

**I-69 MAJOR MOVES 2020
PUBLIC-PRIVATE AGREEMENT
BOOK 2
TECHNICAL PROVISIONS**

(This page is intentionally blank.)

TABLE OF CONTENTS

1.0	GENERAL SCOPE OF WORK.....	1
1.1	Project Identification.....	1
1.2	Section Limits.....	2
1.3	Project Management.....	3
1.4	IFA Contacts	11
1.5	Progress Meetings (USP)	12
1.6	Coordination with Adjacent Projects (USP).....	12
2.0	QUALITY MANAGEMENT	15
2.1	Witness and Hold Points	15
2.2	Design Witness and Hold Points.....	15
2.3	Construction Hold Points.....	17
2.4	Submittal and Electronic Posting Requirements	17
2.5	Working Drawings	18
2.6	Items List.....	19
2.7	Correspondence.....	19
2.8	Final Documents	19
2.9	As-Built Plan Requirements	20
3.0	DESIGN REQUIREMENTS.....	21
3.1	General Design Requirements.....	21
3.2	Specific Design Requirements	21
3.3	Design Criteria	22
3.4	Design Exceptions	23
4.0	CONSTRUCTION REQUIREMENTS.....	25
4.1	General	25
4.2	Salvage of Cable Barrier System (USP)	26
4.3	Clearing Right-of-Way.....	26
4.4	Work Area Access (USP).....	27
4.5	Work in Waterways (USP)	27
5.0	ENVIRONMENTAL.....	31
5.1	Permits and Approvals	31

TECHNICAL PROVISIONS

6.0 ROADWAY..... 35

6.1 Roadway General 35

6.2 I-69 at Campus Parkway/ Southeastern Parkway Interchange General 36

6.3 Roadside Safety..... 38

6.4 Seed Mix (USP) 38

6.5 Special Topsoil for Roadside Development (USP)..... 45

6.6 Quality Control/Quality Assurance, QC/QA, Soil Embankment (USP) 45

7.0 PAVEMENT..... 57

7.1 Pavement General 57

7.2 Pavement Design..... 58

7.2.1 PCCP Patching, Full Depth, Modified (USP) 59

7.2.3 HMA Partial Depth Patch..... 64

7.2.4 Temporary Pavement 65

7.3 Certification 65

7.4 Pavement Design Reports 65

8.0 DRAINAGE..... 67

8.1 Drainage General..... 67

8.2 Underdrains..... 70

8.3 Cured-in-Place Thermosetting Resin Pipe Liner (CIPP) (USP)..... 70

9.0 STRUCTURES..... 75

9.1 Bridge Structures General..... 75

9.2 Bridge Structures Unique Special Provisions 79

9.2.1 Existing Overlay Removal, Hydrodemolition and Latex Modified Concrete Overlay for Bridge Deck (USP)..... 79

9.2.2 Embedded Galvanic Anodes (USP) 84

9.3 Specific Bridge Requirements 88

9.3.1 Bridge Structures No. 1 & 2: I-69 NB & SB over Sand Creek..... 88

9.3.2 Bridge Structure No. 3: Brooks School Road over I-69 88

9.3.3 Bridge Structure No. 4 & 5: I-69 NB & SB over Mud Creek 88

9.3.4 Bridge Structure No. 6: Campus Parkway over I-69 89

9.3.5 Bridge Structure No. 7: I-69 NB over Thorpe Creek 89

TECHNICAL PROVISIONS

9.3.6 Bridge Structure No. 8: I-69 SB over Thorpe Creek 89

9.3.7 Bridge Structure No. 9: I-69 NB over State Road 13 89

9.3.8 Bridge Structure No. 10: I-69 SB over State Road 13 90

9.3.9 Bridge Structure No. 11: County Road 650 West over I-69 91

9.3.10 Bridge Structures No. 12 & 13: I-69 NB & SB over Fosters Branch..... 91

9.4 Retaining Wall Structures..... 91

9.5 Sound Walls 92

9.6 Sound Wall Fire Hydrant Access Door Features (USP) 93

10.0 TRAFFIC 95

10.1 Pavement Markings 95

10.2 Signing..... 95

10.3 Indiana Logo Signs (USP) 95

10.4 Traffic Signals 96

10.5 Campus Parkway Signal Cantilever Structure 97

10.6 Lighting 98

11.0 MAINTENANCE OF TRAFFIC 99

11.1 Maintenance of Traffic Design Criteria..... 99

11.2 Maintenance of Traffic Pavement Performance Standards (USP)..... 101

11.3 Traffic Operations Analysis..... 102

11.4 Public Information Meetings (USP)..... 110

11.5 Incident Management Plans (USP)..... 110

11.6 Incident Response Requirements (USP) 113

12.0 INTELLIGENT TRANSPORTATION SYSTEMS 115

12.1 General Requirements..... 115

12.2 Automatic Traffic Recorder Controller (USP) 115

13.0 UTILITIES..... 121

TECHNICAL PROVISIONS

(This page is intentionally blank)

1.0 GENERAL SCOPE OF WORK

1.1 Project Identification

Contract No.: R-37053

Project No.: 1383332

Roadway Des. No.: 1383332: I-69 Added Travel Lanes from 116th Street to 0.56 mile east of Campus Parkway/Southeastern Parkway

1383489: I-69 Interchange Modification Exit 210

1383336 I-69 Added Travel Lanes from 0.56 mile east of Campus Parkway/Southeastern Parkway to 0.42 mile east of SR 13

1383337 I-69 Added Travel Lanes from 0.42 mile east of SR 13 to Lapel Road

Structure Des. No.: Note that INDOT Structure Numbers have changed since the RID documents were generated.

Des No	RID Structure Number	New Structure Number	Description
1383486	I69-6-05313 DNBL	I69-206-05313 DNBL	I-69 NB over Sand Creek
1383487	I69-6-05313 DSBL	I69-206-05313 DSBL	I-69 SB over Sand Creek
4006439	I69-29-08-80		Small structure at Sta. 489+99.60 "A"
1383488	I69-8-05315B	I69-208-05315B	Brooks School Road over I-69
1383490	(I69) 238-29-05317C	(I69) 238-29-05317C	Campus Parkway over I-69
1383509	I69-10-5318 CNBL	I69-210-5318 CNBL	I-69 NB over Mud Creek
1383510	I69-10-05318 CSBL	I69-210-05318 CSBL	I-69 SB over Mud Creek
1383512	I69-13-05320 JBNS	I69-213-05320 JBNS	I-69 NB over Thorpe Crk
1383513	I69-13-05320 BSBL	I69-213-05320 BSBL	I-69 SB over Thorpe Crk
1383514	I69-13-05321 BNBL	I69-213-05321 BNBL	I-69 NB over SR 13
1383515	I69-13-05321 BSBL	I69-213-05321 BSBL	I-69 SB over SR 13
1383623	I69-15-05323	I69-215-05323	CR 650W over I-69 NB/SB
1383624	I69-16-05324 CNBL	I69-216-05324 CNBL	I-69 over Fosters Branch
1383625	I69-16-05324 CSBL	I69-216-05324 CSBL	I-69 over Fosters Branch

Route No.: Interstate 69

Counties: Hamilton and Madison

District: Greenfield

Federal Oversight: Yes

1.2 Section Limits

Section A

The project limits are generally as described below, subject to the specific limits of work described in the Design-Build Contractor's Contract Proposal.

Des No. 1383332

This section begins approximately 0.40 mile south of 116th Street along I-69 at Station 263+40 Line "A" (RP 204+50) and ends 0.56 mile east of Campus Parkway/Southeastern Parkway at Station 590+00 Line "A" (RP 210+69) for a section length of approximately 6.19 miles, in Hamilton County, Indiana. The section scope shall include the addition of a third travel lane on the median side in each direction and resurfacing of the existing lanes and outside shoulder including up to the back of gore for each exit and entrance ramp within the section limits. Beyond the gore, the ramps will be reconstructed or resurfaced as necessary to match proposed geometry and profile. The addition of an auxiliary lane from the 116th Street southbound entrance ramp to the future 106th Street southbound exit ramp is also included in the section. The section also includes the widening of the NB and SB I-69 bridges over Sand Creek and the deck replacement of the Brooks School Road bridge over I-69. The section also includes the lining of three small structures. The section also includes retro-fit underdrain for the existing pavement.

Des No. 1383336

This section begins at 0.56 mile east of Campus Parkway/Southeastern Parkway along I-69 at Station 590+00 Line "A" (RP 210+69) and ends 0.42 mile east of SR 13 at Station 812+50 Line "A" (RP 214+90) for a section length of approximately 4.21 miles, in Hamilton and Madison Counties, Indiana. The section scope shall include the addition of a third travel lane on the median side in each direction and resurfacing of the existing lanes and outside shoulder including up to the back of gore for each exit and entrance ramp within the section limits. Beyond the gore, the ramps will be reconstructed or resurfaced as necessary to match proposed geometry and profile. The reconstruction of pavement under I-69 along SR 13 is also included in the section. The section also includes the widening of the NB and SB I-69 bridges over Mud Creek, Thorpe Creek and SR 13. The section contains two new small structures and the lining of seven small structures. The section also includes retro-fit underdrain for the existing pavement.

Section B

Des No. 1383489

This section begins at 0.20 mile north of I-69 and ends approximately 0.20 miles south of I-69 along Campus Parkway and Southeastern Parkway. It also includes all ramps at the Campus Parkway / Southeastern Parkway Interchange. The section scope shall include the reconstruction of the I-69 Exit 210 interchange with Campus Parkway and Southeastern Parkway from the current traditional diamond configuration to a planned double crossover diamond (DCD) interchange. The current bridge over I-69 will be overlaid and widened to the south side of the bridge. A sidewalk will be added on the south side of the interchange. The pavement will be full reconstruction to accommodate the new horizontal alignments. The ramps will be resurfaced as part of the section.

Section C

Des No. 1383337

This section begins 0.42 mile east of SR 13 along I-69 at Station 812+50 Line “A” (RP 214+90) and extends no further than Lapel Road at Station 133+55 Line “C” (RP 219+62) for a maximum section length of approximately 4.72 miles, in Madison County, Indiana. The section scope shall include the addition of a third travel lane on the median side in each direction and resurfacing of the existing lanes and outside shoulder including up to the back of gore for each exit and entrance ramp within the section limits. Beyond the gore, the ramps will be reconstructed or resurfaced as necessary to match proposed geometry and profile. The section also includes the widening of the NB and SB I-69 bridges over Fosters Branch, if within the proposed project area. All small structures and median drainage will be replaced in this section. The section also includes retro-fit underdrain for the existing pavement.

1.3 Project Management

1. Key Personnel

Design-Build Contractor shall provide Key Personnel in accordance with Section 7.4 of the PPA. The following describes the roles and responsibilities of the Key Personnel:

- Project Manager – The Design-Build Contractor’s designated individual as their single point of contact for purposes of overall administration of the project, and who is authorized to act on their behalf in all respects with respect to contractual matters and for resolving any and all issues that

may arise between the Design-Build Contractor and the IFA during progress of the work.

- Construction Manager – The Design-Build Contractor’s designated individual who is responsible for oversight and management of all construction and other field activities related to the project. The Construction Manager shall be different from and report to the Design-Build Contractor’s Project Manager.
- Construction Superintendent – The Design-Build Contractor’s designated individual who is responsible for field supervision of all field activities. The Construction Superintendent may be the Construction Manager, or an individual who reports directly to the Construction Manager. If the Construction Superintendent is also the Construction Manager, then the Construction Superintendent may not serve in any other additional role. If the Construction Superintendent does not also serve as the Construction Manager, then the Construction Superintendent may fill one other Key Personnel Role if qualified.
- Lead Engineer – The Designer’s Engineer who will manage all Work performed by Design-Build Contractor’s Designer including management of any Design Work support during construction such as design changes and the completion of Record Drawings. The Lead Engineer is responsible for releasing design documents for construction, reviewing all construction documents and for certifying that all Released for Construction documents, including both design and construction documents, conform to the requirements of the Technical Provisions and the PPA.
- Erosion and Sediment Control Manager – the Design-Build Contractor’s designated individual who is responsible for the installation, inspection and maintenance of all required erosion and sediment control measures. The Erosion and Sediment Control Manager shall be a Certified Professional in Erosion and Sediment Control. For additional requirements, refer to the Department Standard Specifications and Recurring Special Provisions 108-C-192.
- Design Quality Manager – The Designer’s Engineer who is responsible for Design Quality Assurance for all design work that is performed for the project, including any design changes during construction and the production of Record Drawings. The Design Quality Manager shall include a certification with each design submittal that all necessary Design QC checks have been completed and that any design changes resulting

from such checks are incorporated in the submittal. The Design Quality Manager may be the Designer’s Lead Engineer or one of the Designer’s other Engineers who is qualified to perform the Design Quality Assurance work.

- Maintenance of Traffic (MOT) Manager – The Design-Build Contractor’s designated Worksite Traffic Supervisor who is responsible for the installation, inspection and maintenance of all required maintenance of traffic devices per the Released for Construction documents. The Maintenance of Traffic Manager shall be certified by the American Traffic Safety Service Association, ATSSA, or approved equal certifying organization in accordance with Standard Specification 801.03. The Maintenance of Traffic Manager shall be different from and report to the Construction Superintendent.
- Utility Coordinator – The Design-Build Contractor’s designated individual who is certified through INDOT’s Utility Coordinator Certification Training, and who is responsible for completing the utility coordination process as defined in the Indiana Design Manual Chapter 104, 105 IAC 13, and the INDOT Utility Accommodation Policy.

2. Project Administration

a. Project Schedule

Design-Build Contractor shall provide a Project Schedule in accordance with Section 108 of the Standard Specifications and Recurring Special Provision 108-C-215 as supplemented by this Section a. The Project Schedule shall be used by the Parties for planning and monitoring the progress of the Work, as well as serving to determine the amount due to Design-Build Contractor for a progress payment in accordance with Sections 4.3 and 12.2 of the PPA.

b. Project Baseline Schedule

The Project Baseline Schedule and the Preliminary Project Baseline Schedule shall conform to the “Baseline CPM Schedule” in Recurring Special Provision 108-C-215. Design-Build Contractor shall submit the Project Baseline Schedule no later than 90 Days following NTP for approval by the IFA in its sole discretion. IFA will review the Project Baseline Schedule in accordance with Recurring Special Provision 108-C-215.

Each activity on the Project Baseline Schedule shall be assigned a cost by Design-Build Contractor for the purposes of calculating and tracking earned

value. The cost loading of the schedule will be reviewed by IFA as described in preceding paragraph.

c. Project Status Schedule

Design-Build Contractor shall submit to IFA Project Status Schedule updates to reflect the current status of the Project including recovery schedules, schedule revisions due to Change Requests, and approved Change Orders.

The Project Status Schedule shall conform to the “Monthly Update CPM Schedule” in Recurring Special Provision 108-C-215. The Project Status Schedule shall be submitted to IFA in accordance with Recurring Special Provision 108-C-215 for approval. If the Project Status Schedule is not submitted by the required date the IFA may withhold or adjust Progress Payments.

d. As-Built Schedule

Design-Build Contractor shall submit an “as-built schedule” in conformance with the “Final CPM Schedule” in Recurring Special Provision 108-C-215. The “as-built schedule” shall be submitted to IFA in accordance with Recurring Special Provision 108-C-215 for approval.

e. Revisions

If it becomes necessary to add, combine, eliminate, or modify schedule Activities to reflect modifications to the Work, such changes shall be made through a Change Order that has been issued by IFA, and therefore reflected in the Project Schedule. Revisions to the Project Schedule and consequent realignment of funds between payment activities may be requested by Design-Build Contractor in accordance with, and subject to, Section 13 of the PPA.

f. Time Impact Analysis

As part of a Change Request as set forth in Sections 6 and 13 of the PPA Design-Build Contractor shall submit to IFA a written time impact analysis illustrating the influence of each claimed delay. Each time impact analysis shall include a fragmentary network demonstrating how Design-Build Contractor proposes to incorporate the change, delay, or Design-Build Contractor request into the current Project Status Schedule.

The time impact analysis shall demonstrate the time impact to each and every affected schedule Activity in the most recent Project Status Schedule at the time of the occurrence.

The time impact analysis submittal shall include the details of the change, including added, changed or deleted data for schedule Activities and logic. If the current Project Status Schedule is revised subsequent to submittal of a time impact analysis but prior to its approval, Design-Build Contractor shall promptly indicate in writing to IFA the need for any modification to its time impact analysis.

Design-Build Contractor shall submit one printed Gantt chart including all schedule Activities affected by the time impact analysis, grouped and sorted by WBS and compared to the current Project Baseline Schedule. In addition, Design-Build Contractor shall provide one electronic backup of the Project Schedule with the time impact analysis and a comprehensive narrative for each Change Request. Design-Build Contractor shall incorporate the results of the Change Request from IFA into the Project Status Schedule for the next Progress Report.

g. Recovery Schedule

If the Work is delayed on any Controlling Work Item for a period which exceeds the greater of either thirty days in the aggregate or that number of days in the aggregate equal to five percent of the days remaining until Substantial Completion, the next Project Status Schedule shall include a recovery schedule demonstrating the proposed plan to regain lost Project Schedule progress and to achieve Substantial Completion by the specified date.

3. Project Management Plan

The Project Management Plan (PMP) is an umbrella document that describes Design-Build Contractor's managerial approach, strategy, and quality procedures to design and build the Project and achieve all requirements of the PPA Documents. The PMP shall be submitted for IFA approval in its sole discretion. The general outline and minimum content of the PMP shall be as follows:

1. Project Administration
 - a. Organization - Organizational diagram
 - b. Personnel - Names and contact details, titles, and job roles
 - c. Design-Build Contractor's - Contracting Plan
 - d. Baseline Project Schedule in accordance with Section 1

- e. Quality Control - Procedures to establish and encourage continuous improvement
 - f. Audit –
 - i. Procedures to facilitate review and audit by IFA
 - ii. Auditing and management review of Design-Build Contractor's own activities under the PMP
 - g. PMP Update - Procedures for preparation of amendments and submission of amendments to any part of the PMP
 - h. Document Management - The manner in which records will be maintained in compliance with the Technical Provisions, including any specific systems Design-Build Contractor will use.
2. Quality Management Plan
- a. Organizational structure covering the activities to be performed in accordance with the PPA Documents
 - b. Personnel - Resource plan for the Design-Build Contractor and its subcontractors
 - c. Arrangements for coordinating and managing staff interaction with IFA and its consultants including collocation of Key Personnel and description of approach to coordinating work of off-site personnel
 - d. Names and contact details, titles, job roles and specific experience required for the Key Personnel and for other principal personnel during design
 - e. Names and contact details, titles, job roles of principal personnel for Design-Build Contractors and any third party with which Design-Build Contractor will coordinate activities
 - f. Design QA/QC Plan
 - i. Arrangements for coordinating and managing staff interaction with IFA and its consultants including collocation of Key Personnel and description of approach to coordinating work of off-site personnel
 - ii. Responsibility of Design-Build Contractors and affiliates
 - iii. Steps taken to ensure Design-Build Contractors and Suppliers meet the obligations imposed by their respective Contracts
 - iv. Interfaces -Interfacing between the Design-Build Contractor, subcontractors and independent certifiers during design including interfaces between the structural design auditor, the safety auditor, and any quality reviewer
 - v. Coordination with Utility Owners
 - vi. Procedures - Procedures describing how the principal activities will be performed during the design stage: to include

- geotechnical site investigation, surveys and mapping, environmental management, safety audit, structural audit, and checking
- vii. Quality control and quality assurance procedures including a resource table for monitoring and auditing all design services, design review and certification, verification of plans
- viii. Procedures to establish Design-Build Contractor's hold points in design process where checking and review will take place
- ix. Procedures to ensure accuracy, completion, and quality in submittals to IFA and Governmental Entities
- x. Procedures to establish and encourage continuous improvement
- g. Construction Quality Management Plan
 - i. Complete procedures for preparing for and complying with Construction hold points.
- 3. Environmental Management
 - a. Organization - Design-Build Contractor's main contractual arrangements
 - b. Organizational structure covering the activities to be performed in accordance with the PPA Documents
 - c. Environmental Contact Tree
 - d. Personnel - Resource plan for the Design-Build Contractor and its subcontractors
 - i. Arrangements for coordinating and managing staff interaction with IFA and its consultants, including collocation of Key Personnel and description of approach to coordinating work of off-site personnel
 - ii. Names and contact details, titles, job roles and specific experience required for Key Personnel and for other environmental personnel
 - e. Subcontractors - Overall control procedures for subcontractors, including consultants and subconsultants
 - f. Environmental Compliance and Mitigation Plan
 - g. Spill Prevention Plan
- 4. Safety Plan
 - a. Organization – Personnel, policies, plans, training programs, Work Site controls, and Incident management and response plans to ensure the health and safety of personnel involved in the Project and the general public affected by the Project

- b. Procedures for immediately notifying IFA of all incidents arising out of or in connection with the performance of the Work
5. Communications Plan
 - a. The manner in which the Design-Build Contractor's organization will respond to unexpected requests for information, communicate changes or revisions to necessary Design-Build Contractor personnel, and notify affected stakeholders before and after changes are made
 - b. Processes and procedures for communication of Project information between the Design-Build Contractor's organization, IFA, the Department, permitting agencies, utilities, other third parties and the public.
4. Propose updates to the PMP and, as applicable, affected components in the event of the following:
 - The occurrence of any changes to Key Personnel, Quality Plan, Safety Plan, Project Schedule, project administration policies and procedures
 - The occurrence of other changes necessitating revision to the PMP
 - As otherwise directed by IFA

Provide the revised PMP to IFA for approval in its sole discretion no later than 14 days after the occurrence of the change or direction triggering the need for the revisions to the PMP.

IFA will audit and monitor the activities described in the PMP to assess Design-Build Contractor performance. All commitments and requirements contained in the PMP shall be verifiable.

5. Field Offices

Design-Build Contractor shall provide one modified Type C field office meeting the following requirements immediately adjacent to the Design-Build Contractor's field offices and within one mile of the project Site. The modified Type C field office shall meet all of the requirements of Standard Specification 628.02, except:

- The minimum size shall be 2,500 sq ft, with a minimum width of 20 ft.
- The field office shall have a room suitable for conducting meetings with up to 20 participants.
- All of the field office equipment and supplies listed in the Standard Specifications for a Type C field office are required, except the requirements for the following items shall be modified as follows:

TECHNICAL PROVISIONS – Section 1
General Scope of Work

- Chairs 20
- Drafting Stools 2
- Drafting Tables 2
- File Cabinet Drawers 20
- Folding Office Tables 8
- Office Desks and Office Chairs 8
- Shelving (lft) 48
- Waste Paper Baskets 8
- Dry erase board 3' x 5' w/ eraser 1
- Multiple colored dry erase markers
(required for the duration of the contract)

6. Field Laboratory

Design-Build Contractor shall provide one Type C field laboratory as specified in Department Standard Specifications 628.02(f). In addition to the provisions of Section 628.02(f) Design-Build Contractor shall provide hot and cold running water (potable), and a portable cook stove for drying samples and with propane in containers of suitable size to be transported to the jobsite. Design-Build Contractor does not need to include telephone lines or telephones in the field laboratory.

7. Cellular Telephones

Design-Build Contractor shall provide eight (8) Cellular phones for IFA field staff meeting the requirements of Standard Specifications 628.04, Type A.

1.4 IFA Contacts

Design-Build Project Manager:

Mr. Tony Jones P. E.
INDOT Office of Project Management
IGCN, Rm. N601
100 N Senate Ave.
Indianapolis, IN 46204
Phone: (317) 233-5282

e-mail: TWJones@indot.in.gov

Existing Plans and As-Built Plans:

Mr. David Schilling
INDOT Contract and Construction Div.
IGCN, Room N725
100 N. Senate Avenue
Indianapolis, IN 46204
Phone: (317) 233-8805
e-mail: dschilling@indot.in.gov

1.5 Progress Meetings (USP)

Weekly progress meetings shall be held at the project field office, or other mutually agreed upon location. The Design-Build Contractor shall document the Progress Meetings with meeting minutes and distributed to IFA within three days after the Progress Meetings.

