Federal Emergency Management Agency

Washington, D.C. 20472

October 19, 2000

MEMORANDUM FOR: Doug Bellomo, P.E., Project Officer
Eastern Studies Team

Bill Blanton, Project Officer
Central Studies Team

Mike Grimm, Project Officer
Western Studies Team

[Original Signed]

FROM: Matthew B. Miller, P.E., Chief
Hazards Study Branch

SUBJECT: Procedure Memorandum No. 16 – Use of HEC-RAS Version 2.2

Background: The U.S. Army Corps of Engineers (USACE) released HEC-RAS Version 2.2 in late 1998. The changes and improvements in the model can result in significant differences in water surface elevation computations when compared to previous versions of the model, especially in the analysis of bridges and culverts. Attached to this memorandum is a February 8, 2000, memorandum that provides direction on the implementation of the new version.

Issue: Improper use of previous versions of HEC-RAS or improper conversions to Version 2.2 could cause significant processing delays and additional costs in Flood Insurance Study/Restudies and map revision requests.

Final Procedure: Ensure that all applicable requirements for in-house processing of Letter of Map Change requests and Flood Insurance Studies/Restudies are followed as explained in the attached February 8, 2000, memo. Also ensure that all newly contracted studies and restudies utilize Version 2.2 of HEC-RAS as appropriate.

In addition, USACE released a software patch in March 1999 to update the portion of the Version 2.2 that performs the steady flow water-surface profile calculations (SNET) to Version 2.2.1. It is worth noting that, although the patch does update SNET to Version 2.2.1, the version of HEC-RAS remains 2.2. For more information regarding this patch as well as the HEC-RAS program, please visit the USACE Hydrologic Engineering Center's Web site at www.hec.usace.army.mil.

Attachments

cc: See Attached Distribution List

Federal Emergency Management Agency

Washington, D.C. 20472

February 8, 2000

MEMORANDUM FOR: Regional Mitigation Division Directors
Technical Services Division Staff
(See attached distribution list)

[Original signed]

FROM: Michael K. Buckley, P.E., Director
Technical Services Division

SUBJECT: Implementation of HEC-RAS Version 2.2 for NFIP Mapping

The U.S. Army Corps of Engineers released a new version of their hydraulic computer model, HEC-RAS, Version 2.2, in September 1998. The changes and improvements that have been made to this new version are significant. This memorandum outlines the procedures to follow for implementing HEC-RAS Version 2.2 for flood hazard mapping in the National Flood Insurance Program (NFIP). Please note that the accepted models list entitled, "Numerical Models Accepted for NFIP Usage," has been revised to include this version of HEC-RAS.

Summary of Changes in HEC-RAS Version 2.2

The attached document, "HEC-RAS Version 2.2, September Release Notes," outlines the modifications that have been made to this version of the model. The most significant changes are the corrections in bridge and culvert modeling. The previous versions of HEC-RAS incorrectly calculated conveyance through bridges and culverts in pressure flow situations. Specifically, the problems occurred in the momentum equation calculations for bridge analysis and in distinguishing between inlet and outlet control situations for culvert analysis. In general, culverts analyzed with HEC-RAS Version 2.2 under pressure flow will show lower water-surface elevations than previous versions of the model. However, bridges analyzed with Version 2.2 under pressure flow generally show higher water-surface elevations using this version compared to previous versions of the model. The differences in water-surface elevations can be as much as several feet in some instances.

Because of the potential magnitude of the water-surface elevation differences between the versions of HEC-RAS, we request that all entities involved in flood map production begin using Version 2.2 as soon as possible, if they are not already doing so. The following sections outline the procedures to be followed for using HEC-RAS Version 2.2 for all map change requests and Flood Insurance Studies (FISs) in the NFIP flood hazard mapping program.

Procedure for Map Revision and Amendment Requests

Effective immediately, all new map revision and map amendment cases using HEC-RAS will be required to use Version 2.2. For cases that are currently in-house that use previous versions of HEC-RAS, the Technical Evaluation Contractors/Map Coordination Contractors (TECs/MCCs) should rerun the model using Version 2.2 and assess the differences in water-surface elevation. Significant differences, i.e., greater than 0.5 foot, should be remapped to show the correct elevations reported in the Version 2.2 run.

Procedure for Pre-Preliminary Studies (at TECs/MCCs)

For all studies the TECs/MCCs have in-house, the models should be rerun and the differences in water-surface elevation should be assessed. Water-surface elevation differences greater than 0.5 foot and the impacts to the mapping should be brought to the National Office Project Engineer's attention during a regular monitoring visit. At that time, options will be discussed and an estimate should be provided for the required work necessary to correct the mapping to correspond to the Version 2.2 results. Decisions on remapping would be made on a case-by-case basis, with coordination between the FEMA National Office Project Engineers and Regional Engineers.

Procedure for Post-Preliminary Studies (at TECs/MCCs)

At this time, no efforts should be taken to rerun the models for FISs where Preliminary maps have been issued based on previous versions of HEC-RAS.

Procedure for On-Going Studies

For all contracted FISs that have not yet been delivered to the TEC/MCC for processing, the Regional Engineers (Project Officers) should immediately contact their Study Contractors who are performing hydraulic analyses with HEC-RAS and request that they use version 2.2 for the study. All hydraulic models and mapping should be updated prior to delivery to the TEC/MCC.

I trust that this adequately explains the procedures to be taken in utilizing HEC-RAS version 2.2 for NFIP mapping. If you have any questions regarding this matter, please feel free to contact Ms. Sally Magee of our National Office staff at (202) 646-8242, or by e-mail at sally.magee@fema.gov.

Distribution List

FEMA Technical Services Division (electronic distribution only)

- Mike Buckley
- Matthew B. Miller
- Frederick H. Sharrocks Jr.
- Doug Bellomo
- Mike Grimm
- Phil Myers
- Bill Blanton
- John Magnotti
- Mark Crowell
- Sally Magee
- Katie Hayden
- Max Yuan
- John Gambel
- Helen Cohn
- Cynthia Croxdale
- Agnes De Coca
- Anne Flowers
- Cecilia Lynch
- Kathy Miller
- Jay Scruggs

Federal Insurance Administration

- Joe Coughlin

Program Assessment and Outreach Division

- Donna Dannels

Program Support Division

- Bob Shea
- Bill Lesser

FEMA Regional Offices

- Kevin Merli, Region I
- Michael Dabney, Region II
- Thomas Majusiak, Region III
- A. Todd Davison, Region IV
- Stuart Rifkind, Region V
- Frank Pagano, Region VI
- Bob Bissell, Region VII
- Steve Olsen, Region VIII
- Sally Ziolkowski, Region IX
- Carl Cook, Region X

Mapping Assistance and Coordination Contractors

- Zekrollah Momeni (Dewberry & Davis)
- Albert Romano (Baker Engineers)
- Vince DiCamillo (PBS&J)