Michigan Department of Transportation

Road & Bridge Design Publications

Monthly Update – May 2024

Revisions for the month of **May** are listed and displayed below and will be included in projects submitted for the **September** letting. The special detail index for **April** will remain in effect.

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

Road Design Manual
14.44 County Drain Review: Added a sentence to remind designers that the project manager is responsible for sending a copy of the plans (at milestone reviews) to the County Drain Commissioner, Water Resources Commissioner, or Drainage Board as required in the Drainage Manual.

14.60.02, 14.60.03, 14.60.05, 14.61, 14.61.01, 14.63, 14.64: Made minor revisions to update sections to current practice.

Bridge Design Manual
7.02.31E: Deck Replacements: Guidance is being added for the sequence of deck pours on superstructures that include pin and hanger assemblies. The pour sequences have been developed to minimize the risk of cracks developing in the new concrete, to minimize any rework and refinishing needed, and to help ensure that the rails for the expansion joint devices at the pin and hanger assembly locations are at the correct depth.

8.06.05 M.: Updated note to define which piers are pile bents.

Updates to the MDOT Cell Library, Sample Plans, and other automated tools may be required in tandem with some of this month's updates. Until such updates 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.

14.43 (revised 4-26-2021)

SPECIAL DRAINAGE DESIGNS

Specialized units within the Department assist 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 Bureau of Bridges & Structures, Structure Design Section, Special Structures Unit, as well as Utilities, Drainage, and Roadside Section of the Design Division. Requests for design assistance must be made as soon as possible after the scope verification meeting.

14.44 (revised 5-28-2024)

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 (Hydraulic Unit – Environmental Services Section) as soon as possible. The Project Manager is also responsible for sending a copy of the plans (required by law under the Drain Code) at milestone reviews (Plan Review and Final Project Coordination (FPC)) to the County Drain Commissioner, Water Resources Commissioner, or Drainage Board, per Section 2.5.5 in the ***MDOT Drainage Manual***.

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

14.45 (revised 12-17-2018)

MAINTAINING TRAFFIC AND CONSTRUCTION STAGING
(PPD 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
- maintaining traffic plans and staging typicals/plans

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.

14.60

SUBMISSION OF COMPLETED PLANS

14.60.01 (revised 11-22-2021)

General

The final plan/proposal package should be submitted to the Specifications and Estimates Unit on or before the date listed in the calendar year's schedule of Letting and Board Dates. This date should not be confused with "Plan Completion Date." Plan completion date occurs after the FPC Meeting and is the date when 100% of the plans are completed. See Section 14.54 for task timelines. A copy of the letting schedule is located on the Plan Development SharePoint site.

The Supervisor of the Specifications and Estimates Unit will determine which projects are candidates for letting with 3 or 4 week advertisements. Projects proposed for 3 week advertisements must have the approval of the Engineer of Design (except for Capital Preventive Maintenance, Non-Freeway Resurfacing Program and Pavement Marking projects). Projects proposed for a 6 week advertisement require notification with the Supervisor of the Specifications and Estimates Unit, and must be submitted one week prior to normal turn in. All other projects will utilize a 5 week advertisement period.

Once a project is submitted to the Specifications and Estimates Unit the Project Manager can check ProjectWise for the status of a project.

Upon receipt of the plan/proposal package for processing, the Specifications and Estimates Unit may ask to review the project with the Design Unit in order to gain an insight into the type of work involved to determine if any additional special provisions and/or supplemental specifications are required.

14.60.02 (revised 5-28-2024)

Requirements

Advertisement cannot occur until all projects within a contract have funding obligation. Funding obligation requests cannot occur without the following:

- All change requests in JobNet are approved
- Environmental Certification or Classification in JobNet is up to date
- ROW Certification or Conditional Certification is approved
- S/TIP CON phase is approved – if a JobNet change request increases the project budget significantly, a previously approved S/TIP phase may become pending, and will need to be approved again before obligation can occur
- FHWA has signed off on the CA Form, if necessary

Expedited or other projects requiring special attention should be brought to the attention of the Supervisor of the Specifications and Estimates Unit prior to submittal. This includes projects without all the material described above.

