



**Kane County, Illinois  
Cooperating Technical Partner  
Mapping Activity Statement**

**Agreement No. 2001-01, Hydrologic and Hydraulic Analyses and Floodplain Mapping of the Blackberry Creek Watershed**

In accordance with the Cooperating Technical Partner (CTP) Memorandum of Agreement dated August 1, 2001, between Kane County, Illinois and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement No. 2001-01 is as follows:

- 1. Objective and Scope:** The objective of this Mapping Activity is to develop detailed hydrologic and hydraulic analyses and floodplain and floodway mapping in the Kane County portion of the Blackberry Creek Watershed, Kane County, Illinois. Hydrologic analyses will be done for the whole watershed to maintain the continuity of the hydrologic and hydraulic processes. However detailed analysis and mapping will be completed for approximately 62 square miles of drainage area, and hydraulic analyses and floodplain mapping will be completed for approximately 36 linear miles of flooding, including the following flooding sources: Between Main Street and I-88 (approximate river stations from 131400 to 123640); between I88 and Highway 56 (approximate river stations from 123530 to 96700); in Aurora (Cherry Hills and W. San Souci subdivisions, approximate river stations from 76280 to 71880); and in Montgomery (approximate river stations from 64840 to 54735 covers both Kane and Kendall counties). This information will modify parts of the hydrologic and hydraulic model assembled for the 1989 Natural Resources Conservation Service (NRCS) study.
- 2. Period of Performance:** This Mapping Activity began on May 9, 2000 and is anticipated to be completed on December 31, 2003. This Mapping Activity may be terminated at the option of FEMA or Kane County, Illinois in accordance with the provisions of the August 1, 2001, CTP Memorandum of Agreement.
- 3. Funding/Cost-Sharing:** The majority of this effort is covered under a joint funding agreement between Kane County, Illinois and the U.S. Geological Survey (USGS). A portion of the total project cost is expected to be derived from FEMA through the CTP grant process.
- 4. Standards:** The following standards and documents are relevant to this Mapping Activity:
  - Detailed hydrologic and hydraulic analyses and floodplain mapping will follow the standards set forth in FEMA 37, *Guidelines and Specifications for Study Contractors* (January 1995), and Title 44 of the Code of Federal Regulations (CFR), Part 65. FEMA 37 is available at FEMA's Web site at [http://www.fema.gov/mit/tsd/EN\\_reg.htm](http://www.fema.gov/mit/tsd/EN_reg.htm). Title 44 of the CFR is available at FEMA's Web site at [www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=199944](http://www.access.gpo.gov/cgi-bin/cfrassemble.cgi?title=199944).
  - Computer models used for hydrologic and/or hydraulic analyses will meet the requirements of 44 CFR 65.6(a)(6) and be on FEMA's *Numerical Models Accepted by FEMA for NFIP Usage* ([http://www.fema.gov/mit/tsd/EN\\_modl.htm](http://www.fema.gov/mit/tsd/EN_modl.htm)).

- Planimetric features will be compatible with the base map (with respect to horizontal accuracy) selected by FEMA for Digital FIRM production. Topographic mapping taken from aerial photogrammetry or surveys will comply with the requirements of Appendix 4 of FEMA 37. The selection of the topographic mapping source to be used will be coordinated with the FEMA Regional Project Officer prior to analysis and mapping.
- Any levee or dike systems to be shown on the community's FIRM as providing protection from the 1% annual chance flood will comply with the requirements of 44 CFR 65.10. Chapter 7 of FEMA 37 provides guidelines for evaluating levee and dike systems.
- Flood elevations and floodplain and floodway boundaries will reasonably tie in to non-revised information in accordance with 44 CFR 65.6(a)(2).
- The floodway will be established in accordance with 44 CFR 65.7, as well as any applicable state and/or community requirements.
- Digital mapping will comply with the requirements of Chapter 9 and Appendix 7 of FEMA 37.
- Digital Elevation Models (DEMs) and field survey data will meet vertical accuracy requirements contained in Appendix 4 of FEMA 37.

**5. Products:** Kane County will make available items outlined in Chapter 11 of FEMA 37 in the Technical Support Data Notebook (TSDN) format. These include:

- Digital 1% and 0.2% annual chance floodplain and floodway boundaries;
- Digital profiles of the 1%, and 0.2% annual chance water-surface elevations, representing existing conditions;
- Executive summary of hydrologic and hydraulic modeling methodologies, including high water data used for calibration, for purposes of amending the Flood Insurance Study (FIS) report;
- Floodway data tables;
- Digital copies of all hydrologic and hydraulic modeling (input and output files); and
- All back-up data used in the analyses or mapping.

Kane County will deliver all digital input and output data, intermediate data processing products, and final products in the format compatible to Appendix 7 of FEMA 37 or the FEMA Standard DFIRM Spatial Database (SDSD).

**6. Schedule and Milestones:**

**Milestone 1 (Hydrology Phase):** Products for the first milestone to be provided to the FEMA Project Officer include draft hydrologic analyses in accordance with the TSDN format. The overall hydrological analysis will be based on the HSPF algorithm with continuous simulation using actual meteorological data. The modeling sequences, including calibration, are as follows:

- Metrological data available include three rain gages near the study area (Aurora; 1948 - present, and at DeKalb and St. Charles; 1989 - present). For long-term simulation the data from Aurora and Argonne National Laboratory will be used.
- Characterize current land use base on the basis of the Illinois Department of Natural Resources (IDNR) 1996 land coverage data. Subwatersheds are delineated on the basis

of a DEM that is developed from Kane County's 2-foot contour. Future land use to be derived from Kane County's 2020 Land Resource Management Plan.

