



# Bridge Design Review Checklists

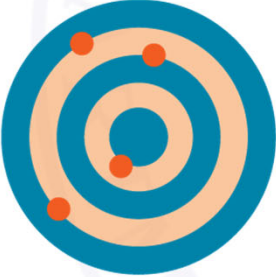
Stephanie Wagner,  
INDOT Bridge Engineering

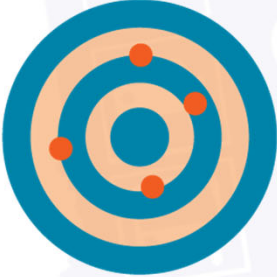
1

## History


- Designers:
  - Uniformity
  - Consistency
- INDOT:
  - Risk Based Approach
- Reviewers:
  - Clarity



**Not Accurate  
Not Precise**

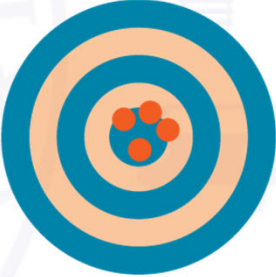


**Accurate  
Not Precise**



**Not Accurate  
Precise**

**GOAL**





**Accurate  
Precise**

2

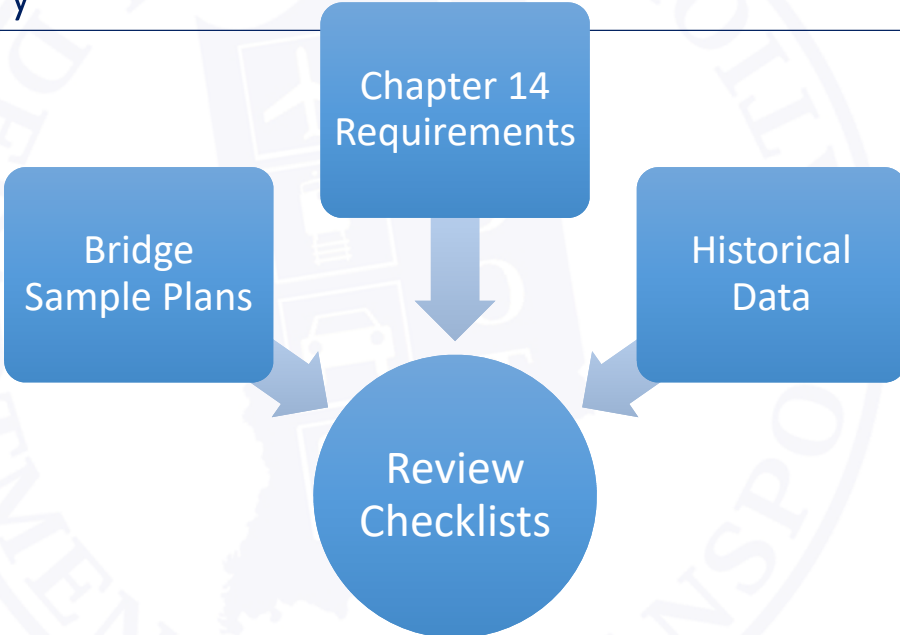

## Development

- > 6 Months of Development
  - INDOT Bridge Engineering
  - Consultant Reviewers
- Years...
  - if including Sample Plan Development
- Never Really Complete

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## Theory

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- ## BDA 100-03
- Internal Document
  - Faster Updates

Information about novel coronavirus (COVID-19)  
Get the latest information about coronavirus and the Indiana Department of Health preparations here - [coronavirus.in.gov](https://www.coronavirus.in.gov)

INDOT - Bridge Design Aids

Bridge Design Aids

Bridge Design Aids (BDA) are a means to share bridge design information with bridge construction and design professionals throughout the state in a timely fashion. BDAs are not policy. They include a variety of guidance such as answers to commonly asked questions, "good practice" tips, and other topics of interest. Our hope is that this effort will reduce confusion regarding the Department's preferences and lead to more uniform bridge plans throughout the state.

When BDA updates are published, notifications will be shared via the INDOT Design Consultants listserv. Subscribe [here](#).

