

**MICHIGAN DESIGN MANUAL  
BRIDGE DESIGN**

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## CHAPTER 5

### CONSULTANT CONTRACTS

#### 5.01

##### GENERAL (11-19-99)

This section is a brief overview of the bridge consultant process. For detailed information regarding Consultant contracts, contract adjustments, prequalification and selection refer to the Design Contract Management Manual.

It is the policy of MDOT to select consultants when the existing staff of the Design Support Area cannot meet the workload, or when the degree of difficulty of a project requires expertise that is not available within the Design Support Area engineering staff.

#### 5.02

##### PROJECT OVERSIGHT (11-19-99)

The Bridge Consultant Unit or an in-house Bridge Unit will manage the consultant bridge projects. This oversight will be general in nature and involve acceptance rather than approval of the design package. Final responsibility for accuracy and quality of work rests with the bridge consultant.

Consultants shall use AASHTO standards and MDOT guidelines to design all bridge work for MDOT. (When required by specific designs, Consultants will use other related design standards and guides such as AREMA, ASTM, ACI, etc.) Where conflicts arise between standards, the MDOT Bridge Project Manager will be the final authority as to the applicable design standards.

#### 5.03

##### CONSULTANT SELECTION PROCESS

The selection process has been formalized by MDOT and shall be as indicated in the Design Contract Management Manual

##### 5.03.01

###### Advertisement for Professional Services

The Engineer of Design Operations - Structures Section will decide when consulting services are required and submit information to the Bridge Consultant Unit leader. (Alternately, an in-house Bridge Unit may elect to consult out a bridge project - following a similar procedure as described in the following outline.) The Bridge Unit leader will work with the Contracts Officer to advertise for consulting services. The information will show the nature of the work, the location of the project and a detailed description of the work required. Requirements to be met by consultants are indicated in the solicitation and a request for letters of interest will show the address where the letters must be sent. The anticipated schedule of consultant evaluation and selection will also appear in the advertisement. The advertisement will be placed in the trade journals by the Contracts Officer. **Michigan Contractor and Builder**, **Michigan Roads and Construction**, and **Project Reports** are accepted trade magazines. Other journals may be used depending on the scope of work. A sample of an advertisement is shown in [Appendix 5.03.01](#). (11-19-99)

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### 5.03.02

#### Prime Consultant and Subconsultant

The prime consultant is the party responsible for the project and will be the primary contact for the project. The prime consultant will be responsible for the performance of the subconsultant.

### 5.03.03

#### Proposals

The MDOT Project Manager will be the official MDOT spokesperson concerning the request for proposal (RFP). Any changes, additions or deletions to the RFP or scope of work will be discussed with the Engineer of Consultant Coordination, and then put in writing and sent by the Project Manager to all consultants that are "short listed". Copies of the correspondence will be provided to the Selection Committee. (11-19-99)

Two copies of a detailed proposal shall be requested from each of the short listed firms. The proposal shall be in two parts: the Technical Proposal and the Cost Proposal.

In addition to the requirements listed in the Contract Management Manual, the consultant shall include the following items in their proposal.

### 5.03.03 (continued)

#### A. Technical Proposal

The Technical Proposal shall, as a minimum, cover the following information:

##### 1. Scope of work. (8-6-92)

The description of the scope of work shall list elements of the project that are the responsibility of the consultant and all elements that are the responsibility of MDOT (or others). Some of the items that should be addressed, depending on the nature of the project, are:

- a. A complete design of the structure using applicable standards and current engineering practice. (Give a brief description of the structure, and number of structures.) (5-1-2000)
- b. Preparation of contract plans and bid item quantities.
- c. Preparation of any specifications required to supplement MDOT's Standard Specifications for Construction.
- d. Any pickup survey or field measurements required to supplement the data provided by MDOT (e.g. camber in existing beams). Any survey required for a hydraulic analysis.

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### 5.03.03 (continued)

#### Proposals

- e. A complete hydraulic analysis to determine the required waterway area at the structure and to determine scour potential. (Include a copy of MDOT's procedures).

Normally, two comparative hydraulic analyses are required by the FHWA. For scope of work statement for hydraulic study and scour analysis, see [Appendix 5.03.03 A.1.e.](#) and/or Consultant Manual for Consultants, Chapter 24(PPD task 3520).

- f. Soil borings of sufficient depth and number and a geotechnical analysis to perform the foundation design and/or scour analysis. For scope of work statement for geotechnical services, see [Appendix 5.03.03 A.1.f.](#) and/or Consultant Manual for Consultants, Chapter 24(PPD task 3530).
- g. Preparation of permit requests. (MDOT will submit these.)
- h. Necessary contacts with concerned agencies: e.g. Michigan Department of Environment, Great Lakes and Energy (MDEGLE), municipalities, utilities, railroad, State Historic Commission. (02-16-2010) (6-24-2019)
- i. Participation in meetings and field reviews at the site.
- j. Solutions to any unique problems, e.g. utility interference, staging for part width construction.
- k. With concurrence from Region/TSC Traffic Engineer, provide plans and specifications for maintaining traffic during construction.

### 5.03.03 (continued)

- 2. Additional scope of work items: Rehabilitation Projects

The following additional items should be considered for agreements involving rehabilitation.

