CHAPTER 7

SUMMARY OF THE RECOMMENDED PROJECT

Description of the Recommended Project

SCVJSS Revenue Program and Project Financing

CHAPTER 7 SUMMARY OF THE RECOMMENDED PROJECT

DESCRIPTION OF THE RECOMMENDED PROJECT

As stated in Chapter 6, the recommended project consists of the expansion of the VWRP and upgrade of both the SWRP and VWRP. The three components of the recommended project are:

- *VWRP Stage V Expansion*: 9 mgd expansion on the southern portion of the site.
- *VWRP Stage VI Expansion*: 6 mgd expansion on the northern parcel.
- *SWRP and VWRP Upgrade*: Modification of existing facilities to include nitrification-denitrification.

A detailed description of each component follows and a site plan for the Stage V and Stage VI expansions is shown in Figure 7-1. Table 7-1 lists the design criteria for the current facilities and proposed expansions at the VWRP.

Stage V

The Stage V expansion will allow the VWRP to treat and provide nitrification-denitrification for an additional 9 mgd of flow. The expansion will be integrated into the existing facilities and will utilize the existing equalization tanks, which are adequate for the additional flow. Support facilities such as maintenance buildings, chemical storage, pumps, and the laboratory building will be incrementally expanded or modified to accommodate the additional personnel and supplies necessitated by the expansion.

Table 7-1
DESIGN CRITERIA FOR THE RECOMMENDED PROJECT

UNIT PROCESS	DESIGN CRITERIA	VWRP		
		EXISTING	STAGE V	STAGE VI[a]
Plant Flows	Average	12.6 mgd	+9.0 mgd	+6.0 mgd
	Peak Sanitary [Q_{pk}=2.00]	25.2 mgd	+18.0 mgd	+12.0 mgd
	Peak Storm [Q_{ph}=2.25]	28.4 mgd	+20.2 mgd	+13.5 mgd
	Influent BOD	325 mg/l	300 mg/l	295 mg/l
	Influent Suspended Solids	445 mg/l	400 mg/l	385 mg/l
Comminutors	Number	3	+0	+1
	Capacity	21.5 mgd	21.5 mgd	21.5 mgd
Grit Chambers	Number	3	+1	+1
	Detention Time @ Peak Sanitary Flow	1.4 min	1.2 min	1.4 min
Primary Sedimentation Tanks	Number	9	+5	+3
	Length	65.0 ft	65.0 ft	120.0 ft
	Width	20.0 ft	20.0 ft	20.0 ft
	Nominal Depth	11.4 ft	11.4 ft	11.4 ft
	Overflow Rate @ Average Flow	1,080 gpd/sf	1,190 gpd/sf	830 gpd/sf
	Detention Time @ Average Flow	1.9 hrs	1.7 hrs	2.5 hrs
	Overflow Rate @ Peak Sanitary Flow	2,150 gpd/sf	2,370 gpd/sf	1,670 gpd/sf
	Detention Time @ Peak Sanitary Flow	1.0 hrs	0.9 hrs	1.2 hrs
Primary Effluent Flow Equalization Basins	Number	2	+0	—
	Volume, Total	4.4 million gal	4.4 million gal	—
	Maximum Depth	24.5 ft	24.5 ft	—
	Volume as a Percentage of Average Daily Flow	35%	20%	—

