

DHS FEMA Region IV HYDROLOGIC AND HYDRAULIC (H&H) STUDY QUICK GUIDE

DEFINITION

A Hydrologic and Hydraulic (H&H) Study is the study of movement of water, including the volume and rate of flow as it moves through a watershed, basin, channel, or man-made structure.

PURPOSE

H&H studies are completed to ensure structures are sized correctly to handle floodwaters, while not inadvertently increasing flooding up or down stream. The studies are performed to quantify the volume flow rate of water draining from a watershed (i.e., drainage area), and determine the depth and velocity of flow and forces from flowing water on a surface or at hydraulic structures. H&H studies are essential to mitigate against flood loss in the future.

AN H&H STUDY IS REQUIRED

For FEMA-funded projects involving:

- Projects occurring in watercourses¹ with year-round or seasonal base flows²
- New construction or alterations of bridges and culverts, including changes to the length, diameter, material, number of culverts, or modifications to inlets or outlets (e.g. head or wing walls, rounding, grouted rip rap)
- New construction or re-construction of levees riverward of existing alignment or higher than existing grades
- Channel modification or realignment
- Significant re-grading (raising or lowering levels of land), including adding fill material(s)

WHEN AN H&H STUDY IS NOT REQUIRED

- Project is a storm water drainage or conveyance structure, where water does not flow year-round or seasonally
- Return back to exact pre-disaster condition (length, diameter, material, number of culverts, exit and entrance conditions, and stream morphology has not changed, etc.)



An H&H study may be only one of several requirements to ensure FEMA reimbursement. Permits may be required under the Clean Water Act or other regulations. Additional requirements may exist if state or federally listed threatened or endangered species, critical habitat, or cultural resources are present in the project area. Always coordinate with your community floodplain manager prior to making modifications in a mapped floodplain.

HOW TO OBTAIN AN H&H STUDY

For assistance, contact an agency or company that has licensed, professional civil, environmental, or hydrologic engineers

CONTENTS OF AN H&H STUDY (Minimum requirements)

All H&H studies shall include:

- Identification of upstream and downstream impacts (e.g. stage, velocity, duration) of alterations to the floodplain, including change to the extent or depth of the Special Flood Hazard Area (SFHA) or changes to the Base Flood Elevation (BFE)
- General site description, including location, latitude and longitude, drainage basin, FIRM, regulatory mapped flood zone (if applicable)
- Existing condition: pipe shape, material, length, inlet and outlet conditions, performance level
- Proposed condition: pipe shape, size, material, length, inlet and outlet conditions, performance level
- Will the proposed condition satisfy the local floodplain ordinance and local and state storm water management requirements?
- Stamped certification by a professional engineer in the state where the facility is located and certification that the calculations and drawings comply with 44 CFR 60.3

¹ Watercourse definition: a natural or artificial channel through which water flows

² Base flow definition: natural or human-induced sustained flow of a watercourse in the absence of direct runoff

When an H&H Study is Required

