8 PAVEMENT

8.1 General

Design-Build Contractor shall design and construct the pavement Work in accordance with the applicable requirements in the PPA Documents, including Project Standards and this Section 8 and its Attachment 8-1 (Unique Special Provisions: Pavement); Governmental Approvals; and applicable Laws.

INDOT's Authorized Representative will assist in the coordination and resolution of roadway pavement issues with affected interests and regulatory agencies. Design-Build Contractor shall document the resolutions of issues, including meeting minutes and memoranda for the record.

8.2 Design Requirements

Design Build Contractor shall design, analyze, and provide all permanent pavements required. Prepare separate pavement designs for mainline, ramps, and shoulders.

AASHTO PavementME software, version 2.0, shall be used on the Project.

Materials for roadway pavement surfaces may be hot-mixed asphalt (HMA) or Portland cement concrete (PCC). The pavement design shall provide for positive drainage of subgrade and subbase materials from under all portions the pavement.

Resurfacing, where required, will be designed for a functional design life of not less than13 years, as shown on the output from the PavementME software.

Functional design life for rehabilitation pavement sections shall be equal to or greater than 14 years and structural design life shall be equal to or greater than 30 years.

Functional design life for new pavement sections shall be equal to or greater than18 years and structural design life shall be equal to or greater than 50 years.

8.2.1 Subgrade Treatment

Design Build Contractor shall provide subgrade treatment according to Table 8-1 and Project Standards.

Table 8-1 Subgrade Treatment

Location	Treatment
Newton County, Newton/Jasper County Line to Kankakee River	Type IB – cement
Kankakee River	Type IB – cement
South of SR 2 to US 231	Type IB – lime

Note:
1. Removal of overlaying material shall be removed in such a way that the permeability of the existing No. 8 stone is not contaminated.

8.2.2 Pavement Design Reports

Design-Build Contractor shall prepare and submit preliminary pavement design reports for all the pavements, permanent and temporary, required on the project, for review and comment by INDOT. Final pavement design reports shall be signed and sealed by a Registered Professional Engineer and submitted for review and approval by INDOT.

Pavement design reports shall include, at a minimum, the following:

- All design inputs, including design method, design life, analysis parameters, performance criteria, traffic load spectra, climate, pavement structural cross section, subgrade and subbase drainage, materials characteristics, and input parameters, including soil subgrade
- Design subgrade strength, resilient modulus (Mr) values, planned subgrade improvements, and as-needed subgrade improvements
- Discussion of the input parameters, rationale, and assumptions used
- Site plan showing the limits of the roadway element covered by the report
- Typical cross-section drawings for the recommended pavement design strategy, including the overlay of existing pavements
- Pavement ME input file

8.3 Construction

Construction of the permanent pavement shall be according to Project Standards and the following:

- Positive drainage along all existing pavement layers shall be maintained.
- Safety edge shall be provided in accordance with INDOT Design Memorandum 15-02.
- HMA open-graded drainage layers shall be placed at a minimum thickness of 250 lb/yd² (2½-inch thickness).
- Remove all existing inside shoulder pavement prior to construction of added travel lane.
- Reconstructed shoulders shall be the same pavement thickness as the adjacent travel lane. Existing shoulders shall be milled and resurfaced with same thickness as the mainline pavement. Stone Matrix Asphalt (SMA) surface is not required for shoulders. Shoulder corrugation milling is required for all permanent pavements. Shoulder corrugation milling is not required for existing shoulder pavements to remain in place.
- For outside shoulder HMA pavement a maximum four feet of existing shoulder shall remain in place prior to construction of new shoulder pavement.

8.3.1 Pavement Patching

Attachment 8-5 (Patching Locations) lists the locations for partial depth and full depth patching to be completed prior to any pavement milling.

8.3.2 Milling, Sealing and Overlay

Design-Build Contractor shall mill all existing HMA pavement within the project limits to a nominal depth of 0.5 inches. After milling the existing pavement surface, any visible crack which is one-fourth inch wide or wider shall be cleaned and sealed. Cracks shall be cleaned by blowing with compressed air or by other suitable means. Asphalt material shall be placed utilizing a wand tip that allows fills the opening without penetration into the cracks. The opening of the cracks shall be filled or overbanded slightly but not to exceed the space created by the milling. All excess asphalt material shall be removed from the pavement. The sealed cracks shall be covered with sufficient fine aggregate or other suitable material to prevent tracking of the asphalt materials. All excess cover material shall be removed from the pavement within 24 hours. The material used to fill the crack shall be Asphalt Binder PG 64-22 in accordance with Project Standards. Design-Build Contractor shall overlay the existing pavement after milling and sealing.

8.3.3 Underdrains

Underdrains shall be constructed for all new pavement. All underdrains to remain in place shall be maintained during construction in equal or better condition as compared to the beginning of construction. Design-Build Contractor shall inspect underdrains before construction and identify any underdrains failing condition rating. These sections are to be replaced in kind. Contractor shall also inspect underdrains post construction to verify the conditions of the underdrains are maintained.

Required underdrain work:

<u>Segment A</u>

- Concrete section (North of US 231)
  - Inspect underdrains along the outside and inside lanes. Retrofit if not functional. No retrofit is anticipated in this section.
- South of US 231
  - Construct new inside shoulder and underdrains.
  - Inspect underdrains along the outside lane. Retrofit if not functional.

<u>Segment C2</u>

- Construct new inside shoulder and underdrains.
- Inspect Underdrains along the outside lane. Retrofit if not functional.

