



MONTGOMERY COUNTY ENGINEERING DEPARTMENT

Hydrology and Hydraulic Analysis Guidelines

To help ensure expedient review of your Hydrology and Hydraulic Analysis to show no adverse impacts to the BFE for development in the floodplain, Montgomery County Engineering requests the following information to be provided in a formal report outline which at a minimum should include the following information.

1. Executive summary, which includes contact information for the engineering firm as well as the developer/property owner.
2. Table of contents (which included appendix for Exhibits and modeling data.)
3. Datum information
4. Coordination completed/in process for permits from other agencies with other agencies. (TXDOT – if access is off TXDOT road, TCEQ permits such as for APO operations, USACE 404 – Clean Water Act, Endangered Species Act, etc.)
5. Clarification if the proposal is a part of a phased project and references to other supporting documents.
6. Source of models –
 - what was the information obtained from FEMA, did you have to develop your own HEC-RAS model
 - Did you need to develop a HEC- HMS model (likely yes if a drainage plan is also needed since the drainage plan must account for Atlas14) for FEMA BFE comparison use FIS flows if available
 - What version of HEC-RAS did you use?
7. Other data sources, Lidar information, land use, bridge information etc.
8. Summary of Hydrology Methodology
9. Summary of Hydraulic Analysis
 - Ensure to explain Manning's n assignment.
 - Table HEC-RAS output of WSE, flow FIS BFE, HEC-RAS existing, proposed and difference (difference is between FIS BFE and proposed.)
10. Proposed mitigation (if needed)
11. Exhibit of Project location with a Site map of project overlaid on NFHL and wetlands if wetlands were identified on the property.
 - For your reference link to FEMA shape file (<https://hazards.fema.gov/femaportal/wps/portal/NFHLWMS>) or KMZ file (<https://hazards.fema.gov/femaportal/wps/portal/NFHLWMSkmzdownload>) to ensure proper locations for the floodplain boundaries
 - Check for any applicable LOMR's
12. If excavating, an Exhibit that shows area of excavation

13. If adding fill, Exhibit that shows area of fill.
14. Exhibit of the project area on the full parcel
 - Include MCAD parcel/property numbers for the plots of land. (this generally starts with an R)
15. Include FEMA FIS cross sections on all plots and tables.
 - Specify what cross section is used for FIS flows
16. Include FIS flows and WSE when highlighting WSE changes.
 - A column that shows FIS – Pre-DEV WSE to highlight areas that the model is showing higher BFE's to the current effective FIS.
 - This includes new river stations identified if additional cross sections are added to a model. BFE's must be provided using FIS Profiles through the project area.
 - WSE change of Pre DEV – Post-DEV cross sections – to show WSE changes within the same modeling system
 - No rise must be both for the existing to proposed to show development changes from the same model but also No Rise with the existing BFE.
17. Provide exhibits of Existing and Proposed HEC-RAS cross sections
18. In an exhibit, provide enhanced table of HEC-RAS output per cross section/River station #, including pre and post flows, velocity, WSE, etc.
19. Comparison of Pre and Post development hydrographs.
20. Exhibit of FIS profile (s)
21. Summary FIS discharges as appendix/exhibit
22. Summary of FIS BFE's table as appendix/exhibit
23. If detention is identified in the floodplain, explanation of how the detention will work during a flood event and detain runoff/storage from the property as 100-year elevations are reached.

If any mitigation activities are identified, a maintenance plan, budget and who will perform maintenance for perpetuity will be needed for the development permit applications. Mitigation activities may include undercutting/tree clearing, excavation/dredging/benching.

Be aware for the development permit applications proof of compliance with USACE 404 and Endangered Species Act as well as any TCEQ permits will be required upon submitting the application. Exhibits of the identified wetlands and any identified areas for endangered species must be overlaid with your project area will be needed to show proof of compliance.

Floodway development requires geotechnical and structured foundations for structures and permanent equipment/machinery.

If requesting a LOMR-F, include the development non-structure permit documentation for the fill as well as a map that clearly shows where the fill was placed on the parcel.

Montgomery County highly recommends EAP for temporary equipment in floodway.

Be advised that the Engineering office does not accept permit applications. You must submit permits to the permit office along with your payment. For more information see the permit office website, https://www.mctx.org/departments/departments_d - f/environmental_health/permitting/index.php

The engineering department advises to have your drainage and H&H studies as well as plats approved before you submit your permit application. This will speed up the permit approval process.