

2023 Bridge Design Conference

Design Policy Update

Subhi M. Bazlamit

Director of Standards and Policy

February 21, 2023

2022-2023 Design Memos

Design memo	Subject	Date
22-04	Payment Revisions of Construction Zone Energy Absorbing Terminals and Temporary Traffic Barriers	02/09/22
22-05	Concrete Median Barriers for Interstate Routes	04/20/22
22-06	Revisions to Maintenance of Traffic Standards	04/20/22
22-07	Revisions to Letting Preparation Schedule	04/20/22
22-08	Revisions to Hydraulic Submittal Process and Editable Documents	04/20/22
22-09	Revisions to Reinforced Concrete Structure – Chapter 405	06/06/22
22-10	INDOT Lighting Policy	07/07/22
22-11	Pre-Bid Meeting Information	07/07/22
22-13	Working Drawings for Precast 3-Sided Structures and Box Culverts	07/07/22
22-15	INDOT 2022 Standard Drawings	07/26/22
22-16	Intelligent Transportation Systems (ITS) Update	08/04/22




2022-2023 Design Memos

Design memo	Subject	Date
22-17	AASHTO LRFD Bridge Design Specifications	09/13/22
22-18	Chemical Anchors for Post-Installed Reinforcement	09/13/22
22-19	Welded Wire Reinforcement(WWR) Light Weight Concrete Continuity for Prestressed Beams	09/13/22
22-20	Surface Seal for Concrete Structural Members	10/06/22
22-21	Deck Pour Sequence for Prestressed Beam Superstructures	10/07/22
22-22	Post-construction Stormwater Management	11/10/22
22-23	Engineering Assessment Manual	11/10/22
22-25	Infrastructure Investment and Jobs Act-Build America, Buy America	12/19/22

DM 22-09 Revisions to Reinforced-Concrete Structure

- IDM Chapter 405 has been revised to reference the *AASHTO LRFD Bridge Design Specifications, 8th Edition* with interim revisions through May 2018
 - Welded Wire Reinforcement (WWR) added and should only be detailed on the plans for the web reinforcing in AASHTO I-beam and bulb-tee beams.
 - Hooks and Bends out of IDM and into RPD 703-B-316d which was incorporated into *2022 INDOT Standard Drawings*

INDIANA DEPARTMENT OF TRANSPORTATION	
BAR BENDING DETAILS	
EFFECTIVE FOR LETTINGS ON OR AFTER 12-01-21	
RECURRING PLAN DETAIL NO.	703-B-316d
Sheet 01 of 01	

INDIANA DEPARTMENT OF TRANSPORTATION	
BAR BENDING DETAILS	
SEPTEMBER 2022	
STANDARD DRAWING NO.	E 703-BRST-01
	 6/15/2022 DESIGN STANDARDS ENGINEER DATE
	 06/27/2022 CHIEF ENGINEER DATE

DM 22-13 Working Drawings for Precast 3-sided Structures and Box Culverts

- LPA and State Shop Drawing and Falsework Review Procedures have been revised
 - Coordinator 7 should no longer be copied on submittals
 - For Structures requiring load rating, the Engineer of Record (EOR) should submit a “New Design” request in the Load Rating Request Application (LRRRA) via ITAP. Upload:
 - Shop drawings
 - Load rating calculations
 - Load Rating Summary, (RPD 700-B-310d)
 - An automated email notification will be sent from LLRA to EOR when the load rating review is complete.
 - If EOR requires revisions to shop drawings that affect the load rating, the designer must resubmit in LRRRA

Construction Management Resources

- [Work Zone Safety](#)
- [Capital Project Dashboard](#)
- Change Order Resources:
 - [Change Order Cost Analysis Worksheet](#)
 - [Change Order Cost Evaluation Process](#) (video)
 - [Change Order Flow Chart](#)
 - [Change Order Policy](#)
 - [Change Order Request Form](#)
 - [Change Order/Work Order Form](#)
 - [Cost Change Request Form](#)
- [Construction Memos](#)
- [Construction Training Calendar](#)
- [Contract Documents](#)
- [District Claims Worksheet](#)
- [FHWA Construction PODI List](#)
- [Eligibility for Anchored Concrete Barrier Wall](#)
- [General Instructions to Field Employees \(GIFE\)](#)
- [INDOT Guidelines for Setting Contract Time](#)
 - [Contract Time-Set Worksheet](#)
- [LPA & State Shop Drawing & Falsework Review Procedure](#)
- [Partnering Handbook for INDOT Projects](#)
- [Standard Specifications & Drawings, Special Provisions](#)