Table 7-1 (Continued)
DESIGN CRITERIA FOR THE RECOMMENDED PROJECT

UNIT PROCESS	DESIGN CRITERIA	VWRP		
		EXISTING	STAGE V	STAGE VI[a]
Aeration Tanks	Number	7	+5	+4
	Length	135 ft	135 ft	135 ft
	Width	26.5 ft	26.5 ft	26.5 ft
	Nominal Depth	15.0 ft	15.0 ft	15.0 ft
	Detention Time @ Avg. Flow	5.4 hrs	5.4 hrs	6.4 hrs
	Detention Time @ Avg. Flow + RAS	4.0 hrs	4.0 hrs	4.8 hrs
Final Sedimentation Tanks	Number	8	+6[b]	+4
	Length	135 ft	150 ft	135 ft
	Width	16 ft	18 ft	16 ft
	Nominal Depth	10.0 ft	10.0 ft	10.0 ft
	Overflow Rate @ Avg. Flow	730 gpd/sf	7[c] @ 715 gpd/sf 6 @ 670 gpd/sf	695 gpd/sf
	Detention Time @ Avg. Flow + 1/3 Avg. Flow	1.8 hrs	7[c] @ 1.9 hrs 6 @ 2.0 hrs	1.9 hrs
	Overflow Rate @ Peak Sanitary Flow	—	—	1,390 gpd/sf
	Detention Time @ Peak Flow + 1/3 Peak Flow	—	—	1.0 hrs
Filters	Number	8	+6	+4
	Type	Pressure	Pressure	Pressure
	Waste Filter Backwash Flow	1.44 mgd	2.52 mgd	3.24 mgd
	No. of Backwashes	3 per day	3 per day	3 per day
	Overall Length	27.8 ft	27.8 ft	27.8 ft
	Side Shell Length	24 ft	24 ft	24 ft
	Diameter	10 ft	10 ft	10 ft
	Surface Area	240 sf	240 sf	240 sf
	Surface Loading Rate @ Avg. Flow	5.08 gpm/sf	4.99 gpm/sf	4.96 gpm/sf
	Surface Loading Rate @ Peak Sanitary Flow	—	—	5.40 gpm/sf
Waste Filter Backwash Equalization Tanks	Number	1	+0	+0[c]
	Volume	83,000 gal	83,000 gal	83,000 gal
Decant Tanks	Number	1	+1[b]	+0
	Length	135 ft	135 ft	135 ft
	Width	16 ft	16 ft	16 ft
	Nominal Depth	10 ft	10 ft	10 ft
	Volume, Each	162,000 gal	162,000 gal	162,000 gal
	Over Flow Rate	667 gpd/sf	585 gpd/sf	750 gpd/sf
	Detention Time	2.7 hrs	3.1 hrs	2.4 hrs
Chlorine Contact Tanks	Number	3	+1	+1
	Length	178 ft	178 ft	178 ft
	Width	20 ft	20 ft	20 ft
	Nominal Depth	14.6 ft	14.6 ft	14.6 ft
	Volume, Each	388,780 gal	388,780 gal	388,780 gal
	Volume, Total	1,166,340 gal	1,555,120 gal	1,943,900 gal
	Detention Time @ Avg. Flow	2.2 hrs	1.7 hrs	1.7 hrs
	Detention Time @ Peak Sanitary Flow	—	—	1.4 hrs

Table 7-1 (Continued)
DESIGN CRITERIA FOR THE RECOMMENDED PROJECT

UNIT PROCESS	DESIGN CRITERIA	VWRP		
		EXISTING	STAGE V	STAGE VI[a]
Dissolved Air Flotation (DAF) Unit	Small Tank			
	Number	2	+0	+0
	Diameter	16 ft	16 ft	16 ft
	Area	200 sf	200 sf	200 sf
	Large Tank			
	Number	1	+0	+0
	Diameter	25	25	25
	Area	490 sf	490 sf	490 sf
	Average WAS Flow	0.36 mgd	0.54 mgd	0.65 mgd
	Average Solids	760 lb/hr	1130 lb/hr	1,380 lb/hr
	Hydraulic Load Rate @ Avg. Flow	0.28 gpm/sf	0.42 gpm/sf	0.51 gpm/sf
	Solids Load Rate @ Avg. Flow	0.85 lb/hr/sf	1.27 lb/hr/sf	1.55 lb/hr/sf
Anaerobic Digesters	Number of Digesters	6[d]	+2	+1
	Total Digester Influent	0.15 mgd	0.22 mgd	0.27 mgd
	Total Liquid Depth	38.4 ft	38.4 ft	38.4 ft
	Side Water Depth	26.0 ft	26.0 ft	26.0 ft
	Total Conical Depth	13.0 ft	13.0 ft	13.0 ft
	Diameter	65.0 ft	65.0 ft	65.0 ft
	Working Volume per Unit	86,267 cf	86,267 cf	86,267 cf
	Total Volume per Unit	100,655 cf	100,655 cf	100,655 cf
	Detention Time w/ Working Volume	21.5 days	20.5 days	19.1 days
	Detention Time w/ Total Volume	25.1 days	24.0 days	22.3 days
	Storage Capacity	5.0 days	3.4 days	2.8 days
Plate and Frame Filter Presses[e]	Number of Presses	2	+1	+0
	Volume, Each	330 cf	330 cf	330 cf
	Overall Cycle Time	2.0 hrs	2.0 hrs	2.0 hrs
	Avg. Sludge Flow	210,000 gal	308,000 gal	378,000 gal
	Digested Sludge Suspended Solids	2.6%	2.6%	2.6%
	Daily Solids	46,000 lbs	68,600 lbs	84,000 lbs
	Average Solids in Cake	26%	26%	26%
	Average Solids per Run	5,400 lbs	5,400 lbs	5,400 lbs
	Cake Tonnage	88 tons	132 tons	162 tons
Digested Sludge Storage Silo[e]	Number	—	+1	+0
	Diameter	—	38 ft	38 ft
	Height	—	45 ft	45 ft
	Volume	—	23,215 cf	23,215 cf
	Sludge Storage	—	755 tons	755 tons
	Sludge Storage Duration @ 5 days/wk Operation	—	5.7 days	4.7 days
Filtrate Equalization Tank	Number	1	+0	+0
	Length	100 ft	100 ft	100 ft
	Width	20 ft	20 ft	20 ft
	Maximum Water Depth	13.5 ft	13.5 ft	13.5 ft
	Volume	200,000 gal	200,000 gal	200,000 gal

