Guide and / or I.M. Revision Notice

To: Cities, Counties, and Consultants  
Date: February 15, 2011

From: Office of Local Systems  
Revision Notice Number: 2011-01

The Federal-aid Project Development Guide (Guide) and / or Instructional Memorandums to Local Public Agencies (I.M.s) have been revised as indicated below. This revision notice identifies all new or revised documents and includes a summary of the significant changes. Where appropriate, it also references the existing Project Development Information Packet (Packet) or County Engineers I.M. documents that have been replaced or superseded.

The Iowa DOT does not provide paper copies of the Guide or I.M.s. Since these documents are updated frequently, we recommend using the on-line version of the Guide and I.M.s for reference. However, if you prefer using paper copies, all new or revised documents have been included in this file for convenient printing. If you maintain a paper copy of these documents, please remove the old documents and replace them with the new documents. Note: This file is designed for double-sided printing; therefore, all documents with an odd number of pages will be followed by a blank page.

For more information and additional download options, refer to the Guide and I.M.s web page. If you have any questions concerning these revisions, please contact Donna Buchwald Donna.Buchwald@dot.iowa.gov or 515-239-1051.

*** PLEASE NOTIFY ALL AFFECTED PERSONNEL OF THIS CHANGE ***

<table>
<thead>
<tr>
<th>Document Title or I.M Number</th>
<th>Summary of Significant Revision(s)</th>
</tr>
</thead>
</table>
| I.M. Table of Contents  
February 15, 2011          | The I.M. Table of Contents has been revised to reflect new or revised I.M.s, as indicated below. |
| I.M. 2.120  
Bridge Inspections  
February 15, 2011 | This is a new I.M. This I.M. includes guidelines and procedures for a LPA to assist them in complying with the National Bridge Inspection Standards (NBIS). |
Instructional Memorandums to Local Public Agencies

Table of Contents

Some I.M.s are written either to counties or cities; others are written to both counties and cities. The intended audience is indicated in the "To:"
field of the I.M. as well as the Table of Contents below. Many of the I.M.s are referenced by the Federal-aid Project Development Guide (Guide). These I.M.s are marked with an asterisk (*). For more information about the relationship between the Guide and I.M.s, refer to the Guide and I.M.s web page.

Note: The I.M.s are currently in the process of being transitioned into a new format and numbering system. New or updated I.M.s will use the new format. Existing I.M.s will remain in the old format until they are revised or updated. Some of the I.M.s are not yet complete, as shown in light grey text. Some incomplete I.M.s will be based on an existing Project Development Information Packet document, some will be based on an existing County Engineers I.M. that will be renumbered, and some will include entirely new content. Where applicable, a reference and link to the existing Packet document or County Engineers I.M. is provided.

<table>
<thead>
<tr>
<th>No.</th>
<th>Subject</th>
<th>Revision Date</th>
<th>Written To</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Chapter 1 – General Information</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Section 1.0 -- General</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.010</td>
<td>County Road Embargoes on the Iowa Detour and Road Embargo Map</td>
<td>November 2001</td>
<td>Counties</td>
</tr>
<tr>
<td>1.020</td>
<td>Pavement Friction Evaluation Program</td>
<td>August 2003</td>
<td>Counties</td>
</tr>
<tr>
<td>1.030</td>
<td>Ordering Forms and Supplies From the Iowa Department of Transportation</td>
<td>November 2001</td>
<td>Both</td>
</tr>
<tr>
<td>1.050</td>
<td>Manuals, Guides and Instructional Information Available to Counties</td>
<td>December 2002</td>
<td>Both</td>
</tr>
<tr>
<td>1.070*</td>
<td>Title VI and Nondiscrimination Requirements</td>
<td>February 21, 2008</td>
<td>Both</td>
</tr>
<tr>
<td>1.080*</td>
<td>ADA Requirements</td>
<td>February 21, 2008</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment A – Sample Curb Ramp Transition Plan (Word)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.120</td>
<td>References to the Iowa Code</td>
<td>August 2003</td>
<td>Counties</td>
</tr>
<tr>
<td></td>
<td>Section 1.1 -- References</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chapter 2 – Administration</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Section 2.0 -- Finance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.010</td>
<td>Transfer of Local Secondary Road Use Tax Funds to the Farm-to-</td>
<td>November 2001</td>
<td>Counties</td>
</tr>
<tr>
<td></td>
<td>Market Fund</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Attachment A - Local to FM Fund Transfer Resolution (Word)</td>
<td>November 2001</td>
<td>Counties</td>
</tr>
<tr>
<td>2.020</td>
<td>Federal and State Bridge Replacement and Rehabilitation Programs</td>
<td>August 2004</td>
<td>Counties</td>
</tr>
<tr>
<td>2.030</td>
<td>Transfer of Farm-to-Market Funds to the Local Secondary Road Fund</td>
<td>April 12, 2007</td>
<td>Counties</td>
</tr>
<tr>
<td>2.040</td>
<td>Temporary Allocation of Farm-to-Market Funds</td>
<td>November 2001</td>
<td>Counties</td>
</tr>
<tr>
<td>2.050</td>
<td>Procedure to Change a County Secondary Road Construction Program (see I.M. 3.11, dated March 2003)</td>
<td>(future)</td>
<td>Counties</td>
</tr>
<tr>
<td></td>
<td>Attachment A – Add FM or Local Project Resolution (see attachment to I.M. 3.11, dated March 2003) (Word)</td>
<td>(future)</td>
<td>Counties</td>
</tr>
<tr>
<td></td>
<td>Attachment B - Advance Local Project Resolution (see attachment to I.M. 3.11, dated March 2003) (Word)</td>
<td>(future)</td>
<td>Counties</td>
</tr>
<tr>
<td>2.071</td>
<td>Secondary Road Budget Accounting Code Series</td>
<td>July 2005</td>
<td>Counties</td>
</tr>
<tr>
<td></td>
<td>Section 2.1 -- Maintenance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.110</td>
<td>Maintenance of County Roads at Intersections, Interchanges, and Grade Separations with the Primary Highway System</td>
<td>June 1998</td>
<td>Counties</td>
</tr>
<tr>
<td>2.120</td>
<td>Bridge Inspections</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment A - Bridge Scour Stability Worksheet, Level A Evaluation</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td>No.</td>
<td>Subject</td>
<td>Revision Date</td>
<td>Written To</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------------------------------------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment B</strong> - Intermediate Scour Assessment Procedures, Level B Evaluations</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment C</strong> - Scour Plan of Action (POA)</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment D</strong> - Scour Safe Foundations for Spread Footings or Steel Piles</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment E</strong> - Highly Erodible Soils</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment F</strong> - Berm Stability Criteria</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment G</strong> - Guidance for Developing and Implementing Plans of Action (POA) for Bridges with Unknown Foundations, Flowcharts, and Worksheets</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment H</strong> - USGS Hydrologic Region Map with Region Descriptions</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment I</strong> - Special Training, Equipment, and Access Requirements Checklist</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment J</strong> - Load Rating Evaluation Form</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment K</strong> - Iowa Legal Trucks Diagram</td>
<td>February 15, 2011</td>
<td>Both</td>
</tr>
</tbody>
</table>

**Section 2.2 -- Traffic Service and Control**

2.210 Engineering and Traffic Investigations -- Speed Limit Study

- Attachment A - Speed Restriction Ordinance  ([Word](#))
- Attachment B - Amendment to Speed Restriction Ordinance  ([Word](#))
- Attachment C - Resolution for Establishing Speed Limits  ([Word](#))

2.220 Establishing and Signing Area Service B and Area Service C Roads

- Attachment A - Area Service "B" Ordinance  ([Word](#))
- Attachment B - Area Service "B" Resolution  ([Word](#))
- Attachment C - Area Service "C" Ordinance  ([Word](#))
- Attachment D - Area Service "C" Resolution  ([Word](#))

2.230 Signing for Low Cost Stream Crossings

- Attachment A - Resolution for Low-Water Stream Crossing  ([Word](#))

2.240 Iowa DOT Traffic Counts  (future)  Both

**Section 2.3 -- Agreements**

2.310 Construction Agreements Between City and County on Secondary Road Extensions

- Attachment A - Resolution for Construction Agreement between City and County on Secondary Road Extensions  ([Word](#))

**Chapter 3 – Project Development**

**Section 3.0 -- General**

3.002* Federal-aid Project Scheduling  February 16, 2007  Both

3.005* Project Development Submittal Dates and Information  April 22, 2010  Both

3.010 Project Development Outline -- Federal-Aid Funding (BRS, BHS, BROS, BHOS, STS-S, STP-A, STP-E, STP-ES)  February 2002  Both

3.020 Project Development Outline -- Farm-to-Market Funding (FM)  February 2002  Counties

3.030 Project Development Outline -- Local Funding (L)  February 2002  Both

3.050* In-Kind Contributions  April 12, 2007  Both

3.060 Project Numbers  (see [I.M. 3.14](#), dated December 2002)  (future)  Both

**Section 3.1 -- Environmental Reviews and Permits**

3.105* Concept Statement Instructions  (see Packet, Index No. 6, [Concept Statement Instructions](#))  (future)  Both