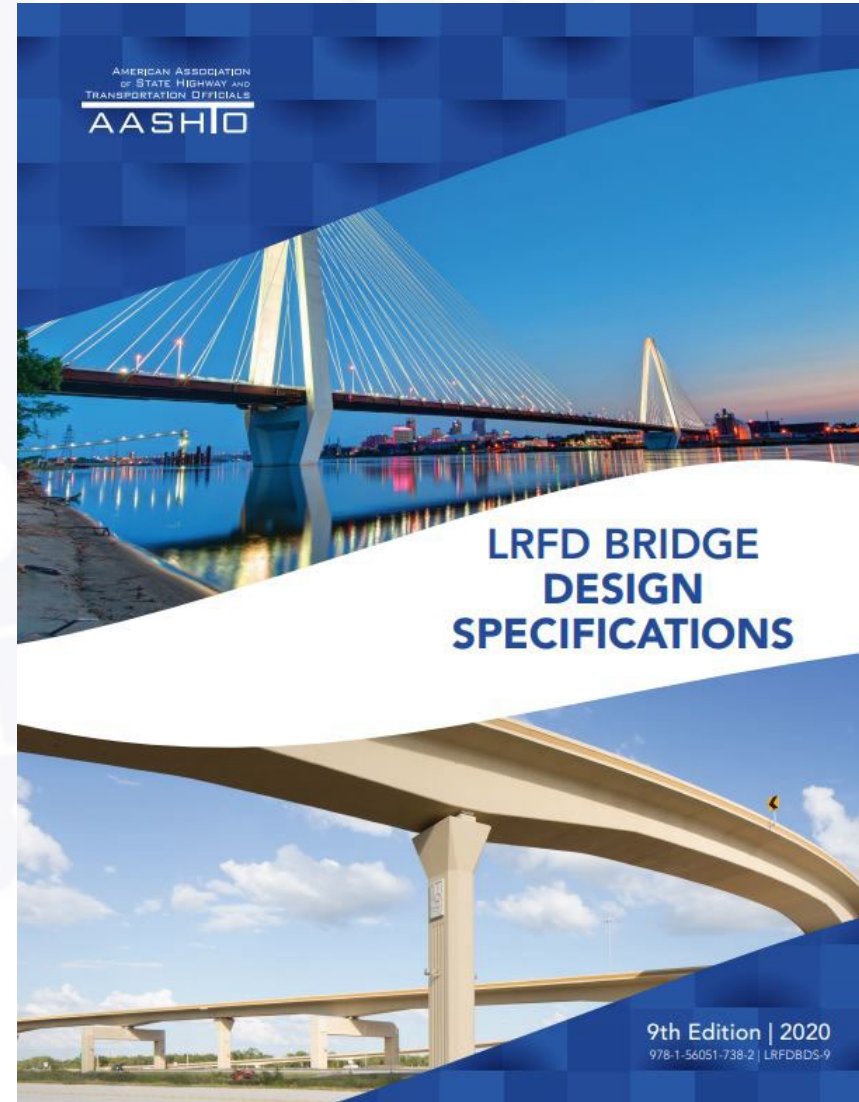
DM 22-15: INDOT 2022 Standard Drawings

- SC in March 2022 approved updates
 - E 801- TCDV Temporary Traffic Control Devices
 - E 801- TCLC Lane Closures
 - E 801- TCSC Shoulder Closures
 - E 801 -TCTS Temporary Closures
- E 503- BATJ Terminal Joint
- E 609- RCBA Reinforced Concrete Bridge Approach
- E 703- BRST Bridge Reinforcing Steel
- E 707 -Fabrication Tolerances

DM 22-17 AASHTO *LRFD Bridge Design Specifications*

- Stage 2 Submittals on or after March 1, 2023

New or replacement bridges should be designed in accordance with the AASHTO *LRFD Bridge Design Specifications, 9th Edition*



