

## VII - WATER CONTROL PLAN

### 7-01 GENERAL OBJECTIVES

Lopez Dam and Reservoir are integral flood control facilities in the Pacoima-Tujunga Wash system of tributaries to the Los Angeles River. The purpose of the dam, a unit under the approved comprehensive plan for flood control in the LACDA, is to provide protection against debris-laden floodwaters for large areas between the dam site and Los Angeles River. Important improvements in these areas include valuable industrial, business, and residential properties and transportation systems. A secondary use for the dam is that it also forms a headworks to direct flows into the Pacoima Wash Channel and/or the Lopez Spreading Grounds operated by the LACDPW.

### 7-02 MAJOR CONSTRAINTS

Several physical constraints at Lopez Dam result in regulation limitations, including:

- a. Seepage occurs along the downstream toe of the dam when the reservoir level is at the spillway crest or above. The seepage has not been detrimental to the integrity of the dam. However, with pool elevations exceeding a 12-foot spillway surcharge, some instability may develop. Prolonged reservoir storage should be limited and COE personnel should monitor the dam whenever the reservoir contains water, especially at water levels above the spillway crest.
- b. The capacity of the reservoir outlet conduit is relatively small compared to the standard project flood (SPF) discharge of 11,200 cfs and the probable maximum flood (PMF) discharge of 30,400 cfs. The maximum discharge capacity of the outlet for the water level at the spillway crest is 422 cfs.
- c. The reservoir outlet discharges directly into the spillway channel which creates turbulence and affects the spillway flow. The outlet gate should be closed during flow over the spillway to eliminate spillway flow interference.
- d. Greater amounts of non-vegetative debris accumulate in the reservoir than was originally anticipated. The original design was based on retaining a 50-year accumulation of debris plus the debris produced by a major flood. The debris allowance was determined to be 794 acre-feet. This storage was completely filled with debris by February, 1969, only 15 years after completion of the dam. The greater amount of debris production results in decreased flood control storage and debris removal on a more frequent basis is required.
- e. Vegetative debris can plug the low level inlet to the reservoir drain under certain conditions. No structural improvements have been incorporated into the project for the specific purpose of controlling vegetative debris. Reservoir ponding will not occur while the outlet gate is at the full-open position until the reservoir content reaches approximately 45 acre-feet and the inflow exceeds 144 cfs.

f. Long term reservoir impoundment could be a safety hazard due to the fact that the reservoir is located in a residential area. There is a potential for children drowning, as well as several other safety concerns.

#### 7-03 OVERALL PLAN FOR WATER CONTROL

Due to the very limited flood control capability of Lopez Dam, the overall plan for water control at Lopez Dam has been formulated to address the following objectives and criteria: (a) minimization of sedimentation; (b) minimization of pool depths to reduce seepage through the embankment; (c) maintenance of a debris pool to avoid clogging the inlet trash rack on the outlet works with vegetative and miscellaneous debris; (d) gate closure during spillway flow to avoid outlet flow disturbance of flow in the spillway channel; and (e) ease of operation while providing for flexibility.

The objectives of the overall water control plan can be achieved by operating the reservoir outlet as if it were uncontrolled during all conditions except during spillway flow. For all inflow conditions when the water surface is below the spillway crest, the outlet gate is to be full-open. The outlet gate should be closed at all times when spillway flow is occurring. After spillway flow has ceased, the outlet gate is to be opened to the full-open position to allow draining of the pool.

#### 7-04 STANDING INSTRUCTIONS TO DAM TENDER

The standing instructions to the dam tender for the regulation of Lopez Dam and Reservoir are given in Table 7-1. At all times when there is no spillway flow (water surface elevation less than 1,273 ft.-NGVD), the reservoir outlet gate should be set at the full-open position of 5 feet. At all times during spillway flow, the gate should be closed to avoid interference with spillway flow. After spillway flow has ceased, and unless instructed otherwise, the gate opening should be reset to the full-open position.

The dam operator should follow the communication guidelines for normal and emergency operating conditions given below:

a. Communication with the District Office is available:

1. Notify the Reservoir Operations Center when a gate change will be required according to the schedule given in Table 7-1.
2. Notify the ROC if unable to set the gates as instructed.

b. Communication with the District Office is not available:

1. Try to reestablish communication through the LACDPW.
2. Allow a period of one-half hour to pass to reestablish communication with the District Office. If after one-half hour communication is not reestablished, follow the gate operation schedule given in Table 7-1.

