

CULVERT PLAN REVIEW CHECKLIST

County: _____ Design No.: _____ By: _____ Date: _____
Project Name: _____

1. GENERAL - ALL PROJECTS

1.1 Title Block

- ___ "Design For (xx Skew) (RA)(LA)" "Design For Repair To (xx Skew) (RA)(LA)".
- ___ Structure Type and Size (Ex.: "Twin 12' x 12' x 240'-0 RCB Culvert" "10' x 10' x 320'-0 RCB Culvert").
- ___ Sheet Title (Ex.: "General Notes & Culvert Quantities").
- ___ Station of culvert (mainline). Mainline culvert station should agree with T.S. & L. for new structure or previous plans for repair. Verify that Masterworks (PPMS)Project Scheduling System (PSS) matches.
- ___ Turn In to Contracts Date (Ex.: "December 2013").
- ___ County
- ___ "Iowa Department of Transportation - Highway Administration."
- ___ "Design Sht. No. x of x", "File No.", "Design No."
- ___ Box around title block.

1.2 General

- ___ Check plan constructability. Sufficient details included to guide contractor. Staging sequence provided if required.
- ___ Scale not shown on situation plan or any details.
- ___ Details consistent with culvert standard sheets.
- ___ Non-standard details reviewed with appropriate personnel.
- ___ Cadd files drawn with the correct levels for printing color plans.
- ___ Project number in the border all sheets for each design. For routes that are not three digits include the leading zero(s) before the route number (e.g. BRF-063-3(46)--38-62).
- ___ Standard abbreviations used. See [LRFD BDM 13.1.4].
- ___ Precast culvert alternate is included for culverts meeting the alternate criteria. See [LRFD BDM 7.3].
- ___ Bent bar details include the note, "Note: All dimensions are out to out. D = pin diameter."

2. TITLE SHEET - ALL PROJECTS

2.1 General

- ___ Title sheet conforms to current DOT format posted on Bridges and Structures Bureau web site. Bottom border should state "Bridges and Structures Bureau".
- ___ Correct Project Number (upper right side, right lower border and top left border of sheet).
- ___ Correct PIN Number (upper right side of sheet).
- ___ Correct File Number and Project Directory Name (lower border).
- ___ "Letting Date" filled in with the letting date (upper left border).
- ___ Culvert Standard Plan Box.
- ___ Boxed note referencing Road Standards on road sheets. Include the roadway and roadside sheet number(s).

- ___ Index of Seals (sheet number seal is located on, name and expertise). Add consultant firm information below this by asterix when needed.
- ___ For projects referencing standard culvert plans include the engineer who signed the standard in the index of seals. See [LRFD BDM 1.8.1.1].
- ___ County Name (center of sheet, lower border and bottom left border).
- ___ Proper sheet heading ("Primary", "Interstate", etc.).
- ___ Proper 'Work Type'. See Masterworks (PPMS)PSS (Ex.: "RCB Culvert New – Twin Box") (center of sheet, top left border). Extensions on bridge-sized culverts should be 'Work Type': Reconstruction – RCB Culvert Ext. - ___ Box.
- ___ Verbal location at the center of the sheet should follow format "Route over feature crossed" and "Distance from major feature or intersection" (US 69 over Iowa River, 0.25 Mi. S. of S. Jct of C20).
- ___ Revision box
- ___ Traffic data shown on title sheet unless more than one structure is included in the plans. For multi-structure plans show the traffic data on each individual situation plan and use the traffic data note on the seed title sheet that refers to individual situation plans for traffic data information. See LRFD BDM 1.8.1.2].
- ___ Traffic data includes % trucks.
- ___ "Sheet Number 1" bottom right border.

2.2 Location Map

- ___ Remove references to scales on plans.
- ___ North arrow, North is up
- ___ Map Township/Range (Ex.: "T-87N", "R-2W").
- ___ For larger scale urban map, "Part of City of xx."
- ___ Leader to Culvert location with text "Design No. xx", and "FHWA No. xx" if applicable. (arrowhead should be larger than normal)

2.3 Index of Sheets

- ___ Sheet containing 'Estimated Culvert Quantities' tabulation referenced (tabulation containing total culvert quantities).
- ___ Sheet containing 'Estimated Roadway Quantities' referenced
- ___ Any tabulations summarizing pay quantities not included in the culvert and road tabulations above referenced. (e.g., Roadside sheets, R sheets)
- ___ Correct soil profile sheet numbering convention - SPS.xx.
- ___ Typically need not itemize RCB culvert sheets: Just indicate "Design No. xx"

3. ESTIMATE SHEET AND GENERAL NOTES – ALL PROJECTS

3.1 Estimate Sheet

3.1.1 Estimated Quantity Tabulation

- ___ Quantity tabulation for design provided on this sheet.

