

Guide and / or I.M. Revision Notice

To: Cities, Counties, and Consultants

Date: July 18, 2013

From: Office of Local Systems

Revision Notice Number: 2013-02

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existing Project Development Information Packet (Packet) or County Engineers I.M. documents that have been replaced or superseded.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 *****

Document Title or I.M. Number	Summary of Significant Revision(s)
I.M. Table of Contents July 18, 2013	The I.M. Table of Contents has been revised to reflect new or revised I.M.s, as indicated below.
I.M. 2.005 Farm-to-Market Program July 18, 2013	This I.M. replaces I.M. 3.211, Rehabilitation of Existing Surfaces, and adds information about the Farm-to-Market Program not previously documented.
I.M. 2.020 Federal and State Bridge Program July 18, 2013	This I.M. has been updated. Substantive changes from the previous version include the following: <ul style="list-style-type: none"> • Provided information on changes due to MAP-21 funding. • A bridge is eligible for replacement if the Sufficiency Rating is 60 or less. • Information was added concerning bridges over railroad tracks that are owned by the railroad. • Information was added concerning chloride testing.
I.M. 2.120 Bridge Inspections July 18, 2013	This I.M. has been updated. Substantive changes from the previous version include the following: <ul style="list-style-type: none"> • A Table of Contents has been added. • A definition for Unknown Foundation Plan of Action has been added. • A section on Use of Consultant Services has been added. • A section on Official Bridge Files has been added and changes were made throughout the I.M to reflect what is meant by the "Bridge File". • Additional clarification was added to the Bridge Inspection Organization section. • Changes were made to the Team Leader requirements in the Qualifications of Personnel section. • Instructions were added for late inspections in the Routine Inspection section. • In the Underwater Inspection section, low water was defined as levels less than 6 feet. Instructions were added for low water inspections.

Document Title or I.M Number	Summary of Significant Revision(s)
	<ul style="list-style-type: none"> • The Fracture Critical Members section was rewritten. • A section on Culverts has been added. • The requirements pertaining to the Bridge File were changed in the Records section. • The requirements were changed in the Local Agency Field Data Collection Form section. • Instructions were added for the two new forms for Fracture Critical Member Locations and Conditions for Trusses and for Thru/Two Girders, which are new attachments. The new instructions have been included in the Master Lists section. • Changes were made in the Unknown Foundations section to further clarify Level A and Level B Evaluations. • Changes were made to the requirements in the Procedures for County/City Bridge section. • Attachment A is now available in Word format. • Attachment B has been renamed. • Attachment C is now available in Word format. • Attachment D is new. • Attachment E has been replaced with information previously found in Attachment K. • Attachment F has been replaced with information previously found in Attachment M. • Attachment G has been replaced with information previously found in Attachment H. • Attachment H is new. • Attachment I is new. • Attachment J is new. • Attachment K is new. • Attachment L is new. • Attachment M is new.
<p>I.M. 3.211 Rehabilitation of Existing Surfaces Obsolete</p>	<p>This I.M. was replaced by I.M. 2.005, Farm-to-Market Program.</p>
<p>I.M. 3.213 Traffic Barriers (Guardrail and Bridge Rail) July 18, 2013</p>	<p>This I.M. has been updated. Substantive changes from the previous version include the following:</p> <ul style="list-style-type: none"> • Information was added concerning bridge approach guardrail on rehabilitation projects. • Attachment A is new.

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.

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INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties	Date: July 18, 2013
From: Office of Local Systems	I.M. No. 2.005
Subject: Farm-to-Market Program	

Contents: This Instructional Memorandum (I.M.) provides information, guidelines, and procedures for the distribution, uses, and restrictions associated with Farm-to-Market (FM) funds for counties.

Funding Sources and Eligible Uses

The FM Fund is comprised of 8% of the Road Use Tax Fund (RUTF), per Iowa Code section [312.2](#). Iowa Code section [310.4](#) states that the FM Fund shall be used for the establishment, construction, reconstruction, or improvement to the FM System, including drainage; grading; surfacing; resurfacing; construction of bridges or culverts; the elimination, protection, or improvement of railroad crossings; acquiring of additional right-of-way; and all other expenses incurred in the construction, reconstruction, or improvement of the FM System. Transfers of funds may be made from the FM Fund to the Local Secondary Road Fund as per [I.M. 2.030](#), Transfer of Farm-to-Market Funds to the Local Secondary Road Fund. Also, transfers can be made from the Local Secondary Road Fund to the FM Fund as per [I.M. 2.010](#), Transfer of Local Secondary Road Use Tax Funds to the Farm-to-Market Fund. For procedures to modify the FM System, refer to [I.M. 4.210](#), Modification of the Farm-to-Market (FM) System, and [I.M. 4.220](#), Farm-to-Market Review Board Advisory Opinions on Proposed Jurisdictional Transfers.

Allocation, Borrowing, and Reallocation Procedures

Iowa Code section [310.27](#) allows for counties to accumulate up to 3 years worth of funds. Counties are also allowed to “borrow ahead” (temporarily allocate) up to 5 years worth of funds. If a county does not spend its allocation of FM funds within 3 years, the funds greater than 3 years of allocation get distributed amongst the remaining counties. The Iowa Department of Transportation (Iowa DOT) Office of Finance tracks receipts and expenditures for each county’s FM Fund. The Iowa DOT Office of Local Systems has a spreadsheet that keeps track of the years borrowed ahead or accumulated. The spreadsheet is published monthly and can be found on the Office of Local Systems [Funding Information](#) web page. In consultation with the Iowa County Engineers Association (ICEA) Executive Board, the Office of Local Systems may also impose additional restrictions on future obligations from the FM Fund, if necessary, to preserve a positive cash flow for the statewide FM Fund. If this occurs, a memo will be issued detailing the additional restrictions. Counties also must follow [I.M. 2.040](#), Temporary Allocation of Farm-to-Market Funds, before using a temporary allocation of FM funds.

Project Development and Department Oversight

Projects with Federal-aid or State-aid

In addition to the procedures outlined below for projects funded only with FM funds, Counties must also follow all applicable Federal-aid and State-aid requirements, as indicated in the project funding agreement.

Projects using only FM Funds

The Iowa DOT is responsible to ensure the project is an eligible use of FM funds, meets the Iowa Code restrictions for temporary allocations, complies with any additional restrictions imposed by the Office of Local Systems, and meets the Iowa DOT’s requirements for letting. Otherwise, the Iowa DOT has very limited oversight.

Counties will need to conduct their own design exceptions, and are encouraged but not required to use [I.M. 3.218](#), Design Exception Process. Counties should keep design exceptions on file in their office for FM funded projects.

The basic project development steps are shown below. For details to complete any particular step, see the referenced I.M.

1. Budget and Program Project. Include the project in the County Five Year Program (CFYP), as developed through the Transportation Program Management System (TPMS). The project does not need to be included in the Secondary Road Budget, as the project will not be paid from the local Secondary Road Budget. There is no I.M. on this procedure; however, instructions are issued annually and can be found on the Office of Local Systems [County and City Reports](#) web page. TPMS builds the project numbers according to [I.M. 3.060](#), Project Numbers.
2. Check/Final Plans. Submit check/final plans electronically to the appropriate Iowa DOT District Office, complete with all bid items and notes, according to [I.M. 3.005](#), Project Development Submittal Dates and Information. Refer to [I.M. 3.505](#), Check and Final Plans, for more information.
3. Right-of-Way/Relocation Assistance. If Federal-aid will be used on a later project phase, FHWA Environmental Concurrence must be received from the Iowa DOT's Office of Location and Environment before right-of-way is acquired. Refer to [I.M. 3.605](#), Right-of-Way Acquisition, and [I.M. 3.750](#), Project Development Certification Instructions.
4. Letting. Projects are let at the Iowa DOT unless conditions warrant special approval from the Office of Local Systems. Refer to [I.M. 3.705](#), Local Letting Process - State or Local Funded, or [I.M. 3.730](#), Iowa DOT Letting Process.

Construction Voucher Process

For projects on the FM System, project payments are made to Contractors using the Contractor Pay System (CPS). The County authorizes payment to the Contractor by completing a voucher, which is sometimes referred to as a "309 Voucher", or by generating a voucher in the FieldManager software. The Office of Finance processes these payments after they receive paperwork from the County for a 309 Voucher, or the electronic submittal for FieldManager vouchers. If a project has Federal-aid, the Office of Finance requests reimbursement from FHWA, and the reimbursement is transferred into the FM account from which the project payment was made.

To fill out the 309 vouchers, follow the steps below:

- Enter the total quantity that you want paid to date in the appropriate column. For projects using only FM funds (and State-aid when applicable), enter the quantities in the "Rural Non-Participating" column for each applicable item. For projects that have Federal-aid participation, enter the quantities in the "Rural Participating" column for Federal-aid eligible items and the "Rural Non-Participating" column for non-Federal-aid eligible items.
- Enter the total number of working days charged to date, as applicable, on the top left area of the voucher in the block titled "Days Worked, To Date".
- Enter the date of "This Voucher" on the top right area of the voucher.
- The County Engineer must sign all of the vouchers. For the semi-final voucher, the County Engineer and Contractor must sign the voucher. For the final voucher, the County Engineer, Board of Supervisors, and the Contractor must sign the voucher. The Contractor signs the final voucher in the "Claimant's Certification" box located on the bottom right of the voucher form.
- The intermediate and final vouchers for projects using only FM funds can be submitted directly to the Office of Finance. If the construction costs include Federal-aid or State-aid, the final voucher has to be submitted to the District Office, instead of the Office of Finance, as part of the Final Forms Packet.

The Office of Finance mails the first voucher to the County upon receiving confirmation that the contract has been fully awarded. Subsequent vouchers will be mailed to the County upon receipt of a voucher submitted for payment, or upon receipt of a Change Order that adds items to a contract or adjusts quantities of existing contract items.

To submit FieldManager vouchers, follow the instructions written in the FieldManager Users Guide.

The FieldManager program is used to track project quantities, and also generates Working Day Reports and can issue Change Orders. The delay of waiting for the hard copy of updated 309 vouchers is eliminated with the use of this program. This program is available for use on FM projects that are let through the DOT. There is no cost for installation of the FieldManager software but it does require a key fob (approximately \$ 50.00) to access the Iowa DOT accounting system. Training to use the program is available yearly through the Iowa DOT and can be scheduled at a location in the county if needed.

Project Close-out Procedures

For projects using only FM Funds, the County Engineer will certify on the Statement of Completion and Final Acceptance of Work ([Form 830435](#)) that the work was completed in substantial compliance with the plans and specifications. The Statement of Completion and Final Acceptance of Work requires the signature of the County Engineer and the Board of Supervisors. The Board of Supervisors may pass a resolution, as described in [I.M. 3.940](#), County Engineer Resolution, in order for the County Engineer to sign on behalf of the Board of Supervisors. The Statement of Completion and Final Acceptance of Work should be mailed to the Office of Finance. Once the project audit has been completed, the Final Packet should be mailed to the Office of Finance. The Final Packet includes the Interest Payment Information Form ([Form 830236](#)), the Final 309 Voucher, the Final Payment Form ([Form 830436](#)), Contractor Evaluation Report Form ([Form 830430](#)), and Certification of Subcontractor Payments Form ([Form 518002](#))

For projects using State-aid in conjunction with FM funds, the above listed forms should be submitted to the District Office, along with a letter stating the amount of State-aid being requested to be transferred to the County's FM fund. The District Local Systems Engineer (DLSE) will conduct a review of the completed project to assure substantial compliance with the terms of the funding agreement. The DLSE will sign the Statement of Completion, if the completed work is found acceptable, and a copy of the signed form will be forwarded to the County Engineer.

For projects using Federal-aid in conjunction with FM funds, the project closeout procedures should follow [I.M. 3.910](#), Final Review, Audit, and Close-out Procedures for Federal-aid projects.

If the project was a jointly sponsored project, the counties involved will need to reconcile their FM accounts at the completion of the project. The county who initially paid for the project will need to be reimbursed by the other county's FM account. The county that needs to reimburse the paying county will need to submit an email or letter to the Office of Finance stating the amount of FM funds to be transferred from their county to the paying county. The email or letter shall also include the project number for which the FM funds are being transferred.

Use of FM Funds for 3R Projects

Iowa Code Section [310.4](#) states that the FM Fund shall be used for establishment, construction, reconstruction, or improvements to the FM System. Projects that are not generally considered construction shall meet the following requirements to ensure that the proposed work constitutes an "improvement" in accordance with this Code section.

General Requirements

- The road must be part of the FM System.
- The road must meet the conditions of [I.M. 3.214](#), 3R Guidelines, "3R Table for Rural Collectors" under the "Resurfacing" category.
- Projects must cost more than \$50,000.
- Projects must be shown in the CFYP.

- For Granular Resurfacing projects, the application rate must be equal to or greater than 250 tons per mile.
- Counties must meet the current FM borrowing restrictions.
- The work must be done by contract. Reimbursement of FM funds for performance of the work by county forces is not allowed.

Types of Projects that are Applicable:

- Granular Resurfacing (see below for more information)
- Double Seal Coat
- Full Depth Patching
- Surface Recycling
- Longitudinal Subdrains
- Pavement Markings
- Crack Cleaning or Sealing
- Fog Sealing
- Slurry Sealing
- Other similar projects

Procedure for FM Granular Resurfacing Contracts to be Let Locally

Note: These procedures are applicable to projects using only FM funds; they are not applicable to FM projects with Federal-aid or State-aid participation. The reasons for which FM granular resurfacing contracts can be let locally are that typically the contractors are local and the projects need to be let quickly to get the rock onto the roads as early as possible in the spring and summer.

1. The County sends a request to the appropriate DLSE, and includes a cost estimate and general description of the project.
2. The DLSE forwards the request to the Office of Local Systems.
3. The Office of Local Systems verifies that the County meets the current FM borrowing restrictions and the guidelines set forth in this I.M.
4. The Office of Local Systems informs the DLSE and County of its decision.
5. The County submits plans, a FM Financial Worksheet (located in TPMS), and letting information (notice to bidders, bidding proposal) to the DLSE. The DLSE reviews this information to make sure it is consistent with the original project description. The County must also submit the Bulletin Reporting Form ([Form 650013](#)) to the Office of Contracts so the project can be included in the local letting information on the Office of Contracts' webpage. This can also be accomplished by using the "Local Letting Notice" on the ICEA Service Bureau website.
6. Once the project has been let, submit the bid tabulations to the DLSE and request concurrence in the award of contract. The DLSE will notify the County in writing if the contract award can proceed.
7. After the contract has been signed, the County sends a copy to the DLSE and Office of Local Systems.
8. The DLSE forwards a copy of the contract to the Office of Finance.
9. The County submits a Universal Payment Voucher ([Form 181001](#)), along with invoices from the Contractor, to the DLSE in order to request payment. Follow the instructions below for filling out the Universal Payment Voucher. The Function Code for granular surfacing projects = 444. The DLSE submits a voucher to the Office of Finance, who will issue payment to the Contractor. The DLSE copies the Office of Local Systems on the voucher submittal.