DM 22-18 Chemical Anchors for Post-Installed Reinforcement

- Current design should be based on the AASHTO code requirements, and the guidance provided in IDM Chapter 412 post-installed concrete anchors
- Field-drilled holes in concrete and a chemical anchor should be used
In accordance with LRFD 5.13 which refers to ACI 318

Old Figure 412-3B was deleted



DM 22-19

Welded Wire Reinforcing Steel (WWR) in Prestressed beams

- Revisions to Chapter 406 Prestressed-Concrete Structure and Figures
- WWR is the first option over conventional mild reinforcing
- No standard hooks, and can be anchored by two longitudinal wires (minimizes congestion at the bottom of the beam)
- Strands configuration modified
- The use of WWR requires larger prestressed sections, then use mild reinforcing steel
- Designers should use WWR in the design and detailing of prestressed beams whenever feasible

DM 22-20 Surface Seal for Concrete Structural Members

- Recent revisions to Section 707 in the *Standard Specifications* in September 2022 SC meeting waived the surface sealing requirement for concrete structural members if the fabricator uses Self-Consolidating Concrete (SCC)
- Notes related to surface sealing should not be included in the plans
- DM 21-12, the surface seal is no longer required for newly constructed bridge decks or reinforced concrete approach slabs
- RSP 702-R-691 incorporated into 2022 INDOT *Standard Specifications* requires the use of pozzolans in all bridge decks and approach slabs



DM 22-21 Deck Pour Sequence for Prestressed Beam Superstructures

- A continuous deck pour should be allowed at the Contractor's option and noted on the plans if the following criteria are met:
 - (1) The span containing the largest volume of concrete, including the pier diaphragm at the beginning of the span, can be placed within 3 ½ hours, and
 - (2) The pour rate is less than 80 cubic yards per hour
- A note like that in Figure 404-2F should be shown on the plans to indicate the calculated minimum required pour rate, if less than 80 cubic yards per hour.
- If the calculated required pour rate is 80 cubic yards per hour or higher, the optional continuous pour note should not be included in the plans.
- Designer should evaluate the feasibility of a continuous Pour during the design process using the criteria provided in 404-2.06(02)



INDOT | BRIDGE DESIGN AIDS

CONTINUOUS DECK POUR FOR PRESTRESSED BEAM SUPERSTRUCTURES

- Planned deck pour sequences are to be submitted by the Contractor to the PEMS. The PEMS should send the deck pour sequence directly to the EOR for review and approval and copy the Office of Bridge Design at BridgeDesignOffice@indot.IN.gov
- The EOR will distribute approved requests.
- proposes to pour the deck continuously in a single pour, the EOR should use the INDOT Continuous Bridge Deck Pour Sequence Review Spreadsheet to evaluate the proposed pour sequence
- The acceptance criteria shown on the spreadsheet should be used as the EOR's primary basis for approving or rejecting a pour sequence post-letting and setting a minimum pour rate for a continuous pour pre-letting if deemed possible by the spreadsheet.
- Therefore, IDM 404-2.06(02) suggests that the pier diaphragms and a 5'-0" wide portion of deck directly above the piers be poured after all the positive moment regions are constructed eliminating the risk of applying tension to setting concrete.

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BDA 404-01 | **DECEMBER 7, 2022**

CONTINUOUS DECK POUR FOR PRESTRESSED BEAM SUPERSTRUCTURES

Reference: IDM 404-2.06(02) Transverse Construction Joint

Chapter 503 Maintenance of Traffic - Revisions

- FHWA has reviewed
- INDOT is finalizing based on FHWA comment
- Revision issued as early as this Spring

Chapter 503 Maintenance of Traffic - Revisions

Section 503-2.02 → Significant Work Zone Impact Determination

- If not in Engineer's Report, designer should do immediately after NTP is received
- Criteria for making determination is in 503-2.02
 - Revisions being made to INDOT specific criteria
 - No change in determination by Federal Rule-
 - Any Interstate project with a lane closure lasting more than 3 days **AND**
 - In a Transportation Management Area (major urban area)
 - TMAs in Indiana:
 - Cincinnati (all of Dearborn County)
 - Evansville (all of Vanderburgh and Warrick Co.)
 - Fort Wayne (all of Allen Co.)
 - Gary (all of Lake, La Porte, and Porter Cos.)
 - Indianapolis (all of Marion, Boone, Hamilton, Hancock, Hendricks, Johnson, Madison, Shelby Cos.)
 - Louisville (all of Clark and Floyd Cos.)
 - South Bend/Elkhart (all of St Joseph and Elkhart Cos.)