- Calibration and verification will be performed based on flood stages, discharge, and volume. The HSPF Blackberry Watershed model will be calibrated for a period from 1990 to June 1996, with meteorological data from Aurora, St. Charles, and/or DeKalb. Comparison will be made with observed data from the USGS gaging station at Yorkville (data available since 1960). After the long-term calibration is done, the model will be further calibrated with the July flood event in 1996. Flooding levels within the watershed will be compared to observed high water marks collected with the information provided by local residents, in addition to the data at Yorkville.
- Verification of the HSPF model will be done for a period from August 1996 through 1999 or 2000. In this step, the HSPF Blackberry model will be based on the same (1996) land use and a comparison with actual data will be done with two USGS gaging stations; at Yorkville and at the Jericho Road Bridge (since 1998).
- After model calibration, a long-term simulation for about 40 years daily conditions (from 1960) will be done with meteorological data from Aurora/Argonne. This simulation will yield continuous discharge time series at specified outflow points of subwatersheds. Total flow at Yorkville will be used for a comparison. Flood frequency data will be derived on the basis of the annual maximum series at these points. Flood frequency analysis for peak discharge at 5, 10, 25, 50, 100, and 500 year return intervals will be derived according to the procedures specified in Bulletin 17B. For verification, regional flood frequency formulas developed by the USGS will be applied to further check these peak flows.

**Milestone 2 (Hydraulics Phase):** Products for the second milestone to be provided to the FEMA Project Officer include draft hydraulic analyses in accordance with the TSDN format.

- Flood profiles and floodway determination will be assembled using the HEC-RAS hydraulic model.
- A portion of channel cross sections and channel connections will be based on the 2001 survey by the IDNR, Kane County, and USGS. The 2001 resurvey updated hydraulic structures and old cross sections surveyed in 1975 by the Illinois State Water Survey. Natural cross sections surveyed in 1986 by IDNR will be used in the current model.

**Milestone 3 (Final Products):** Final products to be provided to the FEMA Project Officer include the completed TSDN and accompanying data containing the information outlined in Section 5 of this Mapping Activity Statement. These products will be made available in accordance with the Period of Performance described in Section 2 of this Mapping Activity Statement.

**7. Certification:** The following certifications apply to this Mapping Activity (as appropriate):

- Hydrologic and/or hydraulic analyses and data will be certified by a registered Professional Engineer or Licensed Land Surveyor or be conducted by USGS staff with appropriate oversight through peer-level review.
- Topographic information will be certified by a registered Professional Engineer or Licensed Land Surveyor in accordance with 44 CFR 65.5(c) or be conducted by USGS staff with appropriate oversight through peer-level review.

- Any levee systems to be accredited as discussed in Section 4 of this Mapping Activity Statement will be certified in accordance with 44 CFR 65.10(e).

**8. Technical Assistance and Resources:** Kane County may obtain copies of FEMA-issued Letters of Map Change (LOMCs), archived engineering back-up data, and data collected as part of the Mapping Needs Assessment Process from FEMA's Mapping Coordination Contractor (MCC). The MCC may be contacted at 1-877 FEMA MAP (1-877-336-2627). General technical and programmatic information, such as FEMA 265, the Quick-2 computer program, and the MT-2 forms, can be downloaded from FEMA's Flood Hazard Mapping Web site ([www.fema.gov/mit/tsd/](http://www.fema.gov/mit/tsd/)). Specific technical and programmatic support may be provided through FEMA's MCC; such assistance should be requested through the FEMA MCC Project Officer specified in Section 12 of this Mapping Activity Statement.

Kane County may also consult with the FEMA Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or sub-contractors, and GIS-based engineering and modeling training.

**9. Cooperators:** Kane County, Illinois, in cooperation with the USGS, will develop all products called for under this Mapping Activity Statement. Procurement of subcontractors other than USGS using Federal funds provided as part of this Mapping Activity will comply with the requirements of 44 CFR 13.36.

**10. Quality Assurance/Quality Control (QA/QC) Procedures:** Kane County, Illinois and the USGS will undertake a joint internal QC review to ensure that the products described under Section 5 of this Mapping Activity Statement conform with the standards outlined under Section 4 of this Mapping Activity Statement. Additionally, any independent review for compliance with these standards will be undertaken by FEMA through PBS&J.

**11. Reporting:** Reporting requirements will be in accordance with Agreement Articles V & VI.

**12. Points of Contact:** The FEMA Regional Project Officer is Ken Hinterlong, Jr., and the CTP Project Manager is Tim Harbaugh or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities. If it is necessary, the assistance of FEMA's MCC should be requested through the FEMA MCC Project Officer, William Blanton.

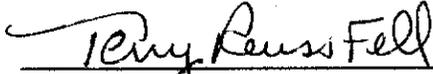
Each party has caused this Mapping Activity Statement to be executed by its duly authorized representative.



Michael McCoy, County Board Chairman  
Kane County, Illinois

7-31-2001

Date



Terry Reuss Fell, Chief  
Hazard Identification and Risk Assessment Branch  
Federal Emergency Management Agency, Region V

9-13-01

Date