14.60.02 (continued)

All plan/proposal package and final supporting document submittals should include at least the following, in addition to the plans:

1. Title Sheet
2. Signed / Completed
   Project Signature Sheet
3. Milestone Checklist
4. Proposal level cost summary (AP Preconstruction)
5. Unique special provisions (approved for project use) including maintaining traffic
6. Frequently used supplemental specifications and special provisions (package and checklist)
7. Required permits
8. Utility Relocation Status Report (Form 2286)
9. Utility Charge Estimate (Form 0223) - for bridge projects
10. ROW Certification for Advertising (Form 0725I or Form 0725N)
11. Coordination clauses
12. Signed / Completed
    Certification Acceptance File
13. Notices to Bidder
14. Progress schedule with any incentive/disincentive clauses
15. Project Cost Estimating Checklist (Form 0268)
16. Exception with a memorandum signed by the Region Engineer acknowledging the risks and a completed Exception Risk Analysis (Form 2912).
17. Structure Lump Sum Items Worksheet (Form 2911) if applicable
18. Signed / Completed RBPI (Risked Based Project Involvement) Stewardship & Oversight Action Plan form (if applicable)

The Project Manager must get approval from the Supervisor of the Specifications and Estimates Unit prior to submitting a final package without ***ALL*** of the above items.

14.60.03 (revised 5-28-2024)

Exceptions

There are some exceptions to the above minimum requirements for submittal of plan/proposal packages to the Specifications and Estimates Section. Exceptions are permitted in the following areas:

1. Permits
2. ROW Certification on non-federally funded projects
3. Trunkline agreements with local agencies
4. Unique Special Provisions (not desirable and must have supporting signed/approved Special Provision Exception Risk Analysis Form 2908, also see Section 14.58)

In order to submit a package to the Specifications and Estimates unit with an allowable exception for items 1-3 above, the following steps must be followed:

- Perform a risk analysis for each appropriate exception.
- Invite appropriate experts for each exception to the FPC Meeting.
- Send the Exception Risk Analysis (Form 2912) along with the other required documents to the FPC participants (two weeks prior to the meeting).
- If the participants at the FPC meeting agree with your request for an exception, have them initial the Exception Risk Analysis (Form 2912).
- If the participants disagree with the need for an exception, they must attach written comments to the Exception Risk Analysis (Form 2912).
- The Exception Risk Analysis (Form 2912) along with any comments should be forwarded to the Region Engineer for their signature. The form is placed in the Supporting Documents folder in ProjectWise when the plan/proposal package is submitted to the Specifications and Estimates unit.

14.60.03 (continued)

- If the exception is a permit, include a Notice to Bidders that a permit is required, the projected date of permit approval and identify any restrictive conditions. Once the project is advertised, the Project Manager will monitor the permit approval process and submit the approved permit through the addendum process (see Section 14.63). If the permit has not been approved and received by the Project Manager at least one week prior to the letting, they must contact the Supervisor of Specifications and Estimates to determine if the project needs to be postponed or withdrawn from the letting (see Section 14.64).

Specifications and Estimates will not submit the package for advertisement without an approved exception.

14.60.04 (revised 12-17-2018)

QA/QC Review

It is the responsibility of the Project Manager to perform a QA/QC review of the entire plan/proposal package prior to submittal to the Specifications and Estimates Unit. As a minimum, in addition to those items listed under Section 14.60.02, the following items ***must*** be correct:

- Quantities and pay items on plan sheets must match those in AP Preconstruction.
- All Unique Special Provisions with a pay item must have a matching pay item in the plans and in AP Preconstruction.
- All 7000 numbers in AP Preconstruction must have a Unique Special Provision in the proposal with matching units.
- Any Frequently Used Special Provision with a pay item must have a matching pay item in the plans and in AP Preconstruction.
- All Frequently Used Special Provisions and Specifications include in the package are the latest version.
- AP Preconstruction files must be complete and correct.
- All references to standard plans and special details are the latest version.

