Design Package Review Checklist for Stream Crossings ☐ DGR ☐ LVR

Applicant:_____ Road Name:_____ LAT/LONG:_____

Engineer: _____ Reviewer:_____ Date:_____

The DGLVR Program requires that all plans and specifications be submitted to the conservation district for review prior to permit submittal. The conservation district review is to confirm that DGLVR Policy and Stream Crossing Standard are met. The conservation district may ask for assistance in reviewing the plans from outside sources such as the SCC, CDGRS, and Trout Unlimited (TU). This package must include all drawings necessary for permitting and construction.

Documents submitted for this review shall include, at a minimum, the following items:

- ☐ **Construction Drawings** including plan, profile, cross-section and detail drawings.
- ☐ **Hydrologic and Hydraulic (H&H) Study**
- ☐ **Proposed E&S Plan**
- ☐ **Construction Specifications**

At a minimum, the plans must include the following per the DGLVR Stream Crossing Standard section VI.B.:

☐ ***1. Existing conditions of project site, including but not limited to the full longitudinal profile survey and cross sections of the stream, existing stream crossing, stream crossing and channel slope, road approaches and road fill cover, and delineated wetlands (if applicable).***

- Construction detail drawings include clear and concise depiction of all existing conditions on plan, section, and profile drawings.
- Profile drawings show the existing streambed profile along the thalweg, extending beyond the upstream and downstream project limits (tie-in points). Existing channel slopes noted upstream and downstream of the existing culvert.
- Plan view should clearly show the existing structure, structure alignment, dimensions, road approaches, cross section locations and any wetlands.
- Section drawings should show the existing structure dimensions, elevation, and depth of road cover.
- Drawings include existing roadway elevation, and elevation and location of benchmarks.

☐ ***2. Geographic Location and bankfull width of stream.***

- The plan view drawings note and depict the bankfull width of the stream, bankfull elevation(s) and the location of all cross-sectional measurements.

☐ ***3. Proposed stream crossing structure width, length and height with profile and typical cross sections.***

- Plans show structure dimensions and elevations, including inlet and outlet invert elevations and locations, on the plan, section and profile views.
- Proposed alignment of replacement structure is shown on the plan view.
- If applicable, footer dimensions, elevations and depth of bury are provided.
- Finished roadway elevation over structure depicted on profile and section views.
- Clearly labeled discharge values and water surface elevations at the proposed crossing inlet for the Q2, Q10, Q25, Q50, and Q100.

☐ ***4. Elevations and locations of abutments, footings, wingwalls and other associated appurtenances.***

- The proposed conditions drawings show the locations and elevations of all structure features such as abutments, footings, wingwalls and other associated appurtenances.

☐ ***5. Details for stream bed re-construction (e.g. channel width, proposed channel alignment, channel side slopes, stream bed slope and location of tie-in points).***

- The proposed-conditions plan view and profile drawings adequately inform reconstruction of a stable stream channel that reestablishes and maintains longitudinal continuity upstream, through, and downstream of the replacement crossing.
- Clearly shows on the profile drawing the design slope and depth of streambed material in the proposed reconstructed reach.

- Shows design of streambed and bank margin including rock sizing and elevations at structure inlet and outlet and extending upstream and downstream of the crossing as needed to tie into existing streambed and banks.
- Notes locations and elevations of tie-in points at upstream- and downstream limits of the reconstructed reach (these should occur at existing grade control features).
- The proposed bankfull width of the reconstructed reach shown to scale, with design bankfull width noted.
- Identifies method for stabilizing transition areas at upper and lower project limits.

☐ ***6. Location and details for low flow channel width, depth, and material size and types.***
- Low flow channel dimensions from the cross-sectional surveys are shown on the section view.
- Details should include the width and depth of the channel and information on the stream bed materials used in constructing the low flow channel.

☐ ***7. Locations and construction details, including rock sizing, of in-stream structures, grade controls, and/or bank stabilization structures (if applicable).***
- Plan, section and profile drawings clearly show all grade controls and instream structures, including locations and elevations of grade control features (at crest / thalweg) through the reconstructed reach.
- Plans should note whether grade control features at the tie-in points will be maintained as existing (stable) or will be constructed. For constructed riffles, the design riffle length should be specified.
- Detail drawings for grade control structures should clearly indicate material type, size, installation slopes and overall structure length.

☐ ***8. Depth, gradation, and composition of material for streambed restoration. Refer to the DGLVR Stream Crossing Replacement Technical Manual for more guidance on determining substrate gradation and composition.***
- On the proposed section and profile view the streambed material thickness, inlet and outlet bed elevations should be shown.
- Material gradation and composition should be specified. Note if native material onsite will be reused or if material will need to be imported.
- Gradation, composition and construction details included for the low flow channel, bankfull channel and the bank margins.

☐ ***9. Specification for compaction of placed streambed material.***
- Details provided on compaction (mechanical or hydraulic) of materials used to construct the streambed through the reconstructed reach to prevent subsurface flow down through the substrate.
- Note that substrate is thoroughly compacted when water stays on top of the newly constructed stream bed and does not go subsurface.

☐ ***10. Details for scour hole restoration details and reestablishing channel cross section.***
- If applicable, details are provided to indicate material type, size, and depth to reconstruct the scour hole.
- Reconstruction of the channel cross section through the scour hole should be shown to tie into the existing or reconstructed stream bed.

☐ ***11. Structure manufacturer's specifications, details, and installation instructions.***
- Submittal includes all structure specification drawings, including applicable structural details of all components, including but not limited to reinforcing steel, type of materials, thickness, anchorage requirements, backfill lift thickness, etc.

☐ ***12. Thickness, compressive strength, reinforcement, testing, and other special requirements for concrete according to the manufacturer specifications, if applicable.***
- If applicable, concrete specifications and manufacturer's requirements are provided.
- Includes details for concrete sampling and testing as required.

☐ ***13. Load limits for bridges and/or culverts including signage per local codes.***
- All details related to structure load limits and related signage per Township and PA code are provided.

☐ ***14. Location of all utilities and notification requirements (PA One Call).***

- Drawings show locations of all utilities and specifies contractor notification requirements for PA One Call.

☐ ***15. Location and elevation of survey benchmarks.***

- Elevations and locations of benchmarks are clearly shown on design plans.

☐ ***16. Method of surface water diversion and dewatering during construction.***

- Submittal includes detail drawings for diversion of the stream flow and dewatering of the construction site.
- Provides details for control of sediment during diversion and dewatering.

☐ ***17. Erosion and Sedimentation Control Plan, if applicable.***

- Construction documents will include an approved E&S Plan with detail drawings for all BMPs to be used during construction, if applicable.

☐ ***18. Vegetative requirements that include seed and plant materials to be used, establishment rates, and season of planting.***

- Plans include details on reseeding and establishment rate. Should note if any specialized bank stabilization or soil amendments will be needed to ensure establishment.

☐ **19. Cross section view of the proposed structure that clearly notes proposed streambed thalweg elevation (at the crest of a constructed grade control feature), Q100 water surface elevation, and top of structure opening elevation.**

☐ ***20. Additional site-specific requirements.***

- Stream crossing replacements through the DGLVR Program include many aspects that differ from more basic culvert replacement projects, therefore project specifications should be included with the bid package.
- If not provided as notations to the detail drawings, separate site-specific specification documents should be provided for unique construction elements. This allows prospective contractors a clear sense of the project goals and needs, establishing a clear understanding of construction requirements.

Notes:

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