

# PRELIMINARY DESIGN CHECKLIST – BRIDGE (CONNECT)

Date: 7-1-2024

County: \_\_\_\_\_ Design No.: \_\_\_\_\_ Check By: \_\_\_\_\_ Date: \_\_\_\_\_

Project Location: \_\_\_\_\_ Consultant: \_\_\_\_\_

## GENERAL

### Abbreviations

\_\_\_ Use as needed. Reference [BDM 13.1.4]

### Title Block

- \_\_\_ "Design for (xx Skew) (RA)(LA)"
- \_\_\_ Structure Type and Size and Beam Type (e.g. "304'-0 x 40'-0 Pretensioned Prestressed Concrete Beam Bridge")
- \_\_\_ For bridge with multi-project staging, the structure width listed should be the width of the current stage plus all previously completed stages. (e.g. if stage 1 construction is 20 ft. and stage 2 construction is 30 ft., the first project title block should show 20 ft. and the second project title block should show 50 ft.) Show text: Stage 1, Stage 2 as-needed
- \_\_\_ Span Description (e.g. "101'-0 End Spans", "102'-0 Center Span")
- \_\_\_ For bridge on horizontal curve, show 'Radius = xxxx'
- \_\_\_ Station of bridge at center of bridge (offset needed for duals). Include roadway (e.g. "US 30 – Ramp D")
- \_\_\_ Current TSL Date (e.g. "July 2023")
- \_\_\_ County
- \_\_\_ "Iowa Department of Transportation"
- \_\_\_ "Design No.", "Design Sheet. No. x of x", "FHWA No."
- \_\_\_ Sheet Title (Ex. Situation Plan, Situation Plan-Site, or Situation Plan-Misc.)

### Location

- \_\_\_ Location: Road over road/stream
- \_\_\_ Township/Range (e.g. "T-86/87N", "R-2/3W")
- \_\_\_ Section (e.g. "35/36")
- \_\_\_ Township Name
- \_\_\_ County
- \_\_\_ City of \_\_\_\_\_ (if needed)
- \_\_\_ Railroad Crossing: For replacement RR bridges use existing Federal Railroad Administration No. (FRA). For new bridges FRA will be assigned later. The Iowa Crossing Number is no longer being used.
- \_\_\_ Bridge Maintenance Number – Show if known
- \_\_\_ FHWA No.: New number shall be provided and shown
- \_\_\_ Latitude/Longitude (6 decimal) at station of bridge at center of bridge (e.g. "12.345678/-12.345678")

### Traffic Estimate

- \_\_\_ Traffic Data as shown in Road Plans – see CADD cell

### Vertical Profile Data

- \_\_\_ Proposed profile grade detail - Vertical curve data include sta/elev of g1/g2 end points as needed.

### Horizontal Curve Data

- \_\_\_ Horizontal curve data. Submit data if on super elevation.

### Vertical Clearance Table

- \_\_\_ Include station/offsets/elevation (overhead/underpass), deck thickness, haunch, beam depth, vertical clearance. If needed, provide separate Staging Vertical Clearance Table.

### Utilities

- \_\_\_ General Utility Symbols and Utilities Note Cell. Place a label on the plan view to identify areas that may be of potential conflict.

### Recoverable Berm Location Table

- \_\_\_ Recoverable berm location table

### Berm Slope Location Table

- \_\_\_ Berm slope location table

### Hydrology & Hydraulic Data

- \_\_\_ Hydraulic data table – see data cell for appropriate application
- \_\_\_ For drainage areas greater than 10 sq.mi. a Riverine Infrastructure Database (RIDB) dataset is to be developed. Stream ID and river mile verified. [LRFD BDM 3.2.2.8]

### Berm Slope Armoring for Stream Projects

- \_\_\_ Provide typical section showing embedded vs. non-embedded grading surface (e.g. "2'-0 Class E Revetment (Embedded)"). Show and label grading surface (e.g. "Grading Surface").
- \_\_\_ Use 9-inch thickness for erosion stone, typical 2' lining thickness for Class E and typical 3' lining thickness for Class B or C. Stone Toe lining may be thicker.
- \_\_\_ Note/label armoring station/offset limits
- \_\_\_ Show Revetment Quantities Table for bridge over waterway– see CADD cell for details.