14.60.05 (revised 5-28-2024)

AASHTOWare Project (AP)Preconstruction Files

Listed below are some directions/reminders concerning AP Preconstruction files:

- Project should be identified as J.N. with A (######A)
- Proposal Contract ID should be “C.S.-J.N.”, with no extra spaces or characters, job number does not have an “A” or any other suffix (i.e., 54321-123456)
- If more than one job is packaged together, the Contract ID number is based on the predominate C.S. in the lowest numerical job number of those being packaged together.
- County number is filled in
- Spec year is correct, both at proposal and project level
- Section and Line number have been run
- Primary Region has been filled in
- Section List indicate “Road Work” or “Bridge Work”
- Long description entered using standard wording
- Number of plan sheets filled in
- Contract type is filled in
- All Pre-established prices have been marked
- Funding distribution adds to 100%
- Each Lump Sum item adds to a combined total of 1.00
- Administrative unit has been filled in
- Beginning and Ending termini have been filled in
- CE dollar amount is correct
- Control group changed to ”DS” in the Project and Proposal level
- The unit bid requirement code (on Items tab) is fixed, NOT LOCKED, for all dollar items
- Project start date and completion date filled in
- The supplemental description for all 7000 items is the same as the pay item in the Special Provision.

14.60.05 (continued)

AASHTOWare Project (AP)Preconstruction Files

Listed below are some common oversights of plan/proposal packages submitted to the Specifications and Estimates Unit:

- Copies of Special Details not included in the plans.
- Undefined pay items. Every pay item used on the project must be covered by the Standard Specifications for Construction, Special Provision or Supplemental Specification.
- Identical pay items in both the road and bridge sections. These should be revised to appear in only one section. This eliminates the possibility of a Contractor bidding differently on the same pay item.
- Packaging of projects. Packages with road, bridge, utilities, signals, signing, etc. should be packaged prior to submittal to the Specifications and Estimates Unit.
- Project cost, including CE, not within the limits of JobNet CON phase programmed budget.
- Construction completion date exceeding a permit's expiration date.
- Missing or incorrect Mobilization maximum amount.
- Funding for Incentive/Disincentive clause not programmed or quantity not properly entered in AP Preconstruction.

14.61 (revised 5-28-2024)

PRE-LETTING BRIEFING/PRE-BID MEETING

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.

   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.

14.61.01 (continued)

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 Contract Services Division (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 and submits a Special Provision for approval and 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 the Contract Services Division. 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.

14.63 (revised 5-28-2024)

ADDENDA

Changes to the contract (plans, specifications and special provisions) are sometimes necessary when they affect the way a Contractor bids a project. Notification to Contractors is sent out by the Contract Services Division in the form of an addendum (an amendment to the contract documents as advertised). Changes most often originate by Contractor Inquiry. Addenda are issued at the request of the Project Manager/Cost and Scheduling Engineer, after a project is advertised but before the letting. Once the plans and proposal have been sent to the Contract Services Division, for advertising, the plan/proposal package cannot be changed except by addendum.

The Project Manager should determine if changes are necessary by determining the effect on the way the work will be bid. The Project Manager should consult with the Supervisor of the Specifications and Estimates Unit to determine the impacts as necessary. If there is no effect on the bidding, an addendum may not be necessary. This type of change can be handled by a plan revision after the project is let and prior to construction.

If an addendum is needed, it is initiated by supplying the required information to the Specifications and Estimates Unit. Detailed instructions and templates for submitting an addendum request can be found in ProjectWise or on the Plan Development website.

14.63 (continued)

Typically there are three types of changes made to the contract documents by an addendum. Pay item, proposal, and plan changes require the following information:

1. If Pay Items are Affected:

The proposal line number, pay item number, pay item description, and quantity and units as specified in the Schedule of Items in the proposal.

2. If the Proposal is Affected:

The proposal page number(s) of the document affected along with supplying any additional or replacement page(s).

3. If Plan Sheets are Affected:

The sheet number(s) of the plan set(s) affected along with the change to the plan sheet(s) if not supplying additional or replacement plan sheet(s).