- Attachment A – Example Concept Statement  (future)  Both
<table>
<thead>
<tr>
<th>No.</th>
<th>Subject</th>
<th>Revision Date</th>
<th>Written To</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.110*</td>
<td>Environmental Data Sheet Instructions (see Packet, Index No. 6, Environmental Datasheet Instructions)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment A – Example Environmental Data Sheet</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td>3.112*</td>
<td>FHWA Environmental Concurrence Process (see Packet, Index No. 6, NEPA Project Classification Process)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment A - Environmental Concurrence Process Overview (see Packet, Flowcharts, Chart No. 6 – Environmental Process Overview)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment B - Environmental Assessment / FONSI Process (see Packet, Flowcharts, Chart No. 6A – Environmental Assessment / FONSI Process)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment C - Environmental Impact Statement / ROD Process (see Packet, Flowcharts, Chart No. 6B – Environmental Impact Statement / ROD Process)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment D - Section 106 Process (see Packet, Flowcharts, Chart No. 6C – Section 106 Process)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td>3.114*</td>
<td>Cultural Resource Regulations (see Packet, Index No. 6, Cultural Resource Regulations)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td>3.120*</td>
<td>Farmland Protection Policy Act Guidelines (see Packet, Index No. 6, Farmland Protection Policy Act Guidelines)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td>3.130*</td>
<td>404 Permit Process</td>
<td>March 26, 2008</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Appendix A – 404 Permit Checklist</td>
<td>March 26, 2008</td>
<td>Both</td>
</tr>
<tr>
<td>3.140*</td>
<td>Storm Water Permits</td>
<td>February 21, 2008</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment A – Sample Pollution Prevention Plan (Word)</td>
<td>February 21, 2008</td>
<td>Both</td>
</tr>
<tr>
<td>3.150*</td>
<td>Highway Improvements in the Vicinity of Airports or Heliports</td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td>3.160*</td>
<td>Asbestos Inspection, Removal, and Notification Requirements</td>
<td>April 12, 2007</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment A – Notification of Demolition form (Word)</td>
<td>April 12, 2007</td>
<td>Both</td>
</tr>
<tr>
<td>Section 3.2 -- Design Guidelines and Exceptions</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.210*</td>
<td>Rural Design Guidelines</td>
<td>March 26, 2008</td>
<td>Counties</td>
</tr>
<tr>
<td>3.211</td>
<td>Rehabilitation of Existing Surfaces</td>
<td>November 2001</td>
<td>Counties</td>
</tr>
<tr>
<td>3.213*</td>
<td>Traffic Barriers (Guardrail and Bridge Rail)</td>
<td>November 2001</td>
<td>Both</td>
</tr>
<tr>
<td>3.214*</td>
<td>3R Guidelines</td>
<td>March 26, 2008</td>
<td>Both</td>
</tr>
<tr>
<td>3.215*</td>
<td>Clear Zone Guidelines</td>
<td>March 26, 2008</td>
<td>Both</td>
</tr>
<tr>
<td>3.216*</td>
<td>Economic Analysis (Benefit-to-Cost Ratio)</td>
<td>October 2001</td>
<td>Counties</td>
</tr>
<tr>
<td>3.218*</td>
<td>Design Exception Process</td>
<td>December 2002</td>
<td>Counties</td>
</tr>
<tr>
<td></td>
<td>Attachment A – Design Exception Process Flowchart (see Packet, Flowcharts, Chart No. 4 – Design Exception Process)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td>3.220*</td>
<td>Design Exception Information for Bridges Narrower than Approach Pavement (see I.M. 3.132, dated February 2002)</td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td>Section 3.3 -- Consultant and In-House Design</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.305*</td>
<td>Federal-aid Participation in Consultant Costs</td>
<td>August 29, 2006</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment A – Federal-Aid Consultant Checklist</td>
<td>August 29, 2006</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment B – Guidelines for Federal-Aid Consultant Contracts</td>
<td>August 29, 2006</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td>Attachment C – Payment Methods</td>
<td>August 29, 2006</td>
<td>Both</td>
</tr>
<tr>
<td>No.</td>
<td>Subject</td>
<td>Revision Date</td>
<td>Written To</td>
</tr>
<tr>
<td>-----</td>
<td>-------------------------------------------------------------------------</td>
<td>---------------</td>
<td>------------</td>
</tr>
<tr>
<td>3.310*</td>
<td>Federal-aid Participation in In-House Services</td>
<td>December 11, 2008</td>
<td>Both</td>
</tr>
<tr>
<td>3.315</td>
<td>Farm-to-Market Funded Consultant Contracts</td>
<td>(future)</td>
<td>Counties</td>
</tr>
</tbody>
</table>

**Section 3.4 -- Preliminary Design**

3.405* Preliminary Plans
- Attachment A – Preliminary Plan Guidelines
- Attachment B – Preliminary Plan Checklist
- Attachment C – Preliminary Plan Process Flowchart
  
  | June 18, 2010 | Both |

3.410* Preliminary Bridge or Culvert Plans
- Attachment A – Flood Insurance Studies
- Attachment B – Iowa DNR Floodplain Regulations
- Attachment C – Instructions for Completing the Form 1-E
- Attachment D – Instructions for Completing the Risk Assessment Form
  
  | June 18, 2010 | Both |

**Section 3.5 -- Final Design**

3.505* Check and Final Plans
- Attachment A – Check and Final Plan Guidelines
- Attachment B – Check and Final Plan Checklist
- Attachment C – Check and Final Plan Process Flowchart
  
  | June 18, 2010 | Both |

3.510* Check and Final Bridge or Culvert Plans
- Attachment A – Bridge or Culvert Plan Supplementary Checklist
  
  | June 18, 2010 | Both |

3.520* Electronic Bid Item Information (see Packet, Index No. 8, BIAS 2000 Information)
- Attachment A – Check and Final Plan Guidelines
- Attachment B – Check and Final Plan Checklist
- Attachment C – Check and Final Plan Process Flowchart
  
  | June 18, 2010 | Both |

**Section 3.6 -- Right-of-Way, Utilities, and Railroads**

3.605* Right-of-Way Acquisition
- Attachment A – Compensation Estimate Procedures
- Attachment B – FHWA Authorization of Right-of-Way Costs Flowchart
- Attachment C – Early Right-of-Way Acquisition Process Flowchart
  
  | June 18, 2007 | Both |

3.640* Utility Accommodation and Coordination
- Attachment A – Utility Coordination Flowchart
- Attachment B – Utility Coordination Checklist (Word)
  
  | December 11, 2008 | Both |

3.650* Federal-aid Participation in Utility Relocations
- Attachment A – Utility Relocation Federal-Aid Eligibility Flowchart
- Attachment B – FHWA Authorization of Utility Relocation Costs Flowchart
  
  | June 18, 2007 | Both |

3.670* Work on Railroad Right-of-Way
- Attachment A – Notification and Agreement of Maintenance Work in Railroad Right-of-Way (Word)
- Attachment B – Notification of Construction Work in Railroad Right-of-Way (Word)
- Attachment C – Work on Railroad Right-of-Way Flowchart
  
  | May 1, 2007 | Both |

3.680* Federal-aid Projects Involving Railroads
- Attachment A – FHWA Authorization of Railroad Costs Flowchart
  
  | May 1, 2007 | Both |

**Section 3.7 -- Lettings and Contracts**

- Attachment A – Check and Final Plan Guidelines
- Attachment B – Check and Final Plan Checklist
- Attachment C – Check and Final Plan Process Flowchart
  
<p>| (future) | Both |</p>
<table>
<thead>
<tr>
<th>No.</th>
<th>Subject</th>
<th>Revision Date</th>
<th>Written To</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.710*</td>
<td>DBE Guidelines</td>
<td>June 18, 2007</td>
<td>Both</td>
</tr>
<tr>
<td>3.720*</td>
<td>Local Letting Process – Federal-aid</td>
<td>April 12, 2007</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment A</strong> – Pre-Award Checklist and Certification</td>
<td>April 12, 2007</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment B</strong> – Post-Award Checklist and Certification</td>
<td>April 12, 2007</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment C</strong> – Supplemental Agreement</td>
<td>April 12, 2007</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Forms Packet</strong> Note: The documents included in the Forms Packet are not actually a part of I.M. 3.720 or its attachments. However, for convenient download, these documents are bundled together in a self-extracting executable file (forms.exe).</td>
<td>N/A</td>
<td>Both</td>
</tr>
<tr>
<td>3.730*</td>
<td>Iowa DOT Letting Process <em>(see I.M. 3.44, dated September 2005)</em></td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment A</strong> – Iowa DOT Letting Process Flowchart <em>(see Packet, Flowcharts, Chart No. 12 – DOT Pre-letting Process and Chart No. 13 – DOT Post-letting Process)</em></td>
<td>(future)</td>
<td>Both</td>
</tr>
<tr>
<td>3.750*</td>
<td>Project Development Certification Instructions</td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment A</strong> – Project Development Certification Process Flowchart</td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td></td>
<td><strong>Attachment B</strong> - Sample Project Development Certification Form</td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td>3.760*</td>
<td>Public Interest Findings</td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td>3.770</td>
<td>Paving Point Requirements</td>
<td>(future)</td>
<td>Counties</td>
</tr>
</tbody>
</table>

**Section 3.8 -- Construction**

3.805* Construction Inspection *(see I.M. 3.51, dated September 2002)* (future) Both

3.810* Federal-aid Construction by Local Agency Forces December 11, 2008 Both

3.870 Farm-to-Market Voucher Process (future) Counties

**Section 3.9 -- Project Close-out and Audits**


<table>
<thead>
<tr>
<th>Attachment A</th>
<th>Project Close-out Process Overview Flowchart</th>
<th>December 3, 2007</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attachment B</strong></td>
<td>Final Review and Audit Process Flowchart – Highway or Bridge Construction</td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td><strong>Attachment C</strong></td>
<td>Final Review and Audit Process Flowchart – Non-highway Construction, DOT Specifications</td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td><strong>Attachment D</strong></td>
<td>Final Review and Audit Process Flowchart – Non-highway Construction, Non-DOT Specifications</td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td><strong>Attachment E</strong></td>
<td>Pre-audit Checklist <em>(Word)</em></td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
<tr>
<td><strong>Attachment F</strong></td>
<td>Final Forms Packet Checklist <em>(Word)</em></td>
<td>December 3, 2007</td>
<td>Both</td>
</tr>
</tbody>
</table>

3.930* Interest Payment Procedures December 3, 2007 Both

<table>
<thead>
<tr>
<th>Attachment A</th>
<th>Sample Interest Payment Information Form</th>
<th>December 3, 2007</th>
<th>Both</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attachment A</strong></td>
<td>Sample County Engineer Resolution <em>(Word)</em></td>
<td>December 3, 2007</td>
<td>Counties</td>
</tr>
</tbody>
</table>

**Chapter 4 – Systems Classification And Identification**

**Section 4.0 -- General**

4.010 Procedures to Modify the Secondary Road Route Numbering System September 2002 Counties

4.030 County Road Vacations September 2002 Counties

| Attachment A - Resolution for Road Vacation Public Hearing *(Word)* | September 2002 | Counties |
| Attachment B - Notice of Public Hearing *(Word)* | September 2002 | Counties |
| Attachment C - Resolution to Vacate a County Road *(Word)* | September 2002 | Counties |

**Section 4.1 -- (Reserved)**

**Section 4.2 -- Farm-to-Market System**
<table>
<thead>
<tr>
<th>No.</th>
<th>Subject</th>
<th>Revision Date</th>
<th>Written To</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.210</td>
<td>Modification of the Farm-to Market (FM) System</td>
<td>March 2002</td>
<td>Counties</td>
</tr>
<tr>
<td></td>
<td>Attachment A - FM Review Board Application Resolution (Word)</td>
<td>March 2002</td>
<td>Counties</td>
</tr>
<tr>
<td>4.220</td>
<td>Farm-to-Market Review Board Advisory Opinions on Proposed</td>
<td>April 2002</td>
<td>Counties</td>
</tr>
<tr>
<td></td>
<td>Jurisdictional Transfers</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
TO: Counties and Cities  
FROM: Office of Local Systems  
DATE: February 15, 2011  
I.M. No. 2.120 

SUBJECT: Bridge Inspections 

INSTRUCTIONAL MEMORANDUMS

Contents: This Instructional Memorandum (I.M.) includes guidelines and procedures for a Local Public Agency (LPA) to assist them in complying with the National Bridge Inspection Standards (NBIS). This I.M. also includes the following attachments:

- Attachment A - Bridge Scour Stability Worksheet – Level A Evaluation
- Attachment B - Intermediate Scour Assessment Procedures Flowchart – Level B Evaluation
- Attachment C - Scour Plan of Action (POA)
- Attachment D - Scour Safe Foundations for Spread Footings or Steel Piles
- Attachment E - Highly Erodible Soils
- Attachment F - Berm Stability Criteria
- Attachment G - Guidance for Developing and Implementing Plans of Actions (POA) for Bridges with Unknown Foundations, Flowcharts, and Worksheet
- Attachment H - USGS Hydrologic Region Map with Region Descriptions
- Attachment I - Special Training, Equipment, and Access Requirements Checklist
- Attachment J - Load Rating Evaluation Form
- Attachment K - Iowa Legal Trucks Diagram

Introduction

According to Iowa Code Chapter 314.18, the counties, cities, and other public agencies are responsible for the safety inspection and evaluation of all highway bridges under their jurisdiction which are located on public roads, in accordance with the NBIS. These responsibilities include inspection policies and procedures, inspections, reports, load ratings, quality control (QC), quality assurance (QA), maintaining a bridge inventory, and other requirements of the NBIS.