The Design-Build Contractor shall provide a six week look-ahead schedule at the progress meetings, including the number of work crews, work hours, delineation of day time and night time work and the specific portions of the work to be performed during the six week period. The Design-Build Contractor shall also discuss the status of the overall project schedule, including critical operations and potential problems. Design-Build Contractor shall provide a Progress Report to IFA documenting the design and construction progress on a monthly basis.

1.6 Coordination with Adjacent Projects (USP)

The Design-Build Contractor shall coordinate all final design, drainage, maintenance of traffic, incident management, and construction activities with the following projects in accordance with 105.07:

- I-69/106th Street New Interchange Construction, Contract IR-35629
- Other Department maintenance contractors working in the project area.
- The following contracts are expected to be let in the vicinity of the project and may impact TMP.
 - B-35028 bridge over I-69 south of Anderson, 10/7/15 letting.

TECHNICAL PROVISIONS – Section 1
General Scope of Work

- B-34412 bridge replacement on SR 38, 3 miles east of SR 13, 2/23/16 letting
- R-35447 SR 37 3.2 mile north of I-69 Small Structure Replacement, 7/13/16 letting.
- B-35650, SR 38 0.3 miles west of SR 13 over Mud Creek
- RS-37898 - Greenfield District SR37 Resurfacing Contract
- Various mowing contracts

Information on these projects is available on the contract letting page and the 18-month letting list on INDOT website at http://www.in.gov/indot/div/lettings/18MonthsConstLettingDetails_Ext.pdf.

(This page is intentionally blank)

2.0 QUALITY MANAGEMENT

2.1 Witness and Hold Points

Witness and hold points are established to provide IFA the opportunity to review, observe, and examine plans, operations and tests a minimum of 2 weeks prior to construction of the specified point.

Witness points are points that require the Design-Build Contractor to notify or submit identified items to IFA. Work may proceed beyond a witness point, at the Design-Build Contractor's risk, provided the required notification has been provided.

Hold points are mandatory verification points that require the Design-Build Contractor to notify or submit identified items to IFA. No work shall proceed beyond a hold point until written approval is given by IFA. Witness and hold points may include, but are not limited to, the following:

2.2 Design Witness and Hold Points

The following is a partial list of witness and hold points for design:

Witness Points

- a. Plan Sheets not defined as Hold Points
- b. Preliminary layout, typical sections and design computations for the interchange
- c. Finalized Cross Sections
- d. Pipe Structure Details and Drainage Calculations
- e. Transportation Management Plan

Hold Points

- a. Detention Design
- b. Hamilton Drainage Board Permits
- c. Madison County Drainage Board Permits
- d. Approval of Rule 5 NOI
- e. Revision to Interchange Justification Report (if required)
- f. Final Maintenance of Traffic Details

TECHNICAL PROVISIONS – Section 2
Quality Management

- g. Maintenance of Traffic Level 1 Design Criteria Checklist
- h. Maintenance of Traffic Operations Analysis
- i. Level 1 Design Criteria Checklist for Design Items
- j. Level 2 Design Criteria for Design Items
- k. Final Interchange Geometric Layout
- l. Pavement Design
- m. Finalized Typical Cross Sections
- n. Finalized Profile Grade
- o. Clearances and Geometrics for Structures
- p. Foundation Review
- q. Foundation Design of Overhead Sign Structures
- r. Roadside Barrier Design
- s. Load Ratings for Bridges
- t. Geotechnical Evaluation Report
- u. Retaining Wall Design and Details
- v. Signing Plans
- w. Traffic Signal Plans
- x. Lighting Plans
- y. ITS Plans
- z. Additional Special Provisions
- aa. Environmental Permit Revisions
- bb. Approval of Preliminary Plans for Bridge Rehabilitation with calculations
- cc. Approval of Final Plans for Bridge Rehabilitation with calculations
- dd. Bridge Scour Reports as noted in Section
- ee. Working Drawings as defined in Standard Specifications

- ff. Erosion and Sediment Control Plans

2.3 Construction Hold Points

All construction activities as described in the standard specifications recurring special provisions and Technical Provisions that require inspection by the Engineer shall be hold points. The following is a partial list of hold points for construction:

Hold Points

- a. Quality Control Plan for Grading
- b. Quality Control Plans for PCCP and HMA
- c. Quality Control Plan for Erosion and Sediment Control (Due 2 weeks after award of contract)
- d. Quality Control Plan for Painting Structural Steel
- e. Pre-Paving Conference
- f. Fabrication Inspections
- g. Reinforcing Bar Placement (clearances, sizes, splices, spacing checks)
- h. Structure Concrete Placement (forms, elevations, placement method, mix approval, pour sequence and procedure, curing plan)
- i. Falsework Plans
- j. Post Tensioning Technical Data and Details
- k. Erection Plan for Overhead Structural Members
- l. Plan for Removal of Existing Structures

2.4 Submittal and Electronic Posting Requirements

The Design-Build Contractor will be provided with access to the Project's dedicated website. All witness and hold point submittals shall be made electronically in Portable Document Format (PDF) by use of the website for this project. Access and use of this website will be described during the pre-construction meeting.

The Design-Build Contractor shall send an e-mail notification of all witness and hold point submittals to the following IFA personnel:

- a. IFA's Project Engineer/Project Supervisor

- b. IFA's Area Engineer
- c. IFA's Design-Build Project Manager
- d. IFA's Consultant Project Manager

E-mail notification shall also be sent to other persons as identified by IFA.

The date of a submittal will be considered to be the date of the e-mail notification to the specified IFA personnel. Submittals will not be considered until the required e-mail notification is sent.

The Design-Build Contractor shall maintain a complete set of current Released for Construction Plans on the Project Website at all times. The plan set shall be updated as revisions are made. In addition, a file containing only the revised plans sheets shall be posted to the Project Website when revisions are made. Current copies of all supporting design information shall be maintained on the Project Website in a similar fashion. E-mail notifications shall be sent to all interested parties as design information is posted to the Project Website.

A hold point will not be considered approved until all of the following has occurred in the order listed:

- a. IFA has issued written approval of the hold point submittal,
- b. The Design-Build Contractor has posted the approved hold point submittal to the Project Website and updated the complete Released for Construction Plans on the Project Website, and
- c. E-mail notification has been sent to the specified IFA personnel.

A Quality Assurance Form shall be completed and included with each submittal.

The Design-Build Contractor shall respond to all comments and questions from reviews of witness and hold point submittals.

2.5 Working Drawings

Shop plan and working drawing development and approval shall be in accordance with the Standard Specifications and Design Criteria and shall be the responsibility of the Design-Build Contractor. Design-Build Contractor shall submit approved shop plans and working drawings as witness and hold point submittals. IFA will review the Working Drawing approvals for conformance with standard INDOT practice

2.6 Items List

The Design-Build Contractor shall submit a complete list of items representative of the work to be performed under the contract item for Design/Build. The list shall be from the pay item list on the Department's website and shall be the list current for the letting date of the contract. The list shall include the item code, the item description, and the unit of measure for each item. Each item shall be assigned a quantity of 1 and a unit price of \$0.00. Contract line numbers shall not be assigned to items on the list. An initial item list shall be submitted electronically in CES format prior to the start of work, but in no case later than 30 days after contract award. The Design-Build Contractor shall submit an updated item list as necessary throughout the life of the contract as new items of work are added. Updated item lists shall be submitted electronically in CES format and shall only include those items added since the previous submittal. An updated item list shall be submitted monthly, unless no new items have been added during the month.

2.7 Correspondence

All correspondence shall be routed through the IFA's Project Engineer/Project Supervisor with copies to the IFA's Area Engineer, IFA's Design-Build Project Manager and IFA's Consultant Project Manager.

2.8 Final Documents

Within 60 days after the Partial Acceptance, the Design-Build Contractor shall furnish IFA final hard copy documentation which shall include, but not be limited to, as-built plans, two copies of as-built plans for traffic signals, engineering reports, design calculations, shop plans, working drawings. Design calculations shall be provided for all bridge structures, earth retaining structures, roadside safety requirements, drainage structures, sign structures and all other items requested by IFA. The final documentation shall include a final list of all items meeting the requirements previously described herein, except that the quantity for each item shall be the final as-built quantity. The final item list shall be submitted in CES format, by Designation Number, with quantity calculations for each item.

IFA will prepare the Final Construction Record, which will incorporate the above information along with inspection and test results collected by IFA. The Design-Build Contractor shall submit final documentation for completed work to the IFA onsite personnel for review and concurrence as the work progresses. The final hard copy documentation shall be submitted as one complete package following completion of all construction activity and shall be certified by a professional engineer. All information requested shall be submitted on a CD or DVD to both INDOT Central Office and INDOT Greenfield District.

2.9 As-Built Plan Requirements

The Design-Build Contractor shall prepare final as-built plans. The plans shall conform to INDOT plan development and preparation guidelines for tracing submittal. The as-built plans shall be submitted to IFA as electronic data on disk in Portable Document Format (PDF) and AutoCAD (.dwg) or MicroStation (.dgn), and Tagged Image File (.tif) files. Final as-built plans shall also be posted to the Project Website and ERMS in accordance with current INDOT posting policy.

3.0 DESIGN REQUIREMENTS

3.1 General Design Requirements

The Design-Build Contractor shall provide all necessary services to design all permanent and temporary portions of the project. All work shall conform to current INDOT and AASHTO standards, practices, policies, guidelines and specifications. INDOT's standards, practices, policies, guidelines and specifications shall control in case of a conflict, except for erosion control measures in which the IDEM Indiana Stormwater Quality Manual shall control in case of conflict. Only design firms that are prequalified with INDOT for the work types specified, and that are sufficiently staffed and capable of performing the required work, shall be used on the Design-Build Contractor team on the project. The required capabilities include successful completion of designs for major road and bridge projects. The Design-Build Contractor's design firms will be considered as subcontractors responsible for the design and engineering of the project. Multiple design firms may work on the Design-Build Contractor team, however, one design firm shall be designated as the prime design firm. The Design-Build Contractor shall assign professional engineers and surveyors licensed in the State of Indiana to be in direct responsible charge of all engineering and surveying work. If services are required that are predominantly oriented toward other disciplines, such as environmental, landscaping, transportation planning, or architectural applications, the Design-Build Contractor shall assign other professionally competent personnel registered or licensed in the State of Indiana to be in charge of the work.

Plans signed and stamped by a professional engineer shall be developed in accordance with INDOT's plan preparation guidelines. Specifications and details shall be provided. In addition, electronic files on disk in Portable Document Format (PDF) and AutoCAD (.dwg) or MicroStation (.dgn) format shall be provided.

3.2 Specific Design Requirements

The Design-Build Contractor shall:

- a. Consult with IFA to understand IFA's requirements for the project and review all available data.
- b. Use English Units for preparation of all plans and submittals.
- c. Provide all remaining utility coordination, geotechnical investigation, engineering, design, Rule 5 NOI, necessary permits or permit revisions, as-built plans, and all necessary items to construct the project complete and in place.

- d. Maintain and make available to IFA, upon request, a project record that includes a history of significant events including changes and comments that influenced the development of the project.
- e. Perform all additional surveys required for this project. Construction for INDOT projects IR-34001 and IR-34166 had not been completed at the time survey was completed for this project. The Design-Build Contractor shall be responsible for any additional survey required and any updates to the design related to the changes to the topographic survey related to these projects.
- f. Perform all additional soil surveys, soil borings, geotechnical investigations, and appropriate analysis, including global stability, to produce the proposed design. Submit a Geotechnical Evaluation Report, prepared by the Design-Build Contractor's Geotechnical Engineer of Record, presenting the results of all additional investigations, and all modifications or additions to the Geotechnical Data Report provided by IFA. The geotechnical investigation shall be in accordance with the current version of the INDOT Geotechnical Manual. The review shall be documented in the Geotechnical Evaluation Report and shall be submitted to the Office of Geotechnical Services for review and approval.
- g. Provide video documentation of the existing condition of all routes being utilized as a result of the Maintenance of Traffic plan.

3.3 Design Criteria

This project shall be designed according to the following Design Criteria, the Indiana Design Manual and all Active Design Memoranda as of the Effective Date, the INDOT Standard Specifications, applicable recurring special provisions, the AASHTO “A Policy on Geometric Design of Highways and Streets” 6th Edition with 2012 Errata, the AASHTO “A Policy on Design Standards Interstate System”, January 2005, the 2002 AASHTO Standard Specifications for Highway Bridges, 17th Edition and subsequent interim specifications, the latest version of the Indiana MUTCD, including latest revisions, specific and limited aspects of the Reference Plans and details if set out in this document, except as noted below:

- 1. I-69, 4R Partial Reconstruction, Interstate Freeway, Urban (Intermediate), Design Speed 70 mph.
- 2. Interchange Ramps, Partial 4R, Interstate Freeway, Urban, Design Speed per Indiana Design Manual Figure 48-5A.
- 3. Brooks School Road, 3R, Collector, Urban, Design Speed 35 mph.

4. The clear zone for the proposed I-69 typical tangent section shall be 30 feet from the edge of travel lane.
5. All design criteria shall meet or exceed minimum standards according to the applicable design tables except as noted in the Technical Provisions.

3.4 Design Exceptions

The following design exceptions are allowed:

1. Level 1 Design Exception for Des. No. 1383332, 1383336 and 1383337-The left (inside) shoulder width on I-69 (Line “A”) for both northbound and southbound directions shall be a minimum eight feet paved , within the project limits except as noted below:
 - a. A shoulder width of 4’ is allowed in the southbound lane at the begin project point;
 - b. A shoulder width of 5.9’ is allowed along the northbound lanes at the NB SR 37 overpass bridge pier.
 - c. An additional 2 feet of usable shoulder shall be provided along barriers excepting the two locations noted above.
2. Level 1 Design Exception for Des. No. 1383332 – The horizontal stopping sight distance for southbound lanes within the curve at P.I. Station 326+00.03 “A” shall meet the posted speed limit of 65 mph.
3. Level 1 Design Exception for Des. No. 1383488 – The vertical clearance (under) for this project bridge deck replacement project shall be a minimum of 16’-0”.
4. Level 2 Design Exception for Des. No. 1383332 and 1383336 – Existing non-compliant clear zone slopes outside of the roadway are allowed to remain in place if only minor re-grading is required due to pavement resurfacing.
5. Level 2 Design Exception for Des. No. 1383489 –Separation between Shared-use path and edge of travel lane is allowed to be less than 10’ required.

(This page is intentionally blank)

4.0 CONSTRUCTION REQUIREMENTS

The following work elements shall be the minimum requirements for this project.

4.1 General

1. Wherever the basis of payment is discussed in the Standard Specifications, recurring and unique special provisions, it shall be read, “The cost of this item shall be included in the contract lump sum price.
2. Construction shall be in accordance with these Technical Provisions, the Standard Specifications (except as modified in the Technical Provisions), all applicable Recurring Special Provisions and Contract Specific Recurring Special Provisions included in Attachment 041.
3. The following sections of Standard Specification Section 100 – General requirements are deleted as they are superseded by the PPA: Sections 102, 103.04, 103.05, 104.01, 104.02, 104.03, 105.02, 105.05, 105.06, 105.07, 105.15, 105.16, 107.06, 107.17, 107.19, 107.22, 107.23, 107.24, 107.25, 108.02, 108.03, 108.08, 108.09, 108.10, 108.11, 108.12, 109, 110, 111, and 113.
4. Section 108.01 of the Standard Specifications is revised to read: “The subcontractor shall be in accordance with the requirements of 105 IAC 11-2-10, Subcontractors.”
5. The Design-Build Contractor shall be allowed to work 24 hours per day, 7 days per week, except for the requirements noted in Special Provision 108-C-585, local ordinances and as follows:
 - a. No work shall be performed from noon December 23 until sunrise December 27.
 - b. No work shall be performed on the date of the Brickyard 400 race.
6. A profilograph shall be used in accordance with Sections 401 and 501 of the Standard Specifications, as applicable.
7. Monuments shall be installed in accordance with Chapter 17-4.09 of the Indiana Design Manual, the Standard Specifications, and Standard Drawings.
8. Drainage shall be maintained at all times during all phases of construction.

9. References to the Geotechnical Evaluation Report herein refers to the report which shall be prepared by the Design-Build Contractor's Geotechnical Engineer of Record and approved by INDOT Geotechnical Services.
10. Design-Build Contractor will be responsible for performing any maintenance during construction of the Project that is required by the Standard Specifications or applicable Recurring Special provisions. Note that Construction Memorandum 09-02 – "Potholes in Work Zones" does not apply. Design-Build Contractor will be required to repair any potholes that exist or develop during construction as part of their lump-sum bid. An IMSA certified Level II technician shall be available 24 hours a day to respond within 2 hours for the maintenance of traffic signal equipment.

4.2 Salvage of Cable Barrier System (USP)

1. The Design-Build Contractor shall salvage 5,000 lineal feet of cables with associated posts and all threaded terminals, turnbuckles and anchor fittings from the existing cable barrier system within the project limits. The cable shall be placed on spools, individual spools of cable shall weigh no more than 14,000 pounds, threaded terminals, turnbuckles and anchor fittings shall be delivered in containers suitable or outside storage. The salvaged materials shall be delivered to the Greenfield District 210 Lot, 940 Osage Street, Greenfield, IN 46140. The Greenfield District contact below shall receive 72 hour notice prior to the delivery:

Jeffery Brooks
INDOT, Greenfield Operations Manager,
32 S Broadway St
Greenfield, IN 46140
Phone 317-467-3484
Email JBROOKS@indot.in.gov

4.3 Clearing Right-of-Way

1. No tree clearing shall be performed from April 1 through September 30 on trees suitable for Indiana Bat roosting (greater than 3 inches) unless approved by USFWS.
2. Tree clearing shall be limited to the construction limits of the side slopes, and no more than is necessary to construct the proposed work.
3. The Design-Build Contractor shall salvage cable barrier system components per the unique special provisions.

4.4 Work Area Access (USP)

The Design-Build Contractor shall prepare a detailed plan of ingress and egress locations in the work area along each phase of construction where construction vehicles will be entering the construction zone. The Design-Build Contractor shall submit this detailed plan to the Engineer for approval. Flagging traffic, traffic stoppages, lane closures or arrow boards will not be allowed for this operation.

4.5 Work in Waterways (USP)

This section describes the acceptable materials and methods for dewatering the work area in waterways.

1. Materials

- (a) Dewatering Bag The dewatering bag shall be nonwoven, needle punched, 8 ounce polypropylene geotextile with the characteristics in the table below:

Property	Test Method	Minimum Value
Tensile Strength (Grab)	ASTM D-4632	225 lbs.
Elongation	ASTM D-4632	50%
Puncture	ASTM D-4833	130 lbs.
Mullen Burst	ASTM D-3786	425 psi
Trapezoidal Tear	ASTM D-4533	90 lbs.
UV Resistance	ASTM D-4355	70%
Apparent Opening Size	ASTM D-4751	80 Sieve = .18mm
Permittivity	ASTM D-4491	1.26 sec.-1
Water Flow Rate	ASTM D-4491	100 gpm/square feet

The geotextile seams shall be double stitched with a high strength thread. A Type C certification in accordance with 916 shall be required.

2. Construction Requirements

The Design-Build Contractor shall use isolation, diversion channels or the pump-around method for dewatering work areas in waterways shown in the plans and as described herein. Alternate methods proposed by the Design-Build Contractor for dewatering work areas shall be submitted and approved by the Engineer prior to implementation. The submission shall include any permit modifications necessary. Construction in a waterway shall be sequenced to begin at the most downstream point and work progressively upstream installing required channel and grade control facilities. Work shall be completed in small segments, exposing as little of the channel at a time as practical. Equipment operators shall be contained in the immediate work area and avoid excessive compacting of the soil surface. During the process of cut and fill, the Design-Build Contractor shall avoid letting side-cast or waste material enter waterways or placing it on unstable areas. Instead, the Design-Build Contractor shall efficiently move excavated material to areas needing fill or to a stockpile with perimeter protection.

Isolation shall only be used in intermittent or ephemeral streams where the proposed work can be completed between rain events during a period the stream has no flow. Isolation shall not be used when rain is forecasted during the work period.

Diversion channels shall be constructed using riprap, geotextile or erosion control mats or a combination of these materials so the temporary channel is not erodible while in use. Diversion channels that are expected to remain in place for more than one month shall be designed to carry a storm event with a 10% exceedance probability.

The pump-around method shall be in accordance with the following:

- a. Installation of the pump-around method shall begin upstream of the work area and proceed downstream.
- b. Work shall not be conducted during rain events.
- c. Approved erosion and sediment control measures shall be installed prior to construction of the pump-around. No work shall be performed outside of the limits of the approved work area. Disturbance within the work area shall be minimized.
- d. A clean water sandbag dike shall be installed upstream of the work area and then a sediment sandbag dike shall be installed downstream of the work area. Upstream pool or sump areas and downstream discharge areas shall then be constructed. Pumps shall then be installed to divert the

stream flow around the work area and to dewater the stream within the work area. Ponding caused by the upstream dike shall not exceed the 1% exceedance probability elevation.

- e. Water from the diversion pumps shall be discharged downstream of the work area onto a stable velocity dissipater consisting of riprap or sandbags.
- f. Water from work area dewatering pumps shall be discharged through a dewatering bag, or other approved device. The dewatering bag shall be located such that discharge water flows back into a stabilized area of the channel downstream of the work area. The dewatering bag shall be installed per the manufacturer's recommendations.
- g. Equipment shall not be operated in the channel outside of the limits of the work area. Temporary stream crossings shall only be constructed as approved by the Engineer, and only after any necessary permit modifications are secured.
- h. The channel within the work area shall be graded in accordance with the plans and all stream restoration measures shall be installed.
- i. After a work area is completed and stabilized, the clean water sandbag dike and diversion pump shall be removed and the stream allowed to re-enter the work area down to the sediment dike. Sediment shall be allowed to settle out of the water upstream of the sediment dike and then the dewatering pump and sediment dike shall be removed.
- j. A pump-around shall also be installed on any tributary or storm drain outfall which contributes base flow to the work area. This shall be accomplished by locating a clean water dike at the downstream end of the tributary or storm drain outfall and pumping the stream flow around the work area. Discharge of water pumped from a tributary or storm drain shall be the same as for the main channel discharge.

All areas disturbed by dewatering the work area in waterways shall be restored to their original condition and re-vegetated to their original conditions or as shown on the plans.