The FHWA must give prior approval for applicable addenda involving FHWA oversight projects before they can be published. The Project Manager is responsible for obtaining FHWA approval. E-mail approval from the FHWA Area Engineer is sufficient documentation.

Addenda submitted within four days of the letting require the approval of the Specifications and Estimates Supervisor. The decision to submit a late addendum during the week of the letting should be discussed with and approved by the Supervisor of the Specifications and Estimates Unit.

Project Managers should make every attempt to minimize the number of addenda requests, especially those within four days of the letting date. Addenda must NOT be used as a process for completing the design of a project after advertisement.

14.64 (revised 5-28-2024)

POSTPONEMENT, WITHDRAWAL, OR REJECTION FROM LETTING

The Project Manager will work with the Supervisor of Specifications and Estimates on any project that requires the following action:

1. Postponement from Letting

Takes place prior to the letting and is usually a delay to the next available letting. The Contractor retains the plans and proposal, and an addendum will be issued.

A copy of the postponement memo signed by the Director of the Bureau of Development will be sent to the Director of the Bureau of Finance and Administration for appropriate action.

The Project Manager will make the required changes and submit an addendum request to the Specifications and Estimates Unit.

2. Withdrawal from Letting

Takes place prior to the letting and is usually a delay of more than one letting. The original plans and proposal material will be retained in ProjectWise and AP Preconstruction for historic records.

A copy of the withdrawal memo signed by the Director of the Bureau of Development will be sent to the Director of the Bureau of Finance and Administration for appropriate action.

The Project Manager has the responsibility to pursue whatever contract changes are necessary and resubmit the project back to the Specifications and Estimates Unit for re-advertising. See Section 14.64 Subsection 7 titled “Resubmission of a Withdrawn or Rejected Project”.

14.64 (continued)

3. Rejection from Letting

Takes place after letting and Executive Bid Review. The original plans and proposal material will be retained in ProjectWise and AP Preconstruction for historic records.

A copy of the rejection memo signed by the Director of the Bureau of Development will be sent to the Director of the Bureau of Finance and Administration for appropriate action.

The Project Manager has the responsibility to pursue whatever contract changes are necessary and resubmit the project back to the Specifications and Estimates Unit for re-advertising. See Section 14.64 Subsection 7 titled “Resubmission of a Withdrawn or Rejected Project”.

4. Bid Rejection Less Than 10% Over the Engineer’s Estimate

a) The Project Manager contacts the Design Division’s Supervisor of Specifications and Estimates with concerns that the bids received are not reflective of previous projects with similar scope and type of work or that the project cannot be built as advertised.

b) The Supervisor of Specifications and Estimates and the Project Manager review the proposal package to document why the bids are not acceptable. The Project Manager, in cooperation with the System/Template Manager and Region Engineer, recommends that bids be rejected to the Director of the Bureau of Development.

c) If the decision is made to reject all bids, a rejection memo is sent to the Director of the Bureau of Finance and Administration from the Director of the Bureau of Development requesting rejection of all bids with an explanation why the bids should be rejected.

14.64 (continued)

POSTPONEMENT, WITHDRAWAL, OR REJECTION FROM LETTING

5. Bid Rejection More Than 10% Over the Engineer's Estimate

a) Design Division's Specifications and Estimates Unit reviews the bid tabulation with the Project Manager to determine what items caused the bid amounts to exceed the Engineer's Estimate.

b) The Specifications and Estimates Unit and the Project Manager review the proposal package to see if the bid amount is reasonable. The Project Manager, in cooperation with the System/Template Manager and Region Engineer, recommends that bids be rejected or accepted to the Director of the Bureau of Development.

c) If bids are rejected, a rejection memo is sent to the Bureau of Finance and Administration from the Director of the Bureau of Development requesting rejection of all bids.

d) If bids are accepted, a "justification memo" is sent to the Bureau of Finance and Administration from the Director of the Bureau of Development with reasons why the bids should be considered reasonable and be awarded to the low bidder.

e) If the low bid is $500,000 or greater, the justification memo is placed on the next available State Transportation Commission agenda for informational purposes and placed on the next available State Administrative Board agenda for approval.