Use of FM funds for Non-construction Work

FM funds can be used for consultant contracts, utility relocation payments, and right-of-way payments, as long as the work is being completed as part of an FM project. The Iowa DOT has a responsibility to review the FM eligibility of these contracts and payments.

In order to make payments from the FM account for these services, follow the steps below:

1. Complete the Universal Payment Voucher form ([Form 181001](#)) as follows:
 - Voucher Number and Date: Enter the Voucher Number and Date on the top right area of the form. The Voucher Number is the sequential number of the Universal Payment Voucher submitted for payment to the Vendor for a particular project number. The Date is the date that the voucher form is filled out, not the date of the invoice.
 - Contract No.: Typically this field can be left blank.
 - Vendor Number: Typically this field can be left blank.
 - Social Security/Tax I.D. Number: Enter the Social Security Number or Federal Tax I.D. Number of the individual/business in which the payment is being made on the top middle area of the form.
 - Name and Address: Enter the name and address of the person/business for which the payment is being made in the box on the top left area of the form.
 - Vendor Invoice: Enter the date and invoice number from the invoice on which payment is being made. The invoice may be a typical type of invoice, such as from a consultant for design services, or it may be a right-of-way acquisition contract. If it is a right-of-way acquisition contract, use the date of the last signature on the contract as the date and the parcel number as the invoice number.
 - Item Number: Enter 1, 2, 3, etc. if you are paying out multiple warrants to the Vendor on one Universal Payment Voucher form.
 - Cost Center: Typically this field should be entered as "8010" for the FM Fund. If this does not apply, contact the DLSE for assistance.
 - System Number: Enter the system number from the assigned project number. The system number is the two digits or alpha-numeric combination immediately preceding the county number located at the end of the project number.
 - County Number: Enter the county number associated with the project number (last two digits of the project number).***
 - Control Section: Enter the "C0xx" alpha-numeric combination or the four digit city number for an FM extension project, from the project number.
 - Or Bldg Number: Typically this field can be left blank.
 - Paren or Unit: Enter the paren number of the project number.
 - Design Bridge or Plate & Parcel or A Number or Job Number: Typically this field can be left blank.
 - Object Code: Use "860".
 - Function Code: Use a function code that best matches what is being paid. Typical Function Codes are as shown below. If these do not apply, contact the DLSE for assistance.
 - Design = 201
 - Right-of-way = 301
 - Utilities = 310

- Rural/Urban: Typically, a "1" is entered since FM will typically only be used for rural roads. However, there are situations in which a county may administer a city project that is located on an FM extension, in which case a "2" may be appropriate.
- Part/Non-Part./Suspense: If Federal-aid funds are authorized for the costs being submitted for payment, enter a "1". If no Federal-aid funds are authorized for the costs being submitted for payment, enter a "2".
- Amount: Enter the amount to be paid for each invoice that is listed.
- Total: Enter the total amount of payment being made to the Vendor on the Universal Payment Voucher form.
- Approval Authority: On the top line, the County Engineer signs. The middle line may be signed by the Board of Supervisors if the County Engineer does not have the authority to sign on behalf of the Board. Refer to [I.M. 3.940](#) County Engineer Resolution, for more information on the County Engineer having authority to sign on behalf of the Board of Supervisors. The bottom line is for the DLSE's signature.
- Claimant's Certification: If an original invoice was submitted for payment, no signature is required. If an original invoice was not submitted or is unavailable, then the Vendor needs to sign and date this block.

Attach all supporting documentation (e.g. invoice, ROW Contract) to the voucher when submitting for payment.

Attach a copy of the agreement or contract between the County and Vendor with the first payment request for certain types of agreements or contracts (e.g. engineering, appraisals, and railroad). The payments will be held to the amounts stipulated in the contract unless a supplemental agreement is submitted.

2. Submit the Universal Payment Voucher form and supporting documentation to the appropriate DLSE.
3. The DLSE will review the form, and if it is acceptable, the DLSE signs the form. The original form and supporting documentation are then forwarded to the Office of Finance for payment processing.
4. The Office of Finance processes payment to the Vendor as appropriate.

INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties and Cities	Date: July 18, 2013
From: Office of Local Systems	I.M. No. 2.020
Subject: Federal and State Bridge Programs	

Contents: This Instructional Memorandum (I.M.) includes guidelines and procedures for the Local Public Agency (LPA) Federal and State bridge programs for highways. This I.M. also includes the following attachments:

- [Attachment A](#) - City Bridge Priority Point Rating Worksheet ([Word](#))
- [Attachment B](#) – County Bridge Priority Point Rating Worksheet ([Word](#))
- [Attachment C](#) – Touchdown Points and Limits of Participation
- [Attachment D](#) – County HBP Fiscal Constraint Requirements

GENERAL

Cities and counties in Iowa are provided dedicated funding for bridges through one Federal-aid program and two State programs. The Federal-aid bridge program is administered by the Iowa Department of Transportation (Iowa DOT) Office of Local Systems in accordance with 761 Iowa Administrative Code (IAC), [Chapter 161](#). Likewise, the State programs are administered in accordance with 761 IAC, [Chapter 160](#). In both cases, these programs are developed and administered in consultation with city and county officials through their representative organizations. This I.M. documents the results of that consultation by describing each program in detail and providing additional guidance concerning eligible bridges and eligible project costs.

FEDERAL BRIDGE PROGRAM

The 2-year Federal Transportation Bill, Moving Ahead for Progress in the 21st Century (MAP-21), signed on July 6, 2012, did not re-establish the Highway Bridge Program (HBP) which provided funding for bridge reconstruction or rehabilitation projects. However, such projects are eligible for Surface Transportation Program (STP) funding. Therefore, representatives from the city and county organizations agreed to continue a bridge program using a set-aside from the “50% Available to Any Area of the State” portion of STP funds. For the sake of continuity, we will continue to refer to these funds as HBP funds. The HBP program provides Federal-aid participation for qualifying projects at a reimbursement rate of 80 percent of the eligible costs.

The HBP allocation is divided each fiscal year with 79% for the counties and 21% for the incorporated cities. This percentage of distribution is allocated on the square footage of each jurisdiction’s deficient bridges (structurally deficient or functionally obsolete, and a sufficiency rating of 80 or less) with no limit of Average Daily Traffic (ADT). Typically, these percentages are reviewed with representative city and county organizations for possible modification at the beginning of each new Federal multi-year highway transportation bill. The portions of HBP funds allocated for cities and counties are administered differently, as outlined below.

Cities

Cities may request to add a bridge to the City Bridge Candidate List at any time, but the deadline for the next Federal Fiscal Year’s funding is October 1. Such requests shall be submitted in writing to the Iowa DOT Office of Local Systems and shall include the FHWA bridge number, route carried, feature crossed, and the most recent replacement cost estimate available. Any highway bridge within the corporate limits, whether in whole or in part, may be submitted for consideration. This includes bridges on Farm-to-Market extensions within the city limits of cities less than 500 population. The City Bridge Candidate list, including the priority points, is available on the Office of Local Systems [web site](#).

During the month of November each year, the Office of Local Systems selects bridges from the Proposed City Bridge Candidate List based on their ranking and available funding. Candidates are ranked in descending order according to their priority points (see [Attachment A](#) to this I.M.). Cities are limited to one bridge per city per fiscal year. The total Federal-aid contribution limit per bridge is set at \$1 million.

Priority points will be calculated using the data shown on the SI&A form. If the data on the SI&A form does not reflect the most recent inspection, the priority points will not correctly reflect the status of a bridge when the Iowa DOT's Proposed City Bridge Candidate List computer program is ran.

Each city with a selected bridge is sent a letter offering HBP or State bridge funding for the next Federal Fiscal Year. State funds are typically offered to only one or two small bridges per year. The city then decides if they have the matching funds to proceed and sends a letter accepting or rejecting the funding. If accepted, the city provides an updated cost estimate and information on who will administer the project. The Office of Local Systems will then prepare the appropriate agreement for the project for distribution by the District Local Systems Engineer (DLSE). This agreement will indicate if the project will receive Federal-aid or State funding, as determined by the Office of Local Systems. The city must sign and return the agreement to the DLSE within 90 days of receipt. If a city does not return an agreement within 90 days, the Office of Local Systems will treat the offer as declined by the city.

After the agreement is approved, the city may begin project development; however, the city must receive written notification from the DLSE prior to beginning any work for which they desire Federal-aid reimbursement. Project development activities shall be carried out as outlined in the [Federal-aid Project Development Guide](#) and the associated I.M.s.

Projects must meet all the Federal-aid requirements and be let at the Iowa DOT within 3 years of signing the agreement. If requested by the city, a 6 month extension may be granted by the Office of Local Systems.

HBP funds awarded are for the next Federal Fiscal Year, which begins on October 1. These funds are not available until the corresponding Federal appropriations bill is passed, which is supposed to occur prior to October, but often is delayed. If a city would like to begin Federal-aid reimbursable work before the awarded funds are available, the following process must be followed:

1. The project agreement must be signed by both parties.
2. The city (not a consultant) must send a request to the DLSE for approval to perform reimbursable work early. This request must specifically identify the cost of work to begin before the awarded funds are available.
3. The DLSE forwards the request to the Office of Local Systems for approval. The Office of Local Systems will confer with the Office of Program Management to determine if sufficient funds are available. The Office of Local Systems will notify the DLSE of its decision and the DLSE will notify the city.
4. If approved, the city must then include the project in the current year of the TIP/STIP.
5. The city may begin the FHWA authorization process for only the work that they have requested. Work must not begin until written notice of FHWA authorization has been received from the DLSE.

Counties

The Office of Local Systems does not select county bridges for HBP funding. Instead, county bridge projects are selected by the County Engineer in cooperation with the County Board of Supervisors. HBP funds are allocated to each county according to the following formula:

1. One-third (33 percent) on the county Road Use Tax (RUT) fund distribution, weighted 32 percent on the Farm-to-Market Factor and 68 percent on the Secondary Road Factor, as calculated by the Iowa County Engineers Service Bureau.
2. Two-thirds (67 percent) on a qualifying deficient bridge factor. This factor is the percent of square footage of SD or FO bridges with ADT's greater than or equal to 25 and a Sufficiency Rating of 80 or less.

After receiving the notification of the HBP funds available, the Office of Local Systems will notify the counties of their allocations based on the latest factors. Counties then select their own bridges for programming and development. Any eligible bridge may be programmed, provided the counties' HBP program as a whole is fiscally constrained in the Statewide Transportation Improvement Program (STIP). For additional information regarding the fiscal constraint requirements and procedures, see [Attachment D](#) to this I.M.

No county will be allowed to accumulate more than 3 years of HBP funds. In October of each year, the years of funds accumulated is calculated by taking an average of the last 3 years' allocations and dividing that into

the current balance of unobligated HBP funds. Projects let in the Iowa DOT's December letting or before, will be considered as obligated for purposes of this calculation. Counties with more than 3 years of accumulated funds after the December letting will have the amount that exceeds 3 years accumulated funds redistributed to those counties with less than 3 years accumulated funds.

Counties with approved bridge projects that could exceed their accumulated allocation may be able to let their projects, provided that HBP funds are available and the total cost does not exceed their anticipated 6 year allocation in the current year. The Iowa DOT may grant exceptions. Since Counties may "borrow ahead" in this manner, saving up for a large project may not be used to obtain a waiver from the 3 year accumulated funds limit.

The allocation system described above is designed to maximize utilization of all of the available HBP funds but does not guarantee that a county will be able to let a HBP funded bridge project each and every year, or be able to utilize its entire allocation. This system is dependent upon all of the Federal-aid funds being released at the beginning of the Federal Fiscal Year.

Project development activities shall be carried out as outlined in the [Federal-aid Project Development Guide](#) and the associated I.M.s. All projects must be let by the Iowa DOT. After letting, the county makes initial project payments either from their Farm-to-Market or Secondary Road funds, depending on which system the bridge is on. The Federal-aid (80 percent of the participating project cost) will be reimbursed to the appropriate fund, up to the amount shown in the STIP.

STATE BRIDGE PROGRAMS

City Bridge Construction Fund

Iowa Code Section 312.2, 12.b provides \$500,000 annually off-the-top from the Road Use Tax Fund to the city bridge construction fund for the reconstruction or replacement of highway bridges within or touching a city's corporate limits, regardless of who owns the bridge. This includes bridges on Farm-to-Market extensions within the city limits of cities less than 500 population. State participation in qualifying projects will be 80 percent of the eligible costs, up to the limit specified in the project funding agreement.

The City Bridge funds are allocated to cities in the same manner as the HBP funds for cities, as described above.

Project development must comply with State law and the agreement provisions. Projects involving only City Bridge Funds or other non-Federal-aid funds may be let locally by the city.

County Bridge Construction Fund

Iowa Code Section 312.2, 12.a provides \$2 million annually off-the-top from the Road Use Tax Fund to the county bridge construction fund for the construction, reconstruction, or replacement of highway bridges on the Secondary Road System. State participation in qualifying projects will be 80 percent of the eligible costs, up to a maximum of \$2 million per project.

During the month of November each year, the Iowa DOT Office of Local Systems requests one candidate from each county for County Bridge funds. To assist counties in selecting candidates for funding, the Office of Local Systems prepares a current listing of each county's qualifying bridges along with a determination of priority points, calculated in accordance with County Bridge Priority Point Rating factors (see [Attachment B](#) to this I.M.). A list of all county bridges including their priority points is available on the Office of Local Systems [web site](#).

Candidates are ranked in descending order according to their priority points. Projects are selected from the listing until the available funds are obligated. The successful county candidates are notified of funding in January.

Project development must comply with State law and the agreement provisions. Projects involving only County Bridge Funds or other non-Federal-aid funds may be let locally by the county.

ELIGIBLE BRIDGES

In general, to be eligible for either HBP or State bridge funding, a bridge must be classified as structurally deficient (SD) or functionally obsolete (FO); have a Sufficiency Rating of 80 or less; and have an Average Daily Traffic (ADT), as determined by the Iowa DOT, greater than or equal to 25. Each of these criteria are explained in more detail below.

SD or FO

For a bridge to be classified as SD or FO, one of the following conditions must be met on the Structural Inventory and Appraisal (SI&A) form:

SD:

1. A condition rating of 4 or less for:

Item 58 - Deck; or
Item 59 - Superstructures; or
Item 60 - Substructures; or
Item 62 - Culvert and Retaining Walls.¹

2. An appraisal rating of 2 or less for:

Item 67 - Structural Condition; or
Item 71 - Waterway Adequacy.²

FO:

1. An appraisal rating of 3 or less for:

Item 68 - Deck Geometry; or
Item 69 - Underclearances³; or
Item 72 - Approach Roadway Alignment.

2. An appraisal rating of 3 or less for:

Item 67 - Structural Condition; or
Item 71 - Waterway Adequacy.²

¹ Item 62 applies only if the last two digits of Item 43 are coded 07 or 19.

² Item 71 applies only if the last digit of Item 42 is coded 0, 5, 6, 7, 8, or 9.

³ Item 69 applies only if the last digit of Item 42 is coded 0, 1, 2, 4, 6, 7, or 8.