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- ___ Tabulation title "Estimated Culvert Quantities". Include appropriate title from Masterworks (PPMS)PSS for cast-in-place or precast alternates.
- ___ Column in tabulation for 'As-Built' quantities.
- ___ All Item Codes and Descriptions agree with Project Scheduling (in-house projects) or Bid Items Application (consultant projects). - OK to use 'short' description.
- ___ Estimated quantities reflect addition of itemized tables in plans.
- ___ Roadway quantities note, in box.
- ___ If a working blanket or granular blanket is required in SPS sheets, include the appropriate bid items (e.g., "Granular Material for Blanket and Subdrain").

3.1.2 Estimate Reference Information Notes

3.1.2.1 All Projects

- ___ Estimate reference notes listing includes all applicable default notes stored in Project Scheduling (in-house projects) or Bid Items Application (consultant projects).
- ___ If a working blanket or granular blanket is required in SPS sheets, include bid item reference notes provided by Soils Design to describe bedding material requirements.

3.2 General Notes Sheet

3.2.1 General

- ___ Traffic Control Note, in box.
- ___ Pollution prevention plan note. See [LRFD BDM 13.2.2] note E40_.
- ___ Repair/Extension Project: Design history tabulation (see standard sheet 1038/M1038). New projects should not include a "design history at this site" tab.

3.2.2 Specifications 'Note'

- ___ Correct 'Specifications' note. See [LRFD BDM 13.7.2] note E601_.
- ___ Supplemental specifications, developmental specifications and special provisions listed by name. Do not include the specification number.
- ___ Electronic copy of special provisions (if necessary) placed in the special provision turn in folder.
- ___ If Standard 'G1' applies, do not duplicate.

3.2.3 Design Stresses 'Note'

- ___ Correct 'Design Stresses' note'. See [LRFD BDM 13.2.2] note E50_.
- ___ If Standard 'G1' applies, do not duplicate.

3.2.4 General Notes

3.2.4.1 All Projects

- ___ All applicable 'standard' general notes (per design manual) provided. 'Non-standard' notes checked for need and do not conflict with standard specifications and standard plan details.
- ___ If Standard 'G1' applies, do not duplicate General Notes.

3.2.4.2 Repair Project

- ___ 'Removals, As Per Plan' [LRFD BDM 13.5.2] note E440 provides complete listing of work included in item.

4. SITUATION PLAN (Placed after Estimated Quantities sheet and General Notes sheet)

4.1 New Construction

4.1.1 General

- ___ Location information near title block. Example:
(Relocated) US 151 Over Maquoketa River
T-87N R-2W
Section 36
Cascade Twp.
Dubuque County
City of _____
FHWA # _____ - on all RCB culverts > 20' along roadway
Latitude XX.123456°
Longitude XX.123456°
Bridge Maintenance No. (if replacing existing bridge)
- ___ Traffic estimate shown.
- ___ Hydraulic data
- ___ Profile data, check for coordination with roadway design.
- ___ Remove "Design Notes" from Preliminary TSL for final Situation Plan.

4.1.2 Plan

- ___ Shoulder and approach pavement widths and slopes (include foreslope) shown for main and crossing roadway, check for coordination with roadway design.
- ___ Horizontal curve data, check for coordination with roadway design.
- ___ Alignments and stationing along CL of approach roadway (and equations), check for coordination with roadway design. Label profile grade line.
- ___ Proposed ditches and pipes shown, check for coordination with roadway design.
- ___ Any removals to be performed by culvert contractor designated.
- ___ 'Back to back of parapets' dimension shown.
- ___ Length from centerline roadway left to back of parapet dimension shown.
- ___ Length from centerline of roadway right to back of parapet dimension shown.
- ___ Lengths of individual sections dimension shown.
- ___ Angle of skew tangent from centerline of roadway dimension shown.
- ___ Label headwall size and skew angle. Indicate "Inlet" and "Outlet".
- ___ Existing structure(s) shown.
- ___ Highway name.
- ___ Pertinent structures and features close enough to influence construction shown (utilities, old structures, etc.).

4.1.3 Longitudinal Section

- ___ Existing ground line and proposed grade line shown and labeled.
- ___ Following elevations labeled and shown:

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Profile grade at centerline of roadway or at centerline of survey or at office relocation centerline.

Flowlines at inlet and outlet.

— Foreslopes labeled (6:1, etc.) (additional slopes when applicable (e.g. flumes and drop inlets)).

— Benchmark or Control Point

— Dimension fill height (Use 1' increments). See Culvert Design Manual for metric conversion.

— "Anticipated settlement = ____" below view title.

— Bell joints standard note, if necessary.

— If an existing culvert is non-standard, it is to be extended with the same size non-standard culvert (assuming an RCP would not work).

— Adequate details provided to define location and scope of concrete repair work.

5.2 Temporary Barrier Rail

— Reduced width signing plan provided if lane width less than 14'-6". See [LRFD BDM 12.1.8.2].

— 'F-Shape' used for min. lane 12-5 interstate mainline, 10'-6" primary. H-Pile section used when these minimums cannot be provided.