### Signature Block

- \_\_\_ State of Iowa Professional Engineering Seal covering Hydraulic Design – bridge over waterway/ or bridge sized RCB (includes Precast options and CIP options).

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## Staging

\_\_\_ Staging sequence details if required

## Railroad Bridges

- \_\_\_ Show macadam stone slope protection
- \_\_\_ Minimum horizontal clearance dimension to pier
- \_\_\_ For RR overpass provide heavy construction pier if center of track to face of column is less than 25'
- \_\_\_ Show fence if required
- \_\_\_ Add note stating fence type (curved - sidewalk/trail or straight – shoulder only)
- \_\_\_ UP/BNSF/CN/CP RR bridge - use 3'-8 barrier rail above RR ROW which may transition to 3'-2 outside of RR ROW when applicable
- \_\_\_ UP/BNSF/CN/CP RR bridges - do not add fence on bridge barrier rail unless required
- \_\_\_ UP/BNSF/CN/CP RR bridge - include standard sheet 1067

## Temporary Bridges

\_\_\_ If the bridge will be temporary, complete this checklist along with the Preliminary Design – Temporary Bridge checklist.

## General Notes

General Notes shown on the TS&L are to be incorporated into the General Notes of the final plan set. The final designer shall delete these notes from the final TS&L. Example notes:

- \_\_\_ This design is for the replacement of the existing 240' x 26' Continuous I-Beam Bridge, Monona Design No. 1654, FHWA No. 037080, Maint. No. 6727.6S175.
- \_\_\_ Work under this design shall include removal of remnants of Monona Design No. 1530. Includes removal of substructure units and the removal of the 42' x 20' I-Beam approach span from the downstream channel.
- \_\_\_ The project will impact United States Geological Survey (USGS) stream gage 06607200, Maple River at Mapleton IA. Contact the USGS 30 days prior to construction that will impact the gage. USGS Contact: ?
- \_\_\_ The project will impact an Iowa Flood Center (IFC) stream sensor ID No. ENISH02, East Nishnabotna River (US 59) at Shenandoah. Contact the IFC 30 days prior to construction that will impact the sensor. IFC Contact: ?

## Design Notes

Design Notes shown on the TS&L are intended to inform the final bridge designer of design decisions and other requirements. The final designer shall delete these notes from the final TS&L. Example notes:

\_\_\_ Non-Standard Abutment Wing Wall

- \_\_\_ Standard Bridge Index No. ??? (e.g. J40, J44, H40, H44, etc.)
- \_\_\_ TL-? single slope Bridge Railing Proposed
- \_\_\_ Pier Type – (Frame, T, Pile Bent, Diaphragm, etc.) and assumed width. Note if pile bent is to be individually or fully encased.
- \_\_\_ For grade separation bridges with width 30 feet or less, include a note stating that the pier type may be changed in final design
- \_\_\_ Provide vent hole in beam
- \_\_\_ As this project requires a sovereign lands permit, bid item reference notes shall restrict broken concrete as a substitute for revetment. [BDM 3.2.7.3.5]
- \_\_\_ Bridge aesthetics to be incorporated during final design
- \_\_\_ An Iowa DNR Flood Plain Permit is required. Preliminary Design will submit the application and place the permit in the PW Regulatory\_Permits subdirectory folder upon receipt.
- \_\_\_ An Iowa DNR Sovereign Lands Permit is required
- \_\_\_ The bridge does not meet Iowa DOT's desired (operational or channel) freeboard per BDM 3.2.2.4 (list rationale). Final design aspects in the BDM related to inundation required.
- \_\_\_ The proposed bridge will be constructed using Accelerated Bridge Construction (ABC) methods. The ?? method has been chosen as the preferred method with a selected closure duration of ?? days.
- \_\_\_ Requirements for a state water trail or paddling route are applicable. Signage, plan notes, and bid items shall be addressed by the Design Bureau and included in the road plans. [BDM 3.2.2.11]
- \_\_\_ There is a potential for conflicts with existing foundations. (specify type and location(s))
- \_\_\_ Vehicle Collision Force [BDM 3.7.4] – use appropriate note: Pier #? is located within the acceptable clear zone of ?? feet.
  - o Collision requirements shall be evaluated during final design.
  - o The pier is exempt from Collision Force requirements due to site conditions as approved by the bridge project development engineer. (Ex. urban low speed between traffic signals)
  - o The pier is exempt from collision force requirements due to redirection or absorption of the collision load (verify during final design).
  - o The pier shall be designed for structural resistance to vehicular collision forces (ex. directly behind a roadway median barrier that is not structurally independent)
- \_\_\_ Final Design shall consider the need for temporary shoring to accommodate staging of bridge construction and include in the final plans as