Chapter 503 Maintenance of Traffic - Revisions

Section 503-2.05(03) → Traffic Control Strategy Selection Hierarchy

- For Rural Freeways
 - First check to see if existing crossovers are in place and need no work
 - If not, consider the closure of one travel direction at a time
 - If no viable detour route exists, use the crossover strategy
- Rural Freeway Projects involving a single bridge
 - First consider a runaround with a temporary bridge built in the median

Chapter 503 Maintenance of Traffic - Revisions

Section 503-3.01(03) → Schedule of MOT Activities

- Review of Interstate Highway Congestion Policy by Stage 1
 - Proposed MOT Plan comply
 - Early thoughts on mitigation strategies for undesirable impacts to mobility and safety
- MOT Plan drafted by Stage 2
- MOT Plan completed and submitted/Exception Request approved by Stage 3
 - Include elements of the Traffic Operations and Public Information Plans that need to be in the bid package
 - Approved IHCP Exception Request

Chapter 503 Maintenance of Traffic - Revisions

Section 503-3.04 → Taper Rates

- Tapers for Lane Merges/Shifts on urban Freeways
 - Should be based on 70 mph speeds (not speed limit)
 - Standard Drawings have been revised to show this
 - Recognizes
 - Documented operating speeds (>>> 45 mph)
 - Drivers tend not to slow in work zones

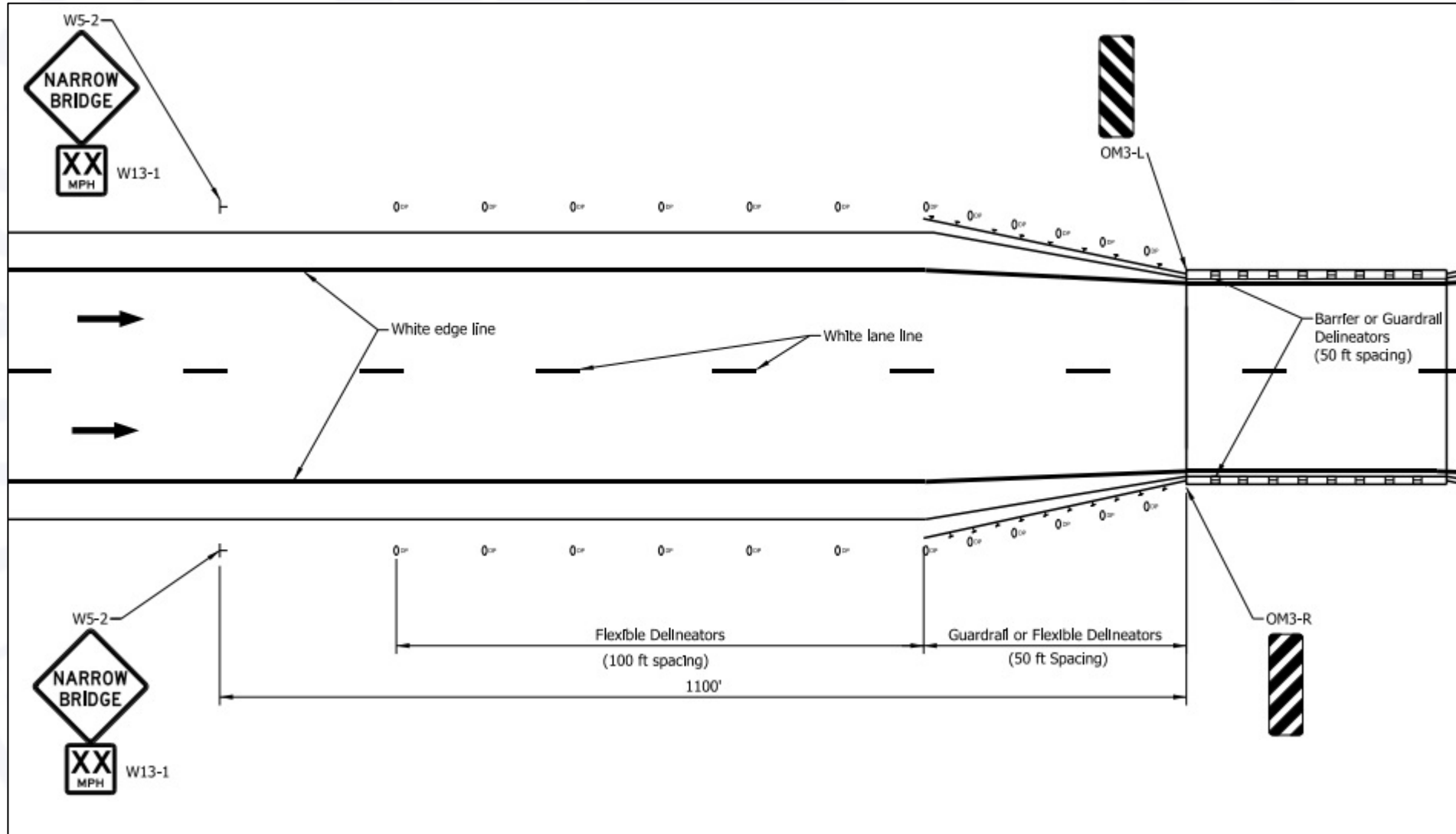
New RPD 808-T-233d (Cont'd)