- a. Inspect the existing bridge and job site to determine the extent and complexity of rehabilitation work and to determine the need for any additional work not included in the Description of Project.
- b. Prepare a life cycle cost comparison between the intended rehabilitation and complete replacement. (This item may have to be presented as "Stage I" of the agreement as the scope of the remaining services may depend on the results of this comparison.)
- c. Analyze the existing structure to determine if it conforms to current specifications and loading conditions.
- d. Perform a deck condition survey to determine the location and proportions of visible spalls and patches and also subsurface delaminations. With concurrence from MDOT's Region/TSC Traffic Engineer, provide traffic control to permit this work. (11-19-99)

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### 5.03.03 (continued)

#### Proposals

#### 3. Construction Services

When contract award is to be made soon after plan completion, the following items should be considered. It should be made clear that the fees for each of these is clearly defined and not combined with the fee for plan preparation.

- a. Review of fabricator's shop drawings (structural steel, prestressed concrete beams, modular expansion joints).
- b. Provide design assistance with problems that may arise during construction. (This does not include problems which result from plan errors or omissions.) MDOT will provide an estimate of the number of hours that a total fee can be based upon. Payment, however, will be based on actual number of hours required.

In addition to the required services, the proposal shall also acknowledge the consultant's responsibility to maintain office records, submit monthly progress reports, and submit MDOT vouchers with their billings. The technical proposal shall include a schedule of plan preparation. The schedule shall make provisions for MDOT and FHWA reviews and approvals prior to proceeding with preparation of final plans.

### 5.03.03 (continued)

#### B. Cost Proposal

In general, the consultant fee shall be based on payroll plus overhead plus direct costs plus profit, as described in the Contract Management Manual. On small or unusual projects, the fee may be based on a lump sum amount proposed by the consultant.

When the consultant services include review of shop drawings and/or assistance with field engineering problems, the consultant shall be instructed to submit their fee in two parts: one for plan preparation, and one for construction services. (11-19-99)

### 5.03.04

#### Final Selection

MDOT will select a consultant based on criteria outlined in the Contract Management Manual. In addition, MDOT will consider the following items in selecting a bridge consultant:

- A. The consultant's familiarity with the scope of the project.
- B. The estimated number of man-hours projected to perform the work. Where man-hours have been assigned for surveys, delamination and deck analyses, hydraulic studies and geotechnical work, MDOT authorities should be contacted for verification. (8-6-92)
- C. The degree of competency of the consultant.

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### 5.04

#### CONSULTANT COORDINATION

Coordination between the consultant and MDOT is the responsibility of the Design Engineer (Project Manager) to whom the project has been assigned.

#### 5.04.01

##### Agreement Preparation

The Project Manager provides assistance when the agreement is being prepared and reviews the "Scope of Work" as prepared by the consultant. (The "Scope of Work" becomes an exhibit to the agreement.) He reviews the final agreement for form and completeness.

#### 5.04.02

##### Plan Information

###### A. MDOT Provided Materials

The Project Manager will provide the following material as needed by the consultant:

1. Engineering Reports and supplements
2. Supplemental Specifications and Special Provisions
3. Road Plans, survey notes, soil data
4. Plan materials; i.e., special detail sheets, expansion joint sheets, etc.
5. Coding for Payment Voucher
6. Payment Voucher forms
7. Prints of sample job for use as a guide

#### 5.04.02 (continued)

###### B. Consultant Purchased Materials

The following material is available to the consultant by purchasing from the Contracts Division:

1. Bridge Design Guides
2. Bridge Design Manual
3. Road and Bridge Standard Plans
4. Construction Specifications
5. Pay Item Code Book

#### 5.04.03

##### MDOT Contacts

The MDOT Project Manager is the contact between MDOT and the consultant in matters regarding the preparation of bridge designs and plans. Contacts between consultants and other personnel should be avoided.

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### 5.04.04

#### Consultant Identification on Plans

The following procedure shall be used on plans prepared by consultants:

- A. The title sheet shall be sealed by the consultant.
- B. The block on the title sheet marked "Plans Prepared By" shall be revised to say "Plans Reviewed By", and the name of the coordinating MDOT Design Engineer shall be indicated.
- C. All sheets shall bear the name or logo of the consultant in or adjacent to the title block.
- D. The initials appearing in each sheet's title block shall be those of the consultant's personnel.

### 5.04.05

#### Plan Review/Quality Assurance

All design calculations, computer input, and quantity computations must be independently checked by the consultant. Documents must be signed by both designer and checker. Computer output should be spot checked to see that results are reasonable. Consultants should be advised of these requirements, and MDOT review of their work shall assure compliance. The documents must be filed for future reference. For a check list of items to be reviewed, see [Appendix 5.04.05](#). This list is intended to be a guide, not a complete list for all cases. (11-19-99)

### 5.04.06

#### THE Plan Review Meeting (11-19-99)

After approval of preliminary plans by the Design Engineer, the consultant forwards reproducible copies of the plans and preliminary estimate to MDOT. The Design Engineer distributes prints of the preliminary plans and preliminary estimate to the appropriate agencies and keeps a record of the distribution and responses.

The Design Engineer-Road will make arrangements for THE Plan Review Meeting. If the bridge work is not included in a road project, the Design Engineer-Bridge will make the arrangements.

