12.1 Overview

12.1.1 Introduction

Stormwater pump stations are necessary to remove stormwater from highway sections that cannot be drained by gravity. Because of high costs and the potential problems associated with pump stations, their use is recommended only where other systems are not feasible. When operation and maintenance costs are capitalized, a considerable expenditure can be justified for a gravity system.

12.1.2 Design Considerations

Pump station design presents the designer with a challenge to provide a cost-effective drainage system that meets the needs of the project. There is a myriad of considerations involved in their design. Below is a listing of some of them:

- wet-pit vs. dry-pit
- type of pumps
- number and capacity of pumps
- motor vs. engine drive
- peak flow vs. storage
- force main vs. gravity
- above vs. below grade
- monitoring systems
- backup systems
- maintenance requirements

Many of the decisions regarding the above are currently based on engineering judgment and experience. To assure cost-effectiveness, the designer should assess each choice and develop economic comparisons of alternatives on the basis of annual cost. However, some general recommendations can be made which will help minimize the design effort and the cost of these expensive drainage facilities. These are discussed in the following pages of this chapter.

For further information on the design and use of pump stations see, *Highway Storm Water Pumping Stations*, Volume 1 & 2, FHWA-IP-82-17, NTIS numbers PB 84-152727 and 152735 and the other references given at the end of this chapter. The Hydraulic Institute, 9 Sylvan Way, Parsippany, New Jersey, 07054-3802 has developed standards for pumps. Pump station design should be consistent with these standards.