

Monterey County Water Resources Agency

San Antonio Dam Multi-Year Maintenance Plan

SUBJECT TO REVISION

**Reservoir Operations Committee
May 5, 2016**

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Monterey County Water Resources Agency

**San Antonio Dam
Multi-Year Maintenance Plan
as of
May 5, 2016**

- Costs escalated at 2-percent per year (per U.S. Army Corps of Engineers Civil Works Construction Cost Index System, Amendment 7, 30 Sep 2015)
- Revenue escalated at 2-percent per year
- Six work items may need to be addressed as part of the Interlake Tunnel / Spillway Modification Project

San Antonio Dam - Large Upcoming Maintenance Projects

Work Item	Project	Projected Fiscal Year	Estimated Cost 2016 Dollars
17	Reline 84" Penstock dwnstream of BFV (±600 LF) SINKING FUND (1 of 9)	16-17	\$ 105,000
10	Install New 8" ARV (near BFV) - 1 of 7	16-17	\$ 19,799
16	Fabricate new intake structure bulkhead gate	16-17	\$ 55,520
48	Install inlet structure bulkhead gate	18-19	\$ 35,598
52	Purchase and Install New 8" ARV (near BFV) - 2 of 7	18-19	\$ 18,652
54	Fabricate new inlet trash racks	18-19	\$ 91,623
69	Install new inlet trash racks by Dec 31, 2020 (per DSOD) <i>underwater w/ divers</i>	19-20	\$ 161,530
67	Purchase and Install New 8" ARV (near BFV) - 3 of 7	19-20	\$ 18,652
84	Road Maint - Patch/Repair AREA 1 - Main Gate to Control House	20-21	\$ 60,804
87	Purchase and Install New 8" ARV (near BFV) - 4 of 7	20-21	\$ 20,295
102	Road Maint - Patch/Repair AREA 2 - Up to and across dam crest, including around south knob	21-22	\$ 60,804
106	Purchase and Install New 8" ARV (near BFV) - 5 of 7	21-22	\$ 18,652
119	Purchase and Install New 8" ARV (near BFV) - 6 of 7	22-23	\$ 18,652
135	Purchase and Install New 8" ARV (near BFV) - 7 of 7	23-24	\$ 18,652
136	Repalce 10" ARV (D/S of BFV) - 1 of 7	23-24	\$ 20,952
137	Repalce 10" ARV (D/S of BFV) - 2 of 7	23-24	\$ 20,952
138	Repalce 10" ARV (D/S of BFV) - 3 of 7	22-23	\$ 20,952
139	Repalce 10" ARV (D/S of BFV) - 4 of 7	23-24	\$ 20,952
140	Repalce 10" ARV (D/S of BFV) - 5 of 7	23-24	\$ 20,952
141	Repalce 10" ARV (D/S of BFV) - 6 of 7	23-24	\$ 20,952
142	Repalce 10" ARV (D/S of BFV) - 7 of 7	23-24	\$ 20,952

SUBJECT TO REVISION

BFV BUTTERFLY VALVE
 ARV AIR RELEASE VALVE

San Antonio Dam

Items that may be addressed during Tunnel / Spillway Modification Project

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost
1	Repair spillway concrete floor Replace logboom at spillway inlet channel with Tuff-Boom type			\$ 42,892		\$ 450,000		\$ 450,000	\$ 492,892
2	debris boom			\$ 9,221			\$ 100,000	\$ 100,000	\$ 109,221
3	Road Maint - Patch/Repair AREA 4 - Spillway Access Roads			\$ 20,804		\$ 30,000		\$ 30,000	\$ 50,804
4	Investigate spillway concrete deterioration and prepare maintenance / repair plan		DSOD 5-5-2015 Insp. Report	\$ 12,225				\$ -	\$ 12,225
5	Install new piezometers in dam - abandon existing casagrande piezometers			\$ 46,436		\$ 230,000		\$ 230,000	\$ 276,436
6	Update dam stability analysis - last done: Bechtel, 1970			\$ 26,454		\$ 50,000		\$ 50,000	\$ 76,454
FOR FURTHER CONSIDERATION									
	Road Maint - Patch/Repair AREA 3 - Vista Rd and Parking Lot			\$ 20,804		\$ 40,000		\$ 40,000	\$ 60,804