### 5.04.07

#### Waterway Permits

The consultant prepares the data required for the waterway permit. The Design Engineer in conjunction with Design Engineer - Hydraulics/Hydrology reviews the data and forwards it to the Evaluation and Mitigation Unit, Environmental Section of the Project Planning Division for review prior to sending the data to Michigan Department of Environment, Great Lakes and Energy (MDEGLE), U.S. Army Corps of Engineers or U.S. Coast Guard. For additional information regarding permits, see [Chapter 14](#). (12-15-2000) (02-16-2010) (6-24-2019)



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### **5.04.08**

#### **Progress Schedules**

The consultant shall submit monthly progress schedules for MDOT review. The consultant should submit a Study, Preliminary Plans, and 100 percent complete OEC/Final Plans for our review.

### **5.04.09**

#### **Payment Vouchers**

The consultant shall submit payment vouchers. The Project Manager shall check the vouchers for accuracy and see that they correspond to the progress schedules.

### **5.04.10**

#### **Status of Plans**

The consultant shall submit progress schedules including PPD task updates. MDOT will use this information to determine the status of the project.

### **5.04.11**

#### **Evaluation of Consultant Performance**

The Design Engineer will evaluate the performance of the consultant after final plans have been reviewed. Additional intermediate reviews are encouraged if the consultant's performance is not satisfactory. The additional evaluations can be done at the Study, Preliminary Plan, OEC Plan Review and after construction is complete. The Design Project Manager should contact the Construction Project Engineer to obtain his input for the evaluation after construction. (12-5-2005)

Consultant projects that extend beyond one year (or earlier when a consultant's performance is unsatisfactory) require interim evaluation. A consultant performance evaluation form will be filled out by the Project Manager and submitted at the end of one year and every six months thereafter. (11-19-99)

MDOT has prepared a standard evaluation form, Service Vendor Performance Evaluation, as shown in [Appendix 5.04.11](#). The completed evaluation form shall be sent to the consultant. The evaluations will be used as a reference when considering consultants for future projects. The evaluation will also be used to determine if a consultant shall continue to be pre-qualified to do work for MDOT. (12-5-2005)

### **5.04.12**

#### **Contract Completion Notice (12-5-2005)**

MDOT classifies a project complete once it has received and accepted the design calculations, final plans and final estimate.

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Appendix 5.03.01

**ADVERTISEMENT  
FOR  
PROFESSIONAL SERVICES**

The Michigan Department of Transportation will require professional engineering services to develop plans and related documents for (type and location project). Interested consultants are requested to advise the Department of their availability to perform services.

The anticipated schedule involves the choice of consultant by (date) entering into a consultant contract and commencement of design by (date) and completion of plans and advertising for construction by (date).

The project will consist of (detailed description of project elements). The design loading will be \_\_\_\_ and the roadway width \_\_\_\_ft - \_\_in plus \_\_\_\_ft - \_\_in sidewalks.

The Michigan Department of Transportation is an equal opportunity employer and a minimum of (%) DBE participation is required.

Interested professional firms possessing substantial expertise in (type) design are invited to submit a letter of interest. Included in the submittal should be a completed Standard Form 254 and a current brochure describing their firm. The form may be obtained by calling or writing to:

General Printing Office  
Superintendent of Documents  
North Capitol Street, N.W.  
Washington, DC 20401  
(Phone: 202/783-3238)

Letters of interest should be addressed to:

(Name)  
Engineer of Design  
Michigan Department of Transportation  
P.O. Box 30050  
Lansing, Michigan 48909

Letters of interest should be postmarked no later than (date).

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### SCOPE OF WORK STATEMENT FOR HYDROLOGIC, HYDRAULIC, AND SCOUR ANALYSES (PPD TASK 3520) (02-16-2010) (6-24-2019)

#### 1. SCOPE:

This procedure addresses the Consultant's duties in the preparation of the hydrologic and hydraulic analyses for waterway crossings (bridges and culverts), and scour analysis with scour countermeasure design for bridges.

#### 2. WORK STEPS:

##### 2.1 HYDROLOGIC ANALYSIS

A. For waterway crossings with **drainage areas equal to or greater than two square miles**, send a request for the 2%, 1%, and 0.2% flood frequency discharges to the Hydrologic Studies Unit, Land and Water Management Division, Michigan Department of Environment, Great Lakes, and Energy.

For waterway crossings with **drainage areas less than two square miles**, compute the 2% and 1% flood frequency discharges using the methodology outlined in Chapter 4 of the Road Design Manual. If the crossing is classified as a bridge (this includes culverts with spans equal to or greater than 20 feet and no bottom slab), the 0.2% flood frequency discharge must also be computed for the scour analysis.

B. Submit a copy of the MDEGLE flood frequency discharge estimates or the discharge calculations to the MDOT Project Manager for review and approval by the Design Engineer - Hydraulics/Hydrology prior to starting the Hydraulic Analysis in work step 2.2.

##### 2.2 HYDRAULIC ANALYSIS

Conduct hydraulic analyses to compute water surface profiles for the existing and proposed waterway crossings, using the 2% and 1% flood frequency discharges. A hydraulic analysis for the 0.2% flood frequency discharge is also required for any bridge or 3-sided culvert with a span greater than 20 feet. The hydraulic analyses must show no harmful interference to adjacent riparian owners and upstream properties. The results must be certified in writing by a licensed professional engineer and submitted with the appropriate MDEGLE permit applications. Examples of hydraulic certifications are in the Supplemental Information section of this task.