— Traffic lane and work area widths shown on rail layout plan. Correct lane width shown on standard sheet 1049 note. Traffic lane width should be noted as 'minimum'.

4.2 Repair/Extensions Projects

4.2.1 General

— Location information near title block. Example:
US 151 Over Maquoketa River
T87N R2W
Section 36
Cascade Twp.
Dubuque County
City of _____
Bridge Maint. No. 3609.9S137 - on all RCB culverts > 20' along roadway
FHWA # _____ - on all RCB culverts > 20' along roadway
Latitude XX.123456°
Longitude XX.123456°

— Traffic counts for current year.

4.2.2 Plan

— Alignments and stationing.

— 'Back to Back of Parapets' dimension shown.

— Highway name shown.

— Legend of work to be performed.

5. DETAILS - REPAIR/EXTENSION PROJECTS

5.1 General

— For an existing culvert that is being extended and the headwall is at a skew to the culvert (not perpendicular) the culvert is "not" to be squared up. The headwall is to be removed but the proposed culvert is to be attached along the skew line.

— If an existing culvert is being extended at a different skew, for spans less than 8', a minimum 3' section (on the shortest wall) is to be attached to the existing culvert prior to the proposed bend. For spans 8' or longer, a minimum 5' wall section is to be used.

6. RCB CULVERTS

— If fill exceeds maximum used for standards, check that culvert program has been run and output matches values on plan. If metric culvert, check that program output has been converted properly.

— Check that fill height is included in general notes. Design assumption is that floor of culvert is not placed on bedrock.

— Prefer to use Special Backfill when a granular blanket is necessary. Include default estimate reference note that prohibits RAP/HMA.

— Use of working blanket consistent with SPS sheets. Use granular blanket to refer to required material and working blanket to refer to optional material for the contractor.

— Check if openings for pipes, or weepholes are necessary.

— For culverts without fill current notes and details are used. See [LRFD BDM 7.2.4.5.1].

— Show typical detail on General Notes sheet of Class 20 excavation limits. If working blanket or granular blanket is required, show extent of blanket working material on this detail.

7. CAST IN PLACE CULVERTS

— When using a non-standard barrel, the bell joint sheet must also be modified.

— Check for appropriate use of bell joints. If flume, include bell joints at junction of culvert end barrel section and flume. If tapered inlet, include a bell joint at junction of tapered inlet and culvert barrel section.

— When bell joints are used, include "Bell Joint Orientation Detail" which is in the CADD cell library.

— Bends located internal to section, not at joint locations.

— End barrel section minimum/maximum lengths. See [LRFD BDM 7.2.4.5.2.1].

— Avoid joints below centerline of roadway (especially for 5' of fill or less), if possible.

8. PRECAST CULVERTS

— Dimension length of straight barrel sections on Situation Plan.

— Dimension "G" length as indicated on precast culvert end section standards on Situation Plan.

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- ___ Multiple barrel culverts include Standard Sheet 1082P.
- ___ Include Installation Plan when using precast boxes under existing bridges. See [LRFD BDM 13.7.2] note E685.
- ___ On Class 20 excavation detail, include 6" special backfill layer under precast box, with 3/8" maximum aggregate. Include default estimate reference note that prohibits RAP/HMA.

9. FLOWABLE MORTAR

- ___ Proposed flowable mortar RCB culverts for bridge replacement should allow a minimum of 3'-0 vertical clearance for bridge beam spacing less than 6'-0, minimum 1'-0 vertical clearance for bridge beam spacing 6'-0 or greater and minimum 1'-6 horizontal side clearance. See [LRFD BDM 7.2.4.10].
- ___ Provide a detail in an elevation view showing dimension of vertical clearance from top of culvert to bottom of existing bridge low beam or deck.
- ___ Provide a detail in an elevation view showing dimension of horizontal clearance from sides of culvert to existing bridge substructure.
- ___ Vent hole layout for flowable mortar placement. See [LRFD BDM 7.2.4.10].
- ___ Show removal limits if required. (Removal of railing, end sections, curbs, etc.)

10. ROADWAY PLANS

- ___ Erosion control, including seeding and mulching, bid items (all projects) - do not include as incidental items.
- ___ Traffic control bid items (all projects where required by traffic control plan).
- ___ Traffic control plan current and acceptable to Design Bureau.
- ___ PPP current, consistent with grading plan and acceptable to Design Bureau.
- ___ "Temporary Stream Diversion" bid item to be included and Road Standard applied for any river, stream, creek, or drain ditch.
- ___ "Box Culvert (Backfill)" Road Standard DR-111 applied, unless flowable mortar project.
- ___ For flowable mortar projects, include Road Design Details 4317 or 4318.
- ___ Channel revetment quantities shown on the situation plan to be included with the Roadway bid items.

REFERENCE ABBREVIATIONS

BDM – Bridge Design Manual

CADD M – CADD Memo