Notes: a) Stage VI primary sedimentation tanks, aeration tanks, and final sedimentation tanks will be built on the north parcel of the VWRP site and will operate independently of the rest of the WRP.
b) One existing final sedimentation tank will be converted to a decant tank for waste filter backwash as a part of Stage V.
c) Waste filter backwash (WFB) equalization pumping capacity increased.
d) One digester is used for storage of digested sludge.
e) Assumes five days per week operation.

The major new facilities to be built as part of Stage V include five primary sedimentation tanks, five aeration tanks, six final sedimentation tanks, six filters, one chlorine contact tank, two digesters, and one plate and frame filter press. At the completion of Stage V, one existing final sedimentation tank will be converted to a decant tank for waste filter backwash. With the exception of the final sedimentation tanks, the new facilities will have the same dimensions as the existing facilities. The Stage V sedimentation tanks, termed the west final sedimentation tanks, have different dimensions than the existing tanks, hence they will have different design criteria. The existing VWRP final sedimentation tanks will be identified as the east tanks.

Stage VI

After completion of the Stage V expansion, Stage VI, the 6 mgd expansion on the undeveloped north portion of the VWRP, will be constructed as dictated by actual flow increases. The northern portion of the VWRP site has sufficient area for an additional modular expansion to accommodate possible flows beyond 2015. No facilities for Stage VI have been sited any closer than 10 feet from the adjacent DFG conservation easement (discussed in Chapter 6) in order to avoid any impact on the easement.

Operational and cost effectiveness considerations necessitate that Stage VI include construction of independent headworks, primary treatment facilities, and secondary treatment facilities. These facilities will operate as a stand-alone system. The Stage VI facilities will be designed and operated without flow equalization. As with the Stage V facilities, the Stage VI facilities will include nitrification-denitrification as part of the aeration process.

The secondary effluent from Stage VI will be mixed with that from the rest of the plant before further treatment. The remaining wastewater treatment processes, filtration and chlorination-dechlorination, will receive the combined flow and will be incrementally expanded as part of Stage VI. Similarly, the SCVJSS solids processing facilities will be expanded to treat the additional solids generated from Stage VI. The existing outfall to the Santa Clara River has sufficient capacity to discharge the increased flows.

Specifically, the major new facilities to be built as part of Stage VI include three primary sedimentation tanks, four aeration tanks, four final sedimentation tanks, four pressure filters, one chlorine contact tank, and one digester. Also, the Stage VI expansion will necessitate the construction of new support facilities, including a new control and laboratory building and a new maintenance building.

Upgrade of the Saugus and Valencia WRPs

The process modification of the existing facilities to incorporate nitrification-denitrification will not necessitate construction of new tankage. The modification will employ existing aeration tanks, but the tanks will need to be equipped with additional pumps, pipes, baffles, and mixers to effect the nitrification-denitrification process. Existing operations will need to be altered, but the resulting effluent quality will be as high or higher under the new operating mode. The modification will also not require a reduction in the treatment capacity of either WRP.

In general, nitrification-denitrification is accomplished by modifying the aeration tanks to include an anoxic zone for denitrification followed by an aerobic zone for nitrification. The nitrification process allows conversion of ammonia to nitrate. The flow (mixed liquor) is recycled to the anoxic zone where nitrate is stripped of its oxygen by microbes, forming nitrogen gas.

The modifications required include converting the first portion of each aeration tank to an anoxic zone

by removing or shutting down the air diffuser equipment. The anoxic zone also requires mechanical mixers to keep the activated sludge in suspension. In addition, new recycle pumps, flow meters and piping will be added to allow for the flow (mixed liquor) recycle. At the SWRP, the existing air diffusers will be replaced in order to provide the needed air transfer efficiency. Lastly, the aeration tanks at both WRPs will be fitted with baffles in order to maintain good hydraulic conditions and to separate the anoxic zone from the aerobic zone. Detailed design criteria will be finalized upon completion of on-going research.