- = dam safety program compliance item
- = "project" meaning work item projected to accomplish during a particular fiscal year

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 1

Years' Cost
 Escalated from 2016 Dc
 0

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost	
1	Vegetation Control, Rodent Control	16-17		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 21,983	
2	100% Cycle Butterfly Valve & Howell-Bunger Valve	16-17	DSOD 5-5-2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 2,774	
3	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)	16-17	DSOD, MCWRA	\$ 13,068				\$ -	\$ 13,068	\$ 13,068	
4	Piezomter / Drain monitor, data process, consultant management, annual surveillance report review	16-17	DSOD	\$ 30,399		\$ 41,891		\$ 41,891	\$ 72,290	\$ 72,290	
5	Settlement & Shift Survey	16-17	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 20,948	
6	Flush Piezometers (suspended until reservoir reaches min-pool)	16-17		\$ 20,624				\$ -	\$ 20,624	\$ 20,624	
7	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.	16-17		\$ 36,307				\$ -	\$ 36,307	\$ 36,307	
8	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting	16-17		\$ 17,096				\$ -	\$ 17,096	\$ 17,096	
9	Inspect, clean, re-coat Howell-Bunger valve & sleeve, and replace brass bushing	16-17		\$ 13,181		\$ 5,000	\$ 1,440	\$ 6,440	\$ 19,621	\$ 19,621	
10	Install New 8" ARV (near BFV) - 1 of 7	16-17		\$ 17,799			\$ 2,000	\$ 2,000	\$ 19,799	\$ 19,799	
11	Purchase & Install Closed Circuit TV & Communications in BFV Chamber	16-17		\$ 15,154			\$ 5,000	\$ 5,000	\$ 20,154	\$ 20,154	
12	Inspect 96" BFV trunion packing/parts & service as-needed	16-17		\$ 10,551			\$ 3,000	\$ 3,000	\$ 13,551	\$ 13,551	
13	Inspect spillway bridge - develop maintenance/repair plan & cost estimate as-needed	16-17		\$ 3,832				\$ -	\$ 3,832	\$ 3,832	
14	Repair spillway 10" clay pipe subsurface drain (right side)	16-17		\$ 17,799			\$ 1,500	\$ 1,500	\$ 19,299	\$ 19,299	
15	Prepare Emergency Action Plan for SA Dam	16-17	DSOD 7-29-2015 Ltr	\$ 7,936				\$ -	\$ 7,936	\$ 7,936	
16	Fabricate intake structure bulkhead gate	16-17		\$ 19,160		\$ 36,360		\$ 36,360	\$ 55,520	\$ 55,520	
17	Reline 84" Penstock dwnstream of BFV (±600 LF) SINKING FUND (1 of 9)	16-17		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000	
18	Touch-up paint outer 84" steel penstock in tunnel - PARTIAL (YEAR 1 of 2 - FILL-IN WORK AS-NEEDED)	16-17		\$ 6,226			\$ 1,000	\$ 1,000	\$ 7,226	\$ 7,226	
19	Contingency	16-17		\$ -					\$ -	\$ -	
				\$ 100,029					\$ 100,029	\$ 100,029	
				\$ 356,566	\$ 105,000	\$ 98,251	\$ 17,240	\$ 115,491	\$ 577,057	\$ 577,057	
										Target Budget for Items Shown: \$	577,445
										Budget - Estimated Total Cost: \$	388

