

### III - HISTORY OF PROJECT

#### 3-01 Authorization

Carbon Canyon Dam and Channel was authorized pursuant to two acts of Congress. The first of these, the Flood Control Act of 1936 (Public Law 738, 74<sup>th</sup> Congress, H.R. 8455, approved 22 June 1936), provided in part for the construction of reservoirs and related flood-control works for the protection of metropolitan Orange County, California. The second (Public Law 761, 75<sup>th</sup> Congress, approved 28 June 1938), amended the 1936 Act by providing for the acquisition by the United States of land, easements, and right-of-way for dam and reservoir projects, channel improvements, and channel rectification for flood control. The overall project was adopted in the Flood Control Act of 1936 on the basis of the 29 July 1935 report of the Orange County Flood Control District (OCFCD) in connection with an application for a grant under the Federal Emergency Relief Appropriation Act of 1935.

#### 3-02 Planning and Design

Information generally pertaining to the dam was first presented in the OCFCD report mentioned above. In numerous subsequent conferences with LAD, the Orange County Board of Supervisors and OCFCD discussed the plan of improvement. A comprehensive report on a plan for flood control in Orange County, California, was prepared by OCFCD in March 1955. This plan included Carbon Canyon Dam and Carbon Canyon Creek channel improvements. Design of the dam, and a length of improved channel immediately downstream of the dam, was performed by LAD, and presented in "General Design for Carbon Canyon Dam and Channel, Design Memorandum No. 2, Santa Ana River Basin (and Orange County)", dated August 1957, submitted 21 February 1958, and approved with comments 17 April 1958. This memorandum included design of the dam, outlet works, spillway, and a concrete-lined channel 4080 feet in length (see para. 3-04a), as well as construction of drainage structures, relocation of two highways, modification of bridges, the removal of school buildings and residences, and the relocation of utilities.

#### 3-03 Construction

Construction of Carbon Canyon Dam started in April 1959 under contract DA 04-353-CIVENG-59-144, with work completed and accepted by the U.S. Army Corps of Engineers on 9 May 1961. Construction of the Corps project channel (para. 3-04a) started in April 1960 and was completed in May 1961. The project was constructed by Oberg Construction Company of Northridge, California.

#### 3-04 Related Projects

Plate 1-1 shows projects related to Carbon Canyon Dam.

a. Carbon Canyon Channel. Carbon Canyon Channel (also called Carbon Canyon Creek) has been improved and partially lined from Carbon Canyon Dam to its juncture with Carbon Creek Channel. The LAD segment of this project is a 4080-foot concrete-lined rectangular channel extending downstream from Carbon

Carbon Canyon Dam partway to Miller Basin Complex, an OCEMA facility at the terminus of Carbon Canyon Channel. The remainder of Carbon Canyon Channel from the end of the LAD channel to Carbon Creek Channel has been partially improved, and is maintained by OCEMA. The Miller Basin Complex serves the functions of flood retarding basin, desilting basin, and stilling basin. At Miller Basin, Carbon Canyon Channel, becomes Carbon Creek Channel. Miller Basin also serves to divide flow between Carbon Creek Channel (which flows to Coyote Creek and then the San Gabriel River) and Carbon Canyon Diversion Channel (which flows to the Santa Ana River). The channel capacities and configurations for Carbon Canyon Channel from Carbon Canyon Dam to Miller Basin are shown on plate 3-1.

b. Carbon Canyon Diversion Channel. Carbon Canyon Diversion Channel is an unlined channel, built and maintained by OCEMA, extending from Miller Basin to the Santa Ana River. Carbon Canyon Diversion Channel was constructed to allow flow to be diverted away from Carbon Creek Channel into the Santa Ana River. Flow from Carbon Canyon Channel is normally directed into the diversion channel so that it may be used at groundwater recharge facilities on the Santa Ana River downstream. Once storage in Miller Basin reaches capacity, flow is then split between Carbon Creek Channel and Carbon Canyon Diversion Channel by means of a weir installed for that purpose. The channel capacities and configurations for the Carbon Canyon Diversion Channel are shown on plate 3-1.

### 3-05 Modification to Regulations

The original authorized reservoir regulation schedule for Carbon Canyon Dam called for a standby gate setting of both gates closed. In July 1982, the schedule (Exhibit A) was revised to call for a standby gate setting of one gate open to 0.5 feet to pass low flows. This change was adopted to prevent the formation of pools of stagnant water at the outlets. Additionally, the change was adopted to reduce sediment buildup at the outlet works, to reduce gate corrosion, and to maintain a drier reservoir bottom to allow heavy equipment access for silt clearing operations around the intake tunnels. The gate to be left open alternates, depending on sediment buildup, gate maintenance, and other conditions. Benefits from this mode of regulation are reduced gate corrosion and painting, and reduced insect propagation. The revised schedule also allows the reservoir pool below elevation 425 to be drained more rapidly with both gates set at 0.9 feet during falling stages. The standing instructions were also revised to call for wait-time of one hour after loss of communication with the LAD office before regulation is continued according to schedule. During falling stages, current downstream gauge height is to be maintained until communication is reestablished.

### 3-06 Principal Regulation Problem

Carbon Canyon Dam has never spilled, and there have never been any structural deficiencies or major hydraulic malfunctions. Based on the results of the 1969 reservoir sedimentation survey, sediment accumulated behind the dam at an average rate of 2.54 ac-ft per square mile per year during the 1961-1969 period (418 ac-ft in 8.5 years). This rate is somewhat higher than the 1.55 ac-ft per square mile per year expected over the life of the project. As of the 1969 survey, there was 6387 ac-ft of storage available above elevation

419 (top of debris pool) for flood control (6615 ac-ft remaining capacity below spillway crest minus 228 ac-ft capacity remaining in the debris pool), of which 5533 ac-ft (7033 ac-ft original capacity minus the 1500 ac-ft 50-year sediment allowance) is required to control the reservoir design flood (RDF) with the current regulation schedule (pl.2-2). Recent observations made by Corps personnel indicate that there is now very little sediment storage space remaining in the debris pool. Unless silt clearing is performed at Carbon Canyon Dam at needed intervals, impingement of sediment in the flood control pool will likely occur before the end of project life.

A limitation encountered in the regulation of Carbon Canyon Dam is that of downstream channel capacity in the segment of channel that runs through Alta Vista golf course. This segment of channel has an unknown capacity, is somewhat erosive, is overgrown with vegetation, and has numerous bridges which may impede flow during large events. The LAD Reservoir Regulation Section (RRS) would dispatch channel observers to this area if high flows are anticipated.