMETER	COVER DIAMETER "A"	B	COVER DEPTH "D1"	COVER DEPTH "D2"
7'-0"	101 1/2"	8 3/4"	1'-5"	12"
8'-0"	114"	9"	1'-5"	12"
9'-0"	128"	10"	1'-5"	12"
10'-0"	140"	10"	1'-6"	12"

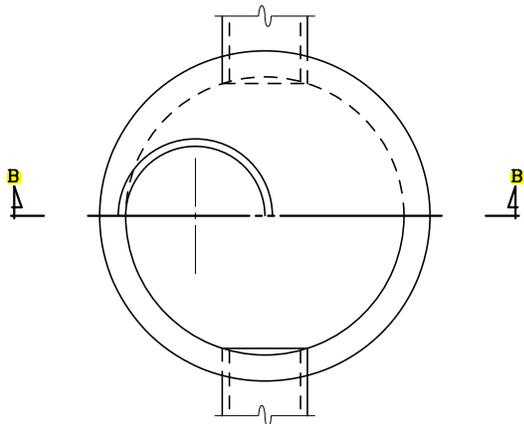


SEPARATE BASE OPTION

BASE AND RISER DIMENSIONS					
STRUCTURE DIAMETER	BASE DIAMETER "A1"	BASE DIAMETER "A2"	WALL THICKNESS "T"	BASE DEPTH "D1"	BASE DEPTH "D2"
7'-0"	101 1/2"	108"	8 3/4"	8"	12"
8'-0"	114"	128"	9"	8"	12"
9'-0"	128"	140"	10"	8"	12"
10'-0"	140"	154"	10"	8"	12"

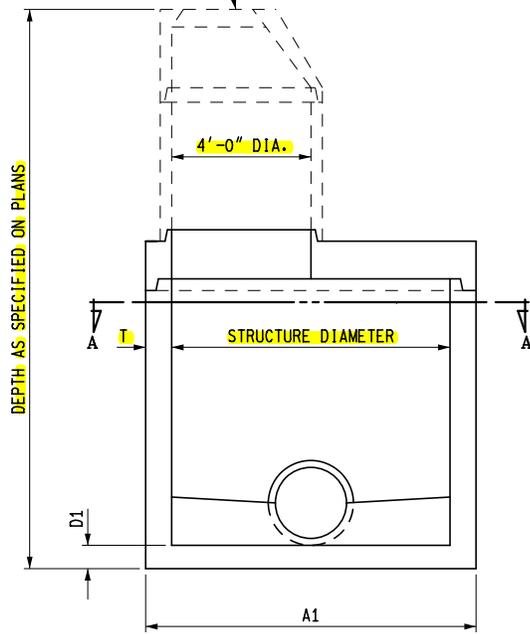
MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

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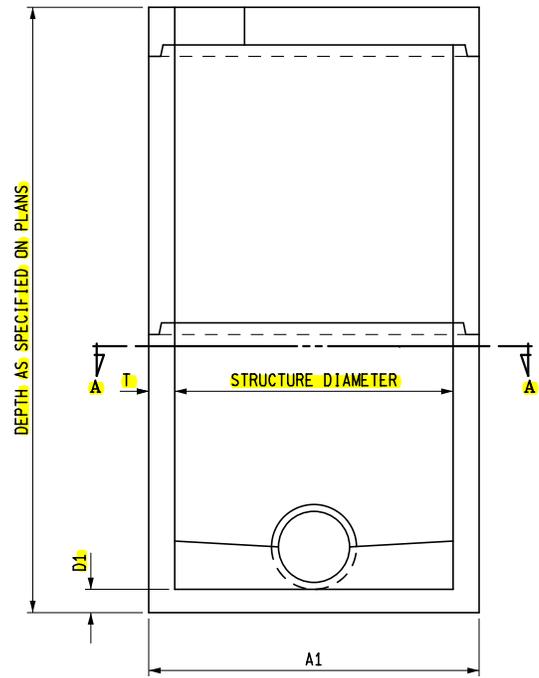


HALF SECTION A - A

TOP OF MASONRY STRUCTURE
OR BOTTOM OF CASTING



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST MANHOLE

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

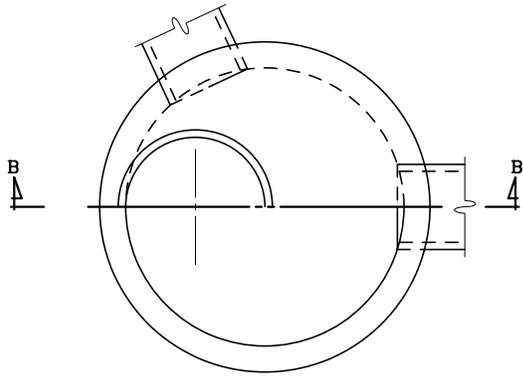
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

2-26-2015
PLAN DATE

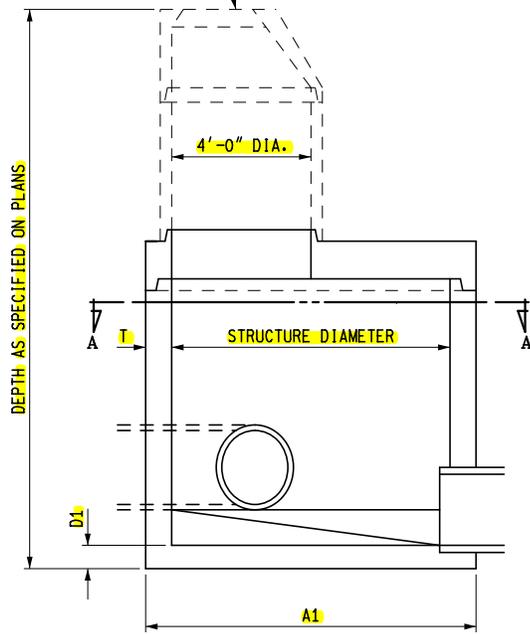
R-1-G

SHEET
6 OF 9

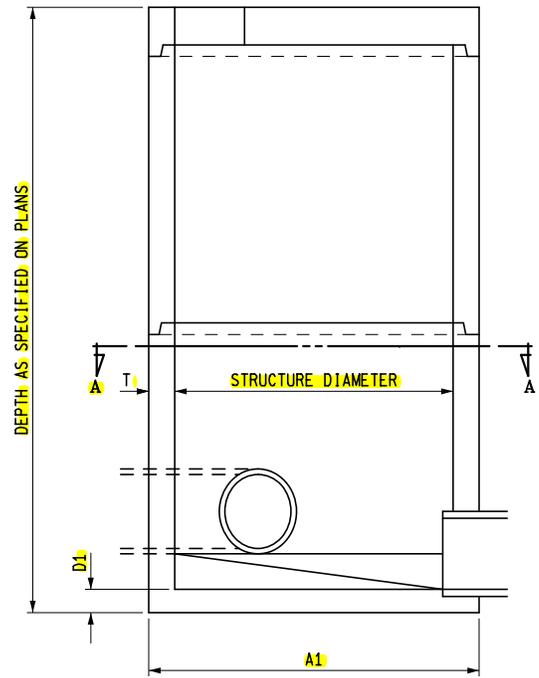


HALF SECTION A - A

TOP OF MASONRY STRUCTURE
OR BOTTOM OF CASTING



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST INLET

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

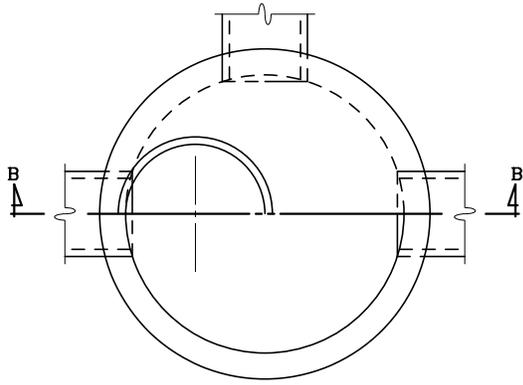
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

2-26-2015
PLAN DATE

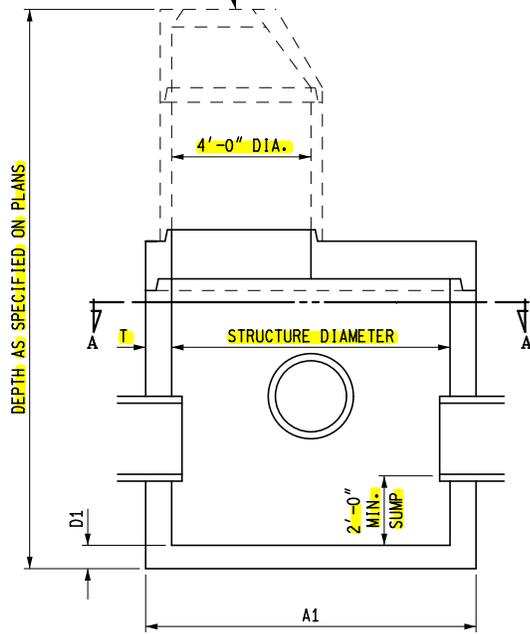
R-1-G

SHEET
7 OF 9

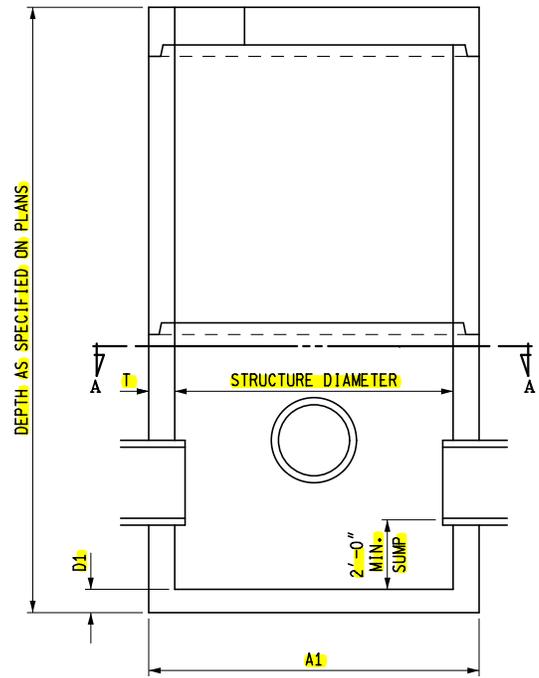


HALF SECTION A - A

TOP OF MASONRY STRUCTURE
OR BOTTOM OF CASTING



SECTION B - B
SHOWING REDUCER CAP



SECTION B - B
SHOWING FLAT SLAB TOP

PRECAST CATCH BASIN

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

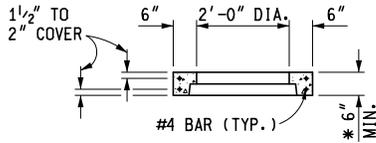
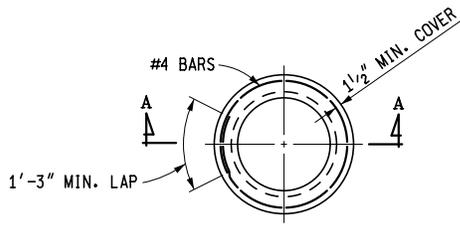
DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

2-26-2015
PLAN DATE

R-1-G

SHEET
8 OF 9



SECTION A - A

* WHEN RISER TONGUE LENGTH IS GREATER THAN 3", USE 2 TIMES THE TONGUE LENGTH.

NOTE: PRECAST RISER SHALL FULLY ENGAGE THE TONGUE OF THE RISER PIPE.

PRECAST RISER RING (FOR 2'-0" DIAMETER STRUCTURE)

NOTES:

THE DRAINAGE STRUCTURE COVERS ALLOWED FOR USE ON THESE DRAINAGE STRUCTURES ARE SPECIFIED IN SUBSEQUENT STANDARD PLANS AND ARE INTERCHANGEABLE ON ANY STRUCTURE.

THE TOPS OF MASONRY STRUCTURES SHALL BE SUFFICIENTLY LOW TO PERMIT PROPER ADJUSTMENT OF COVER TO GRADE USING MORTAR OR BRICK AS DIRECTED BY THE ENGINEER.