The NBIS may be found in 23 CFR 650. The following are additions or clarifications to the indicated subsections of 23 CFR 650.

Definitions (23 CFR 650.305)

Armored Countermeasure (Armoring) - Material such as Class E Revetment, according to Section 4130 of the Standard Specifications, placed under and around a bridge structure for the purpose of protecting the embankment or berm from scour and/or erosion. Armoring is not a permanent countermeasure since the material is subject to displacement during a major flood event which is considered to be the lesser of the 500 year or roadway overtopping event.

Bridge Inspector Refresher Training Course – (FHWA-NHI-130053) – The major goals of this course are to refresh the skills of practicing bridge inspectors in fundamental visual inspection techniques, review the background knowledge necessary to understand how bridges function, communication issues of national significance relative to the nations’ bridge infrastructures, re-establish proper condition and appraisal rating practices, and review the professional obligations of bridge inspectors.

Fracture Critical Inspection Techniques for Steel Bridges Training Course – (FHWA-NHI-130078) – The course curriculum for this training reflects current practices, while addressing new and emerging technologies available to bridge inspectors. In addition, the course features exemplary training, hands-on workshops for popular types of nondestructive evaluation (NDE) equipment, and a case study of an inspection plan for a fracture critical bridge.

Fracture Critical Member (FCM) - A steel member in tension, or with a tension element, whose failure would probably cause a portion of or the entire bridge to collapse. Floor beams are considered to be fracture critical members when the floor beam spacing is greater than 14 feet.
Grace Period - A period of time to allow for unforeseen circumstances such as severe weather, concern for bridge inspector safety, concern for inspection quality, the need to optimize scheduling with other bridges, or other unique situations may be cause to adjust the scheduled inspection date. The adjusted date should not extend more than 30 days beyond the scheduled inspection date.

Independent Party - An entity not influenced by or affiliated with the LPA or the LPA's Program Manager. An LPA or consulting firm with more than one Program Manager can utilize an alternate Program Manager from the same consulting firm or LPA to conduct the QA review.

Low Water - Water depth of less than 6 feet.

Monthly Notifications – automated notifications sent by e-mail to the LPA’s by the Iowa DOT’s Office of Bridges and Structures regarding inspections past due or bridges not in compliance with posting requirements on a monthly basis.

Permanent Countermeasure - Designed to account for all three major types of scour (i.e. long term degradation, general or contraction scour, and local pier or abutment scour). Properly designed and installed systems satisfy the requirements of a “Permanent” classification. Examples of permanent systems include:

- Fabric Formed Articulated Block Mattress (ABM)
- Stone Revetment
- Proprietary Articulated Concrete Block (ACB)
- Gabion Mattress

Stone revetment is subject to displacement during a major flood event which is considered to be the lesser of the 500 year or roadway overtopping event. Therefore, unless the revetment is designed in accordance with Hydraulic Engineering Circular (HEC) HEC 23 and contained, it cannot be considered to provide adequate protection to attain a “Permanent” classification. The following are some examples of permanent stone revetment:

- Burial below the contraction scour elevation.
- Installation of cut-off walls.
- Placing the revetment as launchable stone.

Safety Inspection of In-service Bridges – (FHWA-NHI-130055) – This course is based on the “Bridge Inspector’s Reference Manual” and provides training on the safety inspection of in-service highway bridges. Satisfactory completion of this course will fulfill the training requirements of the National Bridge Inspection Standards (NBIS) for a comprehensive training course. This course does not address fracture critical, underwater, or complex structures.

Scour Plan of Action (POA) (see Attachment C to this IM) - A POA is a written procedure developed by the bridge owner or delegated Program Manager that outlines the monitoring plan for a specific bridge. The plan provides guidelines and practical information pertaining to each bridge for the purpose of monitoring foundation scour during flood events.

Standard bridge – a bridge constructed using the “Bridge Standards” developed by the Iowa DOT. See the Procedures for Rating Standard Bridges section below in this IM.

Structural Inventory and Inspection Management System (SIIMS)(R) - Bridge inspection data collection software.

Scour Evaluation - Scour evaluation is the process of determining the susceptibility of each bridge for scour. The depth, or level, of this process varies for each bridge. Some bridges may be determined scour safe after the first level of evaluation, Level A. Other bridges cannot be determined scour safe after Level A so they shall go to Level B using assessment procedures. Still others may need to go to the highest level of evaluation, Level C.

Level A - Bridge Scour Stability Worksheets (see Attachment A to this IM). Bridges that meet the required Stability Total of less than 35 points, do not need any further evaluation, and may be considered scour safe. Bridges with a Stability Total of 35 points or greater need further evaluation using the Level B Intermediate Scour Assessment Procedures Flowchart (see Attachment B to this IM).
**Level B** - Intermediate Scour Assessment Procedures Flowchart (see Attachment B to this IM). From this assessment, bridges are determined to be either stable, limited risk needing monitoring, scour susceptible needing monitoring, or scour susceptible needing a Level C Evaluation.

**Level C** - This is the most in-depth level of the evaluation process needed for those bridges that do not satisfy guidelines in the Level B Evaluation. A full computational analysis is completed using the Federal Highway Administration’s HEC 18 procedures and a determination is made concerning the stability of the bridge. Bridge owners may decide to develop a Plan of Action (POA) for these structures in lieu of the Level C Evaluation.

**Thalweg** - The lowest point in the stream channel along the cross section.

**Bridge Inspection Organization** ([23 CFR 650.307](#), d)

According to Iowa Code 314.18, the counties, cities, and other public agencies are responsible for the safety inspection and evaluation of all highway bridges under their jurisdiction, which are located on public roads, in accordance with the NBIS. These responsibilities include inspection policies and procedures, inspection reports, load ratings, QC, QA, maintaining a bridge inventory, and other requirements of the NBIS.

The Bridge Owner shall have a Program Manager who is assigned the above responsibilities. The Bridge Owner may retain a consultant to perform the duties of Program Manager.

**Qualifications of Personnel** ([23 CFR 650.309](#), b)

The Iowa DOT has developed the following procedure to determine if an individual with experience performing NBIS bridge inspections can qualify as a Team Leader in accordance with the [23 CFR 650.309(b)](#) and guidance provided by FHWA Questions and Answers on NBIS.

Bridge inspection experience is defined as active participation in bridge inspections in accordance with NBIS, in either a field inspection, supervisory, or management role. A combination of bridge design, bridge maintenance, bridge construction, and bridge inspection experience is acceptable. At least 50% or more of the individual’s experience must come from bridge inspection.

To determine an individual’s bridge inspection experience, the number of years performing or supervising bridge inspections and the number of annual bridge inspections performed shall be provided. Office work associated with field inspection; such as, completing Structure Inventory & Appraisal (SI&A) forms, maintaining files of inspection data, performing load rating calculations, and other miscellaneous work, may be considered bridge inspection experience. One day a week is allotted for office work related to field inspection; therefore, the number of days calculated for field inspection time is divided by 4 to approximate average office time and then added to the field inspection time.

**Example calculation of bridge inspection experience for a technician Team Leader:**

- Number of years performing or supervising bridge inspections: 25
- Annual bridge inspections performed: 150
  - 150 bridges/6 bridges per day = 25 days
  - 25 days/4 = 6.25 days of office related work
  - Total days per year = 25+6.25 = 31.25 days
- Months per year: 31.25 days/22 working days per month = 1.42 months
- Bridge inspection experience: (1.42 months) (25 years) = 35.5 months

35.5 months is greater than the required 30 month minimum, therefore this person would be approved.

Bridge inspectors not qualified as Team Leaders may assist the Team Leader but may not inspect bridges independently. Education and experience requirements for bridge inspectors who are not Team Leaders should be determined by the Program Manager or Bridge Owner.
Program Managers and Team Leaders who perform field inspections on FCM’s shall complete the Fracture Critical (FC) Inspection Techniques for Steel Bridges Training Course, by December 31, 2011. Any individual that meets the qualifications of Program Manager or Team Leader after December 31, 2011, that will be performing field inspections on FCM’s shall complete the Fracture Critical (FC) Inspection Techniques for Steel Bridges Training Course.

The NBIS requires periodic bridge inspection refresher training for Program Managers and Team Leaders as part of QC and QA. The Iowa DOT has defined periodic as being every 5 years. Therefore, all bridge inspection personnel are required to complete the Bridge Inspection Refresher Training Course every 5 years following the completion of the Safety inspection of In-Service Bridges Training Course.

**Inspection Frequency (23CFR 650.311)**

Routine Inspections (23CFR 650.311, a)

The required inspection frequency for routine inspections may be extended by the grace period to account for unforeseen circumstances as described in the definition of grace period. Subsequent inspections should adhere to the previously established interval; that is the use of the grace period should be an exception. The inspection date recorded for Items 90, Inspection Date, shall be the actual date the new inspection is initiated. The details of why the bridge inspection was late shall be documented and placed in the bridge file folder.

Bridges that have Item 58, Deck; Item 59, Superstructure; or Item 60, Substructure, with a condition rating of 3 or less, should have an inspection frequency less than 24 months, which may be a routine inspection on a more frequent basis or a special inspection in between routine inspections. Other factors that may impact frequency of inspections are Item 29, ADT; Item 70, Posting; Item 64, Operating Rating; and all items under Structure Type and Materials on the SI&A form.

Underwater Inspections (23CFR 650.311, b)

Underwater inspection requirements covered in this article pertain to the inspection of the structural elements such as abutments or piers to determine the structural integrity. If at any time during the 60 month underwater inspection interval there is low water, inspections may be performed with a method appropriate for the element and without the use of divers.

Bridges that have Item 60, Substructure, with a condition rating of 3 or less due to deficiencies below the waterline should have an underwater inspection frequency less than 60 months. Other factors that may impact frequency of inspections are Item 29, ADT; Item 70, Posting; Item 64, Operating Rating; all items under Structure Type and Materials; environment; age; and scour characteristics.

Fracture Critical Members (FCMs) (23CFR 650.311, c)

An Item 59, Superstructure, coding of 4 or less should have an inspection frequency less than 24 months. FCM inspection may be on a more frequent basis or a special inspection in between FCM inspections. Other factors that may impact frequency of inspections are Item 29, ADT; Item 70, Posting; Item 64, Operating Rating; and all items under Structure Type and Materials.