BDA Number	Date	Subject
<a href="#">BDA List</a>		
100-03	01/11/2021	Bridge Design Review Checklists
412-04	09/08/2020	Embedded Galvanic Anodes
100-02	01/13/2020	Bridge Sample Plans - Thin Deck Overlay
412-03	01/13/2020	Polymeric Overlay Considerations

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## Conceptual Changes

INDIANA DEPARTMENT OF TRANSPORTATION

BRIDGE REHABILITATION PLANS  
FOR SPANS OVER 20 FEET  
ROUTE: 149 AT: 334+55  
PROJECT NO. 1600292 P.E.  
00292 CONST.

**STAGE 3** = 100 Complete

NextLevel INDIANA

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# Conceptual Changes

- Transmittal Letter for Communication
  - Designer:
    - Items included/missing in the submittal
    - Updates on non-ERMS coordination (Ex. Load Rating Submittal)
  - Reviewer:
    - Uniform Communication –all comments in one place
    - Attach Checklist to Transmittal Letter

**5. Level One Checklist**  
**6. Pavement Design<sup>1</sup>**  
**7. Design Computations**

**Notes to Reviewer:**

- A pavement design memo is a draft. The final memo was submitted for INDOT Pavement Design 1/5/21 for review. Verification of the submittal has been included in the Correspondence File.
- A bridge load rating request was submitted through LRRR on 1/8/2021 and verification of the submittal has been included in the Correspondence File.



**INDIANA DEPARTMENT OF TRANSPORTATION**  
*Driving Indiana's Economic Growth*

**Stage 3 Transmittal Letter**  
 Date: 2/17/2021

TO: Reviewer  
 THRU: Central Office Bridge Coordinator  
 THRU: District Coordinator  
 FROM: Designer, [designer@eng.com](mailto:designer@eng.com), 317-123-4567

SUBJECT: Stage 3 Submittals for B-12345, Des 1234567


The Stage 3 Submission has been completed for the referenced project. Please find the following items uploaded into ERMS for your review:

- Copy of this Transmittal Letter
- Response Letter
- Correspondence File
- Stg3 Plans
- Level One Checklist
- Pavement Design<sup>1</sup>
- Design Computations
- Quantity Calculations
- Cost Estimate
- Provisions

If you have any questions or need further information, please contact me.

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# Nomenclature Updates



- Staged (1, 2, 3) Submittals for Preservation
  - Bridge Rehabilitation and Preventive Maintenance
  - Creates consistency across all INDOT projects

**Bridge Preservation Projects Submittals**

Previous Submittal	New Submittal Name
Bridge Inspection Report	Stage 1
Preliminary Plans	Stage 2
Final Plans	Stage 3



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# Nomenclature Updates



- Stage 1 Documentation for Preservation
  - No More: Scoping Report/Inspection Report
  - Rehab Projects → Bridge Rehabilitation Report
  - PM Projects → Preventive Maintenance Meeting Minutes
- Preventative to Preventive
  - Consistent with FHWA Language

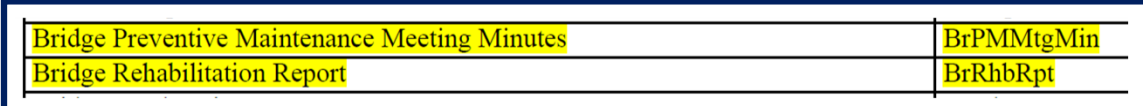
Design Approval Documents

Previous Name	Work Type	New Document Name	ERMS
Bridge Inspection Report or Field Check Meeting Minutes or Bridge Scoping Report	Bridge Preventive Maintenance	Bridge Preventive Maintenance Meeting Minutes	BrPMMtgMin
	Bridge Rehabilitation	Bridge Rehabilitation Report	BrRhbRpt



