VII - WATER CONTROL PLAN

7-01 GENERAL OBJECTIVES

The primary objective of Hansen Dam is flood control, specifically, the minimization of flood damages for portions of the San Fernando Valley along Tujunga Wash and the Los Angeles River. In this regard, water is temporarily stored behind Hansen Dam during periods of high inflows and is released more slowly through the downstream Tujunga Wash Channel.

There is no objective to operate the dam to reduce inundation damages to its improved reservoir lands. All usage of reservoir land is intended to have a purpose secondary to its role as the bottom of the flood control reservoir. All costs associated with reservoir inundation are intended to be routine maintenance costs associated with a clear understanding of risk and subsequent willingness to locate within the flood control reservoir.

7-02 MAJOR CONSTRAINTS

Significant problems have arisen at the project over recent years, including:

a. Loss of storage space due to sedimentation. Based on the results of the April 1983 reservoir sediment survey, current flood storage capacity below the spillway crest elevation of 1,060 ft. is approximately 25,500 ac-ft which is 23 percent less than the initially allocated flood control storage capacity (33,100 ac-ft). See plate 3-6 for the area-capacity curve reflecting 1983 conditions. Under 1983, conditions the SPF would reach a maximum water surface elevation of 1.057.25 ft., a maximum storage of 23,600 ac-ft, and a peak outflow of 20,640 ft^3/s.

b. Repetitive clogging of the outlet conduits with dense silt. Due to a 10-month impoundment period following the major flood of 1978, an 18-ft. deep cohesive silt deposit completely clogged the gated outlet conduits. In 1982, following a 1-1/2 month impoundment, some conduits were observed to be 80 percent clogged with material.

c. Repetitive blocking of the trash rack by floatable debris. During the flood of 1980, while all gates were fully open, inflow (up to 11,350 ft^3/s) transported floatable debris into the trash rack, nearly sealing off the outlet works. This occurrence is described in detail in section 3-06. During 1982, inflow as low as 500 ft^3/s carried floatable debris, clogging the lower 10 ft. of the trash rack.

d. A variety of downstream difficulties associated with the dam's sediment outflow. In 1980, a policy of leaving all gates in the fully open position was adopted to minimize reservoir siltation, including silt packing in the outlet conduits. Subsequently, the problem of debris clogging the trash rack due to the direct impingement of fast-moving inflow was experienced. Local agencies also complained that the free-flowing stream picked up sediment from the reservoir bottom and transported the sediment into the downstream channel. Several downstream problems were noted. Groundwater

recharge basins silted in. Water that would have previously been diverted for recharge was bypassed to the ocean because of its high suspended sediment content and because it was released at rates exceeding diversion capability (up to 400 cfs). Low flow in the downstream concrete channels silted in. Abrasion to the downstream concrete channel inverts was accelerated.

7-03 OVERALL PLAN FOR WATER CONTROL

Hansen Dam is regulated for flood control on Tujunga Wash and in the Los Angeles River. Plate 2-2, which depicts the storage allocations for Hansen Reservoir, shows that the entire space of the reservoir below the elevation 1,060 ft. (the spillway crest) is devoted to flood control. It is also the maximum water surface elevation for a Standard Project Flood (SPF). Between elevation 1,060 and 1,081.2 ft. (the maximum surface elevation for a Probable Maximum Flood (PMF)) is the spillway design surcharge pool. Here flood control is no longer the prime objective in deference to passing as much water out of the reservoir as is required to assure the safety of the dam. The 5.8 ft. between elevation 1,081.2 and 1,087 ft. is reserved for freeboard.

Hansen Dam is regulated in coordination with other projects protecting Tujunga Wash and the middle Los Angeles River. These projects include Pacoima, Big Tujunga, Lopez, and Devil's Gate Dams. Their locations are shown on plate 2-1A.

There may be instances where some reduction in releases may be considered necessary from a systems perspective. These conditions are discussed in section 7-13.

7-04 STANDING INSTRUCTIONS TO THE PROJECT OPERATOR

In the event that all communication with the District Office, including the Base Yard, should be interrupted, a set of Standing Instructions to the Project Operator for Water Control have been compiled for each dam. A copy of these instructions for Hansen Dam is included in Exhibit A of this manual.