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 2

Years' Cost
Escalated from 2016 Dc
1

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost
20	Vegetation Control, Rodent Control	17-18		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 22,422
21	100% Cycle Butterfly Valve & Howell-Bunger Valve	17-18	DSOD 5-5-2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 2,829
22	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)	17-18	DSOD, MCWRA	\$ 13,068				\$ -	\$ 13,068	\$ 13,329
23	Piezomter / Drain monitor, data process, consultant management, annual surveillance report review	17-18	DSOD	\$ 30,399		\$ 41,891		\$ 41,891	\$ 72,290	\$ 73,736
24	Settlement & Shift Survey	17-18	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 21,367
25	Flush Piezometers (suspended until reservoir reaches min-pool)	17-18		\$ 20,624				\$ -	\$ 20,624	\$ 21,037
26	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.	17-18		\$ 36,307				\$ -	\$ 36,307	\$ 37,034
27	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting	17-18		\$ 17,096				\$ -	\$ 17,096	\$ 17,437
28	Update SA Dam Emergecny Action Plan (EAP)	17-18		\$ 2,116				\$ -	\$ 2,116	\$ 2,159
29	96" BFV hydraulic operation system repair & upgrade	17-18		\$ 10,808			\$ 12,000	\$ 12,000	\$ 22,808	\$ 23,264
30	Repair spalled concrete at spillway left approach wall and at left wall near bridge	17-18	DSOD 5-5-2015 Insp Rpt	\$ 6,462			\$ 1,000	\$ 1,000	\$ 7,462	\$ 7,611
31	Video spillway 10" dia subsurface drains	17-18		\$ 5,548			\$ 2,500	\$ 2,500	\$ 8,048	\$ 8,209
32	Replace left abutment surface drain piping (side hill drains)	17-18		\$ 27,662			\$ 4,000	\$ 4,000	\$ 31,662	\$ 32,295
33	Install new access hatch in 84" penstock near BFV for downstream penstock internal re-coating work	17-18		\$ 19,160		\$ 20,000		\$ 20,000	\$ 39,160	\$ 39,943
34	Repair Howell-Bunger valve Discharge Cone (Sandblast, Patch/Repair, Resurface) DWGs 3440-6-008, 017	17-18		\$ 23,449		\$ 35,000		\$ 35,000	\$ 58,449	\$ 59,618
35	Determine need/benefits of replacing 96" BFV weight/lever with gear operator; develop preliminary specs and cost estimate as needed	17-18		\$ 5,948				\$ -	\$ 5,948	\$ 6,067
36	Reline 84" Penstock downstream of BFV (±600 LF) SINKING FUND (2 of 9)	17-18		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000
37	Touch-up paint outer 84" steel penstock in tunnel - PARTIAL (YEAR 2 of 2 - FILL-IN WORK AS-NEEDED)	17-18		\$ 6,226			\$ 1,000	\$ 1,000	\$ 7,226	\$ 7,370
38	Contingency	17-18								\$ -
				\$ 86,078					\$ 86,078	\$ 87,799

\$ 338,356	\$ 105,000	\$ 111,891	\$ 23,800	\$ 135,691	\$ 579,047	\$ 588,528
						Target Budget for Items Shown: \$ 588,994
						Budget - Estimated Total Cost: \$ 466