**Inspection Procedures – Load Rating (23 CFR 650.313, c)**

Bridges are to be load rated in accordance with the FHWA Policy Memorandum on Bridge Load Ratings for the National Bridge Inventory, dated November 5, 1993 and FHWA Policy Memorandum on Bridge Load Ratings for the National Bridge Inventory, dated October 30, 2006. Item 64, Operating Rating; and Item 66, Inventory Rating; will need to be updated accordingly upon completion of the new load rating capacity calculations. Computations shall be performed based on items found during the most recent field inspection. (See Attachment J to this IM)

At the discretion of the Program Manager, Team Leader, or Load Rater, the bridge may be re-rated to reflect changes in condition, method of analysis used, or changes in acceptable load rating methodologies. The re-rating may be justified without changes in the condition codes of Item 58, Deck; Item 59, Superstructure; or Item 60, Substructure. A new Bridge Load Rating Report form will need to be generated in SIIMS and the
form certified by a Professional Engineer, licensed in the State of Iowa, when the controlling member changes or the controlling capacity is reduced.

Procedures for Rating Standard Bridges

The following procedure should be utilized for determining the load ratings of standard bridges that have been rated by the Iowa Highway Research Board Project, HR-239. There are currently 4 phases of the report available for different standard bridge designs (Load Rating for Standard Bridges (1982), Load Rating for Secondary Bridges (1991), Load Rating for Standard Bridges, Phase III (1998), and Load Rating for Standard Bridges, Phase IV (2008)).

1. Identify the standard bridge used. Refer to project plans, if available, in the bridge file to determine the version of the standard utilized. Some standards have multiple versions due to minor revisions.

2. Item 27, Year Built, is a good indicator of which standard version was used, if you are unable to locate the original plans. Some verification may be necessary in the field to determine exactly which version was utilized.

3. Review the applied dead load to determine if it matches the standard rating assumptions.

4. The operating and inventory ratings in the summary for each standard bridge are coded as an HS rating. This is NOT what should be coded on Items 64, Operating Rating, and Item 66, Inventory Rating, on the SI&A form. These numbers shall be converted to a tonnage based on a 36 ton truck. The HS number shall be multiplied by the ratio of 36 tons/20 tons = 1.8 and this number recorded on the SI&A in Items 64, Operating Rating, and Item 66, Inventory Rating. For example, if the operating and inventory ratings are listed as HS 32.0 and HS 23.3 respectively; then Item 64, Operating Rating, should be coded 57.6 (32.0 tons x 1.8 = 57.6 tons) and Item 66, Inventory Rating, should be coded 41.9 (23.3 tons x 1.8 = 41.9 tons).

5. Some of the HR-239 reports include detailed computations for review of the critical and non-critical elements. These computations can be adjusted when changes to the dead load conditions are encountered or section loss in structural elements are noted.

6. Some of the standard bridges have restrictions to the number of vehicles that may be on the bridge at one time even if the roadway will accommodate more than one vehicle. If bridges are rated using one lane loading these bridges shall be posted accordingly and Item 41, Posting Status, on the SI&A coded based on the restriction.

These ratings are for Item 59, Superstructure elements; and in some cases, Item 58, Deck elements also. Further analysis may be necessary to determine the capacity if significant changes in condition or applied dead load are noted based on the current conditions. Item 60, Substructures, should be reviewed for deterioration. Section loss should be reviewed and losses considered in adjustments to the original ratings.

Load Factor Rating (LFR) Requirements

Bridges are to be load rated in accordance with the FHWA Policy Memorandum on Bridge Load Ratings for the National Bridge Inventory, dated November 5, 1993, for all bridges constructed, replaced, or rehabilitated since January 1, 1994. Bridges in this category shall be rated by load factor methods.

These ratings are required for the HS ratings Items 64, Operating Rating, and Item 66, Inventory Rating, on the SI&A. The bridge owner may elect to use Load Factor Rating (LFR), Allowable Stress Rating (ASR), or Load Resistance Factor Rating (LRFR) to establish load limits for purposes of load posting.

Bridges built or rehabilitated since January 1, 1994, falling into the following categories shall be rated by load factor methods:

1. Bridges constructed or replaced with the following materials:
   a. Steel produced in 1936 (33 ksi or better) or after.
b. Prestressed concrete.
c. Reinforced concrete.

2. Bridges that undergo major rehabilitation or repairs.

3. Bridges designed with the Load Resistance Factor Design (LRFD) method prior to October 1, 2010, shall be rated with LRFR or LFR method.

The following material types do not require LFR analysis and may be analyzed using ASR:

1. Masonry including stone, concrete block, or clay brick.
2. Bridges constructed with timber and designed prior to October 1, 2010.
3. Rolled steel produced prior to 1936 (30 ksi or less).

Bridge Load Rating Report

A Bridge Load Rating Report has been developed to be included in each bridge file to help identify the critical elements for the capacity rating of the structure and for certification of the ratings by a Professional Engineer, licensed in the State of Iowa.

1. All rating calculations shall be certified by a Professional Engineer, licensed in the State of Iowa, and summarized on the Bridge Load Rating Report in SIIMS.

2. The Bridge Load Rating Report shall be reviewed by the Program Manager or Team Leader to ensure that it indicates the critical element, the operating and inventory ratings and the method of analysis used to determine the rating capacity of the bridge.

3. Rating calculations for standard bridges shall be certified by a Professional Engineer, licensed in the State of Iowa, as still applicable under the current condition ratings and applied loads of the bridge, and be summarized on the Bridge Load Rating Report. For standard bridges the Controlling Element and Location fields are not required to be completed.

4. If a Bridge Load Rating Report has been previously completed, existing ratings shall be reviewed with the critical elements being determined from available file information and accepted by a Professional Engineer, licensed in the State of Iowa. Recertification is not required for existing computations included in the file that are deemed reasonable based on the present condition of the structure (see Attachment J to this IM).

5. Re-ratings needed due to reasons listed in the Load Rating Evaluation Form (see Attachment J to this IM) will need to be certified if the element re-rated becomes the critical element and controls the capacity of the structure.

6. Completing the Posting Table on the Bridge Load Rating Report is not required if posting is not required.

Culverts

This section is under construction and will be added at a later date.

Posting

All bridges shall be rated for the following vehicles:

1. Type 4
2. 3S3
3. 3-3

Note: if SU7 vehicles are using a bridge, the bridge should also be rated for the SU7 vehicle.
All bridges with continuous spans or simple span lengths of 100 feet or greater should also be rated for:

1. 3S3B
2. 4S3

Diagrams of the Iowa Legal Trucks are in Attachment K to this IM. The SU7 vehicle configuration can be found in the First Edition of the 2008 AASHTO Manual for Bridge Evaluation with the 2010 versions.

Posting signs should limit all vehicles as efficiently as possible. Posting for a single gross weight limit, maximum axle weight limit, or both are the most enforceable means of restricting vehicles. Any method described in the Manual for Uniform Traffic Control Devises (MUTCD) is appropriate. Using the signs in the MUTCD with pictorial images of vehicles is allowed as long as it is clearly understood that the number of axles shown on any one vehicle could be literally interpreted if/when a violation is taken to court.

Bridges that have adequate capacity of legal vehicles up to 40 tons, but do not have adequate capacity for legal vehicles over 40 tons should be posted for a maximum gross limit of 40 tons regardless of the allowable limit calculated. This eliminates confusion about any permit vehicles that are within the 40 to 48 ton range.

Bridges do not need to be posted for loads that are annual permit loads. Bridges that commonly carry vehicles that fall under the annual permit types should be documented in SIIMS so when a permit request is made these bridges can be included on the permit as embargoed for that vehicle.

Item 70, Posting, should be calculated using the most restrictive legal truck. The most restrictive truck will be the one with the lowest Rating Factor (RF). 1.0 – RF = % below legal load. Use this % to determine which NBI coding, between 0 and 5, should be entered into Item 70, Posting. When Item 70, Posting, is equal to 4 or less, posting the bridge for the appropriate restriction is required. Item 41, Posting Status, shall be coded for the required restriction. The rating method for Item 70, Posting, does not have to be the same method used for Item 64, Operating Ratings, and Item 66, Inventory Rating. If a bridge is re-rated for Item 64, Operating Rating, and Item 66, Inventory Rating using the LFR or LRFR methods, the posting limits do not have to be re-calculated by these methods.

Advanced Posting

Bridges shall have advance load postings at the last available location to avoid crossing an embargoed structure by using an alternative route or turning around. The signs shall be readily visible and installed in accordance with the MUTCD.

When bridges are clearly visible and signs legible from the advance intersection, both advanced warning signs and signing at the bridge site are not required. The signing located at the bridge site will be sufficient to warn oncoming traffic.

Advance warning signs that restrict the bridge to one lane or limits the number of vehicles on the structure at one time shall also be located far enough in advance of the structure to allow the traffic to slow down prior to crossing the bridge along with oncoming traffic.

Overload or Superload Permitting

The bridge owner shall review requests for overload crossings of their bridges to minimize damage, ensure public safety, and protect the integrity of the local infrastructure.

1. The bridge files shall be reviewed and computations completed as required to determine if the specific overload will cause overstress to the structure.

2. Permit requests and approvals shall be kept on record for documentation. Special requirements such as reduction of speed, centering on the roadway, elimination of braking, and other restrictions should be noted on the permit.

3. The bridge owner has the right to be compensated for costs associated with the review for the overload permit by the individual/company requesting the permit as per Iowa Code 321E.14, Fees for Permits.
4. Any request can be denied if it is determined the overload will be detrimental to the public facility.

**Inspection Procedures - Records** *(23 CFR 650.313, d)*

Bridge owners are required to maintain a complete, accurate, and current record of each bridge under their jurisdiction, either electronically or hard copy, as per the American Association of State Highway and Transportation Officials Manual for Bridge Evaluation (AASHTO Manual). The components of a complete bridge record are listed in the AASHTO Manual. Many of the items listed will be included in SIIMS for each bridge. Bridge owners are encouraged to include electronic copies of these items in SIIMS as soon as possible.

The following list of items shall not to be considered in lieu of the requirements in the AASHTO Manual. All of the items in the AASHTO Manual will not be available for every bridge structure; therefore, the items listed below should be included in each bridge file as a minimum. However any and all items addressed in the AASHTO Manual should be included in the bridge files when available.

**Bridge Plans**

Plans for bridges are not required to be in the file folder; however, they are required to be readily available to the bridge owner, Program Manager, or Team Leader at all times. Plans for bridges let after January 1, 2011, shall be included in SIIMS. Bridge owners are encouraged to scan relevant plan sheets for bridges let prior to January 1, 2011, and include them in SIIMS.

**Repair Plans**

Plans for bridge repair are not required to be in the file folder; however, they are required to be readily available to the bridge owner, Program Manager, or Team Leader at all times. Plans for bridges let after January 1, 2011, shall be included in SIIMS. Bridge owners are encouraged to scan relevant plan sheets for bridges let prior to January 1, 2011, and include them in SIIMS.