Any bridge classified as SD is excluded from the FO category. In other words, a bridge cannot be classified as both SD and FO, even if it meets the requirements for both classifications. All bridges are classified as SD, FO, or "neither".

Sufficiency Rating

The Sufficiency Rating is calculated using SI&A data, according to the formula given in the [Recording and Coding Guide for the Structure Inventory and Appraisal of Nations Bridges](#), published by FHWA.

HBP Funds – Bridges with a Sufficiency Rating of 60 or less are eligible for replacement or rehabilitation. Bridges with a Sufficiency Rating of 61 to 80 are eligible for rehabilitation only, unless approved by the Iowa DOT Office of Local Systems (see "REHABILITATION WORK" section below for more information).

State Bridge Funds – Bridges with a Sufficiency Rating of 80 or less are eligible for either replacement or rehabilitation.

ADT

The current Average Daily Traffic (ADT) must be greater than or equal to 25 vehicles per day (vpd), as determined by the Iowa DOT. If the LPA disagrees with the Iowa DOT's ADT, Item 29 on the SI&A, the LPA

may request an update, provided new count data is submitted and the data collection methods are verified by the Iowa DOT, Office of Transportation Data. The Iowa DOT loans traffic counting equipment to local agencies on an as-available basis. For equipment availability and other questions, please contact the Office of Transportation Data at 515-239-1323.

If there is evidence that the deteriorating condition of the bridge caused the low ADT, the LPA may submit a request for consideration to waive this requirement. The most effective documentation are old traffic counts that show higher volumes when the bridge was in better condition. However, if old traffic counts are not available, other factors may be considered, such as progressively more restrictive load postings over an extended period of time.

FHWA Qualifying Bridge List

The FHWA Qualifying Bridge List (QBL) is prepared in the fall of each calendar year. Bridges on the QBL meet the HBP requirements for SD / FO and Sufficiency Rating; however, they may not meet the ADT requirement. QBL data for a bridge may be viewed by clicking on the QBL link shown for the project in the Transportation Program Management System (TPMS) development module. If no link is shown, the bridge is not on the QBL.

The QBL is based on information that may be over one year old; therefore, it is possible that an eligible bridge may not be included on the list. If an LPA wishes to use HBP funds for a bridge not on the QBL, a written request must be submitted to the DLSE. Updated SI&A information and any other documentation needed to justify the request must be attached or uploaded to the Iowa DOT's [Structural Inventory and Inspection Management System](#) (SIIMS). After the eligibility has been verified by the DLSE, the DLSE will forward the request to the Office of Local Systems. This request must be reviewed and approved by the Office of Local Systems before any HBP funds can be authorized for work on the bridge.

Caution: If the SI&A ratings for the bridge requested have dropped significantly (i.e., 2 points or more in the last year), Local Systems will probably require additional information or explanation to justify the sudden change in bridge conditions. Such additional information might include pictures or other documentation provided by the city, county, or consultant that explains why the sudden change occurred. Reasonable care should be taken to verify that the changes to the SI&A ratings are justifiable, especially for those bridges that are close to not qualifying. Questionable SI&A rating information may lead to an audit of the city or county bridge inspection program.

If a bridge has been closed for 10 years, it is considered not significantly important and is therefore not eligible and will be removed from the list; unless, the LPA has made reasonable progress in scheduling the rehabilitation or replacement of the bridge, which indicates the bridge was of significant importance.

BRIDGE INSPECTIONS

All public highway bridges must be inspected in accordance with the National Bridge Inspection Standards (NBIS), as required by 23 CFR 650, [Subpart C](#). If the Iowa DOT determines that an LPA is not in at least conditional compliance with NBIS requirements that LPA is not eligible to receive any type of Federal funds or State bridge funds, even if it has bridges that meet the eligibility requirements outlined above. For additional guidance concerning the NBIS requirements, refer to [I.M. 2.120](#), Bridge Inspections.

Bridges carrying highway traffic over a railroad may be owned by a railroad company. If the railroad company owns the bridge, it is not subject to the inspection requirements of the NBIS. As a result, this bridge is not listed in the National Bridge Inventory (NBI) and is not eligible for Federal funding, unless the following steps are taken:

1. The bridge is inspected according to NBIS requirements.
2. Any rehabilitation or replacement of the bridge includes the requirement that ownership of the bridge is transferred to a public agency that will be responsible for maintaining the structure.

ELIGIBLE PROJECT COSTS

Types of Costs

Within the Limits of Participation (see below), HBP funds and City Bridge Funds may be used for preliminary engineering, right-of-way, construction, utility relocations (as per [I.M. 3.650](#)), and construction engineering. County Bridge Funds may only be used for construction costs within the Limits of Participation.

Limits of Participation

Replacement cost may include the bridge plus a nominal amount of roadway work sufficient to connect the structure to the existing roadway or return the grade line to an attainable Touchdown Point in accordance with [I.M. 3.205](#), Urban Design Guidelines, and [I.M. 3.210](#), Rural Design Guidelines. In most situations the Touchdown Points and the Limits of Participation are at the same location. However, there are a few situations where the Limits of Participation may extend beyond the Touchdown Points. For more information, see [Attachment C](#).

Limits on Channel Work

Reasonable channel work necessary to improve the stream alignment through the bridge opening is eligible for funding. Typically a limit of 500 feet is allowed under USACE Nationwide Permit Number 13, therefore, channel realignments exceeding 500 feet are typically not eligible for HBP or State bridge funds. To be eligible the work must be accomplished as part of the bridge project.

REHABILITATION WORK

Bridge rehabilitation projects have some additional requirements and procedures associated with them, as described below.

Future Bridge Program Eligibility

Because HBP funds are allocated to cities and counties in part based on the number of SD and FO bridges, the Iowa DOT has instituted a “10-year rule” that prevents a bridge from remaining in either the SD or FO classifications after being replaced or rehabilitated, regardless of the type of funds used for the replacement or rehabilitation project. Rehabilitation projects are defined as requiring major work to restore the structural capacity of the bridge, as well as work necessary to correct major safety deficiencies. The Iowa DOT also considers bridge deck overlays that meet the requirements outlined below as rehabilitation work.

The effect of this rule is that the Iowa DOT will remove any bridge that has been replaced or rehabilitated in the last 10 years from the Qualifying Bridge List, and as a consequence, such bridges will not be eligible for Federal or State bridge funds in Iowa. Therefore, LPA should carefully consider the potential funding impacts when planning any type of bridge replacement or rehabilitation project.

Structural and Safety Deficiencies

The purpose of the Federal and State bridge programs is to address bridges that are SD or FO; therefore, a rehabilitation project must correct a bridge’s SD or FO status (except as noted in the “Design Exceptions” subsection below) and any major safety or structural problems. For example, the project may have to include widening, barrier rail, strengthening, etc. The remaining life of the rehabilitated bridge must be at least 15 years. The structural capacity after the rehabilitation must be greater than H15.

To address possible safety problems, bridge rehabilitation projects should be reviewed according to the safety considerations outlined in [I.M. 3.214](#), 3R Guidelines. Bridge rails and approach guardrails should be reviewed in accordance with [I.M. 3.213](#), Traffic Barriers (Guardrail and Bridge Rail).

Replacement vs. Rehabilitation

If the bridge is only eligible for rehabilitation with HBP funds but the LPA requests replacement instead, the LPA must submit a written request to the Office of Local Systems with the following information:

- The reason for replacement vs. rehabilitation. This should include specific numbers relating to such considerations as ADT, detour distance, load limits, number, and proximity of crossings on the stream, bridge widths in the area, public input, safety aspects, etc.
- A cost estimate of rehabilitation to current standards for width and load carrying capacity, and a cost estimate for replacement.
- For county bridges, an explanation of why each of the bridges in the county with a Sufficiency Rating of 60 or less is not being replaced before the proposed structure. Each bridge should be addressed individually or grouped by similar Sufficiency Ratings, ADT, road system, road surface type, or any other logical way.

The Office of Local Systems will review the proposed justification for possible approval. If the rehabilitation cost is more than 65% of the replacement cost, it is probably more cost effective to replace the bridge and the Office of Local Systems and FHWA will usually approve replacement. The Office of Local Systems and FHWA will also examine the merits of the project and what the LPA is doing to replace or rehabilitate its remaining deficient bridges.

For city projects, if the replacement is not approved by the Office of Local Systems or FHWA, the city may use the funding offered for rehabilitation, or they may decline the funding offered and remain on the Proposed City Bridge Candidate List until the bridge qualifies for replacement.

Overlays

Bridge deck overlays are not typically eligible for HBP or other Federal funds unless the project includes substantial reconstruction of the deck by removing all deteriorated deck concrete. Deteriorated concrete includes areas that are delaminated or spalled; as well as, concrete which is contaminated with chloride above the corrosion threshold. The LPA may either remove the entire deck down to the top mat of reinforcement or they may perform chloride testing to determine what, if any, areas of the top mat need to be removed and replaced. When the chloride concentration exceeds 0.6 of the hydroxyl concentration, corrosion is observed¹. Chloride contents in excess of 0.025% per cubic yard of concrete for uncoated mild steel reinforcing bars and 0.1% per cubic yard for epoxy coated bars will cause corrosion to begin. This contaminated concrete must be removed and replaced. For concrete with a density of 150 lb./ft.³ this is 1 pound of chloride per cubic yard of concrete for uncoated steel and 4 pounds of chloride per cubic yard of concrete for epoxy covered bars. If testing is performed instead of removing and replacing the top mat of the deck, the plan sheets should document the following information: locations where testing was performed, the outcomes of the testing, and what action needs to be taken because of the testing. No specific approval from FHWA is required to perform testing in lieu of replacing the top mat.

Design Exceptions

Bridge rehabilitation projects should be designed to meet the AASHTO structural design guidelines referenced in [I.M. 3.510](#), Check and Final Bridge or Culvert Plans, and the applicable geometric design guidelines provided in [I.M. 3.210](#), Rural Design Guidelines, [I.M. 3.205](#), Urban Design Guidelines, and [I.M. 3.214](#), 3R Guidelines. Design exceptions for structural capacity less than what the bridge was originally designed for will not be granted. However, if the LPA can demonstrate that is not cost effective to upgrade the bridge to meet the geometric design guidelines, a design exception may be approved as prescribed in [I.M. 3.218](#), Design Exception Process.

If a design exception is granted for a geometric element on a bridge rehabilitation project, the LPA has determined that for the remaining life of the bridge, it is adequate for the type and volume of projected traffic, and that particular geometric element may not be used as the basis for classifying the bridge as FO. Examples of such geometric elements include deck width, vertical clearance over the bridge roadway, vertical and horizontal underclearances, and approach roadway geometry. Since this may affect the future eligibility of the bridge for the Federal and State bridge programs, LPAs should carefully consider this before requesting a geometric design exception.

¹Hausmann, D.A. (1967) "Steel Corrosion in Concrete: How Does it Occur?" *materials Protection*, **6**, 19-23.

INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties and Cities	Date: July 18, 2013
From: Office of Local Systems	I.M. No. 2.120
Subject: Bridge Inspections	

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 ([Word](#))
- [Attachment B](#) - Intermediate Scour Assessment Flowchart – Level B Evaluation
- [Attachment C](#) - Scour Plan of Action (POA) ([Word](#))
- [Attachment D](#) - Scope of Services for NBI Bridge Inspection Services ([Word](#))
- [Attachment E](#) - Iowa Legal Trucks Diagrams
- [Attachment F](#) - Routine Permit Trucks Diagrams
- [Attachment G](#) - USGS Hydrologic Region Map with Region Descriptions
- [Attachment H](#) - Unknown Foundations Guidance, Flowchart, Risk Assessment, Worksheet, and Plan of Action (POA) - Level A Evaluation ([Word](#))
- [Attachment I](#) - Unknown Foundations Flowchart - Level B Evaluation
- [Attachment J](#) - Quality Assurance Field Review Worksheet ([Word](#))
- [Attachment K](#) - Fracture Critical Member Locations and Conditions for Trusses Form ([Word](#))
- [Attachment L](#) - Fracture Critical Member Locations and Conditions for Thru/Two Girders Form ([Word](#))
- [Attachment M](#) - Sample Fracture Critical Member Locations and Conditions for Trusses Form

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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.

Extended Inspection Cycle - 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 Course – (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.

Unknown Foundation Plan of Action (POA) – A risk based POA developed by the bridge owner or Program Manager after completing the unknown foundation risk assessment worksheet to determine the level of risk to the traveling public.

USE OF CONSULTANT SERVICES

Use of consultant services for bridge inspection in accordance with this IM is acceptable. For consistency in inspections, it is strongly recommended that Attachment D to this I.M., Scope of Services for NBIS Bridge Inspection Services, be included in the Request for Proposal, if applicable, and the agreement. Use of Attachment D to this I.M., Scope of Service for NBIS Bridge Inspection Services, will ensure the NBIS requirements and activities are met.

OFFICIAL BRIDGE FILES

It is FHWA's expectations that the bridge owner will maintain a complete Bridge File for each individual bridge with all the required components documenting the bridge's inspection history. The various forms and documents required to be completed by the Iowa DOT in SIIMS qualify as "State Forms", which are required to be completed as part of the Official Bridge File.

The Iowa DOT as the Official Bridge Inspection Organization has the authority to establish requirements for the completion of State forms and other supporting documentation in a manner consistent with managing a bridge management system and quality assurance program. Therefore, the SIIMS records serve in this capacity as part of the Official Bridge File.

There are however, other documents that are not required to be included in SIIMS that should be maintained by the bridge owner as stated in the AASHTO Manual for Bridge Evaluation (MBE) Section 2.2, Components of Bridge Records. These also constitute part of the bridge file and the owner is free to keep such records in either hard copy or electronic format of their choosing. In conclusion, the Bridge File is a combination of SIIMS bridge records required to be maintained by the Iowa DOT and other documents maintained separately by the bridge owner as per the MBE.

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 NBIS regulations apply to all publicly owned highway bridges longer than 20 feet located on public roads. Railroad and pedestrian structures that do not carry vehicular traffic are not covered by the NBIS regulations. Similarly, the NBIS does not apply to inspection of sign support structures, high mast lighting, retaining walls, noise barrier structures, and overhead traffic signs. Tunnels, since they are not bridges, are not covered by the NBIS. Bridges within the public right-of-way but not on the roadway, such as entrances to fields and driveways to

private properties, are not covered by the NBIS regulations. The LPA is responsible for maintaining these bridges that are not covered by the NBIS regulations but are still within the public right-of-way.

A bridge on a public highway where the bridge is privately owned is not subject to the NBIS and therefore, the FHWA has no legal authority to require private bridge owners to inspect or maintain their bridges. However, the FHWA strongly encourages private bridge owners to follow the NBIS as a standard for inspecting their structures or reroute the public road when a privately owned bridge carries a public road,

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)

Bridge inspection experience is defined in the NBIS as active participation in bridge inspections in accordance with the NBIS, in either field inspections, or a supervisory or management role. A combination of bridge design, bridge maintenance, bridge construction, and bridge inspection experience, with the predominant amount in bridge inspection, is acceptable.