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A hydraulic analysis is required for, but not limited to, any of the following conditions:

1. A new or replacement culvert
2. Culvert extensions greater than 24 feet, including end sections
3. Proposed work on a culvert or bridge that has a drainage area greater than 2 square miles
4. A raise in road grade greater than the average thickness of a top course
5. Proposed bridge work that will potentially affect the energy grade line of the watercourse

In addition to the hydraulic analysis, a hydraulic report must be submitted when any of the above has a drainage area greater than 2 square miles. The required format for a hydraulic report can be found in the Supplemental Information section of this task. If the Consultant feels that a hydraulic analysis is unnecessary, they may request a written waiver from the Design Engineer - Hydraulics/Hydrology. A hydraulic certification is still required if the hydraulic analysis is waived.

### **PROCEDURE:**

- A. Obtain the results of the Hydraulic survey according to the work steps outlined in PPD TASK 3350 - CONDUCT HYDRAULIC SURVEY.
- B. Conduct and document a site investigation of the stream and surrounding area. Take photographs upstream and downstream of the site, including any existing structures modeled in the study and the upstream and downstream overbank areas at the crossing.
- C. For both existing and proposed conditions, determine the water surface profiles for the flood events listed in work step 2.1. For crossings with drainage areas greater than 2 square miles, use an IBM-compatible version of the U.S. Army Corps of Engineers Hydraulic Engineering Center's HEC-RAS personal computer program. For culverts with drainage areas less than 2 square miles, Hydraulic Design Series Number 5, Hydraulic Design of Highway Culverts, is acceptable. Refer to Section 4.05.03 of the Road Design Manual and the Supplemental Information section of this task.
- D. If a hydraulic report is not required, the results of the hydraulic analyses must be summarized in a table comparing data for existing and proposed conditions. A sample table is in Section 3.6 of the Supplemental Information.
- E. Submit two copies of the hydraulic analysis, report, and certification to the MDOT Project Manager for review and approval by the Design Engineer - Hydraulics/Hydrology prior to THE Plan Review Meeting. Include all design assumptions with the hydraulic analysis.
- F. Receive any items returned by the MDOT Project Manager as incomplete or deficient.
- G. Make necessary changes and resubmit the entire package including a written response to all comments. Keep copies of the MDOT comments and the revised materials for the project record.

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- H. Receive the MDOT Submittal Evaluation form. Contact the MDOT Project Manager if one is not received within two weeks of submitting the hydraulic analysis report.
- I. If the waterway crossing is classified as a bridge (see Section 2.1.A), proceed with work step 2.3.

### 2.3 SCOUR ANALYSIS AND SCOUR COUNTERMEASURE DESIGN FOR PROJECTS INVOLVING BRIDGES

The scope of this section is to prepare a scour analysis and design scour countermeasures for a bridge structure.

A. Obtain soil boring logs and test data.

- i. If PPD TASK 3530 - CONDUCT FOUNDATION STRUCTURE INVESTIGATION is a Consultant task, then coordinate the geotechnical investigation to include a minimum of three soil borings and representative samples of each stratum encountered to a depth of 25 feet. Obtain representative samples from each stratum encountered for identification and gradation analysis. Classify samples using ASTM D 2487-85 and determine particle size distribution using AASHTO T-88. Provide a cumulative particle-size plot for each sample tested.

Take one boring at the upstream face of the structure in the center of the channel; take the remaining borings at the abutments on the overbanks. These samples will provide data for estimating scour depths in work step 2.3.B. Site conditions, access restrictions, type and size of the structure, and engineering judgement may alter the location and number of borings; in general, the boring pattern shall be sufficient to determine the extent, thickness, and location in plan and profile of all soil layers within the potential scour zone.

Include a copy of all soil boring logs and test data as an appendix to the Scour Analysis Report of work step 2.3.B.

- ii. If PPD TASK 3530 - CONDUCT FOUNDATION STRUCTURE INVESTIGATION is **NOT** a Consultant task, then send a request for the soil boring logs and test data information to the MDOT Project Manager. Include a copy of all soil boring logs and test data as an appendix to the Scour Analysis Report of work step 2.3.B.

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- B. Do not begin work on the scour analysis until approval is received from MDOT for the hydraulic analysis done in work step 2.2. Prepare a scour analysis for the 1% and 0.2% flood frequency discharges using the most recent versions of the Federal Highway Administration's Hydraulic Engineering Circulars Nos. 18 and 20. Complete the Level 2 worksheet as outlined in the "MDOT Guidelines For Evaluation of Scour at Existing Structures" and include the worksheet in the Scour Analysis Report.
- C. If potential scour is identified in work step 2.3.B., design scour countermeasures per HEC-18. The proposed countermeasures must not cause a harmful interference to adjacent riparian owners and upstream properties, which may require additional hydraulic analysis. The Consultant is responsible to ensure adequate lateral stability exists for the bridge structure under all scour conditions (see PPD Task 3570).
- D. Submit three copies of the Scour Report with final scour countermeasure design (see Section 3.8 in the Supplemental Information) to the MDOT Project Manager for review and approval by Design Engineer - Hydraulics/Hydrology.
- E. Receive any items returned by the MDOT Project Manager as incomplete or deficient.
- F. Make necessary changes and resubmit the entire package including a written response to all comments. Keep copies of the MDOT comments and the revised materials for the project record.
- G. Receive the MDOT Submittal Evaluation form. Contact the MDOT Project Manager if one is not received within two weeks of submitting the Scour Analysis Report.
- H. Incorporate any review comments in the analysis and design of the bridge foundation (See PPD task 3530).