TABLE 7-1

## LOPEZ DAM RESERVOIR REGULATION SCHEDULE

Step No.	When Reservoir Water Surface is Between Elevations (feet - NGVD)	Gate Setting (feet of opening)	Computed Outlet Discharge (cfs)	Spillway Discharge (cfs)
1	1,254-1,273	5.0	0-422	0
2	1,273-1,299	0	0	0-44,500

NOTES: Spillway Crest Elevation 1,273 ft, NGVD.  
 Top of Dam Elevation 1,299 ft, NGVD.  
Follow Step 1 at all times when there is no spillway flow  
Follow Step 2 at all times during spillway flow

DAM OPERATOR INSTRUCTIONS

1. Communication with the District Office is available.
  - a. Notify the Reservoir Operations Center when a gate change will be required according to the schedule.
  - b. Notify the Reservoir Operations Center if unable to set the gate as instructed.
2. Communication with the District Office is not available.
  - a. Try to reestablish communication through the Los Angeles County Department of Public Works.
  - b. Allow a period of one half hour to pass to reestablish communication with the District Office. If after one half hour communication is not reestablished, follow the gate operation schedule.

## 7-05 FLOOD CONTROL

Because of the limited storage capacity of Lopez Dam and the large channel capacity downstream of the dam, the flood control provided by the dam is due to the configuration of the dam and channel rather than to the operation of the outlet gate. The dam acts to divert flows coming from the unimproved Pacoima Wash upstream into the concrete lined channel downstream. The capacity of the downstream channel is about the same as the SPF Inflow Peak for Lopez Dam. Therefore, the water control plan for Lopez Dam has been developed considering the supplemental objectives and criteria discussed in Section 7-03 and the constraints listed in Section 7-02. The maximum operational benefits will be obtained by following the reservoir regulation schedule given in Table 7-1. The basic water control plan specifies that the reservoir outlet gate remain in the full-open position at all times unless spillway flow is occurring. The gate is to be closed during spillway flow to insure optimal flow conditions in the spillway channel. After spillway flow has ceased, and as a general rule, the reservoir outlet is to be opened again to the full-open position to allow draining of the pool. The reservoir pool drawdown from the spillway crest to the outlet invert, assuming no inflow into the reservoir, and the gate in the full-open position, is approximately 30 hours. It may be desirable to delay the drawdown time during certain conditions. The drawdown times for select gate openings are provided in table 7-2.

Maximum open channel flow of the outlet conduit is 144 cfs. Based on available information, this is probably less than the debris carrying discharge. Therefore, there is no requirement to close the outlet gate at the start of inflow in order to build a debris pool, because once inflow becomes greater than 144 cfs and debris starts to form, reservoir impoundment will begin, and a debris pool will build up.

## 7-06 RECREATION

There are no existing recreational facilities or activities associated with Lopez Dam and Reservoir.

## 7-07 WATER QUALITY

Since flood control operation of Lopez Dam has limited effect on water quality, no special provisions for water quality control are included in normal regulation. At various times in the past, LAD has cooperated with LACDPW in modifying its gate operating schedule to trap sediment being sluiced from upstream Pacoima Reservoir behind Lopez Dam. A 1959 agreement allowed the LACDPW to operate the outlet for purposes of lowering the concentration of suspended solids in water being delivered to downstream spreading grounds. This agreement expired in 1964.

## 7-08 FISH AND WILDLIFE

The Lopez Reservoir encompasses approximately 80 acres of vacant land. No vegetation exists within the reservoir basin. The margins of the basin have a scattered covering of tree tobacco (Nicotiana glauca) and broom baccharis

TABLE 7-2

## LOPEZ DAM POOL DRAWDOWN

<u>Gate Opening</u> <u>(feet)</u>	<u>Drawdown Time*</u> <u>(hours)</u>
0.5	332.0
1.0	113.5
1.5	66.5
2.0	49.0
2.5	42.5
3.0	38.0
3.5	35.0
4.0	32.5
4.5	31.0
5.0	29.5

\*Assuming reservoir inflow equal to zero and pool initially full at spillway crest.

(Baccharis sarothroides), which intergrades into the California coastal scrub of the surrounding hills.

The basin does not provide suitable habitat for wildlife. The lack of cover and intermittent flooding make the area unsuitable for most species. During periods in which the reservoir is holding water the basin provides marginal habitat for wading birds and migrating water fowl.

#### 7-09 WATER SUPPLY

The Lopez Dam water control plan does not provide for regulation for water supply. In some instances LAD has coordinated regulation of Lopez Dam with LACDPW's water supply operations of upstream Pacoima Dam and downstream spreading grounds.