- Narrow Bridge Markings (808-MKNB)
 - Changes marking width callouts to reflect RSP 808-T-233.

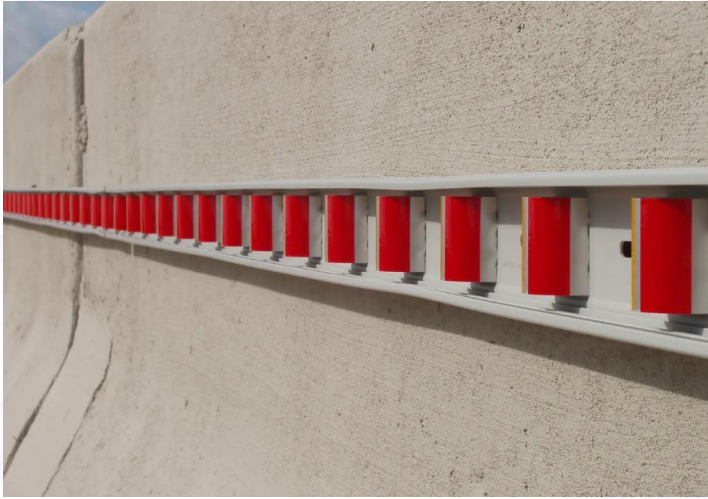
11	Narrow Bridge Markings, Index and General Notes	808-MKNB-04
12	Narrow Bridge Markings on Two Lane Road	808-MKNB-01
13	Narrow Bridge Markings at One Lane Bridge	808-MKNB-02
14	Narrow Bridge Markings on Divided Highway	808-MKNB-05

- Adds option for linear delineation systems on barrier wall or guardrail
- Updates passing sight distance values to 2018 AASHTO Green Book

Narrow Bridge Markings (808-MKNB)



New RPD 808-T-233d



- Josh Heigert

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- Work History

15 years with HDR Engineering in Phoenix, AZ

- Education

B.S. Rose-Hulman Institute of Technology (2007)

M.S.E. Arizona State University (2012)



Pavement Design at Bridges

Allen R. Davidson / Tony Jones

February 21, 2023

Pavement Design: Schedule

Pavement Design should be finalized before the STG 3 Design and should have either of the following:

- An official pavement design memo from INDOT Pavement Division (give 3 months timeframe for this), or
- Design Memo 22-03 with supporting information.

If Design Memo 22-03 applies in full, then no coordination with INDOT Pavement Design is necessary. Use a copy of the design memo appropriately marked-up as the final pavement design for your Final Tracings submittal and documentation.

The supporting information for Design Memo 22-03 will usually include plan sheets. Emails, core reports and geotechnical waivers can also be included as supporting information.