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## **3.0 SUPPLEMENTAL INFORMATION**

**3.1 MDOT's Road Design Manual, Chapter 4, Drainage**

**3.2 MDOT's Bridge Design Manual (various chapters)**

**3.3 HYDRAULIC SURVEY PPD TASK 3350 FOR BRIDGES AND CULVERTS**

**3.4 MDOT Guidelines for Evaluation of Scour at Existing Structures**

**3.5 Hydraulic Certification Forms (attached)**

**3.6 Example Table for Culverts with Drainage Areas Less Than 2 Square Miles (attached)**

**3.7 Hydraulic Report Format (attached)**

**3.8 Scour Report Format (attached)**

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**3.5 HYDRAULIC CERTIFICATION FORMS**

HYDRAULIC CAPACITY CERTIFICATION  
(Replacement Crossing)

RE:     *[Enter Road Name]*  
          *[Enter Stream Name]*  
          *[Enter Town, Range, Section]*  
          *[Enter Township]*  
          *[Enter County]*

I, Certifying Engineers Name & 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.

*[P.E. Signature]*  
*[Enter P.E. Name]*



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**3.5 HYDRAULIC CERTIFICATION FORMS (cont.)**

HYDRAULIC CAPACITY CERTIFICATION  
(NEW CROSSING)

RE:     *[Enter Road Name]*  
          *[Enter Stream Name]*  
          *[Enter Town, Range, Section]*  
          *[Enter Township]*  
          *[Enter County]*

I, Certifying Engineers Name & 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.).

*[P.E. Signature]*  
*[Enter P.E. Name]*

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**3.5 HYDRAULIC CERTIFICATION FORMS (cont.)**

DAMAGE ASSESSMENT CERTIFICATION

RE:     *[Enter Road Name]*  
          *[Enter Stream Name]*  
          *[Enter Town, Range, Section]*  
          *[Enter Township]*  
          *[Enter County]*

I,     *Certifying Engineers Name & 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.

*[P.E. Signature]*  
*[Enter P.E. Name]*

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**3.6 EXAMPLE TABLE FOR CULVERTS WITH DRAINAGE AREAS LESS THAN 2 SQUARE MILES**

BY:  
DATE:

STRUCTURE NUMBER :  
CONTROL SECTION :  
JOB NUMBER :  
WATERCOURSE :  
LOCATION :  
CITY :  
COUNTY :  
DISCHARGE :       50-YEAR:  
                              100-YEAR:  
DRAINAGE AREA :  
METHOD OF ANALYSIS :

	EXISTING	PROPOSED	CHANGE
CULVERT TYPE			
SIZE			
LENGTH			
ENTRANCE TYPE			
U/S INVERT ELEV.			
D/S INVERT ELEV.			
50-YEAR			
VELOCITY AT OUTLET			
HEADWATER			0.00
100-YEAR			
VELOCITY AT OUTLET			
HEADWATER			0.00
50-YEAR AND 100-YEAR FLOOD ELEVATIONS ARE FOR COMPARISON ONLY			

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### 3.7 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. Section, Town, and Range
5. Drainage area
6. Discharge rates for 50-, 100-, and 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 water course

B. A summary table including the following items for existing and proposed conditions at each cross section within the study for the 100-year flood event:

1. Velocity in the channel
2. Top width
3. Energy gradient
4. Change in energy gradient
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/Note 8.05 F.](#), General Plan of Structure Sheet, Bridge Design Manual. (8-23-2021)

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.

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- E. Plotted profile of the channel bottom and the existing and proposed 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 underclearance 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. Printouts of the computer input and output along with a copy of the input and output files on a (3 ½ inch), double-sided, high density floppy disk or a compact disc(CD).

### **3.8 SCOUR REPORT FORMAT (BRIDGE PROJECTS ONLY)**

The scour analysis with proposed scour countermeasure design is a bound report. It contains a summary and recommendation for proposed scour countermeasures. This report includes a summary table, a plot of the potential scour, calculations with background data, and copies of the Level 2 worksheet from MDOT's "Guidelines for Evaluation of Scour at Existing Structures." Values automatically calculated by HEC-RAS are not acceptable. The calculations must be done by hand, and printouts of the HEC-RAS output with the calculations parameters highlighted must be included in the report. The appendix of this report shall contain survey notes, soil borings, sieve analyses, protective treatment design, and plans. Any questions should be referred to the Design Engineer - Hydraulics/Hydrology.

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### SCOPE OF WORK STATEMENT FOR FOUNDATION STRUCTURE INVESTIGATION (PPD TASK 3530)

#### 1. SCOPE

This procedure describes the Consultant's responsibilities in performing the FOUNDATION STRUCTURE INVESTIGATION (PPD TASK 3530). This task is typically part of bridge projects.

