APPENDIX E

Instructions for Completing Form 1-E and Risk Assessment Form

Instructions for Completing Form 1-E:

A sample Form 1-E is shown on pages E-5 and E-6 of this appendix. The Form 1-E is required only for structures with a total span of 20 feet or greater. However, submittal of Form 1-E is recommended for all structures that require a hydraulic review in order to speed up the review process. Form 1-E is available on the internet in either Adobe Acrobat (PDF) format or Microsoft Word fillable format.

Line #1---Location Indicate the location within the section where the bridge or culvert is located. For example: "SW ¼ of NE ¼ of Section 12."

Line #3---Project number The appropriate District Office will assign project numbers to structures to be let in Ames with farm-to-market or federal funds. If the project will be let locally, it is important for you to assign a project number (up to seven digits) because we need it for internal accounting purposes.

Line #5---Extreme high water This is an actual known elevation, not a calculated elevation such as in Line #29 for "Design high water." Accurate information here is very important. On existing bridges, the downstream high water marks are more usable than high water marks on a pier or upstream from the bridge. Pier high water marks are effected by draw down. Upstream high water marks are effected by backwater caused by the present bridge. However, all are helpful in designing a new bridge.

A copy of the Iowa Department of Natural Resources' "Instructions for Setting High Water Marks" is attached as Appendix G for your information and use. This is an old instruction but the method is valid today. If possible, you should have a high water mark at or near the typical valley section you use for designing your bridge opening. This information allows us to determine how the present structure performed during extreme floods and helps determine the bridge opening that will be needed.

Line #6---Ordinary high water "Ordinary high water" on Form 1-E really means a typical high water that happens every year or two and no more often than every five years. Do not use long interval flood data here, such as a 50-year flood. Also, Line #6 should not be confused with the "Ordinary High Water" that is calculated for 404 Permits as discussed in I.M. 3.13. These are completely different uses of the same term, so do not confuse them.

Line #7---Average low water Stream slope is more accurately determined using low water shots than using stream bed shots. Stream bed shots may contain blow holes and humps that can considerably distort the value. These holes and humps can be so gradual that they are not apparent until the survey information is plotted.

Give the plan data if the stream is in a Drainage District and the last clean-out plans are available.

Line #8---Buildings in the floodplain This information is important especially if design high water elevation will be increased due to raising the road grade or reducing the hydraulic opening of the structure.

Line #12 and #13---Ice and debris Potential for ice or debris in the stream may result in stronger piers than would otherwise be needed. In general, P-10 pile bent piers may be used in most of the bridges below 100 square mile drainage area. If ice and debris is a problem, stronger piers may be needed on even a much smaller drainage area. Bridges draining more than 100 square miles will generally need a stronger pier than the P-10 type. That could be a fully-encased P-10 pier or a river tee pier.

Line #29 and #30---Design high water & road grade overflow Do not confuse design high water and extreme high water. Design high water is determined by taking a calculated flood discharge such as a Q_{25} and then using PCVAL or WSPRO to develop the water surface elevation. Extreme high water is an actual high water elevation obtained from sources such as maintenance records or residents who have lived near the bridge site for many years.

Less important roads can be designed to pass a smaller and more frequent flood by allowing road grade overflow. Where the structure is over a large stream or over a stream where drift or ice could be a problem, adequate clearance for the bridge should be provided even though the approaches are over-topped by a relatively small flood. Bridges over these large streams should have clearance above the 50-year flood and, in most cases, should be above the extreme high water. Overflow bridges can be set with the low superstructure one foot above the design high water.

Road grade overflow as a design means of allowing shorter bridges becomes more attractive as road funds dwindle. The practicality of road grade overflow is an option that the engineer must evaluate. If road grade overflow is used, the plans should be so noted. This will help guard against a future grade raise without reanalyzing the hydraulics of the crossing.

See the section titled, "Design Guidelines" in I.M. 3.131 for detailed discussion of the selection of design floods and clearances.

Line #32---Wing dikes Use wing dikes on all bridges with significant overbank flows. It is much better to have the end of a wing dike erode away than have the bridge berm damaged. See Appendix H for wing dike details.

Line #34---Traffic count Since the county or city will have the most recent and accurate traffic information, please fill this out.

Back of Form I-E Completing the "Valley Cross Section Data" on the back side of this form is very important and should be completed as accurately as possible. Always list the location of the valley section under the "Remarks" section on the back side. Read the instructions on taking a

valley section. This information can also be furnished on the printout from hydraulic software such as WSPRO, HEC-2, HEC-RAS, HYCLV, etc.

Instructions for Completing Risk Assessment for Bridges (Culverts) (Form 517002):

A sample Risk Assessment form is shown on pages E-7 and E-8 of this appendix. The Risk Assessment for Bridges (Culverts) (Form 517002) is available on the internet in either Adobe Acrobat (PDF) format or Microsoft Word fillable format.

1. Hydrologic Evaluation

A. Check USGS Water Resources Data.
B. Check Flood Insurance Studies, USGS reports, Corps of Engineer projects, etc.
C. Estimate backwater for each (method used is optional). The backwater estimates should be based on the recommended structure. Method used to compute discharge is normally USGS Report 00-4233 or gaging station data if a gaging station is near the site.
D. For example, Iowa DNR Floodplain Development Permit, or Corps 404 Permit.

2. Property Related Evaluations

A. Low damage potential - no buildings.
Moderate damage potential - outbuildings.
High damage potential - residential/industrial.
B. For Flood Insurance Studies, all the information should be in the study. Call Iowa DNR for additional information.

3. Environmental Considerations

A. Check the Concept Statement and the appropriate environmental documents.

4. Highway and Bridge (Culvert) Related Evaluations

A. Check appropriate features if any.
B. Identify recurrence interval at over-topping (proposed road grade) if less than 500 year.

5. Miscellaneous Comments

A-E. Self explanatory.
F. Sample comments: Bank stabilization may be required in the future - not recommended at this time. Riprap on spur dikes not recommended on this project.

6. Traffic Related Evaluations

A-C. Self explanatory.
D. Detour - If the road (structure) washed out, what is the length of the posted detour route?

7. Present Facility

A. Self explanatory.
B. At what discharge and recurrence interval does the existing road overtop?
C. Self explanatory. Most streams draining less than 1300 sq. kilometers are subject to flash flooding.

8. Alternatives

A. Self explanatory.
B. Self explanatory.
Discussion: If other alternatives were considered (e.g., longer bridge or shorter bridge or culvert), state in a general way and give reason for rejection.

Examples: A culvert was considered but was rejected because of drift potential. A longer bridge was considered but was not necessary hydraulically and was too costly.

C. For most sites, further analysis would not be necessary.