7-05 FLOOD CONTROL

The plan for controlling floods on Tujunga Wash below Hansen Dam is presented in this section. The objective of the operating water control plan is to minimize flow damages. Project releases will be regulated to protect downstream communities. An attempt should be made to inform LACDPW and the Los Angeles City DWP of the release and of possible impacts to these agencies' spreading grounds downstream.

The project should be operated according to he Reservoir Regulation Schedule in Exhibit B. This is achieved by allowing the reservoir to build a pool by keeping the eight gates open at 1.0 ft. until the water surface elevation reaches 1.010.5 ft. After the water surface elevation reaches 1.010.5 ft., all gates are opened fully to 8.0 ft. until the downstream channel capacity of 20,800 ft^3/s is reached at a pool elevation of 1053.0. ft. The gates are progressively closed as the water surface elevation rises until, at elevation 1,066, the gates are fully closed. At this point, spillway flow

plus ungated outflow approximately equal to downstream channel capacity occurs. On the falling limb of the inflow hydrograph, the same gate schedule is followed as the rising limb down to a pool elevation of 1,053.0 ft. All gates are left fully open at 8.0 ft below a water surface elevation of 1,053.0 until the reservoir is empty. Exhibit B provides a schedule that achieves this regulation. The schedule was revised in 1988 to reflect the following: to conform to a revised downstream channel capacity of 20,800 ft^3/s; to have no more than four gates operated at a time; and to prevent debris and sediment from building up and clogging the outlet works. Keeping the gates open at 1.0 ft. until the water surface elevation reaches 1.010.5 is intended to minimize the floating debris problem, and keeping the gates fully open as the reservoir empties is intended to minimize the conduit sedimentation problem.

Hansen Reservoir should be drained as rapidly as possible, consistent with the achievement of downstream flood control. If runoff conditions are expected to cause flow to exceed the downstream channel capacity based on downstream channel observers and anticipated side inflow, releases should be reduced, so as not to contribute to the flooding. The objective is to safely empty the reservoir in preparation for the next flood and to prevent the outlet works from becoming clogged from sediment deposition.

A forecast to make regulation decisions may be either a series of computer generated inflow hydrographs (expected in the future) or a reasonable judgmental assessment of on-going rainfall and runoff, based upon available information. In either case, the ROC of the LAD would be responsible for developing the forecast and for determining confidence in it toward its application to reservoir water control decisions. The intent is to consider all appropriate information in implementing the water control plan described above.

7-06 RECREATION

Approximately 1,450 acres are under lease to the City of Los Angeles for recreation development. Existing recreation development consists of an 18-hole golf course, two parks, a recreation center with ballfields, an amphitheater, and a miniature trail concession. There is significant equestrian use adjacent to the basin, and many trails meander through the reservoir. Some of the trails run through existing quarry operations and are often relocated by the City of Los Angeles to prevent conflicts.

As mentioned previously, the sole purpose of Hansen Dam is flood control. No water is impounded behind the dam for the purpose of recreation. A 130-acre recreational lake was maintained behind the dam up until the 1970's when it succumbed to sedimentation. The Water Resources Development Act of 1986, Report 99-1013, Section 847, provides for the sale of dredged material at Hansen Dam to be appropriated by Congress to the Secretary of the Army to construct, operate, and maintain recreational facilities at the Hansen Dam project. A proposal to excavate another lake in the basin is in process at this time. Other facilities proposed at this time are individual and group picnic areas and primitive camping areas. Plans are currently in preparation for a bike path and an equestrian trail which will run from one end of the dam to the other.

The channel of Tujunga Wash downstream of Hansen Dam is strictly a flood control channel, and provides no water oriented recreation use. Thus no releases are made for recreational purposes.

7-07 WATER QUALITY

Because Hansen Dam has two ungated outlets, it cannot be operated to contain contaminant spills, unless the water surface elevation remains below 1,011 ft. (invert of the two ungated outlets). Hansen Dam is not operated for water quality objectives.

7-08 FISH AND WILDLIFE

No Hansen Dam water control objectives exist for fish and wildlife, either within the reservoir, or within the channel of Tujunga Wash downstream. The Environmental Assessment that accompanies this water control manual contains detailed information on species types found within the Hansen Dam project area.