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 3

Years' Cost
 Escalated from 2016 Dollars
 2

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost
39	Vegetation Control, Rodent Control	18-19		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 22,871
40	100% Cycle Butterfly Valve & Howell-Bunger Valve	18-19	DSOD 5-5-2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 2,886
41	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)	18-19	DSOD, MCWRA	\$ 13,068				\$ -	\$ 13,068	\$ 13,596
42	Piezometer / Drain monitor, data process, consultant management, annual surveillance report review	18-19	DSOD	\$ 30,399		\$ 41,891		\$ 41,891	\$ 72,290	\$ 75,211
43	Settlement & Shift Survey	18-19	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 21,795
44	Flush Piezometers (suspended until reservoir reaches min-pool)	18-19		\$ 20,624				\$ -	\$ 20,624	\$ 21,457
45	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.	18-19		\$ 36,307				\$ -	\$ 36,307	\$ 37,774
46	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting	18-19		\$ 17,096				\$ -	\$ 17,096	\$ 17,786
47	Update SA Dam Emergency Action Plan (EAP)	18-19		\$ 2,116				\$ -	\$ 2,116	\$ 2,202
48	Install inlet structure bulkhead gate	18-19		\$ 35,598				\$ -	\$ 35,598	\$ 37,036
49	Internal Inspection of 84" Penstock & Touch-Up Coat Internal Penstock D/S of BFV	18-19	DSOD	\$ 30,307		\$ 16,800	\$ 3,000	\$ 19,800	\$ 50,107	\$ 52,132
50	Flush left abut drains & spillway drains (last flushed 2015)	18-19		\$ 8,435		\$ 10,274		\$ 10,274	\$ 18,709	\$ 19,464
51	Investigate condition of electrical wiring in tunnel; develop plan and cost estimate(s) as needed	18-19		\$ 2,774		\$ 1,400		\$ 1,400	\$ 4,174	\$ 4,342
52	Purchase and Install New 8" ARV (near BFV) - 2 of 7	18-19		\$ 12,452			\$ 6,200	\$ 6,200	\$ 18,652	\$ 19,405
53	Reline 84" Penstock downstream of BFV (±600 LF) SINKING FUND (3 of 9)	18-19		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000
54	Fabricate new inlet trash racks	18-19	DSOD 5-5-2015 Insp Rpt	\$ 13,869		\$ 77,754		\$ 77,754	\$ 91,623	\$ 95,325
55	Contingency	18-19								\$ -
				\$ 50,213					\$ 50,213	\$ 52,241
				\$ 300,662	\$ 105,000	\$ 163,119	\$ 12,500	\$ 175,619	\$ 581,281	\$ 600,523
									Target Budget for Items Shown: \$	600,774
									Budget - Estimated Total Cost: \$	251

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 4

Years' Cost
 Escalated from 2016 Dc
 3

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost	
56	Vegetation Control, Rodent Control	19-20		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 23,328	
57	100% Cycle Butterfly Valve & Howell-Bunger Valve	19-20	DSOD 5-5-2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 2,944	
58	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)	19-20	DSOD, MCWRA	\$ 13,068				\$ -	\$ 13,068	\$ 13,868	
59	Piezometer / Drain monitor, data process, consultant management, annual surveillance report review	19-20	DSOD	\$ 30,399		\$ 41,891		\$ 41,891	\$ 72,290	\$ 76,715	
60	Settlement & Shift Survey	19-20	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 22,231	
61	Flush Piezometers (suspended until reservoir reaches min-pool)	19-20		\$ 20,624				\$ -	\$ 20,624	\$ 21,886	
62	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.	19-20		\$ 36,307				\$ -	\$ 36,307	\$ 38,530	
63	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting	19-20		\$ 17,096				\$ -	\$ 17,096	\$ 18,142	
64	Update SA Dam Emergency Action Plan (EAP)	19-20		\$ 2,116				\$ -	\$ 2,116	\$ 2,246	
65	Install new survey monuments	19-20		\$ 3,688			\$ 750	\$ 750	\$ 4,438	\$ 4,710	
66	RFP, hire dam surveillance consultant for 5-yr term	19-20	DSOD	\$ 7,936				\$ -	\$ 7,936	\$ 8,422	
67	Purchase and Install New 8" ARV (near BFV) - 3 of 7	19-20		\$ 12,452			\$ 6,200	\$ 6,200	\$ 18,652	\$ 19,793	
68	Reline 84" Penstock downstream of BFV (±600 LF) SINKING FUND (4 of 9)	19-20		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000	
69	Install new inlet trash racks by Dec 31, 2020 (per DSOD)	19-20	DSOD 5-5-2015 Insp Rpt	\$ 41,608		\$ 100,000	\$ 19,922	\$ 119,922	\$ 161,530	\$ 171,417	
70	Contingency	19-20								\$ -	
				\$ 78,548					\$ 78,548	\$ 83,355	
				\$ 291,247	\$ 105,000	\$ 156,891	\$ 30,172	\$ 187,063	\$ 583,310	\$ 612,586	
										Target Budget for Items Shown:	\$ 612,789
										Budget - Estimated Total Cost:	\$ 203