14.64 (continued)

6. Single Bid Rejection less than 10% over the Engineer's Estimate

a) If the single bid is not acceptable, the Project Manager contacts the Design Division's Specifications and Estimates Supervisor with concerns that the low bid received is not reflective of previous projects with similar scope and type of work or that the project cannot be built as advertised.

b) The Specifications and Estimates Supervisor and the Project Manager review the proposal package to document why the single bid is not acceptable. The Project Manager, in cooperation with the System/Template Manager and Region Engineer, recommends the bid be rejected to the Director of the Bureau of Development.

c) If the decision is made to reject the bid, a rejection memo is sent to the Director of the Bureau of Finance and Administration from the Director of the Bureau of Development requesting rejection of the bid with an explanation why the single bid should be rejected.

d) If the single bid is deemed acceptable, the Bureau of Finance and Administration will process the bid in the normal manner. This includes the extra step of reporting the single bid contract to the State Transportation Commission agenda for approval.

14.64 (continued)

POSTPONEMENT, WITHDRAWAL, OR REJECTION FROM LETTING

7. Resubmission of a Withdrawn or Rejected Project

a) Once the withdrawal or rejection memo has been signed, a new ProjectWise folder is created with a "-2" extension (e.g. 123456-2), and an email notification is sent to the Project Manager.

b) The Project Manager must email MDOT-DesignEstimates to request the creation of a new proposal file in AP Preconstruction with a "-2" extension (e.g. 63172-123456-2).

c) The Project Manager will revise the letting date in JobNet and make updates to the plans, proposal, AP Preconstruction and applicable supporting documents prior to resubmitting the project to the Specifications and Estimates Unit.

7.02.31 Deck Replacements (Cont.)

E. Pour Sequence for Superstructures with Pin and Hanger Assemblies (5-28-2024)

When replacing the bridge deck on superstructures with pin and hanger assemblies the pour sequence must be carefully considered. Generally, the sequence should call for the deck over the suspended spans to be poured first followed by the positive moment areas of the remaining spans. If the length of the cantilever (measured from the centerline of bearing at the pier to the centerline of the pin and hanger assembly) is relatively short, the negative moment areas over the piers and the cantilever can be poured with the positive moment area. If the length of the cantilever is relatively long, the negative moment area over the piers and the cantilever should be poured separate from the positive moment area of the cantilever span. Short cantilevers are considered 10 feet or less in length.

7.02.31 (continued)

The direction of the pour must also be considered. Generally, the following pour directions should be called for on the plans:

1. Suspended spans with pin and hanger assemblies at both ends – the pour can progress in either direction and should be left to the Contractor to decide based on their preferred means and methods.

2. Suspended spans supported on one end by an abutment and on the other end by a pin and hanger assembly - the pour should progress from the abutment toward the pin and hanger assembly.

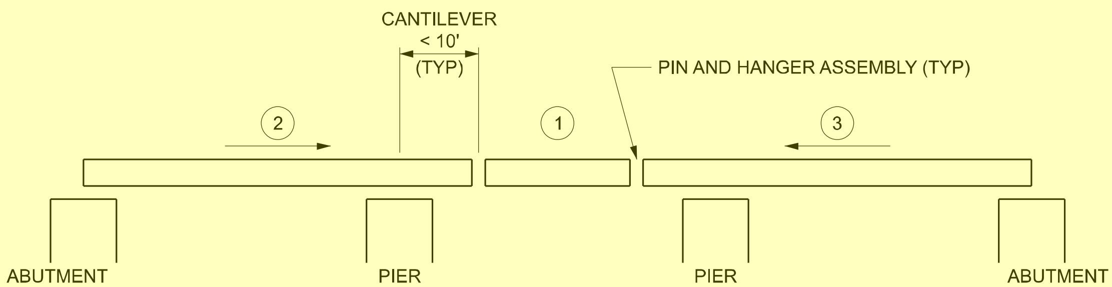
3. Positive moment areas of cantilever spans with one end supported by an abutment – the pour should progress from the abutment toward the cantilever.