7-09 DROUGHT CONTINGENCY PLAN

Hansen Dam does not contain any storage allocation for water supply, however, the Water Resources Development Act of 1986, Report 99-1013, Section 847 authorizes the Secretary of the Army to facilitate water conservation and groundwater recharge measures at Hansen Dam project in coordination with the City of Los Angeles, California and the Los Angeles County Flood Control District, to the extent consistent with other project purposes. Tujunga Wash downstream of the dam is concrete-lined but diversion possibilities exist at the Hansen and the Tujunga Spreading Grounds (see secs. 3-04 b. and d.). Currently, no storage is used for water conservation until local interests formally agree to participate in the removal of sediment deposits accumulated in the reservoir that are directly attributable to water conservation operation. However, in the event of a drought, the possibility of impounding water for water conservation would be considered. Any such plan would be evaluated to ensure that the flood control purpose of the project would not be compromised.

7-10 HYDROELECTRIC POWER

No facilities for the generation of hydroelectric power at Hansen Dam exist, nor are any contemplated.

7-11 NAVIGATION

No navigation of any sort is possible or allowed in Hansen Reservoir or in Tujunga Wash, either upstream or downstream of Hansen Dam.

7-12 OTHER

Maintenance and construction on the downstream channel of Tujunga Wash normally occur during the dry season of late spring and summer. During such periods, the eight Hansen Dam gates may be closed in order to reduce releases in support of such downstream activities.

7-13 DEVIATION FROM NORMAL OPERATION

The regulation schedule for Hansen Dam is outlined in Exhibit B and discussed in section 7-05.b. However, it is possible, and would be desirable, under certain limited circumstances, for the release rate from Hansen Dam to be decreased below what is called for in Exhibit B.

In addition to the prevention of downstream damages, there are other possible reasons for deviation form the normal release plan at Hansen Dam:

a. Emergencies. In the event of a potential drowning, toxic spill, or other accident in which high flows on Tujunga Wash downstream of Hansen Dam could prevent rescue or could cause further injury, the eight gates at Hansen Dam could temporarily be partially or totally closed. This would reduce, but not eliminate, the flow to the downstream channel if the reservoir water surface were above an elevation of 1,011, the elevation of the ungated outlets. Such emergency action should be taken immediately, unless such action would likely result in worse conditions. Notifications to all concerned agencies of emergency actions must be made as soon as possible.

b. Unplanned Minor Deviations. Unplanned events that could create a temporary need for minor deviations from the schedule published in Exhibit B include emergency bridge repairs, the restoration of utility lines across Tujunga Wash, and certain unplanned necessary maintenance and inspection. Hansen Dam may be operated to support these activities, provided that flood protection is not jeopardized, and provided that no significant threat is made to endangered wildlife species in the reservoir (see sec. 8-05).

c. Planned Deviations. The same arguments apply to planned construction, maintenance, inspections, etc., as described in section 7-13.b. Such planned activities should be scheduled for the dry season, whenever possible. The dry season is normally May through October, although on a rare occasion, a tropical storm with heavy rain and high runoff potential can occur during the late summer or early fall.

7-14 RATE OF RELEASE CHANGE

The eight hydraulic gates at Hansen Dam move at a rate of 0.8 ft/min. The dam tender can safely operate one gate at a time in succession, operating controls on one until the desired setting is reached, then operating the adjacent gate. When the water elevation in the reservoir has reached 1010.5 ft, this physical limitation on speed of operation prevents a sudden jump in downstream releases from 1,260 cfs to 7,920 cfs. In a major flood, with all gates open to 8.0 feet, the two ungated outlets will begin to discharge at elevation 1011.0 feet as inflow increases. The concrete lining

of the downstream channel precludes concern over bank erosion or sloughing due to sudden gate changes, however the downstream channel capacity of 20,800 cfs maximum must not be exceeded and may be influenced by side inflow. Therefore gradual decreases in gate openings at Hansen Dam, based upon downstream reports by channel observers, may be desired even prior to gate closings scheduled when elevation 1053.0 feet is reached.

7-15 WATER CONTROL PLANNING TOOLS

Specific planning tools have been utilized in the development of the flood control plan. These tools are also used to evaluate and regulate rules planned deviations and also facilitate operation of the dam during emergencies and unplanned deviations. Water control planning tools used for Hansen Dam include:

a. Outlet Rating Curves (pl. 7-1 and 7-2).

b. Spillway Discharge Curve (pl. 7-3).

c. Area-Capacity Curves (pl. 3-6).

d. Downstream Channel Capacity Plate (pl. 3-1).