The upgrade may also require modifications to ancillary systems. In particular, the current disinfection system may not be compatible with the constituent characteristics of the resulting effluent. Modification of the disinfection system may require the re-addition of a very small amount of ammonia to the effluent. The small amount of ammonia is necessary to limit trihalomethane formation resulting from excess free chlorine residual. Thus, the upgrades may require a storage and delivery system for ammonia at each WRP. The potential environmental impacts associated with the construction and operation of the upgrade of the WRPs is contained in Part II, the 2015 EIR.

Wastewater Conveyance and Biosolids Management

Wastewater conveyance and biosolids management activities are integral parts of the recommended project. As noted in Chapter 6, however, there is a distinct need to continually evaluate wastewater conveyance and biosolids management options, rather than addressing them in a 17-year program, due to the variability of needs and management options. In order to maintain the flexibility to identify the optimum wastewater conveyance and biosolids management solutions through the planning horizon, the Districts will on a case-by-case basis evaluate the needs of the SCVJSS through 2015. In general, the wastewater conveyance needs of the SCVJSS will be evaluated every two years, and recommendations for relief will be made for a five-year planning horizon. Biosolids management will also continue to follow a diversified management program, which actively seeks out alternative disposal options, to respond to the changing regulatory and economic environment.

Planning, Design, and Construction Schedule

Scheduling for Stage V and Stage VI is dictated by the forecasted flow and the lead time required for planning, design, and construction. The proposed schedule for expansion of the VWRP and upgrade of both SCVJSS WRPs is shown in Figure 7-2. As the current capacity of the SCVJSS is expected to be exceeded in 1999, the scheduling of Stage V is critical. The construction of Stage V will require the early completion of the facilities required to treat the increased wastewater flow, with the remaining facilities completed in late 2001.

In the interim, excess flow above 19.1 mgd will need to be accommodated at existing SCVJSS facilities. However, with flow equalization and chemical treatment, the SCVJSS can be expected to adequately treat all flows and meet all discharge standards until the hydraulic expansion of Stage V comes on line. Nevertheless, flow projections are generally subject to a high degree of uncertainty. Consequently, it is possible that the flow may not materialize in the manner expected, thus avoiding the need for the SCVJSS facilities to operate above their nominal capacities. Scheduling for either or both stages, therefore, will be accelerated or delayed consistent with actual flow throughout the planning period. This is particularly true for the Stage VI expansion, which is planned to be constructed and operational in 2010, based on current flow projections.

The upgrade of existing facilities to incorporate nitrification-denitrification is scheduled in order to

comply with the June 2003 deadline imposed by the RWQCB for the reduction of ammonia in the receiving water.

Environmental Impacts of the Recommended Project

The environmental impacts associated with the recommended project, as compared to existing conditions, are described in Part II of this document, the 2015 Plan EIR.

SCVJSS REVENUE PROGRAM AND PROJECT FINANCING

A major consideration in proposing any capital construction program is its cost and the impact it will have on both the existing and future users. To help address these issues, any agency receiving state or federal funds (including SRF loans) associated with its capital construction program must prepare a revenue program.

Specifically, a revenue program must demonstrate that the proposed system of user charges is both: 1) fair and equitable, and 2) based on both the flow and the strength of the user's discharge. Furthermore, a revenue program must provide that, following completion of construction, there will be a sufficient revenue stream to continue to operate and maintain each facility throughout its useful life. Lastly, as it pertains to SRF loans, a revenue program must provide for repayment of the loan funds.

Summary of the Existing Revenue Program

The current revenue program contains two major components: 1) the Service Charge Program, and 2) the Connection Fee Program.

Key elements of the Service Charge Program include:

- Existing users are only charged for operation and maintenance (O&M) and upgrade capital.
- Charges are based on usage of the system (estimated by user category and facility size).
- Charges are based on a combination of flow and strength (chemical oxygen demand and suspended solids).

Key elements of the Connection Fee Program include:

- New users or existing users who significantly increase their discharge are charged a one-time fee for the incremental cost of expanding capital facilities to accommodate the new discharge.
- Charges are based on the estimated usage of the system.
- Charges are based on a combination of flow and strength.

These features of both programs satisfy both the "fair and equitable" and the "flow and strength" SWRCB requirements for a proposed system of user charges. Accordingly, in 1990, the SWRCB issued a letter granting approval of the Districts' revenue program.

With approval of the existing revenue program, the only remaining issue is the ability of the revenue program to meet future needs. Financing of the recommended project is presented under two categories: 1) capital costs and 2) O&M costs. Although the project costs will be incurred in future years, all amounts contained in the following discussion are in 1997 dollars. Table 7-2 shows the cost breakdown for the recommended project.

