



INDIANA DEPARTMENT OF TRANSPORTATION

Driving Indiana's Economic Growth

Design Memorandum No. 22-03

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TO: All Design, Operations, and District Personnel, and Consultants

FROM: /s/ Kumar Dave
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Highway Engineering Division

SUBJECT: Pavement Design for Bridge and Small Structure Projects and Pavement Design Requests

REVISES: *Indiana Design Manual* Sections 601-5.03 (new), 601-6.0, 605-1.09 thru 605-1.13 (deleted), Figure 601-5C (new), and 17-5.09(01)

EFFECTIVE: Lettings on or after July 1, 2022

Standard pavement sections for standalone bridge and small structure projects have been established. For eligible projects, a pavement design request is no longer required, and an approved pavement design will no longer be issued. The new and revised IDM sections and new figure are included for reference at the end of this memo.

Standardized pavement designs are shown in IDM Figure 601-5C, Pavement Design for Bridge and Small Structure Projects. The appropriate pavement section is selected based on the ESAL category (determined from the average annual daily **truck traffic**, AADTT) and one of the following applications.

1. New/Reconstructed Full Depth Pavement, HMA, Mainline and Adjacent Shoulder (with and without a terminal joint)
2. New/Reconstructed Full Depth Pavement, HMA Shoulder Only (based on shoulder width)
3. New/Reconstructed Full Depth Pavement, Composite, Mainline and Adjacent Shoulder
4. New/Reconstructed Full Depth Pavement, PCCP, Mainline and Adjacent Shoulder (with terminal joint only)

Where more than one application is included in a project, the pavement section and type should be considered separately for each application. For example, a small structure replacement project

may include a full depth mainline and adjacent shoulder as well as a shoulder only applications. The appropriate pavement section and type for each may be different.

Project Eligibility

Standard pavement sections may be used in lieu of project-specific pavement designs as shown below. For projects that do not meet both criteria below, a pavement design request is required.

1. The project is a standalone bridge or small structure with minimal or no increase in profile grade. Minimal increase is considered 12 in. or less.
2. The project does not include any of the following elements:
 - a. Underdrains
 - b. Curbed roadway cross section
 - c. Inadequate cover over the buried structure
 - d. Existing shoulder used for maintenance of traffic. This item is conditional (See below).

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, a minimum of 50 ft 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 Standard Drawings series 306-TMPT for transition milling.

Using the Shoulder for Maintenance of Traffic

Where the existing shoulder will be used as a travel lane for MOT, it should be evaluated for condition and sufficient structural capacity prior to use. A pavement design request for evaluation of shoulder structural capacity for MOT should be submitted. The Shoulder MOT request form is available on the Department's Editable Documents webpage, under Pavement.

In general, pavement in good condition with a minimum 9 in. of pavement structure will be adequate for short durations.

Where the shoulder structural capacity or condition has been deemed inadequate for the proposed MOT, use Figure 601-5C to determine the reconstructed shoulder pavement section.

Previously Submitted Pavement Design Requests

Pavement design requests submitted previously will be processed and an approved pavement design will be issued.

Pavement Design Requests

Complete pavement design requests and attachments should be uploaded as a single file to ERMS using the following naming convention, as appropriate

PVMTDGN Request [Des #] for Roadway Services

PVMTDGN Request [Des #] for Roadway Services Shoulder MOT

[*Shoulder MOT* is added as Extra Information when using the ERMS MFUT]

An incomplete submission will be returned without review.

The Pavement Design Request form and instructions have been updated to reflect this change. Forms and instructions are available from the Department's Editable Documents webpage, at <https://www.in.gov/dot/div/contracts/design/dmforms/>, under Pavement.

Questions

Questions should be directed to the Pavement Design Office, Kumar Dave at kdave@indot.in.gov.

IDM Revisions

Chapter 601

601-5.03 Standard Pavement Sections [Add Jan. 2022]

A pavement design request is not required for low volume roads with aggregate pavement, trails and other non-vehicular use facilities, as well as for projects that are limited to short lengths of full depth pavement as described in this section. INDOT has developed standard pavement sections for these applications.

601-5.03(01) Standard Pavement Sections for Low Volume Roads and Trails [Add Jan. 2022]

Standard pavement sections may be used in lieu of project-specific pavement designs for aggregate pavement on low volume roads and trails and other non-vehicular use facilities as follows:

1. Aggregate Pavement on Low Volume Roads, AADTT \leq 50 trucks. The pavement section will consist of:
 - 4 in. Compacted Aggregate No. 73, on
 - 6 in. Compacted Aggregate No. 53, on
 - Subgrade Treatment, Type III, or as specified in the geotechnical report
2. Trails and other Non-Vehicular Use Facilities. The pavement sections will consist of the section as shown on the INDOT *Standard Drawings* series 502-NVUF for concrete pavement and 604-NVUF for HMA pavement.