PREMIUM JOINTS ARE REQUIRED ON ALL SANITARY MANHOLES. SEE ASTM DESIGNATION C-923.

GRANULAR MATERIAL CLASS III SHALL BE USED IN BACKFILLING AROUND ALL STRUCTURES THAT FALL WITHIN THE 1:1 INFLUENCE LINES FROM THE EDGE OF PAVEMENT OR BACK OF CURB.

STEPS FOR DRAINAGE STRUCTURES SHALL BE OF AN APPROVED DESIGN AND MADE FROM CAST IRON, ALUMINUM, OR PLASTIC COATED STEEL. RUNGS SHALL BE A MINIMUM OF 10" IN CLEAR LENGTH, DESIGNED TO PREVENT THE FOOT FROM SLIPPING OFF THE END. THE MINIMUM HORIZONTAL PULL OUT LOAD SHALL BE 400 LBS. THE MINIMUM VERTICAL LOAD SHALL BE 800 LBS.

THE BELL SHALL BE REMOVED FOR THE FIRST LENGTH OF OUTLET PIPE PROJECTING THROUGH THE WALL OF THE MANHOLE.

PRECAST CONCRETE SECTIONS, SUMPS, AND FLAT TOP SLABS SHALL BE BUILT ACCORDING TO CURRENT ASTM C-478 AND ACCORDING TO DETAILS SPECIFIED ON THIS PLAN. PRECAST REINFORCED CONCRETE FLAT TOP SLAB SHALL BE MARKED TO SHOW LOCATION OF REINFORCEMENT. THE WALLS OF THE PRECAST UNITS MAY HAVE A SLIGHT TAPER TO ALLOW FOR FORM REMOVAL. PRECAST CONCRETE 2'-0" DIAMETER DRAINAGE STRUCTURES SHALL HAVE A MINIMUM 3" WALL THICKNESS WITH A 6" MINIMUM BEARING SURFACE ON TOP. SEE PRECAST RISER RING FOR 2'-0" DIAMETER STRUCTURE.

THE INSIDE DIAMETER OF PIPES ENTERING OR LEAVING PRECAST DRAINAGE STRUCTURES SHALL BE LESS THAN THE INSIDE DIAMETER OF THE DRAINAGE STRUCTURE MINUS 2'-0". A PIPE LEAVING A 2'-0" DIAMETER DRAINAGE STRUCTURE IS ALLOWED TO HAVE 1'-0" INSIDE DIAMETER OR LESS.

THE NUMBER OF PIPE OPENINGS IN A RISER SHALL BE DETERMINED BY THE DESIGNER. SPACING BETWEEN OPENINGS SHALL BE 1'-0" MINIMUM. OPENINGS MAY BE CONSTRUCTED BY CASTING OR BY DRILLING THE CURED CONCRETE.

PRECAST CONCRETE FOOTINGS OR BASES SHALL BE REINFORCED WITH #4 BARS SPACED AT 1'-0" BOTH WAYS OR WITH TWO LAYERS OF WELDED WIRE FABRIC OF EQUIVALENT CROSS SECTIONAL AREA LAID AT RIGHT ANGLES AND WIRED TOGETHER. REINFORCEMENT SHALL BE PLACED IN TOP OF FOOTING AND SHALL BE MARKED.

PRECAST CONCRETE FOOTINGS SHALL BE SUPPORTED BY A COMPACTED 6" GRANULAR SUBBASE.

THE MINIMUM WALL THICKNESS FOR ALL 2'-0", 4'-0", 5'-0", AND 6'-0" DRAINAGE STRUCTURES USING CONCRETE BLOCK, BRICK, OR CAST-IN-PLACE CONCRETE SHALL BE AS SPECIFIED IN TYPICAL WALL SECTIONS.

THE CONICAL SECTION OF MANHOLES OR CATCH BASINS CONSTRUCTED OF BLOCK OR BRICK SHALL BE SHROUDED WITH GEOTEXTILE FABRIC TO A MINIMUM DEPTH OF 5'-0" OR THROUGH THE FROST ZONE. ENOUGH GEOTEXTILE MATERIAL SHALL BE LEFT ON THE TOP (8" OR MORE) TO ROLL OVER THE TOP OF THE CONE.

PREFORMED HIGH DENSITY POLYSTYRENE FILLER PIECES MAY BE USED TO CHANNEL FLOW IN THE BOTTOM OF MANHOLES PROVIDED THEY HAVE AT LEAST 2" OF CONCRETE COVER. THE USE OF THIS MATERIAL FOR CHANNEL FLOW IS RESTRICTED TO MANHOLES WHERE THE BOTTOM SECTION IS NOT SUBJECT TO FREEZING. THE USE OF THIS MATERIAL MUST BE APPROVED BY THE ENGINEER.

MICHIGAN DEPARTMENT OF TRANSPORTATION
BUREAU OF HIGHWAY DEVELOPMENT STANDARD PLAN FOR

DRAINAGE STRUCTURES

F.H.W.A. APPROVAL

2-26-2015
PLAN DATE

R-1-G

SHEET
9 OF 9

MICHIGAN DESIGN MANUAL ROAD DESIGN

CHAPTER 1

PLAN PREPARATION

1.01

DEVELOPMENT METHODS

1.01.01 (revised 11-28-2011)

References

- A. Geometric Design Guides - Design Division
- B. Guidelines for Plan Preparation – Design Division
- C. *Michigan Manual of Uniform Traffic Control Devices*, Current Edition
- D. Standard Plans and Special Details – Design Division
- E. *Standard Specifications for Construction*, Current Edition

Existing plans for a recent project, similar in nature to the proposed project, are an excellent reference.

1.01.02 (revised 11-28-2011)

General

This chapter provides the information and details necessary to prepare a set of plans. The plans should contain all the information essential for bidding and constructing the project. Although innovation and creativity are encouraged in the preparation of plans, the importance of general uniformity must be emphasized. Plans should be adaptable to the diverse requirements of the Design Division and Construction Field Services Division. At the same time the plans should be a functional reference, familiar to the users. A general format should be followed by all Designers.

1.01.03 (revised 10-22-2012)

Survey and Mapping Methods

The choice between a ground survey, an aerial survey, a laser scanning survey, or a combination depends in part on the type and length of project, the information required, and the time schedule.

Some projects may not require a survey or may require only a minor pick up survey. Old plans are valuable sources of information on these projects.

Refer to [Chapter 14](#), Procedures for Plan Preparation, for more information on surveys and mapping.

1.02

PLAN SHEETS

1.02.01 (revised 3-16-2015)

Title Sheet

The location map shown on the title sheet will generally be obtained from either county or city maps which are available in ProjectWise in the Reference Documents. For a particular project, a suitable map or section of one is chosen and incorporated on a standard title sheet cell. Because first impressions often sell the product, the title sheet should be neat in appearance and layout

MICHIGAN DESIGN MANUAL ROAD DESIGN

1.02.01 (continued)

Title Sheet

A. Project Location

The project should be located on the map and the limits (P.O.B. Stationing and P.O.E. Stationing) outlined to clearly show and stand out from the rest of the map. The map should be oriented with north to the top of the sheet and with a north arrow shown near the map.

The map must show the entire project limits and other features that will easily identify the location. Preferably, at least two trunklines, names of major cross roads, and an incorporated city or village, township, and county should be shown on the location map. The town, range and section numbers should also be shown on the map.

The point of beginning and the point of ending should be identified by control section, physical reference, job number, stationing, and control section mileposts. Station equations and stationing of major cross roads should also be shown.

The location map should also show bridge numbers, railroad crossing numbers, and railroad companies within the project limits for both existing and proposed crossings.

1.02.01 (continued)

B. Traffic Data

Existing year traffic data and projected 20 year traffic data should be located on the upper left part of the title sheet. Pertinent counts including ADT, DHV, percent commercial, and the year taken are shown in tabular form. For freeway projects, the commercial DDHV should also be listed. These counts are usually present counts and projected counts. Counts are obtained from the Bureau of Transportation Planning (see [Chapter 14](#) of this manual).

The design speed and posted speed should also be shown. If the design speed changes within a project, show the various limits by stationing, cross roads, or mile points.

C. Project Identification

The following format should be used for identifying projects:

MICHIGAN DEPARTMENT OF TRANSPORTATION

ROUTE: I.** & M.**
CITY OF *****
***** TOWNSHIP
***** COUNTY

SECTION	CONTROL SEC	JOB NO.	FEDERAL	
			PROJECT	ITEM
1A	XXXXX	XXXXXXXX		
1B (LOG JOB)	XXXXX	XXXXXXXX		
2	XXXXX	XXXXXXXX		

For filing and reference purposes, both the control section and job numbers should be shown in the appropriate blocks in the bottom margin. If the project has multiple job numbers, show them in the title block. Projects with multiple control sections should show the major control section (as programmed) first with others following in parentheses.

MICHIGAN DESIGN MANUAL

ROAD DESIGN

1.03.02 (revised 3-16-2015)

Plan Preparation Conventions

A. Drafting

See the [Sample Plans](#) for examples of drafting conventions, symbols, line weights, etc. to use in preparing plans.

B. File Naming Conventions

1. Plan and Proposal Milestones

See [Chapter 3 of Design Submittal Requirements](#).

2. Reference Information Documents (RID)

See [Section 14.65 and Design Submittal Requirements](#).

**MICHIGAN DESIGN MANUAL
ROAD DESIGN**

CHAPTER 14

INDEX

PROCEDURES FOR PLAN PREPARATION

14.01 GENERAL

14.02 DESIGN PACKAGE EVALUATIONS

14.02.01 Scope Verification

14.02.02 Final Right-of-Way

14.02.03 The Plan Review

14.02.04 Omissions/Errors/Check (OEC) Meeting

14.02.05 Pre-Construction Meeting

14.02.06 Post-Construction Meeting

14.03 ESTIMATES

14.03.01 Definitions

14.03.02 Program Estimates

14.03.03 Preliminary Estimates

14.03.04 Engineer's Estimate

14.04 Section Deleted

14.05 PROJECT STUDY TEAM

14.06 PROJECT ASSIGNMENT

14.07 PROJECT NUMBERS

14.07.01 Work Type Codes and Descriptions

14.08 ACTIVATION OF "C" PHASE

14.09 MDOT OVERSIGHT / FHWA OVERSIGHT

MICHIGAN DESIGN MANUAL ROAD DESIGN

CHAPTER 14 PROCEDURES FOR PLAN PREPARATION INDEX (continued)

14.28 REQUEST FOR PRELIMINARY MAINTAINING TRAFFIC

14.29 PRELIMINARY GEOMETRIC REVIEW FOR NON-FREEWAY RECONSTRUCTION / NEW CONSTRUCTION (4R) AND FREEWAY RESURFACING, RESTORATION, REHABILITATION AND RECONSTRUCTION / NEW CONSTRUCTION (3R/4R)

14.30 PRELIMINARY CONSTRUCTABILITY REVIEW

14.31 ENVIRONMENTAL REVIEW AND CLEARANCE

14.31.01 Environmental Classification

14.31.02 Environmental Certification

14.32 MDOT ENVIRONMENTAL PERMITS

14.32.01 Clearance

14.32.02 Oversight

14.32.03 Application

14.32.04 Duration

14.32.05 Issued Permits

14.33 PRELIMINARY ROW SUBMITTAL

14.34 Section Deleted

14.35 FINAL ROW SUBMITTAL

14.36 The Plan Review

14.36.01 Requirements

14.36.02 Procedure

14.37 REVIEW OF PROJECT SCOPE, COST AND SCHEDULE

14.38 ROW REVISIONS

14.39 UTILITIES STATUS REPORT CERTIFICATION

14.40 MDEQ PERMITS FOR SEWER AND WATER MAINS

MICHIGAN DESIGN MANUAL ROAD DESIGN

CHAPTER 14 PROCEDURES FOR PLAN PREPARATION INDEX (continued)

