



City of Indianapolis
Federal Emergency Management Agency
Cooperating Technical Community

Agreement 00-02 - Hydrologic and Hydraulic Analyses and Floodplain Mapping

In accordance with the CTC Memorandum of Agreement dated August 8, 2000 between the City of Indianapolis and the Federal Emergency Management Agency, Task Agreement 00-02 is as follows:

1. **Objective and Scope:** The objective of this agreement is to develop detailed hydraulic analyses and floodplain and floodway mapping in City of Indianapolis. Analyses will be of the 10%, 2%, 1%, and 0.2% annual chance floods and floodway representing existing conditions. A previous study by the City of Indianapolis has concluded that no new hydrologic analysis is needed for the selected pilot stream, at this time. Hydraulic analysis and floodplain mapping for approximately 4 linear miles of flooding along Buffalo Creek. Delineations will be provided for the 1% and 0.2% annual chance floodplains and floodway and will be used by FEMA to revise the January 05, 2001 Flood Insurance Study (FIS) and Flood Insurance Rate Map (FIRM) for Marion County, Indiana.
2. **Period of Performance:** This Mapping Activity will begin on August 8, 2000 and end no later than August 1, 2001. This Mapping Agreement may be terminated at the option of FEMA or City of Indianapolis in accordance with the provisions of the August 8, 2000 CTC Memorandum of Agreement.
3. **Funding/Cost-Sharing:** City of Indianapolis is willing to perform or contract the required services for an amount not to exceed
4. **Standards:** The following standards and documents are relevant to this Mapping Activity:
 - Detailed hydrologic and hydraulic analyses and floodplain mapping must 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 website at http://www.fema.gov/mit/tsd/EN_reg.htm.
 - Computer models used for hydrologic and/or hydraulic analyses must 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).
 - Topographic mapping used to delineate floodplain and floodway boundaries must be of adequate scale and topographic definition to provide reasonable accuracy. Planimetric features must be compatible with the base map (with respect to horizontal accuracy) to be used by FEMA for Digital FIRM production. Topographic mapping taken from aerial photogrammetry or surveys must comply with the requirements of Appendix 4 of FEMA 37. The selection of the

topographic mapping source to be used must be coordinated with the FEMA 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 must comply with the requirements of 44 CFR 65.10. Chapter 7 of FEMA 37 provides guidelines for evaluating levee systems.
 - Flood elevations and floodplain and floodway boundaries must reasonably tie-in to non-revised information in accordance with 44 CFR 65.6(a)(6).
 - The floodway must be established in accordance with 44 CFR 65.7, as well as any applicable state requirements.
 - Digital mapping must comply with the requirements of Chapter 9 and Appendix 7 of FEMA 37.
 - Digital Elevation Models (DEMs) and field survey data must meet vertical accuracy requirements contained in Appendix 4 of FEMA 37.
5. **Products:** City of Indianapolis will make available items outlined in Chapter 11 of FEMA 37 in the Technical Support Data Notebook (TSDN) format. These include: digital floodplain and floodway boundaries; digital profiles of the 10%, 2%, 1%, and 0.2% annual chance water surface elevations; FIS report; floodway data tables; digital copies of all hydrologic and hydraulic modeling (input and output files); and all backup data used in the analyses or mapping.

6. **Schedule and Milestones:**

Milestone 1 (Scoping Phase): Activities to be completed for the first milestone include:

- Final selection of flooding sources and limits to be studied.
- Initial data research to compile information such as effective FIS modeling; historical flood data, gage records, and highwater marks; copies of historical Letters of Map Change (LOMCs); and "as built" construction plans. Guidance for such research is contained in Chapter 3 of FEMA 37.
- Selection of suitable topographic data for floodplain delineation, including comparison of planimetric features (such as roads) to the base map planned for use by FEMA for Digital FIRM production.
- Selection of analysis methodologies, including hydrologic and/or hydraulic computer models to be utilized.
- Determine cross section locations for hydraulic modeling.

Upon completion, products for the first milestone will be provided to the FEMA Project Office. These include:

- Annotated copies of effective FIRMs depicting limits of proposed study.
- Documentation of the proposed source of topographic data, including: scale; contour interval; source/methodology; date of survey/data collection; vertical and

horizontal datums; and comparison of planimetric features with the Digital FIRM base map planned for use by FEMA.