**Photographs**

A road view and a side view of the bridge structure are the minimum requirement. Structures with Item 58, Deck; Item 59, Superstructure; Item 60, Substructure; Item 61, Channel / Channel Protection; and Item 61, Culvert coding of 4 or less are required to have photographs of the deficiency in the bridge folder or scanned into SIIMS. Structures that have had no changes from the previous inspection do not require updated photographs. Photographs will be required in SIIMS on January 1, 2013.

**Scour Evaluation Data**

Any scour evaluation documentation is required to be in the file folder or scanned into SIIMS, to include any Level A scour analysis worksheets (see Attachment A to this IM), Level B scour flowcharts (see Attachment B to this IM), or Level C HEC 18 calculations. Bridge owners or Program Managers are required to indicate the level of scour analysis completed using the check boxes on the Channel/Channel Protection tab in SIIMS. POAs (see Attachment C to this IM) are required to be in the file folder or scanned into SIIMS and indicated on the Channel & Channel Protection form. Scour analysis worksheets and POAs will be required in SIIMS on January 1, 2013.

**Channel Cross Section**

A channel cross section on the upstream side of the bridge is required to be a part of the bridge record. A standard Channel Cross Section form has been incorporated into SIIMS. Each bridge structure is required to have a data point at the top of bank, toe of bank, thalweg, and each substructure unit. The Channel Cross Sections are to be updated every 4 years for natural waterways and 10 years for drainage ditches controlled by a drainage district in SIIMS unless conditions at the bridge warrant more frequent monitoring. The Channel Cross Section will be required in SIIMS on January 1, 2013.
Local Agency Field Data Collection Form

The Local Agency Field Data Collection form will be completed and stored in SIIMS.

Structure Inventory and Appraisal Forms (SI&A)

The SI&A forms will be completed and stored in SIIMS.

Load Rating Calculations

The bridge record is required to include a complete record of the calculations of the bridges load carrying capacity. A standard Bridge Load Rating Report has been incorporated into SIIMS and is required to be completed for each bridge structure by January 1, 2013. The load rating calculations are required to be signed by a Professional Engineer, licensed in the State of Iowa. Electronic signatures for the forms in SIIMS are not required, but a signed copy of the load rating calculations is required to be in the bridge file folder. Bridge owners are encouraged to have an electronic scanned copy of the signed Bridge Load Rating form included in SIIMS.

Load Rating Evaluation Form

The purpose of the Load Rating Evaluation Form (see Attachment J to this IM) is to provide the Program Manager or Team Leader with a checklist of items to determine if the condition of the bridge has changed since the most recent load rating calculations were completed. The Load Rating Engineer signing this form is not confirming that the load rating calculations are correct, only that the condition of the bridge has not changed. If any of the items on the form indicate that the condition of the bridge has changed since the most recent load rating calculations, then re-rating the structure for load carrying capacity is required. Any load rating evaluation documentation is required to be in the file folder or scanned into SIIMS, including the Load Rating Evaluation form.

Critical Findings

A standard Critical Finding report form has been incorporated into SIIMS. The completed report is to be filed in SIIMS.

Critical Features

FC and scour critical elements are addressed in SIIMS.

Special Inspection Equipment

The list of specialized equipment and any additional requirements to complete the bridge inspection is included in SIIMS.

QC Office Review Form

All bridge inspections will be required to have a QC Form completed by the Program Manager before the inspection is approved. There is a standard QC Form in SIIMS, which will be required to be completed in SIIMS for each inspection.

Inspection Procedures – Master Lists (23 CFR 650.313, e)

A master list shall be kept which identifies an agency’s FC bridges, the bridges requiring underwater inspection, scour critical bridges, and bridges that are load posted. Additionally, it is recommended that a map be prepared showing each of these bridges for easy reference.

The master list can be generated by selecting the Manager side of SIIMS and running the report for FC bridges and underwater inspections.
Fracture Critical (FC) Bridges

The following information shall be kept as part of the inspection records for each FC bridge.

1. A drawing of the bridge showing the location of all FCMs.

2. The inspection frequency and procedures that are necessary to inspect each FCM within arm’s reach. The procedure may include equipment required (i.e. climbing equipment, ladder, snooper truck) or access methods (i.e. ground access, walk on lower chord) used to inspect the member.

Underwater Inspections

The following information shall be kept as part of the inspection records for each bridge requiring underwater inspection.

1. The location of all elements requiring an underwater inspection.

2. The inspection frequency and procedures necessary to inspect each element. The procedure may include equipment required or access methods used to inspect the member.

Scour Critical Bridges

The following information shall be kept as part of the inspection records for each bridge determined to be scour critical or with unknown foundations. Item 113, Scour Critical, shall be coded as 2 or 3.

1. POA

   The POA includes a specific plan for monitoring, inspecting, or closure of scour critical bridges during and after a significant flood event. The level of flooding that triggers the POA is determined and listed within the POA document. A Team Leader or a Professional Engineer, licensed in the State of Iowa, shall inspect a bridge before it may be reopened. (See Attachment C to this IM for an example)

2. Scour Analysis Procedures

   The analysis used to determine the Item 113, Scour Critical, coding shall be included in the inspection file for each bridge as applicable. This may include a Level A, B, or C scour evaluation (see Attachment A and Attachment B to this IM).

   If a bridge has been designed for scour, a computed scour depth notation shall be shown on the plans or included in the inspection file.

3. Scour Inspection Frequency

   All bridges should be monitored for changes that may affect the scour rating at the routine inspection interval.

   Review Level A Bridge Scour Stability Worksheets (see Attachment A to this IM) and upstream channel cross section to determine scour rating.

Unknown Foundations

The following information shall be kept as part of the inspection records for each bridge with unknown foundations.

1. A POA for monitoring bridges with unknown foundations should be developed and implemented to reduce the risk to users from a bridge failure during and immediately after a flood event (see HEC 23). Also, the use of risk assessment, standard design practices, and engineering judgment can be used to reduce the risk of scour induced failures.
2. Use Attachment G and Attachment H to this IM to evaluate the bridge according to the following procedures:
   
   A. Use the Procedural Flowchart (see Attachment G to this IM) to determine if the foundation type and depth can be determined. If not, then go to Step B.
   
   B. Complete the Risk Assessment Worksheet (see Attachment G to this IM) utilizing the USGS Hydrologic Region (see Attachment H to this IM) information provided and the Structure Inventory and Appraisal form. Determine the risk category based on the point totals and go to Step C3.
   
   C. Utilize the appropriate Risk Category Flowchart to determine if the structure requires a plan of action. If so, refer to Attachment G to this IM for additional guidance on developing the appropriate plan of action.

Bridge owners are cautioned that simply developing a POA for each bridge with an unknown foundation without first making every effort to determine the foundation (by discovery or inference) may not be advisable. The personnel required to implement POA’s for a large number of bridges during a widespread rainfall event may overwhelm staff. The bridge owner needs to review the number of scour critical structures and structures with undetermined foundations within in their jurisdiction that require closure during a flood event as per the POA.

New and Reconstructed Bridges

As required by AASHTO Bridge Design Specifications and FHWA Technical Advisory, Evaluating Bridges for Scour, dated October 28, 1991, all new and reconstructed bridges shall be designed to resist scour in accordance with HEC 18.

Load Posting

Maintain a list of posted bridge with weight limits for each bridge. Additionally it is recommended that a map be prepared showing the locations of these bridges.

**Inspection Procedures – Quality Control ((QC) and Quality Assurance (QA) (23 CFR 650.313, g)**

*This section is under construction and will be added at a later date.*

**Inspection Procedures – Critical Findings (23 CFR 650.313, h)**

**Purpose**

The purpose of the Critical Finding Bridge Report in SIIMS is to ensure that serious bridge damages or defects are reported, the necessary notifications are made to the bridge owner by the Program Manager or Team Leader, and that proper and timely action is taken to ensure the safety of the traveling public. This process alerts the bridge owner so damage or deterioration can be repaired in a proper and timely manner and that the damage and repairs are documented. NBIS require critical findings to be reported to FHWA.

**Criteria**

Conditions that require the filing of a critical finding report shall include, but are not limited to one of the following:

1. a partial or complete bridge collapse,
2. structural or other defects posing a definite and immediate public safety hazard,
3. a condition rating of 2 or less for any of the following bridge items:

   a. Item 58, Deck,
   b. Item 59, Superstructure,
   c. Item 60, Substructure,
d. Item 61, Channel/Channel Protection,
e. Item 61, Culverts, or
f. Item 113, Scour Critical.

In cases where it is determined that the bridge could be used safely at a lower posted load limit, the bridge may remain open if it is immediately posted at the reduced limit.

Procedure for County/City Bridges

1. The individual discovering the critical finding shall:
   a. Immediately report the finding to the responsible local official, who may notify law enforcement or maintenance personnel to close the bridge.
   b. Complete Part I of the critical finding report and submit a copy to the responsible local official within 48 hours of the finding.

2. The responsible local official shall
   a. Take action to ensure the safety of the traveling public.
   b. Complete Part II of the critical finding report within 5 days of the finding.

3. When final action is taken to resolve the critical finding issue, the responsible local official shall complete Parts III & IV of the critical finding report as necessary.

4. Before a closed bridge may be reopened to traffic, a Professional Engineer, licensed in State of Iowa, shall approve any structural repairs, the bridge shall be load rated, and the bridge shall be inspected by a Team Leader.

5. If final action is not taken within 6 months of the initial report of the critical finding, the responsible official shall complete Part III, indicating the current status of the bridge.

Inventory (23 CFR 650.315).

Iowa DOT maintains an inventory of all bridges subject to NBIS. This inventory is available for viewing and updating by local agencies in SIIMS. All local agencies shall enter their inventory data updates into the database using this access system. Usernames and passwords are available by request from the State of Iowa Enterprise A & A System. Access to SIIMS will be approved and granted by the Iowa DOT Office of Bridges and Structures, Bridge Maintenance and Inspection (BM&I) Unit.

For all types of bridge inspections, the inspection dates and condition codes shall be entered into SIIMS within 30 days of the field inspection.

Final approval of inspection reports, including load ratings if necessary, shall be completed in SIIMS within 90 days of the field inspection.
BRIDGE SCOUR STABILITY WORKSHEET
Level A Evaluation

Name: _______________________________________ Date: _________________________________
Bridge No.: ____________________________ County / City: ____________________________
FHWA No.: ____________________________ Bridge Type: ___________________________
Location: ____________________________ ADT: _________________________________

Bridges with observed major bridge threatening scour problems should be considered scour critical and SI&A item #113 should be coded 0, 1, 2, or 3. If bridge threatening scour is not observed then this form is intended to evaluate whether a bridge can be determined to be scour critical, stable, or whether more review is necessary. For each numbered question enter the number of points into the blank at the right. If more than one answer applies, use the answer with the highest number of points. Each question should be answered.