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 5

Years' Cost
 Escalated from 2016 Dc
4

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost
71	Vegetation Control, Rodent Control	20-21		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 23,795
72	100% Cycle Butterfly Valve & Howell-Bunger Valve	20-21	DSOD 5-5-2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 3,002
73	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)	20-21	DSOD, MCWRA	\$ 13,068				\$ -	\$ 13,068	\$ 14,145
74	Piezomter / Drain monitor, data process, consultant management, annual surveillance report review	20-21	DSOD	\$ 30,399		\$ 41,891		\$ 41,891	\$ 72,290	\$ 78,249
75	Settlement & Shift Survey	20-21	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 22,675
76	Flush Piezometers (suspended until reservoir reaches min-pool)	20-21		\$ 20,624				\$ -	\$ 20,624	\$ 22,324
77	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.	20-21		\$ 36,307				\$ -	\$ 36,307	\$ 39,300
78	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting	20-21		\$ 17,096				\$ -	\$ 17,096	\$ 18,505
79	Update SA Dam Emergecny Action Plan (EAP)	20-21		\$ 2,116				\$ -	\$ 2,116	\$ 2,291
80	Inspect Howell-Bunger valve & sleeve, and clean/recoat sleeve, replace brass bushing - as needed	20-21		\$ 8,578		\$ 3,000	\$ 1,440	\$ 4,440	\$ 13,018	\$ 14,092
81	Video spillway 10" dia subsurface drains	20-21		\$ 5,548			\$ 2,500	\$ 2,500	\$ 8,048	\$ 8,711
82	Purchase Dam Barrier Buoy Line (alternative to New Debris Boom)	20-21		\$ -	\$ 35,185			\$ -	\$ 35,185	\$ 38,085
83	SINKING FUND (1 of 3)	20-21		\$ -	\$ 35,185			\$ -	\$ 35,185	\$ 38,085
83	Dam Failure Inundation Mapping for SA Dam (for EAP)	20-21	DSOD 7-29-	\$ 10,582		\$ 20,000		\$ 20,000	\$ 30,582	\$ 33,103
84	Road Maint - Patch/Repair AREA 1 - Main Gate to Control House	20-21		\$ 20,804		\$ 40,000		\$ 40,000	\$ 60,804	\$ 65,816
85	Install guard rails on spillway walls adjacent access manholes	20-21		\$ 9,750			\$ 4,000	\$ 4,000	\$ 13,750	\$ 14,883
86	Repair toe relief well concrete bases	20-21		\$ 31,592			\$ 1,500	\$ 1,500	\$ 33,092	\$ 35,819
87	Replace 8" ARV (near BFV) - 4 of 7	20-21		\$ 14,095			\$ 6,200	\$ 6,200	\$ 20,295	\$ 21,968
88	Reline 84" Penstock dwnstream of BFV (±600 LF) SINKING FUND (5 of 9)	20-21		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000
89	Contingency	20-21		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000
				\$ 58,223					\$ 58,223	\$ 63,023
				\$ 306,187	\$ 140,185	\$ 119,891	\$ 18,940	\$ 138,831	\$ 585,203	\$ 624,787
									Target Budget for Items Shown: \$	625,045
									Budget - Estimated Total Cost: \$	258