The Iowa DOT has developed the following criteria to determine if an individual with experience performing bridge inspections has the qualifications of a Team Leader in accordance with 23 CFR 650.309(b).

1. Licensed Professional Engineers are required to successfully complete the Safety Inspection of In-Service Bridges Course (FHWA-NHI-130055).
2. Technicians are required to have a minimum of 5 years of bridge inspection experience as defined in the NBIS to include the completion of a minimum of 500 field inspections under the supervision of a qualified Team Leader along with the successful completion of the Safety Inspection of In-Service Bridges Course (FHWA-NHI-130055).
3. Technicians that are National Institute for Certification in Engineering Technologies ([NICET](#)) certified as Level III or IV Bridge Safety Inspectors are required to successfully complete the Safety Inspection of In-Service Bridges Course (FHWA-NHI-130055).
4. Engineer Interns that have successfully completed the Fundamentals of Engineering Exam are required to have a minimum of 2 years of bridge inspection experience and have completed a minimum of 200 field inspections under the supervision of a qualified Team Leader along with the successful completion of the Safety Inspection of In-Service Bridges Course (FHWA-NHI-130055).
5. Individuals with an associate's degree in engineering or engineering technology are required to have a minimum of 4 years of bridge inspection experience and have completed a minimum of 400 field inspections under the supervision of a qualified Team Leader along with the successful completion of the Safety Inspection of In-Service Bridges Course (FHWA-NHI-130055).

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, 2012. Any individual that meets the qualifications of Program Manager or Team Leader after December 31, 2012, 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.

Program Managers and Team Leaders whose qualifications have expired have 12 months from the expiration date to successfully complete the Bridge Inspection Refresher Training Course before they are disqualified. The Program Managers and Team Leaders can perform inspection duties during the 12 month "Grace Period"; however, if they have not completed the Bridge Inspection Refresher Training Course within the 12 months they will be disqualified as a Program Manager or Team Leader until they complete this required course.

The two week Safety Inspection of In-Service Bridges Course has been updated. As a result of the significant improvements made to this course, there are new requirements of the participants. All participants taking the two week course must have successfully completed **one** of the following prerequisite courses with a score of 70% or better:

- Prerequisite Assessment for Safety Inspection of In-Service Bridges Course (FHWA-NHI-130101A): a 1 hour web-based course at no cost. This is a test out course for those individuals with significant experience and/or a comprehensive background in bridge inspection or engineering.
- Introduction to Safety Inspection of In-Service Bridges Course (FHWA-NHI-130101): a 14 hour web-based course at no cost. This course is for individuals with limited experience with in-service bridge inspection.
- Engineering Concepts for Bridge Inspectors Course (FHWA-NHI-130054): a 5-day instructor led course for which there is an associated cost per person. This is an in-person course for those individuals with limited experience with in-service bridge inspection.

Upon successful completion of one of the prerequisite requirements, participants may enroll in the two week Safety Inspection of In-Service Bridges Course, for up to 2 years. After 2 years, participants will need to retake one of the prerequisites prior to enrolling. Participants must bring a certificate of completion from one of the prerequisite options to the first day of the Safety Inspection of In-Service Bridges Course.

Professional Engineers that have successfully completed the Safety Inspection of In-Service Bridges have met the qualifications to be bridge inspection Program Managers as per the NBIS. The Iowa DOT provides access to bridge records authorized by the bridge owners in [SIIMS](#) bridge inspection software to these individuals once they have submitted the Bridge Inspector form provided on the [SIIMS](#) website to the Iowa DOT for review and approval.

Approved Program Managers are provided access to all forms and records for each bridge in [SIIMS](#) authorized by the bridge owner. Individuals approving the Load Rating form are required to be Professional Engineers licensed in the state of Iowa. Therefore, each person that is required to approve the load rating information must submit the Bridge Load Rating form provided in [SIIMS](#). The Bridge Load Rating form must be reviewed and approved by the DOT, or by an approved Program Manger who has submitted the Bridge Inspector form including Professional License information. Editing of the Bridge Load Rating form by other users with authorized access to the bridge forms is permitted but approval can only be completed by a qualified Load Rater.

INSPECTION FREQUENCY ([23CFR 650.311](#))

Routine Inspections ([23CFR 650.311, a](#))

The required inspection frequency for routine inspections may be extended by the extended inspection cycle to account for unforeseen circumstances as described in the definition of extended inspection cycle. Subsequent inspections should adhere to the previously established interval; that is the use of the extended inspection cycle should be an exception. The inspection date recorded for Item 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 in [SIIMS](#).

A late inspection is defined as not being completed within or before the month of the previous inspection. If 10 or more bridges will be late for inspection in a given month for a local public agency, an e-mail submitted to the DOT explaining the delayed inspections is acceptable, in lieu of entering comments for each bridge individually.

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.

48 Month Inspection Criteria

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

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, the water level is less than 6 feet, inspections may be performed with a method appropriate for the element without the use of divers.

Structures that experience low water levels less than 6 feet have the structural elements inspected by means of wading and probing during the regular inspection cycles. The DOT is allowing the bridge owner the option of inspecting the underwater substructure elements on a 48 month inspection cycle when the low water level is more than 2 feet and less than 6 feet. If the 48 month inspection cycle is utilized, then Item 92B, Underwater Inspection (frequency), needs to reflect the 48 month cycle and Item 93B, Underwater Inspection (date), needs to have the date of the underwater inspection entered.

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)

Criteria for Inspection Frequencies Less Than 24 Months

1. The alignment of FCMs or sub-elements has measurably changed from the as-built condition.
2. Deterioration in tension areas of a FCM has caused Item 59, Superstructure, to have a condition rating of 3 or less.
3. Item 59, Superstructure, with a condition rating of 4, should be considered for an inspection frequency less than 24 months.

Special Inspection Criteria

1. Deterioration is progressing at a rate that warrants inspection more frequently than 24 months or when there is a condition rating of 2 or less.
2. Channel degradation or channel movement is progressing at a rate that warrants inspection more frequently than 24 months or when there is a condition rating of 2 or less.
3. More frequent inspections should be considered when temporary supports are in place.
4. Fatigue cracks have been found in a redundant steel structure. Special Inspections can be stopped when repair has been performed to mitigate the cracks.
5. Fatigue cracks have been found in a FCM. Special Inspections should continue even after cracks have been mitigated. Only after the potential for any future fatigue cracks has been eliminated can Special Inspections be stopped on a Fracture Critical bridge.
6. Collision damage has severely affected the load capacity of the bridge and repairs cannot be done within a reasonable time period. Once repairs have been made, the Special Inspections can be stopped.
7. Section loss has severely affected the load capacity of the bridge. Once repairs or rehabilitation work have been completed, the Special Inspections can be stopped.

Upon completing the final Special Inspection, the check box must be marked in the Inspection Information section, to indicate that no additional Special Inspections are required. If the check box is not marked, the inspection frequency will continue and the Special Inspection will be due again according to the frequency specified.

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 the Load Rating Evaluation Form in [SIIMS](#).

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.
7. When standard ratings are used from any of the HR-239 reports, the Bridge Load Rating Report does not require a signature by a Professional Engineer, licensed in the State of Iowa. In the Comment section of the Bridge Load Rating Report identify which of the Iowa DOT Office of Bridges and Structures Bridge Standard was used.

The Federal Government instituted a policy to use only metric units for all measurement. Therefore, FHWA requires all National Bridge Inventory data to be in metric units. The Iowa DOT has chosen to use English units instead of metric. [SIIMS](#) was developed using English units for all measurements; including, but not exclusive to, vertical and horizontal clearances, deck widths, bridge length, and Inventory and Operating ratings. These English values will be converted to metric units by [SIIMS](#) for the annual National Bridge Inventory submittal.

The Inventory, Operating, and Posting ratings are typically governed by superstructure elements; and in some cases, deck elements. 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. Substructures should be reviewed for deterioration and rated, if necessary. 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. Bridges designed after October 1, 2010, shall be rated LRFR.

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 in [SIIMS](#) for each bridge 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 reviewed using the Load Rating Evaluation Form in [SIIMS](#) by a Professional Engineer, licensed in the State of Iowa, to verify the ratings are 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.

5. Re-ratings needed due to reasons listed in the Load Rating Evaluation Form in [SIIMS](#) 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.

When the Load Rating Evaluation form indicates that a review of the load ratings is required, the "Review By" and "Review Date" shall be populated at the top of the Bridge Load Rating Report. Indicate the results of the review by including comments in the "Comment" field provided.

Culverts

When a culvert has a fill depth greater than the length shown for Item 49, Structure Length, the live load is considered insignificant and the load capacity can be coded as 99.9 tons for Item 64, Operating Rating, and Item 66, Inventory Rating.

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 E](#) 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 Devices (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). $1.0 - RF = \% \text{ below legal load}$. Use this % to determine which 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 load carrying capacity 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. [761 Iowa Administrative Code \(IAC\) 511.5\(8\)](#), Fair and Reasonable Costs, states that the permit-issuing authority may charge any permit applicant a fair and reasonable cost for measures necessary to avoid damage to public property including structures and bridges.
4. Any request can be denied if it is determined the overload will be detrimental to the public facility.
5. Bridges may be evaluated for Routine Permit Trucks (see [Attachment F](#) to this IM). If the bridge does not have the capacity to carry one or more of these trucks, when center-lined at 5 mph, the inadequacy can be recorded on the Load Rating Bridge Report form in [SIIMS](#).

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 file 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 62, Culvert, coding of 4 or less are required to have photographs of the deficiency. Structures that have had no changes from the previous inspection do not require updated photographs. All relevant photographs taken after January 1, 2012, will be required in [SIIMS](#).

Scour Evaluation Data

All scour evaluation documentation is required to be in [SIIMS](#), including the Bridge Scour Stability Worksheet, Level A Evaluation (see [Attachment A](#) to this IM); Intermediate Scour Assessment Procedures Flowchart, Level B Evaluation (see [Attachment B](#) to this IM); and/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 [SIIMS](#) and indicated on the Channel & Channel Protection form. Scour analysis worksheets and POAs will be required in [SIIMS](#).

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](#).

Local Agency Field Data Collection Form

The MBE specifies that the Bridge File should reflect the information in the current bridge inspection report and that each Bridge File should include a chronological record of all inspections performed. Therefore, the field notes are required to be included in the Bridge File. The Field Data Collection form in [SIIMS](#) was developed for the purpose of documenting field notes and shall be completed in [SIIMS](#).

The two types of bridge inspections, In-Depth and Routine, are determined based on the condition and type of structure being inspected. In-Depth Inspections are recommended for structures that contain elements in less than satisfactory condition or structures that require arms length inspection of elements. In-Depth Inspections are required to have all the appropriate sub elements addressed with comments to support the condition rating of the primary element. It is recommended that all appropriate sub elements are addressed during Routine Inspections to adequately track the deterioration rate of each primary element.

An In-Depth Inspection is recommended for structures meeting the following criteria:

1. All fracture critical bridges.
2. Fatigue vulnerable bridges.
3. Structurally Deficient bridges.
4. Bridges with two or more condition ratings equal to 5 (Item 58, Deck; Item 59, Superstructure; Item 60, or Substructure).
5. Culverts with a condition rating equal to 5.

Item 58, Deck; Item 59, Superstructure; Item 60, Substructure; or Item 62, Culvert; ratings of 5 and below affect the Sufficiency Rating, which indicates that deterioration is beginning to become more apparent; therefore, the bridge is closer to becoming Structurally Deficient.

Structure Inventory and Appraisal Forms (SI&A)

The SI&A forms will be completed and stored in [SIIMS](#).

Load Rating Calculations

The Bridge File 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. The load rating calculations or Bridge Load Rating Report is required to be signed by a Professional Engineer, licensed in the State of Iowa, for all non-standard bridge load ratings. 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. Bridge owners are encouraged to have an electronic scanned copy of the signed Bridge Load Rating form included in [SIIMS](#).

FHWA requires all bridge structures be rated for its safe load carrying capacity as per 23 CFR 650.313(c). Therefore, the Iowa DOT is reviewing all bridge structures that have Item 63 or Item 65, Rating Method, coded as 5. A percentage of the structures Item 63 or Item 65, Rating Method, coded as 5 are culverts, for which there are no standardized method for rating.

Recognizing this, the Iowa DOT submitted a request to FHWA to provide the state with guidance in regards to acceptable method of rating culverts. In the interim, the Iowa DOT developed a Plan of Corrective Action (PCA) that utilizes a three phase process in completing the load ratings for culverts as follows:

1. Culverts that have Item 62, Culverts, with a condition rating of 4 or less, were required to be rated by January 1, 2013.
2. Culverts that have Item 62, Culverts, with a condition rating of 5 will be load rated by January 1, 2015.
3. Culverts that have Item 62, Culverts, with a condition rating >5 will be load rated by January 1, 2017.

Load Rating Evaluation Form

The Load Rating Evaluation Form, in SIIMS, is required to be completed for each in-depth or routine inspection. The Program Manager or Team Leader completing this form in SIIMS is not confirming that the load rating calculations are correct, only that the condition of the bridge has or 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.

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](#).

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, unknown foundations, 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, underwater inspections, scour critical bridges, unknown foundations, and bridges that are load posted.

Fracture Critical (FC) Bridges

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

1. A sketch 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.

The Fracture Critical Member Locations and Conditions for Trusses or for Thru/Two Girders forms (see [Attachment K](#) or [L](#) to this IM) shall be utilized to provide information described in items 1 and 2 above to comply with the NBIS. Bridge owners may elect to produce their own form in lieu of completing the Fracture Critical Member Locations and Conditions form; however, this will require review and approval by FHWA. The Iowa DOT has developed a Sample Fracture Critical Member Location and Conditions form as shown in [Attachment M](#).

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.

When Item 113, Scour, is coded 2 or less, Item 60, Substructure, shall be coded 2 or less as per HEC-18, Section 10.3.2 Bridge Inspection, FHWA Recording and Coding Guide.

New and reconstructed bridges shall be designed to resist scour in accordance with HEC 18, as required by AASHTO Bridge Design Specifications and [FHWA Technical Advisory, Evaluating Bridges for Scour, dated October 28, 1991](#).

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 H](#) and [Attachment I](#) to this IM to evaluate the bridge according to the following procedures:
 - a. Use the Unknown Foundations Flowchart - Level A Evaluation (see [Attachment H](#) to this IM) to determine if the foundation type and depth can be determined. If not, then go to step b below.
 - b. Complete the Unknown Foundation Risk Assessment Worksheet - Level A Evaluation (see [Attachment H](#) to this IM) utilizing the USGS Hydrologic Region (see [Attachment G](#) to this IM) information provided and the SI&A form. Determined the risk category based on the point totals and go to step c below.
 - c. Structures determined to have "Moderate" or "High" risk unknown foundations based on the Risk Assessment Worksheet - Level A Evaluation ([Attachment H](#) to this I.M.) may utilize the Unknown Foundations Assessment Flowchart - Level B Evaluation ([Attachment I](#) to this I.M.) to determine if the category of risk can be reduced.
 - d. Refer to [Attachment H](#) to this IM for guidance on developing the appropriate POA.
 - e. Check the appropriate boxes on the Channel/Channel Protection form in SIIMS that indicated the level of evaluation that was completed and the risk level of the POA that was developed and implemented.