14.49 CRITICAL PATH NETWORKS

14.50 FINAL CONSTRUCTABILITY REVIEW

14.51 INCENTIVE AND LIQUIDATED DAMAGES CLAUSES

14.51.01 Guidelines

14.51.02 Applications

14.51.03 Procedure

14.52 REVIEW OF PROJECT SCOPE, COST AND SCHEDULE

14.53 Section Deleted

14.54 OMISSIONS / ERRORS / CHECK (OEC) MEETING

14.54.01 Attendees

14.54.02 OEC Package Material

14.55 CONTRACT SELECTION TEAM (DBE PROGRAM)

14.56 PACKAGING OR CONSOLIDATING PROJECTS

14.57 CERTIFICATION ACCEPTANCE

14.58 APPROVAL OF SPECIAL PROVISION

14.59 SHELF PROJECTS

14.60 SUBMISSION OF COMPLETED PLANS

14.60.01 General

14.60.02 Requirements

14.60.03 Exceptions

14.60.04 QA/QC Review

14.60.05 TRNS•PORT Files

14.61 PRE-LETTING BRIEFING

14.61.01 Procedure

MICHIGAN DESIGN MANUAL ROAD DESIGN

CHAPTER 14 PROCEDURES FOR PLAN PREPARATION INDEX (continued)

14.62 CONTRACTOR INQUIRIES

14.63 ADDENDA

14.64 POSTPONEMENT, WITHDRAWAL OR REJECTION OF PROJECTS FROM LETTING

14.65 REFERENCE INFORMATION DOCUMENTS

14.66 TABULATIONS OF BIDS

14.67 PRE-CONSTRUCTION MEETING

14.68 Section Deleted

14.69 Section Deleted

14.70 DESIGN PROJECT RECORD

14.71 PLAN REVISIONS

14.71.01 Procedure

14.72 POST-CONSTRUCTION MEETING

14.72.01 Recommendations and Authorizations

14.73 MARKED FINAL PLANS

14.73.01 Mark-Up Standards

14.73.02 File Standards and Requirements

14.73.03 As Built Turn in Process

14.73.04 Design Division Review and Approval Process

14.74 DOCUMENT RETENTION

14.74.01 Permanent Records

APPENDIX B – CRITICAL PATH CONSTRUCTION TIME ESTIMATES

APPENDIX C – FUNDING CODES

APPENDIX D – LIST OF ACRONYMS

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.02.02 (revised 3-26-2012)

Final Right-of-Way

Final ROW Review Submittal Review

Quality Assurance
Development Services Division – Project
Development Services
Region/TSC Real Estate Agent

14.02.03 (revised 3-16-2015)

The Plan Review

Design/Construction Package Evaluation

Quality Assurance
Resident /Delivery Engineer
Project Initiator
Region/TSC System Manager
FHWA Oversight - Optional

14.02.04 (revised 3-26-2012)

Omission/Errors/Check (OEC) Meeting

Design/Construction Package Evaluation

Quality Assurance

14.02.05 (revised 3-26-2012)

Pre Construction Meeting

Design/Construction Package Evaluation

Low Bidder
Resident/Delivery Engineer

14.02.06 (revised 3-26-2012)

Post Construction Meeting

Design/Construction Package Evaluation

Design Unit Leader/Consultant Coordinator
Resident/Delivery Engineer
Prime Contractor
Sub Contractors

14.03 (revised 5-28-2013)

ESTIMATES

14.03.01

Definitions

Program Estimates - Cost estimates made prior to the assignment of a project for preliminary and final design.

Preliminary Cost Estimates - Cost estimates made at any time during plan development but prior to plan completion.

Engineers Estimate - Cost estimate based on final quantities reviewed by the Specifications and Estimates Unit of the Design Division.

Pay Item - The name used to describe an item of work for a project.

Unit Price - The price estimated as the cost to complete one unit of a pay item.

Pay Item Number - A standard pay item number assigned to a pay item for use in TrnsPort PES and other automated systems.

Method of Measurement - The method used to measure material or work used on a project. Measurement can be by unit, lump sum, or at times included in the measurement for other items.

MICHIGAN DESIGN MANUAL

ROAD DESIGN

14.12.01 (revised 3-16-2015)

Road

Alignment

Typically, there are three different types of data described as 'Horizontal Alignments' that are used for MDOT design, any of which may or may not be considered a legal alignment. These three types of alignments are: Survey, As Constructed, and Construction.

Survey Alignment: Historically, a survey alignment was primarily used as a baseline for locating topographic features, cross-sections, etc., along a proposed route. This was an alignment provided to or created by survey crews to lay out a preliminary location and collect data relative to that route.

As-Constructed Alignment: This is frequently referred to as a "best fit" alignment, which represents the physical road location at a specific point in time. These alignments are typically computed using survey points collected along the actual roadway centerline (crack, crown, paint stripe, curb split, etc.).

Construction Alignment: An alignment developed for the purpose of constructing a roadway. The construction alignment is proposed by an engineer. Additional R.O.W. needed for a project was frequently described from this alignment.

Legal vs. Non-legal

A **legal alignment** defines actual location of the Right-of-Way based on a survey alignment, as constructed alignment, and/or a construction alignment as referenced in property descriptions, conveyances, i.e. legal documents. It is considered a property controlling entity similar in standing to government section lines. A legal alignment is often used as a basic part of these descriptions. A survey to re-establish the location of the legal alignment is necessary when the purchase of additional R.O.W. is required, or the designer wishes to know where the existing R.O.W. is located to avoid

14.12.01 (continued)

acquiring additional R.O.W. There may be several "legal" alignments on any particular project from which different parcels have been purchased over time. Considerable research and survey work may be required. The legal alignment and the physical centerline may not coincide. Generally, if property is purchased, the Department's past policy has been to describe the conveyance from the construction alignment, potentially creating yet another "legal" alignment. In order to minimize the creation of multiple legal alignments and thereby the confusion and added cost of future surveys, future **R.O.W. acquisitions should be based on *previously established legal alignments whenever possible.***

A **non-legal alignment** is used primarily to locate features for the purpose of design. It can be considered a line that provides direction and stationing for locating features, determining quantities, and staking out the project. A non-legal alignment is not intended to relate to the location of the Right-of-Way and is not used for property acquisition.

MDOT Alignment Standard

Alignments will be designated only as **legal** or **non-legal** by the surveyor/engineer. Differentiation and perpetuation of existing alignments will be done through annotation. Design alignment deliverables will be designated on CAD levels as

Ali_Legal_Line_GS or

Ali_NonLegal_Line for MDOT_01 workspace and

Geom_Horiz_Legal_Wt0_Line_GS,

Geom_Horiz_Legal_Wt1_Line_GS,

Geom_Horiz_NonLegal_Wt0_Line_GS,

Geom_Horiz_NonLegal_Wt1_Line_GS

for MDOT_02 workspace in MicroStation for the plan alignment sheets.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.21.03 (revised 3-26-2012)

Bridge Loading and Under clearance Review

It is essential that the Department maintain accurate and detailed records and control of the added deadload on bridges and of the under clearance at underpasses. Occasionally these considerations will mean that deck surfacing material must be removed before a resurfacing can be undertaken or that surfacing under a bridge must be removed so that a new surface can be maintained at or near the existing elevation. On some H-15 bridges, 2" of surfacing may reduce the operating load capacity by 10,000 lbs.

After scope verification, a memo should be sent to the Bridge Management Unit listing structures within the limits of the project, proposed treatments, proposed plan completion and letting dates requesting recommendations. The Bridge Management Unit will contact the Operations Field Services Division to determine if periodic maintenance inspections have disclosed the need for remedial measures. Detailed recommendations will then be sent to the Project Manager.

14.21.04

Special Structures/Footing Design

On occasion there may be situations where the scope of work includes disciplines beyond the expertise of the Project Manager and/or the unit assigned the project. Frequently, items such as sound walls, retaining walls, unique culverts and footings are assigned a bridge unit for design assistance. In these instances the Project Manager should request assistance from the Special Assignment Structures Unit in Bridge Design. The request should be by memo with copies to the Supervising Engineer-Bridge, and Engineer of Bridge Design. These requests should be made as soon as the need is known to allow the bridge unit(s) as much lead time as possible to accommodate the project's schedule while meeting their own schedules.

14.22 (revised 3-16-2015)

RAILROAD COORDINATION (PPMS Task Description 3650)

A contact by the Department with the railroad company is required any time a highway alteration occurs within the railroad right of way.

For at-grade crossings and grade separations, the contact is made by the Railroad Coordination Unit – Office of Rail.

In the case of at-grade crossings:

1. Submit one (1) set of prints of the title sheet, typical cross section, and plan and profile sheets for the affected railroad crossing with a memorandum to the Railroad Coordination Unit – Office of Rail indicating the proposed improvements to be made. This unit will advise the Design Unit as to what preliminary additions and alterations are desirable in order to satisfy the particular railroad company involved. Even if little or no impact on the railroad is expected, the railroad will usually be notified, and a coordination clause may be required.
2. Always show track elevations and profiles on the plans. If sufficient survey is not available, write a note to this effect on the plans. If track adjustments in excess of 1" are required, a request for pick-up survey is needed to obtain the required information.
3. After the plan notes have been completed to the satisfaction of the Railroad Coordination Unit – Office of Rail, submit three (3) sets of prints to the Railroad Coordination Unit – Office of Rail for their use in contacting the railroad. Any required Special Provisions will be supplied to the Design Unit by the Railroad Coordination Unit – Office of Rail.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.22 (continued)

RAILROAD COORDINATION

4. While the general design of the railroad crossing should be set after **The Plan Review**, it should be noted that railroad negotiations will take a minimum of six months to complete. If an agreement is required, it will take a minimum of one year. The Design Unit must take this into account by timely submittal of the initial prints to the Railroad Coordination Unit – Office of Rail.

Note that **The Plan Review** does not attempt to determine whether a crossing is adequate, should be extended, or if a complete new crossing is warranted. An observation may be made regarding the condition of the crossing and compatibility with the proposed project, but it is the responsibility of the Railroad Coordination Unit – Office of Rail to determine the actual work required at the crossing. This may require scheduling of a diagnostic team review and ultimately, lead to the issuance of a regulatory order by the Department.

It is particularly important that both existing and proposed utility crossings under and over the railroad be shown. Details of those crossings must also be included and approved by that particular railroad company.

See also Section 12.11.03 of the Road Design Manual and Chapter 13 of the Bridge Design Manual.

14.23

REQUEST FOR TRAFFIC VOLUMES (PPMS Task Description #2120)

Existing traffic volumes (ADT, DHV) for 3R projects should be requested from the Data Collection Section in the Bureau of Transportation Planning. Volumes from the latest available year should be included in the plans (Title Sheet).

Increased Capacity/New Routes (4R) projects require projected traffic volumes, usually 20 years in advance of the projected year of construction. Ordinarily these volumes have already been determined during the Project Development stage (see Section 14.05). However, if a significant period of time has elapsed, these volumes should be revised. Revisions are requested from the Project Planning Section in the Bureau of Transportation Planning. This request should be made as soon as the need becomes evident.

If the amount of traffic data is large (i.e. entrance & exit ramps at several interchanges), it may be desirable to show the information on a separate plan sheet.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.26 (revised 3-16-2015)

DISTRIBUTION OF PRELIMINARY PLANS TO UTILITIES AND UTILITY COORDINATION MEETING (PPMS Task Description 3660) (PPMS Milestone M361)

Preliminary plan distribution to utilities shall be completed whether or not utility conflicts have been identified. It is important to provide preliminary plans because it allows the utilities an opportunity to review the proposed project, to ensure facilities are plotted accurately, and provides notification to relocate facilities in conflict.

Distribution of preliminary plans, and the Utility Coordination Meeting if necessary, typically occurs after **The Plan Review** Meeting and before the Omissions and Errors Check (OEC) Meeting. The TSC Utility Coordinator and the Project Manager shall work together to determine if a particular project warrants scheduling a Utility Coordination Meeting. Some projects may not require a Utility Coordination Meeting while others may require several meetings. Those invited usually include:

- TSC Utility Coordinator
- Project Manager
- Private/Public utilities
- Municipalities
- Road Commissions
- Design Team key members
- Design Consultant representatives
- MDOT construction team members

The preferred method for preliminary plan distribution is to send separate letters to public/private and municipal utilities that address the following:

14.26 (continued)

- The Letter to Public/Private Utilities at Preliminary Plan Stage, (Form 2481) includes the following:
 - References Public Act (PA) 368 of 1925 entitled Highway Obstructions and Encroachments; Use of Highway by Public Utilities
 - Gives legal notification to relocate
 - Authorizes preliminary engineering for reimbursable relocations
- The Letter to Municipal Utilities at Preliminary Plan Stage, (Form 2482) is used because MDOT may be responsible for the relocation costs associated with municipal utility relocations within their corporate limits. This may require MDOT to complete the following:
 - Perform the relocation design
 - Include relocation work in the project plans
 - Formalize an agreement

If Forms 2481 and 2482 are not sent to the utilities, the Utility Coordination Meeting Invitation letter must cite PA 368, authorize preliminary engineering, provide relocation reimbursement information, and be accompanied by preliminary plans.