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# ERMS Naming Convention



## Submittals Removed

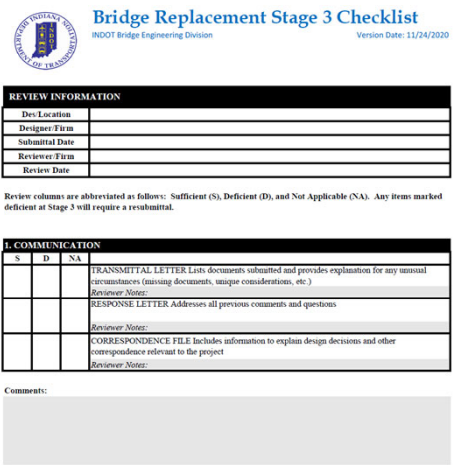
- BrInspRpt
- BRPPS



Submittal	Sub. Abbreviation	Describe	Abbreviation
Bridge Rehab Preliminary Field Check	BRPFC	[Process Submittal] M&U/Sp	
Construction Change	ConstChg	10-Wk	10WkLr
Engineer's Report	EngRpt	Abbreviated Assessment	AbbEngRpt
Environmental	ENV	All Project Environmental Report	Comm
Final Field Check	FFC	Asbestos Certificate (FLID)	AsbCrt
Final Heating	FHRG	Asbestos Report	AsbRpt
Final Right-of-Way	FRW	Bridge Preventive Maintenance Meeting Minutes	BrPMMtgMin
Final Tracings	FT	Bridge Rehabilitation Report	BrRhbRpt
Geotechnical	GEO	Bridge Load Rating Memo	LoadRtgMemo
Grade Review (Road)	GR	Bridge Search Data Form (previously 59-BSD)	BSDF
Hydraulics (See Note 7)	HVD	Contract Preparation Documents Form (14-1C)	ContPrpDoc
Load Rating	LOADRTG	Correspondence	Corresp
Pavement Design	PVMTDGN	Cost Estimate	Est
Preliminary Field Check	PFC	Cross Sections	Xsect
Preliminary Right-of-Way	PRW	Details	Details
Public Hearing	PHRG	Demolition Letter	DemolLtr
Railroad	RR	Design Computations (including but not limited to - roadway design, bridge design, traffic design, hydraulic approval memo, scour memo, inlet spacing, intersection sight distance, maintenance of traffic)	DgnCompr
Stage 1	STG1	Draft Engineer's Report	DraftEngRpt
Stage 2	STG2	Draft Environmental Document	DraftEnvDoc
Stage 3	STG3	Environmental Consultation Form (7-3C)	EnvConFm
Survey	SVY	Environmental Review Plans	EnvRvwPlans
Traffic	TRAF	Experimental Features Approval (if applicable)	ExperFeatAppr
Utility	UTIL	Final Engineer's Report	FinalEngRpt
Permits-Description	Descr-Abbreviation	Final Environmental Document	FinalEnvDoc
County Design Permit	CDPermit		
FAA Navigable Airspace/Fall Structure Permit	FAA		

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# Checklist How To



**Bridge Replacement Stage 3 Checklist**  
INDOT Bridge Engineering Division  
Version Date: 11/24/2020

**REVIEW INFORMATION**

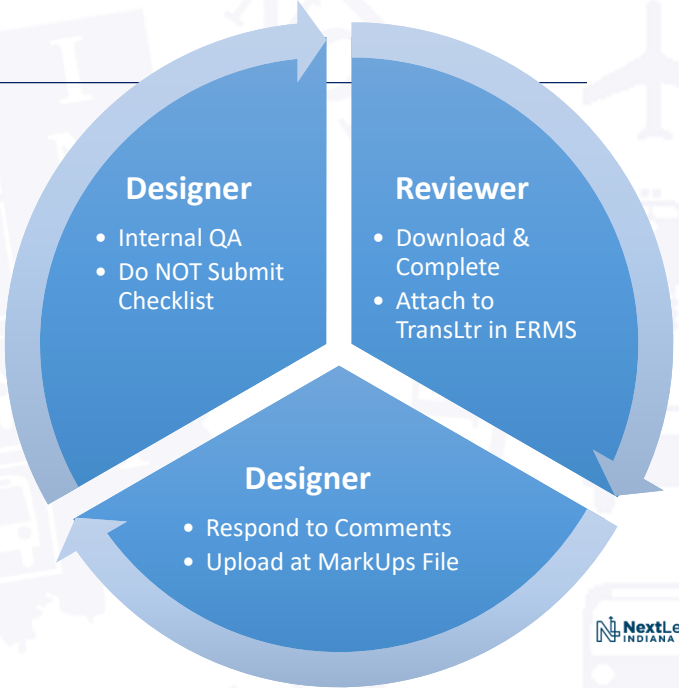
Des Location	
Designer/Firm	
Submittal Date	
Reviewer/Firm	
Reviewer Date	

Review columns are abbreviated as follows: Sufficient (S), Deficient (D), and Not Applicable (NA). Any items marked deficient at Stage 3 will require a resubmittal.

