



**DUPAGE
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STORMWATER MANAGEMENT

MEMORANDUM

TO: Jim Zay - Chair, Stormwater Management Planning Committee

FROM: Sarah Hunn, P.E. - Director, DuPage County Stormwater Management *SH*

DATE: April 3, 2026

RE: DuPage County Stormwater Management's Floodplain Mapping Program

This memorandum is written to provide explanation as to why DuPage County Stormwater Management continues to utilize **HSPF** and **FEQ** for its floodplain modeling and mapping rather than transitioning to **HEC** programs. Please recall that FEQ was originally chosen as DuPage County's hydraulic model due to the types of watersheds, stream systems and hydraulic structures in DuPage. Our watersheds are extraordinarily flat with backwater impacts, reverse flow situations and multiple flow routes. In addition, our stream systems have on-line, offline floodplain storage as well as unique flood control facilities with movable gate hydraulic structures that accompany our complex urban waterways.

1. Specialized Handling of Complex Infrastructure

- **Unique Hydraulic Structures:** DuPage County contains many non-standard culverts, drop structures, and side weirs. FEQ was specifically developed with routines to simulate these "unique" structures accurately. For example the use of the Hager equation for side weir flows and sluice gates at the Elmhurst Quarry.
- **Field-Tested Calibration:** Unlike HEC models that may use generalized nomographs for the analysis of culverts, FEQ routines were calibrated against actual hydraulic structures and USGS field data specific to DuPage County. The USGS performed in depth validation and verification of the model's capabilities and accuracy.
- **Superior Convergence:** FEQ offers better mathematical stability during complex simulations because it can automatically adjust its own "time steps" to handle rapid changes in water flow. *Versions of HEC-RAS recently released offer this capability, however we would need to test these with our complex flood control operations.

2. Integration with Continuous Simulation (HSPF)





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- **Holistic Hydrology:** The county relies on HSPF for "continuous simulation" hydrology (modeling rainfall and runoff over long periods, rather than just a single storm event).
- **Proven Linkage:** FEQ is natively linked to HSPF and post-processing tools like GenScn. As of now, it is unproven whether HEC-RAS can adequately support the County's long-term use of this specific continuous simulation methodology.
- **Plan Consistency:** The 1989 Stormwater Management Plan (Plan) requires the use of a continuous hydrologic simulation model, as well as a fully dynamic runoff and flood routing hydraulic model, and the 2 models must be compatible. We believe the Plan would have to be modified or updated by the County Board if any modeling changes or changes to the above Plan requirements were to be made.

3. Regulatory Issues and Impacts

- **FEMA Approval:** DuPage County has 24 FEMA-approved regulatory floodplain maps developed with HSPF/FEQ that took 11 years to finalize.
- **Enormous Transition Cost:** Transitioning these 24 effective watershed models to a new software platform would be a massive undertaking, requiring years of re-modeling and re-certification with no guarantee that HEC-RAS would accurately represent the operation of existing flood control facilities like Fawell Dam or the Elmhurst Quarry.

4. GIS Efficiency and Data Integrity

- **Automated Workflows:** The County's custom GIS applications (like TM and LCTOTS) automate the extraction of cross-sections and land cover data much more efficiently than extraction in HEC-RAS Mapper.
- **Database Archiving:** Unlike HEC-RAS Mapper, which focuses on visual output, the County's custom tools are designed to store and archive all input data directly within the County's centralized geodatabases for long-term use and record-keeping.

5. Transparency and Public Domain Access

- **"Beneath the Hood" Clarity:** FEQ is public domain software via the USGS, allowing engineers to see and modify the source code to understand the underlying physics.





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- **Proprietary Constraints:** The U.S. Army Corps of Engineers does not release the source code for HEC programs and does not provide technical support to non-Corps personnel, often requiring the use of outside vendors for troubleshooting.

While **HEC-RAS** is a powerful, industry-standard tool with a modern interface, the **FEQ/HSPF** combo remains the "brain" of DuPage's regulatory and operational framework. The current 2026 Michael Baker contract ensures the GIS "muscles" (the data input tools) stay functional while the County explores if HEC-RAS can eventually handle the heavy lifting of the County's unique infrastructure.

Future Considerations

In 2024, Stormwater Management initiated a discussion with the US Army Corps of Engineers to investigate the use of HSPF hydrology with HEC-RAS hydraulic modeling. This methodology would preserve the subbasin flow timing that is critical to the County's flood control facility operations. While the Army Corps did not receive funding for this study in 2025, staff were just recently notified that the proposal and study has been given approval for funding in 2026.

As this Army Corps study is being completed, DuPage County has assurance from the USGS that they will continue to support FEQ to ensure the County can protect their investment in its watersheds.

