6.2 Overview

6.2.1 Introduction

The analysis of the peak rate of runoff, volume of runoff and time distribution of flow is fundamental to the design of drainage facilities. Errors in the estimates will result in a structure that is either undersized and causes more drainage problems or oversized and costs more than necessary. On the other hand, it must be realized that any hydrologic analysis is only an approximation. The relationship between the amount of precipitation on a drainage basin and the amount of runoff from the basin is complex and too little data are available on the factors influencing the rural and urban rainfall-runoff relationship to expect exact solutions.

6.2.2 Definition

Hydrology is generally defined as a science dealing with the properties, distribution and circulation of water on and under the earth and in the atmosphere. For the purpose of this manual, hydrology will deal with estimating flood magnitudes as the result of precipitation. In the design of highway drainage structures, floods are usually considered in terms of peak runoff or discharge in cubic meters per second, m^3/s (cubic feet per second, cfs) and hydrographs as discharge per time. For structures which are designed to control volume of runoff, like detention storage facilities, or where flood routing through culverts is used, then the entire discharge hydrograph will be of interest.

6.2.3 Factors Affecting Floods

In the hydrologic analysis for a drainage structure, it must be recognized that there are many variable factors that affect floods. Some of the factors which need to be recognized and considered on an individual site by site basis are such things as:

- rainfall amount and storm distribution
- drainage area size, shape and orientation
- ground cover and soil type
- slopes of terrain and stream(s)
- antecedent moisture condition
- basin storage potential (overbank, ponds, wetlands, reservoirs, channel, etc.)
- watershed development potential
- type of precipitation (rain, snow, hail, or combinations thereof)

6.2.4 Sources Of Information

The type and source of information available for hydrologic analysis will vary from site to site and it is the responsibility of the designer to determine what information is available and applicable to a particular analysis.

Suggested data sources for material related to hydrologic studies or analyses are as follows:

1. ConnDOT, Hydraulics and Drainage Section (FEMA studies, SCEL reports, design reports, scour evaluation reports)
2. ConnDEP, Inland Water Resources Division (FEMA studies, SCEL reports, Flood Control Project Information)
3. Municipality in which the project is proposed.
4. U.S. Geological Survey (stream gage data, floods of record)
5. Regional Planning Agencies
6. U.S.D.A., Natural Resources Conservation Service (Design reports)
7. U.S. Army Corps of Engineers (Flood Control Projects)