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necessary. (Conceptual temporary shoring may be shown, but it will be a final design task to consider any extent and plan needs.)

\_\_\_ Final Design shall submit the U.S. Coast Guard permit application 6 months prior to letting [BDM 3.10.1]. (bridge projects over a navigable waterway)

## Plan Notes

Plan Notes should remain on the final TS&L. Example notes:

\_\_\_ 2-Span Grading Shown (see EW 203/204 - 5' offset)

\_\_\_ Top of bridge deck (or slab for CCS) at centerline roadway is '?' above (or below) the profile grade to account for (if applicable, deck cross slope and) parabolic crown. See [LRFD BDM 1.7.1]

\_\_\_ Class (C, E, etc.) revetment stone is (embedded or non-embedded)

\_\_\_ The bridge will be designed to withstand the applicable effects of ice and the horizontal stream loads and uplift forces associated with the Q100 [BDM 3.2.2.4] (Use when a Flood Plain permit is required and Q50 operational freeboard is less than 3')

## Miscellaneous

\_\_\_ North arrow

\_\_\_ Scale bar

\_\_\_ Survey Control Point – Use coordinates/description per plan set

\_\_\_ Border: "County", "Project No.", "File No.", "Sht. No. x of x"

\_\_\_ Project (Phase) number in the border for all sheets. For routes and paren numbers that are not three digits, include the leading zero(s) before the route and paren numbers (eg. BRF-063-3(046)--38-62).

\_\_\_ Situation Plan Sheets – See Guideline details for Situation, Site and Misc. Plan. For dual bridges, Site and Misc. Plan for each bridge to reflect unique information, notes and leveling. See [BDM C3.9]

\_\_\_ Show bridge cross section – fully dimension, show lanes, shoulders, deck cross slopes and rails.

\_\_\_ Bridge deck cross slopes to match through lane cross slopes. Shoulder slope to match adjacent lane slope.

\_\_\_ Zone of Intrusion – verify dimensions/details when this situation applies

## PLAN VIEW

\_\_\_ Bridge Dimensions

- o Show 'Face to Face of Paving Notches' dimension
- o Show 'Centerline to Centerline Abutment Bearings' dimension
- o Show 'Span #' and each span dimension

o Show proposed stations along centerline of approach roadway or baseline approach roadway at piers/abutments

\_\_\_ Dimensions adjusted for horizontal and grade length within spans differing greater than 1/2 inch for PPCB bridges.

o Horizontal length stationing is measured from centerline to centerline abutment bearings and centerline to centerline spans. Label 'Horizontal Dimensions'.

o Grade length is measured for individual spans and bridge length along the grade from centerline to centerline abutment bearings and face to face paving notch (normal to grade). Label 'Along Grade Dimensions'. [LRFD BDM 1.7.2 and Figures]

\_\_\_ Roadway designation(s)

\_\_\_ Typical Approach Roadway Section - dimension lane/shoulder widths and show cross slopes

\_\_\_ Trail/Sidewalk on Bridge Deck:

- o To control water runoff on the bridge, verify whether a raised grade or on-grade trail/sidewalk is required based on an urban vs rural approach section and roadway vs stream crossing.
- o The separation barrier and rail determination is indicated and is shown with correct width.
- o Show clear opening dimension on bridge and ensure that rail attached to barrier does not encroach on required width
- o Show appropriate parapet/fencing

\_\_\_ Slope protection shown and labeled as to type.