Currently no formal agreement exists with LACDPW with respect to the operation of Lopez Dam. However, from 1959 to 1964, LACDPW operated the gated outlet under license from LAD in order to maintain a small debris pool behind Lopez Dam. Suspended solids in water conservation releases from Pacoima Dam settled out in this pool resulting in higher quality water released to downstream spreading grounds. The agreement required LACDPW to remove accumulated sediments resulting from their operations. Because LACDPW felt the cost of sediment removal exceeded the water supply benefits, LACDPW allowed the license to expire without renewal in 1964.

LAD has also periodically cooperated with LACDPW in allowing closure of the gated outlet at Lopez Dam and trapping sediment sluiced from Pacoima Reservoir in Lopez Reservoir. This operation facilitates removal of sediment from Pacoima Reservoir and has been allowed on the condition LACDPW remove the debris deposited in Lopez Reservoir.

#### 7-10 DEVIATION FROM NORMAL REGULATION

There may be instances when it is necessary for the operation of Lopez Dam to deviate from the established flood control plan. Prior approval of deviations is required from District Engineer, LAD, except for emergencies and minor deviations as discussed in subparagraphs a and b, below.

a. Emergencies. Some emergencies that can be expected are: drownings and other accidents, and failure of operation facilities. Necessary action under emergency conditions should be taken immediately unless such action would create equal or worse conditions. The Reservoir Regulation Unit, LAD, is to be informed of any deviations as soon as practical.

b. Unplanned Minor Deviations. There are unplanned instances that create a temporary need for minor deviations from the normal regulation of the reservoir, although they are not considered emergencies. Construction activities account for the major portion of such incidents and often include utility stream crossings, facility maintenance, bank protection work, and channel maintenance and major construction contracts. Changes in releases are sometimes necessary for maintenance and inspection. Requests for changes of release rates are generally for a few hours to a few days. Each request is

analyzed on its own merits. Consideration is given to upstream watershed conditions, potential flood threat, conditions of reservoirs, and possible alternative measures. In the interest of maintaining good public relations, the requests are usually complied with, providing there are no foreseen adverse effects on the overall operation of the project for the authorized purposes. Approval for these minor deviations will normally be obtained from the Reservoir Regulation Unit, LAD, by telephone with subsequent written confirmation.

c. Planned Deviations. These are planned instances, which require deviations from the normal regulation. Each condition is to be analyzed on its own merits. Sufficient data on flood potential, reservoir and watershed conditions, possible alternative measures, benefits to be expected, and probable effects on other projects and useful purposes will be presented by letter or telephone to Reservoir Regulation Unit, LAD, along with recommendations for approval.

#### 7-11 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 set operation rules for planned deviations and also to facilitate operation of the dam during emergencies and unplanned minor deviations. Water control planning tools used for Lopez Dam and Reservoir include:

- a. Pool Drawdown Table (Table 7-2),
- b. Outlet Rating Curve and Table (Plate 7-1 and Table 7-3),
- c. Spillway Discharge Curve and Table (Plate 7-2 and Table 7-4), and
- d. Area-Capacity Curves and Tables (Plate 7-3 and Table 7-5).

Table 7-3. Lopez Dam Outlet Discharge in Cubic Feet Per Second

ELEVATION	GATE OPENING IN FEET									
	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
1254	0	0	0	0	0	0	0	0	0	0
1255	6	10	10	10	10	10	10	10	10	10
1256	9	21	30	30	30	30	30	30	30	30
1257	11	27	49	62	62	62	62	62	62	62
1258	12	32	60	82	99	99	99	99	99	99
1259	13	36	67	92	116	130	144	144	144	144
1260	14	40	73	101	127	147	162	170	175	186
1261	14	44	80	109	138	160	178	191	206	232
1262	15	47	85	117	147	171	194	211	233	266
1263	16	49	90	124	155	182	208	230	256	288
1264	17	52	94	131	164	192	221	248	276	306
1265	18	54	99	138	171	203	233	264	293	321
1266	18	55	102	144	180	213	246	279	308	336
1267	19	57	106	149	188	223	258	292	322	350
1268	20	58	110	155	195	232	269	304	334	363
1269	20	60	113	160	202	241	280	315	346	376
1270	21	61	116	165	210	250	290	326	358	388
1271	21	62	119	170	217	258	300	337	368	400
1272	22	64	122	175	224	267	309	347	379	411
1273*	22	66	124	180	231	275	319	356	388	422
1274	23	67	127	185	237	283	327	365	400	433
1275	23	68	130	189	243	291	335	373	410	444
1276	24	70	132	194	249	299	344	381	420	454
127	24	71	135	198	255	306	352	389	429	464
1278	25	72	138	202	261	313	360	398	438	474
1279	26	74	140	206	266	320	367	406	448	484
1280	26	76	143	210	272	326	374	414	456	493
1281	27	78	146	214	277	333	381	422	464	502
1282	27	79	148	218	282	339	388	430	472	510
1283	27	81	151	222	287	344	394	438	480	519
1284	28	82	153	225	292	350	401	446	487	527
1285	28	84	156	228	297	356	406	453	495	535
1286	28	86	158	232	302	361	412	460	502	543
128	29	87	160	235	306	365	418	467	510	551
1288	29	88	163	238	310	370	425	474	518	559
1289	29	89	166	241	314	375	431	480	525	567
1290	30	90	168	244	319	380	437	486	532	574
1291	30	91	170	247	323	386	443	492	539	582
1292	30	92	172	250	326	391	449	499	547	589
1293	30	93	175	253	330	396	455	506	554	596
1294	31	94	178	256	334	401	461	512	561	603
1295	31	95	180	259	338	406	467	518	568	610
1296	31	96	182	262	341	411	473	525	575	617
1297	31	96	184	265	344	416	479	532	582	624
1298	32	97	186	267	346	420	484	538	589	631
1299**	32	98	187	270	348	424	490	545	596	638