601-5.03(02) Standard Pavement Sections for Standalone Bridge and Small Structure Projects [Add. Jan. 2022]

Standard pavement sections may be used in lieu of project-specific pavement designs as shown below. For projects that do not meet all the criteria below, a pavement design request is required.

1. The project is a standalone bridge or small structure with minimal increase in profile grade. A minimal increase is considered 12 in. or less.
2. The project includes none of the following elements:
 - a. Underdrains present in existing pavement.
 - b. Curbed roadway cross section.
 - c. Inadequate cover over the buried structure.
 - d. Existing shoulder proposed as travel lane for maintenance of traffic. This item is conditional. See section 601-5.03(03).

Standard pavement sections and selection criteria are shown in Figure 601-5C, Pavement Designs for Bridge and Small Structure Projects. Where more than one application is included in a project, the pavement type and section should be considered separately for each application. The appropriate pavement section should be shown on the plans.

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, a minimum of 50 ft 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 *Standard Drawings* series 306-TPMT for transition milling.

Contact the Pavement Design Office Manager for guidance when there is uncertainty about using the standard section.

601-5.03(03) Shoulder Pavement for Maintenance of Traffic [Add. Jan. 2022]

Where the existing shoulder will be used as a travel lane for MOT, it should be evaluated for condition and sufficient structural capacity prior to use. A pavement design request for shoulder evaluation should be submitted. The request form is available on the Department's [Editable Documents webpage](#), under Pavement.

In general, pavement in good condition with a minimum 9 in. pavement structure will be adequate for short durations.

Where the shoulder structural capacity and or condition is deemed inadequate for the proposed MOT, Figure 601-5C should be used to determine the reconstructed shoulder pavement section.

601-6.0 PAVEMENT DESIGN REQUEST AND INSTRUCTIONS [REV. JAN. 2022]

The completed Pavement Design Request form and attachments should be uploaded as a single file to ERMS using the following naming convention, as appropriate.

PVMTDGN Request [Des #] for Roadway Services

PVMTDGN Request [Des #] for Roadway Services Shoulder MOT

An editable version of the Pavement Design Request and instructions are available for download from the Department's website at www.in.gov/dot/div/contracts/design/dmforms/. An incomplete Pavement Design Request will be returned without review.

Chapter 17

17-5.09(01) Miscellaneous Requirements [Rev. July 2012, Apr. 2016, Sep. 2019, Jan. 2022]

The designer should provide complete RCBA details on the bridge plans.

4. Terminal Joint. The need for a terminal joint considers the type of end bent, expansion length, and type of approach pavement. See Section 409-2.04(01) for terminal joint criteria. See INDOT *Standard Drawings* series E 503-BATJ for terminal joint details.

Separate details have been created for HMA and PCCP approach pavement types.

- a. Terminal Joint, Type HMA requires 30 feet of a thickened full depth HMA pavement. Where a terminal joint is constructed as part of a larger full depth road reconstruction project, the full depth pavement section should be as shown in the approved pavement design with the HMA base layer thickness increased as needed to obtain the minimum thickness shown on the standard drawing. Where a terminal joint is constructed as part of a standalone bridge project, the full depth section should be in accordance with Figure 601-5C.
- b. Terminal Joint, Type PCCP requires a series of jointed reinforced concrete pavement (JRCP) sections. The JRCP is paid for by the square yard for the thickness required. Reinforcing bars are included in the cost of JCRP. The D-1 contraction joint and the expansion joint with load transfer are paid for by the linear foot.

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	Medium ESAL	High 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)	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 880 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)	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 1100 lbs/syd QC/QA-HMA, 4, 64, Base, 25.0 mm on Subgrade Treatment Type IC on Geotextile for Pavement, Type 2B (or per Geotechnical Report)
	Mainline and Adjacent Shoulder	All Shoulder Widths, Includes Terminal Joint, HMA (pavement depth 15 in. all ESALs)	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	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 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)	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 880 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 1100 lbs/syd QC/QA-HMA, 4, 64, Base, 25.0 mm on Subgrade Treatment Type IC (or per Geotechnical Report)
	Shoulder Only	Shoulder Width ≤ 8 ft	Widening with HMA, Type B, consisting of 165 lbs/syd HMA Surface, Type B ⁽³⁾ on 275 lbs/syd HMA Intermediate, Type B on 660 lbs/syd HMA Base, Type B on Subgrade Treatment Type IC (or per Geotechnical Report)	Widening with HMA, Type C, consisting of 165 lbs/syd HMA Surface, Type C ⁽³⁾ on 275 lbs/syd HMA Intermediate, Type C on 880 lbs/syd HMA Base, Type C on Subgrade Treatment Type IC (or per Geotechnical Report)

⁽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.

PAVEMENT DESIGN FOR STANDALONE BRIDGE AND SMALL STRUCTURE PROJECTS

Figure 601-5C (Page 2 of 2)