Procedure

Project Manager

1. Send preliminary plans to the TSC Utility Coordinator for distribution to utilities.
2. Complete a preliminary assessment of utility issues and conflicts with the TSC Utility Coordinator and Design Team.

Note:

It may be beneficial to have a conflict list and special plans with cross section details for use as presentation tools to the utilities.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.28 (revised 3-16-2015)

REQUEST FOR PRELIMINARY MAINTAINING TRAFFIC

(PPMS Task Description #'s 3390, 3540 & 3550)

Once the design has proceeded to a point where the proposed scope of work has been defined (typicals with existing and proposed dimensions, plan sheets with existing and proposed curb lines, etc.), the Project Manager should request a preliminary maintaining traffic scheme from the Region/TSC Traffic and Safety representative. This may include such items as:

- a detour route with any required work to accommodate the proposed traffic
- identification of local special events that may influence traffic during construction or that may be substantial enough to require scheduling the project around the activity
- the use of temporary traffic signals
- the use of temporary cross-overs or a runaround
- preliminary maintaining traffic special provision
- temporary and or permanent pavement markings

It is at this stage when critical construction staging issues may be identified that may significantly influence the proposed scope of work and the corresponding project cost. Situations such as a proposed reconstructed section not wide enough to maintain traffic that has no available detour route or a structure on a detour route with load restrictions often are not identified until this stage. It is essential that a preliminary maintaining traffic scheme be included for review at **The Plan Review** Meeting.

14.29 (revised 3-16-2015)

PRELIMINARY GEOMETRIC REVIEW FOR NON-FREEWAY RECONSTRUCTION / NEW CONSTRUCTION (4R) AND FREEWAY RESURFACING, RESTORATION, REHABILITATION AND RECONSTRUCTION / NEW CONSTRUCTION (3R/4R) (PPMS Task Description #3560)

During preliminary design on Non-Freeway Reconstruction/New Construction (4R) and Freeway Resurfacing, Restoration, Rehabilitation and Reconstruction/New Construction (3R/4R) projects, it is necessary to have a review by the Geometrics Section of the Design Division. For further discussions on these classifications see Sections 3.08, 3.10 and 3.11. This review will evaluate such areas as:

- sight distance
- design speeds
- curve and interchange placement
- turning radii
- exit and entrance ramps
- driveways
- turn lanes
- roadside safety
- intersection design

Once the design elements have been identified and included in the plans, a memo with a set of plans (or appropriate plan sheets) should be sent to the Supervisor of the Geometrics Unit requesting a review and recommendations by a specified date. This should be done when base plans are available to allow any revisions/additions to be incorporated into the plans prior to **The Plan Review**. The memo should indicate the classification (3R or 4R) of the project in general (see Section 3.08.01C for combined work types).

Non-Freeway Resurfacing, Restoration and Rehabilitation (3R) projects (see Section 3.09) may be coordinated during plan development on an informal basis.

Regardless of the type of work, all outstanding geometric issues should be resolved prior to submitting for **The Plan Review**.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.36 (revised 3-16-2015)

The Plan Review (PPMS Task Description #3590) (PPMS Milestone 352M)

Most projects being designed by the Region/TSC or its Consultants require a Plan Review meeting. Refer to the table, QA/QC Process by Template on the Plan Development Services intranet website to verify the need for a Plan Review Meeting. The meeting and corresponding field review should be conducted by Quality Assurance. Under unusual circumstances such as expedited project schedules or when a Quality Assurance Engineer is unavailable, a Region/TSC Design Engineer or Region System Manager may arrange to facilitate **The Plan Review** meeting. Refer to the QA/QC Process Guide for Project Managers on the Plan Development Services intranet website for exceptions to the plan review process (Form 0334).

Section 14.36.01 identifies the information that should be provided in the Preliminary Plan file at a minimum if required. The Plan File shall be developed consistent with Section 1.02 and the current version of the **Road Sample Plans**.

14.36.01 (revised 3-16-2015)

Requirements

The Plan Review material will be submitted in the following 3 files:

1. Supporting Documents File
 - A. See **Form 2913 Plan Review Material Submittal Order** or **Form 0303 Design Plan Submittal**.
2. Proposal File
 - A. See **Form 2913 Plan Review Material Submittal Order** or **Form 0303 Design Plan Submittal**.
3. Plan File
 - A. See **Road Sample Plans** and **Chapter 1**.
4. RID
 - A. Place required RID files according to the **Design Submittal Requirements** in the RID Preliminary folder.

MICHIGAN DESIGN MANUAL

ROAD DESIGN

14.36.02 (revised 3-16-2015)

Procedure

1. When the Project Manager or Consultant determines the plans meet the requirements for **The Plan Review**, a Plan Review Material Submittal (Form 2913) is completed to verify that supporting documents, proposal materials and plans are ready to submit. The materials are entered into ProjectWise using the file naming conventions outlined in Section 1.03.02.
2. The Project Manager fills out a Plan Review Meeting (Form 0200). Include E-mail addresses for invitees outside of MDOT, Include dates that key personnel and conference rooms are available. They should be at least 3 weeks (preferably 4-5 weeks) from the submittal date.
3. The Project Manager will verify that ProjectWise (folder 3) is current with the following format;
 - 3 – Plan Review
 - Meeting Request and Minutes
 - Review Comments

If the format is not correct contact the ProjectWise administrator to apply the proper template.
4. When the project is ready for final review, form 0200 is placed in the ProjectWise subfolder "Meeting Requests and Minutes" using the file name *Job Number-form 200* and the state is advanced to "Request for Meeting" to initiate submittal to Quality Assurance for review. The ProjectWise state on the three files containing plans, proposal material and supporting documents in the "Plan Review" folder are also advanced once to "Submitted for Review".

14.36.02 (continued)

5. The plans will be reviewed by Quality Assurance for completeness and a meeting date scheduled 4-5 weeks from the time of submittal. Instances where projects require a compressed schedule or scheduling without plans should be kept to a minimum. The 4-5 week period is needed to assure all participants are given ample time to review the plans prior to the meeting. This is essential to making **The Plan Review** as useful and productive as possible.
6. Plans and other material are made accessible in ProjectWise by the Project Manager. Quality Assurance distributes the same to non-ProjectWise users in an alternate deliverable and usable format. The reviewers include the following:
 - Operations Field Services Division
 - Region System Manager
 - TSC Manager
 - Region/TSC Resident/Delivery Engineer
 - TSC Development Engineer
 - Region/TSC Operations Engineer
 - Region/TSC Soils/Materials Engineer
 - Region/TSC Traffic and Safety Engineer
 - Region/TSC Maintenance Engineer
 - Region/TSC Utilities/Permits Engineer
 - Region/TSC Real Estate Agent
 - Region Resource Specialist
 - Region Bridge Engineer
(Bridge Jobs Only)
 - Region Bridge Inspection Engineer
(Bridge Jobs Only)
 - Environmental Services Section
 - FHWA Oversight
 - Design Utilities Section
 - Railroad Coordination Unit – Office of Rail
(if applicable)
 - Geometrics Section- Design
 - Utilities/Permits Development Services Division
 - MDOT-RIDSupport**
 - City or Village (if applicable)
 - County Drain Commissioner
(if applicable)
 - County Road Commission
 - Department of Management and Budget
(MIR Program)
 - Others identified by the Project Manager

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.36.02 (continued)

Procedure

During the review process, reviewers can deposit comments in to the Review Comments subfolder in ProjectWise. Prior to the meeting, the Project Manager incorporates all comments received into the plan set for discussion at the meeting.

7. After **The Plan Review** Meeting is held, either the Quality Assurance Engineer or Region/TSC Design Engineer must resolve any undecided or controversial issues and inform the individuals involved of the outcome (approval/rejection) of their proposal prior to the distribution of the meeting minutes. The meeting minutes and a half-sized set of plans with comments will be given to the Design Unit, and should remain in the project files until the project is closed out.

14.37 (revised 3-16-2015)

REVIEW OF PROJECT SCOPE, COST AND SCHEDULE

After **The Plan Review** has been completed, the Project Manager should review the project scope, cost (preliminary engineering and construction) and schedule. Any significant changes to the scope, cost and/or schedule should be submitted to the appropriate System Manager or Statewide Transportation Planning Division. See Section 14.15 (Change Request/Review of Project Scope, Cost and Schedule).

NOTE: If the project was required to be, but not, on the approved STIP at the time of the Scope Verification Meeting (see Section 14.10), the Project Manager should again check to see if the project is on the STIP by following the instructions given in that section.

If the project is not on the STIP, the Project Manager must immediately notify Statewide Planning Section of the Statewide Transportation Planning Division in the Bureau of Transportation Planning. The approval process for the STIP involves many independent entities and cannot be expedited. Therefore, it is imperative that the Project Manager take action at this time to avoid possible delays in advertising the project.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.41.11 (revised 9-17-2012)

Special Maintenance and Operational Obligations

When special conditions for either maintenance or operational obligations exist (bike paths, sound walls, pedestrian bridges, etc.), contact the Governmental Coordination Unit - Development Services Division, as these must be covered by an agreement.

14.41.12 (revised 9-17-2012)

Michigan Institutional Roads (MIR Program)

Work done with MIR funds does not require an agreement since these are budgeted MDOT funds. Work is confined to roads open to the public. Institutions may request work on private roads, parking lots, or other items of benefit to them such as drainage or lighting. These items are not eligible for MIR funds and must be funded with a special account number. An agreement must be secured with the Department of Management and Budget by the Governmental Coordination Unit - Development Services Division.

14.42 (revised 3-16-2015)

SPECIAL USE PERMITS

Special Use Permits (SUPs) are issued by local governmental agencies. Currently, except in a few instances, the Contractor is responsible for obtaining Special Use Permits. However, on occasion, construction delays can be caused if certain SUPs are required. Therefore, the Project Manager needs to address SUPs during the plan development process.

All SUPs are not required to be obtained during the design phase, only those that have the potential to delay construction. To determine which SUPs could impact construction schedules, the Project Manager should list any possible SUPs on the title sheet prior to submittal for **The Plan Review**. These can be discussed separately at **The Plan Review** and a determination made as to which, if any, are required to be obtained prior to advertising. The minutes from **The Plan Review** will indicate any SUPs that are required. The Project Manager will coordinate the work with the appropriate individual(s) to obtain the SUPs prior to the distribution of the plan/proposal package for the OEC Meeting. Any required SUPs should be included in the plan/proposal package submitted to the Specifications and Estimates Unit.

A partial list of Special Use Permits is given below:

- Mining (wetland)
- Night work
- Noise
- Tree cutting/replacement
- Burning
- Water system connections
- Public utility
- Concrete plants of crushers
- Pavement breakers
- County drain
- Dust control
- Storm sewer connection
- City/Township ordinance
- Other

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.43 (revised 3-26-2012)

SPECIAL DRAINAGE DESIGNS

The Special Drainage Structure Engineer in the Municipal Utilities Unit assists in the preparation of plans and specifications for various highway drainage structures including mechanical systems for pump houses, tunnel storm sewers, inverted siphons, special manholes, junction chambers, slab culverts, box culverts, precast three sided culverts, precast arch culverts, head walls, and circular culvert extensions. All requests for such work should be directed to the Design Engineer-Municipal Utilities Unit, Utilities, Drainage, and Roadside Section Design Division. Requests for design assistance must be made as soon as possible after the scope verification meeting.