<table>
<thead>
<tr>
<th>POINTS GIVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>POINTS</td>
</tr>
</tbody>
</table>

**STRUCTURE**

1. Category:
   - A. Single span, pile foundations, and spread footing. 4
   - B. Multi-span, piers on piling, and continuous and non-continuous superstructure. 4
   - C. Multi-span, piers on spread footings, and continuous and non-continuous superstructure. 8
   - D. Structure is an over flow bridge. 8

2. Number of piers in the main channel:
   - A. No piers in main channel. 0
   - B. One pier. 1
   - C. Two to four piers. 2
   - D. Five or more piers. 4

3. Pier foundation:
   - A. No piers or all piers above flood flows. 0
   - B. Spread foundations:
     1) Spread on erosion resistant bedrock 0
     2) Spread on erodible rock (shale) 2
     3) Unknown foundation type 5
     4) Spread on soil or gravel 6
   - C. Pile bents, footing/piling or caisson, depth below existing stream bed:
     1) Pile depth greater than 40’ 0
     2) Pile depth 20’ to 40’ 2
     3) Unknown pile depth 3
     4) Pile depth less than 20’ 5
4. Abutment foundation:

A. Abutments located above flood flows. 0
B. Spread Foundations:
   1) Spread on erosion resistant bedrock 0
   2) Spread on erodible rock (shale) 2
   3) Unknown foundation type 4
   4) Spread on soil or gravel 6
C. Pile Bents, footing/piling or caisson, depth below existing stream bed:
   1) Pile depth greater than 40’ 0
   2) Pile depth 20’ to 40’ 1
   3) Unknown pile depth 2
   4) Pile depth less than 20’ 2
D. High Timber Abutment. 6

5. Road low point elevation vs. low member submergence:

A. Submergence of low member or overtopping of road low point is improbable. 0
B. Low member elevation is above road low point, submergence possible. 1
C. Low member elevation is below road low point, submergence possible. 4

HISTORY

6. Observed scour at piers:

A. No piers or all piers above flood flows. 0
B. Spread foundations:
   1) No scour hole 0
   2) Scour hole above top of footing 2
   3) Scour hole within limits of footing 8
   4) No measurement taken at piers 7
C. Footing/piling foundations:
   1) No scour hole 0
   2) Scour hole above top of footing 2
   3) Scour hole within limits of footing 4
   4) Piling exposed 6
   5) No measurement taken at piers 5
D. Pile bent foundations:
   1) No scour hole 0
   2) Less than 5’ scour 2
   3) More than 5’ scour 4
   4) No measurement taken at piers 3

7. Abutment type and condition:

A. Stub/Integral abutments, effective berm slope:
   1) 2:1 or flatter 0
   2) Steeper than 2:1 but flatter than 1.5:1 3
   3) 1.5:1 or steeper 6
B. High abutments, depth of footings or backwall planking below stream bed:
   1) More than 5 feet 0
   2) 0 to 5 feet 4
   3) Footing is above stream bed 8
C. Abutment on bedrock – no deficiencies. 0
8. Abutment protection:
   A. No protection necessary. 0
   B. Wingdikes or revetment protection in good condition. 0
   C. Other protection in good condition. 1
   D. Protection condition poor or not provided, but needed. 3 ______

9. Location of abutments compared to top of bank:
   A. More than 25 feet away. 0
   B. 5' to 25'. 2
   C. Less than 5'. 6
   D. Abutment within stream banks. 8 ______

10. Observed scour at abutments:
    A. No problems. 0
    B. Minor scour problems. 4
    C. Major scour problems observed in past inspections. 8 ______

11. Observed debris (or ice) lodged against bridge:
    A. Remote. 0
    B. Slight Amount of Occasional – every 3 years or more. 3
    C. Frequent – more than once every 3 years. 6
    D. No available information. 4
    E. Moderate to heavy debris or continually present. 8 ______

**STREAM GEOMORPHICS**

12. Average degradation of stream bed since construction, not including local scour:
    A. Less than 4' or stream aggrading. 0
    B. 4' to 6'. 2
    C. Greater than 6'. 6
    D. No Comparative cross-sections. 4 ______

13. Observed lateral movement of stream:
    A. Stable. 0
    B. Movement, no threats to bridge. 2
    C. Unstable, threatens bridge. 8
    D. No information available. 4 ______

14. Channel bottom material:
    A. Bedrock. 0
    B. Boulders and cobbles. 2
    C. Gravel, Sand, Silt, and Clay. 4 ______

15. SI&A Item #61 Channel and Channel Protection:
    A. Rated a 6 or more. 0
    B. Rated a 5 or less. 4 ______
SITE GEOMORPHICS

16. Bridge location:

A. Bridge over mainstream, tributary or spillway nearby:
   1) No tributary nearby 0
   2) Tributary downstream within 100 ft 1
   3) Tributary or spillway upstream within 1,000 ft 4

B. Bridge over tributary, mainstream nearby:
   1) No mainstream within 1,000 feet 0
   2) Mainstream within 1,000 feet 2
   3) Mainstream within 500 feet 4

17. Stream bend within 150 feet of bridge (deflection):

A. 0 to 15 degree bend. 1
B. 15 to 45 degree bend. 3
C. 45 to 90 degree bend. 6

18. Alignment of piers to flood flows:

A. No piers or all piers above flood flows. 0
B. 0 to 5 degrees skew. 1
C. 5 to 15 degrees skew. 3
D. 15 to 90 degrees skew. 6

STABILITY TOTAL ______

Bridges with a stability total below 35 points could be considered stable and code SI&A Item 113 as 7 or 8 depending on the particular situation. Bridges with a total greater than 45 for a single span or 55 for a multi-span should be considered scour critical and code SI&A Item 113 as 2 or 3. Bridges coded as scour critical need to be considered for corrective counter measures or monitored closely.

Bridges with a stability total in the 35 to 45 range for single span and 35 to 55 range for multi-span require Intermediate Scour Assessment Procedures Flowchart (see Attachment B to this IM) to be completed.
INTERMEDIATE SCOUR ASSESSMENT PROCEDURES FLOWCHART

Level B Evaluation

Start

Level A Evaluation completed?

Yes

Level A Evaluation Stability Point Total < 35?

Yes

Code SI&A Item 113 as 8.

No

Complete Level A Evaluation and begin again.

No

Level A Evaluation Stability Point Total < 35?

No

Level C Scour analysis complete or countermeasures installed?

Yes

Code SI&A Item 113 as 8.

No

Does one apply?

Yes

Code SI&A Item 113 as 8 with no further evaluation required.

No

Bridge with pier pile elevations >35 feet below streambed.

Bridge with piles driven into scour safe foundations as shown on Attachment D to this IM.

Bridge with a pile tip elevation between 25 and 35 feet below streambed and there is <10 feet of highly erodible soils (very soft silty clay through coarse sand as shown on Attachment E to this IM.

Bridge with spread footings on shale or limestone material as shown on Attachment D to this IM.

Single span bridge with effective flood plains <5 times the span length and one of the following is true:
1. concrete abutments on piles,
2. timber abutments <6 feet high on piles,
3. stream slope <5 feet/mile.

Does one apply?

Yes

No

Relief bridge for main channel.

First bridge downstream of a dam and within 1 mile of a large reservoir.

1/2 mile of a low-head dam.

Does one apply?

Yes

Analysis required by Level C Evaluation procedures. Code SI&A Item 113 as 6 until analysis is completed.

No

Type or depth of foundation is unknown?

Yes

Code SI&A Item 113 as U until further guidance developed or foundation determined.

No

Bridge is over drainage ditches, ditch is straightened, has a slope <5 feet/mile, has spoil banks/levees, and the bridge spans the channel. Does not apply to channelized natural streams.

Bridge is over quiescent pools, such as wetlands, ponds, and lakes.

Single span bridge with properly designed riprap and no scour problems since installation or revetment.

Does one apply?

Yes

Monitor as required.

No

Analysis required by Level C Procedures.

End

Abbreviations / Acronyms:
SI&A = Structural Inventory and Appraisal
SCOUR PLAN OF ACTION (POA)

Name: _______________________________________ Date: _________________________________
Bridge No.: __________________________________ County / City: __________________________
FHWA No.: __________________________________ Bridge Type: ___________________________
Location: ____________________________________ ADT: _________________________________

Functional Groups
Functional groups which will be involved in the monitoring process during a flood event are defined as follows:

Local maintenance personnel: (Specify by job title)
This individual will be involved in the process of monitoring the development of flooding conditions, implementing bridge closure plans, general monitoring of bridge condition during floods, and advising the City/County Engineer of bridge closures. Guidelines need to be specified as to when this structure is required to be closed and or monitored during a flood event.

A critical water surface elevation should be determined for closure of the bridge. This could be a conservative elevation that can be calculated from the plans based on 25 or 50 year flood elevation. This elevation can be painted on a pier or abutment so the maintenance personnel can determine if they need to continue monitoring or initiate closure procedures.

Management:
The City/County Engineer or their representative (Specified). This individual will be involved in implementing bridge closure plans and the process of reopening of closed bridges. This individual is the ultimate authority for closing and re-opening bridge structures.

Initiation of Monitoring
Local maintenance personnel (specify by job title) shall initiate monitoring when one of the following events occurs: (these are just examples, list site specific requirements for each scour critical structure)
- A flood watch or warning is announced by the National Weather Service which includes the drainage area tributary to the bridge.
- Heavy rainfall occurs in the vicinity of the drainage area tributary to the bridge.

Reopening Procedures
Details of the criteria required to re-open the structure should be clearly stated. Following the flood event, these structures are required to be inspected by a Professional Engineer, licensed in the State of Iowa, or a Team Leader prior to opening the bridge, to determine if the structure has changed from its pre-flood condition and if any additional follow-up action is required. The POA should list the individual responsible for re-opening a bridge by job title.