\_\_\_ POT stationing of mainline roadway construction centerline and side-road intersection

\_\_\_ Skew angle – show actual in plan view and design skew in Title Block to nearest degree

\_\_\_ Minimum vertical clearance location

\_\_\_ Minimum horizontal clearance dimension to pier

\_\_\_ Show assumed pier width(s), as applicable

\_\_\_ Label guardrail – "Guardrail"

\_\_\_ Arrows for direction of traffic

\_\_\_ Dimension variable width bridges at abutments

\_\_\_ Bridge abutment wing wall dimension shown if non-standard length used

\_\_\_ Structures with no side piers – dimension berm toe offset

\_\_\_ Show and label existing contours

\_\_\_ Existing utilities shown, referenced line styles are at an appropriate scale for readability (include survey for fence-lines, tiles)

\_\_\_ Existing structures (bridge, culverts); label - type/size/station and design number

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- \_\_\_ Other proposed structures (bridge, culverts) shown on TSL sheets; label - type/size/station and design number
  - o If structure not part of project (paren) or a tied project, also add 'Not Part Of This Contract' (Use this option for dual bridges, staged bridges unless let together or tied)
  - o If structure part of project (paren) or a tied project with different design number, also add 'See Design ????'
- \_\_\_ Dimension side road lane and shoulder widths
- \_\_\_ Show proposed roadway embankment contours and ditch grading, if available.
- \_\_\_ Show proposed berm and any proposed channel or special grading contours
- \_\_\_ Label all centerlines and profile grade lines
- \_\_\_ Label stationing on at least two "tic" marks in the plan view
- \_\_\_ Stream name and direction of flow
- \_\_\_ Check text/dimensioning legible and not placed on top of other details
- \_\_\_ Proposed foundations do not conflict with existing foundations. (Unit leader approval required for exceptions-conflicts shall be noted).

- \_\_\_ Prebore Holes - Integral Abutments: show prebore holes 10'-0 deep from bottom of footing and 1'-4 diameter along centerline of abutment footing for bridge lengths greater than 130 feet. Dimension diameter and bottom of prebore hole elevation. Stub Abutments: not required.
- \_\_\_ Potential footing/piling conflicts noted. (Unit leader approval required).

## CADD Checklist

Refer to: [Automation Tools - Connect Applications](#)

- \_\_\_ Verify Iowa Regional Coordinate System is correct for the project site.
- \_\_\_ Correct CONNECT ProjectWise folder structure is being used.
- \_\_\_ Correct seed files are being used.
- \_\_\_ Correct File naming conventions are being followed.
- \_\_\_ Correct Model naming conventions are being followed.
- \_\_\_ The correct levels, element templates, or features are used (this will ensure the correct font style is being applied).
- \_\_\_ Combine multisheet designs into one pdf file named TSL\_CC\_DDDD.pdf

## LONGITUDINAL SECTION

- \_\_\_ Bottom of footing elevation (Bott., Ftg., Elev.)
- \_\_\_ Slope protection: label type
- \_\_\_ Existing ground line and proposed grade line shown/labeled
- \_\_\_ Existing structure – substructure, piling (from as-built plans)
- \_\_\_ Berm slope labeled (2.5:1 max, Normal)
- \_\_\_ Show Proposed and Staging (if needed) Vertical Clearance – show actual locations and dimensions
- \_\_\_ Top of berm elevation at abutments
- \_\_\_ Design streambed elevation
- \_\_\_ Q 'Design' water surface elevation as per H&H Data information
- \_\_\_ Abutment/pier deck (or slab for CCS) elevations along the centerline of approach roadway
- \_\_\_ Channel and Operational Low Beam – see BDM definitions. CADD - Point to elevation locations and label 'Channel Low Beam' and 'Operational Low Beam' but do not include elevations in the section.