This procedure covers a geotechnical investigation that must be in accordance with MDOT's [Geotechnical Manual](#). This investigation is necessary for all new structures and those existing structures that are to be widened or subjected to increased loads. The product of this task is a Geotechnical Report. (02-16-2010) (7-29-2019)

#### 2. WORK STEPS

- A. Review and evaluate existing information such as existing borings, existing recommendations, etc., if available.
- B. Plan any additional soil borings necessary.
- C. Consultants must obtain all necessary permits, including an up-to-date permit from the MDOT Utilities Coordination and Permits Section, required to perform this survey on any public and/or private property.
- D. For protection of underground utilities and according to Public Act 53, 1974, the Consultant shall place A FREE locate request for public facilities by using the online [e-Locate](#) application or dial Miss Dig (1-800-482-7171) a minimum of three full working days, excluding Saturdays, Sunday, and holidays, before beginning each excavation in areas where public utilities have not been previously located. Utility members will thus be routinely notified. This does not relieve the Consultant of the responsibility of notifying utility owners who may not be a part of the Miss Dig alert system. (7-29-2019)

The Department's freeway lighting system, the ITS, and other miscellaneous electrical systems are not a part of Miss Dig. Contractors must submit a staking request on [Form 5300](#) 72 hours before digging in or near MDOT freeway right-of-way. (7-29-2019)

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## SCOPE OF WORK STATEMENT FOR FOUNDATION STRUCTURE INVESTIGATION (PPD TASK 3530) (Continued)

- E. Take soil borings, perform in-situ testing and collect soil samples.
- F. Perform laboratory analyses.
- G. Prepare the Geotechnical Report submittal package. Contact the MDOT Project Manager if you have questions regarding submittal requirements. The submittal package shall include the following:
  - i. A cover letter stating conformance to MDOT's [Geotechnical Manual](#). (02-16-2010) (7-29-2019)
  - ii. List of outstanding questions and/or considerations.
- H. Submit the report to the MDOT Project Manager.
- I. Receive any items returned by the MDOT Project Manager as incomplete or deficient.
- J. Make necessary changes and resubmit the revised materials. Keep copies of the MDOT Project Manager's comments and the revised materials for the project record.
- K. Receive the MDOT Submittal Evaluation form. Contact the MDOT Project Manager if one is not received within two weeks of submitting the Geotechnical Report.

### 3. SUPPLEMENTAL INFORMATION (7-29-2019)

For more information, refer to the following items available through the MDOT web site:

1. MDOT's [Geotechnical Manual](#) (02-16-2010)
2. [Michigan Design Manual, Bridge Design](#)

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## BRIDGE DESIGN

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### CHECK LIST FOR REVIEW OF CONSULTANT PLANS

1. Are tracings sealed by a professional engineer? Does consultant's logo appear on each sheet?
2. Design (11-19-99)
  - a. Check structure design by comparing to MDOT Bridge Program.
  - b. Has Consultant provided copies of their design and quantity calculations with designer's and checker's signatures.
3. Title sheet must include: (11-19-99)
  - a. Notes and allowable stresses
  - b. Federal number, Job number, etc.
  - c. Description of work (in the title block)
  - d. List of Standard Plans
  - e. Plan Index
  - f. Project located on map
4. Site Sheet must include:
  - a. Alignment controls, witnesses. Correlate with alignment on road plans.
  - b. Benchmarks
  - c. Traffic data
  - d. Utility information
  - e. Cross section of approach
  - f. Profile and vertical controls
  - g. Necessary notes
  - h. Is staging required and shown? Is the concept for maintaining traffic shown?
5. Log of Borings must include:
  - a. Bottoms of footings
  - b. Minimum pile penetration
  - c. Estimated elevation of pile tips
  - d. Boring location sketch
  - e. Standard notes
  - f. Presence of water or water table
6. General Plan of Structure
  - a. Is cross section compatible with approaches?
  - b. Is deck grade a minimum 0.25 percent? (Desirable .4 percent)
  - c. Are curb and gutters correctly labeled and are there adequate downspouts?
  - d. Is slope of fill warped to 1:6 where traffic approaches below structure?
  - e. Are limits of riprap correctly shown for stream crossings?
  - f. Do underclearance elevations indicate adequate clearance?
  - g. Does elevation view show proper side clearances?
  - h. Are excavation and fill limits properly shown? Is undercut required?
  - i. Do dimensions agree with those on detail sheets?
  - j. Are footing pressures shown on preliminary plans appropriate for the soil description?
  - k. Is proper live loading noted?
  - l. Are cofferdams or subfootings required? Is sheet piling required? Is permanent sheet piling designed?
  - m. Is hydraulic data shown for stream crossings?
  - n. Is appropriate scour protection provided?



# MICHIGAN DESIGN MANUAL

## BRIDGE DESIGN

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### CHECK LIST FOR REVIEW OF CONSULTANT PLANS

7. All Detail Sheets
  - a. Are there sufficient dimensions and details to construct the bridge?
  - b. Does reinforcement appear reasonable at critical points? Spot check laps and development lengths. (See item 2)
  - c. Is appropriate reinforcement epoxy-coated?
  - d. Is substructure detail of anchor bolt and/or dowel spacing compatible with Structural Steel Detail?
  - e. Are bolsters properly stepped for superelevated decks?
  - f. Has the Expansion Joint Detail sheet been included? Are construction and expansion joints properly located in the substructure?
8. Structural Steel Details
  - a. Does stationing and dimensions to centerlines of bearing on substructure details match the center-to-center of bearing dimensions shown on the beam elevation (i.e., will the beams fit in place)?
  - b. If a field splice is required, is it detailed?
  - c. Are stiffener and connection plate details according to MDOT guides?
  - d. Are bearing types appropriate for span lengths?
  - e. If rockers are used, has the tilt diagram been included?
  - f. Are welding symbols correct?
  - g. Has C&T reviewed Structural Steel Details?
9. Prestressed Concrete Beam Details (11-19-99)
  - a. Check beam depth and strand arrangement with MDOT charts.
10. All Sheets (11-19-99)
  - a. Are sheets properly numbered and identified?
  - b. Are existing plan sheets required?
  - c. Are all plan notes included?
  - d. Are quantities shown for each unit and is all required work covered by a pay item? Are all pay items covered by a specification or special provision?
  - e. Is north arrow correctly shown?
  - f. Are the detailer and checker indicated on all plan sheets?