14.44 (revised 3-26-2012)

COUNTY DRAIN REVIEW

When it becomes evident a county drain will be affected by a project, the Project Manager should contact **both** the Region/TSC Drainage Coordinator and MDOT Drainage Coordinator (Supervising Engineer – Utilities, Drainage & Roadside Section in the Design Division) as soon as possible.

MDOT drainage coordination responsibilities are described in the **MDOT Drainage Manual**, Section 2 Legal Policy and Procedures, Appendix 2-D, Attachment B.

14.45 (revised 3-16-2015)

MAINTAINING TRAFFIC AND CONSTRUCTION STAGING (PPMS Task Descriptions 3820 & 3830)

After **The Plan Review** Meeting has been held and the plans revised accordingly, the Project Manager should request the final maintaining traffic scheme from the Region/TSC Traffic and Safety representative. This should include the following applicable items:

- maintaining traffic special provision
- all pay items and quantities
- temporary and/or permanent signing
- temporary and/or permanent signals (this may have to be coordinated with the Operations Field Services Division)
- a copy of any agreement(s) authorizing MDOT use of a detour route

The above request can be initiated by sending a memorandum and an up-to-date set of plans to the Region/TSC Traffic and Safety representative. On large projects with separate staging typicals and/or plan sheets or unique/complex projects, a meeting with the Project Manager, Resident/Delivery Engineer, Traffic and Safety representative(s) and Utilities and Permit representative(s) may be beneficial to guarantee the plans, proposal and maintaining traffic special provision are compatible.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.46 (revised 3-16-2015)

FINAL GEOMETRIC AND SAFETY REVIEW (PPMS Task Description #3810)

After **The Plan Review** Meeting has been held and the comments are incorporated into the plans the Project Manager should transmit a set of plans to the Geometrics Unit of the Design Division for review. On large projects this may include several transmittals, discussions, meetings, etc. periodically during development of the final plan/proposal package. It is essential to have geometric and safety items reviewed and approved prior to the OEC Meeting to avoid delays and last second revisions. Items to review may include:

- sight distances
- design speeds
- curve and interchange location
- turning radii
- exit and entrance ramps
- driveways
- turn lanes
- storage and transition lengths
- superelevation
- roadside safety
- intersection layout

This review is only to allow the Geometrics Unit to verify that all previous recommendations have been incorporated in the plans.

14.47

RIGHT OF WAY MONUMENTING

Monumentation of trunkline Right-of-Way has presently been discontinued due to both a lack of funding and shortage of personnel. Permanently monumented Rights-of-Way benefit the Department both as physical evidence of the location of trunkline and property boundaries as well as reducing the costs of future surveys, adjacent surveys and other boundary control issues. Therefore, it is still to be included in construction plans as defined by the situations below.

Right-of-Way monumenting must be done by a Professional Surveyor licensed to practice in the State of Michigan.

14.47.01

New Construction

On new construction, ROW monumentation should be placed along the ROW at every deflection, Curve PC and PT, intersections with section lines, plat boundaries, and crossings with municipal Rights-of-Way. The monument locations should be coordinated with the project control and shown on the construction and ROW plans labeled with their Station and Coordinate values. The actual numbering of monuments should be coordinated with the Lansing Design Survey Unit. The scope of services for such a contract should be prepared by the Lansing Survey consultant management staff or the Regional Surveyor (if not included in the construction contract). Funding must be identified for any such work.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.49 (revised 3-26-2012)

CRITICAL PATH NETWORKS

Critical Path Networks are often needed to develop the *progress schedule* for a project. They are required on any project designated to include an Incentive/Disincentive or Special Liquidated Damages clause. Critical Path Networks are also recommended for projects with the following characteristics:

- New construction
- Major reconstruction or rehabilitation on an existing roadway that will severely disrupt traffic.
- Unique or experimental work.
- More than one construction season.
- Complex staging (multiple stages with traffic shifts).

There may be projects that do not fall under the above characteristics which should have a Critical Path Network. The Project Manager should evaluate each project separately. Construction Field Services Division staff and the Resident/Delivery Engineer assigned to the project should be consulted when determining the need for, and, when developing a Critical Path Network.

A list of construction time estimates for use in developing critical path networks is included in Appendix B at the end of this chapter.

14.50 (revised 3-16-2015)

FINAL CONSTRUCTABILITY REVIEW (PPMS Task Description 3860)

Once the revisions from **The Plan Review Meeting** have been incorporated into the plans, Final Plans begin. After the final maintaining traffic special provision has been received, and staging typicals and/or plan sheets have been completed, this information plus any unique special provisions should be sent to the Resident/Delivery Engineer for review. Discussions concerning a Construction Critical Path Network, if applicable, should also occur at this stage. In conjunction with the Constructability Review Checklist for the Project Development/Design Phase, the work in this task must be addressed prior to the distribution of the final plan/proposal package for the OEC Meeting.

The final constructability review applies to all projects. On small projects this task may consist of only the transmittal of plans to the Resident or Delivery Engineer for comment. On large projects with complex staging, one or more meetings with the Resident/Delivery Engineer and Region/TSC Traffic and Safety Engineer may be required throughout this task. For projects in templates that do not require an OEC Meeting, the Final Constructability Review must be completed prior to Plan Completion.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.51 (revised 7-22-2013)

INCENTIVE AND LIQUIDATED DAMAGES CLAUSES

There are two inducements to completing work by the prescribed completion date or time. These are in addition to the normal schedule of Liquidated Damages included in Section 108.10 of the current Standard Specifications for Construction. Both are listed below.

1. Incentive payments - used primarily on critical projects where traffic inconvenience and delays are to be held to a minimum. The amounts are based on estimates of items such as traffic safety, traffic maintenance, and road user delay costs.
2. Liquidated Damages for Other Department Costs - based on increased user costs and/or additional cost incurred by MDOT; such as increased maintenance costs or costs due to the type of designs for temporary roads.

14.51.01 (revised 3-16-2015)

Guidelines

Guidelines for the development and use of Incentive or Liquidated Damages Clauses are as follows:

- Projects that are to be on an expedited schedule should be identified during the "Call for Projects" process and in the Project Concept Statement.
- Justification material such as hourly counts, user cost data and construction costs should be available prior to **The Plan Review** Meeting so a traffic control plan can be presented and reviewed at the meeting.
- When Incentive clauses or special expedited schedules are used, adequate Department staff must be available to maintain proper inspection and to assure a quality product.
- Projects should be straight forward and not require several different types of construction procedures or typical sections.

14.51.02 (revised 7-22-2013)

Applications

Incentive Clauses would be appropriate where the following conditions exist:

- A substantial savings in user costs can be realized by shortening the time of the traffic restrictions or completing the project ahead of schedule.
- Total additional user costs should be at least in the neighborhood of 5% of the project cost. \$5000 per day should be considered as the daily minimum incentive for major projects. For smaller interim elements of a project, a lesser value may be used.
- The time of the traffic restriction should be long enough to allow the construction schedule to be compressed at least an additional 15 days, based on a completion date using an expedited schedule.
- Where capacity will be reduced below an acceptable level of service and no detour route is available.
- Where a detour route must be used and the detour has an unacceptable level of service.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.52

REVIEW OF PROJECT SCOPE, COST AND SCHEDULE

Once the plans and proposal are completed and quantities have been entered into TRNS•PORT, the Project Manager should compare the estimate with the programmed cost. If a revision to the cost (or schedule) is required, a Project Authorization/Program Revision Request/2604 should be submitted immediately. This will insure a decision concerning cost is reached prior to the OEC Meeting. If the cost increase is denied a revised scope, change in limits, etc. needed to reduce the cost to within the programmed amount can be incorporated into the plan/proposal package prior to distribution of the material for the OEC Meeting. It is essential that the TRNS•PORT estimate, when submitted to the Specifications and Estimates Section, be within MFOS allowable limits. This eliminates any delays in advertising due to funding.

14.53

Section deleted.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.54 (revised 3-16-2015)

OMISSION / ERRORS / CHECK (OEC) MEETING (PPMS Task Description #3870)

The Plan Completion date indicates 100% completion of the plans, proposal and supporting documents herein after referred to as the OEC package.

Once Plan Completion is achieved, the Project Manager schedules a Final Plan Quality Assurance Review with the Region QA staff to internally review the OEC package for completeness. A complete OEC package is defined on MDOT Form 0330, (OEC Material Submittal Order) or Form 0303 (Design Plan Submittal). All items that are applicable on Form 0330 or Form 0303 must be included with the OEC package to be considered 100% complete. The only exceptions to this list are items that are allowed to be substituted with an Exception Risk Analysis form (Form 2912) in which case the risk analysis form must be included in the OEC package. **Every effort should be made to submit the project for OEC with environmental certification and approved design exceptions.** Once the OEC package is acceptable, the Region Systems Manager signs Form 0330 or Form 0303. The Project Manager may at this point schedule an OEC.

The Project Manager schedules the OEC meeting electronically with a calendar appointment. The message includes the date, time and location of the meeting with a ProjectWise link to the OEC package (100% complete). The Project Manager also sends copies of the package to meeting participants that are non-ProjectWise users in an alternate deliverable and usable format (CD, hard copy, etc.) prior to the meeting. See section 14.54.02 for OEC package material content and pre-meeting review time. The purpose of this meeting is to review the entire OEC package for omissions / errors / conflicts / contradictions, etc. The Project Manager will conduct the meeting. During the course of the meeting the Project Manager will mark any needed revisions on a copy of the plans,

14.54 (continued)

proposal and supporting documents. The names of those attending the meeting should be noted on the title sheet. Copies of each must remain in the project files until the project is constructed and finalized out. At the end of the meeting the Project Manager and Construction Engineer sign the title sheet and the appropriate participants sign the certification acceptance form. The Project Manager will be responsible for verifying all the agreed-upon revisions (marked in red) are incorporated into the plans.

If participants at the meeting are unable to resolve a conflict, the Project Manager should report the conflict to his/her supervisor for resolution. After the conflict is resolved the Project Manager must collect any remaining signatures on the certification acceptance form or title sheet.

CHANGES OR ADDITIONS TO PROJECT SCOPE OR LIMITS WILL NOT BE CONSIDERED AT THIS MEETING EXCEPT WHEN PROJECT COSTS HAVE EXCEEDED PROGRAMMED COSTS AND ADDITIONAL FUNDING IS NOT AVAILABLE.

14.54.01 (revised 2-17-2015)

Attendees

The following people are recommended to attend the OEC Meeting:

- Project Manager/Design Engineer(s)
- Construction Engineer
- Author of the Maintaining Traffic Special Provision (If a Consultant has authored the Maintaining Traffic Special Provision a Region/TSC Traffic and Safety Representative must be invited.).
- Quality Assurance
- Geometrics Unit
- Environmental Clearance Coordinator
- Construction Field Services Division
- FHWA Oversight

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.54.01 (continued)

Attendees

Attendance at the OEC Meeting should be kept to a minimum. The object of the meeting is to identify missing, incorrect or conflicting information in the package prior to advertising and letting. Utilities, Right-of-Way, Soils, Project Development, etc. must be resolved prior to scheduling an OEC Meeting. Additional people should only be invited if the discipline requires clarification (i.e. significant utility relocation during construction or conditions/dates of right of entry regarding ROW not yet in MDOT possession). Work Centers that have contributed to the plan/proposal package should access the plan/proposal package in ProjectWise to verify that all their material is included and up to date, but do not need to attend the meeting. This reduces the number of meetings for staff and allows those attending to focus on the primary goal - errors and omissions.

Others (if applicable):

- Consultant Coordinator/Consultant
- Electrical Unit
- Municipal Utilities Unit
- Hydraulics/Hydrology Unit
- Roadside Development Unit
- Signals (Operation Field Services Division)
- Signs
- Pavement Marking
- Region/TSC Real Estate
- Region/TSC Utilities/Permits

14.54.02 (revised 3-16-2015)

OEC Package Material

The OEC Package material must include the items indicated in Form 0330 or Form 0303. If the submitted material is missing enough of the listed essential items, Quality Assurance may direct the Project Manager to cancel the meeting and reschedule when all the material is complete and/or available. The materials are entered into ProjectWise using the file naming conventions outlined in Section 1.03.02. Place required RID files per the Design Submittal Requirements in the ProjectWise RID OEC folder. The Project Manager should always allow 10 business days for review of the plan/proposal material prior to the OEC Meeting. On large, complex, or unique projects the Project Manager should extend the review time to 3 or even 4 weeks to insure adequate review time. Additional time after the OEC Meeting (beyond the standard 1 week) for corrections to the package should also be considered. It is essential that the Project Manager recognize these additional time requirements and include these in the PPMS network so as to avoid delaying the project letting.