- A written summary of the initial data research; proposed analysis methodologies; and a work plan.
- Copies of topographic maps depicting proposed cross section locations.

Products for Milestone 1 will be submitted to the FEMA Project Officer no later than December 1, 2000.

Milestone 2 (Hydrology Phase): Not Applicable. A previous study by the City of Indianapolis has concluded that no new hydrologic analysis is needed for the selected pilot stream, at this time.

Milestone 3 (Hydraulics Phase): Activities to be completed for the third milestone include completing the hydraulic analyses and preparing sample floodplain mapping. Upon completion, products for the third milestone will be provided to the FEMA Project Officer. These include the completed hydraulic modeling and sample floodplain mapping in accordance with TSDN format. Products for Milestone 3 will be submitted to the FEMA Project Officer no later than February 1, 2001.

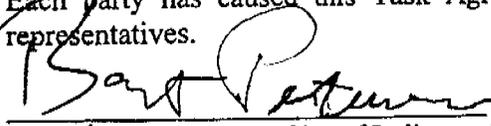
Milestone 4 (Final Products): Activities to be completed for the fourth milestone include completion of the floodplain mapping; generation of flood profiles; compilation of the FIS report; and completion of the TSDN. Final products will be the completed TSDN and accompanying data. A QA/QC report documenting the results of the independent review of all computational and data processing procedures were independently reviewed must also be submitted. Upon completion, final products will be made available to the FEMA Project Officer.

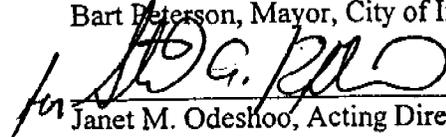
7. **Certification:** The following certifications apply to this Mapping Activity (as appropriate):
 - Hydrologic and/or hydraulic analyses and data must be certified by a registered professional engineer or licensed land surveyor in accordance with 44 CFR 65.6(f).
 - Topographic information must be certified by a registered professional engineer or licensed land surveyor in accordance with 44 CFR 65.5(c).
 - If fill is to be considered in the mapping to raise land areas above the 1% annual chance flood elevation, certification of the fill must be provided in accordance with 44 CFR 65.5(a)(6) by the community's NFIP permit official, a registered professional engineer, or a licensed land surveyor.
 - Any levee systems to be accredited as discussed in Section 4 of this Task Agreement must be certified in accordance with 44 CFR 65.10(e).
8. **Technical Assistance and Resources:** City of Indianapolis may obtain copies of LOMCs, archived engineering backup data, and data collected as part of the Five-Year Mapping Needs Assessment from FEMA's Mapping Coordination Contractor

(MCC) as part of the initial data research. Copies of FEMA's rule-based engineering software packages such as CHECK-2 to evaluate HEC-2 models and FISPLOT, an automated flood profile plotting software package, may also be obtained through the MCC. The MCC may be contacted at 1-877 FEMA MAP. General technical and programmatic information can be downloaded from FEMA's Flood Hazard Mapping website (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 Project Officer specified in Section 11 of this agreement.

9. **Subcontractors:** This Task Agreement will be performed by Christopher B. Burke Engineering, Ltd. (CBBEL) on behalf of the City Of Indianapolis. Procurement of subcontractors using Federal funds provided as part of this Mapping Activity must comply with the requirements of 44 CFR 13.36.
10. **QA/QC Procedures:** The Quality Assurance procedures outlined in Chapter 10 of the *Guidelines and Specifications for Study Contractors* should be followed during the development of the hydrologic and hydraulic analyses and floodplain mapping. Analyses and mapping should be independently reviewed for compliance with the standards defined in Section 4 of this agreement. FEMA's Map Coordination Contractor, the IDNR, or others approved by the FEMA Project Officer and the CTC Project Manager will conduct this independent review.
11. **Points of Contact:** The FEMA Project Officer is Kenneth Hinterlong and the CTC's Project Manager is Donna Price, or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities.

Each party has caused this Task Agreement to be executed by its duly authorized representatives.


Bart Peterson, Mayor, City of Indianapolis


Janet M. Odeshoo, Acting Director, FEMA Region V

8/14/00
date
9/25/00
date