Design-Build Contractor shall submit underdrain details as part of the Stage 1 and Stage 3 Plans and Released for Construction Documents.

8.3.4 Temporary Pavement

Design-Build Contractor shall design, construct, and maintain all temporary pavements within the Project limits as required to maintain traffic during construction. Temporary pavement is defined as pavement that is in use by vehicular traffic for 24 months or less. Temporary pavement shall comply with the requirements of the PPA Documents and the following:

- Design temporary pavements to accommodate the anticipated traffic loading that the

pavement will experience during the construction period.

- Temporary pavement shall comply with the same standards and procedures as for new construction, unless noted otherwise in this Section 8.

The performance standards defined herein shall apply to all temporary HMA or PCC pavement constructed by Design-Build Contractor for maintenance of traffic operations and to existing shoulders used for MOT operations. Any occurrence of noncompliance with the performance standards shall be corrected as soon as possible but no longer than 24 hours after noncompliance is reported in writing by INDOT to Design-Build Contractor. Any areas not meeting these performance requirements are subject to liquidated damages per PPA Exhibit 10.

Temporary pavement shall meet the following requirements:

- Minimum friction number of 37
- IRI of less than 120 inches/mile
- Free of potholes, fatigue areas, duress, and rutting exceeding 0.25 inches
- Provide adequate cross slope to drain water quickly from pavement surface

Pavement distresses are identified in Federal Highway Administration publication FHWA-RD-03-031.

Construct MOT pavements according to the applicable Project Standards.

Design-Build Contractor shall provide all traffic control, templates, straight edges and measuring devices required by INDOT to monitor compliance with requirements of this section.

If INDOT believes, in its sole discretion, that these requirements are not being met, INDOT will direct Design-Build Contractor to conduct pavement testing to measure the pavement properties. Both the testing and corrective actions shall be considered part of Design-Build Contractor's Work.

8.3.4.1 Temporary HMA Pavement Performance Standards

Construct and maintain temporary HMA pavements for MOT according to Project Standards and the following:

1. No occurrence of pavement shoving shall exceed 2.0 square feet in area at any location.
2. No occurrence of pavement rutting shall exceed 0.4 inches in depth for surface pavement, and no occurrence of pavement rutting shall exceed 0.5 inches in depth for surface pavement and subgrade combined. Further, the average pavement rutting for any continuous 300 foot length of pavement shall not exceed 0.25 inches in depth, as determined by averaging the rut measurements at five locations spaced at least 50 feet apart but not more than 60 feet apart.
3. No edge drop-off shall exceed 0.5 inches in depth for a continuous length of 15 feet or more.
4. No depression exceeding 0.5 inches in depth (e.g., pothole) shall exceed 0.5 square feet in area.
5. No bump exceeding 0.5 inches in height shall exceed 0.5 square feet in area.

6. No location of delamination or raveling shall exceed 0.5 square feet in area. Furthermore, the total delamination or raveling shall not exceed 3.0 square feet for all such locations.
7. There shall be no occurrences of fatigue cracking at any location on the MOT pavement.

8.3.4.2 Temporary PCC Pavement Performance Standards

Construct and maintain temporary PCC pavement according to Project Standards and the following:

1. There shall be no occurrences of faulting (0 inch) at any location on the MOT pavement.
2. No pavement crack (transverse, longitudinal or otherwise) on the MOT pavement shall exceed 0.125 inches in width.
3. There shall be no use of roller-compacted concrete as MOT pavement.

8.3.4.3 Existing HMA Shoulder Performance

If the existing shoulder pavement is to be used as MOT pavement, comply with the following requirements:

1. Mill the shoulder used for MOT including any existing shoulder corrugations, and the portion of the shoulder used for MOT shall be resurfaced prior to MOT operations.
2. No occurrence of pavement shoving shall exceed 2.0 square feet in area at any location.
3. No occurrence of pavement rutting shall exceed 0.4 inches in depth for surface pavement, and no occurrence of pavement rutting shall exceed 0.5 inches in depth for surface pavement and subgrade combined Further, the average pavement rutting for any continuous 300 foot length of pavement shall not exceed 0.25 inches in depth, as determined by averaging the rut measurements at five locations spaced at least 50 feet apart but not more than 60 feet apart.
4. No edge drop-off shall exceed 0.5 inches in depth for a continuous length of 15 feet or more.
5. No depression exceeding 0.5 inches in depth (e.g., pothole) shall exceed 0.5 square feet in area.
6. No bump exceeding 0.5 inches in height shall exceed 0.5 square feet in area.
7. No location of delamination or raveling shall exceed 0.5 square feet in area. Furthermore, the total delamination or raveling shall not exceed 3.0 square feet for all such locations.
8. There shall be no occurrences of fatigue cracking at any location on the MOT pavement.

8.4 Certification

All field and laboratory testing for pavements and associated materials conducted by Design-Build Contractor shall be conducted in an accredited laboratory and performed by certified personnel who are qualified to perform INDOT test methods.

8.5 Deliverables

Deliverables, a non-exhaustive list of which is set forth in the table below, shall be submitted in electronic format in accordance with the schedule set forth below. Acceptable electronic formats include PDF and current versions of Microsoft Word and Microsoft Excel, unless otherwise indicated.

Deliverable	Schedule	TP Section
Preliminary pavement design report	With Stage 1 Plans	8.2.2
Final pavement design report	Prior to Released for Construction Documents	8.2.2
Underdrain details	With Stage 1 and Stage 3 Plans	8.3.3