**\* SAMPLE \***

Michigan Department  
of Transportation  
SVES (06/05)

**SERVICE VENDOR  
PERFORMANCE EVALUATION**

CONTRACT NO. AUTHORIZATION NO.  
(if applicable)

**Notes to Evaluator:** Rate service vendor from 1 to 10. Behavioral statements are provided for ratings of 10, 8, 5, and 1 as guidance. Comments must be given for all questions rated. A rating of 7 or less must be documented in the project files. Choose N/A for items which do not apply.

The evaluator is to send the original to the contract administration office, with copies to the vendor being evaluated, the evaluator's project file, and Contract Services Division.

**Note to Vendor:** Any appeal of this evaluation must be filed within 14 calendar days of the signature date on this evaluation form. The appeal process details are available in Guidance Document Number 10157, Service Vendor Performance Evaluation Appeal Process.

ORGANIZATION	VENDOR NAME	Prime Sub
VENDOR PROJECT MANAGER	SPECIAL PROJECT TYPE	
PREQUALIFICATION CLASSIFICATION	WORK TYPE	
EVALUATION TYPE	PROJECT COMPLEXITY	
PROJECT ROUTE AND DESCRIPTION		
CONTROL SECTION	EVALUATION JOB NO.	CONTROLLING JOB NO.
SERVICE COMPLETION DATE	SERVICE ACCEPTANCE DATE	COST OF SERVICE

RATING (Whole Number)	Indicate your appraisal of the Vendor's performance and add comments for each question.
	<b>Project Management</b>
	<p>1. Was the vendor in control of the services provided to MDOT?</p> <p><b>Rating Description</b></p> <p>10 - Vendor displayed outstanding knowledge and control of the services and provided superior advice and counsel to the department that improved MDOT's project approach, including but not limited to communication with the public, coordination with local governments, or the project management considerations.</p> <p>8 - Vendor was always knowledgeable and in control of the services and clearly met the department's expectations.</p> <p>5 - Vendor was usually knowledgeable and in control but required guidance from department personnel.</p> <p>1 - Vendor demonstrated no control over the services and the project was harmed.</p> <p>Comments</p>
	<p>2. Did the vendor communicate adequately with the department staff?</p> <p><b>Rating Description</b></p> <p>10 - Vendor provided superior communications with the department, communicating in a thorough, concise and timely manner, and clearly exceeded the department's expectations by identifying problems and helping to define choices faced by the department.</p> <p>8 - Vendor always communicated with the department in a thorough, concise and timely manner and clearly met the department's expectations.</p> <p>5 - Vendor usually communicated with the department in a thorough, concise and timely manner. Department personnel occasionally had to initiate and clarify communications to move project forward.</p> <p>1 - Communication was lacking and the project was harmed.</p> <p>Comments</p>

<b>RATING (Whole Number)</b>	<b>Indicate your appraisal of the Vendor's performance and add comments for each question. (continued)</b>
	<p>3. Was the vendor responsive to requests from the department, including requests for information and requests to make changes in the work?</p> <p><b>Rating Description</b></p> <p>10 - Vendor anticipated the need for information or changes and proactively initiated action.</p> <p>8 - Vendor was always responsive and promptly complied with all requests.</p> <p>5 - Vendor was usually responsive or was occasionally resistant to requests for information or minor changes.</p> <p>1 - Vendor was unresponsive and the project was harmed.</p> <p>Comments</p>
	<b>Resources</b>
	<p>4. Did the vendor have competent and sufficient personnel with the technical expertise needed to successfully complete the project?</p> <p><b>Rating Description</b></p> <p>10 - Vendor provided personnel with superior qualifications who were able to complete the scope of services with minimal guidance or expertise given by MDOT.</p> <p>8 - Vendor always provided personnel who were able to complete the scope of services with little more than the normal guidance or expertise given by MDOT.</p> <p>5 - Vendor usually provided personnel who were able to complete the scope of services with little more than the normal guidance or expertise given by MDOT. Occasionally, the vendor's personnel demonstrated lack of knowledge and skill.</p> <p>1 - Vendor did not provide competent and sufficient personnel to adequately perform the scope of services and the project was harmed.</p> <p>Comments</p>
	<p>5. Did the vendor have adequate and sufficient resources other than personnel (equipment, manuals, etc.) to fulfill the requirements of the scope of services?</p> <p><b>Rating Description</b></p> <p>10 - All resources exceeded requirements to perform the scope of services.</p> <p>8 - All resources met requirements to adequately perform the scope of services.</p> <p>5 - Resources usually were adequate and sufficient to perform the scope of services. On some occasions, the vendor had to be notified to provide resources to meet requirements.</p> <p>1 - Vendor did not have adequate and sufficient resources to perform the scope of services and the project as harmed.</p> <p>Comments</p>
	<b>Work Performance</b>
	<p>6. Did the vendor follow good safety practices?</p> <p><b>Rating Description</b></p> <p>10 - Vendor took the initiative to ensure the safety and health of the employees. Safety equipment and devices were in excellent condition and were used by all vendor employees.</p> <p>8 - Safety equipment and devices were in good condition and were used by vendor's employees. Vendor immediately carried out any requests by MDOT for changes in safety measures.</p> <p>5 - Vendor usually ensured the safety and health of employees. Safety equipment and devices were in good condition and were used by vendor's employees. Vendor carried out requests by MDOT for changes in safety measures after written notification.</p> <p>1 - Vendor's safety and health practices were unsatisfactory. MDOT imposed stoppages of work for safety issues. Vendor reluctantly made changes requested by MDOT or did not make the change.</p> <p>Comments</p>