The risk-based POAs developed for the unknown foundations are required to be in [SIIMS](#).

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.

Load Posting

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

Quality Control (QC) and Quality Assurance (QA) ([23 CFR 650.313, g](#))

Quality Control (QC) Program

It is the Program Manager's responsibility to ensure the following:

1. The "Monthly Notifications" are reviewed to identify any bridges that have not been inspected within the specified frequency or are not in compliance with load posting requirements.
2. [SIIMS](#) is used to document each inspection, including but not limited to the following:
 - a. Local Agency Field Data Collection Forms in [SIIMS](#) are completed.

- b. The Supplemental Inspection Information tab is completed in [SIIMS](#) for each bridge.
3. Master lists are maintained as required in the Inspection Procedures-Master List section of this IM.
4. Team Leaders maintain the education/experience/training requirements contained in the Qualifications of Personnel section of this IM.
5. The individual charged with the overall responsibility for load rating bridges is a Professional Engineer, licensed in the State of Iowa.

Quality Assurance (QA) Program

Bridge Record Reviews

A review of the bridge records for LPA's to determine if they contain the minimum items listed in Inspection Procedures – Records section of this IM, will be conducted by the Office of Bridges and Structures utilizing [SIIMS](#) on an annual basis for randomly selected LPAs. Additional reviews of the bridge records will be conducted during on site reviews in conjunction with the DOT's annual oversight of the LPAs.

Team Leader Reviews

It is the Program Manager's responsibility to ensure the following:

1. Team Leader Reviews are conducted every 4 years, beginning January 1, 2012.
 - a. Independent party review by a Professional Engineer qualified as a Team Leader.
 - b. Field review of inspection data for 10 bridges inspected during the past 12 months. The bridges selected shall include, but not limited to, predominant bridge types inspected and bridges with lower sufficiency ratings. The bridges selected shall include some bridges with Item 58, Deck; Item 59, Superstructure; Item 60, Substructure; Item 62, Culvert; or Item 70, Posting; rated 4 or less (if available for the bridges inspected by the Team Leader).
 - c. Reviewer accompanies the Team Leader during the inspection of 2 of the 10 selected bridges.
 - d. Quality Assurance Field Review Worksheet ([Attachment J](#) of this IM) completed for each bridge inspected.
 - e. Verification of the validity of information provided by an individual to obtain approval to utilize [SIIMS](#) as a Team Leader.
 - f. Documentation that the Team Leader has completed the Bridge Inspector Refresher Training Course and, if needed, Fracture Critical Inspection Techniques for Steel Bridges Training Course.

The findings of the Team Leader Reviews shall be attached to an e-mail to eric.souhrada@dot.iowa.gov. The report shall be stamped and signed by the reviewer. If there are negative findings regarding the Team Leader, the report shall include corrective recommendations, or actions taken, to resolve those findings.

2. Disqualification and re-instatement of Team Leaders

The Program Manager shall disqualify a Team Leader if they have provided invalid information to obtain approval to utilize [SIIMS](#) as a Team Leader or have not completed the required training required by the Qualification of Personnel section of this IM. The disqualification shall be as follows:

- a. Invalid information willfully provided to obtain approval to utilize [SIIMS](#) as a Team Leader: Permanent disqualification as a Team Leader.
- b. Non Compliance with the Qualification of Personnel section of this IM: Disqualification as a Team Leader until they meet the requirements of Qualification of Personnel section of this IM.

Load Rating Engineer Reviews

Load Rating Engineer reviews will be conducted by the Office of Bridges and Structures utilizing SIIMS in conjunction with on-site field reviews as part of the Iowa DOT's annual oversight of the LPA's program.

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.

FHWA will query the Critical Finding Reports in SIIMS every quarter; therefore, it is imperative that the LPA's complete the Critical Finding Report in [SIIMS](#) as per this I.M.

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 62, 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 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. 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.

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. User names 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.

New Bridge Data

Within 30 days of receiving the new FHWA number for a new bridge or bridge replacement, all of the required NBI data must be populated in SIIMS. If the bridge has not been built or is not open to traffic, Item 41, Posting Status, must be coded as G.

Modifications to a Bridge or Change in Load Restriction

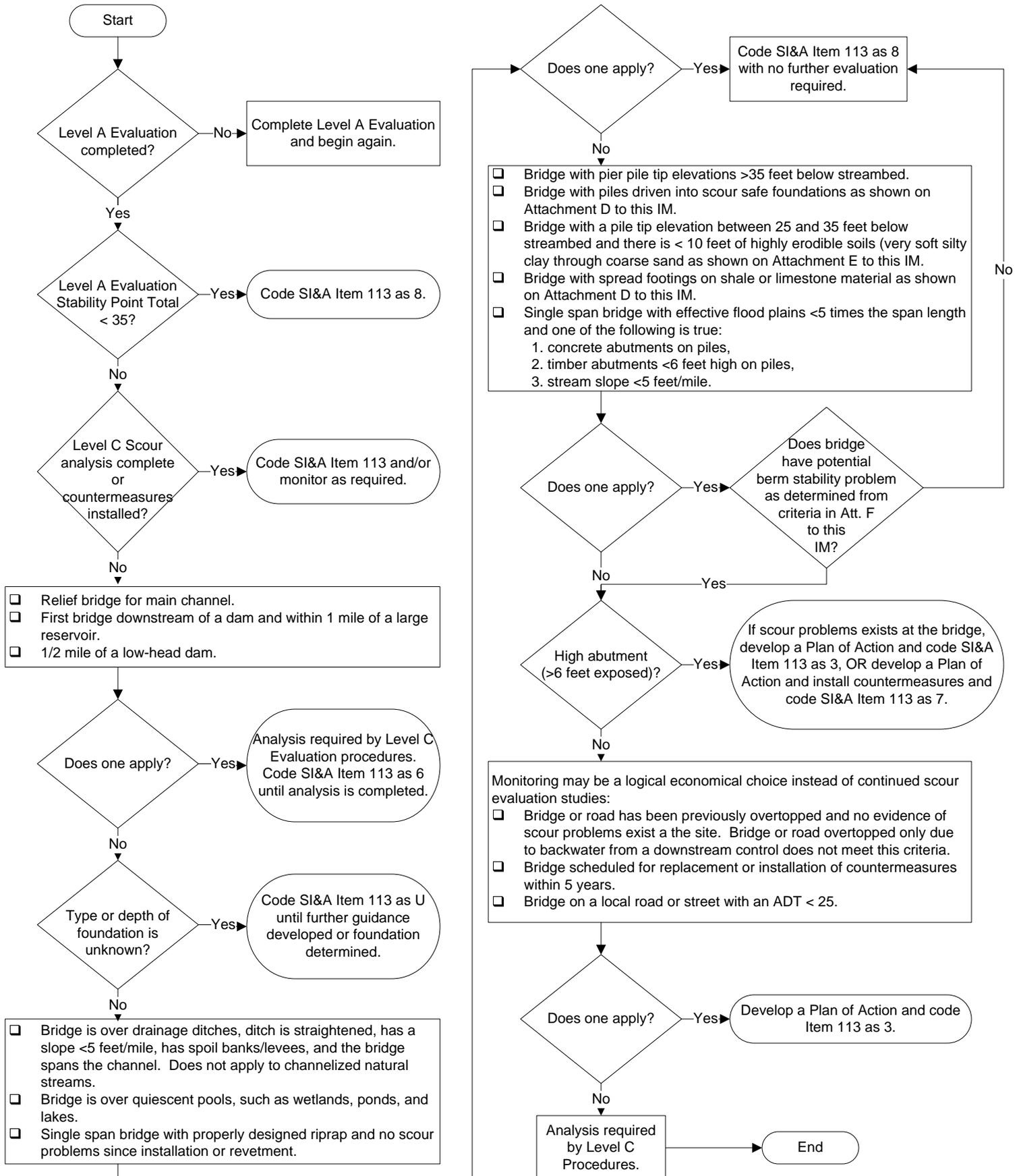
Modification to a bridge that alters the geometry or changes to a bridge load restriction must be updated in the NBI within 180 days of the change.

For all types of bridge inspections, the inspection dates and condition codes shall be entered into [SIIMS](#) within the required month 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.

INTERMEDIATE SCOUR ASSESSMENT FLOWCHART

Level B Evaluation



Abbreviations / Acronyms:

SI&A = Structural Inventory and Appraisal

Scope of Services for NBI Bridge Inspection Services

The work to be completed by the Consultant under this agreement shall include detail work, services, materials, equipment, and supplies necessary to complete tasks noted in this Attachment to the agreement.

The Consultant will monitor and review updates to the Iowa Department of Transportation (DOT), Office of Local Systems, Instructional Memorandum 2.120, Bridge Inspections; and the National Bridge Inspection Standards (NBIS), 23 CFR 650 Subpart C. Updates requiring no additional effort on the part of the Consultant will be incorporated into the work by the Consultant. If the Consultant determines additional or decreased effort will be required to incorporate the update, the Consultant will notify the Bridge Owner. The Bridge Owner will provide written approval or disapproval for the Consultant to incorporate said update into the work. Updates so approved will be considered a change in scope and will follow procedures established elsewhere in this agreement for a change in scope.

The scope of services to be performed shall provide all services associated with the completion of National Bridge Inventory (NBI) inspection of [LPA's name]'s [number of bridges] in-service bridges for the years [calendar year] and [calendar year]. Inspections shall be completed in the month they are due and the NBI inspection and documentation finalized within 90 days of the inspection. If an inspection is not completed within the frequency required, the reason must be entered into the comments field in SIIMS on the Info Tab. The services will be completed by experienced engineers and staff who are Iowa DOT qualified as a Program Manager or Team Leader.

The following is the Program Manager who will be responsible for the bridge inspection: [Program Manager]

Upon receipt of the Notice of Acceptance and Notice to Proceed, the Consultant shall provide a Certificate of Insurance with a minimum level of liability coverage of \$1,000,000 per occurrence to include language naming [LPA's name] as an additional insured.

The scope of services to be performed by Consultant shall be completed in accordance with generally accepted standards of practice; the NBIS; I.M. 2.120, Bridge Inspection; and shall include the following tasks:

A. Bridge Inspection and Documentation Services:

1. Contact the Local Public Agency (LPA) to review and confirm any inventory changes and bridge maintenance information.
2. Complete NBI field inspections of the [number of bridges] vehicular bridges under the jurisdiction of [LPA's name] which require inspection during [calendar year] and [calendar year] as required per the NBIS and according to the guidance provided in I.M. 2.120, Bridge Inspection, Inspection Frequency.
3. Update the Iowa DOT Structural Inventory and Inspection Management System (SIIMS) with the results of the NBI inspection and documentation which shall include the following:
 - a. Creation of a new Inspection Report in SIIMS.
 - b. Completion of all applicable fields in each of the pertinent forms in SIIMS, which shall include input of descriptive field notes for each relevant element of the deck, superstructure, substructure, channel, or culvert.
 - c. Upload photographs of the bridge, including documentation of the road view, a side view, and any deficiencies.
 - d. Completion of the Load Rating Evaluation Form
 - (1) This service includes a review of existing load ratings to determine if the current in-service condition of the bridge is reflected in the current rating.
 - e. Submittal of the Inspection Report, for review, to the Program Manager.

4. Review and approve completed NBI inspections and documentation in the SIIMS database on the Iowa DOT website by a Program Manager.
5. Upon final approval of the Inspection Report, notify the owner of the following:
 - a. Finalization of the Inspection Report.
 - b. Any additional load rating or posting requirements.
 - c. Structures that require updated channel cross sections.
 - d. Structures that have had a change in the Scour Critical classification.
 - e. Any deficiencies, severity and extent, and other findings that would include replacement, major rehabilitation, or repair and maintenance.
 - f. Structures with changes in inspection frequency.

The bridge owner shall be notified immediately of any issues that may adversely affect the travelling public.

6. [Other specific RFP or LPA requests].

B. Bridge Load Rating Services:

1. When approved by the bridge owner, a new analysis will be completed for each structure whose current capacity is not sufficiently represented by the existing ratings. The analysis will be prepared in accordance with I.M. 2.120, Bridge Inspections, and will be certified by a Professional Engineer licensed in the State of Iowa.
2. The Load Rating Report will be a unique report created in SIIMS. The Load Rating Report will contain the calculations and documentation required by the current regulations and will only need to be performed with a change in condition of the bridge as indicated on the Load Rating Evaluation form.
3. [Other specific RFP or LPA requests].

C. Channel Cross-Section Data Collection

1. Collect and/or input into SIIMS the required channel cross-section for the [number of bridges] bridges over waterways under the jurisdiction of [LPA's name]. Update as required per I.M. 2.120, Bridge Inspections, Inspection Procedures – Records (23 CFR 650.313, d) section.
 - a. Input the data into the SIIMS Channel Profile Tab; OR,
 - b. Upload independent cross section data as a separate file in SIIMS.
2. [Other specific RFP or LPA requests].

D. Bridge Records

1. The following information is required to be included in SIIMS if applicable:
 - a. Scour:
 - (1) Bridge Scour Stability Worksheet - Level A Evaluation
 - (2) Intermediate Scour Assessment Flowchart - Level B Evaluation
 - (3) Scour Plan of Action (POA)
 - b. Unknown Foundations:
 - (1) Unknown Foundation Risk Assessment Worksheet - Level A Evaluation
 - (2) Unknown Foundation Assessment Flowchart - Level B Evaluation
 - (3) Unknown Foundation Risk Based POA
 - c. Critical Findings

- d. Sketches of Fracture Critical Members (FCM)
 - e. Special inspection equipment required
2. The following information is required to be included in SIIMS, when available according to I.M. 2.120 Bridge Inspection, Inspection Procedures-Records:
 - a. Design Plans
 - b. Repair Plans
 3. [Other specific RFP or LPA requests].

E. Special Bridge Inspections and Evaluations

1. [Other specific RFP or LPA requests].

F. Fees

The Consultant shall prepare invoices for finalized inspection reports in accordance with its standard invoicing practices and submit it to [LPA's name] on a [frequency] basis. [LPA's name] agrees to pay each invoice within 30 days of receipt of the invoice. Invoices not paid within 30 days will accrue interest on unpaid balances at a rate of 1.5% per month.

Fee for Item A:

1. Non-FCM bridges shall be [fee] per bridge for an estimated [number of non-FCM bridges] bridges for a total estimated fee of [total fee].
2. FCM bridges shall be [fee] per bridge for an estimated [number of FCM bridges] bridges for a total estimated fee of [total fee].
3. Bridges requiring underwater inspection shall be [fee] per bridge for an estimated [number of underwater inspections] bridges for a total estimated fee of [total fee].
4. Bridges requiring additional inspections due to reduced inspection frequency shall be [fee] per bridge for an estimated [number of bridges] bridges for a total estimated fee of [total fee].
5. Bridges requiring a Special (critical feature) inspection shall be [fee] per bridge for an estimated [number of bridges] bridges for a total estimated fee of [total fee].