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 6

Years' Cost
 Escalated from 2016 Dollars
5

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost
90	Vegetation Control, Rodent Control	21-22		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 24,271
			DSOD 5-5-							
91	100% Cycle Butterfly Valve & Howell-Bunger Valve	21-22	2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 3,063
	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)		DSOD, MCWRA					\$ -		
92		21-22		\$ 13,068				\$ -	\$ 13,068	\$ 14,428
	Piezometer / Drain monitor, data process, consultant management, annual surveillance report review		DSOD			\$ 41,891		\$ 41,891	\$ 72,290	\$ 79,814
93		21-22		\$ 30,399						
94	Settlement & Shift Survey	21-22	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 23,129
95	Flush Piezometers (suspended until reservoir reaches min-pool)	21-22		\$ 20,624				\$ -	\$ 20,624	\$ 22,771
	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.							\$ -		
96		21-22		\$ 36,307				\$ -	\$ 36,307	\$ 40,086
	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting							\$ -		
97		21-22		\$ 17,096				\$ -	\$ 17,096	\$ 18,875
98	Update SA Dam Emergency Action Plan (EAP)	21-22		\$ 2,116				\$ -	\$ 2,116	\$ 2,337
99	Inspect Howell-Bunger valve Discharge Cone (Repair/Recoat as needed) DWGs 3440-6-008, 017	21-22		\$ 8,578		\$ 2,000		\$ 2,000	\$ 10,578	\$ 11,679
100	96" BFV hydraulic operation system service & repair - as needed	21-22		\$ 7,520			\$ 3,500	\$ 3,500	\$ 11,020	\$ 12,167
	Purchase Dam Barrier Buoy Line (alternative to New Debris Boom)									
101	SINKING FUND (2 of 3)	21-22		\$ -	\$ 35,185			\$ -	\$ 35,185	\$ 38,847
	Road Maint - Patch/Repair AREA 2 - Up to and across dam crest, including around south knob									
102		21-22		\$ 20,804		\$ 40,000		\$ 40,000	\$ 60,804	\$ 67,132
103	Flush left abut drains & spillway drains (last flushed 2015)	21-22		\$ 8,435		\$ 10,274		\$ 10,274	\$ 18,709	\$ 20,656
	Internal Inspection of 84" Penstock & Touch-Up Coat Internal									
104	Penstock D/S of BFV	21-22	DSOD	\$ 30,307		\$ 16,800	\$ 3,000	\$ 19,800	\$ 50,107	\$ 55,322
	Reline 84" Penstock downstream of BFV (±600 LF) SINKING FUND (6 of 9)				\$ 105,000			\$ -	\$ 105,000	\$ 105,000
105		21-22		\$ -				\$ -		
106	Purchase and Install New 8" ARV (near BFV) - 5 of 7	21-22		\$ 12,452			\$ 6,200	\$ 6,200	\$ 18,652	\$ 20,593
107	Contingency	21-22								\$ -
				\$ 69,835					\$ 69,835	\$ 77,103
				\$ 304,946	\$ 140,185	\$ 125,965	\$ 16,000	\$ 141,965	\$ 587,096	\$ 637,273
									Target Budget for Items Shown: \$	637,546
									Budget - Estimated Total Cost: \$	273

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 7

Years' Cost
Escalated from 2016 Dc
6

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost
108	Vegetation Control, Rodent Control	22-23		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 24,756
			DSOD 5-5-							
109	100% Cycle Butterfly Valve & Howell-Bunger Valve	22-23	2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 3,124
	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)		DSOD, MCWRA							
110	Piezomter / Drain monitor, data process, consultant management, annual surveillance report review	22-23	DSOD	\$ 13,068				\$ -	\$ 13,068	\$ 14,717
111	Settlement & Shift Survey	22-23	DSOD	\$ 30,399		\$ 41,891		\$ 41,891	\$ 72,290	\$ 81,410
112	Flush Piezometers (suspended until reservoir reaches min-pool)	22-23	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 23,591
113	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.	22-23		\$ 20,624				\$ -	\$ 20,624	\$ 23,226
114	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting	22-23		\$ 36,307				\$ -	\$ 36,307	\$ 40,888
115	Update SA Dam Emergecny Action Plan (EAP)	22-23		\$ 17,096				\$ -	\$ 17,096	\$ 19,252
116	Replace left abutment surface drain piping (side hill drains)	22-23		\$ 2,116				\$ -	\$ 2,116	\$ 2,383
117	Reline 84" Penstock dwnstream of BFV (±600 LF) SINKING FUND (7 of 9)	22-23		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000
118	Purchase and Install New 8" ARV (near BFV) - 6 of 7	22-23		\$ 12,452			\$ 6,200	\$ 6,200	\$ 18,652	\$ 21,005
	Purchase Dam Barrier Buoy Line (alternative to New Debris Boom)									
120	SINKING FUND (3 of 3)	22-23		\$ -	\$ 35,185			\$ -	\$ 35,185	\$ 39,624
121	Install Dam Barrier Buoy Line (alternative to New Debris Boom)	22-23		\$ 40,812				\$ -	\$ 40,812	\$ 45,961
122	Paint external conduit & bypass piping in BFV room	22-23		\$ 11,224		\$ 26,262		\$ 26,262	\$ 37,486	\$ 42,215
123	Contingency	22-23								\$ -
				\$ 81,957					\$ 81,957	\$ 92,297
				\$ 321,122	\$ 140,185	\$ 83,153	\$ 13,500	\$ 96,653	\$ 557,960	\$ 615,107
									Target Budget for Items Shown: \$	650,297
									Budget - Estimated Total Cost: \$	35,190

