

CHAPTER 6

WATER RELATED STRUCTURES EXCEPT STORAGE TANKS

6-1. General

Design of water related structures will comply with the need to maintain watertight and durable construction. In this interest, design of concrete structures will be in accordance with the recommendations of ACI 350R. Where appropriate, water related concrete structures will be designed as hydraulic structures. Additional design guidance will be obtained from applicable design agency reference documents and the Handbook of Concrete Engineering by Fintel.

6-2. Intake and discharge structures

Intake and discharge structures, such as for power plants and pumping stations, will be designed to sustain wave forces, hydrostatic pressures, earth pressures, surcharges, and other superimposed loads. Trash racks and screens will be provided. The amount of trash, debris, or seaweed expected to accumulate in intake structures will be the primary consideration in deciding whether or not a continuously cleaning mechanical traveling screen will be used. Design will consider the maximum permissible differential head across the trash rack or screening device.

6-3. Water transmission lines

Design of water transmission lines will include consideration of items such as maintaining watertightness, avoiding erosive velocities, and providing gradual transitions in cross-section and alignment. Structures will be designed to carry the weight of the aqueduct or pipeline with fluid and to resist loads due to wind, snow, and seismic activity. Reaction blocking will be designed and provided where necessary to resist forces due to pressure, thrust, impact, water hammer, etc. The structural design will be coordinated with the

selection of pipeline materials and layout to assure that proper allowance has been made for these forces as well as expansion movements, etc.

6-4. Water and wastewater treatment facilities

a. General. Design of water supply facilities will be in accordance with TM 5-813-1/AFM 88-10, Volume 1; TM 5-813-4/AFM 88-10, Volume 4; and ASCE Water Treatment Plant Design. Design of wastewater treatment facilities will be in accordance with TM 5-814-3/AFM 88-11, Volume 3 and WPCF MOP8CTG.

b. Basins and similar construction. Structures such as primary settling basins, clear wells, sedimentation tanks, Imhoff tanks, filters, sludge digesters, and similar structures will be designed in accordance with concepts set forth in earlier paragraphs under the discussion of structures for bulk liquid materials and TM 5-814-3/AFM 88-11, Volume 3. Pipeline support structures, sluice gates, equipment foundations, and other miscellaneous structures will be designed in accordance with criteria given elsewhere in this manual and current standard practices. Manufacturer's recommended designs may also be considered.

6-5. Underground structures

Design of underground structures associated with water related facilities, e.g., manholes, pits, etc., will comply with criteria for manholes and inlets in paragraph 4-1. Paved inverts and similar details will be provided as required for the particular system being incorporated. Applicable portions of ASTM C 32, C 857, and C 858 will also be considered.