**II. COMMUNICATION**

S	D	NA	
			TRANSMITTAL LETTER Lists documents submitted and provides explanation for any unusual circumstances (missing documents, unique considerations, etc.) <i>Reviewer Note:</i>
			RESPONSE LETTER Addresses all previous comments and questions. <i>Reviewer Note:</i>
			CORRESPONDENCE FILE Includes information to explain design decisions and other correspondence relevant to the project. <i>Reviewer Note:</i>

Comments:



**Designer**

- Internal QA
- Do NOT Submit Checklist

**Reviewer**

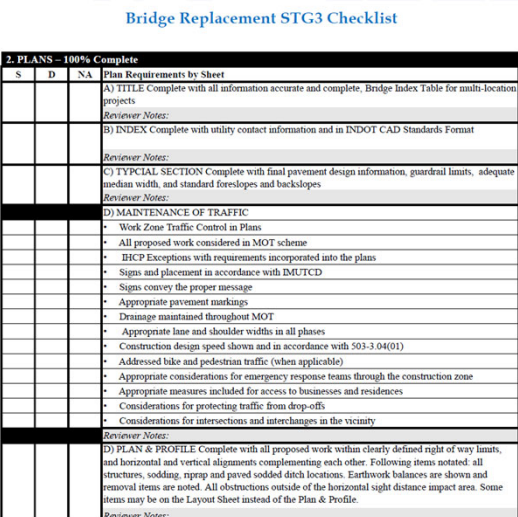
- Download & Complete
- Attach to TransLtr in ERMS

**Designer**

- Respond to Comments
- Upload at MarkUps File

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# Checklist How To



**Bridge Replacement STG3 Checklist**

**2. PLANS - 100% Complete**

S	D	NA	
			Plan Requirements by Sheet
			A) TITLE Complete with all information accurate and complete, Bridge Index Table for multi-location projects <i>Reviewer Note:</i>
			B) INDEX Complete with utility contact information and in INDOT CAD Standards Format <i>Reviewer Note:</i>
			C) TYPICAL SECTION Complete with final pavement design information, guardrail limits, adequate median width, and standard foreslopes and backslopes. <i>Reviewer Note:</i>
			D) MAINTENANCE OF TRAFFIC <ul style="list-style-type: none"> <li>• Work Zone Traffic Control in Plans</li> <li>• All proposed work considered in MOT scheme</li> <li>• IHCP Exceptions with requirements incorporated into the plans</li> <li>• Signs and placement in accordance with DMUTCD</li> <li>• Signs convey the proper message</li> <li>• Appropriate pavement markings</li> <li>• Drainage maintained throughout MOT</li> <li>• Appropriate lane and shoulder widths in all phases</li> <li>• Construction design speed shown and in accordance with 503-3.04(01)</li> <li>• Addressed bike and pedestrian traffic (when applicable)</li> <li>• Appropriate considerations for emergency response teams through the construction zone</li> <li>• Appropriate measures included for access to businesses and residences</li> <li>• Considerations for protecting traffic from drop-offs</li> <li>• Considerations for intersections and interchanges in the vicinity</li> </ul> <i>Reviewer Note:</i>
			D) PLAN & PROFILE Complete with all proposed work within clearly defined right of way limits, and horizontal and vertical alignments complementing each other. Following items notated: all structures, sodding, riprap and paved sodded ditch locations. Earthwork balances are shown and removal items are noted. All obstructions outside of the horizontal sight distance impact area. Some items may be on the Layout Sheet instead of the Plan & Profile. <i>Reviewer Note:</i>

- Deficiencies at Stage 3
  - Require Resubmittal
  - Last Engineering Dept. Review
  - No Surprises at Advertisement
- PM Work: Stage 2?
  - Not a separate Stage 2 Checklist
  - Discuss need at Initial Field Check
  - Push - STG3 Submittal at STG2 Timeline
  - Communicate Intent to Reviewer

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## INDOT Review Plan

**Stage 1 Reviews**


- All Done In-House
- Owner Perspective
- Verify Against Scoping Documents
- Internal Coordination

**Stages 2 and 3**

- Primarily Consultant Reviewers
- Exception: Specialty Projects Stay In-house
  - Accelerated Bridge Construction
  - Projects with Unique Details or Special Interest

**All Deficient Submittals thru INDOT for Concurrence**

- Resubmittals requested by INDOT Personnel




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## Forthcoming

Spring  
2021

- Design Memo w/ IDM Updates
- 2025 Schedules – New Milestones
- Grace during this Transition



- PM Meeting Minutes Sample Document
- Rehabilitation Sample Plans
- Increased Usability of Checklists
- Evaluation Updates



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# Questions?