MDOT-RIDSupport will review the ProjectWise RID OEC folder and provide comments prior to the OEC Meeting. The Design Team will address the comments in the RID OEC folder and place the files for letting in the RID folder located in folder 6. MDOT-RIDSupport will then confirm that all comments have been addressed and the RID files are ready for letting.

The Construction Engineer will be responsible for providing a completed Progress Schedule at the OEC meeting.

At the same time the above material is distributed, the Project Manager should send the project link to the Specifications and Estimates Unit to initiate federal programming of funds and estimate review.

The estimator will review the estimate, adjust any unit costs and return it to the Project Manager prior to the OEC Meeting so that any funding problems can be discussed at the OEC Meeting.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.57 (revised 3-16-2015)

CERTIFICATION ACCEPTANCE

As part of the stewardship agreement with the FHWA, MDOT developed a procedure involving a system of checks/reviews to verify all requirements of the agreement are met. The Department also made the decision to use the majority of the process (completion of the Certification Acceptance form) on all projects (Federal and M funded), including those classified FHWA Oversight. The verification is accomplished by completing the Certification Acceptance form. The form includes reviews (with confirmation by signature or initials) by several divisions and sections within the Bureau of Highways. Once the form is completed it is included in the proposal folder that is submitted to the Specifications and Estimates Unit. The required signatures (or initials) are listed below:

- Bridge Design Unit (if applicable)
- Project Manager / Design Engineer / Consultants
- Quality Assurance Engineer
- Specifications and Estimates Engineer
- Utility Coordination and Permits
- Governmental Coordination and Engineering
- Drainage Engineer (if applicable)
- Force Account Work (if applicable)
- Geometric Design Engineer
- Traffic Signs and Delineation
- Traffic Signals
- Region/TSC Traffic and Safety
- Resident/Delivery Engineer
- FHWA Area Engineer

14.57 (continued)

The following documentation should be attached to the certification acceptance form prior to submittal to the Specifications and Estimate Unit.

- Environmental Classification (Form 1775-LAP)
- Mitigation measures required in the environmental document (EIS, FONSI)
- Permits
- Copies of Scope Verification and The Plan Review Meeting minutes.
- Design Exceptions
- Waiver-Planting Wildflower Expenditures
- Pavement Selection Review Committee Approval Letter.

The Project Manager must send a copy of the **completed** Certification Acceptance form to the FHWA Area Engineer on all FHWA Oversight projects prior to submitting the final plan/proposal submittal to the Specifications and Estimates Unit.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.58 (revised 3-16-2015)

APPROVAL OF SPECIAL PROVISIONS

In order to clarify terminology surrounding this subject, the following definitions are provided:

1. Standard Specifications.- The book of specifications approved for general application and repetitive use.
2. Supplemental Specifications.- Detailed specifications that add to or supersede the Standard Specifications.
3. Special Provisions.- Revisions or additions to the Standard and Supplemental Specifications applicable to an individual project.
4. Frequently Used Special Provisions.- An approved special provision with stable requirements applicable to a number of projects used on a regular basis.
5. Addendum - a change, addition and/or deletion to the contract documents occurring after a project is advertised but before the letting date.

Occasionally, information in the plan/proposal package may differ or conflict. To help in resolving such conflicts, the following order of preference has been established per the 2012 Standard Specifications for Construction:

1. All proposal material except those listed in subsections 104.06B through 104.06F
2. Special Provisions
3. Supplemental Specifications
4. Project Plans and Drawings
5. Standard Plans
6. Standard Specifications

14.58 (continued)

All unique special provisions that are part of the proposal must have the approval of the Design Division prior to contract printing and advertising. When a project is submitted to the Specifications and Estimates Unit for advertisement with unapproved unique special provisions, the Project Manager must complete Form 2908 Special Provision - Exception Risk Analysis, including approval by the appropriate region engineer. Although minimal use is encouraged, this form does allow for exceptions for multiple unique special provisions. These do not include the Frequently Used Special Provisions, which are reviewed and approved before they are placed on the list. The Project Manager should submit any unique special provisions to the Specifications Engineer in the Design Division as soon as possible for their review and approval (at least 30 days prior to the plan completion date). Submittals **must** be submitted electronically in MSWord format. Consultant Special Provisions will follow the same format and submittal procedure and will be the responsibility of the Consultant Project Manager. Drafts of these should be available for review and discussion at **The Plan Review** meeting.

Project Managers are encouraged to use previously approved Special Provisions whenever possible. To review an index of available approved Special Provisions, see the Previously Approved Special Provisions page on the MDOT Web site. If any changes are made to the approved document, it must be saved with another filename. When submitting a revised (previously approved) Special Provision, the redline and strikeout features under MSWord should be used to delineate the changes made to the original document. This will substantially expedite the approval process.

For additional information regarding Special Provisions including a sample format see Chapter 11 (Specifications and Estimates) of the Road Design Manual.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.61 (revised 3-16-2015)

PRE-LETTING BRIEFING

Pre-Bid Meetings are held for Contractors on complex or unique projects. These meetings are usually recommended by the Project Manager, Unit Leader or **Engineer of Design**, although others may propose the meeting be scheduled. Responsibility for arranging the meeting rests with the Project Manager. The Project Manager is also responsible for notifying the appropriate MDOT representatives (Construction, Utility- Permits, Traffic and Safety, Contracts, etc.) as well as outside agencies (cities, villages, counties, etc.) of the time and place. The Contracts Division will advertise the briefing.

The briefing consists of a presentation of the project by a spokesman of the Department before interested Contractors. The briefing is opened to questions after the presentation. Minutes should be recorded and distributed to the attendees.

14.61.01

Procedure

1. The Project Manager determines the need for a Pre-Bid Meeting. Projects with one or more of the following should be considered for a Pre-Bid Meeting:
 - a major project with programmed cost of \$20 million or more.
 - a high impact project with a complex progress schedule.
 - a project with an expedited schedule, incentive/disincentive or increased liquidated damages.
 - project with complex traffic control and staging requirements.
 - project with extensive, new or unusual special provisions.
 - project in an environmentally sensitive areas (i.e. superfund site).
 - other projects which are unique, complex or experimental in nature.

14.61.01 (continued)

Also, a determination as to whether the Pre-Bid Meeting is mandatory must be made at this time. Mandatory Pre-Bid Meetings should be rarely used.

2. Project Manager requests approval for Pre-Bid Meeting from Supervisor of the Specifications and Estimates Unit prior to advertisement of project, who reviews the request with Engineer of Design and notifies Project Manager and Financial Services (approvals only) of decision.
3. Project Manager arranges time and location of meeting. Pre-Bid Meetings should be scheduled a minimum of three weeks prior to letting to allow incorporation of any necessary changes by addendum. When selecting a location, consideration should be given as to whether the potential bidders may need/wish to visit the construction site.
4. Project Manager prepares a Notice to Bidders for inclusion in the proposal. This should be submitted with the plan/proposal package.
5. Project Manager identifies attendees (from MDOT) and notifies each of time and location of meeting.
6. Project Manager conducts meeting including preparation of agenda, distributing material to attendees, and taking notes at the meeting. For meetings which require attendance, a list of bidders in attendance must be submitted to Financial Services. Contractors must complete and sign the registration form to certify attendance.
7. Project Manager submits any changes (if required) to the Specifications and Estimates Unit for issuance of addendum.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.65 (revised 3-16-2015)

REFERENCE INFORMATION DOCUMENTS

The Reference Information Document (RID) process provides availability of electronic data files through the e-Proposal website. RID files are non-contractual items for contractor use prior to bidding on construction projects. They include design files, survey deliverable files, miscellaneous files and the [RID Index.xlsx](#).

Milestone reviews by [MDOT-RIDSupport](#) are intended to be on the same timeline as other reviews mentioned in the previous sections. RID files will be submitted to the Specifications and Estimates Unit and [MDOT-RIDSupport](#) for review prior to final turn in. The files are subsequently published at the same time as the Proposal and Plans. Any changes made to the RID files after this time, due to an addendum, will be the responsibility of the Project Manager. Each published 'set' released after the original publication shall include a revised [RID Index.xlsx](#) using the [Project Changes tab](#) that includes [only the changed files](#) and a brief explanation of the changes made to the files.

See the [Design Submittal Requirements](#) for more information.

14.66 (revised 5-28-2013)

TABULATIONS OF BIDS

Approximately one week after the letting, bid tabulations with the Engineer's Estimate, the low bid Contractor and the other prime Contractor's bids are posted to the MDOT website. Some projects require an additional review and may take longer. The Tabulation of Bids can also be accessed through the Bid Letting System on the Plan Development website by selecting the appropriate letting date and letting item number.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.67 (revised 3-26-2012)

PRE-CONSTRUCTION MEETING

A pre-construction meeting is usually held with the low-bid contractor, subcontractors, and MDOT representatives after the letting and award of a project. Participants usually include (when applicable):

- Contractor
- Subcontractor(s)
- Resident/Delivery Engineer
- Project Manager/Designer/Consultant
- Soils Engineer
- Traffic Engineer
- Utility/Permits Engineer
- Region/TSC Materials Engineer
- Utility Companies
- Counties and/or Municipalities
- Railroad Companies
- FHWA Area Engineer

The agenda may include:

- Introduction of attendees
- Recording of Minutes & Attendance record
- Project description
- Designation of Supervisors
- Proposal (including any addenda)
- Subcontractors
- Real Estate
- Utilities and Railroads
- Affected Municipalities and or Counties
 - Haul routes and hours
 - Special use permits
 - local ordinances
- Testing Order
- Soils/Materials
- Traffic
- Progress Schedule
- Safety Program/Issues
- Work Orders and Contract Modifications
- Labor Compliance
- OJT/EEO/DBE Requirements
- Miscellaneous
- Erosion Control

14.67 (continued)

The Project Manager should be invited to all pre-construction meetings. However, due to the limited time to schedule and hold the meeting, advanced notification may be short. Also, the Project Manager may want to contact the Resident/Delivery Engineer prior to the meeting to discuss the need for their participation. In some instances attendance at the pre-construction meeting is not required on the simplest, most straightforward projects.

Minutes at this meeting are recorded by a Region/TSC representative and copies are distributed to the Engineer of Construction Field Services Division, Region Engineer, TSC Manager, and all participants.

14.68

Section deleted.

14.69

Section deleted.

MICHIGAN DESIGN MANUAL ROAD DESIGN

14.70

DESIGN PROJECT RECORD

As soon as a project has been assigned, the Project Manager should begin to compile a Design Project Record. This is done by maintaining a chronological record of any events affecting plan development which:

1. Affect the cost of design or construction of the project
2. Change the scheduled dates (plan completion, ROW or letting).

After the project is awarded, the contract bid price, design cost, percent cost (design cost divided by the construction cost) and the number of plan sheets are also entered on form #216. A copy is sent to the Design Supervising Engineer and the original placed in the project file and becomes part of the project's permanent files submitted to the file room during the closeout of design files.

14.71 (revised 3-16-2015)

PLAN REVISIONS

Occasionally plans must be revised after a contract is let and, in extreme instances, after construction has begun. Changes issued by Design Division are done on a Revision of Plans (Form 0291). A Plan Revision Distribution (Form 0211) should accompany the Revision of Plans (Form 0291). No other letters of transmittal are required.