Fee for Item B: [itemized by LPA or Consultant].

Fee for Item C: Collection and/or input of the Channel Cross-Sections shall be [fee] per bridge for an estimated [number of non-culvert bridges] bridges for a total estimated fee of [total fee].

Fee for Item D: Completion and/or input of the Bridge Record Data shall be [fee] per bridge for an estimated [number of bridges] bridges for a total estimated fee of [total fee].

Fee for Item E: [itemized by LPA or Consultant].

Reimbursable Expenses for specialty access equipment are estimated below:

Fees for equipment not identified below will not be considered as qualifying reimbursable expenses.

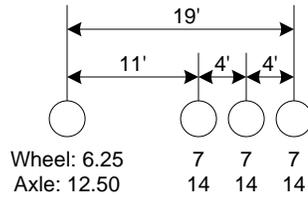
1. [Equipment] at [estimated fee/unit] for a total estimated fee of [total fee].
2. [Equipment] at [estimated fee/unit] for a total estimated fee of [total fee].
3. [Equipment] at [estimated fee/unit] for a total estimated fee of [total fee].

IOWA LEGAL TRUCKS DIAGRAMS

Typical Iowa Legal Truck Types
 (Wheel and axle loads are shown in Kips)

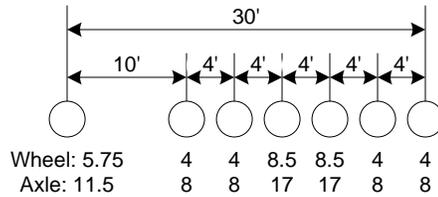
Straight Truck (Type 4)

Total Weight = 54.5 Kips (27.25 Tons)



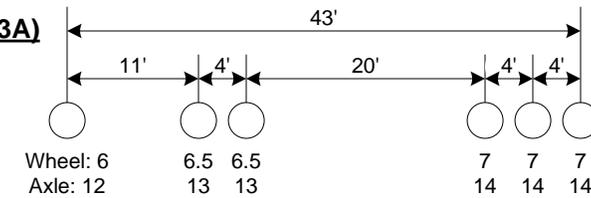
Truck (SU7)

Total Weight = 77.5 Kips (38.75 Tons)



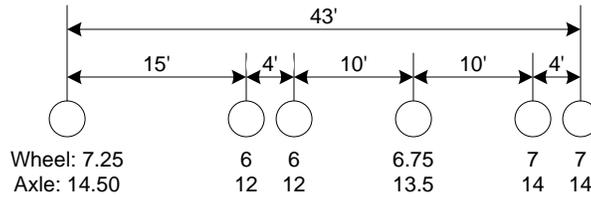
Truck + Semi-trailer (Type 3S3A)

Total Weight = 80 Kips (40 Tons)



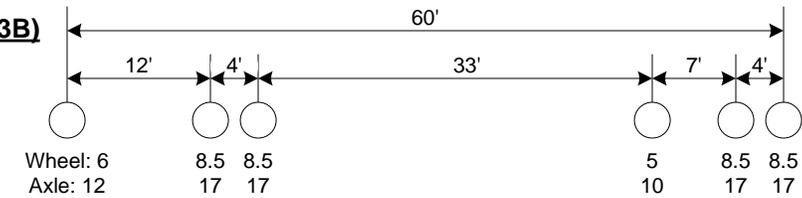
Truck + Trailer (Type 3-3)

Total Weight = 80 Kips (40 Tons)



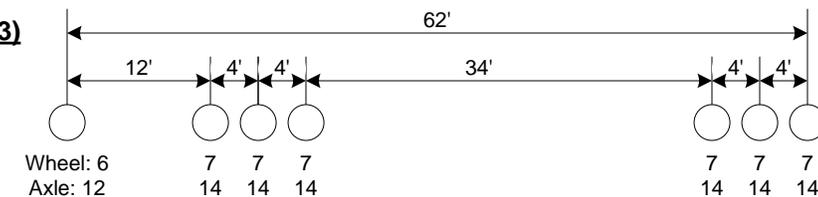
Truck + Semi-trailer (Type 3S3B)

Total Weight = 90 Kips (45 Tons)



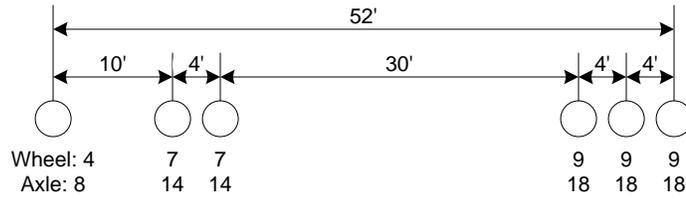
Truck + Semi-trailer (Type 4S3)

Total Weight = 96 Kips (48 Tons)

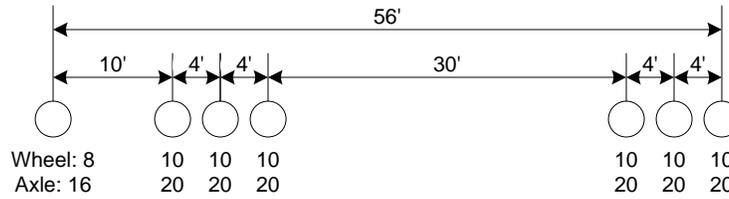


ROUTINE PERMIT TRUCKS DIAGRAMS
 (Wheel and axle loads are shown in Kips)

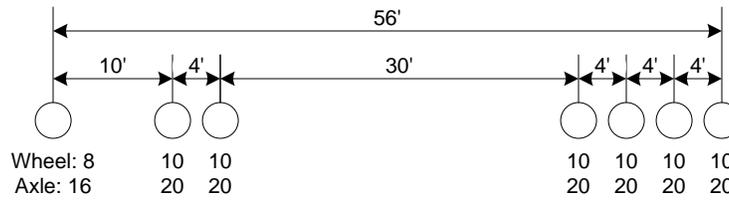
Truck (3 axle)
 Total Weight = 90 Kips (45 Tons)



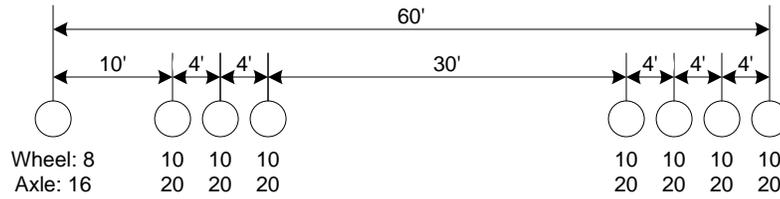
Truck (3 axle)
 Total Weight = 136 Kips (68 Tons)



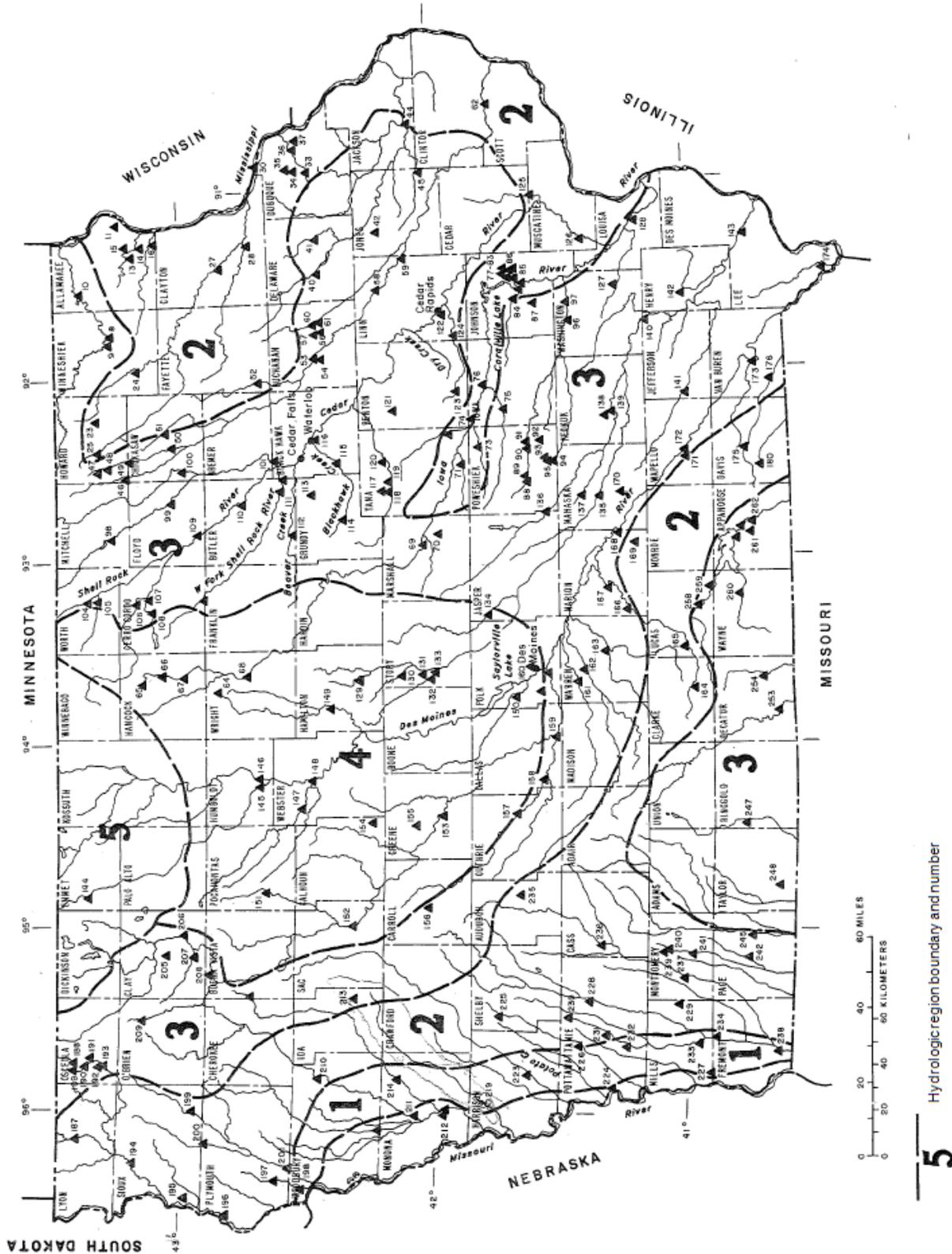
Truck (4 axle)
 Total Weight = 136 Kips (68 Tons)



Truck (4 axle)
 Total Weight = 156 Kips (78 Tons)



USGS Hydrologic Region Map with Region Descriptions



5 Hydrologic region boundary and number

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.

UNKNOWN FOUNDATIONS GUIDANCE - LEVEL A EVALUATION

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:

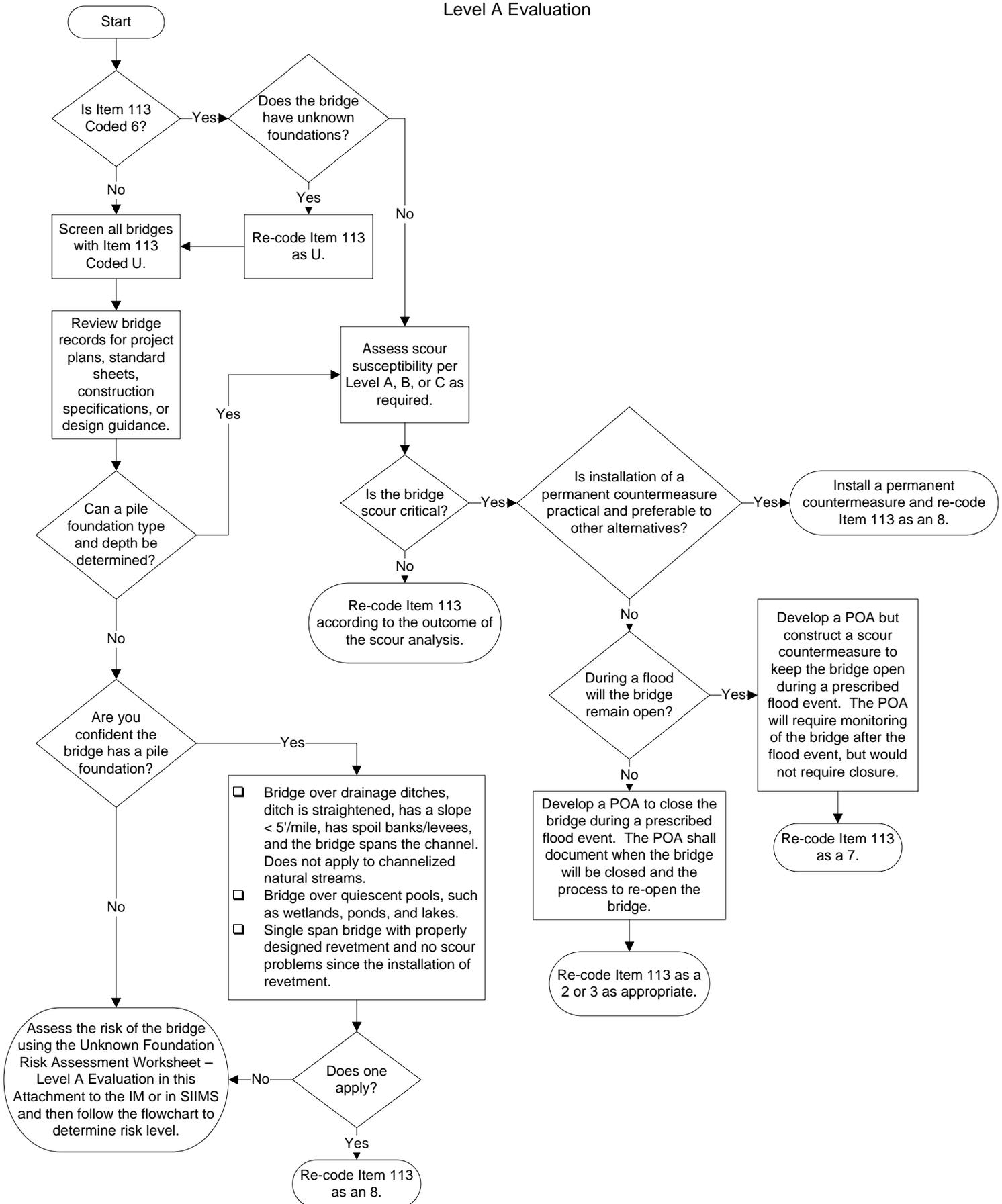
Coordinate a global action plan for all bridges with Item 113, Scour Critical, coded U within a LPA, whether assessed through this guidance or not. The plan should:

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

Level A Evaluation



Abbreviations:
POA = Plan of Action

Intentionally left blank

UNKNOWN FOUNDATION RISK ASSESSMENT WORKSHEET - LEVEL A EVALUATION

Name: _____ Date: _____

Bridge ID: _____ County / City: _____

FHWA No.: _____ ADT: _____

Main Span Materials & Design (Item 43): _____

Location: _____

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 "Moderate" risk, and greater than or equal to 30 points can be considered "High" risk.