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## Bridge Plan Review 2020 Review Findings

Mike McCool, Bridge Dept. Manager  
Beam, Longest and Neff, LLC



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# Bridge Submittals

- Last year “Bridge Design Review 2019 Review & 2020 Preview”
- New Names

INDOT | BRIDGE DESIGN AIDS

BDA 100-03 | JANUARY 11, 2021

**Bridge Preservation Projects Submittals**

Previous Submittal	New Submittal Name
Bridge Inspection Report	Stage 1
Preliminary Plans	Stage 2
Final Plans	Stage 3

**Design Approval Documents**

Previous Name	Work Type	New Document Name	ERMS
Bridge Inspection Report or Field Check Meeting Minutes or Bridge Scoping Report	Bridge Preventive Maintenance	Bridge Preventive Maintenance Meeting Minutes	BrPMMtgMin
	Bridge Rehabilitation	Bridge Rehabilitation Report	BrRhbrpt

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# Bridge Scoping Reports

- Design Manual Editable Documents (example)
  - 412-02-01 Meeting Minutes
  - 412-02-02 BSR
- Title Page Requirements
  - NBI number
  - Photo of bridge
  - Designer’s name
  - Firm name

I. COVER SHEET/TITLE PAGE (Provide a cover sheet or title page as illustrated below.)

BRIDGE SCOPING REPORT  
 BRIDGE FILE NUMBER: \_\_\_\_\_  
 NBI NUMBER: \_\_\_\_\_  
 DESIGNATION NUMBER: \_\_\_\_\_  
 ROUTE IDENTIFICATION AND FEATURE CROSSED:  
 \_\_\_\_\_ over \_\_\_\_\_  
 [Include photo of subject structure]

PROJECT LOCATION: (8 miles southwest of the south junction with State Road 39, in Section 13, T-11-N, R-2-W, Ray Township, Morgan County, Indiana)

REFERENCE POINT: \_\_\_\_\_

PREPARED BY: \_\_\_\_\_  
 (INDOT designer name and INDOT District or Central Office, or Consultant Project Manager name and Consulting Firm)

DATE: \_\_\_\_\_

[LPA PROJECTS ONLY] OWNER REPRESENTATIVE: \_\_\_\_\_  
 (Signature, Title, and Date)

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## Bridge Scoping Reports

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- Common missing information about existing bridge
  - Posted/Design speed
    - not in example
  - Bridge length
  - Bridge width
  - Skew
  - Vertical clearance
    - not in example
  - Roadway approach width
  - ADT

**B. Structure/Dimensions**

Surface Type: (Original concrete deck, asphalt overlay, concrete overlay, or thin overlay)

Out to Out of Copings: (Width, feet-inches)

Out to Out of Bridge Floor: (Length, feet-inches)

Skew: (Angle and Direction; i.e., Left or Right)

Type of Superstructure: (Reinforced Concrete Slab, Prestressed Concrete, Structural Steel, etc.)

Spans: (No. and length of each span, feet-inches)

Type of Substructure/Foundation: (Pier Type & Shape, Abutment/End Bent Type, Piles or Spread Footings, etc.)

Seismic Zone (only if in Zone 2):

**E. Approaches**

Roadway Width (feet-inches)

Surface Type: (Asphalt or Concrete)

Guardrail: (Type and length)

Guardrail Transition: (Type)


Roadway Width (feet-inches)

**F. Traffic**

Current AADT (year)

Future AADT (year)

Percentage Commercial vehicles



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## Bridge Scoping Reports

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- If overlay project please provide
  - Info on 1<sup>st</sup> overlay (or 2<sup>nd</sup>, or 3<sup>rd</sup>)
  - Note typically bridge deck replaced rather than 3<sup>rd</sup> overlay per IDM 412-3.02(04)
  - Estimate the height of PG change
- Note estimated patching area per IDM 412-3.02(07)
- If full and partial > 15%, it's not a Preventive Maintenance Project any longer per IDM Figure 412-1A