Capital Financing

Capital improvement projects can be split into two subsets, upgrade and expansion. Upgrade projects provide a higher level of treatment or correct existing problems without providing additional capacity. These projects only benefit existing users, therefore, existing users would finance these projects through the Service Charge Program. Expansion projects

Table 7-2
SCVJSS RECOMMENDED PROJECT COST BREAKDOWN[a]

PROJECT	CONSTRUCTION COSTS	DESIGN AND CONSTRUCTION MANAGEMENT	CAPITAL COST TOTAL	ANNUAL O&M	EQUIVALENT ANNUAL COST[b]
VWRP Stage V	$28,020,000	$5,670,000	$33,690,000	$3,830,000	$6,530,000
VWRP Stage VI	$20,650,000	$4,110,000	$24,760,000	$2,560,000	$4,550,000
Upgrade					
SWRP	$960,000	$190,000	$1,150,000	$70,000	$160,000
VWRP	$1,150,000	$230,000	$1,380,000	$110,000	$220,000
TOTAL	**$50,780,000**	**$10,200,000**	**$60,980,000**	**$6,570,000**	**$11,460,000**

Note: a) 1997 dollars.
b) Amortized at 5% annual interest rate for 20 years.

Table 7-3
RECOMMENDED PROJECT COST AND DEBT SERVICE ESTIMATES[a,b]

	TOTAL CAPITAL COST	ANNUAL DEBT SERVICE[c]
VWRP Stage V	$33,690,000	$2,260,000
VWRP Stage VI	$24,760,000	$1,660,000
Upgrade		
SWRP	$1,150,000	$93,000
VWRP	$1,380,000	$77,000

Notes: a) 1997 dollars.
b) Assumes the Districts will obtain low interest SRF loans to finance project.
c) Amortized at 3% annual interest rate for 20 years.

provide increased capacity, but no higher level of treatment. These projects only benefit new users or existing users who significantly increase their discharge. Therefore, new users or those who significantly increase their discharge would finance these projects through the Connection Fee Program.

Upgrade of the Saugus and Valencia WRPs

Construction costs for the upgrade portion of the recommended project will be funded by existing users through the Service Charge Program. Districts Nos. 26 and 32 intend to use long term financing in the form of either SRF loans or bonds to facilitate construction.

Service charge revenue will be used to repay any loan or bond indebtedness associated with the capital costs of the upgrade. Assuming full funding of the upgrade construction with SRF loans, the estimated increase in the service charge associated with the upgrade would be approximately $3.00 per sewage unit (single family home).

Expansion of the Valencia WRP

The recommended project includes two treatment plant construction phases, identified as the VWRP Stage V and VWRP Stage VI. These projects would increase the SCVJSS wastewater treatment capacity by 15 mgd to meet the increased flow demands created by the new users of the SCVJSS. Therefore, these projects fall into the general category of expansion.

As expansion related projects, construction costs will ultimately be funded by new users through the Connection Fee Program. Although the collection of connection fees parallels actual growth trends, construction must be completed and facilities must be placed in service before the new flows actually materialize. It is anticipated that Districts Nos. 26 and 32 intend to use long term financing in the form of SRF loans to facilitate construction with sufficient lead time to meet the flow demands of the system. Connection fee revenue will then be used to repay any loan indebtedness associated with the cost of the expansion of the VWRP. As a result, the expansion of the VWRP will have no impact on existing users or the service charge which they pay.

It is anticipated that the VWRP Stage V and VI projects will be financed through SRF loan funding. Construction of these projects is expected to be completed in late 2001 and late 2009, respectively. Pursuant to the SRF loan program, loan repayment will begin one year after construction is completed. Estimated project costs and debt service for long term-financing of these two projects are shown in Table 7-3.

O&M Financing

Upgrade of the Saugus and Valencia WRPs

O&M costs are expected to increase when the nitrification-denitrification facilities are placed in service. Since these facilities are not growth related, increased costs will be borne by the existing users.

The anticipated O&M for existing facilities upgraded for nitrification-denitrification is approximately $0.18 million per year. This will represent approximately a $3.00 per sewage unit increase in the annual service charge. This cost will commence concurrent with the beginning of operation of the facilities.

Expansion of the Valencia WRP

O&M costs are expected to increase when the VWRP Stage V and VWRP Stage VI expansions are placed in service. Although the total cost for O&M will increase, the number of users will also increase proportionately. Therefore, the cost per sewage unit will remain the same, and the expansion will have no impact on the existing service charge rate.