(This page is intentionally blank)

5.0 ENVIRONMENTAL

5.1 Permits and Approvals

1. Any revision to the plans made by the Design-Build Contractor that result in additional impacts to streams, lakes, rivers, wetlands, or other waters shall require the Design-Build Contractor to amend the USACE Section 404 Permit, IDEM 401 Water Quality Certification, and the IDNR Construction in a Floodway permits (from Section A) and obtain the corresponding regulatory agency approval.
2. With respect to Section C, it is anticipated that modifications to the USACE Section 404 and IDEM Section 401 permits will be required. Impacts to Waters of the US and Waters of the State will be considered to be cumulative across all Sections of the Project. INDOT/IFA is securing mitigation credits from the Central Indiana Mitigation Bank for Sections A, B, and C. The Design-Build Contractor will be responsible for the modifications required for the Section 404 and Section 401 permits and for mitigating any additional impacts to jurisdictional waters. The Design-Build Contractor will also be responsible for obtaining any CIF permits required for Section C.
3. The Design-Build Contractor shall be required to obtain the Rule 5 permit before any land disturbing activities commence. Obtaining multiple Rule 5 permits for distinct elements/segments of the work is acceptable. Erosion control measures shall be in accordance with Chapter 205 of the Indiana Design Manual and the IDEM Indiana Stormwater Quality Manual, all environmental permit requirements, and applicable INDOT specifications.
4. The Design-Build Contractor shall submit their design and obtain a Hamilton County drainage board permit, using the Hamilton County Surveyor's Office as a contact. The Design-Build Contractor shall submit their design and obtain, if required, a Madison County drainage board permit, using the contact noted herein.
 - Hamilton County Surveyor
1 Hamilton County Sq.
Suite 188
Noblesville, IN 46060
 - Madison County Drainage Board
c/o Anjie Cox
Madison County Government Center

16 East 9th Street
Anderson, IN 46016
acox@madisoncounty.in.gov

5. Stormwater quantity design guidelines shall be as described herein. Stormwater quality design guidelines shall be in accordance with INDOT requirements.
6. Stormwater detention shall not be allowed within identified Waters of the U.S.
7. If tree clearing or construction activities are performed within a wooded area where evidence of bird roosting is present, precautionary measures shall be taken to avoid an outbreak of histoplasmosis. At a minimum, the area shall be wetted down prior to the construction activities and cleanup.
8. No work within waterways shall be conducted from April 1 to June 30 (fish spawning season) without prior written approval from IDNR Division of Fish and Wildlife.
9. Prior to the initiation of any construction activities on bridges, including the removal of any bridge structures, the underside of each bridge must be carefully examined for the presence of bats, especially between April 1 and September 30. If any bats are found roosting on the underside of the bridge, the Design-Build Contractor must immediately contact USFWS for resolution prior to moving forward with construction activities.
10. Design-Build Contractor shall not construct any temporary runarounds, crossings, causeways, pump-arounds, or other temporary impacts unless as specified in the project permits without prior approval from all required regulatory agencies.
11. The Indianapolis Metropolitan Airport is located 9,400 feet north of Project A. The Noblesville Airport is located 8,000 feet northwest of Project B. The Design-Build Contractor shall apply for a FAA Form 7460 (Notice of Proposed Construction or Alteration) if any permanent structures or equipment utilized for the projects penetrates the 100:1 slope from the airport.
12. IFA and INDOT intend to advance several key preconstruction environmental Governmental Approvals commensurate with the state of Project development. Table 5-1 lists the Governmental Approvals. This list is not exhaustive and there may be other Governmental Approvals that are required based on the Design-Build Contractors final design.

Table 5-1 Governmental Approvals

Agency	Permit/Approval	Responsible Party
Federal Highway Administration (FHWA)	Categorical Exclusion, Level 3 Revision to Interstate Access	INDOT/IFA ¹
Federal Highway Administration (FHWA)	Revision to Interstate Access (if required)	Design-Build Contractor
Indiana Department of Environmental Management (IDEM)	Section 401 Water Quality Certification	INDOT/IFA ² Design-Build Contractor ³
US Army Corps of Engineers (USACE)	Section 404 of the Clean Water Act	INDOT/IFA ² Design-Build Contractor ³
Indiana Department of Natural Resources (IDNR)	Construction in a Floodway (CIF)	INDOT/IFA ⁴ Design-Build Contractor ⁵
Indiana Department of Environmental Management (IDEM)	Rule 5 – Erosion Control	Design-Build Contractor
Hamilton County	Hamilton County Regulated Drain Permit	Design-Build Contractor
Madison County	Madison County Regulated Drain Permit (if required)	Design-Build Contractor
Federal Aviation Administration (FAA)	Tall-Structure Permit	Design-Build Contractor

Notes:

1) INDOT and IFA are in the process of conducting additional environmental studies/coordination for Section C. It is currently anticipated that the Level 3 CE will be obtained by late summer 2015.

2) INDOT and IFA are in the process of obtaining the Section 401/404 permits for the Project. The permit applications, when completed, will be included in the RID.

3) Modifications to the Section 401/404 permits will be required for Section C. The Design-Build Contractor will be responsible for these modifications; for any modifications required for Sections A & B that result from plan revisions made by the Design-Build Contractor that add additional impacts to streams, lakes, rivers, wetlands, or other waters; and for mitigating any additional impacts to jurisdictional waters.

TECHNICAL PROVISIONS – Section 5
Environmental

4) INDOT and IFA are in the process of obtaining the IDNR CIF permits for Section A. The permit applications, when completed, will be included in the RID.

5) The Design-Build Contractor will be responsible for obtaining any CIF permits required for Section C, and for any modifications to the CIF permits from Section A that result from plan revisions made by the Design-Build Contractor.

6.0 ROADWAY

6.1 Roadway General

1. The typical section for I-69 shall consist of three 12 foot lanes. The inside shoulder shall be an 8 foot paved shoulder where no barrier is present. Where guardrail is required, the minimum offset shall be 2 feet from the edge of the paved shoulder. Where concrete barrier or railing is present, the inside shoulder shall be a 10 foot paved shoulder. Where there is guardrail, an 8 foot paved shoulder with two feet of aggregate shall be provided.
2. The existing 10 foot outside shoulder can remain in place, except for sections of I-69 where reconstruction is required.
3. An auxiliary lane shall be added to the outside of the existing lane from Station 242+85.00 to Station 261+00.00 Left "A".
4. Auxiliary lanes shall be 12 feet wide with a 10 foot paved shoulder.
5. Any new bridge over I-69 shall provide a minimum stopping sight distance as required by the Indiana Design Manual for 45 mph stopping sight distance for design speed less than 45mph.
6. Minimum vertical clearance for bridges over I-69 shall be 16 feet with the following exceptions:
 - a. Campus Parkway over I-69 shall have a minimum vertical clearance of 16.5 feet over I-69.
7. Minimum vertical clearance for I-69 over SR 13 shall be 14.6 feet (14'-7 ¼") to provide the maximum practical clearance for truck traffic.
8. Snowplowable raised pavement markers are required for mainline, ramps and Campus Parkway/Southeastern Parkway.
9. If the proposed scope of work includes widening east of SR13 in Section C, such widening shall include both the northbound and southbound lanes within the proposed station limits.
10. The limits of widening are not restricted by this requirement, however the permanent striping for the northbound inside lane drop shall not occur within the horizontal curve approaching the SR38, or within the limits of the SR38 interchange. If added travel lanes are built beyond the start of the full width section of SR 38 northbound exit ramp but not to the end of Section C (Sta

133+55), the outside travel lane shall be dropped at the exit ramp and the new inside added travel lane shall be tapered to meet the existing inside travel lane at that point.

6.2 I-69 at Campus Parkway/ Southeastern Parkway Interchange General

1. The current engineering and operational acceptability alternative identified in the FHWA interchange justification report is a double crossover diamond (DCD) interchange, also known as a diverging diamond interchange. Changes to the interchange type shall require modification of the Interchange Justification Report by the Design-Build Contractor and acceptance by IFA and ultimately by FHWA.
 - a. Level of service D or better traffic operations, following Highway Capacity Manual 2010 methodology, shall be provided for both the AM and PM peak hour conditions in the design year at the ramp intersections with Campus Parkway/Southeastern Parkway. Additionally as per the Indiana Design Manual, a lane-group or approach level of service shall be the same or at least one level of service below the associated intersection level of service.
 - b. The interchange design shall ensure that forecast design hour 95th percentile traffic queues on the ramps do not spillback to I-69 mainline, or to the adjacent intersections along Campus Parkway/Southeastern Parkway, for both the AM and PM peak hour conditions in the design year, including during Klipsch special event conditions.
 - c. Any alternative interchange type shall accommodate traffic management during special events at the Klipsch Music Center in the design year. Boden Road and Olio Road are the defined routes from I-69 to Klipsch Music Center. Alternate routes shall not be considered in the interchange analysis. Traffic management shall be defined from both traffic operations and operating cost standpoints. Specifically:
 - i. Any alternative interchange type shall provide equal or better traffic operations (LOS and 95th percentile traffic queues) than the DCD interchange in the Reference Plans under special event conditions.
 - ii. Any alternative interchange type shall be able to be controlled by a maximum of two policemen during special event conditions.
 - d. Any alternative interchange type shall provide an interchange average delay equal to or less than the DCD interchange configuration in the Reference Plans for both the AM and PM peak hour conditions in the

design year. Interchange average delay shall be calculated using all vehicles entering the interchange for the analysis period as follows: the average per vehicle delay (for each movement through each node or junction within the interchange) is weighted by the corresponding volume making the movement to yield an average delay through the interchange.

- e. Any alternative interchange type shall accommodate 30 percent additional traffic volume demand (i.e. beyond the forecast volumes) as well as the DCD interchange configuration in the Reference Plans in terms of traffic operations (LOS and 95th percentile traffic queues).
2. A DCD interchange shall have the following design criteria:
 - a. A DCD interchange shall be designed in accordance with the FHWA Diverging Diamond Interchange Informational Guide (FHWA Publication FHWA-SA-14-067) and the Indiana Design Manual, as applicable.
 - b. The DCD interchange design speed shall be 25 mph.
 - c. The crossover angles shall not be less than 45°.
 - d. The horizontal tangent length through the crossover shall not be less than 90 feet. Campus Parkway/Southeastern Parkway shall have two through lanes in each direction.
 - e. Design-Build Contractor shall submit truck turning templates and all sight distance calculations, including intersection sight distance, throughout the DCD.
 - f. PR-Ramp NW-E and PR-Ramp SE-W may be designed to turning roadway design criteria. All other ramps shall be designed as open roadways
 3. Interchange ramps at Exit 210 shall be rehabilitated per Section 7 of the Technical Provisions.
 4. A 10 foot shared-use path shall be installed connecting to the existing path on both ends.
 5. A sidewalk shall be installed within the limits of reconstruction of Campus Parkway/Southeastern Parkway.
 6. The maximum profile grade on Campus Parkway shall not exceed 5%.

7. The crest vertical curves of Campus Parkway over I-69 shall be designed for 45 mph.
8. Design vehicle shall be a WB-67 for all design calculations.

6.3 Roadside Safety

1. The backslope of ditches shall be 3:1 to existing ground. The backslope may be steepened to 2:1, however, the use of 2:1 backslope shall be restricted to those locations where 3:1 backslopes cannot be met within the existing R/W.
2. If clear zone requirements cannot be met, guardrail may be used. Outside slopes behind guardrail shall be 3:1 to a flat bottom ditch. The minimum width of flat bottom ditches shall be 4 feet. The backslope of ditches shall be 3:1 to existing ground. The foreslope and backslope behind guardrail may be steepened to 2:1, however, the use of 2:1 slopes shall be restricted to those locations where 3:1 backslopes cannot be met within the existing R/W. Foreslopes steeper than 3:1 shall be armored with riprap.
3. Median barrier in accordance with Chapter 49 shall be required for median width of 50 feet or less.
4. In areas where re-grading of the outside slope is due only to resurfacing, improvement of the existing slope to meet the above criteria shall not be required. A Level 2 Design Exception has been approved to cover these instances. Along resurfaced pavement, the outside slope shall be 3:1 maximum.
5. All existing guardrail and associated guardrail transitions shall be replaced along mainline I-69, Lines “A”, “AL” and “AR”.
6. Where the finished surface elevation of the pavement changes, the guardrail shall be removed and reset to maintain rail heights as shown in the INDOT Standard Drawings. Any existing guardrail that does not meet current INDOT standards shall be replaced.

6.4 Seed Mix (USP)

1. Description

This work includes soil preparation, native seed mixes, installation methods, maintenance and watering for sowing of native grass and wildflower seed, and other inherent horticultural management practices along and across mitigation areas.

2. Materials

a. Native Grass and Forb Seed

- 1) A temporary cover shall be included with all seed mixes. The temporary cover shall consist of 10 lbs of Annual Rye (*Lolium multiflorum*) with 30 lbs of Seed Oats (*Avena sativa*) for a total temporary seeding rate of 40 lbs/ac.
- 2) The Design-Build Contractor shall sow seed mixes as shown on drawings and schedules for each area designated for seeding. Prior to bidding, the Design-Build Contractor shall determine the quantity of seed that will be required for each specified seed mix.
- 3) Seed mixes shall be in accordance with the following:
 - i. Seed Mixture D (Modified) shall be used to restore any disturbed soil along stream banks. This mixture shall be applied at a rate of 15.81 pounds/acre in accordance with the following table:

Botanical Name	Common Name	Rate Oz/ac
Glyceria striata	Fowl Mana Grass	1
Carex spp.	Wetland Carex	8
Leersia oryzoides	Rice Cut Grass	2
Schoenoplectus tabernaemontani	Bullrush	2
Elymus candensis	Prairie Wild Rye	80
Elymus virginicus	Virginia Wild Rye	160
	Subtotal:	253

- b. Mycorrhizal Inoculates shall be commercially produced ectomycorrhizal and endomycorrhizal fungi that improve plant root absorption of soil nutrients. The Design-Build Contractor shall furnish mycorrhizal inoculum in a granular or concentrated powder form for areas to be seeded with permanent seed. The product shall contain a minimum of the 4 species of Endomycorrhizae fungi and a minimum of the seven species of Ectomycorrhizae fungi.

c. Source Quality Control

- 1) Seed materials shall be shipped with certificates of inspections required by governing authorities. Shipping shall comply with regulations applicable to landscape materials.
 - 2) Plant names indicated shall comply with “Standardized Plant Names” as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed should conform generally with names accepted by the nursery trade. Stock provided shall be true to botanical name and legibly tagged.
 - 3) Seed used shall be of local genotypes, harvested from areas within the same hardiness zone and natural region as that of the project area whenever possible.
- d. Substitutions If specified seed is not obtainable, the Design-Build Contractor shall notify Engineer and present proposal for use of substitutions. The Engineer reserves the right to determine material equivalency and make final approval for all substitutions. If local genotypes are unavailable, Design-Build Contractor shall submit list of alternates to Engineer for approval.
- e. Quality
- 1) All seed shall be tested in a certified seed laboratory with certified results presented to the Office of the Indiana State Seed Commissioner in writing prior to planting.
 - 2) All seed shall be of the previous season’s crop and the date of the analysis shown on the container shall be within the past nine months of the time of use on this project.
 - 3) All seed shall be free of prohibited and restricted noxious weeds in accordance with 360 IAC 1.
 - 4) Amounts of grass and forb seeds in mixes shall be adjusted to achieve 100% Pure Live Seed (PLS).
 - 5) Germination rates shall be at least 90% for all grass seed species and at least 75% for all forb seed species.
- f. Submittals
- 1) The Design-Build Contractor shall submit a Type C certification in accordance with 916 for each seed mixture required. The certification

shall include botanical and common name, percentage by weight, purity and germination for each seed species.

- 2) The Design-Build Contractor shall submit a Pure Live Seed (PLS) count spreadsheet listing all seed species to Engineer for final approval prior to installation of any seed.
- 3) Maintenance
 - i. The Design-Build Contractor shall submit a one year maintenance plan for all native seed areas from date of substantial completion through date of final acceptance for approval by Engineer. The maintenance plan shall provide for a monthly maintenance regimen to monitor and control all pests, noxious weeds and exotic species within seeded areas. The maintenance plan shall also provide for watering of all native seed mix areas.
 - ii. A mowing schedule along with a schedule to control noxious weeds and invasive species shall be specified for a one year period for all native seeding areas for the purpose of controlling exotic invasive plants, reducing weed competition, and shading of native plants.
 - iii. After seeding is complete, the Design-Build Contractor shall conduct a monthly inspection of the site to determine the effectiveness of the maintenance plan and update or modify maintenance approach and practices as needed to promote highest possible performance of seed.
 - iv. A final exotics control and long term maintenance training session shall be provided to the Engineer. The Design-Build Contractor shall demonstrate all required maintenance methods and instruct Engineer on appropriate maintenance methods, field mark special maintenance areas, and provide a maintenance handbook describing methods and timing for recommended maintenance practices.

3. Construction Requirements

a. Product Delivery, Storage and Handling

- 1) Packaged materials shall be delivered in containers in original packaging showing weight, analysis and name of manufacturer. Materials shall be protected from deterioration during delivery, and while stored at the site.

- 2) All seed shall meet best industry standards for testing and labeling. Labels will include name, weight, type of seed, and number of corresponding certified seed report.
 - 3) Each seed mix shall be supplied and delivered to the job site in separate bags or containers.
 - 4) If standard mixes are provided premixed by seed supplier, Design-Build Contractor shall have seed mixes shipped to site with appropriate labels and test results.
 - 5) Each seed container shall have at least one approved Department of Agriculture seed tag on or in the container. The seed tags shall indicate the seed mix name and each seed's botanical name, common name, purity and germination rate.
- b. Planting Season All seeding shall occur in the spring between March 15 and June 1.
- c. Soil Preparation
- 1) Areas that have been re-graded shall have topsoil placed and compacted to at least 85% of its maximum dry density. Seeding areas for Herbaceous Riparian Vegetation Mix shall have 3 inches of topsoil. All other areas shall have 6 inches of topsoil.
 - 2) Soil preparation shall include use of a glyphosate herbicide at least three days prior to installation, tilling, mowing and any other standard methods suitable for establishment of seeded areas as specified. Do not apply fertilizer to the site.
 - 3) After the grass within the areas to be seeded has been properly treated with herbicide, the soil shall be loosened and tilled to a depth of four inches. Any remaining dead grass or other debris shall be removed from the soil and disposed of offsite.
- d. Native Grass and Forb Seeding
- 1) Moist stratified forb seed shall be used in spring plantings.
 - 2) Design-Build Contractor shall evaluate prepared site conditions and determine the most effective method of seed installation for the areas specified. Multiple installation techniques may be required in order to

effectively seed areas to accommodate varying slope, soil type, seed mix type, and site conditions at the time of installation.

- 3) Seeding methods may include drill seeding, hand broadcasting, or any other proven method for successful installation of warm season grasses, native forb and seed mixes.
- 4) Seed shall be evenly and uniformly distributed over the designated seeding areas.
- 5) All varieties of seed in mix may be planted simultaneously provided that each seed type is uniformly applied at the specified rate.
- 6) The Design-Build Contractor shall not sow seed when weather conditions are unfavorable, such as during drought, high winds, or extremely wet conditions.
- 7) All seed shall be planted no deeper than 1/8 inch below the surface of the soil. Good seed to soil contact and predation control shall be required regardless of method of installation.
- 8) The Design-Build Contractor shall apply mycorrhizal inoculates across seeded areas to improve germination and growth rates for all seeded species. Design-Build Contractor shall coordinate with seed supplier to identify the appropriate mycorrhizal inoculates, application rates and methods for all planting areas.
- 9) Watering will be required during the establishment period for all native seeded areas. The Design-Build Contractor shall make sure that 1/4 inch per week of water is provided to all seeded areas during the establishment period. If sufficient natural rainfall occurs to meet the water requirement, no supplemental watering will be needed. Water used shall be in accordance with 914.09(a).
- 10) The Design-Build Contractor shall remove and dispose of surplus subgrade material, debris, stone, foreign material and trash from site upon completion of seeding activities.

e. Maintenance by Design-Build Contractor

- 1) The maintenance period shall begin immediately after each plant and or seeded area is planted. Maintenance shall continue for one year until planting has passed final inspection and acceptance.

- 2) Any seeded areas not passing final inspection shall be replaced and maintained for one additional year from the date of replacement.
- 3) Maintenance includes watering, weeding, cultivating, mowing, removal of dead materials, pruning, and other necessary operations as directed by Engineer.
- 4) If mowing is used as a method of weed control then the Design-Build Contractor is responsible for avoiding the seedling plantings. Any damage caused to the seedling plantings by the Design-Build Contractor shall be replaced by the Design-Build Contractor at no additional cost to the Owner. Mowing within the project limits shall be the responsibility of the Design-Build Contractor during the one year warranty period.
- 5) Maintenance by State shall not begin until final acceptance of all seeding areas has been provided by the Engineer.

f. Inspection and Replacement

- 1) Inspections shall be performed prior to the days on which seeding operations are performed and at the conclusion of planting to determine completion, exclusive of replacement plants. Notify Engineer of installation schedule to coordinate site inspections. Site inspections will continue throughout the maintenance period.
- 2) Final inspection of seeded areas shall not be made for a minimum period of 21 calendar days after permanent seeding and until seed has germinated and is growing in a satisfactory stand.
- 3) If a satisfactory stand of vegetation is not established within 45 days from the date of seeding, the area shall be reseeded or repaired at no additional cost until a stand deemed satisfactory is established.
- 4) Deficiencies in the work shall be corrected before final acceptance will be made.
- 5) If erosion occurs during the warranty period due to lack of germination of seeded areas, the Design-Build Contractor shall repair the eroded areas with topsoil as approved and directed by the Engineer.
- 6) All replacement seeding shall be of the same mix type, seed species ratios and application rates unless otherwise directed by the Engineer.

- 7) Beginning at initial acceptance of landscape work and during the one year warranty period, the Design-Build Contractor shall make periodic inspections of the work to verify viability of landscape installation. The Design-Build Contractor shall submit a written report of inspection findings to the Engineer.

6.5 Special Topsoil for Roadside Development (USP)

This section 6.5 shall apply to topsoil obtained from within the project limits,

Revise Standard Specification 914 as follows:

BEGIN LINE 4, DELETE AND INSERT AS FOLLOWS:

This topsoil shall consist of loose friable soil, free of refuse, stumps, large roots, rocks over 1in. diameter, brush, weeds, or other material which would be detrimental to the proper development of vegetative growth. It shall be capable of supporting normal vegetation as demonstrated by the growth of healthy vegetation on it. It shall not be taken from a source known to contain any of the noxious weeds defined as such in the Indiana State Seed Law, IC 15-4-1.

Topsoil shall have a pH value of 6.0 to 7.0 *and an organic matter content of 5 to 10% by volume or 2 to 3% by dry weight.* Testing for pH value shall be performed in accordance with AASHTO T 289. *Testing for organic matter content shall be in accordance with ASTM D2974.* Agricultural limestone may be added to topsoil in order to raise the pH to meet specification requirements. The addition of agriculture limestone shall be determined based on tests performed by a laboratory approved by the INDOT Office of Geotechnical Services. Topsoil shall not be incorporated into the work until it is approved.

6.6 Quality Control/Quality Assurance, QC/QA, Soil Embankment (USP)

1. Description

This work shall consist of the construction of a soil embankment in accordance with 105.03, 203 and 207 and the requirements included herein. The Design-Build Contractor shall develop and implement a Quality Control Plan (QCP), and perform quality control testing of the required compaction of the soil embankment. The Department will perform acceptance testing of the soil embankment in accordance with 203 and the subgrade treatment in accordance with 207.

2. Equipment

Global Positioning System (GPS). The Design-Build Contractor shall provide a GPS system that meets the following requirements. The goal of GPS requirements is to achieve accurate and consistent GPS measurements among all GPS devices on the same contract. Conversions of GPS data are required to be minimized to avoid errors introduced during the process.

GPS-Related Definitions.

GPS: A space-based satellite navigation system that provides location and time information in all weather, anywhere on or near the Earth to determine the location in geodetic coordinates. In this specification, GPS is referred to all GPS-related signals including US GPS, and other Global Navigation Satellite Systems (GNSS).

Hand-Held GPS rover: A portable GPS radio/receiver for in-situ point measurements.

GPS Base Station: A single ground-based system that consists of a GPS receiver, GPS antenna, radio and radio antenna to provide L1/L2 differential GPS correction signals to other GPS receivers within a range limited by radio, typically 3 miles (4.8 Km) in radius without repeaters.

Network RTK: Network RTK is a system that use multiple bases in real-time to provide high-accuracy GPS positioning within the coverage location that is generally larger than that covered by a ground-based GPS base station; e.g., VRSTM.

GPS Correction Service Subscription: A service that can be subscribed to receive VRS signals in order to achieve higher accuracy GPS positioning normally via cellular wireless data services; i.e., without the need for a ground-based base station. Examples of GPS Correction Service subscriptions are: Trimble VRSTM, Trimble VRS NOWTM, or OmniSTAR.

RTK-GPS: Real Time Kinematic Global Positioning Systems based on the use of carrier phase measurements of the available GPS signals where a single reference station or a reference station network provides the real-time corrections to achieve centimeter-level accuracy.

UTM Coordinates: Universal Transverse Mercator (UTM) is a 2-dimensional Cartesian coordinates system that divides the surface of Earth between 80°S and 84°N latitude into 60 zones, each 6° of longitude in width and centered over a meridian of longitude. Zone 1 is bounded by longitude 180° to 174° W and is centered on the 177th West meridian. The UTM system uses

projection techniques to transform an ellipsoidal surface to a flat map that may be printed on paper or displayed on a computer screen. UTM is metric-based.