Road Category	Annual Average Daily Truck Traffic (Construction Year)	ESAL (millions)	ESAL Category Name	Minimum HMA Pavement Depth (in.)	Pavement Type ⁽²⁾
Interstate (A)	1900 < AADTT < 5700 ⁽¹⁾	10 < ESAL < 30	High	14	QC/QA-HMA Cat. 4 / HMA Type D
Freeway and Principal Arterial (B)	AADTT < 570	< 3	Low	10	QC/QA-HMA Cat. 3 / HMA Type B
	570 < AADTT < 1900	3 < ESAL < 10	Medium	12	QC/QA-HMA Cat. 3 / HMA Type C
	1900 < AADTT < 5700 ⁽¹⁾	10 < ESAL < 30	High	14	QC/QA-HMA Cat. 4 / HMA Type D
Remaining Road Classes (C)	AADTT < 510	< 3	Low	10	QC/QA-HMA Cat. 3 / HMA Type B
	510 < AADTT < 1700	3 < ESAL < 10	Medium	12	QC/QA-HMA Cat. 3 / HMA Type C
	1700 < AADTT < 5700 ⁽¹⁾	10 < ESAL < 30	High	14	QC/QA-HMA Cat. 4 / HMA Type D

⁽¹⁾ AADTT > 5700 requires a pavement design request

⁽²⁾ Pavement type and section based on application

Application		PAVEMENT TYPE AND SECTION	
		Low ESAL	
New/Reconstructed Full Depth Pavement, HMA	All Shoulder Widths, Without Terminal Joint	165 lbs/syd QC/QA-HMA, 3, 64, Surface, 9.5 mm on 275 lbs/syd QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on 660 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on Subgrade Treatment Type IC on Geotextile for Pavement Type 2B (or per Geotechnical Report)	<p>This is an example of a copy of Design Memorandum 22-03 marked-up for a bridge that gets 450 trucks per day and will need:</p> <ul style="list-style-type: none"> - new terminal joints, - shoulder widening outside of the mainline replacement area, - transition milling and resurfacing beyond the mainline replacement. <p>These sample mark-ups can be done using the various "Comment" features found in Adobe Reader (the free version). However, the method of marking-up doesn't really matter.</p>
	Mainline and Adjacent Shoulder	165 lbs/syd QC/QA-HMA, 3, 64, Surface, 9.5 mm on 275 lbs/syd QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on 1210 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on 6 inches of Compacted Aggregate, No. 53 on Subgrade Treatment, Type IC on Geotextile for Pavement, Type 2B	
New/Reconstructed Full Depth Pavement, HMA	Shoulder Width > 8 ft	165 lbs/syd QC/QA-HMA, 3, 64, Surface, 9.5 mm on 275 lbs/syd QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on 660 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on Subgrade Treatment Type IC (or per Geotechnical Report)	
	Shoulder Only	Shoulder Width ≤ 8 ft	

⁽³⁾ Where existing mainline pavement is resurfaced, use QC/QA HMA surface course as shown for shoulder width > 8 ft. Intermediate and base courses should consist of type specified.

PAVEMENT DESIGN FOR STANDALONE BRIDGE AND SMALL STRUCTURE PROJECTS

Figure 601-5C (Page 1 of 2)

Application		PAVEMENT TYPE AND SECTION		
		Low ESAL	Medium ESAL	High ESAL
HMA Transition Milling/Resurfacing	For HMA pavement, transition milling or resurfacing should be provided beyond the full depth pavement. Where the profile grade for the full depth pavement section ties in at the existing profile grade, 50 ft minimum of resurfacing (milling 1.5 in., 1.5 in. surface course) should be provided. Where the profile grade for the full depth pavement section ties in above the existing pavement, transition milling should be provided. See INDOT <i>Standard Drawings</i> series 306-TPMT for transition milling.			
New/Reconstructed Full Depth Pavement, Composite Mainline and Adjacent Shoulder	All Shoulder Widths	165 lbs/syd QC/QA-HMA, 3, 64, Surface, 9.5 mm on 275 lbs/syd QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on varies ⁽⁴⁾ lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on Subgrade Treatment, Type IC (or per Geotechnical Report)	165 lbs/syd QC/QA-HMA, 3, 70, Surface, 9.5 mm on 275 lbs/syd QC/QA-HMA, 3, 70, Intermediate, 19.0 mm on varies ⁽⁴⁾ lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on Subgrade Treatment, Type IC (or per Geotechnical Report)	165 lbs/syd QC/QA-HMA, 4, 76, Surface, 9.5 mm on 275 lbs/syd QC/QA-HMA, 4, 76, Intermediate, 19.0 mm on varies ⁽⁴⁾ lbs/syd QC/QA-HMA, 4, 64, Base, 25.0 mm on Subgrade Treatment, Type IC (or per Geotechnical Report)
⁽⁴⁾ Top of subgrade should match existing subgrade elevation. Base course thickness is that necessary to match the thickness of the existing composite pavement section or minimum depth based on ESAL, whichever is greater.				
New/Reconstructed Full Depth Pavement, PCCP Mainline and Adjacent Shoulder	All Shoulder Widths, Without Terminal Joint	Contact Pavement Design Office		
	All Shoulder Widths, Includes Terminal Joint, PCCP (pavement depth 12 in., all ESALs)	Initial 40 ft of new mainline and shoulder pavement, use: Pavement beyond the initial 40 ft, use:	JRCP as per Standard Drawing E 503-BATJ-02. Plain jointed PCCP, 12 in. (match JRCP thickness) with tied PCCP shoulders on Subbase for PCCP on Subgrade Treatment, Type IC on Geotextile for Pavement, Type 2B 1.5-in. diameter dowel bars and D-1 joints spaced at 15 feet	

