

Appendix 6-C
MDOT Hydraulic Report Format and Supporting Documents

HYDRAULIC REPORT FORMAT

Prepare a typed hydraulic report using the format outlined below. Bind the report in a folder, inserting any loose items into pockets contained within, and arrange the contents in the following order:

- A. A tabulation of the following items:
 - 1. Stream name
 - 2. Township
 - 3. County
 - 4. Sections, Town, and Range
 - 5. Drainage area
 - 6. Discharge rates for 2 percent chance (50-year), 1 percent chance (100-year), and 0.2 percent chance (500-year) flood events.
 - 7. Scope of study delineating the reach of channel covered and the method used to establish the starting water surface elevation.
 - 8. Description of and basis for coefficients and variables used.
 - 9. Comments pertaining to the study including the impacts of the proposed work on the watercourse.

- B. A summary table (see example below) including the following items for existing and proposed conditions at each cross section within the study for the 1 percent chance (100-year) flood event:
 - 1. Velocity in the channel
 - 2. Top width
 - 3. Energy grade
 - 4. Change in energy grade
 - 5. Computed water surface elevation
 - 6. Change in water surface elevation

NOTE: A hydraulic summary table must be included on the plans in the format shown in Section 4.05.10, Road Design Manual or Section 8.05C, General Plan of Structure Sheet, Bridge Design Manual.

- C. Photographs taken upstream and downstream of the crossing labeled with their location in reference to the trunkline. Include photos of any other structures within the study limits.

- D. A site sheet showing the study limits with the baseline and cross section locations plotted.

- E. Plotted profile of the channel bottom and the existing and proposed 1 percent chance (100-year) water surface and energy grade lines. The profile shall include the existing and proposed structures, as well as all other structures within the study limits. Top of road and under-clearance elevations shall be included for all structures.
- F. Plotted cross sections of the watercourse used in the study.
- G. Copies of the General Plan of Site and General Plan of Structure sheets for the existing (if available) and proposed structures
- H. A copy of the input and output files

1 Percent Chance (100-year) Flood Frequency: Existing Versus Proposed Condition

Elevations are in N.A.V.D.

Sec. No.	Velocity in Channel (fps)		Top Width (feet)		Energy Grade (feet)		Change in Energy (feet)	Computed WSEL (feet)		Change in WSEL (feet)
	EX.	PROP.	EX.	PROP.	EX.	PROP.		EX.	PROP.	

The Ten Tenets in Preparing a Hydraulic Report

1. Start downstream.
2. Look downstream to determine left from right.
3. Look for downstream controls.
4. Improvements do not reflect far upstream.
5. Backwater can extend a long way upstream.
6. Show water surface elevation and date on each section.
7. Include a picture of the channel for each section and a few that are representative of the overbanks.
8. Look for and document high water marks and other evidence of past flooding.
9. Compare proposed results to existing conditions.
10. The report shall be prepared and sealed by a registered Professional Engineer licensed in Michigan

HYDRAULIC CAPACITY CERTIFICATION
(Replacement Crossing)

RE: Road Name
Stream Name
Town, Range, Section
Township
County

I, Certifying Engineers Name and P.E. #, do hereby certify that the _____ bridge/culvert replacement shown on plans dated _____, is designed with an equal or greater hydraulic capacity, that the existing bridge or culvert and its approaches do not cause a harmful interference (i.e., an increased stage or change in direction of flow that causes or is likely to cause any of the following: damage to property; a threat to life; a threat to personal injury; pollution, impairment, or destruction of water or other natural resources), and that deletion of existing auxiliary openings and road overflow areas is not planned.

_____, PE

HYDRAULIC CAPACITY CERTIFICATION
(NEW CROSSING)

RE: Road Name
Stream Name
Town, Range, Section
Township
County

I, Certifying Engineers Name and P.E. #, do hereby certify that the new _____ bridge/culvert shown on plans dated _____, is designed to pass the 100-year flood without causing a harmful interference (i.e., an increased stage or change in direction of flow that causes or is likely to cause any of the following: damage to property; a threat to life; a threat to personal injury; pollution, impairment, or destruction of water or other natural resources).

_____, PE

DAMAGE ASSESSMENT CERTIFICATION

RE: Road Name
Stream Name
Town, Range, Section
Township
County

I, Certifying Engineers Name and P.E. #, do hereby certify that I have inspected the upstream adjoining properties and find that the reduction in hydraulic capacity and resulting _____-foot increase to upstream flood stages or diversion of flow will not cause a harmful interference to flood flows or damage to adjacent structures, crop lands, or potential building sites. I further certify that the existing crossing has not caused environmental and/or property damage in the past nor are there any indications that the existing crossing is hydraulically inadequate.

_____, PE