Geodetic Coordinates: A non-earth-centric coordinate system to describe a position in longitude, latitude, and altitude above the imaginary ellipsoid surface based on a specific geodetic datum. WGS-84 and NAD83 datum are required for use with UTM and State Plans, respectively.

ECEF XYZ: Earth-Centered, Earth-Fixed Cartesian X, Y, Z coordinates.

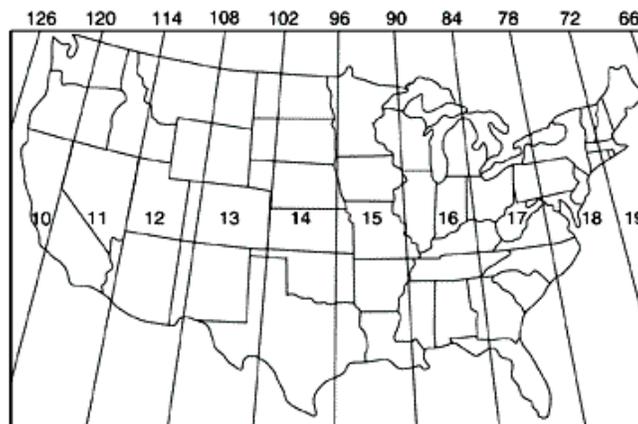
Grid: Referred to ECEF XYZ in this specification.

GUI Display: Graphical User Interface Display

State Plane Coordinate: A set of 124 geographic zones or coordinate systems designed for specific regions of the United States. Each state contains one or more state plane zones, the boundaries of which usually follow county lines. The current State Plane coordinate is based on NAD83. Issues may arise when a contract crosses state plane boundaries.

UTC: Coordinated Universal Time (UTC) is commonly referred to as Greenwich Mean Time (GMT) and is based on a 24 hours' time scale from the mean solar time at the Earth's prime meridian (zero degrees longitude) located near Greenwich, England.

All GPS devices shall be set to the same consistent coordinate datum/system regardless if the GPS or Grid data are originally recorded. UTM is the preference and shall be set to zone no. 16 N for this contract. Zones outside of the continental United States may be acquired on the web at www.dmap.co.uk/utmworld.htm. The records shall be in meters. Use of UTM will facilitate GPS data checks onsite.



The state coordinate system being applied on the contract may be used instead of the UTM coordinate system.

3. Construction Requirements.

The Design-Build Contractor shall provide the GPS system (including hand-held GPS receivers (Rovers)) that makes use of the same reference system that may be a ground-based base station or network-RTK, to achieve RTK-GPS accuracy. Examples of combinations are:

1. GPS hand-held GPS rovers referenced to the same on-ground base station.
2. GPS hand-held GPS receivers referenced to the same network RTK.

GPS Data Records and Formats. The recorded GPS data, shall be in the following formats:

1. Time: The time stamp shall be in military format, hhmmss.ss in either UTC or local time zone. 0.01 second is required to differentiate the sequence of IC data points during post process.
2. GPS: Latitudes and longitude shall be in ddmm.mmmmmmmm or decimal degrees, dd.dddddddd. Longitudes are negative values when measuring westward from the Prime Meridian.
3. Grid: Coordinates shall be in meters with at least 3 digits of significance (0.001 m or 1 mm).

Rover - A portable GPS radio/receiver for in-situ point measurements shall be provided and operated by the Design-Build Contractor.

4. Quality Control Plan

The Design-Build Contractor shall submit a QCP for the contract. As a minimum, the QCP shall contain the following information.

a. General Requirements

1. The QCP shall be contract specific and state how the Design-Build Contractor proposes to control the materials, equipment, and operations on the contract for the embankment operations.

2. The QCP shall be signed and dated by the Design-Build Contractor's representative at the time the QCP is submitted to the Engineer. The QCP shall be submitted 15 days prior to commencing the embankment operations.
3. The Department will review, sign, and date the QCP if the contents of the QCP are in compliance with the requirements as stated herein.
4. The QCP shall be maintained to reflect the current status of the operations, and revisions shall be provided in writing prior to initiating the change. The QCP revision shall not be implemented until the revision has been accepted.
5. The QCP shall contain the name, telephone number, duties, and employer of all quality control personnel necessary to implement the QCP. The minimum number of quality control personnel shall be as follows:
 - a. QCP Field Manager. The person responsible for the execution of the QCP and liaison with the Engineer. The QCP Field Manager shall be a Certified Technician for Construction Earthworks.
 - b. Quality Control Technician. The person responsible for conducting quality control tests and inspection to implement the QCP. There may be more than one Quality Control Technician. The Technician shall be a Qualified Technician for ITM 506, ITM 509, and ITM 512.
 - c. One quality control person may perform the duties of the QCP Field Manager and the Quality Control Technician.
6. Embankment operations shall not begin before the QCP has been accepted.
7. The QCP shall include the GPS system supplier to be used.
8. The Department may require the replacement of ineffective or unqualified equipment or Quality Control personnel. Construction operations may be required to stop until appropriate Quality Control operations are taken.

References

1. AASHTO Standards.

AASHTO T 99 Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop

2. ITM Standards.

ITM 506 Field Determination of Moisture Content of Soils

ITM 509 Field Determination of Strength Using Dynamic Cone Penetrometer

ITM 512 Field Determination of Maximum Dry Density and Optimum Moisture Content of Soil

ITM 513 Soil Test Section Construction

ITM 902 Verifying Sieves

ITM 910 Verifying Balances

ITM 914 Verifying Soil Test Molds

ITM 915 Verifying Soil Hand Compaction Hammers

b. Quality Control Technician.

The Quality Control Technician shall be responsible for the following minimum functions:

1. GPS check testing for the rover
2. Test section construction and establishing target values for the optimum moisture content, production moisture content, and strength of the materials using the one-point proctor with the Department Family of Curves in accordance with ITM 512 , and Dynamic Cone Penetrometer (DCP).
3. Monitoring of compaction operations.
4. Quality control testing for the stiffness and moisture content
5. Maintenance, completion, and submittal of the Daily Diary, related QC test reports, and deficiency analysis in either electronic and/or hard copies

c. Testing Facility.

The location of the testing facility and a list of test equipment shall be included in the QCP. The testing facility shall be located so that Quality Control test results are provided to the contract in a timely manner, be of sufficient size to conduct the Quality Control tests, and have a satisfactory

base on which compaction of the soil in accordance with AASHTO T 99 (Method A) may be conducted. A statement of accessibility of the testing facility shall be included in the QCP that allows Department personnel to witness Quality Control activities and to review Quality Control tests.

A list of the testing equipment proposed for Quality Control testing and the test methods and frequency of calibration or verification of the equipment shall be included in the QCP. The Design-Build Contractor shall maintain a record of all equipment calibration or verification results at the testing facility. The minimum frequency and procedures shall be as follows:

Equipment	Requirement	Minimum Frequency	Procedure
Balances	Verification	12 months	ITM 910
Sieves	Check Physical Condition	12 months	ITM 902
Molds	Check Dimensions	12 months	ITM 914
Rammers	Check Dimensions	12 months	ITM 915

d. Materials Sampling and Testing.

The procedures for sampling and testing of the soil and the frequency of tests shall be identified and include as a minimum the following:

1. Moisture. The procedure for determining the moisture content of the soil during production compaction. The minimum frequency of tests shall be one test for each 1400 yd³ of each lift of embankment.
2. Strength. The procedure for determining the in-place strength of the soil. The minimum frequency of tests shall be one test for each 1400 yd³ of each lift of embankment.
3. Maximum Dry Density and Optimum Moisture Content. The procedure for determining the maximum dry density and optimum moisture content of the soil for the test sections and when there is a change in the soil type

e. GPS Check Testing.

Prior to the start of production, the Design-Build Contractor and GPS representative shall conduct the following to check the proper setup of the GPS and the rover(s) using the same datum:

1. On a location nearby or within the contract limits, the GPS base station (if required by the GPS) shall be established and the GPS rover tied into the same base station.
2. Verification that the rover is working properly and that there is a connection with the base station shall be made.
3. Production shall not begin until proper GPS verification has been obtained. The GPS rover shall be verified against a known survey point within the project limits. The stationing of the GPS rover output is required to match the stationing of the known survey point.
4. The project surface model shall be developed by the Design-Build Contractor from the plan file provided by the Department.
5. GPS check testing shall be conducted daily during production operations to ensure consistency and accuracy of GPS measurements for all GPS devices prior to the compaction operations.

f. Test Sections.

The procedures for constructing the test sections to determine the number of passes of the roller(s) for verification of the DCP requirements shall be included in the QCP and be in accordance with ITM 513. Test sections shall be approximately 225 ft long and 24 ft wide and be constructed in a production location. GPS measurements for all DCP tests shall be obtained with the rover.

g. Proof rolling.

Proof rolling prior to placement of the first lift of embankment will be required to identify weak locations. The procedure for proof rolling shall be included in the QCP.

h. Soil Management.

The procedures for management of the borrow pit and soil cut sections to assure uniform soil material shall be included in the QCP. This includes the procedures that shall be followed for the necessary adjustments in compaction because of a change in soil type.

i. Response to Test Results.

The response to quality control tests for the test sections and during production compaction shall include as a minimum the following:

1. Moisture. The procedure for corrective action when the moisture tests are not within -3 percentage points of the optimum moisture content and the optimum moisture content for silty and sandy soils, not within -2 percentage points of the optimum moisture content and + 2 percentage points of the optimum moisture content for clay soils, and not within -6 percentage points of the optimum moisture content and the optimum moisture content for granular soils.
2. Strength. The procedure for corrective action when the blow counts of the DCP are less than the required blow counts determined based on laboratory tests for each soil type
3. Maximum Dry Density and Optimum Moisture Content. The procedure for corrective action when the maximum dry density and optimum moisture content test results indicate that there is a change in the soil type
4. Deficient Areas. The procedures for reworking deficient areas when identified by QC or QA testing.

j. Documentation.

The Quality Control Technician shall maintain a diary, either electronic and/or hard copy. The diary shall be an open format book with at least one page designated for each day of embankment construction and testing. The diary shall be kept on file until the completion of all earthwork and subgrade operations and final contract acceptance. Entries in the diary shall as a minimum include:

1. General weather conditions including the amount of rain received on the contract each day
2. Location of common or borrow pit excavation
3. Location (including identification of lifts) of embankment placement and compaction
4. Estimated quantity of embankment placed
5. Time test samples were obtained and tests completed
6. Nonconforming tests and the resulting appropriate action taken

7. Changes in key personnel
8. Significant changes in equipment or operations which may affect the placement or compaction of the embankment
9. Deficient areas and response to test results
10. Any significant event or problem

The Quality Control Technician or QCP Field Manager shall sign the entry in the diary. On occasion, the diary may be signed by another person; however, the diary is required to be counter-signed by the Quality Control Technician or QCP Field Manager.

The Design-Build Contractor shall provide the following documentation at the completion of the soil embankment operations each day:

1. Quality Control Tests. The results from the moisture, strength, and maximum dry density and optimum moisture content tests. All tests shall be clearly documented on hard copies and/or electronically and shall be identifiably related to the test results in the diary.
2. Equipment. Documentation of the manufacturer, model, and type of rollers used each day of soil compaction
3. Diary. All diary entries

5. Acceptance of Soil Compaction

Acceptance of the compaction of the soil embankment will be determined on the basis of tests performed by the Engineer

a. Test Sections.

Test sections shall be constructed in the presence of the Engineer with the available equipment of the Design-Build Contractor to determine the number of passes of the roller(s) for verification of the DCP blow counts for up to a 6 in. lift. GPS measurements for all DCP tests on the test sections shall be obtained with the rover. The soil in the test section shall meet the requirements of 203.09. The soil immediately below the test section in the first lift shall be proofrolled in accordance with 203.26 prior to construction of the lift. An additional test section will be required if there is a change in the type of soil used in the embankment. The Design-Build Contractor may also request additional test sections.

b. Compaction Acceptance with DCP.

The compaction acceptance will be determined by DCP testing in accordance with ITM 509. The moisture content for silty and sandy soils shall be within -3 percentage points of the optimum moisture content and the optimum moisture content, within -2 percentage points of the optimum moisture content and + 2 percentage points of the optimum moisture content for clay soils, and within - 6 percentage points of the optimum moisture content and the optimum moisture content for granular soils. The optimum moisture content will be determined in accordance with ITM 512 for silty, sandy and clay soils and determined in accordance with AASHTO T 99 for granular soils.

The Department will establish the criteria for the DCP acceptance of compaction by performing the sieve analysis, liquid limit, plastic limit, and optimum moisture and maximum density testing in accordance with ASTM D 1140, AASHTO T 90, T 267, and T 99 or ITM 512, respectively, on representative samples of the soils to be used. The required blow counts will be determined based on the laboratory tests for each soil type.

The DCP test results for each construction area for each lift will meet the required DCP values determined for each type of soil. The Engineer will randomly select the location(s) within each construction area for sampling in accordance with ITM 802. The frequency of tests will be one test for each 1400 yd³ or fraction thereof for each lift. A construction area less than 1400 yd³ will require one DCP test. Moisture tests will be obtained at a frequency of two tests for each day of embankment construction, or as needed, with each moisture test representing approximately 1/2 of the embankment construction for each day.

When a deficiency is identified at the random location, the Design-Build Contractor shall investigate and correct the deficiency in accordance with Compaction Acceptance of Deficiencies. The Engineer will subsequently randomly select two additional locations within the remaining construction area for sampling in accordance with ITM 802 and DCP testing in accordance with ITM 509. If one or both of the two additional locations fails to meet DCP criteria, then the entire area shall be evaluated by the Design-Build Contractor in accordance with the QCP and reworked as necessary before acceptance testing is resumed in that area.

c. Compaction Acceptance of Deficiencies

Individual locations that do not meet the DCP or moisture requirements and all locations exhibiting excessive pumping or rutting as determined by the Department will be considered deficiencies.

In accordance with the following tables, locations requiring rework will be accepted if the tests conducted by the Design-Build Contractor of each reworked deficiency indicate that the DCP and moisture content values meet the required acceptance criteria. Locations where rework is not required may still be reworked at the Design-Build Contractor's option in accordance with the QCP.

Reworked areas are subject to further review for excessive pumping or rutting at the discretion of the Department.

Compaction Acceptance of Deficiencies			
Construction Areas For \leq 6 inch Lift (ft²)	Deficient Area DCP or %Moisture (ft²)	Excessive Pumping Or Rutting?	Rework Required?
15,000 to 75,600	≥ 1500	Yes	Yes
		No	Yes
	< 1500	Yes	Yes
		No	No-Optional
5,000 to $< 15,000$	≥ 750	Yes	Yes
		No	Yes
	< 750	Yes	Yes
		No	No-Optional
$< 5,000$	≥ 100	Yes	Yes
		No	Yes
	< 100	Yes	Yes
		No	No-Optional

Final Surface of Subgrade - Compaction Acceptance of Deficiencies			
Construction Areas (ft²)	Deficient Area DCP or %Moisture (ft²)	Excessive Pumping Or Rutting?	Rework Required?
5,000 to 75,600	≥ 250	Yes	Yes
		No	Yes
	< 250	Yes	Yes
		No	No-Optional
$< 5,000$	≥ 100	Yes	Yes
		No	Yes
	< 100	Yes	Yes
		No	No-Optional

7.0 PAVEMENT

7.1 Pavement General

This Section 7.0 covers the design and construction of pavement. Design-Build Contractor shall conduct all Work necessary to meet the requirements associated with this Section 7.0.

For purposes of this Section 7.0, the word “lanes” shall mean all travel lanes, auxiliary lanes, passing lanes, deceleration lanes, and any other pavement on which traffic may normally travel. The word “shoulders” shall mean inside and outside shoulders and gore areas. Ramps shall be considered to start at the theoretical back of gore.

Design-Build Contractor shall design pavement structural layers for all new roadways within the Project Limits with no reduction of, or restrictions to allowable legal load limits and to accommodate oversized/overweight vehicles permitted to use 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 the pavement. The Design-Build Contractor shall provide a consistent pavement type throughout each roadway element. Each roadway element shall be defined as a discreet segment, such as an entire ramp, a section of roadway between two pavement termini, or other logical limits.

Safety edge shall be provided in accordance with INDOT Design Memorandum 15-02.

The Lump Sum Bid shall include all of the patching included in the Pavement Patching Allowance Tables included in the RID. Prior to any pavement rehabilitation, IFA and the Design-Build Contractor will jointly inspect the pavement and IFA will mark all areas to be patched partial depth or full depth. The Design-Build Contractor shall accurately measure and tabulate all areas that IFA has marked for patching. Payment adjustments for actual pavement patching as directed by IFA will be made per the terms in the PPA based on the total area of pavement patching, regardless of where patching was requested vs. the Pavement Patching Allowance Table and regardless of whether additional reinforcement and joints are required.

7.2 Pavement Design

Design-Build Contractor shall design all pavements within the Project Limits using the most updated version of AASHTO-ME Pavement Design software and the Indiana Design Manual, Chapter 304 - Comprehensive Pavement Analysis. Where there are conflicts between the requirements in these two documents, the requirements in this document shall take precedence.

1. Performance criteria for MEPDG shall be based on Indiana Design Manual Chapter 304.
2. The RID contains preliminary pavement designs provided by INDOT based on the field investigations and testing conducted by INDOT. The Design-Build Contractor shall prepare a final pavement design that meets all of the design parameters specified in this Section 7.0 and shall be based on actual in-situ properties of existing subgrade value. Proposed pavement designs must utilize the design assumptions that are included in the preliminary pavement designs and the analyses that are provided in the RID, and must provide equal or better performance.
3. New and reconstruction pavement shall be designed for a minimum design life of 20 years for flexible pavement and 30 years for rigid pavement.
4. Pavement rehabilitation of existing pavement shall be designed for a minimum design life of 15 years. Proposed rehabilitation shall address both functional and structural deficiencies. Rehabilitated pavement shall address functional distresses in such manner that corrective maintenance activities like pot holes and fatigue cracking will not be required for 10-years after completion of the project.
5. Design-Build Contractor shall include the proposed permanent pavement designs as a Hold Point and shall indicate the applicable roadway and station limits for new, reconstructed and rehabilitated areas on mainline lanes, auxiliary lanes, shoulders, ramps, and intersecting roadways. Design-Build Contractor shall provide a tabulation of the design inputs such as FWD data, resilient modulus, or other basis for the pavement thickness designs, and including station limits.
6. After Design-Build Contractor has completed its pavement investigations and analyses, Design-Build Contractor shall provide verification of the pavement designs and submit for INDOT review as a Hold Point.

7. Underdrains shall be retrofitted for existing pavement and shall be constructed for all new pavement. The location of Underdrains pipe shall be at the outside edge of shoulder and installed in accordance with the Indiana Design Manual, Standard Drawings and Standard Specifications.
8. Due to very weak subgrade, subgrade treatment Type 1 B (cement only) shall be performed for new pavement regardless of pavement type.
9. Inside shoulder shall be the same pavement type and thickness as the adjacent travel lane per Chapter 304 of the IDM.

7.2.1 PCCP Patching, Full Depth, Modified (USP)

These requirements apply in all areas, both where the existing PCCP pavement is intact and where PCCP pavements have been previously rehabilitated with crack and seat or “break and seat” methods.

1. Materials

Materials shall be in accordance with 506.02, except that concrete used in PCCP patches shall contain a limestone or dolomite coarse aggregate of Class AP quality.

The concrete mix designs for PCCP patches of any length shall be in accordance with Section 506.03 of the Standard Specifications. Change in Materials (a), Adjustments to Materials (b) and Other Adjustments (c) as stated in Section 506.03 of the Standard Specifications will not be allowed for concrete used in PCCP patches.

The concrete mix criteria for PCCP patches shall be in accordance with Section 502.04 of the Standard Specifications, except High-Early Strength (HES) concrete is modified as follows:

- a. The water cementitious ratio shall not be greater than 0.020 over the target stated in the CMDP and shall not exceed the maximums stated in Section 502.04(b) of the Standard Specifications.
- b. Minimum flexural strength shall be 450 psi at an age consistent with the CMD use in the proposed work, including any lane closure restrictions. The HES shall achieve a minimum of 550 psi in two days.
- c. Chemical admixtures types A, B, C, D, E, F and type G will be permitted with prior written approval. A Type C or Type E chemical admixture containing minimal amounts of chloride may be considered by the IFA for approval. Calcium chloride, Type L, shall not be used in

HES concrete. Use of a HRWR or HRWRR admixture system per Section 912.03 of the Standard Specifications is allowed; however, the components and dosage rates of the system shall be as recommended by the admixture manufacture and approved by the IFA.

- d. If types F or G chemical admixture are used in the HES concrete, the maximum slump for formed PCCP shall be 5 $\frac{3}{4}$ inches.

Trial batches shall be in accordance with Section 506.05 of the Standard Specifications, except HES concrete is to include the following:

- a. Flexural strength for HES concrete will be determined at a minimum of 4 hours, 8 hours, 12 hours, 24 hours and 2 days. Three beams will be cast for each beam set tested up to and including 24 hours for the purpose of maturity. An alternate break schedule at ages prior to 24 hours may be adjusted, if approved by the IFA.
- b. Maturity will be determined in accordance with Indiana Test Method 402. All molds, facilities and materials necessary to prepare and initially cure the beams shall be provided. In addition, internal vibrators, per Section 5.5 of AASHTO T 23, shall be provided for the purpose of consolidating the beams. The Department will provide the apparatus to test the beams for flexural strength. Personnel shall be provided to assist the Department in casting, curing and testing the beams.

Job Control is to be in accordance with 506.06 except that HES concrete will be controlled as follows

- a. Air content, slump and relative yield will be tested on the first load of the day and at least once every 50 cubic yards.
- b. At least one set (each set consisting of two beams) will be cast for every 150 cubic yards of concrete placed, as well as the last load placed. Beams will be used for testing flexural strength. Plastic properties of air content, slump and relative yield will be measured on each sample of concrete from which beams are made.

The concrete mixing and transportation shall be in accordance with Section 502.10 of the Standard Specifications.

Concrete shall be placed, finished, textured, cured and inspected in accordance with Section 506.10 of the Standard Specifications, except as follows:

- a. The surface shall be finished with wet burlap or by wood floats for all patches less than 30 ft.
- b. Patches longer than 30 feet shall be textured and tined in accordance with Section 504.03 of the Standard Specifications.

Patching limits shall meet pavement smoothness requirements in accordance with Section 502.20 of the Standard Specifications. Opening to traffic shall be in accordance with Section 502.18 of the Standard Specifications, except as follows:

- a. Construction vehicles, equipment, or traffic may be allowed on the PCCP containing HES concrete, when a flexural strength of 425 psi is achieved. The flexural strength shall be determined by averaging the two beams cast from each of the job control samples. Any test that fails to meet flexural strength will be evaluated for accuracy by comparison to the maturity results.

2. Construction Requirements

a. PCCP Removal

1. The minimum patch area shall be the full lane width by six feet long.
2. The pavement shall not be scored with a concrete saw or jackhammers more than three days prior to when it will be broken, except when the pavement is closed to traffic. The pavement shall not be scored with a wheel saw more than one day prior to when it will be broken, except when the pavement is closed to traffic.
3. Any subbase or pipe underdrains damaged during patching operations shall be repaired or replaced.
4. The scoring and removal of pavement for PCCP patches shall be as follows.
5. Two transverse saw cuts shall be made perpendicular to the centerline at each end of the patch, except that the saw cuts may be skewed slightly if necessary to maintain a minimum distance of 18 in. from the end of the patch to the nearest transverse crack in the pavement to remain in place. When approved by the IFA, this minimum distance may be reduced to 6 in. in areas of close crack spacing where the pavement otherwise appears to be sound. The interior saw cut shall be made at the location that will provide the proper length of exposed

existing steel as shown on the plans and shall be either full-depth or to a depth which will completely sever the longitudinal reinforcement. The longitudinal edges of the patch shall be formed by full-depth saw cuts. Patches one-half lane width or full lane width will be permitted. Saw cut extensions into pavement which is to remain in place will not be permitted. All outlining and interior saw cuts shall be made with an approved concrete saw. The shoulder between the full-depth saw cut and the pavement edge shall be removed using a hand held hammer and hand tools prior to pavement removal. If available, the Design-Build Contractor may use an approved wheel saw to make the shoulder cut and removal.