Structures that are monitored during a flood event are required to be inspected to by the local maintenance personnel to provide findings to the City/County Engineer to determine if any follow up action is required, i.e. armoring.
SCOUR SAFE FOUNDATIONS FOR SPREAD FOOTINGS OR STEEL PILES

<table>
<thead>
<tr>
<th>Foundation Material</th>
<th>Depth into Foundation Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weathered or broken limestone</td>
<td>&gt;4 feet</td>
</tr>
<tr>
<td>Any limestone other than weathered or broken</td>
<td>Any depth</td>
</tr>
<tr>
<td>Any shale other than hard (or very firm) shale</td>
<td>&gt;7 feet</td>
</tr>
<tr>
<td>Hard (or very firm) shale</td>
<td>Any depth</td>
</tr>
<tr>
<td>Very firm glacial clay</td>
<td>&gt;10 feet</td>
</tr>
</tbody>
</table>
# HIGHLY ERODIBLE SOILS
(Excerpt from “Driven Pile Foundation Soils Information Chart”)

<table>
<thead>
<tr>
<th>Soil Description</th>
<th>Blow count per foot (N Value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alluvium or Loess</td>
<td></td>
</tr>
<tr>
<td>Very Soft Silty Clay</td>
<td>Mean: 1</td>
</tr>
<tr>
<td></td>
<td>Range: 0-1</td>
</tr>
<tr>
<td>Soft Silty Clay</td>
<td>Mean: 3</td>
</tr>
<tr>
<td></td>
<td>Range: 2-4</td>
</tr>
<tr>
<td>Stiff Silty Clay</td>
<td>Mean: 6</td>
</tr>
<tr>
<td></td>
<td>Range: 4-8</td>
</tr>
<tr>
<td>Firm Silty Clay</td>
<td>Mean: 11</td>
</tr>
<tr>
<td></td>
<td>Range: 7-15</td>
</tr>
<tr>
<td>Stiff Silt</td>
<td>Mean: 6</td>
</tr>
<tr>
<td></td>
<td>Range: 3-7</td>
</tr>
<tr>
<td>Stiff Sandy Silt</td>
<td>Mean: 6</td>
</tr>
<tr>
<td></td>
<td>Range: 4-8</td>
</tr>
<tr>
<td>Stiff Sandy Clay</td>
<td>Mean: 6</td>
</tr>
<tr>
<td></td>
<td>Range: 4-8</td>
</tr>
<tr>
<td>Silty Sand</td>
<td>Mean: 8</td>
</tr>
<tr>
<td></td>
<td>Range: 3-13</td>
</tr>
<tr>
<td>Clayey Sand</td>
<td>Mean: 13</td>
</tr>
<tr>
<td></td>
<td>Range: 6-20</td>
</tr>
<tr>
<td>Fine Sand</td>
<td>Mean: 15</td>
</tr>
<tr>
<td></td>
<td>Range: 8-22</td>
</tr>
<tr>
<td>Course Sand</td>
<td>Mean: 20</td>
</tr>
<tr>
<td></td>
<td>Range: 12-28</td>
</tr>
</tbody>
</table>
BERM STABILITY CRITERIA

Berm stability should be reviewed for any bridges that exceed the following values:

1) Any berm slope steeper than 1.5:1, or

2) When the road grade to normal stream bed is > 20’ and the effective berm slope (measured from road grade to the edge of stream) is steeper than 2:1, or

3) When the road grade to normal stream bed is < 30’ and the effective berm slope is steeper than 2.5:1.

Abutment berm slopes or high abutments protected by properly designed riprap are considered stable.
GUIDANCE FOR DEVELOPING AND IMPLEMENTING PLANS OF ACTION (POA) FOR BRIDGES WITH UNKNOWN FOUNDATIONS

The National Bridge Inspection Standards (NBIS) regulation, 23 CFR 650.313, requires that bridge owners identify bridges that have Item 113, Scour Critical, coded as 0, 1, 2, or 3; and to prepare a Plan of Action (POA) to monitor known and potential deficiencies. Bridge owners should be working on completing evaluations to determine which bridges over waterways are vulnerable to scour.

A bridge with Item 113, Scour Critical, coded as U represent a unique subset of bridges that were exempted from being evaluated for scour vulnerability due to the lack of a process and guidance that would have allowed bridge owners to determine the necessary foundation characteristics. The FHWA has provided several risk-based methods for assessing bridges with unknown foundations. However, there may still be an inventory of bridges coded U for which a scour evaluation cannot be completed.

Bridge owners should anticipate that any bridge reported with Item 113, Scour Critical, coded U after November 2010 will require development and implementation of a POA, until properly designed countermeasures are installed to protect the bridge foundations or until the bridge is replaced. The Coding Guide currently recommends development and implementation of a POA for existing bridges having a code “U.”

FHWA has previously provided guidance for bridge owners on development and implementation of POA’s for bridges determined to be scour critical. For bridges with unknown foundations, a bridge owner has two options for development of a POA:

1. A bridge with Item 113, Scour Critical, coded U can simply be changed to a scour critical code (e.g., 3) for the NBI and subjected to a POA as described for scour critical bridges.

2. A bridge with Item 113, Scour Critical, may remain coded U with a POA developed based on a risk assessment and bridge owner defined criteria considering known information about the bridge.

The POA for a bridge with Item 113, Scour Critical, that remains coded U may be different than for a bridge determined to be scour critical. The POA developed should be based on the known information of the bridge and the bridge owner determined risk from scour. The POA for a bridge over waterways with unknown foundations should contain minimum requirements commensurate to the consequences of loss of service of the structure to ensure a reasonable level of safety to the traveling public.

The steps below provide assistance to bridge owners in developing a POA for a bridge with Item 113, Scour Critical, coded U:

STEP 1:
Assess bridges with unknown foundations in accordance with guidance provided in this IM and examples provided on the Unknown Foundations website. For bridges with Item 113, Scour Critical that remains coded U after a risk-based assessment, FHWA recommends that a POA be developed based on the risk categories defined by bridge owners during initial categorization and grouping (e.g. A - High Risk, B - Moderate Risk, C - Low Risk).

STEP 2:
Develop a POA based upon the defined risk category that considers safety to the traveling public and the consequences of loss of service of the structure. The POA may be less detailed than for a scour critical bridge based on the defined risk categories, but it should contain elements that protect users during and after a scour event, and provide a proactive plan for addressing the bridge scour concerns in the future. Examples for lowest and highest risk categories are below.
A. Lowest Risk Categories:

Assumes that the bridge has performed well and has no history of scour related problems.

For bridges considered as low risk, the POA may be as simple as monitoring bridges for scour during routine biennial inspections and after major events.

If scour or a rainfall event has been observed in excess of predetermined monitoring triggers, then the bridge should be considered for an in-depth foundation investigation. Any information on observed or inspected conditions would be identified on the bridge inspection report so that inspectors could monitor the bridge for changes.

B. Moderate Risk Categories:

Assumes that the bridge has performed satisfactorily, but because of bridge owner defined criteria, it has been identified as moderate risk.

For bridges considered moderate risk, the POA may be similar to those for bridges determined to be scour critical. At a minimum, the bridge should be monitored on a more frequent basis than a bridge in a low risk category.

A bridge in this category should be considered for an in-depth foundation investigation if scour or a rainfall event has been observed for at least a magnitude equal to predetermined monitoring triggers. If significant changes in streambed continue to occur, countermeasures should be considered to make the bridge safe from scour and stream instability.

C. Highest Risk Categories:

Assumes that the bridge has performed satisfactorily, but because of bridge owner defined criteria, it has been identified as high risk.

POA may be similar to those for bridges determined to be scour critical. At a minimum, the bridge should be monitored on a more frequent basis than a bridge in a moderate to low risk category. Also, a bridge in this category should be considered for an in-depth foundation investigation if any significant changes in streambed occur, and scheduled for timely design and construction of a new bridge or countermeasures to make the bridge safe from scour and stream instability.

STEP 3:
Coordinate a global action plan for all bridges with Item 113, Scour Critical, coded U within a LPA, whether assessed through this guidance or not. The plan should:

1. Identify the scour critical and unknown foundation bridges;

2. Define major events or monitoring trigger; and

3. Provide information for requesting technical assistance or conducting an in-depth foundation investigation.

Bridge owners should monitor and verify that the process of implementing POAs is working satisfactorily. The global action plan for developing and implementing POAs should be revisited and updated as necessary.
UNKNOWN FOUNDATIONS FLOWCHART

Start

Is Item 113 Coded 6?

- Yes: Does the bridge have unknown foundations?
  - Yes: Review bridge records for project plans, standard sheets, construction specifications, or design guidance.
  - No: Assess scour susceptibility per Level A, B, or C as required.

- No: Screen all bridges with Item 113 Coded U.

Re-code Item 113 as U.

Review bridge records for project plans, standard sheets, construction specifications, or design guidance.

Can a pile foundation type and depth be determined?

- Yes: Is the bridge scour critical?
  - Yes: Install a permanent countermeasure and re-code Item 113 as an 8.
  - No: Assess the risk of the bridge using the Unknown Foundation Risk Assessment Worksheet in this Attachment to the IM or in SIIMS and then follow the flowchart to determine risk level.

- No: Assess the risk of the bridge using the Unknown Foundation Risk Assessment Worksheet in this Attachment to the IM or in SIIMS and then follow the flowchart to determine risk level.

Are you confident the bridge has a pile foundation?

- Yes: Does one apply?
  - Yes: Install a permanent countermeasure and re-code Item 113 as an 8.
  - No: Re-code Item 113 as a 2 or 3 as appropriate.

- No: Develop a POA but construct a scour countermeasure to keep the bridge open during a prescribed flood event. The POA will require monitoring of the bridge after the flood event, but would not require closure.

Bridge over drainage ditches, ditch is straightened, has a slope < 5'/mile, has spoil banks/levees, and the bridge spans the channel. Does not apply to channelized natural streams.

Bridge over quiescent pools, such as wetlands, ponds, and lakes.

Single span bridge with properly designed revetment and no scour problems since the installation of revetment.

Assess the risk of the bridge using the Unknown Foundation Risk Assessment Worksheet in this Attachment to the IM or in SIIMS and then follow the flowchart to determine risk level.

Abbreviations:
POA = Plan of Action
UNKNOWN FOUNDATION RISK ASSESSMENT WORKSHEET

Name: _______________________________________ Date: _________________________________
Bridge No.: _________________________________ County / City: __________________________
FHWA No.: __________________________________ Bridge Type: _________________________
Location: ____________________________________ ADT: _________________________________

For each numbered question enter the number of points into the blank at the right. If more than one answer applies, use the answer with the highest number of points. Each question should be answered. Structures with risk assessment totals equal to or less than 25 points can be considered low risk, 26 to 29 points can be considered medium risk, and greater than or equal to 30 points can be considered high risk.

<table>
<thead>
<tr>
<th>POINTS GIVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>POINTS</td>
</tr>
</tbody>
</table>

1. Superstructure type:

<table>
<thead>
<tr>
<th>POINTS GIVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>POINTS</td>
</tr>
</tbody>
</table>

   A. Continuous  2
   B. Multi-span   4
   C. Fracture critical  8
   D. Single span    8
   E. High concrete abutments  10

2. Item 60, Substructure coding:

<table>
<thead>
<tr>
<th>POINTS GIVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>POINTS</td>
</tr>
</tbody>
</table>

   A. 7 to 9  1
   B. 5 or 6   2
   C. 1 to 4   3

3. Item 61, Channel/Channel Protection coding:

<table>
<thead>
<tr>
<th>POINTS GIVEN</th>
</tr>
</thead>
<tbody>
<tr>
<td>POINTS</td>
</tr>
</tbody>
</table>

   A. 7 to 9  1
   B. 5 or 6   2
   C. 1 to 4   3

4. Geomorphology/hydrology:

The USGS publication Water Resource Investigation Report 8704132 defines a Hydrologic Region based on the slope of the topography and has equations that estimate the flood discharge. Utilize the USGS Region map and the drainage for each structure in conjunction with the following guidelines to determine whether a bridge is low, medium, or high risk for this category.