Bridge Deck Overlays - Rigid	Wearing Surface (58.01)	>3	<b>Facility</b> D/SS>4 and Max. 15% Deck Patching
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CONDITION-DRIVEN PREVENTATIVE MAINTENANCE  
 ELIGIBILITY CRITERIA  
 Figure 412-1A (Page 1 of 2)



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## Bridge Scoping Reports

- Maintenance and Protection of Traffic During Construction
  - MOT recommendation needed
  - Include recommended detour route if closed
  - Level 1 Checklist for MOT is required (unless detour used)
    - Per IDM 412-2.01(01) <= Preventive Maintenance
    - Per IDM 412-2.02(01) <= Rehabilitation
  - If phased MOT, mention if shoulder strengthening needed
  - If bridge over another road, MOT might be needed for that road
  - If sidewalks on the bridge, MOT for pedestrian traffic

### H. Maintenance and Protection of Traffic During Construction

Identify the proposed strategy for maintaining traffic during construction. This can include alternating one-way traffic with signals, diverting the traffic to a detour route, or use of a temporary runaround. Inclusion of preliminary sketches is recommended for a complex traffic-control scheme. The sketches should be included with other schematics described in Section XII. Detour routes should be approved by the District Traffic Engineer prior to submitting this report.



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## Plan Submittals and Quality Assurance

- IDM 14-1.02(02)
  - IDM expectations on Plan Submittals
  - IDM expectations on Quality Control measures
- IDM 14-2.04 Bridge Plans, Replacement Project ← Still Used
- IDM 14-2.05 Bridge Plans, Preservation Project ← Still Used
- BDA 100-03 "Bridge Design Review Checklists" ← New 1-11-21
- **Items in the checklist that are not included or addressed in accordance with a given submittal should be identified in the transmittal letter with a brief explanation of the omission**
- IDM 14-1.02(02) Items in the checklist that are not included or addressed in accordance with a given submittal should be identified in the transmittal letter with a brief explanation of the omission.



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## Submittal Documents

- Transmittal Letter needs to be clear
  - Name of person and firm receiving evaluation
  - Not always same as person signing letter
- Approved Engineering Assessment or Bridge Scoping Report
  - Concurrence signatures required per IDM 412-2.02(02)
  - Prior to the Stage 1/Bridge Replacement
  - Prior to the Stage 2/Bridge Rehabilitation, Preventive Maintenance submittal
  - Many times the reviewer receives Stage 1 & Stage 2 plan submissions before the reports are approved.
- Include correspondence with INDOT/County documenting non-standard design decisions and approval



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## Submittal Documents

- USP and RSP still required to be submitted even with new SharePoint submittal process (Design Memo 20-21)
  - IDM 14-2.04 Bridge Plans, Replacement Project ←Still Included
  - IDM 14-2.05 Bridge Plans, Preservation Project ←Still Included
- **Missing USPs and RSPs at Stage 3 and Final Plans**
  - Utilize CES to assist with USP and RSP
- **Latest versions of Level 1 Checklist & Traffic Control Plan Checklist forms have not been used**
  - Include with each submittal
- Using wrong criteria for Level 1 Checklist
- **Traffic data is not always submitted with Level 1 Checklist**
  - Would be helpful for reviewers



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## Submittal Documents

- Bridge Rehabilitation projects
  - Helpful to have the Existing Plans as part of the Preliminary Plan submittal
  - Reviewer usually does not have a copy to review with Level 1 items
  - Also used to see how the new work fits with the existing bridge
  - Helpful to submit approved Scoping Report with Preliminary Plans
    - On BDA 100-03 checklist
    - Not on IDM 14-2.05(03) checklist
    - Per IDM 412-2.02(02)
- Google Earth is a handy tool
  - Reviewers use to catch missing items from the plans
    - Signs
    - Shoulder and centerline corrugations
    - Raised pavement markers
    - Mailboxes
    - Field entrances

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## Design

- New terminal joint requirements not used correctly
  - Design Memo 19-10
  - IDM 409-2.04(01) Item 3
- Small structures with span greater than 20 feet measured along centerline of roadway per IDM 203-3.01
  - No longer “Road Plans”
  - Now “Bridge Plans”

203-3.0 BRIDGE

### 203-3.01 Introduction

FHWA defines a bridge as a structure with a total span greater than 20 ft, measured along the centerline of the roadway. For a multiple-pipe structure, this includes the distance between the pipes. For hydraulic purposes, a structure with a span greater than 20 ft, perpendicular to the direction of flow, is considered a bridge.