6. The pavement between the interior saw cuts shall be removed by lifting. Sufficient care shall be taken to minimize subbase disturbance and prevent spalling of the pavement that is to remain in place. Any subbase or stabilized subbase material disturbed during pavement removal operations or determined unsuitable by the IFA shall be removed and replaced with HMA patch material.
7. If the IFA determines that the concrete has deteriorated to the extent that it is not practical to lift, the pavement may be broken into small pieces and removed. The breaking equipment shall not transfer an impact energy greater than 3000 ft lb (4000 J) per blow to the pavement surface.
8. The concrete in the splicing area, between the interior and outer saw cuts, shall be removed using handchipping tools that may be hand or mechanically driven. Jack hammers shall not be heavier than nominal 45 lb class and chipping hammers shall not be heavier than nominal 15 lb class. Only chipping hammers shall be used when removing concrete within 1 in. of the reinforcement. Mechanically driven tools shall be operated at a maximum angle of 45⁰ to concrete surfaces.
9. To prevent underbreaking concrete to remain in place, the face of the concrete below the partial-depth saw cut shall be inclined slightly into the patch. The reinforcing steel in the splicing area shall not be bent to aid in removal of the concrete. If more than ten percent of the reinforcing steel in the splice area is damaged due to the Design-Build Contractor's operations, the patch shall be lengthened to provide the required steel exposure for splicing. If less than ten percent of the existing lap steel is damaged, it may be repaired by welding in lieu of lengthening the patch. No welding will be permitted on the splices

between the existing steel and the new steel. Should the Design-Build Contractor's operations cause a spall having a width or depth greater than 1 in. in the pavement to remain in place or cause excessive shattering or underbreaking of the existing slab to remain in place, a new saw cut shall be made extending the patch to remove the spall or underbreaking. After pavement removal, the pavement structure will be inspected by the IFA to determine if it is sufficiently sound. If determined unsound, the Design-Build Contractor shall extend the patch as directed by the IFA.

10. The existing reinforcement steel shall be observed during the removal process to determine if there is any excess rusting or evidence of steel distress. Deteriorated steel will not be permitted in the splice area. The IFA may require lengthening of the patch.

b. Placing Concrete

Full depth patches on PCCP pavements shall conform to the standard drawings and the work shall conform to the applicable portions of Section 506 of the Standard Specifications, with the following exceptions for intact Continuously Reinforced Concrete pavements that have not been previously rehabilitated with break and seat methods.

1) Reinforcement and Joints. Reinforcement and joints shall be according to the following.

- The reinforcement shall be as shown on the plans. Patches shall be tied to the adjacent pavement with No. 4 transverse deformed bar, embedded 8 in. at 36 in. centers.
- The Design-Build Contractor shall tie the steel together, using at least two secure ties for each lap splice.
- Should an existing lap splice be encountered in the patch splice area, the Design-Build Contractor shall construct the new splice by tying both of the exposed reinforcement bars to the new reinforcement bar.
- Reinforcement steel shall be placed and supported on chairs according such that uniform unsupported lengths not exceeding 4 ft (1.2 m) are provided. In such cases where an uneven subbase hinders maintenance of a placement tolerance of ± 1 in. vertically, portland cement concrete, grout (mix one part

cement and two parts sand with water), or HMA shall be used to adjust the chair height to allow the reinforcement to be placed within the specified tolerances.

- The longitudinal reinforcement bars shall be the same size and spacing as the existing longitudinal reinforcement.
- c. Full depth PCCP patches shall include a minimum of 10" PCCP over 6" of aggregate base over a geotextile fabric over compacted subgrade
- d. The completion of trial batch demonstrations shall be included in this work.
- e. Corrections for pavement smoothness and re-texturing shall be included in this work.
- f. Where PCCP pavements have existing HMA overlays and are to be rehabilitated by milling and overlay, the Design-Build Contractor may place the concrete patch either up to the top of the existing PCCP pavement or the full depth from the bottom of the existing PCCP pavement to the milled surface. In either case, the cost of the PCCP patching full depth shall include all of the labor, materials and equipment to complete the work, including any additional HMA or PCCP between the top of the existing PCCP pavement and the milled surface.
- g. Removal and replacement of any PCCP Patching, Full Depth, Modified damaged by freezing shall be included in this work.
- h. Note that actual depth of PCCP in the area to be patched may be different than the depth of pavement shown on the as-built plans. Areas to be patched may have been previously patched using one or more patching methods, which may have placed PCCP patch material below and/or above the adjacent PCCP pavement. There will be no cost adjustment for these cases.
- i. All patched areas where the adjacent pavement thickness is different from the thickness of PCCP patch are to be accurately shown on the as-built plans.

7.2.3 HMA Partial Depth Patch

Any HMA Partial Depth Patching required by IFA shall be per the Standard Specifications Section 507.05(b) – Partial Depth Patching.

7.2.4 Temporary Pavement

Temporary pavements shall be designed to accommodate the anticipated traffic loading that the pavement will experience during the construction period.

Temporary pavement should be engineered using the standards and procedures for new construction. Temporary pavement shall meet the performance requirements included in Section 11.2 of these Technical Provisions.

7.3 Certification

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

7.4 Pavement Design Reports

Design-Build Contractor shall prepare and submit Preliminary Pavement Design Reports as a Hold Point for review and approved by INDOT. Pavement Design Reports shall be signed and sealed by a Registered Professional Engineer.

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.
- Discussion of the input parameters, rationale and assumptions used.
- Site plan showing the limits of the roadway element covered by the design report.
- Typical cross section drawings for the recommended pavement design strategy.

(This page is intentionally blank)

8.0 DRAINAGE

8.1 Drainage General

1. New storm sewer drain shall be a minimum of 6 inches above the ditch flowline elevation.
2. Existing field tile drainage shall be maintained at times. Any field tiles disturbed by Design-Build Contractor shall be replaced.
3. Existing cross culverts within Section A and B shall remain in place unless additional measures are indicated in the Reference Plans. Additional measures for existing cross culverts shall be as shown on the Reference Plans, or replaced with a hydraulically equivalent structure or pipe lining. Equivalency is defined as possessing the same or better hydraulic characteristics per INDOT design criteria, except backwater criteria has been waived and proposed headwater shall be at or below the existing conditions, but shall not overtop the roadway.
4. Existing cross culverts within Section C are tabulated in the Reference Information Documents. These cross culverts shall be evaluated for structural and hydraulic capacity.

Structural capacity shall be determined from the most recent culvert inspection report. Interpretation of the rating for Type I Culverts and Pipes, and shall be as follows:

a. Unlined Culverts

- Overall Rating less than or equal to 4, culvert shall be replaced
- Overall Rating greater than 4 and less than 8, culvert may be lined provided that the lined culvert will meet hydraulic requirements. If lining the culvert will not meet hydraulic requirements it shall be replaced.
- Overall Rating greater than or equal to 8, culvert may remain in place

b. Lined Culverts

- Overall Rating less than or equal to 4, culvert shall be replaced
- Overall Rating greater than 4, culvert may remain in place

Hydraulic capacity shall be evaluated for lined and unlined culverts. Lined culverts shall be evaluated for both the pre-lined condition and lined condition. Proposed hydraulic capacity shall be in accordance with Indiana Design Manual In-Kind Replacement or Pipe Lining design requirements, except backwater criteria has been waived and proposed headwater shall be at or below the existing conditions, but shall not overtop the roadway. The minimum waterway opening shall be equivalent to a 36-inch diameter pipe.

5. All existing drainage structures that will no longer be used shall either be removed and backfilled with structure backfill, Type 5, or filled with structure backfill, Type 5.
6. The ditch slope may be reduced to 0.1%, in isolated locations pending approval of IFA.
7. Inlet spacing, storm drain capacity, and slotted drain computations shall be performed by the Design-Build Contractor in accordance with the Indiana Design Manual.
8. Median ditches, median inlet spacing and median drain capacity computations shall be performed by the Design-Build Contractor in accordance with the Indiana Design Manual for the 2% annual EP storm such that the hydraulic grade line does not encroach onto the travel lanes. Provisions for the 1% annual EP storm are waived. All metal median drain pipes shall be replaced or lined. Additional median drain pipes and inlets shall be added as required to meet capacity requirements.
9. Detention design in Hamilton County shall be designed by the Design-Build Contractor in accordance with the Indiana Design Manual except as modified herein.
 - a. Detention shall be required for the additional impervious surfaces added as part of the projects. Control devices shall limit the discharge to a rate such that the post-construction release rate for each discharge location is no greater than 0.1 cfs per acre of additional impervious surface areas added to the pre-construction discharge for the remainder of the site for 0-10 year return interval storms and 0.3 cfs per acre of additional impervious surface areas added to the pre-construction discharge for the remainder of the site for 11 - 100 year return interval storms.
 - b. The runoff rate shall be determined by a computer model that can generate hydrographs based on the NRCS TR-55 time of concentration and curve number calculation methodologies and the 24-hour NRCS Type 2 Rainfall

Distribution. Note that for the purpose of determining the post-developed conditions curve numbers, due to significant disturbance to the upper soil layers during the construction activities, the initially determined hydrologic soil group for disturbed areas shall be changed to the next less infiltrating capacity category (i.e., A to B, B to C, and C to D). 24-hour Rainfall depth for various frequencies shall be taken from the table below:

Rainfall Depth (inches)						
Duration	Return Period (years)					
	2	5	10	25	50	100
24 hrs.	2.66	3.27	3.83	4.72	5.52	6.46

Examples of computer models that can generate such hydrographs include TR-55 (NRCS), TR-20 (NRCS), HEC-HMS (COE), and HEC-1 (COE). These programs may be downloaded free of charge from the associated agencies' web sites. The computer models ICPR and Pond Pack may also be used. However, the latter computer software are proprietary. If interconnected ponds are utilized, the use of ICPR or Pond Pack may be required by Hamilton or Madison County to appropriately model the more complex hydrologic and hydraulic relationships associated with such system.

- c. The pool level for the detention basins shall not encroach on the clear zone, unless it is protected with guardrail. .
- d. Design computations and associated plans shall be submitted to:

Steven J. Cash
 Hamilton County Surveyor's Office
 One Hamilton County Square, Suite 188
 Noblesville, IN 46060-2230
 Ph: (317) 776-8495
 steve.cash@hamiltoncounty.in.gov

The transmittal letter shall be copied to:

Kenton Ward
 Hamilton County Surveyor
 (same address)

10. Detention design in Madison County shall be designed by the Design-Build Contractor in accordance with the Design Manual except as modified herein.

- a. Design computations shall be in accordance with the Madison County Stormwater Technical Standards Manual, current edition, except that control devices shall limit the discharge to a rate such that the post-construction release rate into Thorpe Creek is equal to or less than the pre-construction release rate for the 1% EP storm event.
- b. Design computations and associated plans shall be submitted to:

Jeff Healy, P.E.
Banning Engineering PC
853 Columbia Rd, Suite 101
Plainfield, IN 46168
Ph: (317) 707-3717 |
jhealy@banning-eng.com

The transmittal letter shall be copied to:

Madison County Drainage Board
c/o Anjie Cox
Madison County Government Center
16 east 9th Street
Anderson, IN 46016
acox@madisoncounty.in.gov

8.2 Underdrains

1. Underdrains shall be installed along all roadways in accordance with the Indiana Design Manual and Standard Specifications.
2. All underdrains shall outlet a minimum of 6 inches above the ditch flowline.

8.3 Cured-in-Place Thermosetting Resin Pipe Liner (CIPP) (USP)

1. Description

This work shall consist of the fabrication, installation, and curing of a tight-fitting, resin-impregnated fabric, cured-in-place pipe liner, hereinafter referred to as CIPP, into existing circular or deformed pipe structures in accordance with Standard Specification 105.03.

2. Materials

CIPP shall be in accordance with ASTM D 5813, Type III, grade 1, 2, or 3, and shall be UV and abrasion resistant. The manufacturer shall determine the proper grade of the CIPP to be used under the installation and operation conditions that will exist for the location in which the CIPP is to be used. CIPP shall be designed in accordance with ASTM F 1216 and appendix X1 for a fully deteriorated condition.

3. Construction Requirements

- a. MAINTENANCE OF DRAINAGE: Drainage shall be maintained during the installation and curing operations in a manner that does not damage adjacent property.
- b. PRE-INSTALLATION REQUIREMENTS: Before beginning the CIPP installation operation, three copies of design calculations shall be submitted to the Engineer. The design calculations shall be sealed by a professional engineer and shall certify:
 - 1) The proposed CIPP thickness was determined in accordance with ASTM F 1216,
 - 2) The required curing pressure, and
 - 3) The proposed waterway opening is in accordance with the plans.

Prior to installing the CIPP, a video inspection of the structure shall be performed. This inspection is to identify cavities in the structure that need to be repaired, identify connecting structures that shall be perpetuated, etc. The video shall become the property of the Department. Cavities adjacent to the existing structure shall be filled in accordance with Standard Specification 725.05. Existing jagged edges or other deformities that impact the CIPP operation or function shall be repaired in accordance with the manufacturer's recommended procedures. All foreign material shall be removed from the existing structure in accordance with the ASTM specifications for the installation method and disposed of in accordance with Standard Specification 203.10.

- c. INSTALLATION REQUIREMENTS: CIPP shall be installed by the inversion method or the pulled-in-place method. Inversion installation of the CIPP shall be in accordance with ASTM F 1216. Pulled-in-place installation of the CIPP shall be in accordance with ASTM F 1743.

If the Design-Build Contractor elects to use polyester resin, all condensate water and all water in contact with the inside or outside of the CIPP during the curing process and until the CIPP has cooled to ambient temperature shall be collected and tested for styrene concentration levels. If the level of styrene concentration is equal to or greater than 100 parts per billion (0.1 mg/L), the contaminated water shall be disposed of at an appropriate disposal facility.

Cured CIPP shall be inspected and videotaped for workmanship. Defects in workmanship as defined in ASTM D 5813 section 6.2 shall be repaired or the CIPP shall be replaced so it meets the requirements of these specifications. The repaired or replaced CIPP shall be re-videotaped. The video tape shall become the property of the Department. The installed CIPP shall be tested for delamination in accordance with the appropriate ASTM specification. The cured CIPP shall be cut within 6 inches of the ends of the existing structure. Where beveled inlets are required, the details shown in the plans shall be followed. Existing connections, including underdrains or another pipe structure, to the structure to be lined shall be perpetuated through the CIPP.

The CIPP shall be permanently marked with a stainless steel label with a minimum thickness of 0.080inch located above the structure low water elevation and within 6 inches of the structure end. The information shown on the label shall be at least ½ inch tall and include the month and year of installation, the CIPP source, and the ASTM material specifications.

d. QC/QA PROCEDURE:

- 1) For each existing structure lined, a type A certification in accordance with Standard Specification 916 and a test report in accordance with ASTM D 5813, section 7.3 shall be submitted.
- 2) An independent laboratory shall test field-cured samples from each CIPP installation. Appropriate documentation for the independent laboratory shall be provided prior to installation of the CIPP. Testing results shall be provided to the Engineer within 7 days of receipt.
- 3) At each structure to be lined, two flat plate samples shall be field cured and submitted for testing. The samples shall be taken directly from the wet out tube, clamped between flat plates and cured in the downstream end of the tube. As an alternative, two restrained end samples may be used for CIPPs installed in pipes between 8 and 18 inches in diameter, or equivalent. The field-cured samples shall be

submitted to the laboratory within 3 days of the completion of the installation.

- 4) The field-cured samples shall be conditioned, prepared, and tested in accordance with ASTM D 5813. The wall thickness and flexural tests need only be performed on the structural portion of the CIPP only.

(This page is intentionally blank)

9.0 STRUCTURES

9.1 Bridge Structures General

1. All rehabilitated structures shall be designed for HS20-44 loading in accordance with the 2002 AASHTO Standard Specifications for Highway Bridges, 17th Edition, and subsequent interim specifications. No bridge structure replacements are anticipated as a part of this project. Any elective replacement structures shall be designed for HL-93 loading in accordance with 6th Edition AASHTO LRFD Bridge Design Specifications and subsequent interim specifications. All bridges shall be designed using Indiana Design Manual, INDOT Specifications, and applicable INDOT Design Memoranda.
2. Superstructure designs shall not include side-by-side box beams.
3. Bridges shall be composite and shall also be continuous over interior supports.
4. Steel bridges shall utilize grade 50 or 70 painted or weathering steel. If weathering steel is utilized, details shall be provided to minimize staining of MSE walls, abutments and/or piers. Hinges or pin and hanger type connections are not allowed. Fracture critical elements and fatigue prone details (AASHTO Category “E” or “F”) are not permissible.
5. Place new snowplowable pavement markers and barrier delineators on all bridges.
6. Concrete bridge railing shall be used on all bridge structures and shall be TL-5 for all I-69 structures. For all other structures, Type PF-1 or PS-1 shall be used, as applicable.
7. Concrete bridge railing transitions shall be placed at each bridge corner, and TGB transitions shall be placed where guardrail is warranted.
8. New work shall match the geometry of existing bridges.
9. New approach slab and bridge concrete shall be Surface Sealed in accordance with the Indiana Design Manual. Existing bridge railings and copings to remain shall also be Surface Sealed.
10. New full-width reinforced concrete bridge approach slabs shall be constructed at all bridges. Approach slabs shall be connected to new and existing pavement ledges, and shall be detailed such that they may not be poured concurrently with bridge deck. Place Type 1A joints as required.

11. Place Sacrificial Anodes per Section 9.3 along all interfaces where cleaned and straightened steel is cast in new concrete.
12. The Load Rating for Bridges shall be submitted and approved by IFA before superstructure shop drawings are submitted for review.
13. The structures shall be constructed in phases to accommodate the MOT Plans and the maintenance-of-traffic requirements. Level One Design Criteria shall be met unless an approved design exception is obtained.
14. Drainage features shall be designed to eliminate or minimize the need for bridge deck drains. Wherever possible, existing bridge deck drains should be preserved, and bridge drainage shall be directed to riprap drainage turnouts. New open bridge deck drains shall be located no closer than 10 feet from a substructure unit.
15. Foundation Design shall be in accordance with the Geotechnical Evaluation Report.
16. If driven pile foundations are used, the number of dynamic pile load tests required and locations where dynamic pile load tests are to be performed shall be in accordance with the recommendations in the Geotechnical Evaluation Report.
17. Any concrete placement with a least dimension of 5.0 feet or more shall be considered mass pour concrete and shall be placed in accordance with the mass pour special provision. Drilled shaft concrete shall not be considered mass pour concrete.
18. If drilled shafts are proposed, the Design-Build Contractor shall submit a special provision for drilled shaft construction to IFA for review. The special provision shall include the name of the proposed drilled shaft subcontractor, the subcontractor's qualifications and experience, proposed materials, construction methods and equipment, proposed use of temporary and permanent casing, slurry, provisions for obstructions, proposed final cleanout and shaft acceptance methods prior to concrete placement, proposed concrete placement methods, preparation for Crosshole Sonic Logging (CSL) and Impact Resistance Spectrum (IRS) testing as described below, and proposed construction tolerances.
19. If drilled shafts are used, the Design-Build Contractor shall provide and install pipes for CSL tests in all shafts, with a minimum of 4 pipes or one pipe for every foot of perimeter, whichever is greater. CSL testing and IRS testing will be provided by IFA. The Design-Build Contractor shall provide site access, test area

preparation and staff to facilitate the testing as required. If the tests indicate that there are zones of defective concrete within a shaft, the defects will be jointly evaluated by IFA and the Design-Build Contractor. In cases where the nature or extent of a defect remains uncertain, excavation or core-sampling of the defective zone may be required in order to permit visual or laboratory assessment of the material. Such excavation or core-sampling shall be performed by the Design-Build Contractor while an IFA representative is present.

- a. In the event that a defect is considered deleterious to the performance of the shaft, options for the repair or replacement of the shaft will be considered. Repair or replacement shall be completed to the satisfaction of IFA. No payment will be made for repair or replacement of defective shafts.
- b. If IFA determines that the drilled shaft is unacceptable based on the CSL tests, the shaft shall either be replaced or cored in accordance with the sub-article below to permit further evaluation.
- c. A production shaft which has been determined to be unacceptable on the basis of the CSL tests shall be cored to determine the quality of the concrete. One core shall be taken from each defective shaft for the full depth of the shaft at no additional cost to IFA.

20. If driven pile foundations are used, the number of dynamic pile load tests required and locations where dynamic pile load tests are to be performed shall be in accordance with the recommendations in the Geotechnical Evaluation Report.

21. Design and construct foundations and structures to meet the following performance criteria:

- a. Post-construction settlement of bridge piers and abutments: Less than 1.0 inch total settlement and less than 0.5 inch differential between adjacent piers or abutments.
- b. Lateral deflection at top of foundations for non-seismic loading: As required for serviceability of the Design-Build Contractor's design, but not to exceed 1.0 inch.

22. Seismic design of the structure shall be based on the soil profile type as recommended in Geotechnical Evaluation Report.

23. Patch piers, crash walls and undersides of decks as necessary to repair all delamination and spalling.

24. Requirements for Structures to be Widened:

- a. The cross-section of the bridges shall be widened to carry the full traveled way width.
- b. Remove existing overlay and mill existing bridge decks, perform hydrodemolition. Milling depth may be variable (no less than ¼") if necessary to maintain HS20 load rating.
- c. On mainline I-69 structures, the Department considers the existing rail at outside shoulders an FT equivalent and therefore it may remain in-tact.
- d. Place a variable depth (1¾" min.) latex-modified concrete overlay on entire deck surfaces. Minimum cross-slope shall be 1.5%.
- e. Place riprap drainage turnouts at ends of railing transitions, on shoulders that receive drainage. Drainage shall not be turned out above the envelop structure backfill. Backfill with Type B-borrow when using MSE wall.
- f. Widened end bents shall be poured semi-integral or integral.
- g. Blast Clean end tops of steel beam top flanges, as well as ends of beams at end bents where concrete is to be poured permanently against steel.
- h. Slopewalls and riprap slopes shall be widened to 2' outside widened bridge decks underneath structure.
- i. Widened piers shall emulate the configuration of the existing piers.

25. Requirements for Structures receiving deck replacements:

- a. Remove barrier rails, concrete deck, approach slabs, barrier transitions, and a short section of guardrail at all bridge corners to re-connect to existing guardrails.
- b. Remove mudwalls down to bridge seat and a minimum of 5'-0" of the bridge deck at end bents.
- c. New end bents shall be poured semi-integral.
- d. Blast Clean end tops of steel beam top flanges, as well as ends of beams at end bents where concrete is to be poured permanently against steel.

26. No work is required on the following structures:

- a. Structure No. I69-4-05310B (116th Street over I-69)

- b. Structure No. 37SB-09803 (SB SR 37 over SB 116th St. Exit Ramp)
- c. Structure No. 37NB-09802 (SR 37 NB over I-69)
- d. Structure No. I69-5-05312 A (Cumberland Road over I-69)
- e. Structure No. I69-6-09834 (Now known as I69-206-09834 (126th Street over I-69)
- f. Structure No. I69-10-09133 (Olio Road over I-69)
- g. Structure No. I69-12-05319A (Cyntheanne Road over I-69)
- h. Structure No. 38-48-04370B (State Road 38 Road over I-69)

9.2 Bridge Structures Unique Special Provisions

9.2.1 Existing Overlay Removal, Hydrodemolition and Latex Modified Concrete Overlay for Bridge Deck (USP)

1. Description

This work shall consist of the removal of the existing bridge deck overlay followed by preparation of the exposed bridge deck surface in accordance with 722, and shall involve milling and the use of hydrodemolition. Subsequent to the deck preparation, the work shall consist of constructing a latex modified portland cement concrete overlay.

