

PRELIMINARY DESIGN CHECKLIST – RCB CULVERT

Date: 8-1-2020

County: _____ Design No.: _____ Check By: _____ Date: _____

Project Location: _____ Consultant: _____

GENERAL

- ___ Abbreviations – Use as needed. Reference [BDM 13.1.4]
- ___ Bench Mark – Use coordinates/description per plan set
- ___ For RCB with multi-project staging, the structure length listed should be the length 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
- ___ Vertical curve data – include sta/elev of g1/g2 end points
- ___ Horizontal curve data
- ___ Traffic Data as shown in Road Plans – see CADD cell
- ___ Hydraulic Data table - include Drainage Area, Q₅₀ cfs and Design High Water Elevation. Include Q₁₀₀, Q₅₀₀ or roadway over-topping for bridge size culverts (≥ 20 ft. total spans)
- ___ Utilities Table - add legend table and label each for all utilities shown on plan sheet
- ___ Location Table – include latitude/longitude (6 decimal) at centerline of approach roadway/centerline of RCB (e.g. “42.022249, -93.622893”)
- ___ Township/Range (e.g. “T-35/36N”, “R-2/3W”)
- ___ Section (e.g. “35/36”)
- ___ Size in Title Block – New RCB – W x H x L
Extension – W x H only
- ___ Skew angle – show actual in plan view, ‘design for’ in Title Block to nearest whole degree
- ___ Project number, file number, design number, CADD file name, FHWA No (≥ 20 ft. total spans)
- ___ Scale bar
- ___ North arrow
- ___ Staging – show sequence details as needed
- ___ Consultant PE signature for H&H on TSL for new RCB’s
- ___ Revetment – Cast-in-Place and Precast RCB: For all new and replacements show at inlet and outlet. For all lengthened RCB’s show at extended end only. Show cross section, quantities table and revetment station/offset limits (see CAD cell for details)
- ___ Revetment – Cast-in-Place RCB: For single and multi-barrel parallel wing headwalls use standard 1092, which does not apply to multi-barrel flared wing headwalls.
- ___ Revetment – Precast RCB: For single and multi-barrel parallel wing headwalls use standard PEP 1-13
- ___ Single All RCBs with precast option: see culvert standards for details. CIP TSL developed during preliminary design – precast RCB TSL developed during final design. Provide dual dimensions on CIP TSL for the precast length left and

right and total length back to back of parapet (including ‘G’ dimension). Add multi-cell precast barrel layout detail as described below.

- ___ Twin and triple precast RCBs: see culvert standards for details. For skewed culverts where the culvert skew is different than the headwall skew, include a multi-cell precast barrel layout detail CIP and precast RCB TSL’s developed during preliminary design. See precast layout details similar to C4.5.2
- ___ Precast RCB – Limited to fill height 2’ – 25’ and settlement of 6 inches (determine during final design)
- ___ Precast RCB - If culvert bends or extensions are required, discuss with section leader before proceeding
- ___ Parallel wing headwalls are used for all typical CIP and precast RCBs – see culvert standards for details.
- ___ Flared wing headwall usage (CIP or Precast barrel):
 - o Slope tapered inlet (generally with flume outlet)
 - o Scour floor (use flared wing headwall at inlet also)
 - o Pedestrian structures
- ___ Pedestrian RCB structures:
 - o Layout CIP only (Precast option during final design)
 - o 12’ x 11’ minimum size
 - o Minimum 0.5% longitudinal slope to prevent ponding (includes the headwall sections)
 - o Use flared-wing headwalls
 - o Add 3’-6 height vinyl chain link safety fence along wing headwall and parapet
 - o Add Note: Frost trough not included for CIP
 - o Add Note: Lighting inside culvert may be required
 - o Trail CIP standards pending

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 note:

- ___ This design is for the replacement of the existing 40’ x 24’ steel I-beam bridge, Keokuk Design No. 5137, FHWA No. 32680, Maint. No. 5406.0S078.

Design Notes

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

- ___ An Iowa DNR Flood Plain Construction Permit is required.
- ___ The proposed RCB will be constructed using accelerated bridge construction (ABC) methods. The ?? method has

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been chosen as the preferred method with a selected closure duration of ?? days.

Plan Notes

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

___ Flow line of the culvert has been set 1' below streambed.

PLAN VIEW

- ___ Label "Situation Plan"
- ___ Ground elevations, contours, and topography. Label contour elevations.
- ___ Existing utilities (fence-lines, tiles); label - fiber optic/gas line/etc.
- ___ Existing structures (bridge, culverts); label - type/size/station and design number
- ___ Proposed length (back-to-back of parapet)
- ___ Precast RCB - show and dimension 6-inch gap between twin/triple culvert barrel walls
- ___ Proposed station on road construction centerline
- ___ Skew angle of culvert to roadway
- ___ Skew of headwalls, if different than skew to roadway
- ___ Proposed lane and shoulder widths
- ___ Show proposed roadway embankment and ditch grading. Verify with Road Design.
- ___ Label all centerlines
- ___ Label stationing on at least two "tic" marks in the plan view
- ___ Stream name and direction of flow
- ___ Check that all text and dimensioning is legible and not placed on top of other text or features such as riprap details
- ___ Label type, location and limits of features such as riprap and channel changes and provide typical cross section
- ___ For RCB extension details, reference [BDM 7.2.4.9]

LONGITUDINAL SECTION

- ___ Roadway cross section in longitudinal view is perpendicular to roadway in plan view
- ___ Culvert projection in longitudinal section is along centerline of culvert in plan view (therefore, true length not shown for skewed culverts)
- ___ Existing ground line and proposed grade line shown and labeled
- ___ Show existing structure
- ___ Proposed flow-lines at inlet, outlet, or other features (slope taper, drop inlet, flume, etc)
- ___ Proposed roadway embankment shaping shown per road plan details. Typically, 3:1 for replacement projects, 3.5/1 new construction

- ___ Profile grade elevation and location shown at intersection with centerline of culvert
- ___ Q 'Design' water surface elevation at inlet (per data block)
- ___ Show maximum fill height and location.

CADD Checklist

Refer to: [Preliminary Bridge - Electronic Deliverables](#)

- ___ Verify Iowa Regional Coordinate System is correct for this project site.
- ___ Correct ProjectWise folder structure is being used.
- ___ The B1_Submittal folder contains the finalized pdf TS&L files.
- ___ The finalized STR .dgn file resides in the BRPrelim root folder and marked as Final Status.
- ___ The correct STR .dgn file naming convention is used.
- ___ The correct model naming conventions are being followed.
- ___ The proposed culvert is drawn accurately in the STR_PRELIM_DESIGNS model.
- ___ The correct level and element symbology are being followed. Use brg levels with ByLevel symbology where possible.
- ___ The PLANBASE and STR_PRELIM models are being used as described in the Electronic Deliverables document.