Note: Elevation given is water surface elevation in feet above NGVD.

\*Spillway Crest

\*\*Top of Dam

Table 7-4

## LOPEZ DAM SPILLWAY DISCHARGE

<u>Elevation</u>	<u>Discharge (cfs)</u>	<u>Elevation</u>	<u>Discharge (cfs)</u>
1273.0	0	1286.5	16,688
1273.5	119	1287.0	17,603
1274.0	336	1287.5	18,554
1274.5	617	1288.0	19,522
1275.0	950	1288.5	20,506
1275.5	1,328	1289.0	21,507
1276.0	1,746	1289.5	22,523
1276.5	2,200	1290.0	23,554
1277.0	2,688	1290.5	24,601
1277.5	3,208	1291.0	25,663
1278.0	3,757	1291.5	26,739
1278.5	4,334	1292.0	27,830
1279.0	4,939	1292.5	28,936
1279.5	5,569	1293.0	30,056
1280.0	6,224	1293.5	31,190
1280.5	6,902	1294.0	32,338
1281.0	7,604	1294.5	33,500
1281.5	8,328	1295.0	34,676
1282.0	9,073	1295.5	35,864
1282.5	9,840	1296.0	37,067
1283.0	10,626	1296.5	38,282
1283.5	11,433	1297.0	39,510
1284.0	12,260	1297.5	40,751
1284.5	13,105	1298.0	42,005
1285.0	13,969	1298.5	43,271
1285.5	14,851	*1299.0	44,550
1286.0	15,751		

Note: Elevation given is water surface elevation in feet above NGVD.

\*Top of Dam

TABLE 7-5

## LOPEZ DAM RESERVOIR AREA AND CAPACITY

<u>Elevation</u>	<u>Capacity (acre-feet)</u>	<u>Area (acres)</u>	<u>Elevation</u>	<u>Capacity (acre-feet)</u>	<u>Area (acres)</u>
1254	0	0	1277	622.7	48.4
1255	2.1	3.7	1278	671.8	49.7
1256	7.7	7.6	1279	722.1	51.1
1257	17.2	11.3	1280	774.1	52.8
1258	29.9	14.0	1281	827.8	54.6
1259	45.2	16.4	1282	883.3	56.5
1260	62.9	18.9	1283	940.7	58.2
1261	83.0	21.2	1284	999.6	59.6
1262	104.9	22.7	1285	1059.8	60.8
1263	128.4	24.1	1286	1121.2	61.9
1264	153.2	25.5	1287	1183.7	63.1
1265	179.3	26.8	1288	1247.3	64.1
1266	206.8	28.1	1289	1311.9	65.1
1267	235.9	29.6	1290	1377.5	66.0
1268	265.9	31.1	1291	1444.0	67.0
1269	297.9	32.8	1292	1511.4	67.9
1270	331.6	34.7	1293	1579.9	69.2
1271	367.3	36.6	1294	1649.8	70.7
1272	404.8	38.4	1295	1721.4	72.4
*1273	441.1	40.4	1296	1794.7	74.3
1274	485.6	42.6	1297	1870.0	76.4
1275	529.4	44.9	1298	1947.6	79.0
1276	575.2	46.6	**1299	2027.9	80.8

- Notes: (1) Table based on survey dated March, 1979.  
(2) Elevation given is water surface elevation in feet above NGVD.

\*Spillway Crest

\*\*Top of Dam