Plan revisions should contain a concise and accurate description of the work involved so as to be understood by anyone not associated with the project. The following are some guidelines for preparing a plan revision:

14.71 (continued)

- The use of revised plan sheets should be avoided whenever possible. If the changes can be described easily and adequately on the Revision of Plans (Form 0291), revised plan sheets do not need to be included in the distribution. However, if the changes are complicated and extensive, revised plan sheets should accompany the Revision of Plans distribution.
- When making changes in dimensions or quantities the old figures should be lightly crossed out (not erased) and new figures added above or adjacent to the old figures.
- Plan revisions involving FHWA Oversight projects must be reviewed and approved by the FHWA prior to distribution. A note stating FHWA concurrence (and by whom) should be included on the Revision of Plans (Form 0291).
- Plan revisions are numbered in ascending order with a letter prefix for the section issuing the revision (R-Road, B-Bridge, U-Utilities). The first plan revision distribution by Road Design would be R-1, the next R-2.
- Quantities should be exact. If exact quantities cannot be determined until after the work is completed, they should be estimated as accurately as possible.
- Do not revise the quantity sheet. This will be corrected with the authorizations (*Recommendation and Authorization for:* form) submitted by the project office.
- If most of the plan sheets are affected, the complete set should be reissued to avoid possible confusion.
- If the RID files need to be changed submit the revised files consistent with the [Design Submittal Requirements](#).

MICHIGAN DESIGN MANUAL

ROAD DESIGN

14.73.02 (revised 3-16-2015)

File Standards And Requirements

Once the As Built mark-ups are complete and formatted properly, use the following requirements to ensure the As Built plans are ready for submission.

Review Mark-ups for Legibility: Ensure the As Built Plan sheets being submitted meet the data capture and mark-up requirements as outlined in Section 14.73.01.

File Requirements: As Built Plans must be in PDF format. They must also be sized and scaled to the PLANHALF size of 11x17.

As Built File Naming Standards: In order to ensure consistency and proper search results, specific naming conventions must be maintained for all As Built sheets.

- File names must follow the naming conventions used in the Letting Plan or Proposal, including capitalization.
- The page number given to the sheet must be the page it represents in the PDF As Let plan set and NOT the page in the project drawing plan set.
- As Built plans sheets that are PDF pages 1-9 should be named as "01, 02, 03"... in order to keep them in proper page sequence in the folder.
- Corrected PDF plan sheets must be saved and named individually.
- Consecutive As Built sheets can be saved in a single pdf file and named according to the following format: "Road_09-22.pdf", "Bridge_09-22.pdf". Use this format only when the As Built contains corrected sheets that are in sequence.

The following list provides examples of the standard naming conventions for As Built.

- Proposal_15.pdf
- Road_01.pdf
- Bridge_22-46.pdf
- Road1_07.pdf
- Bridge1_22.pdf

14.73.03 (revised 9-21-2009)

As Built Turn In Process

After ensuring the As Built meets the required criteria, they are ready to be submitted.

Submit the As Built Plans using ProjectWise by:

- Contacting your local ProjectWise administrator for As Built folder set-up
- Adding As Built plan sheets to the As Built folder for the designated job number
- Filling out and submitting Form 250

Detailed instructions can be found in the ProjectWise Reference documents for As Built under the Standards and Submittal Instructions folder at:

pwname://MDOTProjectWise/Documents/Reference Documents/As Built/~ Standards and Submittal Instructions

14.73.04 (revised 9-21-2009)

Design Division Review and Approval Process

Upon receiving the submitted As Built plan information, the As Built Administrator reviews the As Built to determine if they are ready to be turned to Final status or if they need further correction.

When the As Built is approved, an electronic notification is sent to the submitter acknowledging the As Built is approved and marked to Final status. No further action is required by the submitter.

If the administrator rejects the submitted As Built, an electronic notification is sent to the submitter indicating the items that need to be re-addressed before the plans can be approved. Once the items have been re-addressed the submitter can re-submit the As Built for approval.

**MICHIGAN DESIGN MANUAL
BRIDGE DESIGN - CHAPTER 8: LRFD**

8.05 (continued)

**GENERAL PLAN OF
STRUCTURE SHEET**

C. [A chart similar to the following is to be placed on all plans where applicable:]

SUMMARY OF HYDRAULIC ANALYSIS							
EXISTING				PROPOSED			
FLOOD DATA	DISCHARGE (CFS)	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL (FPS)	WATER SURFACE ELEV. AT U/S FACE OF STRUCTURE	VELOCITY IN D/S CHANNEL (FPS)	WATERWAY AREA (SFT) AT D/S FACE	CHANGE IN WS EL. U/S OF PROPOSED STRUCTURE
50-YEAR							
100-YEAR							
MAXIMUM BRIDGE AREA BELOW LOW CHORD IS				SQUARE FEET			

- D. The drainage area contributory to this crossing is ____ square miles.
- E. The water surface and/or energy grade elevations shown on the above hydraulic table are to be used for comparison purposes only and are not to be used for establishing a regulatory floodplain. (9-2-2003)
- F. The (existing) (adjacent) structure, (feet) (miles) (upstream) (downstream), provides a waterway area of ____ square feet to (high water) (underclearance*) elevation _____. [*Use only if high water elevation is not available.]
- G. Without the preventive measures shown on these plans, there is a possibility that stream bed scour may occur. The estimated total scour depth is calculated to be ____ feet at (Abutment ____) (Pier____). These depths are based on a ____ year runoff event. (8-6-92)
- H. Geotextile liner shall be placed on all slopes prior to placing riprap. Payment for geotextile liner shall be included in payment for riprap. [Use when recommended by the Hydraulics/Hydrology Engineer.](9-18-98)

- I. The (abutment) (pier) maximum average foundation pressure(s) is (are) calculated to be ____ psf for Service Limit State, and ____ psf for Strength Limit State and are based on a gross footing width of ____ ft. [Use when **gross footing width** assumptions are used for footing designs. Create one note for abutments and one note for piers. MDOT designed projects.] (8-20-2009)

The (abutment) (pier) maximum foundation pressure(s) is (are) calculated to be ____ psf for Service Limit State based on an effective footing width of ____ ft, and ____ psf for Strength Limit State based on an effective footing width of ____ ft. [Use when **effective footing width** assumptions are used for footing designs. Create one note for abutments and one note for piers. Consultant designed projects.] (8-20-2009)

- J. For details of slope protection, see Standard Plan B-102-Series.
- K. The nominal fatigue resistance is based on a design life of 75 years (and an average daily truck traffic of ____). [Use for steel bridges only and add ADTT if applicable/available.] (8-20-2009) (3/16/2015)

MICHIGAN DESIGN MANUAL BRIDGE DESIGN

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 _____). [Use for steel bridges only and add ADTT if applicable/available.] (8-6-92) (3/16/15)
- 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)

8.05 (continued)

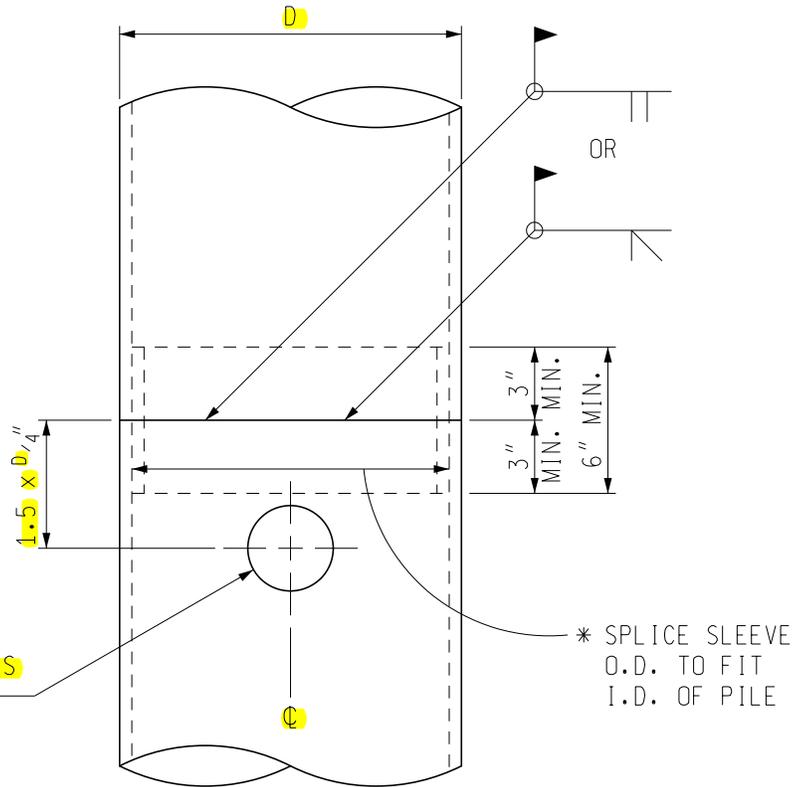
- O. The riprap quantity is based on the lateral dimensions of the area to be protected, regardless of the number of layers required. The estimated weight of riprap is _____ tons. (9-18-98)
- P. Alternate methods of stream diversion shall be submitted to the Engineer for approval. [Use when stream diversion 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.]
- 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

ISSUED: 03/16/15
 SUPERSEDES: 02/14/11

CIP PILE SPLICES



** $D/4$ Ø MAX. HANDLING HOLES
 2 HOLES MAX., 180° APART

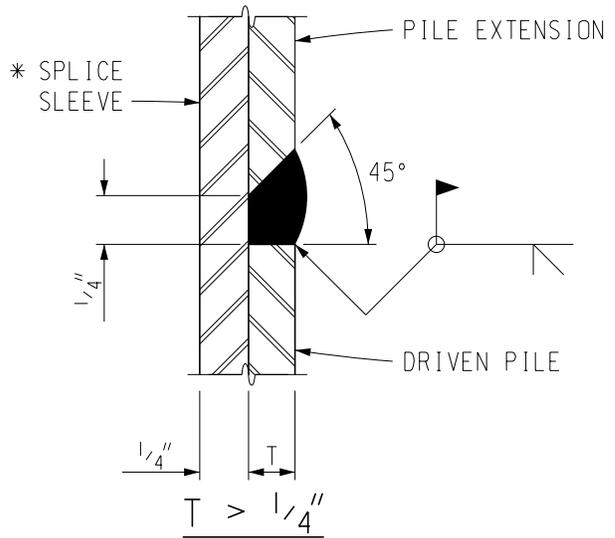
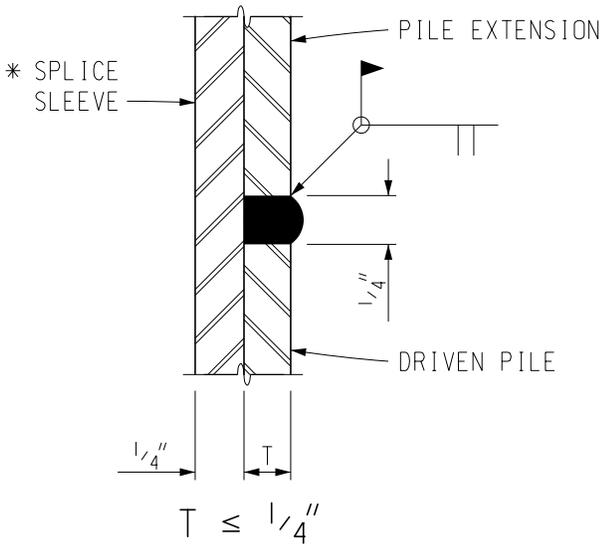
* SPLICE SLEEVE
 O.D. TO FIT
 I.D. OF PILE

SPLICE DETAILS

FOR SPIRAL WELDED AND SEAMLESS PIPE SHELLS

* SPLIT CHILL RINGS AS RECOMMENDED BY THE MANUFACTURER MAY BE SUBSTITUTED FOR SPLICE SLEEVES IF APPROVED BY THE ENGINEER.

** DRILL OR FLAME CUT CIRCULAR HANDLING HOLES. GRIND FLAME CUT HOLES TO MAKE CIRCULAR AND REMOVE HARDENED EDGE OR CUT OFF SECTION OF PILE WITH FLAME CUT HOLES PRIOR TO SPLICING OR CONCRETE PLACEMENT.



NOTE:

THESE DETAILS SHOULD BE SHOWN ON PLANS WHERE CAST-IN-PLACE PILES ARE USED.

