**March 31, 2023**

**Design Memorandum No. 2023.02**

**TO:** **All DPW Engineering Design and Construction Staff, and Design Consultants, Contractors**

**THRU:** **Ericka Miller, PE, PTOE, PMP**
**Deputy Director – Engineering**
**Department of Public Works – City of Indianapolis**

**FROM:** **John Bowen, PE, CPESC**
**Chief Engineer**
**Department of Public Works – City of Indianapolis**

**RE:** **Bridge and Small Structure Project Pavement Designs**

**EFFECTIVE:** **Immediately**

In 2022 INDOT released Design Memo 22-03 establishing standard pavement sections for standalone bridge projects and small structure projects through the addition of Figure 601-5C to the Indiana Design Manual (IDM). Indianapolis DPW has reviewed this figure internally and has created a marked-up version of this figure for particular use on standalone Bridge Construction Projects that will be bid locally and directly through the City. Federal Aid Bridge Projects will follow the most current applicable guidance from INDOT.

For the purpose of simplicity and practicality in using the IDM Figure 601-5C to determine an appropriate pavement design, the following assumption can be made:

$$AADTT = 0.1 * AADT$$

*Unless a more accurate estimation of AADTT has been determined as part of the project.*

Specific considerations regarding Concrete Pavements and Terminal Joint Requirements will be coordinated with DPW's Pavement Engineer through the DPW's assigned Design Project Manager.

| 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**<br><br>**Mainline and Adjacent Shoulder** | All Shoulder Widths, Without Terminal Joint | 165 lbs/syd QC/QA-HMA, 3, 64, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on<br>660 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on<br>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<br>275 lbs/syd QC/QA-HMA, 3, 70, Intermediate, 19.0 mm on<br>880 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on<br>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<br>275 lbs/syd QC/QA-HMA, 4, 76, Intermediate, 19.0 mm on<br>1100 lbs/syd QC/QA-HMA, 4, 64, Base, 25.0 mm on<br>Subgrade Treatment Type IC on Geotextile for Pavement, Type 2B (or per Geotechnical Report) |
| | 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<br>275 lbs/syd QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on<br>1210 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on<br>6 inches of Compacted Aggregate, No. 53 on<br>Subgrade Treatment, Type IC on<br>Geotextile for Pavement, Type 2B | 165 lbs/syd QC/QA-HMA, 3, 70, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 3, 70, Intermediate, 19.0 mm on<br>1210 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on<br>6 inches of Compacted Aggregate, No. 53 on<br>Subgrade Treatment, Type IC on<br>Geotextile for Pavement, Type 2B. | 165 lbs/syd QC/QA-HMA, 4, 76, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 4, 76, Intermediate, 19.0 mm on<br>1210 lbs/syd QC/QA-HMA, 4, 64, Base, 25.0 mm on<br>6 inches of Compacted Aggregate, No. 53 on<br>Subgrade Treatment, Type IC on<br>Geotextile for Pavement, Type 2B. |
| **New/Reconstructed Full Depth Pavement, HMA**<br><br>~~**Shoulder Only**~~ | Shoulder Width > 8 ft | 165 lbs/syd QC/QA-HMA, 3, 64, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on<br>660 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on<br>Subgrade Treatment Type IC (or per Geotechnical Report) | 165 lbs/syd QC/QA-HMA, 3, 70, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 3, 70, Intermediate, 19.0 mm on<br>880 lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on<br>Subgrade Treatment Type IC (or per Geotechnical Report) | 165 lbs/syd QC/QA-HMA, 4, 76, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 4, 76, Intermediate, 19.0 mm on<br>1100 lbs/syd QC/QA-HMA, 4, 64, Base, 25.0 mm on<br>Subgrade Treatment Type IC (or per Geotechnical Report) |
| | ~~Shoulder Width ≤ 8 ft~~ | ~~Widening with~~ HMA, Type B, consisting of<br>165 lbs/syd HMA Surface, Type B[3] on<br>275 lbs/syd HMA Intermediate, Type B on<br>660 lbs/syd HMA Base, Type B on<br>Subgrade Treatment Type IC (or per Geotechnical Report) | ~~Widening with~~ HMA, Type C, consisting of<br>165 lbs/syd HMA Surface, Type C[3] on<br>275 lbs/syd HMA Intermediate, Type C on<br>880 lbs/syd HMA Base, Type C on<br>Subgrade Treatment Type IC (or per Geotechnical Report) | ~~Widening with~~ HMA, Type D, consisting of<br>165 lbs/syd HMA Surface, Type D[3] on<br>275 lbs/syd HMA Intermediate, Type D on<br>1100 lbs/syd HMA Base, Type D on<br>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
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30 ft

| 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 *Standard Drawings* series 306-TPMT for transition milling. | | | |
| **New/Reconstructed Full Depth Pavement, Composite**<br><br>**Mainline and Adjacent Shoulder** | All Shoulder Widths | 165 lbs/syd QC/QA-HMA, 3, 64, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 3, 64, Intermediate, 19.0 mm on<br>varies[4] lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on<br>Subgrade Treatment, Type IC (or per Geotechnical Report) | 165 lbs/syd QC/QA-HMA, 3, 70, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 3, 70, Intermediate, 19.0 mm on<br>varies[4] lbs/syd QC/QA-HMA, 3, 64, Base, 25.0 mm on<br>Subgrade Treatment, Type IC (or per Geotechnical Report) | 165 lbs/syd QC/QA-HMA, 4, 76, Surface, 9.5 mm on<br>275 lbs/syd QC/QA-HMA, 4, 76, Intermediate, 19.0 mm on<br>varies[4] lbs/syd QC/QA-HMA, 4, 64, Base, 25.0 mm on<br>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**<br><br>**Mainline and Adjacent Shoulder** | All Shoulder Widths, Without Terminal Joint | Contact Pavement Design Office | Initiate coordination with the DPW Paving Engineer prior to the Preliminary Plans Submittal. | |
| | All Shoulder Widths, Includes Terminal Joint, PCCP (pavement depth 12 in., all ESALs) | Initial 40 ft of new mainline and shoulder pavement, use:<br><br>Pavement beyond the initial 40 ft, use: | JRCP as per Standard Drawing E 503-BATJ-02.<br><br>Plain jointed PCCP, 12 in. (match JRCP thickness) with tied PCCP shoulders on<br>Subbase for PCCP on<br>Subgrade Treatment, Type IC on<br>Geotextile for Pavement, Type 2B<br>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
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