2. Materials

Materials shall be in accordance with Standard Specification 722.02 and as follows.

- a. Evaporation retardant shall be one of the products listed below. A Type D certification in accordance with 916 shall be furnished to the Engineer prior to use.
 - 1. MasterKure ER 50, manufactured by BASF
 - 2. Sika-Film, manufactured by Sika Corporation
 - 3. Eucobar, manufactured by Euclid Chemical Company

3. Storage and Handling of Materials

Storage and handling of materials shall be in accordance with Standard Specification 722.03.

4. Construction Requirements

a. Removal of Existing Concrete Overlay

When an existing deck overlay is to be removed, the removal shall be performed with a milling machine. Removal in areas that are inaccessible to the milling machine, shall be done by chipping hammers or hand chipping.

b. Deck Scarification

The deck surface shall be scarified by surface milling to an initial depth of ½ in or as otherwise shown in plans. The milling operation shall be limited to the portion of the deck that is closed to traffic at any one time. After the initial surface milling, additional milling may be required as directed.

Surface milling shall be performed with a milling machine capable of removal to the required depth. The equipment shall be self-propelled with sufficient power, traction and stability to maintain accurate depth of cut and slope. The equipment shall be capable of accurately and automatically establishing profile grades along each edge of the machine by referencing the existing bridge deck by means of a ski or matching shoe.

If the milling operation results in the snagging of the top mat of steel reinforcement, the milling operation shall be stopped and the depth of removal adjusted. Any damaged reinforcing bars shall be repaired as directed at no additional cost.

c. Hydrodemolition

Hydrodemolition shall be used to remove all unsound concrete in accordance with Standard Specification 722.05(a)2. The hydrodemolition equipment shall consist of a self-propelled computerized machine that utilizes a high pressure water jet stream capable of removing concrete as specified herein, as well as removing rust and concrete particles from exposed reinforcing bars. The hydrodemolition equipment shall be calibrated and approved prior to use.

Prior to hydrodemolition, the equipment shall be calibrated on an area of sound original deck concrete as designated by the Engineer.

The initial settings shall be verified on an area of unsound concrete. The initial settings may need to be adjusted in order to achieve total removal of

unsound concrete. Calibration of the hydrodemolition equipment shall be conducted for every day of operation and, if necessary, re-calibrated to ensure removal of known areas of delaminated concrete as well as to guard against removal of sound concrete. The Engineer shall be notified of the final equipment settings resulting from the calibration process.

After calibration of the equipment, concrete removal by hydrodemolition shall be conducted on the bridge deck. The removal will be verified as necessary, every 30 Ft. along the cutting path. Hand chipping shall be used in areas that are inaccessible to the self-propelled hydrodemolition equipment. Hand chipping tools may be hand or mechanically driven and operated.

The Design-Build Contractor shall submit a waste water control and disposal plan for approval prior to commencing hydrodemolition activities. The waste water control and disposal plan shall detail how all waste water generated by the hydrodemolition activities shall be contained, tested for pH, stored and transported to a disposal facility in accordance with Standard Specification 202.

The Design-Build Contractor shall provide shielding to ensure containment of all dislodged concrete during hydrodemolition operations to prevent damage to surrounding property and from flying debris both on and under the work site.

Cleaning of the hydrodemolition debris and slurry shall be performed with a vacuum system equipped with fugitive dust control devices and capable of removing wet debris and water in the same pass. The vacuum equipment shall be capable of washing the deck with pressurized water during the vacuum operation to dislodge all debris and slurry from the bridge deck surface. Debris and slurry shall not be allowed to dry prior to vacuuming.

d. Additional Unsound Concrete Removal After Hydrodemolition

After hydrodemolition has been completed, the deck will undergo sounding to identify remaining areas of unsound concrete. The deck surface shall be completely dry prior to sounding.

Additional concrete removal will be directed by the Engineer and shall be performed by hand chipping or hydrodemolition. Only hand chipping tools shall be used when removing concrete within 1 inch of reinforcement.

Where the deck is sound for less than half of its original depth, the concrete shall be removed full depth except for limited areas as determined by the Engineer. Forms for areas of up to 4 SF may be suspended from wires attached to the reinforcing bars. For areas greater than 4 SF, the forms shall be supported from the structural members of the superstructure or by shoring from below.

Where reinforcing bars have been exposed and the bond between the existing concrete and the reinforcing bars has been destroyed, the concrete adjacent to the reinforcement shall be removed to a minimum clearance of 1 inch around the circumference of the exposed reinforcement.

Where reinforcing bars have been exposed and the concrete in contact with reinforcing bars is sound, the additional removal of 1 inch around the circumference of the exposed reinforcement may be waived by the Engineer.

Any damaged reinforcing bars shall be repaired as directed at no additional cost. The removal area shall be cleaned of all dirt, foreign materials and loose concrete to the extent necessary to produce a firm solid surface for adherence of the new concrete. A minimum 1 inch vertical surface shall remain, or be cut 1 inch, outside and around the entire periphery of each full depth removal area after removal of all loose and unsound concrete. The 1-in. vertical cut may be waived if it is determined that a cut will damage the reinforcement.

e. Preparation of Bridge Floor Prior to Overlay Placement

After completion of hydrodemolition and any additional concrete removal, the deck shall be sounded to ensure that all unsound concrete has been removed. Not more than 24 hours prior to the placement of the overlay, the deck shall be cleaned in accordance with 722.05(b) and as follows. Water blasting may be used in lieu of sandblasting. The sandblasting or water blasting shall be performed using two passes with the second pass being at a right angle to the first pass or a cross-blasting technique. The minimum pressure of the water blast shall be 7,500 psi.

f. Patching of the Bridge Floor

Full depth patching of the bridge floor shall be in accordance with Standard Specification 722.06(a).

g. Proportioning and Mixing

Proportioning and mixing of the latex modified concrete shall be in accordance with Standard Specifications 722.04 and 722.08, respectively.

h. Placing and Finishing

Placement and finishing of the latex modified concrete overly shall be in accordance with Standard Specification 722.09 except that a bond coat shall not be applied to surfaces where the removal was accomplished by hydrodemolition. Evaporation retardant shall be applied in accordance with the evaporation retardant manufacturer's recommendations to the surface of the latex modified concrete immediately after every second transverse pass of the burlap or pan drag on the finishing machine is completed. Reapplication of the evaporation retardant shall be performed to all areas where the surface has been disturbed after the application of the evaporative retardant, such as from bull floating or hand finishing, or when drying of the surface is observed. The evaporation retardant shall be used as such and not as a finishing aid. Excessive amounts shall not be applied and worked into the latex modified concrete surface.

i. Texturing and Curing

Texturing and curing shall be in accordance with Standard Specifications 722.10 and 722.11, respectively. When a portion of the grooving or tining, not to exceed 5 ft longitudinally, is complete, the evaporative retardant shall be re-applied to the freshly textured surface.

j. Calibration of Continuous Mixers

Calibration of continuous mixers shall be in accordance with Standard Specification 722.12.

k. The waste water control and disposal plan, waste water containment, testing, storing, transporting and disposal, and any incidentals related to the carrying out of the plan shall be included in this work. If the waste water is found to have a pH of 12.5 or higher it will be classified as hazardous and must be treated accordingly. The initial equipment calibration, any re-calibration, equipment shielding, handchipping curb areas, handchipping unsound concrete, cleaning of debris and slurry, compressed air cleaning, water blasting, and sandblasting shall be included in this work.

9.2.2 Embedded Galvanic Anodes (USP)

1. Description

This work shall consist of the installation of galvanic anodes directly to the existing cleaned reinforcing bars as a means of corrosion protection. The galvanic anodes shall be installed along the concrete deck widening interface as described herein, or by the manufacturer.

a. Summary

- 1) This Section includes furnishing all labor, tools, materials, equipment and services necessary to properly install embedded galvanic anodes.
- 2) Embedded galvanic anodes are designed to provide localized corrosion protection. When placed at the appropriate spacing along the perimeter of concrete patches or along the interface between new/existing concrete, the anodes mitigate active corrosion and the formation of new corrosion sites in the adjacent existing concrete.

b. References

- 3) ACI/ICRI Concrete Repair Manual
- 4) ACI Guideline No. 222 – Corrosion of Metals in Concrete
- 5) ACI Repair Application Procedure (RAP) Bulletin 8 – Installation of Embedded Galvanic Anodes (2010)
- 6) ICRI Guideline 310.1R-2008 Guide for Surface Preparation for the Repair of Deteriorated Concrete resulting from Reinforcing Steel Corrosion
- 7) ASTM B418-12 – Standard Specification for Cast and Wrought Galvanic Zinc Anodes

2. Materials

a. Embedded Galvanic Anodes

Embedded galvanic anodes shall be Anode “Type 1A Class C” with the following approximate dimensions: 3 inches long by 3 inches wide by 2 inches deep. The anodes shall be pre-manufactured with a minimum 100 grams of zinc in compliance with ASTM B418 Type II cast around a pair of uncoated, non-galvanized steel tie wires and encased in a highly alkaline cementitious shell.

The galvanic anodes shall be alkali-activated and shall contain no intentionally added chloride, bromide or other constituents that are corrosive to reinforcing steel as per ACI 562-13. Anode units shall be supplied with integral unspliced wires for directly tying to the reinforcing steel. Embedded galvanic anodes shall be one of the following:

- 1) Galvashield® XP2 available from Vector Corrosion Technologies (www.vector-corrosion.com) USA. Contact: Eric Thorpe, (720) 236-5910.
- 2) SENTINEL SILVER® available from Euclid Chemical (www.euclidchemical.com) 19218 Redwood Road, Cleveland, OH 44110. Phone: (800) 321-7628.
- 3) EMACO CP® Intact 105G from BASF North America <http://www.master-builders-solutions.basf.com/en-basf/Pages/ContactForm.aspx> Phone: (800) 526-1072.

Application for approved equals shall be requested in writing two weeks before submission of project bids. Application for galvanic anode approved equals shall include verification of the following information:

- 1) The zinc anode is alkali-activated with an alkaline cementitious shell.
- 2) The galvanic anode shall contain no intentionally added constituents corrosive to reinforcing steel, e.g. chloride, bromide, etc.
- 3) The anode manufacturer shall provide documented test results from field installations showing that the anodes have achieved a minimum of 10 years in service.
- 4) The galvanic anode shall have been used in a minimum of ten projects of similar size and application.
- 5) The galvanic anode units shall be supplied with solid zinc core (ASTM B418) cast around uncoated, non-galvanized, non-spliced steel tie wires for wrapping around the reinforcing steel and twisting to provide a durable steel to steel connection between the tie wire and the reinforcing steel.
- 6) The anode manufacturer shall provide third party product evaluation, such as from Concrete Innovations Appraisal Service, BBA, etc.

b. Repair Materials

- 1) Anodes are to be embedded in fresh concrete. If repair mortars, concrete or bonding agents should become necessary, they shall be portland

cement-based materials with suitable electrical conductivity less than 15,000 ohm-cm. Non-conductive repair materials such as epoxy, urethane, or magnesium phosphate shall not be permitted. Repair materials with significant polymer modification and/or silica fume content may have high resistivity. Insulating materials such as epoxy bonding agents shall not be used unless otherwise called for in the design.

- 2) If higher resistance repair materials are used other than concrete, use an embedding mortar or as otherwise directed by manufacturer to create a conductive bridge to the substrate prior to repair material installation.

c. Storage

Deliver, store, and handle all materials in accordance with manufacturer's instructions. Anode units shall be stored in dry conditions in the original unopened containers in a manner to avoid exposure to extremes of temperature and humidity.

3. Construction Requirements

a. Concrete Removal

- 1) Remove concrete areas in accordance with plans and Section 202.
- 2) Undercut all exposed reinforcing steel by removing concrete from the full circumference of the steel as per ICRI R310.1R. The minimum clearance between the concrete substrate and reinforcing steel shall be $\frac{3}{4}$ inch (19 mm) or $\frac{1}{4}$ inch (6 mm) larger than the top size aggregate in the repair material, whichever is greater.

b. Cleaning and Repair of Reinforcing Steel

- 1) Clean exposed reinforcing steel of rust, mortar, etc. to provide sufficient electrical connection and mechanical bond.
- 2) If significant reduction in the cross section of the reinforcing steel has occurred, replace or install supplemental reinforcement as directed by the engineer of record.
- 3) Secure loose reinforcing steel by tying tightly to other bars with steel tie wire.
- 4) Verify electrical continuity of all reinforcing steel, including supplemental steel, as per Section 9.3.3.c.5) below.

- 5) If the reinforcing steel is to receive a barrier coating, do not coat the reinforcing steel within 1 inch (25mm) of the anode and do not apply coating to any surface of the anode or the steel tie wires.

c. Galvanic Anode Installation

- 1) Install anode units and repair material immediately following preparation and cleaning of the steel reinforcement.
- 2) Galvanic anodes shall be installed along the interface between new and old concrete in a pattern alternating between top and bottom steel throughout the entire structure length. Spacing shall be as recommended by manufacturer but not to exceed 30 inches.
- 3) Place the galvanic anodes as close as possible to the concrete interface while still providing sufficient clearance between anodes and existing concrete to allow the new concrete to fully encase the anode with a minimum concrete or mortar cover over the anode of 1 inch (25mm).
 - i. Place the anode such that the unit fits along a single bar or at the intersection between two bars and secure to each clean bar.
 - ii. If less than 1 inch (25 mm) of concrete cover is expected, place anode beneath the bar and secure to clean reinforcing steel.
- 4) The tie wires shall be wrapped around the exposed cleaned reinforcing steel at least one full turn in opposite directions and then twisted tight to create a secure electrical connection and allow no anode movement during concrete placement.
- 5) Electrical Continuity
 - i. Confirm electrical connection between anode tie wire and reinforcing steel by measuring DC resistance (ohm) or DC potential (mV) with a multi-meter.
 - ii. Confirm electrical continuity of the exposed reinforcing steel within the repair area. If necessary, electrical continuity shall be established by tying discontinuous steel to continuous steel using steel tie wire.
 - iii. Electrical continuity acceptance levels to be in accordance with manufacturer's recommendations.

6) Manufacturer Corrosion Technician

- i. The Design-Build Contractor will enlist and pay for a technical representative employed by the galvanic anode manufacturer to provide training and on-site technical assistance during the initial installation of the galvanic anodes.
- ii. The qualified corrosion technician shall have verifiable experience in the installation and testing of embedded galvanic protection systems for reinforced concrete structures.
- iii. The Design-Build Contractor shall coordinate its work with the designated corrosion technician to allow for site support during project startup and initial anode installation. The corrosion technician shall provide Design-Build Contractor training and support for development of application procedures, verification of electrical continuity, and project documentation

9.3 Specific Bridge Requirements

9.3.1 Bridge Structures No. 1 & 2: I-69 NB & SB over Sand Creek

File Structure No. I69-6-05313-DNBL (I-69 NB over Sand Creek) and Structure No. I69-6-05313-DSBL (I-69 SB over Sand Creek)

1. The structure shall be rehabilitated and widened in accordance with the Section 9.1 except as modified herein:
 - a. Place riprap scour protection around Piers 2 and 3, in accordance with the scour report.

9.3.2 Bridge Structure No. 3: Brooks School Road over I-69

File Structure No. I69-8-05315B (Brooks School Road over I-69)

1. The structure shall be rehabilitated with a deck replacement in accordance with the Section 9.1 except as modified herein:
 - a. Remove and replace concrete slopewalls at Bents No. 1 and 5.
 - b. Minimum final vertical clearance (under) shall be 16'-0".

9.3.3 Bridge Structure No. 4 & 5: I-69 NB & SB over Mud Creek

File Structure No. I69-10-05318-DNBL (I-69 NB over Mud Creek) and I69-10-05318-DSBL (I-69 SB over Mud Creek)

1. The structure shall be rehabilitated and widened in accordance with the Section 9.1.

9.3.4 Bridge Structure No. 6: Campus Parkway over I-69

File Structure No. (I69) 238-29-05317C (Campus Parkway over I-69)

1. The structure and approach slabs shall be rehabilitated and widened in accordance with Section 9.1 except as modified herein:
 - a. The cross-section of this bridge shall accommodate the full roadway section, a minimum 10'-0" wide shared use path (left) separated by barrier curb or other means, and a 5'-0" wide sidewalk (right), and barrier rails.
 - b. Existing approach slabs may be rehabilitated by milling ¼" depth and performing partial depth patching as needed prior to overlay.
 - c. New structural steel, steel rails and pedestrian fence shall be painted the same color as the rest of the structure. Paint color shall be in accordance with Federal Color Standard 595c, Color 14062 (Deep Hemlock Green).
 - d. Mill existing bridge deck ¼" depth, perform partial depth patching as needed.
 - e. If drainage is to be outlet to sideslopes, place riprap drainage turnouts or protection.
 - f. Place a catch basin or other adequate drainage in the sloped wall berm under deck drain at the SW end of Bent No. 1, to address an existing erosion issue. Associated pipe under embankment shall be no less than 12 inch diameter.

9.3.5 Bridge Structure No. 7: I-69 NB over Thorpe Creek

File Structure No. I69-13-05320-JCNB (I-69 NB over Thorpe Creek)

1. The structure shall be rehabilitated and widened in accordance with Section 9.1.

9.3.6 Bridge Structure No. 8: I-69 SB over Thorpe Creek

File Structure No. I69-13-05320-CSBL (I-69 SB over Thorpe Creek)

1. The structure shall be rehabilitated and widened in accordance with Section 9.1.

9.3.7 Bridge Structure No. 9: I-69 NB over State Road 13

File Structure No. I69-13-05321-CNBL (I-69 NB over State Road 13)

1. The structure shall be rehabilitated and widened in accordance with Section 9.1 except as modified herein:
 - a. Remove mudwalls down to bridge seat and a minimum of 5'-0" of the bridge deck and outside shoulder barrier rail at end bents. Pour existing end bents Semi-Integral.

- b. This particular deck was cast 10” thick in order to address a field change. Non-destructive testing has been performed (See RID).
- c. Any railing removed for end bent rehabilitation shall be replaced with FT Rail, placed continuous with existing rail. Any geometric discontinuities shall conform to the *FHWA Roadside Design Guide*.
- d. Superelevation shall match that of the approach roadway.
- e. Patch pier crashwalls as necessary to repair all delamination.
- f. Extend riprap spillslopes entirely across median.
- g. Minimum final vertical clearance (under) shall be 14.6 feet (14’-7 ¼”) to provide the maximum practical clearance for truck traffic.
- h. Slopewall barrier railing beneath the bridge may remain in place if it remains sufficient for slope retaining purposes.
- i. The vertical curve of the roadway and the bridge do not match at this structure. Adjustments shall be made so that the vertical curve of the roadway on each approach matches the vertical curve across the bridge.

9.3.8 Bridge Structure No. 10: I-69 SB over State Road 13

File Structure No. I69-13-05321-CSBL (I-69 SB over State Road 13)

- 1. The structure shall be rehabilitated and widened in accordance with Section 9.1 except as modified herein:
 - a. Remove mudwalls down to bridge seat and a minimum of 5’-0” of the bridge deck and outside shoulder barrier rail at end bents. Pour existing end bents semi-integral.
 - b. Blast Clean ends of beams at end bents, as well as the top of top flanges where exposed by deck removal.
 - c. Portions of outside shoulder rail shall be replaced with FT Rail, placed continuous with existing rail. Any geometric discontinuities shall conform to the *FHWA Roadside Design Guide*.
 - j. Superelevation shall match that of the approach roadway.
 - d. Minimum final vertical clearance shall be 14.6 feet (14’-7 ¼”) to provide the maximum practical clearance for truck traffic.

9.3.9 Bridge Structure No. 11: County Road 650 West over I-69

File Structure No. I69-15-05323A (County Road 650 West over I-69)

1. The bridge superstructure and substructure shall be rehabilitated with the following treatments:
 - a. Mill existing bridge deck ½” depth, perform hydrodemolition partial depth patching as needed. Place a variable depth (1¾” min.) latex-modified concrete overlay on entire deck surface and approach slabs. Minimum cross-slope shall be 1.5%.
 - b. Replace approach slabs.
 - c. Mill approaches 1½” deep for the entire length of approach transition roadway overlays to address poor pavement conditions.
 - d. Replace barrier rails with rails of an appropriate Test Level.
 - e. Replace barrier transitions and tie into existing guardrail at all bridge corners.
 - f. Remove 5'-0” of the bridge deck ends, mudwalls down to the bridge seats, and rocker bearings. Replace with Semi-Integral End Bents.
 - g. If drainage is to be outlet to sideslopes, place riprap drainage turnouts or protection.
 - h. Install new deck drainage as necessary. Drains shall not outlet over travel lanes or shoulders.

9.3.10 Bridge Structures No. 12 & 13: I-69 NB & SB over Fosters Branch

File Structure No. I69-16-05324-CNBL (I-69 NB over Fosters Branch) and Structure No. I69-16-05324-CSBL (I-69 SB over Fosters Branch)

1. The structure shall be rehabilitated and widened in accordance with Section 9.1 except as modified herein:
 - a. For any work on these structures, a scour report shall be submitted for approval and provide any recommended scour protection.
 - b. Remove a 2' wide by 9” deep concrete strip at 1A Joint and replace.

9.4 Retaining Wall Structures

1. All walls shall be designed in accordance with all applicable INDOT and AASHTO specifications.

2. Retaining wall types shall not include modular block, bin walls, gabion walls, or prefabricated modular walls. Extensible ground reinforcement shall not be used. Wall types are subject to approval by IFA.
3. Proposed MSE walls shall be in accordance with the Standard Specifications, AASHTO Specifications, and FHWA-NHI-10-024, GEC 11. Material specifications for wall types other than MSE walls shall be in accordance with INDOT’s Standard Specifications and AASHTO specifications. All retaining wall components shall be designed in accordance with the Standards and Specifications.
4. Where exposed heights of retaining walls adjacent to a sidewalk are unprotected by railing, appropriate permanent fall hazard protection shall be installed on retaining wall structures.

9.5 Sound Walls

Sound walls shall be Type III in accordance with the recurring special provisions with the exception that it shall be designed in accordance with 6th Edition AASHTO LRFD Bridge Design Specifications and subsequent interim specifications.

- a. Any changes to the sound wall location may require the Design-Build Contractor to revise the existing noise analysis. The revised noise analysis shall be submitted to IFA and FHWA for approval.
- b. Sound walls shall not be located in the floodway of Sand Creek.
- c. The geotechnical evaluation required to design and construct the sound barrier shall be the responsibility of the Design-Build Contractor.
- d. Signing details for the sound barriers shall be the responsibility of the Design-Build Contractor.
- e. Sound Wall Fire Hydrant Access Doors in accordance with Section 9.6 shall be placed in sound walls wherever fire hydrants are located within 400 feet of the edge of shoulder of I-69. The locations of doors include but not limited to the locations noted in the following table:

Approximate Station	Street Name
362+00 “A”	Standing Tree Way
367+70 “A”	Cross Roads Lane
369+80 “A”	Landmark Trail
373+50 “A”	Clark Drive
379+00 “A”	Blue Springs Lane

382+20 "A"	Blue Sky Drive
506+00 "A"	Loyalty Drive
508+40 "A"	Heroic Way
513-20 "A"	Republic Drive
519+60 "A"	All American Rd

9.6 Sound Wall Fire Hydrant Access Door Features (USP)

1. Description

This work shall consist of furnishing and installing handles, signs, and raised pavement markers (RPMs) in accordance with this special provision and in reasonably close conformance with the locations shown on the plans or as directed.

2. Materials

The door shall have no locks. The handle shall be of the lever type. Signs and RPMs shall meet the requirements of 919.01 and 921.02 respectively. The door shall have a plunging type deadbolt that is controlled by the highway side lever handle with no key or locking mechanism. An exterior grade closing mechanism shall be included to cause the door to close automatically.

