

## Chapter 6 Study Documentation

### 6-1. General Requirements

This chapter emphasizes the role of HEC-IFH in study documentation as related to final technical studies reports. Comprehensive, but concise, documentation of the hydrologic engineering analysis is a key aspect of any study. It should be performed continuously throughout the study period. Required hydrologic engineering information ranges from extensive (for feasibility reports) to relatively little (for most Design Memoranda (DM) where more emphasis is placed on hydraulic design). Reporting requirements for different types of studies are described in applicable Engineer Regulations (ER's). In addition, hydrologic and hydraulic Engineer Technical Letters (ETL's) summarize the array of hydrologic engineering data that must be presented for planning reports and suggest display formats. The goal of study documentation should be to describe (in a basic and orderly sequence) the nature of the flood problem, the status and configuration of the existing system, the proposed system and alternatives, the performance characteristics of the proposed system, and operation plans.

### 6-2. Content Related to Planning Considerations

Hydrologic reporting requirements should include a description of the without-project conditions, alternate flood loss reduction plans analyzed, analytical procedures and assumptions used, and system implementation and operation factors influencing the hydrologic aspects of the study. Basic hydrologic reporting requirements are specified in ER 1105-2-100 and EM 1110-2-1413.

### 6-3. Content Related to Design Considerations

Hydrologic engineering material presented in the design documents describes in detail the hydrologic system, and any refinements of sizes, performance standards, and operation criteria from the feasibility study. The hydrologic engineering requirements for the DM are specified in ER 1110-2-1150.

### 6-4. Reporting Capabilities of HEC-IFH

HEC-IFH has extensive reporting and plotting capabilities that document the results of an interior analysis. The data stored in each data module, as well as hydrologic analysis summaries and plan comparison results, can be printed or plotted to provide report documentation. The following outline, which follows the requirements of EM 1110-2-1413, also indicates technical study areas in which tables and plots from the HEC-IFH program may be used for documentation.

- Existing system layout: schematics, aerials, tables, plates, maps.
  - Existing facilities on aerials
  - Important environmental aspects
  - Damage locations
  - Cultural features
- Description of physical features of existing (without) conditions.
  - Watershed/subbasin boundaries on map
  - Dimensions of any existing gravity outlets, channels, storm sewers, etc. **(HEC-IFH)**
  - Area capacity data of detention areas **(HEC-IFH)**
- Description of basic hydrologic approach/ assumptions.
  - Historic/hypothetical storms **(HEC-IFH)**
  - Loss rates **(HEC-IFH)**
  - Runoff transforms **(HEC-IFH)**
  - Routing **(HEC-IFH)**
  - Base flow **(HEC-IFH)**
- Presentation of hydrologic flow characteristics.
  - Peak discharge **(HEC-IFH)**
  - Duration **(HEC-IFH)**
  - Frequency **(HEC-IFH)**
  - Velocity
- Impact of future without-project conditions.
  - Description of runoff and operation changes similar to existing conditions
  - Description of adopted procedures for parameter estimation
- Hydrologic analysis of alternatives.
  - Location, dimensions, and operation criteria of alternate plans
  - Display of final array of plans on aerials - compare with existing
  - Impacts of measures and plans on peak discharges, durations, velocities, etc. **(HEC-IFH)**
  - Display of residual effects of large SPF/PMF in urban areas, and 100-year in rural **(HEC-IFH)**
  - Hydrologic description of alternate plans shall include description of required local agreements/ maintenance requirements
  - Description of consequences if agreements are not met **(HEC-IFH)**
- Design information.