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 8

Years' Cost
 Escalated from 2016 D
 7

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost
124	Vegetation Control, Rodent Control	23-24		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 25,251
125	100% Cycle Butterfly Valve & Howell-Bunger Valve	23-24	DSOD 5-5-2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 3,186
126	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)	23-24	DSOD, MCWRA	\$ 13,068				\$ -	\$ 13,068	\$ 15,011
127	Piezomter / Drain monitor, data process, consultant management, annual surveillance report review	23-24	DSOD	\$ 30,399		\$ 41,891		\$ 41,891	\$ 72,290	\$ 83,039
128	Settlement & Shift Survey	23-24	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 24,063
129	Flush Piezometers (suspended until reservoir reaches min-pool)	23-24		\$ 20,624				\$ -	\$ 20,624	\$ 23,691
130	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.	23-24		\$ 36,307				\$ -	\$ 36,307	\$ 41,706
131	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting	23-24		\$ 17,096				\$ -	\$ 17,096	\$ 19,637
132	Update SA Dam Emergecny Action Plan (EAP)	23-24		\$ 2,116				\$ -	\$ 2,116	\$ 2,431
133	Reline 84" Penstock dwnstream of BFV (±600 LF) SINKING FUND (8 of 9)	23-24		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000
134	Video spillway 10" dia subsurface drains	23-24		\$ 5,548			\$ 2,500	\$ 2,500	\$ 8,048	\$ 9,244
135	Purchase and Install New 8" ARV (near BFV) - 7 of 7	23-24		\$ 12,452			\$ 6,200	\$ 6,200	\$ 18,652	\$ 21,425
136	Repalce 10" ARV (D/S of BFV) - 1 of 7	23-24		\$ 12,452			\$ 8,500	\$ 8,500	\$ 20,952	\$ 24,067
137	Repalce 10" ARV (D/S of BFV) - 2 of 7	23-24		\$ 12,452			\$ 8,500	\$ 8,500	\$ 20,952	\$ 24,067
138	Repalce 10" ARV (D/S of BFV) - 3 of 7	22-23		\$ 12,452			\$ 8,500	\$ 8,500	\$ 20,952	\$ 24,067
139	Repalce 10" ARV (D/S of BFV) - 4 of 7	23-24		\$ 12,452			\$ 8,500	\$ 8,500	\$ 20,952	\$ 24,067
140	Repalce 10" ARV (D/S of BFV) - 5 of 7	23-24		\$ 12,452			\$ 8,500	\$ 8,500	\$ 20,952	\$ 24,067
141	Repalce 10" ARV (D/S of BFV) - 6 of 7	23-24		\$ 12,452			\$ 8,500	\$ 8,500	\$ 20,952	\$ 24,067
142	Repalce 10" ARV (D/S of BFV) - 7 of 7	23-24		\$ 12,452			\$ 8,500	\$ 8,500	\$ 20,952	\$ 24,067
143	Grout reservoir water level tube from control building to inlet structure	23-24		\$ 8,578			\$ 3,000	\$ 3,000	\$ 11,578	\$ 13,300
144	Contingency	23-24								\$ -
				\$ 81,957					\$ 81,957	\$ 94,143
				\$ 342,712	\$ 105,000	\$ 56,891	\$ 74,500	\$ 131,391	\$ 579,103	\$ 649,595
										Target Budget for Items Shown: \$ 663,303
										Budget - Estimated Total Cost: \$ 13,708