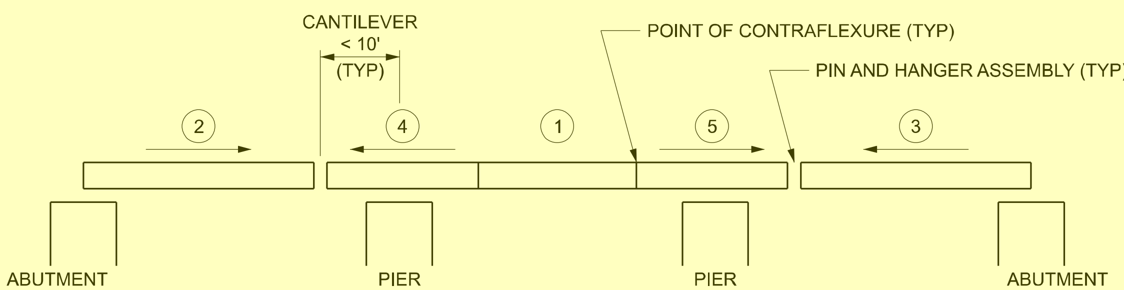
4. Positive moment areas of cantilever spans with both ends supported by piers and with cantilevers on both ends – the pour can progress in either direction and should be left to the Contractor to decide based on their preferred means and methods.

5. Negative moment areas of cantilever spans – the pour should progress from the point of dead load contraflexure toward the pin and hanger assembly.

Diagrams illustrating the pour sequence and pour direction for different superstructure configuration can be found in Figures 7.02.31 a & b.

Figure 7.02.31 E.-A





POUR 1 FIRST, 2 OR 3 IN ANY ORDER, THEN PIER POUR 4 CLOSEST TO POUR 2 AND FINALLY REMAINING PIER POUR 5.

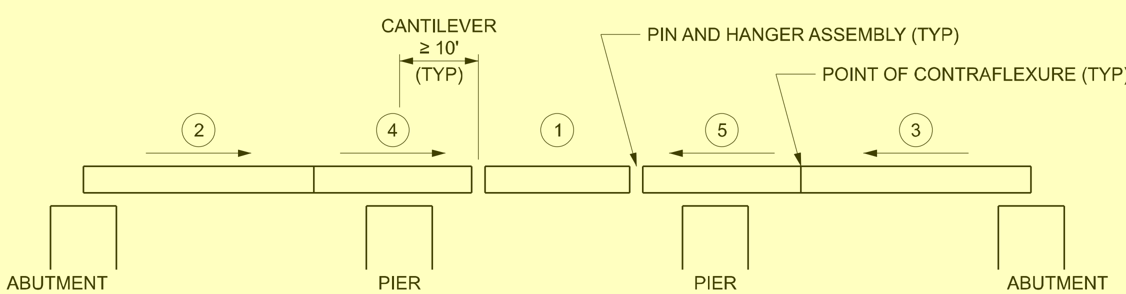
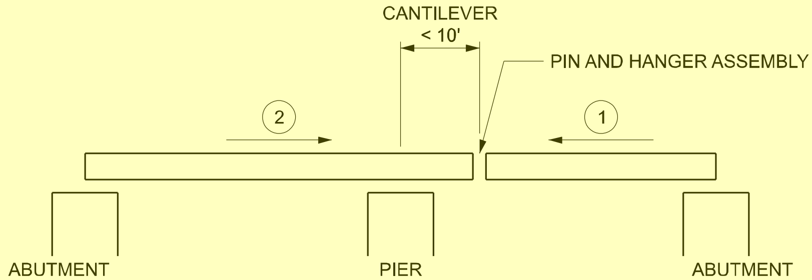
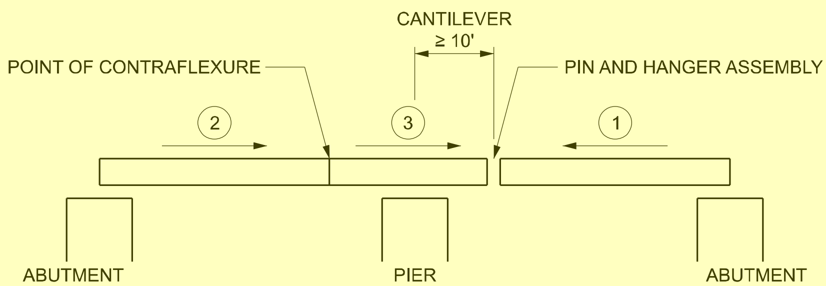


