

Appendix B – Submission Check List**State Highways and Local Roads Checklist
for Hydraulics and Drainage Design Reviews**

The following is a checklist to be completed and included with all State Highways and Local Roads projects that have hydraulics and drainage involvement. To expedite the review process, meet project schedules, and avoid possible delays due to incomplete design submissions, the following checklist outlines the necessary material (for each design phase) that should be provided to the Hydraulics and Drainage Section for review. Also, approximate review time frames with each submission are provided for the designer to consider. The procedures and criteria of the current Consulting Engineers Manual, Bridge Design Manual, and Drainage Manual should be followed with special attention to Sections 302, 303, 304, 403, 404, 502, 707, 711, 712, 713, 802, and 804 of the Consulting Engineers Manual; Sections 2, 5, 11, and 13 of the Bridge Design Manual; and all the sections within the Drainage Manual.

The following checklist(s) are to be submitted for all design projects at the appropriate design phases:

Scope Review Meeting/Permit Determination Request

Preliminary Design Checklist (Plans 35% Complete)

Drainage Design Checklist (Plans 50% Complete) – *If Necessary*

Semi-Final Design Checklist (Plans 60% to 70% Complete)

Final Design Checklist (Plans 85% to 90% Complete)

Project No. _____
Roadway _____
Town _____
Date _____
Signature of Engineer _____

Scope Review Meeting/Permit Determination Request

Allow a 2-3 week review time.

- a.** Project description with a brief statement of hydraulics and drainage involvement.
 Included N/A
- b.** Request for determination of permit involvement.
 Included N/A
- c.** Location plan.
 Included N/A
- d.** Available plans, profiles, cross sections, etc...
 Included N/A

Project No.	_____
Roadway	_____
Town	_____
Date	_____
Designed By	_____
Signature of Engineer	_____

Preliminary Design Checklist (Plans 35% Complete)

Allow a 3-4 week review time.

The Preliminary Design Submission should include the following:

a. Preliminary Design Statement

The design statement should contain a narrative for the following:

1. Description of hydraulics and drainage involvement.
 Included Not Included Not Applicable
2. A list of existing culvert or bridge crossings for tributary areas:
a.) > 81 ha (200 Acres) and < 2.59 km² (1 mi²)
b.) > 2.59 km² (1 mi²)
 Included Not Included Not Applicable
3. Available fish passage information from the ConnDEP Fisheries Division.
 Included Not Included Not Applicable
4. Water diversions.
 Included Not Included Not Applicable
5. Justification for drainage design not consistent with the Drainage Manual criteria.
 Included Not Included Not Applicable
6. List of permit requirements (ie: FPM, SCEL, DAM, CAM, etc...).
 Included Not Included Not Applicable
7. Required detention designs.
 Included Not Included Not Applicable
8. Any unusual designs such as pumping stations.
 Included Not Included Not Applicable
9. Tidal Involvement.
 Included Not Included Not Applicable
10. Investigation of existing drainage concerns and/or problems. Contact Town/City maintenance departments for local road projects or ConnDOT Maintenance departments and district drainage engineer for State highway projects.
 Included Not Included Not Applicable

b. Plans, Profiles and available Cross Sections

1. Watercourses, perennial and intermittent should be shown and labeled.
 Included Not Included Not Applicable
2. Special drainage provisions such as sedimentation basins and/or non standard drainage structures.
 Included Not Included Not Applicable
3. Approximate slope limits.
 Included Not Included Not Applicable
4. Taking lines and property lines.
 Included Not Included Not Applicable
5. Existing ground line and existing structures.
 Included Not Included Not Applicable
6. Existing drainage rights from survey information.
 Included Not Included Not Applicable
7. Preliminary conceptual layout of proposed drainage system including channels, ditches and swales.
 Included Not Included Not Applicable
8. FEMA 100 year floodplain and/or SCEL shown and labeled.
 Included Not Included Not Applicable

c. Watershed Area Map

1. An overview contour map (100 or 200 scale contour map or USGS 2000 scale topographic map) for the project showing watershed areas for all cross culverts.
 Included Not Included Not Applicable

d. Structures with drainage areas > 2.59 km² (1 mi²)

1. Hydrology computations determining the drainage area and design discharge.
 Included Not Included Not Applicable
2. Preliminary hydraulic and scour computations for the structure type study alternatives (the above hydrology computations must be approved prior to the start of the preliminary hydraulic computations).
 Included Not Included Not Applicable

Provide justification for items **Not Included**. Justification should correspond to letter and number (e.g.: **a.1., b.1., c.1.**, etc...).

Project No. _____

Roadway _____

Town _____

Date _____

Designed By _____

Signature of Engineer _____

Drainage Design Checklist (Plans 50% Complete)

Allow a 6-8 week review time

See **Note** below.