SUBJECT TO REVISION

San Antonio Dam

Multi-Year Plan YEAR: 9

Years' Cost
 Escalated from 2016 Dc
 8

Item	Description	Fiscal Year	Regulatory Reference	Estimated Staff Cost	Allocation for Future Repair (Sinking Fund)	Estimated Consultant Contractor Cost	Estimated Service & Supply Cost	Estimated Outside Consultant & Contractor & Supply Cost	2016 DOLLARS Estimated Total Project Cost	ESCALATION FROM 16-17 Estimated Total Project Cost	
145	Vegetation Control, Rodent Control	24-25		\$ 18,683			\$ 3,300	\$ 3,300	\$ 21,983	\$ 25,756	
146	100% Cycle Butterfly Valve & Howell-Bunger Valve	24-25	DSOD 5-5-2015 Insp Rpt	\$ 2,774				\$ -	\$ 2,774	\$ 3,250	
147	Dam Inspections: DSOD, MCWRA, Consultant, earthquakes (incl. monitor compromised spillway floor concrete & inspect spillway bridge)	24-25	DSOD, MCWRA	\$ 13,068				\$ -	\$ 13,068	\$ 15,311	
148	Piezometer / Drain monitor, data process, consultant management, annual surveillance report review	24-25	DSOD	\$ 30,399		\$ 41,891		\$ 41,891	\$ 72,290	\$ 84,699	
149	Settlement & Shift Survey	24-25	DSOD	\$ 5,948		\$ 15,000		\$ 15,000	\$ 20,948	\$ 24,544	
150	Flush Piezometers (suspended until reservoir reaches min-pool)	24-25		\$ 20,624				\$ -	\$ 20,624	\$ 24,164	
151	General Maintenance of Lights, Roadways, Signs, Guardrails, Fences, Gutters, Roads, Access, etc.	24-25		\$ 36,307				\$ -	\$ 36,307	\$ 42,540	
152	Asst. Maint. Supt. - Supervision of Maintenance - Coordination, Timekeeping, Reporting	24-25		\$ 17,096				\$ -	\$ 17,096	\$ 20,030	
153	Update SA Dam Emergency Action Plan (EAP)	24-25		\$ 2,116				\$ -	\$ 2,116	\$ 2,480	
154	RFP, hire dam surveillance consultant for 5-yr term	24-25	DSOD	\$ 7,936		\$ 49,450		\$ 49,450	\$ 57,386	\$ 67,237	
155	Replace left abutment surface drain piping (side hill drains)	24-25		\$ 27,662			\$ 4,000	\$ 4,000	\$ 31,662	\$ 37,097	
156	Reline 84" Penstock downstream of BFV (±600 LF) SINKING FUND (9 of 9)	24-25		\$ -	\$ 105,000			\$ -	\$ 105,000	\$ 105,000	
157	Reline 84" Internal Penstock downstream of BFV (±600 LF) & Internal Inspection of Entire Penstock (Expend \$945,000 allocated over prior nine years for contractor costs. Estimated staff costs included here.)	24-25		\$ 42,265				\$ -	\$ 42,265	\$ 49,520	
158	Flush left abut drains & spillway drains (last flushed 2015)	24-25		\$ 8,435		\$ 10,274		\$ 10,274	\$ 18,709	\$ 21,920	
159	Inspect Howell-Bunger valve & sleeve, and clean/recoat sleeve, replace brass bushing - as needed	24-25		\$ 8,578		\$ 3,000	\$ 1,440	\$ 4,440	\$ 13,018	\$ 15,253	
160	Contingency	24-25								\$ -	
				\$ 83,846					\$ 83,846	\$ 98,238	
				\$ 325,737	\$ 105,000	\$ 119,615	\$ 8,740	\$ 128,355	\$ 559,092	\$ 637,041	
										Target Budget for Items Shown:	\$ 676,569
										Budget - Estimated Total Cost:	\$ 39,528

SUBJECT TO REVISION