	<u>POINTS</u>	<u>POINTS</u>
		<u>GIVEN</u>
1. Superstructure type:		
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:		
A. 7 to 9	1	
B. 5 or 6	2	
C. 1 to 4	3	_____
3. Item 61, Channel/Channel Protection coding:		
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 ([Attachment G](#) to this I.M.) and the drainage for each structure in conjunction with the following guidelines to determine whether a bridge is "Low", "Moderate", 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.

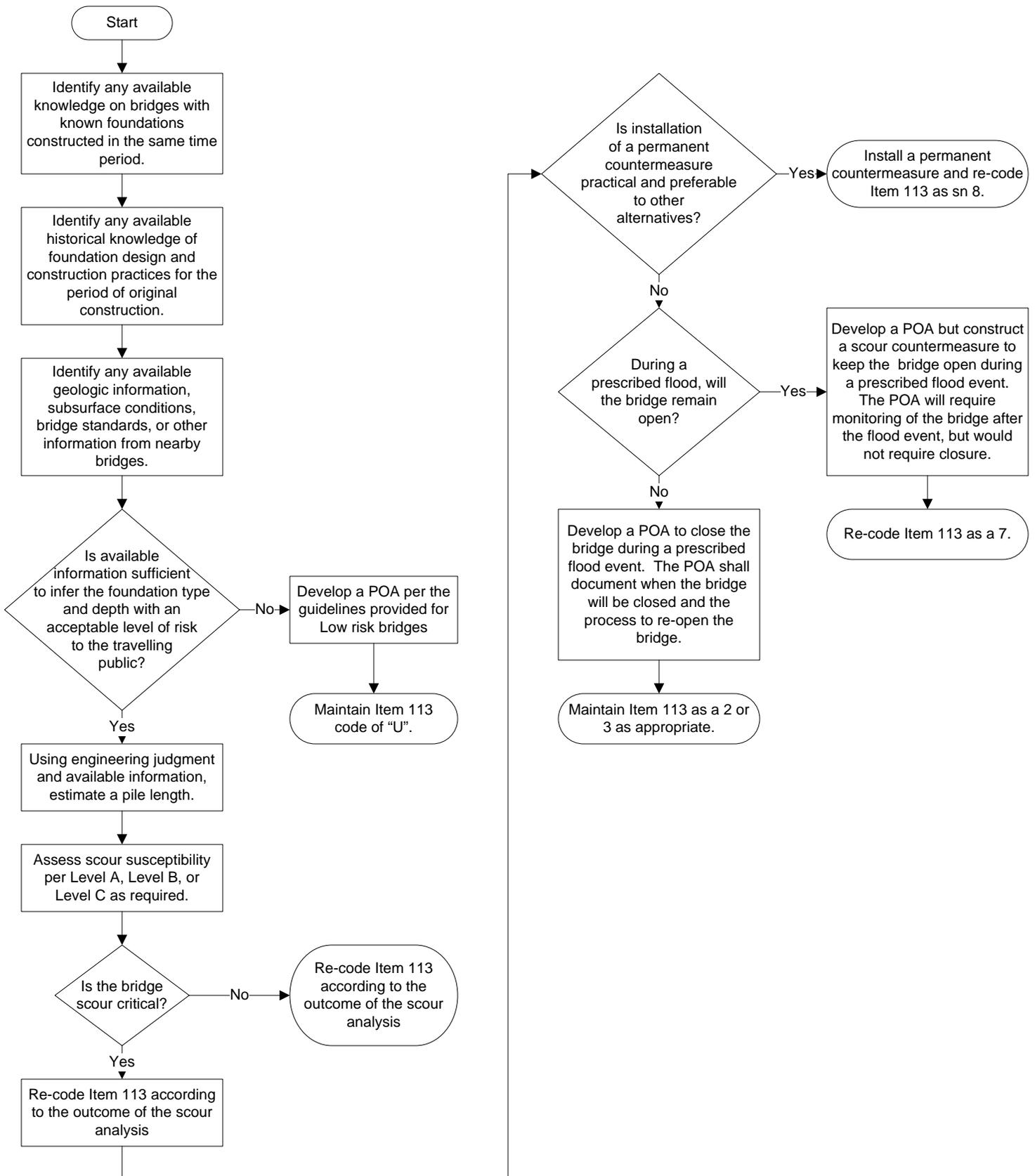
A. Hydrologic Region 1		
1) < 5 square miles	2	
2) 5 to 30 square miles	4	
3) > 30 square miles	6	_____
B. Hydrologic Region 2		
1) < 15 square miles	2	
2) 15 to 100 square miles	4	
3) > 100 square miles	6	_____
C. Hydrologic Region 3		
1) < 30 square miles	2	
2) 30 to 225 square miles	4	
3) > 225 square 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:

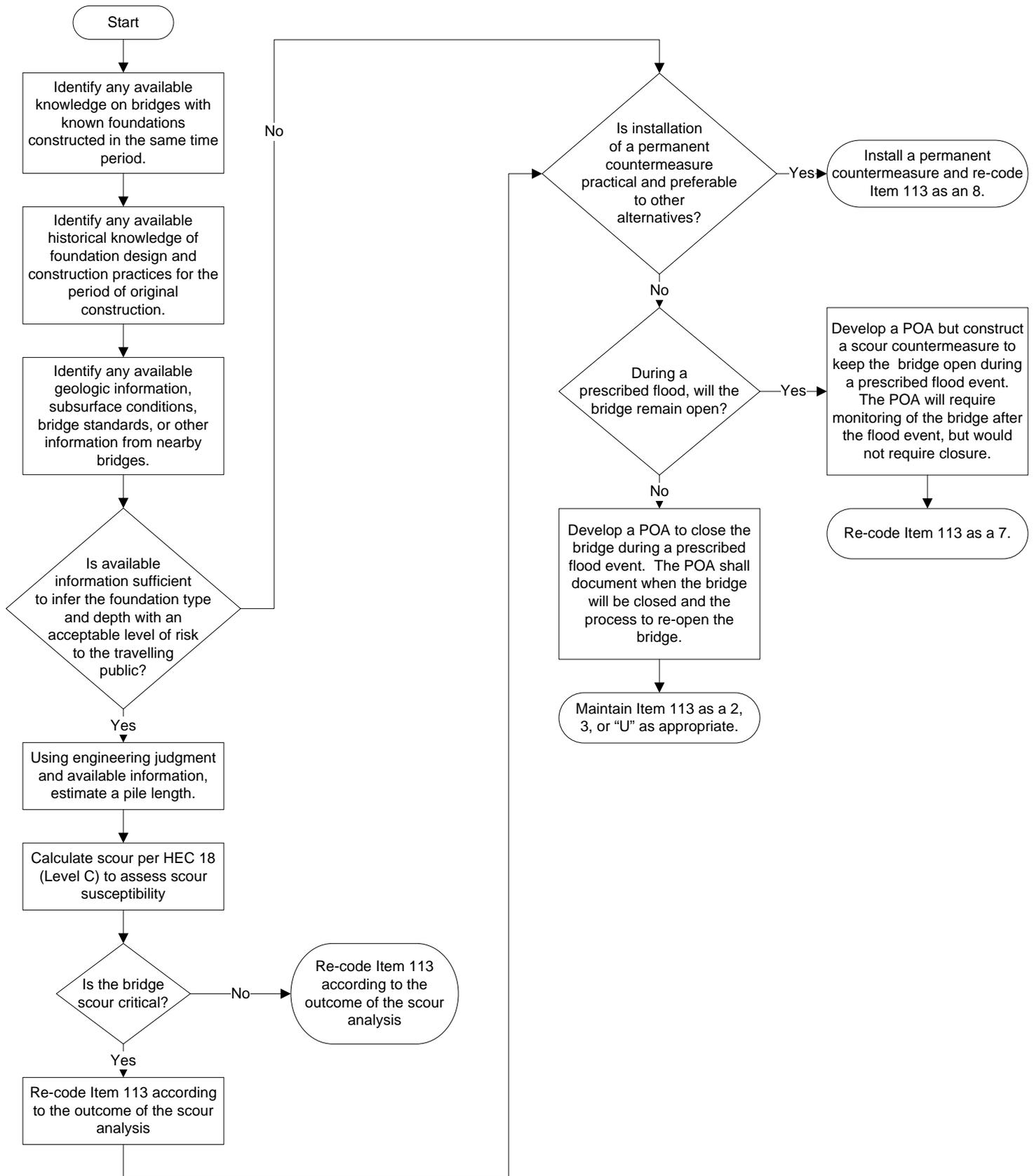
Structures determined to have "Moderate" or "High" risk unknown foundations based on the Risk Assessment Total above, may utilize the Unknown Foundations Assessment Flowchart - Level B Evaluation (Attachment I to this I.M.) to determine if the category of risk can be reduced.

UNKNOWN FOUNDATIONS LOW RISK FLOWCHART



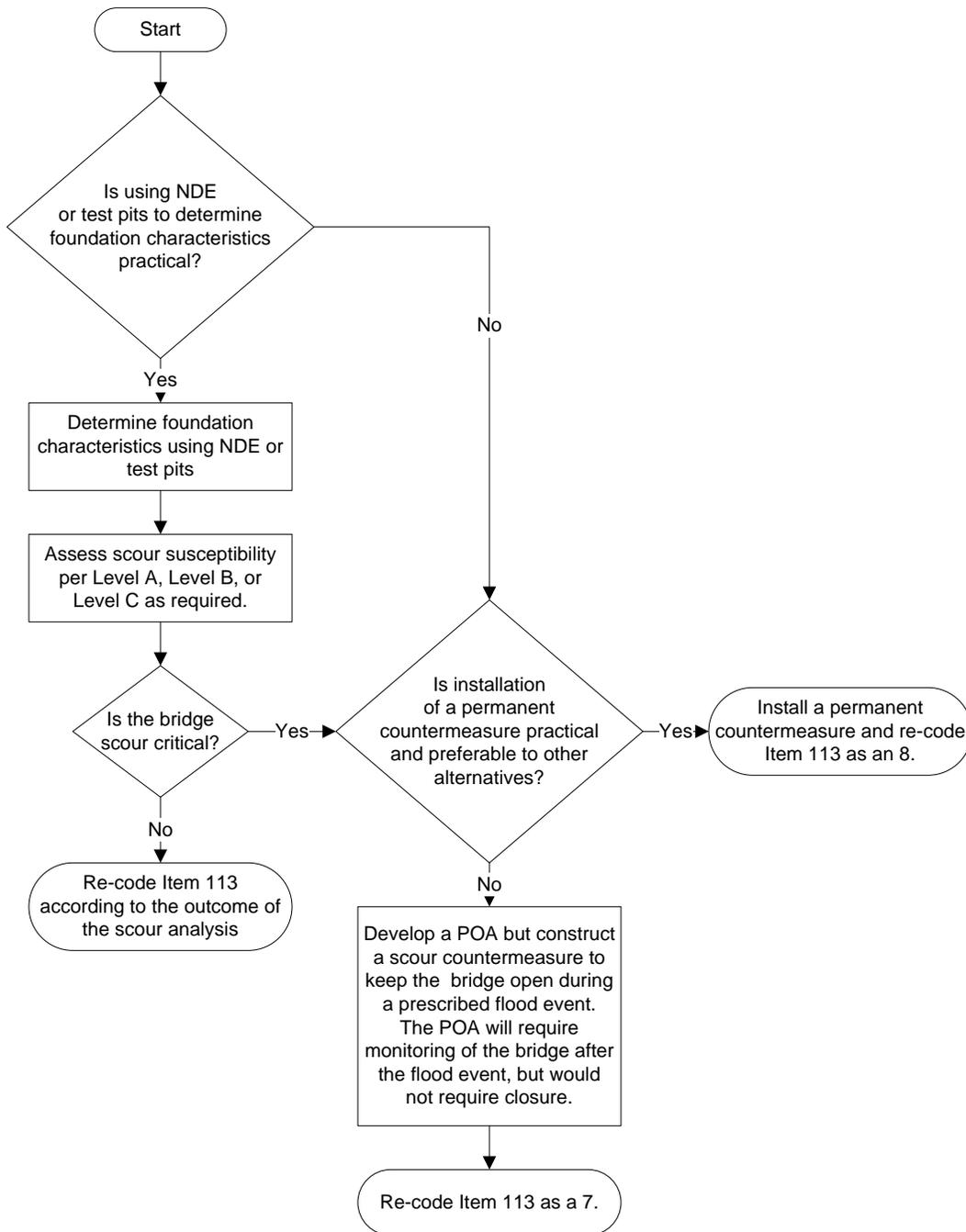
Abbreviations:
POA = Plan of Action

UNKNOWN FOUNDATIONS MODERATE RISK FLOWCHART

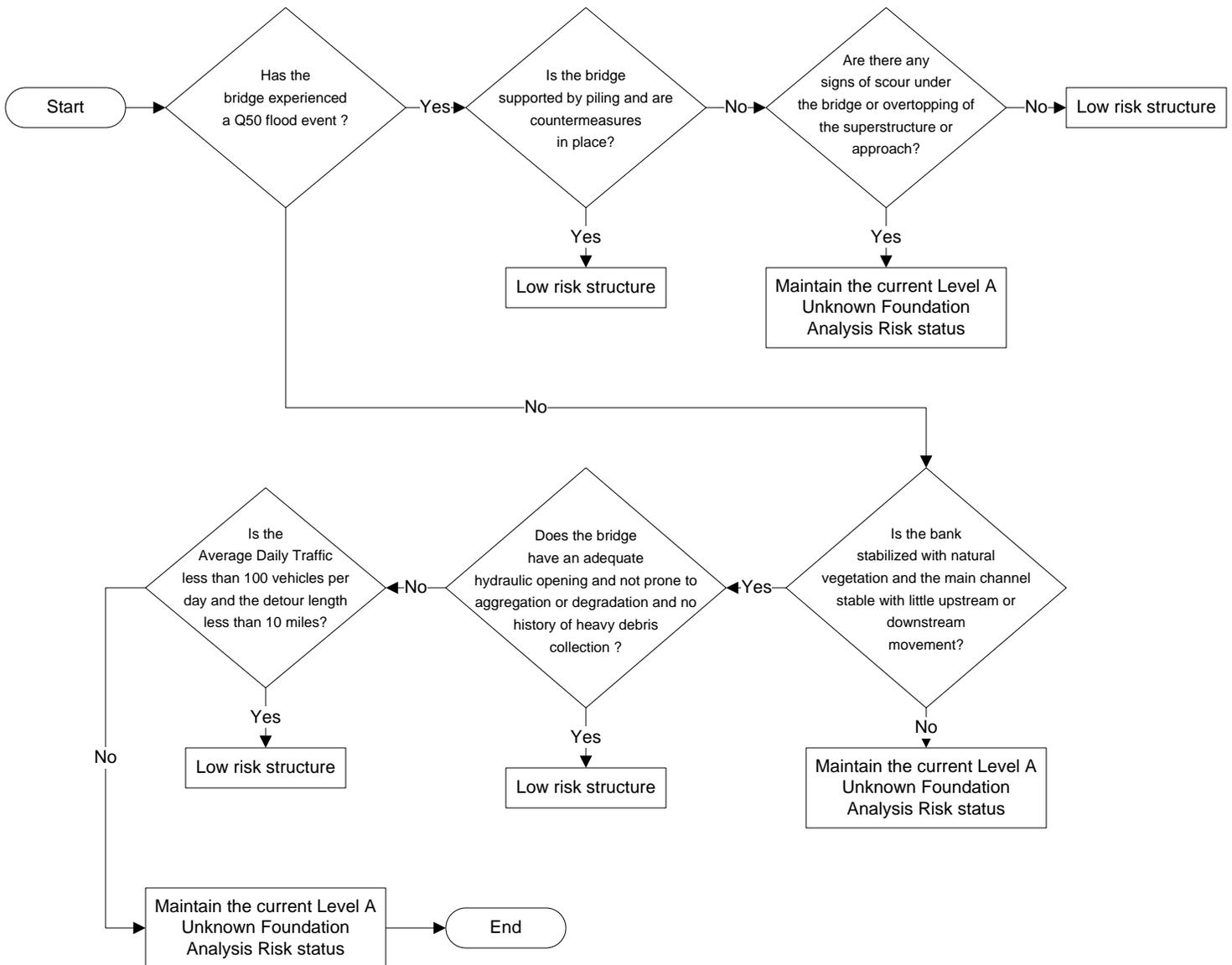


Abbreviations:
 POA = Plan of Action

UNKNOWN FOUNDATIONS HIGH RISK FLOWCHART



UNKNOWN FOUNDATION ASSESSMENT FLOWCHART Level B Evaluation



Abbreviations / Acronyms:

Admin. Office = Administering Office
FHWA = Federal Highway Administration
LPA = Local Public Agency

Notes:

1)

QUALITY ASSURANCE FIELD REVIEW WORKSHEET

Reviewer: _____ Review Date: _____

Agency: _____

Program Manager: _____ *Team Leader: _____

**Team Members: _____

Bridge ID: _____ County / City: _____

FHWA No.: _____ Stream: _____

Main Span Materials & Design (Item 43): _____

Location: _____

* (Required to be present at 2 reviews)

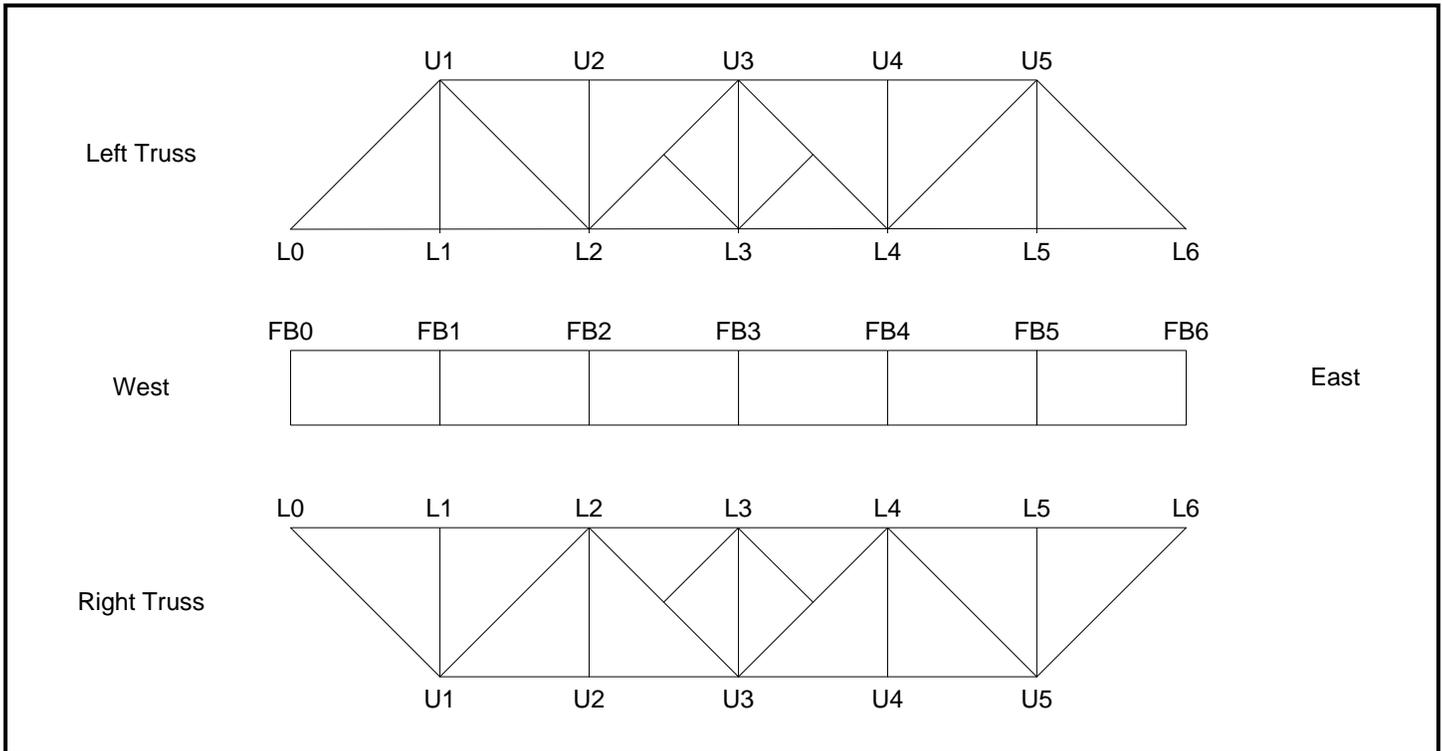
** (Not required to be present)

	<u>No</u>	<u>Yes</u>
1. Is this a Fracture Critical Bridge? If "Yes", are the Fracture Critical Elements identified in the inspection documentation?	_____	_____
2. Are all necessary inspection forms completed fully and accurately in SIMMS?	_____	_____
3. Are the condition ratings, comparable between the inspector and reviewer (+/- 1 condition rating)? "Y" for Yes, "N" for No.	_____	_____
Item 58, Deck: Previous rating: _____ Inspector: _____ Reviewer: _____		
Item 59, Superstructure: Previous rating: _____ Inspector: _____ Reviewer: _____		
Item 60, Substructure: Previous rating: _____ Inspector: _____ Reviewer: _____		
Item 61, Channel and Channel Protection: Previous rating: _____ Inspector: _____ Reviewer: _____		
Item 62, Culvert: Previous rating: _____ Inspector: _____ Reviewer: _____		
4. Does the bridge posting condition at the bridge match the condition coding in Item 41, Posting Status?	_____	_____
5. Were appropriate sketches, notes, and photos from previous inspections used for preparing the inspection documentation?	_____	_____
6. Was an underwater inspection required during this inspection? If "Yes", was the underwater inspection properly documented?	_____	_____

Review comments: _____

Sample Fracture Critical Member Locations and Condition for Trusses

County: Adair FHWA No.: 012345 County ID: Prescott 13 Insp. Date: 7/18/2013



Span	Member Location	FC Member?	Comment #'s Left Truss	Comment #'s Right Truss	Inspection Procedure Required	Inspection Procedure Used
1	L0-U1		2	2		
1	L0-L1	Y	1	1	Hands-on	Hands-on
1	U1-L1	Y	1, 8	1, 8, 5	Hands-on	Hands-on
1	U1-U2		2	2		
1	U1-L2	Y	1, 4	1, 4	Hands-on	Hands-on
1	L1-L2	Y	2	6	Hands-on	Mag-Partical
1	U2-L2	Y	2, 8	2, 8	Hands-on	Hands-on
1	U2-U3		2, 7	2, 7		
1	L2-U3		1	1, 4		
1	Brace at L2-U3		2	2		
1	L2-L3	Y	1, 5	1, 9	Hands-on	Dye Penetrant
1	U3-L3	Y	2, 8	2, 8	Hands-on	Hands-on
1	U3-U4		2, 7	1		
1	U3-L4		1, 4	1, 4		
1	Brace at U3-L4		2	2		
1	L3-L4	Y	2, 5	1, 9	Hands-on	Ultrasonic
1	U4-L4	Y	2, 3, 6	2, 8	Hands-on	Hands-on
1	U4-U5		2	2		
1	L4-U5	Y	1, 4	1	Hands-on	Hands-on
1	L4-L5	Y	2	2	Hands-on	Hands-on
1	U5-L5	Y	1, 3	2, 8	Hands-on	Hands-on
1	U5-L6		2	2		
1	L5-L6	Y	1	2	Hands-on	Hands-on

Code	Comment
1	No notable deficiencies.
2	Light damage.
3	Moderate damage.
4	Gusset plates damaged when torch was used to cut rivets when truss was moved.
5	Splice plates on top & bottom flanges not bolted at L3.

Code	Comment
6	Weld between the vertical & railing spacer bar cracked.
7	Channels damaged when torch was used to cut rivets when truss was moved.
8	Spacer blocks welded to vertical, welds across direction of the stress.
9	Interior splice plate top channel flange missing at L3.

INSTRUCTIONAL MEMORANDUMS

To Local Public Agencies



To: Counties and Cities	Date: July 18, 2013
From: Office of Local Systems	I.M. No. 3.213
Subject: Traffic Barriers (Guardrail and Bridge Rail)	

Contents: This Instructional Memorandum (I.M.) provides guidelines for determining the need for traffic barriers at roadway bridges and culverts. This I.M. also provides guidelines for upgrading bridge barrier rails. This I.M. includes the following attachments:

[Attachment A](#) - Bridge Barrier Rail Rating System ([Word](#))

Other obstructions, within the right-of-way and clear zone, should be reviewed for removal, relocation, or installation of a traffic barrier; or the “do nothing” option based on a cost-effectiveness approach. Refer to [I.M. 3.215](#), Clear Zone Guidelines.

APPROACH GUARDRAIL

In general, approach guardrail should be installed at the following:

1. On newly constructed bridges on the Farm-to-Market system, guardrail should be installed on all 4 corners; except bridges located within an established speed zone of 35 mph or less.
2. On Federal-aid bridges constructed or rehabilitated on rural local roadways, guardrail should be installed on the approach corner in both directions (right side in each direction); except bridges located within an established speed zone of 35 mph or less. Consideration should be given to shielding the trailing corner (left side in each direction) if it is located on the outside edge of a curve. Approach guardrail shall also be upgraded when bridge barrier rail is upgraded.
3. On 3R projects on the Farm-to-Market System, all four corners within the project limits. Existing W-beam installations that are flared and anchored at both ends may be used as constructed without upgrading to current standards.
4. Culverts with spans greater than 6 feet (circular pipe culverts greater than 72 inches in diameter), if it is impractical to extend beyond the clear zone and grates are not utilized.

The FHWA will participate in guardrail, including at all four corners of a bridge, if desired by the county.

Design Exceptions

Design exceptions (refer to [I.M. 3.218](#), Design Exception Process) to not install guardrail at bridges or culverts will be considered if all of the following conditions exist:

1. Current average daily traffic (ADT) at structure is less than 400 vehicles per day.
2. Structure width is 24 feet or greater.
3. Structure is on tangent alignment.
4. Benefit/cost Ratio is less than 0.80.
5. Bridge width is wider than the approach roadway width.

Design exceptions are also possible for guardrail installations that may not be considered crashworthy. For example, standard approach guardrail may not be feasible for a structure located in close proximity to an intersection or entrance, so the guardrail may need to be curved around the radius. Depending on the radius, such an installation might not be considered crashworthy. However, compared to placing a crash cushion or doing nothing, curving the guardrail around the radius may provide the best compromise of cost and safety..

Work with the appropriate Administering Office for more guidance on these issues.

BRIDGE BARRIER RAIL

On newly constructed bridges, the bridge barrier rail shall be constructed to the current acceptable standards (includes SL-1 type rail on structures with less than 1000 vpd).

On Federal-aid bridge rehabilitation projects involving the superstructure, any substandard bridge barrier rail, as well as approach guardrail, shall be upgraded. For Federal-aid bridge rehabilitation projects that do not involve the superstructure, it is strongly recommended that the bridge barrier rail, as well as approach guardrail, be upgraded to the current acceptable standards.

Bridge barrier rail that is coded 0 on Item 36A, Bridge Railings, on the SI&A form of the National Bridge Inspection Standards (NBIS), does not meet current acceptable standards and shall be reviewed for upgrading as part of the 3R projects. Use the "Bridge Barrier Rail Rating System", see Attachment A to this I.M., to assist in determining if a bridge barrier rail should be upgraded with the 3R project and to what extent it should be upgraded. Any bridge which is programmed in the County Five Year Plan for replacement or rehabilitation may not require upgrading as part of the 3R roadway project.

The Bridge Barrier Rail Rating System assigns points to five factors (Crashes, ADT, Width, Length and Type of bridge rail). The sum of these factors will indicate the degree or amount of upgrading required, if any. The crash factor involves crashes (property damage only, personal injury, and fatality) in the last 5 years. The types of bridge barrier rail are from various county bridge standards. If the existing bridge barrier rail is not an old standard, then determine which type it is similar to and assign the corresponding points.

Consideration should be given to extending the guardrail through the bridge on short bridges or bridges which have no end posts. This may be less costly than attaching the guardrail as per the Iowa DOT Standard Road Plans or constructing an end post.

BRIDGE BARRIER RAIL RATING SYSTEM

Name: _____ Date: _____

Bridge ID: _____ County / City: _____

FHWA No.: _____ ADT: _____

Main Span Materials & Design (Item 43): _____

Location: _____

An upgrade to the bridge barrier rails is not required when the "Total Points" are under 25. The following is a list of the required upgrade to the bridge barrier rails relative to the "Total Points":

- 25 - 50 Points - delineation according to Iowa DOT Standard Road Plans
- 51 - 75 Points - block out with Thrie-Beam to curb edge
- > 75 Points - retrofit

	<u>POINTS</u>	<u>POINTS GIVEN</u>
1. Crashes (in the past 5 years):		
A. None	0	
B. 1 Property Damage Only (PDO)	5	
C. 1 Personal Injury (PI)	10	
D. 1 Fatality (F), 2 PDO, or 1 PI and 1 PDO	15	
E. ≥ 2 F, ≥ 2 PI, or ≥ 3 PDO	20	_____
2. ADT (current year):		
A. <200	0	
B. 200-299	5	
C. 300-399	10	
D. 400-750	15	
E. >750	20	_____
3. Bridge width (curb-to-curb) (feet):		
A. ≥ 30	0	
B. 28	5	
C. 24	10	
D. 22	15	
E. ≤ 20	20	_____
4. Bridge Length (feet):		
A. <50	0	
B. 50-99	5	
C. 100-149	10	
D. 150-200	15	
E. > 200	20	_____
5. Type:		
A. Aluminum Rail (1967 Standard)	0	
B. Steel Box Rail (1964 Standard)	5	
C. Formed Steel Beam Rail (1951 or 1957 Standards)	10	
D. Steel Rail (1941 Standard) or Concrete Rail (1928 Standard)	15	
E. Angle Handrail (1928 Standard)	20	_____

Total Points = _____