3. Construction Requirements

One handle shall be placed on the highway side of the fire hydrant access door to make it accessible from the highway side only. The right-of-way side shall not have a handle. The gap between the door's threshold and the bottom of the door shall have enough clearance to accommodate vegetation growth, snow and ice, or any other potential obstructions.

There shall be three signs for each door, mounted on the highway side. The first sign above the door frame shall state, "Fire Hydrant Access". The legend of the second sign, mounted just below the first sign, shall be the street name or highway number of the roadway the hydrant is accessed from. The third sign shall be positioned on the door itself, and shall indicate the perpendicular distance in feet between the nearest point on the highway edge line to the fire hydrant.

A blue RPM shall be installed in the shoulder edge line at the nearest point perpendicular to the door as directed by the Project Engineer. If existing RPMs are available when the sound wall is being installed, the nearest shoulder RPM will have the reflector changed to blue as directed by the Project Engineer.

(This page is intentionally blank)

10.0 TRAFFIC

10.1 Pavement Markings

1. Extended warranty preformed plastic shall be used for longitudinal pavement markings. This includes edge lines, lane lines, dotted lines, broken lines and longitudinal gore lines.
2. New snow-plowable raised pavement markers shall be installed along I-69 and Campus Parkway; and all interchange ramps where work is proposed.

10.2 Signing

1. The Design-Build Contractor shall develop the signing plans in accordance with the Indiana Design Manual and Indiana MUTCD. Signs in accordance with the current standards may be reset or left in place, as required.
2. The Design-Build Contractor is to use INDOT standard sign structures and foundations where possible. An special sign structures that are required shall be designed per IDM Section 502-1.01(11) and 502-1.01(12).
3. Enhanced reference marker signs shall be placed every 0.1 miles within the project limits.
4. The Design-Build Contractor shall coordinate with Indiana Business Logo for all existing Logo signs.
5. Signs or sign structures shall not be mounted on the bridge overpass structures.
6. No signs shall be banded/installed to utility poles, lighting poles, or overhead or cantilever sign structure uprights.
7. Sign lighting for newly installed panel signs is not required.
8. The maintenance of traffic during installation of sign structures shall be included in the overall MOT scheme. Exit directional signs for maintenance of traffic shall be mounted on the overhead sign structure.

10.3 Indiana Logo Signs (USP)

1. Description

This work shall consist of coordinating with the Indiana Logo Sign Group and relocating existing Indiana Logo Sign Group panel signs. The Indiana Logo Sign Group panel signs are the blue specific information panel signs that have a

separately attached sign consisting of a single or multicolored symbolic design unique to a product, business, or service facility located on wide flange structures within the I-65 right-of-way. They are used to identify traveler services that are available on a crossroad at or near an interchange or an intersection. The Design-Build Contractor shall coordinate with the Indiana Logo Sign Group regarding the timeline for the relocation of the signs. The Design-Build Contractor shall remove, store and relocate the existing panel sign, remove the existing wide flange foundations and install new wide flange foundations for the signs at its new location.

2. Materials

Foundation removal shall be performed with standard construction equipment and per the requirements of the 2014 INDOT Standard Specifications.

3. Construction Requirements

The Design-Build Contractor shall contact the Office Administrator of the Indiana Logo Sign Group at the address below a minimum of five business days prior to the preconstruction meeting for this project and a minimum of five business days before relocation of the signs begins.

Indiana Logo Sign Group 600 East
96th Street Indianapolis, IN 46240
Contact: Lulu Rose, Office Administrator
(317) 202-1690, Ext. 7012
Toll Free: 1-800-950-1093, Ext. 7012
Fax:(317) 495-9883

Throughout the course of the project, the Design-Build Contractor shall supply bimonthly updates to the Indiana Logo Sign Group Office Administrator updating on the projected timeliness of the sign relocations.

10.4 Traffic Signals

1. The Design-Build Contractor shall be responsible for designing and constructing the traffic signals at the two I-69 Ramps and Campus Parkway / Southeastern Parkway Intersections.
2. All traffic signal heads shall comply with INDOT Standard Specification 922.03.
3. The traffic signals at Campus Parkway / Southeastern Parkway shall utilize decorative signal mast arms and poles in accordance with Section 10.5 Existing signal mast arms and poles may be re-used if suitable for the intersection

geometry and structural loading. The Design /Builder shall provide the size and design of the signal foundation.

4. The Design-Build Contractor shall provide signal interconnection between the two signals at Campus Parkway / Southeastern Parkway with Hamilton County Highway Department signals along Campus Parkway.
5. The Design-Build Contractor shall conduct a meeting with the District Traffic Engineer within 3 weeks of award of contract. The District Traffic Engineer is:

Jim Poturalski
INDOT, Greenfield District
32 S Broadway St
Greenfield, IN 46140
Phone: 317-467-3446
Email: jpoturalski@indot.in.gov

10.5 Campus Parkway Signal Cantilever Structure

1. This work shall consist of furnish and install the decorative signal poles and mast arms for any required traffic signals within the interchange.
2. Signal poles and mast arms shall be in accordance Standard Specification 922 except as modified herein.
 - a. The signal pole cross section shall be 16-sharp flute and the mast arm shall be 8-sharp flute.
 - b. The poles, mast arms and decorative base shall be of color dark hemlock.
 - c. The decorative base for the pole shall match the cast and fluting of the signal pole.
3. Construction requirements shall be in accordance with Standard Specification 805 except as modified herein.

Existing signal poles and mast arms may be removed and reset as long as the Design-Build Contractor certifies the signal head locations are in accordance with the mast arm and signal pole structural loading capacity.

The Design-Build Contractor shall supply a working drawing of the signal pole foundation design certified by a Registered Indiana Professional Engineer.

10.6 Lighting

1. The Design-Build Contractor shall design and install lighting at the following I-69 interchanges:
 - a. I-69 at Campus Parkway / Southeastern Parkway - Full interchange lighting is required per the Indiana Design Manual.
 - b. I-69 at SR13 – Partial interchange lighting is required per the Indiana Design Manual.
 - c. I-69 at SR 37 / 116th Street – Design-Build Contractor shall make necessary modification to the existing lighting to provide full interchange lighting per the Indiana Design Manual lighting design criteria, to cover the added pavement area.
 - d. The Design-Build Contractor shall include the cost in their bid for providing power to any new services points.
2. The Design-Build Contractor shall coordinate the heights of highmast structures with IFA and the U. S. Federal Aviation Administration (FAA) to comply with FAA requirements, and apply for permits if necessary.
3. The Design-Build Contractor shall contact and coordinate with the local utility company before installing a new service point.
4. All the existing light structures such as highmast towers, conventional light poles and underpass lights shall be removed without an outage. The Design-Build Contractor shall maintain proper illumination at all times.
5. The light poles and luminaires west of the I-69 interchange along Southeastern Parkway shall be salvaged and delivered to the Noblesville Street Department.
6. The Design-Build Contractor shall coordinate installations and metering of service points with the INDOT Greenfield District Traffic Engineer.

11.0 MAINTENANCE OF TRAFFIC

11.1 Maintenance of Traffic Design Criteria

1. The maintenance of traffic shall be in accordance with special provisions and the Indiana Manual on Uniform Traffic Control Devices. All conflicting speed limit signs shall be revised to indicate the proper speed limit. All construction activity within construction clear zone shall be protected with temporary concrete barrier.
2. The Design-Build Contractor shall be responsible the Transportation Management Plan (TMP) in accordance with Chapter 81 of the Indiana Design Manual. IFA will provide a list of TMP members to the successful bidder.
3. The Design-Build Contractor shall design the traffic control plan in accordance with Chapter 82 and 83 of the Indiana Design Manual.
4. The design speed and posted speed on I-69, ramps, state highways and local roads shall be the existing posted speed limit on approaches to the work zone, with a maximum 10-mile-per-hour speed reduction within the work zone; The posted speed can be reduced an additional 10 miles per hour in the work zone using flashing worksite speed limit assemblies as shown in the Department Standard Drawings 801-TCDV-10 and 801-TCDV-11 and “When Workers Are Present” signing.
5. The Design-Build Contractor shall provide 8 Portable Changeable Message Signs with Aries Field Processors, in accordance with Section 801 of the Standard Specifications. The signs shall be in place ten days before any lane restricting activities.
6. The minimum MOT lane width shall be 11 feet on Interstate, Ramps, State, city and county routes. Twelve foot lanes are preferable.
7. Acceleration and deceleration lanes shall be provided at all I-69 entrance and exit ramps that are open to traffic.
8. Pavement Edge Drop-offs:
 - a. Drop-off conditions 3 inches or less shall be delineated by barrels, vertical panels, or tubular markers spaced every 40 feet or a distance in feet equivalent to two times the speed limit in miles per hour, whichever is less.
 - b. Drop-offs greater than 3 inches shall comply with the following restrictions:

- i. When drop-off is a result of excavations adjacent to traffic with a horizontal separation of 0 to 2 feet, the drop-off shall be limited to 500 feet in continuous length per location unless positive protection is provided before excavation commences. Locations of drop-offs shall be separated by at least 1.0 mile.
 - ii. Shall be wedged with dense graded aggregate or HMA on a 3:1 (H:V) or flatter slope if horizontal separation is less than 8 feet between traffic and the drop-off or positive protection is provided. If a horizontal separation of 8 feet or greater can be achieved between traffic and the drop-off, no wedging is required. Developer shall provide the wedge prior to the stoppage of work at that location.
 - iii. Shall be delineated by barrels spaced every 40 feet or at an interval in feet equivalent to two times the speed limit in miles per hour, whichever is less.
 - c. Temporary drop-offs during working hours in which construction operations are taking place shall be kept to a minimum, and are restricted to off-peak hours
9. Temporary crossovers shall be per standard drawings 801-TCCO-02 and 801-TCCO-03. Final location of the crossovers shall have prior approval of IFA.
10. A paved shoulder must be provided where they are used for maintaining traffic.
11. Drainage shall be maintained at all times during all phases of construction.
12. Existing and/or proposed mile markers shall be maintained during construction.
13. Access to all INDOT Intelligent Transportation System (ITS) equipment shall be maintained at all times. ITS equipment is identified on the plans.
14. If traffic is split, construction signing shall direct trucks to utilize the right most lanes.
15. Crossover protection for opposing traffic shall be in place throughout the duration of the project and the limits shall not be any less than is currently provided by the existing median protection.
16. Barriers shall not impede snow removal operations. To facilitate snow removal operations by INDOT, from December 1 through March 31 each year the Design-Build Contractor shall maintain open areas along I-69 with a minimum 4 feet inside shoulder and 8 feet outside shoulder. Based on conditions and weather

forecast at the time the December 1 date may be extended until December 15 and the March 31 date may be extended back to March 1. The IFA has sole discretion to approve any extension.

17. Coordination with the hospitals, emergency services and Klipsch Music Center shall be done prior to every stage on Campus Parkway/Southeastern Parkway. Additional signs and message boards may be necessary to detour traffic during concert events.

11.2 Maintenance of Traffic Pavement Performance Standards (USP)

1. The performance standards defined herein shall apply to all Design-Build Contractor implemented temporary HMA or PCCP pavement constructed for maintenance of traffic operations, and to existing shoulders used for MOT operations. Any occurrence of noncompliance with the performance standards shall be corrected within a twelve (12) hour period from the time noncompliance is reported by IFA to the Design-Build Contractor in writing. Any areas not meeting these performance requirements are subject to liquidated damages per the PPA Exhibit 10.
2. Pavement distresses are identified in Federal Highway Administration publication no. FHWA-RD-03-031.
3. For MOT HMA pavements, the mainline pavement shall be constructed and maintained in accordance with current INDOT Standard Specification, Section 400 HMA mixtures. For PCCP pavements, the mainline pavement shall be constructed and maintained in accordance with current INDOT Standard Specification, Section 500 PCCP mixtures.
4. The Design-Build Contractor shall provide all traffic control, templates, straight edges and measuring devices required by Project Engineer to monitor compliance with requirements of this section.
5. New Temporary HMA Pavement Performance Standards
 - a. No occurrence of pavement shoving shall exceed 2.0 square feet in area at any location.
 - b. 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.
 - c. No edge drop-off shall exceed 0.5 inches in depth for a continuous length of 15 feet or more
 - d. No depression exceeding 0.5 inches in depth (e.g., pothole) shall exceed 0.5 square feet in area.

- e. No bump exceeding 0.5 inches in height shall exceed 0.5 square feet in area.
 - f. 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
 - g. There shall be no occurrences of fatigue cracking at any location on the MOT pavement.
6. New Temporary PCCP Pavement Performance Standards
- a. There shall be no occurrences of faulting (0 inch) at any location on the MOT pavement.
 - b. No pavement crack (transverse, longitudinal or otherwise) on the MOT pavement shall exceed 0.125 inches in width.
 - c. There shall be no use of roller-compacted concrete as MOT pavement.
7. Existing HMA Shoulder Performance
- a. If the existing shoulder pavement is to be used as MOT pavement, then the entire existing shoulder width shall be milled including any existing shoulder corrugations, and the shoulder shall be resurfaced prior to MOT operations.
 - b. No occurrence of pavement shoving shall exceed 2.0 square feet in area at any location.
 - c. 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.
 - d. No edge drop-off shall exceed 0.5 inches in depth for a continuous length of 15 feet or more.
 - e. No depression exceeding 0.5 inches in depth (e.g., pothole) shall exceed 0.5 square feet in area.
 - f. No bump exceeding 0.5 inches in height shall exceed 0.5 square feet in area.
 - g. 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.
 - h. There shall be no occurrences of fatigue cracking at any location on the MOT pavement.

11.3 Traffic Operations Analysis

Using no-build traffic data, or if not available, existing traffic counts supplemented by additional traffic counts by Design-Build Contractor, the Design-Build Contractor shall test all MOT phases proposed on the Project to ensure no operational or safety issues are created by the TMP. The traffic alternative analysis shall be submitted to

IFA with the MOT Plans and be subject to the same review requirements. The traffic analysis shall be summarized in report format, and all supporting documentation shall also be submitted to IFA. Design-Build Contractor may utilize Quewz-98 or similar programs to model the expected queue lengths and delay times that will be generated.

The following thresholds for freeways and arterials shall be used by the Design-Build Contractor in the evaluation of the work zone mobility impacts:

1. I-69 and Ramps

- a. Traffic operations shall conform to the Interstate Highway Congestion Policy with approved policy exceptions shown in Table 11-3. The Design-Build Contractor is responsible for applying for and receiving INDOT executive approval for any additional policy exceptions required for closures.

2. Signalized Intersections

- a. If the LOS on each approach to a signalized intersection is between A and C, then the LOS during MOT operations on each approach shall not be reduced below a D with an average control delay per vehicle of up to 45 seconds per vehicle (s/veh). If the 45 s/veh control delay is exceeded, alternative strategies shall be submitted to IFA for approval. If the existing LOS on each approach is D or worse, then the control delay during MOT operations on each approach shall not increase more than 30 percent. If the 30 percent threshold is exceeded, alternative strategies shall be submitted to IFA for approval.

3. Unsignalized Intersections

- a. If the LOS on each approach under stop or yield control is between A and C, then the LOS during MOT operations on each approach shall not be reduced below a D with an average control delay per vehicle of up to 30 s/veh. If the 30 s/veh control delay is exceeded, alternative strategies shall be submitted to IFA for approval. If the existing LOS on each approach is D or worse, then the control delay during MOT operations on each approach shall not increase more than 30 percent. If the 30 percent threshold is exceeded, alternative strategies shall be submitted to IFA for approval.

4. Queues

- a. If, under the MOT condition, the forecast design hour 95th percentile traffic queues or observed queues on the ramps spillback to I-69 mainline, or to the adjacent intersections along Campus Parkway/Southeastern Parkway, alternative strategies shall be submitted to IFA for approval.

Table 11-1: Allowable Construction Closures

[NOTE TO PROPOSERS: LIQUIDATED DAMAGES FOR PROHIBITED LANE CLOSURES AND LANE CHARGES ARE STILL UNDER REVIEW AND SUBJECT TO CHANGE]

No.	A Facility	B Allowable Construction Closures	C Other Allowable Construction Closures with Approval	D Lane Charges for Other Allowable Closures with Approval	E Remarks
I-69 Mainline Lanes					
1	I-69 NB and SB (Overhead Work)	Nighttime 20 minute duration Construction closure of all lanes from 10 pm to 6 am to erect overhead structures.	None.	N/A	Per INDOT Interstate Highway Congestion Policy Exception.
2	I-69 SB (116th to 106th St)	Construction closure of one SB lane to construct 116th SB auxiliary lane and I-69 SB added travel lane except no lane restrictions while Campus Parkway is experiencing lane restrictions due to construction.	None	N/A	

TECHNICAL PROVISIONS – Section 11
Maintenance of Traffic

No.	A Facility	B Allowable Construction Closures	C Other Allowable Construction Closures with Approval	D Lane Charges for Other Allowable Closures with Approval	E Remarks
3	I-69 NB and SB (116th to Campus Parkway)	Construction closure of one NB lane Weekdays from 9 pm to 6 am and one SB lane 7 pm to 6 am. Construction closure of one lane in each direction Weekends 7 pm to 9 am (except Monday am) and Holidays 9 pm to 6 am.	Construction closure of one NB lane Weekdays from 6 am to 9 pm and one SB lane 6 am to 7 pm. Construction closure of one lane in each direction Weekends 9 am to 7 pm and Holidays 6 am to 9 pm.	YES	Per INDOT Interstate Highway Congestion Policy Exception.
4	I-69 NB and SB (Campus Parkway to SR 13)	Construction closure of one NB lane Weekdays from 9 pm to 6 am and one SB lane 7 pm to 6 am. Construction closure of one lane in each direction Weekends 7 pm to 9 am (except Monday am) and Holidays 9 pm to 6 am.	Construction closure of one NB lane Weekdays from 6 am to 9 pm and one SB lane 6 am to 7 pm. Construction closure of one lane in each direction Weekends 9 am to 7 pm and Holidays 6 am to 9 pm.	YES	Pending Approval of INDOT Interstate Highway Congestion Policy Exception.

TECHNICAL PROVISIONS – Section 11
Maintenance of Traffic

No.	A Facility	B Allowable Construction Closures	C Other Allowable Construction Closures with Approval	D Lane Charges for Other Allowable Closures with Approval	E Remarks
5	I-69 NB and SB (SR 13 to Lapel Road)	Construction closure of one NB lane Weekdays from 9 pm to 6 am and one SB lane 7 pm to 6 am. Construction closure of one lane in each direction Weekends 7 pm to 9 am (except Monday am) and Holidays 9 pm to 6 am.	Construction closure of one NB lane Weekdays from 6 am to 9 pm and one SB lane 6 am to 7 pm. Construction closure of one lane in each direction Weekends 9 am to 7 pm and Holidays 6 am to 9 pm.	YES	Pending Approval of INDOT Interstate Highway Congestion Policy Exception.
Ramps and Other Roadways					
6	I Ramps and Other Roadways (Overhead Work)	Nighttime 20 minute duration Construction closure of all lanes from 10 pm to 6 am to erect overhead structures.	None	NO	Per INDOT Interstate Highway Congestion Policy Exception. Coordination with Klipsch Music Center on concert events required.

TECHNICAL PROVISIONS – Section 11
Maintenance of Traffic

No.	A Facility	B Allowable Construction Closures	C Other Allowable Construction Closures with Approval	D Lane Charges for Other Allowable Closures with Approval	E Remarks
7	SR 37 SB Ramps	One ramp lane Construction Closure may be permitted outside of the 2016-2017 and 2017-2018 Hamilton Southeastern District School Sessions if: (a) queue length does not extend north of 126th Street and (b) Campus Parkway is not experiencing lane restrictions due to construction.	Any other Construction Closure of the Facility.	NO	
8	Brooks School Road	Construction Closures not during the 2016-2017 and 2017-2018 Hamilton Southeastern District School Sessions	Construction Closures during the 2016-2017 and 2017-2018 Hamilton Southeastern District School Sessions with School District's agreement.	NO	
9	Campus Parkway/Southeastern Parkway	Construction Closure of one westbound lane during interchange reconstruction except during construction of 116th SB Ramp and SR 37 SB Ramp.	None	NO	Auxiliary lanes required as per traffic operations requirements stipulated in Technical Provisions. Coordination with Klipsch Music Center on concert events required.

TECHNICAL PROVISIONS – Section 11
Maintenance of Traffic

No.	A Facility	B Allowable Construction Closures	C Other Allowable Construction Closures with Approval	D Lane Charges for Other Allowable Closures with Approval	E Remarks
10	Campus Parkway & I-69 SB Ramp Intersection	Must meet Intersection Traffic Operations Criteria stipulated in Technical Provisions except no lane restrictions during construction of 116th SB Ramp or SR 37 SB Ramp.	None	NO	Coordination with Klipsch Music Center on concert events required.
11	Southeastern & I-69 NB Ramp Intersection	Must meet Intersection Traffic Operations Criteria stipulated in Technical Provisions except no lane restrictions during construction of 116th SB Ramp and SR 37 SB Ramp.	None	NO	Coordination with Klipsch Music Center on concert events required.
12	SR 13 Ramp Intersections	Must meet Intersection Traffic Operations Criteria stipulated in Technical Provisions.	None	NO	Coordination with Klipsch Music Center on concert events required.

TECHNICAL PROVISIONS – Section 11
Maintenance of Traffic

No.	A Facility	B Allowable Construction Closures	C Other Allowable Construction Closures with Approval	D Lane Charges for Other Allowable Closures with Approval	E Remarks
13	CR 650 W	Construction Closures not during the 2016-2017 and 2017-2018 South Madison County Community School Corporation's School Sessions.	Construction Closures during the 2016-2017 and 2017-2018 South Madison County Community School Corporations School Sessions with School's agreement.	NO	
14	SR 38 Ramp Intersections	Must meet Intersection Traffic Operations Criteria stipulated in Technical Provisions.	None	NO	Coordination with Klipsch Music Center on concert events required.

NOTES:

1. Any Allowable Construction Closure in Column B of Table 11-1 must be planned in accordance with these Technical Provisions, including the Remarks in Column E. Design-Build Contractor shall provide notice of such Construction Closure, including any supporting documentation, to IFA at least two (2) weeks in advance. Failure to provide notice and supporting documentation in such timely manner shall make the Construction Closure a Prohibited Construction Closure.
2. Design-Builder may request Construction Closures that are within the parameters of Other Allowable Construction Closures with Approval in Column C of Table 11-1. Such requests for Construction Closures may be approved on a case by case basis in IFA's sole discretion, and may require submittal of technical information, including traffic queuing analyses. All such approved Construction Closures for I-69 mainline lanes within the parameters of Other Allowable Construction Closures with Approval in Column C in of Table 11-1 are subject to the Lane Rental Charges as set forth in PPA Exhibit 10, Table 10-2.
3. Any Construction Closure that does not meet the requirements set for in this Table 11-1 and Notes shall be a Prohibited Construction Closure and subject to Liquidated Damages as set forth in PPA Exhibit 10, Table 10-1.

11.4 Public Information Meetings (USP)

1. The Design-Build Contractor shall be responsible for coordinating with the Department about and for conducting a minimum of three public information meetings regarding lane closures, alternate routes, detours and any other important information or information of interest to the public. The Design-Build Contractor shall be responsible for securing a site of the meeting in the area of the project. The meeting times shall be as agreed upon and shall occur in the evening hours. Meetings shall be held as necessary per the direction of the Engineer, specifically for informing the public about major changes in the maintenance of traffic or lane closures.
2. The costs incurred by the Design-Build Contractor for the public information meeting shall be included in the lump sum price for Design/Build.

11.5 Incident Management Plans (USP)

The Design-Build Contractor is advised that the Department will be implementing Incident Management initiatives on this project. This concept requires coordination between key project personnel and the various agencies responding to crashes and incidents within the limits of the project. This system makes the best use of the assets available to obtain access to the incident scene for emergency vehicles as quickly as possible and return traffic flows to normal with the least inconvenience to the motoring public. This system will also better facilitate responses to injured workers within the project area.