Note:

Subgrade Treatment, Type IC is 12 in. coarse aggregate No. 53 in accordance with INDOT *Standard Specifications* section 301. Where the geotechnical report recommendation for subgrade treatment differs from this figure, the subgrade treatment in the geotechnical report should be used.

This is an example of a copy of Design Memorandum 22-03 marked-up for a bridge that gets 450 trucks per day and will need:

- new terminal joints,
- shoulder widening outside of the mainline replacement area,
- transition milling and resurfacing beyond the mainline replacement.

These sample mark-ups can be done using the various "Comment" features found in Adobe Reader (the free version). However, the method of marking-up doesn't really matter.

Pavement Design: Design Memo 22-03

Use Design Memo 22-03 when all criteria of the memo are met:

- Minimal or no increase in profile grade (PG < 12” for minimal project length).
- No underdrain work is needed, except to perpetuate underdrain outlets at the ends of the outlying shoulder pavement.
 - Around bridges, it may make sense to have short sections of asphalt without underdrains at the ends of the RCBAAs.
 - To accommodate it, neither the mainline nor the adjacent shoulders can have a drainage layer. (Drainage layers are often shown on old plans as “Intermediate, OG__mm” or “HMA Base, Type 5D”.)
 - If there is a drainage layer below the existing mainline and the adjacent shoulder must be replaced, it may be cost-effective or give a time savings to replace the adjacent mainline pavement instead of constructing new retrofit underdrains alongside it.
- No curbs adjacent to new pavement areas.
- There is adequate cover of a structure to ensure the structure won’t be disturbed.
- Existing shoulder is either:
 - Not used for MOT; or
 - Have existing evidence that the shoulder is in good condition and has adequate thickness for MOT operations. This evidence can be core samples from the project’s geotechnical report and/or pages from the plan sheets of previous bridge or pavement projects.

Pavement Design: Shoulder Pavement for MOT

- If HMA shoulders are to be used for MOT, get appropriate shoulder cores as part of the geotechnical evaluation. (One core per shoulder in each quadrant of the bridge.)
- The INDOT Core Database, which contains core data from previous or current projects, could be checked by someone with access to the database.
- If no existing evidence of shoulder condition or depth, use the new form “PVMTDGN Request for Shoulder MOT” to request Pavement Engineering research it.
 - Only use this form if you don’t have appropriate information to make a decision. It should not be used for confirmation of such information.
 - If more than one Des No. with same scope in same Contract try to submit as one form if it makes sense.
- If doing shoulder strengthening, then strengthen for the entire width of the shoulder. Partial shoulder width will be difficult to construct and will not perform well.
- Include transition milling and/or resurfacing as outlined in Design Memo 22-03.
- Subgrade Treatment
 - If not specified in a Standard Drawing or a Geotechnical Report, use Type IC.
 - If the Geotechnical Report recommends Type ID or Type IVA, then coordinate with the Geotechnical engineers that signed off on the report. These are no longer preferred subgrade treatment types.

Pavement Design

Thank You