RATING (Whole Number)	Indicate your appraisal of the Vendor's performance and add comments for each question. (continued)
	<p>7. Did the vendor provide a quality work product?</p> <p><b>Rating Description</b></p> <p>10 - Vendor's work product was excellent (complete, accurate, and professional in appearance) and MDOT requirements were exceeded.</p> <p>8 - Vendor's work product was acceptable and MDOT requirements were met without a need for MDOT to identify deficiencies.</p> <p>5 - Vendor's work product met minimum requirements but required notification of deficiencies from MDOT.</p> <p>1 - Vendor's work product was unacceptable and clearly did not meet MDOT requirements, and the project was harmed.</p> <p>Comments</p>
	<p>8. Did the vendor properly notify and coordinate work with other affected parties such as utility companies, property owners, local units of government, and other MDOT areas?</p> <p><b>Rating Description</b></p> <p>10 - Vendor was proactive in initiating and executing notifications and project coordination activities.</p> <p>8 - Vendor always provided proper notification and coordinated with each affected party.</p> <p>5 - Vendor usually coordinated with, or gave proper notification to, all affected parties.</p> <p>1 - Vendor did not provide proper notification nor coordinate with affected parties, and the project was harmed.</p> <p>Comments</p>
	<p>9. Did the vendor meet the applicable environmental requirements, such as documentation, enforcement, obtaining permits, studies, etc.?</p> <p><b>Rating Description</b></p> <p>10 - Vendor was proactive in initiating and executing activities to meet environmental requirements without prompting by MDOT.</p> <p>8 - Vendor always met environmental requirements.</p> <p>5 - Vendor usually met environmental requirements.</p> <p>1 - Vendor's failure to meet environmental requirements harmed the project.</p> <p>Comments</p>
	<p>10. Did the vendor meet deliverable date requirements?</p> <p><b>Rating Description</b></p> <p>10 - Acceptable deliverables were always received more than 15% ahead of schedule.</p> <p>8 - Acceptable deliverables were always within the schedule.</p> <p>5 - Acceptable deliverables were usually received no more than 10% behind schedule.</p> <p>1 - Acceptable deliverables were usually received more than 25% behind schedule.</p> <p>Comments</p>
	<p>11. To the best of my knowledge, did the vendor comply with applicable federal, state and local laws and regulations and/or MDOT guidelines and procedures? This includes, but is not limited to, compliance with prompt payment to subvendors (completing attachment G), submitting accurate and timely invoices, and responding to contractual issues.</p> <p><b>Rating Description</b></p> <p>10 - Vendor displayed outstanding knowledge of applicable federal, state and/or local laws and regulations. In addition, the vendor was proactive in assuring they complied with MDOT guidelines and procedures and therefore needed no MDOT intervention.</p> <p>8 - Vendor always knew and complied with applicable federal, state and/or local laws and regulations. In addition, the vendor always followed MDOT guidelines and procedures with normal guidance or expertise given by MDOT.</p> <p>5 - Vendor was usually knowledgeable of applicable federal, state and/or local laws and regulations, but MDOT had to intervene occasionally to assure compliance. The vendor usually followed MDOT guidelines and procedures but needed more than the normal guidance or expertise by MDOT. Any problems were corrected immediately upon notification by MDOT.</p> <p>1 - Vendor failed to comply with applicable federal, state and/or local laws and regulations and/or the vendor failed to comply with MDOT guidelines and procedures.</p> <p>Comments</p>

RATING (Whole Number)	Indicate your appraisal of the Vendor's performance and add comments for each question. (continued)
	<b>Subvendor Management</b>
	<p>12. Did the vendor coordinate work with subvendor's work, exercise authority over subvendors, provide notice of subvendor work schedule, and ensure that subvendors were in compliance with contract requirements?</p> <p><b>Rating Description</b></p> <p>10 - Vendor was proactive in exercising authority, coordinating and monitoring work operations of the subvendors to ensure acceptable completion of the scope of services.</p> <p>8 - Vendor always exercised authority, coordinated and monitored work operations with their subvendors to ensure acceptable completion of the scope of services.</p> <p>5 - Vendor usually exercised authority, coordinated and monitored work operations with their subvendors to ensure acceptable completion of the scope of services. Any problems were corrected immediately upon notification by MDOT.</p> <p>1 - Vendor's failure to exercise authority, coordinate and monitor work operations with their subvendors harmed the project.</p> <p>Comments</p>

OTHER COMMENTS

SAMPLE

PROJECT MANAGER HAS NOTIFIED ANY SPECIALTY AREAS TO COMPLETE AN EVALUATION

YES

NO

IS THIS A PRIMARY EVALUATION OR A SPECIALTY AREA EVALUATION?

EVALUATED BY: (Please print)

DATE

EVALUATOR'S SIGNATURE