The single most valuable component in Incident Management is coordination. Coordination of resources on the job as well as coordination between all the emergency services providers is a must for efficient response in emergency situations. Prior to the award of this contract, the Department will establish an Incident Management Task Force comprised of many of the agencies that will likely be involved in the event of an emergency within or adjacent to the work zone.

The Incident Management Task Force facilitated by the Department is responsible for establishing policies and procedures that specifically address the detection, verification, response, management, and clearance of incidents within or adjacent to the work zone. The Design-Build Contractor shall assign at a minimum the designated Worksite Traffic Supervisor to participate in the task force as the Design-Build Contractor's Incident Management Liaison.

Prior to the start of construction the Incident Management Liaison shall arrange for a brief, 1 to 2 hour, Incident Management training session for the Design-Build Contractor's key personnel, superintendents and lead foremen, to be conducted by the

Department. This training will help to familiarize the Design-Build Contractor's personnel to the incident management procedures developed by the task force that will need to be followed throughout the project. It will be the responsibility of the Incident Management Liaison to update these personnel when changes to the incident management plan are implemented.

The Design-Build Contractor's Incident Management Liaison shall coordinate all incident response requirements per the Indiana Design Manual, Chapter 81, Traffic Incident Management Plan with:

Mr. Guy Boruff
Director, Public Safety Operations Indianapolis Traffic
Management Business Unit 8620 East 21st Street
Indianapolis, Indiana 46219
Telephone: 317-899-8605
E-mail: gboruff@indot.in.gov

The Incident Management Liaison shall prepare and distribute Incident Management Maps as approved by IFA to agencies identified by the Incident Management Task Force. Maps shall be updated at a minimum of once per change of phase in maintenance of traffic plan or at the discretion of the Incident Management Task Force. The maps shall be no larger than 11 inches by 17 inches, in color, to scale, and include at a minimum the following:

1. Outline of the roadway geometry
2. Open travel lanes/ramps colored in green
3. Closed travel lanes/ramps with active construction in orange
4. Closed travel lanes/ramps accessible to emergency traffic in red
5. Fire hydrants within 500 ft of the state right-of-way. This information is readily available from the local Water Company.
6. Temporary emergency vehicle access points with identifiers defined by the Engineer
7. Rally points for emergency vehicle escorts into the work area with identifiers defined by the Engineer
8. Control points as designated by the Engineer, such as mile markers and block numbers.

9. Emergency road closure, diversion, points with identifiers defined by the Engineer
10. Diversion equipment locations with quantities
11. All entrance and exit ramps shall be uniquely identified and labeled

The Incident Management Liaison shall meet with local fire department representatives no later than 10 days prior to a change in the maintenance of traffic pattern to coordinate computer aided dispatch response plans.

The Incident Management Liaison shall coordinate with the Department Incident Management Task Force meetings as follows:

1. A minimum of 14 days before a phase change in the maintenance of traffic pattern.
2. A supplementary meeting a minimum of seven days before a change in the maintenance of traffic pattern.
3. A minimum of one meeting per month during any maintenance of traffic phase with a duration of more than 30 days.

The Incident Management Liaison shall maintain the list of Incident Management Task Force members. This list shall include at a minimum the following: name, department, work phone, fax, email, pager, unit/car number. The list shall be sorted in alphabetical order by department and then last name. The Incident Management Liaison shall notify members of the Incident Management Task Force of meetings no later than 14 days prior to the meeting.

The Incident Management Liaison shall hold regularly scheduled meetings each month with the Incident Management Task Force members and present project status photos in a slide presentation.

The Design-Build Contractor shall designate a person or persons capable of coordinating the Design-Build Contractor's resources who shall be available and on call by the freeway service patrol 24 hours a day, 7 days a week. If necessary, in the event of an incident, the designees shall have a response time of less than 30 minutes to the site to oversee the use of the Design-Build Contractor's resources to help resolve an incident. The designees shall also be prepared to contact any necessary Design-Build Contractor's personnel outside normal working hours.

In the event of a major incident while construction operations are underway, the Design-Build Contractor's personnel may be required to assist in urgently establishing road or ramp closures to isolate incident scenes. Also, the Design-Build Contractor's heavy

equipment may be required to assist in moving wreckage or debris from the travel lanes and realigning temporary barriers to facilitate reopening the road to normal traffic. The Incident Management Liaison shall coordinate these activities with the law enforcement or fire department officials on the scene and the Department's Indianapolis Traffic Management Center as needed.

The Design-Build Contractor shall remove disabled vehicles from the within the project limits at the request of the Project Engineer and shall respond within 45 minutes of the request. The Design-Build Contractor shall provide a suitable location to store disabled vehicles until the owner can retrieve the vehicle.

To facilitate with closures and provide current road conditions in an emergency situation, the Design-Build Contractor shall supply at a minimum the following pieces of equipment to be located as directed by the Department Traffic Management Business Unit:

1. Flashing arrow sign for each interstate mainline approach to the work zone including ramps leading to the work zone.
2. Safety drums for every lane on the mainline where the flashing arrow sign is positioned.

The Incident Management Liaison will not be required to meet the 30 minute response time during the winter months when all lanes and ramps are open to normal traffic.

11.6 Incident Response Requirements (USP)

The Design-Build Contractor shall coordinate all incident response requirements in accordance with the Indiana Design Manual, Chapter 81, Traffic Management Plan, with:

Ms. Kimberly Peters
Incident Management Operations Director Indianapolis
Traffic Management Business Unit 8620 East 21st Street
Indianapolis, Indiana 46219
Telephone: 317-899-8619
E-mail: kpeters@indot.in.gov

(This page is intentionally blank)

12.0 INTELLIGENT TRANSPORTATION SYSTEMS

12.1 General Requirements

1. One existing Intelligent Transportation System (ITS) site will be impacted during construction as shown in the plans at the following locations:

- a. Replace ATR Station at Sta. 253+60 Line “A”

Any other existing or recently constructed ITS facilities within the project limits shall be maintained and undisturbed during construction.

2. The Design-Build Contractor shall meet with INDOT ITS Department to coordinate final design and installation.

12.2 Automatic Traffic Recorder Controller (USP)

1. Description

The Design-Build Contractor shall furnish and install an Automatic Traffic Recorder (ATR), ATR, Controllers, including Hardware and software for collecting, processing, storing, transmitting, to a host computer, and manipulating information related to the counting, classifying, speed monitoring, and weighing, Weigh- In-Motion, of all vehicles. A new service point shall be provided for the ATR.

2. Materials

All materials, equipment, and cabling, forming parts of ATR controllers, shall be new and approved by the Engineer. ATR controllers shall meet or exceed the following criteria:

- a. Power Source Options will be determined by the Engineer at the time of task assignment and shall be one of the following:

- 1) ATR controllers shall be equipped with a 120 volt AC power supply with a 12 Volt 7 AH battery. Each backup battery shall maintain the operation of the controller to collect the current study configuration for a period no less than 30 days prior to recharging. Diminished or expelled voltage or the disconnecting of the backup battery shall not interrupt ATR operations.

- 2) ATR controllers shall be equipped with a 12 Volt DC power supply.

- b. Memory:

- 1) ATR controllers shall be equipped with a minimum of 2MB of usable internal battery-backed RAM.
 - 2) ATR controllers shall be equipped with a Secure Digital (SD) data storage module and a 4GB SD.
- c. Field Setup and Monitoring:
- 1) ATR controllers shall be equipped with a 16 key keypad and a 4 line 20 character per line Liquid Crystal Display with full alphanumerical capability for setup and monitoring.
 - 2) ATR controllers shall be equipped with preprogrammed setup files for quick setup of standard studies.
 - 3) File storage shall be user selectable in the ATR controller to write files to the CPU module or SD card module. The setup files shall have the ability to be copied from unit to unit.
 - 4) Modifications to the Classification Algorithm shall be able to be performed remotely via TCP/IP communications.
 - 5) The following parameters shall be capable of being changed, monitored or reset by personnel onsite via the integral keyboard and display and remotely via TCP/IP communications.
 - i. Time and date
 - ii. Classification table
 - iii. Site number
 - iv. Station number
 - v. Study configuration
 - vi. Type of files required
 - vii. Sensor calibration settings
 - viii. Recording interval
 - ix. Battery status
- d. Count Rate: Each ATR controller shall be capable of processing a minimum of 200 sensor inputs per second.
- e. Accuracy: Each ATR controller shall be capable of recording and classifying minimally 95% of the vehicles passing through the sensors arrays at each ATR station. Each ATR controller shall meet the accuracy requirements set forth by the Highway Performance Monitoring System (HPMS), the Federal

Highway Administration (FHWA) and the American Society for Testing and Materials (ASTM).

- f. Software: The ATR controller vendor shall furnish Windows compatible software that allows the user to program, poll, convert and edit the data to a format that satisfies the Administration's requirements.
 - 1) Software upgrades shall be provided for a period of two years at no additional cost.
 - 2) Communications shall be via TCP/IP compatible IP addressed cellular modem at 19200 baud. The software and system shall be supplied set to operate at a default rate of 19200 baud.
- g. Sensors: Each ATR controller shall be expandable for loops, piezos, contact closures and Weigh-In-Motion (WIM) sensors through the addition of optional plug-in sensor modules.
 - 1) Hardware and Firmware provided shall be compatible with Quartz (Kistler type) piezo WIM sensors without the need for a separate charge amplifier.
 - 2) All new and replacement sensors shall be approved by INDOT/ITS, be of current technology, capable of meeting INDOT/ITS accuracy requirements and compatible with the existing WIM or ATR equipment.
 - 3) All new and replacement ATR and PCC site sensors shall be approved eleven foot (11') class-1 piezo sensors with an appropriate lead length to extend to the cabinet without any splices or extensions.
- h. Leads and sensor wires:
 - 1) Sensor leads shall be sealed with cold sealant per 906.02, and include factory BNC connectors attached.
 - 2) All wires exposed to daylight shall have UV protected insulation.
 - 3) Manufacture approved or supplied grout shall be used to install all sensors.
- i. Conduits:
 - 1) All conduits shall be PVC per 805.12 unless specifically noted.
- j. Controller Configuration: 8 lanes or less of Loop Axle Loop arrays shall include: 3 – 4 channel loop modules, 1 - 8 channel piezo module, Keyboard &

display and SD module with 4GB Card. All vacant slots in ATR controllers shall be covered by a face plate.

- k. Accessories: ATR controller shall be equipped with the necessary power supply, cables and harnesses to interface the controller with the power service configuration, backup battery, roadway sensors and wireless modem.
- l. Enhanced Operation. Each ATR controller shall have an enhanced operation mode which allows the controller to be configured to collect multiple data sets for each lane over a user defined interval.
 - 1) Enhanced operation mode shall be independent from the ATR controller's present study and both modes shall run simultaneously.
 - 2) Enhanced operation mode recording intervals shall be independently configurable from the recording intervals in the ATR controller's present study and shall be configurable from 10 seconds up to 60 minutes.
 - 3) Enhanced operation mode shall have the ability to combine data into individual flow, lane or sensor array, directional totals or overall total.
- m. Documentation: The ATR controller manufacturer shall provide three sets of operating manuals, service manuals and maintenance instructions for all components making up an ATR controller.
- n. Technical Assistance: The ATR controller manufacturer shall provide the Design-Build Contractor with technical assistance for installing, interfacing with sensors and modem, testing, training and calibrating the ATR controller at each installation site.
- o. Warranty: The Design-Build Contractor shall arrange for vendors to warranty their equipment for not less than five years after the date of final acceptance of all work in the contract. Final acceptance by the Department will not occur until the entire contract has been completed and accepted.

The warranty shall cover, at a minimum all work and materials for all ITS equipment components and hardware including, but not limited to, vehicle detectors, closed circuit television cameras, pan-tilt-zoom mechanism, all video control equipment, component software and all communication equipment including radios, antennas, and cables. Documentation shall be provided for all equipment to show compliance with warranty requirements.

Warranty repairs shall provide for temporary or permanent equipment substitution of items that are essential to prevent a system critical incident while equipment is being repaired.

- p. Extended Warranty: The ATR controller manufacturer shall provide an extended warranty after all standard warranties have expired for a period covering remaining duration of this contract.

3. Construction Requirements

a. Leads and Sensor Wires

- 1) Quartz and Piezo sensor leads shall not be spliced and shall not contain any extension cables. The leads shall be continuous from the sensor to the termination in the cabinet.
- 2) Lead-in wire shall be in conduit. No section of any lead-in wire can be direct buried or encased in HMA or PCCP.
- 3) Sensor wires shall not be spliced.

b. Conduits

- 1) All new and existing conduits shall be checked for obstructions or damage.
- 2) Any blocked conduits shall be cleaned, repaired or replaced as necessary to remove any obstructions.
- 3) Conduits terminating in hand holes or detector housings should be sealed using an approved removable duct sealing compound, temporary cap or an adequate amount of steel wool to prevent rodents and debris from entering and obstructing the conduit. Conduits terminating in cabinets should be sealed using an approved removable duct sealing compound, temporary cap or an adequate amount of steel wool to prevent rodents and debris from entering and obstructing the conduit. Conduits terminating above ground should be sealed using a temporary cap to prevent rodents and debris from entering and obstructing the conduit.

c. Pavement

- 1) The pavement shall be milled a minimum depth of 4 inches throughout the site area to insure that all existing sensors and loops are completely removed.

- 2) The pavement shall be replaced with either HMA or PCCP continuously through the existing site area and an additional distance of 200 feet leading into the first sensor location and a distance of 200 feet beyond the last sensor location in each lane of the entire site.
 - 3) There shall be no joints or transitions directly within 200 feet prior to the site or directly within 200 feet beyond the site.
 - 4) Shoulders must be repaved throughout the site area.
- d. Detector Housings and Handholes
- 1) Detector housings shall be replaced if they are removed, damaged or paved over.
 - 2) If detector housings are replaced they shall be located or relocated to a minimum distance of 3 feet from the edge of the travel lane, in a paved shoulder whenever possible and shall not be buried or obstructed and shall be accessible.
 - 3) Handholes shall not be buried. Handholes shall be placed or raised level to the pavement or ground in which they are located.
 - 4) An adequate number of detector housings and hand holes shall be placed to avoid crossing lanes unnecessarily with sensor and loop lead cuts.
- e. Loops
- 1) All loops shall be replaced using existing cuts in the road.
 - 2) In HMA: All existing loops shall be completely removed by milling to a minimum depth of 4 inches or greater as necessary. New loops shall be installed. All new loops shall be round.
 - 3) In PCCP: If the concrete is milled or replaced, loops shall be completely removed by milling to a minimum depth of 4 inches or greater as necessary. New loops shall be installed. All new loops shall be round.
 - 4) Sealant shall be used to seal all loops and lead-in wires.
 - 5) Loop splices shall conform to ITS loop splicing guidelines.
 - 6) Loop wires shall not cross lanes of traffic unless absolutely unavoidable, additional hand holes and or detector housings shall be placed to avoid crossing lanes.

13.0 UTILITIES

1. The Design-Build Contractor shall designate a utility coordinator who is certified through INDOT's Utility Coordinator Certification Training. The Design-Build Contractor shall be responsible for completing the utility coordination process as defined in the Indiana Design Manual Chapter 104, 105 IAC 13, and the INDOT Utility Accommodation Policy.
2. The Design-Build Contractor shall identify and resolve all utility conflicts remaining on the project at the time of contract award. The plans and details prepared by the Design-Build Contractor shall reflect all final resolutions and decisions accepted.
3. The Design-Build Contractor shall be responsible for construction and connection of new Utility services as applicable for signs, lighting, signals, and all other new Utility services required for the project.
4. The Design-Build Contractor shall schedule and facilitate utility meetings and take other actions as necessary and to the best of its ability to ensure utility conflicts do not unduly delay the completion of the work. The Design-Build Contractor shall notify the Engineer at least two working days in advance of a utility meeting. Utility meetings shall not be held without the presence of an authorized IFA representative.
5. The Design-Build Contractor shall be responsible for the cost of all utility relocations that are required. Utility relocation costs shall be included in the lump sum bid price for Design/Build.
6. The Design-Build Contractor shall be responsible for working with utilities to ensure that all utility concerns are addressed. The Design-Build Contractor shall negotiate with the utilities all necessary utility agreements, relocation plans and permits, and shall review all utility work plans before they submit all such related documents to IFA for approval.
7. Utility Specific Coordination Requirements
 - a. Bright House Networks
 - i. The Design-Build Contractor shall verify the location of the underground fiber optic lines at approx. Sta. 473+85 which was installed after survey was completed.
 - b. Duke Energy Indiana

- i. Construction equipment and personnel must maintain appropriate OSHA Safe Work Zone clearances from energized lines during construction.
 - ii. The Design-Build Contractor shall coordinate with Duke Energy to confirm the location of the 12kV underground electric in the general vicinity of Sta. 253+37.
- c. Marathon Pipe Line
 - i. Marathon requires a 48 hour notice when working within 50 feet of the pipelines.
 - ii. No vibratory equipment is to be used within 10 feet of the pipelines.
- d. Vectren Energy
 - i. Vectren requires a 48 hour notice when working within 50 feet of the pipelines.
 - ii. No vibratory equipment is to be used within 10 feet of the pipelines.

**I-69 MAJOR MOVES 2020
DESIGN-BUILD AGREEMENT
BOOK 2
TECHNICAL PROVISIONS
ATTACHMENT 04-1
RECURRING SPECIAL PROVISIONS**

(This page is intentionally blank)

TECHNICAL PROVISIONS – Attachment 04-1
 Applicable Recurring Special Provisions

RSP Number	Title	Adopted (A) or Revised (R) Date
APPLICABLE RECURRING SPECIAL PROVISIONS		
100-C-166	As-Built Traffic Signal Plans	R 08-15-07
100-C-188	Standard Specifications	R 05-23-13
100-C-203	Indiana Department of Administration M/WBE Participation Policy for Indiana Department Of Transportation Construction Projects	R 12-06-12
100-C-209	Subcontract Report and Payments Requirements	R 08-12-14
100-C-226	As-Built Lighting Plans	A 04-17-12
107-B-040	Environmental Restrictions	R 05-23-13
108-C-192d	Storm Water, Erosion and Sediment Control Inspection Report	A 04-19-12
108-C-215	Critical Path Method Schedule	R 05-23-13
108-C-585	Working Restrictions During Certain Holiday Periods	R 05-23-13
111-R-594	Dowel Bar Assembly Stockpiled Material Requirements	R 05-23-13
112-C-122	State Funded Contract Requirements	R 09-01-05
200-R-401	Recycled Foundry Sand	R 05-23-13
201-M-030	Debris Removal at Bridge Structures	R 05-23-13
202-R-544	Election to Produce Recycled Concrete Aggregate	R 05-23-13
203-R-360	Embankments Constructed of Coal Combustion By-Products	R 05-23-13
203-R-550	Approval of Borrow and Disposal Sites	R 05-23-13

TECHNICAL PROVISIONS – Attachment 04-1
 Applicable Recurring Special Provisions

RSP Number	Title	Adopted (A) or Revised (R) Date
203-R-562	Dynamic Cone Penetrometer Testing for Embankment	R 05-23-13
207-R-616	Subgrade Treatment	A 02-20-14
215-R-615	Chemical Modification of Soils	A 02-20-14
217-R-617	Soils Drying With Chemical Modifiers	A 07-17-14
306-R-613	Milling	A 11-22-13
400-R-610	Provisions for HMA Mixtures	R 05-15-14
401-R-581	Joint Adhesive	R 11-21-14
404-R-612	Seal Coat Application Rates	A 09-19-13
601-R-146	Removal of Guardrail	R 05-23-13
601-R-237d	Spare Parts Package for Guardrail End Treatment	R 07-12-07
601-R-497d	Spare Parts Package for Impact Attenuators	R 09-16-10
602-R-619	Concrete Barrier, Modified Section	A 09-18-14
603-R-414	Polyvinyl Chloride Coated Chain Link Fence	R 05-23-13
604-R-620	Joint Material in Sidewalks, Curb Ramps, and Steps	A 11-21-14
609-B-296	Reinforced Concrete Bridge Approaches	A 12-19-13
610-R-100	Median Crossovers	R 05-23-13
612-R-611	Undersealing	R 05-23-13

TECHNICAL PROVISIONS – Attachment 04-1
 Applicable Recurring Special Provisions

RSP Number	Title	Adopted (A) or Revised (R) Date
615-C-239	Monuments	A 07-17-14
620-R-483	Sound Barrier Systems	R 05-23-13
621-R-398	Capping Cut and Fill Slopes Steeper than 3:1	R 05-23-13
627-R-546d	Cable Barrier System	R 03-21-11
628-C-241	Field Office and Laboratory Requirements	A 09-18-14
728-B-203	Drilled Shaft Foundations	A 03-21-13
731-B-205	MSE Retaining Wall Requirements	R 12-18-14
736-B-104	Silica Fume Modified Structural Concrete Bridge Deck Overlay	R 05-23-13
738-B-297	Polymeric Concrete Bridge Deck Overlay	A 02-20-14
801-C-157	Certification of Temporary Traffic Control Devices	R 05-23-13
801-C-237	Temporary Construction Signs	A 12-19-13
801-M-006	Maintaining Traffic for Maintenance or Resurface Work	R 09-01-05
801-R-030	Temporary U-Turns for Contractor's Vehicles	R 05-23-13
801-R-253	Mobile Construction Signs	A 09-01-05
801-R-542	Worksite Added Penalty Signs	R 06-25-07
801-R-542d	Worksite Added Penalty Sign 78 x 42	R 07-26-07
801-R-543d	Worksite Added Penalty Sign 60 x 36	R 07-26-07

TECHNICAL PROVISIONS – Attachment 04-1
 Applicable Recurring Special Provisions

RSP Number	Title	Adopted (A) or Revised (R) Date
801-R-544d	Worksite Added Penalty Sign 48 x 48	R 07-26-07
801-T-089	Maintaining Existing Traffic Signal Installation	R 09-01-05
801-T-150d	Traffic Control Device Report	A 09-01-05
801-T-194	Automated Flagger Assistance Device	A 05-16-13
801-T-198	Traffic Control For Traffic Breaks	A 07-17-13
801-T-203d	Lane Ends Warning Signs	A 02-20-14
804-T-204	Lane Separators	A 07-17-14
804-T-205	Delineators	A 07-17-14
805-T-039d	Loop Testing Table	A 09-01-05
805-T-078	Electrical Insulation Sealant	A 09-01-05
805-T-086	Traffic Signal Maintenance and Repair	R 05-23-13
805-T-093	Detector Card Rack and Detector Modules	A 09-01-05
805-T-123	Video Vehicle Detector System	R 05-23-13
805-T-124	Integrated Video Vehicle Detector System	R 05-23-13
805-T-173	Wireless Vehicle Detection Systems	R 07-17-14
805-T-173d	Wireless Vehicle Detectors	R 07-17-14
805-T-191	Magnetometers and Microloop Detectors	R 05-16-13

TECHNICAL PROVISIONS – Attachment 04-1
 Applicable Recurring Special Provisions

RSP Number	Title	Adopted (A) or Revised (R) Date
805-T-192	Radio Interconnection	R 05-16-13
805-T-195	Preformed Pave-Over Loops	A 02-21-13
805-T-201	Accessible Pedestrian Signals	A 11-22-13
807-T-087	Highway Illumination Maintenance and Repair	R 05-23-13
807-T-193	Luminaires	A 05-16-13
808-T-190	Longitudinal Rumble Stripes	A 05-16-13
808-T-190d	Longitudinal Rumble Stripes Details	A 05-16-13
808-T-206	Warranty for Durable Pavement Marking Material	A 01-15-15
913-R-614	Lime By-Product	A 02-20-14
919-R-618	Reflective Sheeting Material	A 07-17-14
CONTRACT SPECIFIC RECURRING SPECIAL PROVISIONS		
107-R-169	Statements About Existing Conditions of Utilities, Additional Right-of-Way, and Encroachments	R 05-23-13
108-C-091	Failure to Complete on Time for Restriction-One Structure	R 05-23-13
202-T-161	Removal of Existing Traffic Signal Equipment	A 11-30-06
701-B-132	Pile Driving	R 04-19-11

(This page is intentionally blank)