Caution: Within each region there are small watersheds that have topography which produces runoff characteristics of another region. Utilize the region that best represents the area in which the watershed lies.
A. Hydrologic Region 1
   1) < 5 square miles 2
   2) 5 to 30 square miles 4
   3) > 30 square miles 6 ______

B. Hydrologic Region 2
   1) < 15 square miles 2
   2) 15 to 100 square miles 4
   3) > 100 square miles 6 ______

C. Hydrologic Region 3
   1) < 30 square miles 2
   2) 30 to 225 square miles 4
   3) > 225 square miles 6 ______

D. Hydrologic Region 4 and 5
   1) < 100 square miles 2
   2) 100 to 600 square miles 4
   3) > 600 square miles 6 ______

5. Topography:
   A. Hydrologic Region 4 and 5 2
   B. Hydrologic Region 3 4
   C. Hydrologic Region 1 and 2 6 ______

6. Item 26, Functional Class:
   A. Level B road 1
   B. Local road/minor arterial 2
   C. Farm to Market 3
   D. Urban Arterial 4 ______

7. Item 19, Detour Length:
   A. < 4 miles 1
   B. 4 to 10 miles 2
   C. >10 miles 3 ______

8. Item 29, Average Daily Traffic (ADT):
   A. < 26 2
   B. 26 to 50 4
   D. > 50 6 ______

   RISK ASSESSMENT TOTAL ______

Secondary Level of Assessment:

Bridge structures with an ADT greater than 50 cannot be considered low risk.

Bridge structures that historically experience roadway overtopping during flood events and have shown no signs of scour may be considered low risk.
Abbreviations:

POA = Plan of Action

Identify any available knowledge on bridges with known foundations constructed in the same time period.

Identify any available historical knowledge of foundation design and construction practices for the period of original construction.

Identify any available geologic information, subsurface conditions, bridge standards, or other information from nearby bridges.

Is available information sufficient to infer the foundation type and depth with an acceptable level of risk to the travelling public?

Using engineering judgment and available information, estimate a pile length.

Assess scour susceptibility per Level A, Level B, or Level C as required.

Is the bridge scour critical?

Is installation of a permanent countermeasure practical and preferable to other alternatives?

During a prescribed flood, will the bridge remain open?

Develop a POA per the guidelines provided for Low Risk bridges.

Develop a POA to close the bridge during a prescribed flood event. The POA shall document when the bridge will be closed and the process to re-open the bridge.

Install a permanent countermeasure and re-code Item 113 as sn 8.

Develop a POA but construct a scour countermeasure to keep the bridge open during a prescribed flood event. The POA will require monitoring of the bridge after the flood event, but would not require closure.

Re-code Item 113 as a 7.

Maintain Item 113 code of "U".

Maintain Item 113 as 2, 3, or "U" as appropriate.
Abbreviations:
POA = Plan of Action
Is using NDE or test pits to determine foundation characteristics practical?

Yes

Determine foundation characteristics using NDE or test pits

Assess scour susceptibility per Level A, Level B, or Level C as required.

Is the bridge scour critical?

Yes

Install a permanent countermeasure and re-code Item 113 as an 8.

No

Re-code Item 113 according to the outcome of the scour analysis

Is installation of a permanent countermeasure practical and preferable to other alternatives?

Yes

Develop a POA but construct a scour countermeasure to keep the bridge open during a prescribed flood event. The POA will require monitoring of the bridge after the flood event, but would not require closure.

No

Re-code Item 113 as a 7.

Abbreviations:

POA = Plan of Action
NDE = Non-destructive Evaluation
Hydrologic Region 1

Hydrologic region 1 extends north and south along the bluffs that border the Missouri River valley, with limits approximating those of the physiographic area known as the Western Loess Hills (Prior, 1976). The landscape has a corrugated appearance of alternating waves and troughs. Hills are sharp-featured, with narrow broken ridge-crests, intersecting spurs, and steep-sided slopes; the landscape is conducive to rapid runoff. The western border of the region is well defined and easily distinguished on topographic maps and in the field. The eastern border is more difficult to define and merges gradually with the landscape of hydrologic region 2.

Hydrologic Region 2

The bluff area that borders the Mississippi River valley is typical of the landscape in hydrologic region 2. The landscape can vary from rugged to rolling topography, where runoff may be rapid, commonly causing flash flooding. Bluff-like areas are not only located in the vicinity of the Mississippi River, they also are present along the divide between the Mississippi River and Missouri River basins; in parts of the Iowa and Cedar River basins, in areas that border the Western Loess Hills, and in the headwater parts of basins of streams in south-central Iowa.

Hydrologic Region 3

Hydrologic region 3 is the largest hydrologic region. Most of the area in this region is typical of landscapes in Iowa. The topography of this region can be described as steeply to gently rolling hills interspersed with areas of more subdued topography. The area has a well-established drainage system. Physiographically, it covers most of the Iowa Surface, a large part of the Southern Iowa Drift Plain, and the Northwest Iowa Plains (Prior, 1976).

Hydrologic Region 4

This hydrologic region, which is located in west-central Iowa, is characterized by level terrain and a poorly developed drainage system. The region coincides approximately with the southern two-thirds of the Des Moines Lobe. Many clusters of ponds and marshes with no drainage outlets are present in this region. Small streams in level areas are shallow and sluggish.

Hydrologic Region 5

This hydrologic region in north-central Iowa coincides approximately with the northern part of the Des Moines Lobe (Prior, 1976). The magnitude of floods in this region are the smallest per unit area in the State. This is due to the flat topography and flood-attenuating effect of abundant bogs, swales, and circular depressions.
## SPECIAL TRAINING, EQUIPMENT, AND ACCESS REQUIREMENTS CHECKLIST

**Reviewer:** __________________________________________  **Review Date:** ____________________

**Agency:** ______________________________________________________________________________

**Program Manager:** __________________________________  **Team Leader:** ____________________

**Team Members:** _______________________________________________________________________

**Bridge No.:** __________________________________________  **County / City:** _____________________

**FHWA No.:** __________________________________________  **Bridge Type:** ______________________

**Location:** __________________________________________  **Stream:** __________________________

<table>
<thead>
<tr>
<th><strong>Special Training</strong></th>
<th><strong>Check if required</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Fracture Critical Course</td>
<td></td>
</tr>
<tr>
<td>Underwater Inspection Course</td>
<td></td>
</tr>
<tr>
<td>Climbing / Rigging Training</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Special Equipment</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey equipment</td>
<td></td>
</tr>
<tr>
<td>Non-destructive testing equipment</td>
<td></td>
</tr>
<tr>
<td>Underwater inspection equipment</td>
<td></td>
</tr>
<tr>
<td>Air-water jet equipment</td>
<td></td>
</tr>
<tr>
<td>Sand / shot blasting equipment</td>
<td></td>
</tr>
<tr>
<td>Burning / drilling / grinding equipment</td>
<td></td>
</tr>
<tr>
<td>Timber coring drill</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Access</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ladders / hook ladders</td>
<td></td>
</tr>
<tr>
<td>Special rigging / platforms</td>
<td></td>
</tr>
<tr>
<td>Scaffolding</td>
<td></td>
</tr>
<tr>
<td>Climbers</td>
<td></td>
</tr>
<tr>
<td>Floats</td>
<td></td>
</tr>
<tr>
<td>Bosun chair / repelling</td>
<td></td>
</tr>
<tr>
<td>Catwalk</td>
<td></td>
</tr>
<tr>
<td>Personnel lift</td>
<td></td>
</tr>
<tr>
<td>Bucket truck</td>
<td></td>
</tr>
<tr>
<td>Under bridge inspection vehicle</td>
<td></td>
</tr>
<tr>
<td>Platform truck</td>
<td></td>
</tr>
</tbody>
</table>
LOAD RATING EVALUATION FORM

Name: _______________________________________ Date: _________________________________

Bridge No.: __________________________________ County / City:  __________________________

FHWA No.: __________________________________ Bridge Type: ___________________________

Location: ____________________________________ ADT: _________________________________

The purpose of this evaluation form is to determine if the condition and configuration of the structure is still consistent with the load rating calculations that were completed during a previous bridge inspection. If the answer to all of these evaluation items is “No” then recalculation is not required. IF the answer to any of these evaluation items is “Yes”, a Professional Engineer, licensed in the State of Iowa, must evaluate if re-calculation of the load ratings for this structure is required. Answer “No” or “Yes” to the following.

<table>
<thead>
<tr>
<th>If any of the following criteria are “Yes”, the bridge shall be load rated:</th>
<th>No</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The bridge is a new bridge.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. The bridge has undergone a major rehabilitation that affects the controlling structural element. This may include the deck, superstructure, or substructure elements.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. If Item 58, Deck; Item 59, Superstructure; Item 60, Substructure; or Item 62, Culvert; coding decreased to 3 or less.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. If moderate to significant changes to the superstructure dead load has occurred, such as the addition of an overlay or changes of 2 or more inches of overburden such as earth or rock since the previous rating.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Changes to lateral support of the beams.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. If 5 feet or more of scour/erosion has occurred at the foundations due to flooding events or progressive down cutting, the bridge shall be evaluated for structural capacity of the foundations.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| If any of the following criteria are “Yes”, the bridge shall be considered for re-load rating: | No | Yes |
|--------------------------------------------------------------------------------------------.|----|-----|
| 1. If 58, Deck; Item 59, Superstructure; Item 60, Substructure; or Item 62, Culvert; coding decreased to 4. |    |     |
| 2. New information found during the most recent field inspection affects load capacity. |    |     |
| 3. New information is determined by additional investigation, testing, or analysis affects load capacity. |    |     |
| 4. Item 63 and 65, Rating Method, is coded 5. |    |     |

Program Manager or Team Leader signature Printed name of Program Manager or Team Leader

Re-rate the bridge: No _____ Yes _____

Load Rating Engineer signature Printed name of Load Rating Engineer
Iowa Legal Trucks
Typical Iowa Legal Truck Types
(Wheel and axle loads are shown in Kips)

**Straight Truck (Type 4)**
Total Wt. = 54.5 Kips (27.25 Tons)

- 11’
- 4’
- 4’

Wheel: 6.25
Axle: 12.50
7 7 7
14 14 14

**Truck + Semi-trailer (Type 353A)**
Total Wt. = 80 Kips (40 Tons)

- 43’

Wheel: 6
Axle: 12
6.5 6.5
13.0 13.0
7 7 7
14 14 14

**Truck + Trailer (Type 3-3)**
Total Wt. = 80 Kips (40 Tons)

- 43’

Wheel: 7.25
Axle: 14.50
6 6
12 12
6.15 13.5
7 7 7
14 14 14

**Truck + Semi-trailer (Type 353B)**
Total Wt. = 90 Kips (45 Tons)

- 60’

Wheel: 6
Axle: 12
8.5 8.5
17 17
10 10 10
5 8.5 8.5
14 14 14

**Truck + Semi-trailer (Type 453)**
Total Wt. = 96 Kips (48 Tons)

- 62’

Wheel: 6
Axle: 12
7 7 7
14 14 14
7 7 7
14 14 14