PREPARED BY
 DESIGN DIVISION

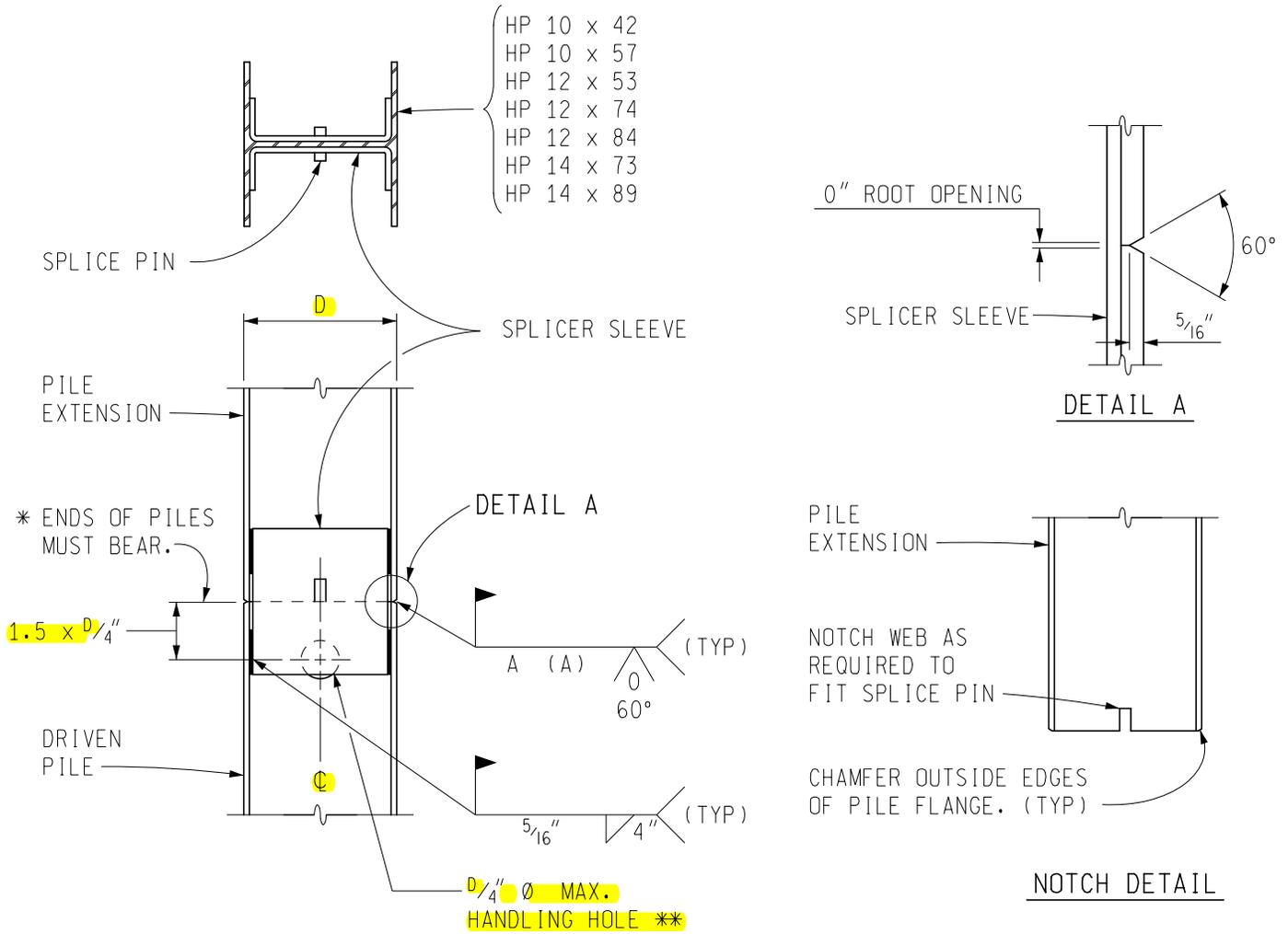
8.21.01

DRAWN BY: BLT
 CHECKED BY: VZ
 APPROVED BY: DAJ

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT

ISSUED: 03/16/15
 SUPERSEDES: 01/23/12

H PILE
 ALTERNATE SPLICE DETAILS



ALTERNATE SPLICE DETAILS

PILE	WELD SIZE (A)
HP 10 x 42	5/16"
HP 10 x 57	5/16"
HP 12 x 53	5/16"
HP 12 x 74	3/8"
HP 14 x 73	3/8"
HP 14 x 89	3/8"
HP 12 x 84	7/16"
ALL OTHERS	CHECK WITH MDOT CONSTRUCTION FIELD SERVICES GEOTECHNICAL SECTION AND THE BRIDGE FIELD SERVICES SECTION.

NOTES:

* SET PILE EXTENSION IN PLACE WITH SPLICER SLEEVE ATTACHED, TAP SEVERAL TIMES WITH THE HAMMER TO IMPROVE BEARING CONTACT, THEN COMPLETE WELDING OF SLEEVES TO LOWER SECTION.

DO NOT USE THE ALTERNATE SPLICE SLEEVE DETAIL WITH INTEGRAL ABUTMENTS, PILE BENTS, OR ANY OTHER PILES THAT MUST RESIST BENDING STRESSES. ONLY USE FULL PENETRATION BUTT WELD SPLICE DETAIL WITH INTEGRAL ABUTMENTS.

** DRILL OR FLAME CUT CIRCULAR HANDLING HOLE. GRIND FLAME CUT HOLE TO MAKE CIRCULAR AND REMOVE HARDENED EDGE OR CUT OFF SECTION OF PILE WITH FLAME CUT HOLE PRIOR TO SPLICING OR CONCRETE PLACEMENT. HOLES IN FLANGES ARE PERMITTED FOR HANDLING ONLY IF THAT PORTION OF THE PILE IS CUT OFF PRIOR TO SPLICING OR EMBEDMENT INTO CONCRETE.

PREPARED BY
 DESIGN DIVISION

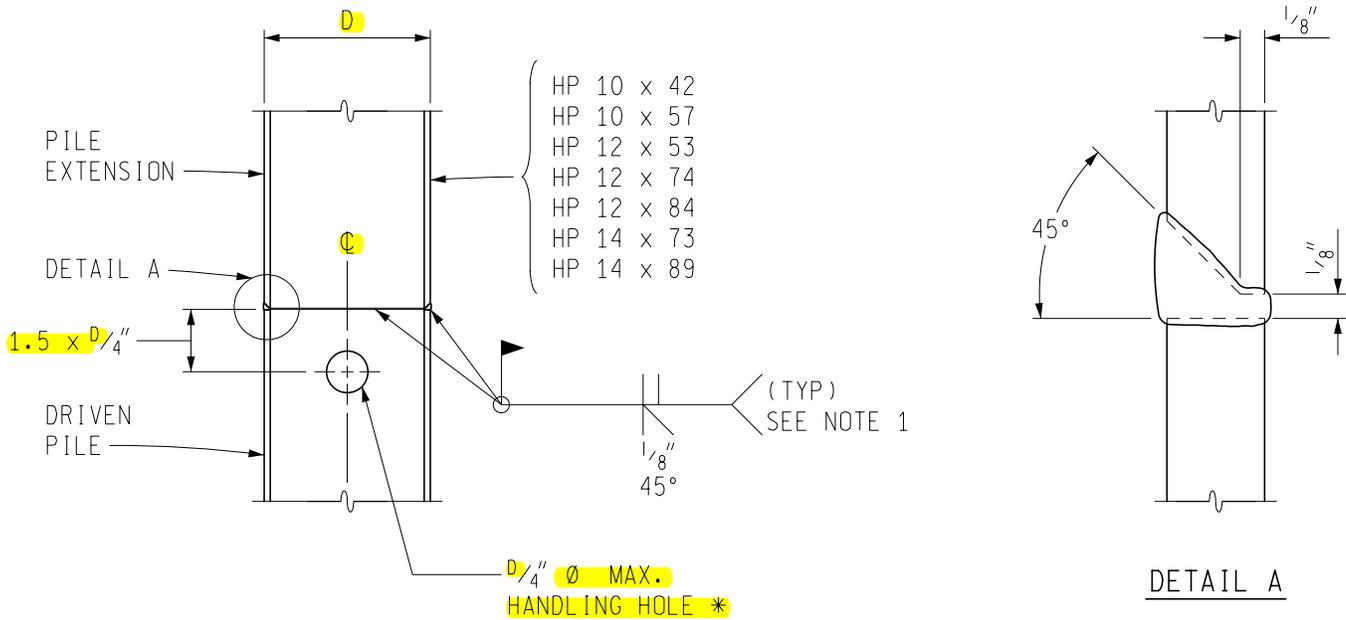
8.21.02

DRAWN BY: BLT
 CHECKED BY: VZ
 APPROVED BY: DAJ

MICHIGAN DEPARTMENT OF TRANSPORTATION
 BUREAU OF HIGHWAY DEVELOPMENT

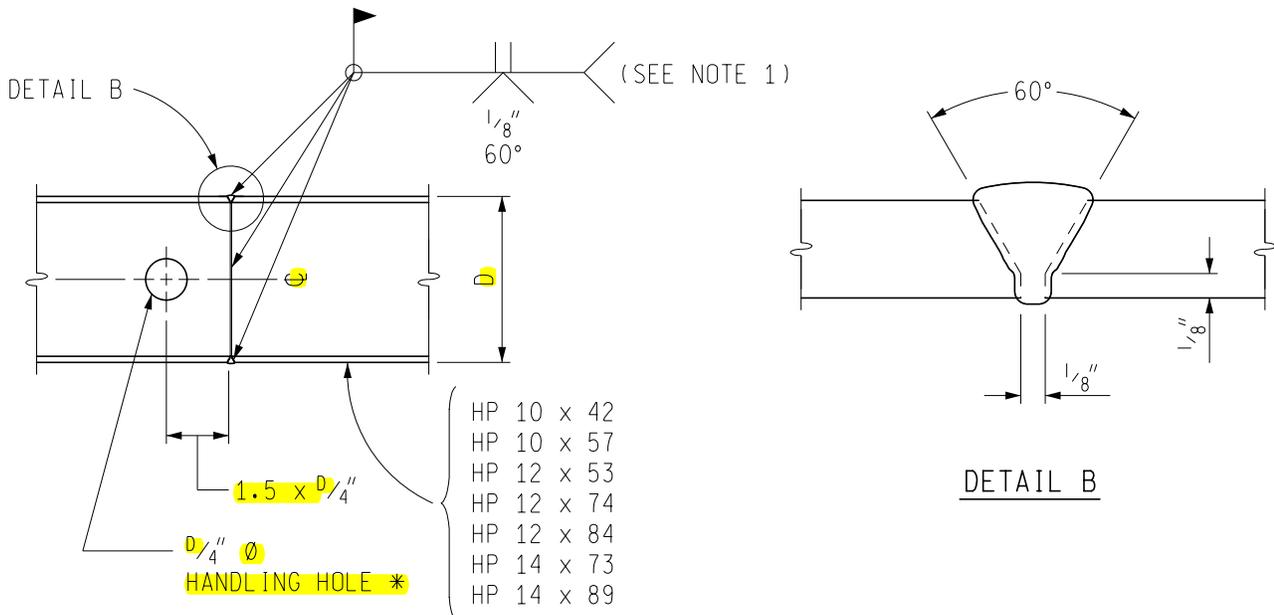
ISSUED: 03/16/15
 SUPERSEDES: 01/23/12

H PILE SPLICE
 (FULL PENETRATION BUTT WELD)



SPLICE DETAILS

FOR PILES IN PLACE (HORIZONTAL JOINT)



SPLICE DETAILS

FOR PILES IN HORIZONTAL POSITION

NOTE 1: BACK GOUGE AND GRIND EDGE PREPARATION SMOOTH.

* DRILL OR FLAME CUT CIRCULAR HANDLING HOLE. GRIND FLAME CUT HOLE TO MAKE CIRCULAR AND REMOVE HARDENED EDGE OR CUT OFF SECTION OF PILE WITH FLAME CUT HOLE PRIOR TO SPLICING OR CONCRETE PLACEMENT. HOLES IN FLANGES ARE PERMITTED FOR HANDLING ONLY IF THAT PORTION OF THE PILE IS CUT OFF PRIOR TO SPLICING OR EMBEDMENT INTO CONCRETE.