CHAPTER 6

Researching and Evaluating Existing Models

6.1 Purpose

When planning to use computer modeling as the basis for a hydrologic-hydraulic assessment, prudence suggests searching for existing models. Computer model input, output, and documentation may already exist that can be used as is or modified rather than developing an entirely new model and incurring the associated expense to do so. Existing models have been developed for various reasons and at various levels of detail and quality. Therefore, this chapter offers suggestions on potential existing model sources and evaluation of model suitability.

6.2 Searching for Existing Models

Many sources can be searched for existing models. Determination and acceptance of the accuracy and applicability of existing models obtained from any source is, however, the responsibility of the modeler.

Possible sources of models include:

- **Flood Insurance Study (FIS) Models:** If BFEs are published for a stream in a FIS, they are almost always based on hydraulic modeling. Refer to the FIS narrative to confirm that a model was used. The majority of FIS models are available from FEMA or from the IDNR – Division of Water. Contact the IDNR first because that state agency may have digital copies of the FIS models while FEMA only has hard copies. IDNR files also include backup information for many of the models.

  Many streams were included as Zone As in FISs. Most were modeled by approximate methods with HEC-RAS models developed. These models generally used the 2005 LiDar terrain, StreamStats discharges, and did not include bridges. They did not therefore meet the standards of a detailed study so should be used with caution.

- **Construction in a Floodway Permit Models**: These models have been submitted to the IDNR as supporting justification for the approval of an application for Construction in a Floodway based on IC 14-28-1. However, some projects may have been exempted from modeling requirements and therefore the models may not have been evaluated.

Regardless of whether or not the application was approved, these models may be available from the IDNR – Division of Water. While the models are generally available from IDNR in hard copy, many can be provided in digital form.

- **IDNR "Recommendation" or Floodplain Analysis Regulatory Assessment (FARA) Models**: These models have been developed by or submitted to the IDNR – Division of Water to determine floodway limits and BFEs for streams that were not studied in a FIS. In some instances, these are "bare bones" models using minimal information, because no detailed information existed for a stream.   Therefore, these models should be used with caution. Potential users are urged to consult with IDNR before selecting such models.

- **Letter of Map Revision (LOMR) Models**: Similar to FIS models, LOMR models are created to support a change to an elevation or floodway published in a FIS. The IDNR – Division of Water and FEMA maintain these models, although, as with FIS models, the IDNR may be the only source for digital copies.

- **IDNR Special Study Models**:   The IDNR – Division of Water occasionally will develop a model for a special study, such as a lake control structure or flood control project. Contact the IDNR – Division of Water to determine if such models are available for particular stream reaches.

- **Other Sources of Models**: Some floodplain related projects do not require IDNR approval; however models may exist.   In some situations, an engineer may be asked by local permit officials to develop a model for a project site in order to satisfy local planning and zoning ordinances.   Accordingly, contact with local government personnel, developers, and engineers may be warranted as a final step in searching for existing models.

6.3 The Indiana Hydrology and Hydraulics Model Library

The model library is a mapping application for the State of Indiana that allows you to view and download available hydrology and hydraulic models along a waterway. These models have been compiled by the Indiana Department of Natural Resources and are provided as a service. Please see the disclaimer section for a description of the liability associated with the use of these models.

Models are stored in the IDNR database by stream reach, by selecting a stream reach, the available models are shown on the right hand side of the screen. Stream reaches are defined by the reaches in the Coordinated Needs Management Strategy (CNMS) Database, which was developed by FEMA to manage floodplain mapping information.

The mapping library can be found at:

http://dnrmaps.dnr.in.gov/appsphp/model/index.php.

6.4   Evaluating Existing Models

When existing models are discovered, they should be carefully assessed. Factors to consider in determining model suitability include:

- **Model Age**: Models available in the 1970's were executed on mainframe computers. Input and data editing and warning capabilities were primitive compared to what are available today. Accordingly, data errors that show up using current modeling programs may not have been detected when the models were first assembled. Modeling methods have evolved over the years so that what was an acceptable model 20 years ago may not meet current standards.

- **Model Type**: Methodologies and assumptions vary among different modeling programs; an assumption made in one program may not be applicable to another.

- **Model Purpose**: Models are assembled for different reasons. For example, a "rough draft" model may be created for a proposal to perform more detailed modeling or as part of emergency response in times of crisis. While good engineering practice would document these models as being "draft," many times that does not happen.

- **Base Data/Base Mapping Used to Create the Model**: Models often come without documentation describing how the model was developed. Comparing the base data to field data or detailed mapping data may be one way to confirm the quality of the model. Another approach is research the models more thoroughly by examining reports, permit application materials, mapping, and other items that may present clues to the quality of the model. Users should also pay attention to the datum used for the modeling input.