Semi-Final Design Checklist (Plans 60% to 70% Complete)

Allow a 5-6 week review time

Note: A separate, earlier drainage submission (at approximately 50% completion) may be required if the drainage design is particularly complicated, requires significant right of way and/or otherwise might jeopardize the schedule of the project. **This checklist MUST accompany both of these submissions.**

Indicate which submission this checklist is for and include the following information:

- Drainage Design Submission* *Semi-Final Design Submission*

a. Draft Drainage Report

1. Disposition of Preliminary Design/Drainage Design Submission comments with written responses justifying comments not incorporated.
 Included Not Included Not Applicable
2. A condition survey of the existing drainage pipes and structures that are to remain in use should be investigated for structural adequacy and documented. (See Section 3.6.3.)
 Included Not Included Not Applicable
3. The condition of existing ditches that are to remain in use should be field inspected, analyzed and results documented to verify their stability and the need for cleaning and reshaping.
 Included Not Included Not Applicable
4. The condition of the outlet at the existing discharge points should be investigated and documented to ensure no erosion or sediment problems exist. If outlet protection is required, it should be incorporated into the project and computations submitted.
 Included Not Included Not Applicable

5. A condition survey report including items 2, 3, and 4 above. (See Appendix A and B, Chapter 4)
 Included Not Included Not Applicable
6. Drainage design computations should include gutter flow analysis, storm sewer design, and hydraulic gradeline (HGL). The hydraulic gradeline should be analyzed to ensure 0.3m (1 ft) freeboard is maintained at drainage structures. This analysis should consider all friction, entrance, junction, exit and bend losses. Designer to verify that the proposed drainage will not adversely impact the existing downstream storm system or property owners. (See Chapter 11, Storm Drainage Systems.)
 Included Not Included Not Applicable
7. Drainage computations should identify structures by station and offset rather than by a numerical identifier. If station and offset is not feasible for the computations then include an index with the location of the structure corresponding to its numerical identifier. The watershed map should be prepared accordingly.
 Included Not Included Not Applicable
8. Existing drainage systems shall be analyzed for hydraulic adequacy to meet the proposed conditions and, if found inadequate, an upgrade will be designed in conformance with the criteria established in the Drainage Manual.
 Included Not Included Not Applicable
9. All roadway drainage systems should be brought to a suitable outlet.
 Included Not Included Not Applicable
10. If upgrading of pipes downstream of the project is necessary, then additional rights may need to be acquired.
 Included Not Included Not Applicable
11. The need for temporary drainage should be addressed. Temporary drainage computations should be prepared in accordance with criteria in the Drainage Manual. (See Section 3.6.11.)
 Included Not Included Not Applicable
12. Proposed swales, ditches and channels should be designed in accordance with HEC-15 for discharges 1.42 m³/s (50 ft³/s) and less or HEC-11 for discharges in excess of 1.42 m³/s (50 ft³/s). (See Chapter 7, Channels.)
 Included Not Included Not Applicable
13. Minor and small cross culvert design computations with culvert data sheet. (See Chapter 8, Culverts.)
 Included Not Included Not Applicable
14. Topographic mapping with watershed area delineated for each inlet and/or cross culverts as required to perform the drainage calculations. The flow path used in the time of concentration calculation and coefficient of imperviousness should be shown for each area. (See Chapter 6, Hydrology.)
 Included Not Included Not Applicable
15. Diversion identified.
 Included Not Included Not Applicable
16. All plans, computations and reports identify the responsible engineers who prepared and checked the work.
 Included Not Included Not Applicable
17. Alternate types of drainage pipe material have been considered and documented.
 Included Not Included Not Applicable

b. Plans, Profiles and Cross Sections

1. The existing and proposed storm drainage shown to their outlets.
 Included Not Included Not Applicable
2. Size and type of existing drainage pipes/structures and disposition of pipes/structures to be abandoned.
 Included Not Included Not Applicable
3. Properties affected by diversions should be shown on the plans so that proper rights can be acquired.
 Included Not Included Not Applicable
4. Drainage Rights and Easements.
 Included Not Included Not Applicable
5. Outlet Protection shown on plans and details provided.
 Included Not Included Not Applicable
6. Intersection grading plans to ensure inlets are located at the low points to alleviate ponding/icing conditions. Top of frame elevation should be shown.
 Included Not Included Not Applicable
7. In areas where cross culverts are being extended, replaced, or where outlet protection is proposed a profile or cross section of the natural ground should be provided to show how the inverts will tie into the existing topography.
 Included Not Included Not Applicable
8. The top of frame and invert elevations for each storm drainage structure shown. Proposed drainage structures shall be identified by station and offset on cross sections.
 Included Not Included Not Applicable
9. Existing and proposed drainage patterns (flow arrows) of pipes, ditches, channel and swales.
 Included Not Included Not Applicable
10. Details for any special drainage structures not found in the Standard Drawings.
 Included Not Included Not Applicable
11. The direction of flow should be shown by arrows to 61m (200 ft.) beyond any drainage outlet, or shown to terminate by dissipation or entrance into a watercourse or body of water.
 Included Not Included Not Applicable

c. Structures with drainage areas > 2.59 km² (1 mi²)

1. Draft hydraulic design report.
 Included Not Included Not Applicable
2. Draft scour report when the proposed structure spans the waterway.
 Included Not Included Not Applicable
3. Draft floodway report.
 Included Not Included Not Applicable
4. Draft SCEL report.
 Included Not Included Not Applicable
5. Draft scour report if required.
 Included Not Included Not Applicable

Provide justification for items **Not Included**. Justification should correspond to letter and number.

Project No. _____

Roadway _____

Town _____

Date _____

Designed By _____

Signature of Engineer _____

Final Design Checklist (Plans 85% to 90% Complete)

Allow a 4-5 week review time.

The Final Design Submission should include the following:

- a. Disposition of Semi-Final Design comments with written responses justifying comments not incorporated.
 Included Not Included Not Applicable
- b. Final Drainage Report and Final Plans.
 Included Not Included Not Applicable
- c. Final scour report.
 Included Not Included Not Applicable
- d. Final floodway analysis report.
 Included Not Included Not Applicable
- e. Final SCEL report.
 Included Not Included Not Applicable
- f. Final hydraulic design report.
 Included Not Included Not Applicable

Provide justification for items **Not Included**. Justification should correspond to the designated letter.