Figure 7.02.31 E.-B





NOTES:

CONCRETE POURS WITHOUT A POUR DIRECTION ARROW MAY PROGRESS IN EITHER DIRECTION AND SHOULD BE LEFT TO THE CONTRACTOR TO DECIDE BASED ON THEIR PREFERRED MEANS AND METHODS.

LEGEND

(2) POUR SEQUENCE NUMBER

→ POUR DIRECTION

PIN AND HANGER ASSEMBLY POUR SEQUENCES

8.06.05

Pile Notes

A. Drive all piles to a nominal pile driving resistance not less than _____ kips. Determine nominal pile driving resistance (R_{ndr}) using (the FHWA Modified Gates Dynamic Formula) (dynamic test with signal matching (P.D.A. testing)) (static load tests). [Provided by MDOT Geotechnical Services Section or Geotechnical consultant. See section 7.03.09 for values and criteria. Use for **LRFD** projects only.] (8-20-2009)

B. [Load Factor Design (LFD)]
Drive all piles to a minimum bearing capacity of ____ tons. [Use for Load Factor Design (LFD) projects]

C. [Load Factor Design (LFD)]
Do not use the pile driving formulas in the Standard Specifications to determine battered pile capacity. Drive battered piles to the elevation established for vertical piles. [Use on Load Factor Design (LFD) projects when piles are driven to a 2.5V:1H batter or flatter.]

D. Use pile shells with a minimum of (0.500”)(0.375”)(0.312) nominal wall thickness, (16”)(14”)(12”) O.D. [Use with C.I.P. concrete piles.] (5-24-2021)

E. The estimated pile length is based on the static analysis. (8-20-2009)

F. Drive batter piles for Abutment(s) ___ to a 3V:1H (2.5V :1H) batter angle.
(9-18-1998)

G. Use (HP 10X42) (HP 10X57) (HP 12X53) (HP 12X74) (HP 12X84) (HP 14X73) (HP 14X89) Steel piles. (11-28-2011)

H. Drive piles to such accuracy that the ends of the piles to be embedded in the concrete are within 3" of the location shown on the plans. [Use for pile bents and integral abutments with one row of piles.] (4-19-2021)

8.06.05 (continued)

I. Drive piles in a sequence that begins with the center of the pile group and proceeds outward in both directions or from one side of the pile group to the other side. The contractor may request Engineer approval to sequence the pile driving from the center of the pile group outward in a clockwise or counterclockwise pattern if four or more rows of piles exist. [Use for pipe piles to alleviate soil pressure from driven piles. A pile driving sequence will minimize detrimental effects of heave and lateral displacement of the ground as well as the influence the new construction has on adjacent structures.] (8-20-2009)

J. The estimated loss of nominal pile resistance due to scour after driving is _____ kips. [For information only. Use for **LRFD** projects only.] (8-20-2009)

K. The estimated factored downdrag after pile driving is _____ kips. [For information only. **LRFD** projects only.] (8-20-2009)

L. The factored pile resistance available to resist all factored loads (including the estimated factored downdrag) is equal to (50) (65) percent of nominal pile driving resistance (that is reduced by the loss due to scour). [For information only. Add downdrag and scour when appropriate. See section 7.03.09 for values and criteria. Use for **LRFD** projects only.]
(11-28-2011)

M. Pier (s) _____ (is) (are) considered pile bent(s). Steel piles used for pile bents are considered main members and all welding must be according to AASHTO/AWS D1.5 Bridge Welding Code, as modified by the current Special Provision for Structural Steel and Aluminum Construction. [Use only when piles project above surface and function as a true pile bent. Do not use for integral abutment piles.] (5-28-2024)