**INDIANA DEPARTMENT OF TRANSPORTATION**  
Driving Indiana's Economic Growth

Design Memorandum No. 19-10

September 5, 2019

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

FROM: /s/ Elizabeth W. Phillips  
Elizabeth W. Phillips  
Director, Standards and Policy

SUBJECT: Terminal Joints

REVISES: *Indiana Design Manual* (IDM) Sections 17-5.09(01), 402-7.02(03) and 409-2.04

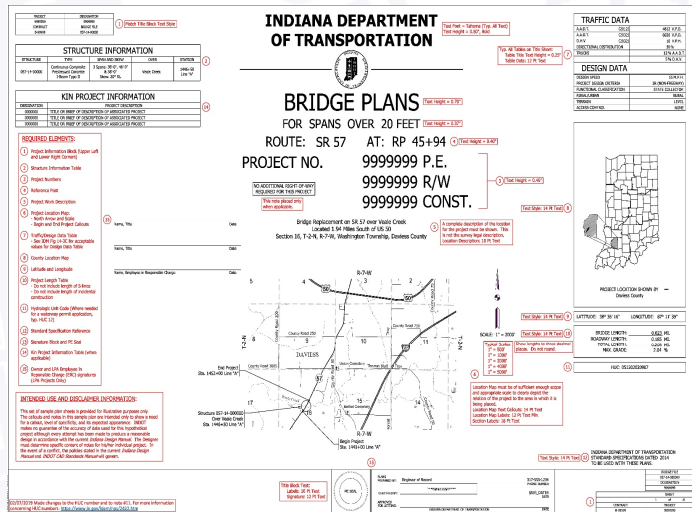
EFFECTIVE: Lettings on or after March 1, 2020

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# Plan Details

## • Title Sheet

- Wrong RP stations
  - INDOT Manuals - Roadway Referencing System
- Wrong HUC Codes
  - [www.indianamap.org](http://www.indianamap.org)
- Title should be
  - “Bridge Plans”
  - “Bridge Rehabilitation Plans”
  - “Bridge Preventive Maintenance Plans”
- **New structure number for bridge replacement project**
  - **Design Memo 16-01**
- If no R/W required add note



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# Plan Details

- Show section with Guardrail on Typical Section sheet
- Shoulder break grading behind guardrail posts is many times not accounted for. Especially on rehab and preventative maintenance projects which do not have survey and cross sections. Design Memo 19-06 “Practice Pointers”
- A beam is a beam and a girder is a girder. Be consistent in plans.
- Missing existing roadway geometry information for rehabilitation plans
  - Use existing plans for
    - Vertical Alignment
    - Stations
    - Elevations
    - Etc.

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## MOT

- **Construction zone design speed missing from plan sheets**
- A Traffic Control Plan Checklist is required for each submittal after the PFC per IDM 503-3.01(02) Item 13. This is sometimes missing from the submissions
- Make sure MOT for shoulder strengthening is shown on the plans
  - Typically, as a separate MOT phase
- **MOT Level 1 checklists are filled out inconsistently or missing**
  - Most designers are consistent in filling in the design speed, lane width and shoulder width
  - Other items vary in how filled out
  - Level 1 checklist may be required under bridge



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## Cost Estimates

- CES Estimate Information not Filled out at Top
  - Checker initials missing
- **Contingency in Final Plans estimate**
  - **IDM 20-1.03(03) says all quantities should be finalized at this stage**
- **Quantities not matching between plans, quantity calcs & estimate**
- Option Bids for Rigid Bridge Deck Overlay not in CES correctly

**INDOT | BRIDGE DESIGN AIDS**

BDA 412-02 | DECEMBER 7, 2017 (REV. AUGUST 2020)

MATERIAL OPTIONS FOR RIGID BRIDGE DECK OVERLAYS

Reference: IDM 412-3.02(04) Rigid Overlays



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